Franchise Tax Board

Information Technology Capital Plan

Information Technology Capital Plan, Plan Year 2009-10 through 2013-14 Executive Approval Transmittal

Department Name **FRANCHISE TAX BOARD**

APPROVAL SIGNATURES

I am submitting the attached Information Technology Capital Plan as required by the State Administrative Manual Section 4904.

I certify that the IT Capital Plan was prepared in accordance with State Information Management Manual section 57 and that the proposed IT projects are consistent with our business strategies and information technology strategy.

I have reviewed and agree with the information in the attached Information Technology Capital Plan.

Chief Information Officer	Date Signed
Cathy Cleek	7/31/08
Printed name: Cathy Cleek	
Information Security Officer	**Date Signed**
Denise S Mellor	8 1 08
Printed name: Denise Mellor	
Budget Officer	**Date Signed**
Michelle Fallon	8/1/08
Printed name: Michelle Fallon	
Department Director	**Date Signed**
[illegible] for	8/1/08
Printed name: Selvi Stanislaus	

DEPARTMENT IT CAPITAL PLAN

Department Name and Org Code:	**Plan Year:**
Franchise Tax Board (FTB) - 1730	2009-10 through 2013-14

1. Summarize your organization's business goals and objectives below:

FTB remains focused on excellence in tax administration. Applying transparency and open government as our standard mode of operation, the department helps taxpayers voluntarily comply with tax laws in a way that lessens the burden of paying taxes.
FTB's strategic goals are:

1. Improve Customer Service
2. Increase Fairness and Compliance with Tax Law
3. Increase Transparency
4. Create a Great Place to Work, Contribute and Learn
5. Demonstrate Operational Excellence
6. Protect Taxpayer Information and Privacy

2. What are your organization's plans to upgrade or replace your IT infrastructure for the following? When responding, please indicate the timeframes of your intended upgrade or replacement efforts.

2.1.	**Hardware**	Please refer to *Attachment Q2* for the response.
2.2.	**Software**	Please refer to *Attachment Q2* for the response.
2.3.	**Network**	Please refer to *Attachment Q2* for the response.

3. Existing Approved Reportable IT Projects

Provide the following information regarding your existing approved reportable IT projects on Table 1 on the following page:

- **Existing IT Project;**
- **Approved Project Cost;**
- **Project Number; and**
- **Implementation Date**

4. Proposed IT Projects

After each proposed IT project has been documented by answering questions 4.1 through 4.15 of the attached IT Project Proposal Form, provide the following information on Table 2 on the following page:

- **The name of each proposed IT project;**
- **The priority ranking;**
- **The FSR submission date; and**
- **The estimated cost**

Table 1-Existing Approved Reportable IT Projects Summary by Department

Existing IT Project	Approved Project Cost*	Project Number	Implementation Date
Centralized Reverse Proxy Services (CRePS) [2/]	$658,774	DOF # 1730-184	01/31/2009[2/]
California Child Support Automation System – Child Support Enforcement Project[3/]	$1,487,310,991	DOF # 1730-150	11/01/2008
California Child Support Automation System – State disbursement Unit Project [3/]	$204,126,584	DOF # 1730-172	11/01/2008
Court Ordered Debt Expansion (CODE)	$18,199,060	DOF # 1730-182	08/08/2009
E-Commerce Portal Infrastructure (EPI)	$8,819,075	DOF # 1730-185	11/02/2009
Withhold At Source System (WASS)	$7,265,722	DOF # 1730-186	08/02/2010

***Note:** If a Special Project Report (SPR) was submitted for review in July 2008 that includes project costs that differ from the last approved project document, enter both the last approved project cost and the revised project cost from the SPR under review.

[2/]Implementation date for CRePS Project has been revised from the original date of 12/01/2007 to 01/31/09. FTB is preparing information defining the project delay along with revised EAWS and the schedule changes for the Office of the State Chief Information Officer.

[3/]With the approval of the 2008/09 state budget, all Project and contract responsibilities for the CCSAS Project transfer to the Department of Child Support Services (DCSS). In conjunction with this transfer, FTB Project staff will transition to DCSS on January 1, 2009 (or upon achievement of certification as a Single Statewide System, whichever is later).

Table 2-Proposed IT Project Summary

Proposed IT Project	Priority Ranking	FSR Submission Date	Estimated Total Cost
Enterprise Data to Revenue (EDR)	1	09/15/2008	$200.0 M
Workload Growth (WLG)	2	07/15/2008	$20.0 M
IT Refresh / Replacement (ITR)	3	07/15/2008	$30.7 M
Financial Institutions Record Match (FIRM)	4	07/15/2008	$10.6 M

PROPOSED IT PROJECTS

Complete this IT Project Proposal Form (questions 4.1 though 4.15 below) for each proposed IT project that meets the definition of a reportable project as defined in the State Administrative Manual Section 4819.37:

4.1 Proposal name and priority ranking:

Enterprise Data to Revenue (EDR) - Priority Ranking 1

4.2 Description of the proposed IT project:

The EDR Project addresses fundamental problems involved with processing Personal Income Tax (PIT) and Business Entity (BE) tax returns and the underutilization of data with an emphasis on generating revenue.

Project Scope includes the following:

1) Reengineer PIT and BE return processing to more fully automate and integrate Return filing and Validation and user training, provide performance monitoring and simulation, and increase ability to make changes.

2) Image all PIT and BE returns, expand data capture and Return Validation, and make data available enterprise-wide via Enterprise Data Warehouse, Enterprise Operational Data, data services, data mining and modeling.

3) Provide Enterprise Services (Taxpayer Folder, Internal Authentication, Single Sign-on, Address, Notification, View, Underpayment Modeling, Validation, Adjustment, Post Assessment, Infrastructure) to enhance and replace redundant functionality and make functionality reusable.

4) Modify BETS to more closely align with Service Oriented Architecture, make more modular and reduce maintenance risk.

4.3 Which of your department's business goals and objectives does this project support, and how?

All EDR Project improvements align directly with FTB's vision:

Goal #2 Increase Fairness and Compliance with Tax Laws

- Issue timely, accurate, and understandable notices and advice.
- Identify and implement approaches to resolve tax gap issues,
- Improve audit selection and speed up the audit and appeal cycle.

Goal #3 Increase Transparency

- Provide taxpayers with access to their tax data in convenient self-service applications.

PROPOSED IT PROJECTS CONTINUED - EDR

Goal #5 Demonstrate Operational Excellence

- Streamline processes and modernize our IT systems for reliability, ease of use, cost effectiveness, speed, and ability to react to change.
- Increase IT systems agility through widespread adoption of standardized software, standard platforms, and solutions.
- Deploy our information technology and compliance resources in alignment with our strategic goals.
- Decrease paper-based processes and move toward a digital office and electronic processes.

Goal #6 Protect Taxpayer Information and Privacy

- Safeguard confidential taxpayer information by adherence to internal and external standards.
- Use industry best practices for information security at all levels.
- Use appropriate authentication for FTB e-government services.

4.4 What are the expected business outcomes or benefits of the proposal as they relate to your organization's business goals and objectives?

- Utilization of more data in return processing to increase automation and reduce fallouts; and in modeling to improve Filing Enforcement (FE), Audit and Collections case selection
- Centralization of data to improve enterprise access and availability
- Elimination of paper returns and paper dependent workflow to reduce operational costs
- Expansion of return validation to increase quality of data and revenue
- Access to business rules to improve ability to change and manage workflow more effectively
- Automation and integration of redundant PIT and BE return processing systems to improve workflow efficiency and reduce maintenance and operations costs
- Implementation of enterprise services including Underpayment Modeling, Address Update and Noticing to improve efficiency and effectiveness

4.5 The following are from the State's IT strategic plan. Check the appropriate box(es) to identify the goals this proposal supports:

☒ **Supporting and enhancing services for Californians and businesses**
☒ **Enhancing information and IT security**
☒ **Reducing state operational costs (leveraging, consolidation, new technology, etc.)**

☒ **Improving the reliability and performance of IT infrastructure**
☒ **Enhancing human capital management**
☒ **Supporting state and agency priorities and business direction**

PROPOSED IT PROJECTS CONTINUED - EDR

4.6 Is the proposal consistent with your organization's Enterprise Architecture?
☒ **Yes**
☐ **No**

If no, please explain why the deviation from the organization's Enterprise Architecture is necessary.

4.7 Will the proposed system collect, store, transmit, or exchange confidential or sensitive information?
☒ **Yes**
☐ **No**

4.8 If this proposal is conceptually approved, what is the estimated date (mm/yyyy) the FSR will be submitted?

09/2008

4.9 What is the estimated project start date (mm/yyyy) if the FSR is approved?

07/2009

4.10 What is the duration of the proposed project?

7 years

4.11 Will the proposed project utilize the existing infrastructure?
☒ **Yes**
☐ **No**

If no, please explain.

4.12 Is the proposal related to another proposal or to an existing project?
☐ **Yes**
☒ **No**

If yes, describe the related proposal or project and how it is related:

4.13 Describe the consequences of not doing this proposed project at the planned timeframe:

The consequence would be a delay in collecting increased revenue for FTB's collection & audit activities. In addition, FTB continues to run the risk of catastrophic failure of the Business Entities Tax System due to the discontinuance of vendor support for Accenture's proprietary software.

PROPOSED IT PROJECTS CONTINUED - EDR

4.14 Check the appropriate box(es) to identify the proposal's funding strategy:
☒ **Augmentation needed**
☒ **Redirection of existing funds**
☐ **Other (describe):**

4.15 What are the estimated cost and funding source(s) by fiscal year through implementation (information should be provided in the following format):

Pending completion of the EAWs, there is not enough information to complete the yearly break-up at this time.

Fund Source	2009-10	2010-11	2011-12	2012-13	2013-14 and future	Total
General Fund						$200M
Federal Fund						
Special Fund*						
Total						$200M

*** Note: Identify the fund source and if the department is the sole user of the fund.**

PROPOSED IT PROJECTS

Complete this IT Project Proposal Form (questions 4.1 though 4.15 below) for each proposed IT project that meets the definition of a reportable project as defined in the State Administrative Manual Section 4819.37:

4.1 Proposal name and priority ranking:

Workload Growth (WLG) - Priority Ranking 2

4.2 Description of the proposed IT project:

FTB staff will augment the existing CPU by procuring additional processing capacity (914 to 1337 MIP) and central storage memory capacity (64 to 80 GB). Upgrades to the existing Mainframe software will also be required. In addition, FTB staff will augment the existing Enterprise Customer, Asset, Income and Return (ECAIR) system by upgrading the software and procuring additional storage (4 to 14 TB) and server capacity.

4.3 Which of your department's business goals and objectives does this project support, and how?

Goal #1 Improve Customer Service;

- Increase our understanding of our diverse customer needs, measure their satisfaction with our current services, and improve those services identified.
- Improve the speed in which we process tax returns and handle exceptions, including claims for refund, tax return errors, etc.
- Provide customer service options emphasizing self-service and e-service options.
- Increase the ease and reduce the burden of filing returns and paying taxes for taxpayers and their agents.

Goal #2 Increase Fairness and Compliance with Tax Law;

- Issue timely, accurate, and understandable notices and advice.
- Identify and implement approaches to resolve tax gap issues, such as abusive tax shelters.
- Improve audit selection and speed up the audit and appeal cycle

Goal #5 Demonstrate Operational Excellence

- Streamline processes and modernize our IT systems for reliability, ease of use, cost effectiveness, speed, and ability to react to change.
- Continually increase productivity of all employees.
- Ensure the utmost availability and quality of our services and systems to keep FTB running smoothly.

PROPOSED IT PROJECTS CONTINUED - WLG

- Increase IT systems agility through widespread adoption of standardized software, standard platforms, and solutions.
- Deploy our information technology and compliance resources in alignment with our strategic goals.
- Decrease paper-based processes and move toward a digital office and electronic processes.
- Pursue partnerships with other state and federal organizations to deliver seamless, customer-centered products and services

4.4 What are the expected business outcomes or benefits of the proposal as they relate to your organization's business goals and objectives?

This project will add sufficient resources (CPU capacity, memory and storage) to support growth to the existing Mainframe and ECAIR for workloads projected beyond FY 2008/09.

4.5 The following are from the State's IT strategic plan. Check the appropriate box(es) to identify the goals this proposal supports:

☐ **Supporting and enhancing services for Californians and businesses**
☐ **Enhancing information and IT security**
☐ **Reducing state operational costs (leveraging, consolidation, new technology, etc.)**
☒ **Improving the reliability and performance of IT infrastructure**
☐ **Enhancing human capital management**
☐ **Supporting state and agency priorities and business direction**

4.6 Is the proposal consistent with your organization's Enterprise Architecture?
☒ **Yes**
☐ **No**

If no, please explain why the deviation from the organization's Enterprise Architecture is necessary.

4.7 Will the proposed system collect, store, transmit, or exchange confidential or sensitive information?
☒ **Yes**
☐ **No**

4.8 If this proposal is conceptually approved, what is the estimated date (mm/yyyy) the FSR will be submitted?

FSR was approved by the Governance Council on July 14, 2008.

4.9 What is the estimated project start date (mm/yyyy) if the FSR is approved?

01/2009

PROPOSED IT PROJECTS CONTINUED - WLG

4.10 What is the duration of the proposed project?

16 months (5/30/2010)

4.11 Will the proposed project utilize the existing infrastructure?
☒ **Yes**
☐ **No**

If no, please explain.

4.12 Is the proposal related to another proposal or to an existing project?
☐ **Yes**
☒ **No**

If yes, describe the related proposal or project and how it is related:

4.13 Describe the consequences of not doing this proposed project at the planned timeframe:

The consequence of not doing this proposed project will result in risking major equipment or software failure. In addition, processing delays and degradation in performance will impact FTB's ability to efficiently and effectively collect revenue and to respond to taxpayers.

4.14 Check the appropriate box(es) to identify the proposal's funding strategy:
☒ **Augmentation needed**
☒ **Redirection of existing funds**
☐ **Other (describe):**

4.15 What are the estimated cost and funding source(s) by fiscal year through implementation (information should be provided in the following format):

Fund Source	2008-09	2009-10	2010-11 & After	Total
General Fund	43,448	11,273,501	8,709,327	20,026,276
Federal Fund				
Special Fund*				
Total	$43,448	$11,273,501	$8,709,327	$20,026,276

*** Note: Identify the fund source and if the department is the sole user of the fund.**

PROPOSED IT PROJECTS

Complete this IT Project Proposal Form (questions 4.1 though 4.15 below) for each proposed IT project that meets the definition of a reportable project as defined in the State Administrative Manual Section 4819.37:

4.1 Proposal name and priority ranking:

IT Refresh / Replacement (ITR) - Priority Ranking 3

4.2 Description of the proposed IT project:

- Completing a one-time, department-wide infrastructure upgrade of workstation equipment (desktop/notebook personal computers, network printers/Windows servers and copiers) over five years old. Then implement a five year infrastructure refresh program to avoid the gradual obsolescence of individual components.

- Secure a baseline budget augmentation to support replacement of desktop/notebook personal computers, network printers/Windows servers and copiers on a five-year refresh cycle.

- Also, complete a one-time replacement infrastructure upgrade of “end-of-life” equipment (mainframe printer, mainframe tape library, server tape drives). These components are no longer manufactured or supported due to market demands, technology innovation and development driving changes in the products.

4.3 Which of your department's business goals and objectives does this project support, and how?

Goal #1 Improve Customer Service;

- Improve the speed in which we process tax returns and handle exceptions, including claims for refund, tax return errors, etc.
- Maintain compatibility and increase efficiency by replacing (five years or older) workstation equipment (desktop/notebook personal computers, network printers/Windows servers and copiers) and replacing “end-of-life” equipment (mainframe printer, mainframe tape library and server tape drives).

Goal #2 Increase Fairness and Compliance with Tax Law;

- Issue timely, accurate, and understandable notices and advice.

Goal #5 Demonstrate Operational Excellence;

- Streamline processes and modernize our IT systems for reliability, ease of use, cost effectiveness, speed, and ability to react to change.
- Continually increase productivity of all employees.

- Ensure the utmost availability and quality of our services and systems to keep FTB running smoothly.

The Department must not only sustain its current level of service but more importantly, build the capacity to meet the future business needs.

4.4 What are the expected business outcomes or benefits of the proposal as they relate to your organization's business goals and objectives?

Benefits: Reduced maintenance cost for repair of old equipment.

This project will provide risk mitigation and FTB will maintain operating current revenue generating programs. These are non-financial benefits and cannot be easily quantified and measured.

Augment FTB's baseline for an on-going Workstation Equipment refresh cycle – approximately $4 million annually starting in FY 2010/11.

4.5 The following are from the State's IT strategic plan. Check the appropriate box(es) to identify the goals this proposal supports:

☒ **Supporting and enhancing services for Californians and businesses**
☒ **Enhancing information and IT security**
☒ **Reducing state operational costs (leveraging, consolidation, new technology, etc.)**
☒ **Improving the reliability and performance of IT infrastructure**
☐ **Enhancing human capital management**
☒ **Supporting state and agency priorities and business direction**

4.6 Is the proposal consistent with your organization's Enterprise Architecture?
☒ **Yes**
☐ **No**

If no, please explain why the deviation from the organization's Enterprise Architecture is necessary.

4.7 Will the proposed system collect, store, transmit, or exchange confidential or sensitive information?
☒ **Yes**
☐ **No**

4.8 If this proposal is conceptually approved, what is the estimated date (mm/yyyy) the FSR will be submitted?

FSR package submitted to Agency on 07/15/2008.
Draft FSR package (pending Agency Approval) submitted to OCIO on 7/15/2008.
Final FSR package (with financing option) expected to be submitted to OCIO by early 08/2008.

4.9 What is the estimated project start date (mm/yyyy) if the FSR is approved?

01/12/2009

4.10 What is the duration of the proposed project?

01/12/2009 – 11/22/2010 (22 months)

4.11 Will the proposed project utilize the existing infrastructure?
☒ **Yes**
☐ **No**

If no, please explain.

4.12 Is the proposal related to another proposal or to an existing project?
☐ **Yes**
☒ **No**

If yes, describe the related proposal or project and how it is related:

4.13 Describe the consequences of not doing this proposed project at the planned timeframe:

- Potential Equipment Failures - As a result of not replacing equipment based on an established refresh schedule, declines in general productivity due to aging equipment breakdowns can be significant. These include slower response times, system lockup and reboot time, higher maintenance costs, increased problem resolution time and the increase in the number of PC hardware failures.

- Incompatibility Issues - FTB is required to accurately exchange data with external sources (taxpayers, tax practitioners, businesses, and other government agencies), including the Internal Revenue Service (IRS), the California Board of Equalization (BOE), the California Employment Development Department (EDD), etc. The technology, including hardware (PCs and Servers), and software, used must be compatible with these external entities.

- Following equipment approaching 'end of life' and/or 'end of support' resulting in possible interruption in revenue generating business activities:

  - Mainframe Printer (end of life issues) – 12/31/2010

    Without the replacement of this printer system, FTB will lack the ability to provide the printing capacity/capability needed by revenue generating business program areas.

PROPOSED IT PROJECTS CONTINUED - ITR

- Enterprise (Mainframe) Tape Library System (end of life issues) – 12/31/2010

  If FTB's tape library hardware fails, the ability to recover the data at an offsite location is jeopardized. FTB would lack the ability to provide a fully functional data backup/recovery solution needed by revenue generating business program areas.

- Server Tape Drives (end of support issues) – 12/31/2008

  Without the replacement of the server tape drives, FTB would lack the ability to process the over 2 million paper returns using the manual key entry application Keybase that resides exclusively on the NonStop server.

4.14 Check the appropriate box(es) to identify the proposal's funding strategy:
☒ **Augmentation needed**
☒ **Redirection of existing funds**
☐ **Other (describe):**

4.15 What are the estimated cost and funding source(s) by fiscal year through implementation (information should be provided in the following format):

Fund Source	2008-09	2009-10	2010-11	2011-12 & after	Total
General Fund	$218,632	$17,889,449	$6,377,079	$6,259,504	$30,744,664
Federal Fund					
Special Fund*					
Total	$218,632	$17,889,449	$6,377,079	$6,259,504	$30,744,664

*** Note: Identify the fund source and if the department is the sole user of the fund.**

PROPOSED IT PROJECTS

Complete this IT Project Proposal Form (questions 4.1 though 4.15 below) for each proposed IT project that meets the definition of a reportable project as defined in the State Administrative Manual Section 4819.37:

4.1 Proposal name and priority ranking:

Financial Institutions Record Match (FIRM) - Priority Ranking 4

4.2 Description of the proposed IT project:

FTB will create a combined debtor file that will contain delinquent debtor IDs (social security numbers or federal employer identification numbers). Debtor file data will be extracted from individual and business collection systems. FTB will contract with a vendor who will use the debtor file to match account numbers of delinquent debtors against accounts held in financial institutions for the purpose of identifying taxpayer assets that FTB can access in our involuntary collection actions. In addition, for our tax accounting systems, this solution will allow FTB to update address data, establish volume control and hierarchy functionality, and implement electronic levies for attachment of funds held in accounts at financial institutions.

4.3 Which of your department's business goals and objectives does this project support, and how?

Goal # 2—Increase Fairness and Compliance with Tax Law:
Implementation of this project will improve the systems, processes and activities necessary to identify non-compliance and gain compliance by allowing FTB to efficiently collect outstanding tax liabilities. The record match will permit the department to identify previously unknown deposit accounts held by delinquent debtors to collect outstanding debts and help close the tax gap.

Goal # 5—Demonstrate Operational Excellence:
Instituting a financial institution record match process is indicative of FTB's commitment to adhering to the highest standards for the operation of its tax programs.

4.4 What are the expected business outcomes or benefits of the proposal as they relate to your organization's business goals and objectives?

Increased Revenue as follows:

FY 09/10	$38 million
FY 10/11	$66 million
FY 11/12	$104 million
FY 12/13	$111 million

PROPOSED IT PROJECTS CONTINUED - FIRM

4.5 The following are from the State's IT strategic plan. Check the appropriate box(es) to identify the goals this proposal supports:

- ☐ **Supporting and enhancing services for Californians and businesses**
- ☐ **Enhancing information and IT security**
- ☐ **Reducing state operational costs (leveraging, consolidation, new technology, etc.)**
- ☐ **Improving the reliability and performance of IT infrastructure**
- ☐ **Enhancing human capital management**
- ☒ **Supporting state and agency priorities and business direction**

4.6 Is the proposal consistent with your organization's Enterprise Architecture?

- ☒ **Yes**
- ☐ **No**

If no, please explain why the deviation from the organization's Enterprise Architecture is necessary.

4.7 Will the proposed system collect, store, transmit, or exchange confidential or sensitive information?

- ☒ **Yes**
- ☐ **No**

4.8 If this proposal is conceptually approved, what is the estimated date (mm/yyyy) the FSR will be submitted?

07/15/2008

4.9 What is the estimated project start date (mm/yyyy) if the FSR is approved?

07/2009

4.10 What is the duration of the proposed project?

2 years & 9 months

4.11 Will the proposed project utilize the existing infrastructure?

- ☒ **Yes**
- ☐ **No**

If no, please explain.

PROPOSED IT PROJECTS CONTINUED - FIRM

4.12 Is the proposal related to another proposal or to an existing project?

☒ **Yes**
☐ **No**

If yes, describe the related proposal or project and how it is related:

FIRM is patterned after FTB's Financial Institution Data Match (FIDM), a project FTB implemented as a result of federal legislation to identify the assets of delinquent child support debtors. The success of FIDM prompted FTB to extend the asset identification effort—via FIRM—to other classes of debtors.

4.13 Describe the consequences of not doing this proposed project at the planned timeframe:

A delay in the project schedule will delay the receipt of additional revenue.

4.14 Check the appropriate box(es) to identify the proposal's funding strategy:

☒ **Augmentation needed**
☒ **Redirection of existing funds**
☐ **Other (describe):**

4.15 What are the estimated cost and funding source(s) by fiscal year through implementation (information should be provided in the following format):

Fund Source	2009-10	2010-11	2011-12	2012-13	Total
General Fund	$2.9 million	$4.3 million	$2.2 million	$1.2 million	$10.6 million
Federal Fund					
Special Fund*					
Total	$2.9 million	$4.3 million	$2.2 million	$1.2 million	$10.6 million

*** Note: Identify the fund source and if the department is the sole user of the fund.**

Enterprise Architecture

A.1. Does your organization have documented Enterprise Architecture principles, strategies, or standards to guide decisions on technology projects?

☒ **Yes**
☐ **No**

A.2. Indicate on Table A-1 below, the completion status of the component Reference Models of your formal Enterprise Architecture efforts. If available, please submit a copy of your Enterprise Architecture document.

The FTB divided the Enterprise Architecture into seven documents specializing on different segments of the Enterprise Architecture. Each of the Enterprise Architecture Definitions (EAD) define the current and target states of FTB's architecture, a gap analysis and a strategy for implementation as it relates to the architectural segment.

- Business Intelligence (BI) (*Attachment: A2.1.EAD_BI*)
  - BI concerns analytic processing technologies that depend upon Data & Delivery Management Architecture Definition for the quality of data in both transactional (OLTP) and analytical data (OLAP) stores. The BI EAD is comprised of technologies and solutions that include data warehouse, data marts and federated data solutions catering to reporting, data mining or predictive analysis needs. Since this EAD deals with the capture, architecture, storage and analysis of data for OLAP purposes, included in the scope are architecture, methodology and processes to create a enterprise data warehouse (EDW) and data marts.

- Business Process Management (BPM) (*Attachment: A2.2.EAD_BPM*)
  - BPM is a discipline at the intersection of management and information technology. BPM encompasses methods, techniques and tools to design, enact, and control business processes involving humans, organizations, applications, documents, and other sources of information. BPM leverages tools (software) and solutions (integration) that depict, analyze and optimize business processes and workload management.

- Data Management and Delivery (DMD) (*Attachment: A2.3.EAD_DMD*)
  - DMD comprises all the disciplines related to managing data as the FTB's most valuable resource second to its employees. It is the development and execution of architectures, policies, practices, and procedures that properly manage the full data lifecycle needs of an enterprise. DMD includes the effective utilization, quality, availability, integration and standardization of data and information across the enterprise. It defines the management, acquisition, cleansing, storage, and utilization of all data.

Enterprise Architecture

- Enterprise Content Management (ECM) (*Attachment: A2.4.EAD_ECM*)
  - ECM concerns the strategies and technologies employed to manage documents and content across the enterprise. The ECM EAD provides an architecture strategy that will address all current and future departmental ECM needs while also being a scalable, portable, dynamic service.

- Electronic Data Exchange (EDE) (*Attachment: A2.5.EAD_EDE*)
  - EDE provides a set of standards for structuring information electronically exchanged between and within FTB and other businesses, organizations, government entities and other groups. EDE focuses on the internal infrastructure required to manage electronic data exchanges.

- Identity Access Management (IAM) (*Attachment: A2.6.EAD_IAM*)
  - Identity management and access control for FTB's external and internal users in an SOA environment provides an integrated standards-based solution that delivers authentication, web single sign-on, access policy creation and enforcement, user self-service, delegated administration, reporting and auditing.

- Services Oriented Architecture (SOA) (*Attachment: A2.7.EAD_SOA*)
  - SOA involves exposing business process functionality and data as callable services by multiple applications, thus maximizing the cost-effectiveness of developing and implementing the service and reducing redundancy.

NOTE: See attached Enterprise Architecture Definitions (EAD)

Table A-1, Enterprise Architecture Completion Status

Component Reference Model	Status			
	Implemented	**Implementation in Progress**	**Planned or Planning in Progress**	**Not Implemented and Not Planned**
Business		X		
Service		X		
Technical		X		
Data		X		

Enterprise Architecture

A.3. Describe the governance structure your organization uses to review and approve the Enterprise Architecture and any subsequent changes.

The Chief Architect is accountable for annual refresh of the EA. The creation and refinement of the EA is carried out by the Enterprise Architecture Council (EAC), with the support and contributions of industry analysts and subject matter experts in the Centers of Excellence (CoE).

The EA is updated on an annual basis to:

1) incorporate amendments;
2) incorporate new technical standards, patterns and services, information, solutions, and business processes; and
3) to evolve the future-state models and roadmaps to reflect accomplishments and business strategy.

At the completion of the annual revision cycle, the updated EA is submitted to the following groups for adoption:

- Technology Action Committee(TAC)
  - A cross-functional action committee, co-chaired by a Technology Services Division (TSD) bureau director (BD)
- Internal Business Action Committee (IBAC)
  - Shares the responsibility for identifying and raising Internal Business issues
- Governance Council (GC)
  - A decision-making body responsible for managing information technology (IT) and business issues at the departmental level

See EAC Charter (*Attachment: A3.EAC_Charter*) for a complete description of the EA governance including the EA Assurance process.

A.4. Does your organization have an Enterprise Architect? (if yes, provide their name, telephone number, and e-mail address below)

☒ **Yes**
☐ **No**

Name: Carl Engel
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Information Security

B.1. How is your Information Security Officer involved in proposed project development efforts?

The Chief Security Officer (CSO) has identified key staff members within her organization that are considered security subject matter experts, providing support and oversight to departmental projects, task forces, and project initiatives. This group consults with departmental program areas and project teams to ensure compliance with Information Security laws, policies and industry best practices. In addition, the CSO is part of the department's IT project proposal approval process and is required to approve proposed project efforts.

B.2. What are your department's core business principles, policies and standards related to information integrity, confidentiality, and availability and the protection of information assets?

FTB's Information Security Principles

- We adhere to the information security principles of defense in depth, least privilege and separation of duties.
- We abide by State and Federal Information Security laws, policies, standards and guidelines.
- We require that all of our information systems be designed to ensure the confidentiality, integrity and availability of our information assets.
- We provide standards, procedures and guidelines in support of our Information Security policies.
- We authorize, authenticate and uniquely identify all users of information assets.
- We periodically and independently review the effectiveness of security controls applied to our information systems.
- We provide Information Security education and awareness to users of FTB information assets.

FTB's Information Privacy Principles for Individuals

- We have reasonable safeguards to ensure the security and confidentiality of personal information.
- We educate our employees on the importance of protecting the privacy of personal information.
- We protect personal information against loss or theft, as well as unauthorized access, disclosure, copying, use, or modification.
- We provide personal information only to employees who have a business need and only when appropriate safeguards are in place.
- We tailor our safeguards based on the type of information we maintain.
- We periodically review our practices to ensure we have adequate safeguards.

Information Security

FTB IT Principles

IT Principles for FTB have been developed to align IT with FTB's Operating Principles of Innovation, Integrity, and Enterprise Thinking. These principles guide decision making for IT projects and initiatives. One of the key principles is security:

- Security is considered at every level of the Enterprise Architecture (Innovation)
- Enterprise Architecture complies with the FTB's Information Security Policy (Integrity)

FTB Information Security Policy (FTB Policy file 9500)

The purpose of this policy is to clearly state the roles, responsibilities and requirements for the security and protection of FTB's information resources. Ensuring the confidentiality, integrity and availability of the information resources entrusted to us is our legal and ethical responsibility and is essential in achieving the department's mission and goals.

Tax Systems Modernization

FTB is committed to aligning Enterprise Architecture and IT Governance to IT Projects and managing IT investments with tax business as the key driver. The Tax Systems Modernization initiatives currently underway will move FTB to the next generation of customer service deliverables, which is to increase transparency, secure revenue collections, and improve fairness and compliance. In order to demonstrate operational excellence, FTB must have an IT infrastructure that effectively supports business operational needs. This will be accomplished by aligning the IT infrastructure, delivery, and governance with FTB's Strategic Business Vision, Goals, and Strategies through a series of Tax Systems Modernization IT projects. One of the key goals of these initiatives is to "Protect Taxpayer Information and Privacy".

FTB has security standards in place for the following:

- Servers
- Printers
- Desktops and Laptops
- VMWare
- Access Controls
- Password Authentication
- Environmental and Security Control
- Encryption
- Wireless Computing.Net
- J2EE

In addition to the above standards, FTB's Enterprise Architecture Team is actively developing standards to better align IT with FTB's strategic plans and key initiatives.

Information Security

Enterprise Architecture

FTB has developed Enterprise Architecture Definitions (EAD) that document seven key areas defining FTB's Enterprise Architecture. For example, one of these EAD documents is Identity and Access Management (IAM). IAM provides FTB security as a business service, and a method to ensure all individuals and services are properly authenticated, authorized and audited when accessing application services. The IAM solution will provide a centralized and consistent security policy and will be delivered in a "security as a service" strategy. To be effective, the security service will be integrated with an Enterprise Service Business (ESB) allowing these services to be discoverable and usable for all web services throughout the department regardless of the system or business unit.

B.3. If data within your department is shared with external entities, does your department implement data exchange agreements with these entities?

☒ **Yes**

Franchise Tax Board treats all information received, maintained and generated as confidential. It follows industry best practices and uses a defense in depth strategy to protect information assets and data and maintain their confidentiality, integrity and availability. Data is not shared unless there is specific statutory authority. In case of data shared with external entities the department maintains strict adherence to all the policies, standards and core business principles as stated in response to Question B.2. (above) and to further maintain the integrity, confidentiality and protection of the such information it takes the following additional steps with regard to data sharing agreements. Each agreement contains provisions covering the following:

1) Ownership of data shared in the agreement is retained by our department.
2) Requires a Statement of Confidentiality be signed by employees of external agencies with access to confidential data.
3) Restrict the use of the data and information provided to the purpose and extent as stated in the Agreement.
4) Requires that employee access to information provided is strictly on a "need to know" basis.
5) Requires each entity that has entered into the Agreement to take appropriate precautions to protect confidential information and deal properly with any unwarranted or unauthorized disclosure.
6) Requires a thorough review by each agency receiving data of all unauthorized or suspected unauthorized access; use and/or disclosure (incidents) of information obtained under this agreement.
7) Requires each agency provide a secure environment to protect the confidential information obtained pursuant to the Agreement.
8) Requires that all records received by each party under an Agreement and any database(s) created, copies made, or files attributed to the records received are destroyed when they are no longer needed for the business purpose for which they were obtained.

☐ **No - If no, please explain.**
☐ **Not applicable**

Information Security

B.4. How does your department ensure that software developers and programmers follow standards and best practices for Web, application, and system development?

- Security Policies
- Security Standards
- Processes and Procedures
- On site training for developers regarding application security best practices
- Application Security Scans of critical e-file applications, and oversight by application testers and CSO staff members
- Independent security assessment of critical business applications (In process)
- CSO staff participation throughout the system development life cycle for critical system development efforts

In addition to the above, the department is currently developing a comprehensive application security compliance monitoring program. This program will include additional oversight and compliance monitoring from an enterprise perspective to ensure that applications currently being developed and applications already in production are secure.

B.5. Does your organization have an Information Security Officer? (if yes, provide their name, telephone number, and e-mail address below)

☒ **Yes**
☐ **No**

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Workforce Development, Workforce Planning and Succession Planning

C.1. Does your organization have a workforce development plan for IT staff?

☒ **Yes**
☐ **No**

If yes, briefly describe it.

Although FTB does not have a documented, formal workforce development plan, several development strategies are identified in the FTB FY 08/09 workforce plans. These strategies include preparing development plans for key functions, conducting a baseline skills assessment and partnering with industry leaders to provide training**.**

C.2. Check the appropriate box(es) to identify which workforce development tools, if any, your organization is using for IT classifications:

☒ **Training**
☒ **Upward Mobility**
☒ **Mentoring**
☒ **Career Assessments**
☒ **Knowledge transfer program**
☒ **Performance Evaluations**
☒ **Other (please list)**

Employee Development Tool (ED-Tool) is a web-based self-assessment tool that employees can use to rate their knowledge, skills and abilities in current and potential future classifications. The results may also be used to develop training plans in conjunction with annual performance reviews.

C.3. Does your organization have a workforce plan for IT staff (i.e., for Rank and File)?

☒ **Yes**
☐ **No**

If yes, briefly describe it.

FTB has FY 08/09 workforce plans for each bureau in the Technology Services Division. These short-term plans focus on functions performed or knowledge possessed by one person as well as declared and anticipated retirements (based on eligibility). The FTB long-term workforce plans (2009-2011) will align with FTB's Strategic Plan (2007-2011) and will include recruitment and retention strategies, as well as a skills gap analysis.

Workforce Development, Workforce Planning and Succession Planning

C.4. Does your organization have a succession plan for IT staff (i.e., for Management)?

☒ **Yes**
☐ **No**

If yes, briefly describe it.

Although we don't have a documented, formal succession plan for IT staff, several related strategies are identified in our FY 08/09 workforce plans. In addition, the following activities support our departmental succession planning efforts:

- Participation in the IT Managers Academy
- Participation and sponsorship in the Inter-governmental Management Training (IGMT) Program
- Participation in the Executive Leadership Program at Sacramento State
- Participation in the Executive Institute annual conference sponsored by DTS
- Management Development Program in partnership with Sacramento State

MDP Program Components	
Workshops	MDP course components consist of a series of interactive workshops and panel presentations. Courses are led by external consultants and by FTB managers with subject matter expertise.
Coaching / Mentoring	Each MDP participant seeking certification is assigned to a coach for the duration of the program. The coach provides support, guidance and collaborates with the participant to identify and address specific personal development initiatives.
Project	Each MDP participant is assigned to a project team and given a "real world" FTB issue to solve. Project findings are presented to the appropriate Governance Action Committee and/or FTB Governance Council. The project component concludes with a project showcase presented to all supervisor and managers in the Gerald H. Goldberg Auditorium.

Workforce Development, Workforce Planning and Succession Planning

- Talent Development and 360 degree Evaluation Workshops
- Leadership Library online on our intranet
- Leadership Cafés – lunch time workshops presented by FTB's Leadership
- Bi-annual management rotations (see benefits description on following page)

FTB Governance Operating Principle: **Enterprise Thinking**

We believe that building a strong organization requires that decisions must be made on the basis of benefiting the entire organization. We strive to be inclusive in our decision-making and apply policy consistently, with sensitivity to the diverse nature of our employees and stakeholders. Through practicing enterprise thinking and decision-making, we seek to achieve the larger goal of building a truly great organization.

C.5. IT Staffing

Provide the following information in table C-1 on the following page:

- **The name of each IT classification currently in the organization.**
- **The number of staff in each IT classification in the organization.**
- **The number of staff in each IT classification eligible to retire in the next five years.**
- **The percentage of each IT classification eligible to retire in the next five years.**

Table C-1 — IT Staffing (including CCSAS)

IT Rank and File Staff Classification	Number of IT Rank and File Staff in Classification	Number of IT Rank and File Staff in Classification Eligible to Retire in Next 5 Years	IT Management Staff Classification	Number of IT Management Staff in Classification	Number of IT Management Staff in Classification Eligible to Retire in Next 5 Years
Staff Info Sys Analyst (Spec)	182	33	Sr. Info Sys Analyst Sup	5	4 [2/]
Sr. Info Sys Analyst (Spec)	124	29	Data Processing Mgr I	11	
Computer Operator (a)	6	4 [2/]	Data Processing Mgr IV	2	
Info Systems Technician (b)	4		Assc Info Sys Analyst Sup	1	
Programmer I (c)	1		Data Processing Mgr II	55	13
Programmer II (d)	2		Data Processing Mgr III	28	8
Computer Operations Spec I (e)	5		Sys Software Spec III Sup	13	4
Sr. Telecom Engineer (f)	1				
Assoc Telecom Engineer (g)	1				
Sys Software Spec II (Tech)	34	9			
Sys Software Spec III (Tech)	72	12			
Assoc Info Sys Analyst (Spec)	210	36			
Asst Info Sys Analyst	88	20			
Assoc Prog Analyst (Spec)	22	1			
Staff Prog Analyst (Spec)	104	24			
Assoc Sys Software Spec (Tech)	11	1			
Sys Software Spec I (Tech)	61	6			
Sr. Programmer Analyst (Spec)	0	0			
TOTAL:	928	175	TOTAL:	115	29

IT Staffing continued:

NOTES:

[1/] The above data includes all permanent employees (on full time and reduced work time schedules) only. It does not include Retired Annuitants (RAs), Student Assistants (SAs) or any temporary staff or staff on limited term (LT) positions.

[2/] The attrition numbers for Classifications coded (a) thru (g) under the Rank and File Staff and for the first four Classifications under the Management Staff have been grouped together respectively to comply with the disclosure and confidentiality policies of the State. Age is considered confidential information and any presentation that discloses or provides the reader a means to determine the age of an individual employee is considered a breach of such confidentiality. To prevent such disclosure or determination and any resulting breach of confidentiality, the class codes have been combined while stating the number of employees eligible to retire in the next 5 years.

Project Management, Portfolio Management and IT Governance

D.1. Does your organization have a process for improving the alignment of business and technology?

☒ **Yes**
☐ **No**

If yes, briefly describe it.

While FTB's systematic approaches to strategic planning for business and IT have worked well, industry trends indicate a shift toward integrating the two to achieve a greater return on IT investment that will yield efficiencies in delivering business solutions.

Aware of these opportunities, FTB is placing greater urgency on fusing business and IT agendas during the strategizing stage, when it is easier to reduce obstacles to achieving business goals, rather than having IT planning follow sequentially after business plans are well embedded.

FTB adheres to the guidelines specified in the Agency Information Management Strategy (AIMS). AIMS seeks to align the strategies of both business and information technology to empower the department to consistently offer the highest level of customer service. It serves to provide the department with business systems, driven by business requirements through effective and efficient deployment of information technology.

FTB's current operations with IT governance processes bring our senior business and IT managers together to form the Governance Council (GC). The GC is chaired by the Assistant Executive Officer. It oversees enterprise approaches to budgeting, architecture and standards development, addressing security and privacy needs, managing IT assets, aligning our IT activities with our strategic vision, and formal IT projects. Every member of the Council has been given responsibility for our overall IT portfolio, so that every IT project must be weighed against our other IT priorities and our overall vision. The CIO works closely with the GC Chairperson and the GC members to lead this segment of the GC's ongoing efforts. The Council has the authority to pull IT resources out of one part of our organization to redirect them toward an IT project in another part of the organization--something that we have seldom done in the past. The IT governance structure and associated processes establish a clear and consistent approach to the planning and development of IT systems, as well as implementing and maintaining the information technology infrastructure in support of the department's business needs.

The Technology Action Committee (TAC) at FTB addresses enterprise technology issues, policy, and strategic direction. Changes and updates to technology as a result of task force initiation, or through recommendation by the Enterprise Architecture Council (EAC) are reflected within the Franchise Tax Board's Enterprise Architecture. With input from EAC, and through enterprise technology discussion, the TAC acts as an advisory resource to the GC. There is a partnership between the TAC, the GC, the Chief Information Officer (CIO), other advisory committees, and the FTB business areas. The TAC is responsible for developing an enterprise focus to business driven technology solutions. It works to advise the GC and the CIO on the best use of enterprise IT resources.

Project Management, Portfolio Management and IT Governance

D.2. What is the status of implementing a formal portfolio management methodology for technology projects within your organization?

☐ **Implemented (Please describe)**

☐ **Implementation in progress (Please describe)**

☒ **Planned or planning in progress**

☐ **Not implemented and not planned**

D.3. List any automated tools being used for portfolio management. Enter "None" if no automated tools are being used.

"None"

Though FTB does not use a formal automated tool for portfolio management at this time, it manages the various projects and monitors the individual project growth using Project Management Standardization tools and templates like:

Project Status Report (see *Attachment D3.A*)

Cost Estimates & Tracking Guidelines (see *Attachment D3.B*)

Costing Model spreadsheet that is used to track the costs of an on-going project on a regular basis.

Project Portfolio Listing Report:
This report is a workbook prepared in Excel used to update the CIO/GC on a regular basis. The information is presented under the categories of 'FSRs in Development', 'Projects in Development', 'PIERs Outstanding' and displays a visual picture of the overlapping project schedules in one snapshot. The report resides on the POG website.

D.4. What is the status of implementing a standard project management methodology for technology projects in your organization?

☒ **Implemented (Please describe)**

The FTB project management methodology is based on *A Guide to the Project Management Body of Knowledge* (PMBOK) Third Edition; SIMM Section 45, Appendix A; and SIMM Section 200, *Project Management Methodology Guidelines*. These methodologies, guidelines and standards are put into practice by all FTB employees who are the project members to successfully complete Business and Information Technology projects using standard tools, templates and methodologies; thereby ensuring enterprise consistency in project processes, documentation and presentations.

Project Management, Portfolio Management and IT Governance

The Project Oversight and Guidance (POG) Section—the PMO at FTB—oversees and facilitates the adherence to project management methodology and standards for all approved IT Projects. The bureau has ensured that project management standards and practices have been integrated into project planning and development throughout the organization. This has been achieved in a phased approach in the following four steps:

Phase I	Initial Rollout
Phase II	Project Management Standardization Overview
Phase III	Project Management Standardization Education
Follow up	Consult with staff to determine whether the project management standards can be improved.

POG ensures compliance with the Statewide Information Management Manual (SIMM) and State Administrative Manual as they relate to IT project initiation and development. Many of the project management practices require documentation to ensure adherence to project management standards and guidelines. POG manages the templates that have been developed to help project managers complete the documentation. All delegated projects are monitored by their sponsor and/or steering committee for compliance with these standards.

To ensure these practices and processes are being followed, each project is assigned a Project Oversight Analyst from the POG Section. For projects that are rated as a “low risk” criticality, the oversight analyst reviews the documentation and completes the Independent Project Oversight Report (IPOR) and Checklist on a quarterly basis. For reportable projects designated as medium or high risk, FTB secures the services of an Independent Project Oversight Contractor (IPOC) to oversee the project management processes in place for the project and to complete the IPORs. The POG analyst oversees the IPOC contract.

☐ **Implementation in progress (Please describe)**
☐ **Planned or planning in progress**
☐ **Not implemented and not planned**

D.5. Does the organization require its project managers to be certified, either through a professional organization (e.g., PMI, ITIL) and/or through completion of specified project management coursework:

☐ **Yes**
- ☐ **PMI**
- ☐ **ITIL**
- ☐ **Agency-specified project management coursework (identify below)**

☒ **No**

Project Management, Portfolio Management and IT Governance

D.6. Select from the list other areas of training your organization requires of its project managers:

☐ **Fundamental Project Management**
☐ **Systems Development Life Cycle**
☐ **Scheduling tool (identify below)**
- –
- –
- –

☐ **Project Performance Management (e.g., Earned Value Management)**
☐ **Business Process Analysis**
☐ **Requirements Traceability**
☐ **Procurement/Contracts Management**
☐ **Other (identify below)**
- –
- –
- –

☒ **None**

D.7. Describe project-level governance practices, including change management, issue resolution, and problem escalation.

The CIO issues an IT Project Call Letter annually to request IT project concepts that will be submitted for consideration by the FTB Governance Council (GC). The call letter provides guidelines and cites key business initiatives that drive the nature of the project concepts that will be considered for the upcoming project cycle. The resulting Information Technology project concepts are initially submitted to TAC for evaluation. Business representatives participate in the evaluation of the conceptual proposals. The Committee follows pre-established criteria provided by the GC and feedback from the EAC to rate and prioritize projects and to derive recommendations to the GC. The GC then approves or denies the allocation of resources required for project initiation. With GC approval, the feasibility study process is initiated. (see *Attachment D7A*)

The Project & Planning Support Bureau (PPSB) coordinates the initiation of IT projects and the establishment of the FSR Study Team. The study team includes representatives from across the department to ensure any area that may be impacted by the proposed projects is included in the FSR process. Team members have clearly defined roles and work under the direction of the project manager.

The PPSB is responsible for the following:

- Providing general process guidance
- Developing cost estimates based upon the identified level of effort required
- Providing FSR quality assurance reviews
- Ensuring that project initiation activities comply with statewide policy and procedures
- Ensuring that all key stakeholders signoff and approve FSR
- Coordinating the required project approvals, both internally and with control agencies as appropriate

- Providing on-going project monitoring, status reporting, resource and expenditure tracking
- Managing contracts for IV&V and Independent Project Oversight Reports (IPOR) activities. (see *Attachment D7B*)

Approved projects have a designated project manager, a project sponsor and a steering committee. It is the responsibility of the project manager to facilitate the activities that will lead to the successful completion of a project and to escalate issues as required. Steering Committees are responsible for removing obstacles for the project team, approving requirement changes and schedule changes, and resolving any issues identified by the project team or the project manager. Project sponsors are responsible for managing project scope and ensuring that adequate resources are allocated. Major project deviations must be approved by the GC and external oversight as required.

Project managers use a variety of tools to support their project management practices for the on-going governance of individual projects. The Project Management Standards: Project Category Selection Guide (see *Attachment D7C*) is a tool to define what project management documents are appropriate for projects categorized as small, medium or large. These tools provide the basis for the day to day project level governance activities, inclusive of change management, issue resolution, and escalation procedures as detailed in the various project management tools to be used for the project.

D.8. Does the project management methodology include processes for documenting lessons-learned and applying these to future projects?

☒ **Yes (Please describe)**

POG facilitates the project retrospective meeting held immediately after project implementation. The project retrospective meeting is attended by the Project Manager, the technical and business area team members and other project clients. The issues raised and discussed in this meeting are documented with an intention to provide information about the project management and development processes, responsibilities, actions, and deliverables that could benefit subsequent projects. The template is called Project Retrospective (*see Attachment D8*)

☐ **No**

Attachment: A2.1.EAD_BI

California Franchise Tax Board (FTB)

Enterprise Architecture: Business Intelligence Definition

Version No. 1.0

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Author:
Enterprise Architecture Council

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1.0 Executive Summary and Charter

1.1 Overview

Business intelligence (**BI**) is a business management term, which refers to applications and technologies that are used to gather, provide access to, and analyze data and information about company operations and performance. Business intelligence systems help companies have a more comprehensive knowledge of the factors affecting their business, such as metrics on sales, production, internal operations, and they can help companies to make better business decisions. Three main components are reporting, data mining, and predictive analytics.

An aspect of Business Intelligence that is of special interest to FTB is modeling and scoring. The desire for improved metrics on efficiencies and outcomes for modeling requires data services that will provide access to enterprise-wide Business Intelligence information. Access to this critical information will provide a wider array of information to model on and will lead to better modeling results. It will also provide for:

- Less data redundancy
- Improved data inaccuracy
- Increased access to FTB Data
- More efficient use of taxpayer and third party information
- More consistent treatment across debt types.

1.2 Scope

The scope of the Business Intelligence Architecture Definition concerns analytic processing technologies that depend upon Data & Delivery Management Architecture Definition for the quality of data in both transactional (OLTP) and analytical data (OLAP) stores. The BI Architecture Definition is comprised of technologies and solutions that include data warehouse, data marts and federated data solutions that cater to reporting, data mining or predictive analysis needs. Tools and technologies to deliver business intelligence solutions that are applicable to FTB will be addressed. Since this Architecture Definition deals with the capture, architecture, storage and analysis of data for OLAP purposes, included in the scope are architecture, methodology and processes to create a enterprise data warehouse (EDW) and data marts.

1.3 High-level Requirements

The following table outlines the high-level requirements of the Business Intelligence Architecture Definition.

Figure 1.3-1: Business Intelligence Architecture Definition – High Level Requirements

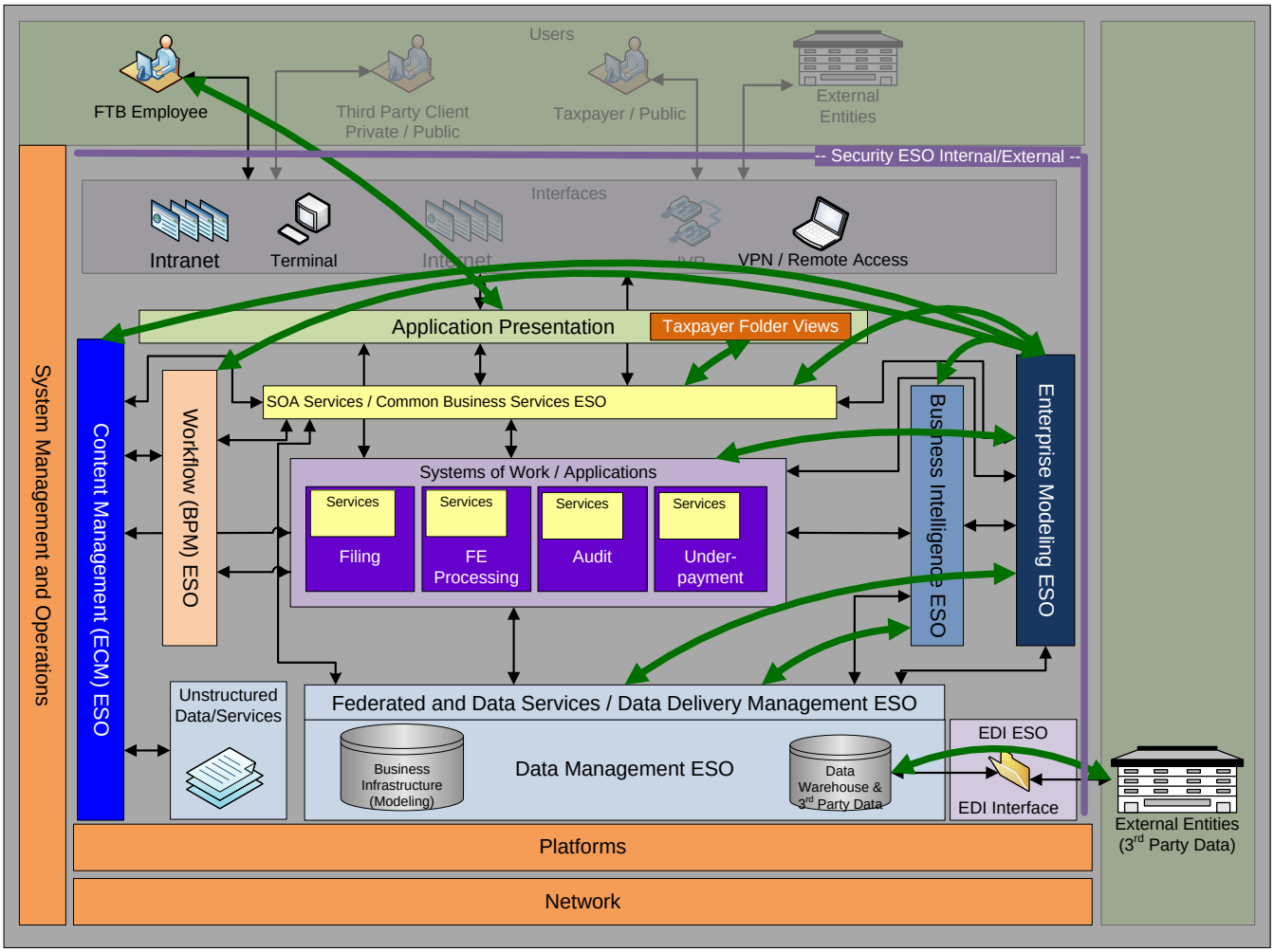
Requirement	Description
Capture historical data from all relevant OLTP data repositories	Business Intelligence is enhanced by the capture of historical OLTP data. OLTP data will be developed to include time values so that the OLAP data is prepared for historical data reporting and intelligence.
Provide suitable architecture for analytical processing of data	Business Intelligence is enhanced by strategies to enhance analytical processing. First is the data warehouse as the "trusted" data source for OLTP and OLAP needs. De-normalized relational data from the warehouse will be used in multi-dimensional structures for use in data marts etc. Also the use of 'dashboards' for proper business decision-making and management, and the use of federation. This also implies that a prudent mixture of ETL solutions and Federated solutions is used, and the criteria for using one or the other be specified.
Provide a process methodology for capturing, analyzing and delivering user requirements for business intelligence	A process for capturing, analyzing and then delivering the user requirements for business intelligence will be defined. This, along with the data architecture and models as well as tools help to define and implement the total business intelligence solutions as desired by the users.
Ability to address new requirements for reporting, data mining, modeling or analytical processing with agility and promptness	It is important for business intelligence solutions to address any requirements for analytical processing with agility and promptness as they arise, whether for modeling, reporting, data mining etc. This necessitates that a architecture be built that captures all relevant historical data, and has furthermore layers or tiers of data storage, from mere capture, to de-normalized structures to data marts, which can address these needs.
Provide Usage Analysis	Collecting and reviewing usage of the information provided by the BI platform is critical to determine the success the BI Architecture Definition. FTB will track usage on any exposed object, such as a report or dashboard and who is using it. This will allow BI to inform users of upcoming changes as well as inform management if certain areas of information delivery are not being utilized. This information will help determine the ROI to create and maintain the environment. Both IT and business partners will get a view of where the organization currently is delivering information well and areas that need improvement

1.4 Conceptual Model

The following diagram illustrates the portion of the Enterprise System Architecture that will interact with, supply information for, or is a dependency of the Business Intelligence Architecture Definition. The green arrows represent information flows between the Business Intelligence system, other systems, and to the FTB employee.

The diagram below illustrates how FTB employees interface with applications to perform Business Intelligence activities and how the business intelligence system interacts with common business services, System of Work services, and data services to not only acquire information for Business Intelligence, but to provide BI results to systems within the enterprise. Unstructured data from the Content Management System that does not exist within system databases, such as non-captured tax form fields, will provide additional information for Business Intelligence. Information generated through the Business Intelligence System, such as analyses of third party data will also contribute data to the enterprise. All of this information provides a more comprehensive view of the Systems of Work (SOW) lifecycle that can then result in more effective workflow processes. However, Business Intelligence at an enterprise level will require more data exchange across the enterprise and may require additional network and hardware resources in order to transmit the additional data.

Figure 1.4-1: Business Intelligence Architecture Definition – "To Be" Technical Architecture Model



2.0 Current Architecture

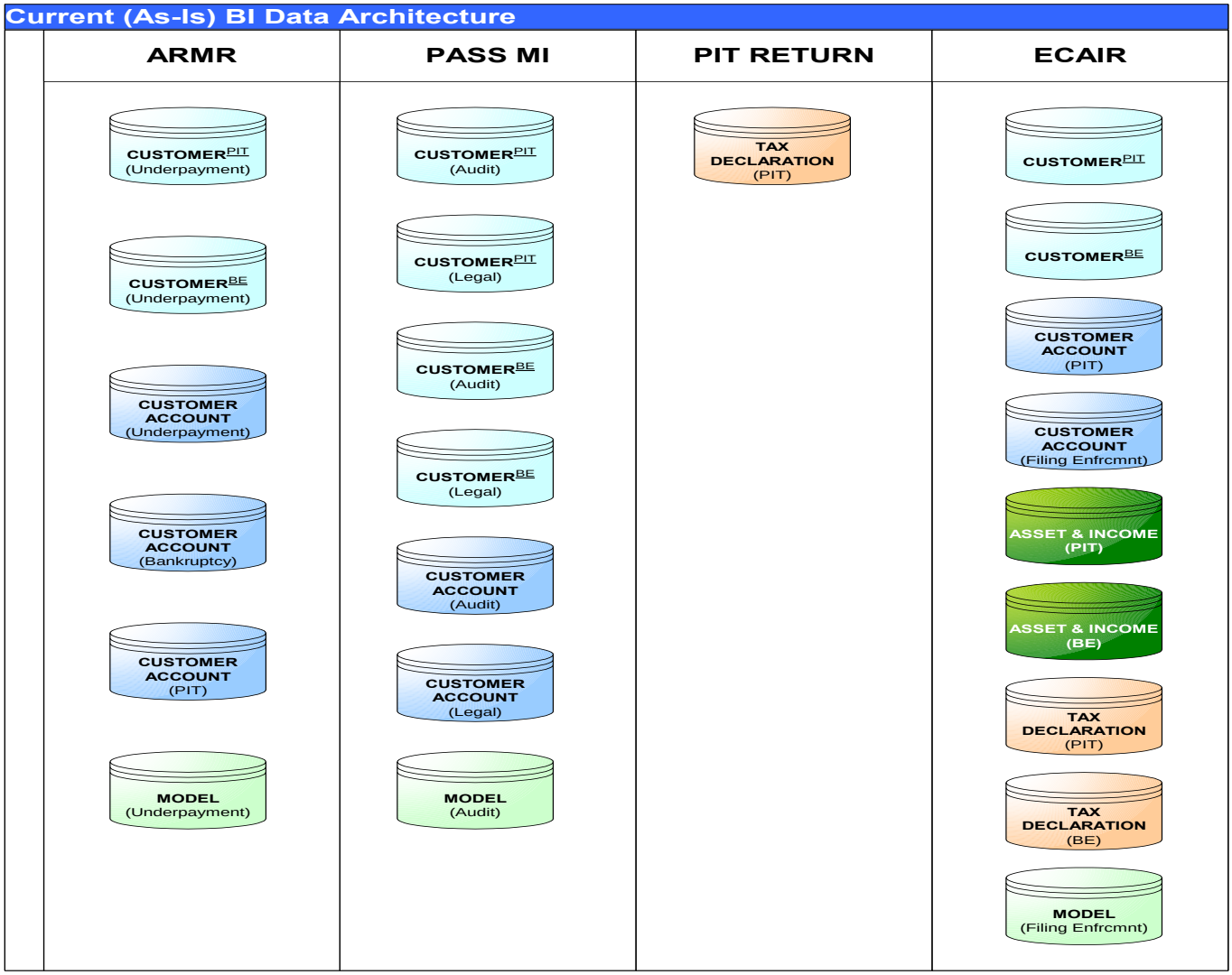
2.1 Current Capabilities and Components

BI is on a continuum of change from the monolithic or distributed data warehouses that defined BI's first generation to emerging trends in BI. The trends in BI are concerned with the analytics of data whether the data is in the operational space (Operational BI) or the reporting, analytical space (Traditional BI).

2.1.1 Current Data Architecture

Figure 2.1-1 illustrates the current BI data architecture environment at FTB. This data architecture employs the architectural subject areas, but stores the data redundantly for each of the BI systems. The data and the BI applications are siloed.

Figure 2.1-1: Current BI Data Architecture

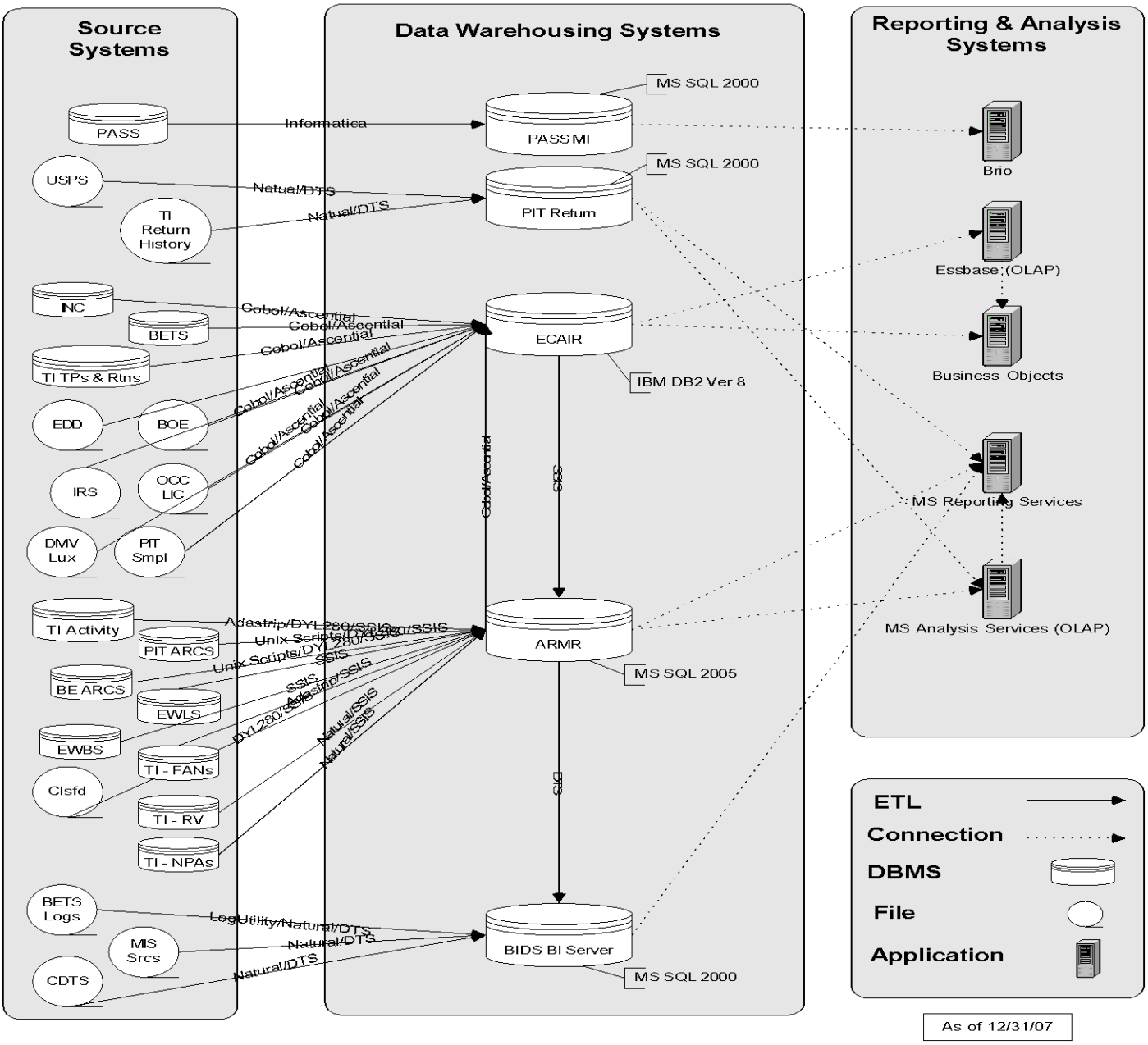


2.1.2 Current BI Technical Architecture and System Inventory

The current technical architecture for Business Intelligence parallels the data architecture and adds the process and delivery mechanisms for BI focused data.

Figure 2.1-2 illustrates the current technical architecture and environment of FTB's BI systems. The diagrams following the BI technical architecture depict the current technical systems inventory of the major BI systems at FTB. The diagrams show System Identity, User Community, Level of Usage, Data Content, Data Sources, Staff Resources, Hardware Resources and Software Resources.

Figure 2.1-2: Current BI Technical Architecture



2.2 Current Governance and Organization

The current BI organization and system architectures are tightly connected to the evolution of overall information technology services in the department since 1995. Prior to 1995, information technology services at FTB were "centralized" in one organization that serviced all FTB business areas. Until this time, information needs were primarily provided through mainframe applications that lent themselves to central control and management. The increasing use of personal computers and the emergence of distributed computing, coupled with a concern about the ability of the department to respond to rapid changes in technology for meeting business needs, prompted FTB to reorganize technology services into a "decentralized" model. Under this model, each major business area was responsible for developing and maintaining the specific technologies that supported their business activity.

Business activity influenced the emergence of BI at FTB as efforts to provide for reporting and analytical needs were tightly integrated with the deployment of each project. Just as each initiative was developed at different points in time, under different management, and in partnership with different vendors, so were corresponding BI efforts, for example:

- **ARMR** (Accounts Receivable Management Reporting System) implemented as a separate, parallel project, to ARCS in 2000.
- **PASS MI** (Professional Audit Support System Management Information) implemented as separate project, subsequent to PASS in 2004.
- **BETS Revenue Reports** implemented as a separate effort, subsequent to BETS, in 1997.
- **ECAIR** (Enterprise Customer, Asset, Income, & Returns) was implemented as the last phase of INC, in 2002.

These are not all of the BI systems developed during this period, but these examples illustrate the driving forces behind the existence the current "stove-pipe" BI systems and the efforts FTB is taking to transition to a more coordinated and cohesive architecture through organization and governance.

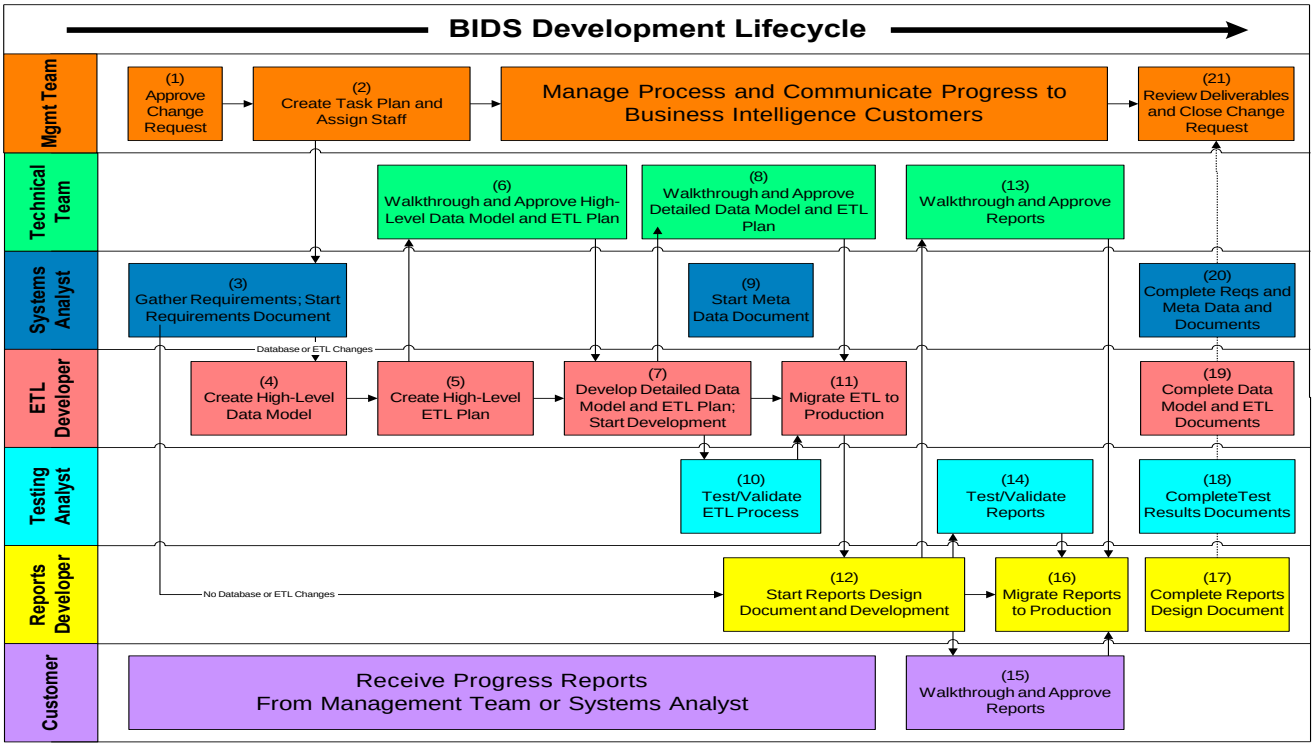
2.2.1 Business Intelligence and Data Services (BIDS)

The Business Intelligence and Data Services (BIDS) group was formed in early 2006 by consolidating most of the staff involved in supporting the analytical and reporting needs of FTB's business customers. One of the key goals of this consolidation was to examine the BI activities and practices and the technologies and tools for opportunities to reduce redundancies, standardize, and implement industry best practices. To minimize potential negative impact to customers, the staff was organized around the systems or activities they supported:

- **ARMR/PASS MI Unit**: This unit consists of analysts, developers, and testers that support ARMR and PASS MI.
- **ECAIR Unit**: This unit consists of analysts, developers, and testers that support the ECAIR data warehouse.
- **ADM BI Unit**: This unit consists of analysts and developers who support the PIT Return Data Mart, MIS Reports, and ad hoc reporting and other data services.

BIDS Development Lifecycle BIDS implemented a consolidated development lifecycle applicable to all BIDS development activity. BIDS considers a standardized development lifecycle key to improving their ability to effectively meet BI users' needs, increase the quality of data and products, and reduce potential redundancy and development costs. As part of this lifecycle, the BIDS Technical Team is empowered to approve or deny all proposed changes to the BI systems. This has helped the organization move away from the prior practices of development or system changes that ignored the impact to other BI systems or other development activities – practices the perpetuated "stove-pipe" systems. The following is a diagram of the BIDS Development Lifecycle:

Figure 2.2-1: BIDS Development Lifecycle



2.2.2 Other FTB Business Intelligence Activities

While BIDS is the primary provider of business intelligence reporting and analytics, other organizations within the department also engage in providing reports, analytics, and ad hoc support. These areas include:

Economic and Statistical Research Bureau – provides a wide range of reports and analytics relating to corporate and individual filing activity and demographics. The organization is responsible for overseeing the creation of annual samples of filing data that are critical for determining the potential impacts of changes in tax policy or trends in economic activity. The information is used for a variety of purposes, such as the department's Annual Report, news releases, revenue impact analyses, a variety of special studies, and providing answers to questions posed by other departmental units, other state departments, the Legislature, and the general public. Although the organization does not represent itself as a "provider of BI," many of their activities are clearly BI in nature.

Privacy, Security and Disclosure Bureau – develops security policies and procedures, including security measures for the protection of FTB's facilities, and to prevent, detect, and track unauthorized access to information technology systems, networks, and data. Some activity related to tracking data exchange agreements with third parties and analyzing system usage activity for potential violations of security policy are BI in nature.

Financial Management Bureau – in addition to other fiscal responsibilities, provides reports and analytical support relating to CALSTARS and Activity Based Costing (ABC). These activities are often considered to be within the BI umbrella.

Compliance Systems Bureau – provides some reporting and analytics related to various applications developed and maintained for audit and collection activity, including ad hoc support. BIDS often refers ad hoc support to this organization when requests actually need operational data associated to systems supported by this group. The organization is currently developing a BI application associated with the Court Ordered Debt Expansion (CODE) project.

Tax Systems & Applications Bureau – provides reporting and analytics relating to tax systems and web-based systems that support taxpayer activities through FTB's public website. Web statistics are collected using a commercial-off-the-shelf application and provided to users through FTB's intranet or through ad hoc support. BIDS also works with this organization when requests for data services need operational data associated to systems supported by this group.

Network Management Bureau – has responsibility for the design, implementation and day-to-day operation of the voice and data network infrastructure. Most notably, this organization has deployed a new call center system, Enterprise-Wide Customer Service Platform 2 (ECSP2), which includes a "Reporting Info Mart" that is a BI application focused on call center and IVR data.

2.2.3 Current Business Intelligence Users

Figure 2.2-2: Illustrates the type of user base for FTB BI systems

BI System	Type of Users			Total
	Casual Users	Power Users	Developers	
ARMR	500	12	5	**517**
PIT Return DM	50	11	4	**65**
ECAIR DW	20	10	5	**35**
PASS MI	100	3	3	**106**
Outside of BIDS	195	8	20	**223**
Total	**670**	**36**	**17**	**946**

3.0 Target Capabilities and Components

3.1 Target BI Data Architecture

A collaborative and cooperative target environment for Business Intelligence with no unplanned duplication and efficient use of licenses, staff and other resources requires three major requirements:

1. FTB will use single data inputs for key subject areas

a. Supports the business rule to prevent unplanned redundancy. Data will not be replicated unless there is a business need to do so (such as performance or security needs).
b. Requires each feed be assigned to a specific BI group. Responsibilities include: primary extraction of data, understanding and representing the data accurately, consulting as many stakeholders as possible to make sure that all needs of the enterprise are considered and met.
c. Requires a Governance Structure

2. FTB shall use a Common Data Architecture

a. Data must be compatible for distributed structure to work
b. Implies common keys and surrogate keys exist to ensure that data is being gathered consistently and integrated correctly for the same party
c. Requires standard definitions be developed
d. Implies data quality issues are addressed (preferably in the operational systems)

3. Compatible business intelligence technical and application architecture

a. An initial focus on a distributed structure that acknowledges the current mixed (heterogeneous) business intelligence environment and seeks to minimize short-term disruptions.
b. Level One data marts reflect major categories of data, consistent with the department's Enterprise Data Architecture. Level One data marts receive the enterprise data feeds
c. Level Two data marts use data sourced from level one data marts. May actually extract data for their use or simply provide direct reporting.
d. Implies common platforms and tools
e. FTB will incorporate Traditional and Operational BI to meet business needs

The Figure below represents the target BI data architecture illustrating the reuse of data from common data subject areas defined by the Enterprise Data Architecture and demonstrates no data redundancy is necessary. Uniqueness is inherent in the MODEL subject area to each of the business functions, yet the models will be able to relate to one another via the CUSTOMER subject area. This is for identifying a CUSTOMER with multiple problems across business functions.
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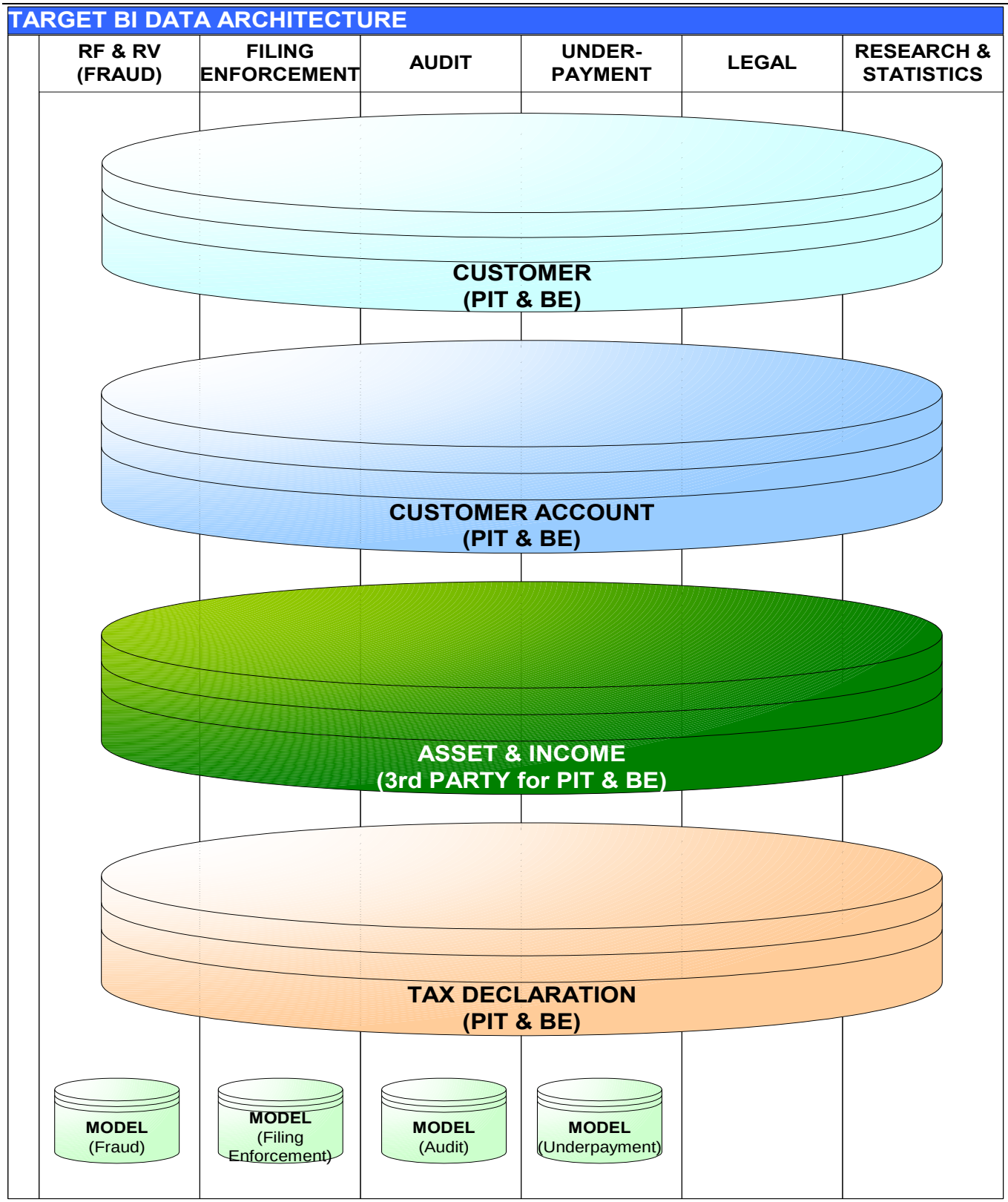
Figure 3.1-1: Target BI Data Architecture



3.1.1 Target Enterprise Data Warehouse Architecture

The data warehouse is an environment that must support three primary roles:

1. **Data Acquisition or Collection -** This is the intake role. Taking data from the operational support systems and placing it into the data warehouse environment.
2. **Data Distribution -** This is the role of making the data available for distribution to the end-user
3. **Data Access -** This is the role of providing easy/optimized access to information.

These three roles must be supported by a data architecture that is comprised of three physical tiers.

1. **Staging Area -** A Staging Area is defined as "any data store designed primarily to receive data into a warehousing environment". Other applications shall not access these datastores for any other purpose than loading the warehouse.
2. **Data Warehouse -** A Data Warehouse is defined as "a data structure that is optimized for distribution. It collects & stores integrated sets of data from staging and provides feeds to data marts." It The Data Warehouse is the *"trusted"* source of data to the enterprise. is *subject-oriented*, *integrated*, *time-variant* and *non-volatile*.

   Subject-oriented: A data warehouse is organized around major subjects, such as party/customer, tax declaration, customer account, and asset & income. Rather than concentrating on the day-to-day operations and transaction processing of an organization, a data warehouse focuses on the modeling and analysis of data for decision makers. Hence, data warehouses typically provide a simple and concise view around particular subject issues by excluding data that are not useful in the decision support process.

   Integrated: A data warehouse is usually constructed by integrating multiple heterogeneous sources, such as relational databases, flat files, and on-line transaction records. Data cleaning and data integration techniques are applied to ensure consistency in naming conventions, encoding structures, attribute measures, and so on.

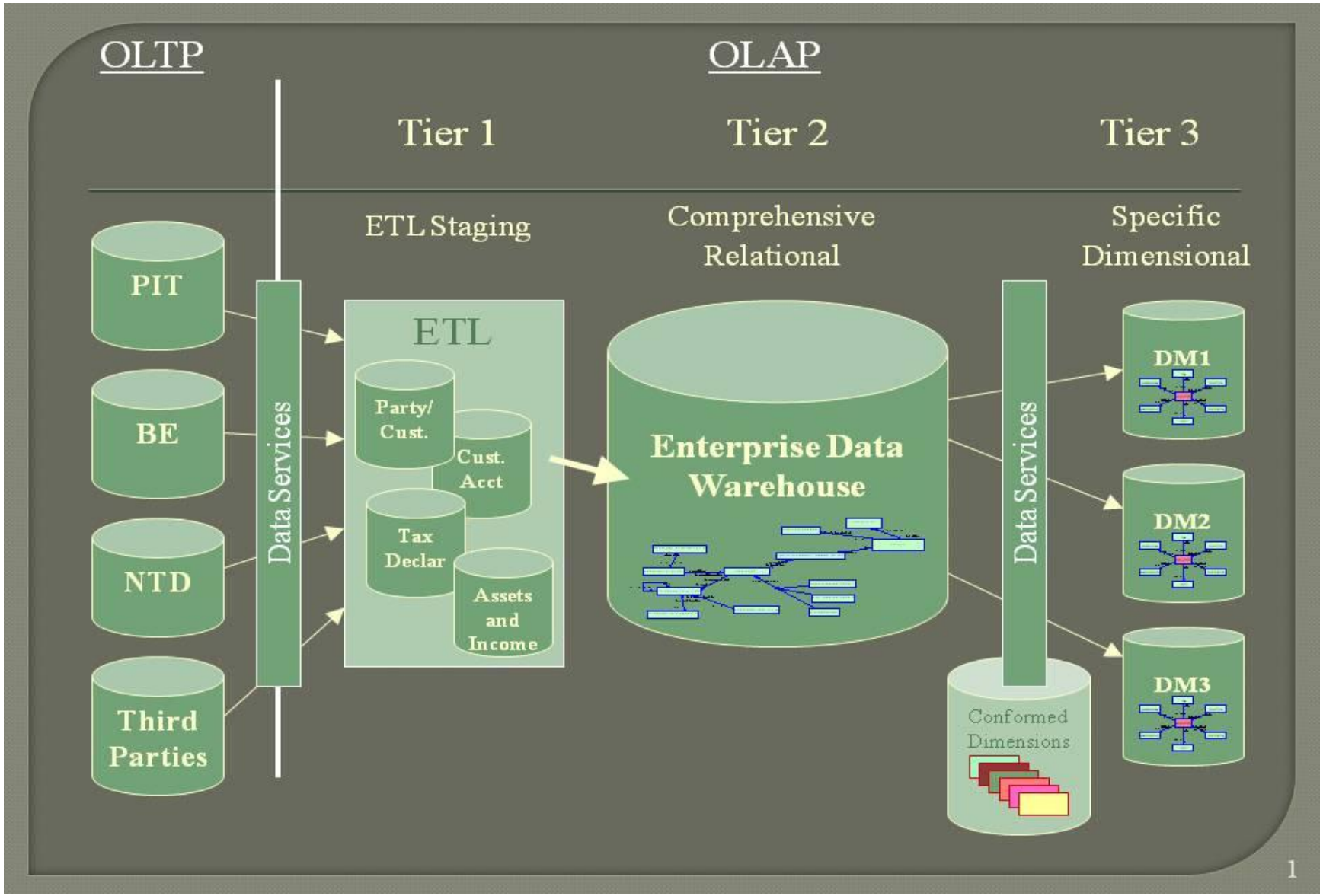
   Time-variant: Data are stored to provide information from a historical perspective (e.g., the past 5-10 years). Every key structure in the data warehouse contains, either implicitly or explicitly, an element of time.

   Nonvolatile: A data warehouse is always a physically separate store of data transformed from the application data found in the operational environment. Due to this separation, a data warehouse does not require transaction processing, recovery, and concurrency control mechanisms. It usually requires only two operations in data accessing: initial loading of data and access of data

3. **Data Marts -** A Data Mart is defined as "a data structure that is optimized for access. It is designed to facilitate end-user analysis of data. It typically supports a single analytic application for a distinct set of consumers."

   Figure 3.1-2 illustrates the three-tier architecture

Figure 3.1-2: Target Data Warehouse Architecture



3.2 Target BI Technical Architecture

This section discusses and illustrates traditional and operational BI in FTB's environment.

3.2.1 Target Traditional BI

Traditional BI will not be replaced by real-time or near real- time Operational BI. FTB has started the move toward the future in transitioning the ECAIR data warehouse to the enterprise level data warehouse. FTB will create standardized data inputs to the warehouse and create a staging area for stable and useable data (trusted data). The conformed data dimensions and data marts will be configured for reuse, performance and predictive analytics.

3.2.2 Target Operational BI

Operational BI will incorporate what may be called data sensors, data sensor networks and knowledge discovery persistence. Advanced analytics will allow for decision-making in real time. Operational BI focuses on providing real-time monitoring of business processes and activities as they are executed within computer systems. Data is captured at a point in time using logic and queries and saved by persistent data logging for future identity matching of situations and patterns.

3.2.2.1 Data Sensors explained

- **Data Sensors**

A Data Sensor is a software instrument (logic and/or query) that records specific parameters of a data stream and/or events. The sensors are constructed to record, measure, and then analyze the data stream against its history or other conditions as set by business rules (also see BPM Architecture Definition). A metaphor for a data sensor is much like an anemometer records wind speed. The wind speed is the selected data element that can be tested against performance parameters and/or its history. Wind data is then used to determine what construction methods and materials can be used to build a house in a high wind or low wind area. Data sensors at FTB could record the 1040 AGI and 540 AGI along with a TPs ID or other identifying data. A sensor can be a counter of blue-path returns. Added to the blue-path counter can be a blue path refund amount sensor and blue path remit amount sensor. Blue-path refund vs. remit amounts can be compared to counts. Date sensors may be added as well. Advanced implementations allow threshold detection, alerting and providing feedback to the process execution systems. PIT Return Data Mart would be a good candidate for Operational BI architecture.

The data sensor knows what the needle looks and feels like, so the rest of the haystack of data can be ignored.

- **Data Sensor Networks**

Data sensor networks consist of a set of distributed data sensors to cooperatively monitor operational conditions, such as return counts vs. amount, which returns impede operations, which business functions have faster turnaround time, and what patterns identify fraud or other threats. Data sensor networks can be business function specific. The following analogy will help one understand this concept. One pixel in a graphic will not let you envision the entire picture, as a set of pixels will allow you the possibility to see the entire picture. Likewise one sensor equals one pixel where a sensor network equals the entire picture.

An example of Operational BI at FTB may occur with return filing and verification (RF&V) activities for fraud threat detection. A Data Sensor Network is created for discovery and recording of the difference between what an employer reports on the employee's W-2 compared to the employee's filed return. This will immediately flag the return for fraud for either identifying the fraudulent employer or that employee. For employer fraud, patterns will need to be discovered over time. These patterns are stored and then future referenced as data passes through the operational systems. This is an example of data learning from data and queries learning from queries. The benefit of Operational BI for fraud activities is identification of a problem before refunds are issued. A Sensor Network can be created specifically for fraud activities or other modeling needs where data is available to perform these tasks.

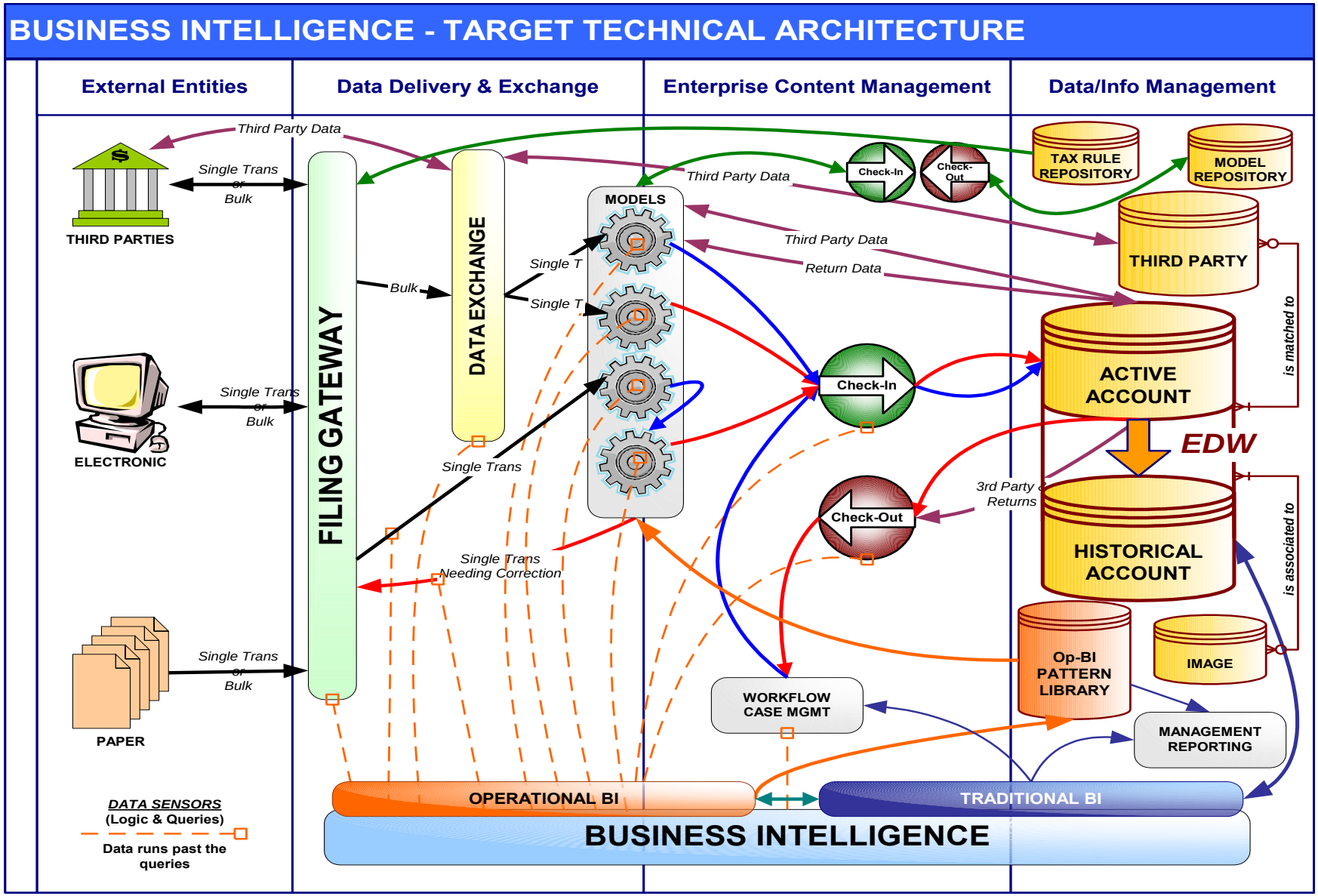
The target data warehousing/BI environment will reduce or eliminate the snapshot concept and the batch extract, transform and load (ETL) that has dominated since the very beginning. The majority of developmental dollars and a massive amount of processing time is used retrieving data from operational databases.

Additionally, the target data warehousing/BI environment at FTB will:

- eliminate write then detect extract process;
- read the same data stream that flow into and between the operational system modules;
- create data that is meaningful to the data warehouse environment by the operational system to a queue as it was created.

In Figure 3.2-1 on the next page, the architecture data delivery, content management, and data management are shown as vertical functions where business intelligence traverses these functions. The details of data delivery, content management and data management are addressed in their appropriate architecture definition documents. Note the data sensors testing selected values that are of interest to the enterprise throughout the entire life cycle of a tax declaration.

Figure 3.2-1: Target BI Technical Architecture (Operational with Traditional)



3.3 Target Enterprise Governance

3.3.1 Business Intelligence and Performance Management Maturity Curve

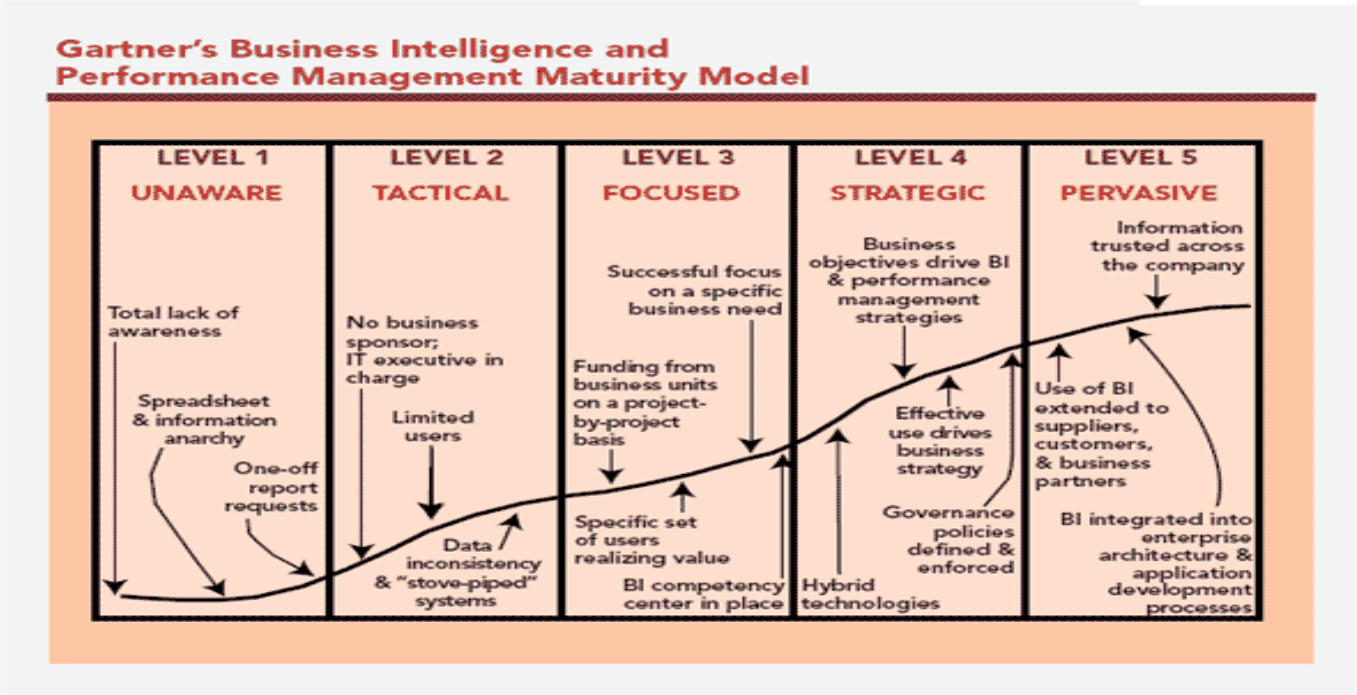
FTB's target BI organization must be tightly connected to the business goals and objectives of the enterprise. The Gartner Group offers a useful tool for understanding where an organization is with regard to BI and what it needs to do to move to the next level. Gartner refers to this tool as the "Business Intelligence and Performance Management Maturity Curve." The curve is based on the real-world phenomenon that organizational change is usually incremental over time.

FTB is currently "**Level 3 – Focused**" category. The recommendations for moving to the **Level 4 – Strategic** level include:

- *Meet with current users to understand how they are leveraging the data and determine if there is additional information you can provide to improve their decision-making processes and their ability to impact the business objectives.*
- *Work with other business units that are key to achieving corporate goals.*
- *Establish a BI Competency Center (BICC) under the Data and Business Centers of Excellence, which is a group of business, IT and information analysts working together, virtually or actively, to define business intelligence strategies and requirements.*
- *Look for opportunities to move to a more overall business-driven vision, by focusing on an architectural approach to support the appropriate tools and applications needed by a broad range of users.*

FTB will use the Gartner Group Business Intelligence and Performance Management Maturity Model to move to Level 4 and to Level 5 to measure BI's effectiveness to the enterprise.

Figure 3.3-1: Gartner's BI & PM Maturity Model



As illustrated in the above chart, the BI & PM Maturity Curve is based on a model that describes the transition in five levels. For the purposes of this document, FTB's current level of 3, and target levels of 4, & 5 are explained:

Level 3 – Focused: Successful BI initiatives deployed, supporting defined business initiatives; one or more business sponsors; metrics are formally defined to analyze specific departmental or functional performances; analytic applications deployed with ongoing user training for a larger number of users across different departments; information often still resides in stove-piped databases, reports, applications, and spreadsheets.

Level 4 – Strategic: BI Competency Center (BICC – discussed later in this document) is in place; dynamic and proactive effort to use BI to meet strategic business goals; funding considered strategic, not just a cost center; well defined repeatable processes in place; effort to reduce unnecessary redundant tools and away from stove-piped systems.

Level 5 – Pervasive: BI is part of corporate culture; information is trusted and valued; scope of BI initiatives extended, sometimes to include external customers/suppliers; BI integrated into business processes; BI is pervasive across systems, applications, technologies and devices. There are real-time, online systems that are broadly, pervasively and effectively used.

3.3.2 Business Intelligence Competency Center (BICC)

One of the key recommendations for moving an organization's BI effort to the next level is establishing a Business Intelligence Competency Center (BICC). Establishing competency centers is a best practice for promoting the effective use of technologies or processes that have widespread impact on organizations and would benefit from cross-functional communication and direction, or governance. The BICC will be a part of the Data Center of Excellence and the Business Center of Excellence.

BICC Defined: A BICC consists of a small team of BI experts consisting of a balanced mix of business users, IT providers, and information analysts. Their basic charter is linking FTB's business-driven goals and objectives with the information, applications, processes, training, policies, and technology necessary to promote the effective use of BI across the organization.

4.0 Gap Analysis

4.1 BI Gap Analysis Defined

A major issue with BI at FTB is the massive amount of data that needs to be extracted, transformed and loaded (ETL) to a data warehouse system. The operations and analysis performed on this data and the ETL process, is performing at a decreasing rate. Performance of our BI systems is a primary complaint from the business community.

Although the Enterprise Customer, Asset, Income and Return (ECAIR) data warehouse is becoming enterprise focused, there are no rules or standards to pull the 3rd Party data into FTB's data stores. Currently, 3rd Party data is not managed and is not using a stable front-end to load the data. This results in data that is unusable. Many of the data feeds are hand coded resulting in reduced data quality.

FTB will develop and maintain a central metadata repository for the enterprise, and eliminate multiple silo metadata repositories around FTB. Metadata should not be hand coded/entered.

4.2 Gap Analysis Table

Figure 4.2-1 discusses the changes required to close the gap between FTB's current BI architecture and the target BI architecture.

Figure 4.2-1: Gap Analysis Table

DATA & TECHNICAL DOMAIN	GAP	CHANGE REQUIRED	BENEFITS	RISKS	IMPACT
Performance degradation will become increasingly problematic as more Third Party Data is added.	The addition of more data for modeling is slowing performance of the database.	Restructure DW Partition DW Use best practice query algorithms. Use Decision Analytics. Employ or train staff in higher mathematics and statistics to create algorithms for performance	Data is to be either restructured/normalized and/or partitioned to support future quantities of data. More attention to query algorithms must be developed to support more data. Making modeling faster will allow RF&V to	If data is not restructured either by normalization, partitioning, and/or query algorithm improvements, then the data warehouse for modeling will continue to take longer result times. This will contribute for the need of more computing and personnel resources.	**High**

DATA & TECHNICAL DOMAIN	GAP	CHANGE REQUIRED	BENEFITS	RISKS	IMPACT
		for ETL and Intelligence algorithms for Analytics.	generate notices more quickly and accelerate revenue to FTB. The restructure would include better structures for OLAP processing as well as better time slicing of OLTP data		
Real time Tax Rule Creation and Modification	Business Rules are hard coded in software applications.	Remove Tax Business Rules from software application code. Create Tax Business Rule Repository and Tax Business Rule Management engine. BI needs to support and/or work with the Business Process Management area.	Real time Tax Rule Creation and Modification will allow FTB to: • Identify potential trends, strategies, and adjustments • Fine tune and adjust the validation and verification processes	Need to separate the tax validation rules from the software application code, and store these rules and business knowledge facts into separate agile data stores. If this is not accomplished, annual changes costs will continue to be expensive as IT staff will always need to change the business rules in the application code.	**High**
Single enterprise feeds for key subject areas, or single data warehouse.	BI at FTB has Awareness of the key subject areas, but they are not implemented. 3rd Party data is not loaded in any one place or method. Incomes in many forms, times, and areas. Some ETL logic is hand coded. ETL should be only automated.	Projects must comply BI requirements, and be responsible for their processes to feed the warehouse. This must be automated as much as possible via direct feeds from the business	Reduces cost of now capturing the data in one place, and not having to recapture the same data for each database or application that uses the data. Supports the business rule to prevent unplanned redundancy. Data will not be replicated unless there is a business need to do so (such as performance or security needs). Creates a stable front	Governance needs to be a prime concern for feeding the data warehouse from return and third party data. Multiple non-standard or redundant data feeds will add to the cost of doing business in the area of cleansing the data after the fact to conform to the DW.	**High**

DATA & TECHNICAL DOMAIN	GAP	CHANGE REQUIRED	BENEFITS	RISKS	IMPACT
			end giving way to useable data.		
Compatible data architecture and BI Methodology. & Compatible business intelligence technical and application architecture	FTB does have a target data architecture that is generally accepted or is completely ignored. A consistent BI methodology is required along with the target data, technical and application architectures. Before an OLTP system is created, BI must be considered in the planning stage or FSR stage.	Establish the BI Competency Center Enforce the target architecture, through Enterprise Architecture and the BI Competency Center (BICC). Accept or develop a compatible methodology for BI and FTB business.	Consistency in the development and deployment of BI systems.	The risk not to have a compatible architectures and BI methodology will continue to result in poor data quality, complex ETL, higher resource costs, and poor performance.	**High**
Enterprise Metadata Repository for OLTP and OLAP	Metadata Repositories are silo and hand code. No metadata standards are adhered to.	FTB needs to govern and create a central enterprise metadata repository that is compatible with industry metadata standards	Consistent and Contextual meaning of data reduces the cost of staff trying to analyze each piece of data for meaning and use each time it is used. If it is defined upfront and made useful, then time and cost is minimized for delivery of the BI product.	Governance and creation of a central or federated metadata repository is imperative in BI. If this is not done costs will remain high in developing BI products to the business.	**High**

4.3 Strategies

- **Continue organizational consolidation of BI functions**. The effort to consolidate BI functions, which began in 2006, has helped to reduce redundant activities and initiate standardization of processes and practices. Some additional BI activities continue in the department, outside of the organization with primary responsibility for BI. Continued consolidation of these activities will help to prevent the proliferation of siloed stovepipes and promote a single vision and clear responsibility toward meeting enterprise goals and objectives.
- **Strengthen communication between BI users and BI providers**. Establish the BI Competency Center (BICC). BI providers must have a clear understanding of those expectations and have a communication process in place that continually updates those expectations, as conditions change. Conversely, BI users must be fully aware of the BI products and services available to them to meet their business goals.
- **Strengthen the link between BI initiatives and corporate planning efforts**. While BI at FTB has successfully met some business areas' tactical needs, moving to the next level, in the BI Maturity Curve, requires a stronger focus on the strategic direction of the organization. A stronger link to corporate planning efforts will help propel BI to be a strategic enterprise resource.
- **Utilize BI maturity assessment tools to identify additional opportunities for growth**. A number of assessment tools are available for uncovering potentially hidden opportunities or risks specific to BI organizational efforts. One of the most recognized sources for these tools is The Data Warehouse Institute and available on their website: http://www.tdwi.org/
- **Implement the Business Intelligence Competency Center**. Deployment of a BICC is a widely accepted best practice for organizations interested in ensuring their BI efforts are in line with business goals and objectives and that their BI customers effectively use the products and services available from their BI providers.

5.0 Roadmap

Target BI at FTB will focus on the analytics and reporting both in real-time operational and traditional analytical. Figure 5-1 identifies the phases and sub-phases to reach the target BI architecture.

Figure 4.3-1: Business Intelligence Architecture Definition Phases

Task Name	Scheduled Work (in hours)
Business Intelligence	**8,204**
Business Intelligence - PHASE I	**2856**
Business Intelligence Planning	
Coordinate BI Planning with Enterprise Data Management & Data Services	160
Plan and Document Metadata Repository	240
Document Business Intelligence Plan	160
Review Business Intelligence Plan	40
Enterprise Data Warehouse (EDW) Analysis	
Determine EDW Requirements	120
Develop EDW Logical Data Model	120
Analyze Requirements and Identify EDW Tables	112
Milestone - Agreement on EDW Data Contents	
Enterprise Data Warehouse Design	
Determine Design Approach	96
Document Design Approach	80
Review Design Approach	40
Enterprise Data Warehouse Data Model Design	
Analyze Requirements and Identify EDW Tables	80
Design EDW Views Template	80
Design EDW Physical Data Model	40
Enterprise Data Warehouse Population Design	
Validate Data Replication	24
Design EDW Population Approach	80
Document Data Warehouse Population Approach	40
Review EDW Population Approach	16
Design EDW Population Template	80
Review EDW Population Template	16
Enterprise Data Warehouse Data Services Design	
Design EDW Data Service Approach	80
Document EDW Data Service Approach	40
Review EDW Data Service Approach	16
Design EDW Data Service Template	80
Review EDW Data Service Template	16
Milestone - EDW Design Complete	
Enterprise Data Warehouse Build & Test	
Build Automation Script for generating View code	80
Confirm EDW Environment	40
Enterprise Data Warehouse Data Structures Build & Test	
Build EDW Database	80
Build EDW Views	80
Enterprise Data Warehouse Data Services Build & Test	
Develop, Test & Review Data Services	360
Enterprise Data Warehouse Population Build & Test	
Develop, Test & Review Replication Process	360

Develop, Test & Review Population Processes	360
Milestone - EDW Build & Test Complete	0
Business Intelligence - PHASE II	**1100**
Underpayment - Replicate/Decouple Workflow Rules Analysis	
Determine Workflow Rule Requirements	80
Create Workflow Rule Model	40
Document Workflow Rule Requirements	20
Review Workflow Rule Requirements	16
Milestone - Agreement on Workflow Rule Requirements	0
Underpayment Modeling - Data Mart Analysis	
Determine Data Mart Requirements	40
Create Data Mart Logical Data Model	40
Document Data Mart Requirements	20
Review Data Mart Requirements	16
Milestone - Agreement on Data Mart Requirements	0
Underpayament Modeling - Data Mart Design	
Design Data Mart (Facts and Dimensions)	40
Design Data Mart - Cube Implementation	40
Create Data Mart Physical Data Model	40
Document Data Mart Design	20
Review Design of Financial and Performance Data Marts	16
Milestone - Agreement on Design of Financial and Performance Data Marts	0
Data Mart ETL & Data Services Design	
Design Data Mart ETL & Data Services Approach	80
Document Data Mart ETL & Data Services Approach	40
Review Data Mart ETL & Data Services Approach	16
Data Mart Build & Test	
Data Mart Data Structures Build	120
Confirm Data Mart Environment	20
Build Data Mart Data Structure	40
Milestone - Data Mart Data Structures Build Complete	0
Data Mart ETL & Data Services Build	
Develop, Test, Review Data Mart ETL & Data Services	176
Data Mart Build - Cube Implementation	
Confirm Financial Data Mart - Cube Implementation Environment	20
Build Data Mart - Cube Implementation	160
Milestone - Data Mart Build Complete	0
Business Intelligence - PHASE III	**1856**
Business Intelligence Filing Enforcement (FE) Modeling - PHASE III-A	**928**
FE Modeling - Data Mart Analysis	
Determine Data Mart Requirements	40
Create Data Mart Logical Data Model	40
Document Data Mart Requirements	20
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Create Data Mart Physical Data Model	40
Document Data Mart Design	20
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FE Data Mart ETL & Data Services Design	
Design Data Mart ETL & Data Services Approach	80
Document Data Mart ETL & Data Services Approach	40
Review Data Mart ETL & Data Services Approach	0
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Data Mart Data Structures Build	120
Confirm Data Mart Environment	20
Build Data Mart Data Structure	40
Milestone - Data Mart Data Structures Build Complete	0
Data Mart ETL & Data Services Build	
Develop, Test, Review Data Mart ETL & Data Services	176
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Confirm Cube Implementation Environment	20
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Create Data Mart Logical Data Model	40
Document Data Mart Requirements	20
Review Data Mart Requirements	16
Milestone - Agreement on Data Mart Requirements	
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Design Data Mart - Cube Implementation	40
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Milestone - Agreement on Data Mart Design	
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Design Data Mart ETL & Data Services Approach	80
Document Data Mart ETL & Data Services Approach	40
Review Data Mart ETL & Data Services Approach	0
Audit Data Mart Build & Test	
Data Mart Data Structures Build	120
Confirm Data Mart Environment	20
Build Data Mart Data Structure	40
Milestone - Data Mart Data Structures Build Complete	0
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Milestone - Data Mart Build Complete	0

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Determine Operation BI Requirements	80
Create Operational BI Logical Data Model	120
Create Operational BI Rules for Fraud Modeling	160
Document Fraud Operational BI Requirements	40
Review Fraud Operational BI Requirements	32
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Determine Data Mart Requirements	60
Create Data Mart Logical Data Model	60
Document Data Mart Requirements	32
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Data Mart Build - Cube Implementation	
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Design OpBI Data Services Approach	120
Document OpBI Data Services Approach	40
Review OpBI Data Services Approach	32
Fraud OpBI Build & Test	
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Build OpBI Data Services	120
Confirm OpBI Environment	20
Develop, Test, Review OpBI Data Structures & Data Services	360
Milestone - OpBI Data Structures & Data Services Build Complete	

6.0 Appendix

6.1 Definitions

BICC – Business Intelligence Competency Center

CONFORMED DIMENSION - A dimension shared across fact tables. This guarantees that the same terminology and values will be used throughout all reporting in the organization, which eliminates departmental conflicts over terminology definitions and relates one truth to all users.

DATA QUALITY - Data Quality is accurate and consistent data resulting in useable information and knowledge.

DIMENSION - A table that identifies a major perspective of a business data set such as Customers

ECAIR - Enterprise Customer, Asset, Income and Return data warehouse

FACT - A table that holds the metrics for a given subject area such as units sold

OPERATIONAL BUSINESS INTELLIGENCE – See Section 3.3.2

PREDICIVE ANALYTICS and **PREDICTIVE TAX COMPLIANCE MANAGEMENT** – See Section 3.3.4

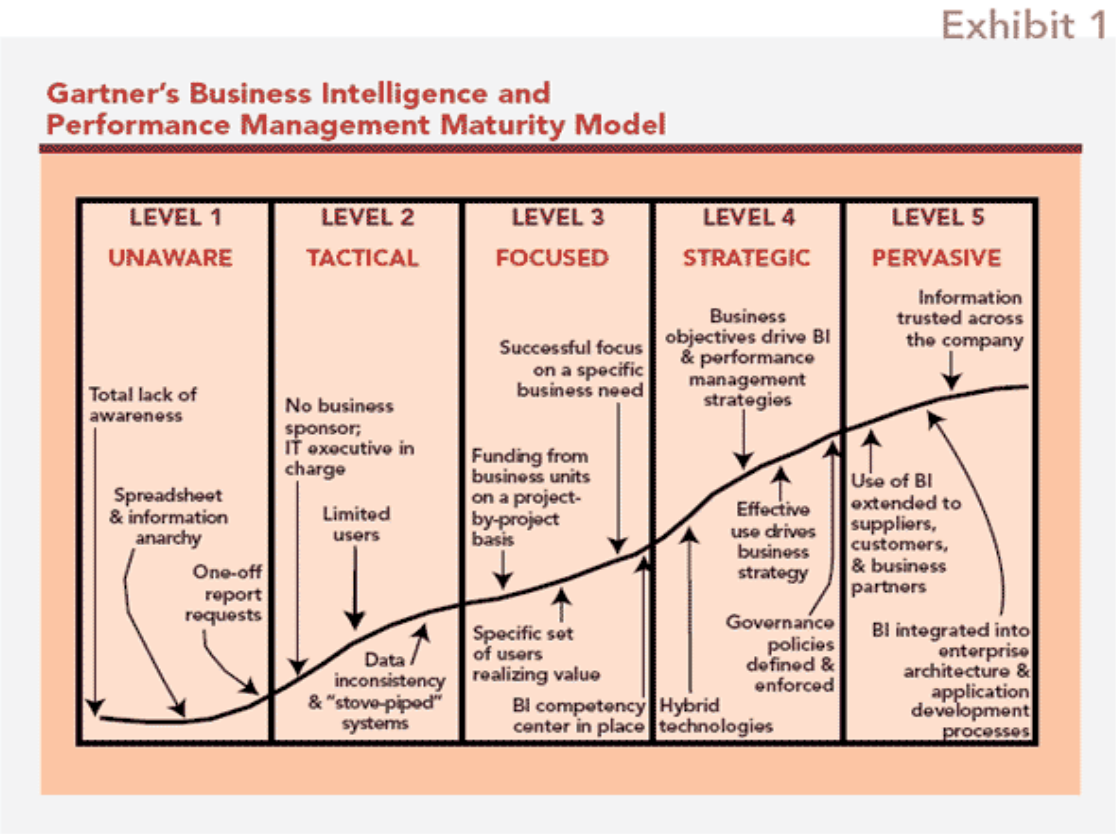
TRADITIONAL BUSINESS INTELLIGENCE – See Section 3.3.1

TRUSTED DATA – Trusted Data comes from a central source (i.e., Enterprise Data Warehouse) where the data has been formatted and verified for quality and use for all downstream processes and datastores.

6.2 Industry Best Practices

As illustrated in section 2.2.2.1, the composition of the target BI organization must be tightly connected to the business goals and objectives of the overall organization. The Gartner Group offers a useful tool for understanding where an organization is with regard to BI and what it needs to do to move to the next level. Gartner refers to this tool as the “Business Intelligence and Performance Management Maturity Curve.” The curve is based on the real-world phenomenon that organizational change is usually incremental over time.

Figure 6.2-1: Gartner's BI & PM Maturity Model



6.3 Industry Trends

The current industry trend for BI is the move toward adding operational intelligence analytics to the current BI toolbox. Operational BI stems from the ability to be proactive running the business versus reactive.

FTB can benefit by Operational BI analytics as seen with such BI systems in the PIT Return Data Mart, some of the ARMR and PASS MI, as well as INC. Not all BI would require operational real-time data, as there will always be the need for historical financials and other traditional BI reporting. The greatest value using Operational BI would be in the area of Fraud Detection Modeling before a refund is sent to the customer.

6.3.1 Traditional Business Intelligence – (also called Static BI)

Traditionally, reporting drives BI. At the simplest level, a report is the rendering of information requested from existing data, with at least some level of formatting and usually some added calculations, such as subtotals and totals at a minimum. An interactive pivot table doesn't really change the nature of a report. The ability to select parameters, for instance, is actually a reporting application surrounding just another report. Latency is another issue for BI where most of the data analysis is after the fact

reporting on events that have already passed. Offline knowledge discovery for tax compliance functions include but not limited to:

- Predictive analysis from distributed heterogeneous data
- Mining unusual patterns from massive and disparate return and financial data

6.3.2 Operational Business Intelligence - (also called Dynamic BI)

Real time operational business intelligence is the process of delivering information about business operations without any latency. In this context, real time means delivering information in a range from milliseconds to a few seconds after the business event. While traditional business intelligence presents historical information to users for analysis, real time business intelligence compares current business events with historical patterns to detect problems or opportunities automatically. This automated analysis capability enables corrective actions to be initiated and or business rules to be adjusted to optimize business processes. Additionally, operational BI gives the organization the ability to identify a threat such as fraud so that action can be taken before a refund or any monies are in an unlikely customer's possession.

Gartner Reports[4]:

"Real-time analytics demand real-time data warehousing. Know the critical issues facing the real-time warehouse and understand both your options and the decision criteria that drive your architectural choices.

Key Findings

- *Real-time data warehouses are defined by the presence of a single real-time updated data attribute as required by a business analysis.*
- *There are actually three classes of data warehouse refresh or update rates: periodic, intra-day and real-time.*
- *Business users tend to insist on real-time updates even when they are unable to affect business outcomes.*

Recommendations

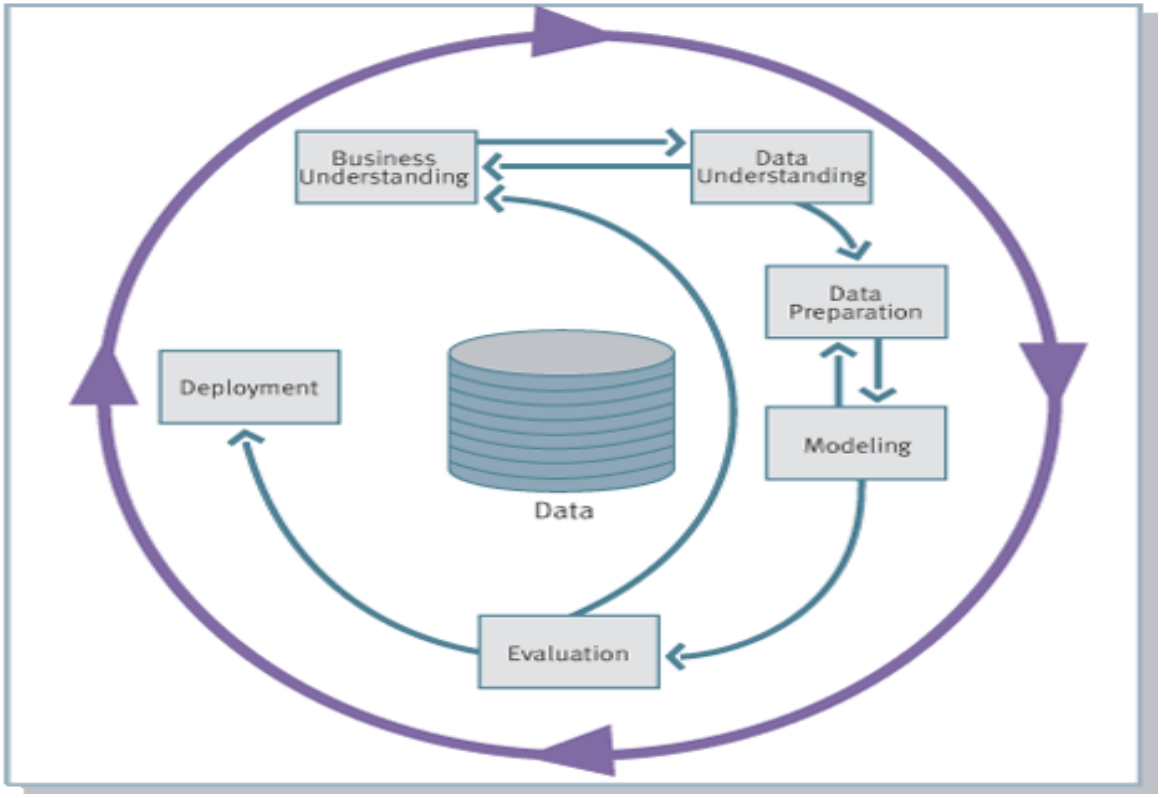
- *Create real-time data attributes in your data warehouse that are attached to real-time business drivers that influence business operations in real-time.*
- *Avoid the false assumption that a real-time data warehouse requires real-time feeds for all sources.*
- *Utilize data staging areas such as operational data stores, data integration hash files and near-real-time partitions to manage real-time data to periodic data relationships.*

6.3.3 Methodology - CRoss Industry Standard Process for Data Mining (CRISP-DM)[6]

CRoss Industry Standard Process for Data Mining (CRISP-DM) is a data mining methodology that has been developed as an industry- and tool-neutral data mining process model. CRISP-DM is a methodology that makes data mining and predictive analytics projects more efficient, better organized, more reproducible, more manageable and more likely to yield business success. Even small-scale data mining investigations benefit from using this methodology

The CRISP-DM process model for data mining provides an overview of the life cycle of a data mining project. It contains the corresponding phases of a project, their respective tasks and relationships between these tasks. At this description level, it is not possible to identify all relationships. An electronic copy of the CRISP-DM Version 1.0 Process Guide and User Manual is available at http://www.crisp-dm.org/index.htm

Figure 6.3-1: Phases of the CRISP-DM Process Model



The life cycle of a data mining project consists of six phases. The sequence of the phases is not strict. Moving back and forth between different phases is always required. It depends on the outcome of each phase which phase, or which particular task of a phase, that has to be performed next. The arrows indicate the most important and frequent dependencies between phases.

The outer circle in the figure symbolizes the cyclic nature of data mining itself. A data mining process continues after a solution has been deployed. The lessons learned during the process can trigger new, often more focused business questions. Subsequent data mining processes will benefit from the experiences of previous ones.

Below follows a brief outline of the phases:

Business Understanding
This initial phase focuses on understanding the project objectives and requirements from

a business perspective, and then converting this knowledge into a data mining problem definition, and a preliminary plan designed to achieve the objectives.

Data Understanding
The data understanding phase starts with an initial data collection and proceeds with activities in order to get familiar with the data, to identify data quality problems, to discover first insights into the data, or to detect interesting subsets to form hypotheses for hidden information.

Data Preparation
The data preparation phase covers all activities to construct the final dataset (data that will be fed into the modeling tool(s)) from the initial raw data. Data preparation tasks are likely to be performed multiple times, and not in any prescribed order. Tasks include table, record and attribute selection as well as transformation and cleaning of data for modeling tools.

Modeling
In this phase, various modeling techniques are selected and applied, and their parameters are calibrated to optimal values. Typically, there are several techniques for the same data mining problem type. Some techniques have specific requirements on the form of data. Therefore, stepping back to the data preparation phase is often needed.

Evaluation
At this stage in the project you have built a model (or models) that appears to have high quality, from a data analysis perspective. Before proceeding to final deployment of the model, it is important to more thoroughly evaluate the model, and review the steps executed to construct the model, to be certain it properly achieves the business objectives. A key objective is to determine if important business issues have not been sufficiently considered. At the end of this phase, a decision on the use of the data mining results should be reached.

Deployment
Creation of the model is generally not the end of the project. Even if the purpose of the model is to increase knowledge of the data, the knowledge gained will need to be organized and presented in a way that the customer can use it. Depending on the requirements, the deployment phase can be as simple as generating a report or as complex as implementing a repeatable data mining process. In many cases it will be the customer, not the data analyst, who will carry out the deployment steps. However, even if the analyst will not carry out the deployment effort it is important for the customer to understand up front what actions will need to be carried out in order to actually make use of the created models.

CRISP-2.0: Updating the Methodology

Many changes have occurred in the business application of data mining since CRISP-DM 1.0 was published. Emerging issues and requirements include:

- *The availability of new types of data—text, Web, and attitudinal data, for example—along with new techniques for pre-processing, analyzing, and combining them with related case data*

- *Integration and deployment of results with operational systems such as call centers and Web sites*
- *Far more demanding requirements for scalability and for deployment into real-time environments*
- *The need to package analytical tasks for non-analytical end users and integrate these tasks in business workflows*
- *The need to seamlessly integrate the deployment of results and closed-loop feedback with existing business processes*
- *The need to mine large-scale databases in "situ", rather than exporting an analytical dataset*
- *Organizations' increasing reliance on teams, making it important to educate greater numbers of people on the processes and best practices associated with data mining and predictive analytics*

Figure 6.3-1 above is supported by the industry direction and methodology as prescribed by the CRISP-DM processes both in versions 1.0 and CRISP-DM 2.0. CRISP—DM 2.0 supports the need to mine large-scale databases in "situ" meaning operational databases, rather than exporting large-scale analytical data stores. FTB will have the need for real time analytics as well as logging storage of these results.

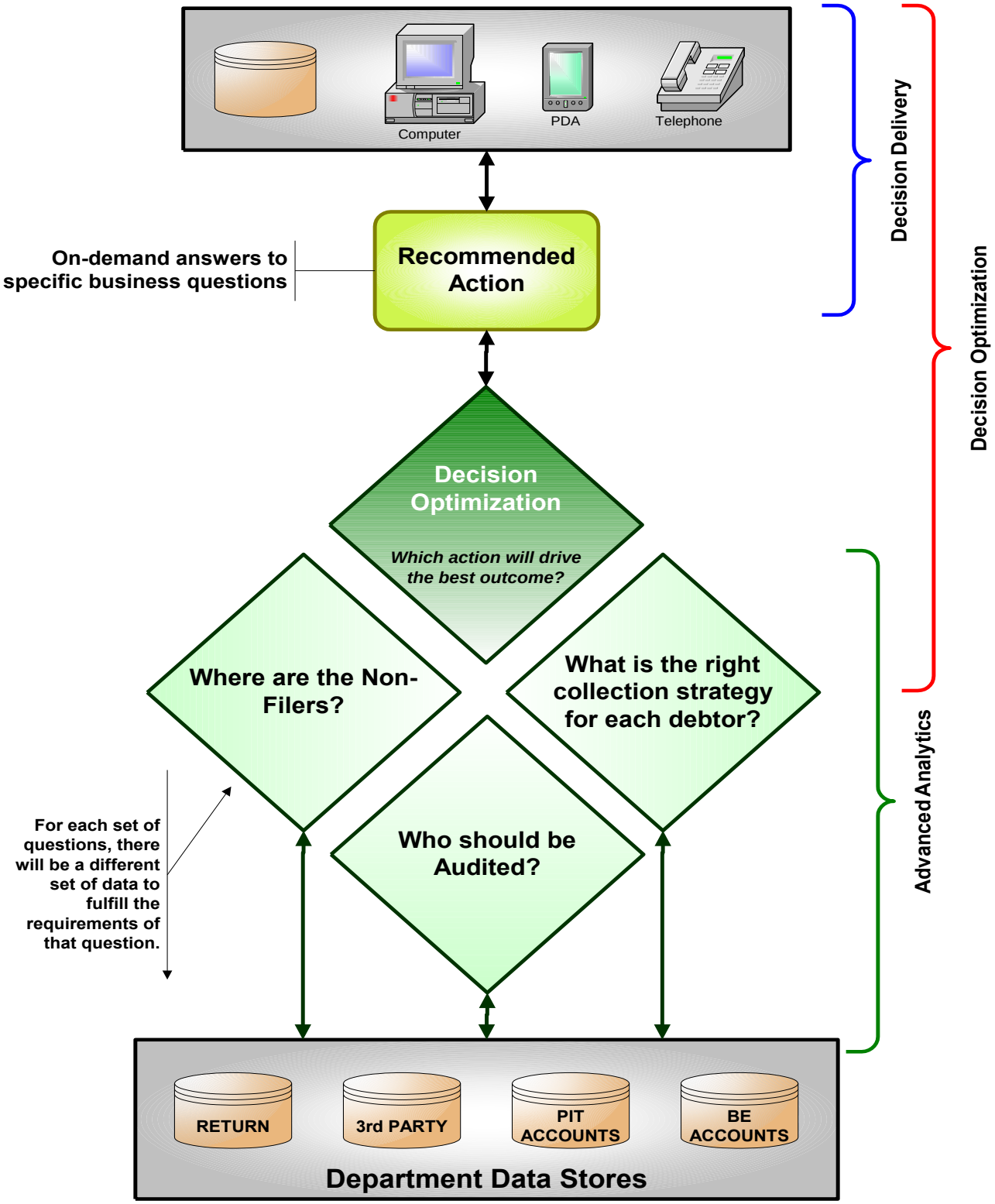
6.3.4 Business Intelligence Predictive Tax Compliance Management

FTB manages large, disparate sources of data that contain the hidden knowledge needed to improve compliance operations. This hidden knowledge that can be found in Third Party data, has enormous potential for improving decision making, but cannot be manually extracted and put to use. Most of this data is in house at FTB, but not accessible or available at the enterprise level. Advanced analytics, is the process of uncovering patterns and relationships in data. For tax administrators, these patterns improve decision making by uncovering areas for compliance process improvement—helping FTB make better, timelier decisions to achieve their goals.

BI with data mining produces predictive models to improve non-filer discovery, audit selection and collections management. Based on the results from using advanced analytics, FTB can determine which actions will drive the best outcome, and then deliver those recommended actions to the systems or people that can take appropriate action. In tax compliance management, the goal of data mining is to discover "knowledge" that enables a tax agency to optimally focus limited resources to detect non-compliance, and ultimately enhance voluntary compliance. In order to achieve compliance,

Advanced analytics such as data mining are used to examine the way in which tax compliance management issues relate to data on past, present, and projected future actions. Advanced analytics include statistical, mathematical and other algorithmic techniques, and are more complex than the basic analytics used to compute frequencies, cross-tabs, and query and reporting cubes. Advanced analytics complement basic analytic environments such as OLAP and reporting—providing deeper levels of insight. Advanced Predictive Analytics is more than running SQL against a data warehouse. The figure below illustrates a predictive analytics framework for tax compliance management.

Figure 6.3-2: Predictive Analytics Framework for Tax Compliance Management



Attachment: A2.2.EAD_BPM

California Franchise Tax Board (FTB)

Enterprise Services
BPM Architecture Definition

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	02-01-2008	Replace Gartner Phases with BPM Stages.	
	04-16-2008	Format and word changes	3.4 jw

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1.0 Executive Summary and Charter

1.1 Overview

Business Process Management (BPM) is a discipline at the intersection of management and information technology. BPM encompasses methods, techniques and tools to design, enact, and control business processes involving humans, organizations, applications, documents and other sources of information. BPM leverages tools (software) and solutions (integration) that depict, analyze and optimize business processes and workload management. Business rules and processes are registered centrally and delivered to the enterprise effectively and efficiently.

FTB has identified significant opportunities that are achievable by automating and integrating business processes internally as well as with external parties (e.g., data providers). Currently, FTB creates, operates and manages processes within individual Systems of Work (SOW) tied to the organizational structure rather than operational function. This has resulted in process redundancy and outcome discrepancy (i.e. multiple notices, different tax amounts, etc). Additionally, workflow steps between systems are manual and a source of costly rework.

FTB business processes and workflow are implementations of business rules that reflect FTB's policies, procedures and legislation. Today, workflow is implemented in applications that range widely in terms of processing capabilities, technologies used, communication protocols, security methodologies, and programming languages.

FTB's customers are individuals and business entities. FTB performs business functionality for their customers on all transactions submitted. Once the transactions are identified with an entity, the transaction is associated and processed as an entity centric event. BPM solutions better service the transactions, cases and associated entity information by creating clear metrics, tracking, and reporting.

FTB will deploy BPM solutions to achieve effective and efficient, enterprise-wide workflow, business rules management, and case management. The mature BPM architecture leverages the following architecture components to accomplish the desired effectiveness and efficiency:

- Business intelligence continually discovers additional reengineering opportunities.
- IAM determines human access to the information, cases, and associated workflows.
- ECM incorporates images (in/outbound) into the automated workflow processes.
- DDM provides the most appropriate information for the automated workflows steps.
- SOA services provide functionality for processing work at any and all workflow steps.

1.2 Scope

The BPM architecture definition defines the current and target states of FTB's Business Process Management architecture, a gap analysis and a strategy for implementation. The following list contains the subject areas covered:

- Governance to support BPM
- Business Process
- BPM as a discipline
- BPM-enabling technologies

1.3 General Requirements

The following table outlines the high-level requirements of the BPM Architectural Definition.

Figure 1.3-1: BPM Architectural Definition - Integrated Requirements

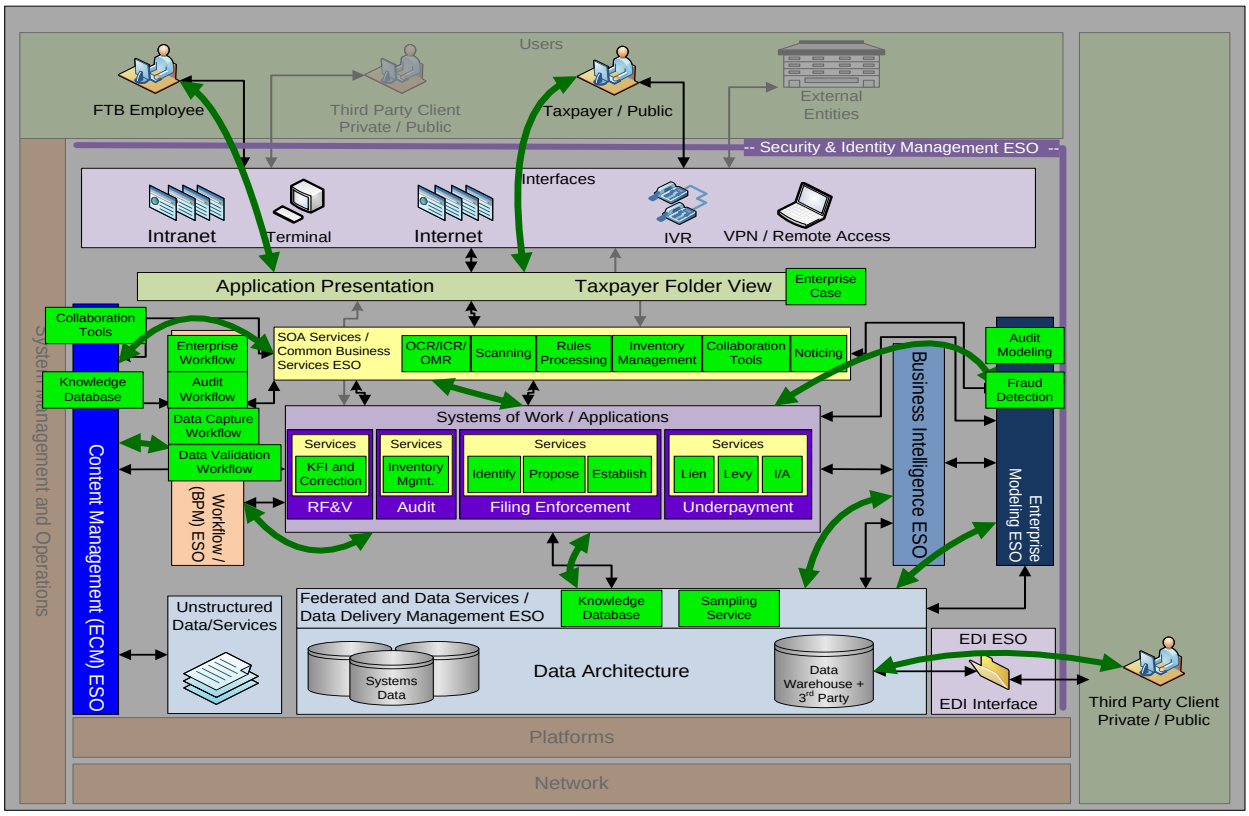
General System Requirements
Application Independence: • Workflows must be independent of specific services (or applications) to allow for a flexible implementation and maintenance process. • Business rules must be extracted from the existing applications and managed centrally. • Workflow related functionality must be provided as common infrastructure services • Workflows leverage common enterprise services.
Application Accessibility: BPM Solution must integrate well with existing and future services (SOA). BPM Solution must be capable of replacing existing case management functionality. BPM Solution must be capable of expanding to all FTB processes Validations and modeling will be pushed closer to the data capture process, which may require integration of different applications in cross-SOW business processes. These applications will need access to workflow processes.
Tracking: BPM Solution must enable appropriate tracking and measurement of workflow effectiveness and efficiency. Existing processes may need modifications to enable appropriate tracking of workflow execution. New processes should be built to provide tracking data.
ECM Integration: BPM Solution must be able to facilitate ECM workflow and incorporate existing ECM workflows Case management applications should interface with ECM solutions and workflows must be able to integrate the case management process with ECM workflows. Document oriented processes may be provided by an ECM solution. A distinction may be made between internal business collaboration and customer-focused business process execution allowing for the use of different products.
Business Intelligence: BPM Solution must facilitate acquisition of tracking metrics available to BI and Governance groups. Tracking of workflow execution should cross SOW boundaries so that full lifecycle analysis can be performed by BI and modeling services.
Integration with Enterprise Modeling: BPM Solution must provide a centralized rules engine (for storage of key models and model criteria) BPM Solution must conduct Enterprise Modeling processes BPM Solution must facilitate modeling for the purpose of rules discovery. Modeling stratifies cases to provide for the most appropriate treatment strategy. This process must integrate well with the applications that will be used to manage cases and implement the strategies. Modeling is dynamic and event driven and workflows accommodate events that interrupt the flow of execution.
Visual Tools: BPM Solution must present, modify, and demonstrate business process improvement without modifying existing workflows. BPM must provide visual tools for the creation, modification and modeling of workflow processes. BPM Solution must use FTB approved standards for rules and workflow language (BPEL) Visual tools for creation of workflow processes should be common and available for use across all SOWs. Workflows should incorporate human, application, and document oriented processes. These tools should create standards-based output and be useful to both developers and business analysts.

General System Requirements
Manage Enterprise Workflow: BPM Solution must have site licensing model. BPM Solution must serve as enterprise management for incorporated workflows. BPM Solution must allow for resource leveling, process tuning, and overall efficiency management. The System must be designed around and have the capability to manage workflow and work queues associated with different staff roles, and also be able to manage multiple work queues.
Enterprise Level Routing: BPM Solution must route exceptions according to predefined process for manual intervention. BPM Solution must allow manual interventions to be re inserted into workflow after exception is resolved. The System must route exceptions to different work queues. The System must allow authorized state staff to route work to another work queue (based on preset and configurable routing conditions).
Monitoring: BPM Solutions must monitor workflows for management reporting purposes. BPM solutions must automate workload balancing where rules are known and defined in the system.
Flexible Allocation and Assignment: BPM Administrators must allocate, reroute or process workloads in any and all managed processes BPM Administrator must assign or reassign workloads to various resources.

1.4 Conceptual Architecture

The following diagram shows the ETA with the services relevant to case management and workflow at an enterprise level. Sows are represented in the drawing along with relationships and interactions between the components illustrated using green arrows. Although not shown here, Taxpayer Folder services are also a component of the enterprise case concept.

Figure 1.4-1: BPM Architectural Definition – "To Be" Technical Architecture Model



The Following are descriptions of the workflow management functionality related to other Architectural Definition.

1.4.1 SOA Services / Common Business Services

Each business unit has processes that require workflow management and measurement. These processes are implemented by a series of services (see SOA Architecture Definition document) that are integrated and measured. For example, audit and collection activities require modeling, case prioritization, cases management services that are associated as steps in workflow. Therefore, service oriented architecture principles; standards and services are vital to the operation of a mature BPM solution.

1.4.2 Business Process Management

The BPM solution must use industry-accepted standards (as they are developed) such as BPMR (Business Process Modeling Notation) and BPEL (Business Process Execution Language.) Workflow and business rules engines must integrate with business services to execute business activities.

1.4.3 Enterprise Content Management (ECM)

ECM systems have workflow capabilities. These workflows must be standardized and aligned with the BPM solution (see ECM Architecture Definition document).

Many common and SOW-specific services are transformed and integrate with workflows ranging from the common processes used primarily by Returns Filing & Validation such as; OCR/ICR, scanning, and the rules processing, to collaboration and noticing services.

1.4.4 Enterprise Modeling

Enterprise modeling services are discovered, implemented and managed through the BPM solution. Workflows associated with enterprise modeling are event driven and provide dynamic model execution and stratification. Common modeling notations and service-oriented tools maximize the integration of workflow systems that are provided by vendors of products.

1.4.5 Federated and Data Services / Data Delivery

Business rules, workflow definitions and BI/metrics are stored data stores. Persistence is provided through data services.

FTB's target architecture reflects industry best practices. Our target BPM architecture is a mature and effective BPM, combined with service-oriented architecture to optimize results. SOA promotes standardization, consolidation, and elimination of redundant functionality. Optimized service delivery improves BPM quality, effectiveness and efficiency. By implementing a standards-based BPM solution and workflow environment, FTB combines services (SOA) to refine existing business processes and creates efficient new ones.

2.0 Current Architecture

FTB has implemented workflow in several different application areas; however, all implementations are specific to a single application. Current workflow processes are not available for reuse. The following lists some of the areas that use workflow:

- **INC**: Case Management Template (CMT) has a manual workflow within CMT and between CMT and INC. It is built as part of the system.
- **ARCS**: Through the use of rules and states, ARCS moves cases from state to state and adds them to work lists for collectors.
- **IPACS**: Uses workflow to route batches through the applications that make up IPACS. The workflow is automatic and a key part of the system, but can be monitored and changed by managers. Built as part of system.
- **PASS**: Uses workflow functions to automatically route cases through the system. Built as part of the system.

FTB owns two popular tools used for Business Process Analysis. Like most other tools in the BPM/BPMS arena, these tools perform other main functions and are used for business process analysis. Below are examples of tools FTB uses that cross over into BPM:

Microsoft Visio: Can be used to visually document business processes. Microsoft Visio has pre-built templates to be used for process modeling, but has limited functionality.

Sybase PowerDesigner: Includes object-oriented analysis and design capabilities, but mostly focused on data models.

3.0 Target Capabilities and Components

3.1 BPM Technical Architecture

This architectural definition focuses on the Business Process Management System (BPMS) technologies and how they fit within FTB. BPMS is the technology implemented to support business in the identification, management, control, modeling, monitoring and improvement of their business processes. This technology puts the control of processes back in the hands of business but does not completely eliminate IT from BPM.

BPM requires tools that business managers use to control and modify processes. This requires technologies that make process clearly expressed and readily changeable. We call these BPM-enabling technologies. FTB's BPM technology will provide graphical models that enable managers to control various aspects of business operations and invoke the relevant resources.

3.1.1 Process Modeling and Business Process Analysis

Process models are events that trigger action and the sequences of steps and the business rules used in and between those steps to support decision-making and execution flow. Process models are needed to help business and IT managers understand actual processes and enable them (by visualization and simulation) to propose improvements.

The business process modeling tools (business process analysis (BPA) tools) will provide a shared environment for the capture, design and simulation of business processes by business analysts, managers, architects and other staff. These BPA tools are modeling-only environments, not execution environments. These BPA tools will support the BPMN and BPEL standards, so it can work and communicate with other BPM technologies that will be acquired. These BPA tools will be the initial step in supporting the BPI/BPM initiatives and enterprise architecture and will be used to create "as-is" and "to-be" process models.

FTB will have explicit process modeling capabilities that are easily changeable by non-technical managers. These models provide a basis for cross-organizational collaboration between managers responsible for the separate parts of a process, and with IT professionals on the implementation of the resulting design. To support simulation, models will embrace characteristics such as skills, availability and costs of the people, and other resources that perform the process.

The toolset will provide a framework to follow when modeling processes and a fully functional dashboard allow business staff to have visibility into the processes and their interactions. This allows business users to graphically view the processes and their interactions. It will give visibility to the Business Activity Monitoring data, which provides event-driven, real-time access to process performance. This provides users with historical and real-time access to process execution, provides alerts and allows users to act on problems in real-time. This BPA tool will primarily be use by BP architects, who are responsible for redesigning business processes at a conceptual level, and BP analysts, who redesign processes at a more detailed level and are responsible for coordinating the implementation of the new processes as part of BPM projects, IT development projects or package purchase acquisitions. The BPA tool will be used by other roles in the organization as well. For example, business users and data, enterprise and technical architects looking to understand business processes in the context of their disciplines.

BPA tools are key components of BPI and BPM initiatives. BPA tools complement BPMS tools by enabling deeper, multilevel modeling than the modeling component of a BPMS.

3.1.2 Process Execution

Making a model executable requires other BPM-enabling software such as integration technology, a runtime environment and rule engines. Many of the enabling technologies continue to be available separately. When provided together, we call the system a BPMS. To support the entire process life cycle, from modeling through execution to monitoring, the process model will become the core of the business process. The BPMS allows the users to design the process models, and execute the models in a simulation environment. This environment will use both historical and real-time data to perform the model simulation to test how the design works with other processes and with any constraints placed on the processes. The BPMS tools are used to design and build the process models, and store the models in a single process repository.

Business managers will use the BPMS's graphical process model to see and directly monitor and manage all interactions between human, system and information resources and adjust behavior and execution flow in response to changing dynamics and improve business performance. The BPMS addresses the desire of business managers at FTB to see and gain hands-on control of their operational processes to better manage work outcomes. As a software infrastructure platform, BPMS enables business and IT professionals to work together collaboratively on all process design, development, execution and enhancement activities.

The BPMS will support the following:

- Support modeling and analysis of business processes, including all aspects of workflow to be managed (that is, tasks, roles, decisions, approvals, reviews, escalations, collaborations, flows, rules, policies, forms and other business information objects, events, goals, objectives, and scenarios) to identify the best possible design.
- Support round-trip engineering between the model and its physical implementation, so that changes made to the model are easily reflected in the execution and so that changes to the resources are easily fed back into the model.
- Coordinate multiple interaction patterns between users participating in the process, systems required to complete the end-to-end process and information content, some of which may be remote to the BPMS. Interaction patterns include human-to-human, system-to-system, human-to-system, human-to-information content and content interdependencies.
- Provide participants with access to various forms of business content (both structured and unstructured information) for manipulation and management within the process context.
- Support user manipulation and management of business rules.
- Support user and group collaboration in the process context (in real time and offline).
- Support monitoring, reporting, analysis and notification of work activities and business events, using both data about completed work transactions and in-flight business transaction data (in real time and offline, potentially for predictive analysis).
- Support process simulation and optimization using real-time, historical and estimated data values.

- Provide for management of all process components (see the above list) through their life cycle (that is, access control, versioning, descriptive metadata and so on).

REF: Hype Cycle for Business Process Management, 2007

The BPMS will contain these core BPM-enabling tools

- Orchestration engine, which coordinates the sequencing of the activities and steps (system and manual) according to the flows and rules in the process model.
- Business intelligence and analysis tool which support analysis of data produced during process execution. Capabilities range from reporting to online analytical processing analysis to graphical user dashboards. Business activity monitoring (BAM) systems do this in real time with proactive alerting.
- Rule engines will execute rules that abstract business policies and decision tables from the underlying applications, and make available more-flexible process changes.
- Enterprise Rules Repository will contain process definitions, process models and business rule data to enable reuse across business functions.
- Simulation and optimization tools enable business managers to compare new process designs with current operational performance. Scenarios are executed, altering resource constraints and business goals, to assess risk and display the financial and operational impact on FTB.
- Integration tools link the model to other system assets (data and logic) that support work steps.

3.2 Target Enterprise Governance

BPM is an IT-enabled management discipline. Its goal is agility through making processes visible (explicit processes). BPM is a discipline and a technology. BPM as a discipline is the most critical element of BPM. It is not a technology; rather it's the steps FTB needs to go through to be able to be successful. The BPM discipline is enabled by BPM technologies.

Business Process Management (BPM) requires three areas for successful implementation: Business Process Improvement (BPI), BPM as a discipline, and BPM-enabling technologies.

Implementing a BPM and its governance will have a significant impact on how FTB's Systems of Work (SOW) staff, both business and IT, is organized. FTB will centrally control and manage FTB's business processes by a centralization of control over all of FTB's main processes.

FTB will follow best practice recommendations, which puts ownership of BPM in control of business staff. This is a significant change, since IT tends to control and manage processes.

FTB will clearly define areas of responsibility and control between business staff and IT staff. This is important in process-centric structures, which are very different than FTB's current function-centric siloed structure. The governance and organization must be prepared for change and use the Governance Council and Enterprise Architecture Council's BMP Centers of Excellence to address expected resistance. FTB will have two councils to manage processes.

3.2.1 Internal Business Action Committee Meeting

FTB will follow the best practice of each major business process will have an executive sponsor. This group meets monthly and focuses on implementing process improvement

initiatives and resolving cross-discipline issues. This group will set priorities regarding process improvement initiatives and review all policies associated with the business processes across functional areas. This group will have a more balanced representation of the SOW areas and less IT representation then the current IBAC committee.

Process Owners Council

FTB will follow the best practice of having a group who manages the changes to processes across FTB. This level of governance consists of global process owners who meet monthly to implement inter-process changes.

3.2.2 BPM Center of Excellence

The BPM Center of Excellence offers a "one-stop shop" providing services to multiple business process management (BPM) initiatives that enable the enterprise to progress with BPM efforts overall. It is the responsibility of the BPM Center of Excellence to ensure:

- <u>Business user should be able to:</u>
  - Know what business processes the enterprise manages
  - Know what the business processes are for
    - Including modeling
  - Know where the business processes are stored
    - At a minimum the Authoritative Source
  - Know who is allowed to access the data (security)
    - If they are allowed to know this
  - Know how to get the business processes
  - Know what can be done with the business processes (privacy, compliance)
  - Know what decisions have been made about the business processes
  - Know who has made decisions about the business processes
    - Governance
    - Stewardship
  - Know who manages the business process
    - Stakeholder community
  - Know who to contact for the business process
    - Know what processes exist to resolve issues

- <u>The enterprise as a whole will benefit as the business user also:</u>
  - Uses the BPM to increase the efficiency of the enterprise's operations Including re-engineering of business processes to take advantage of improved data understandability, availability, and quality
  - Uses the BPM to meet the enterprise's business goals Including adaptation to changing market, regulatory, and other environments. And also agility in responding to new opportunities
  - Uses the BPM to mitigate risk in the enterprise including reduction of operational risk inherent in the process itself as process quality improves

4.0 Gaps Analysis

4.1 Business Role

A key component of a BPI/BPM initiative is the redefinition of the role of the business as a partner in BPM. Business will not only participate in defining the processes, but also in defining the goals of the BPM effort, selection the BPM tools, and user of the tools. This will be a significant shift where IT staff takes the lead. This sharing will require requires organizational and cultural changes.

4.2 Silo Centric Processes

BPM governance process manages and aligns IT projects and systems but does not align them to the enterprise architecture. FTB, like many organizations, has developed silo based systems, where focus is solely on the business process it performs. This has created an IT support infrastructure that has staff assigned to and focused on a specific process within one SOW. This type of structure is not conducive to collaboration between systems, and sharing of data and knowledge.

FTB has discovered each SOW built processes that perform similar processing. BPM will be the discipline, within FTB, that supports an organization's effort to model and manage the processes within a SOW and between SOWs.

To solve these gaps, FTB's BPM will:

- Document existing processes (both system and human) to make them visible
- Place business process knowledge in a enterprise repository using common notation
- Coordinate processes through workflow within SOWs and between SOWs
- Model process changes before they are made, to ensure they are the best approach and compensate for loss of knowledge
- Monitor current processes and identify and correct those that are broken
- Orchestrate the constant and continuous changes going on within the department at any given time

4.3 Hidden Processes

Process tends to be imbedded (hidden) in the applications or known by a few staff. With many senior staff retiring in the coming years and the workforce being mobile, this process knowledge is impossible to replace.

Today's accelerating business cycles are driving the need for managers to manage business transactions in real time. Managing work activities by using after-the-fact reports are not good enough. Pressures on FTB for information transparency, operational accountability and compliance now make it critical for managers to stay on top of daily transactions. However, business processes are largely hidden in applications and in employees' heads. A process that is automated in applications is at best implied to the user. Programmers control the process flow via various techniques, such as screen flow (user navigation), internal flow control logic and even data values.

A BPMS will make processes explicit, which are visible, via graphical models and will be independent of physical resources used in execution. Forms of explicit process management tools have been used as design aids, as end-user training tools and as part of operations

manuals but a BPMS will take explicit process management to a higher level of value by making the model executable. The graphical model is metadata that is loosely coupled to its physical runtime resources. At runtime, the model is interpreted and bound to the referenced physical resources. This approach keeps the model synchronized with the actual executing process.

4.4 BPM Tools

FTB has limited BPM technologies and is not using them to support BPM. FTB will procure a BPMS solution that follows its BPM architecture definition.

4.5 Streamlining interoperable Processes

Understanding our complex business processes interactions is a significant challenge. The assistance of a tool with visualization, simulation and activity-based costing (ABC) will optimize business processes. BPA tools will define the business architecture portion of the enterprise architecture. It will be possible to do change impact analysis across organizations and roles based on the inter-relationships of their models.

BPA tools enable BP architects to document, analyze and streamline complex processes, thereby allowing business areas to become more agile and effective. BP analysts, in turn, redesign BP models and refine them to a more detailed level to ensure the processes are properly communicated to those implementing them through development, package purchase or applications hosted by partners or third parties.

5.0 Roadmap

Task

FTB BPM Enterprise Assessment

Organizational Assessment of BPM Maturity Level (Gartner)

Assess Corporate Culture (Gartner)

Create BPM Center of Excellence (EAC)

Pre-Project Tasks

Determine the Roles and Skills Needed

Select Executive Sponsor

Determine Lacking Skills and Train Staff

Select Appropriate Project

Determine Existing BPM Artifacts (BPS, Workflow, BRE)

Determine the Level of Participation between Business and IT

Project BPM Tool Tasks

Define BPM Roles and Skills Needed for Project

Define Organizational Structure for BPM Effort

Define Scope of BPM Effort

Create Governance

Determine Standards to Follow

Select Methodology, if appropriate

Select Framework, if appropriate

Determine whether "As-Is" and "To-Be" Processes need to be documented

Determine the Prime of User of the Tool (Single tool or multiple tools)

Determine the Tool's Usage Environment (existing tools or platforms is must match)

Determine Whether Tool Performs Single Function or Multiple Functions

Determine Whether Tool must Integrate with Other BPM Tools (BPA, Workflow, BRE, BPMS, etc)

Determine Whether Tool must Integrate with Other ESO Tools/System (SOA, BI, ECM, etc)

Develop a plan and objectives for the use of BPM Tool

Based upon the Criteria Above, Evaluate BPM Tools Required

Download Evaluation Copy of Each Tool

Select Tool(s) Matching the Criteria

Purchase Tool(s)

Install Tool(s)

Train Users of Tool(s)

Determine BPM Tool Interaction in Project

Will BPA be used to Create Workflow Processes

Will Workflow Use Rules Repository (BRE) to Control Flow

Determine the BPM Tool(s) Interaction with other FTB Tools/Systems

Begin Using Tool(s)

Part 1: PIT RF Business Rules

Define Process to Discover, Validate and Record

Discover business rules from Business Staff
Discover business rules from IT Staff
Record rules in BRE
Validate business rules with Legal
Reconcile rules among groups
Document rule collection process and results

Part 2: Reengineer PIT RF & RV

Define Objectives for BPR
Record RF "As-Is" Processes in BPA
Record RV "As-Is" Processes in BPA
Document BPA Process & Results

Part 3: BE Filing & Fraud Rules

Define Process to Discover, Validate and Record
Discover business rules from Business Staff
Discover business rules from IT Staff
Record rules in BRE
Validate business rules with Legal
Reconcile rules among groups
Document rule collection process and results

Part 4: RE BE Filing

Define Objectives for BPR
Record RF "As-Is" Processes in BPA
Record RV "As-Is" Processes in BPA
Document BPA Process & Results

Part 5: Enhance Collection Modeling Process & Rules

Discover PIT ARCS rules
Discover BE ARCS rules
Discover COD rules
Discover VRC rules
Reconcile rules among groups
Record PIT ARCS "As-Is" Processes in BPA
Record BE ARCS "As-Is" Processes in BPA
Record COD "As-Is" Processes in BPA
Record VRC "As-Is" Processes in BPA
Document BPA Process & Results

Part 6: Workflow Management Governance & Transition

Vendor develops Governance
Vendor documents Governance
Workflow Governance Transitioned to State

Part 7: Design Collection Workflow Rules

Design Collection "To-Be" Workflow Process
Develop Workflow using Workflow Tool
Integrate Workflow with BRE
Test Workflow

Part 8: Develop & Implement BE Workflow

Design BE "To-Be" Workflow Process
Develop Workflow using Workflow Tool

Integrate Workflow with BRE
Test Workflow

Part 9: Decouple/Replicate PIT RF & RV Rules

Integrate PIT RF & RV with BRE
Test Integration

Part 10: Modify RF PIT Workflow

Design PIT RF "To-Be" Workflow Process
Develop Workflow using Workflow Tool
Integrate Workflow with BRE
Test Workflow

Part 11: Develop & Implement Integrated RF/RV PIT Workflow

Design PIT RF/RV "To-Be" Workflow Process
Develop Workflow using Workflow Tool
Integrate Workflow with BRE
Test Workflow

Training, Policy, Procedure Activities -- for Business Consideration

Implement Workflow in Collection System
Implement Workflow in BE System
Implement BRE in PIT System
Implement Workflow in PIT System
Implement Workflow in PIT System

5.1 Dependencies

Our full Business Process Management Suite (BPMS) will be dependent upon these architectures and technologies; Service Oriented Architecture (SOA), Security and Business Intelligence (BI).

- SOA: There's a two-way relationship with SOA. BPMS tools will be used to design the system-to-system process flows. BPMS also relies on SOAs for monitor and changes processes.
- Security: Used to define and control the workflow.
- BI: Provide information about process and workflow results.
- Data Management: Store models, flows, rules, etc.
- ECM: For unstructured data, BPMS could supply the workflow.

The implementation of the Security architectural definition will ensure that workflow rules can be enforced as processes move between systems and staff. With the implementation of SOA, business users will be able to use Business Application Modeling to record the activities within a database and analyze how things are working. Users can now execute their process changes within the systems in real-time through the use of SOA. This gives user control of system in the end-to-end processing.

6.0 Appendix

6.1.1 Best Practices

BPM is a highly productive management discipline that provides for governance in a business process environment toward the goal of improving agility and operational performance. BPM is a structured approach that employs methods, policies, metrics, management practices and software tools to manage and continuously optimize an organization's activities and processes.

Following a BPM methodology is critical. Organizations are in transition and long-standing business practices may be in flux. BPM further drives and guides change. The management discipline of BPM itself is not static; it too must respond to change. Strict governance and procedures must be in place for business rule management and approval of process change. Organizations must understand how better process management enables agile response to change. The focus on improved process management forces the organization to adopt a greater focus on process discipline. The only motivation for senior leadership to embrace such a disruption to the status quo must lie in the promise of a significant benefit to the organization.

Increased business agility is one of the many outcomes realized from adopting BPM. The gains realized through new BPM management practices and enabling technologies propel agility throughout the organization. BPM requires business managers to learn real-time management skills to achieve greater business agility. Those skill sets include collaboration and consensus building. Shared control between business managers and IT professionals shortens the cycle time to make process improvements. IT developments staff must leave behind the long-held belief that they alone must perform all the front-end analysis and process design. IT managers must proactively encourage a progressive shift to shared responsibility for these activities with business process analysts, business managers and process owners.

BPM as a set of principles:

- View business processes as valued assets.
- Realize that business processes have a constant revision cycle.
- Demand an engineering approach to process management.
- Believe that process management delivers more than improved operational performance.

Failures of sound management disciplines are often due to the lack of technology to support the underlying practices. One of the most-valuable aspects of BPM technology is the ability to directly support process management practices in a more-fluid manner across the entire life cycle.

One of the greatest challenges faced in a business process improvement (BPI) effort is overcoming the sometime conflicting values that different groups embrace. Businesses have adopted many tactics to cope with competing interests: changing incentive structures, management reporting, and matrix management and even imposing disincentives. The most important *best practice* here is the participation of executive leadership. Each major business process has an executive sponsor who sits with peers on the process executive council.

Two key issues in a BPI effort are governance and organization: Who has the final responsibility for business processes and to who should the process experts report? Regardless of who leads BPI efforts, both sides need to retain and grow core competencies and manage shared competencies.

IT Core Competencies:

- Setting standards for technical and best-practice procedures
- Integration of process steps with physical orchestration
- Resolving scalability issues supporting scope and complexity
- Process-level and system-level security
- Tool testing and integration

Business Core Competencies:

- Strategy and business case development
- Defining business performance metrics
- Simulation, optimization and scenario creation
- Process monitoring and analysis
- Business change management and communication
- Policy management

Shared Competencies:

- Process deployment
- Process execution and performance
- Tool evaluation
- Business and process rules analysis and management
- Operational procedures, including version-level control
- Creation of process, rules and events repository
- Detailed process design
- Training and education
- Event analysis and management

Overcoming barriers to BPI:

- Appoint the most collaboration-oriented senior executives as owners of the major business processes.
- Practice systematic stakeholder management and change management around the whole BPI program, as well as for individual initiatives.
- Build and periodically refresh the BPI business case by emphasizing the likely business benefits.

Determining the correct BPMS for process improvements:

- Model and simulate all interaction patterns between workers, systems and information to create shared understanding about how to optimize business results.
- Consistently execute the optimal process.
- Coordinate and manage the handoff of work across boundaries.
- Provide real-time feedback to line managers about work-in-progress to support in-line process adjustments.
- Monitor process outcomes to performance targets, and continuously refine and adjust process flows and rules.
- Collaborate with IT professionals throughout the process life cycle.

An organization needs special skills to use the BPM-enabling tools with the BPM discipline. Traditional business analyst and IT skills are not enough. New skills and approaches are required to properly acquire, manage and optimize the business processes. Also, business should be using the BPM tools, not just IT. IT supports and uses the tools, but the tools are meant to be a toolset that business uses to drive IT.

Gartner Docs:
Gartner's Position on Business Process Management, 2006

6.1.2 Trends and Standards

BPM and EA are two rapidly growing disciplines making significant contributions to better the performance of the organization – typically involving IT. They are about planning, but have different perspectives on time. Both practices capture what is happening in their field of view and what they plan to implement in the future. Both use modeling, but with differing levels of detail or granularity. The key is to employ the same or compatible modeling methodologies for their two purposes to make each one stronger and to enable each discipline to be implemented more effectively with less effort.

BPM is not a label for new technology or a simple process upgrade; it is significantly broader in scope and has several relevant values:

- Business processes are essential organizational assets, including the people that perform them.
- BPM is not a one-time event, but a persistent management approach to gaining continuing performance advances.
- BPM is not just a technical solution; it depends on the related culture (that is, gaining user understanding, encouraging ownership and observing metrics) and anticipation of new business and technological capabilities.
- Employing BPM technology can provide critical insights and enable sound engineering and simulation to gain the optimal performance in a complex multi-hierarchy environment.
- BPM incorporates the goal of achieving change rapidly and frequently to meet dynamic forces and simultaneously stimulate innovation in process evolution.

Common myths of BPM:

- *BPM is just a process improvement project* – BPM is not a project. Process improvement is a continuous outcome from the ongoing management of the business process.
- *BPM is a technology* – BPM is a management practice, and certain technologies help to enable that practice.
- *A business process is a software application* – Many business processes are driven by people and are labor intensive, with no technology supporting the process.
- *BPM is all about process standardization* – Better process management leads you to adopt best process practices; however, BPM also delivers agility, innovation and specialization.
- *BPM is a radical change to business* – Although process changes occur, beginning with the current-state process and incrementally change business over time.

BPM is a management discipline that requires organizations to shift to process-centric thinking, and to reduce their reliance on traditional territorial and functional structures. The development of BPM technologies is enabling business managers to abstract process flows and rules from the underlying applications and infrastructure, and to change them directly. BPM is neither a technology nor an updated version of BPR. It is an IT-enabled management discipline. It represents a fundamental change in how businesses manage and run their operational processes.

Organizations can move to BPM in various ways. The “right” choice depends on the company’s unique business challenges, the leaders’ understanding of BPM and the commitment to organizational transformation. Success with BPM also requires a culture of real-time management and skill in using software tools to support rapid decision-making. To support the real-time management style, the organization must align its business analysts with process owners and may need a separate process center of excellence. It also needs to progressively refocus the work of the IT department.

6.1.3 Standards

BPM is a management discipline that treats business processes as assets to be valued, designed and exploited in their own right. It is a structured approach employing methods, policies, metrics, management practices and software tools to manage and continuously optimize an organization’s activities and processes. It aims to improve agility and operational performance. It treats processes as organizational building blocks with as much (if not more) significance as functional areas and geographic territories. The BPM discipline has implications for four aspects of business:

- *Strategy:* The strategy of the organization must be explicitly linked to and, in turn, executed through its business processes. Processes provide a shorter link between strategy and operations by overcoming the vested interests of territorial and functional managers. Although operational changes within a functional unit are relatively easy to make, conflicts of interests between functions often inhibit any shared understanding of the need for broader process change to reach strategic objectives.
- *Governance:* There should be explicit responsibility for business processes and policies at the highest levels of the organization, and for sub-processes at the departmental level. Business objectives drive process performance objectives, which motivate staff and business partners. There must be clear accountability for the approval, implementation and audit of process and business rule changes.
- *Organization:* The organizational structure must recognize the interdependencies and relationships that foster value creation across the enterprise. It de-emphasizes hierarchical reporting relationships and empowers employees to seek improvements across organizational boundaries.
- *Culture:* The methods, procedures and skills that support all stages of the process life cycle must be conducive to rapid change. There is a culture of constant change to stay in step with fluctuating business conditions.

Each step of the process revision cycle creates value. Beyond the value of creating a business case for improvements to a process, the first step in the BPM discipline of managing a process is modeling the target process. Prior to starting any design or revision process, the organization

should decide the scope of its initial activities, make the business case for BPM and adopt a proven methodology.

- *Discovery* identifies the intricacies of how a process executes.
- *Modeling* is valuable because it shows easy improvement opportunities, or at least the scale of the problem.
- *Simulation* reveals bottlenecks that are not obvious during static modeling.
- *Deployment* then creates detailed process execution scripts and makes the required changes in systems.
- *Execution* is where the main value of BPM is realized, because it's where the actual improvement in the process is first seen.
- *Monitor* collects information from the executing process in real time.
- *Analytics* creates further value when key performance indicators based on process execution are linked directly to business objectives.
- *Optimization* is a fact-based approach to process scenario optimization.
- *Refine* establishes the way the stakeholders want work to be accomplished.

The following table lists some of the current BPM related standards and the organization that is responsible for each.

Figure 6.1-1: BPM Standards

Standard	Organization	Type
Business Process Execution Language (BPEL)	OASIS	Execution Language
Business Process Modeling Notation (BPMN)	Business Process Management Initiative (BPMI)	Notation language
Business Process Modeling Language (BPML)	BPMI	Execution language
Business Process Query Language (BPQL)	BPMI	Administration and monitoring interface
Business Process Semantic Model (BPSM)	BPMI	Process metamodel, in fashion of Object Management Group (OMG) Model-Driven Architecture (MDA)
Business Process Extension Layer (BPXL)	BPMI	BPEL extension for transactions, human workflow, business rules
UML Activity Diagrams	OMG	Notation language
Workflow Reference Model	Workflow Management Coalition (WfMC)	Architecture
XML Process Definition Language (XPDL)	WfMC	Execution language
Workflow API (WAPI)	WfMC	Administration and monitoring, human interaction, system interaction
Workflow XML (WfXML)	WfMC	Choreography (or similar to it)
Business Process Definition Metamodel	OMG	Execution language and/or notation language, as MDA

(BPDM)		metamodel
Business Process Runtime Interface (BPRI)	OMG	Administration and monitoring, human interaction, system interaction, as MDA metamodel
Web Services Choreography Interface (WSCI)	World Wide Web Consortium (W3C)	Choreography
Web Services Choreography Description Language (WS-CDL)	W3C	Choreography
Web Services Conversation Language (WSCL)	W3C	Choreography
XLANG	Microsoft	Execution language
Web Services Flow Language (WSFL)	IBM	Execution language
Business Process Schema Specification (BPSS)	OASIS	Choreography (and collaboration)

Table from What is Business Process Modeling by M Havey on ONJava.com.

Attachment: A2.3.EAD_DMD

California Franchise Tax Board (FTB)
Enterprise Architecture Council

Enterprise Architecture Definition Data Management and Delivery

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1.0 Executive Summary and Charter

1.1 Overview

Data Management and Delivery (DMD) comprises all the disciplines related to managing data as the FTB's most valuable resource second to its employees. It is the development and execution of architectures, policies, practices and procedures that properly manage the full data lifecycle needs of an enterprise. DMD includes the effective utilization, quality, availability, integration and standardization of data and information across the enterprise. It defines the management, acquisition, cleansing, storage, and utilization of all data.

1.2 Scope

The scope of the DMD Architecture Definition includes the storage mechanisms, data architecture and structures, data quality, data standards and administration. The DMD Architecture Definition deals with data residing within FTB systems. Out of scope for this document are Business Intelligence Architecture Definition which includes analytic processing technologies that require Data Management and Delivery to provide their services of quality data; And the Data Exchange Architecture Definition is associated with data from external interfaces, system-to-system integration with external systems and data that flows through these external facing interfaces.

1.3 High-level Requirements

The following table outlines the high-level requirements of the Data Management and Delivery Architecture Definition.

Figure 1.3-1: Data Management and Delivery Architecture Definition – Integrated Requirements

Requirement	Description
Standards Based	The services must conform to widely adopted data standards and the FTB Business Information Models and Structures.
Data Quality	Data quality practices and controls are required throughout FTB's network of applications and data sources to ensure the data is complete, accurate, consistent, and timely. Data quality standards must ensure current-state and target-state data meets FTB's business needs and process standards.
Data Sharing	Data sharing is an integral part of this Architecture Definition. Data sharing is enabled primarily by the use of query-oriented and transaction-oriented data services. Data services are predominantly web services that expose data from information to the enterprise, using open-standards so that any potential client can use it.
Data Profiling	Data profiling processes check and improve the quality of data. Data profiling procedures, standards and tools are specified so that quality assurance may be carried out periodically and on-demand. The capabilities of the tools and the users of the tools should be maximized. Purchase of tools or better use of existing tools is required.
Data Cleansing	Data Cleansing is necessary and performed at an enterprise level. These services are highly scalable and capable of handling the large volumes of data processed by FTB.
Data Transformation	Data Transformation is required when the data types of an entity or attribute do not match between the source and destination.
System Performance	The hardware and infrastructure must meet the business performance standards for responsiveness and meet the enterprise needs for efficient

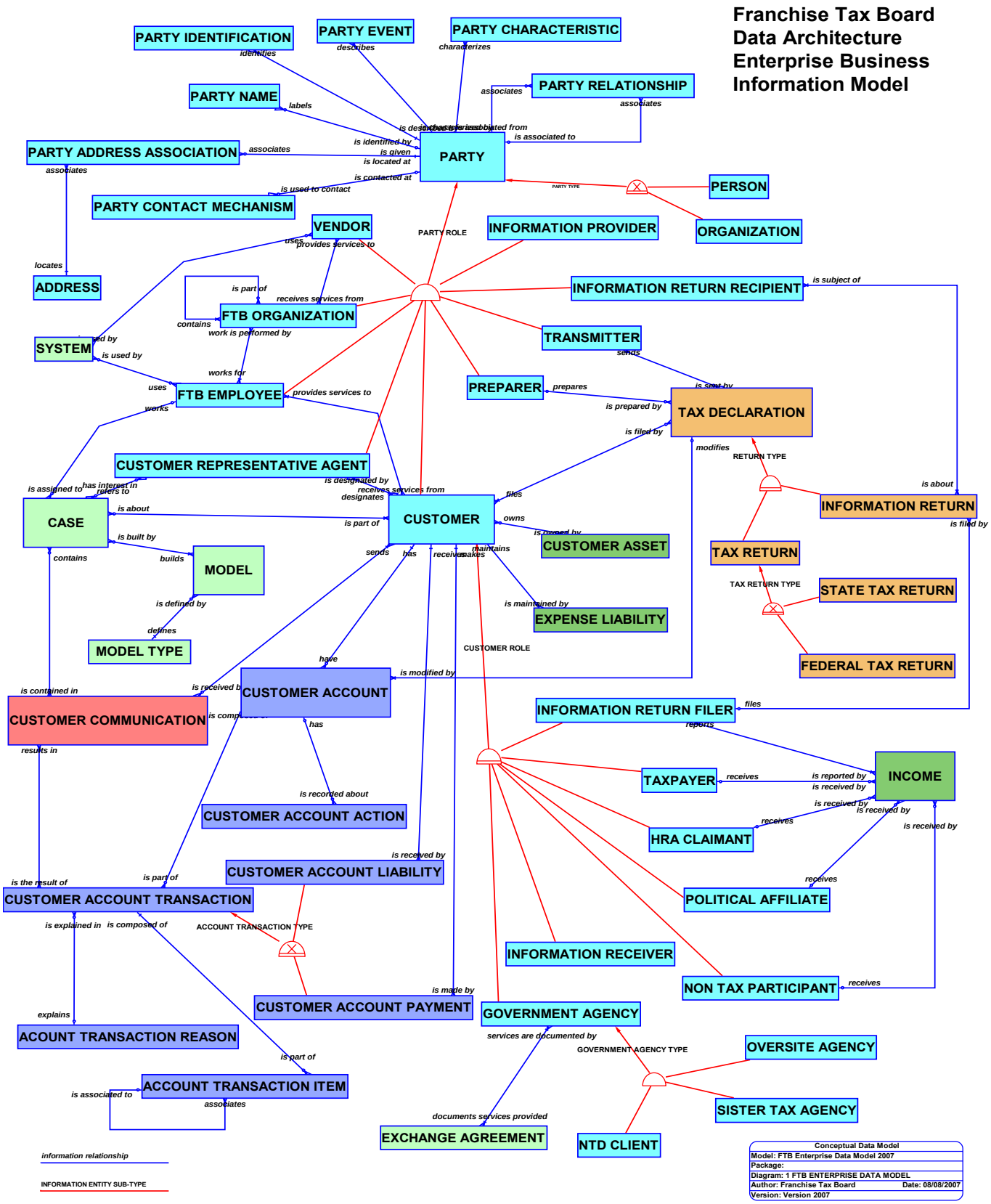
Requirement	Description
	handling and processing of data.
Comprehensive Federation or integration of Data provided through services	The data for taxpayer folder should represent a comprehensive view of a taxpayer. This will require integration of many systems with delivery through data services All taxpayer related information must be, at a minimum, associated and available by taxpayer through federation or integration.
Security and Audit	Security of data and audit of use are required. The source of the data and the particular requirements for disclosure of the data are managed according to security policies (see).
Abstraction	The management, consolidation or movement of data in internal systems must be abstracted by the use of services that maintain a consistency for calling applications.
Administration	The technical architecture and system performance must provide efficient management, consolidation or movement of data in internal systems.

1.4 Conceptual Model

1.4.1 FTB Enterprise Business Information Model

The figure below is the FTB Enterprise Business Information Model that contains the diagrams depicting major information categories that support core business areas of FTB. It is an integrated model of all information showing each subject area. This diagram shows the major areas of interest to FTB and their relationships to each other. These relationships represent important business rules that describe how FTB does business. The model aids understanding of data relationships across the department. See Appendix 3.3 for further information.

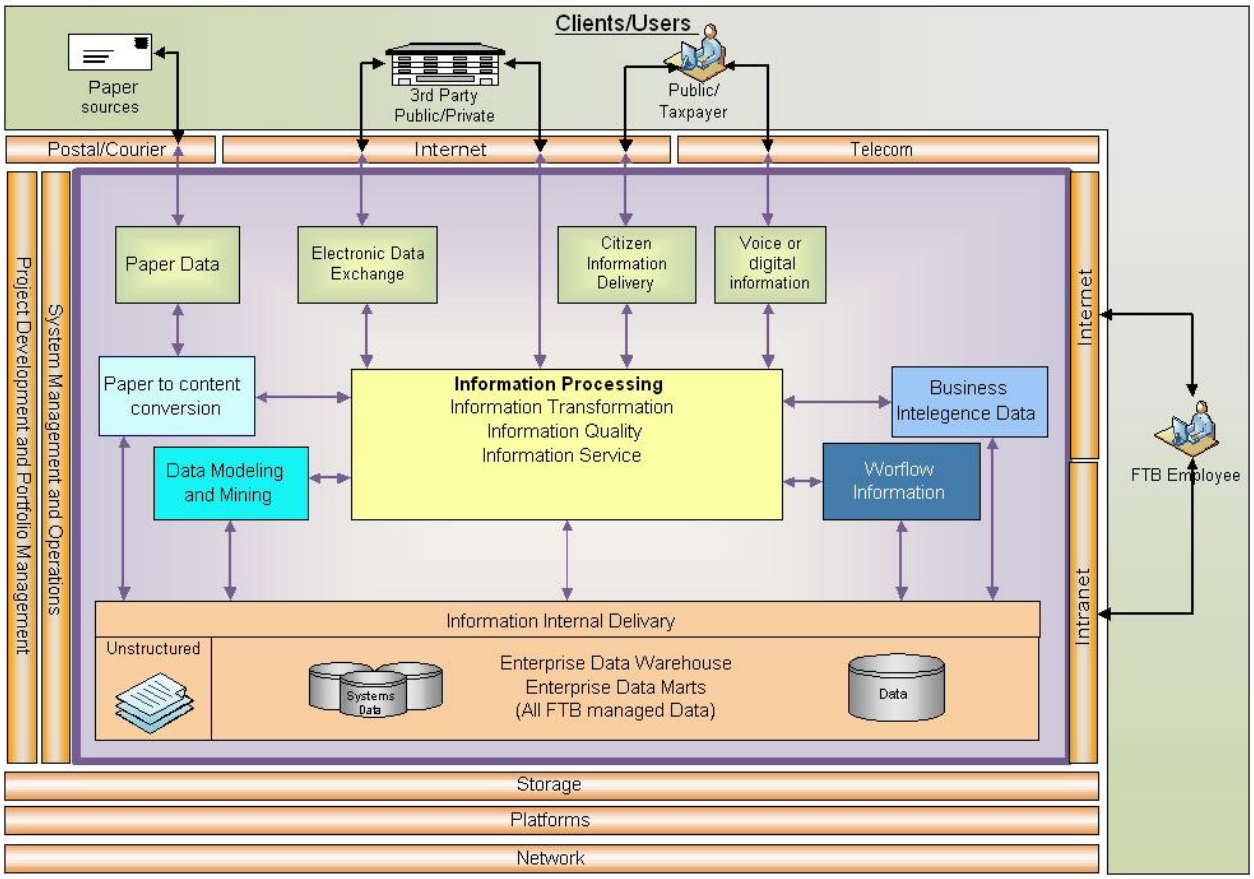
Figure 1.4-1: FTB Enterprise Business Information Model



1.4.2 Enterprise Technical Architecture: Data Context

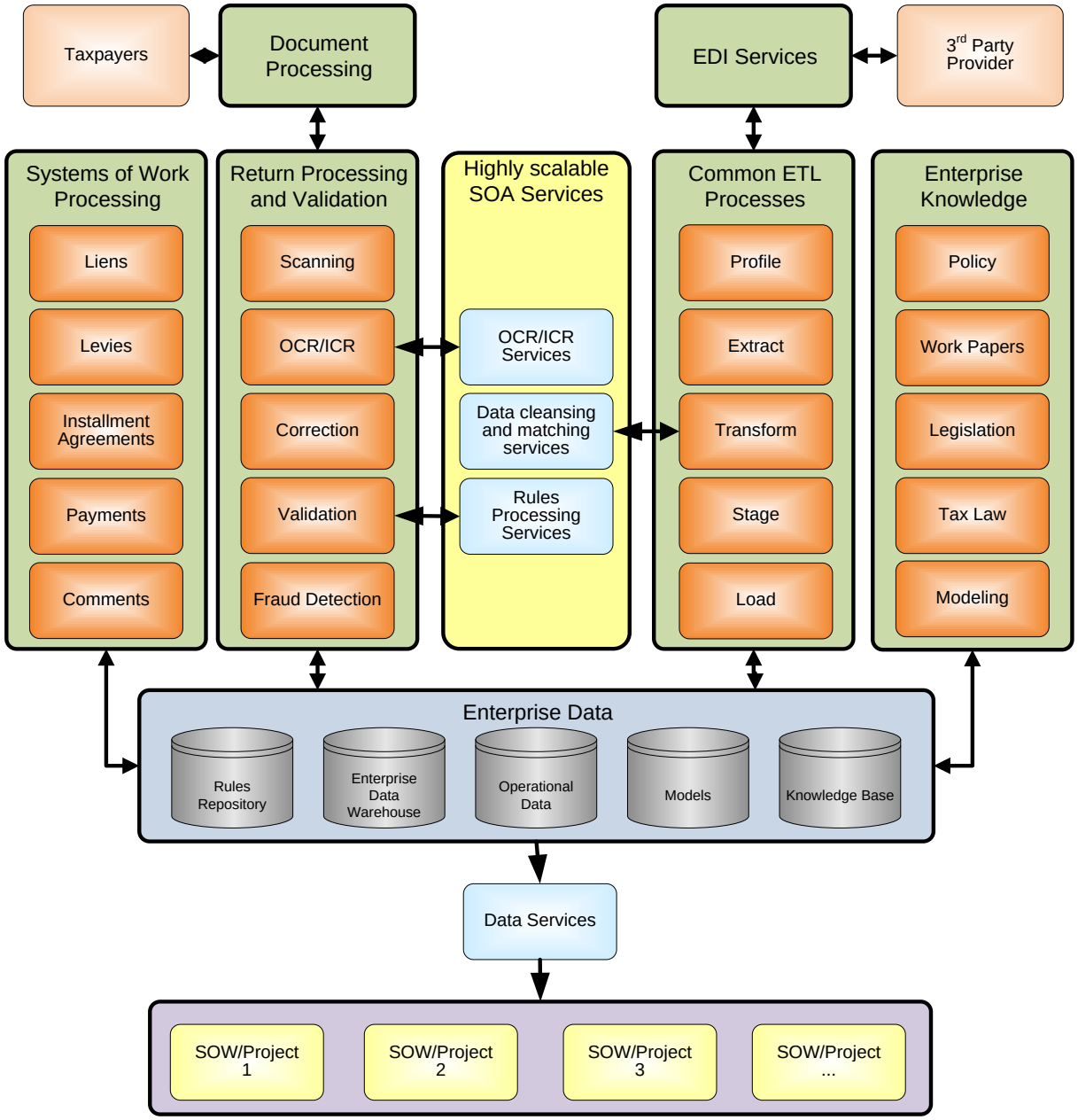
The figure below shows functionality relevant to data at an enterprise level. The data for Taxpayer Folder, 3rd Party Data and Audit are shown with relationships and interactions between components illustrated using green arrows.

Figure 1.4-2: Data Management and Delivery Architecture Definition – Target Technical Architecture Model



At an enterprise level, there is a need to acquire more data, manage data more efficiently, share data more widely, and deliver data in an efficient manner in order to provide information to enable business opportunities. Some vital components are improving data exchange, acquiring new data sources, extracting data from paper forms, building an enterprise data warehouse, and exposing data through data services. These tasks require the right technical architecture, tools, services and business drivers to accomplish these efforts. These are illustrated in the following figure.

Figure 1.4-3: Data Management and Delivery Architecture Definition – Vital Components



Reusable data services are the means of consolidating and sharing data from across the enterprise to the SOWs. These services will present data in the manner that best suits the needs of the enterprise and in a consistent form while still allowing for management, consolidation and movement of the data in internal systems. Service Oriented Architecture (SOA) implies reuse and leveraging of services by more than one user for more than one purpose. The disparity of the types of databases that exist at FTB present some challenges.

There are two types of data services possible, the “query-oriented” data services and the “transaction-oriented” data services.

2.0 Current Capabilities and Components

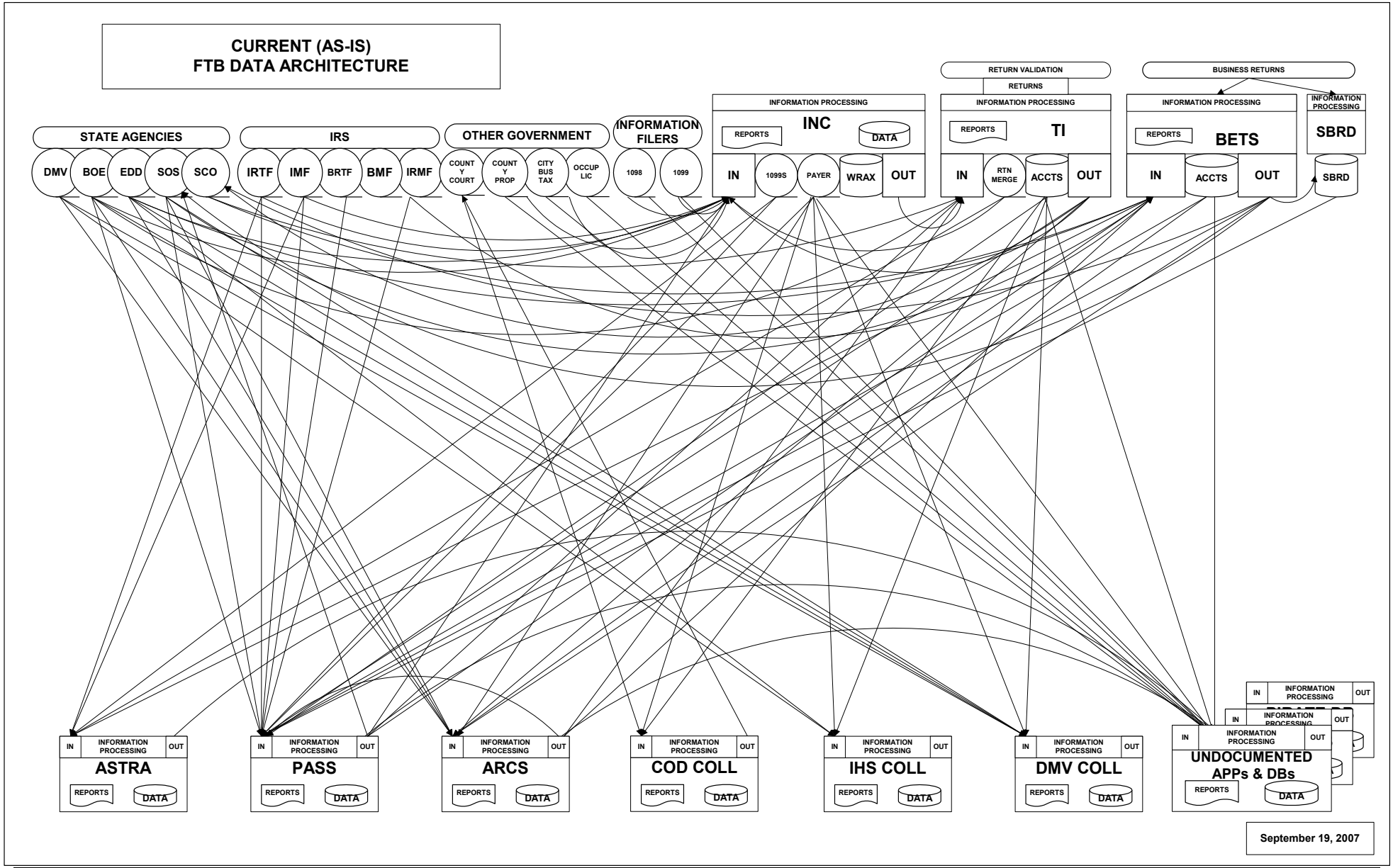
Systems at FTB were developed to meet a specific business goal, and where developed as stovepipe based systems. Multiple operational data stores exist across many database management systems and on multiple operating system platforms. Complex series of batch programs pass data between these systems nightly. There is a small amount of real-time data sharing accruing by utilizing various homegrown and purchased middleware products. Common data is replicated across systems. The following table is a partial list of FTB systems along with the Database Management System and Operating System that each system primarily uses.

Figure 1.4-1: FTB Systems, Database Management Systems and Operating Systems

	Adabas zOS	DB2 UNIX	DB2 zOS	FoxPro Windows	MS SQL Windows	Oracle Windows	Sybase UNIX
PIT ARCS	x						x
BE ARCS			x				x
COD	x						
VRC	x						
IHS				x			
TI	x						
BETS			x				
INC		x					
IPACS						x	
IDAX						x	
POA	x						
EWBS							x
EWLS							x
RV	x						
eGateway					x		
ESS					x		
SEC					x		
Astra	x						
Fedstar					x		
PASS							x
Stars	x						
NRWS					x		
Wagwhvr	x		x				x
EAMS					x		
TimePortal					x		
ARMR					x		
ECAIR		x					
PASS MI					x		
PIT Return					x		

The following figure illustrates FTB's current Data Architecture. Major operational data received from outside sources is shown as flows to the systems that process and use it. This figure illustrates the magnitude and complexity of FTB's current data exchanges; it is not intended to be all encompassing.

Figure 1.4-2: Current FTB Data Architecture



2.1 Current Governance and Organization

The current data management and delivery functions are governed by FTB's Data Architecture, Database Support Section, and the system/application project leads. There is no formal governance for data management and delivery. The following figure illustrates FTB's current data management functions.

Figure 2.1-1: Current FTB Data Governance

Entity	Function
Data Architect	• Maintains Enterprise Business Information Model of FTB's core business data architecture. • Performs Data Needs Analysis services with the primary and downstream business communities (logical data modeling) which is mandatory for large projects, and voluntary for small projects • Reviews data models for compliance of FTB's data architecture • Maintains FTB's Data Naming Standards which is used as guidelines and voluntary
Database Administrator	• Performs database performance and maintenance services • Performs physical data modeling services • Installs and supports Database Software and Data inquiry products • Performs ongoing product support and training, to include a regular forum for problem resolution and information exchange • Ensures a transparent and productive data environment to support the FTB mission
Project Architect/Lead	• Develop physical data structures for a project without *guidance from Data Architecture and/or the Database Support Section.* • Work with immediate business area for a silo data solution
Business Knowledge Worker (Ungoverned Data Development)	• Many business units at FTB create databases or spreadsheets that contain mission critical and secure data. • This data is used for a quick turnaround that cannot be developed by traditional IT services for reports and processing that is internal and external to the department. • Ungoverned databases and sophisticated macro imbedded spreadsheets are sometimes turned into applications with non-secure datastores for use in one or more business units.

3.0 Target Capabilities and Components

3.1 Data Architecture Principles

In support of FTB's Data Architecture, principles for the on-going management and use of data as a strategic resource have been developed in the five major areas listed below:

1) **Information is a strategic business resource "owned" by the enterprise.**

2) **Data must be shared, integrated and accessible across the department.**

3) **Data quality must be maximized to provide best value to the business.**

4) **System solutions must be architected.**

5) **Applications must be partitioned from information processing and management reporting.**

Each principle is fully described in Appendix 6.2.

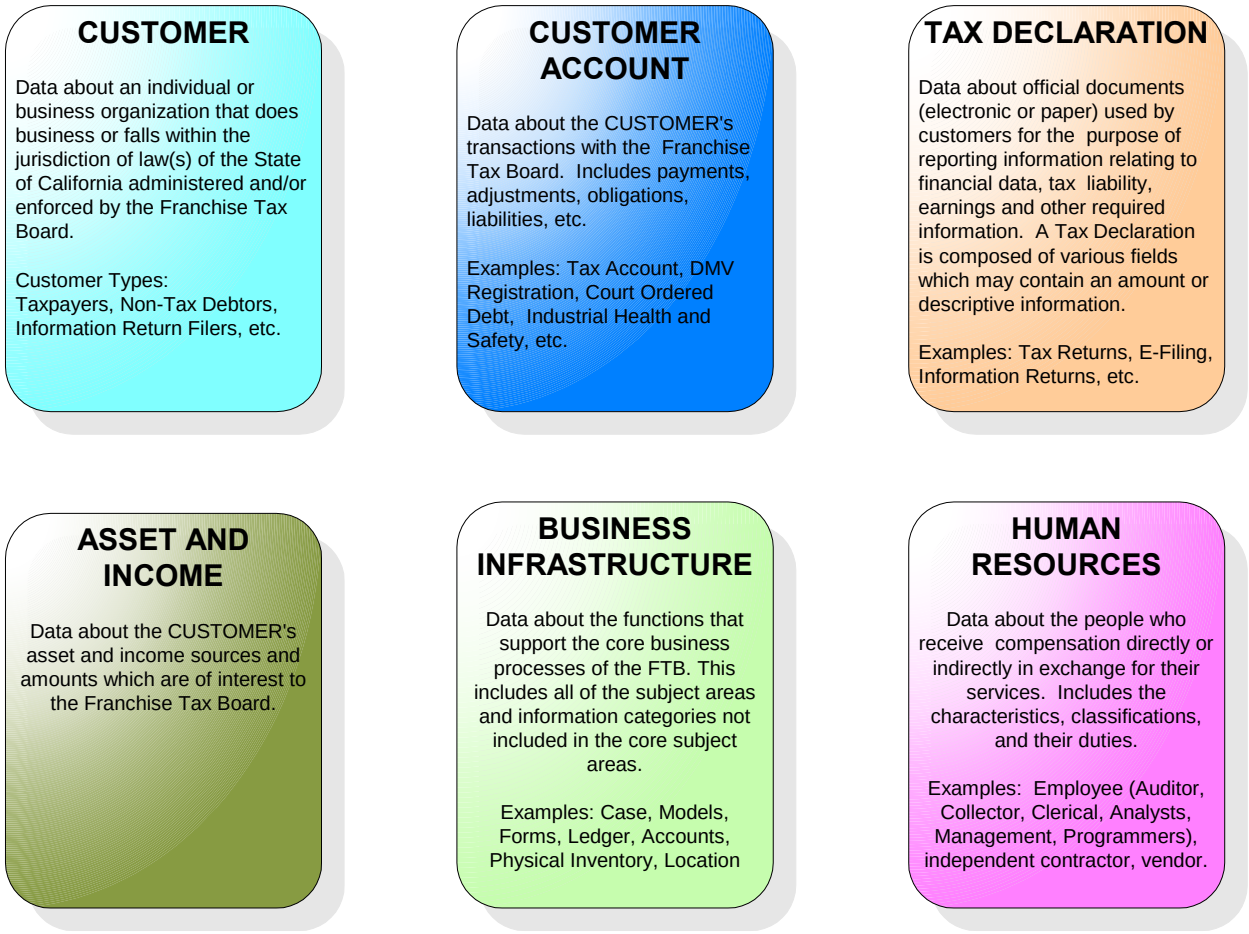
3.2 Common Data Architecture

FTB's corporate data resource will be developed within a single, organization-wide *common data architecture.* Common data architecture is the science and method of designing and constructing a data resource that is business driven, based on real-world objects and events as perceived by the organization, and implemented into appropriate operating environments. It is the overall structure of a data resource that provides a consistent foundation across FTB boundaries to provide easily identifiable, readily available, high-quality data to support the business information demand.

The *common data architecture* is a formal, comprehensive data architecture that provides a common context within which all data at FTB disposal is understood and integrated.

The *common data architecture* will be subject area oriented. It is built from data subjects that represent business objects and business events in the real world that are of interest to FTB and about data that is captured and maintained. The subject-oriented approach is industry preferred opposed to the project-oriented approach as found in typical BI data stores. The subject-oriented approach prevents siloed data and gives credence to integrated data. The following figure illustrates FTB's primary *common data architecture* subject areas:

Figure 3.2-1: FTB's Primary Data Subject Areas



The *common data architecture* contains concepts, principles, and techniques for developing and maintaining formal data names, comprehensive data definitions, proper data structures, precise data integrity rules, and robust data documentation. Documentation about the data resource is often referred to as metadata, which is commonly defined as data about the data.

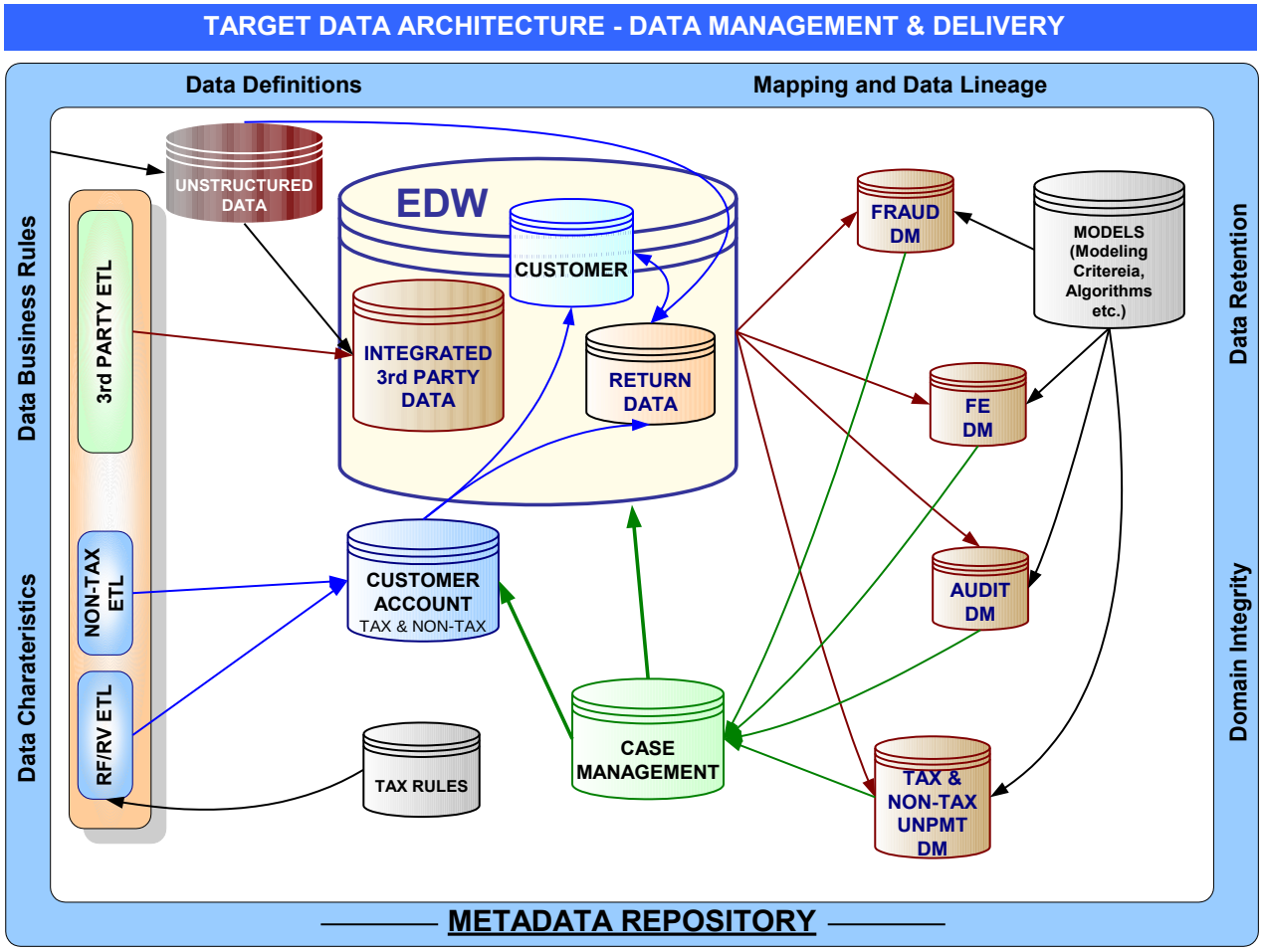
FTB shall thoroughly document its primary data resources and Third Party data resources. *Data resource data* are any data that document the data resource and help people understand, manage, and use that data resource to support the business information demand.

3.3 Physical Data Architecture

3.3.1 Target Data Architecture

The figure below illustrates the target physical data architecture. The diagram is a representation of the information flow into the FTB operational and data warehouse data stores.

Figure 3.3-1: FTB's Target Physical Data Architecture



The outer layer shows the metadata repository where all data objects coming into FTB will be cataloged and defined. Unstructured data must be defined and identified with its purpose and author. Data mapping & lineage, impact analysis, data characteristics, data business rules, retention, and domain integrity information will be a part of the metadata repository to improve data quality and the measure of the data quality.

Within the Data Management architecture, the data is extracted, transformed and loaded (ETL) into the FTB's data stores. The metadata repository and ETL of data will not be circumvented by manual coding or any other means as this will result in the degradation of data quality and possibly make the data unusable. (See the following Third Party Data section)

The Customer Account subject area data store represents the PIT and BE financial accounting system stores. The Enterprise Data Warehouse contains the Third Party data, Customer/ Customer Demographic data, and Return data.

The Customer data shall be managed in one customer data store. All customer and address data shall be stored in a centralized datastore to eliminate redundancy to avoid creating a new customer database every time a new application is created.

The Data Marts are created for enterprise modeling and other predictive analytics for identifying non-filers, audit cases and collections cases. One of the outputs from the Data Marts feed the Case Management Data Store and system. The Case Management system may be considered as operational and is fed back into the Enterprise Data Warehouse for historical purposes.

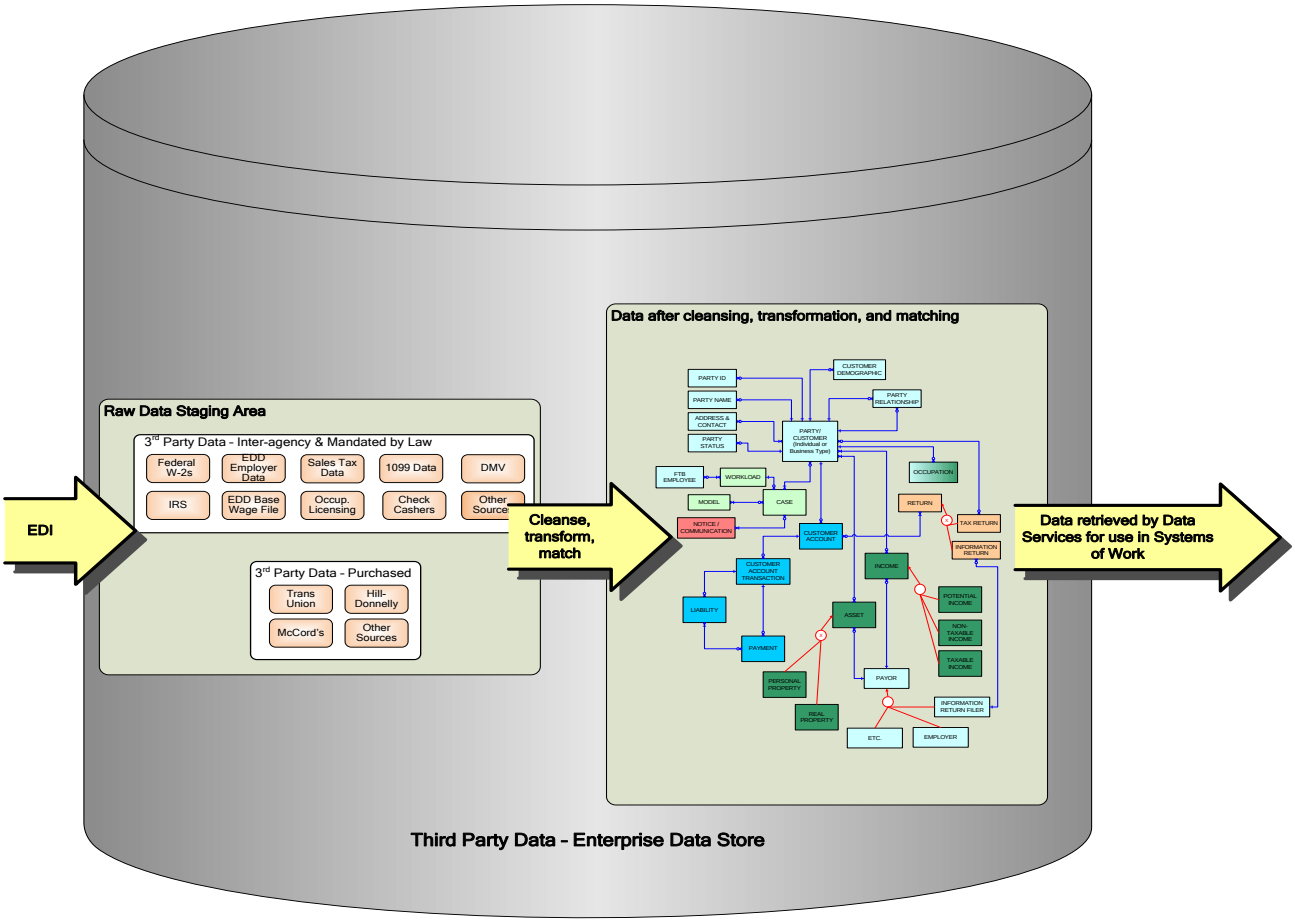
The Models and Tax Rules data stores are for recording and storing the criteria/ranges for models and the Tax Year rules respectively. The models and rules are decoupled from the operational systems so they can be more agile for frequent business needs.

Data Management and Delivery requires the quality of the data delivered be consistent, reliable and timely.

3.3.2 Third Party Data

The following figure depicts the Third Party Data Acquisition Model. The third party data from the data providers is in raw format within a data staging area. The data is ready for cleansing along with the post-cleansing and matching data that is stored in a format that is most appropriate for enterprise use. Ideally, the data is obtained by electronic transfer rather than magnetic media or other legacy formats. This data exchange include documents, spreadsheets, pictures, video and audio files.

Figure 3.3-2: Target Third Party Data Acquisition and Data Quality Architecture Model



During the data acquisition process, the data will be stored and organized in the form it arrived in, therefore the physical data structures will not be in an entity driven organization. For example, EDD data and DMV data both contain party address data. It is likely the structure of the address data is specific to each provider. As part of the data quality process, data is cleansed, transformed, matched and copied into a standardized data structure that is ready to be used by the enterprise.

The cleansing, transformation, and matching processes have data exchange components and components that are not related. During the process of cleansing, transforming, and matching, errors may be discovered requiring records to be returned to the sender for correction and resubmission. Error reporting is clearly a data exchange function. Transforming and matching are data management related, i.e. altering the data and associating it for internal purposes.

3.3.3 Data Formats

Please see the Enterprise Data Exchange Architecture Definition document.

3.3.4 Transformation and Validation Processes

Data exchanges often include processes to transform data from one file format into another for uploading into a database. The processes check for duplicates and errors, create logs, drop

records out for manual intervention, and may return messages of acceptance or rejection. Rejection messages often contain reasons for the file rejection. Before the data is loaded into another system, transformation and validation processes will be run. These processes will be enabled before or after the data transfer depending upon the business requirements.

Considerations of a validation process include:

- **Converting file formats.** Often the export data of one application will not be in the same layout as required by the receiving system. Conversion of the file formats will be required.
- **Validating file layouts.** When a file is transferred to FTB, an edit program is run to determine if the file is in an acceptable format. If the file passes this validation process, processing continues. If the file fails, it is stopped before moving into the system. With either a pass or fail, the system must return a message with the status of the file and an explanation if the file failed.
- **Preventing duplicates**. Before loading in a new record, it's important to ensure that it doesn't already exist in the destination application. There are many different ways to get duplicate data. For example, the file itself could have been sent twice or records within a file may be repeated. This process will eliminate duplicates and database corruption.
- **Backup and logging**. Regularly schedule backups and restore procedures will be documented and tested. Transactions will be logged for troubleshooting and security tracking according to user and systems requirements.
- **User interface.** For complex processes, an administrative interface will provide for review what data will change and be used to resolve errors prior to import.
- **Provide user responses.** Alerts, receipts, and acknowledgments are different methods for responding to a customer action or FTB action. Alerts can be email notices for error process or events. (see EDE Architecture Definition Document)

3.4 Data Standards

FTB shall develop and maintain the following data oriented standards:

- Standard data models
- Standard data naming conventions
- Standard data terms and definitions
- Standard data oriented functions, processes, and practices
- Standard data oriented roles and responsibilities
- Standard data formats
- Standard data oriented deliverables and metrics

3.5 Metadata

Metadata is not just data about data. It includes business rules associated with a piece of data. FTB will use a metadata repository product for the enterprise. See previous figure showing the layer for "Data Business Rules and Metadata".

FTB will build an enterprise metadata model that supports multiple contexts through an extensible model that treats ontology as descriptive.

Enterprise metadata will be set in context. Enterprise wide data (e.g., Enterprise Data Warehouse data) can no longer manage data without contextual metadata. All FTB applications and systems must define the *context* of the data that is being used and not siloed systems, where the context of data is inherent within the system.

3.6 Data Quality

FTB shall support data quality for both current and future business information demand. Data quality is a measure of how well FTB's Data Management and Delivery supports the current and the future business information demand of the organization. The Data Management and Delivery cannot support only the current business information demand while sacrificing the future business information demand. Data resource quality is stability across changing business needs and changing technology. Stability across change is the ideal that provides the foundation FTB needs to become an intelligent learning organization.

The issues of data quality and data integration are related. Many data quality issues stem from the inability to identify and match data. FTB will improve data quality by integrating future systems.

3.7 Technical Architecture

FTB will implement a common customer identification scheme for the customer and their associated records. The common customer identifier provides the ability to integrate data across the enterprise.

Future mission critical datastores will require 24/7 or near 24/7 availability. Future technical architecture will need to meet this need in addition to addressing security requirements, support data retention policies, and integrate these into a recovery plan.

Security shall be integrated and comply with SAM 5300 and FTB standards.

Operational data integration tools that utilize the Metadata Repository shall be used to support database consolidation, migration, upgrades, and synchronization.

FTB may use database federation or centralized datastores (*see Appendix 3.5.1.1)*

FTB shall use Service Oriented Architecture data services for the delivery of data from FTB's physical data stores (i.e., the data layer).

4.0 Target Enterprise Governance

4.1 Target Data Governance

Data Management and Delivery is vital to FTB. Similar to any valuable asset, FTB shall recognize that its data assets must be managed. Data management seeks to effectively control and leverage data assets. Data governance shall support the data principles discussed in section 3.1 above.

Data Management and Delivery is a shared and collaborative responsibility between the Data Center of Excellence, business data stewards serving as trustees and of enterprise data assets, and technical data stewards serving as the expert custodians for these assets.

Figure 4.1-1: Target FTB Data Governance

Entity	Function
Data Architect	• Heads FTB's Data Center of Excellence • Reviews, approves or disapproves data models for compliance of FTB's data architecture • Maintains Enterprise Business Information Model of FTB's core business data architecture. • Maintains FTB's Data Standards
Data Center of Excellence	The Data Center of Excellence is composed of the department's Business and IT data experts responsible for: • *Data Governance* – planning, supervision and control over data management and use • *Data Architecture, Analysis & Design* – data modeling and specification • *Database Management* – database design, implementation and support • *Data Security Management* – ensuring privacy, confidentiality and appropriate access • *Data Quality Management* – defining, monitoring and improving data quality • *Reference & Master Data Management* – managing trusted versions and replicas • *Data Warehousing & Business Intelligence Management* – enabling reporting and analysis • *Document, Record & Content Management* – managing data outside of databases • *Meta Data Management* – integrating, controlling and providing metadata • *Discussion and Approval of Data Related Activities*
Database Administrator	• Performs database performance and maintenance services

Entity	Function
	• Performs physical data modeling services • Installs and supports Database Software and Data inquiry products • Performs ongoing product support and training, to include a regular forum for problem resolution and information exchange • Ensures a transparent and productive data environment to support the FTB mission • Is a part of or communicates with the Data Center of Excellence
Project Architect/Lead/ Manager	• Develop physical data structures for a project with guidance from Data Architecture and the Data Center of Excellence • Gets approval from the Data Center of Excellence to continue the data project
Business Staff	• Works with the Data Center of Excellence to communicate the purpose, data needs, security level of data being stored, and the business reason for creating a the data store inside or outside data governance.. • Receives approval or rejection of data activities.

4.2 Responsibility of the Data Center of Excellence to the Business

It is the responsibility of the Data Center of Excellence to the business to ensure that:

- <u>Business user should be able to:</u>
  - Know what data the enterprise manages
  - Know what the data means
    - Including calculations and derivations
  - Know where the data is stored
    - At a minimum the Authoritative Source
  - Know who is allowed to access the data (security)
    - If they are allowed to know this
  - Know how to get the data
  - Know what can be done with the data (privacy, compliance)
  - Know what decisions have been made about the data
  - Know who has made decisions about the data
    - Governance
    - Stewardship
  - Know what quality issues exist with the data
  - Know who else is interested in the data
    - Stakeholder community
  - Know who to contact if there are issues with the data
    - Know what processes exist to resolve issues

- <u>With this knowledge, an business user will be able to:</u>
  - Use the data they rely on to perform their assigned responsibilities

- Ensure that the data can always be turned into information
- Participate effectively in stewardship functions that assure the quality, privacy, security, and compliance requirements of the data

- <u>The enterprise as a whole will benefit as the business user also:</u>
  - Uses the data to increase the efficiency of the enterprise's operations Including re-engineering of business processes to take advantage of improved data understandability, availability, and quality
  - Uses the data to meet the enterprise's business goals Including adaptation to changing market, regulatory, and other environments. And also agility in responding to new opportunities
  - Uses the data to mitigate risk in the enterprise including reduction of operational risk inherent in the data itself as data quality improves

5.0 Gap Analysis

5.1 Gap Analysis Defined

To improve data quality and integration, FTB will utilize a common identifier for all records. FTB will utilize a federal or statewide identification system, such as REAL ID. If no standard identification system is in place, FTB will implement one for internal use.

Figure 5.1-1: Gap Analysis Table

DATA & TECHNICAL DOMAIN	GAP	CHANGE REQUIRED	BENEFITS	RISKS	IMPACT
Common Data Architecture	FTB does have a target data architecture that is generally accepted or is completely ignored.	Establish the Data Center of Excellence. Enforce the target architecture through Data Center of Excellence.	Consistency in the development and deployment of all system solutions.	The risk not to have a compatible architecture will continue to result in poor data quality, complex ETL, higher resource costs, and poor performance.	**High**
Determine use of Enterprise Modeling	No Standardization of Data across data source systems and the third party data sources.	Establish data standards to support enterprise-modeling capabilities. This is done by implementing an enterprise data store for modeling activities.	Data has a common format, type and value set for both data and presentation layers From a semantic standpoint data has a common meaning (income from one source has the same meaning as income from another source so that they can be directly compared in a model) Better data will lead to more effective models	If FTB continues to ignore data standardization in terms of modeling data internally and externally, then there will be continued lack of sharing of data between SOWs.	**High**

DATA & TECHNICAL DOMAIN	GAP	CHANGE REQUIRED	BENEFITS	RISKS	IMPACT
			that will generate more revenue and reduce costs.		
Enterprise Metadata Repository for OLTP and OLAP	Metadata Repositories are silo and hand code. No metadata standards are adhered to.	FTB needs to govern and create a central enterprise metadata repository that is compatible with industry metadata standards	Consistent and Contextual meaning of data reduces the cost of staff trying to analyze each piece of data for meaning and use each time it is used. If it is defined upfront and made useful, then time and cost is minimized for delivery of the BI product.	Governance and creation of a central or federated metadata repository is imperative in BI. If this is not done costs will remain high in developing BI products to the business.	**High**
Data will be shared, integrated and accessible across functional and organizational boundaries	This is an architecture principle that must be respected throughout the enterprise	Business and IT must be educated on the sharing of data and what it means to each line of business.	All data are available across the enterprise in a consistent format using a catalog directory of this data to find it and procedures for getting the data without extensive IT intervention for the business.	All data being available across the department will require disclosure measures and usage guidelines. This data must not be replicated in multiple areas in FTB. There should be access to the source data store.	**High**
The quality of data will be maximized to provide the best value to the business	This is an architecture principle that must be respected throughout the enterprise	All FTB organizations must be educated on the importance of data quality and “Trusted” data. The Data Center of Excellence and the BI Competency Center are the stewards.	Higher levels of quality data. Quality data reduces the need to clean data on the back end / downstream processes like BI. Data must be cleansed early in the tax processes.	The risk of not providing data quality measures will perpetuate the need to constantly cleanse the data through traditional BI ETL when the data should have been cleansed and formatted within compatible data architecture at the beginning of the operational tax processes. Poor data quality equals higher cost, and lost cases in litigations.	**High**

5.1.1 Strategies

Figure 5.1-2: Third Party Data Target Process Model Descriptions

#	FUNCTION/ PROCESS	DESCRIPTION
	3rd Party Data Acquisition	The Improve Data Timeliness Opportunity #2 is due to the expanded use (i.e., enterprise-wide) of 3rd Party Data. While data is timely today for INC, it is likely that more timely data will be needed for other SOWs.
•	Identify New Sources	There is little room for improvement in the identification of new data sources because FE does an excellent job at identifying and evaluating new sources today.
•	Establish Agreements	Agreements with the 3rd party data providers will need to be established that improve the timeliness of 3rd party data.
	Electronic Data Interchange (EDI)	Data exchange with providers could be extended to perform end-to-end processing that includes data acquisition, format, cleansing, matching, and error management. Today SWIFT performs the acquisition process, stores the provider file, and has the capability to perform SOW-specific edits. However, this back-end functionality (i.e., format, cleansing, matching, editing) is not consistency used due to staffing and funding constraints.
•	Acquire Data	3rd party data must be acquired on a timely basis to support future modeling activities. Legacy formats needs to be replaced with electronic transmission where possible to streamline the interface between the provider and FTB.
•	Format	The Electronic Data Interchange (EDI) Opportunity #3 enterprise service should be employed to receive, edit, track use, and manage 3rd party data. Record level rejection is added.
•	Cleanse	The Improve Data Quality Opportunity #2 expands data cleansing of addresses and $ amounts using new automated tools and best practices. Manual cleansing is considered taking into account the cost vs. benefit. The Address enterprise service is utilized to improve the accuracy of record addresses.
•	Error Management	Error records and files are returned to the provider. Provider's quality score is tracked for use in provider management and FE processing.
•	Match	The Improve Match Criteria Opportunity #1 uses multiple addresses and possible other demographics such as date of birth.
	Stage and Load	The stage and load process decouples 3rd Party Data from INC and is focused on improving the overall performance of the technical infrastructure.
•	Stage	New architecture, tools, and methods should be considered for staging.
•	Load To INC	Loading of records into any other database will be an implementation decision. The technical architecture of the 3rd Party Data TBO addresses this approach.
•	Load to ECAIR	ECAIR migrates or is replaced by an enterprise 3rd Party Data store. The 3rd Party Data TBO addresses this approach.
•	Receive Returns Information from TI and BETS	TI or BETS information is not stored as part of the 3rd Party Data. Data services are used to access this information independent of 3rd Party Data functionality.

5.2 Roadmap

5.2.1 Phase Recommendation

The following are steps to move from the current silo-based database implementation to an integrated state.

Figure 5.2-1: Data Management and Delivery Architecture Definition Phases

Task Name	Scheduled Work (in hours)
Data Delivery and Management	**6,676**
Data Delivery and Management - PHASE I	**480**
Data Delivery and Management Planning	
Coordinate with other ESOs in Data Governance and Standards Planning	320
Document Data Governance and Standards	80
Approve Data Governance and Standards	40
Implement Data Governance and Standards	40
Data Delivery and Management - PHASE II	**6196**
Establish Enterprise Metadata Repository - Phase II-A	
Establish Metadata Governance Processes	80
Determine Metadata Methodology & Requirements for Gathering Metadata	80
Procure Metadata Repository Tool	160
Gather Metadata & Populate Repository	860
Publish Metadata	80
Milestone - Enterprise Metadata Repository Established	
Establish the Enterprise Data Warehouse (EDW) - Phase II-B	
Enterprise Data Warehouse Planning	
Coordinate EDW Planning with BI and SOA	160
Document EDW Plan	80
Review EDW Plan	40
Enterprise Data Warehouse Analysis	
Determine EDW Requirements	120
Develop EDW Logical Data Model	120
Analyze Requirements and Identify EDW Tables	112
Milestone - Agreement on EDW Data Contents	
Enterprise Data Warehouse Design	
Determine Design Approach	96
Document Design Approach	80
Review Design Approach	40
Enterprise Data Warehouse Data Model Design	
Analyze Requirements and Identify EDW Tables	80
Design EDW Views Template	80
Design EDW Physical Data Model	40
Enterprise Data Warehouse Population Design	
Validate Data Replication	24
Design EDW Population Approach	80
Document EDW Population Approach	40
Review EDW Population Approach	16
Design EDW Population Template	80
Review EDW Population Template	16

Enterprise Data Warehouse Data Services Design	
Design EDW Data Service Approach	80
Document EDW Data Service Approach	40
Review EDW Data Service Approach	16
Design EDW Data Service Template	80
Review EDW Data Service Template	16
Milestone - EDW Design Complete	
Integrate Metadata Repository with the Enterprise Data Warehouse	
Integrate and link MDR with the EDW	80
Enterprise Data Warehouse Build & Test	
Build Automation Script for generating View code	80
Confirm EDW Environment	40
Enterprise Data Warehouse Data Structures Build & Test	
Build EDW Database	80
Build EDW Views	80
Enterprise Data Warehouse Data Services Build & Test	
Develop, Test & Review Data Services	360
Enterprise Data Warehouse Population Build & Test	
Develop, Test & Review Replication Process	360
Develop, Test & Review Population Processes	360
Milestone - EDW Build & Test Complete	
Populate Data Marts for Enterprise Modeling - Phase II-C	
Underpayment Model Population	
Support BI in the analysis design and implementation of Underpayment Modeling Data Mart (See BI ESO)	320
Populate Underpayment Modeling	80
Filing Enforcement Model Population	
Support BI in the analysis design and implementation of FE Modeling Data Mart (See BI ESO)	320
Populate FE Modeling	80
Audit Model Population	
Support BI in the analysis design and implementation of Audit Modeling Data Mart (See BI ESO)	320
Populate Audit Modeling	80
Fraud Model Population	
Support BI in the analysis design and implementation of Fraud Modeling Data Mart & OpBI (See BI ESO)	640
Populate Fraud Modeling	120
Data Delivery and Management - PHASE III	**1496**
Utilize Metadata Repository	
Link Metadata Repository to all data items	200
Establish Data Access Through Data/Web Services	
Develop Data Access Requirements for Data/Web Services	120
Review Data/Web Services	40
Verify Data/Web Services Requirements have been met	40
Test Data/Web Services for Performance	120
Approve Data/Web Services	32
Migrate "As-Is" Databases to Target Database Structures	
Data Migration Planning	
Develop Data Migration Plan	80
Document Data Migration Plan	40
Review Data Migration Plan	16
Data Migration Requirements	
Develop Data Migration Requirements	80
Document Data Migration Requirements	40

Review Data Migration Requirements	16
Data Migration Design	
Develop Data Migration lineage and flows from source to target database environment	80
Document the data migration lineage and flows from source to target database environment	40
Review and Affirm the Data Migration Design	32
Data Migration Build, Test and Review	
Build automation scripts for data migration	200
Develop, Test and Review data migration from source to target databases	320
Milestone - Migrate "As-Is" Databases to Target Database Structures	

6.0 Appendix

6.1 General Definitions

Categories of Data - Logical classification of data elements (attributes) that pertain directly to a function or a major topic of interest to the enterprise. (Also see Subject Areas)

Context Diagram - A high level data flow diagram depicting only the inputs and outputs of a system.

Data Dictionary - A vendor supplied or custom developed database that typically track user-populated data element definitions and their occurrences across an organization's applications.

Data Entity - An item that represents a class of People, Objects, Locations, or Events (POLE) having characteristics of interest to the enterprise about which data could be kept. Examples include: 1) People: TAXPAYER, PREPARER; 2) Object: RETURN, CUSTOMER ACCOUNT; 3) Location: RECEIVING, STORAGE LOCATION, ORGANIZATION; 4) Event: CUSTOMER ACCOUNT ACTION.

Data Entity Model / Data Entity-Relationship Model - A structured representation of data and its inherent relationships, which depict the functional use of data without regard to its physical implementation. (See Data Model)

Data Entity Type - A collection of data entities to which a specific definition applies.

Data Model - A structured representation of data and its inherent relationships, which depict the functional use of data.

- **Conceptual/Semantic Model**- Contains Data Entities and their Relationships that describe business data concepts despite its physical implementation
- **"First-Cut" Logical Model** - Scoped to the project requirements and includes all the necessary Data Entities, Relationships and Attributes yet without the consideration of physical implementation.
  "Normalized" Logical Model - The further decomposition of the data model which includes elimination of repeating data groupings, redundant key values or rows, and attributes dependent upon other non-key attributes
- **Physical Data Model -** A representation of an application specific implementation of logical data model requirements.

Data Quality - Data Quality is accurate and consistent data resulting in useable information and knowledge

Data Sharing - The situation where one type of data is used to support more than one business activity.

Data Steward - Someone who manages data for someone else (i.e., a trustee/custodian). Further, data is not owned by any one person or unit, but owned by the enterprise. Therefore, this person is entrusted by the enterprise with information others require.

Enterprise Model - An integrated view of multiple applications, or application perspectives. Generally speaking, the Enterprise Model represents the "bigger picture" than a single application, function, or database.

Enterprise Pool - See **Subject Area**

Instance Data - Repository data is considered only as data depending on the perspective of the user. One user's perspective may be considered as metadata by another user.

Logical to Physical Mapping - The identification of logical data model requirements that will be used in the physical data models. Additionally, logical to physical mapping may utilize existing physical data structures, which have been identified in a logical data model.

Mechanism - An automated method or system by which specific processes are executed.

Metadata - A descriptive detail of data instances, also known as "the data about data". Examples of metadata include field names, lengths, program names, definitions, etc., which are usually the detailed description of data resources and business systems.

Metamodel - An encyclopedia/repository model representing a distinct view of the repository information. Examples of metamodels may include the detailed data entities/relationships of a subject area, data flow models detailing a context diagram, etc.

Multityping - A data model where a real-world data entity may be described by more than one data entity. For example, CUSTOMER might be classified as a TAXPAYER, INFORMATION RETURN FILER and a NON-TAX DEBTOR. Each classification adds more attributes, relationships, and rules to the knowledge we can express about that CUSTOMER.

Referential Integrity - Create, Update, and Delete constraints between to data entities/tables.

Repository - An integrated access point for globally resident information represented as metadata (detailed description of data resources and business systems). Repository contents are definable, loadable, and retrievable regardless of the origination tool, platform, programming language, or DBMS. The repository may be thought of as the card catalog in a public library.

Subject Area - A classification or grouping of data entities that pertain directly to a function or a major topic of interest to the enterprise. Examples include: CUSTOMER, RETURN, HUMAN RESOURCES, and CUSTOMER ACCOUNT.

Sub-type - A subordinate data entity type in a sub-type set. Common attribute and relationship types are "packaged" into the super-type for the subtype set and inherited by the sub-types in the sub-type set. In this way, a subtype is a more specialized category of its super-type that inherits all of the super-type's attributes and relationships, and also may contain additional attributes and relationships that are unique. TAXPAYER is a subtype of CUSTOMER.

Sub-type Set - A classification of a super-type's immediate sub-types as exclusive/inclusive and complete/non-complete.
Super-type - A data entity type that is the super-ordinate member of a subtype. A super-type is a generalization of its subtypes. Its attributes and relationship types are inherited by all of its subtypes. CUSTOMER is a super-type.

Trusted Data – Trusted Data comes from a central source (i.e., Enterprise Data Warehouse) where the data has been formatted and verified for quality and use for all downstream processes and datastores.

6.2 FTB Data Principles

1) Information is a strategic business resource "owned" by the enterprise.

All data is an enterprise resource. All organizational units have common ownership of data, although they may have different responsibilities with respect to the data (stewardship). The inherent interdependence of organizational units and business processes demands that data be managed at the cross-functional or enterprise level.

2) Data must be shared, integrated and accessible across the department.

Multiple sources of data are combined to form a single enterprise resource. Pools of enterprise data are used by multiple applications and data must be defined and managed consistently across the department. The right data must be available to, and accessible by, the right person at the right time. This means that the definition and location of data must be readily available across the department.

- **Meaningful data standards facilitate understanding, communication and productivity.**
  Shared data requires enterprise-focused data standards to ensure common understanding and consistency. Data standards exist for two reasons: (1) to improve productivity of the business through common understanding of its information and business rules, and (2) to facilitate communication among business people as well as information systems professionals.
- **To support all customers, data must be named and defined with a singular definition, standard set of values and uniform business rules.**
- **The use of already approved data characteristics (such as length, format) is required.**
- **The meaning of data and its business rules must be made accessible to data producers and knowledge workers.**
- **All applications and knowledge workers should access data from a single database unless it is not feasible.**
  It is difficult to assure consistency among distributed copies of data. Replicated data requires a business case and a plan for managing the consistency of the data.
- **Knowledge workers are responsible for the downloaded data they retrieve/receive.**
  In the same way that employees are accountable for their work, they are accountable for their use of information. Confidentiality or privacy requirements must be adhered to. As recipient of data, the knowledge worker becomes a steward of downloaded data. This does

not become "their" data. If erroneous data is discovered, they should follow guidelines to correct errors at the authorized source, not simply update their copy.

3) Data quality must be maximized to provide best value to the business.

Data quality includes completeness, accuracy and timeliness. Completeness is the existence of all data needed for business processes; accuracy is the absence of errors; and timeliness means the most current data is available when needed.

- **Capture data as close to its original source as possible.**
  - *Data producers should capture data electronically at its source. Data entered by the data producer tends to have the highest level of integrity. Data entered by intermediaries via forms, paper documents or other means, will be more likely to contain errors. Data intermediaries may not have the ability to rectify errors or omissions encountered on the non-electronic form.*
  - *Data quality is enhanced when data is collected at the original source outside the enterprise.*
  - *Data recorded by the customer eliminates potential errors encountered when an intermediary or business person records customer data.*
- **Capture data using the method that provides the best accuracy, completeness and timeliness.**
  The use of scanners and/or other automated data collection devices may eliminate the potential for human error. Electronic receipt of data or use of scanners can enhance timeliness and completeness of data.
- **Capture data once.**
  Data is the only business resource that is not consumed when it is used (retrieved). Therefore, it need not be re-entered for each different use.
- **Those who create/update data are responsible for the quality of the data.**
  One of the basic principles of quality is accountability by persons performing work. Integrity rules cannot be effective without accountability. Accountability requires that data producers be properly informed. Data producers must know their data customers, data usage and data quality requirements.
- **Define data quality targets; measure and report data quality.**
  To maximize data quality, producers and data intermediaries must know data quality requirements as well as current output quality statistics. Knowledge workers need to know the level of quality in order to use data properly.
- **Use data quality measurements to identify and correct defective processes.**
  If data quality is not acceptable, it indicates that the data collection and evaluation process must be improved. Data producers to measure the quality of their output can use data quality "audits" or assessments. The results of the audits should be used to improve the process.

4) System solutions must be architected

Systems are business process driven, developed with an enterprise viewpoint, and use data-oriented methodologies. Databases should be designed to facilitate system portability, scalability and adaptability.

- **Redundancy must be planned.**
  Data should be replicated when necessary with one location designated as the source. Replicated data should be synchronized with the source as needed to validate data.
- **Design systems to capture data for downstream business needs.**

Systems should be architected to capture data for the enterprise and not just for a single business process. Systems that restrict data capture to a single business process are referred to as stovepipe systems.

- **Eliminate redundant data create/update applications, interfaces and data transformations.**
  These redundancies represent the re-acquisition of data resources that exist electronically elsewhere. They represent non-value-added costs and put the enterprise at risk for producing conflicting data reports. Capture data once and replicate it as necessary.
- **When unable to use a single data source, distribute data by replicating it, as opposed to interfacing and transforming it to a different format.**
  When data is required in more than one database for timely or cost effective access, it should be replicated or extracted in a common form. The same data fact in multiple databases must have the same definition and set of values to maintain consistency across databases. The only acceptable exceptions are transforms required for approved software packages in which data is not maintainable in the same format. All data transforms require automated integrity controls to assure that data values are consistent.
- **Data quality controls should be independent.**
  Business rules and data integrity controls should be defined and developed separate and apart from the business process logic and data access logic. Because there may be many business events that cause update to data, the integrity logic must be reusable across the applications that can cause change to shared data.
- **Develop applications using single create/update modules around entity types, subtypes and natural business events.**
  Developing applications around the inherent business objects maximize the consistency of data and supports data integrity.
- **Edit/validation systems should be developed separately from operational systems.**
- **Existing routines for data validation, computations and source file access should be used where possible.**
  Existing algorithms for name/id/address validation, etc., should be used where possible, and where not possible, the new ones must follow the same business requirements as previously established.
- **A data impact analysis is an essential part of developing or modifying an automated system, or when changing data definition, location or characteristics.**
  A data impact analysis describes the impact of the new or changed data design on all departmental systems that use or could use the data. This analysis must be performed when access or data usage is impacted by a change in systems or technology. This analysis is used to inform business system managers, current project managers and program managers of the changes so they can accommodate any changes that impact them.
- **Data modeling should be used for data analysis when: 1) developing an application, or 2) making substantial changes to the data base/format of an application.**
  Data modeling (entity relationship diagramming) reveals data interfaces and impacts.
- **Data analysis/data modeling activities should be performed with an enterprise viewpoint to be of value.**
- **The re-use of prior data analysis is strongly suggested.**
- **A logical data model: 1) should be used to architected any new database, 2) should be in synch with the enterprise data model, and 3) should be fully attributed, with each data entity and attribute defined in business terms, including data characteristics.**

- **Architected solutions require the use of enterprise naming conventions, abbreviations and enterprise-defined data definitions for any data model or analysis.**
- **The use of a standard CASE tool ensures standardized deliverables. Uniform deliverables facilitate better communication of business information needs throughout the organization.**

5) Applications must be partitioned from information processing and management reporting.

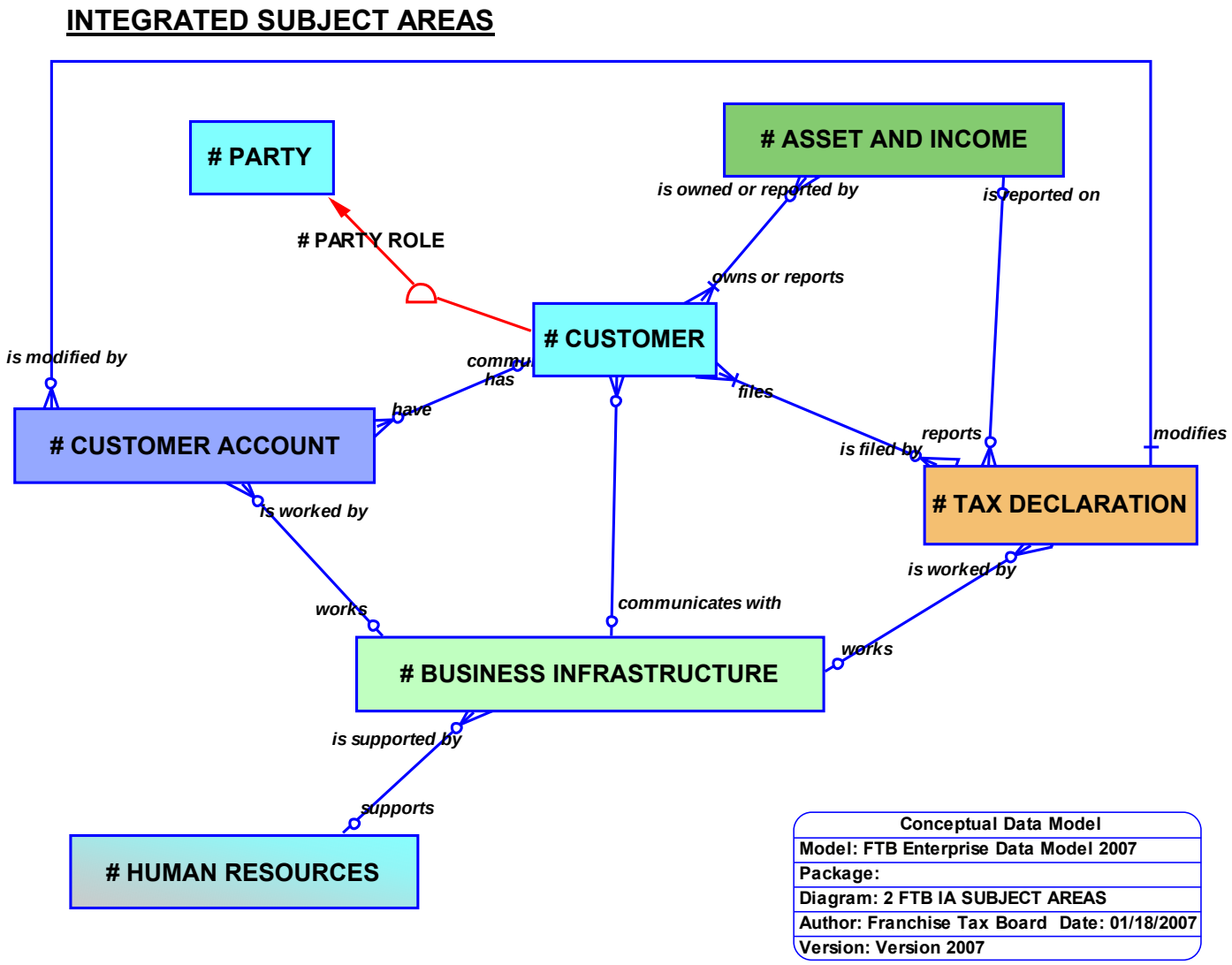
Applications are the day-to-day use of core business data. Partitioning applications allows for 1) consistent editing using enterprise business rules, and 2) production of management reports without affecting the performance of operational systems.

- **Information processing consists of the acquisition and editing (cleaning/scrubbing) of raw data.**
  Separating this function from the core business applications allows for 1) the consistent use of business rules and the establishment of enterprise pools of clean data available for multiple applications, and 2) the ability of the core business application to concentrate on the problem to be solved.
- **Management reporting' is the ability to present management with the information needed to make informed business decisions.**
  Management reporting (e.g., revenue tracking) systems should be developed separately from operational systems.

6.3 FTB Enterprise Data Architecture *(Subject Areas and Data Entities)*

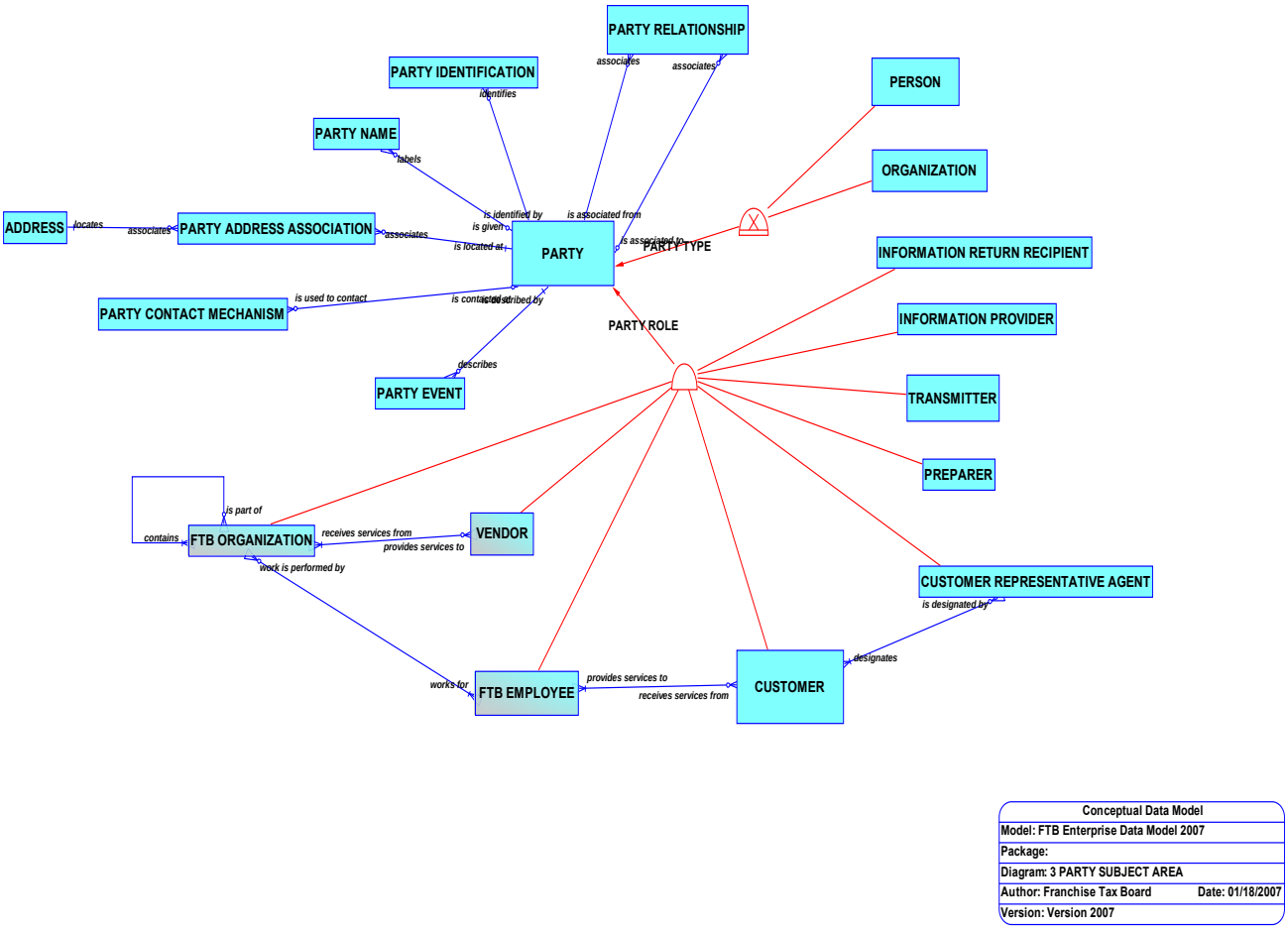
6.3.1 Subject Areas

Figure 6.3-1: Integrated Subject Areas



PARTY SUBJECT AREA

Figure 6.3-2: Party Subject Area

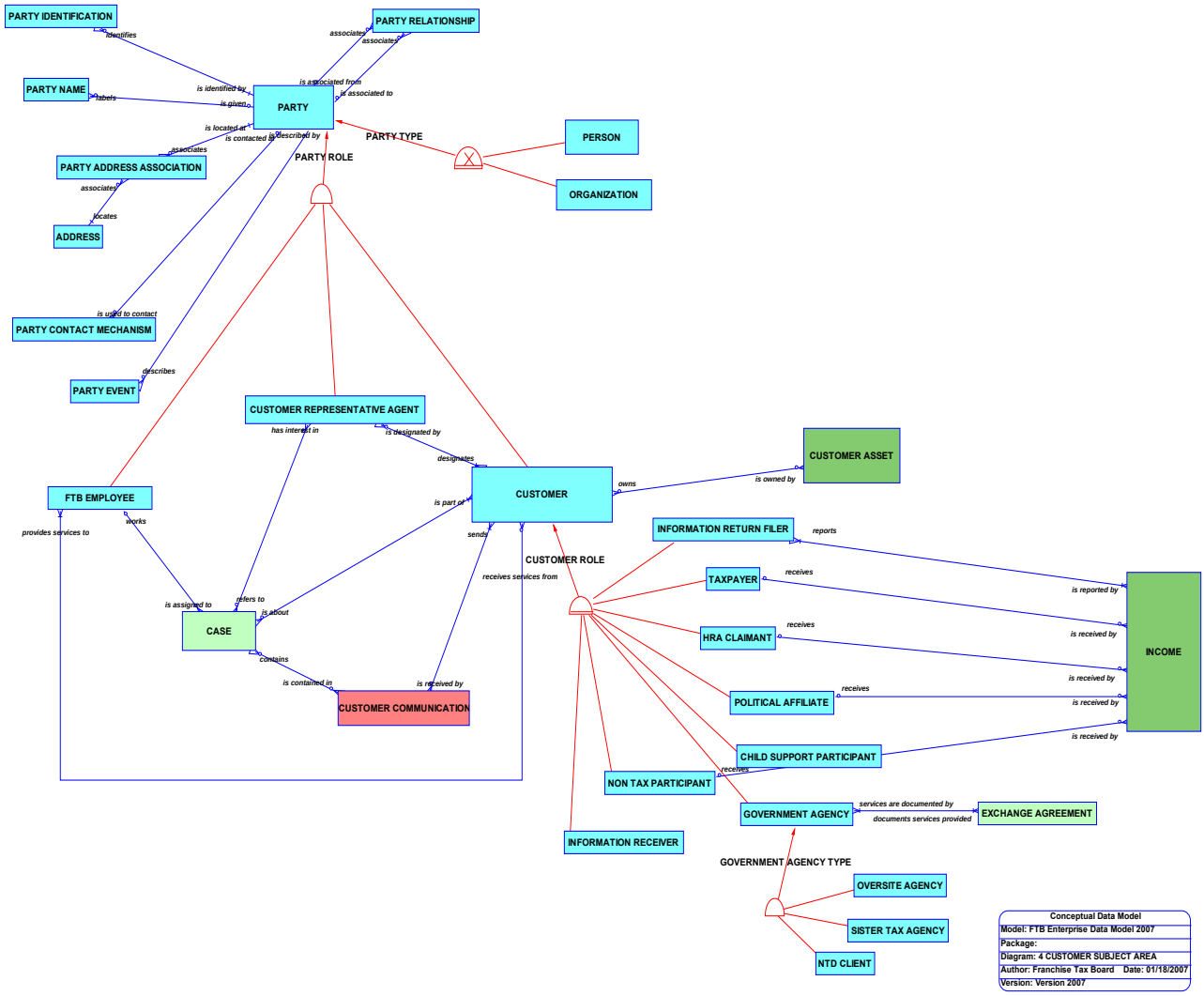


Description PARTY SUBJECT AREA

PARTY SUBJECT AREA is a grouping of data about an individual or organization that does business with the Franchise Tax Board.

CUSTOMER SUBJECT AREA

Figure 6.3-3: Customer Subject Area

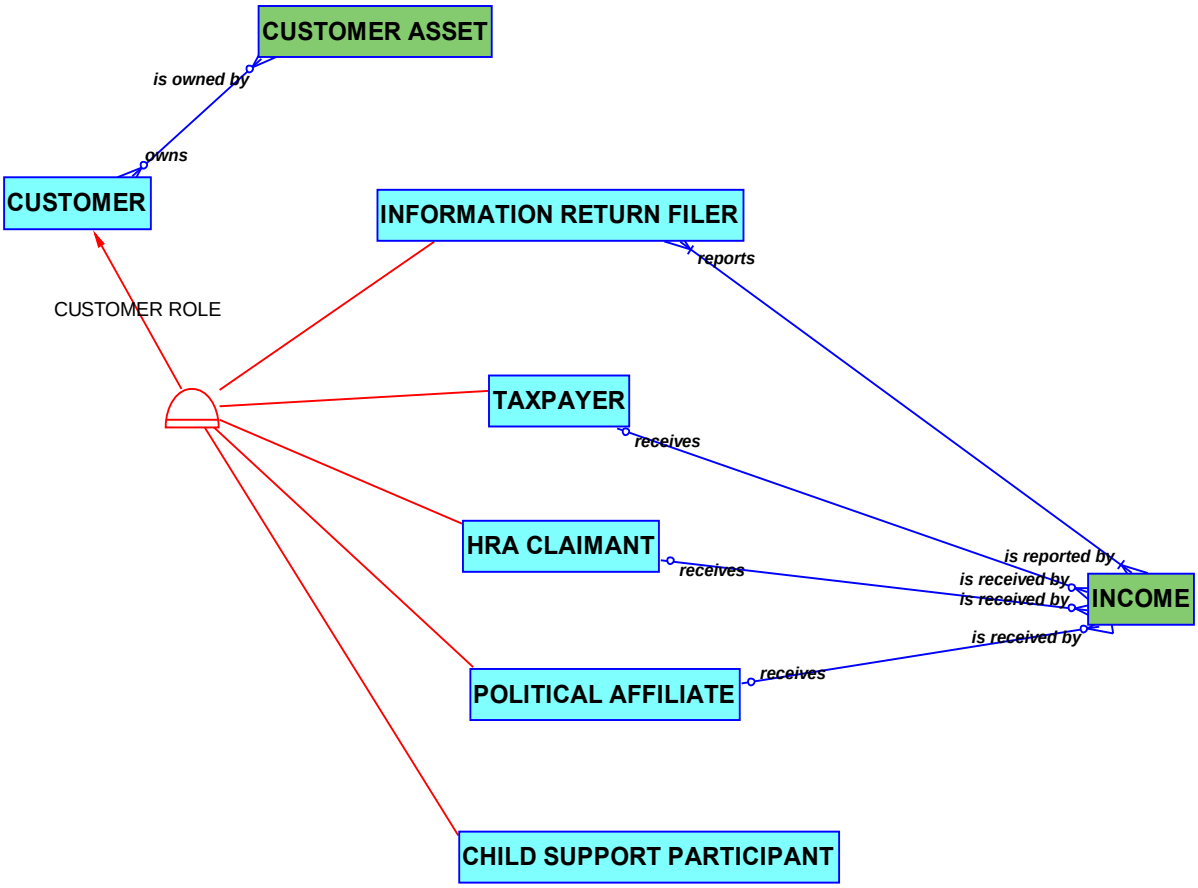


Description CUSTOMER SUBJECT AREA

CUSTOMER SUBJECT AREA is a grouping of data about an individual or business organization that does business or falls within the jurisdiction of law(s) of the State of California administered and/or enforced by the Franchise Tax Board.

ASSET AND INCOME SUBJECT AREA

Figure 6.3-4: Asset and Income Subject Area



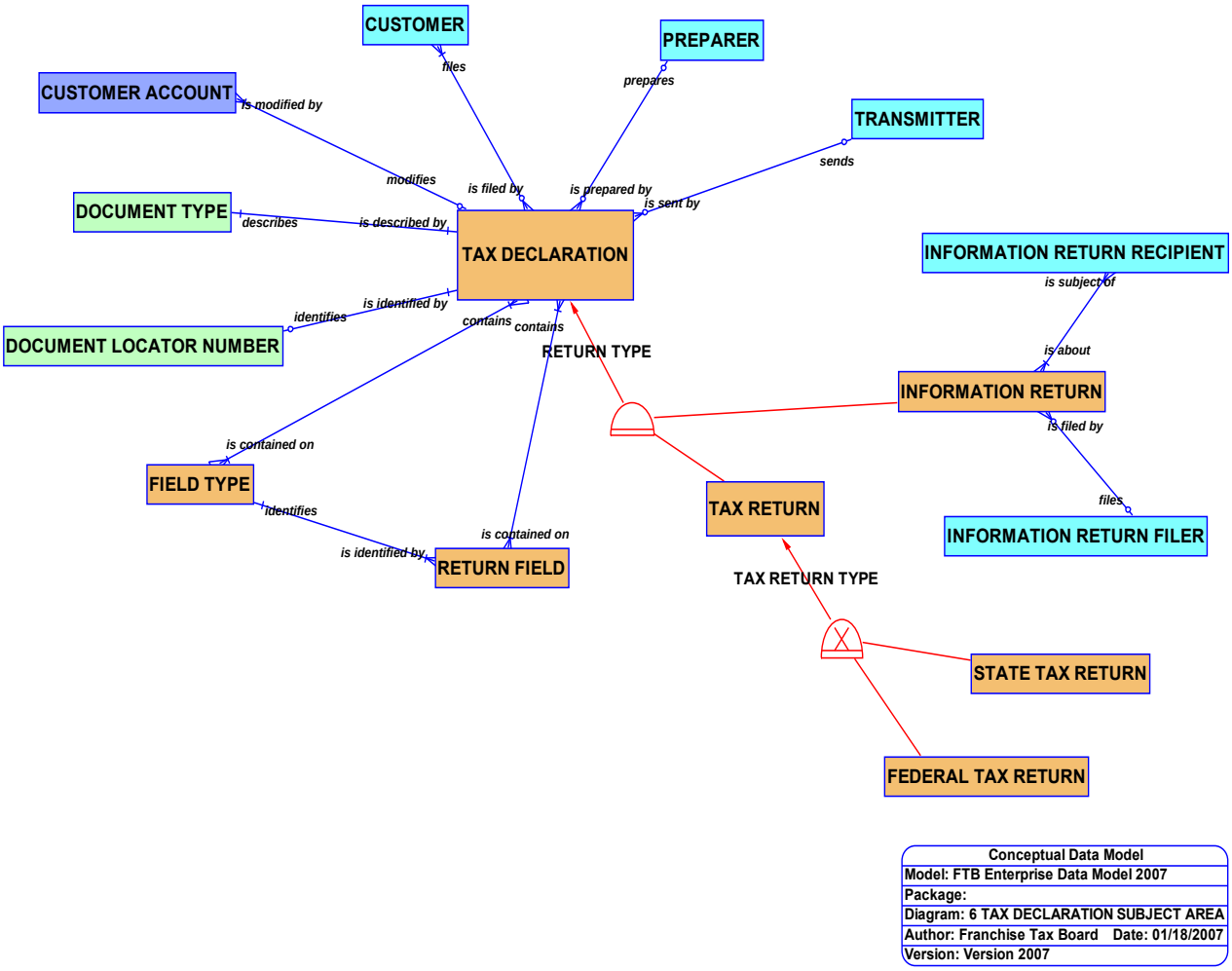
Conceptual Data Model	
Model: FTB Enterprise Data Model 2007	
Package:	
Diagram: 5 ASSET AND INCOME SUBJECT AREA	
Author: Franchise Tax Board	Date: 01/18/2007
Version: Version 2007	

Description ASSET AND INCOME SUBJECT AREA

ASSET AND INCOME SUBJECT AREA is a grouping of data about the CUSTOMER's asset and income sources and amounts, which are of interest to the Franchise Tax Board.

TAX DECLARATION SUBJECT AREA

Figure 6.3-5: Tax Declaration Subject Area



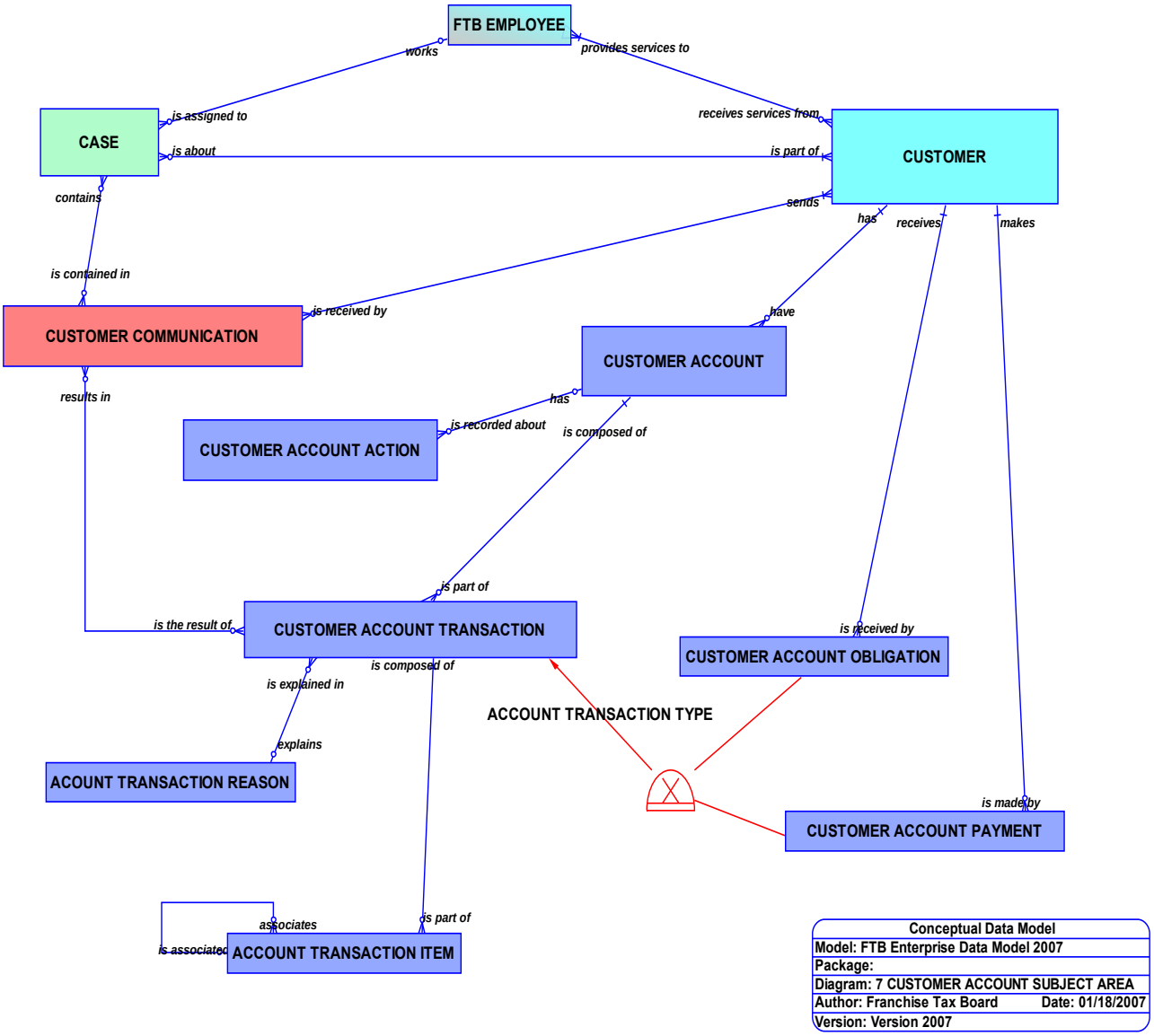
Description TAX DECLARATION SUBJECT AREA

TAX DECLARATION SUBJECT AREA is a grouping of data about official documents (electronic or paper) used by customers for the purpose of reporting information relating to financial data, tax liability, earnings and other required information. A Tax Declaration is composed of various fields, which may contain an amount or descriptive information.

Examples: Tax Returns, E-Filing, Information Returns, etc.

CUSTOMER ACCOUNT SUBJECT AREA

Figure 6.3-6: Customer Account Subject Area



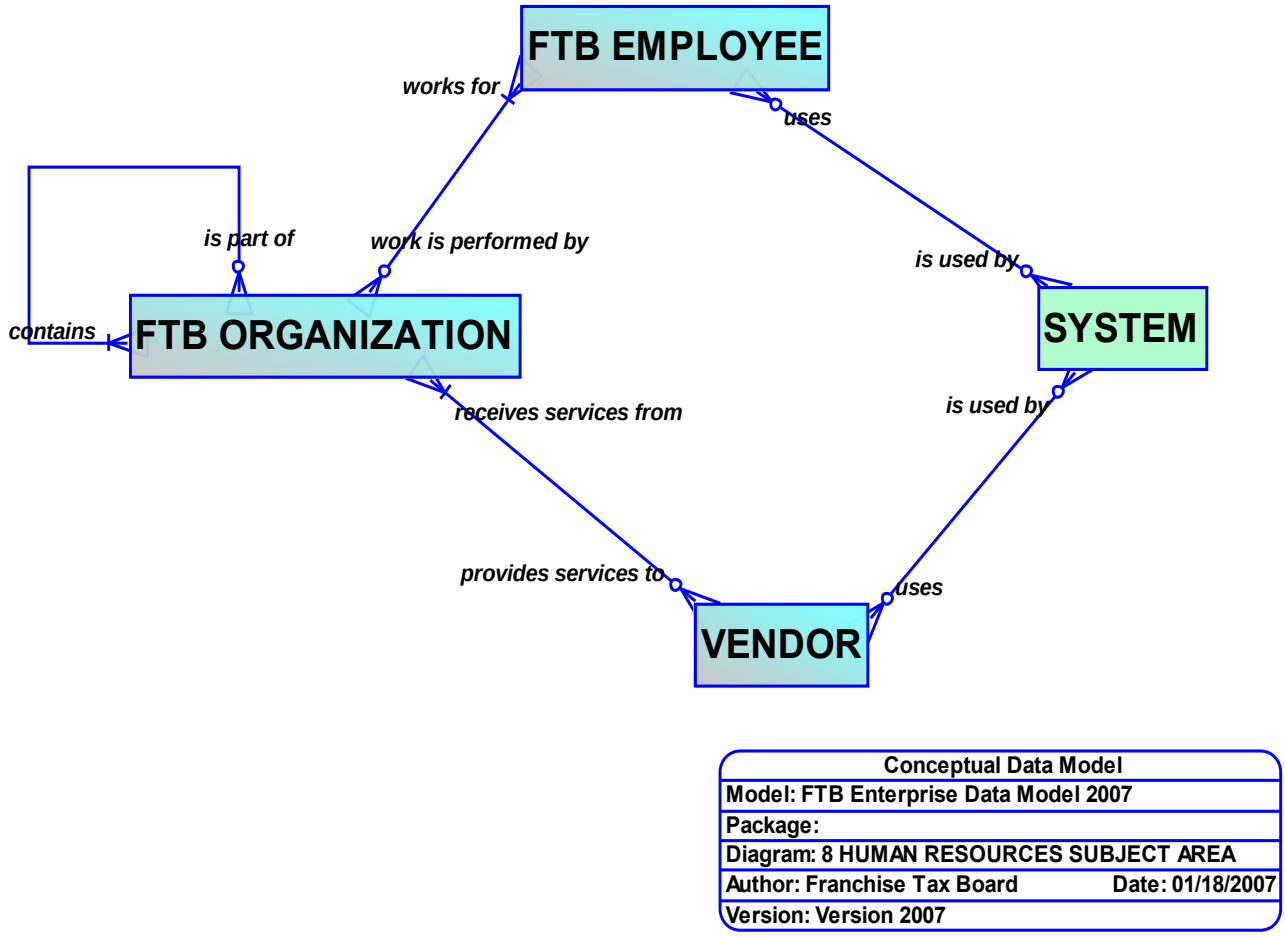
Description CUSTOMER ACCOUNT SUBJECT AREA

CUSTOMER ACCOUNT SUBJECT AREA is a grouping of transactions with the Franchise Tax Board. Includes payments, adjustments, obligations, liabilities, etc.

Examples: Tax Account, DMV Registration, Court Ordered Debt, Industrial Health and Safety, etc.

HUMAN RESOURCES SUBJECT AREA

Figure 6.3-7: Human Resources Subject Area



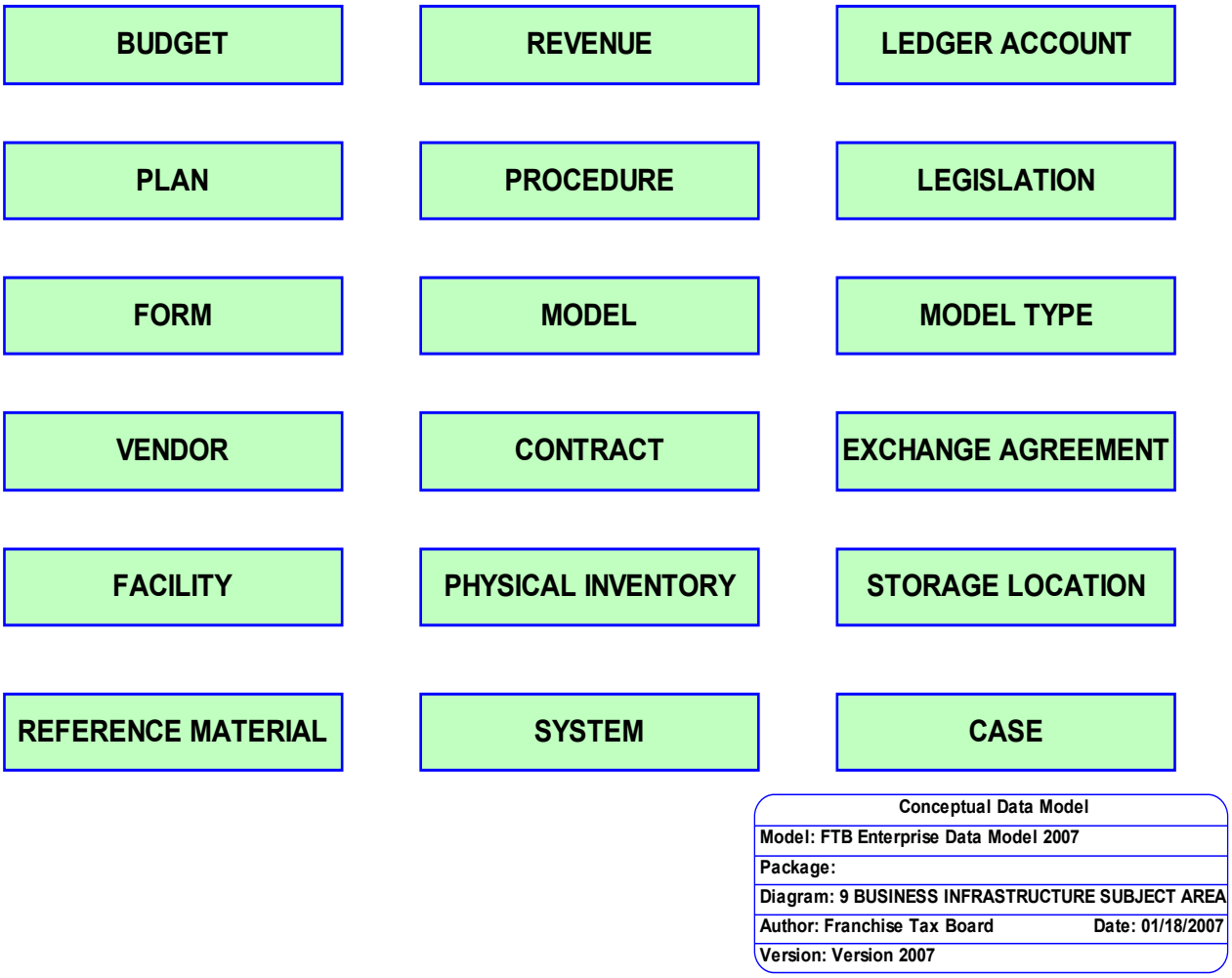
Description HUMAN RESOURCES SUBJECT AREA

HUMAN RESOURCES SUBJECT AREA is a grouping of data about the people who receive compensation directly or indirectly in the exchange for their services. This includes the characteristics, classifications, and their duties.

Examples: Employee (Auditor, Collector, Clerical, Analysts, Management, Programmers, etc.), independent contractor, vendor.

BUSINESS INFRASTRUCTURE SUBJECT AREA

Figure 6.3-8: Business Infrastructure Subject Area



Description BUSINESS INFRASTRUCTURE SUBJECT AREA

BUSINESS INFRASTRUCTURE SUBJECT AREA is a grouping of data about the functions that support the core business processes of the FTB. This includes all of the subject areas and information categories not included in the core subject areas.

Examples: Case, Models, Forms, Ledger, Accounts, Physical Inventory, Location

6.3.1 Data Entities

Name	Comment
ACCOUNT TRANSACTION ITEM	ACCOUNT TRANSACTION ITEM is data about the instance representation of a "journal entry line item" in accounting terms. According to the principles of double-entry accounting, each ACCOUNT TRANSACTION is composed of at least two ACCOUNT TRANSACTION ITEMs (i.e., a debit and a credit).
ACOUNT TRANSACTION REASON	ACCOUNT TRANSACTION REASON is data that describes for which an ACCOUNT TRANSACTION is applied.
ADDRESS	ADDRESS is data about a delivery point and/or physical location. Standardized addresses allow for the accuracy of mail delivery and save the cost of returned mail.
BUDGET	BUDGET is data about an itemized summary of probable expenditures, allocations and/or budgeted positions for a given period. Comment:: Examples are training, budget, travel budget, equipment, branch budget, salaries, contracts, project budget, etc.
CASE	CASE is data about the common issues and associated activities or actions that involve persons or organization parties. Comment: Examples are Non-Tax Debt, DMV, collection, DIR, fraud, audit, protest, bankruptcy, probate, appeal, settlement, investigations, litigation, withhold at source(real estate sales, entertainment performances), etc.
CONTRACT	CONTRACT is data about an agreement between the Franchise Tax Board and other parties that is written and enforceable by law. Comment: Examples are postal contract, personal services contracts, equipment lease agreement, vendor contract, labor contract, etc.

CUSTOMER	CUSTOMER is data about a PARTY (Person or Business Organization) that does business with or falls within the jurisdiction of law(s) of the State of California administered or enforced by the Franchise Tax Board. Comment: Examples are TAXPAYER, GOVERNMENT AGENCY, NON-TAX DEBTOR, INFORMATION RECEIVER, INFORMATION RETURN FILER, HRA CLAIMANT, POLITICAL AFFILIATE
CUSTOMER ACCOUNT	CUSTOMER ACCOUNT is data about the CUSTOMER's transactions with the Franchise Tax Board. Comment: Examples are tax, Child Support, DMV registration, court ordered debt, Industrial Health and Safety, etc. Examples of when a new customer account is created: a new return is filed, a potential non-filer is identified, assignment of non-tax collection account, filing of HRA claim, payment received for new customer, offset request for new customer, customer changes to estate or trust, etc.
CUSTOMER ACCOUNT ACTION	CUSTOMER ACCOUNT ACTION is data about the activities taken that are recorded on a CUSTOMER ACCOUNT. Comment: Examples are establish a new account, file a lien, place a hold on the account, add a Comment:, encumber an asset, issue an attachment, assign to collections, send a notice, EFT status (mandatory vs. voluntary), etc.
CUSTOMER ACCOUNT LIABILITY	CUSTOMER ACCOUNT LIABILITY is data about a PARTY's legal commitment to pay the FTB in a CUSTOMER ACCOUNT TRANSACTION.

CUSTOMER ACCOUNT PAYMENT	CUSTOMER ACCOUNT PAYMENT is data about the remittances received or acquired by FTB that are applied to CUSTOMER ACCOUNTs. CUSTOMER ACCOUNT PAYMENTS are types of CUSTOMER ACCOUNT TRANSACTIONS. Comment: Examples are Customer Account Payment types: estimate, extension, withholding, return/remit, misc. identified, misc. unidentified, bill payment as result of RIN or STD, proposed assessment, etc. Liability Types: penalty, interest, tax, non-tax collection, fees, agency penalties, etc. Examples of Origin: asset seizures, bank, employer, withholding agent, garnishments, levies, escrows, bankruptcies, probate proceedings, etc. Media Types: EFT, paper, cash, Western Union, etc.
CUSTOMER ACCOUNT TRANSACTION	CUSTOMER ACCOUNT TRANSACTION is data about the representation of a journal entry in accounting terms. Note that ACCOUNT TRANSACTION does not have transaction amounts as this is calculated by summing the line items of the ACCOUNT TRANSACTION ITEM entity. Each ACCOUNT TRANSACTION must be composed of one or more ACCOUNT TRANSACTION ITEMs CUSTOMER ACCOUNT TRANSACTION is data about a credit or debit that results in an addition, deletion or revision to a CUSTOMER's ACCOUNT. Comment: Examples are post a transfer to a CUSTOMER ACCOUNT, post a payment to a CUSTOMER ACCOUNT, etc.
CUSTOMER ASSET	CUSTOMER ASSET is data about anything a CUSTOMER possesses in which they have an ownership interest. Comment: Examples are 1. Real property (e.g., land, buildings), personal property (e.g., inventory, furnishings, boats, cars, stocks, bonds, cash, bank accounts, dividend income, accounts receivable), etc. 2. Monetary or financial obligation owed to the TAXPAYER by third parties including government agencies or unpaid wages (e.g., refund due a taxpayer), etc.

CUSTOMER COMMUNICATION	CUSTOMER COMMUNICATION is data about any interaction between PARTY and the Franchise Tax Board. Comment: Examples are sending forms, requests for information, inquiry, phone contact notes, letters sent, letters received, educational material, notices, etc.
CUSTOMER REPRESENTATIVE AGENT	CUSTOMER REPRESENTATIVE AGENT is data about a PARTY (Person or Organization) who represents the interest of a Franchise Tax Board CUSTOMER.
DOCUMENT LOCATOR NUMBER	DOCUMENT LOCATOR NUMBER is data about the physical location of documents received and processed. Comment: DLN includes: type of RETURN, truck #, block #, process year, sequence number
DOCUMENT TYPE	DOCUMENT TYPE is data about the kind of form, schedule, statement, claim filed by a CUSTOMER. Comment: Examples are 540, 9000, 1099, etc.
ENTITY	ENTITY is data about a group of individuals (persons) or a legal organization (business organization) formed for a common purpose. Comment: Examples of ENTITY types: corporations, non-profit corporations, partnerships, associations, trusts, banks and financials, government agencies, political committee, lobbyist group, trusts, LLC, LLP, cooperatives, S corps, C corps, master limited partnerships, non-admitted insurance co., estates, RICS, REMICS, REITS, etc. Examples of ENTITY status: qualified vs. non-qualified, franchise vs. income tax.
EXCHANGE AGREEMENT	EXCHANGE AGREEMENT is data about the written documentation for the exchange of information or services between the Franchise Tax Board and other GOVERNMENT AGENCY(s).
FACILITY	FACILITY is data about an existing or proposed structure used to house the Franchise Tax Board staff, equipment, and/or materials. Comment: Examples are District Offices, Central Office, Sun Center, Trade Center, conference rooms, training rooms, security access, etc.

FEDERAL TAX RETURN	FEDERAL TAX RETURN is data about the official documents used by a TAXPAYER to report their demographics, earnings, financial data, tax liability and other required information to the Internal Revenue Service.
FIELD TYPE	FIELD TYPE is data about the identification of different line items or monetary information reported on RETURNS. Comment: Examples are mortgage interest, interest paid, dividend, tax liability, refund, payment, credit, income, deduction, etc.
FORM	FORM is data about an approved, numbered document used to obtain and/or provide information. This includes electronic forms. Comment: Examples are tax returns/schedule, information returns, leave requests, bills, account action requests, timesheets (634), Interagency Agreement, etc.
FTB EMPLOYEE	FTB EMPLOYEE is data about PERSON (PARTY) who works or has worked for the Franchise Tax Board and is subject to Civil Service rules. Does not include independent contract workers.
FTB ORGANIZATION	FTB ORGANIZATION is data about a PARTY that is a Branch, Division, Bureau, Section, Unit or other group within the Franchise Tax Board.
GOVERNMENT AGENCY	GOVERNMENT AGENCY is data about a CUSTOMER that is a public organization with whom the Franchise Tax Board does business.
HRA CLAIMANT	HRA CLAIMANT is data about a CUSTOMER who is a senior citizen (62 years of age or older), blind, or disabled individual that may be eligible for property tax relief or rent assistance.
INCOME	INCOME is data about the amount of money or its equivalent received by a CUSTOMER from any source (taxable or non-taxable).
INFORMATION PROVIDER	INFORMATION PROVIDER is data about PARTYs (Person or Organization) that provide information to the Franchise Tax Board other than through EXCHANGE AGREEMENTS or required by information reporting laws.
INFORMATION RECEIVER	INFORMATION RECEIVER is data about a CUSTOMER (Person or Business Organization) who receives appropriate information from the Franchise Tax Board in accordance with disclosure laws.

INFORMATION RETURN	INFORMATION RETURN is data about the official documents used for the purpose of reporting payments and/or information required by information reporting laws.
INFORMATION RETURN FILER	INFORMATION RETURN FILER is data about a CUSTOMER who is subject to information reporting laws.
INFORMATION RETURN RECIPIENT	INFORMATION RETURN RECIPIENT is data about a PARTY (Person or Organization) that is the subject of an INFORMATION RETURN.
LEDGER ACCOUNT	LEDGER ACCOUNT is data about the ledger maintained for Franchise Tax Board ORGANIZATION(s) and their support appropriations. Comment: Examples are budget plans, revenue accounts, appropriations, fiscal account, receivables, etc.
LEGISLATION	LEGISLATION is data about a proposed or enacted law or group of laws relevant to the Franchise Tax Board. Comment: Examples are wage reporting simplification (AB3086), Revenue and Taxation Code, Internal Revenue Code, Taxpayer Bill of Rights, Pension Act, etc.
MODEL	MODEL is data about the particular set of selection criteria used to develop a workload or identify trends. Comment: Examples are Solar Energy Credit, Head of Household with Bad Address, Research and Statistics Model, etc.
MODEL TYPE	MODEL TYPE is data about a specific category of MODEL. Comment: Examples are Audit Model, Collection Model, Research & Statistics Model, etc.
NON TAX PARTICIPANT	NON-TAX PARTICIPANT is data about a CUSTOMER (Person or Business Organization) that has a non-tax liability, which the Franchise Tax Board is responsible for collecting.
NTD CLIENT	NTD CLIENT is data about a party that is a public organization with whom the Franchise Tax Board does business for non-tax debt. Client Agencies are: Federal, State, County, Court, Office, City
ORGANIZATION	ORGANIZATION is data about a group or business that does business with FTB.

OVERSITE AGENCY	OVERSIGHT AGENCY is data about a GOVERNMENT AGENCY - CUSTOMER that oversees Franchise Tax Board activities.
PARTY	PARTY is data about a person or organization that has a role in doing business with the Franchise Tax Board.
PARTY ADDRESS ASSOCIATION	PARTY ADDRESS ASSOCIATION is data about the associations between PARTIES and Addresses. The PARTY ADDRESS ASSOCIATION allows for the standardization of addresses, which reduces redundancy and improves quality in the location of PARTIES. An example of this association allows a historical tracking of PARTY addresses, the types of address, which PARTIES are associated to one address, and which ADDRESSes are associated to one PARTY.
PARTY CHARACTERISTIC	PARTY CHARACTERISTIC is data about the behavior patterns of a party. Examples: potentially dangerous, sensitive, bad check writer, etc
PARTY CONTACT MECHANISM	PARTY CONTACT MECHANISM is data about the way to contact a PARTY and the location of that contact mechanism. Examples of a PARTY CONTACT MECHANISM are: Phone Numbers, Fax Numbers, Pager Numbers, Cellular Numbers, e-mail addresses, etc.
PARTY EVENT	PARTY EVENT is data about the condition and when it occurred of the PARTY. Comment: Examples are deceased, bankrupt, dissolved, suspended, etc.
PARTY IDENTIFICATION	CUSTOMER IDENTIFICATION is data about the ways the Franchise Tax Board identifies CUSTOMERs. Comment: Examples are TPID, SSN, FEIN, Corporate Account Number, Drivers License Number, BEAN, SEIN (EDD Account Number), etc.
PARTY NAME	PARTY NAME is data about the name that is given to a Person or an Organization.
PARTY RELATIONSHIP	PARTY RELATIONSHIP is data about the connections between PARTIES who have a joint or combined reporting requirement.
PERSON	A PERSON is data about a PARTY that is an individual human being that does business or interacts with FTB.

PHYSICAL INVENTORY	PHYSICAL INVENTORY is data about supplies and equipment purchased or leased. Comment: Examples are desks, chairs, typewriters, pencils, copy machines, PC's, etc.
PLAN	PLAN is data about a coordinated set of tasks, visions, goals, objectives, drawings, and/or models to achieve a specific purpose. Comment: Examples are strategic plan, project plan, operational plan, tactical plan, etc.
POLITICAL AFFILIATE	POLITICAL AFFILIATE is data about CUSTOMER who is a candidate, lobbyist, political action committee, or ballot measure campaign in the State of California. This is of interest to comply with the Political Reform Act of 1974.
PREPARER	PREPARER is data about a PARTY (Person or Organization) compensated for completing a return.
PROCEDURE	PROCEDURE is data about a prescribed course of action. Comment: Examples are audit procedures, collection procedures, cashiering procedures, desk manuals, Employee Nomination Award, security procedures, etc.
REFERENCE MATERIAL	REFERENCE MATERIAL is data about the internal and external information sources used by Franchise Tax Board employees to perform the functions of their jobs. Comment: Examples are law books, manuals, Lexis/Nexis, internet/intranet, legislation, State Administration Manual, reverse directories, phone books, property tax records, departmental policy, case law, etc.
RETURN FIELD	RETURN FIELD is data recorded in a specific area of a RETURN. It may be either an amount or descriptive information. Comment: Examples are on a Form 540, Exemption field may contain a number; on a Form 540, Name field may contain the taxpayer name; on a Form 1099, Rent field may contain a monetary amount, etc.
REVENUE	REVENUE is data about monies assessed or collected by the Franchise Tax Board. Comment: Examples are dollars assessed from tax returns and audit assessments, dollars collected from tax payments, involuntary collections (attachments), and contract work, etc.

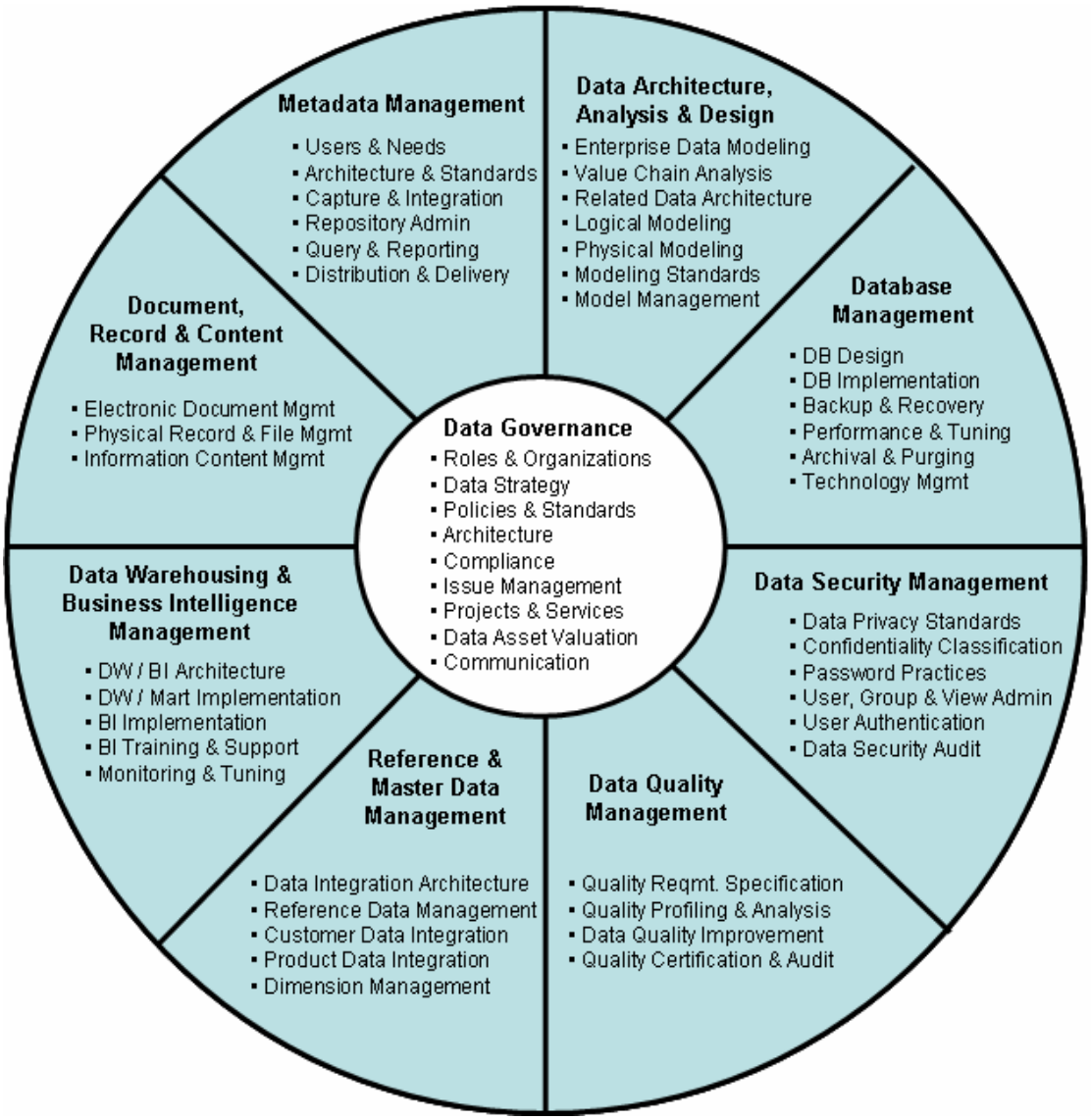
SISTER TAX AGENCY	SISTER TAX AGENCY is data about a GOVERNMENT AGENCY - CUSTOMER with which the FTB has similar business interests.
STATE TAX RETURN	TAX RETURN is data about the official documents used by a TAXPAYER to report their demographics, earnings, financial data, tax liability and other required information.
STORAGE LOCATION	STORAGE LOCATION is data about a space for storing items of interest to the Franchise Tax Board. Comment: Examples are forms warehouse, Information Storage, supply room, trucks, file cabinets, PCs, tape library, vault, law library, etc.
SYSTEM	SYSTEM is data about the integration of data, software, hardware, methods, and/or network that process and provide information to the Franchise Tax Board.
TAX DECLARATION	TAX DECLARATION is data about official documents (whether paper of electronic) used by CUSTOMERs for the purpose of reporting information relating to financial data, tax liability, earnings and other required information. A return is composed of various fields, which may contain an amount or descriptive information.
TAX RETURN	TAX RETURN is data about the official documents used by a TAXPAYER to report their demographics, earnings, financial data, tax liability and other required information.
TAXPAYER	TAXPAYER is data about a CUSTOMER (Person or Business Organization) that falls within the jurisdiction of the Revenue and Taxation Code of the State of California administered or enforced by the Franchise Tax Board.
TRANSMITTER	TRANSMITTER is data about a PARTY (Person or Organization) who transmits RETURNs and/or CUSTOMER ACCOUNT PAYMENTs and may be compensated.
VENDOR	VENDOR is data about an external PARTY (Person or Business Organization) that provides services, materials and/or equipment needed by the Franchise Tax Board.

6.4 Industry Best Practices

6.4.1 Data Management Body of Knowledge (DMBOK).

The diagram below illustrates the nine functions within the DMBOK framework.

Figure 6.4-1: Data Management Associations (DAMA) Data Management Framework



DMBOK further breaks down each function into sub-functions and activities. Each activity has been categorized as belonging to one of four Activity Groups. The FTB can choose to use these activity assignments when making organizational responsibility assignments.

- Planning Activities (P) — Activities that set the strategic and tactical course for other data management activities. Planning activities may be performed on a recurring basis.
- Control Activities (C) — Supervisory activities performed on an on-going basis.
- Development Activities (D) — Activities undertaken within projects and recognized as recognized as part of the systems development lifecycle (SDLC), creating data deliverables through analysis, design building, testing and deployment.
- Operational Activities (O) — Service and support activities performed on an on-going basis.

1. Data Governance

1.1. Data Management Planning

1.1.1. Identify Strategic Enterprise Data Needs (P)
1.1.2. Develop and Maintain the Data Strategy (P)
1.1.3. Establish the Data Management Professional Organizations (P)
1.1.4. Identify and Appoint Data Stewards (P)
1.1.5. Establish Data Governance & Stewardship Organizations (P)
1.1.6. Develop, Review and Approve Data Policies, Standards and Procedures (P)
1.1.7. Review and Approve Data Architecture (P)
1.1.8. Plan and Sponsor Data Management Projects and Services (P)
1.1.9. Estimate Data Asset Value and Associated Costs (P)

1.2. Data Management Supervision and Control

1.2.1. Supervise the Data Management Professional Staff and Organizations (C)
1.2.2. Coordinate Data Governance Activities (C)
1.2.3. Manage and Resolve Data Related Issues (C)
1.2.4. Monitor and Ensure Regulatory Compliance (C)
1.2.5. Communicate, Monitor and Enforce Conformance with Data Policies, Standards, Procedures and Architecture (C)
1.2.6. Oversee Data Management Projects and Services (C)
1.2.7. Communicate and Promote the Value of Data Assets (C)

2. Data Architecture, Analysis and Design

2.1. Enterprise Data Architecture

2.1.1. Develop the Enterprise Data Model (P)
2.1.2. Align with Other Business Models (P)
2.1.3. Define the Database Architecture (P) (same as 3.3.2)
2.1.4. Define the Data Integration / MDM Architecture (P) (same as 6.2)
2.1.5. Define the Data Warehouse / BI Architecture (P) (same as 7.2)
2.1.6. Define the Metadata Architecture (P) (same as 9.2)
2.1.7. Define Enterprise Taxonomies and Namespaces (P)

2.2. Data Modeling and Specification

2.2.1. Define Information Needs (D)
2.2.2. Develop and Maintain Logical Data Models (D)
2.2.3. Develop and Maintain Physical Data Models (D)

2.3. Data Model Quality Management

2.3.1. Develop Data Modeling Standards (P)
2.3.2. Review Data Model Quality (C)
2.3.3. Manage Data Model Versioning and Integration (C)

3. Database Management

3.1. Database Development

3.1.1. Define Database Design Standards (P)
3.1.2. Design Physical Databases (D)
3.1.3. Review Database Design Quality (C)
3.1.4. Develop Data Access Services (D)
3.1.5. Develop Information Products ((D)
3.1.6. Implement Development / Test Database Changes (C)
3.1.7. Create and Maintain Test Data (D)
3.1.8. Migrate and Convert Data (D)
3.1.9. Test and Validate Data Requirements (D)

3.2. Database Production Support

3.2.1. Implement Production Database Changes (C)
3.2.2. Obtain Externally Sourced Data (O)
3.2.3. Plan for Data Recovery (P)
3.2.4. Backup and Recover Data (O)
3.2.5. Set Database Performance Service Levels (P)
3.2.6. Monitor & Tune Database Performance (O)
3.2.7. Plan for Data Retention (P)
3.2.8. Archive, Retrieve and Purge Data (O)
3.2.9. Manage Specialized Databases (O)

3.3. Data Technology Management

3.3.1. Understand Data Technology Requirements (P)
3.3.2. Define the Database Architecture (P) (same as 2.1.3)
3.3.3. Implement and Maintain Database Environments (C)
3.3.4. Evaluate Data Technology (P)
3.3.5. Install and Administer Data Technology (O)
3.3.6. Inventory & Track Data Technology Licenses (C)
3.3.7. Support Data Technology Usage & Issues (O)

4. Data Security Management

4.1. Understand Data Privacy, Confidentiality and Security Needs (P)
4.2. Define Data Privacy and Confidentiality Standards (P)
4.3. Define Password Standards and Procedures (P)
4.4. Implement Data Security Controls (D)
4.5. Manage Users, Passwords and Group Membership (C)
4.6. Manage Data Access Views (C)
4.7. Manage Data Access Permissions (C)
4.8. Monitor User Authentication and Access Behavior (C)
4.9. Classify Information Confidentiality (C)
4.10. Audit Data Security (C)

5. Data Quality Management

5.1. Develop and Promote Data Quality Awareness (O)
5.2. Define Data Quality Metrics (P)
5.3. Define Data Quality Requirements and Business Rules (D)

5.4. Analyze / Profile / Measure / Monitor Data Quality (C)
5.5. Set Data Quality Service Levels (P)
5.6. Certify Data Quality (C)
5.7. Identify, Escalate and Resolve Data Quality Issues (C)
5.8. Conduct Clean-up Campaigns (O)
5.9. Design and Implement Operational DQM Procedures (D)
5.10. Monitor Operational DQM Procedures (C)
5.11. Test and Validate Data Quality Requirements (D)
5.12. Audit Data Quality (C)

6. Reference and Master Data Management

6.1. Understand Reference & Master Data Integration Needs (P)
6.2. Define the Data Integration / MDM Architecture (P) (same as 2.1.4)
6.3. Implement Reference and Master Data Management Solutions (D)
6.4. Control Code Values and Other Reference Data (C)
6.5. Integrate Master Data (O)
6.6. Replicate Reference and Master Data (O)
6.7. Maintain Dimensional Hierarchies (O)

7. Data Warehousing and Business Intelligence Management (See EA Definition BI V1.doc)

7.1. Understand Business Intelligence Data Needs (P)
7.2. Define the Data Warehouse / BI Architecture (P) (same as 2.1.5)
7.3. Implement Data Warehouses and Data Marts (D)
7.4. Implement Business Intelligence Tools and User Interfaces (D)
7.5. Implement Enterprise Reporting (D)
7.6. Implement Management Dashboards and Scorecards (D)
7.7. Implement Analytic Applications (D)
7.8. Train Business Professionals (O)
7.9. Replicate and Transform Data for Business Intelligence (O)
7.10. Monitor and Tune Data Warehousing Processes (C)
7.11. Support Business Intelligence Activity (O)
7.12. Monitor and Tune BI Activity and Performance (C)

These activities do not include actual Business Intelligence activities performed by knowledge workers, which include:

- Perform Ad Hoc Query & Reporting
- Perform Multidimensional Analysis
- Perform Statistical Analysis
- Perform Data Mining
- Model “What If” Scenarios
- Monitor and Analyze Business Performance

8. Document, Record and Content Management

8.1. Manage Electronic Documents (text, graphics, image, audio, video)
8.2. Manage Physical Records (paper, fiche)
8.3. Manage Information Content (search engine indexes, taxonomies, XML namespaces, report and document format standards)

9. Meta Data Management

9.1. Understand Meta Data Requirements (P)
9.2. Define the Meta Data Architecture (P) (same as 2.1.6)
9.3. Develop and Maintain Meta Data Standards (P)
9.4. Implement a Managed Meta Data Environment (D)
9.5. Create, Capture, Store and Maintain Meta Data (O)
9.6. Maintain Meta Data Source Data Stores
9.7. Extract, Reconcile, Integrate and Share Meta Data (C)
9.8. Manage the Meta Data Repository (C)
9.9. Query, Report and Analyze Metadata (O)
9.10. Manage Meta Data Distribution and Delivery to Glossaries, Directories and Other Meta Data Marts (C)

6.5 Industry Trends

6.5.1 Database Federation

Trends to watch include improvements in database federation, which is the ability to provide data from a single request where data is housed in two disparate systems. In the future, these disparate systems could reside outside the department. Other departments will also have need to access the FTB data in this fashion. These solutions will need to maintain a proper level of security. Single requests for data could also include a combination of structured and unstructured data.

6.5.2 Operational BI

Another trend is the growing use of operational data warehousing which combines traditional operational relational database with data warehouse to support real time analytics, data warehouse appliances, and column-vectored or vertical database management systems. *(Also see BI Architecture Definition Document)*

6.5.3 XML and Data Services

XML is becoming the standard by data delivery services to share data across systems as well as internal web services. XML appliances are a trend to address the current performance issues sometimes associated with XML. *(Also see Service Oriented Architecture document)*

Attachment: A2.4.EAD_ECM

California Franchise Tax Board (FTB)

Enterprise Content Management (ECM) Architecture Definition

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1.0 Executive Summary and Charter

Enterprise Content Management (ECM) is strategies and technologies employed to manage documents and content across the enterprise. ECM should be able to work with a variety of content that needs to be managed. The ECM ESO provides an architecture strategy that will address all current and future departmental ECM needs while also being a scalable, portable, dynamic service.

1.1 Overview

Document processing is a main business function at FTB. An opportunity exists to establish an Enterprise Content Management (ECM) service that would include imaging processes that scan paper documents, creating digital images from electronic notices, and routing images across the enterprise. ECM at FTB will be employed to capture, store, search, secure and control access, control versions, retrieve, distribute, preserve end destroy documents and content.

1.2 Scope

The ECM ESO defines the current and future states of FTB's content management, a gap analysis and a strategy for implementation. The following list contains the subject areas covered:

- Incoming and outgoing content
- Content to Data Conversion
- Distribution and access of services for content
- Storage of content

1.3 ESO High-level Requirements

The following table outlines the high-level requirements of Enterprise Content Management within FTB.

Figure 1.3-1: ECM ESO - Integrated Requirements

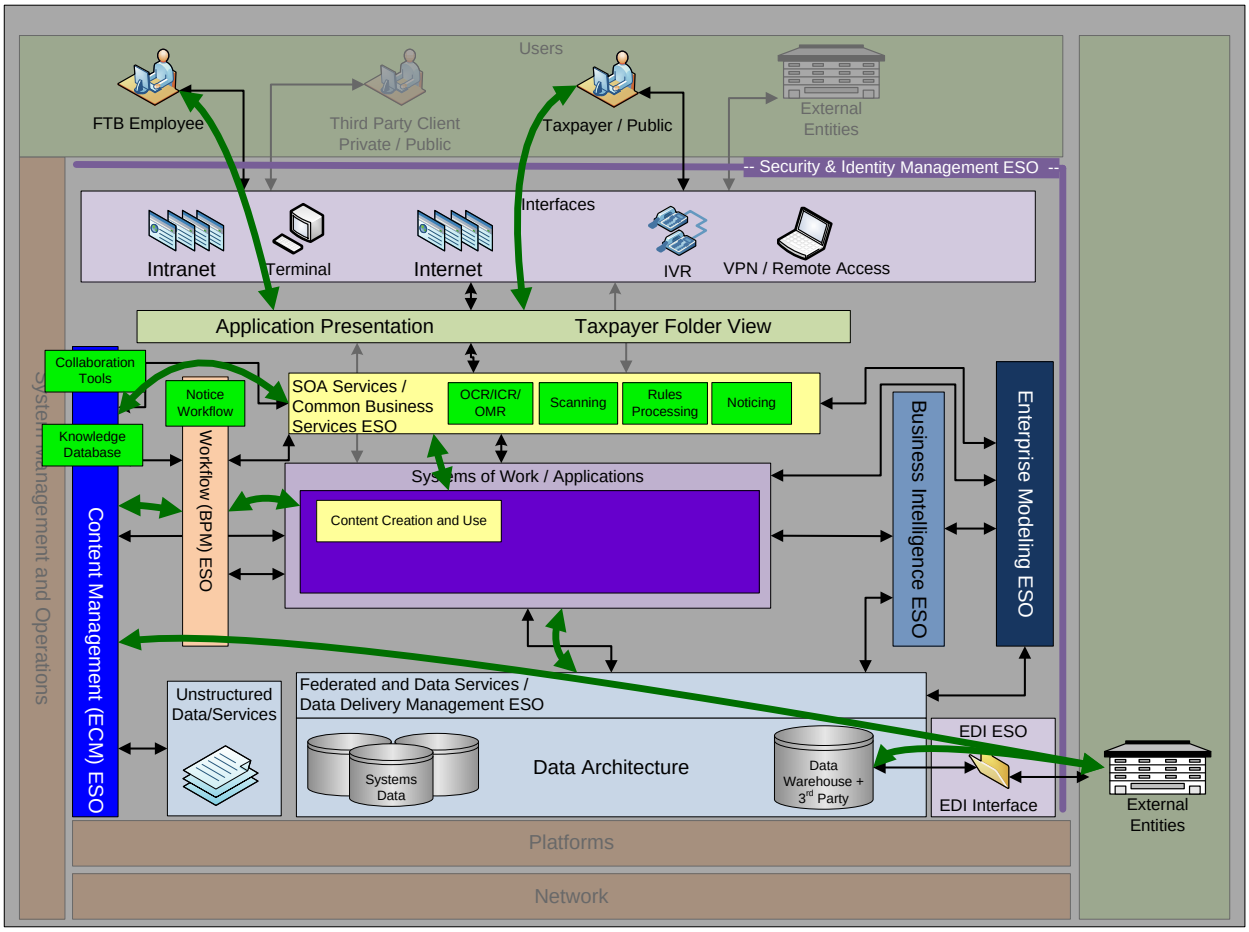
Requirement	Description
Content Delivery	The ECM implementation will support the delivery of content to the enterprise via services and display components.
Federation	The ECM implementation will allow federation of content across the enterprise
Multiple content types	The ECM implementation will allow for multiple content types such as PDF or Word documents, TIFF images, emails, faxes, audio and video files, etc.
Integration with scanning services	The ECM implementation will be accessible to the scanning processes for uploading scanned images via services.
Classification	The ECM implementation will allow all content to be associated with an entity such as a taxpayer and a context such as an audit. Other forms of classifications will be provided such as categories and types. This is also called meta tagging and is a crucial part of the strategy. This involves close working with the business folks.
Integration with Notice services	The ECM implementation will integrate with or coexist with the enterprise notice system to provide notice templates, template versioning and template variations. The ECM implementation will provide a repository for notices that are created or visual representations of electronic notices.
Workflow	The ECM implementation will contain or utilize workflow capabilities to enable collaboration and document approvals.

Requirement	Description
Version and variation control	The ECM implementation will support the management of document versions and variations for language or output type.
Service Oriented	The ECM implementation will provide services for interfacing and receiving or storing content.
Searchable	The ECM implementation will provide search functionality so that documents are discoverable through various means.
Collaboration	The ECM implementation will support collaboration among users through document creation, information dissemination, scheduling, calendaring or other tools needed for team collaboration.
Scalable	The ECM implementation will be scalable enough to handle the volumes of information that will be stored
Expiration and retention	The ECM implementation will support automated management of retention policies. Again, business involvement required here to first standardize on policies and rules, access control etc.
Security	The ECM implementation will support departmental security policies and guidelines.

1.4 Conceptual Model

The following diagram shows infrastructure services relevant to the ECM ESO with relationships between components. Content is created internally or comes from external sources. ECM content will be stored in a centralized location within the enterprise and functionality such as version control, workflow, or other services will be provided.

Figure 1.4-1: ECM ESO – "To Be" Conceptual Model



2.0 Current Architecture

2.1 Current Capabilities and Components

Currently, FTB does not have an "enterprise" ECM system or process. Numerous systems and processes are being used to perform the department's ECM needs. FTB has an informal limited "ECM" governance structure. To describe FTB's current ECM capabilities, FTB's ECM attributes are listed below:

- **Capture**: Content is created departmentally through three main input systems, Tandem, IPACS, E-gateway. There are also other input processes for 3rd party data, white mail, tax supporting documents, etc. These are received in a variety of methods; fax, phone conversations, white mail, FTP, on-line, paper receipt, etc. Additionally, numerous in-house processes exist that generate content within FTB to support our business functions.
- **Manage**: Content is managed through folder organization and/or file name variations. Our Tax documents management is the most mature process using the IPACS and E-gateway database and storage platforms. Other FTB processes use a variety of tools and processes like Microsoft SharePoint, Serena PVCS Version Manager, Microsoft Visual SourceSafe, IBM Rational ClearQuest, etc.
- **Store and Retrieve**: Content storage and retrieval is performed numerous ways. Storage is performed for both paper and electronic processes in a variety of methods, from paper storage in the warehouse to electronic storage on a server/SAN system. Retrieval is performed in a variety of methods, from actual manual paper file pulling and routing to automatic electronic workflow routing. Our two main current retrieval applications for tax documents are the e-View and IDAX applications.
- **Preserve**: The long-term retention of our content is being performed numerous ways with redundancy across the systems that perform these functions. Retention timeframes vary from system to system and are controlled by different methods and processes, from batch processing to manual updates.
- **Deliver**: Content delivery varies from system to system. From case management tools to applications designed specifically to deliver and control content, E-view and IDAX.
- **Collaboration**: Other than independent and manual processes, we don't share content in a centralized fashion or method except for some in-house tax document processing systems.
- **Security**: Security is controlled independently from platform to platform and is usually controlled within the application by the use of an access/authorization table.

2.1.1 Current ECM workloads

Figure 2.1-1: Imaging Categories and Volumes

Category	Number of Workloads	One-time Imaging Estimates	Monthly Imaging Estimates
1(a) – (*Minimum Value)*	7	-	2,695 pages
1(b) – (*Existing Storage and Retrieval)*	148	381,290 files	453,623 pages
1(c) – (*Existing Data Collection)*	15	160,000 pages	79,373 pages

2 – (*Additional Tech. Capabilities)*	31	50,000 files	107,714 pages
Scan & Shred Phase I	29	-	4,583,333 pages

2.1.2 Electronic Content Types

FTB identified 741 examples of electronic content being used or created by the department. Of the 741 examples, there were many duplicates and overlapping circumstances.

Figure 2.1-1: Electronic Content Types

EC Category	Response Examples
Business Process Rules & Procedures	ARM Procedure Manuals, ARCS Release Planning, Audit Procedure Manuals, Strategic Plans
System / Technical	Schema Documents, System Change Requests, ARCS E-Lien Electronic Files, PASS Help File
Web	Web Forms, Bureau Web Pages, Web Procedures
Training	Training Materials, Training Brochures, Training Schedules, Training Presentations
Project	Project Plans, Project Charters, Project Documents, Project Templates
Financial / Budget	Financial Reports, Financial Statement Worksheets, Budget Change Proposal, Schedule 3 Documents
Business Performance / Management Reports	Monthly Reports, Inventory Reports, Business Plan, Annual Report, Statistical Reports
Administrative	Organizational Flow Charts, Meeting Agendas, Meeting Minutes, Duty Statements
Taxpayer Related	Taxpayer Notices, Taxpayer Correspondence, Revenue Report, Audit Work Papers
Taxation Related	Tax Publications, Legislative Change Proposals, Tax Schedules
Miscellaneous	Email, Compressed Files, Data Files

2.1.2.1 Electronic Content Attributes

The percentages represented below are a cross section of FTB.

- **Capture**: Over 70% of the electronic content types are created using a Microsoft product (Word, Excel, Visio, PowerPoint, Publisher, Outlook, FrontPage, Project, Access, Internet Explorer, .NET). A distant 2nd was Adobe Acrobat/Reader with 6%.

- **Manage**: Managing electronic content (i.e. version control) is accomplished through folder organization and/or file name variations 70% of the time. The majority of FTB's sections are not clear on what version control is. 25% listed 'Other' tools that are listed below. *(Note; "ERoom, Autoforms, IBM Rational ClearQuest, McAfee HelpDesk and Macromedia RoboHelp are not considered version control tools. It may also be possible that these tools are being used to manage electronic content even if that is not their primary function.)*

  - Microsoft SharePoint

- Serena PVCS Version Manager
- Microsoft Visual SourceSafe
- Interwoven TeamSite
- eRoom
- Autoforms
- IBM Rational ClearQuest
- McAfee HelpDesk
- Macromedia RoboHelp

- **Store and Retrieve**: 90% of contact at FTB is easily located; however, survey results indicate redundancy is an issue.

- **Preserve**: 70% of FTB is not concerned with the need to centralize and automate the retention of content.

- **Deliver**: Over 60% of electronic content is either routed from or routed to others. In addition, 43% have workflows that are not automated and 28% of FTB does not know.

- **Collaboration**: 56% of the electronic content requires collaboration. This is done through email and shared network folders. 20% of all electronic content types are shared with others external to FTB.

- **Security**: Approximately 43% of the electronic content requires identity management.

- **Current Content Management Solutions at FTB**: The solutions listed in the following tables are identified as tools used for version management of electronic content. The tools listed in the table on the left are identified as true Content Management solutions per Enterprise Architecture. The tools listed in the table on the right are not traditionally used to manage content but are identified as being used in that manner.

Figure 2.1-2: FTB Content Management Tools

Version Management Tool (Vendor)
eRoom (EMC Documentum)
SharePoint (Microsoft)
Natural ISPF (Software AG)
Visual SourceSafe (Microsoft)
PVCS Version Manager (Serena Software)
Teamsite (Interwoven)

Tool used for Version Management (Vendor)
AutoForms (Adcorr)
ARCS
Extra Personal Client (Attachmate)
Brio
CalATERS
Crystal Reports (Seagate)
CUT
eManual
Encryption
Rational ClearQuest (IBM)
Rational Robot (IBM)
INC
Macromedia - RoboHelp
McAfee - HelpDesk

Office – Excel, Project, Visio (Microsoft)
SQL Reporting Service (Microsoft)
New Tax Comp
PAPPE
PASS System
PAWS
SENDIT
SMARTrac
TI Mainframe

3.0 Target Capabilities and Components

This section will outline the future vision for an ECM process within FTB. The goal of the architecture is to provide an architecture that will address all current and future departmental ECM needs while being a scalable, portable, dynamic service.

The major components needed to consolidate workloads into “enterprise” ECM processes have already been purchased. By leveraging our current capabilities and expanding these capabilities, we could assemble the resources to target short-term gains, and address the long-term goal of providing FTB enterprise content management services.

- **Capture**: Both electronic and paper content will be funneled through a centralized common process for validation, storage, delivery, retention, etc. Routing through a common process allows ”enterprise” services to be utilized. Electronic content will continue to be collected in its current methods but now funneled through a centralized process. Paper content will be collected using two input methods, centralized scanning and satellite scanning. Centralized scanning will be by a common departmental system that would handle our large volume workloads. Satellite scanning will take place at the documents originating source and would handle sensitive, white mail, field scanning processes, small workloads, administrative processes and tax supporting documents. Satellite scanning images will be routed from the satellite locations through the central common imaging pipeline into the centralized archive for storage and retention.
- **Manage**: Specialized Enterprise ECM systems exist based on content category types. Tax workloads use archives to process and store the content outside of the databases and have a “pointer” to the content. This saves on overall database size, recoverability, back-up times, etc.
- **Store and Retrieve**: Storing all content into a centralized archive will provide a single point for the management, storage, retrieval, delivery, collaboration, and security. The archives will also contain documents from FTB’s out-going processes. (Example: Notices, correspondence, etc.)
- **Preserve**: Storing all content into a centralized archive will allow for consolidation of retention timelines. Retention will be automated and will be based on workflow and case management processes.
- **Deliver**: Establishment of an enterprise document viewing service. Establishing a single enterprise document viewing service will provide greater efficiency and reduce costs incurred by maintaining separate applications/processes. Any system or application will use the service.
- **Collaboration**: ECM Collaboration will be identified and provided through business process management (workflow/case management) Architecture Definition Document.
- **Security**: ECM security falls into three main areas; authorization, authentication, electronic data interchange. These discussions will be deferred to the Identity and Access Management and Electronic Data Interchange Architecture Definition documents.

3.1 Enterprise Governance

Organizational structure and governance is important to facilitate an effective long-term ECM process. The consensus in the ECM industry is projects fail due to governance, tool complexity and cost issues and lack of defined business needs and objectives. FTB’s validated these studies by performing interviews of 40 sections identifying and defining the ECM attributes that

are currently being stored throughout the department. As suggested, the findings determined organizational structure and governance that support ECM must be in-place and are crucial to the success of any future ECM processes. FTB determined there are three layers of organizational structure and governance needed to support our ECM solution; Forms Design and Governance, Business Design and Governance, and IT Design and Governance.

3.1.1 Forms Governance

The forms design and re-design processes will be standardized to minimize form review, coding, testing and implemented by both FTB and the Tax Form Vendor Community. Governance of this process will be necessary to ensure enterprise design standards and vendor accountability are developed, kept and maintained.

A Tax Forms and Notices Action Team will perform forms Governance. The team will provide forms governance, standards, and policies.

The Forms Advisory Committee will provide governance in the following areas:

1. Provide recommendations for redesign on any notice or form FTB receives or generates, including tax forms, billing notices and audit notices. Provide recommendations for design on new forms and notices utilizing industry standard design techniques and best practices.
2. Recommend improvements to the process of form development design and review.
3. Discuss and recommend improvements to the workflow of forms through the processing pipeline.
4. Discuss the impact of legislation on forms and notices at an enterprise level.
5. Disseminate historical knowledge related to forms design.

3.1.2 Business Governance

A governance process will be enacted to oversee, guide, direct, enforce and administer ECM through project phases. FTB will take an enterprise approach to provide consolidated enterprise governance. Tasks include:

1. Division level agreements on data capture priorities/objectives to best support TSM.
2. Division level agreements on ECM priorities/objectives to best support TSM.
3. FTB forms standards to software company vendors and preparers to facilitate data capture.
4. Determine data capture and ECM priorities (White Mail, Tax Forms, Supporting Documents, Image Task Force Workloads) for structured and unstructured workloads to allow for phased-in approach to “all” data to support TBO’s and EBO’s.
5. Stop rogue imaging, data capture, and ECM projects and sub-systems and enforce enterprise ECM approach.
6. Determine if manual data entry methods are obsolete and transfer current manual data entry workloads to OCR/ICR capture based systems.

3.2 Information Technology (IT) Governance

The Enterprise Architecture Solution Architects will lead a group of Subject Matter Experts to provide enterprise-focused recommendations on:

1. Data Capture to best support ECM.
2. Data Management to best support ECM.

3. Data Storage and Retrieval to best support ECM.
4. Data Preservation to best support ECM.
5. Data Delivery to best support ECM.
6. Data Collaboration to best support ECM.
7. Data Security to best support ECM.
8. Stopping rogue imaging, data capture, and ECM projects and sub-systems and enforce enterprise ECM approach.

4.0 Gap Analysis

4.1 Imaging Categories

This section will overview recommendations and tie them together with external studies on how to implement a long-term departmental ECM ESO solution.

Each workload is placed in one of two categories. Category 1 includes workloads that will be imaged using current in-house scanning capabilities, and, Category 2 includes workloads that cannot be imaged using current in-house scanning capabilities and will require the purchase of additional technical capabilities. Category 1 is further divided into three sub-categories explained below.

Category 1(a) - Minimum Image Value: These 7 workloads are not recommended for imaging for one or more of the following reasons: the workload is not referred back to once initial processing is complete, the workload is already, or in the process of, being converted to an on-line form, or the workload is currently processed electronically.

Category 1(b) - Image Value from existing Storage and Retrieval Capabilities: These 148 workloads will be imaged for archiving purposes (to save filing, storage, and retrieval costs) using current departmental capabilities.

Category 1(c) - Image Value from existing Data Capture Capabilities: These 15 workloads will be imaged for field level data capture purposes (field-level OCR) to save manual data collection costs, using current departmental capabilities.

Category 2 - Image Value from Purchasing Additional Technical Capabilities: Imaging these 31 workloads require purchasing additional technical capabilities for full text searches using full page Optical Character Recognition (OCR).

4.2 Imaging Strategies

The following addresses the department's short and long-term imaging needs, provides an enterprise-wide approach to providing imaging capabilities, and addresses the departmental imaging issues.

- **Expand imaging capabilities** –FTB would benefit from expanding its current tax document and payment imaging capabilities to include tax returns and payments that aren't currently being processed through the Imaging Services Section. Secondly, the department will realize significant gain by expanding imaging to include both documents supporting tax processing (Example: tax-related legal documents and tax-related correspondence, etc.) and documents that support the non-tax administration of FTB. (Example: personnel records/documents, non-tax related legal documents, non-tax related correspondence, exams, etc.).
- **Centralize imaging operations** – The consolidation of departmental imaging into one pipeline process has already been planned and funded. By leveraging our current IPACS capabilities and expanding these capabilities, we will assemble the resources to address short-term gains, and address the long-term goal of providing FTB an

enterprise ECM system.

There are a few sensitive white mail and field office workloads that will take place at their originating source through satellite scanning equipment. Images will be routed from the satellite locations through the central imaging pipeline to utilize pipeline data collection, storage and retrieval functions built into a departmental ECM process.

- **Establish a centralized document archive**. Storing all post processing data and images from the IPACS and E-gateway systems into a central document archive will provide a single point of data retention for both input systems and also allow for a single "enterprise document viewer" application replacing the current IDAX and E-View applications. It will allow pre-build and storage of "virtual" images in PDF. This will minimize the requestor access times, possibly eliminating the mainframe file and print services. The archives will contain documents from FTB's out-going processes. (Example: Notices, correspondence, etc.)

- **Establish an "enterprise document viewer" application** – Establishing an enterprise document viewer will provide greater efficiency and reduce costs incurred maintaining two separate applications. It will provide a limited view of the data, minimize requestor access times, and possibly eliminate the mainframe file and print services.

- **Provide the ability to view and route imaged documents –** While storing electronic images rather than paper documents will reduce storage and retrieval costs, moving to a truly "paperless" processing environment necessitates resolving 2 key issues:
  - **Issue #1** - Providing users with a means for simultaneously displaying, in full-screen, an "image viewer" and a data entry application. System engineering is currently testing two options to resolve this problem: (1) provide users with a wide-screen monitor that accommodates the simultaneous opening of two full-page applications; or (2) provide users with a second "dual screen" monitor, with one monitor serving as the viewer and the other displaying the data entry application. While desktop computers will accommodate up to 2 monitors, laptops will only accommodate 1 monitor making it likely that employing both Options 1 and 2 may become necessary.
  - **Issue #2** - Providing basic workflow routing capabilities. The Imaging Services Section, which performs workflow routing for the IPACS imaging system could be expanded to provide departmental workflow routing.

- **Develop a scalable imaging system** - To meet both current and future demands, FTB will implement a scalable system that can accommodate new workloads by adding additional hardware/software resources.

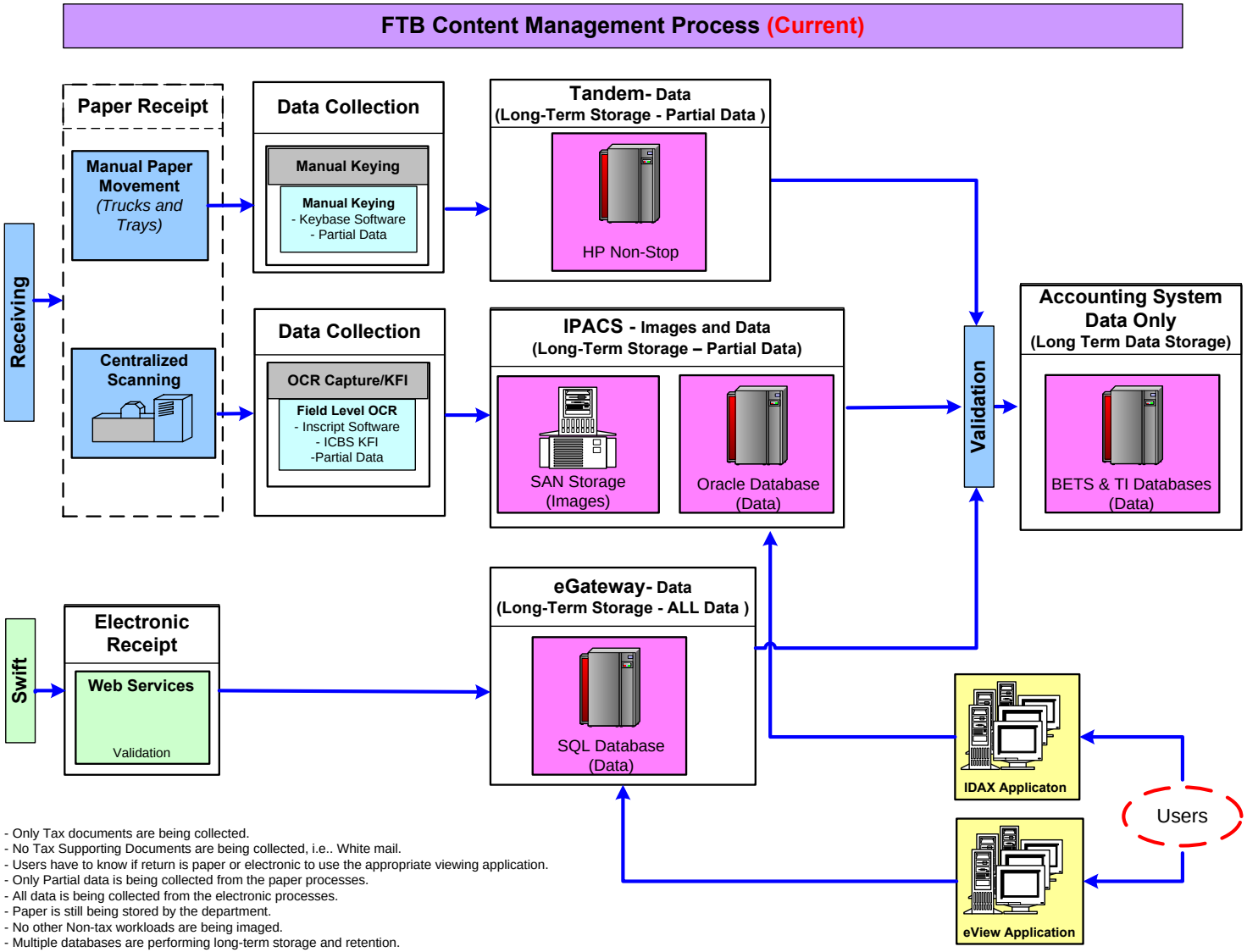
GAP	Success Factor	Benefit	Risk
Not "all" data effectively and efficiently collected.	Capture processes will be expanded to include all forms and workloads		
Workloads (forms) are not designed for cost effective OCR/ICR data capture and would need to be redesigned to	Forms to be redesigned to facilitate OCR/ICR collection Enhance automatic date collection		

facilitate OCR/ICR collection.	Forms standardized departmentally to minimize form review, coding, testing and implemented by both FTB and the Tax Form Vendor Community ECM governance process will be necessary to ensure enterprise design standards and vendor accountability		
Disparate imaging processes	Consolidation of departmental imaging into one pipeline process		
Disparate data retention achieves	Store all post processing data and images into a central document archive	Allow for a single "enterprise document viewer" Minimize the requestor access times, possibly eliminating the mainframe file and print services.	
No centralized document viewer	Establish an "enterprise document viewer" application	Provide greater efficiency and reduce costs incurred maintaining two separate applications	
Storing both paper and electronic documents	Store only electronic documents		

5.0 Roadmap

The following is the phase-in departmental ECM processes from our current systems, capabilities and workloads. Although, imaging, data capture, or consolidation of most workloads will provide departmental gains, it is not realistic to be able to implement the processes in a single project phase. FTB will need to determine workload precedence and priority for phasing in our long-term ECM services. There are four main phases outlined below. Some of the phases contain the same project type since these are on-going projects that stretch across multiple phases. For Example: To perform data capture from “all” documents we will need to use OCR/ICR technologies. In doing this we will eventually phase out the current manual paper data collection system (Tandem) into an OCR/ICR data collection system (IPACS). Since Tandem consists of 30 different workloads, it is not realistic to transition all of these workloads to IPACS during a single project or phase. With that, three phases list the project “Move Manual Data Entry processes from Tandem to OCR/ICR KFI processes on IPACS”. Phase 1 of the project might be 10 workloads, phase 2 might be the next 10 workloads and phase 3 might be the remaining 10 workloads. Supporting architecture based diagrams showing each of the four main ECM phases. Adopting and using standards for each content category type will make a later implementation of an overall ECM process much more feasible versus our current ECM methods and practices.

Figure 5.1-1: FTB Content Management Process (Current)

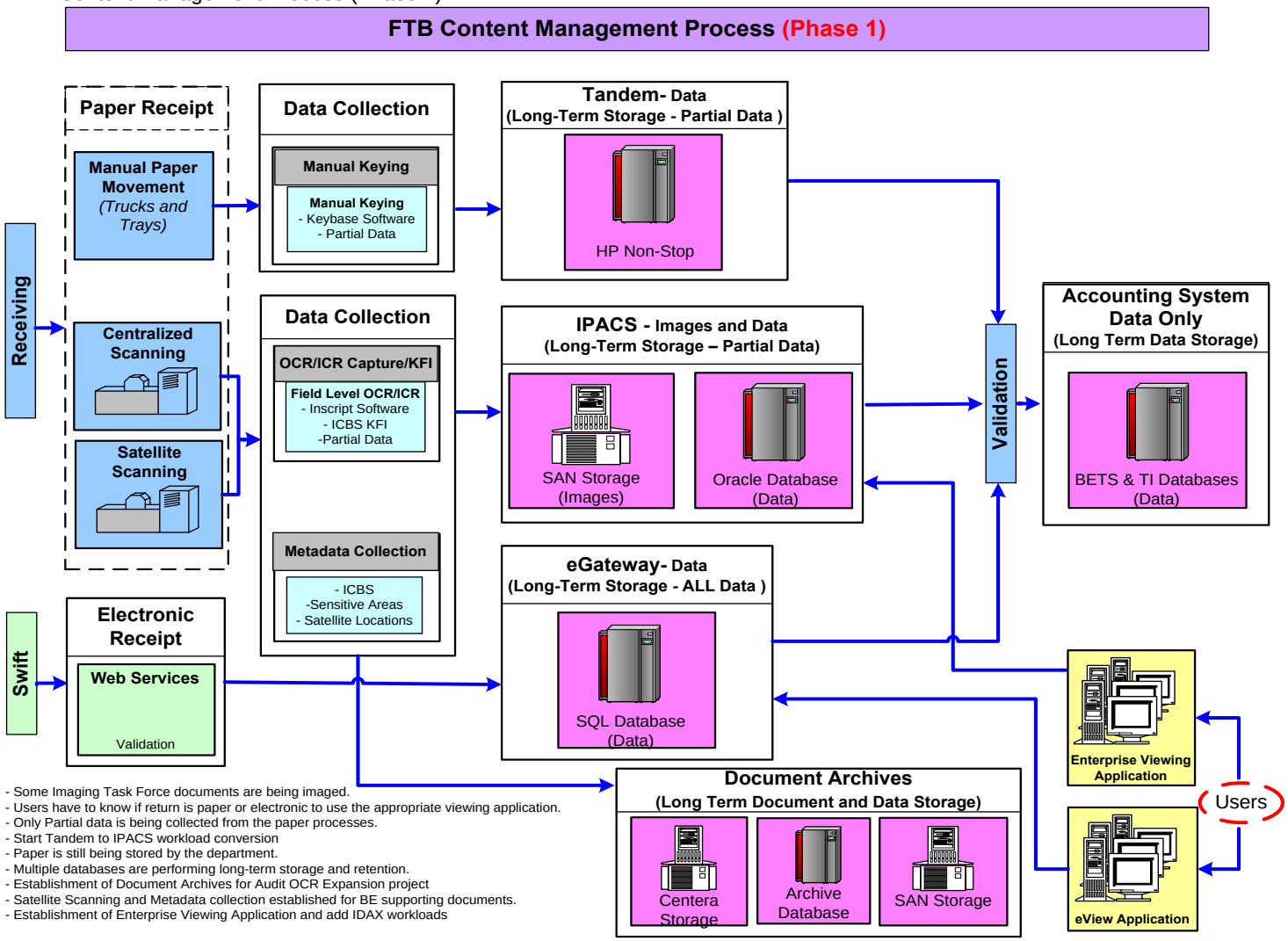


- Only Tax documents are being collected.
- No Tax Supporting Documents are being collected, i.e.. White mail.
- Users have to know if return is paper or electronic to use the appropriate viewing application.
- Only Partial data is being collected from the paper processes.
- All data is being collected from the electronic processes.
- Paper is still being stored by the department.
- No other Non-tax workloads are being imaged.
- Multiple databases are performing long-term storage and retention.

5.1 Phase 1

ECM Attribute	Opportunity –	Project
Capture	Expand & Capture All Return Data – Return Filing & Validation TBO	Establish centralized pipeline imaging process/system.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Imaging and attaching orphaned Business Entities (BE) documents to the main return.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Set-up BE supporting document scanning with satellite scanning operations.
	Enterprise Data Management – Audit TBO	Perform Audit OCR Enhancement Project Imaging.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Move Manual Data Entry processes from Tandem to OCR KFI processes on IPACS.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Modernize forms to enable OCR data capture.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Set-up Encoder Imaging for Small Documents.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Establish Metadata Management Strategies for department and start metadata collection on workloads.
Manage	Taxpayer Folder - Taxpayer Folder EBO	Establish document archives database.
	Modeling – Underpayment TBO	Establish ECM recommendations for “Imaging Task Force” content categories. (Training, Project, Financial/Budget, Administrative, etc.).
Store and Retrieve	Taxpayer Folder - Taxpayer Folder EBO	Establish document archives “Image” storage.
Preserve	Taxpayer Folder - Taxpayer Folder EBO	Establish retention policies per workloads.
Delivery and Collaboration	Taxpayer Folder - Taxpayer Folder EBO	Establish enterprise document viewer process.
	Taxpayer Folder - Taxpayer Folder EBO	Add IDAX workloads to enterprise document viewer
	Modeling and Workflow - Return Filing & Validation TBO	“BES” Workflow automation for BE workload
Security	Expand & Capture All Return Data – Return Filing & Validation TBO	Standardize SAL logging to new format for IDAX application.

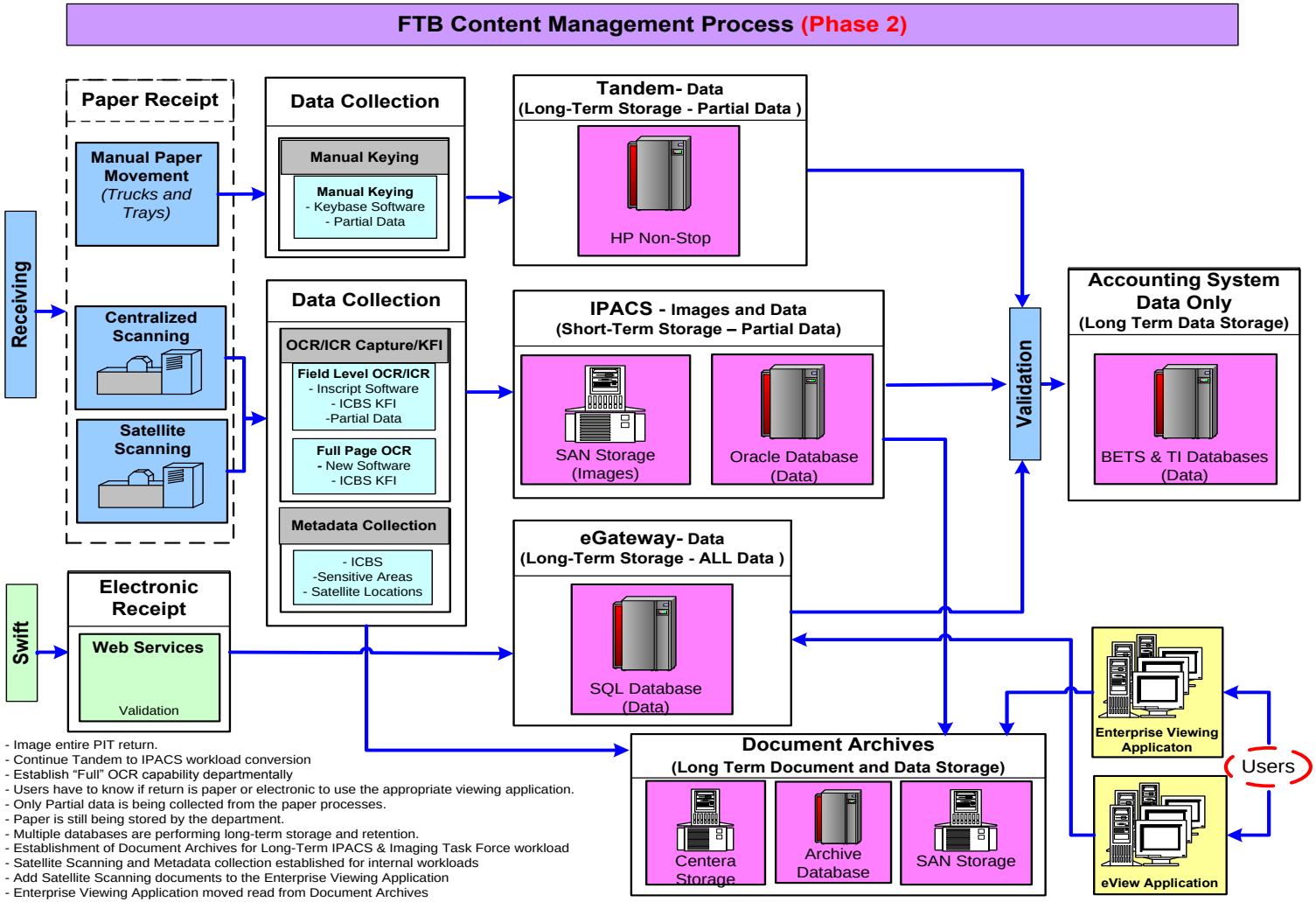
Figure5.1-2: FTB Content Management Process (Phase 1)



5.2 Phase 2

ECM Attribute	Opportunity - TBO/EBO	Project
Capture	Expand & Capture All Return Data – Return Filing & Validation TBO	Image entire Personal Income Tax (PIT) Return (PIT Scan and Shred).
	Expand & Capture All Return Data – Return Filing & Validation TBO	Continue to move Manual Data Entry processes from Tandem to OCR KFI processes on IPACS.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Establish “Full” OCR capability for unstructured data.
	Enterprise Data Management – Audit TBO	Continue to modernize forms to enable OCR data capture.
Manage	Taxpayer Folder - Taxpayer Folder EBO	Move IPACS long-term data into archives.
Store and Retrieve	Taxpayer Folder - Taxpayer Folder EBO	Move IPACS long-term images into archives.
	Taxpayer Folder - Taxpayer Folder EBO	Move “Imaging Task Force” workload scanning into archives.
	Modeling – Underpayment TBO	Establish “Google” like search capabilities for selected workloads.
Preserve	Taxpayer Folder - Taxpayer Folder EBO	Set retention timeframes per workload in archives.
Delivery and Collaboration	Taxpayer Folder - Taxpayer Folder EBO	Add “supporting documents” to enterprise document viewer
	Modeling and Workflow - Return Filing & Validation TBO	“Research” Workflow automation for BE workload
	Modeling and Workflow - Return Filing & Validation TBO	“Audit” Workflow automation for BE workload
Security	Expand & Capture All Return Data – Return Filing & Validation TBO	Identify authorization and authentication processes for ECM workloads.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Identify electronic data interchange processes for ECM.

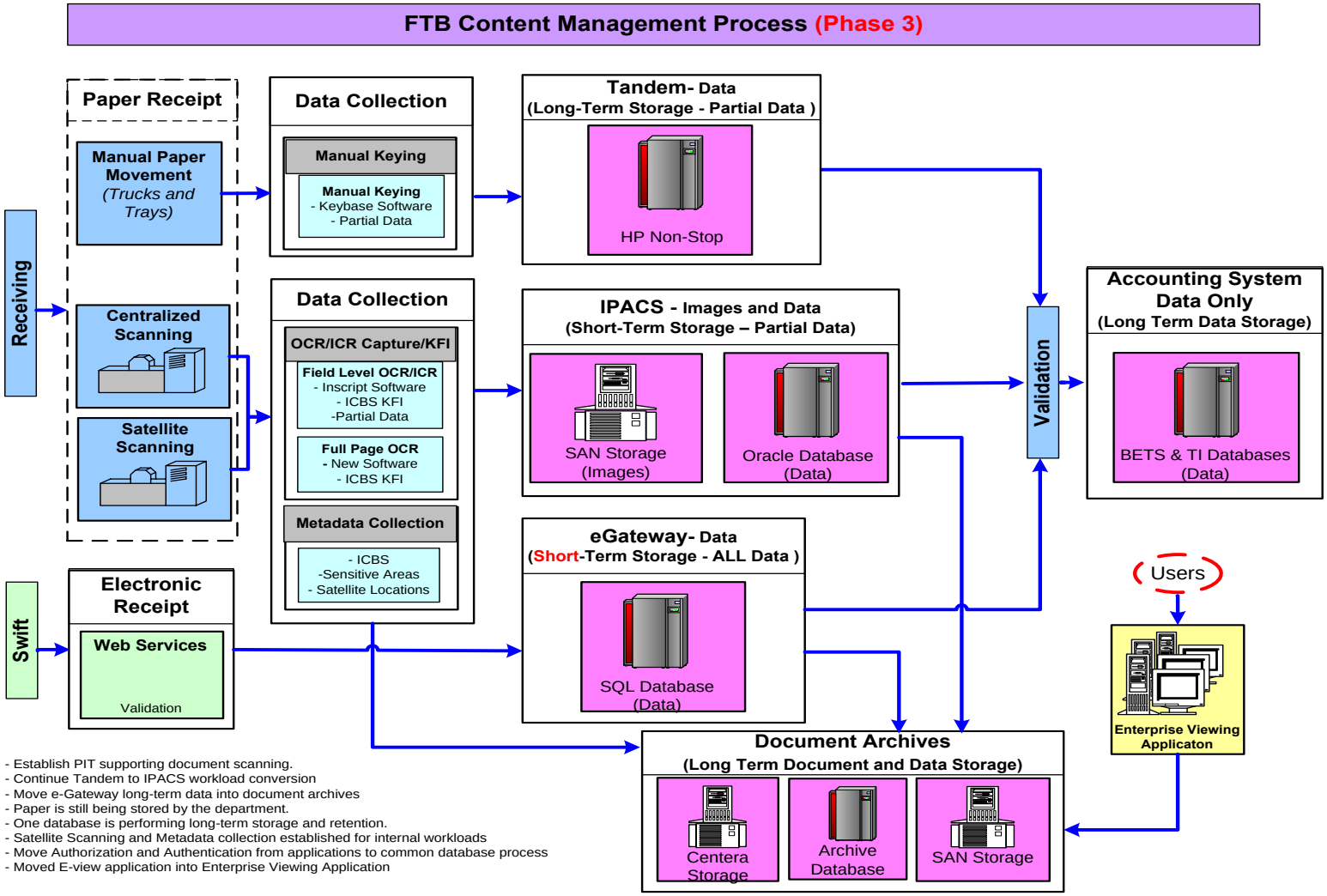
Figure 5.1-3: FTB Content Management Process (Phase 2)



5.3 Phase 3

ECM Attribute	Opportunity - TBO/EBO	Project
Capture	Expand & Capture All Return Data – Return Filing & Validation TBO	Set-up PIT supporting document scanning with satellite scanning operations.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Continue to move Manual Data Entry processes from Tandem to OCR KFI processes on IPACS.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Continue to modernize forms to enable OCR data capture.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Perform “full” data capture from PIT tax documents.
Manage	Enterprise Data Management – Audit TBO	Move E-gateway long-term data into archives.
Store and Retrieve	Taxpayer Folder - Taxpayer Folder EBO	Move E-gateway long-term images into archives.
	Taxpayer Folder - Taxpayer Folder EBO	Move “Imaging Task Force” workload scanning into archives.
Preserve	Taxpayer Folder - Taxpayer Folder EBO	Set-up retention timeframe extension in archives through workflow and case management tools.
Delivery and Collaboration	Taxpayer Folder - Taxpayer Folder EBO	Add “Imaging Task Force” workloads to enterprise document viewer (Training, Project, Financial/Budget, Administrative, etc.).
	Taxpayer Folder - Taxpayer Folder EBO	Add e-View workloads to enterprise document viewer
	Taxpayer Folder - Taxpayer Folder EBO	Add electronic supporting content to enterprise document viewer (Electronic Fax, emails, phone calls, text messages, etc.).
	Modeling and Workflow - Return Filing & Validation TBO	Replace CDTS workflow tool capabilities
	Modeling and Workflow - Return Filing & Validation TBO	Retire CDTS workflow tool
	Modeling and Workflow - Return Filing & Validation TBO	“IVS” Workflow automation for PIT workload
	Modeling and Workflow - Return Filing & Validation TBO	“Research” Workflow automation for PIT workload
	Modeling and Workflow - Return Filing & Validation TBO	“Audit” Workflow automation for PIT workload
Security	Modeling and Workflow - Return Filing & Validation TBO	Move authorization and authentication processes for ECM workloads from applications to common database process.
	Modeling and Workflow - Return Filing & Validation TBO	Standardize electronic data interchange processes for ECM.

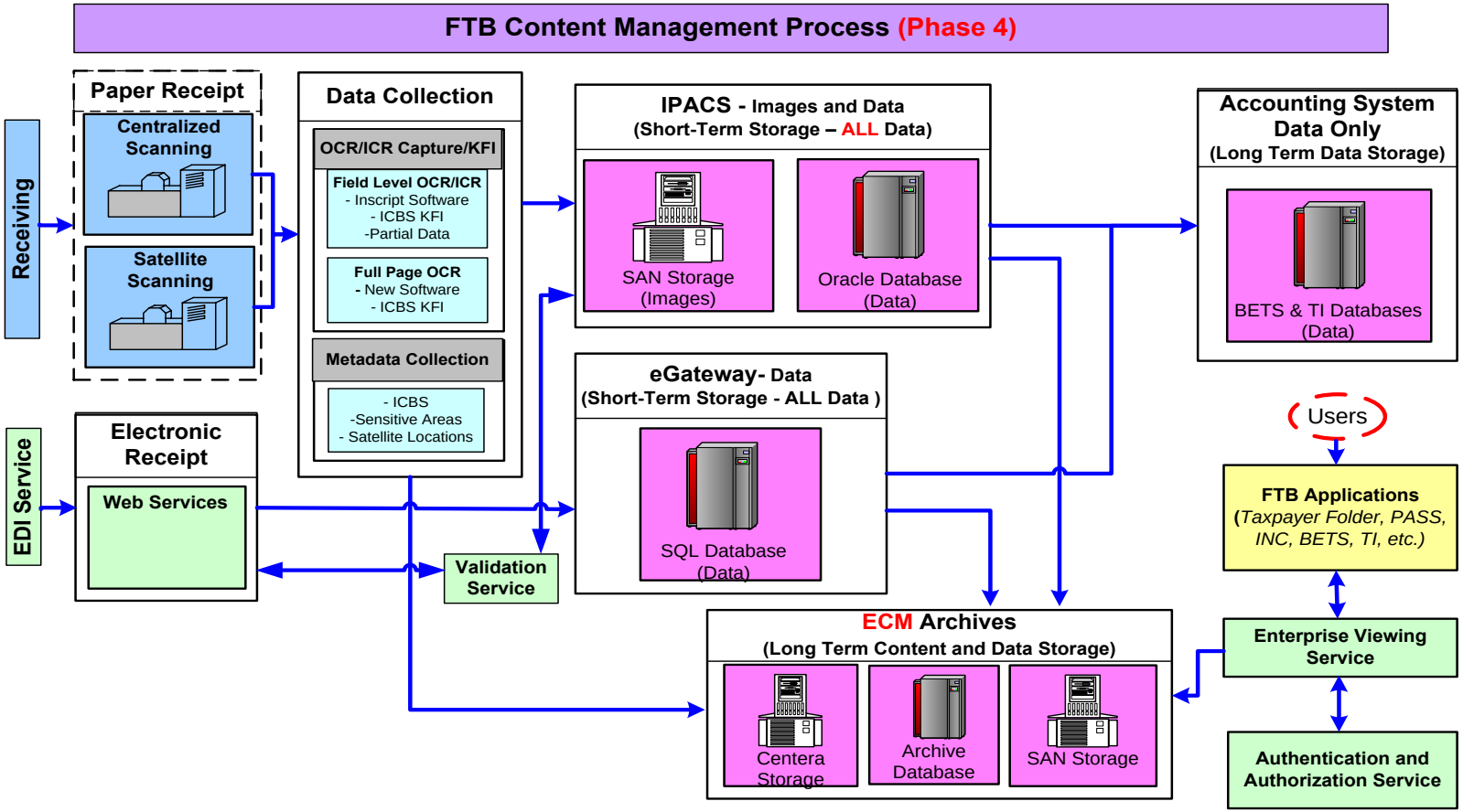
Figure 5.1-4: FTB Content Management Process (Phase 3)



5.4 Phase 4

ECM Attribute	Opportunity - TBO/EBO	Project
Capture	Expand & Capture All Return Data – Return Filing & Validation TBO	Set-up "Field Office" return\document scanning with satellite scanning operations.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Perform "full" data capture from BE tax documents.
	Expand & Capture All Return Data – Return Filing & Validation TBO	Set-up "Imaging Task Force" workload scanning (Training, Project, Financial/Budget, Administrative, etc.).
Manage	Enterprise Data Management – Audit TBO	Move BE electronic supporting content into archives (Electronic Fax, emails, phone calls, text messages, etc.).
		Move PIT electronic supporting content into archives (Electronic Fax, emails, phone calls, text messages, etc.).
Store and Retrieve	Taxpayer Folder - Taxpayer Folder EBO	Move "Imaging Task Force" workload scanning into archives.
Preserve	Taxpayer Folder - Taxpayer Folder EBO	Set-up Purge processes in archives.
Delivery and Collaboration	Taxpayer Folder - Taxpayer Folder EBO	Transform enterprise document viewer into "enterprise" viewing service for Taxpayer Folder and other Tax processing system.
	Taxpayer Folder - Taxpayer Folder EBO	Transition "Scan and Shred" workflow into "enterprise" business process management and case management systems.
Security	Modeling and Workflow - Return Filing & Validation TBO	Move authorization and authentication processes for ECM workloads from common database process to enterprise security service.
	Modeling and Workflow - Return Filing & Validation TBO	Move electronic data interchange processes for ECM to enterprise EDI process.

Figure 5.1-5: FTB Content Management Process (Phase 4)



- Establish PIT supporting document scanning.
- Tandem to IPACS workload conversion finished, retire Tandem, All data is collected now.
- Paper is no longer being stored by the department, retire CDTS system.
- Satellite scanning for 'Non-tax' FTB workloads (Financial, Budget, Admin, etc.)
- Satellite Scanning and Metadata collection established for field office workloads
- Move Authorization and Authentication into Enterprise Service
- Transition from Document Archives into ECM Archives (All data types into archives)
- Collect and Store Faxes, Emails, Phone Calls, Text Messages into ECM Archives
- Move Enterprise Viewing Application into Enterprise Viewing Service called by applications
- Move Swift into Enterprise Electronic Data Interchange Service
- Move Validation into Validation Service used during data collection, not post processing

6.0 Dependencies

This ESO has dependencies with the Security & Identity Management, Business Process Management, Electronic Data Interchange, and Data Delivery & Management ESOs.

7.0 Appendix

7.1.1 ECM Definitions

- **Enterprise Content Management** (ECM) – The technologies used to capture, manage, store, preserve, and deliver content (i.e. documents, images, and data) in a secure auditable way to meet business needs.
- **Electronic content** – Text, images, videos, PDF files, HTML and other non-HTML formats. Electronic data includes email, tax return data, personnel information, and tax collection information. It is further defined as any content created in Microsoft Office or any similar product. It does not include databases and programming code.
- **ECM Attributes** – ECM attributes are Capture, Manage, Store and Retrieve, Preserve, Deliver, Collaboration and Security.
- **Capture** – How the electronic content was created for usage.
- **Manage** – The version management of electronic content.
- **Store and Retrieve** – The location and ability to search for electronic content.
- **Preserve** – The long-term retention needs of electronic content.
- **Deliver** – Transfer the electronic content to the right audience and in the right format.
- **Collaboration** – The ability to easily create and share content and make decisions regardless of location.
- **Security** – The electronic content authorization (access to/restrictions from).

7.1.2 Industry Best Practices

- **Forms Design** –The “Capture” attribute of ECM shows the importance of Forms Design to allow for effective the efficient capturing of data using OCR. The Forms design practices include drop-out ink, bar codes, registration zones, scan lines, and scannable forms. All of these best practices of forms design will be incorporated into our current and new forms design processes.
- **Encoder Imaging** – “Capture” attribute of ECM show small documents being imaged on encoder systems rather than high-speed scanners. In addition to the benefit of freeing up high-speed scanner scanning capacity, encoders have faster throughput rates, better MICR recognition results, and are cheaper to buy and maintain than scanners.
- **Transaction level processing** –Transaction based processing is the most effective method for ECM. We currently bundle our checks and documents into batches containing from 100 to 400 documents/transactions. In batch based processing, a whole batch can be delayed from processing and deposit for one transaction. This could mean millions of dollars are delayed from deposit for a 100-dollar check. In Transaction level process only the 100-dollar check would be delayed during processing and deposit. This will be critical for workflow case management functions.
- **Automate mail opening/imaging/sorts** - Removing or minimizing paper handling opening and sorts. Combining sorts and/or using machines to automate or remove sorts, allows for more efficient and effective processing by removing manual processing that are labor and time intensive.
- **Image Compression** – Compression of to reduce cost for Capturing, Managing, Storing and Retrieve, and Delivery of content.

- **Centralized Storage "Archives"** – Centralizing for ECM systems. This reduces cost for Managing, Storing and Retrieve, and Delivery of content by centralizing those costs across multiple platforms and systems.

7.1.3 Industry Trends

- **Check 21 (Image Exchange)** - Check 21 legislation allows for electronic Image Exchange of check images and data to/with depositing banks. Benefits are multiple daily deposits, an extended banking window, no courier fees, and a decrease in check float time allowing the state to earn additional interest on deposited funds.
- **Image Quality Software** – Software is being developed/perfected that ensures an image is readable before the paper document is destroyed. The software can be ran as an in-line or off-line process.
- **Off-line OCR/ICR** – OCR/ICR processing of documents is being transferred to off-line versus in-line processing during imaging. This results in cheaper scanners and faster imaging throughput during imaging.
- **Full page OCR/ICR** – Industry trends show "full page" OCR/ICR growth to aid finding, retrieving and linking documents to expedite processing. This provides users with the ability to search a document with "Google like" searches and allow them to "cut and paste" information directly from a particular document image into another application.
- **Unstructured to structured content** - Previously unstructured content is increasingly being structured using XML and forms. Web pages, training materials, technical documentation, reports, and most recently marketing materials, are increasingly being recognized as content that should be structured. Structured content is becoming more common due to XML, content reuse, simplified translation, effective web site control, and increased consistency.
- **Metadata Management Strategies** - The adoption of metadata management strategies are being driven by the need to improve search and retrieval of content, especially on corporate intranets and on customer-facing web sites. However, metadata is an important component of any effective content management strategy, regardless of the content delivery vehicle. The ability for those who need content to find what they need, access and retrieve it, no matter where it is stored is paramount. Making this happen requires an enterprise metadata strategy. The task of developing an enterprise metadata strategy is fast becoming a "must have" as opposed to a "nice to have".
- **Standards** – ECM is not a mature process and does not have ISO/IEEE standards for content management. The following link is a white paper discussion about the types of standards that need to be developed for a content management system. http://www.rockley.com/articles/The%20Rockley%20Group%20-%20The%20Role%20of%20Content%20Standards%20in%20Content%20Management.pdf

Attachment: A2.5.EAD_EDE

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Enterprise Architecture Council

Electronic Data Exchange Architecture Definition

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1.0 Executive Summary and Charter

1.1 Overview

Electronic Data Exchange (EDE) provides a set of standards for structuring information electronically exchanged between and within FTB and other businesses, organizations, government entities and other groups. EDE focuses on the internal infrastructure required to manage electronic data exchanges. The management of electronic data exchanges includes:

- Scheduling & tracking of data sends and receipts
- Data formats and standards supported
- Infrastructure used to map interface data to internal data and components/services that facilitate that transition
- Confirmation of receipt or receipt of confirmation
- Identification and notification of internal data owners
- Movement of data to internal repositories and that should include systems or applications, services or interfaces, message queues, or databases and other data repositories.

The Data Exchange infrastructure will be adaptable to various mediums of transfer including electronic file transfers and data sent through tapes or other media. The Data Exchange Architecture Definition touches on cleansing, formatting and transformation of data that comes in from third party partners. The same data captured in our scanning systems and Internet systems will use the same services for cleansing, formatting and transforming data.

1.2 Scope

FTB's EDE facility is a centralized secure data exchange method which provides built-in quality checks, supports standard file formats and a common user-friendly approach to exchanging data without communication barriers. It provides a common set of data exchange formats and methods the sender and receiver can select to meet their technical capabilities. EDE crosses multiple lines of business and is combined in one robust framework that functions with cross-divisional applications.

This EDE architecture definition document further defines the current and target states of the FTB's EDE Architecture, a gap analysis and a strategy for implementation.

1.3 ESO High-level Requirements

The following table outlines the high-level requirements of the Data Exchange ESO.

Figure 1.3-1: Data Exchange ESO – Integrated Requirements

Requirement	Description
Flexibility	The Data Exchange services will support multiple types of communication such as FTP, secure HTTP and Web Services.
Security	The communication of data will be secure and meet required standards, such as FIPS 141.
Configurable	New communication configurations will be provided through configuration interfaces that do not require programming. The services will also be able to hold the interface requirements of the external party, such as interface and data contract details.
Alerts	The Data Exchange services will provide for alerts that communicate success or failures of data exchanges.
Interfaces	The Data Exchange will support automated routing of data to internal systems, services, queues or databases containing all routing details and requirements.
Audit Trail	The Data Exchange services will maintain an audit trail of all activity.

1.4 Conceptual Model

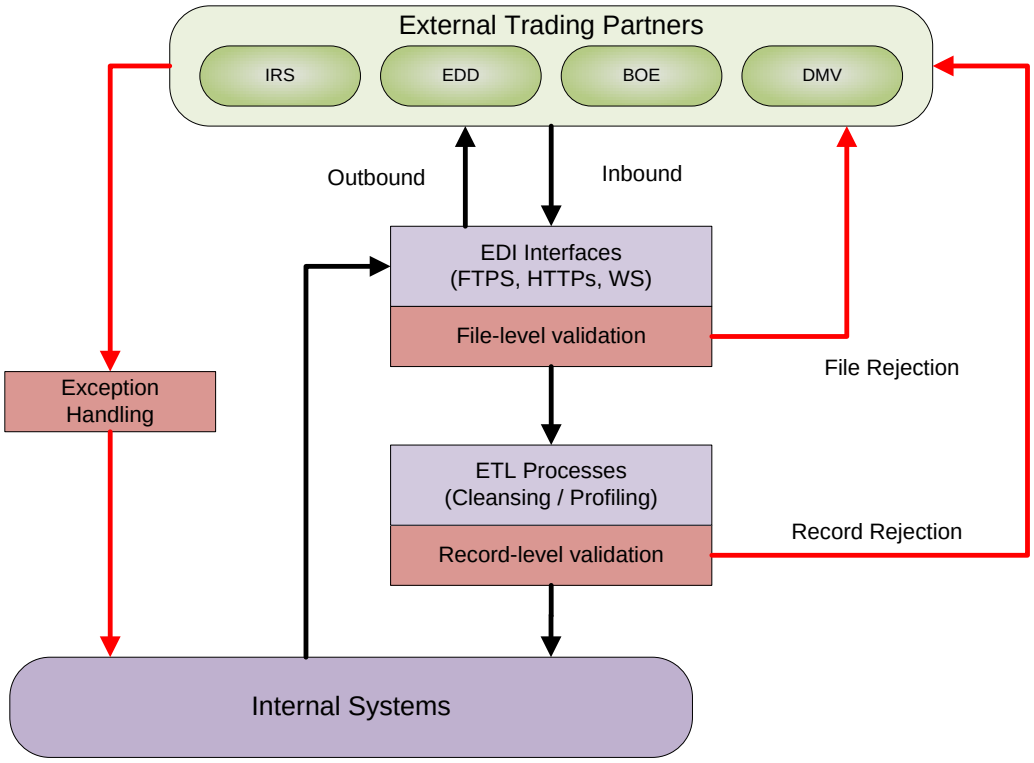
The following diagram shows services relevant to Data Exchange infrastructure at an enterprise level. The diagram below illustrates the processes involved with Data Exchange.

Data must be exchanged with external partners through data exchange interfaces (EDI). These interfaces will be open standards-based and support the most widely used protocols such as FTPS (Secure File Transfer Protocol) or HTTPs (Secure Web).

When files are received and checked for file-level corruption. The interface or data contract details must be stored and used. The file follows a standards-based file structure such as XML. Files that fail validation are returned to the sender for correction and resubmission, with possible information about the errors or omissions.

The ETL processes that cleanse and transform data for internal use is not in the scope of this architecture definition document.

Figure 1.4-1: ETA



FTB currently receives approximately 250 data sources from direct reporters, federal agencies, California departments and providers of purchased products. There are potential modifications to the existing systems that would be of benefit such as adding a central database for logging or an SFTP protocol. Our current EDE receiving system is not yet positioned to tracking of record-level information.

During the process of cleansing, transforming, and matching (see Data Delivery and Management Architecture Definition document), errors may be discovered that require records to be returned to the sender for correction and resubmission. Error reporting is a data exchange function.

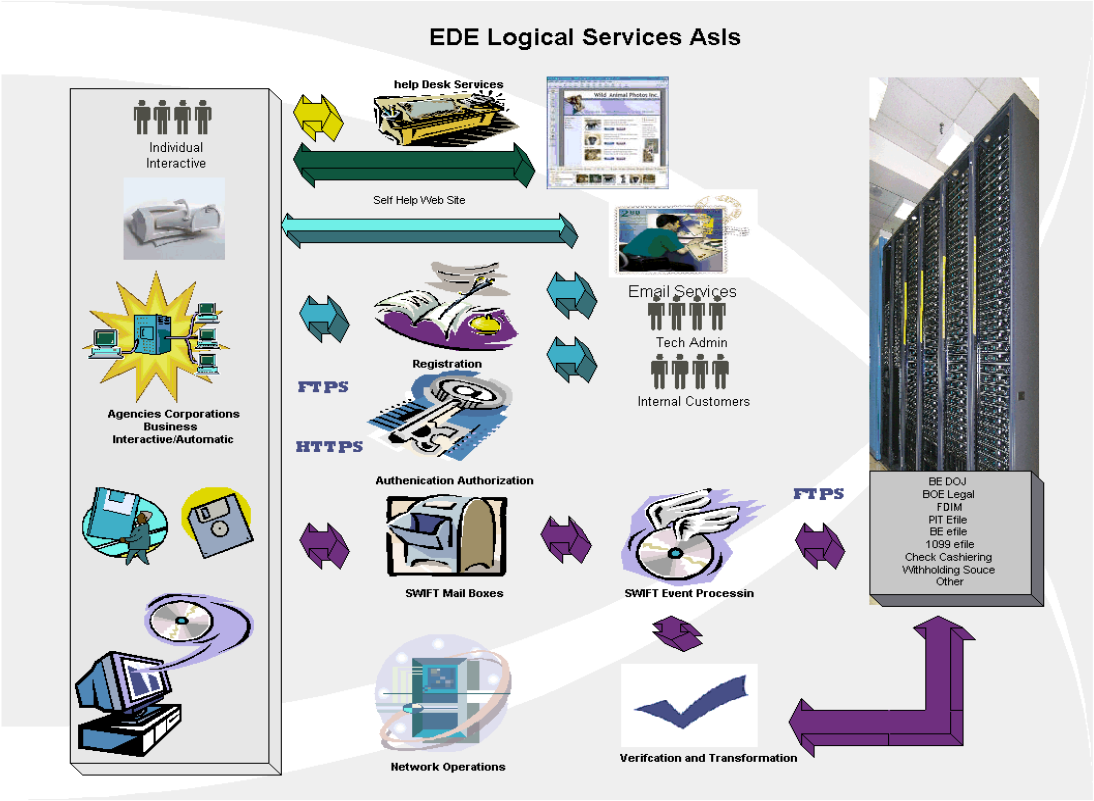
2.0 Current Architecture

The existing EDE System for FTB (Secure Web Internet File Transfer (SWIFT)) has these components:

- Web site – general SWIFT portal
- Registration – manual through already established business partner.
- Email services – swift uses client to send email through an enterprise SMTP server
- Transport service – Through already established open standard protocols
- Security authentication service – Uses Active Directory. Initial entry is done manually. Two emails, one with user name and one with password are sent out to user unencrypted.
- Help desk services – Through SOW or enterprise help desk
- Monitoring services – Logging within SWIFT tracks events

Once the registration process is complete, the customer chooses FTPS or HTTPS standard protocols for transferring files. Customers can transfer or retrieve files waiting for them on SOW systems via SWIFT. Users use their own web browser or client that supports their chosen secure protocol. The system carries out a process when the customer logs onto the system and attempts to transfer or retrieve files depending upon which system they are transferring to or type of file they are transferring. If required, after the transfer is complete, SWIFT generates a receipt. If a customer transfers an efile return the system passes the file to the target system for verification. The receiving system returns an acknowledgement to SWIFT for the customer. SWIFT sends the acknowledgement, which contains the status of the transferred file.

Figure 1.4-1: Current EDE Logical Services



2.1 Initiation of Transfer

A common understanding of how data will be formatted is required to transfer data from one system to another. The data will be stored and transferred in logical predetermined data formats both systems understand. Exchange agreements, contracts and IRS or FTB publications will be used to communicate the supported formats. There are fixed format files, comma delimited files, Extensible Markup Language (XML), Electronic Data Exchange Standard (EDI), Electronic Funds Transfer (EFT), custom data files, and unstructured data files. Unstructured files composed of many different types of information; such as, pictures and pdf files are included in data transfers.

A triggering action, either manual or automatic, is required to start the data interchange process. For an automatic data exchange, a timed process will be used, such as; a scheduler kicking off a program at certain intervals. Applications that are more complex might have a scheduling application built-in or be event driven. Manual initiation occurs when exporting and importing files and a person must physically start the process. Schedules that are difficult to determine in advance are usually candidates for manual initiation. Custom client, browser or packaged file transfer software will be supported to perform manual actions. This mechanism enables the pushing and pulling of files. One can think of this as the electronic version of the U.S. post office.

2.2 Methods of Transfer

Method of transfer addresses both the protocol used and the type of interface. Customers are typically at different levels of technology expertise. Access to the EDE system will address varieties of customer technology. The number of protocols eligible for use by a customer may be limited by the customer computer systems' technology or security. The protocol methods will be best practice protocols and Internet standards. Of the multiple ways to exchange data over the web, two standards, HTTPS and File Transfer Protocol Secured (FTPS), are the most common. Secure Shell (SSH) is a network protocol that allows data exchange over a secure channel between two computers. Secure File Transfer Protocol (SFTP) is SSH over FTP and is gaining in popularity with the rise of Unix/Linux platforms.

2.3 Transport

The EDE system will include the following for transport methods:

- Security, Security, and Security
- Guaranteed delivery and restart
- Proof of file Integrity, Server will provide proof of data integrity of file transfers using Checksum or MD5
- Event Driven API
- Data privacy
- Support for large file transfers
- Support for batch files and interactive file transfers
- Online help within browser based method
- Support for all file types binary, text etc.
- Eliminate redundant infrastructure and its associated costs
- Testing and development systems for support
- Regular security scans and assessment
- Support for emerging protocols
- Manage the file transfers
- Email notification

- Free client software without a license charge

2.4 Data Transfer Mechanisms

The EDE system receives the file and then transfers the file to the destination using a standard protocol common with all FTB operating systems. The receiving system will be able to reply to the delivery system.

2.5 Provide user responses

Alerts, receipts, and acknowledgments are different methods for responding to a customer action or FTB action. Alerts can be email notices for error process or events. Receipts are the first response, if required, to denote that the file was received. Acknowledgements contain information about whether the file passed or was rejected. If the file contained errors, there is an explanation of the errors. The Testware tool is an off-line method to provide user responses.

3.0 Target Architecture

3.1 Future Capabilities and Components

The future capabilities and components of FTB's EDE system are the same as the current with slight modification:

- Registration – automated through a web self-registration system. (Please see AIM Architecture Definition document)
- Security authentication service – Uses Enterprise AIM system.
- Help desk services – Through enterprise help desk

EDE delivery methods are data agnostic providing business and government agencies secure Internet data transfer methods. The delivery methods utilize best practice protocols that allow system users to transfer both structured and unstructured data files. The security and self-registration are dependent on the Security Architecture Definition defined in the Identity and Access Management Architecture Definition document.

3.2 Future Enterprise Governance

A central team will be responsible for defining, publishing the FTB's dimensions, and supporting the system. The FTB's multiple lines of business will be combined in one robust framework. The team will have the following responsibilities:

- Provide cross-divisional support for applications
- Identify implementation issues and work with appropriate stakeholders to resolve
- Facilitate resolution of ambiguities within standards and rules
- Coordinate with outreach to other related industry entities, identifying information gaps and identifying strategies to fill those gaps
- Establish consistent procedures for file transfers
- Improve the quality, affordability and availability of data to support tax business through effective and efficient information exchange and management
- Assure the system complies with Sarbanes-Oxley (SOX) compliance, Gramm-Leach Bliley Act (GLBA), Health Insurance Portability and Accountability Act (HIPAA) and Federal Information Security Management Act (FISMA).

4.0 Gap Analysis

4.1 Gap Analysis Defined

The chart below contains the risks, benefits and critical success factors for the gaps between the existing EDE and the target EDE.

Figure 4.1-1: Gap Analysis Summary Table

GAP	Success Factor	Benefit	Risk/Issue
Unable to Push/pull files from customer systems	Able to push data files to customers and obtain files from them without human intervention	Cost effectiveness and customer convenience	Requires standardization of port ranges
Manual Self registration	Customers are able to register themselves for file downloads	Cost effectiveness and customer convenience	
Cost of Licenses is to high	Replace software component where TCO is high. Contract renegotiated to lower price point.	Cost savings	My cause costumers to relearn how to use system.

5.0 Roadmap

5.1 Phase Recommendation

Figure 5.1-1: Phase 1 Recommendation

Attribute	Business Opportunity/Requirement	Description of Effort
Self Registration		Currently underway in the EASE project
License cost		Replace software component where TCO is high. Contract renegotiated to lower price point.

6.0 Appendix

6.1 Definitions

- **Reporting.** The reporting EDE function includes reports on transfers, required security logs, system logs, monitoring systems and communication systems. The communication system will enable FTB to alert customers or internal staff regarding the status of transfers.

- **Registration and Self-Help Web**. This will allow a transmitter the ability to register for access to the EDE and manage their security accounts for authentication and authorization. The transmitter will be able to obtain self-help like resetting passwords, common ask question, and troubleshooting problems through a web interface.

- **Help Desk Services.** This complex service supports customers transferring files. The range of help can be from password resets to assistance understanding rejected files.

- **Testware.** Testware is downloadable software that will allow a transmitter to pre-check their file integrity before sending it to FTB. It will perform common field validation and format checks with an instant response. It will also contain converter software to convert from the transmitters file structure to an FTB acceptable file structure. Testware is currently a stand-a-lone software product with limitations.

- **Fixed Format.** Fixed Format is a file structure consisting of physical records of a constant size within which the precise location of each variable is based on the column. Programs receiving fixed format data would be programmed to receive data in that exact format. This is typically documented by a publication produced by FTB.

- **CSV.** CSV file format is a common text file format that contains comma-delimited values. CSV is almost universally supported by applications, but it poses challenges as well. The data cannot contain quotes and commas due to those being used for field delimitation. As with fixed formats, the receiving system will still need to be programmed (or “mapped”) to know what type of data it’s receiving.

- **XML.** The XML format is known as a “self-describing” format, which uses field tag names to delineate the values. The information about the data, such as field names and types, is encoded with the data, so a receiving system can dynamically receive it and dynamically map the data to the database, making the data transfer process less laborious than with a CSV or fixed format file. XML is the standard for transferring data over the Internet although XML requires additional computing power to process the records.

- **Electronic Data Interchange Standard.** The Electronic Data Interchange Standards is a set of standards for structuring information electronically exchanged between and within businesses, organizations, government entities and other groups. EDI is still the data format used by the vast majority of electronic commerce transactions in the world. EDI documents generally contain the same information that would normally be found in a paper document. EDI is used among many professions, legal, transportation, shipping, etc. EDI has not found its way into tax form processing.

- **Electronic Funds Transfer (EFT).** Financial institutions where money is transferred from one account to another utilize EFT. Examples of EFTs include; electronic wire transfers, automatic teller machine (ATM) transactions, direct deposit, business-to-business payments, web payments, and federal, state and local tax payments.

- **Custom Data Formats**. Custom data formats do not meet newer standards, however, may be driven from the originators of the data.

- **Unstructured Data Files.** Unstructured data files are a group of files composed of many different types of files such as; documents, images, multimedia, and spreadsheets.

- ***HTTPS***

HTTPS provides for secure transmission and receipt of data the majority of which occurs via the Uniform Resource Identifier (URI). An HTTPS request can be typed or linked into the address bar of a web browser, or coded within an application. HTTPS request types are commonly called web services and include Representational State Transfer (REST) and Standard Object Access Protocol (SOAP).

- **REST** stores the transferred information in a packet that is sent along with the URI using a standard POST transaction within HTTPS. This can be initiated from a browser or a custom application. The technology to use POST is available on any Internet connected system. HTTP is the standard technology.

- **SOAP** transfers data packets via the POST function requiring specific format rules in order for the data packets to be properly read, and can include additional instructions or procedures.

HTTPS can use REST to transfer data directly via URLs and POST parameters, whereas SOAP transfers all data in packets via the POST function. This makes REST an easier method to use, and SOAP a more powerful method. SOAP based transfers are usually initiated from a software program.

- ***File Transfer Protocol Secured (FTPS)***

FTPS allows you to send data from one place to another using FTP protocol through a Transport Layer Security (TLS) and its predecessor, Secure Sockets Layer (SSL), connection.

- Generic Client – there are many clients available to allow human interaction to transfer files and pick up files (ex. Microsoft Internet Explorer, FTP Pro, Cute FTP, Fire Fox etc).

- Custom client – is the same as a generic client, however, may offer schedule option to eliminate human intervention (ex. FTP Pro, Tumbleweed Secure Transport Client etc).

- Program – the interaction is completed by computer-to-computer connections. The programs use FTPS as a protocol and transfers data based upon the workflow of vendor systems. Usually the most technically sophisticated users have complex fully automated systems.

- **SFTP**

SFTP is a network protocol that provides file transfer and manipulation functionality over any reliable data stream. This is an emerging protocol, which is not yet an Internet standard.

- Generic client – there are many SSH products that can allow a user to interact with a command line and GUI interface to transfer a file. Most Unix systems have a built in Secure Shell to access the computer. There are other products such as Putty, Cygwin, and etc.

- Program – the interaction is completed by computer-to-computer connections using SFTP protocol to connect and transfer files.

- ***Other Media Formats***

Not all customers have the technology to transfer data over the Internet. Many customers still prefer using magnetic media, such as disk or tape, and transfer the data using postal services. Magnetic files are uploaded on behalf of the customer and processed through the system. The acknowledgement is processed via postal service or email. The manual processing of these files will be incorporated within the EDE system and reuse the same programs for processing the data.

Attachment: A2.6.EAD_IAM

California Franchise Tax Board (FTB)

Enterprise Access and Identity Management Architecture Definition

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1.0 Executive Summary and Charter

1.1 Overview

Identity and Access Management (IAM) will provide FTB security as a business service, and a method to ensure all individuals and services are properly authenticated, authorized and audited when accessing application services. The IAM solution will provide a centralized and consistent security policy and will be delivered in a “security as a service” strategy, removing the responsibility of writing security code from FTB developers. To be effective, the security service will be integrated with an Enterprise Service Bus (ESB) allowing these services to be discoverable and usable for all web services throughout the department regardless of the system or business unit.

1.2 Scope

Identity management and access control for FTB’s external and internal users in an SOA environment provides an integrated standards-based solution that delivers authentication, web single sign-on, access policy creation and enforcement, user self-service, delegated administration, reporting and auditing.

1.3 High-level Requirements

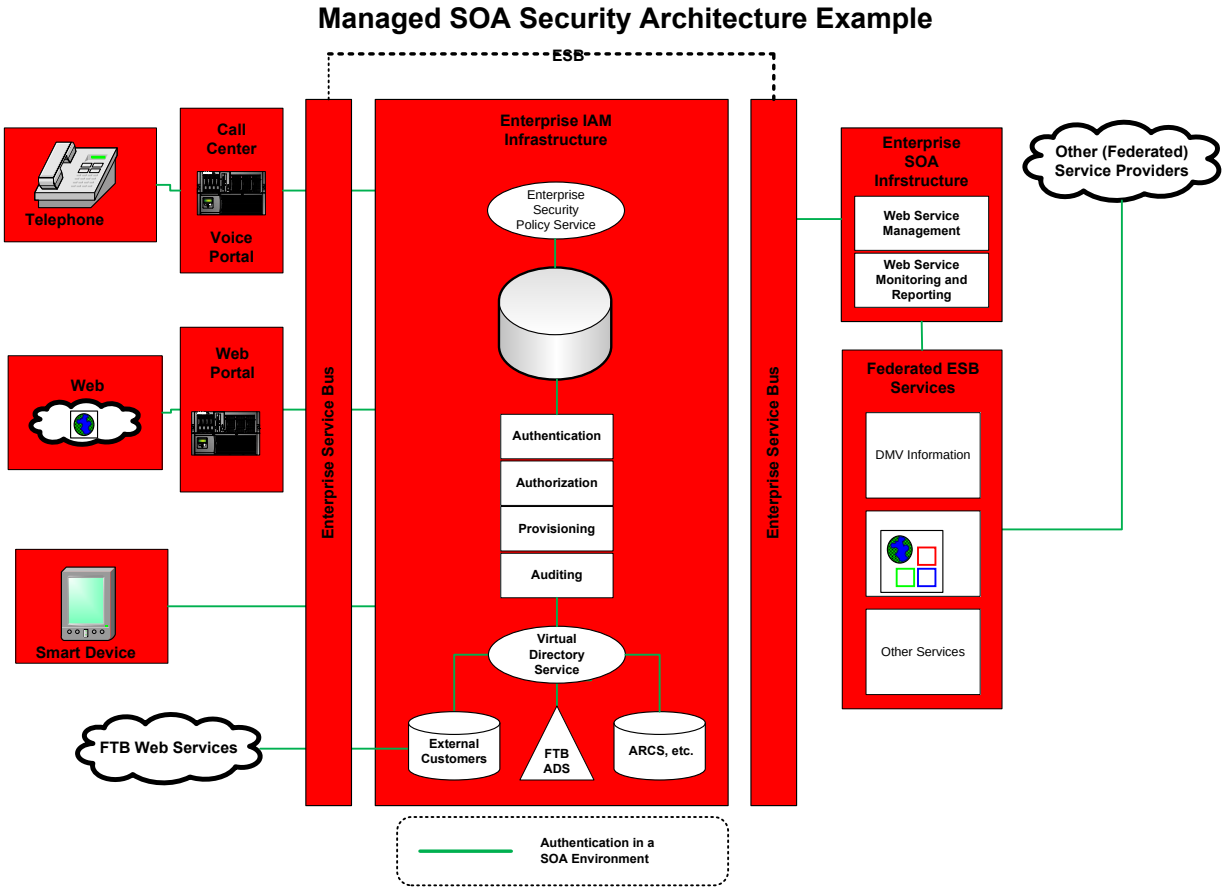
Figure 1.3-1: High level requirements

Requirement	Description
Provide Centralized Authentication for the Enterprise	Leverages existing authentication mechanisms to make it easier to integrate with existing environments
Provide Distributed Authentication	Secures applications with minimal security risk and maximum deployment flexibility
Single Sign On capability	Ensures that existing sign-on mechanisms can be leveraged across Web applications, federated partners, and Web Services
Real Time Management	Provides a centralized view of who is accessing resources
Provide a centralized policy that defines access control policies	Ensures only authorized users access protected resources
Flexible Data Store Support	Allow administrators to separate policy and configuration information from user data. Prevents duplication of user data by using a centralized security solution on existing directory services.
Open Standards Based	Uses standards such as SAML and ID-FF to create and share security for federation and easy upgrade and redeployment.
Access Auditing and Event Logging	Provides a trail of access for auditing violations.
Easily Scalable	scales to meet the growing requirements of enterprises and service providers

1.4 Conceptual Architecture Model

The AIM architecture will be an integrated IAM solution within an SOA environment providing security as a service. The SOA infrastructure will be capable of supporting composite applications comprised of underlying reusable services that do not contain hard-coded security controls. Access to internal applications will be secured by the IAM solution.

Figure 1.4-1: Managed SOA Security Architecture Example



2.0 Current Capabilities and Components

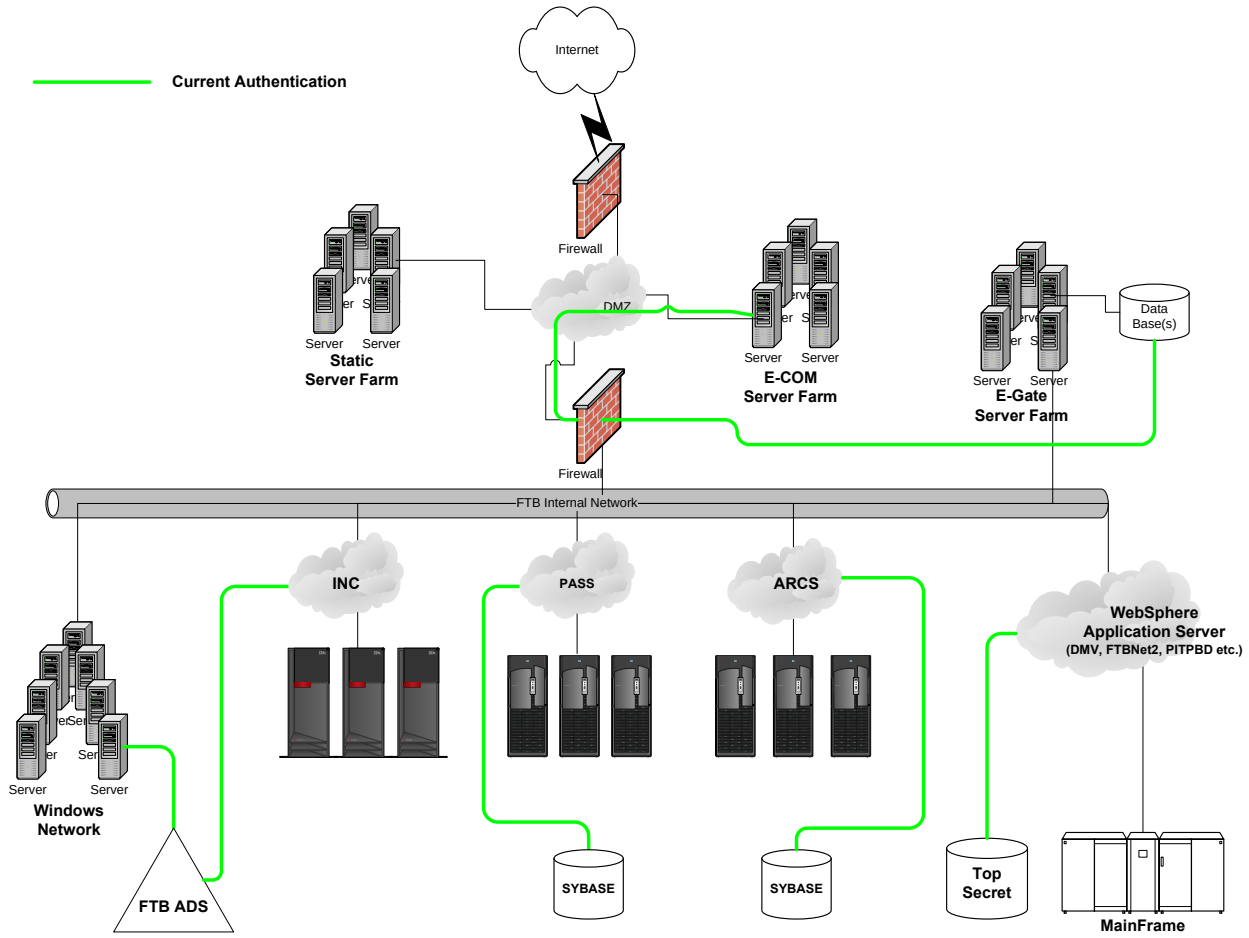
2.1.1 FTB current security

FTB has developed applications as stovepipe solutions. Each application developed its own authentication, authorization, auditing and user provisioning code and procedures. The main tax processing applications have either relied on the Top Secret security service (legacy applications) or developed individual data base systems for security (PASS, ARCS etc.). The result was the development of separate security groups who control access to the various systems throughout the department and the development of specialized security code using various methods for system auditing. This also complicates de-provisioning when employee's duties change or they leave FTB employment.

IAM governance is a combination of identity auditing, role-management and enforcement of security policies as they apply to the enterprise. FTB has change management, an IT service desk and is developing a problem resolution section following the ITIL principles.

Enterprise Security is managed by platform type using a variety of methods. Over the past several years, the majority of new and updated applications have been designed to leverage Microsoft Active-Directory (AD). Application developers create security routines that validate identity and role access via AD API calls. FTB does not have an integrated IAM system that governs access to the various tax systems. Authentication is performed by comparing credentials against information stored inside a system peculiar database (ARCS), Microsoft's Active Directory (AD), SQL database or for mainframe based applications – CA's Top Secret security server. In recent years, many of FTB's internally developed applications have been written to leverage the AD API interfaces for security, or hosted on WebSphere, which uses Top Secret to perform authentication.

Figure 1.4-1: "As-Is" Technical Architecture



3.0 Target Architecture

3.1 Future Capabilities and Components

Identity management simplifies the process of managing user identities across a variety of applications in order to provide provisioning and secure access, ensure ongoing compliance and enable federation for sharing beyond boundaries.

Identity management involves administration and policy creation, while access management entails enforcement of those policies. Together, IAM is a hierarchical collection of security practices and technologies, each new stage building on the prior one.

FTB will provide capabilities to enterprise applications and services to simplify user experience by reducing the number of times users log into protected resources. We will establish federated security with other state agencies through seamless access using open standard based protocols. The Data store will deliver information and services to users efficiently and cost-effectively no matter how business needs change or user requirements grow. The service delivers a set of capabilities to provide a centralized data store for users' identity data and for supporting data that can be leveraged for Web services architectures. Finally, the IAM infrastructure will support an SOA environment.

3.1.1 Identity and Access Management

IAM will provide complete capabilities to both detect and prevent compliance violations. An enterprise solution will make it possible to detect and remediate existing policy violations using automated processes. Without an enterprise solution, detecting policy violations can take weeks. Identity management provisioning and identity auditing capabilities is key to helping FTB achieve regulatory compliance at a reasonable cost as FTB moves to adopt federal Information Systems standards (NIST).

IAM will simplify how users gain access to applications, provide SSO capabilities to Web applications, portals, windows desktop environments, applications, and loosely coupled Web services using a centralized set of authentication mechanisms and secure-access policies.

The IAM systems will intercept requests to applications or services and determine whether the user has been properly authenticated. Once authenticated, the user's credentials are verified using a central user profile repository (Metadirectory) and policy store that determines whether the user will be permitted to access the resource. If the user has not previously been authenticated, they are prompted with a login challenge to supply a username and password or other type of credential.

Administrators will have a clear view of which users are signed onto which resources, thus providing centralized control over application security.

3.1.1.1 External Authentication for Secure E-Services

FTB plans to leverage its implementation of its reverse proxy with our current secure web architecture to implement an enterprise authentication solution to provide an Identity and

Access Management solution. Solutions for this project will support the following standards for web services security:

- Web Service Security (OASIS standards)
- Web service authentication and authorization
  - SAML, XACML
- W3C XML encryption standard
- XML Signature (Wc3) and X.509 certificates
- Security for UDDI (OASIS standard)

3.1.1.2 Web SSO

As FTB moves to provide customers a single web portal to access applications, Web SSO will be needed to enable users to sign on once and get access to all services, which they're authorized to use.

3.1.1.3 Self Serve Registration

As FTB moves to implement an opt-in method of providing access to web based applications, implementation of a self-registration service will be needed to give users access by proving who they said they are.

3.1.1.4 Federation

Integrated federation services will allow FTB to extend core authentication and authorization services with partners via standards based security. These standards include the Security Assertion Markup Language (SAML) and Liberty Identity Federation Framework (ID-FF). FTB's federation will allow users to link accounts across partner sites and generates a security assertion for each user, creating a seamless, simple sign-on experience.

3.1.1.5 Data Services

Horizontal in nature, the data service will be the core component of the IAM solution, providing a central repository that contains profile information, passwords, through data supports, such as, flat files, databases, directories, etc. This service will be compliant with the Lightweight Directory Access Protocol (LDAP). Until it is feasible to consolidate to one data store, FTB will use more than one directory. Therefore, it is important to have only one entry for all existing directories to facilitate and centralize management. This metadirectory will create a global view of isolated identity information stored in multiple locations.

3.1.1.6 Provisioning Service

This will allow centralized and automated management of user accounts and entitlements across multiple applications and directories. This will be related to FTB's operational procedures for account creation modification, retirement and deletion. Provisioning will verify identity to fulfill approval. Provisioning has the capabilities to manage identities across disparate systems.

3.1.2 Reverse Proxy

A reverse Proxy Server will provide access to ecommerce web applications while providing network isolation from external customers, and prevents the disclosure of internal network addresses and network addressing schemes. Reverse proxy servers will simplify firewall rule sets by reducing the number of trusted IP addresses that are allowed to access internal

resources. This service will automatically route requests on behalf of the user appropriately through a referral mechanism and provides secure firewall-like services. The requester's original packets are interpreted and never sent to the backend systems.

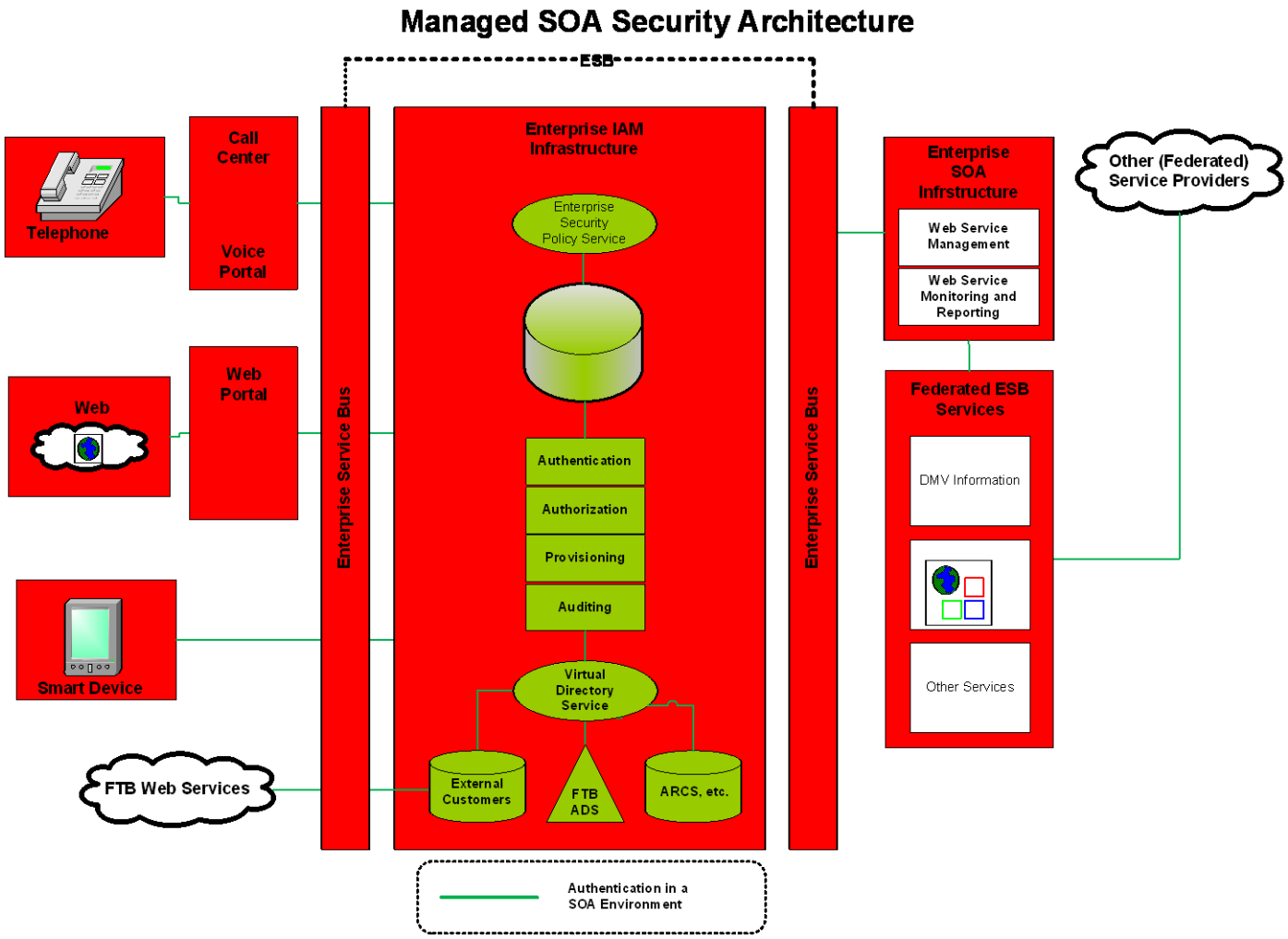
3.1.3 SOA environment

SOA environment will comprise of several components:

- An Enterprise Service Bus
- A Service Registry (UDDI)
- A Governance Module for web service security enforcement
- A management interface to control the web service environment.
- Voice and web portals
- Various databases to store service and policy information

The SOA infrastructure can be thought of as a composite application that is made up of underlying reusable services that should contain no hard-coded security controls. In order to ensure that this "application" is secure, it will need an IAM solution, which is a set of real-time security services externalized from and consumable by all the underlying applications (services), configured via policy and enforced for compliance. The IAM must be an integral part of the SOA infrastructure, so that as new or changed business services are designed, developed and deployed, accesses to them are controlled and audited. This design will allow the business or policy needs to change, while the security services infrastructure will dynamically adapt.

Figure 3.1-1: Managed SOA Security Architecture



3.1.3.1 Web Portal

The Web Portal functions as a central point of access to information. This will provide FTB with a consistent look and feel with access control and procedures for multiple applications (services). In a SOA environment, these services may exist on another trusted network without the user needing to be aware of its location.

3.1.4 Enterprise SOA Infrastructure

This includes Web Services Management that is used to provide visibility and control required to deploy Web Services into production and allows control and administration of a common security infrastructure for all Web Service applications. This allows for implementing best practice security policies and Web Service monitoring for all managed services. This works by:

- Decrypting XML messages

- Authenticating user credentials
- Perform authorization checks for users and Web Services
- Create and manage audit logging
- Submitting security messages to the intended Web Service

3.1.5 Enterprise IAM Governance

FTB will create a governance body that will oversee, control and regulate the IAM process. It will follow three major phases:

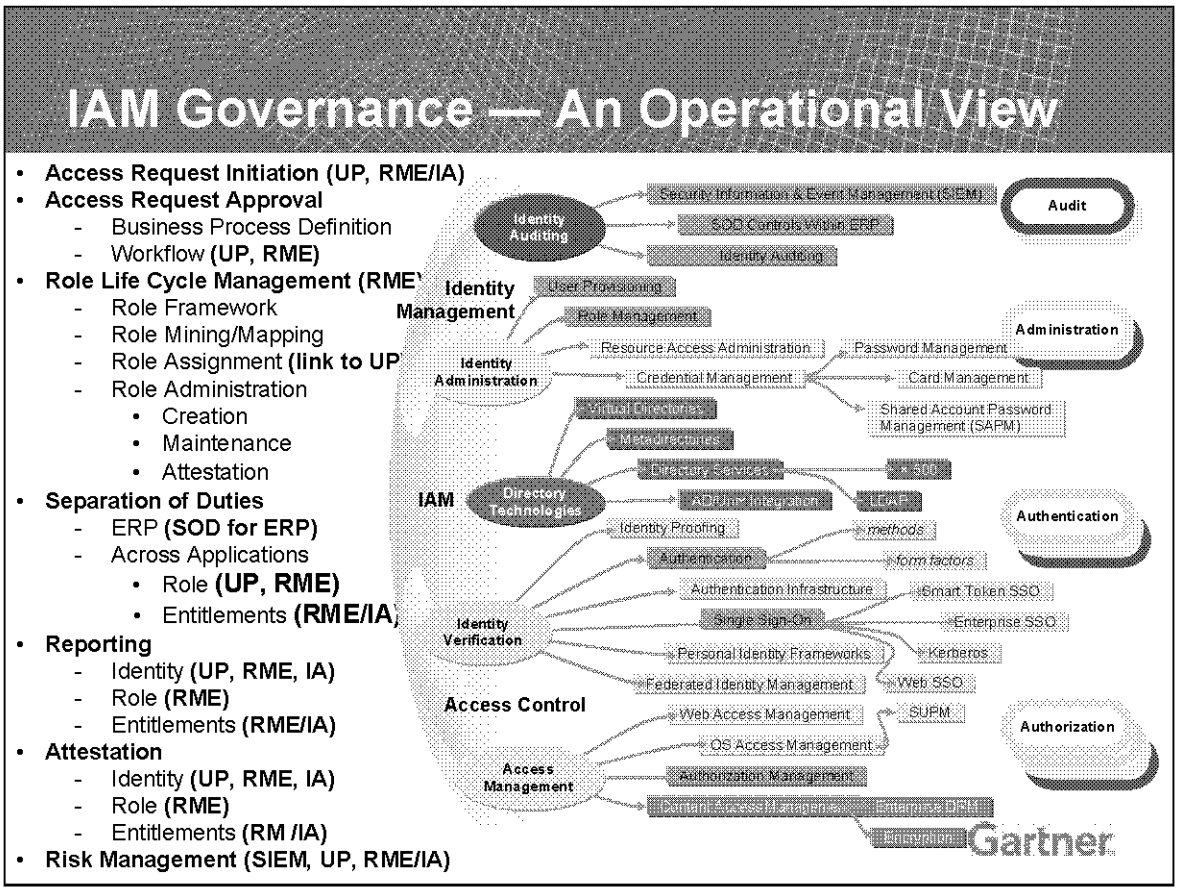
1. Establish control objective – this needs to be done to minimize the risk to the enterprise. An example of this developing clear guidelines for application development and/or infrastructure deployment
2. Implement controls – these are the processes and procedures that are required to meet the control objectives.
3. Establish a centralized auditing program – this provides proof that the controls are actually in place and are working.

An overall look at the operational view of IAM Governance lists activities that the enterprise needs to address for user identities, roles and, most importantly, authorization entitlements:

- Access request initiation — by the end user, manager, security administrator, or HR representative
- Access request approval, including the definition of the business approval flow, that is, who can approve an access request, when the request needs to be escalated, and so forth
- Role life cycle management, including the establishment of the role framework, role mining/mapping, role assignment (this would include a link to a user provisioning product), and role administration, including creating, maintaining and attesting to the role
- Reporting of identity information for identities, roles and authorization entitlements
- Attestation of identity information for identities, roles and authorization entitlements
- Access risk management — reviewing not only what a user has been granted access to, but what they are using so that their role assignments are appropriate (From Gartner 11/07 IAM Summit)

The following figure is a breakdown of IAM Governance activities and associated processes that should be in place:

Figure 3.1-2: Operational View of IAM Governance



4.0 Gap Analysis

Figure 3.1-1: Gap Analysis

GAP	Success Factor	Benefit
Identity data is duplicated across the enterprise in different data stores	Centralized , automated identity management	Reduced complexity and reduces cost
Disparate platforms	Virtual centralization of data store. Centralization of security policy	No redundant data. Can have a central IAM with multiple platforms
Disparate authentication access controls	Role based authentication with reusable access control policies	Centralized, automated identity management
Security Policies are inconsistent	Centralized automated security policies.	Consistent control of security policies
Diverse user base with differing level and types of access	Role based authentication with reusable access control policies	Easier to manage and audit
No Enterprise auditing and reporting	Virtual identity profile which has a single view and single point of management	Improved security though knowledge
No enterprise remediation	Automated remediation through all systems with session termination	Improved security through fast and affiant remediation. Automation
No enterprise metric capabilities	Automated compliance reporting reviews for standard compliance such as Sarbanes-Oxley and HIPAA	Able to establish compliance to legislation.
Web self registration	Implementation of web self registration.	Reduced overhead. Improved customer service.

5.0 Roadmap

In order to migrate from our current authentication and access methods, FTB should consider the dependencies that FTB's SOA strategy will have on currently planned projects.
The following is the recommendation on how to phase-in departmental IAM from our current systems, capabilities and workloads. There are main phases outlined below.

Figure 3.1-1: Security and Identity Management Roadmap

ID	Task Name	Scheduled Work	Percent Complete	Duration	Start Date	Finish Date	Predecessors
1	Start phase I of IAM	1,180 hrs	0%	202 days	03/11/2008	12/17/2008	
2	Determine requirements for IAM Phase I	300 hrs	0%	37 days	03/11/2008	04/30/2008	
3	Submit Project for Bid	80 hrs	0%	43 days	05/01/2008	06/30/2008	2
4	Select Vendor	100 hrs	0%	1 day	07/16/2008	07/16/2008	3
5	Implement product	700 hrs	0%	110 days	07/17/2008	12/17/2008	4
6	Start Phase II of IAM	4,000 hrs	0%	412 days	12/18/2008	07/16/2010	5
7	Determine requirements for Phase II of IAM	400 hrs	0%	87 days	12/18/2008	04/17/2009	
8	Submit Phase II Project for Bid	80 hrs	0%	42 days	04/20/2009	06/16/2009	7
9	Select Vendor	100 hrs	0%	1 day	07/15/2009	07/15/2009	8
10	Implement Proposed Phase II IAM solution	3,420 hrs	0%	262 days	07/16/2009	07/16/2010	9

5.1.1 First Phase

The first phase in deployment of an IAM solution would be to enable identity management for external customers accessing web applications. This is a mature technology providing the following benefits:

- Enables customers with a single sign on to the applications that they are entitled to use.
- Provides centralized control for application security.
- Protects applications by providing an enterprise security policy.
- Provides the ability to extend core authentication and authorization services with partners via standards-based security assertions (including SAML and ID-FF) for Federated Identity.

5.1.2 Second Phase

The second phase for IAM deployment would be to provide a comprehensive IAMS solution that will interface with the phase I deployment web SSO solution and will provide the following services:

- User provisioning
- Role based access management
- Access Management
- Auditing services
- Centralized security policy service

6.0 Appendix

6.1.1 Best Practices

To ensure a secure environment for a Service Oriented Architecture (SOA) environment, it is imperative that all types of individuals and entities (including services) are properly identified, authenticated and managed. FTB will deploy a security service that is external to, but accessed by all applications and services, with best practice being to procure rather than develop. Developers will design business logic instead of writing security code inside their applications. The IAM solutions chosen as a governance system for an SOA environment will be capable of interfacing with Federated IAM systems and be compliant with the California Enterprise Architecture Program (CEAP) vision for statewide (Federated) identity management.

Federated Identity Management is now at a maturity level where it is ready for practical use, as it should be a mainstream technology within 2 to 5 years. Other security technologies that currently considered mature and ready to deploy include Enterprise Single Sign On (ESSO), Web Access Management (WAM) and strong authentication systems (two factors) which support smart card or token technologies. FTB will use the industry common open standard, Security Assertion Markup Language (SAML).

6.1.2 Industry Trends

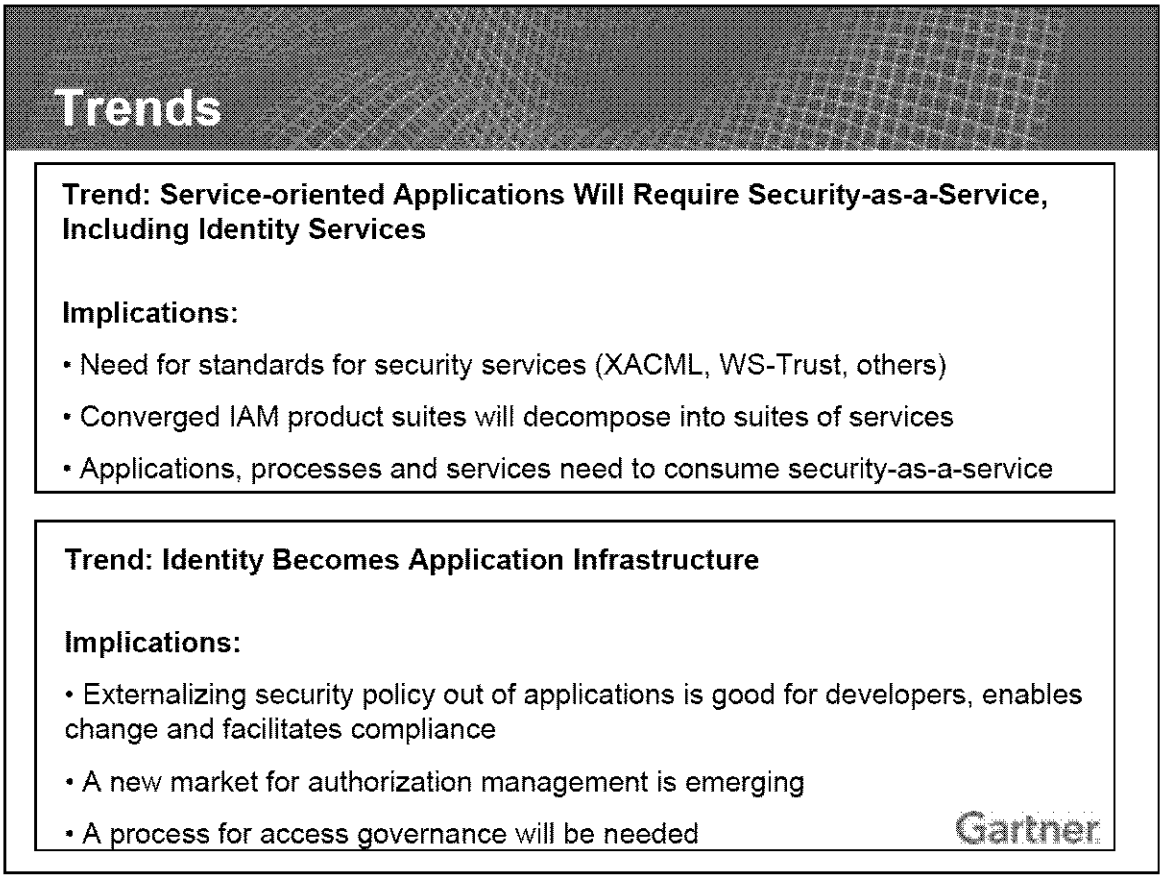
As SOA begins to drive application development, FTB will follow industry trends and will be able to shift accordingly. In the next 10 – 15 years, a shift from Web SSO to a wholly SOA should occur due to the following comparisons.

Figure 3.1-1: Comparison of Web SSO with IAM to SOA with AIM

Benefits and Drawbacks	
Web SSO with IAM	**SOA with IAM**
Relatively easy to deploy	Requires an in depth examination of processes, procedures and governance prior to deployment.
Mature technology – low deployment risk	Maturing technology – higher risk but higher reward
Provides a consolidated identity though account matching and system synchronization.	Provides a consolidated identity using either a centralized user repository or by creating a “virtual” database that joins disparate user databases.
System access is through a synchronization of accounts using “screen-scraping”	System access is verified by an identity provider in the form of a security assertion (token) containing user information that may include session, authentication and role data.
Typically used to grant access to “stove-piped” systems	Provides SSO capabilities for applications (service) that may also include composite applications. Stovepipe systems can be

	accessed with web-service “wrapping” technology.
Authentication is still controlled by individual applications	De-couples the authentication and authorization from applications and provides security to those systems as a service. This is a best practice
Most Web SSO solutions support Federated Identity	Supports Federated Identity
Does Not typically support user provision	Supports user provisioning
No Role Based Access Control	Most IAM solutions provide RBAC

Figure 3.1-2: Trends



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California Franchise Tax Board (FTB)
Enterprise Architecture Council

Service Oriented Architecture (SOA) Architecture Definition

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1.0 Executive Summary and Charter

1.1 Overview

The Franchise Tax Board (FTB) and the State of California have a long-term vision of moving to a Service Oriented Architecture (SOA) enterprise environment, which will provide better utilization of functionality and reduce the development of redundant systems across the enterprise. In an SOA, business process functionality and data are exposed as a service callable by multiple applications, thus maximizing the cost-effectiveness of developing and implementing the service. In order to be useful, the service will perform a small unit of functionality that is flexible so callers will be able to integrate the service with other services to perform the required functions of an application. To be used effectively by the enterprise, these services will be described, discoverable and useable without regards to the system, program or organizational unit.

There are three basic types of enterprise-wide services under the SOA umbrella: the Common Business Services, the Common Infrastructure Services, and the Common Information or Data Services.

A Common Business Service is a common business function exposed as a service (web service) that provides business value to more than one system using Service Oriented Architecture (SOA). The Common Business Services provide business functionality to enterprise consumers such as Address, Locate, Noticing, etc.

The Common Infrastructure Services provide basic infrastructure services to consumers such as single audit logging, error handling, and security, etc.

The Common Information or Data Services provide data to consumers from data repositories.

The combination of web services and services, internal and external to an organization make up a service-oriented architecture.

1.2 Scope

The SOA architecture definition defines the current and target states of FTB's Service Oriented architecture, a gap analysis and a strategy for implementation. The following list contains the subject areas covered:

- Governance to support SOA
- Common business services, common infrastructure services and common data services
- SOA enabling technologies

The common business services, common infrastructure services and common data services are dependent on other core areas such as Security, Data Management and Delivery and Content Management, which have their own Architectural Definition. There are many dependencies across the enterprise that must be aligned in order for any one architectural area to provide a cost effective and efficient solution. This Architecture Definition Document will focus on SOA from a business and technology perspective.

1.3 High-level Requirements

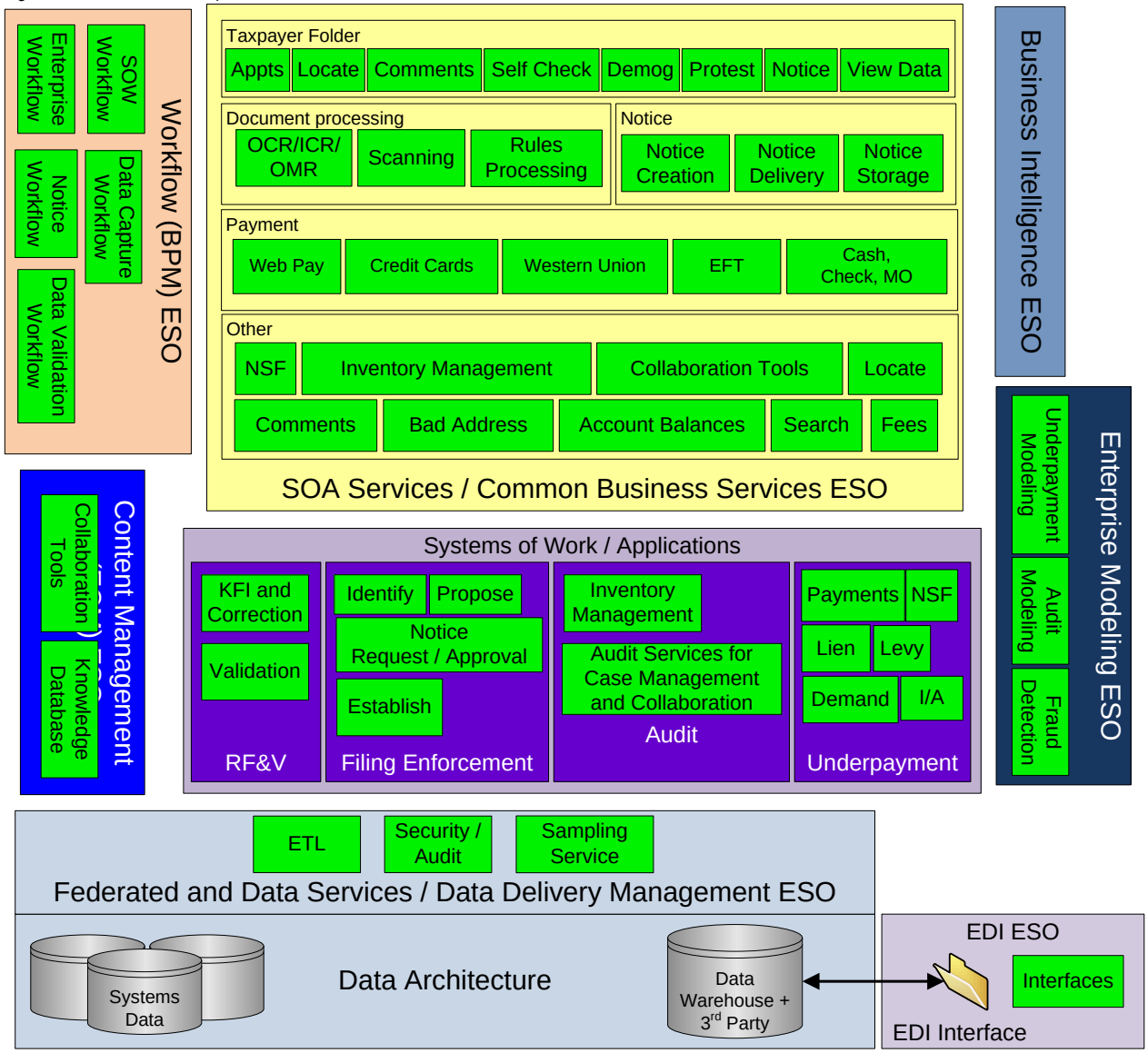
The following table outlines the high-level requirements of SOA.

Figure 1.3-1: SOA – High Level Requirements

Requirement	
Reusable	Services should be reusable by multiple clients to maximize the investment and utilization of the service.
Scalable	Services should scale well for the particular applications. Use of products such as Microsoft Word to render documents should be avoided.
Securable	Services should implement standards-based security models.
Standards Based	Services should use standards-based communication protocols.
Available	Services should be implemented in an environment that can provide continued service in the event of component failures. Services should meet requirements of Service Level Agreements.
Maintainable	Services should be built in ways that minimize the time necessary to implement changes and legislative mandates. A method of providing service versions to callers is desirable.
Discoverable	A means for enterprise users to identify and understanding the available services should be implemented.

1.4 Conceptual Architecture

Figure 1.4-1: Future Conceptual Architecture



2.0 Current Architecture

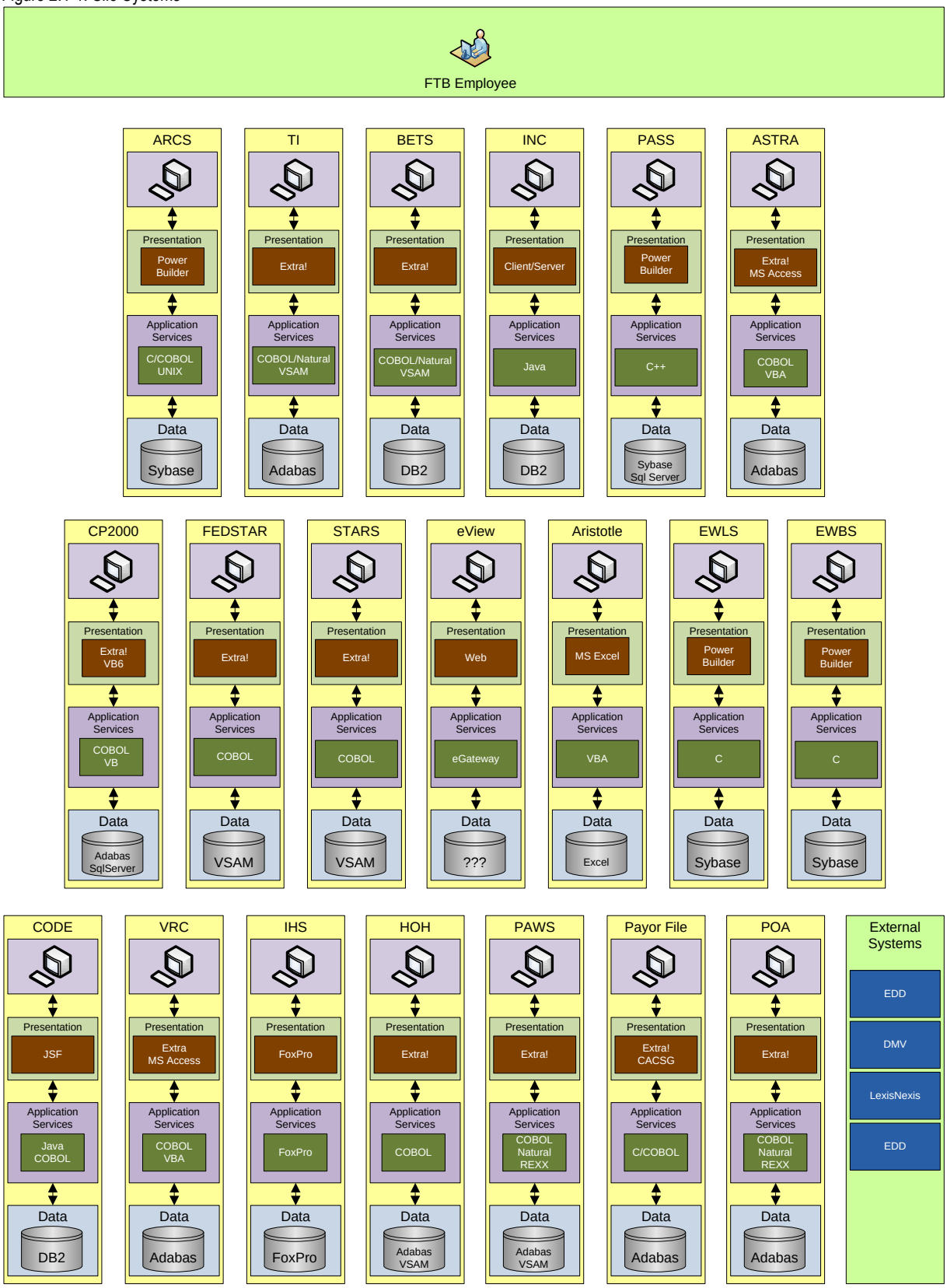
FTB's current architecture has two types of systems; "silo" stand alone and Web Service based.

2.1 Silo Systems

Application development at FTB has followed a 'silo' architecture where applications are not designed to work together to support common enterprise business processes but to support a functional area's needs. Advances in hardware and software technology coupled with the business need for more information and quicker turnaround times have made it necessary for FTB to change its approach to building systems.

In the figure below, FTB's major systems are shown. Utilizing a traditional, application-centric approach to application development, each system has a dedicated database, hardware environment, and tightly coupled application modules. Each area's applications were written in different languages, many times based on vendor preference. Data residing in one system needed by another system has often been replicated. Today FTB supports over 53 programming languages, 55 databases and 7 operating systems.

Figure 2.1-1: Silo Systems



2.2 Enterprise Web Services

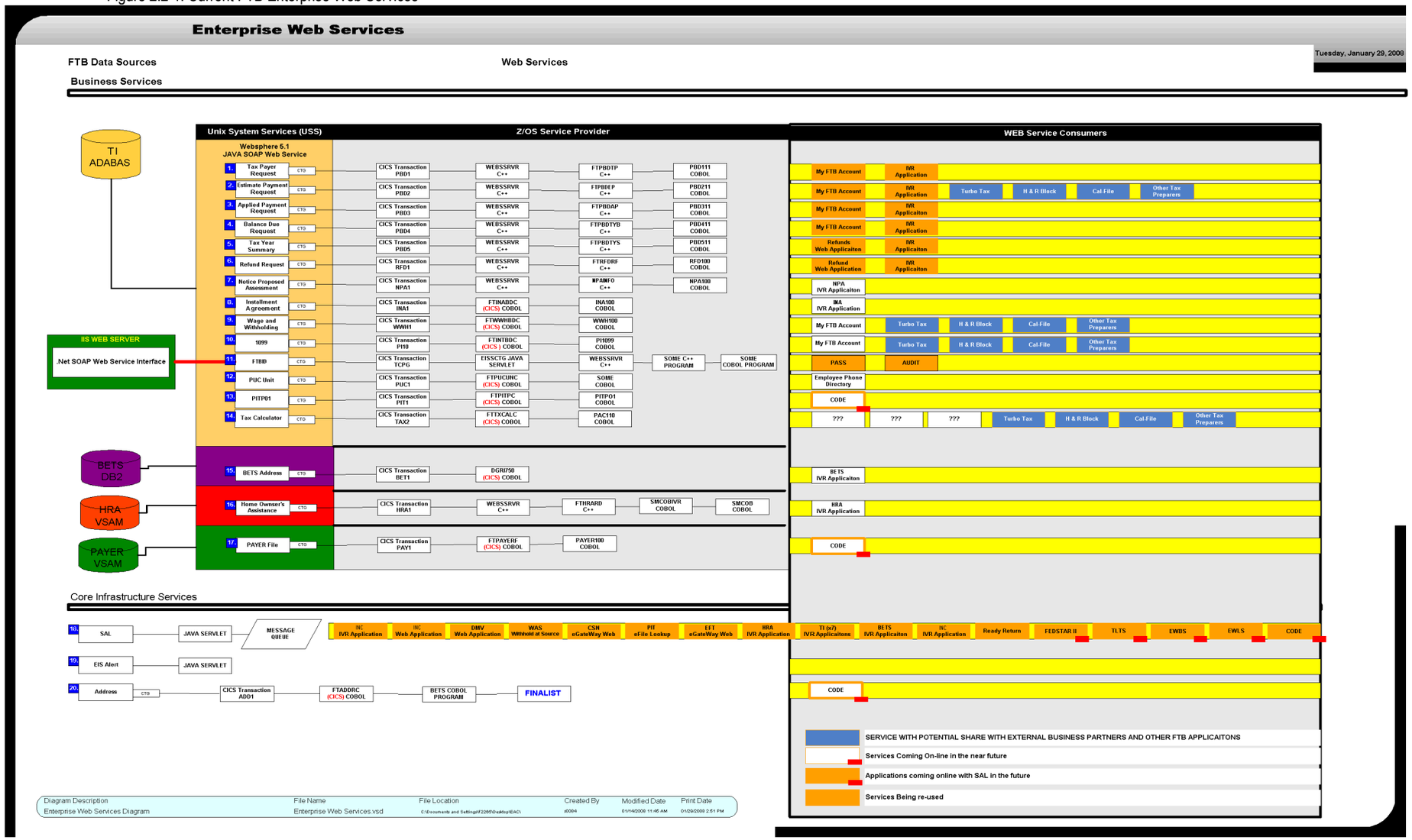
In the early 1990's, with FTB's introduction of its Interactive Voice Response (IVR) system and public facing web applications, it began to leverage back end legacy data and business rules from the Taxpayer Information system (TI) via screen scraping. Screen scraping simulates the steps that an actual user of the system would take to obtain the required data. In the late 1990s, the first web services were written to extract data directly from TI for the Payment and Balance Due and Refund applications. This eliminated production problems that resulted from changes made to the TI screens that were being screen scraped. A new infrastructure was created that allowed FTB to leverage back end application logic and provide this information to the IVR and the Internet through the use of web services and XML.

Today, FTB has a library of web services that foster reuse of existing business logic. The current systems being accessed with web services technology have expanded beyond TI and now include the Business Entity Tax System (BETS), eGateway, Integrated None-filer Compliance system (INC) and Homeowner and Renters Assistance System (HRA).

The figure below shows FTB's library of web services, which foster reuse of existing business logic. On the right side of the figure, the Web Service consumers are listed. The consumers call the appropriate business service that resides on WebSphere. Back end application logic is leveraged from the Z/OS service providers for business rules and data access. Utilizing XML, the results are returned to the Web Service consumer.

Core infrastructure services are listed at the bottom of the diagram. The security audit logging service (SAL), is called by the business services to perform audit logging.

Figure 2.2-1: Current FTB Enterprise Web Services

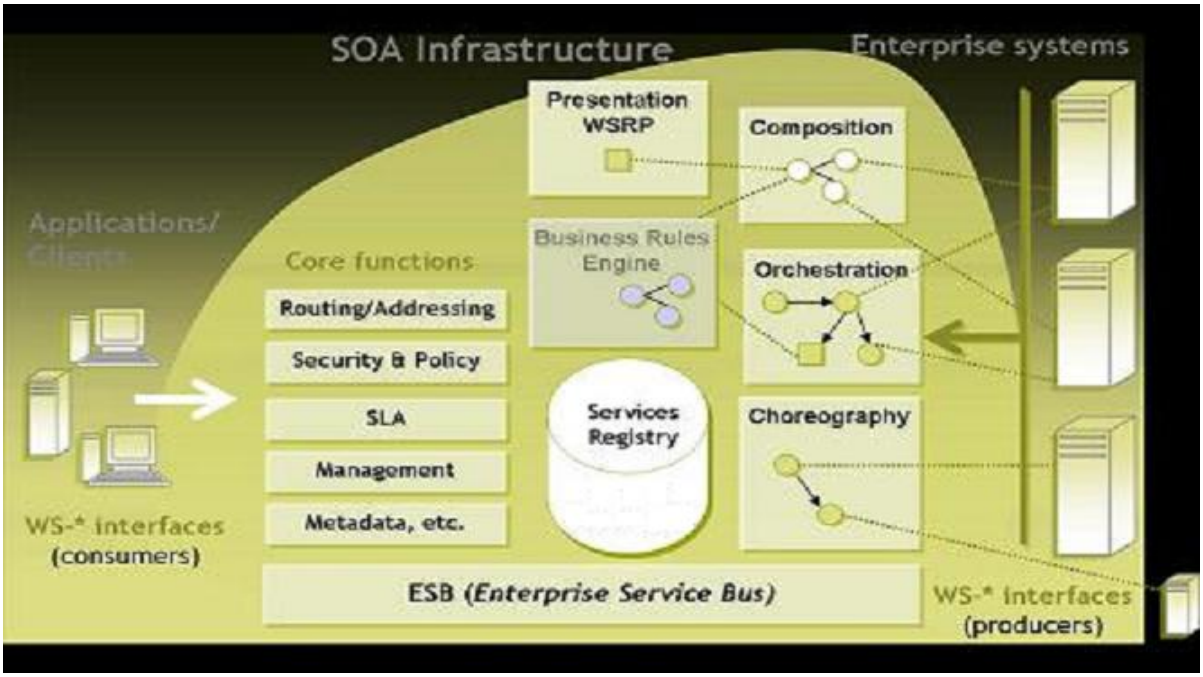


3.0 Target Architecture

3.1 Future Capabilities and Components

SOA is a business-centric IT architectural approach to integrate business processes through the implementation of repeatable tasks. FTB will expand its use of services to meet the business needs of the enterprise and promote reusability. The figure below represents a mature SOA infrastructure.

Figure 3.1-1: High Level Mature SOA Infrastructure



3.1.1 Web Services

Web Services at FTB can include business logic, business rules, and data. These Web Services will be available to systems within and outside of FTB. Web Services will be written in either Java or .NET, incorporate a web service interface, will use SOAP messaging, will be designed to be interoperable and not machine dependent and will not use operating platform specific API's. Any operating system inside FTB that can communicate using the standard HTTP protocol or Message Queuing technologies will be able to send and receive information using web services. FTBs Web Services may be hosted and executed on any operating system. These Web Services will communicate with a client using industry standard XML messages that follow the SOAP-standard. Common in both the Web Services field and industry it is standard that each web service has a Web Service Definition Language (WSDL) file. The WSDL file itself is a prerequisite for automated client-side code generation in the mainstream Java and .NET SOAP frameworks. FTB will mandate both SOAP and WSDL in their definition of a web service ensuring interoperability within the FTB organization, the California State Enterprise Architecture Program (CEAP), and private industry customers. Exposing web

services to external customers may also generate new revenue streams for FTB in the future. Below are service types FTB will use to define its architecture.

Figure 3.1-2: FTB service types

Service	Description
Business Service	FTB currently and will continue to use Business Services. A business service is the logical encapsulation of a business function. The following are examples of a business service. A tax calculation of penalties and interest. An estimated payment calculation for a taxpayer.
Data Service	Will be capable of delivering data from any type of information store. It will not matter what company or format the database is in or from.
Core Service or Infrastructure Service	Are the “plumbing” services. These services are leveraged to increase the sophistication with which ESB is able to carry out messaging, routing, and SOA related functions. Security and business policies will need to incorporate or introduce rules. Some of the cores services may be applied together with policy services and security centralization.
Centralized Rule Service	Most often classified as members of the core services layer because they provide generic processing functionality leveraging technology resources. Their functional context is not derived from any organization-specific business models. Even though rule data is business-centric, to the rules service, it is just data that it is required to manage and dispense.
Service Management Service	Assist with managing an SOA environment by providing mechanisms to install, maintain, monitor, and troubleshoot Web Services.
Service Communication Service	Provides support for various types of communications models between services: queued messaging, publish-subscribe event notification, and distributed logging services.
Policy Service	Provides a framework for creating, administering and managing policies for the SOA infrastructure; these policies cover security, resource allocation, and performance.
Security Service	Provides support for different security models, mechanisms, protocols and technologies that extend core Web Service security protocols. They support activities such as authorization, authentication, trust policy enforcement and credential transformation.
Business Rules Service	Physically abstracted into a dedicated part of the architecture under the management of specialized rules engines and platforms. This centralizes access to business rule logic and avoids redundancy. It further centralizes the governance of business rules so that they can be modified and evolved from a single location. See BPM Architecture Definition Document

3.1.2 Services Registry and Repository

FTB will implement a registry with full support for the Universal Description, Discovery and Integration (UDDI) protocols. The registry will provide a single point of reference for developers to register, discover, and govern web services. This Web Service registry, like other web service components, will be standards-based to foster interoperability across organizational boundaries. The registry will maintain basic information about a service and will provide links to service metadata and artifacts (that will be stored in the repository).

3.1.2.1 Standards Enforcement

The registration process will provide a point of control at which FTB can perform governance compliance tests and institute basic approval processes during service configuration and release management. The registry will play an important role as part of the runtime governance infrastructure providing a single point of reference for all service information enabling service endpoints and intermediaries to share information.

The FTB will define common standards to be followed by every service provider by the SOA center of Excellence (COE) (please see SOA governance section). The service registry administrator (SRA) will ensure that FTB enterprise architecture SOA standards have been applied. These standards will follow industry best practices.

3.1.2.2 Publishing and identifying services

Having each service published in a common services repository will allow for the discovery of the existence and location of services. This ensures FTB employees will be able to determine which services exist, and what the services do within the enterprise organization. The repository will contain functionality meta-data that will describe the data elements that the service can return and describe how the service can be called or invoked.

3.1.2.3 Monitoring, logging and tracking services

Because of security concerns, governmental regulations dictate monitoring, logging and tracking standards. FTB will establish an effective monitoring, logging, and service tracking system to track which services are being used, how often and by whom. Tracking of information is crucial for future reference and audit events.

3.1.2.4 Service Level Agreements

FTB will specify and enforce Service Level Agreements (SLA) between consumers and producers of Web Services in the registry. By centrally publishing service information to the registry, all potential users of the service will be able to discover it easily. During the establishment of the SLA, service consumers and producers (service providers) negotiate a utilization contract. This process involves the following steps:

- The service consumer applies for permission to use a service.
- The service consumer and service provider negotiate acceptable levels of service and other issues.
- Any agreements that impact the runtime infrastructure are propagated to the appropriate service mediation system for runtime enforcement.

- The service consumer is provisioned to use the service.

3.1.2.5 Transparency

A service registry utilizing an Enterprise Service Bus (ESB) will provide Web Services transparency. All clients of a Web Service will “point” to the ESB. The service registry “knows” the details (such as location and interface) of the web service and the ESB “consults with” the service registry to determine where to route the service request. This provides flexibility as the web services can be updated and moved without affecting the users.

3.1.3 Enterprise Service Bus (ESB)

The ESB will become the backbone used to deliver web services at FTB. In order for FTB’s SOA infrastructure to be dependable, robust and secure, it will be necessary to connect any IT resource, regardless of technology or location. The ESB will easily combine and re-assemble service dependencies. FTB will determine, within the SOA CoE, if SOA deployments will solely rely on the use of an ESB, or just utilize an ESB to offload non-core processing tasks.

The ESB and service registry must be scalable with high availability, and have a well-designed recovery plan in case of a disaster. The FTB’s ESB will have the following features:

3.1.3.1 Dynamic Lookup and Routing

FTB’s ESB will support "virtual services." The ESB appears to be the real service provider to the requester, routing messages to the actual service provider. FTB will store the location of a service provider in an external registry, using WSDL files. The ESB will look up services at run time. The endpoint information will be managed centrally, as part of an overall SOA governance model.

3.1.3.2 Content-based Routing

Content-based routing is a special case dynamic routing. Lookups will occur based on criteria that can be found inside the web service SOAP message and is based on content and context of XML messages.

3.1.3.3 Message Aggregation and Distribution

In most scenarios in FTB’s SOA today, one service requester invokes one web service. FTB’s future SOA environment will have a one-to-many relationship. For example, a requester sends a request, resulting in multiple web services be orchestrated together and a single aggregated response is sent back. Another scenario is a request sends a request, and that request is sent to multiple service providers. Once one of the multiple service providers have responded, the web service response being sent back to the requestor is aggregated into one consolidated response message.

3.1.3.4 Message Transformation

Most messages in the ESB will be XML-based and not all messages in the ESB will require transformation. The ESB will have the ability to use XSLT transformation on messages flowing through it. Plug-ins will be available to provide support for very complex transformations and offers an API that can be invoked during the ESB transformation.

3.1.3.5 Messaging Infrastructure

An ESB may be tied to whatever messaging infrastructure (MOM), that FTB supports (WebSphere MQ), or the ESB may allow for adapters using JCA technology. However, most ESB vendor products are building upon MOM messaging infrastructures. Which messaging service we use is dependent on the tool that is selected.

3.1.3.6 Protocol Support

FTB's ESB will be multi-protocol where varieties of protocols (WS-SOAP, JMS, JCA, etc.) natively interact with the ESB, without employing an adapter. This is "how you get on the bus." Requestors using one protocol can invoke services that are exposed using a different protocol. It is also possible to support different security protocols. For example, FTB could perform a SAML based authentication and authorization with a web service consumer from the Department of Technology Services and then the ESB would convert that authentication header to a format accepted by a backend web service requiring basic authentication over SSL on the mainframe.

3.1.3.7 Adapters

The ESB will have adapters to provide connectivity to all internal and external. This is needed for legacy systems not built with a messaging model.

The ESB will transform messages into a legacy format that is understandable by the application. The software responsible for effecting these transformations is referred to as an adapter.

3.1.3.8 Security

With the implementation of the ESB, FTB will incrementally implement the new authentication and authorization web services. The ESB can map security to existing security mechanisms that are already in place, and over time utilize the new security mechanisms as necessary without disruption to the end customers of the services. For example, FTB implemented a web service to access TI through WebSphere. This Web Service required basic authentication credentials. It was later decided FTB wanted to eliminate WebSphere, and add a web service implemented instead in CICS 3.1. With this scenario, the clients would simply call the web service on the ESB. However, the ESB would be modified to change the Web Service call to CICS directly and to send the appropriate security credentials as needed. The ESB would map the web service authentication and authorization scheme to CICS authentication from the container manage security enforce by the WebSphere implementation.

3.1.4 Business Rule Engines

FTB will have a Business Rule Engine (BRE), which is a software system that helps manage and automate FTB business rules. The rules that will be defined in a BRE may come from business areas, legal regulations, FTB policy, security, or other sources. BRE engines are pluggable software components that separate the business rules from the web services and application code. This allows the business users to modify the rules frequently without the need of IT and allows the services applications to be more adaptable to business agility. A BRE Engines should allow FTB to implement dynamic rules in business processes without having re-program business services. (Please see the BMP Enterprise Architecture Definition Document.)

3.2 Future Enterprise Governance

SOA governance will organize and align efforts to manage and control the enterprise architecture realizing the objective of Service Oriented Architecture. FTB SOA goals are to:

- Align business and IT
- Establish service re-use
- Establish an agile service environment

FTB's SOA governance will define the interrelationships of different groups, participants and services and how they will work as a cohesive unit within the larger SOA architecture.

In order for the FTB to develop a mature SOA enterprise architecture, it is necessary to align business and IT to a methodology and process that connects business and enterprise architecture. To achieve services reuse, FTB will ensure the existence of standards put into place an effective governance model. FTB will achieve agility through the ability to program IT processes at a higher level of abstraction than raw services. Service orchestration or BPM workflow with configurable policies and SLA/OLA contracts will be in place.

3.2.1 Center of Excellence (CoE)

FTB is following the emerging trend of establishing a SOA CoE. The CoE will be an organizational unit that facilitates an exchange of ideas between business and IT leaders and experts. The CoE gathers input from multi-disciplinary skill sets, which operate across organizational boundaries in order to make shared technology decisions. The SOA architecture is developed, documented, and communicated to the enterprise from the CoE. The CoE enforces compliance of standards, ensures highly tuned processes, and drives software and data re-use. The result is less development cost, less testing and lower support costs.

3.2.1.1 Reporting

The CoE will be involved in compliance reporting to management and information security.

3.2.1.2 Requirements and Policies

The CoE will develop, document and communicate:

- Service Interface Specifications
- Service Security Requirements
- Information Model
- Service Architecture Specifications
- Service Architecture Diagrams

3.2.1.3 Guides and Checklists

The CoE will develop and disseminate service question and answer checklists, service quick start guides, and deployment checklists for SOA system software products.

3.2.1.4 SOA Training

The CoE will help FTB define what technology training that FTB will invest. The CoE will have executive support to achieve cross organization cooperation.

3.2.2 Service Registry Administrator (SRA)

The Service Registry Administrator (SRA) manages the consistency of the catalog and enforces guidelines that protect against redundancy, proliferation and unauthorized modifications of the service catalog. The SRA controls the adoption of service definitions into the shared registry, and is responsible for controlling consistency and quality of the design of services, including the service-data relationship. The SRA is a member of the CoE.

4.0 Gap Analysis

FTB, like many organizations, has developed silo-based systems where, focus is solely on the business process it performs. This has created an IT infrastructure with the following problems:
Dedicated silo hardware that is expensive: FTB's applications run on dedicated application server and database computers. This equipment is typically provisioned to handle the worst-case load, and is usually highly underutilized.

Synchronizing silo data is complex and error-prone: Most FTB applications have their own operational data stores, thereby creating a complex data synchronization infrastructure, particularly for shared data about products, partners, and customers. It's almost impossible to get a centralized view of the data here at FTB.

Integrating silo applications is difficult: Getting silo applications to integrate is an ongoing challenge, particularly when the underlying reference data between two silos is not in sync.

Staff assigned to and focused on a specific process within one System of Work (SOW): This type of structure is not conducive to collaboration between systems, and sharing of data and knowledge.

To solve these gaps, FTB's IT will implement cultural changes, create service registry and repository, establish service certification and ownership, implement version control, create service level agreements, create SOA architecture and implement an SOA security infrastructure (See IAM Architecture Definition Document), and re-align (See IT Strategic Plan)

4.1 Cultural Changes

Current IT efforts are focused on delivering applications as quickly as possible at the lowest possible cost. Organizational structure, accounting practices, and incentive systems all reinforce this goal. FTB must develop a culture where external solutions are understood and used. This will include:

- Adopting different ways of working and different ways of thinking, which include cross organization cooperation and creating news roles within the organization with different responsibilities. The newly created Operations bureau and the SOA CoE are the start of this process.
- Foster a technical and cultural environment where reuse is considered a characteristic of excellence in software engineering.
- Facilitate reuse of services through communication, leadership and governance.
- Focus on long-term goals rather than individual project costs and timelines. Implement the best, most cost effective long-term solutions.
- Prevent silos by preventing application bureaus from operating independently.
- Establish a management group to prioritize cross-functional application enhancements and annual changes that follow EA recommendations and provide the best value for FTB.
- Provide answers for the following questions:

- Who pays for the service infrastructure?
- Who pays for initial service development?
- How are costs shared across service consumers?
- Who pays for service enhancements?
- Who pays for upgrades to the infrastructure to support rising load on a service and?

4.2 Service Registry and Repository

Today FTB does not have a registry and repository for web services causing duplication of effort. FTB must establish a repository to make visible enterprise services. Reuse of services will be facilitated through governance and a well-described service repository that describes, classifies, and makes discoverability possible.

4.3 Service Certification and Ownership

Today, FTB does not have governance for enterprise service certification. Governance will need to be created to manage shared services, make service ownership determinations and policies for modifying, extending, combining, or retiring a service. The certification process must be defined and published so developers understand and use the process to get their new services certified.

4.4 Version Control

Today there is no version control for enterprise web services. As the number of services expands, lack of version control will lead to "legacy SOA applications." Deploying a new version of the interface may require changes to all clients of the previous version. Without well-established SOA management, not all users of the services are known. Software versioning is a requirement of the SOA FTB environment.

4.5 Service Level Agreements (SLA)

FTB does not have contracts between service consumers and service providers. As more consumers use FTB services, it will be necessary to define who the consumers of a service are and the acceptable levels of service for each consumer. For example, when sharing a service with an external agency or outside vendor, their acceptable level of service may be different than what an FTB user of the service may negotiate. Internally at FTB different areas have different levels of acceptable service. Through the SLA, FTB can manage our application and network resources and how they are being used. Automated processes will be set up to notify FTB when acceptable levels of service are in danger or being compromised and to enforce the SLA by redirection of resources. Consumers of a service will have their own SLA with the service provider. For example, a service that calculates tax with penalties and interest might be invoked by many different applications. Due to the financial nature of the tax calculation routine, it would be reasonable to expect a minimum level of service. If the maximum expected response time for the tax calculation routine is 400 ms, any scenario that a response time exceeding 400ms might be indicative of a problem and be dealt with accordingly. Unless a prior contract exists between the consumer and the tax calculation service, there would be no way to

measure and enforce such a service level agreement. The directory will be a place to communicate and share SLA agreements and use technology to enforce them.

4.6 SOA Infrastructure

FTB has a limited SOA infrastructure. Tools and processes will be implemented to advance from our current state

4.7 Security

FTB has no security policy that will support an advanced SOA infrastructure. Exposing web services and data to the Internet, is a security concern. The industry has many implementation standards for web services security that can be implemented to address the security aspects of sharing data with external customers and business partners (see the IAM Architecture Definition Document)

5.0 Roadmap

The following chart illustrates how SOA will be implemented at FTB.

Figure 4.7-1: Service Oriented Architecture Phases

Task Name

Service Oriented Architecture: Common Business Services

PART 1 - Service Oriented Architecture: Planning and Governance

SOA Planning

Coordinate with other ESOs in Data Governance and Standards Planning

Service Monitoring Governance and Standards
- Determine Requirements for Availability, Logging, Auditing, Performance Metrics
- Document Service Monitoring Governance and Standards
- Approve Service Monitoring Governance and Standards
- Implement Service Monitoring Governance and Standards
- Communication

Exception Management Governance and Standards
- Determine Requirements for Exception Management and Error Handling
- Document Exception Management Governance and Standards
- Approve Exception Handling Governance and Standards
- Implement Error Handling Governance and Standards
- Communication

Service Delivery Governance and Standards
- Determine Requirements for Version Management
- Document Version Management Governance and Standards
- Approve Version Management Governance and Standards
- Implement Version Management Governance and Standards
- Communication

Version Management Governance and Standards
- Determine Requirements for Version Management
- Document Version Management Governance and Standards
- Approve Version Management Governance and Standards
- Implement Version Management Governance and Standards
- Communication

Service Level Agreements (SLAs) Governance and Standards
- Determine Requirements for SLAs
- Document SLA Governance and Standards
- Approve SLA Governance and Standards
- Implement SLA Governance and Standards
- Communication

Service Registry Governance and Standards
- Determine Requirements for the Services Registry & Repository
- Document Registry Governance and Standards
- Approve Registry Governance and Standards
- Implement Registry Governance and Standards
- Communication

PART 2 - Establish SOA Service Registry

Select Service Repository
Implement Service Registry Tool
Test Registry
Gather Service Information & Populate Registry
Milestone - SOA Registry Established

PART 3 - Security and ID Management Services

Collaborate with Security to establish IAM infrastructure requirements for services:
- Identity Services
- Authentication Services
- Authorization and Privacy Services
- Confidentiality and Integrity Services

Hours are not included for development & testing of these services - assuming they are being purchased and included in the Security estimates

PART 4 - Enterprise Service Bus

Determine Requirements for the ESB
Select ESB
Implement ESB
Test ESB
Communication
Milestone -ESB Established

PART 5 - SOA: Establish Data Subject Area Services - Collaboration with DDM

Establish Data Subject Area Services for CUSTOMER/PARTY

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Test

Establish Data Subject Area Services for CUSTOMER ACCOUNT

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services Requirements have been met
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Test

Establish Data Subject Area Services for TAX DECLARATION

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Test

Establish Data Subject Area Services for ASSET and INCOME

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Test

Establish Data Subject Area Services for CUSTOMER COMMUNICATION

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Test

PART 6A - Establish Underpayment Modeling Service

Review Business Requirements
Design
Code
Unit Test
Implement/Document
Support System/Integration System

PART 6B - Establish Underpayment Data/Web Services - Collaboration BI & DDM

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Testing

PART 7 - Establish Filing Enforcement (FE) Data/Web Services - Collaboration BI & DDM

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Testing

PART 8 - Establish Audit Data/Web Services - Collaboration with BI & DDM

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Testing

PART 9 - Establish Fraud Data/Web Services - Collaboration with BI & DDM

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services for Performance
Implement/Document Data/Web Services
Support System/Integration Testing

PART 10A - Establish ADDRESS Service

Review Business Requirements
Design
Code
Unit Test
Implement/Document
Support System/Integration Testing

PART 10B - Establish ADDRESS Data/Web Services - Collaboration with DDM

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Testing

PART 11A - Establish Enterprise Noticing Service

Review Business Requirements
Analysis and Design
Code
Unit Test
Implement/Document
Support System/Integration Testing

PART 11B - Establish ENTERPRISE NOTICING Data/Web Services - Collaboration with DDM

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Testing

PART 12A - Establish Levy Service

Review Business Requirements
Analysis and Design
Code
Unit Test
Implement/Document
Support System/Integration Testing

PART 12B - Establish LEVY Data/Web Services - Collaboration with DDM

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Testing

PART 13A - Establish Installment Agreement Service

Review Business Requirements
Analysis and Design
Code
Unit Test
Implement/Document
Support System/Integration Testing

PART 13B - Establish Installment Agreement Data/Web Services - Collaboration with DDM

Review Data Access Requirements for Data/Web Services
Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Testing

PART 14A - Update Address Service

Review Business Requirements
Analysis and Design
Code
Unit Test
Implement/Document
Support System/Integration Testing

PART 14B - Establish Address Update Data/Web Services Collaboration with DDM

Review Data Access Requirements for Data/Web Services
Analysis and Design Data/Web Services
Code Data/Web Services
Unit Test Data/Web Services
Implement/Document Data/Web Services
Support System/Integration Testing

6.0 Appendix

6.1 Definitions

BPM – Business Process Management a discipline that encompasses methods, techniques and tools to design, enact, and control business processes involving humans, organizations, applications, documents and other sources of information. BPM leverages tools (software) and solutions (integration) that depict, analyze and optimize business processes and workload management.

BPEL – Business Process Execution Language - an XML-based orchestration language that enables separate businesses to interconnect their applications and share data in distributed or grid computing environment using a combination of Web services.

Business Process – the codification of rules and best practices that constitute the business. It includes people, business services, adapters and some sort of process management activity that manages the flow of work between all the parts.

Business Services - the logical encapsulation of some business function.

Core Services or Infrastructure Services - These are really the plumbing services, which include service management, service communication, policy services, and security services. Security and business policies will often need to incorporate or introduce rules, which is why some of the cores services may be applied together with policy services and security centralization.

Composite Applications – applications built from the business functions of existing applications, with perhaps one or two new components added.

Duplicated SOAs: In Duplicated SOAs things seem to work well. Many services have been duplicated twice or more times. There is little reuse between enterprise development teams. This type of SOA results in high maintenance costs although things may seem to work well.

EDA - Event-Driven Architecture –a software architecture pattern promoting the production, detection, consumption of, and reaction to events. Event-driven architecture complements service oriented architecture (SOA) because services can be started by triggers such as events.

ESB – enterprise service bus - a collection of software components that comprise the foundational services for more complex architectures via an event-driven and standards-based messaging engine (the bus).

SCA – service component architecture, an emerging set of standards related to SOA applications.

Service: A discrete set of business or technical functionality that can be identified, has a defined set of input and output, and is reusable. What goes on behind the service interface is deliberately hidden and should not be of concern to the service consumer.

Shelf-ware SOAs: In Shelf-ware SOAs, SOA is implemented. However, few applications actually use the enterprise services. Enterprise systems are using point-to-point, unstructured integration, and there is little buy-in from several business units within the organization. This SOA is waste of resources and won't deliver benefits. A CoE will help prevent this from happening.

SOA – Service oriented Architecture - a business-centric IT architectural approach to integrate business processes through the implementation of repeatable tasks.

SOA Registry & Repository –a central reference for all the software components within the SOA environment.

SOAP - SOAP messaging is the standard mechanism for communicating with web services, and hides the details of the language of the web service. SOAP messaging is an industry standard, language neutral, vendor neutral, and is platform neutral for *client applications* consuming the web services.

Web Service - can be used to implement a service-oriented architecture. A major focus of Web services is to make functional building blocks accessible over standard Internet protocols that are independent from platforms and programming languages. These services can be new applications or just wrapped around existing legacy systems to make them network-enabled.

The Wild West SOA: Services proliferate wildly. There is no formal service-definition process. Nobody knows how many services are in place, where they are or what they do. There is no leveraging or reuse of existing resources. This type of SOA environment is extremely difficult to fix and gain control.

WSDL – web service description language - is an XML-based service description that describes how client applications can communicate with the web service endpoints or ports as they are called.

6.2 Industry Best Practices and Trends

- Manage the expectations of SOA investments by understanding that the involved parties don't all envision the same outcome as the objective. Consider these differences in tailoring business communications at all levels.

- SOA is a long-term, complex initiative and organizations must invest in developing the required understanding, best practices, and organizational culture before committing to mission-critical projects. Large projects should be subdivided into smaller components so that the SOA effort is applied initially in a relatively small scope to be expanded over time. Early SOA projects should not last longer than six months from the start of design to the delivery of results. Think strategically, but act tactically. Develop a long-term

vision for SOA, but implement it incrementally, learning during the process and managing the risks of transition.

- Define clear modularization of software layers (e.g., enterprise data and applications, services, business processes, business activity monitoring, etc.).

- As the number of services deployed grows to more than 20 to 30, industry best practices recommend implementing a services repository and ESB.

- The use of standards and meta-data are critical to SOA benefit realization. Use a combination of top-down, bottom-up and business-event driven analysis to identify services — and pay close attention to service granularity.

- Industry best practice is to give preference to platforms that distinctly recognize event and service flows as separate design and deployment models for software, and provide integrated runtime, management and development infrastructure that supports both models.

- The use of design patterns can be used to break down complex problems into manageable chunks that can be developed more efficiently.

- The use of SOA design patterns can map into an Enterprise Service Bus implementations, which can provide components needed for service invocations, routing and transformation of service messages, as well as, facilitating services management.

- These three principles — simplicity, isolation and statelessness — are best practices in the design of all distributed systems, including distributed, interactive SOA due to their inherent complexity.

- Open standards are one of the key principles and benefits of SOA. Standards such as XML, SOAP and WSDL are providing the foundation by which organizations can ensure that a wide variety of enterprise resources can be enabled to interoperate and cooperate as part of an SOA. Standards-based SOA solutions enable organizations to build open, heterogeneous solutions that are not locked into specific vendors or platforms.

- *Business services* are implemented as *web services*. They include the business logic, business rules, and data that make up the business functionality. They can be written in any language that supports web services (Java, .NET, etc.) but they must incorporate a web service interface. SOAP messaging is the standard mechanism for communicating with a web service. This hides the details of the language that the web service is written in. SOAP messaging is an industry standard, language neutral, vendor neutral, and platform neutral.

Some industry standards recommendations, such as WS-I, mandate both SOAP and WSDL in their definition of a Web Service. There are different transport protocols such as HTTP, HTTPS, RPC, SMTP, FTP, and WebSphere MQ that can be implemented. HTTP/HTTPS and SOAP are standards that FTB has the most experience to implement. Part of the FTB IT staff have experience with Distributed Computing Environment (DCE), Distributed Component Object

Model (DCOM) and/or RMI (Remote Method Invocation), which are consider distributed object technologies. Object reuse and service orientation are fundamental concepts to these models.

6.2.1 Web Services Data Security, Best Practices, and Trends

Web services technology can be implemented in a variety of ways, which can co-exist with other technologies and can be adopted in an incremental manner without requiring major transformations to legacy applications and/or databases. Many of the features that make web services attractive, including greater accessibility of data, dynamic application-to-application connections are at odds with traditional security models and controls. The good news is that there are solutions, industry standards, and best practices that can be followed. Ensuring the security of web services will involve augmentation of traditional security mechanisms with security frameworks, which are as follows:

- **XML Encryption** - XML Encryption provides confidentiality of web service messages using. XML Encryption is a specification from the World Wide Web Consortium (W3C) and it provides a mechanism to encrypt XML documents.

- **XML Signature** - XML Signatures provide integrity of web service messages. XML Signature is a specification produced to selectively sign XML data in web service messages.

- **Web service authentication and authorization using XACML -** Security Assertion Markup Language (SAML) and XML Access Control Markup Language (XACML) provide mechanisms for authentication and authorization in a Web services environment.

- **Web Services (WS)-Security -** WS-Security is a specification, produced by OASIS. It defines a set of SOAP header extensions for end-to-end SOAP messaging security. It supports message integrity and confidentiality by allowing communicating partners to exchange signed encrypted messages in a Web services environment.

- **Security for Universal Description, Discovery and Integration (UDDI)** - UDDI allows web services to be easily located and subsequently invoked. Security for UDDI enables publishers, inquirers and subscribers to authenticate themselves and authorize the information published in the directory.

6.2.2 Best Practices for a SOA CoE

- The SOA CoE is a partner to project teams and provides a service.

- The SOA CoE must work across all of the SOA domains – business, people, program management, governance, architecture, enabling technologies, operations, and management.

- The SOA CoE is not the sole source of SOA knowledge but manages and communicates it.

- The SOA CoE must be connected to all stakeholders and bridge organizations.

- The SOA CoE must be answerable with defined goals and measures.

6.2.3 XML Gateways and XML Firewalls

A common way to secure web services is to use an XML gateway that receives requests from requesters, performs security checks against the incoming requests, and then forwards the requests to an internal web service provider. XML Gateways are network devices specially designed for XML security with a number of distinct advantages, including performance, security, and reliability. With the continued evolution of SOA, there is a trend in the industry to move functionality to the network in the form of various hardware devices: XML Gateways or XML Firewalls. As time progresses, more features are being wrapped into these products.

XML Firewalls are essentially high performance proxies, which perform security services such as authentication, authorization, auditing and XML message validation at the message level. They are used to protect backend web services from XML-based threats. A XML security firewall is typically deployed behind an existing IP firewall, and secures all XML traffic before it reaches the web service on the application server. A few years ago, many of the products on the market we labeled “XML Firewalls”; however, the popular industry term being used today is “XML Gateways”, because they are expected to do more than conventional firewalls.

The trend has been repeated in the past, as standards and technology matures additional functionality is added to products. XML Gateways are being adopted by industry and the vendors are taking feedback from the marketplace, customer demands, competitive analysis, and are beefing up XML Gateways with features. Historical trends also bear out the long-term successfulness of the simpler network device approach for network and security functions. IP routing was once done in software. Before Cisco took over with special purpose network devices in the 90’s, the industry debated the relative merits of software, appliance, and the true network device approach for load balancing and SSL acceleration, but now appliance based network devices dominate. It is likely that for XML Security Gateways, the same trend towards purpose-built network appliances will win out; driven by inherently lower cost and greater security required for SOA enabled web services.

6.2.3 Industry Standards for XML based Web Services

OASIS (Organization for the Advancement of Structured Information Standards) is a nonprofit, international consortium whose goal is to promote the adoption of product-independent standards for information formats. The goal of OASIS is not to create structured information standards for XML, but to provide a forum for discussion, to promote the adoption of interoperability standards. The W3C is another nonprofit consortium organization that makes industry recommendations on XML and Web Services standards. A recommendation is a specification that has been approved by OASIS or W3C committee members and made public. This is the highest rating a specification can receive. If a specification is recommended by the OASIS or W3C, chances are it will *become* the standard, if it is not already.

6.2.3.1 XML Web Service Specifications

UDDI 3.0,
XACML 1.0 for Role Based Access Control Policies
SOAP 1.1 with Attachments

WSDL 1.1
XML Signature 1.0
XSLT 1.0
Web Services Security: SOAP Message Security 1.0
Web Services Security: SOAP Message with Attachments (SwA) Profile 1.0
WS-I: Basic Security Profile 1.0
WS-I: Basic Profile 1.1
WS-Security
SAML 2.0
WS-Federation
Liberty Alliance
WS-Trust
XKMS (XML Key Management Specification)
Web Services Notification (WSN) v1.3
WS-Reliability (WS-R) v1.1
WS-ReliableMessaging v1.1
Web Services Resource (WSRF) v1.2
WS-SecureConversation v1.3
Web Services Transaction v1.1

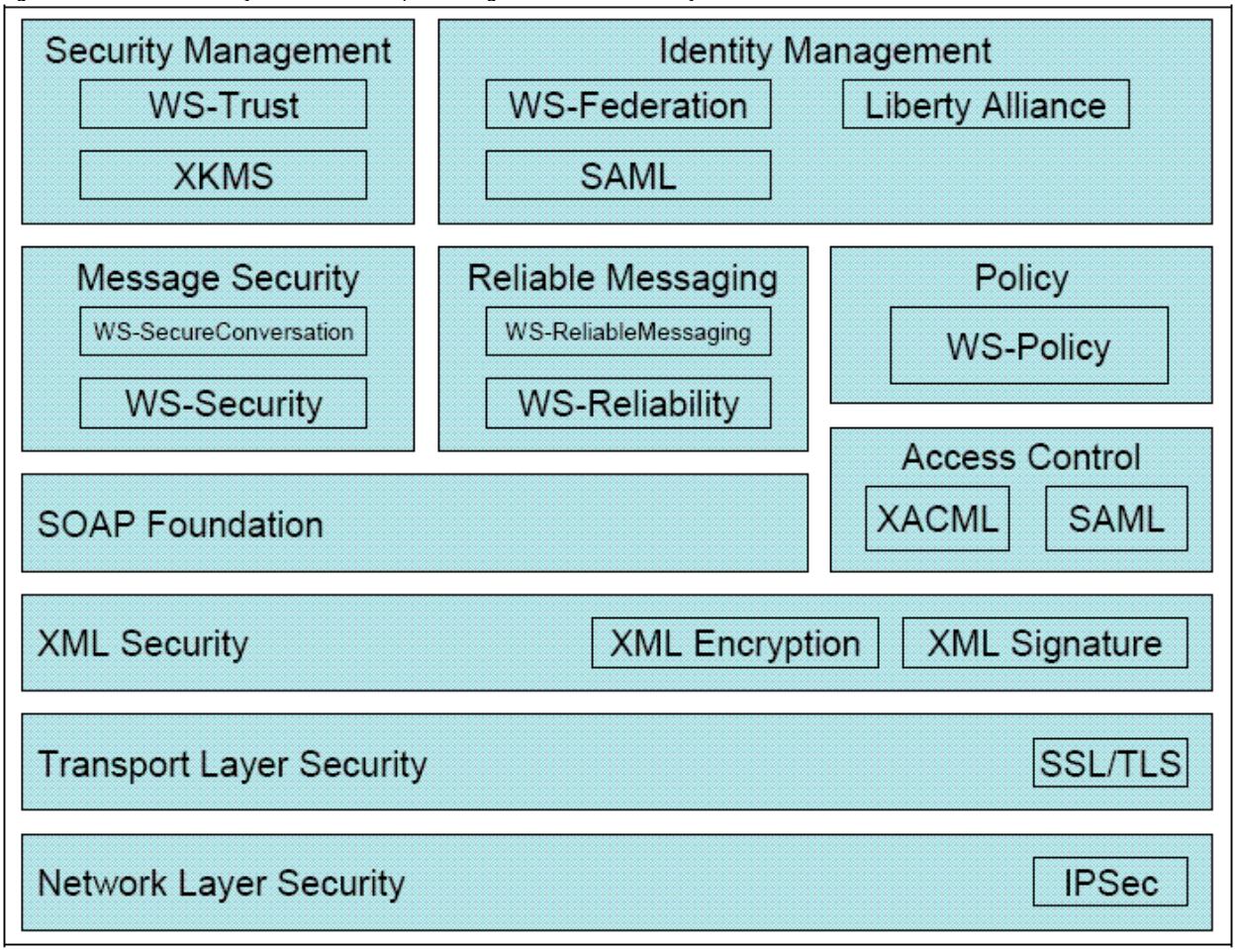
In the early implementation of web services, the specifications above did not exist. Early on there was a mix of proposed recommendations and working draft standards being developed by different vendors that may have slowed down web services adoption. However, with help of OASIS, W3C, and the large vendors such as IBM, Microsoft, BEA, and others web services interoperability and security standards have matured. In the future, it should be expected that the vendors would continue to develop system solutions that will continue to allow system to be interoperable.

6.2.4 Industry Implementation Standards for Web Services Security

The figure below illustrates current industry standards for implementing web services security. The illustration from the Federal government released the *Federal Guide to Web Services Security* (NIST 800-65) shows the building blocks and maps the different standards to the different functional layers found in typical secure web service implementations.

Each of these different implementation standards contains web services data as attributes embedded within well-formed XML protocol structures. For example, WS-Security has a specific XML schema and data attributes embedded within the XML data being passed from the web service provider to the consumer.

Figure 6.2-1: Current Industry Standards for Implementing Web Services Security



Charter

June 26, 2008

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1. Preface

1.1. Architecture Defined

Webster defines **architecture** as "***the art or science of building***". The word from Latin and originally from Greek speaks to building from a master plan. At FTB, we know the value of building with a plan. We take our art and our science seriously as we build better business processes and models, build and deliver better services, build and leverage better information and build upon and leverage the most cost effective infrastructure and technology available to us.

1.2. Endorsement and approval

This document is endorsed by: Governance Council (GC), Chief Information Officer (CIO), Internal Business Action Committee (IBAC) and Technology Action Committee (TAC). It was approved by GC on June 5, 2008.

1.3. History

In March 2007, the Enterprise Architecture (EA) Section and the Tax Systems Modernization effort (TSM) undertook the challenge of improving the IT systems that provide direct benefit to the citizens of California. The EA Section and TSM created the Franchise Tax Board (FTB) Enterprise Architecture Future State Model, which provides a documented target for FTB's Enterprise Architecture.

At the same time, CISCO performed a functional assessment of FTB's IT. The resulting report was a point-in-time assessment of FTB's organization and processes that revealed improvement opportunities required to effectively support the growing demands on the enterprise. Among other things the assessment offered these two key recommendations: Strengthen FTB's Enterprise Architecture efforts and create a culture where FTB Standards, Templates and Checklists are valued.

In response to these factors and other factors, FTB's Governance made expanding and evolving EA's role at FTB a 2008 Key initiative. FTB's CIO and Chief Architect, with the support of TAC members, developed the Enterprise Architecture Council (EAC). Through the EAC, FTB looks to achieve significant, measurable improvement in EA Maturity, IT agility, and business value.

1.4. Intent

This document describes the Enterprise Architecture Council (EAC) and its scope, objectives, and role in Governance at FTB. Additionally, key relationships, models, and processes are described that support and further clarify the Enterprise Architecture Council.

1.5. Adoption, Maintenance, and Expiration

Under the authority of the GC and the CIO, the EAC Charter was adopted by the TAC and IBAC.

It is reviewed annually to incorporate new or changed roles or relationship, and to realign with changing business priorities. Amendments to the EAC Charter that

occur mid-cycle can be proposed by the EAC, TAC, IBAC or the CIO and must be approved by the TAC and IBAC. When approved, TAC issues an EAC Charter amendment bulletin. Amendments are incorporated into the EAC Charter at the next revision cycle.

This charter is not designed with an expiration date. A joint vote of TAC, IBAC and GC is required to conclude this Charter.

2. Enterprise Architecture Council

2.1. Mission

The EAC:
***M*aximizes** enterprise IT benefits for our department,
***A*dvances** enterprise architecture, and
***P*romotes** enterprise thinking.

2.2. Description

Above and beyond the deliverables, the EAC makes decisions and conducts processes that translate business vision and strategy into effective enterprise change opportunities. The EAC is a key member of FTB's governance structure and is responsible for developing/refining: enterprise architecture maturity, architecture assurance, and enterprise architecture deliverables. The EAC is business driven, IT aware, and architecture focused. EAC collaborates with project development and operations personnel to create the most cost effective service delivery architectural model possible for FTB.

2.3. Membership

The EAC is lead by FTB's Chief Architect, who is supported by administrative staff as well as other senior architects for the purpose of serving the enterprise at all levels. The initial architects include but are not limited to:

- Senior Enterprise Architect
- Business Solutions Architect
- Services Solution Architect
- Data Solutions Architect
- Application Solutions Architect
- Project Architect
- Communications

2.4. Organization

The EAC is organized in several layers and roles. The Chief Architect casts the vision for the EAC and guides and directs the organization through it various processes. Additionally, the Chief Architect also carries reporting responsibilities to FTB CIO, and collaboration responsibilities with California Enterprise Architecture Program (CEAP). A Senior Enterprise Architect leads and facilitates the organization through the defined processes. The Solutions Architects (SA)

direct the day to day activities for enterprise architecture organization. In addition to the daily activities, the SA chairs one of the particular Centers of Excellence. In an expanding EA Council or with the creation of a new Center of Excellence may be chaired by another FTB Architect. Finally, the organization has one project architect who stays in continuous contact with architects and/or engineers assigned to project efforts. (See Figure 2.4-1: EA Council Organizational model)

Figure 2.4-1: EA Council Organizational model

	Enterprise Architecture Council Chief Architect						
	Senior Enterprise Architect						
	Operations Center	**Architecture Compliance**	**Data Center of Excellence**	**BPM Center of Excellence**	**SOA Center of Excellence**	**Tools Center of Excellence**	Communications Center
Staff	Operations Lead Admin	Project SolutionArchitect Asst Proj Arch	Data Solution Architect Asst Data Arch	Business Solution Architect Asst Busi Arch	Service Solution Architect Asst Serv Arch	Technology Solution Architect Asst Tech Arch	Communications Lead Communication Assistant
Responsibility	Process, Records, Governance support	Support any active project efforts	Key areas: Delivery Management Analytics Content	Key areas: BI 2.0 Process Workflow Modeling	Key areas: Service Standards Security Delivery	Key areas: Software Network Storage Platforms	Develops, implements and conducts the EAC communication plan
Support	EAC supports: GC TAC IBAC	EAC supports: Federated Architects assigned to specific projects	Domain Architect Data Delivery Business Intel Data Mngmt SME Business Operations Development Support/ITIL	Domain Architect Modeling Process Business SME Business Operations Development Support/ITIL	Domain Architect Security SOA Data Services SME Business Operations Development Support/ITIL	Domain Architect Network Server Storage SME Business Operations Development Support/ITIL	Planning

2.5. Responsibilities

In addition to the responsibilities with their discipline expertise, all architecture roles above have these basic roles:

- ✓ Support FTB's IT vision, goals, strategies, and principles.
- ✓ Define architecture Target, goals, and strategies.
- ✓ Conduct architecture assurance process.
- ✓ Communicate architecture to executives, directors, project members, development staff, and operations personnel.
- ✓ Provide architecture guidance for all development efforts through defined processes.

2.6. Deliverables

EAC is accountable / responsible to deliver:

1. Strategy documentation such as principles, vision, policies, standards and road maps in alignment with FTB Strategic Plans and key initiatives
2. Specifications and patterns for projects which support estimates and expectations during Project Life Cycle (PLC)
3. Annual EA maturity and effectiveness assessments
4. Training program for EA processes and compliance requirements
5. Annual EA refresh, assessments and migration plans

Other detailed deliverables may include:

Figure 2.6-1: EA Deliverables

Name	Contents
IT Strategic Plan	• Enterprise Technology Vision and Roadmap • Relationship of ETV to Strategic Business Vision • Environment trends • IT goals • Current state architecture(as is) • Work plan
Conceptual Architecture	• Conceptual architecture principles • Domain architecture principles • Standards and guidelines
Future-State Architecture Models	• Business process models • Information models • Infrastructure patterns, services and standards • Solution Patterns
Current-State Architecture Models	• Business process – As-is models • Information – As-is models • Technology – Current infrastructure • Solutions installed base (Applications)
Gap Analysis	• Business process change requirements • Information change requirements • Technology change requirements • Solution change requirements
Migration Strategy	• High-level project definitions • High-level migration plan
EA Assurance Reports	• EA compliance assurance reviews and findings

2.7. Authority

The EAC is delegated the following authority:

- ✓ To determine architectural vision and direction for FTB
- ✓ To request staff participation in EA process and Centers of Excellence
- ✓ To assess, report, govern the enterprise architecture compliance of all project efforts for FTB.

EAC Authority is subject to the governance structure within which it is set.

2.8. Span of Organization

The EAC is applicable throughout FTB where ever business processes or technology deliver services to or for FTB. This is including, but not limited to: All

Tax Systems areas; The systems of work: Return Filing, Return Validation, Filing Enforcement Processing, Audit, Payment Processing, Overpayment, and Underpayment (tax and non-tax); Both development and operations organizations; HR; Legal; and Admin.

3. Scope

Scope is determined along four dimensions: the span of the enterprise; the breadth of the EA; the depth of analysis in modeling; and the planning horizon to the target state. These dimensions apply to all systems of work (figure 2.2-1) at FTB

3.1. Breadth of Enterprise Architecture

The EA scope spans the following architectural areas:

- *Business Architecture* – defining and redefining end to end business processes
- *Service Architecture* – defining and redefining internal and external service delivery.
- *Data Architecture* – defining and redefining FTB Information
- *Technology Architecture.* – defining and redefining technology infrastructure

(See Figure 2.4-1: EA Council Organizational model)

These areas are supported through a Center of Excellence facilitated by EAC solutions architects. Each area consists of further detailed architectures such as networks, security, modeling, and process and serve the entire enterprise.

3.2. Depth of analysis in models

Architectural framework and the models that provide detailed definition determine EAC depth. Depth is achieved through time by maturity processes. The models include:

- High-level business process models
- Logical information models and integration strategies.
- Detailed technology model for all technical components, services, infrastructure patterns, and standard deployment models.
- Solution views that link high-level business processes, information and technology components for all new solutions or system modernizations.

EAC Target models do not include pre-existing development, operation processes or models, but are tightly coupled at any point of change.

3.3. Planning Horizon

Based on the planning horizon for FTB's Strategic Plan, the planning horizon for the future-state EA is three to five years. EAC additionally maintains strategies for an additional five years based on industry trends.

3.4. Out of Scope

EAC does not include any development or operation efforts. EAC considers itself a customer of services as a means to accomplishing EAC activities. EAC is not responsible for FTB Strategic Plan or System of work strategic plans. EAC does not perform project oversight, guidance or assurance.

4. Objectives and Metrics

Enterprise architecture objectives and metrics reflect both the quality of the architecture content and the quality of the process producing it. The metrics demonstrate the value and impact of the EA, as well as the EAC's commitment to improve the development and delivery of the business value and service. These objectives and metrics are described in the three dimensions below. These are sample metrics and reflect the department's current technology maturity. Other metrics will apply during other stages of maturity.

4.1. Organizational Coverage

Objective: EAC is committed to influencing and aligning the entire organization with approved processes and standards.

The most important issue for EA effectiveness is the degree to which the architecture affects the enterprise as a whole. Consequently, the first key metric of EA effectiveness is the degree to which the architecture effort covers all organizations and all aspects of IT deployed across the enterprise.

Table 1. Organizational Coverage Metrics

Objective	Metric	Reporting Cycle	Information Required	Process to Collect/Report
90% by YE08 area governance 100% going forward	Application areas governed by EA	Quarterly	Total # of Application units and # of business units exempted from EA governance	Collected from EA artifacts. Responsibility of EAC to report to TAC quarterly
90% project governance by 3Q08	% of projects governed by EA	Quarterly	Total # of projects and # of projects exempted from EA governance	Collected by collaboration with POG. Responsibility of EA to report to TAC quarterly
60% EA-aware project staff by 4Q08 80% by 4Q09	% of key project staff (designers and managers) who have received EA training	Quarterly	Total # of key project staff and # of key project staff trained in EA	Collected in collaboration with POG and EAC Project Architect. Responsibility of EAC to provide training and to report to TAC

4.2. Process Performance

Objective: EAC is committed to rapid, yet quality improvement of architecture on an annual basis.

Process performance addresses architecture development and maturation rate. Cycle times and the quality of the underlying process are measured by completing EA processes annually.

Table 2. Process Performance Metrics

Objective	Metric	Reporting Cycle	Information Required	Process to Collect/Report
Complete EA refresh annually	% completion or refresh of Enterprise Architecture	Annually	# of required EA artifacts and # of artifacts completed or refreshed	Collected through EAC BPM tools. Responsibility of EAC to prepare for presentation to the TAC

4.3. Content Utility

Objective: EAC is committed to architectural artifacts and components that completely meet FTB's needs.
Ultimately, the effectiveness of the architected environment is reflected in an overall sustained and sustainable decrease in the time to deliver business functionality to end users at the least total cost of ownership. Additionally, a reduction of the number of systems approved with exceptions to the EA artifacts and components reveals content effectiveness.

Table 3. Content Utility Metrics

Objective	Metric	Reporting Cycle	Information Required	Process to Collect/Report
90% approval, 6% exemption, 4% denied for total projects by YE08	% of projects approved without EA exemption granted	Annually	# of projects and # of EA/TAC/IBAC approved exemptions	Collected in collaboration with POG and Governance partners. Responsibility of EAC to prepare for presentation to the GC
15% reduction in duration and resources by YE09	Total design time for initial project definition: alternatives and requirements	Annually	Actual project timelines and reporting during FSR and RFP steps. Annual comparison	Collect collaboratively with POG/ Project teams and PMO. Responsibility of the CPO to report to the EAC/TAC/GC
25% ETA reduction by YE08	% reduction supported technology products during the calendar year, # of products in retirement	Annually	# of supported products year start, # of supported products year end	Collected collaboratively with ITIL and EASY Responsibility of the EAC to collect and report to the TAC/IBAC

5. Governance

5.1. Applicability

The EAC governs processes, technology, information and solutions within all areas of FTB through principles, standards, initiatives, and goals.

5.2. Retroactivity

The EAC does not retroactively apply governance to existing technologies, information, solutions and business processes, except when specifically identified for modernization or retirement.

5.3. Principals

EAC's actions and decisions are based on its guiding principals. (See "FTB EA Guiding Principles")

5.4. Structure and Authority

The EAC is a key member of FTB's governance structure (see Figure 5.4-1: Governance Model). The EA Governance authority is delegated from GC, to TAC and IBAC, to EAC. . EAC supports the overall governance of FTB.

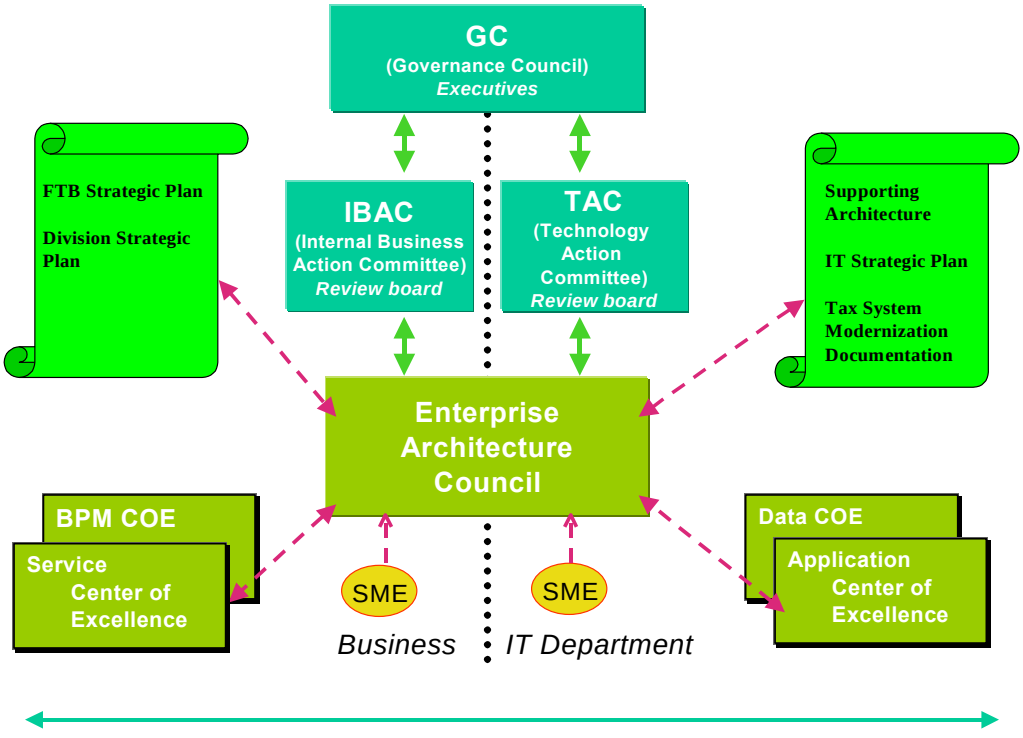
All project/development efforts are required to participate in EA processes and to pass key architecture assurance checkpoint in the PLC.

In cases where the EAC, Project Manager, or architect (technical lead) identify an architectural variance on a project, the EAC or Chief Architect has the authority to refer the project back through the architecture assurance phase of the PLC. During the project development steps the Project architect and project manager accomplish EA compliance responsibilities.

The EAC has authority to determine if a project must go through architecture assurance identified by the EAC. If, in the opinion of the EAC, the project is a low architectural risk, the EAC may conditionally exempt the project from the architecture assurance process. If risk or conditions change, project is reassessed.

6. Roles and Responsibilities

Figure 5.4-1: Governance Model



6.1. Governance Council

Description
As the top-level decision-making authority in the organization, the GC has primary decision authority over all aspects of FTB governance including enterprise architecture.

Governance relationship
The authority for day-to-day architecture decisions is delegated to EAC and the Chief Architect. GC delivers the FTB Strategic plan that is a key driver of the EAC efforts. Additionally, GC acts as an appeal board for EA decisions that are not resolved in EAC or the TAC/IBAC appeal steps.

6.2. Technology Action Committee

Description
The TAC is a cross-functional action committee, co-chaired by a Technology Services Division (TSD) bureau director (BD). GC has delegated authority to TAC to facilitate day-to-day technology services decisions.

Governance relationship
The TAC acts as a resource to the GC in an advisory capacity as required. TAC supports EAC as an appeal board for any Architecture improvements or exceptions as they are applied to solution delivery in the Technology Services Division.

6.3. Internal Business Action Committee

Description
The Internal Business Action Committee (IBAC) addresses enterprise-wide policies and practices affecting the internal business systems, processes and programs. The IBAC considers issues and proposals that involve or impact internal business systems and practices where efficiencies, quality, or infrastructure can be improved by consolidation, process reengineering, collaboration, and information resource sharing among bureaus and divisions.

Governance relationship
The IBAC acts as a resource to the GC in an advisory capacity as required. IBAC supports EAC as an appeal board for any business process reengineering (architectural) improvements or business responsibility exceptions as applied to key projects and programs.

6.4. Center of Excellence

Description
The Centers of Excellence (CoE) are architecture think tanks for best practice and trend discovery in specific architecture areas. While there can be many CoE within and organization, EAC choose to start with four key architectural groupings. Two CoE are business focused: Process Center of Excellence and Service Center of Excellence. Two CoE are technology focused: Tools Center of Excellence, Data Center of Excellence.

Membership
The CoE membership consists of domain architects (for definition see figure xx) from around the department. The domain architects are recommended by their Bureau Director and selected by EAC solutions architects. Membership is annual and renewable upon EAC and BD approval.

Governance relationship
The CoE provides specific architecture guidance for the specific solution expertise. The CoE provides definition for the overall EA framework and participates in EA processes quarterly. Additionally, the CoE may be needed as expert testimony for EAC decisions.

Responsibilities
1) Participate in EA processes that refine and improve FTB service delivery through architecture development.
2) Prepare and submit EA deliverables to the EAC assigned to specific solutions.

Membership
- Solution Architect (Chair)
- Business and domain architects
- Project, development and operations representatives
- ITIL or support representatives

Figure 6.4-1: Solution Architect vs. Domain Architect definitions

Solution Architect (SA)	Domain Architect (DA)
Broad understanding of technologies spanning all Technology Domains (TD)	In depth understanding of all technologies within their Technology Domain (TD)
Facilitates/drives CoE for alignment of solution architecture and business opportunities	Recommends “best” technology fit from several similar technologies for a given solution architecture
Build Business relationships and partnership with client to maintain relevance to client organizations	Assist in identifying the appropriate SMEs from the TD to participate in developing foundation and solution architecture
Responsible for evolving architecture principles and solution patterns	Alignment with other TDs
Defines solution architecture using the TDs for specific client requirements	Participate in the development of any foundation or solution architecture
Participate in the development of the technology roadmaps with DAs	Look for consolidation opportunities within their TDs
Continually evaluates technology effectiveness/data interoperability	Continually evaluates technology effectiveness/data interoperability
Presents technical requirements to vendor partners	Manages issue resolution with vendors on technology quality and functionality

6.5. Project Development Organization (FTB Operation model Column 2 – development)

The project development organization conducts all development efforts for FTB. (organizational details not available at the time of this charters creation).

The EAC conducts applicable EA processes to all projects prior to their approval. All approved projects governed by Chief Project Officer (or Project Development Office) are aligned with business and technical architectures. CPO assures architectural compliance for all development. If necessary, CPO requests possible development exemptions or architectural changes based on the Architecture Assurance process. EAC provides a project architect as a consultant on all development efforts, who supports the assigned architect (or technical lead) for any given effort. Project Development also supports EAC by providing members to CoE.

6.6. Operations Management Organization (FTB Operation model Column 3 – operations)

The operations management organization conducts all production and operations activities including support, incident resolution, and program operations. (operations details not available at the time of this charters creation).

The EAC relies on operations for EA performance reports and CoE participation.

6.7. Technology Procurement

Procurement governs and provides coordination for all technology procurements at FTB. The EAC provides the procurement staff with a regularly updated list of approved technology products (through a BPM tool). The procurement department regulates purchase to only those technologies Departmentally approved, as recorded by the EAC. When the procurement department receives a purchase requisition for unapproved technology, the purchase request is routed to EAC for review and approval prior to purchase.

Figure 6.7-1: RACI Matrix

Activity	Chief Information Officer (CIO)	Chief Architect	Enterprise Architecture Council (EAC)	Center of Excellence	Governance Council (GC)	Technology Advisory Committee (TAC)	Internal Business Action Committee	Project Oversight and Guidance	Project Development Organization	Operations Management Organization
Refresh Deliverables										
Enterprise Architecture Council Charter	**A**	**A**	**A**	**R**	**I**	**A**	**A**	**I**	**I**	**I**
Enterprise Architecture Principles	**A**	**A**	**R**	**I**	**I**	**A**	**I**	**I**	**I**	**I**
Enterprise Technology Vision	**A**	**A**	**R**	**R**	**I**	**A**	**A**	**I**	**I**	**I**

Activity	Chief Information Officer (CIO)	Chief Architect	Enterprise Architecture Council (EAC)	Center of Excellence	Governance Council (GC)	Technology Advisory Committee (TAC)	Internal Business Action Committee	Project Oversight and Guidance	Project Development Organization	Operations Management Organization
Information Technology Strategic Plan	**A**	**A**	**R**	**C**	**A**	**A**	**A**	**I**	**I**	**I**
Enterprise Architecture Framework	**A**	**A**	**C**	**R**	**I**	**I**	**I**	**I**	**I**	**I**
Enterprise Architecture Models and Standards	**A**	**A**	**R**	**I**	**I**	**I**	**I**	**I**	**I**	**I**
Project Life Cycle										
Refresh Process	**C**	**A**	**R**	**C**	**A**	**A**	**A**	**I**	**I**	**I**
Approval Process	**I**	**A**	**R**	**C**	**A**	**A**	**A**	**I**	**I**	**I**
Assurance Process	**C**	**A**	**R**	**C**	**A**	**A**	**A**	**I**	**I**	**I**

- **R**esponsible - This position is responsible that work is done (they are "doers").
- **A**ccountable - position with responsibility and approval authority for a task or action
- **C**onsulted - person(s) who has to be consulted about task or action and who need to provide an input. They are "kept in the loop" by two-way communication.
- **I**nformed - person(s) who need to be informed about the task or action. They are "kept in the picture" by one-way communication.

7. Process

7.1. Architecture Refresh Process

The Chief Architect is accountable for annual refresh of the EA. The creation and refinement of the EA is carried out by the EAC, with the support and contributions of industry analysts and subject matter experts in the CoE. The EA is updated on an annual basis to: 1) incorporate amendments; 2) incorporate new technical standards, patterns and services, information, solutions, and business processes; and 3) to evolve the future-state models and roadmaps to reflect accomplishments and business strategy. The architecture creation/revision process is a structured process established by the EAC and approved by the Chief Architect.

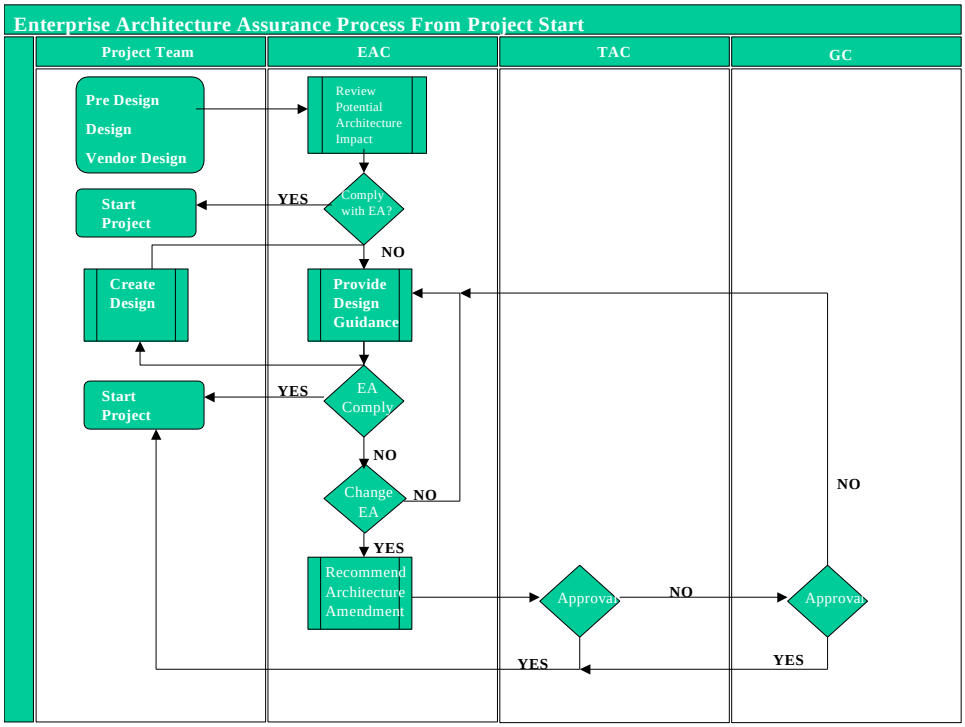
7.2. Architecture Approval Process

At the completion of the annual revision cycle, the updated EA is submitted to the TAC/IBAC/GC for approval and adoption.

7.3. Architecture Assurance Process

All changes to business processes, information, technology and solutions are subject to architecture assurance. The intent of the architecture assurance process is to ensure that development of projects or changes to a project are compliant with the EA. The architecture assurance process facilitates the review of variances that are discovered during the PLC. The objective of the process is to help projects with certifications of EA compliance and/or waivers for authorized exceptions. In the case of an exception, the TAC may issue a waiver to approve the exception, or alternatively, it may deny the exception.

Figure 7.3-1: EA Project Life Cycle Governance

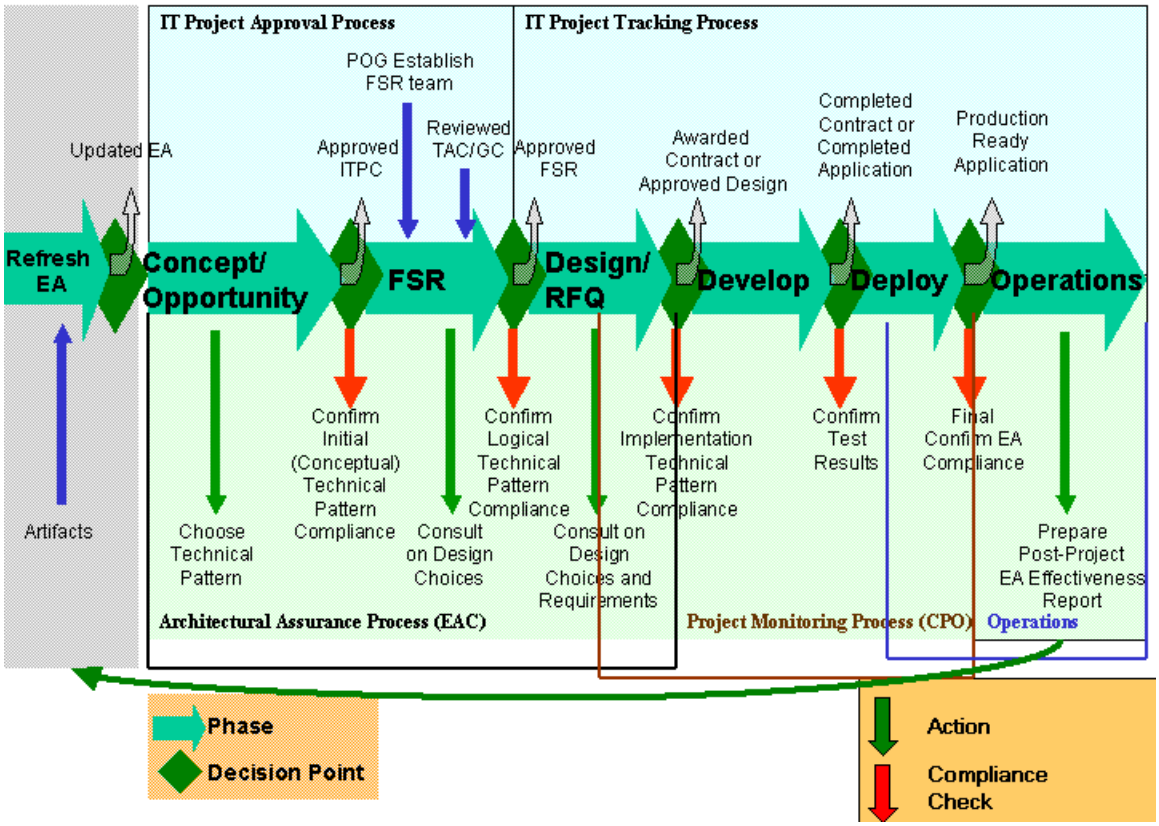


7.4. Architecture Assurance Appeals Process

In the event that a petition by a project sponsor for an exception to the EA is denied by the TAC, the project sponsor may opt to appeal that decision to the GC, which has the authority to overrule the TAC.

7.5. Project Life Cycle Processes

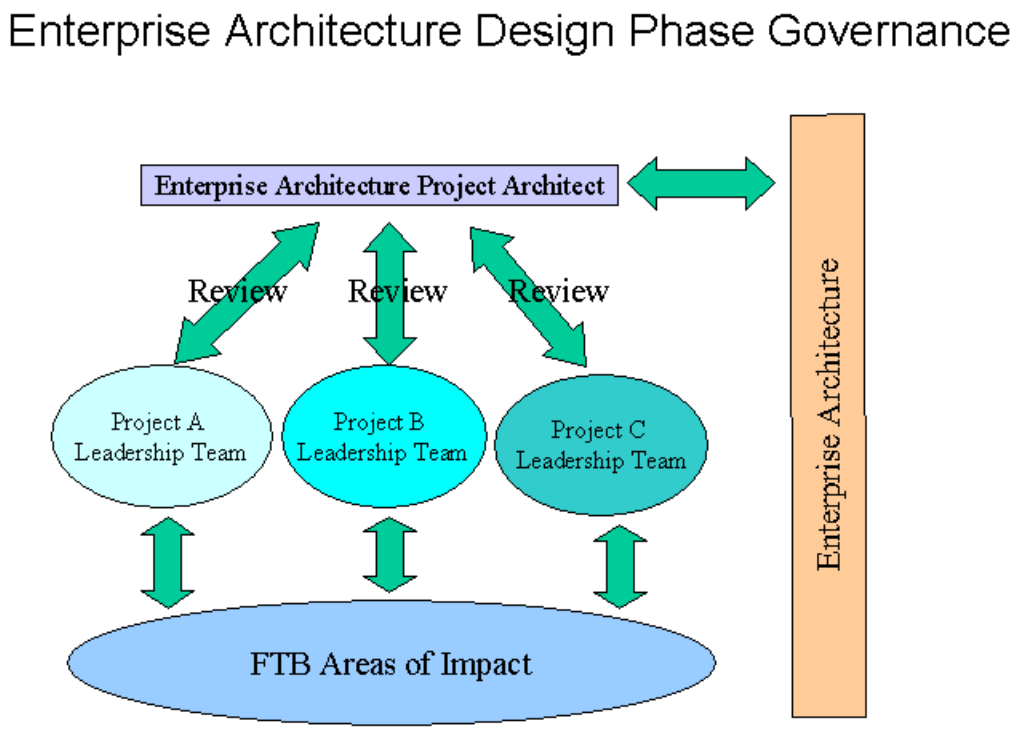
Figure 7.5-1: Project Lifecycle



Project Concept/Opportunity Phase: Each Concept presented is assessed by EAC to determine the architecture impact. EA informs TAC of FTB's approved technical patterns, principles and architectural benefits. The EAC informs TAC of a similar effort or similar functionality all ready present in the enterprise if applicable. EAC supports the ITPC process by providing assessment results based on FTB's Business and IT Strategic Plans.

FSR Phase: The EAC informs the project team(s) of the key interaction points for architecture review and confirm the initial conceptual technical pattern outlined in the Project Concept phase as determined by POG swim lanes. The EAC consults with the project team on high level design and alternative choices providing common language and recommended patterns for proposed alternatives.

Design/RFQ: On approval of an FSR, EAC's Project Architect regularly with the project manager and/or architect (technical lead) assigned to the project. The project architect supports the project by providing common language, design patterns and requirements that ensure EA compliance.



Projects with a significant architecture impact (risk) receive ongoing design guidance from the EAC. This ensures the project is compliant with EA.

Projects with a midlevel architecture impact may request guidance on request, though a formal architecture review is required through the regular architecture assurance process.

Projects with a low-risk architecture impact will go through a formal architecture review. EA may waive some of the review steps if it determines that the project is clearly within EA compliance.

8. Communication

Communication is one of the main activities and objectives of EAC. EAC uses all effective and efficient communication tools available to communicate enterprise vision and direction. All approved EA documentation resides on FTBNet and is accessible by to FTB employees.

The EAC presents current EA or project issues to the TAC and IBAC at the regular meeting.

The EAC presents achievements against performance objectives on a quarterly basis to the IBAC, TAC and GC.
The Chief Architect presents highlights of the annual EA revisions to the GC at the end of the revision cycle.

Business, service, technology and information architectural changes, advancement and decision are communicated at TSD Forums, town halls, and bureau meetings.

IT Project Status Report (PSR)

Project Title:
Acronym:
FTB FSR No.: **DOF Project No.**:

Report Period: **From** **To**

Latest Approval Authority: ☐FSR ☐PCR ☐SPR ☐Previously Approved Effort
Latest Approval Date: Original FSR Approval Date:

Status: Will the next milestone be met? ☐Yes ☐No
If the next milestone will not be met, provide detail in the Current Status Summary Section.

Progress: ☐On Schedule ☐Ahead of Schedule ☐Behind Schedule ☐Canceled ☐On Hold ☐Closeout

Scope: Has there been a change in scope? ☐Yes ☐No
If yes, detail the scope change and its impact to the project's schedule and budget in the Current Status Summary Section.

Budget: ☐Within Approved Budget ☐Over Budget

Project Summary	
Approved One-time Cost:	Approved Annual Continuing Cost:
Approved Start Date:	Approved Implementation Date:

Contact Information			
Role:	Name:	Telephone No.:	E-mail:
Report Prepared By		-	
Project Manager		-	
Project Sponsor		-	
Executive Sponsor			
POG Analyst		-	
POG Controller		-	
Procurement Analyst		-	

Schedule Status - include the milestones and deliverables identified in the latest approved schedule in the FSR, PCR, or SPR					
Milestone and Deliverable	Approved Start Date	Actual Start Date	Approved Completion Date	Actual Completion Date	Percent Complete
					%
					%
					%
					%
					%
					%
					%
					%
					%
					%
					%
					%

					%

Project Expenditures Status – Approved Costs are based upon the latest approved FSR, PCR, or SPR EAWs			
FY /	Approved	Actual	% of Budget Spent
One-Time IT Project Costs			**!Zero Divide**
Continuing IT Project Costs			**!Zero Divide**
Total	$ 0	$ 0	**!Zero Divide**

FY /	Approved	Actual	% of Budget Spent
One-Time IT Project Costs			**!Zero Divide**
Continuing IT Project Costs			**!Zero Divide**
Total	$ 0	$ 0	**!Zero Divide**

FY /	Approved	Actual	% of Budget Spent
One-Time IT Project Costs			**!Zero Divide**
Continuing IT Project Costs			**!Zero Divide**
Total	$ 0	$ 0	**!Zero Divide**

Total Project (/ , / , /)	**Approved**	**Actual**	**% of Budget Spent**
One-Time IT Project Costs	**$ 0**	**$ 0**	!Zero Divide
Continuing IT Project Costs	**$ 0**	**$ 0**	!Zero Divide
Total	**$ 0**	**$ 0**	!Zero Divide

Purchase Order/Contract Expenditure Status - based on latest approved FSR, PCR, or SPR						
PO No.	Purchase Description	Vendor	Amount	Total $ to Date	Contract Balance	PO Term Date
						Start
						Finish
						Start
						Finish
						Start
						Finish

Current Status Summary: include progress toward milestones; scope, schedule or budget changes; staffing changes; resolution of major issues

Risk Management Status
Reportable Projects: Refer to Independent Project Oversight Report (IPOR) last approved on . **Delegated Projects:** Have the project's risks been reviewed and updated during this reporting period? Yes ☐ No ☐ During this reporting period: 1) List the occurrence of any risks (new or listed in the FSR) and the corresponding date of the occurrence in the date occurred field 2) List any mitigating or contingency actions taken to any risks (new or listed in FSR) in the comments field and the corresponding date of the mitigating or contingency actions taken in the comments field

3) List the closing of any risks (new or listed in the FSR) in the comments field and the corresponding date of the closure in the date closed field
4) Remove any risks that were closed in the prior reporting period

Risk	Comments	Date Occurred	Date Closed

Template Revised 8/26/05

Project Oversight and Guidance
Cost Estimating and Tracking Guidelines

One-time IT Project Cost

Definition: The initial cost required to implement the project. This includes both staff effort and equipment (OEE).

Included:	**Not Included:**
▪ Hardware, software, contract services, vendor training, travel or any other non-staff costs that are needed to implement the project (i.e. wiring, facility alterations) ▪ Staff hours required to perform one-time activities related to: ○ Meetings to discuss **requirements** that are implemented ○ Project management of the IT project ○ Procurement services ○ Implementation Activities ○ System design, development and analysis, requirements writing, test conditions writing, automated survey design and build ○ System planning and design ○ Coding/Conversion ○ Testing (load, system, user or security) ○ Installation/Configuration of hardware ○ Acquisition of hardware/software ○ Staff Training ○ If internal oversight is required, POG oversight activities	▪ Non-project team meetings that report all unit activities (i.e. Bureau/Section/Unit all staff meetings) ▪ Project management of environmental issues, existing system issues ▪ Non-IT activities like handling phone/correspondence (these are included in continuing existing program costs) ▪ Steering Committee/Sponsor meetings and prep time ▪ Research time that is not directly related to the project

Continuing IT Project Cost

Definition: The cost of ongoing system maintenance and operations functions, including staff.

Included:	**Not Included:**
▪ Staff hours needed to perform ongoing or maintenance activities related to: ○ Annual Maintenance ○ Database Administration ○ Application Support ○ Internet/browser support ○ IT help desk support ○ Computer operations ▪ Hardware Maintenance/Leases ▪ Software Maintenance/Leases ▪ Telecommunications	▪ Anything prior to implementation ▪ Meetings to discuss ideas and release packages that are never pursued ▪ Research Time that is not directly related to the project

Continuing Existing IT Costs

Definition: The costs of operating the existing IT system until it is replaced in whole or in part by the new IT system

Included:	**Not Included:**
▪ Staff hours needed to perform system and support activities related to existing system ▪ Annual maintenance (hardware/software/telecommunications) being paid for the existing system	▪ Any cost associated with ongoing maintenance of the proposed alternative. ▪ Any cost associated with program (business) area

Continuing Existing Program Costs

Definition: Cost of program or business staff that will be directly affected by this project

Included:	**Not Included:**
▪ Non-IT Staff (Program) hours that will be directly affected by this project (i.e. increase in a workload, decrease of a workload due to the project ▪ Additional Postage, Printing, Envelopes, Mega Com Costs ▪ Marketing Efforts	▪ See definition above

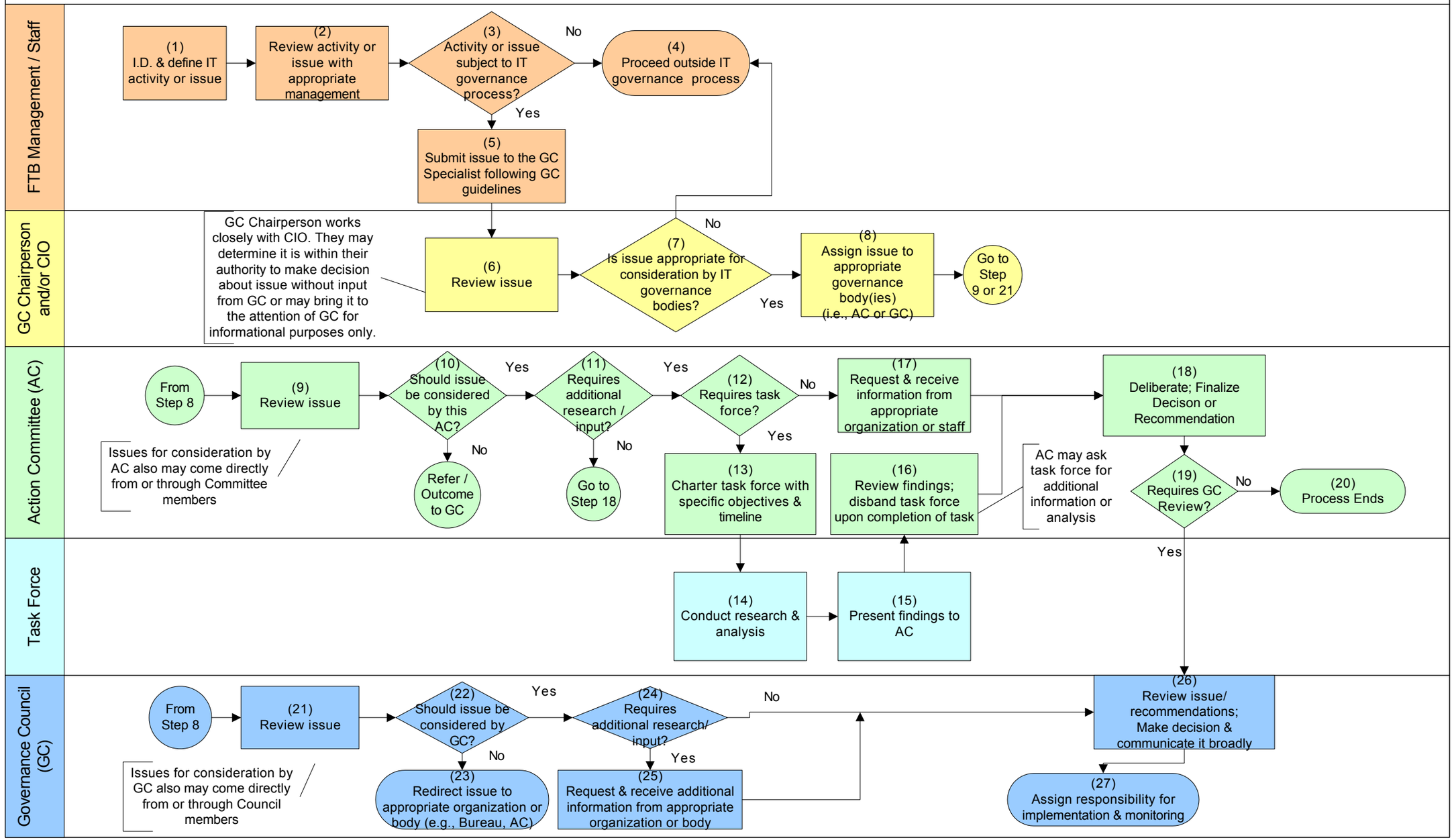
For questions, contact POG Controllers at <u>POG.IT Project Controllers</u> or:

Chrissy Casale – 845-4116

Shari Shintaku – 845-5722

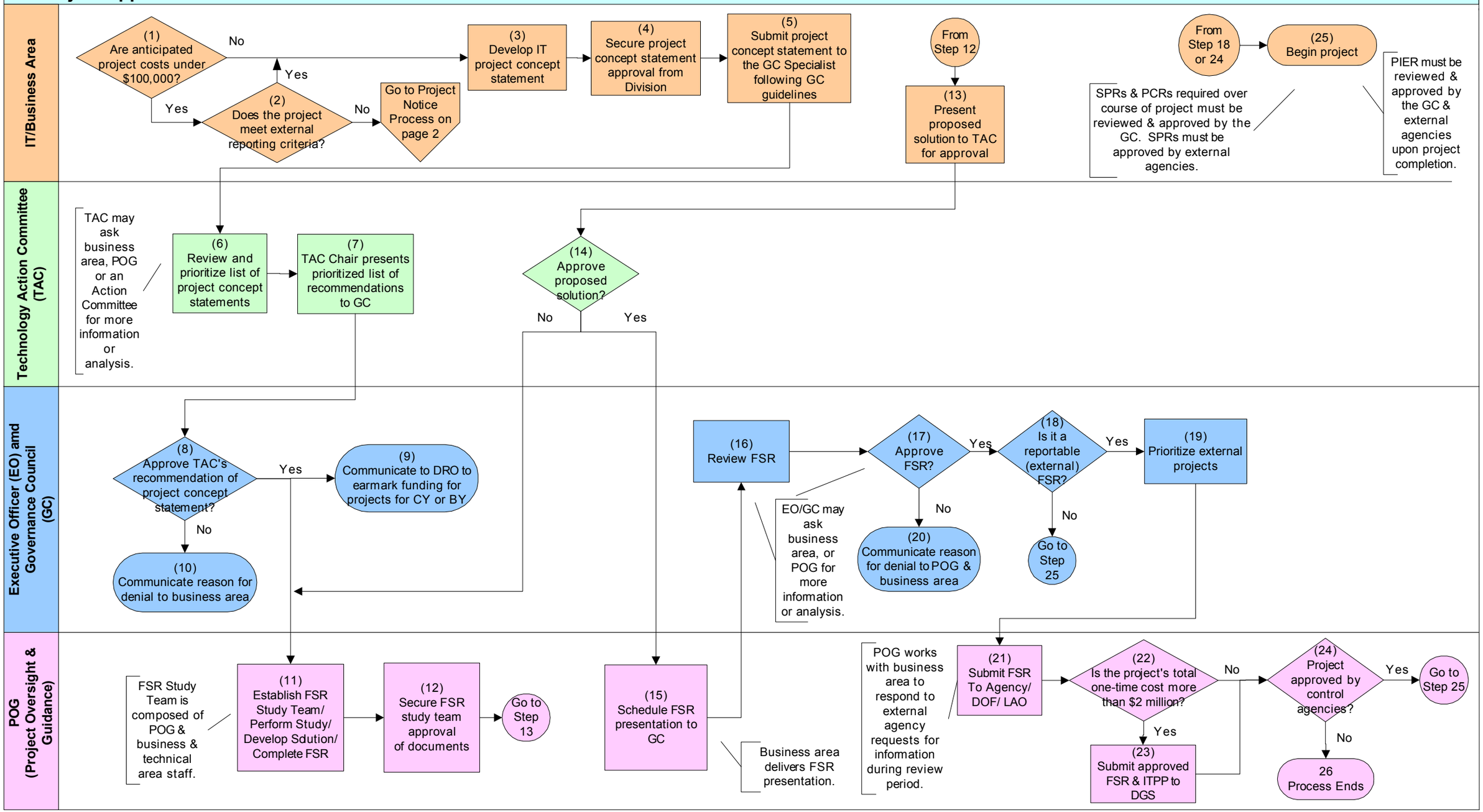
FTB IT Governance Process

Revised October, 2006



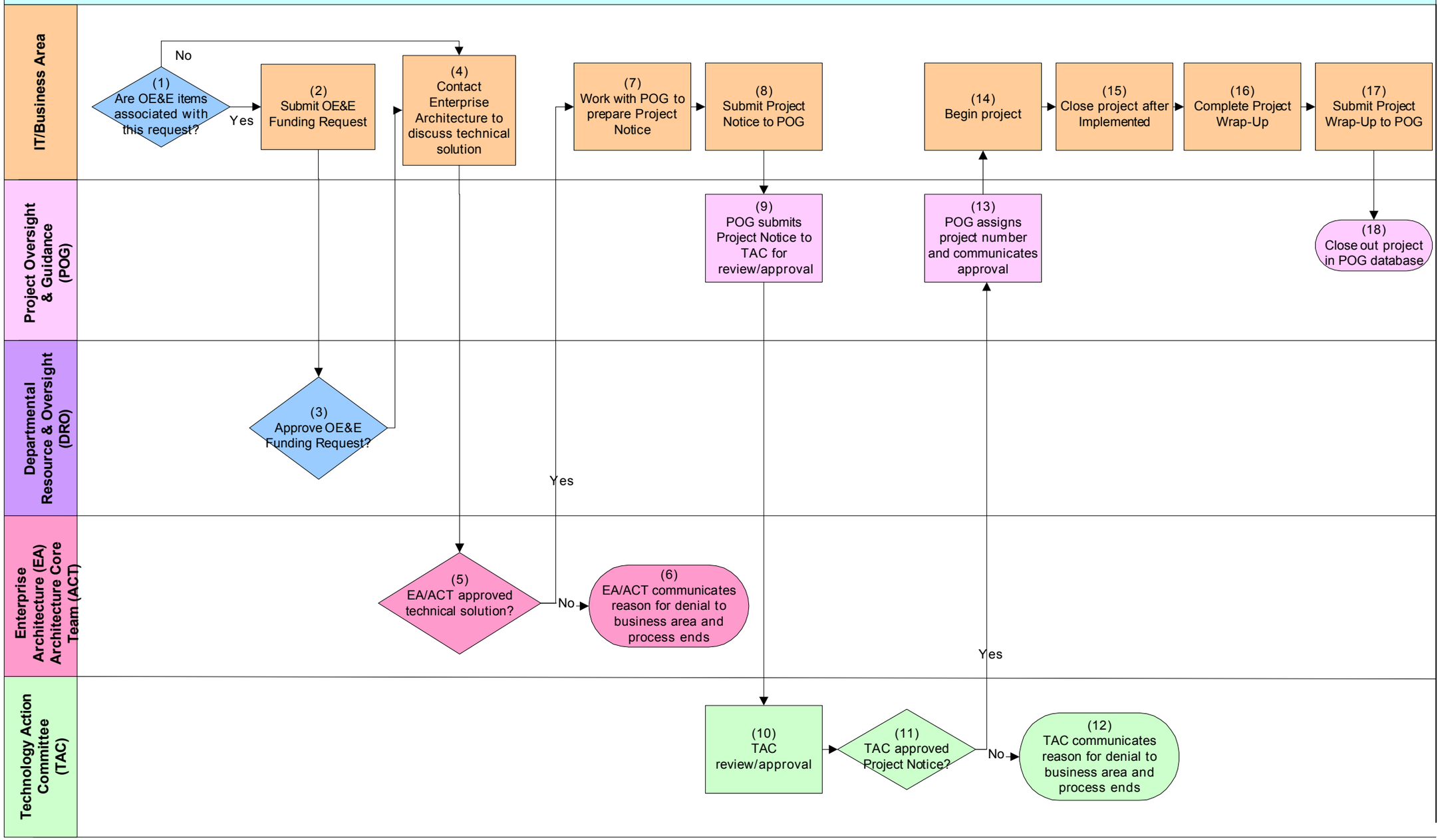
IT Project Approval Process

Revised 10/10/06



Project Notice Process

Revised 11/1/07



For more information oneach step refer to the IT Project Approval Process

Project Management Standards: Project Category Selection Guide

FTB projects are assigned a category at the discretion of the project sponsor except where dictated by Department of Finance (DOF) for IT projects. For all other projects, the sponsor may raise/lower the rating of the project based on factors such as project manager experience, team experience, political sensitivity or other reasons.

The table below is to help project sponsors determine the project category and assign a project manager with the appropriate skill set and experience. This will help to manage projects successfully using industry standards and accepted best practices referred to in the Project Management Institute's "Project Management Body of Knowledge" (PMBOK). This table will help project managers determine required minimum project management practices. The documentation and processes are defined for each project category.

Small Project	Medium Project	Large Project
• Level of Effort – Less than 2500 staff hours (Less than 1.5 PYs) • Project schedule duration - less than 6 months • May have a simple procurement • Not politically sensitive • Project Manager may have minimal experience	• Level of Effort – 2500 to 8500 hours (Equivalent to 1.5 to 5.0 PYs) • Project schedule duration – 6 months to 1 year • More likely to have a complex procurement • May be politically sensitive • May involve other departments/IRS • Project Manager should have some project experience (lead analyst or project manager)	• Level of Effort – Over 8500 hours (Greater than 5.0 PYs) • Project schedule duration – greater than 1 year • Most likely will have the most complex procurement • May involve other departments/IRS • Reportable to the Board &/or external agencies • Politically sensitive • Project Manager must have project manager experience
Project Management Documents	**Project Management Documents**	**Project Management Documents**
• Project Data Sheet • Project Status Report • Work Plan/Schedule • Project Retrospective • GC Update Form	• Charter • Work Plan/Schedule • Communication Management Plan • Change Management Plan (includes Cultural Change Management Plan) • Risk Management Plan • Procurement Management Plan • Project Status Report • Project Retrospective • GC Update Form	• Charter • Work Plan/Schedule • Communication Management Plan • Change Management Plan (includes Cultural Change Management Plan) • Risk Management Plan • Procurement Management Plan • Project Status Report • Human Resource Management Plan • Quality Management Plan • Project Retrospective • GC Update Form
For IT Projects Only	**For IT Projects Only**	**For IT Projects Only**
• Project Notice (PN) or • Desktop Mobile Computing Policy (DMCP) (6278A) • Request for Purchase (6278A) • Project Wrap-Up	• Feasibility Study Report (FSR) or • Desktop Mobile Computing Policy (DMCP) (6278A) • Request for Purchase (6278A) • Project Status Report (PSR) • Project Change Request (PCR) • IT Procurement Plan (ITPP) • Post Implementation Evaluation Report (PIER)	• Feasibility Study Report (FSR) or • Desktop Mobile Computing Policy (DMCP) (6278A) • Request for Purchase (6278A) • Project Status Report (PSR) • Special Project Report (SPR) • Independent Project Oversight Report (IPOR) • IT Procurement Plan (ITPP) • Post Implementation Evaluation Report (PIER)

State of California

Franchise Tax Board

Project Name

Project Retrospective Report

Finance No. 1730-xxx
FTB FSR xx-xx
Project Sponsor:
Project Manager:

Month 2006
(Rev 2/06)

Revision History

Revision	Date	Author	Description

All red italicized text is instructional - delete from the final document.

Project Retrospective Report

Retrospectives are intended to provide information about where changes in project management and development processes, responsibilities, actions, and deliverables could benefit the next project. Each Project Team member keeps notes on items during his or her work on a specific deliverable. The Project Retrospective can be the most educational event in the course of a project for both the Project Team and the Project Manager.

The Project Retrospectives are conducted by the Project Leads and their team members. After the group retrospectives have been held, the Project Manager and Project Leads conduct the final retrospective, reviewing all aspects of the project.

Planning

- *Was the time allotted to planning activities adequate? If not, why not?*
- *Did we choose the correct goals for the project?*
- *What would be the results of more planning?*
- *What should have been done during planning, but wasn't?*
- *Were the team members involved in the initial planning? Was their level of involvement adequate?*
- *Feedback within planning: When changes occurred, was the move back to the planning stage clearly defined?*
- *How did you know when you were ready to move from planning to development? From development to implementation?*

Resources

- *Were the resources allotted adequate? Excessive? Why?*
- *How were they estimated?*
- *How can we improve our estimates?*
- *Did "overload" or "burnout" occur? When? Were there warning signs?*
- *What could have been done to prevent resource overload?*

Scheduling

- *Was the work breakdown structure (task list) relevant to the actual work done during the project?*
- *Did each task have a defined, tangible output (deliverable)?*
- *Did you use the schedule throughout the project? Why or why not?*
- *How was project progress measured? Was it adequate? How could it be improved?*
- *Were the responsibilities for each project task clear?*
- *Were project milestones clearly defined?*
- *What were the biggest risks to meeting the scheduled date?*
- *Was contingency planning adequate? Why? How can we improve it?*
- *Were schedule updates and adaptive actions timely? Were they adequate?*
- *What scheduling changes need to be made in the future?*

Change Management

- *Was approval for changes obtained from all people who must support them in order for them to be successfully implemented? If not, what was the result?*
- *Did changes occur late in the project, and if so, why?*

- *How can we ensure that all appropriate parties are involved in the future?*
- *Were changes adequately and promptly reported to all project team members?*

Status Reporting

- *Were reports relevant? Timely?*
- *Were they read? If not, why not?*
- *Who later asked for data?*
- *What needs to be improved?*
- *Was there a problem with tools to produce the necessary information? What needs to be done about this?*

Technical Issues

- *Were design reviews conducted? If so, how were they structured?*
- *Did the structure accomplish the review goals? If not, what needs to be improved?*
- *What went well?*

Results

- *What went well? Why?*
- *Where were you able to leverage past experience, past training, or previous efforts?*
- *What planned results did you successfully accomplish? Why?*
- *What results did you have that were unplanned?*

Interactions within Your Organization

- *What went well?*
- *What can be improved?*

Interactions with Outside Organizations

- *What groups were involved?*
- *Were initial commitments from other groups timely?*
- *Were communications met as expected? If not, what happened?*

Project Retrospective Report

Session Participants

Name, Role	Name, Role	Name, Role	Name, Role

Planning

Resources

Scheduling

Change Management

Status Reporting

Technical Issues

Results

Interactions within Your Organization

Interactions with Outside Organizations

Attachment Q2

PLANS TO UPGRADE/REPLACE IT INFRASTRUCTURE AT FTB

Hardware Software Network	Infrastructure	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
HDW	Desktop PC	x	x	x	x	x
HDW	ECAIR Unix Server	x				
HDW	Enterprise Tape Library System	x				
HDW	Laptop PC	x	x	x	x	x
HDW	Mainframe Printer	x				
HDW	MF CPU and memory upgrade	x	x	x	x	x
HDW	MF GB OSA Card		x			
HDW	MF Linux IFL				x	
HDW	MF zAAP Engine	x				
HDW	MF zIIP Engine		x			
HDW	Networked Copiers	x	x	x	x	x
HDW	Networked Printers	x	x	x	x	x
HDW	SAN Storage (incl disks, cards, cables, cabinets)	x	x	x	x	x
HDW	Security Services Hardware	x	x			
HDW	Tandem Server Tape Drives	x				
HDW	Unix Itanium Server (HA)		x			
HDW	Windows Servers	x	x	x	x	x
Hdw/Sft	enVision Security Audit Log Appliance		x			
Hdw/Sft	Outbound Campaign call feature		x			
Hdw/Sft	Parallel SysPlex					x
Hdw/Sft	Remote Agent - phone					
Hdw/Sft	Speech Recognition - phone			x		
Hdw/Sft	Virtual Hold - Phone system	x				
Hdw/Sft	Voice Mail System Replacement	x				
Hdw/Sft	Voice Over IP					
Hdw/Sft	Worksite Security	x	x	x	x	x
Net	BlueCoat (Web Proxy)	x			x	
Net	Core Routers				x	
Net	District Office Routers					x
Net	Finjan (Active Content Scanning)	x			x	
Net	Gigabit Ethernet Switches for Access Layer (Refresh of Supervisor, Gigabit port, Fan, and Power Supply)	x	x	x	x	
Net	Gigabit Ethernet Switches for Core, Distribution, Server Farm (Refresh of Supervisor, Gigabit port, Fan, and Power Supply)	x	x	x	x	x
Net	Network Management Servers/Devices	x	x	x	x	x
Net	RILO, Small Office Access Switches (24 port switches)	x	x	x	x	x
SFT	DB2 Extended Features		x			
SFT	ECAIR DB2 DWE	x				
SFT	Enterprise Tape Library Software	x				
SFT	ETL Tool		x			
SFT	Mainframe Printer Software	x				

Attachment Q2

PLANS TO UPGRADE/REPLACE IT INFRASTRUCTURE AT FTB

SFT	MF Software MSU increase	x	x	x	x	x
SFT	MS Office 2007 Professional	x				
SFT	MS SQL Server 2008	x	x	x		
SFT	Omegamon for Mainframe Networks	x				
SFT	Query, Report & ETL tool upgrades			x	x	
SFT	SAN Software and Tools	x	x	x	x	x
SFT	Security Services Software	x	x	x	x	x
SFT	Server PowerPath Licenses	x				
SFT	Upgrade to Oracle Enterprise Edition		x			
SFT	Visual Studio .Net	x				
SFT	VMWare	x				
SFT	Windows Server Software	x	x	x	x	x