



Franchise Tax Board (FTB)
Collecting the income taxes California depends on.

Data Integration Strategy – v5.0

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1. Executive Summary

1.1 - Introduction

Definition: *Data Integration refers to the organization's portfolio of data and information assets as well as the tools, services, processes, strategies and philosophies by which fragmented data assets are aligned to support business goals.*

Franchise Tax Board's (FTB) life blood is the data the business needs in order to perform its mission of tax administration and other programs that the department is legislated to manage. Over the years FTB has developed program areas that require sets of data that are the same yet used for different purposes. As a result, the data in these program area specific systems have become siloed from one another, making the integration of this data increasingly difficult as new systems become implemented. The cost of this problem in lost tax revenue alone as described in the Tax Systems Modernization documentation is staggering.

The product of a Data Integration Strategy should help us respond to:

- **Common View of Taxpayer Data** for internal as well as external users.
- **Reconcilable Reporting** for all business areas and in some cases for taxpayers to answer business questions. Examples: What's the cost of audits end to end? Where is the software the department bought? Where is my purchase order? Where are the bottlenecks in my compliance process? What compliance activities produce the biggest bang for the buck in the short term; in the long run? What is the taxpayer's activity with FTB? What is the history of my activity at FTB over the last two years (taxpayer's perspective)?
- **Expandable and readily maintainable** modeling, scoring engine(s) and their properly configured databases to answer business question such as: What audits should we start given certain criteria? What collection cases should we peruse given certain criteria? Etc.
- **Predictive Analyses:** Examples of business questions - What data in the above systems of data is most reliable, what data is suspect, given all our data sources and there history what behavior is most likely to identify an abusive tax shelter? What law is causing the most confusion? What business processes are constraining workflows?
- **Data should be sharable with appropriate third parties.** EDD, BOE & FTB tax data, and other data exchanges.

The Tax Systems Modernization analysis has built the business case for data integration where this document will address those issues to support its findings. The Enterprise Data to Revenue (EDR) project, a product of the Tax Systems Modernization, will require Enterprise Architecture level guidance so that the FTB as a whole will adhere to enterprise data requirements. This will help ensure that subsequent projects not related to EDR will follow enterprise data architecture policy and not revert back to a siloed data environment.

No matter what technology infrastructure is used to meet this strategy, the department should always be able to look at a simple and over arching requirement and know it is enabling the correct policy and procedures to achieve its business goals through data integration.

1.2 - Purpose

The intention of this document is present data integration -- its meaning, value, applicability -- and to present a high-level strategy that will enable FTB to go forward and support enterprise alignment with the TSM efforts. Data Integration will answer business questions through reports, modeling, scoring, predictive analyses and data sharing methods.

1.3 – References

- 1) FTB 2007-2011 Strategic Plan
- 2) [FTB Enterprise Architecture Definition for *Data Management and Delivery*, 2008](#)
- 3) [FTB Enterprise Architecture Definition for *Business Intelligence*, 2008](#)
- 4) [FTB Enterprise Architecture Definition for *Enterprise Content Management*, 2008](#)
- 5) [FTB Enterprise Data to Revenue FSR, 2008](#)
- 6) [FTB Information Architecture Plan, 1997](#)
- 7) Federal Enterprise Architecture Program – *Data Reference Model Version 2.0*, 2005
<http://www.whitehouse.gov/omb/egov/a-5-drm.html>
http://www.whitehouse.gov/omb/egov/documents/DRM_2_0_Final.pdf

2. FTB Data Integration Strategy Relationships

2.1 – Relationship to FTB Strategic Plan

A Data Integration Strategy at FTB must align with FTBs Strategic Plan. The FTB Strategic Plan 2007-2011 has six goals where data integration can support as follows:

Goal 1 – Improve Customer Service – A data integration strategy will focus on a “*Customer-Centric*” approach to data and customer matching of return and 3rd party data.

Goal 2 – Increase Fairness and Compliance with Tax Law – This goal is supported by data integration where data is searchable in a shared environment and not in a siloed data environment. This will improve timeliness and assure the correct data is attributed the correct customer. With expanded data capture, data integration will ensure equal and fair treatment of the electronic and paper filers.

Goal 3 – Increase Transparency – Expanding information on our Internet site will require data integration from our multiple source systems to look transparent to the customer. Organization boundaries must be minimized or eliminated to allow for an integrated view for the customer. Data integration efforts must be an enterprise effort not a sole business area effort. Transparency also increases through data sharing strategies such as data services, which in turn require data integration to be effective.

Goal 4 – Create a Great Place to Work, Contribute, and Learn – FTB is a great place to work, but it detracts from the quality of our work environment when call centers (as well as other areas such as Collections and Audit) must log on to multiple systems to perform their job. Data integration will greatly improve the work experience and reduce time on the phone with a customer so that more customers can be served.

Goal 5 – Demonstrate Operational Excellence – A data integration strategy for FTB is at the core of this goal and its strategies, both in terms of efficiency and effectiveness. This impacts both revenue generation as well as operational efficiency.

Goal 6 – Protect Taxpayer Information and Privacy – This may be the primary strategic goal and main reason for data integration at FTB. Currently, FTB does not have an enterprise data management program and a data integration effort that will thoroughly identify the data for which FTB has responsibility through a metadata registry and catalog. The metadata registry and catalog is a key component for data integration that identifies and exposes data to the potential users based on the security classification, usage for the data, owner, and custodian of the data.

2.2 – Relationship to OCIO - Agency Data Strategy

The FTB Data Integration Strategy will align with the Statewide Data Strategy the State Office of the CIO (OCIO) is currently conducting. The Statewide Data Strategy effort includes the following strategies on data: Data Integration Strategy, Data Sharing Strategy, Data Warehousing and Analytics Strategy, and Data Governance Strategy.

Additionally, the OCIO is requiring departments to complete their architecture reference models. The scope of the FTB Data Center of Excellence is to furnish the department with the FTB Data Reference Model. (See Section 1.8 Reference 7)

3. Data Integration Background

3.1 - Why Have a Data Integration Strategy

A data integration strategy provides a vision that will promote the department's migration to an information environment that:

- Allows for the sharing of information throughout the department;
- Promotes sharing of information with other government agencies;
- Increases the department's ability to change;
- Maximizes the information assets available to support the department's knowledge workers and executive management; and
- Provides a blueprint for the development of a departmental information infrastructure that is inter-operable, extendible, and scalable.

3.2 - Vision

FTB will experience an integrated data environment that enables effective decisions. In this context data implies all data assets such as system files, databases, documents, official electronic records, images, audio files, video files, emails and websites. Third Party data may require a paradigm change from "process, exploit, and disseminate" to "post before processing".

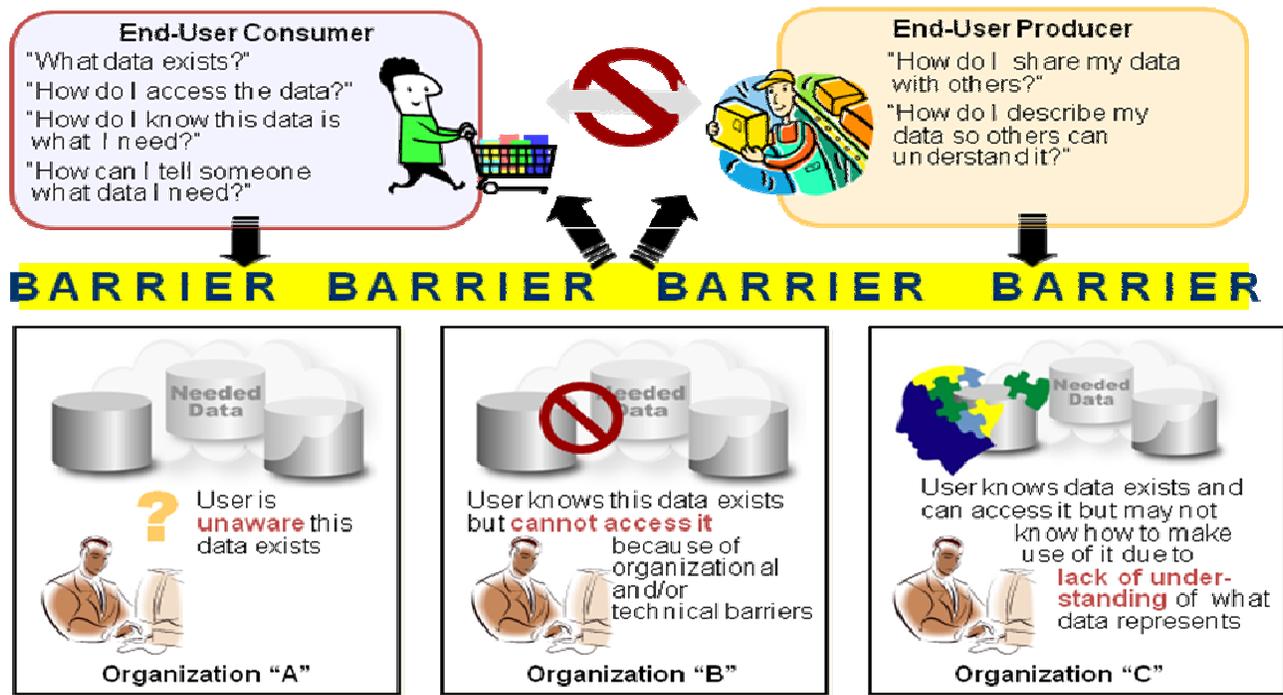
4. Business Problem

Business problems cannot be solved with siloed data. Data in silos are typically for a single business purpose. This data, which tends to be defined for only the purposes of one business area, eventually expands into multiple data locations, multiple technologies in which to store the data, and multiple definitions/meanings and uses for similar data items. This can impede the quality of the data and the timeliness of the data.

4.1 - Primary Issues and Data Integration/Information Sharing Barriers

- No common framework or methodology to describe the data and information that supports the processes, activities, and functions of the business
- Existing systems offer diffused content that is difficult to manage, coordinate, and evolve
- Information is inconsistent in format and/or definition
- Without a common reference, data is easier to duplicate than integrate
- No common method to share data with external partners
- Limited insight into the data needs of others within FTB
- Lack of data understanding
- Data and Information context is rarely defined
- Stove piped boundaries, no central registry
- Lack of funding and incentive to share
- Data sensitivity and security of data
- New laws/issues result in continuous adding of databases that cannot share data
- Legal restrictions on sharing data
- Data is not tagged with its source (i.e., IRS, Dept Consumer Affairs, EDD, etc.). Rules for data sharing and integration are tied to its source.

Figure 1. illustrates the result of these issues and information sharing barriers:



(Figure 1. Information Sharing Barriers)

4.2 - Tax Systems Modernization

The Tax Systems Modernization effort has identified multiple problems (e.g., lost revenue, and continued high cost tax administration) if a proper data integration strategy is not embraced. The Enterprise Data to Revenue Project (EDR) FSR identified problems as follows:

- 1. Data Availability** - Returns are not corrected, payments and taxpayers are not properly identified, fraud goes undetected, cases are not properly prioritized and assigned the most effective resolution strategy because data is unavailable, unshared and costly to maintain.
- 2. Business Processes** - Changes take too long to implement or cannot be made, data is not captured, returns are not corrected and performance cannot be monitored because return filing processes are old, manual, redundant, inflexible and costly to maintain.
- 3. System Redundancy and Reuse** - Systems and functionality are costly to develop and maintain because they are redundant, have different technologies, different platforms and are not integrated or reusable.
- 4. Self-Services** - Taxpayer self-services are limited due to outdated technologies and limited security.
- 5. Data Analysis** - Noncompliance discovery and fraud detection, tracking and prevention are limited because taxpayer behavior analytical tools are unavailable.
- 6. BETS** - The BE accounting system is inflexible to evolving business needs, legislative mandates and poses significant risk to existing business processes due to outdated technologies, siloed data and proprietary software.

Although the EDR is a project that will bring in many new technologies, FTB as an enterprise must embrace an overarching data integration strategy with policies and standards that are not only based on this project, but are beneficial as an architecture for a future projects.

4.3 - Business Problem Examples

The Enterprise Wide Bankruptcy System (EWBS)

The FTB Bankruptcy team lost \$7 Million in claims due to passing the time frame of 180 days from when the claim went public by the court. This was attributed to not being able to gather data from multiple system databases in time to identify those parties that were involved in bankruptcy. This would have not happened if FTB's data were integrated and available to users who needed the data. The solution came from Business Intelligence and Data Services (BIDS) team in the form of a report that gathered data from multiple systems. This was a type of data integration solution that only resolved a single business case, but business cases like Bankruptcy's happen all the time. The BIDS team or other groups must take an extensive amount of resources and time to compile and synthesize data questions. The latency may cost FTB and the State millions of dollars over time.

Tax Payer Folder

The Tax Payer Folder concept has had much difficulty in realization due to the lack of data integration across the department. Currently, Call Center staff must logon to and view several systems to get the complete picture of a taxpayer. The time it takes to gather this information each time a taxpayer calls cuts into the number of calls that can be answered if taxpayer information is viewable and updateable in an integrated environment. The Taxpayer himself/herself cannot view all of their tax and accounting data currently. The Tax Systems Modernization effort will make this a possibility, but architectural policy and standards concerning data integration strategy must be established not only for a project but for the enterprise.

4.4 - Mechanisms for Data Discovery and Integration Opportunities

Current Mechanisms

Currently, FTB's mechanisms for data discovery and integration opportunities are formal as well as informal. The more formal the process when the business is in need of data, then duplicative efforts or the magnitude of the effort is reduced. These mechanisms include:

- Enterprise Architecture Council
- Data Resources and Services Unit
- All Centers of Excellence (primarily the Data CoE)
- Enterprise Data Integration Core Team (EDICT)
- During Application Development
- During the ITPC, Project Notice or FSR processes
- Informal Communication

The first four organizations are the current mechanisms formally charged with looking at enterprise data discovery and integration. The last three mechanisms lack the means of enterprise data integration needs, and typically produce silo solutions that do not lend themselves to enterprise data integration and sharing.

Mechanisms for Continuing Data Integration and Management Maturity

To continue data management maturity at FTB, there may be a need to establish a centralized Data Management/Administration (Governance) function that supports the business data needs and is composed of data administrators that are experts in enterprise data discovery, data standards, data modeling, data sharing, and support data architecture policies established by FTB and the State. Without a central Data Management/Administration function and/or process that the business and IT can go to for data needs, the following will continue to occur: If a requester wants data they: (1) go to Data Resources and Services Unit (DRSU, if they know about the DRSU); (2) if it lies outside the DRSU and the data is only internal, then the requestor may go to EDICT (if they know about EDICT), (3) if EDICT doesn't know then they go to the Data CoE or EAC, or (4) no one. There is no defined data management policy or procedure for the business and IT to follow. (See also Figure 2 above).

The topic of Data Governance is critical to the continuing success of FTB's data initiatives, and will be addressed in length at the conclusion of the Session Two of the 2008-2009 Data Center of Excellence.

5. Data Integration Goals and Strategies

5.1 - Overarching Goals of Data Integration

1. *Deliver an integrated and common view of taxpayer information where this data can be managed in one place.*
2. *Match taxpayers to third party data and other enterprise data to detect compliance issues and close the tax gap*
3. *Ensure all data is **visible, accessible, and understandable** when needed and where needed to accelerate decision making*

The following data integration goals in Table 1 are required to support the overarching goals:

Goal	Strategy
<p>Move toward consistent enterprise data standards</p>	<ul style="list-style-type: none"> • Increase IT systems agility through widespread adoption of standardized software, standard platforms, and solutions. • Refine and implement data naming standards according to ISO-11179 • Adopt data modeling policy and standards for logical, physical and dimensional modeling levels. (Supports enterprise reuse and agility.) • Adopt data coding standards for XML • Adopt standardized data domains for cross enterprise use and reuse • Adopt unstructured data standards for images, documents, spreadsheets and other content • Investigate and Adopt the Dublin Core Metadata Initiative along with ISO-11179 metadata standards • Develop the FTB Data Reference Model as required by the State Office of the CIO.
<p>Increase understanding of our systems and data</p>	<ul style="list-style-type: none"> • Increase understanding of data and systems through education • Discover and promote effective uses of data • Make metadata available to the enterprise for both business and IT • Tag all data (structured and unstructured - raw, and processed) with metadata to enable discovery by known and unanticipated users in the Enterprise • Ensure all data is visible, accessible, and understandable when needed and where needed to accelerate decision making • Support Information Security and Disclosure requirements at all levels

<p>Reduce redundant data</p>	<ul style="list-style-type: none"> • Create enterprise wide policy and standards for planned data redundancy • Create a Total Cost of Ownership (TCO) model controlled by the data owner showing the cost of creating, updating and deleting data by more than one process • Discover the data owner to promote data responsibility • Improve communication about available data
<p>Create a great place to increase technical expertise to work with data</p>	<ul style="list-style-type: none"> • Establish a training, recruitment, and staff retention program for the following skills: <ul style="list-style-type: none"> ○ Logical and physical data modeling ○ Dimensional data modeling ○ Relational and array development ○ XML ○ Object-Relational mapping, modeling and development ○ Query analysis and performance techniques for operational and analytical data
<p>Improve Data Quality</p>	<ul style="list-style-type: none"> • Establish data quality measures using a data profiling process as follows: <ul style="list-style-type: none"> ○ Defining data (Metadata) ○ Monitoring data for problems ○ Correcting data issues
<p>Increase capability to share data and improve universal data sharing that fits the needs of all business areas</p>	<ul style="list-style-type: none"> • Integrate structured with unstructured data • Identify, document and limit the number data locations and access points. • Identify the usage of data via metadata registries and catalogs • Create data sharing policy • Limit and or break the organizational boundaries that keep data in silos. • Adopt the “<i>post before processing</i>” paradigm. Move from a “<i>process, exploit, disseminate</i>” to a “<i>post before processing</i>” paradigm. • Post of all data to shared spaces for users to access except when limited by security, policy, or regulations • Re-negotiate data exchange contracts to accommodate enterprise data sharing while satisfying information security and disclosure’s needs
<p>Improve information performance through standards</p>	<ul style="list-style-type: none"> • Develop and adopt standards on information performance requirements.
<p>Increase data trust through data governance mechanisms</p>	<ul style="list-style-type: none"> • Adopt a data governance process and structure to promote and insure trusted data supports all business areas and controls redundancy.

(Table 1. Data Integration Goals and Strategies)

5.2 - External Challenges to Data Integration Goals

Successful data integration requires the participation of both business and IT. Typically, data integration starts with the business problem being addressed at a project level. Data integration and data governance efforts should continue with or without a project as part of a continuous improvement program. The following factors may contribute to or impede the achievement of data integration goals:

- California State Budget Constraints
- Legislative changes
- California State CIO Enterprise Architecture Initiatives and Plans
- Changes in Workforce retention and skills
- Green IT Initiatives (*this may aid in the advancement of data integration*)

6. Data Governance as a component of data and information strategies

Data governance is a process focused on managing the quality, consistency, usability, security, and availability of information. This process is closely linked to the notions of data ownership and stewardship (Defined in SAM 5300 as *Owner* and *Custodian* respectively).

In order to execute data integration, FTB must institute data governance policies not only involving data/information security, but institute data change control policy and procedure. Currently, FTB does not have data management/architecture change control policy where the business and IT must follow. Current data procedures do not recognize the impact of data changes on enterprise data. Data procedures must be developed for enterprise data not just what a project sees fit to create.

A data integration effort will not succeed if data governance is not established. The second Data CoE Session in January 2009 will propose enterprise data governance and management policies and procedures to support the success of data integration and Tax Systems Modernization efforts.

Examples of enterprise data governance and management policies may include the following:

- All data solutions must be registered into an enterprise repository
- All proposed data solutions (one or more tables) must be architected by providing logical data models and follow data standards before proposed solution is passed to the DBA for physical data modeling.
- All data logical models shall be approved by the Data Solutions Architect and the Data CoE
- All data solutions must follow enterprise data naming standards
- All data solutions must comply with security and disclosure
- All data solutions must have a data integration plan that supports TSM efforts

7. Overview of Data Integration Methodologies

This section is intended to give the reader an overview of possible data integration methods, not to suggest one size fits all. In practice there may be a mixture of the different types of data integration making an enterprise solution feasible on a case-by-case basis.

6.1 - Types of Data Integration

There are several styles/types of data integration that address the integration based on use of data, volume of data, and the number of data users. The industry best practices in the data integration space are:

- **Enterprise Application Integration (EAI)** – Typically a code based package providing application-to-application connectivity with standard interfaces. EAI does not perform any data oriented integration.
- **Enterprise Information Integration (EII)** – Is a metadata driven infrastructure supporting access to multiple systems.
- **Extract, Transform & Load (ETL)** – Tools focused on data transformation as part of a discrete data migration/movement process. Typically associated with the data warehouse/data mart environment.
- **Master Data Management (MDM)** – Is based on operational integration of a single data subject area (e.g., PARTY/CUSTOMER, ACCOUNT, ASSETS, TAX DECLARATION, etc.) where this data is usage independent.
- **Customer Data Integration (CDI)** – Is also called Customer Master Data Management that applies to the PARTY/CUSTOMER data subject area (i.e., an implementation of MDM for customer).

6.2 - Comparison of Integration Technologies

Integration Technology	Data movement	Processing	Interface Type	Integration Method
EAI	None: In application messages	Online – event oriented	Static: written as an application	Does not support data integration
EII	In queries	Online – request oriented	Dynamic	Supports flexible sources – federated data
ETL	Table rows or flat file records	Batch	Static: SQL or I/O	Static sources with file or dbms access
MDM	PARTY/CUSTOMER Unique ID and details	Online – transaction oriented	SOA	Highly flexible based on subject areas

(Table 2. Comparison of Integration Technologies)

6.3 - Data Integration and Sharing Architectures

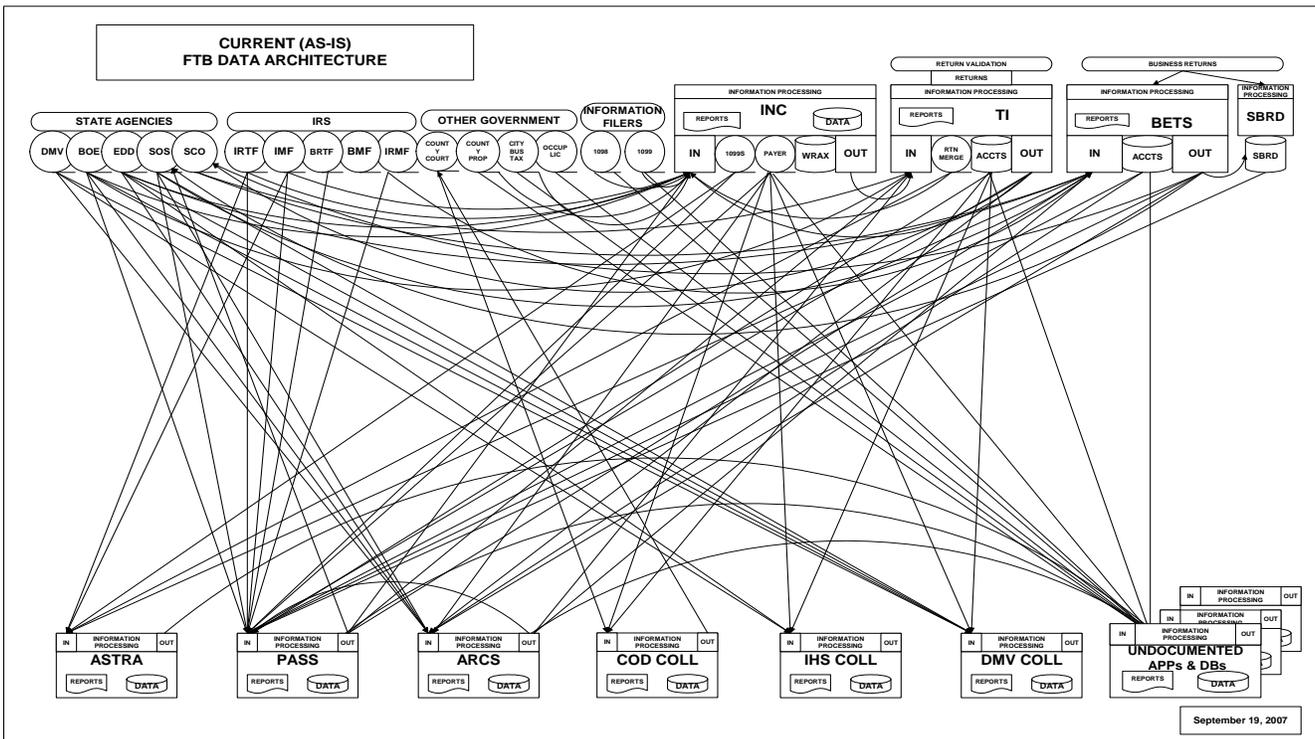
Table 3. describes the architectures used for integration and sharing:

Integration & Sharing Architecture	Description	Use at FTB
Point-to-Point	Moves data between data stores. Typically the receiving system formats the data for its specific use. Figure 2 below illustrates FTB's current point-to-point data architecture	Approximately 90% of all legacy systems use this data sharing architecture

Process, Exploit, Disseminate	Receives raw data, processes the data for specific use, then allows others to share the processed data. This data is only good for specific use.	>80% FTB's legacy systems use this form of data manipulation for specific use. Typically, data is manipulated before other processes can use it.
Post Before Processing	Receives raw data and writes it to a shared datastore or data space. Processes are free to use data for each use. Data is source data not processed for specific uses.	< 5% Some third party data is out in shared data space for any process manipulates it for specific use.
Federated	An integration architecture that brings data together from legacy systems. Must have a metadata hub integrate data and match data to users	0% Typically, this data has been manipulated before other processes need it. Specific data uses for the same data are joined together by a data hub mechanism.
Data HUB	A metadata hub that integrates data based on subject area like PARTY/CUSTOMER. Can be used for federated data, post before processing data, or centralized datastores	0% Used for federated data and Master Data Management subject areas. Requires metadata.

(Table 3. Data Integration and Sharing Architectures)

Figure 2. illustrates the current point-to-point data architecture at FTB.



(Figure 2. FTB Current Data Architecture)

8. Gap Analysis

Gap analysis addressing data integration has been determined within the Enterprise Architecture Definitions for:

- Data Management and Delivery (*See 1.3 - Reference 2*)
- Business Intelligence (*See 1.3 - Reference 3*)
- Enterprise Content Management (*See 1.3 - Reference 4*)
- Electronic Data Exchange (*See 1.3 - Reference 5*)

9. Roadmap for Data Integration

The roadmap for data integration must aggressively establish this strategy within the following milestones:

1. Before and/or in coordination with the TSM EDR's Data Management sub-project to support the enterprise
2. After the next Data CoE Session in the January/February 2009 timeframe, where the next session will address Data Management & Governance

The following phased roadmap approach is derived from the Enterprise Architecture Definition for Data Management and Delivery:

Data Integration Strategy – PHASE I

- Conduct Session 1 of the 2008/09 Data Center of Excellence on Data Integration Strategy
- Develop Data Integration Strategy Document (this document)
- Milestone – Data Integration Strategy approval

Data Management and Governance - PHASE II

- Conduct Session 2 of the 2008/09 Data Center of Excellence on Data Management and Governance Coordinate with EA, CoEs, and TSM in Data Governance and Standards Planning
- Document Data Governance Resources, Processes and Standards
- Approve Data Governance Resources, Processes and Standards
- Milestone - Implement Data Governance Resources, Processes and Standards

Data Reference Model (DRM) - Metadata Management - CONTINUEING

- Establish background document for the FTB DRM
- Establish Metadata Governance Processes in DRM
- Determine Metadata Methodology & Requirements for Gathering Metadata
- Procure Metadata Repository Tool (either with or without EDR)
- Gather Metadata & Populate Repository
- Publish DRM and Enterprise Metadata for enterprise wide access and use
- Milestone – DRM Implemented and Enterprise Metadata Repository Established

10. Recommendation and Conclusion

FTB must act now to approve a data integration strategy to satisfy the goals stated in Section 5 above. Since the completion of the Information Architecture Plan in 1997, data integration and data management issues have not been resolved. FTB is still trying to integrate its data from siloed systems to provide a transparent customer experience and to make valuable decisions. FTB has made improvements, yet data is created and maintained in silo systems with their silo databases. Each time a new system is developed, another silo database is created with the same type of information compounding the data integration problem.

A data integration technology alone cannot remedy our data sharing problems. Data governance and management can break through the barriers that block the effective sharing of data. Data integration issues are mostly organizational and people oriented where data ownership is difficult to pinpoint. Data Governance is centered on data responsibility and with the collaboration of Information Security and Disclosure, FTB can identify data owners and custodians.

Therefore the Data Center of Excellence recommends the following:

- Approve this Data Integration Strategy
- Identify and adopt best practice data integration technologies and fit to the appropriate business need (i.e., data integration use standards).
- Establish Enterprise Data Governance
- Explore the possibility for the creation of a Data Governance organization within FTB.
- Create the FTB Data Reference Model and use as a standard for department and state Data Initiatives
- Identify data owners and custodians in collaboration with Information Security and Disclosure and SAM 5300.
- Adopt data naming standards
- Train and educate IT staff on data centric technologies
- Train and educate staff on the business value and meaning of enterprise data through its metadata.
- Establish an enterprise wide metadata registry so that all users are exposed to this information in regard to its uses, responsibilities, and application. (Note: The current Metadata Repository was an interim solution that was not constructed to handle the type of work of today's commercial metadata registry tool can do. Additionally, it would be impractical to enhance the MDR regarding the cost to build vs. purchase.)