"Value to the Mission"

FEA Practice Guidance

Federal Enterprise Architecture Program Management Office, OMB

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Table of Contents

Section 1: Overview

About the FEA Practice Guidance

The Federal Enterprise Architecture (FEA) Practice Guidance describes important concepts architects can use with stakeholders to deliver value to the business and improve results in agency mission areas. The guidance provides overviews of architecture concepts, descriptions of the content included in architecture work products, and direction on developing and using architecture.

The FEA Practice Guidance is not meant to be prescriptive, but to offer concepts to be applied using a variety of architectural frameworks and methodologies. The guidance does not cover enterprise architecture (EA) development and maintenance since there is already a broad body of knowledge on these topics.

There are four main sections of the FEA Practice Guidance:

- **Section 1: Overview:** Provides a high-level overview of EA concepts and principles.
- **Section 2: Introducing Segment Architecture:** Describes **segment** architecture concepts, the content included in **segment architecture**, and how to use segment architecture.
- **Section 3: Developing Segment Architecture:** Provides guidance on how to develop segment architecture, when one should be developed, and who should participate in its development.
- **Section 4: Enterprise Architecture Transition Strategy:** Describes what is included in an EA **transition strategy** and provides guidance on developing and using an EA transition strategy.

For additional information, appendices are also included:

- **Appendix A: Key Terms:** Defines EA terms and concepts used in the FEA Practice Guidance.
- **Appendix B: Reference Information:** Additional information about the concepts described in the FEA Practice Guidance.

Contact Information

For more information about the FEA or this guidance, go to http://www.egov.gov or send an e-mail to fea@omb.eop.gov.

Delivering Mission Value

All agencies seek to improve their mission performance. Architecture is a management practice to maximize the contribution of an agency's resources to achieve its mission. Architecture can establish a clear line of sight from investments to measurable performance improvements whether for the entire enterprise or a portion (or segment) of the enterprise. This guidance assists architects to develop and use segment architecture in:

- Describing the current and future state of the agency and its segments;

- Defining the desired results for each segment;

- Determining what resources are used for an agency's core mission areas and common or shared services;

- Leveraging resources across the agency; and

- Developing a transition strategy to achieve the desired results.

Figure 1-1 illustrates the relationship of segments across multiple agencies. A single agency contains both core mission area segments and business services segments. Enterprise services are those cross-cutting services spanning multiple segments. Segments can be leveraged within an agency, across several agencies, or the entire federal government.
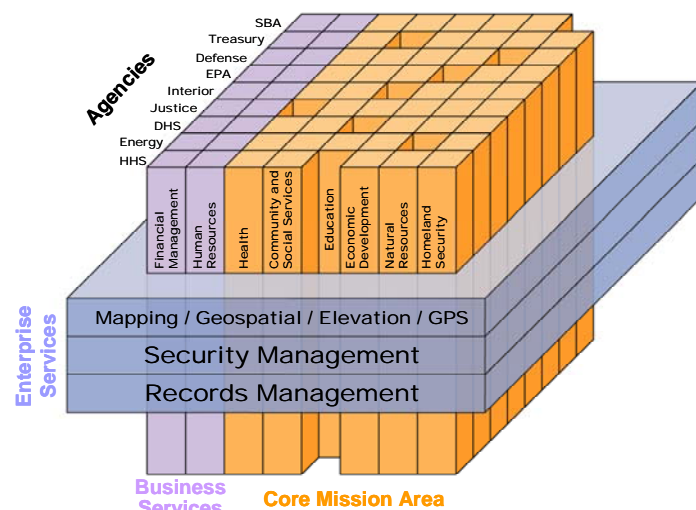
Figure 1-1: Segments and Services

Principles

Business-led architecture is more successful in meeting strategic goals, responding to changing mission needs, and serving citizens' expectations than technology- or budget-driven architecture.

This principle encourages agency architects to proactively collaborate with business stakeholders to develop architecture work products for a segment. Architects must understand the current state of the business and where the business stakeholders would like to make improvements. With this shared understanding, architects and business stakeholders can work together to develop the architecture work products supporting better investment and implementation decision-making.

Agencies are expected to architect first, and then use the architecture to guide and inform information technology (IT) investment planning and implementation. This principle recognizes the time required to capture business needs, define higher performance levels and develop segment architecture sufficient to drive investment decisions. This also recognizes the time required to reconcile how much of the business needs will be met by individual business solutions or enterprise (agency-wide) investments.

For more information on federal architectural principles, refer to the *Architectural Principles for the Federal Government* located at www.egov.gov.

Performance Improvement Lifecycle

Results-oriented architecture is developed within the context of the **Performance Improvement Lifecycle** which can be broken down into three-phases: "Architect", "Invest", and "Implement" (Figure 1-2). Each lifecycle phase is comprised of tightly integrated processes which combine to transform the agency's top-down strategic goals and bottom-up system needs into a logical series of work products designed to help the agency achieve strategic results. When working effectively and integrated well, the Performance Improvement Lifecycle provides the foundation for sound IT management practices, end-to-end governance of IT investments, and the alignment of IT investments with an agency's strategic goals so an agency can achieve its desired mission outcomes and business results.
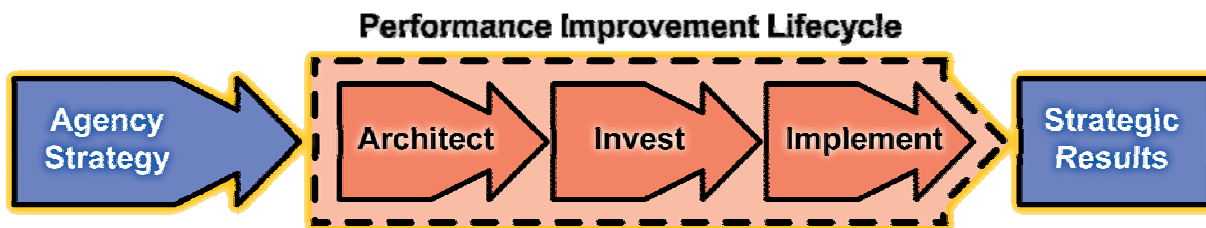
Figure 1-2: Performance Improvement Lifecycle

Table 1-1 summarizes the processes included in each phase of the Performance Improvement Lifecycle, as well as the processes used to transition from one phase of the lifecycle to the next.

Phase	Processes
Architect	• Develop and maintain EA as the shared view of the current and future state of the agency. • Define and prioritize segments as part of the EA transition strategy that defines the sequencing of individual segments.
⇩	• Develop segment architecture to provide a bridge between the enterprise vision (EA and EA transition strategy) and the investment in and implementation of individual business and information management solutions.

Invest	• Define the implementation and funding strategy for individual solutions identified in the EA transition strategy and described in the segment architecture.
	• Create the **program management plan**s to implement the individual solutions identified in the implementation and funding strategy.
Implement	• Execute projects according to the program management plans. • Measure performance to determine how well the implemented solutions achieve the desired results and mission outcomes and provide feedback into the enterprise and segment architecture development processes.

Table 1-1: Performance Improvement Lifecycle Processes

Architecture Levels

Enterprise, segment, and **solution architecture** provide different business perspectives by varying the level of detail and addressing related but distinct concerns. Just as enterprises are themselves hierarchically organized, so are the different views provided by each type of architecture. Figure 1-3 illustrates the relationships between enterprise architecture, segment architecture, and solution architecture.
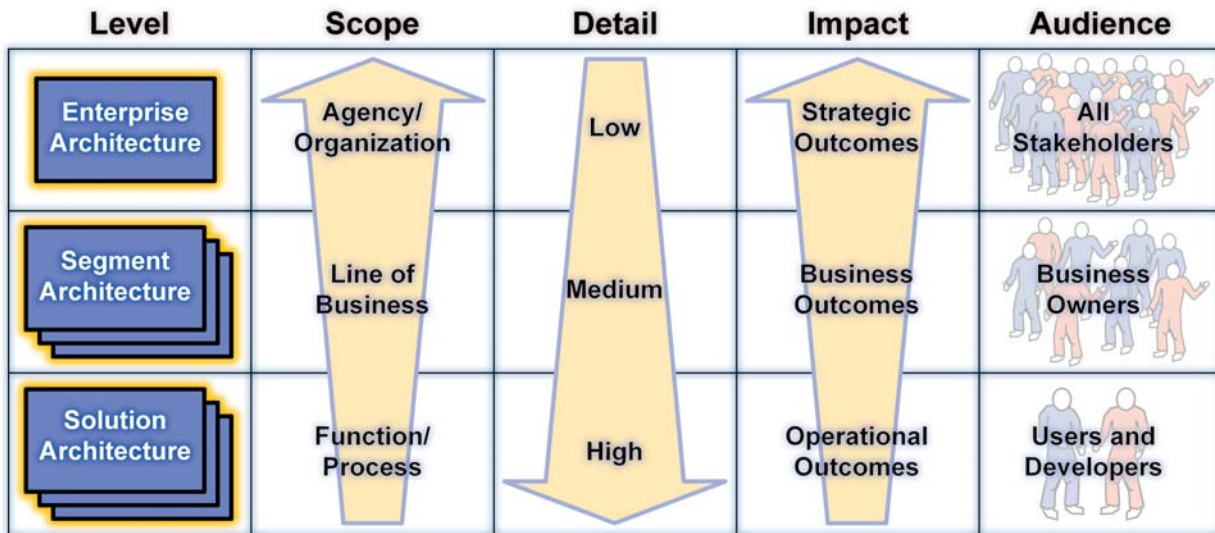
Figure 1-3: Architectural Levels and Attributes

By definition, EA is fundamentally concerned with identifying common or shared assets – whether they are strategies, business processes, investments, data, systems, or technologies. EA is driven by strategy; it helps an agency identify whether its resources are properly aligned to the agency mission and strategic goals and objectives. From an investment perspective, EA is used to drive decisions about the IT investment portfolio as a whole. Consequently, the primary stakeholders of the EA are the senior managers and executives tasked with ensuring the agency fulfills its mission as effectively and efficiently as possible.

By contrast, segment architecture defines a simple roadmap for a core mission area, business service, or enterprise service. Segment architecture is driven by business management and delivers products that improve the delivery of services to citizens and agency staff. From an investment perspective, segment architecture drives decisions for a **business case** or group of business cases supporting a core mission area or common or shared service. The primary stakeholders for segment architecture are business owners and managers.

Segment architecture is related to EA through three principles: structure, reuse, and alignment. First, segment architecture inherits the framework used by the EA, although it may be extended and specialized to meet the specific needs of a core mission area or common or shared service. Second, segment architecture reuses important assets defined at the enterprise level including: data; common business processes and investments; and applications and technologies. Third, segment architecture aligns with elements defined at the enterprise level, such as business strategies, mandates, standards, and performance measures.

Solution architecture defines agency IT assets such as applications or components used to automate and improve individual agency business functions. The scope of a solution architecture is typically limited to a single project and is used to implement all or part of a system or business solution. The primary stakeholders for solution architecture are system users and developers.

Solution architecture is commonly related to segment architecture and enterprise architecture through definitions and constraints. For example, segment architecture provides definitions of data or service interfaces used within a core mission area or service, which are accessed by individual solutions. Equally, a solution may be constrained to specific technologies and standards that are defined at the enterprise level.

Section 2: Introducing Segment Architecture

This section provides introductory guidance to develop and use segment architecture for core mission areas and common or shared services defined by the agency EA and EA transition strategy. *Refer to Section 4 for information on EA transition strategy.*

Segment architecture development is a scalable and repeatable process for architects to engage business stakeholders and deliver value to business areas. This process helps to establish clear relationships between strategic goals, detailed business and information management requirements, and measurable performance improvements.

Architecture Principles for the Federal Government (June 23, 2006) states core mission needs are the primary drivers for architecture development. This principle reflects a rationale that business-led architecture is more successful in meeting strategic goals, and recommends that agency-level architects collaborate with business and program leaders to develop architecture work products to enhance strategic decision-making and guide capital planning.

Information and guidance are provided for the following topic areas:

- **Business Outcomes:** Identifies the characteristics of fully developed segment architecture and describes important business outcomes.

- **Applying Segment Architecture:** Describes common uses for segment architecture across each phase of the Performance Improvement Lifecycle – "Architect", "Invest", and "Implement". Describes agency-level and government-wide benefits resulting from segment architecture development and implementation.

- **Stakeholders:** Outlines an engagement model for segment architecture development by defining Integrated Program Team (IPT) members and their role in the segment architecture development process.

- **Prerequisites and Success Factors:** Describes lifecycle processes and elements contributing to the success of segment architecture development and implementation.

- **Segment Architecture Concepts:** Provides a definition and overview of segments and segment architecture, including a description of segment architecture work products and the segment architecture development process.

- **Segment Identification and Integration:** Describes the process to define enterprise segments and the relationship to EA and the EA transition strategy. Outlines segment types and the relationship between individual segment types

- **Initiating Segment Architecture:** Describes the series of steps architects can use to identify segments and initiate segment architecture development.

Business Outcomes

Segment architecture development is a collaborative process forming a bridge between enterprise-level planning and the development and implementation of solution architecture. This process is a critical element of an integrated lifecycle process to define stakeholder requirements, drive investment, and implement business and information management solutions. Segment architecture work products describe detailed results-oriented architecture and a transition strategy for core mission areas, **business services**, and **enterprise services**. Fully developed segment architecture achieves the following set of business outcomes:

Results-oriented architecture is defined by linking business solutions to the agency mission and performance improvements

Segment architecture is developed to support a clear and concise value proposition linked to the agency mission, as well as strategic goals and objectives. Segment architecture identifies opportunities to deliver business value and defines target performance measures to monitor and demonstrate performance improvements.

Clear relationships are defined between the segment and the rest of the enterprise

Segment architecture creates visibility to other enterprise segments and **cross-agency initiative**s and describes opportunities to reuse or provide common and shared services. The segment architecture transition plan describes dependencies between related initiatives. It also contributes to a common understanding of what the segment is responsible for and how the segment supports the goals and objectives of the agency as a whole.

Segment architecture is fully reconciled with the agency enterprise architecture

Segment architecture is reviewed and approved in the context of the agency **enterprise architecture** and is consistent with common or shared elements including standard business processes, data, applications, and technologies. Business requirements identified at the segment architecture level and solution architecture level are applied to update the agency EA and EA transition strategy.

Business investments and resources are fully aligned with the approved segment architecture

Segment architecture drives investment planning and resource allocation for a core mission area or common or shared service. Sufficient resources are identified and justified to execute the segment transition strategy and achieve measurable performance improvements.

Applying Segment Architecture

The development and use of segment architecture work products are critical elements to fulfill business and information management requirements and provide value to

business areas. Segment architecture development is triggered by both "top-down" (strategic) and "bottom-up" (tactical) drivers.

- Strategic drivers support the execution of the agency strategic plan and implementation of the agency EA. The EA transition strategy defines the relative priority and sequencing of individual segments to achieve strategic goals and is the principal driver for the development and implementation of segment architecture.

- Tactical drivers include the definition of new or revised requirements at the program or organizational level, and the identification of program, process, or system performance gaps. Audit findings, program assessments, customer satisfaction surveys, and other information sources are examples of tactical **change drivers**. Specific drivers are mapped to the agency EA to identify the need to develop or update segment-level architecture.

Segment architecture work products are used across each phase of the Performance Improvement Lifecycle and provide a bridge between the agency enterprise vision (EA and EA transition strategy) and the implementation of business and information management solutions. Figure 2-1 illustrates the role of segment architecture in linking EA with project execution and performance measurement, as well as feedback loops between segment architecture development, project execution, and the development and maintenance of EA.
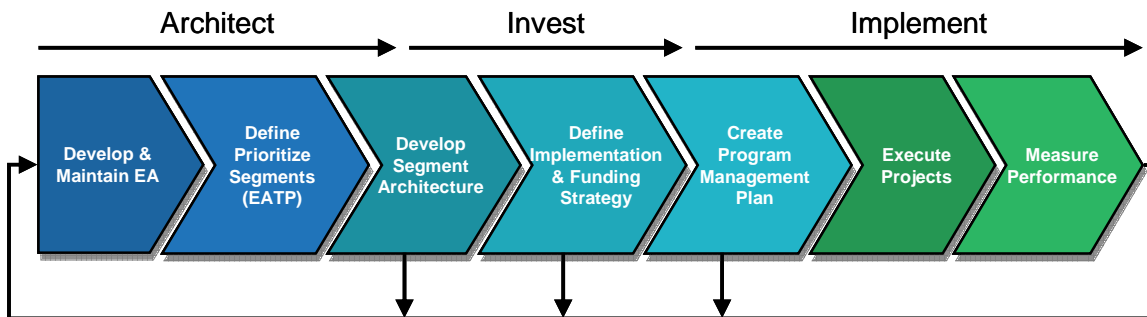
Figure 2-1: Linking EA with Project Execution

Table 2-1 describes a series of roles for segment architecture during each lifecycle phase and describes the benefits from using segment architecture.

Phase	Role	Benefit(s)
Architect	Provides a standard process to facilitate collaboration with business stakeholders.	• Increases the frequency and quality of interactions between EA program staff and business and technical stakeholders improving business and IT planning and decision-making. • Improves alignment of business and IT transformation initiatives with agency EA identifying opportunities to share assets and apply enterprise and government-wide standards.

Phase	Role	Benefit(s)
Architect	Provides a structure and methodology to establish clear line of sight from segment-level change drivers to measurable performance improvements.	• Delivers value to agency **core mission area**s through the development of business-driven, results-oriented architecture, and implementation plans. • Demonstrates the value of agency-level EA by addressing priority business and information management requirements.
Architect	Defines relationships between core mission areas and business and enterprise services, agency EA, and cross-agency initiatives.	• Improves government-wide collaboration identifying opportunities to reuse common or shared business processes, data, and services.
Invest	Describes detailed business-driven architecture and implementation alternatives to support IT business case development and budget formulation.	• Promotes the development and approval of results-oriented architecture in advance of IT investment and budget formulation improving investment decision-making and portfolio management. • Increases alignment of IT business cases and agency budgets with the agency mission and vision. • Improves the quality of supporting documentation for IT investment business cases and budget formulation.
Invest	Links architecture development and IT investment.	• Consolidates IT investments around core mission areas, business services, and enterprise services simplifying the allocation of agency resources and increasing the efficiency and effectiveness of IT investments. • Increases alignment of the IT portfolio with agency EA and cross-agency initiatives supporting opportunities for government-wide collaboration and reuse.
Implement	Defines a detailed Program Management Plan (implementation plan) including the definition of individual executable projects and project milestones linked to measurable performance improvements.	• Accelerates the initiation of individual implementation projects and program activities. • Provides a framework to measure performance and validate target benefits (e.g., cost savings, cost avoidance, improved mission performance, technology standardization). • Provides detailed information to maintain EA and EA transition strategy.

Phase	Role	Benefit(s)
Implement	Provides an approved **target architecture** for the implementation of business and information management solutions.	• Enhances lifecycle management and governance processes by providing a shared vision for business and IT transformation. • Increases the alignment of business processes, information assets, and information technology solutions with the agency EA and relevant cross-agency initiatives increasing operational efficiency and effectiveness.

Table 2-1: Segment Architecture Roles and Benefits

Stakeholders

As with all levels of architecture development, involving the appropriate stakeholders in the development process is critical to successful segment architecture. Segment architecture development is conducted by an integrated project team (IPT) comprising of business subject matter experts, enterprise architects, and technical subject matter experts. IPT activities and meetings are coordinated and managed by a Program Manager.

A collaborative approach to segment architecture development increases stakeholder buy-in and enhances the segment architecture development process. The IPT asks and answers questions about business and information management requirements, makes informed decisions about the nature and priority of improvement opportunities and helps to achieve target **performance goals**. The responsibilities of members of the segment architecture IPT and other principal stakeholders are described in Table 2-2 below:

Role	Characteristics and Responsibilities
Senior Management	• Set agency strategic goals and priorities. • Define business drivers, business issues, and target performance goals for the agency.
Program Manager	• Coordinates and manages all IPT activities during segment architecture development and maintenance. • Applies segment architecture work products to develop an IT investment business case and program management plan. • Maintain line of sight from programs and projects to the agency strategic goals and objectives.
Business Owners (SMEs)	• Define change drivers and business and information management requirements for the segment. • Identify goals and objectives and performance measures.
Chief Architect and EA Team (Enterprise Architects)	• Share knowledge and information and serve as an advocate for architecture development and implementation within the agency. • Support the governance structure and help promote the use of common technologies, standards, and services.

Role	Characteristics and Responsibilities
	• Provide a common structure for the segment architecture development. • Provide universal components of the EA that are inherited and used by segments and solutions. • Identify new performance improvement opportunities. • Define and institutionalize sound architecture development processes. • Advocate common goals and objectives in architecture programs. • Communicate new mandates or initiatives at the enterprise level. • Communicate and share information where critical intersections occur between segments.
CPIC Lead	• Support development of segment funding strategy and business cases. • Promote consolidation of IT investment business cases.
Government and Industry Partners	• Define areas of collaboration and commonality. • Define process overlaps and data exchanges.
Project Managers	• Execute projects that have been identified in the planning stage in a way that is aligned with the target segment architecture and are documented as part of the target architecture or transition plan. • Ensure project teams adhere to standard lifecycle development processes and best practice.
Solution Architects	• Inherit universal, common, and unique elements of the enterprise and segment architecture to support solutions development. • Adhere to technology standards and use of common technologies and services to promote architecture implementation.
Security Personnel	• Account for information that is used and is compliant with the Federal Information Security Management Act (FISMA) requirements and reporting. • Define security requirements. • Identify where security is a critical element in a business process, data, application, or technology in use by an application or process within the segment.

Table 2-2: Segment Architecture Stakeholders

Prerequisites and Success Factors

Effective segment architecture development and use are dependent upon the following series of lifecycle processes, activities and other prerequisites:

- Execution of a process to identify and capture strategic and tactical drivers and trigger the development and maintenance of segment architecture for core mission areas, business services and enterprise services;

- Implementation of a common architectural framework for EA and segment architecture development and maintenance, including architecture work products;

- Definition of a repeatable process for stakeholder collaboration and segment architecture development and maintenance;

- Execution of governance and management processes to review and approve segment architecture and reconcile work products with the agency EA;

- Execution of a communication and outreach strategy to educate business stakeholders on the value of segment architecture as an element of the Performance Improvement Lifecycle process.

Segment architecture development should be driven by the needs of the core mission areas, business services or enterprise services it supports. The following success factors reflect agency best practice and can be applied to enhance the effectiveness of segment architecture development and implementation.

Identify the key business questions the segment architecture should address

Software development initiatives not firmly anchored to the specific user requirements are likely to fail. The same principle holds true for the development of segment architecture where the users (or clients) are the owners and managers of agency lines of business. Effective segment architecture must be driven to provide the information decision-makers need to manage their business more efficiently and effectively.

Select work products from the segment architecture framework to support business questions

The Program Manager should work with the IPT to identify the architecture products to be used to answer business questions. The selection of architecture products should be driven by priority requirements identified by the business owners and managers, and should focus on products – models, reports, presentations, documents, or other deliverables – able to be developed in reasonable time with available resources.

In many cases, the most helpful products are simple concept diagrams or decision menus concisely summarizing available alternatives, or other simple presentations and analysis reports. The measure of a segment's architecture worth is not compliance with a mandate, but its use by agency business managers and other stakeholders.

Focus work product development on priority business questions

The IPT should focus on identifying data sources to develop segment architecture work products and answer business questions. By focusing collection activities on gathering data to answer the highest-priority business questions, the IPT ensures it is not "boiling the ocean" by collecting unneeded data. It is often helpful to focus on "quick wins" to demonstrate value before branching out to other business questions.

Monitor progress, measure performance, and verify outcomes

Segment architecture, like enterprise architecture, is most effective when there are well-documented and clearly understood performance milestones. These milestones should reflect measurable outcomes so the IPT and other stakeholders can assess the effectiveness of segment architecture during each step of development and

implementation. The Program Manager should consider developing a scorecard or checklist to monitor progress, evaluate segment architecture completion, and demonstrate results.

Segment Architecture Concepts

Segment Architecture Content

Segment architecture comprises a series of work products describing **baseline architecture**, target architecture, and a transition strategy for a defined segment of the enterprise. Work products document segment-level change drivers, describe baseline and target performance, business, data, services and technology architecture, and provide an implementation plan to achieve measurable performance improvements.

Segment architecture work products are developed using standard formats and content guidelines aligned with the agency EA framework, and provide a sufficient level of detail to support decision-making during each phase of the Performance Improvement Lifecycle. Standard work product content and formats promote collaboration and reuse by facilitating the reconciliation of segment architecture work products with the agency EA and relevant cross-agency initiatives found in the *Federal Transition Framework*.

Based upon government and agency best practices, segment architecture work products are developed using a standard work process consisting of three phases: "Analyze", "Define", and "Operate"*.*

- **Analyze Phase:** Defines the scope of the architecture and requirements for change. Outlines current business and information management environment and high-level opportunities for performance improvement.

- **Define Phase:** Defines the target architecture to support business and information requirements, and outlines implementation alternatives. Describes a transition strategy culminating in the development of a business case for IT investment and budget formulation.

- **Operate Phase:** Develops a program/project management plan to support the implementation of the target architecture and provides a link to project execution and solution development. All architectural work products are updated as new or revised requirements are defined during project execution, solution implementation, and performance measurement.

Specific architectural work products are developed to support decision-making as a segment matures and moves through each phase of the Performance Improvement Lifecycle. Table 2-3 lists sample segment architecture work products and provides a crosswalk between each phase of the **segment architecture process** and the

Performance Improvement Lifecycle. Appendix B (Key Terms) provides a brief description of each architectural work product.

	Phase	Performance Improvement Lifecycle		
		Architect	Invest	Implement
Segment Architecture Process	Analyze	- Change Drivers - **Vision Statement** - Performance Goals - Baseline Architecture		
	Define	- Target Architecture - Cross-Agency Initiatives - **Alternatives Analysis** (cost-benefit) - Transition Strategy	- Business Case	
	Operate	- Target Architecture (Revised)	- Business Case (Revised)	- Program/Project Management Plan (Implementation Plan) - Solution Architecture - **Performance Measurements**

Table 2-3: Sample Segment Architecture Work Products

Segment Architecture Development

Segment architecture development provides a simple and powerful technique for the Chief Architect and EA program staff members to collaborate with business stakeholders to implement the agency EA and deliver value to core mission areas. The segment architecture process and associated work products outline a methodology to ask and answer questions about business and information management requirements, and make informed decisions about the nature and priority of opportunities to implement target architecture and achieve target performance goals. The resulting segment architecture is a shared vision for business and IT transformation within a core mission area or common service.

Segment architecture development is conducted by an IPT with activities and meetings led by a Program Manager. The Program Manager, business subject matter experts, and enterprise architects participate in each phase of segment architecture development, but the composition of the IPT evolves as the segment moves though each phase of the segment architecture process. For example, IT investment management staff members participate during the "Define" phase to support the development of an IT investment business case. Similarly, technical project managers and system engineers participate to support the "Operate" phase and development of solution architecture.

Table 2-4 identifies the IPT members playing prominent roles to drive the segment architecture development process and provides a crosswalk between the process and Performance Improvement Lifecycle.

	Phase	Performance Improvement Lifecycle		
		Architect	Invest	Implement
Segment Architecture Process	Analyze	- Program Manager - Strategic Planner - Business SMEs - Enterprise Architect		
	Define	- Program Manager - Business SMEs - Business Architect - Data Architect - Application Architect - Technical Architect - Security Architect - IT Operations	- ITIM Liaison	
	Operate	- Program Manager - Business SMEs - Business Architect - Data Architect - Application Architect - Technical Architect - Security Architect - IT Operations	- ITIM Liaison	- Contract/Acquisition Specialist - Project Managers - System Engineers - Quality Assurance

Table 2-4: Integrated Program Team (IPT) Members

Segment architecture development is controlled by EA governance and management processes across each phase of the Performance Improvement Lifecycle. Governance and management processes are implemented to:

- Review segment architecture work product content and format standards to promote reconciliation with the agency EA and relevant cross-agency initiatives;

- Validate opportunities for agency-level and cross-agency collaboration and reuse;

- Review and approve segment architecture in advance of IT investment and project execution;

- Capture segment-level business and information management requirements to update and maintain the agency EA; and

- Capture lessons learned to improve the segment architecture process and standard work products.

Segment Identification and Integration

Enterprise segments are identified during the development of the agency EA and EA transition strategy.

The agency-level transition strategy describes a logical sequencing plan for the development and implementation of segment architecture. Section 4 describes the content of the EA transition strategy and the relationship between segment architecture and the EA transition strategy. The Chief Architect and agency EA program staff, in close collaboration with internal stakeholders, facilitate all activities to develop agency-level EA and the EA transition strategy, including the identification and prioritization of enterprise segments.

Segment identification is a continuous, iterative process. Enterprise assets including systems and IT investments are mapped to the agency-level reference models to create a segment-oriented view of the enterprise (see Figure 2-2).

Enterprise Assets

- **Programs**
- **Processes**
- **Information**
- **Applications**
- **Technology**
- **Investments**
- **Personnel**
- **Organizations**
- **Facilities**

Reference Models

| Performance |
| Business |
| Data |
| Services |
| Technology |

Segments

- **Core Mission Areas**
- **Common Business Services**
- **Common Enterprise Services**
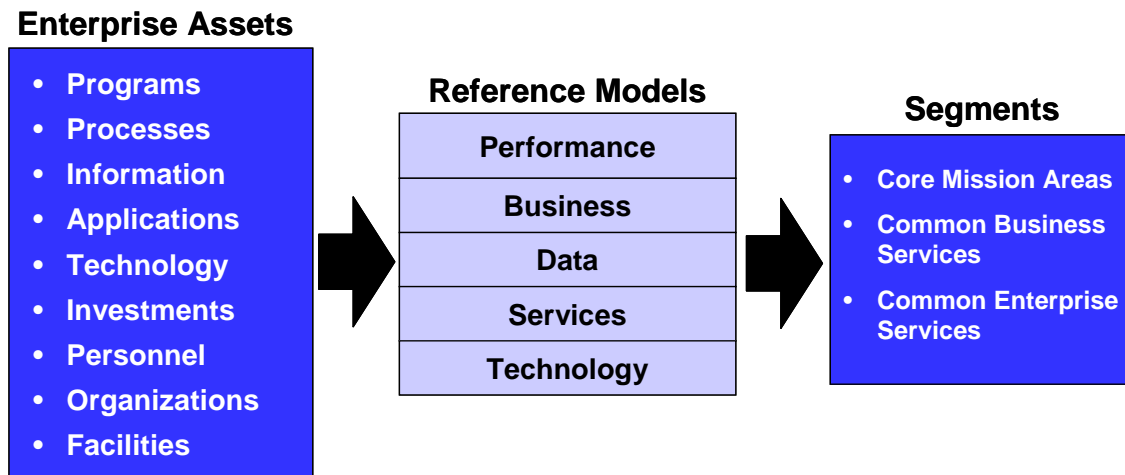
Figure 2-2: Segment Identification

Segment identification applies a variety of internal and external inputs such as the agency mission statement, agency strategic goals and objectives, legislative mandates, common or shared business and information requirements, and cross-agency initiatives found in the *Federal Transition Framework*. This process organizes and consolidates enterprise assets into logical groups aligned with a common purpose (mission area) or common service, and identifies segments in three categories: core mission areas, business services, and enterprise services.

Table 2-5 provides a summary description of each segment type including the related architectural reference model and segment owner.

Segment Type	Description	FEA Reference Model	Segment Owner
Core Mission Area	Unique service areas defining the mission or purpose of the agency. Core mission areas are defined by the agency Business Model (BM) (e.g., tactical defense, air transportation, energy supply, pollution prevention and control, and emergency response).	Business Reference Model: Services for Citizens	Business Area
Business Service	Common or shared business services supporting the core mission areas. Business services are defined by the agency BM and include the foundational mechanisms and back office services used to achieve the purpose of the agency (e.g., inspections and auditing, program monitoring, human resource management, and financial management).	Business Reference Model: Mode of Delivery, Support Delivery of Services, Management of Government Resources	Office of the Chief Information Officer (OCIO), support office or Program Management Office (PMO)
Enterprise Service	Common or shared IT services supporting core mission areas and business services. Enterprise services are defined by the agency Service Model (SM) and include the applications and service components used to achieve the purpose of the agency (e.g., knowledge management, records management, mapping/GIS, business intelligence, and reporting).	Service Component Reference Model	OCIO, support office or Program Management Office (PMO)

Table 2-5: Segment Types

The segment owner has primary responsibility for the development and implementation of segment architecture. Business areas are responsible for the development of segment architecture for core mission areas while the OCIO, a support office or PMO is responsible for development of segment architecture for common business services and enterprise services.

Segment architecture is not developed and implemented independently of other segment types. Development and implementation of segment architecture for a core mission area incorporates approved segment architecture for appropriate business services and enterprise services. Similarly, segment architecture for an enterprise service reflects business and information requirements defined by relevant core mission areas and business services.

Figure 2-3 illustrates the relationships between core mission areas, business services, and enterprise services with the agency. The relationships and dependencies between each segment type are defined and maintained by EA program staff in the agency EA transition strategy.

Segments

Core Mission Areas define the unique purpose of the agency		Aircraft Inspections	Home Mort. Insurance	Grain Inspections	Education Grants	Tactical Defense	Pollution Prevention & Control	Energy Supply
Business Services	Inspections and Auditing	X		X			X	
	Financial Management				X			
	Direct Loans		X					
	Program Monitoring					X	X	X
Enterprise Services	Knowledge Management	X			X			
	Geospatial Mapping		X			X		X
	Reporting	X	X	X	X	X	X	X

Figure 2-3: Segment Types

Initiating Segment Architecture

The development and maintenance of the agency EA and EA transition strategy identify and define enterprise segments and prioritize opportunities to develop and implement segment architecture.

If the agency EA and EA transition strategy have not been developed to a sufficient level of detail to support segment identification and prioritization, EA program staff can execute the following steps to identify candidate segments and initiate segment architecture development with business stakeholders. Stakeholder commitment must be attained to support each step in this process and ensure business and technical subject matter experts are assigned to initiate, develop, and maintain segment architecture.

Step 1: Define and prioritize business and information management needs, and architectural change drivers.

This step identifies key business and information management requirements, and significant strategic, policy, legislative, management, and performance drivers impacting the agency. Elements of the approach to define requirements and drivers include:

- Review major IT investments and business transformation and modernization initiatives currently underway within the organization to identify relevant requirements and drivers; and

- Compile information on current "pain points" to identify opportunities for performance improvement for core mission areas or common services. Pain points can come from audit findings, documented performance gaps, **Program Assessment Rating Tool** (PART) scores, stakeholder satisfaction surveys, or other sources.

Step 2: Define, review, and prioritize candidate opportunities to improve agency performance

This step highlights business needs and change drivers offering the most significant opportunities to increase the efficiency and effectiveness of agency operations. Elements of the approach to define and prioritize candidate opportunities include:

- Identify criteria to evaluate, prioritize, and select opportunities. Evaluation criteria include (but are not limited to) the impact of opportunities on agency performance, the relative complexity and/or difficulty to fulfill business needs and address change drivers, legislative or executive mandates, and relevant program and project dependencies; and

- Apply evaluation criteria to prioritize opportunities.

Step 3: Identify candidate segment(s)

This step maps priority opportunities (business needs and change drivers) to the agency business model and service model to identify candidate segments. Core mission areas and business services are identified in the business model and enterprise services are identified in the services model (see Table 2-3).

Business needs and change drivers are also mapped to cross-agency initiatives to identify common or reusable services or solutions that can be applied to meet agency requirements. Common or reusable services support development of segment architecture and implementation of business and information management solutions to achieve performance improvements.

Step 4: Select a segment and identified resources needed to develop segment architecture

This step identifies management support and business and technical expertise required to execute segment architecture development and integration. Based upon the scope of the selected segment, resources can be identified from multiple program areas and support offices. At minimum, candidate resources should be identified for the following roles:

- Management sponsor(s) or champion(s);

- Qualified program manager; and

- Candidate IPT members (business and technical subject matter experts).

Step 5: Establish segment architecture IPT

This step formally initiates the segment architecture development process by establishing the Integrated Program Team (IPT). Meetings are conducted with the business champion(s) and other principal stakeholders to review resource requirements and the schedule to complete segment architecture development; and assign business and technical subject matter experts to the IPT.

Section 3 provides step-by-step guidance to develop segment architecture.

Section 3: Developing Segment Architecture

This section provides step-by-step guidance to develop segment architecture for core mission areas and common services defined by the agency EA and EA transition strategy. It outlines the segment architecture development process and describes the individual business questions, development activities, and outcomes for each step in the process.

Step-by-Step Guidance

Figure 3-1 illustrates the relationship or crosswalk between each phase of the Performance Improvement Lifecycle and the steps (1 through 4) in the segment architecture development process.
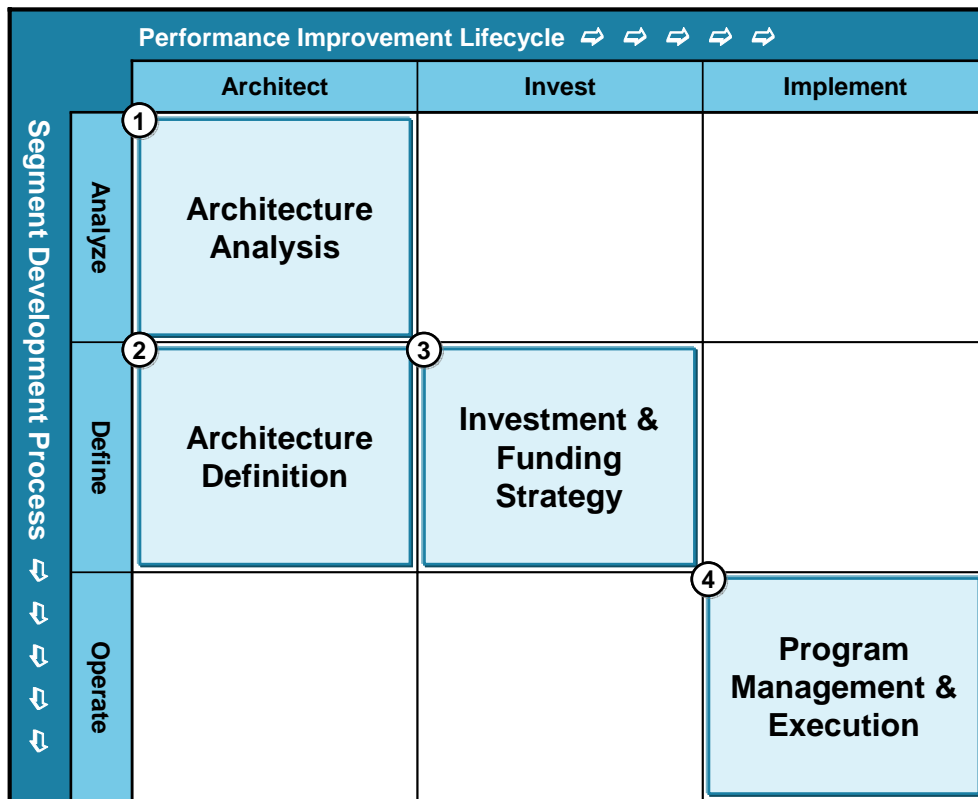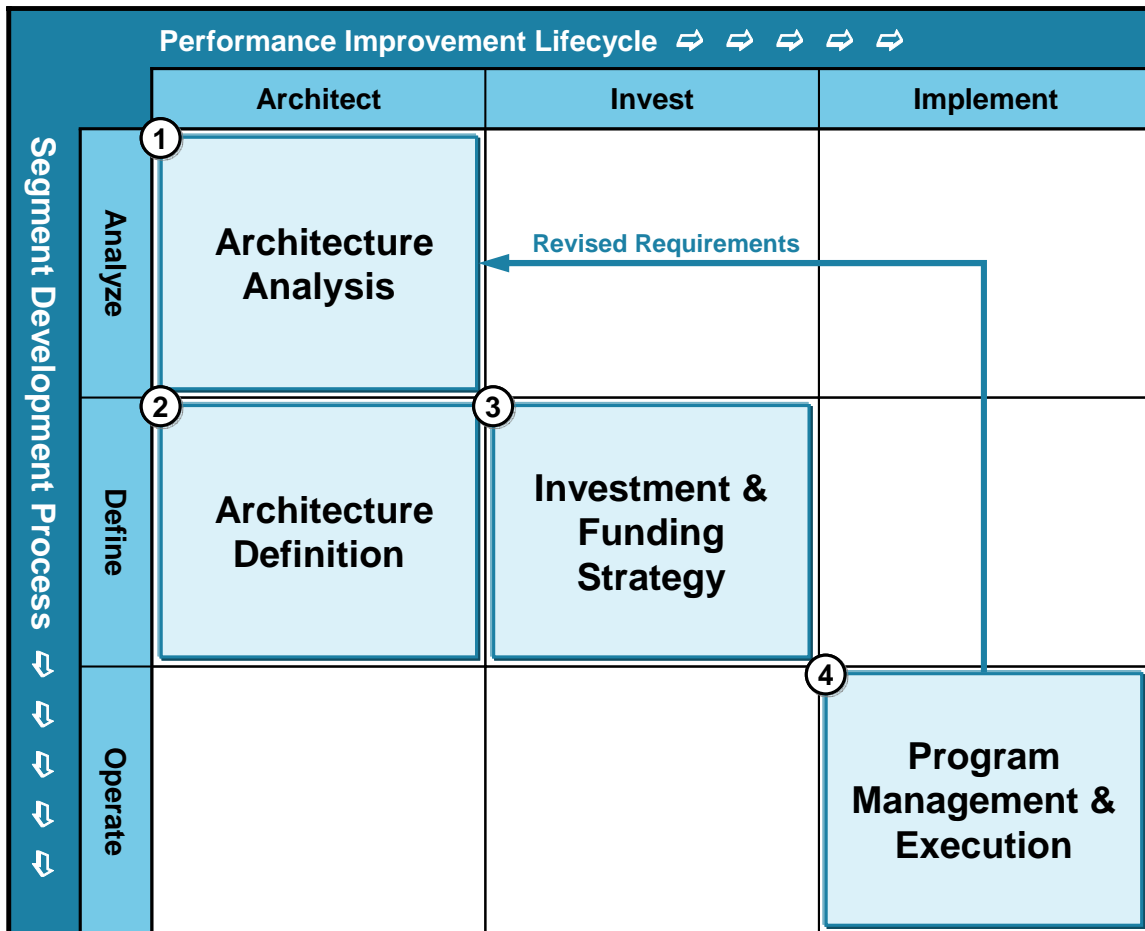
Performance Improvement Lifecycle ⇨ ⇨ ⇨ ⇨ ⇨			
	Architect	**Invest**	**Implement**
Analyze	① **Architecture Analysis**		
Define	② **Architecture Definition**	③ **Investment & Funding Strategy**	
Operate			④ **Program Management & Execution**

Segment Development Process ⇩ ⇩ ⇩ ⇩ ⇩ ⇩

Figure 3-1: Segment Architecture Development

Segment architecture work products support lifecycle processes including IT investment management, program and project management, and systems development. New and revised business and information requirements are continuously identified as the segment moves though each lifecycle phase, and as business and information management solutions are funded and developed to meet stakeholder requirements. Consequently, segment architecture work products must be maintained to reflect these

inputs. Figure 3-2 illustrates a feedback loop from the program management and execution step providing new or revised requirements to the architectural analysis step.


Figure 3-2: Segment Architecture Development and Maintenance

The following sections provide step-by-step guidance to develop and maintain segment architecture to support the Performance Improvement Lifecycle. Guidance is divided into two sections – "Segment Architecture Development" and "Segment Architecture Maintenance" – and is provided using a standard outline describing the questions to be answered in each step, the activities and work products (deliverables) to answer each question, and specific outcomes. Outcomes represent a decision point or milestone that must be achieved to move onto the next step in the process.

Segment Architecture Development

The segment architecture development process asks and answers a series of questions to establish clear relationships between strategic goals, detailed business and information management requirements, and measurable performance improvements. Each step in the development process comprises a series of questions to be answered by the IPT to enhance decision-making.

Step 1: Architectural Analysis
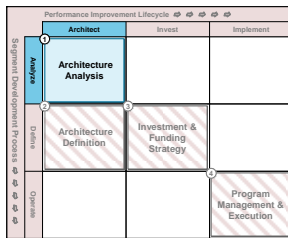
The purpose of this step is to define a simple and concise vision for the enterprise segment and relate the vision to the agency strategic plan. During this step the IPT considers current change drivers, including key strategic, legislative, management, and performance requirements to identify opportunities to achieve performance improvements. The primary questions to be answered during this step are:

✓ *What is the scope of the segment?*

This question is answered by developing a simple conceptual diagram and summary description defining the current scope of the enterprise segment and the existing operational environment (including stakeholders, processes, applications, and information exchanges). Defining segment scope helps build consensus within the IPT on the range of opportunities for improvement and helps focus IPT working sessions. Whenever possible, the IPT should use the EA knowledgebase to compile information on segment scope and the current operating environment.

✓ *What are the primary change drivers impacting the segment?*

This question is answered by identifying and describing new or revised business requirements and other change drivers impacting the segment. Change drivers help justify segment architecture development and implementation, and include both strategic requirements and tactical requirements such as legislative changes, the identification of performance gaps, and changes in stakeholder requirements. The IPT should consider a broad range of inputs when identifying change drivers including the agency strategic plan, enterprise architecture, executive directions, audit findings, performance assessments, stakeholder surveys, and other inputs.

✓ *What are the current segment systems and resources?*

This question is answered by compiling information describing the baseline or "as-is" architecture for the segment. Baseline information is compiled for each architectural layer – performance, business, data, services, and technology – plus current systems, investments, and personnel. Information should be collected to a sufficient level of detail to support the identification of performance improvement opportunities (e.g. improved service to citizens, improved mission performance, cost savings/avoidance, technology standardization, and improved management and use of information).

✓ *What are the deficiencies or inhibitors to success within the segment?*

This question is answered by reviewing current segment assets and change drivers to identify and document opportunities to improve agency performance and achieve measurable results. Candidate opportunities should be linked to relevant change drivers and prioritized based upon their relationship to specific deficiencies, such as audit findings, Inspector General (IG) or GAO recommendations, and PART ratings, and their association with legislative mandates, mission priorities, performance goals and

other criteria. The IPT can update the simple diagram and text description describing segment scope to illustrate and describe priority opportunities for improvement within the context of the current operating environment.

✓ *What is our vision for the segment?*

This question is answered by creating a simple one-page graphic illustrating the vision for the segment. The conceptual diagram should describe the proposed operating environment including planned changes to stakeholder interactions, business processes, information sharing, applications, and technology to resolve documented deficiencies and achieve measurable performance improvements. The concept graphic should be complemented by a summary vision statement describing the proposed operating environment and relevant links to strategic goals and objectives.

Architecture Analysis: Activities

Table 3-1 below lists the major activities required to answer the primary questions for the step, along with each activity's stakeholders and key deliverables.

| Activity	Stakeholder(s)	Deliverables
Develop concept diagram describing segment scope and current operational environment.	- Program Manager - Business Owners (SME) - Enterprise Architect	- One-page "as-is" or baseline illustration and summary text description.
Identify new or revised requirements and change drivers.	- Program Manager - Business Owners (SME) - Enterprise Architect	- Summary list of change drivers and associated information sources.
Compile baseline architecture and segment assets.	- Program Manager - Business Owners (SME) - Enterprise Architect	- Baseline Architecture (across all architectural layers) - Legacy System Portfolio - Segment Investment Portfolio - Current Staff Resources
Identify and document opportunities for improvement.	- Program Manager - Business Owners (SME) - Enterprise Architect	- Annotated baseline concept diagram - Ordered list of opportunities for improvement
Illustrate segment vision.	- Program Manager - Business Owners (SME) - Enterprise Architect	- Vision diagram - Vision statement

Table 3-1: Architecture Analysis Activities

Architecture Analysis: Outcomes

Consensus on the priority opportunities for improvement for the enterprise segment: The identification of prioritized opportunities defines the scope of the target segment architecture to be developed in the following step.

Step 2: Architectural Definition
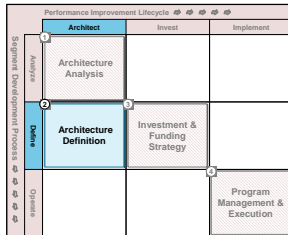
The purpose of this step is to define the "to be" state of the segment and develop a plan for achieving that state. During this step, the IPT will determine the performance goals for the segment, establish target segment architecture, and develop the segment transition strategy. This step should be completed prior to the beginning of the agency's Capital Planning and Investment Control (CPIC) process. The primary questions to be answered during this step are:

✓ *What are the performance goals for the segment?*

This question is answered by establishing the performance goals for the segment including specific performance metrics, measurable performance targets, and the timeframes when the agency will achieve the performance targets. The performance goals form the basis of the performance layer of the target segment architecture and should be reconciled with the agency EA and agency strategic plan to establish a line of sight between the segment performance goals and the agency's overall strategic goals. The IPT uses the performance goals to determine the performance gaps that need to be closed.

✓ *What are the design alternatives for achieving the performance goals?*

This question is answered by evaluating design alternatives for achieving the performance goals. The IPT should review the cross-agency initiatives in the *Federal Transition Framework* to determine if any are relevant to the segment and if so, whether some or all of a cross-agency initiative can be reused as part of the target segment architecture. The IPT should also conduct market research to evaluate any existing assets, systems, components, services, or best practices that could be reused or applied as a part of the target segment architecture. The alternatives analysis should consider risk-adjusted costs and benefits. The IPT uses the alternatives analysis to guide the development of the target segment architecture.

✓ *What is the target architecture for the segment?*

This question is answered by developing the target segment architecture. This includes the segment's established performance goals, as well as the business, data, services, and technology architecture that supports those performance goals. The target segment architecture should be mapped to the FEA Reference Models. It should also describe the systems required in the target environment, as well as those being consolidated. The IPT will use the target segment architecture to develop the segment transition strategy.

✓ *What projects are required to achieve the target architecture and in what order should they be executed?*

This question is answered by developing the segment transition strategy. The IPT should use the target segment architecture to identify gaps to be closed to achieve the target state and define projects to close the gaps. The IPT prioritizes the projects, determines dependencies among the projects, and sequences the projects in the order they should be executed. The IPT captures the results of these activities in the segment transition strategy. The IPT and Chief Architect work together to reconcile the target segment architecture and transition strategy with the agency's EA to ensure consistency with the rest of the enterprise.

Architecture Definition: Activities

Table 3-2 below lists the major activities required to answer the primary questions for the step, along with each activity's stakeholders and key deliverables.

Activity	Stakeholder(s)	Deliverables
Establish the performance goals for the segment.	- Program Manager - Business Owners (SME) - Enterprise Architect	- Performance layer of the target segment architecture
Conduct analysis to evaluate design alternatives for achieving the performance goals.	- Program Manager - Business Owners (SME) - Enterprise Architect	- Market research - Alternatives analysis
Develop the target segment architecture.	- Program Manager - Business Owners (SME) - Enterprise Architect	- Business, data, services, and technology layers of the target segment architecture
Develop segment transition strategy.	- Program Manager - Business Owners (SME) - Enterprise Architect	- List of projects to be executed - Segment transition strategy including a project sequencing plan
Reconcile the target segment architecture to the agency EA.	- Program Manager - Business Owners (SME) - Enterprise Architect - Chief Architect	- Reconciled enterprise architecture and segment architecture

Table 3-2: Architecture Definition Activities

Architecture Definition: Outcomes

Consensus on the target segment architecture and transition strategy: The target segment architecture and transition strategy support the creation of a project funding strategy, and the creation of business cases for investments required to implement the target segment architecture.

Step 3: Investment and Funding Strategy
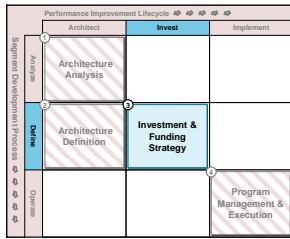
The purpose of this step is to define a funding strategy for project execution and develop the business cases to justify investments in the CPIC process. This step should be completed prior to submitting the agency's budget to the Office of Management and Budget (OMB). The primary questions to be answered during this step are:

✓ *What is the funding strategy for the projects?*

This question is answered by creating a funding strategy for the projects identified in the segment transition strategy. The IPT works with the CPIC Lead to analyze funding alternatives for the projects using the project sequencing plan in the segment transition strategy. This includes identifying and evaluating possible funding sources and approaches. The funding strategy should consider consolidating resources from existing investments identified in the target segment architecture. The IPT and CPIC Lead develop a funding strategy to ensure the necessary funding is available when needed to implement the target segment architecture.

✓ *What is the justification for the investments required to implement the target segment architecture?*

This question is answered by developing business cases for the investments supporting the projects identified in the segment transition strategy. The business case includes information from the architectural analysis, target segment architecture, and project funding strategy. The IPT works with the CPIC Lead to produce the remaining information required by the agency's CPIC process. This information supports the selection of individual IT investments included in the agency's IT investment portfolio.

Investment and Funding Strategy: Activities

Table 3-3 below lists the major activities required to answer the primary questions for the step, along with each activity's stakeholders and key deliverables.

| Activity	Stakeholder(s)	Deliverables
Analyze funding alternatives	- Program Manager - CPIC Lead	Funding alternatives analysis
Create the funding strategy for the projects	- Program Manager - CPIC Lead	Project funding strategy
Develop business cases for the investments	- Program Manager - Business Owners (SME) - Enterprise Architect - CPIC Lead	Business cases (Exhibit 300s)

Table 3-3: Investment and Funding Strategy Activities

Investment and Funding Strategy: Outcomes

IT investment portfolio with an approved funding strategy: The project funding strategy defines the approach and activities needed to provide a funding stream to support the execution of projects identified in the segment transition strategy. The selection of IT investments as part of the agency's IT investment portfolio determines the individual projects included in the program management plan.

Step 4: Program Management Plan and Execute Projects
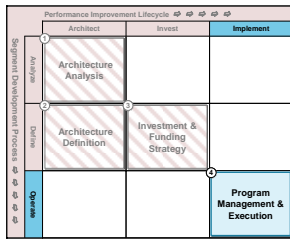
The purpose of this step is translating the segment architecture and funding strategy into a program management plan defining the nature and scope of individual projects required to implement the segment architecture, and dependencies between the segment (program), other agency initiatives, and relevant cross-agency initiatives. The program management plan includes a performance improvement strategy defining progress milestones linked to performance improvement goals and is used to update and maintain the agency EA transition strategy. The primary questions to be answered during this step are:

✓ *How do we use available resources to achieve target performance goals?*

This question is answered by developing a detailed, executable program management plan describing the individual implementation projects, and the logical sequencing of projects to achieve the target segment architecture. The program management plan should be developed to a sufficient level of detail to allow project managers and system developers to understand the scope and duration of individual projects and the relationships between implementation tasks and activities. The program management plan should also clearly define the relationships with other agency initiatives (programs) and cross-agency initiatives.

✓ *What is the nature of individual solutions to implement the target segment architecture and achieve performance goals?*

This question is answered by executing individual projects defined by the program management plan and developing solution architecture for elements of the target segment architecture. Individual projects should be executed in accordance with agency project management guidelines, and solution architecture defined and implemented in accordance with the agency system development methodology. Segment architecture work products can be reused to initiate the system development lifecycle and define requirements and standards to develop solution architecture. Solution architecture is developed in compliance with the approved segment architecture and enterprise architecture and verified using governance processes to ensure standards compliance and reuse.

✓ *How well are we progressing towards achieving target performance goals?*

This question is answered by defining and monitoring performance indicators and target performance measures to verify target performance improvements. The program management plan defines target performance measures linked to implementation milestones. Individual milestones with performance measures are selected and included in the EA transition strategy to measure progress toward the implementation of the segment architecture and target performance improvements.

Program Management and Execution: Activities

Table 3-4 below lists the major activities required to answer the primary questions for the step, along with each activity's stakeholders and key deliverables.

Activity	Stakeholder(s)	Deliverables
Develop a detailed, executable program management plan describing individual implementation projects.	- Program Manager	- Program Management Plan including project sequencing plan.
Execute individual implementation projects.	- Program Manager - Project Managers - Solution Architect - Project Teams	- Project Plan(s) - Solution Architecture
Define and monitor performance indicators and target performance measures.	- Program Manager - Enterprise Architect	- Performance Improvement Plan - EA Transition Strategy (Update) - Actual Performance Metrics

Table 3-4: Program Management and Execution Activities

Program Management and Execution: Outcomes

New or revised business and information management requirements: The development and implementation of solutions defines new requirements assimilated by the IPT and EA program staff to update the segment architecture and agency EA.

Performance metrics describing the impact of the development and implementation of segment architecture: Performance metrics for individual implementation milestones are applied to demonstrate increases in the efficiency or effectiveness of business and information management solutions, or as inputs to revise segment architecture and develop a corrective action strategy to resolve interim performance deficiencies.

Segment Architecture Maintenance

Segment architecture maintenance monitors and assimilates new business and information requirements, and applies these drivers to update segment architecture work products. This maintains clear relationships between agency strategic goals, business and information management solutions, and measurable performance improvements. During this step the IPT considers top-down drivers including recent changes to the agency enterprise architecture and new cross-agency initiatives, as well as bottom-up change drivers such as new requirements identified though the execution

of implementation projects and the development of business and information management solutions. The primary questions to be answered during this step are:

✓ *What are the new or revised change drivers for the segment?*

This question is answered by updating the list of architectural change drivers. New or revised change drivers serve as inputs to segment architecture maintenance activities and are applied to define the impact of new drivers on existing segment architecture work products. The IPT should monitor and assimilate both top-down and bottom-up change drivers including feedback loops from the development and implementation of business and information management solutions.

✓ *What is the impact of new change drivers on segment architecture work products?*

This question is answered by analyzing and prioritizing new change drivers and determining the impact of requirements on existing segment architecture work products. The Program Manager and IPT should develop an action plan to update relevant segment architecture work products to address priority drivers and include these actions in the program management plan. The action plan should include elements of the segment architecture development process required to revise the segment architecture and should be scheduled to support lifecycle processes such as IT investment management.

Segment Maintenance: Activities

Table 3-5 below lists the major activities required to answer the primary questions related to segment architecture maintenance, along with each activity's stakeholders and key deliverables.

Activity	Stakeholder(s)	Deliverables
Update list of architectural change drivers	- Program Manager - Business Owners (SME) - Enterprise Architect	Summary list of change drivers and associated information sources
Analyze and prioritize change drivers	- Program Manager - Business Owners (SME) - Enterprise Architect	Priority list of architectural change drivers
Determine impact of priority change drivers on segment work products and the program management plan	- Program Manager - Enterprise Architect	Updated program management plan

Table 3-5: Segment Maintenance Activities

Segment Maintenance: Outcomes

Allocation of resources to update relevant elements of the segment architecture:
The revised segment architecture is applied to support each phase of the Performance Improvement Lifecycle including IT investment management and project execution.
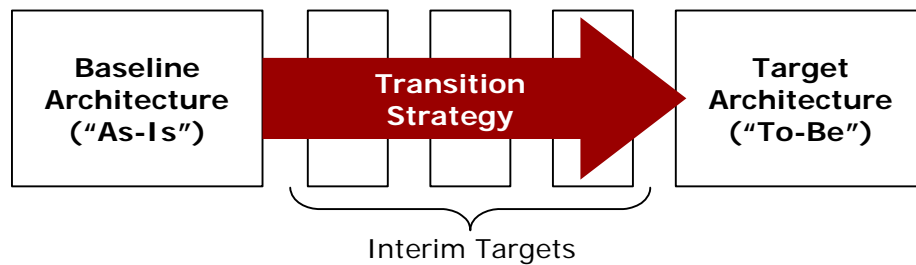
Section 4: EA Transition Strategy

This section describes how to develop and use an EA transition strategy to drive agency investment planning to achieve mission objectives and business results.

Transition Strategy Concepts

Transition Strategy in Enterprise Architecture

The EA transition strategy is a critical component of an effective EA. It describes the overall plan for an organization to achieve the target ("to-be") architecture within a specified timeframe. It clearly links proposed agency investments to the target architecture. Also, the transition strategy helps define logical dependencies between transition activities (programs and projects) and the relative priority of these activities (for investment purposes). Essentially, it is the multi-year plan to coordinate agency initiatives toward achieving the target architecture.

Figure 4-1: EA Transition Strategy: Baseline to Target

The scope of the EA transition strategy includes the entire agency. The transition strategy reflects segment architectures which can be associated with more specific bureau- or program-level units in the organization and can include cross-cutting segments within the agency. While the agency-wide transition strategy will be at a limited level of detail, segment architecture transition strategies are expected to be more detailed. These segment architecture transition strategies should be included as subsets of the EA transition strategy.

To create the transition strategy, both the baseline architecture and the target architecture should already be documented (or inventoried in an EA repository). The required detail and completeness of the baseline architecture should be to the level necessary for it to serve as the starting point for the transition strategy. The EA transition strategy should address the multi-year timeframe for which the agency's target architecture is defined (typically three to five years). As an agency's baseline and target architecture are updated periodically, the EA transition strategy should also be updated accordingly.

Transition Strategy in the Performance Improvement Lifecycle

Development of the EA transition strategy occurs during the "Architect" phase of the Performance Improvement Lifecycle. The transition strategy is a key product of the "Architect" phase that leads to a proposed investment portfolio in the "Invest" phase. Because the IT investment portfolio is generated from the architecture, the agency should be able to show progress toward achieving mission objectives and business results by implementing the investments in the portfolio.
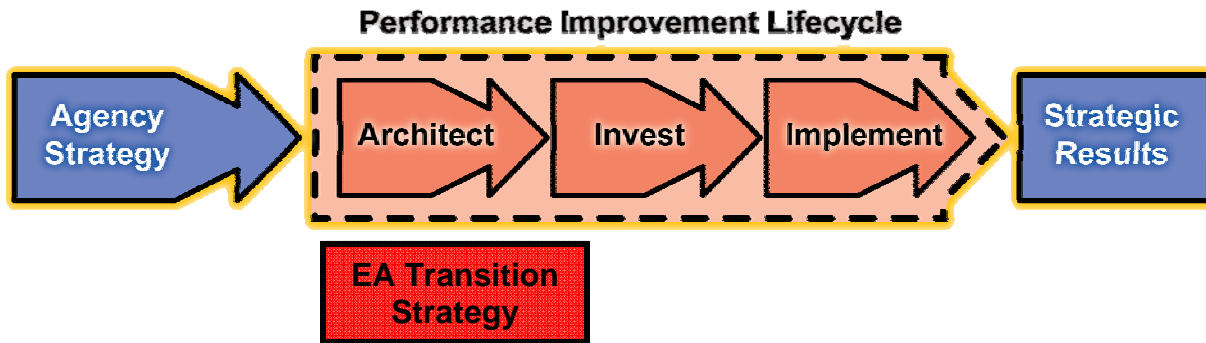

Figure 4-2: EA Transition Strategy in the Performance Improvement Lifecycle

Developing the Transition Strategy

The transition strategy is developed through a number of major steps. The details of how these steps are performed can vary from agency to agency based on a variety of factors, such as the organizational complexity of the agency, the scope of the agency's mission, and agency governance processes. The major steps to develop the transition strategy are:

Step 0: Establish baseline and target architectures (and identify segments);

Step 1: Perform redundancy and gap analyses;

Step 2: Refine and prioritize architecture segments;

Step 3: Lay out the enterprise sequencing plan;

Step 4: Develop segment architectures; and

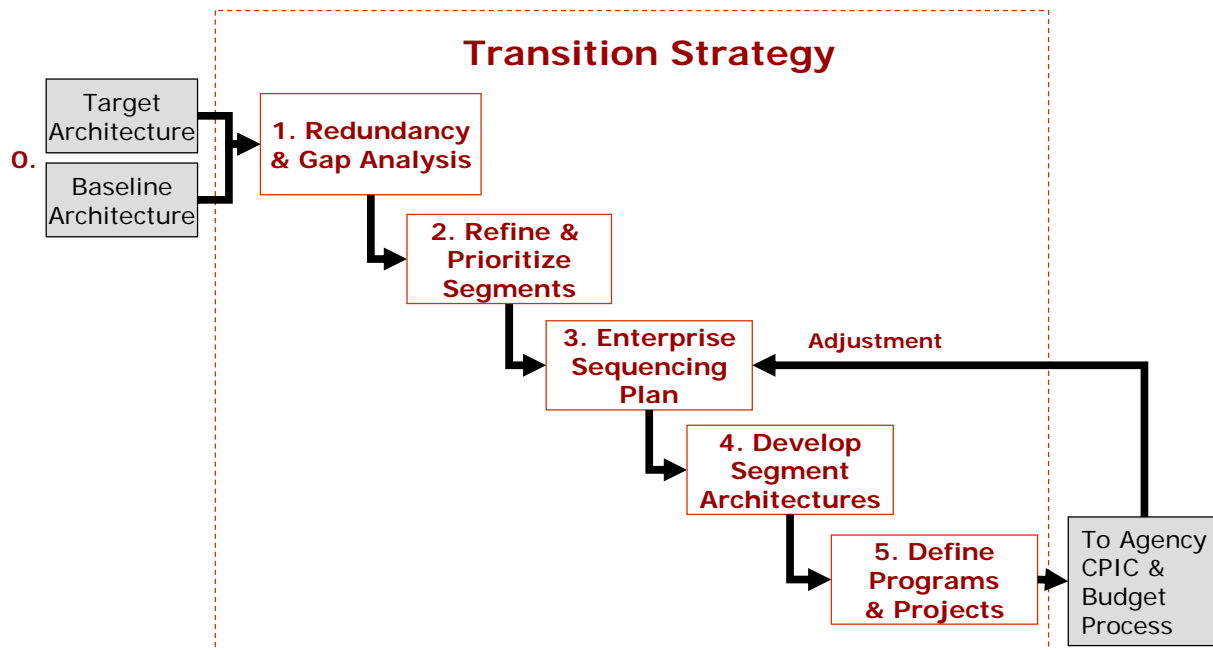Step 5: Define programs and projects.

Figure 4-3: Developing the EA Transition Strategy

Step 0: Establish Baseline and Target Architectures

Baseline and target architectures for the agency should be developed before the EA transition strategy, which is why this is enumerated as "Step 0". When developing the agency baseline and target architectures, architects need to work closely with the business owners to ensure the future state architecture meets the needs of the business and is focusing on priorities that will help the agency perform its mission more effectively. It is understood the agency target architecture will change over time as business needs and priorities change. As future plans are accomplished, the baseline should also be updated as necessary.

Establishing the baseline architecture is very much a data gathering exercise, while designing the target requires more analysis. In general, the baseline architecture should be modeled at a high level across the enterprise, but provide more detail for areas of priority concern to the mission of the agency. The level of detail to which the baseline architecture needs to be completed should be limited to the information needed to identify areas for improvement, and for the baseline to serve as the starting point for the transition strategy. It is likely some analysis of the baseline has already been done to identify areas for improvement, such as, consolidation opportunities or organizational inefficiencies.

When developing the target architecture, the architects need to work closely with the business owners to ensure the target meets the future needs of the business and focuses on priorities that will help the agency perform its mission more effectively. The target architecture should resolve deficiencies identified by business owners and

identify new approaches, such as best practices from outside the organization, to address the agency's business problems. A key part of establishing the target architecture is **identifying segments for the agency's core mission areas and common services**.

For more information on baseline and target architectures, and general guidance on developing various EA work products, see the *Practical Guide to Federal Enterprise Architecture*.

Step 1: Perform Redundancy and Gap Analyses

The purpose of performing redundancy and gap analyses is to identify opportunities for improvement in the baseline architecture and to identify "gaps" between the baseline and target architectures. These analyses should focus on assessing value to the agency mission, identifying performance gaps, and cost cutting or cost avoidance opportunities. The agency-wide target architecture should already have been designed using the business needs of the organization as the primary drivers, and to implement the goals and objectives in the agency's strategic plan. Opportunities identified by these analyses will be addressed by programs and projects laid out in the enterprise sequencing plan (described below).

Some examples of baseline redundancies and gaps between the baseline and target include, but are not limited to:

- **Gap:** Target performance measure, driven by a business need, cannot be achieved using existing business processes and information systems.

- **Gap:** Target information sharing requirements cannot be achieved with current data sharing methods and standards.

- **Gap:** Target cost efficiency for department-wide services cannot be achieved with the existing business processes, applications, and organizational structure.

- **Gap:** Target architecture includes flexible operations that are not supported by the current information systems, services, and business processes.

- **Redundancy:** Baseline analysis identifies redundant information systems providing the same capabilities in different organizational units.

- **Redundancy:** Baseline analysis identifies redundant technology products and standards in use by various organizational units within the department or agency.

For more information on redundancy and gap analysis, and general guidance on developing various EA work products, see the *Practical Guide to Federal Enterprise Architecture*.

Step 2: Refine and Prioritize Architecture Segments

Segments of the overall EA should be identified when the organization-wide EA is being defined. Once segments have been defined, they should be prioritized and the development of segment architectures should be planned in the EA Program Plan[1] and the EA transition strategy.

Segments should be prioritized based on criteria important to the agency. Some examples include, but are not limited to:

- Relevance to agency mission priorities and performance measures;

- Complexity/difficulty to develop and implement the segment architecture;

- Legislative or executive mandate requiring action; and

- Dependencies and common drivers between segment architectures.

In general, segment architectures should be developed in more detail than the agency-wide EA. Segment architectures should have scheduled performance improvement milestones and/or cost savings milestones, and these milestones should be reflected in the EA transition strategy. The EA transition strategy should not serve as an EA Program Plan, which is limited in scope only to the immediate activities of the enterprise architects. Rather, the EA transition strategy should be a summary of program milestones from across the organization, to enable better management and reporting of progress against agency-wide plans.

Step 3: Lay out the Enterprise Sequencing Plan

The enterprise sequencing plan provides an agency-wide view of all modernization activities within the agency. This aggregated view includes segments, programs and projects, enabling senior executives to use the EA for agency-wide planning. Budget cuts, cancelled or delayed projects, or changes to program priorities can be quickly assessed using the plan. The effects of those changes on other projects and programs can be identified and dealt with as needed, as well as the overall impact on the agency's ability to meet mission objectives and performance goals. A conceptual enterprise sequencing plan is shown in Figure 4-4, and the key elements of the sequencing plan are defined below.

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[1] *The **EA Program Plan** is the agency's annual plan for developing and implementing the agency EA. Progress against an agency's EA Program Plan will be assessed using the quarterly EA reporting process by OMB.*
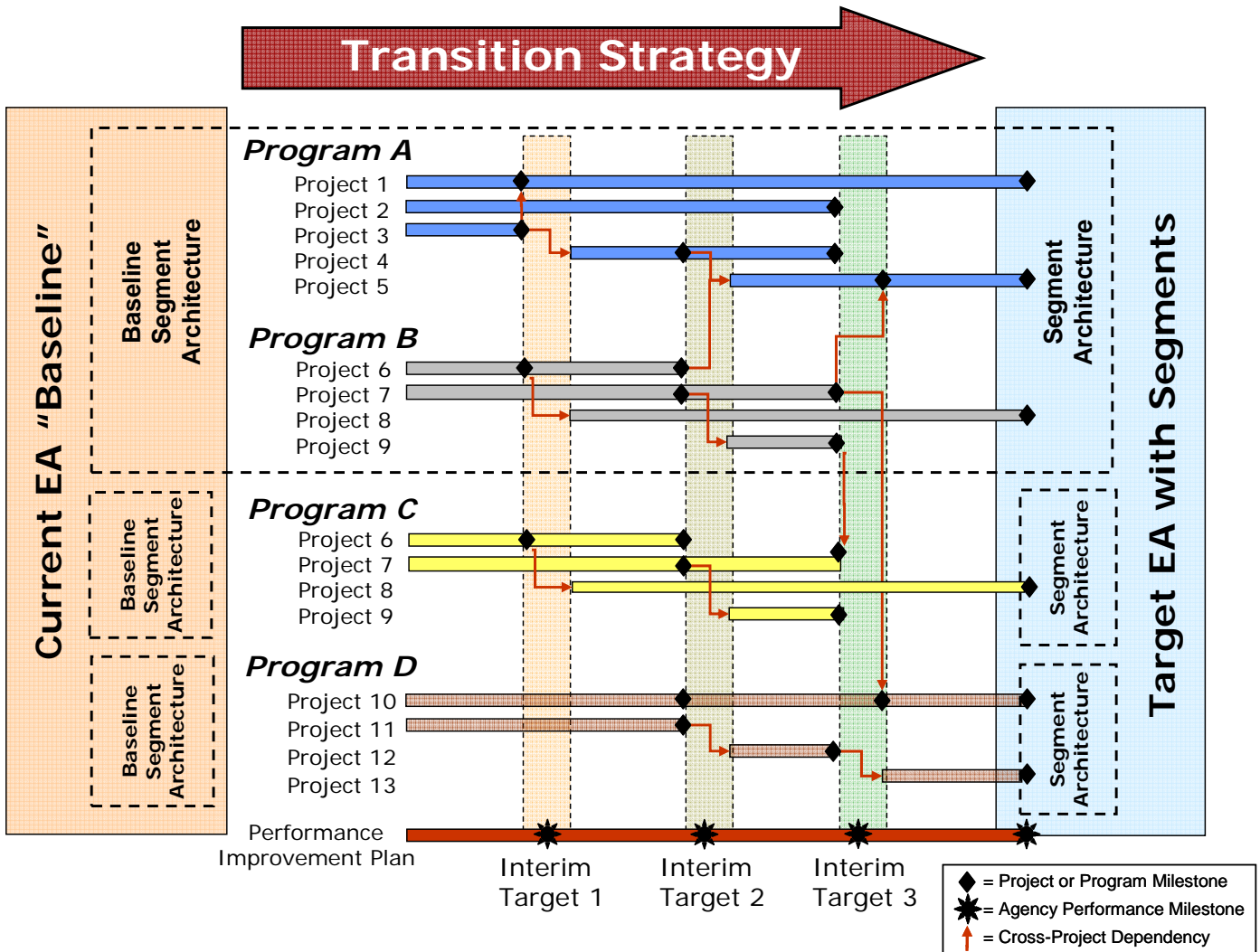
Figure 4-4: Conceptual Enterprise Sequencing Plan

As shown in the enterprise sequencing plan above, the segment architecture transition strategy is developed as the next level of detail within the overall EA transition strategy. Individual programs and project level plans are then defined for each segment architecture, while taking into account any dependencies that may crossover into other segments.

Segment Architecture: A segment architecture provides detailed results-oriented architecture and a transition strategy for a portion or segment of the enterprise. A segment architecture is a subset of the enterprise architecture, is usually more detailed than the overall EA, and may be associated with a specific organizational unit in a department or agency, if appropriate. As part of the EA transition strategy, a segment architecture is used to define initiatives (e.g., proposed investments) for a focus area of the EA that corresponds to a line of business, common service, or business outcome.

Program: As defined in the Performance Assessment Rating Tool (PART) guidance from OMB, a program is an activity or set of activities intended to help achieve a particular outcome for the public. A program may be recognized by the executive branch and the Congress when making budget or other decisions. The nature of programs varies dramatically, therefore agencies and OMB have a great deal of flexibility in defining what a program is.

Project: A discrete, planned effort to achieve a specific goal or result within a brief timeframe. A Program Manager is accountable for each project as it moves through the investment process and implementation. Interactions between projects should be used to show accurate dependencies between programs and segments; the Sequencing Plan is not intended to replace ongoing project management or to track agency budgets down to the project level.

Dependencies between Programs and Projects: Maps the dependencies between programs and projects so the effects of budget decisions or schedule adjustments can be quickly assessed for impacts on performance milestones and plans to achieve the target architecture.

Target Architecture: The target architecture represents the future vision for the agency; also known as a "blueprint" or "to-be" architecture. The target architecture should already be designed before the transition strategy is created, since the target is the endpoint for the transition strategy. As the target architecture is periodically updated, the transition strategy should also be updated. An "interim target" represents a coordinated, incremental upgrade or change to existing operations, functionality, or technology support, and can be useful in coordinating numerous multi-year initiatives in the transition strategy.

Baseline Architecture: The baseline architecture represents the current state of the agency; also known as an "as-is" architecture. The baseline architecture should be completed to the extent it supports the business needs of the organization and can sufficiently serve as the starting point for the transition strategy.

Performance Improvement Summary: Provides a consolidated view of agency performance improvement and cost reduction milestones. This is not a separate plan – it summarizes the performance goals and planned results from each project or program identified in the sequencing plan. Specific program milestones can be events or outcomes, but should lead to performance improvements. The performance improvements listed in the sequencing plan should match performance metrics in Part I - Section D of the agency's Exhibit 300s. This performance information should be updated in the transition strategy as needed, based on funding decisions from the budget process that may affect timeframes to implement initiatives in the sequencing plan.

Step 4: Develop Segment Architectures

Segment architecture provides detailed results-oriented architecture and a transition strategy for a portion or segment of the enterprise. Segments are parts of the EA transition strategy, as shown above, describing core mission areas and common services.

Segment architecture development is a collaborative process forming a bridge between enterprise-level planning and the development and implementation of solution architecture. This process is a critical element of an integrated lifecycle process to define stakeholder requirements, drive investment, and implement business and information management solutions. Segment architectures should be developed using the approach described in the previous sections of this document. These segment architectures serve as the intermediate level of detail between the EA transition strategy and any solution architecture transition plans that are developed as part of the segment.

Step 5: Define Programs and Projects

The projects and programs in the EA transition strategy should be examined in the context of agency goals and the EA when they are defined. Projects and programs identified by the EA should feed directly into the investment management and budget formulation processes. It is understood there are many drivers that can initiate the creation of a project or program, such as a legislative mandate, executive order, national emergency, etc.

Programs and projects defined in the EA transition strategy are the link between EA and the investment management process. Defined programs can be specific to the agency, or move toward common, government-wide solutions (e.g., E-Gov initiatives, Line of Business Service Center, SmartBUY). Program Managers are responsible for budget and execution of each project. For the purposes of the EA transition strategy, a project should be assigned to a program.

During the capital planning and budget formulation processes, the transition strategy should be used to help assess the impacts of program funding decisions and budget trade-offs on the agency's ability to meet scheduled performance milestones laid out in the strategy.

Adjustment: After completion of the investment management and budget formulation processes, the transition strategy will need to be updated based on the actual funding decisions for the agency. Once agency appropriations are final, the transition strategy (particularly the Sequencing Plan) must be updated to reflect funding decisions and budget "trade-offs" for the agency. Program scope, implementation schedules, cross-program dependencies, achievement of performance milestones, and other impacts should be assessed and adjusted accordingly in the transition strategy. This additional step is intended to update the transition strategy as needed; it does not imply that the transition strategy should be driven by the investment management and budgeting

processes. As shown in the rest of this approach, the agency strategy and architecture should drive the creation of investments, not the other way around.

Using the Transition Strategy

Linkage to the Investment Portfolio

A primary output from the agency EA transition strategy is a proposed IT investment portfolio that can be traced back to a business-approved architectural portfolio. Once segments are identified, segment architectures are defined, and programs with projects are architected to implement them, agency planners should use these projects/programs as proposed investments to the investment management process (i.e., capital planning process).

The EA transition strategy should include clear linkage between initiatives identified in the transition strategy and specific investments in the agency's investment portfolio. Agency investment names (and Unique Project Identifier UPI codes) should be matched to the segment architectures and programs in the transition strategy.
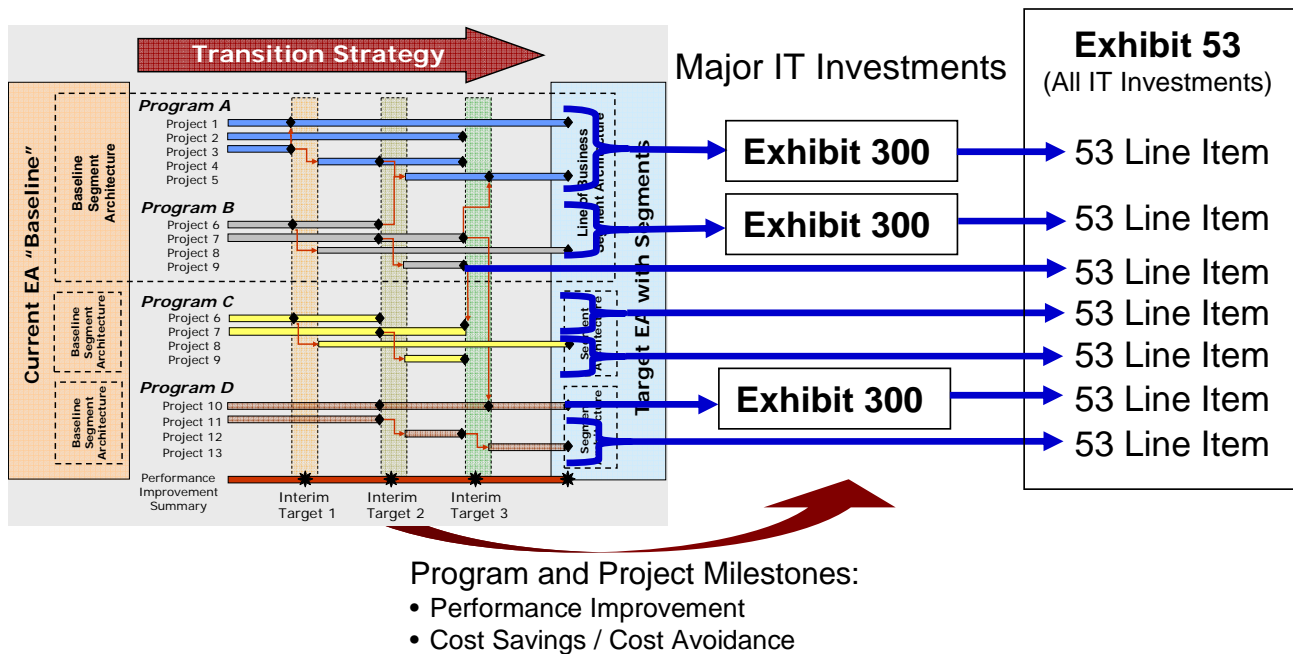
Figure 4-5: Linking EA Transition Strategy to the Investment Portfolio

Segment architectures should be used to organize investments and business priorities within the EA. Segment architectures should not be used to create an additional layer of capital planning approval, unless such a layer already exists for a segment architecture that is operated by a single organizational unit (i.e., component agency, operating division, etc). The intent of using segment architectures is not to complicate the capital planning process and other agency governance processes, but rather to

assist with grouping and prioritizing various agency initiatives that move through these processes.

Performance Management

The programs identified in the transition strategy should be linked to specific program performance measures. Coupled with the dependency relationships in the sequencing plan, this provides the ability to assess the performance impact of changes across programs. For example, one program has its budget modified – the dependency between this program and another program shows the impact this budget adjustment will have on the ability of the second program to meet a planned performance objective. For guidance on how to define an effective performance measure, see *OMB Circular A-11*.

Performance management should be a primary consideration when transition strategy initiatives are proposed for funding in the budget process. Effects on performance measures across the agency, as shown by the dependencies between programs in the sequencing plan, should be considered in agency budget decisions.

Annual OMB EA Assessment

As the transition strategy is updated each year, the agency's success in achieving performance milestones will be assessed against the previous year's plan during the annual EA assessment performed by OMB. For more information on how OMB will assess agency transition strategy progress, see the *OMB EA Assessment Framework*.

Quarterly OMB EA Progress Reports

The EA Program Plan is the agency's annual plan for developing and implementing the agency EA. Development of segment architectures should be identified in this plan so EA resources will be assigned to create segment architectures. Progress against an agency's EA Program Plan will be assessed using the quarterly EA reporting process implemented by OMB.

Program Management

Architects should work with the business owners and program managers responsible for agency business and support operations when defining programs, setting milestones, and designing the target architecture and transition strategy. The agency should assign projects to programs and identify program managers to oversee architecture (planning), investment (budgeting), and implementation (execution) of programs and projects defined in the transition strategy. Segment architectures should be used to group these projects into coordinated efforts that contribute toward achieving a key agency mission objective, a set of performance measures, or another similar business-focused outcome. Throughout the lifecycle of a program, the program manager is accountable for success and has budget responsibility for the project(s) included in the program.

Appendix A: Key Terms

Alternatives Analysis: Definition and comparison of viable alternatives to fulfill business and information management requirements and implement target architecture. For more information on alternative analysis for major IT investments, refer to *OMB Circular A-11 Section 300*.

Baseline Architecture: Describes the current ("as is") state of the agency in terms of performance, business, data, services, and technology.

Business Case: Provides the justification for an investment. For more information on business cases for major IT investments, refer to *OMB Circular A-11 Section 300*.

Business Services: Defined by the agency business model, business services include the foundational mechanisms and back office services used to achieve the purpose of the agency, e.g., inspections and auditing, direct loans, program monitoring, and financial management.

Change Drivers: Strategic, policy, performance and industry factors impacting the design and implementation of business and information management solutions. A mature EA program monitors change drivers and applies relevant drivers to maintain the enterprise architecture.

Core Mission Areas: Unique service areas that define the mission or purpose of the agency. Core mission areas are defined by the agency business model (e.g., tactical defense, air transportation, energy supply, pollution prevention and control, and emergency response).

Cross-Agency Initiatives: OMB-sponsored initiatives such as E-Gov initiatives, Line of Business (LOB) initiatives, and other government-wide initiatives such as Internet Protocol Version 6 (IPV6) and Homeland Security Presidential Directive 12 (HSPD-12).

Enterprise Architecture: A management practice for aligning resources to improve business performance and help agencies better execute their core missions. An EA describes the current and future state of the agency, and lays out a plan for transitioning from the current state to the desired future state.

Enterprise Services: Common or shared IT services that support core mission areas and business services. Enterprise services are defined by the agency service component model and include the applications and service components used to achieve the purpose of the agency (e.g., knowledge management, records management, mapping/GIS, business intelligence, and reporting).

Performance Goals: Performance measures with targets and time frames. Goals should be outcome-oriented and targets should be ambitious. For more information on performance goals, refer to the *Government Performance and Results Act (GPRA)*, *OMB Circular A-11*, and the *PART*.

Performance Improvement Lifecycle: A three-phase process agencies can use to close performance gaps and improve the overall performance of the agency. The lifecycle is made up of the "Architect", "Invest", and "Implement" phases.

Performance Measurements: Actual results generated by the implementation of enhanced business and information management solutions. Results are monitored and measured to verify target benefits resulting from the implementation of business and information management solutions.

Program Assessment Rating Tool (PART): A review of a program to helps identify the program's strengths and weaknesses to inform funding and management decisions aimed at making the program more effective. A PART review looks at all factors that affect and reflect a program's performance including its purpose and design; performance measurement, evaluations, and strategic planning; program management; and program results and accountability.

Program Management Plan: Establishes the overall approach to managing the program. Describes the program, deliverables, related management plans and procedures, and methods used to plan, monitor, control, and improve the project development efforts.

Segment: Segments are individual elements of the enterprise describing core mission areas, and common or shared business services and enterprise services. Segments are defined by the enterprise architecture.

Segment Architecture: Detailed results-oriented architecture (baseline and target) and a transition strategy for a portion or segment of the enterprise.

Segment Architecture Process: Multiple-phase methodology to develop segment architecture work products. Each phase provides an increasing level of architectural detail to support IT investment decision-making and solutions development and implementation. The *Concept of Operations for Cross-Agency Initiatives* provides an example of a multiple-phase architecture development methodology.

Solution Architecture: An architecture for an individual IT system that is part of a segment. A solution architecture is reconciled to the segment architecture above it.

Target Architecture: Describes the future ("to be") state of the agency in terms of performance, business, data, services, and technology.

Transition Strategy: A multi-year plan to implement target architecture for all or part of an enterprise. Defines logical dependencies between transition activities and helps to define the relative priority of each activity.

Vision Statement: Summary description of the target business and information management environment to fulfill requirements, address change drivers, and achieve performance improvements.

Appendix B: Reference Information

Architectural Principles for the Federal Government
(http://colab.cim3.net/file/work/BPC/2006-08-21/FedArchPrinciples2006_6_23_final.doc)

OMB Enterprise Architecture Assessment Framework
(http://www.whitehouse.gov/omb/egov/a-2-EAAssessment.html)

Federal Transition Framework
(http://www.egov.gov/ftf)

Federal Enterprise Architecture Reference Models
(http://www.whitehouse.gov/omb/egov/a-2-EAModelsNEW2.html)

OMB Circular A-11
(http://www.whitehouse.gov/omb/circulars/a11/current_year/a11_toc.html)

Practical Guide to Federal Enterprise Architecture
(http://www.cio.gov/archive/bpeaguide.pdf)

Concept of Operations for Cross-Agency Initiatives
(http://www.whitehouse.gov/omb/egov/e-5-documents.html)

Performance Assessment Rating Tool (PART)
(http://www.whitehouse.gov/omb/part/)