

Composite Enterprise Architecture: The Direction of FEMA's EA

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FEMA Enterprise Architecture

- **Objective** - Intuitive visualization that provides the right information at the right time to the right person to make **informed business and mission decisions**
- **Enterprise Architecture** is the design, structure and implementation for integrating and standardizing the business processes and technology domains to enable the organization to positively affect its mission and objectives. It provides an ability to make informed capital planning decisions.
- **Composite Enterprise Architecture** – Identifies the relationships and interactions between the seven FEMA Enterprise Architecture Domains: Business, Data, Information, Applications, Services, Infrastructure and Security



Topics to Be Covered

1. Introduction to DHS/FEMA Enterprise Architecture
2. FEMA Composite EA Model
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4. Service Oriented Architecture (SOA)
5. Web 2.0 technologies and IT Security



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Duomo Florence, Italy



IL DUOMO – The realization of an Architecture vision



Residing in the heart of downtown Florence, Italy is Santa Maria del Fiore (Saint Mary of the Flowers), known to the world as the Duomo of Florence. The Duomo began construction in the 12th century, and main construction ended in the early 14th century

The dome itself is amazing. At nearly 142 feet, the dome is larger than the domes of the Capitol Building in Washington, D.C., St. Pauls in London, the Pantheon in Rome, and even St. Peters in Vatican City. The dome remained the largest dome in the world until modern materials permitted the construction of stadium-sized domes such as the Metrodome in Minneapolis

Brunelleschi's design contained two shells for the dome, an inner shell made of a lightweight material, and an outer shell of heavier wind-resistant materials. By creating two domes, Brunelleschi solved the problem of weight during construction because workers could sit atop the inner shell to build the outer shell of the dome.

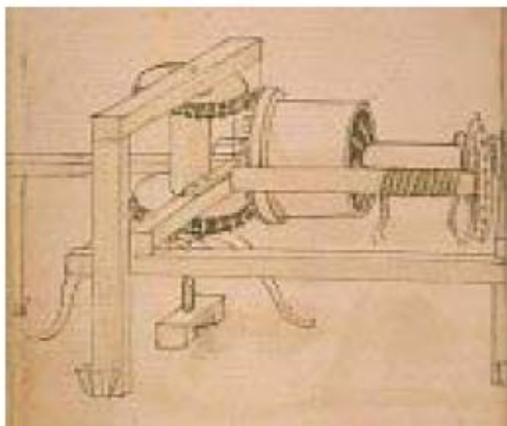


Jerry Casarella "A Toolkit for Enterprise Architects - Bringing Enterprise Architecture to Realization," Chief Architect PSEG, DCI Enterprise Architecture Conference Orlando, March 20 -22, 2006

Need for an Architecture Toolkit

One of the most obvious problems in building the dome was how to transport heavy building materials such as sandstone beams (1,700 pounds) and slabs of marble several hundred feet above the ground and then place them into position... To solve this problem Filippo (the Chief Architect) was compelled to imagine (and create) some 'unheard-of machine' to move and carry tremendous weights to incredible heights.

Ross King from "Brunelleschi's Dome"



As in the Renaissance, today's Enterprise Architects need a toolkit to turn their EA vision into reality.



3



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Winchester Mystery House San Jose, CA





Winchester Mystery House - San Jose, CA

- Some of the bizarre phenomena that gave the mansion its name:
 - A window built into the floor
 - Staircases leading to nowhere
 - A chimney that rises four floors
 - Doors that open onto blank walls
 - Upside down posts
- Sarah Winchester kept the carpenters' hammers pounding 24 hours a day for 38 years
- **Blueprints available: None!** Mrs. Winchester never had a master set of blueprints, but did sketch out individual rooms on paper and even tablecloths!



Winchester Mystery House - San Jose, CA

- **Number of rooms:** 160
- **Cost:** \$5,500,000
- **Date of Construction:** 1884 - September 5, 1922 (38 continuous years!)
- **Number of stories:** Prior to 1906 Earthquake - 7; presently 4
- **Number of basements:** 2
- **Heating:** Steam, forced air, fireplaces
- **Number of windows:** Frames 1,257; panes approx. 10,000
- **Number of doors:** Doorways 467, doors approx. 950 not including cabinet doors.
- **Number of fireplaces:** 47 (gas, wood, or coal burning)
- **Number of chimneys:** Presently 17 with evidence of 2 others
- **Number of bedrooms:** Approx. 40
- **Number of kitchens:** 5 or 6
- **Number of staircases:** 40, total of stair steps - 367
- **Number of skylights:** Approx. 52
- **Number of ballrooms:** 2 (one nearly complete, and one under construction)



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Connecting the Business

Business Security

- Personnel
- Property

Data

- Assets
- MIEM
- Meta model

Infrastructure

- Applications
- Systems
- Etc...

Business

- Service Components
- Service Requirements
- Core Functions



IT Governance

- Polices
- Procedures

IT Security

- 4300 A & B
- FEMA Policies
- Infrastructure



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FEMA Enterprise Architecture

Enterprise Architecture Links FEMA's Mission, Strategic Plan, Business Processes, Capital Planning, Security, Governance and Decision Making



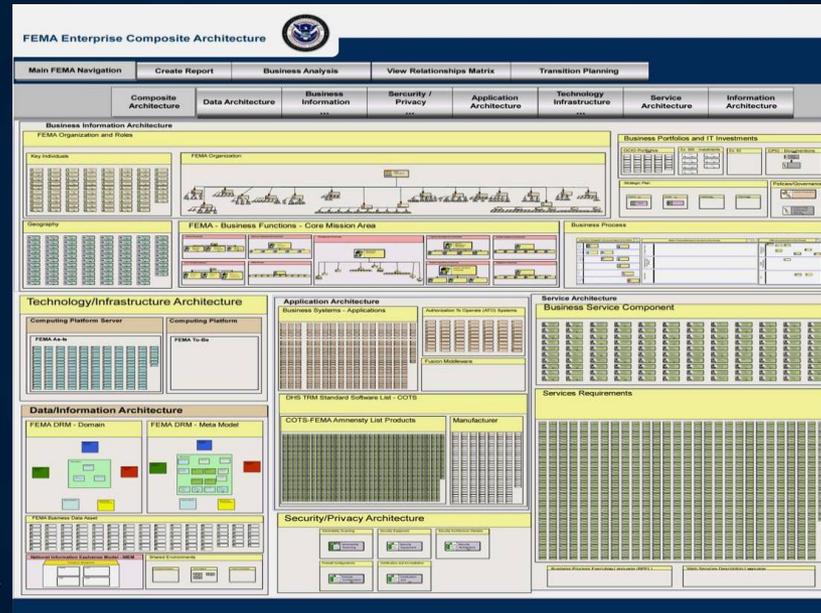
Mission



Strategic Plan



Business Processes



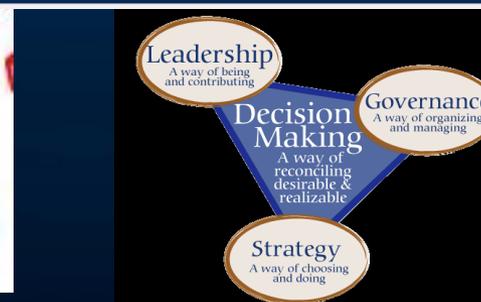
Capital Planning



Security



Governance



Acquisition



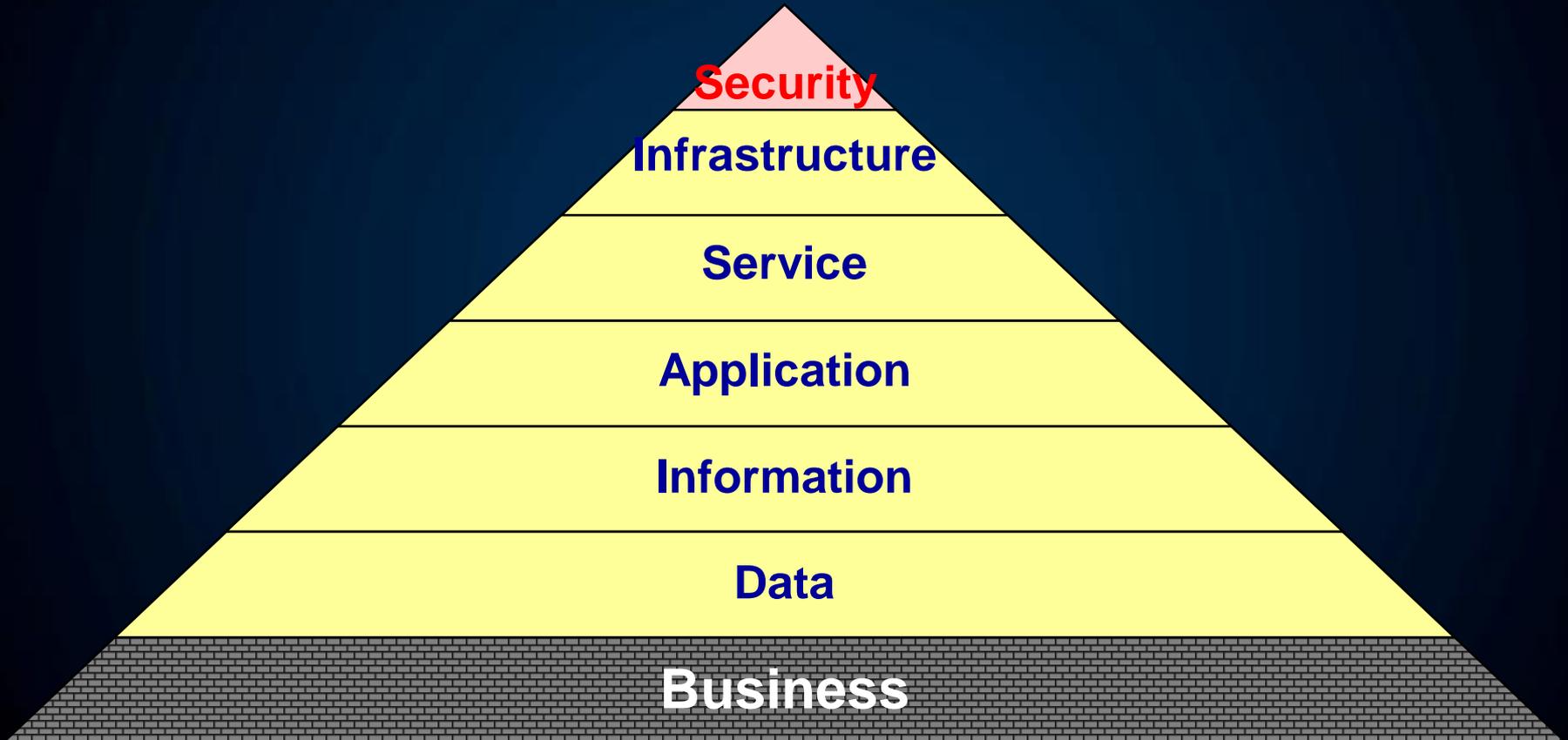
FEMA Enterprise Architecture Process Model





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FEMA Enterprise Architecture Domains





EA Domain Definitions

- **Business Architecture** is a blueprint of the enterprise that provides a common understanding of the enterprise and is used to align strategic objectives and tactical demands
- **Data Architecture** - defines how data is stored, managed, and used in a system. It establishes common guidelines for data operations that make it possible to predict, model, gauge, and control the flow of data in the system.
- **Information Architecture** is the art and science of organizing information to help people effectively fulfill their information needs. Information architecture involves investigation, analysis, design and implementation of data. Top-down and bottom-up are the two main approaches to developing information architectures; these approaches inform each other and are often developed simultaneously.
- **Applications Architecture** defines logical groups of capabilities that capture, manage and manipulate the data objects to create and analyze information sets and to support the business. The applications and their capabilities are defined without reference to particular technologies.



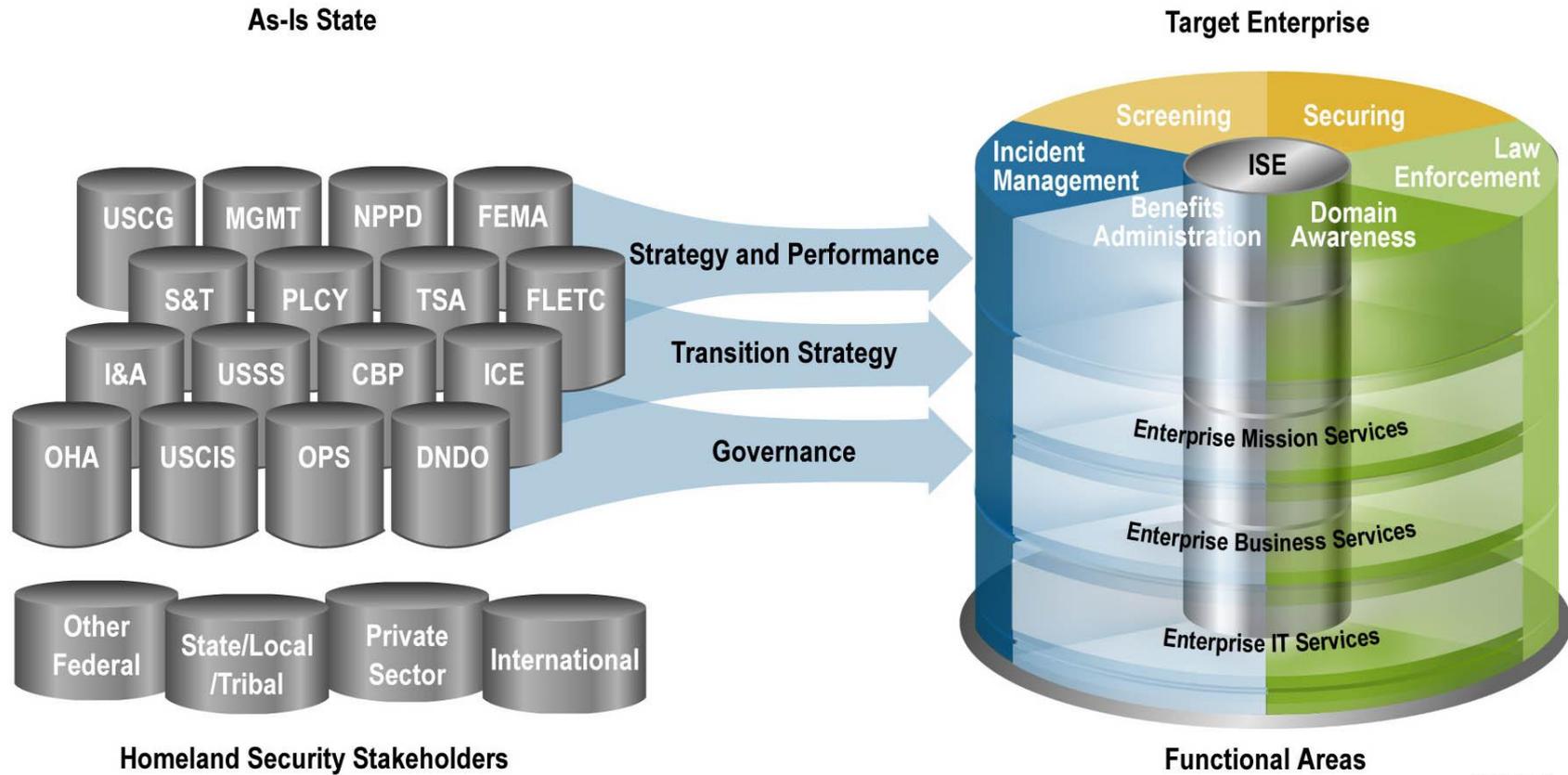
EA Domain Definitions (Continued)

- **Service Architecture** describes a model for building applications and systems using a Service-Oriented Architecture. It categorizes services on the nature of the logic they encapsulate and the manner in which they are used. A service architecture extends and complements prior approaches to implementing services, and builds on open standards such as Web services.
- **Infrastructure Architecture** defines the underlying technology, services and processes that support the applications and business processes required by the enterprise. This involves the design of hardware and server software including server computers, storage, workstations, middleware, non-application software, networks, the configuration and capabilities of the data center, and the operation of the platforms required to support the applications, data storage and communications required by the Enterprise Architecture.
- **Security Architecture** defines common, industry-wide and open-standards-based technologies and applicable industry best practices to enable secure and efficient transaction of business, delivery of services, and communications among its citizens, federal government, state, local and tribal governments, as well as the private business sector. The enterprise security architecture links the components of the security infrastructure as one cohesive unit.



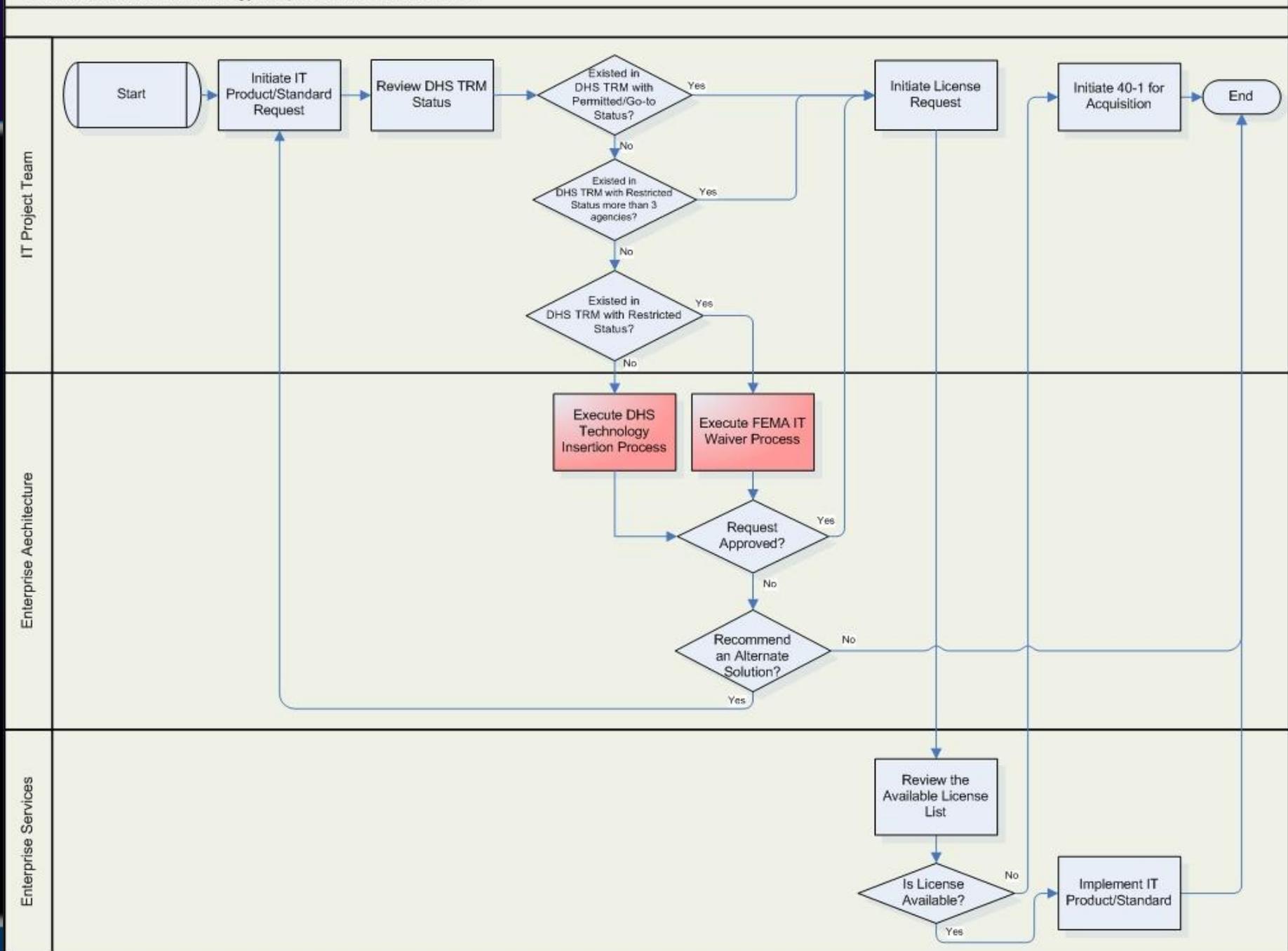
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Homeland Security EA Overview (The Cheese)

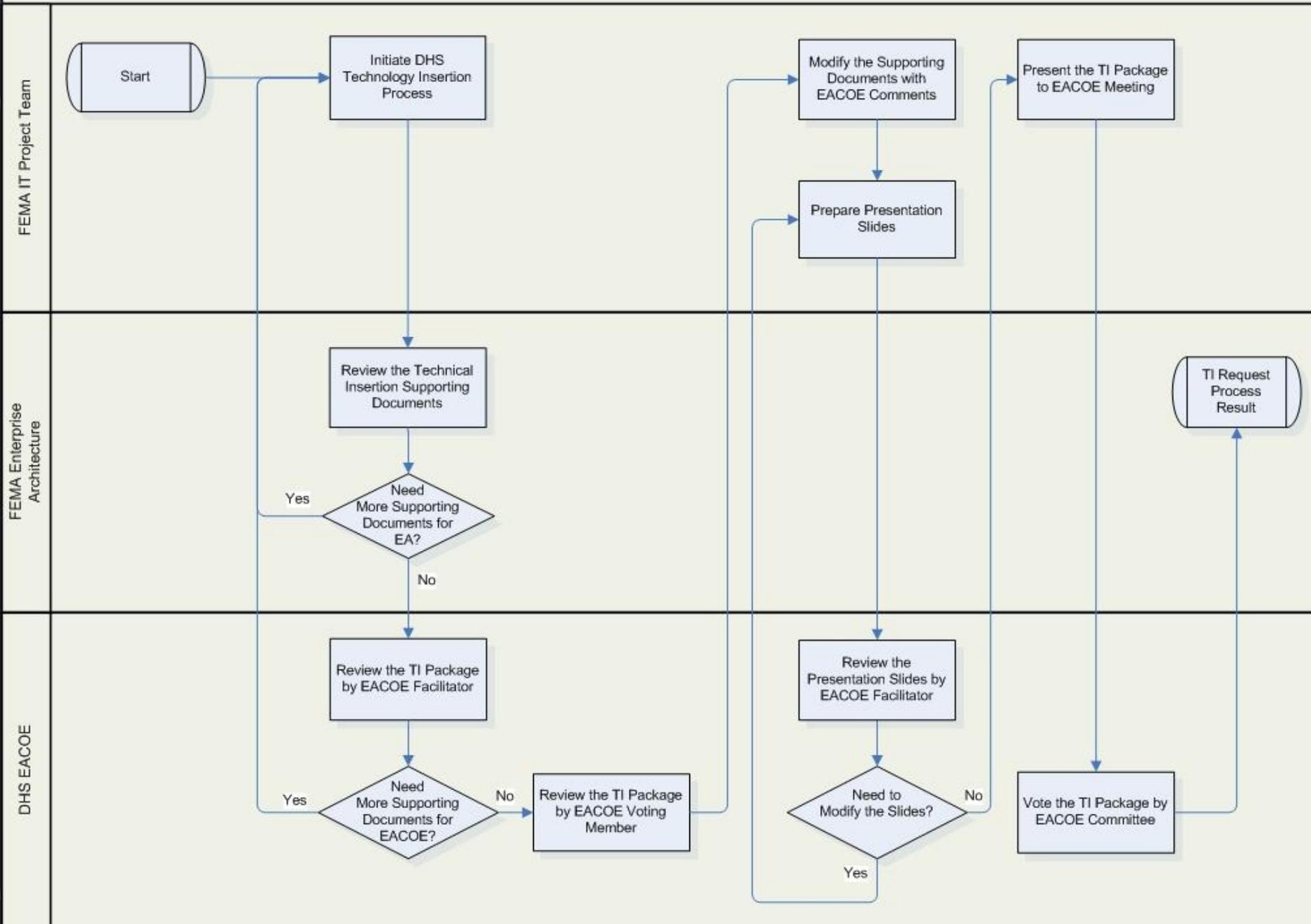


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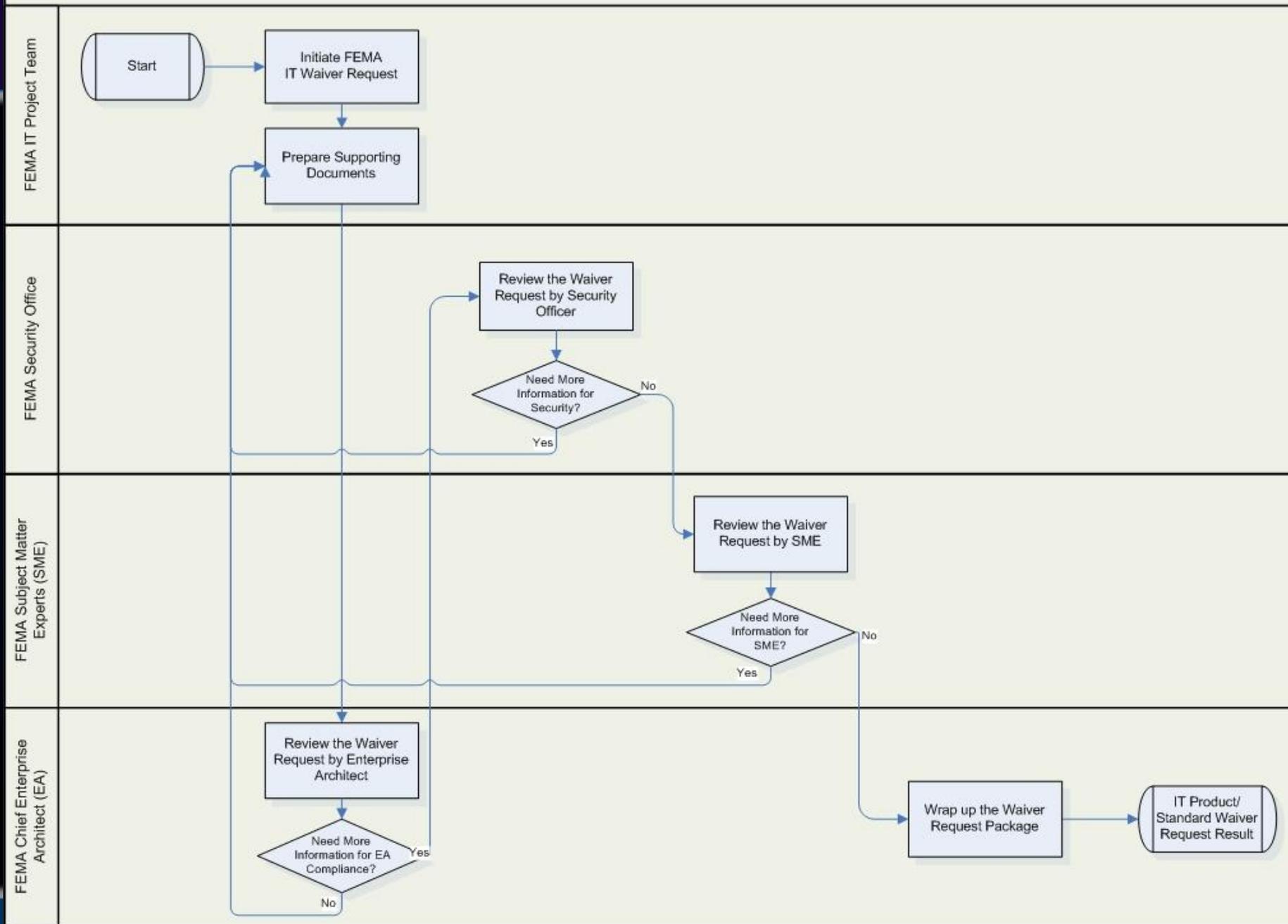
FEMA Information Technology Request End to End Process



DHS Information Technology Insertion Process



FEMA Information Technology Waiver Process





What is a Segment Architecture?

Enterprise Architecture identifies enterprise-wide common or shared assets— whether they are strategies, business processes, investments, data, systems or technologies.

Segment architecture defines a simple roadmap for a core mission area, business service or enterprise service – aligning to the structure and artifacts of the Enterprise Architecture

Solution architecture defines agency IT assets such as applications or components used to automate and improve individual agency business functions.

Level	Scope	Detail	Impact	Audience
Enterprise Architecture	Agency/ Organization	Low	Strategic Outcomes	All Stakeholders
Segment Architecture	Line of Business	Medium	Business Outcomes	Business Owners
Solution Architecture	Function/ Process	High	Operational Outcomes	Users and Developers



Cloud Computing: Do You Know Where Your Data And Infrastructure Are?

- Larry Ellison: “...when talking about cloud computing at a financial analyst conference in September (2008). “It is really just complete gibberish. What is it? When is this idiocy going to stop?””
 - The Wall Street Journal, Thursday March 26, 2009, page A1
- **Virtualization – Yes**
- **Surge Computing – Yes**
- **Consolidated Data Centers – Yes**
- **Service Level Agreements - Yes**
- **Cloud Computing – No!**



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FEMA Composite EA Model

- Identifies repeatable and non-repeatable processes, systems, and projects
- Provides greater insight into the organization as more data is collected and imported to Architect tools
- The FEMA EA web portal will allow management and non management staff, from around the country, to evaluate data and make more informed decisions
- FEMA's Composite EA Model is fully compatible with the Department of Homeland Security's EA framework

FEMA EA Home Page:

<http://online.fema.net/ea/>



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Enterprise Architecture Section | Information Technology Division - Windows Internet Explorer

http://online.fema.net/ea/

Enterprise Architecture Section | Information Technol...

FEMA.gov

FEMA Enterprise Architecture

Search Go

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Regional Operations Disaster Assistance Disaster Operations Logistics Management Mitigation Directorate National Preparedness Offices External Affairs Management

Quick Links

Important FEMA links & documents

- FEMA Strategic Plan for Fiscal Years 2008-2013
- FEMA Preferred Products, Standards & Specifications
- FEMA Systems Inventory
- FEMA IT-Governance
- Architecture Questionnaire for TRC
- DHS TRM

Homeland Security Links

- Homeland Security Enterprise Architecture (HLS EA)
- DHS Sensitive Systems Policy Documents 4300A v6.1.1
- DHS Systems Engineering Life Cycle Guidance

Mission

Enterprise Architecture Domains

Enterprise architecture uses the seven domains to connect and integrate data and technology constructed around business requirements. Security ensures that the infrastructure, critical and

Resources

- EA Overview
- Software & Hardware Waiver Request Form

Contacts

- EA Team Contact Information
- Send Comments

Disclaimer

- Security Disclaimer

FAQ

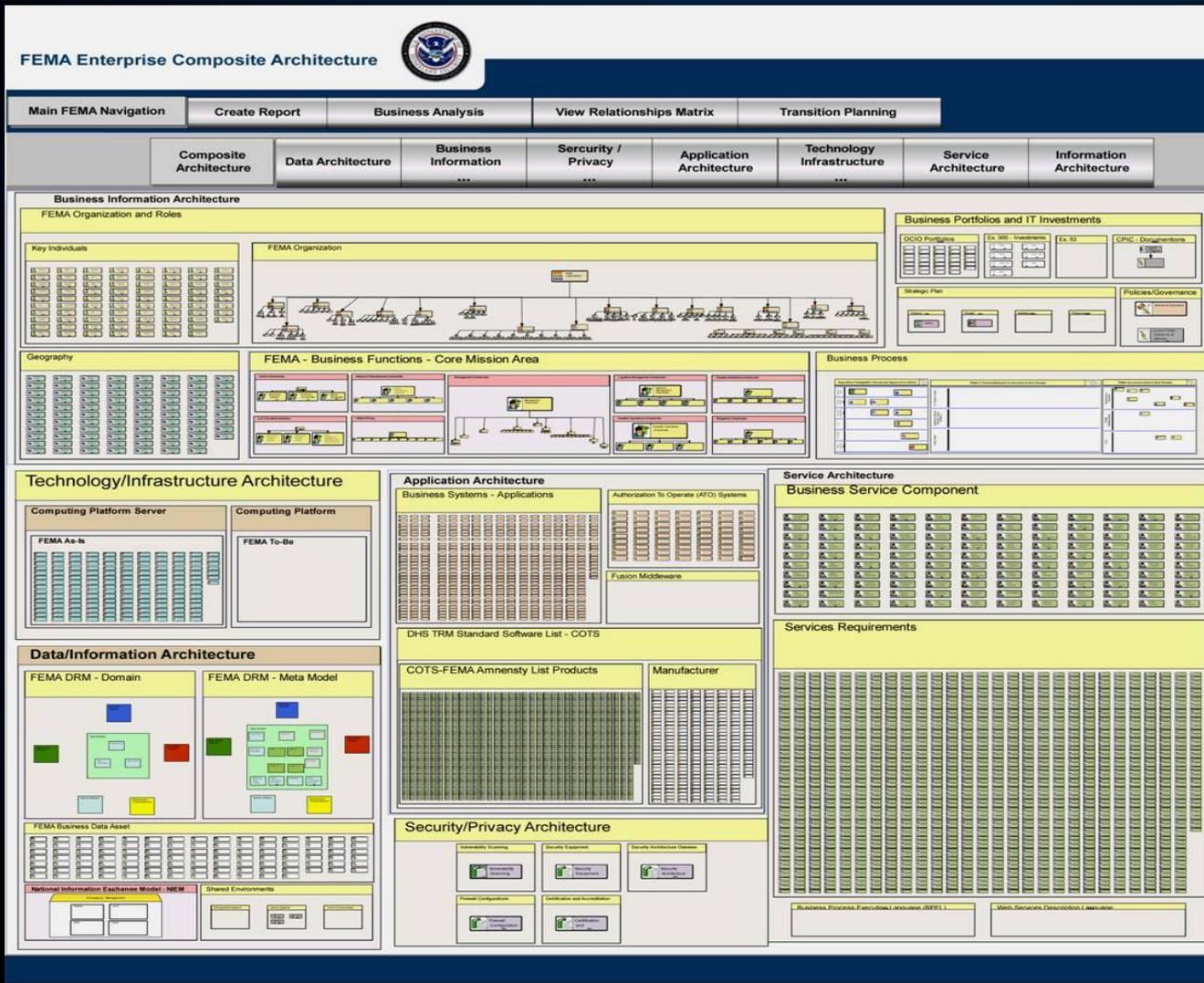
- Frequently Asked Questions

Local intranet 100%

FEMA Composite Enterprise Architecture



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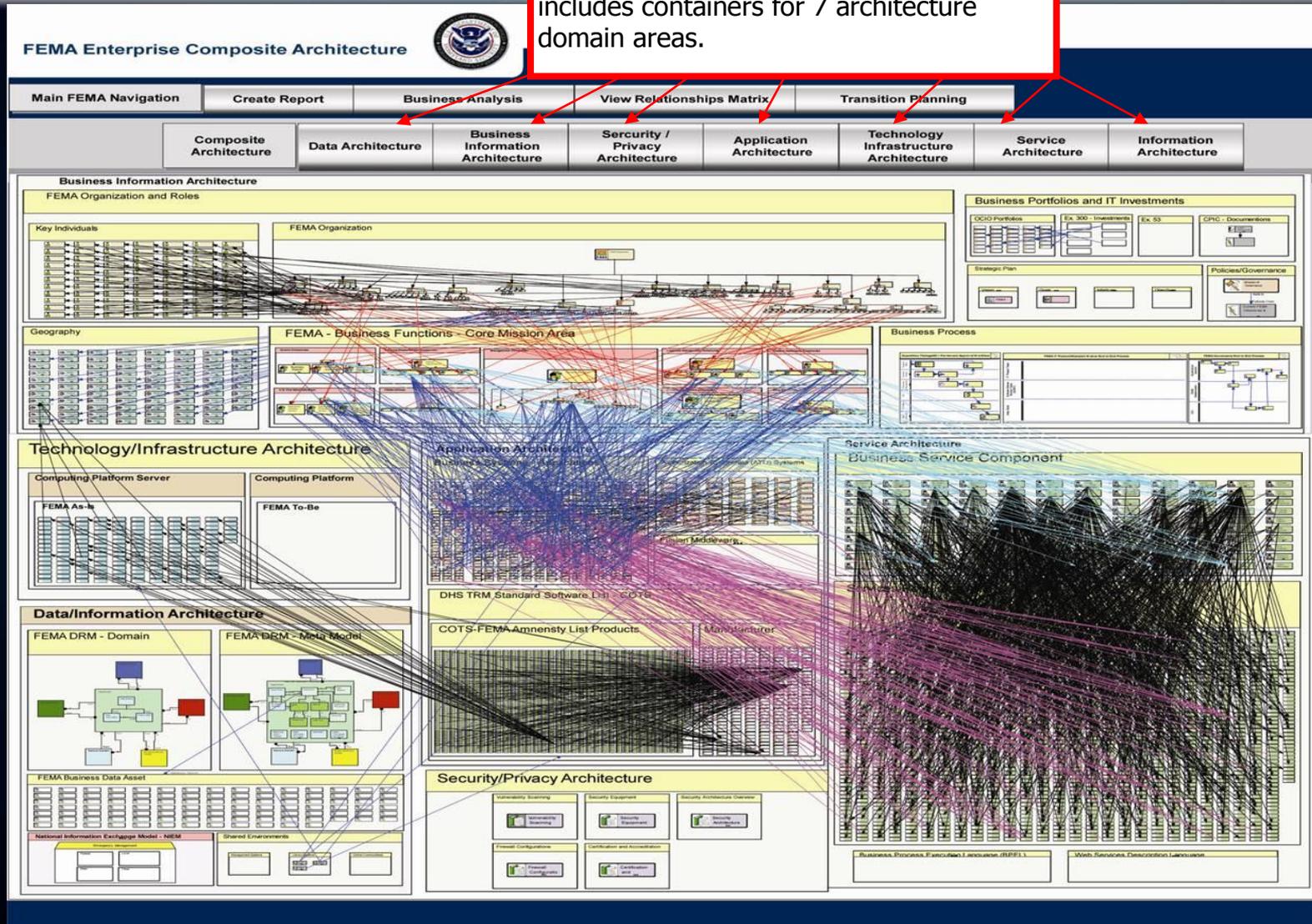


- Creates high level visualization of FEMA's organization
- Incorporates a wide range of information from core business missions and business requirements to mapping to the systems requirements and application services



Relationships: FEMA Composite EA Model

The architect's view of the main model includes containers for 7 architecture domain areas.

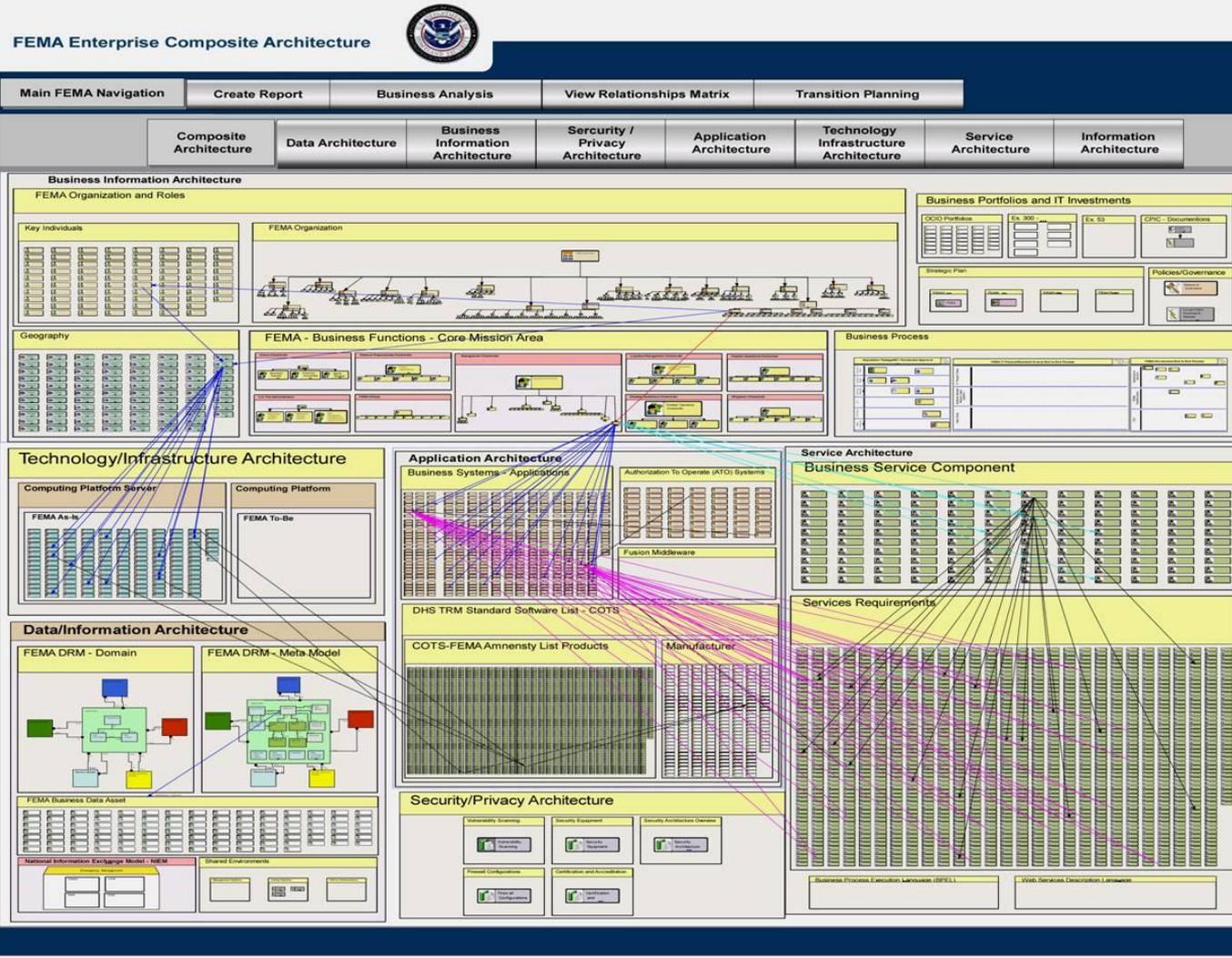




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Relationships Help to Visualize Patterns

- The FEMA Metaverse enables standard and unique queries to drill down with greater clarity because of the breadth of data collected
- FEMA's relationships allow senior managers to visualize patterns and connections within





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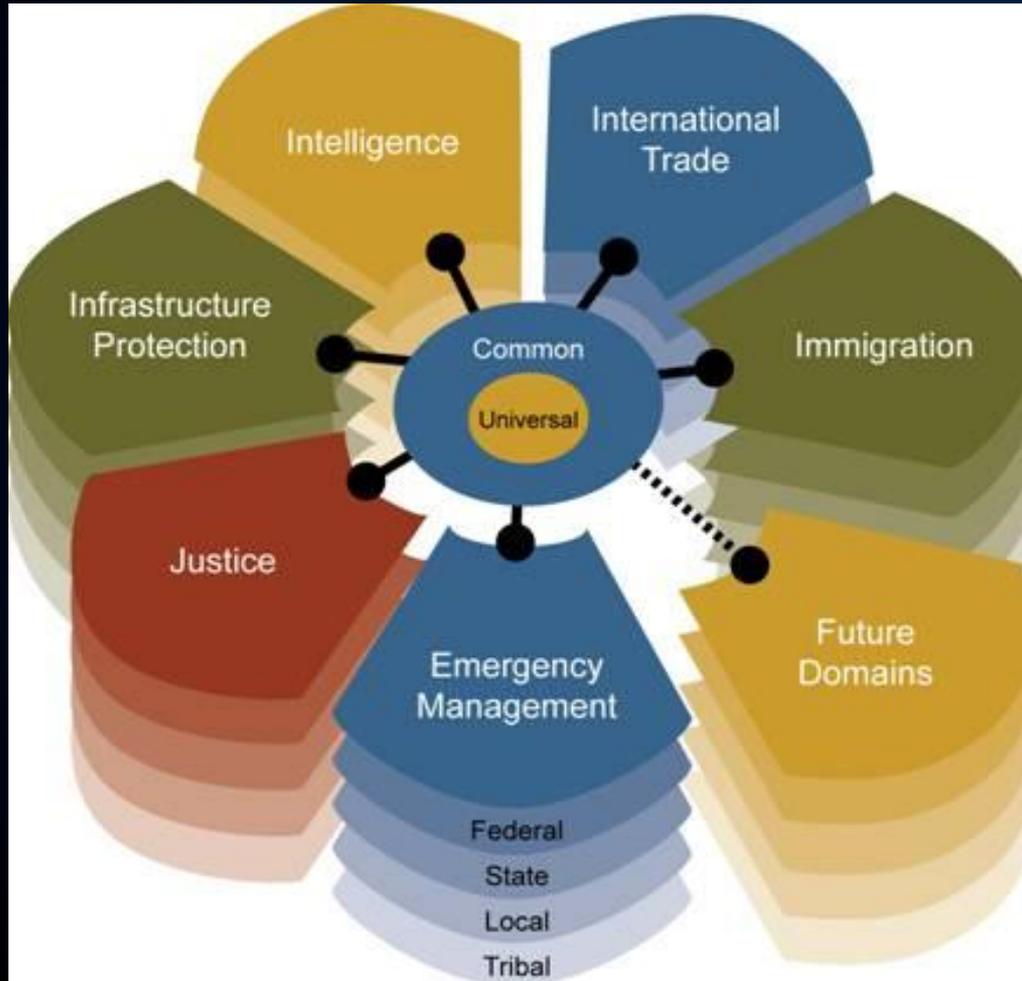
NIEM Program Summary

- The National Information Exchange Model (**NIEM**) is a local, state, tribal, and federal interagency initiative providing a foundation for seamless information exchange.
- NIEM is an xml-based data dictionary and reference model, allowing for **universal use** in all levels of technology.
- The NIEM Program Management Office (PMO) develops standards, a common lexicon, and an online community to support the **national program**.



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NIEM: A Common Language Model



- NIEM Core, Universal and Domains classify the data elements.
- As the NIEM Model matures **Future Domains** will be implemented
- The NIEM program is predicated on Communities of Interest. FEMA and DHS are **cooperative managers of the Emergency Management (EM) Domain**



NIEM, DHS and FEMA

- Disaster Management eGov Initiative, DHS and FEMA Strategic Plans all emphasize 'data sharing standards' as a pillar to **enhanced disaster response**
- DHS has cited NIEM as a EA priority: Systems Engineering Lifecycle (SELC) and DHS Enterprise Data Management Office (EDMO) guidelines **mandate use of NIEM**
- DHS Office of Interoperability (OIC), FEMA EA and the NIEM PMO have an **EM Domain Governance Memorandum of Agreement**





EM Domain Governance

- DHS OIC and FEMA EA will work together to:



- Incorporate a combination of the Common Alert Protocol (CAP), Emergency Data Exchange Language (EDXL) and NIEM to facilitate **data sharing at all levels of Government**
- Develop a Emergency Management **Community of Interest** to facilitate Governance with large-scale participation by subject matter experts
- Develop a repository of **reusable, standardized information exchanges**
- Integrate with the **OASIS** Standards Consortium



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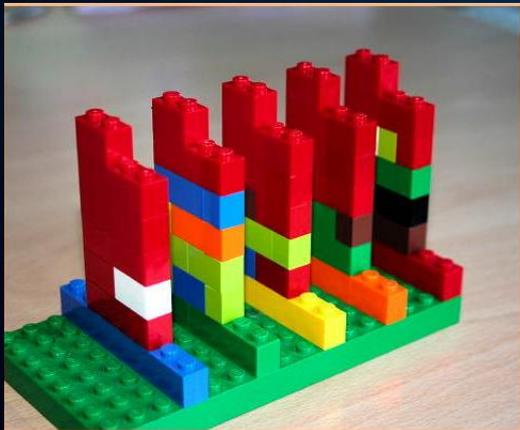
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SOA Is An Evolution, Not Revolution

- Loosely-coupled
- Standards-based
- Extensible
- Broadly accepted
- Secure
- Governance



Source: Oracle Corporation: "FEMA / Oracle Service Oriented Architecture" November 5, 2008



What is ...?

... a service?

A repeatable business task –
e.g., check customer credit;
open new account

... service orientation?

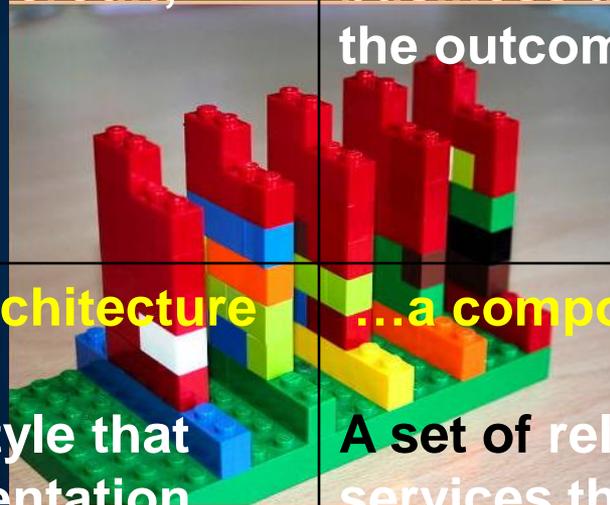
A way of integrating your
business as linked services and
the outcomes that they bring ...

...service oriented architecture (SOA)?

An IT architectural style that
supports service orientation ...

...a composite application?

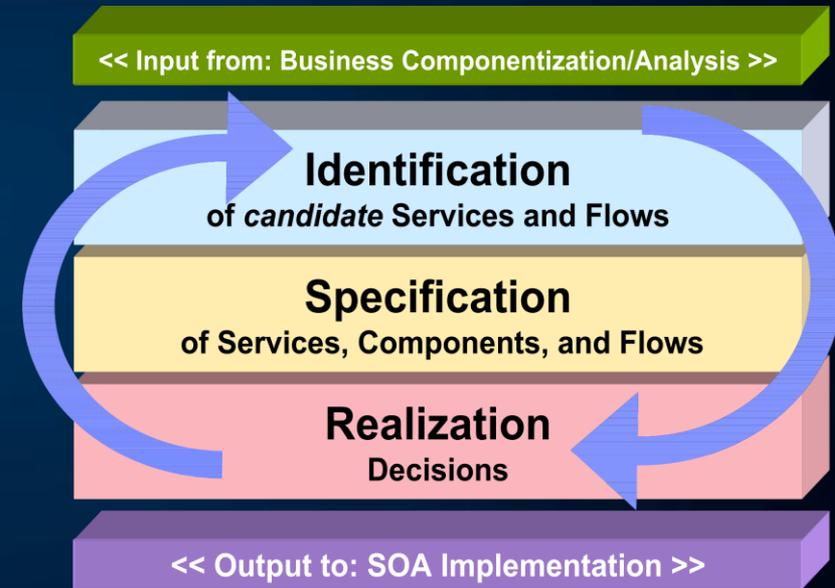
A set of related & integrated
services that support a business
process built on an SOA





The Service Oriented Modeling and Architecture (SOMA) Technique

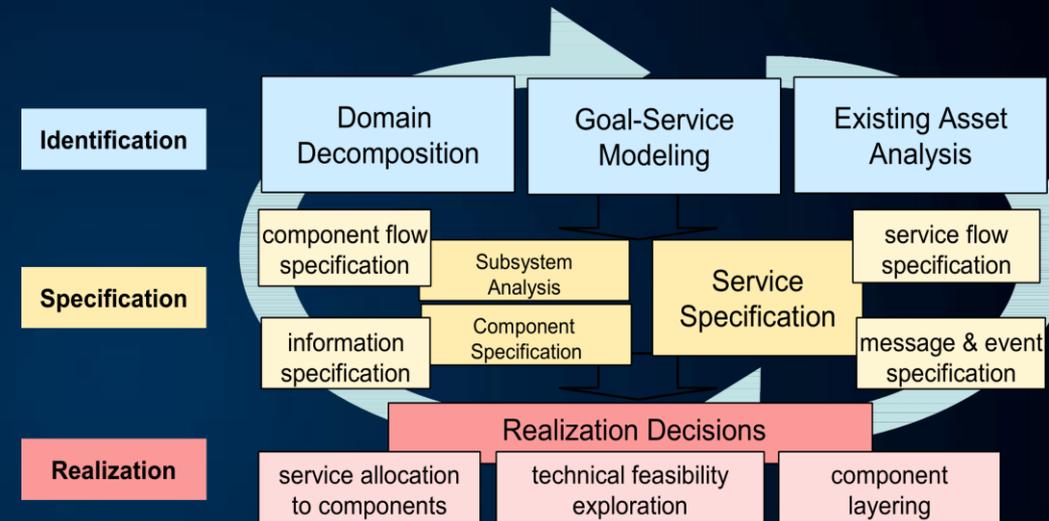
- FEMA Information Services Architecture (FISA) will use a customized version of IBM's SOMA technique to convert business requirements into SOA designs.
SOMA:
 - Builds on business analysis techniques such as the Component Business Model
 - Has been used by IBM successfully over eight years of SOA development
 - Produces a high-level design and service specifications that can be implemented using existing OOP/Component programming techniques such as the Rational Unified Process (RUP)





SOMA Supports All Elements of the Service Development Process

- A pilot doesn't fly the plane without procedures, checklists and instruments: Similarly, SOMA gives the architect:
 - A set of development cycles constructed to optimize decoupling and process sharing
 - Detailed procedural steps for each development cycle
 - Metrics and checklists to support decision making
 - A design methodology built around the use of proven patterns



SOMA Phases and Sub-Phases



SOMA Accelerates SOA Development by Bridging the High-Level and Detailed Design Processes

