TDT4252
Enterprise Modeling and Architecture

Enterprise Architecture

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This week

- Description of Enterprise Architecture
- Zachman's EA Framework, TOGAF, FEAF, Gartner
- Main article A11: Roger Sessions, A Comparison of the Top Four Enterprise-Architecture Methodologies, White Paper, ObjectWatch Inc. May 2007.
- Based on slides by Harald Rønneberg, Statoil

Addittional material. Chapter 4.4 In Lillehagen/Krogstie: Active Knowledge Modeling of Enterprises

Additional Information on Zachman's Framework:

- http://test.zachmaninternational.com/index.php/the-zachman-framework

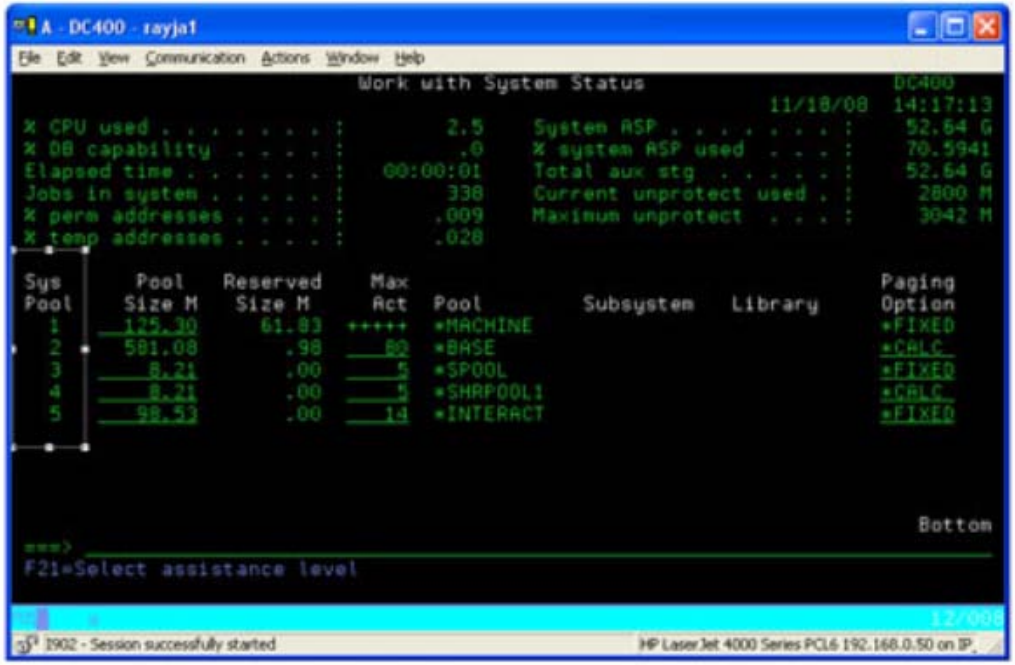
Why Enterprise Architecture?

- 25 years ago, a new field was born that soon came to be known as enterprise architecture. The field initially began to address two problems:
  - System complexity—Organizations were spending more and more money building and maintaining IT systems; and
  - Poor business/IT alignment—Organizations were finding it more and more difficult to keep those increasingly expensive IT systems aligned with business need.

The bottom line: more cost, less value.

Application landscape end of eighties

- Mainframe – solutions
- Silos, primarily in-house integration
- Simple, homogeneous clients
- Bread and butter applications
- No internet, mobile, ERP…. solutions



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Business/IT-alignment – Norwegian organization 2013

- Separate Business and IT-strategy, not connected 7%
- Business strategy developed first, this provides directions for the IT-strategy 50%
- Business and IT-strategy closely integrated influencing each other 26%
- Not own IT-strategy, IT completely integrated in the business strategy 18%

Enterprise Architecture

- We will look at some of the most popular methodologies for Enterprise Architecture:
  - The Zachman Framework for Enterprise Architecture
  - The Open Group Architectural Framework (TOGAF).
  - The Federal Enterprise Architecture (FEA).
  - The Gartner Methodology.

What is Enterprise Architecture?

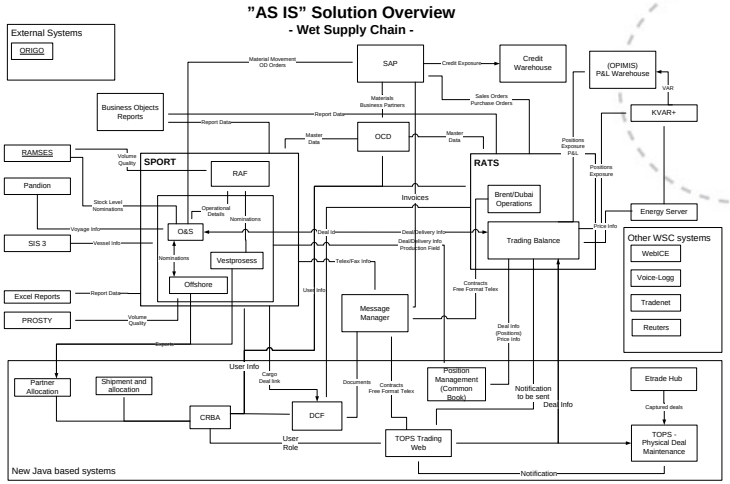
- An enterprise?
  - An organizational unit – from a department to a whole corporation.

- An architecture?
  - A formal description of a system, or a detailed plan of the system at component level to guide its implementation.
  - The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.

TOGAF

What is Enterprise Architecture?

- A formal description of an enterprise, a detailed map of the enterprise at component level to guide its changes.
- The structure of an enterprise's components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.



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The Open Group - Definition

Enterprise Architecture is about understanding all of the different components that go to make up the enterprise and how those components inter-relate.

IFEAD

Institute For
Enterprise Architecture
Developments

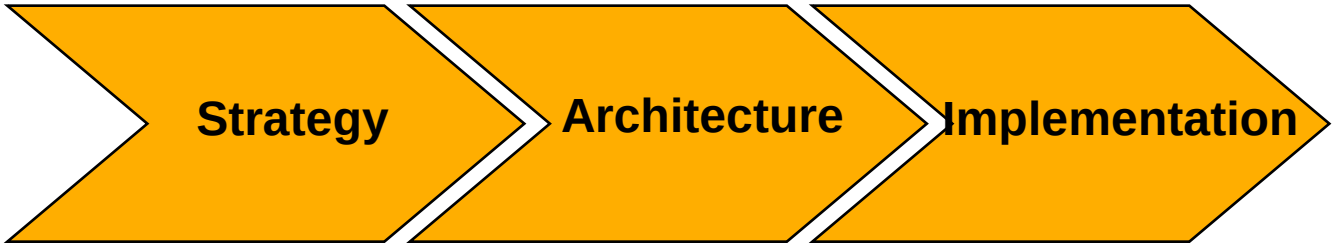
Your, Return On Information

Enterprise architecture is a complete expression of the enterprise; a master plan which “acts as a collaboration force” between aspects of business planning such as goals, visions, strategies and governance principles; aspects of business operations such as business terms, organization structures, processes and data; aspects of automation such as information systems and databases; and the enabling technological infrastructure of the business such as computers, operating systems and networks.

IFEAD is an independent research and information exchange organization working on the future state of Enterprise Architecture.

Gartner

- A planning discipline for the enterprise that goes beyond technology choices:
  - Driven by the strategic intent of the enterprise
  - Holistic in breadth
  - Designed to create a future-state “road map”
  - Provides flexibility and adaptability for changing business, information, and solution needs => change enabler
  - A bridge between strategy and implementation



EA Bridges Strategy and Implementation

Architecture

- Business architecture
- Information architecture
- Solution architecture
- Technology architecture

Business Strategy

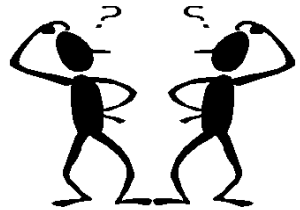
- Business drivers
- Business goals
- Business policy
- Trend analysis

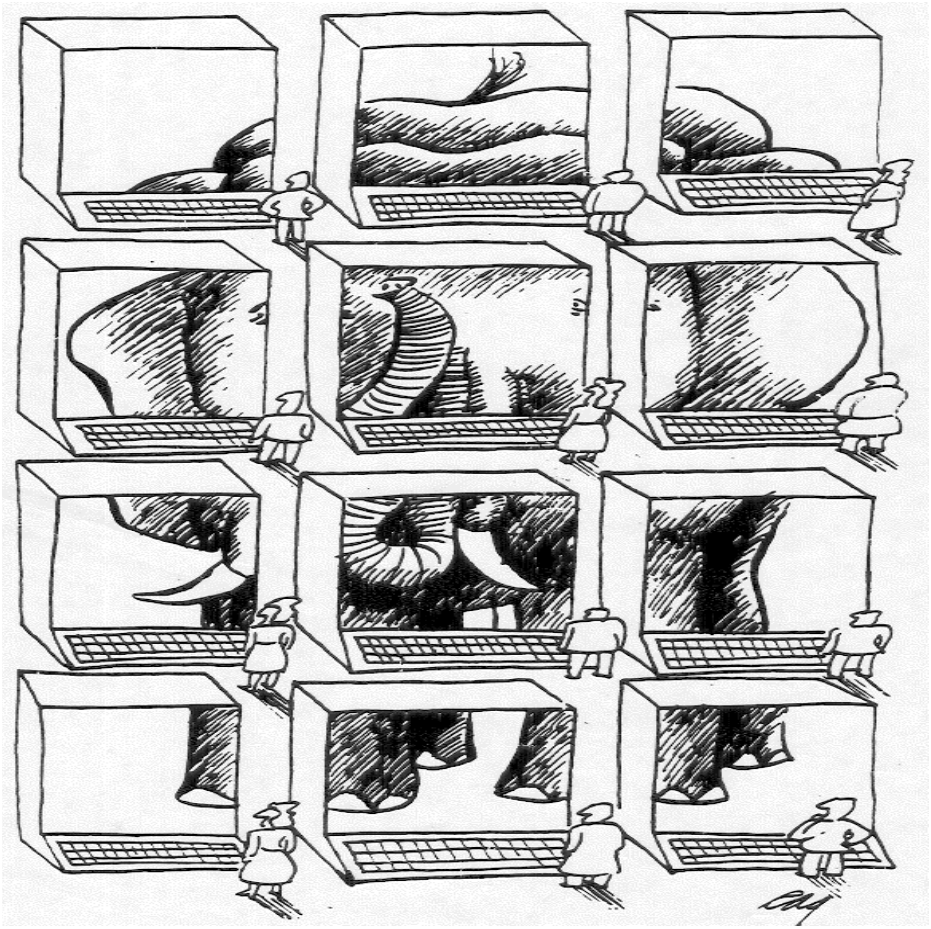
Implementation

- Business processes
- Application systems
- Tech infrastructure
- Organizational structure

The bridge between strategy & implementation

The Enterprise View





Source: Adaptive Corp.

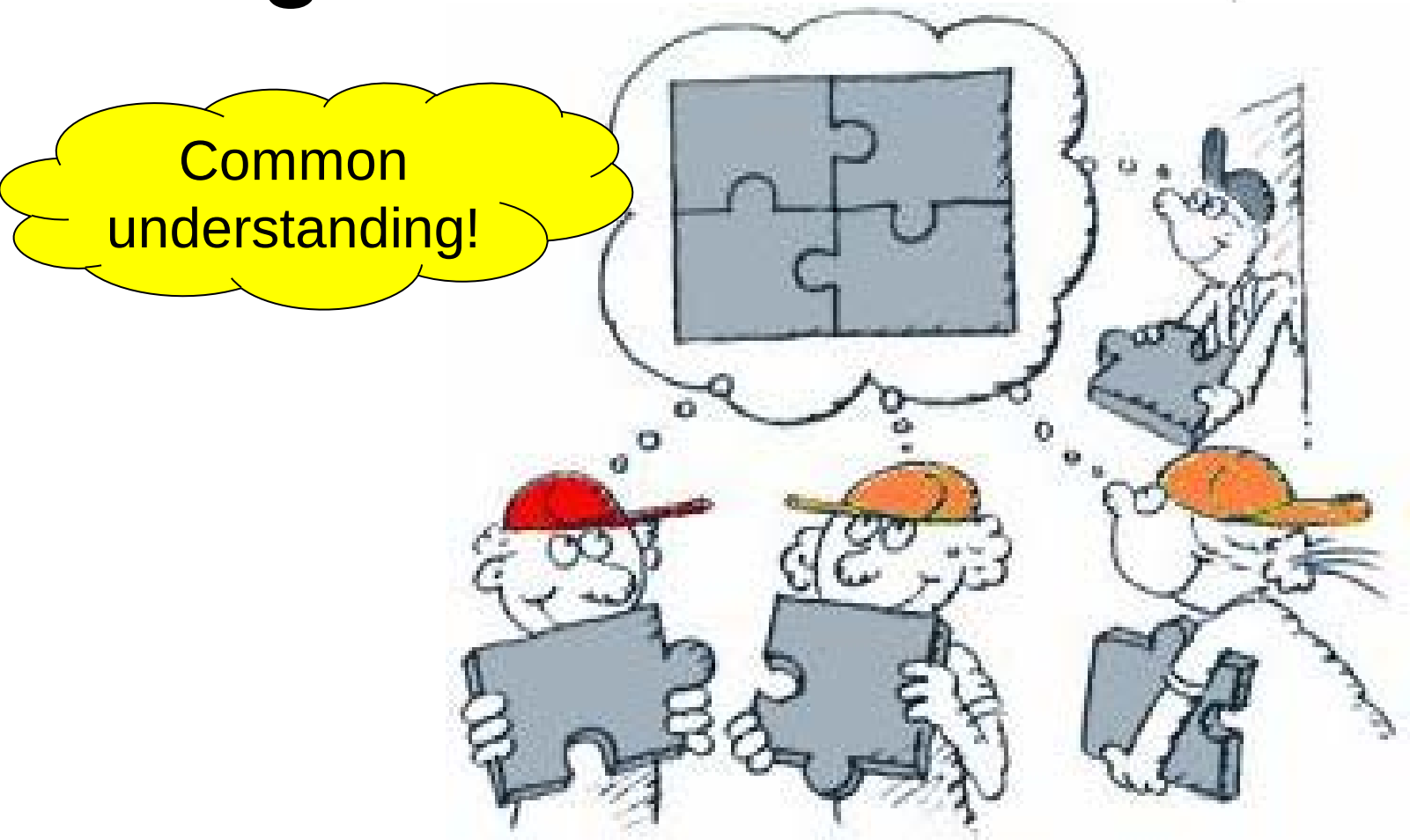
- Why do this at the ENTERPRISE level?
  - To overcome religious wars concerning technology choices within projects.
  - To provide consistent and disciplined use of technology.
  - To reduce stovepipe solutions & reduce integration complexity.

Why do an organization need an EA?

- The purpose of enterprise architecture is to optimise across the enterprise the often fragmented legacy of processes (both manual and automated) into an integrated environment that is responsive to change and supportive of the delivery of the business strategy.
- Thus the primary reason for developing an EA is to get an overview (map) of the business' processes, systems, technology, structures and capabilities.
- The organization need an EA to provide a strategic context for the evolution of the IT system in response to the constantly changing needs of the business environment.
- The organization need an EA to achieve competitive advantage.

TOGAF

Alignment



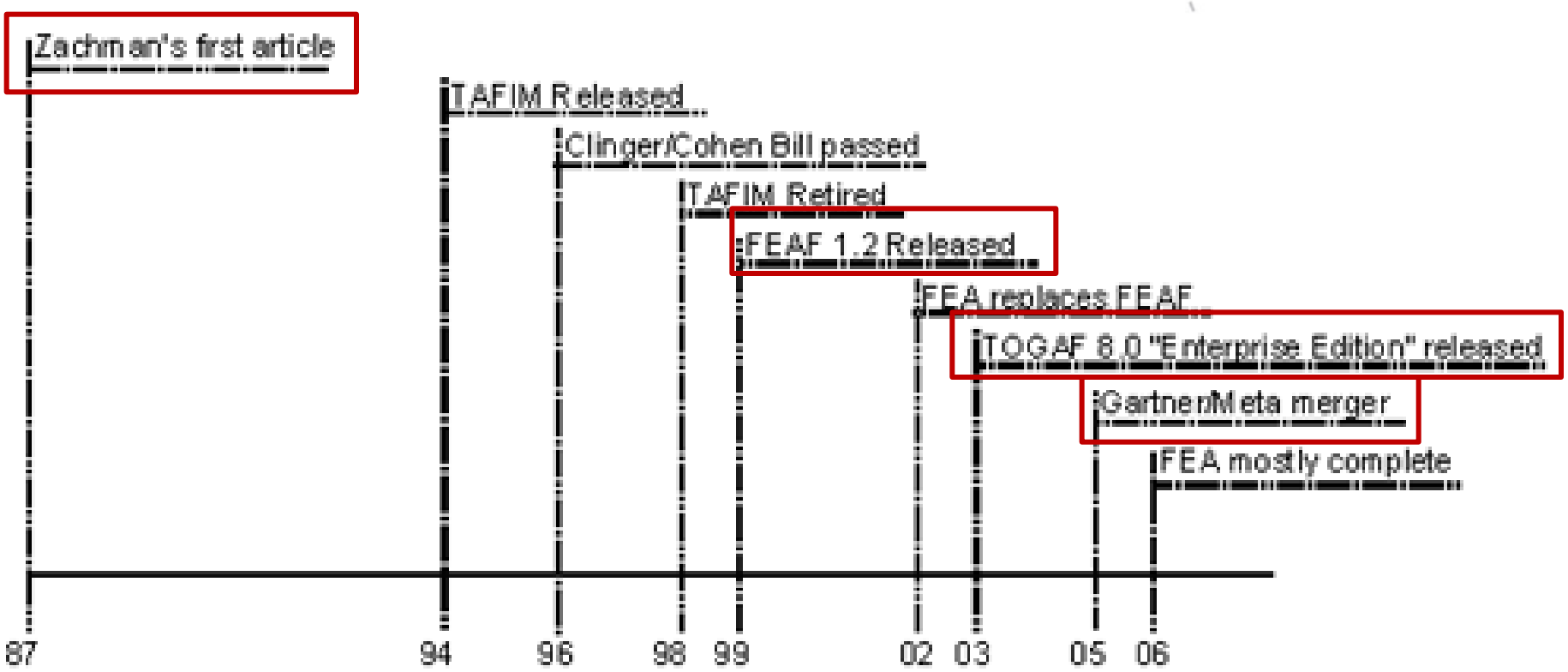
Bridging the gap between Business and IT

- Enhance the relationships between IT and the business
- Reinforce IT understanding of the business strategy
- Create a process for continuous IT/business alignment.
- Enhance IT agility to support business changes
- Create business value from IT

Value for the IT organization

- Deeper understanding of organisational strategic intent
- Correct IT investment allocation
- Realized economies of scale
- Elimination of redundancies
- Reduced IT delivery time due to reuse
- Higher-quality decision making at all levels
- An organization that works on the right things at the right time
- Selection/identification of correct technologies/functionality required by the organisation
- An understanding of what we are doing and why and how individual roles and responsibilities support creation of an environment for enterprise success

EA Timeline



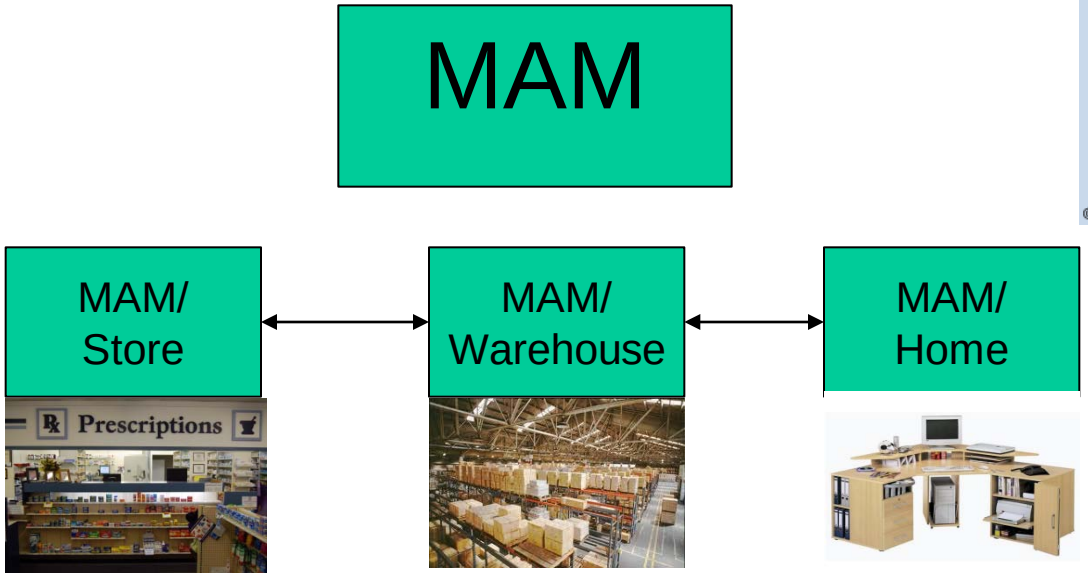
Sessions, 2007

EA – Key Concepts

- Stakeholders' concerns – interests that are critical or important to other stakeholders.
- Principles – a univocal understanding about what is of fundamental importance for the organisation.
- Models – purposeful abstractions of reality.
- Views – difficult to make a univocal and comprehensive set of models that can be understood by all concerned, hence views.
- Frameworks – structure to select views.

Example Case: MedAMore

- MedAMore is a chain of drug stores, which started as a regional chain in 1960.
- IT system to run drug stores: MedAManage (MAM).



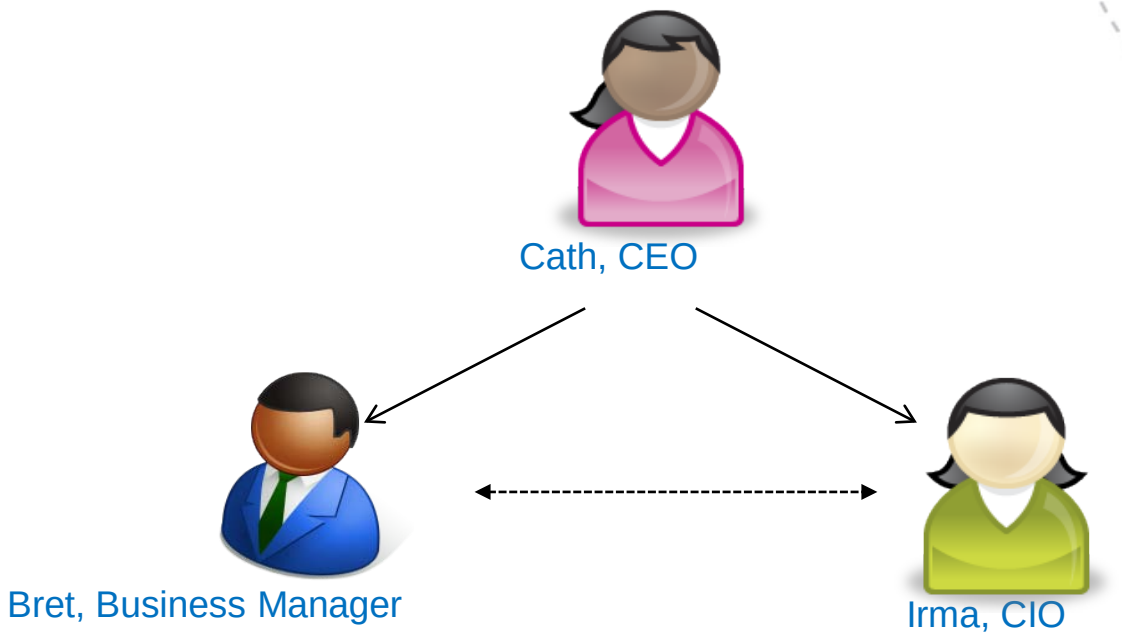
Example case contd.

- By 2002, MedAMore had expanded into the other parts of USA. The company started experiencing some problems:
  - MAM/Store required regional specialisation.
  - Differences in routines in the different regional warehouses required changes to the different MAM/Warehouse models.
  - Difficulty in coordinating the file transfer approach and information sharing across the different modules.
- Some of the challenges were:
  - Difficult to change functions without affecting several million lines of code.
  - Debugging was difficult.

Example case contd.

- Internal conflicts between the technical and the business side.
  - Business side saw IT as reducing business agility.
  - IT side saw the business side as making impossible demands.
  - ➢ Crisis!

Enter Enterprise Architecture! MAM-EA



Zachman's Framework (1)

- Zachman's vision was that business value and agility could best be realized by a holistic approach to systems architecture that explicitly looked at every important issue from every important perspective. His multiperspective approach to architecting systems is what Zachman originally described as an information systems architectural framework and soon renamed to be an enterprise-architecture framework.

Zachman's Framework (2)

- The Zachman Framework is a taxonomy for describing the Enterprise.
- A logical structure for classifying and organizing the descriptive representation of an Enterprise.
- Neutral with regard to the processes or tools used for producing the descriptions.

Zachman's Framework (3)

- According to Sessions, the Zachman "Framework" is actually a taxonomy for organizing architectural artifacts (in other words, design documents, specifications, and models) that takes into account both who the artifact targets (for example, business owner and builder) and what particular issue (for example, data and functionality) is being addressed.

Zachman's EA Framework

ENTERPRISE ARCHITECTURE - A FRAMEWORK ™

Aspects

Viewpoints

View

	DATA *What*	FUNCTION *How*	NETWORK	*Who*	TIME *When*	MOTIVATION *Why*	
SCOPE (CONTEXTUAL) *Planner*	List of Things important to the Business ENTITY = Class of Business Thing	List of Processes the Business Performs Function = Class of Business Process	List of Locations in which the Business Operates Node = Major Business Location	List of Organizations important to the Business People = Major Organizations	List of Events Significant to the Business Time = Major Business Event	List of Business Goals/Strat Ends/Means=Major Bus. Goal/ Critical Success Factor	SCOPE (CONTEXTUAL) *Planner*
ENTERPRISE MODEL (CONCEPTUAL) *Owner*	e.g. Semantic Model Ent = Business Entity Reln = Business Relationship	e.g. Business Process Model Proc. = Business Process I/O = Business Resources	e.g. Business Logistics System Node = Business Location Link = Business Linkage	e.g. Work Flow Model People = Organization Unit Work = Work Product	e.g. Master Schedule Time = Business Event Cycle = Business Cycle	e.g. Business Plan End = Business Objective Means = Business Strategy	ENTERPRISE MODEL (CONCEPTUAL) *Owner*
SYSTEM MODEL (LOGICAL) *Designer*	e.g. Logical Data Model Ent = Data Entity Reln = Data Relationship	e.g. Application Architecture Proc = Application Function I/O = User Views	e.g. Distributed System Architecture Node = I/S Function (Processor, Storage, etc) Link = Line Characteristics	e.g. Human Interface Architecture People = Role Work = Deliverable	e.g. Processing Structure Time = System Event Cycle = Processing Cycle	e.g., Business Rule Model End = Structural Assertion Means =Action Assertion	SYSTEM MODEL (LOGICAL) *Designer*
TECHNOLOGY MODEL (PHYSICAL) *Builder*	e.g. Physical Data Model Ent = Segment/Table/etc. Reln = Pointer/Key/etc.	e.g. System Design Proc.= Computer Function I/O = Data Elements/Sets	e.g. Technology Architecture Node = Hardware/System Software Link = Line Specifications	e.g. Presentation Architecture People = User Work = Screen Format	e.g. Control Structure Time = Execute Cycle = Component Cycle	e.g. Rule Design End = Condition Means = Action	TECHNOLOGY MODEL (PHYSICAL) *Builder*
DETAILED REPRESEN-TATIONS (OUT-OF-CONTEXT) *Sub-Contractor*	e.g. Data Definition Ent = Field Reln = Address	e.g. Program Proc.= Language Stmt I/O = Control Block	e.g. Network Architecture Node = Addresses Link = Protocols	e.g. Security Architecture People = Identity Work = Job	e.g. Timing Definition Time = Interrupt Cycle = Machine Cycle	e.g. Rule Specification End = Sub-condition Means = Step	DETAILED REPRESEN-TATIONS (OUT-OF CONTEXT) *Sub-Contractor*
FUNCTIONING ENTERPRISE	e.g. DATA	e.g. FUNCTION	e.g. NETWORK	e.g. ORGANIZATION	e.g. SCHEDULE	e.g. STRATEGY	FUNCTIONING ENTERPRISE

John A. Zachman, Zachman International (810) 231-0531

Zachman's Framework –Description (1)

- 2 dimension:
  - "Players in the game"
  - Artefacts required by the different players
- Both of these dimensions are critical for obtaining a holistic understanding of the enterprise.

Zachman's Framework –Description (2)

Data What	Function How	Network Where	People Who	Time When	Motivation Why

- Aspects (perspectives):
  - Data (what) – data needed for the enterprise to operate.
  - Function (how) – concerned with the operation of the enterprise.
  - Network (where) - concerned with the geographical distribution of the enterprise's activities and resources.
  - People (who) - concerned with the people who do the work, allocation of work and the people-to-people relationships.
  - Time (when) – to design the event-to-event relationships (behaviour)
  - Motivation (why) – depict the motivation of the enterprise. It will typically focus on the objectives and goals.

Zachman's Framework –Description (3)

Scope	Contextual	*Planner*
Enterprise	Conceptual	*Owner*
Systems	Logical	*Designer*
Technology	Physical	*Builder*
Detailed	Contextual	*Sub-contractor*

- Layers or views (players):
  - Scope: a "bubble chart" or Venn diagram, which depicts in gross terms the size, shape, partial relationships, and basic purpose of the final structure.
  - Enterprise or business model: the design of the business or the architect's drawing.
  - System model: translations of the drawings into detailed specifications. Corresponds to a systems model by a systems analyst.
  - Technology model: the architect's model translated to a builder's model.
  - Detailed representations: detailed specifications given to programmers.
  - Functional enterprise: a system is implemented and made a part of the enterprise.

3 suggestions to help MedAMore

- Every architectural artefact should live on one and only one cell.
- An architecture can be considered a complete architecture only when every cell in that architecture is complete.
- Cells in column should be related to each other.

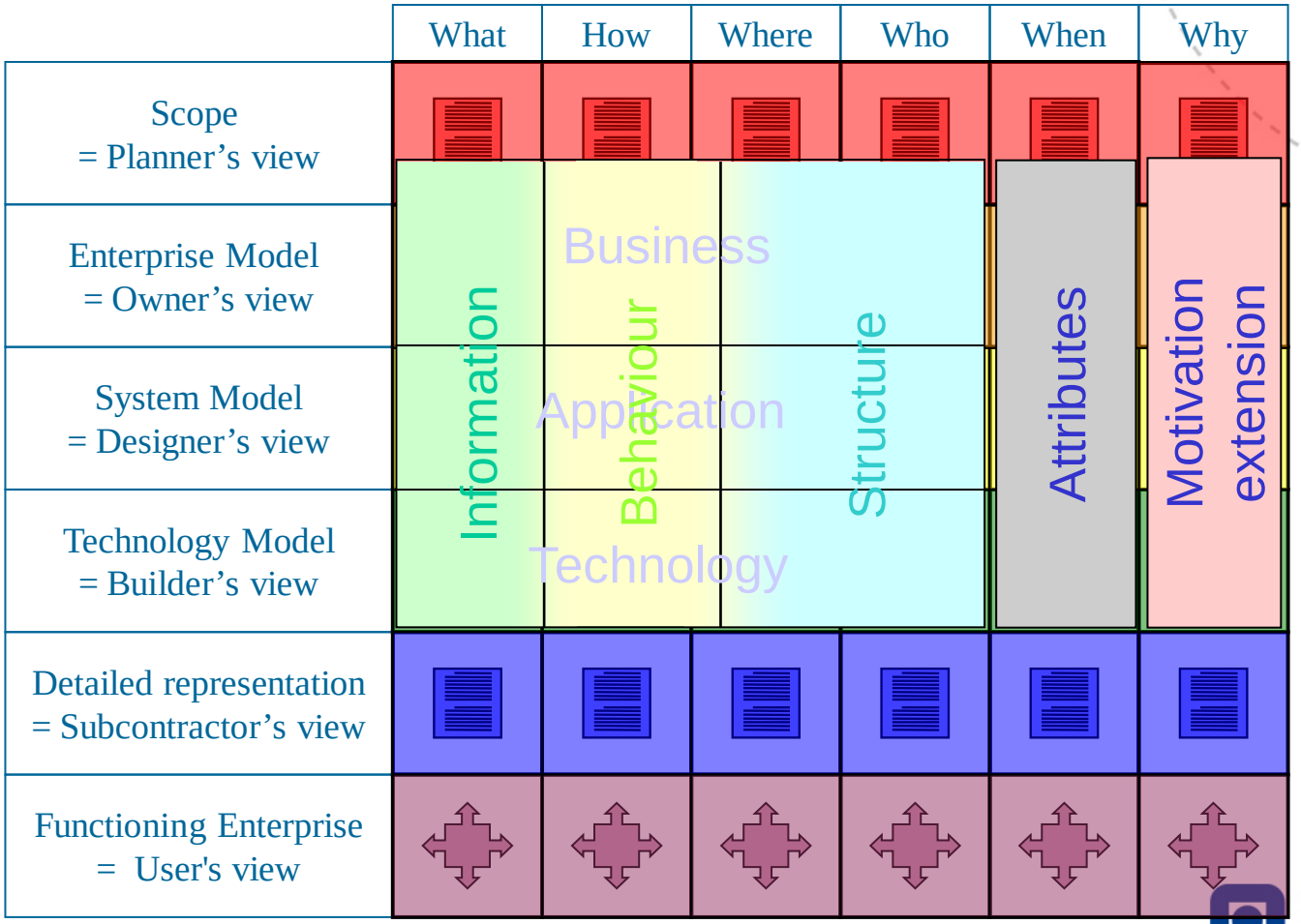
How can Zachman's grid help MAM-EA?

- Ensure every stakeholder's perspective is considered.
- Improve MAM-EA artifacts by sharpening each of their focus points
- Ensure all business requirements can be traced down to some technical implementation.
- Convince Bret that Irma's group is not implementing useless functionality.
- Convince Irma that the business department is including her in their planning.

Zachman's Framework

- Strengths:
  - A comprehensive taxonomy to describe the enterprise.
- Weaknesses:
  - Does not give us step-by-step process for creating a new architecture.
  - Does not give us an approach to show a need for a future architecture.
  - Doesn't even give us much help in deciding if the future architecture we are creating is the best architecture possible.
- For MEM-EA – it does not give a complete solution, e.g. does not describe a process for creating a new architecture.

ArchiMate and Zachman



TOGAF – consists of

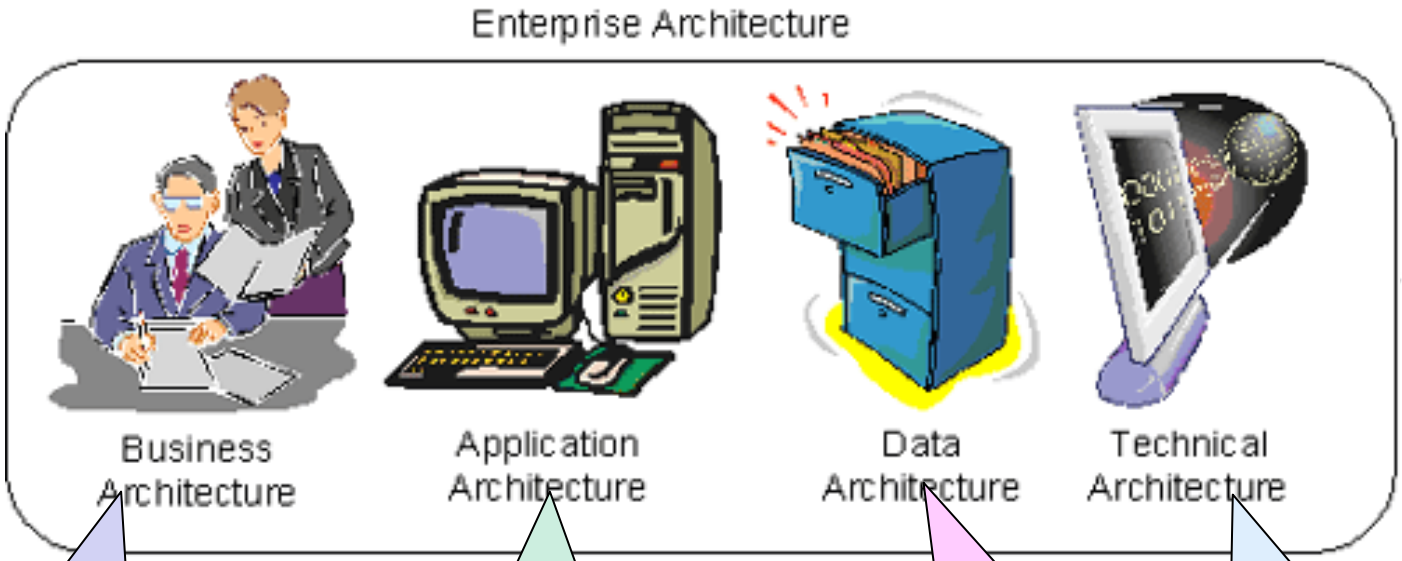
- An Architectural Development Method (ADM)
- Foundation Architecture
  - A Technical Reference Model (TRM)
  - A Standards Information Base (SIB)
  - Building Blocks Information Base(BBIB)
- Resource Base contains advice on:
  - Architecture views, IT Governance, Business scenarios, Architecture patterns, etc.

Greenslade, 2000-2002

TOGAF – Framework or Process?

- TOGAF describes itself as a Framework. But the most important part of it is the Architectural Development Method (ADM):
  - ADM is a recipe for creating architecture.
- TOGAF is an architectural process (Roger Sessions).
- It complements Zachman's Framework:
  - Zachman tell you how to categorise artifacts; TOGAF provides a process for creating them.

TOGAF's Enterprise Architecture



Describes the processes the business uses to meet its goals.

Describes how specific applications are designed and how they interact with each other.

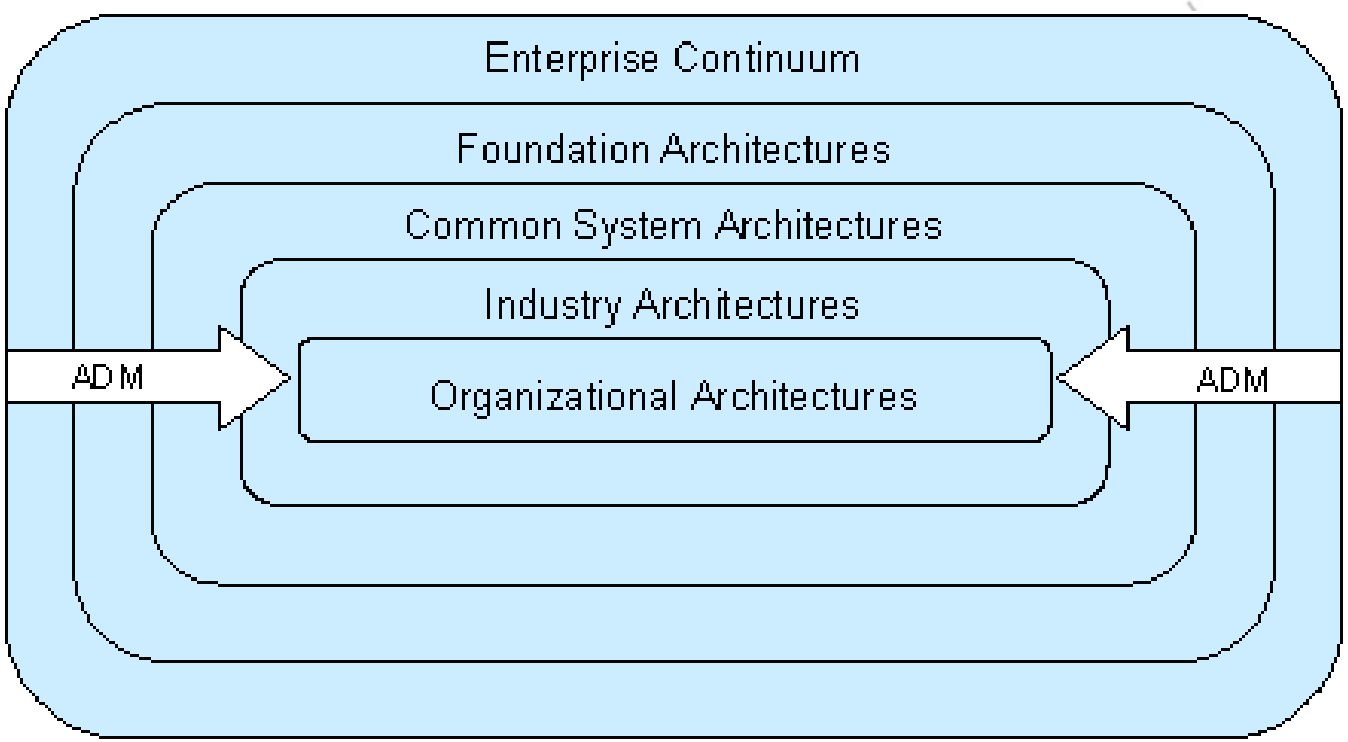
Describes how the enterprise datastores are organised and accessed.

Describes the hardware and software infrastructure that supports applications and their interactions.

TOGAF Enterprise Continuum (1)

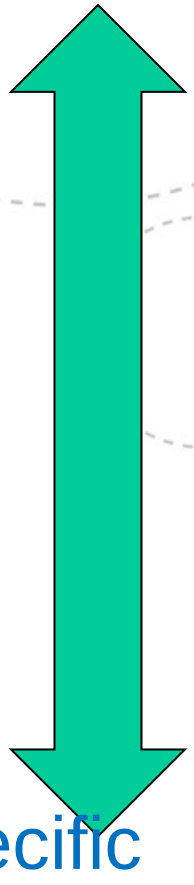
- TOGAF views the Enterprise Architecture as a continuum of architectures, ranging from the highly generic to the highly specific.
- It views the process of creating a specific enterprise architecture as moving from the generic to the specific.
- TOGAF's ADM provides a process for driving this movement from the generic to the specific.

TOGAF Enterprise Continuum (2)

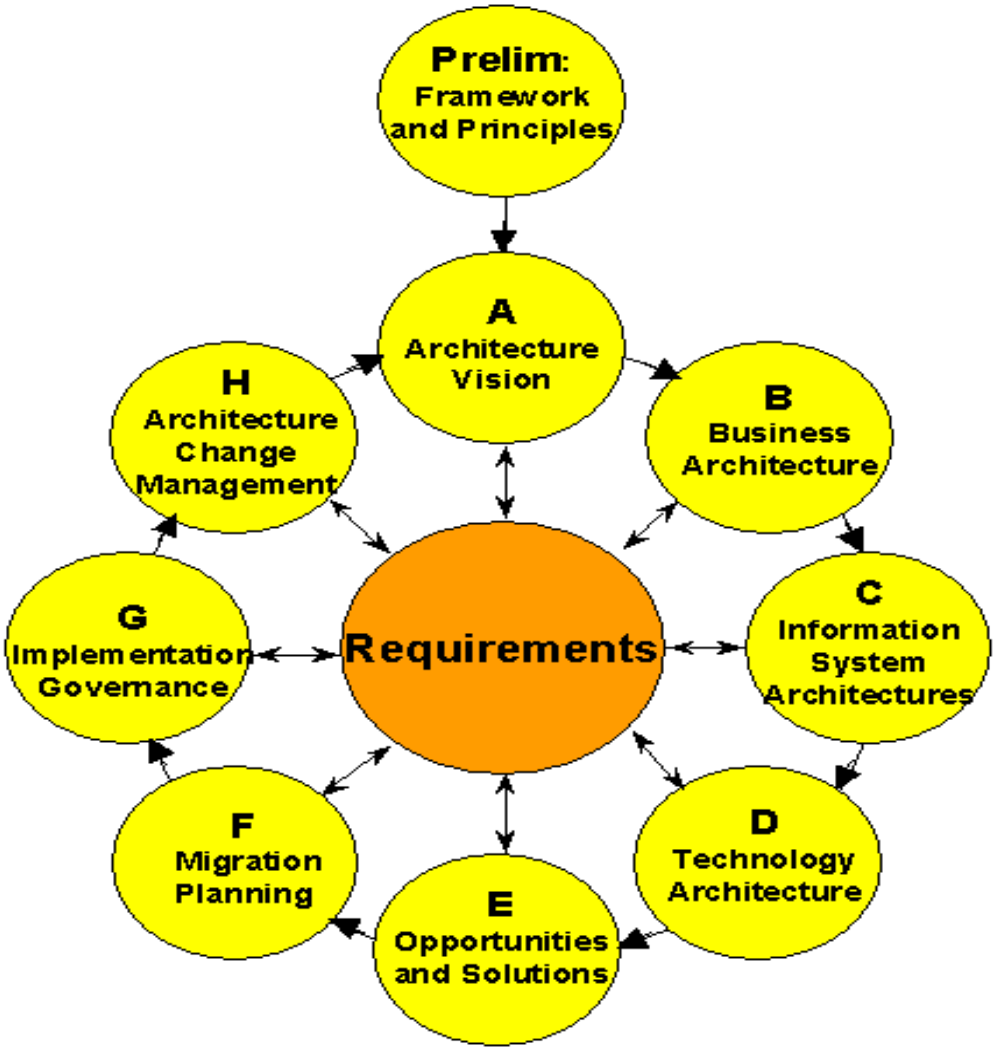


TOGAF Enterprise Continuum and ADM

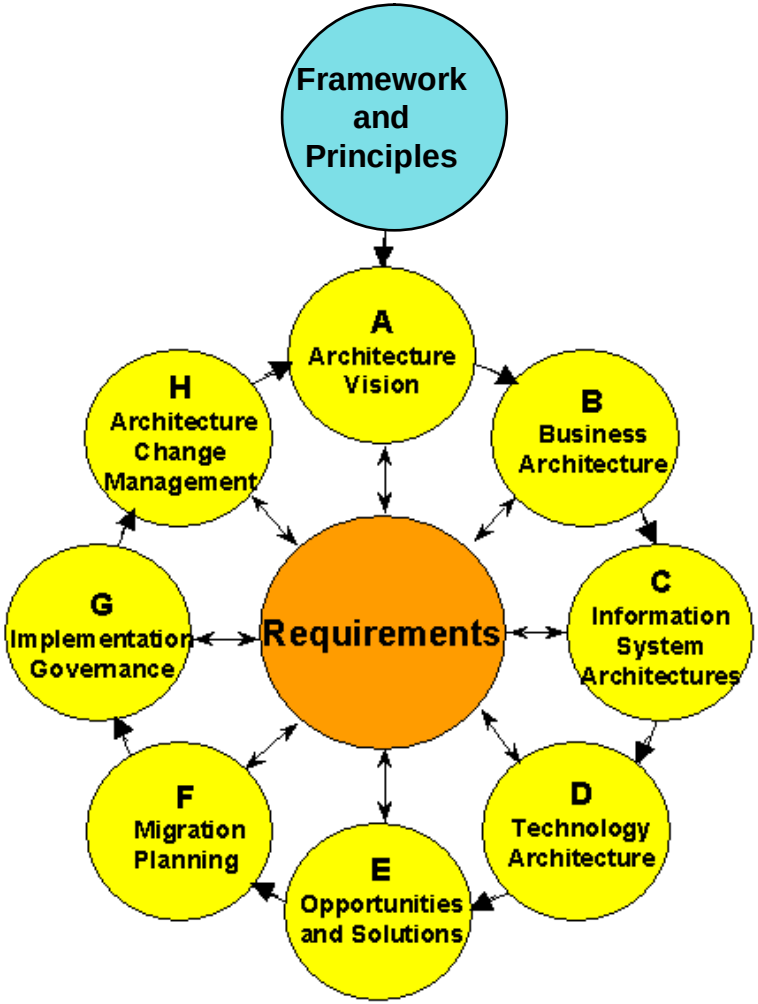
- Foundation Architectures:
  - Most generic, architectural principles that can be used by any IT organisation.
- Common System Architectures:
  - architectural principles that may be found in many types of enterprises.
- Industry Architectures:
  - architectural principles that are specific across many enterprises that are in the same domain.
- Organisational Architectures:
  - Architectures that are specific to a given enterprise.

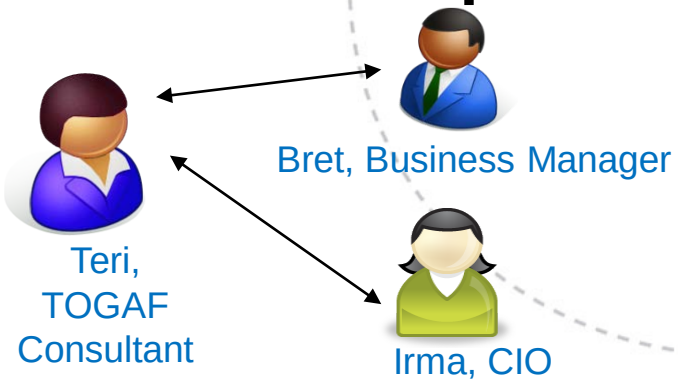


Architecture Development Cycle - ADM



ADM - Framework and Principles





- Define architecture principles that drive technological architectures and document those.
- Choose framework and customise.
  - *Request for Architecture Work*

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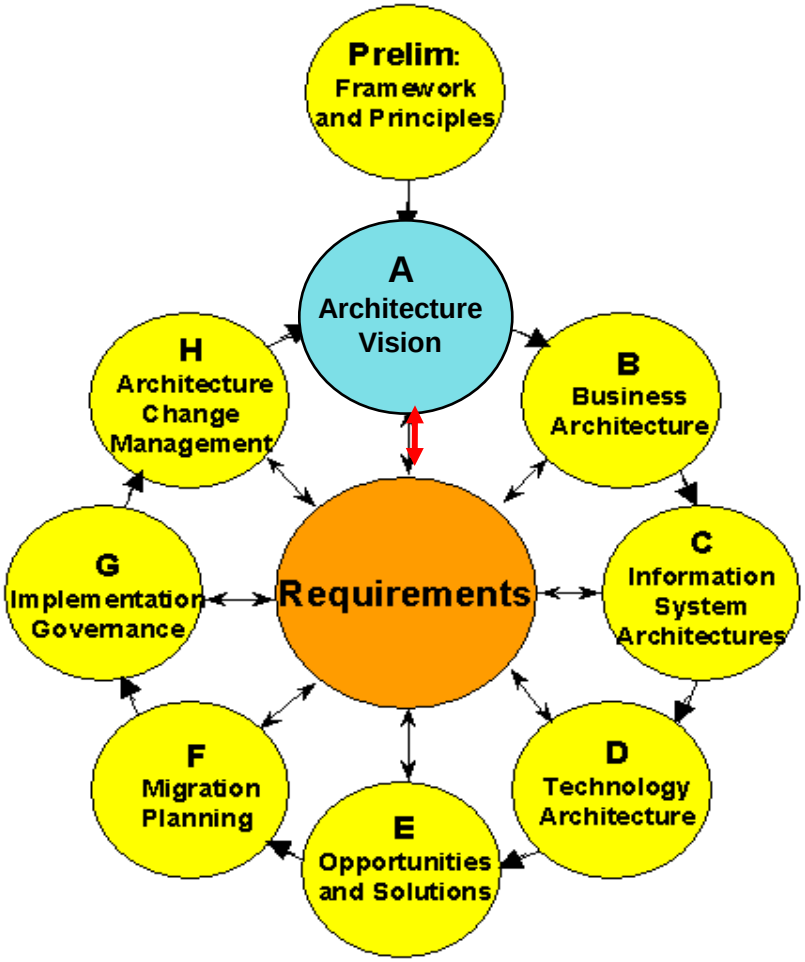
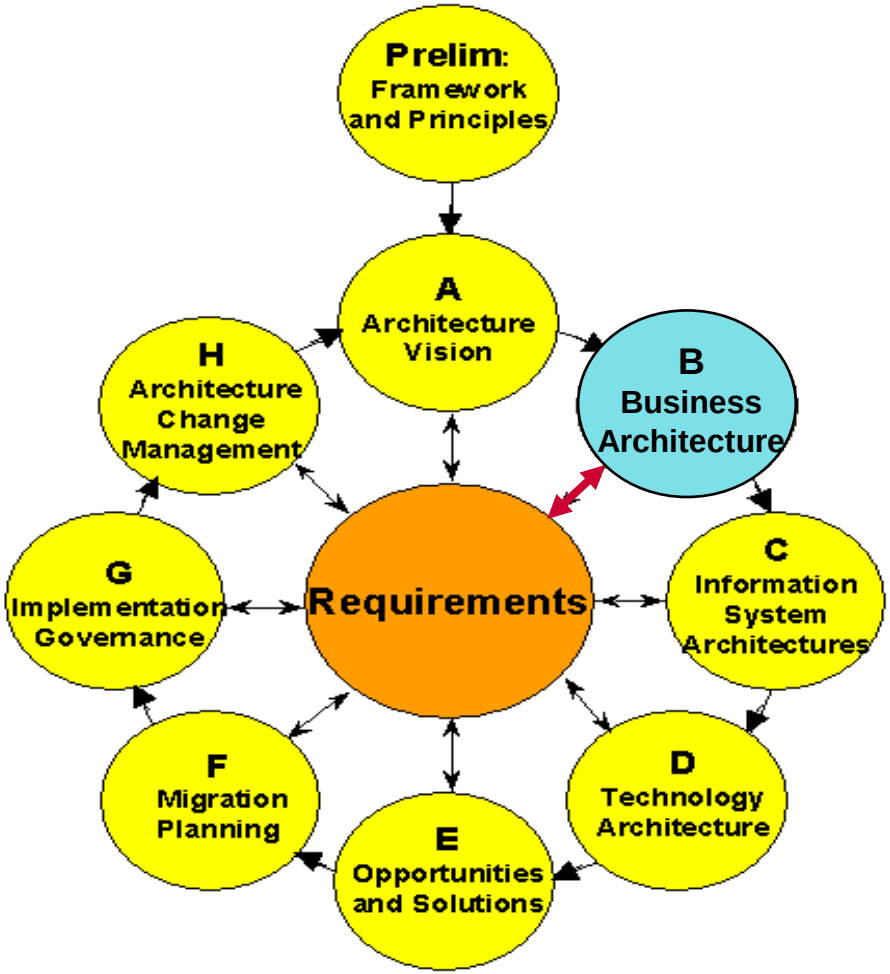
ADM - Architecture Vision

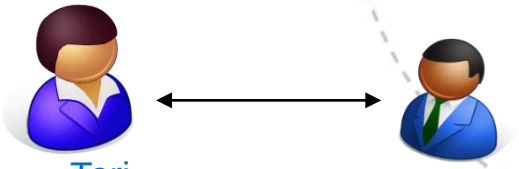


- Define the scope of the architecture project
- Define high level business requirements

➢ *Statement of architecture work/architectural vision, to be approved by Stakeholders*

ADM – Business Architecture





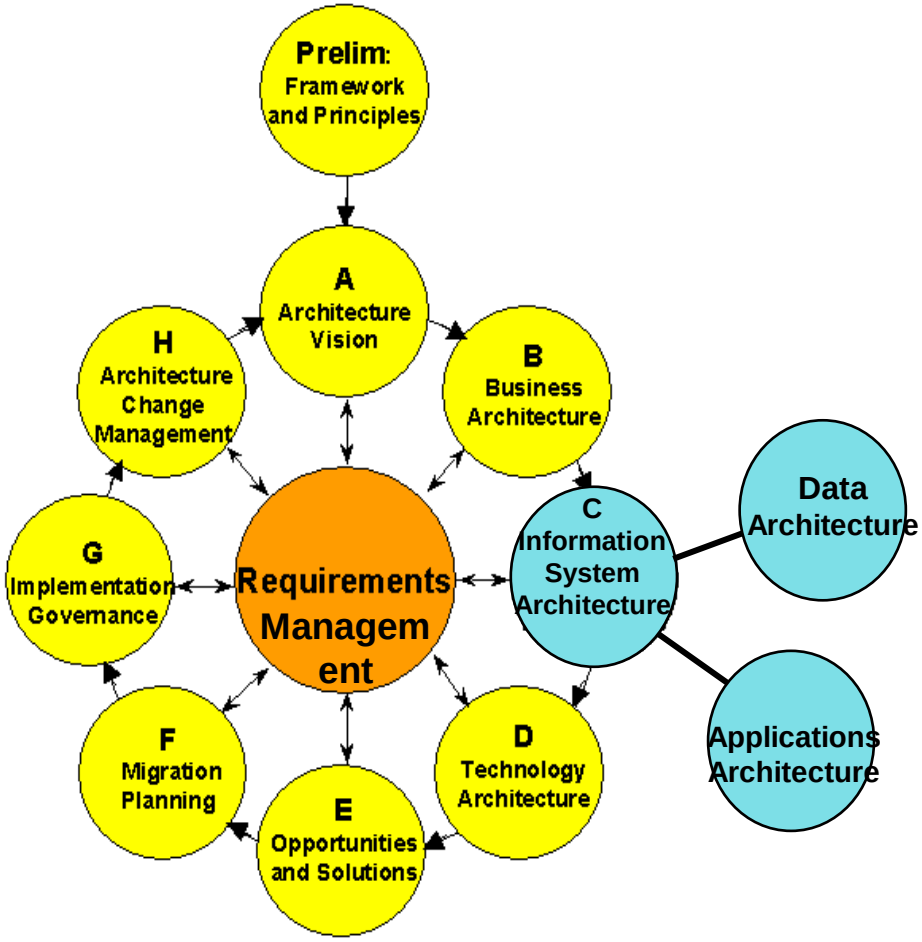
Teri, TOGAF Consultant

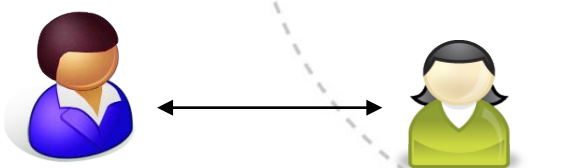
Bret, Business Manager

The objective is to define and describe the product and/or service strategy, and the organizational, functional, process, information, and geographic aspects of the business environment.

- *Detailed baseline and target business architecture and full analysis of the gaps between them.*

ADM: Informations Systems Architecture – Data & Applications

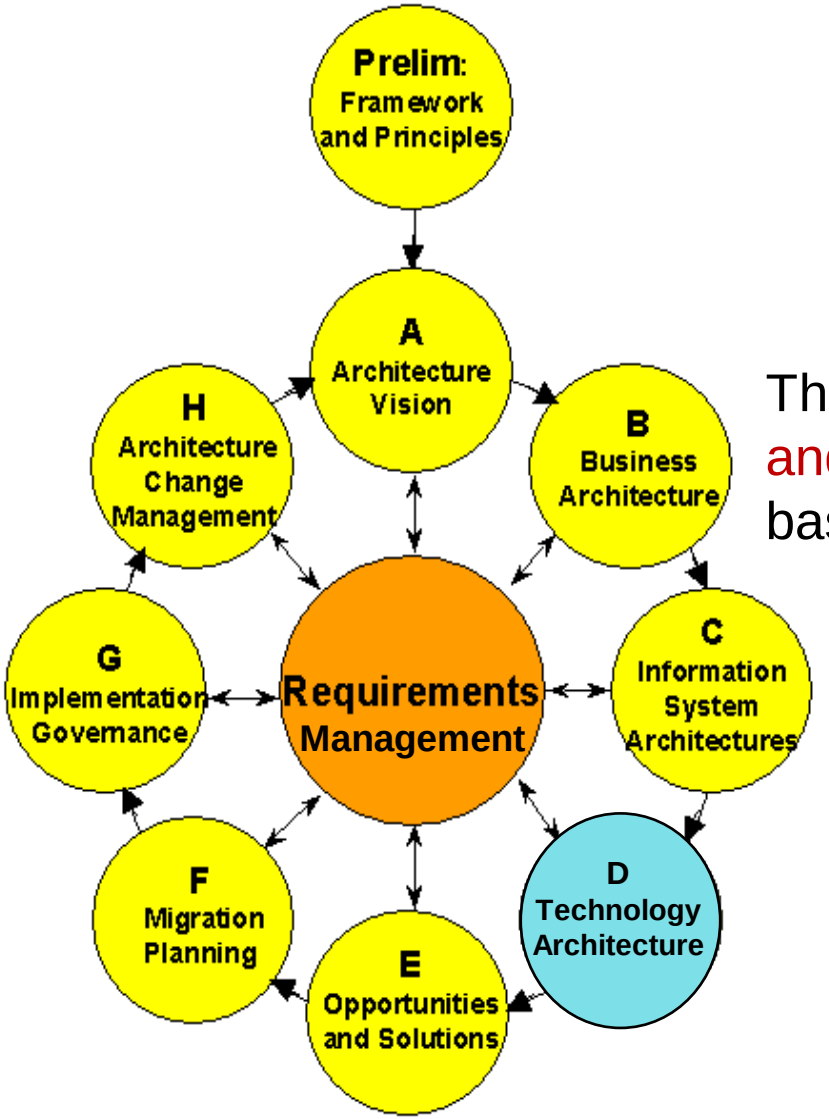


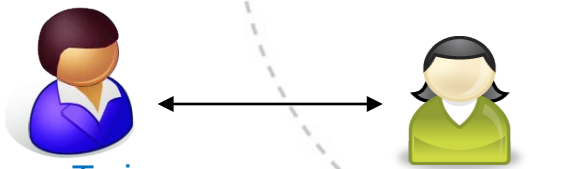


The objective is to define the major types and source of data necessary to support the business. It is NOT about database design. The goal is to define the data entities relevant to the enterprise.

- *Target information and application architecture.*

ADM: Technical Architecture

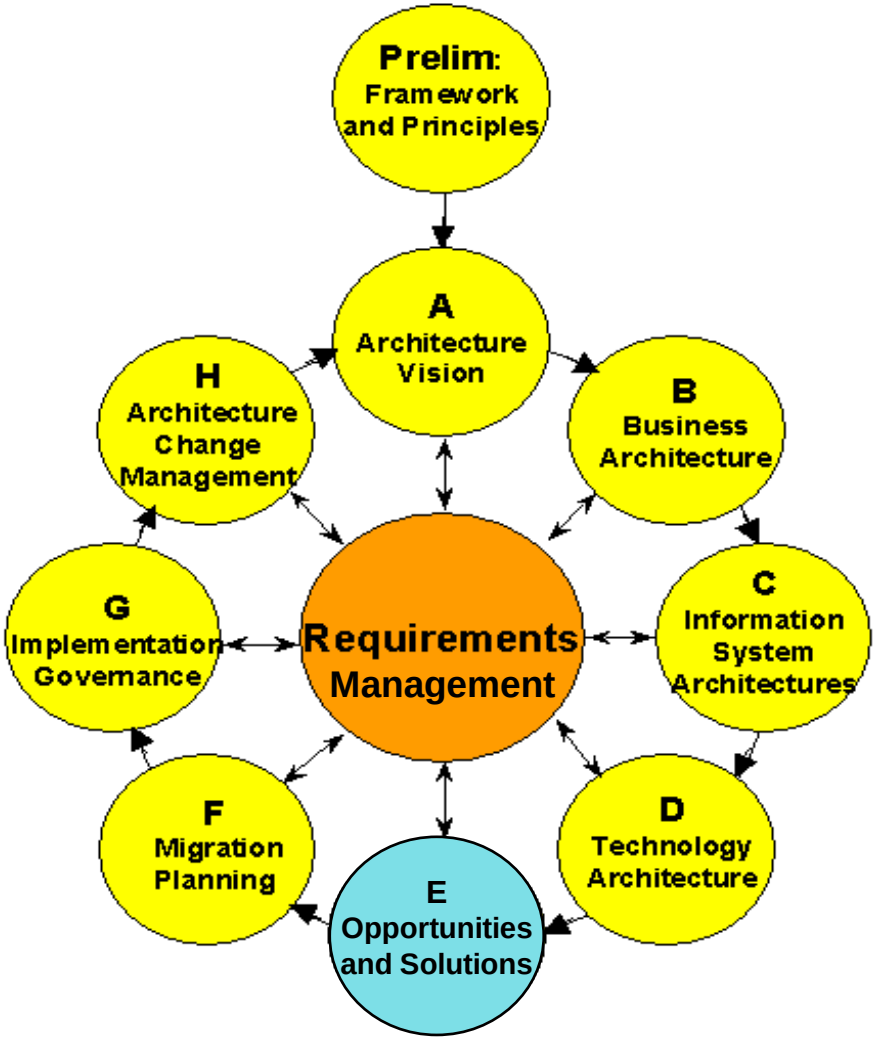




The objective is to define the technology and technical services that will form the basis of the following implementation work.

- *Complete technical architecture: the infrastructure necesary to support the proposed new architecture.*

ADM: Opportunities and Solutions

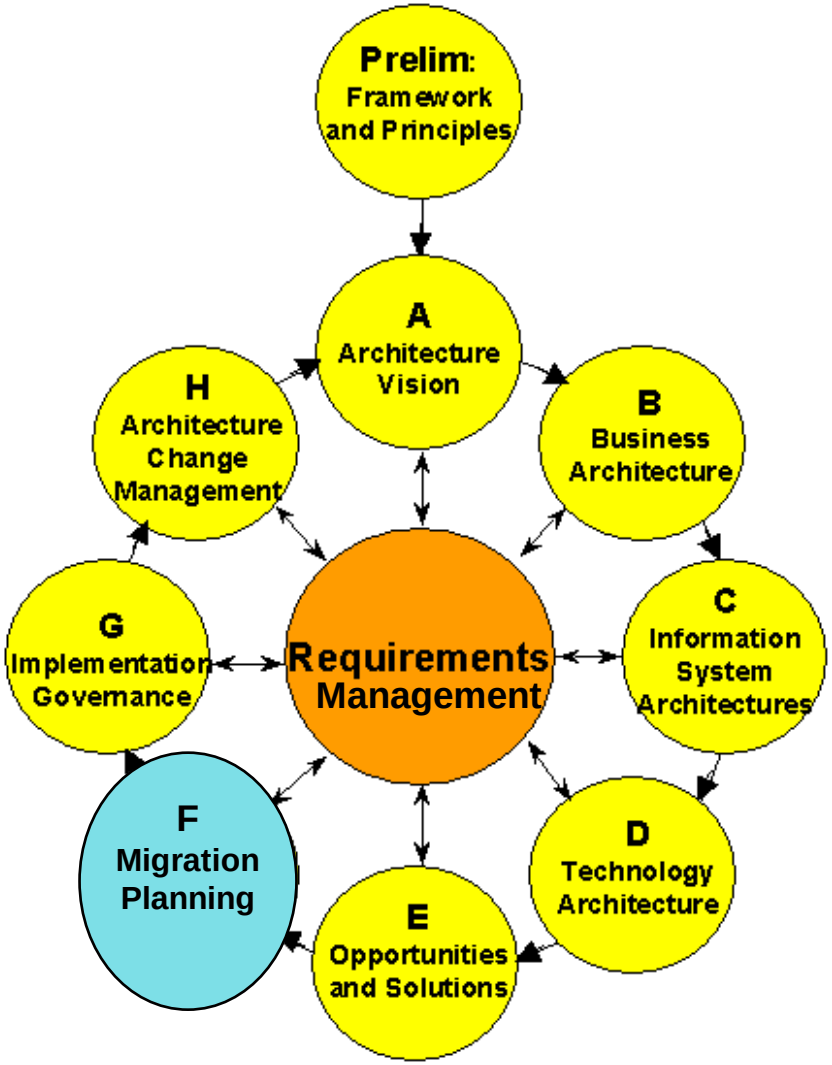


- The first phase directly concerned with implementation
- How to close the gaps?

- Identify implementation projects

Focus on projects that will deliver short term payoffs, e.g. the organisational pain points such as difficulties in completing regional /warehouse specialisation and unreliability in data sharing.

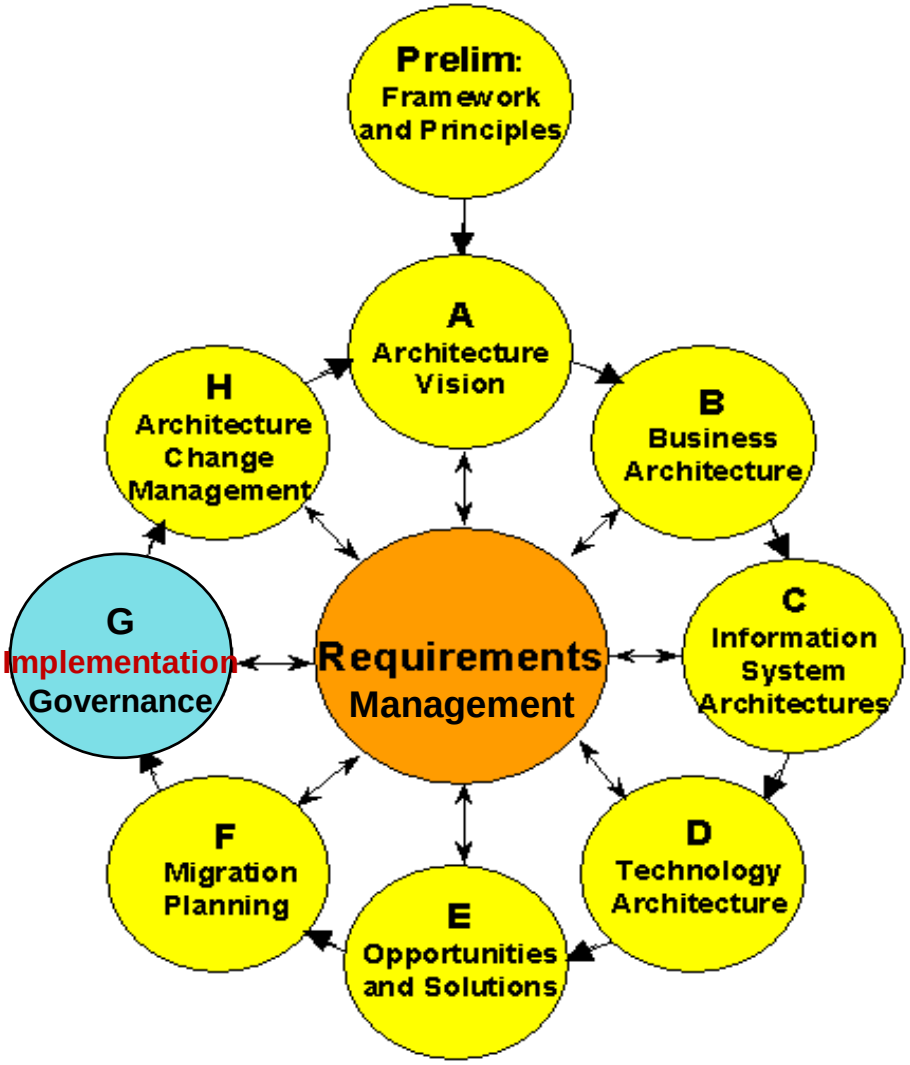
ADM: Migration Planning



- Prioritize between implementation projects

- i.e. project portfolio management
- Cost and benefit analysis
- Risk assessment

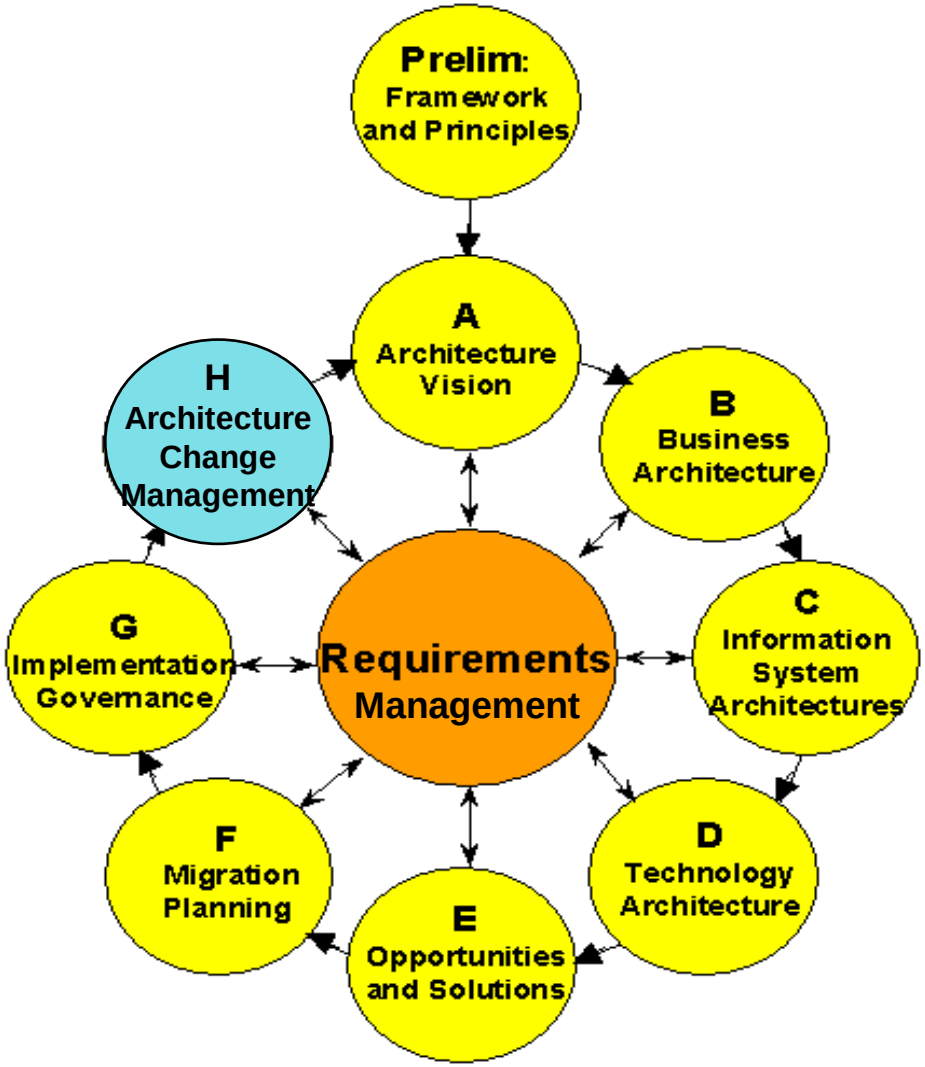
ADM: Implementation Governance



- Architectural contract.
- Ensure compliance with the defined architecture.
- Implementation specifications – acceptance criteria.

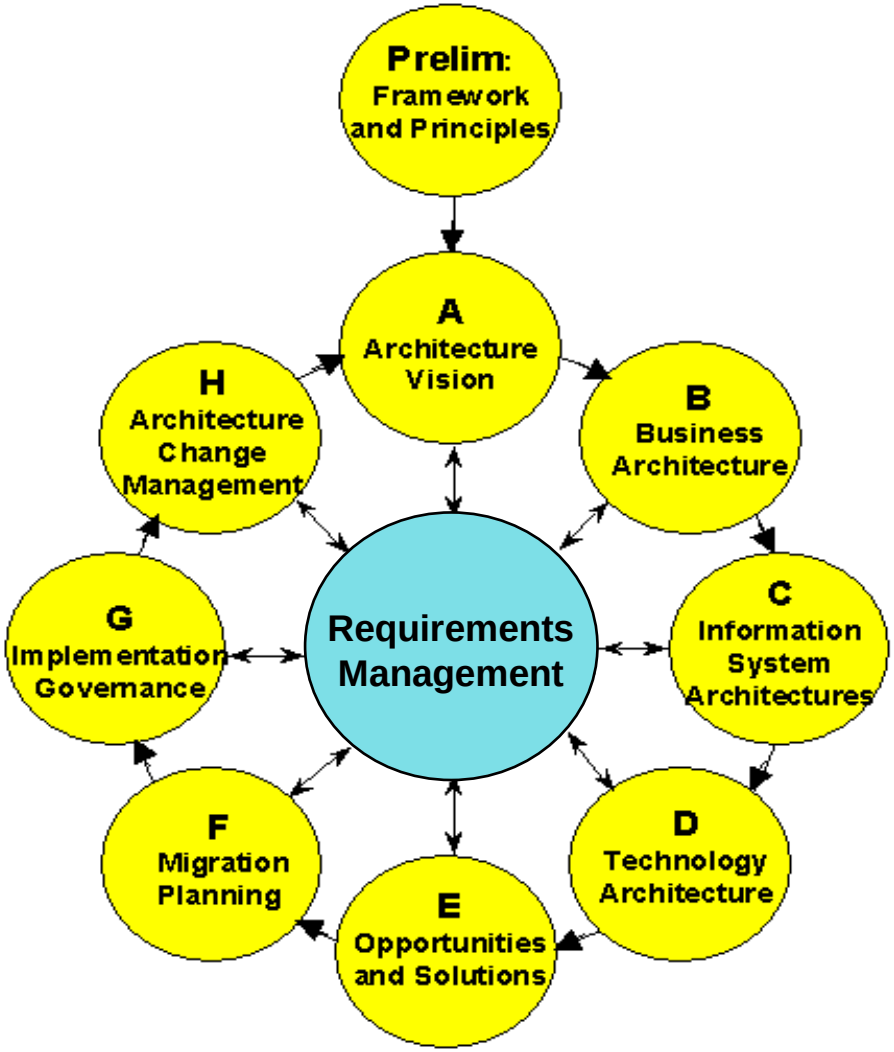
➢ *Architectural specifications for the implementation projects.*

ADM: Architectural Change Management



- Handle architecture change requests
- Suggest new architecture projects

ADM: Requirements Management



- Handling new and changing requirements from architecture projects, IT projects, change projects, operations, etc.

- *Ready to start the phase again.*
- *One of the goals of the first cycle should be information transfer so that Teri's consultancy services are required less in the next cycle.*

TOGAF - benefits

+ TOGAF is flexible about the architecture that is generated – ”architecture agnostic” or vendor neutral.
+ Comprehensive process, from business requirements to applications to infrastructure.
• The final architecture may be good, bad or indifferent.
÷ TOGAF merely describes how to generate enterprise architecture, not necessarily how to generate a good one!

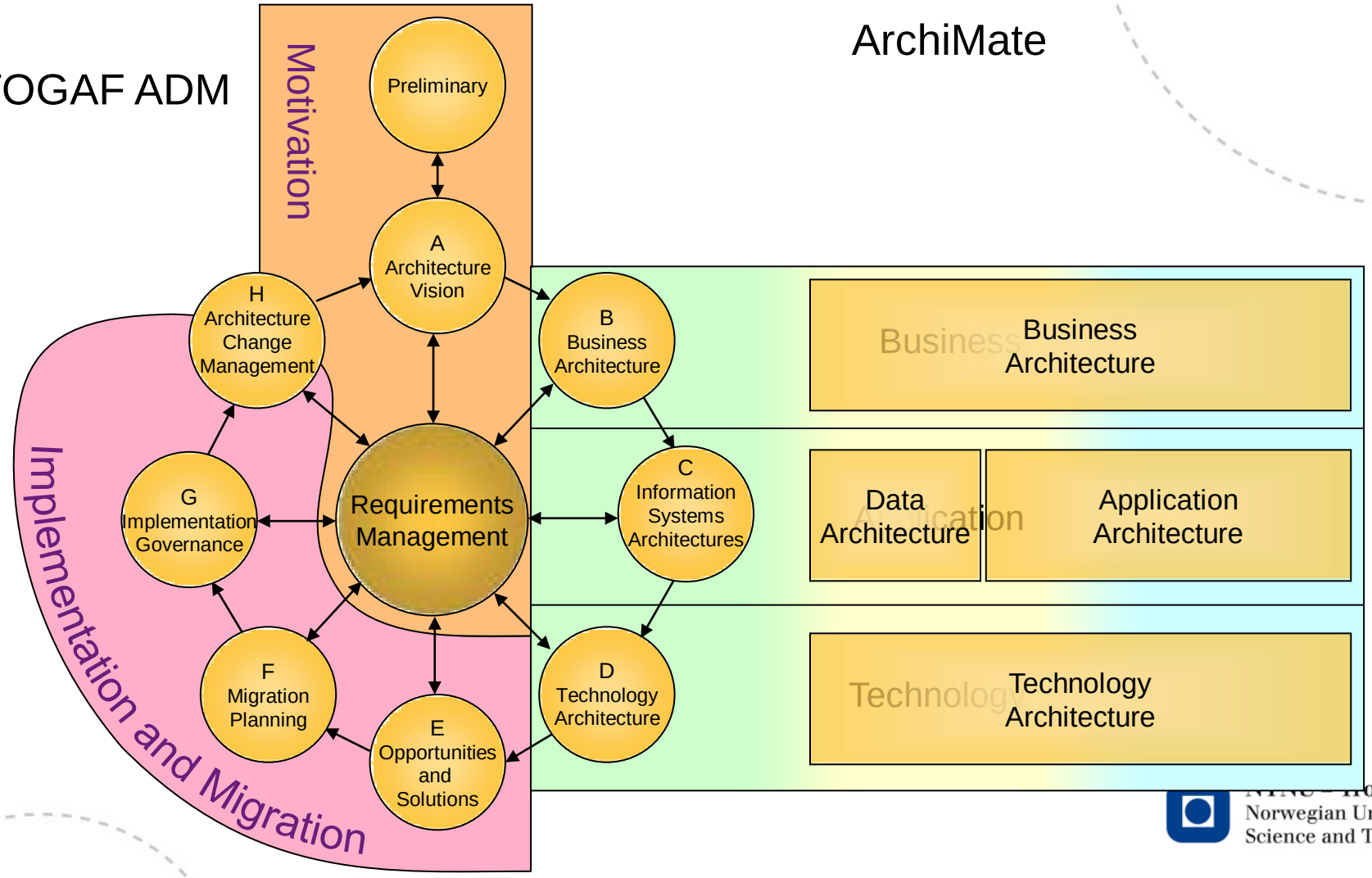
TOGAF and MED-EA

- The final architecture may be good or bad.
- It merely describes how to generate an architecture, not necessarily a good one!
- A good architecture will depend on the experience of the MedAMore staff and Teri, the TOGAF consultant.

TOGAF, ArchiMate and ArchiMate Extensions

TOGAF ADM

ArchiMate



Next Lecture

- Continue Enterprise Architecture
  - FEAF
  - Gartner

This Lecture

- Enterprise Architectures continued: Gartner, FEA
  - Based on lecture slides from Spring 2010, by Harald Rønneberg.
- Required Reading:
  - A11: Roger Sessions, A Comparison of the Top Four Enterprise-Architecture Methodologies, White Paper, ObjectWatch Inc. May 2007.
- Additional reading:
  - Federal Enterprise Architecture Framework, Version 1.1, September 1999, (http://www.cio.gov/documents/fedarch1.pdf)
  - http://en.wikipedia.org/wiki/Federal_Enterprise_Architecture
  - Cisco Systems, 2009. Federal Enterprise Architecture (FEA) and Network Services, White Paper, pages 1-6. (http://www.cisco.com/en/US/solutions/collateral/ns340/ns414/ns859/C11-542359-00_FEAnetsol.pdf)

What is Enterprise Architecture – recap

EA Bridges Strategy and Implementation

Architecture

- Business architecture
- Information architecture
- Solution architecture
- Technology architecture

Business Strategy

- Business drivers
- Business goals
- Business policy
- Trend analysis

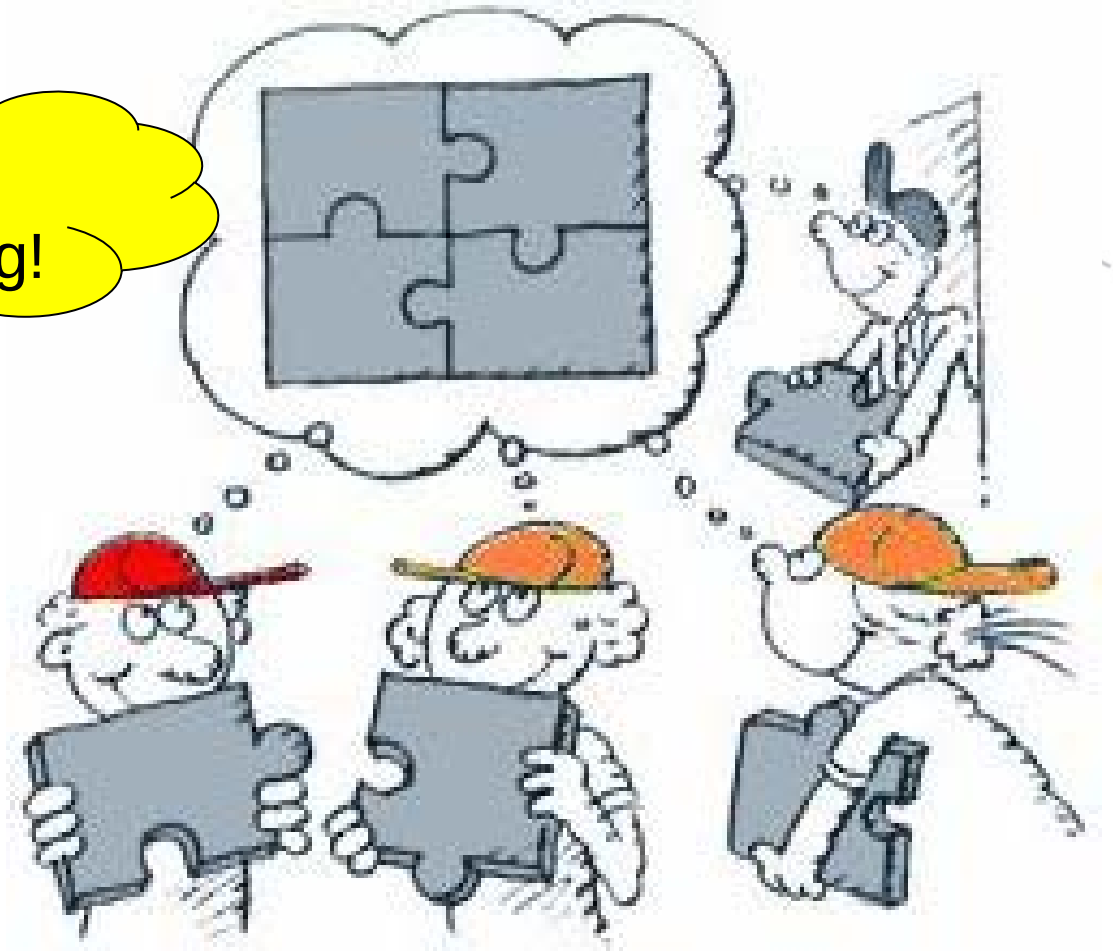
Implementation

- Business processes
- Application systems
- Tech infrastructure
- Organizational structure

The bridge between strategy & implementation

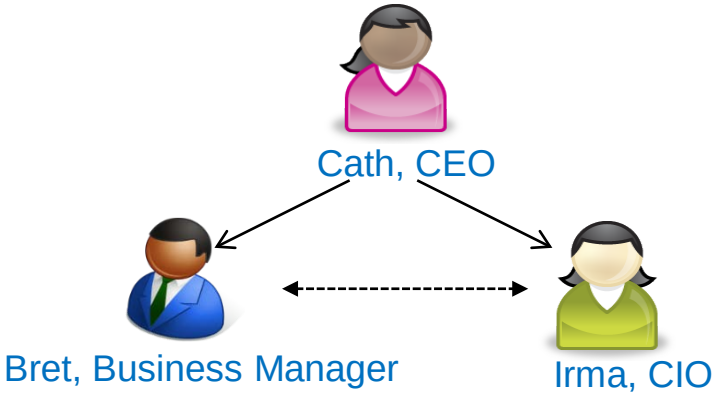
Alignment

Common understanding!



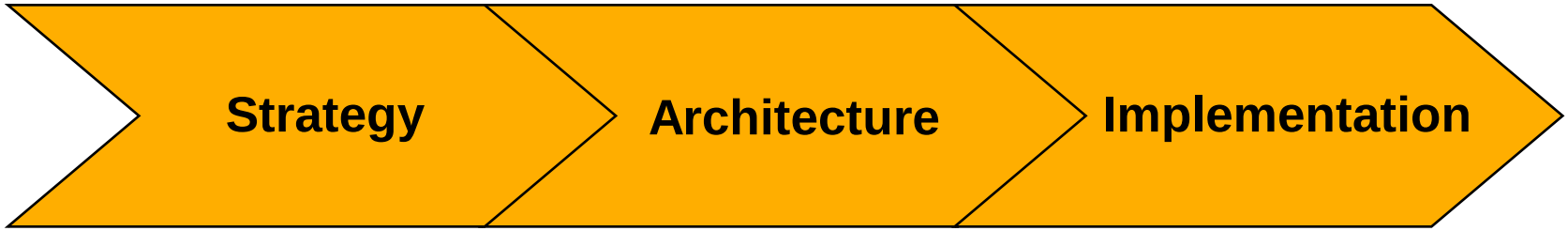
Example case: MEM-EA

- Internal conflicts between the technical and and the business side.
  - Business side saw IT as reducing business agility.
  - IT side saw the business side as making impossible demands.
  - ➢ Crisis!



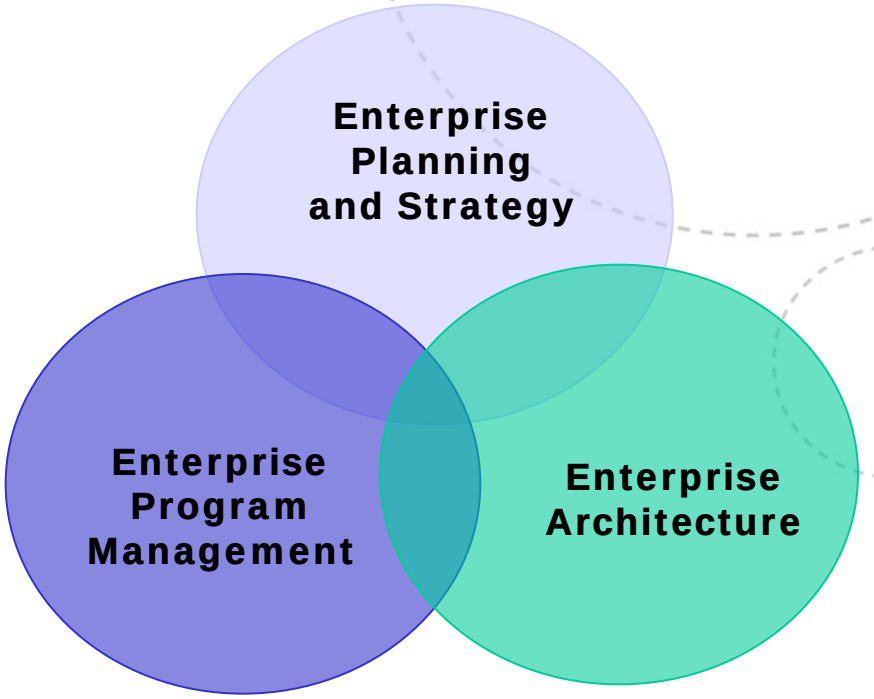
Gartner

- A planning discipline for the enterprise that goes beyond technology choices:
  - Driven by the strategic intent of the enterprise
  - Holistic in breadth
  - Designed to create a future-state “road map”
  - Provides flexibility and adaptability for changing business, information, and solution needs => change enabler
  - A bridge between strategy and implementation



From Strategy to Implementation

- Planning and Strategy
  - Focused on integration of business and IT planning
- Enterprise Architecture
  - Goal is to provide the road map for the enterprise
- Program Management
  - Primary agent for implementing enterprise transformation

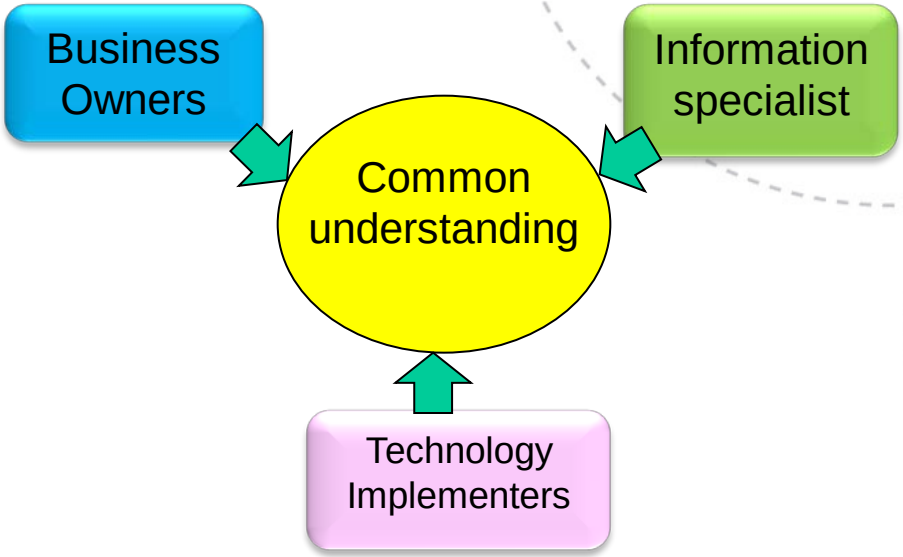


Gartner

- The Gartner EA methodology is a ”practice” – Sessions.
- It is an ongoing process of creating, maintaining, and especially, leveraging an enterprise architecture that gives the enterprise its vitality.

Gartner

- EA is about creating a common understanding.
- Bringing together 3 constituents: business owners, information specialists and technology implementers.
- If we can unify these behind a common vision that drives the business value → success!



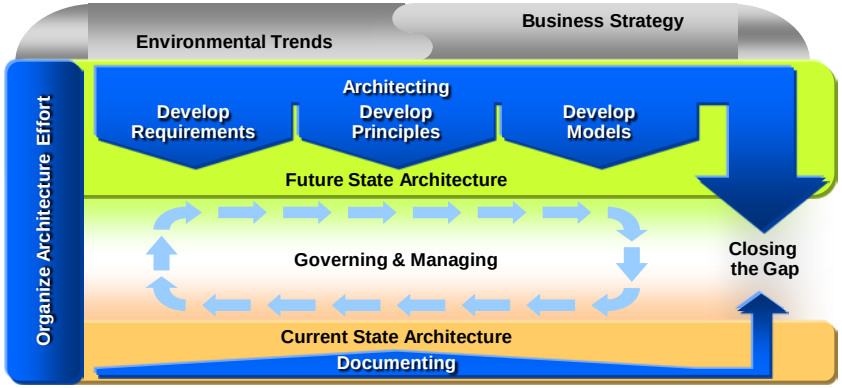
Gartner

- Enterprise Architecture must start where an organisation is going, not where it is
  → focussed on destination.
- Recommends that an organisation begins by telling the story of where its strategic direction is heading and what the business drivers are to which it's responding.
- ➢ Goal: everybody understands and shares a single vision.
- As soon as an organisation has a single vision, the implications on the business, technical, information and solution architectures can be considered.

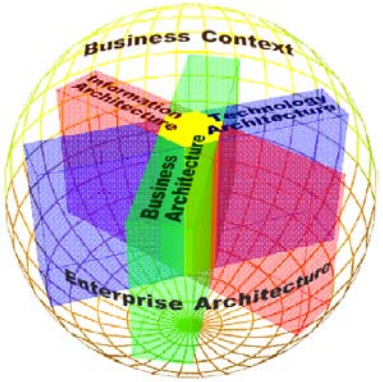
Gartner Enterprise Architecture Method

The two major facets of the Gartner EA method are:

- Gartner Enterprise Architecture Process Model



- Gartner Enterprise Architecture Framework



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Gartner's 4 Architectural Viewpoints

Three primary viewpoints:

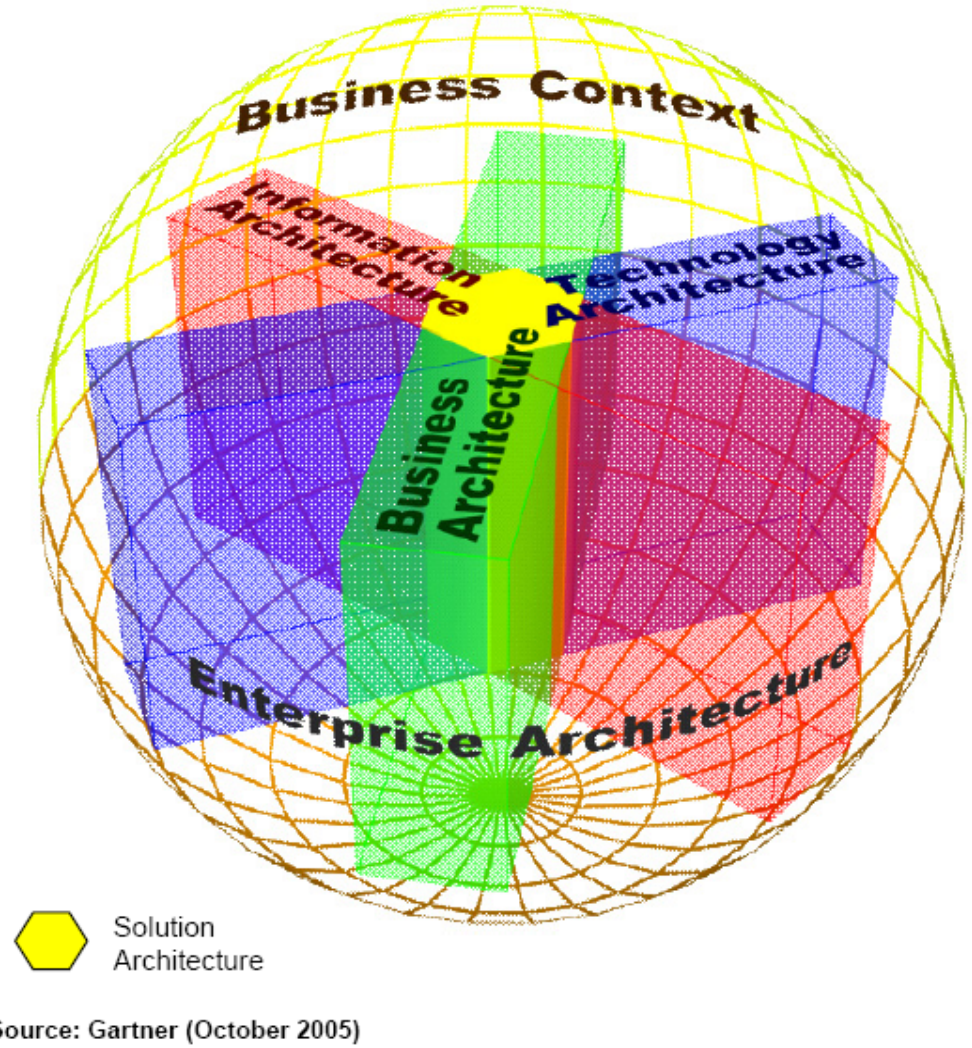
- Business Architecture
- Information Architecture
- Technology Architecture

One meta-architecture viewpoint

- Solution Architecture

Solution Architecture Framework

- A framework for creating Solution Architectures



Source: Gartner (October 2005)

Gartner's 4 Architectural Viewpoints

Business Architecture

- Defines and describes the current- and future- state models of business activities (processes, assets and organization structure)

Information Architecture

- Defines and describes the current- and future- state models of the information value chain, key information artifacts (concepts), information flows

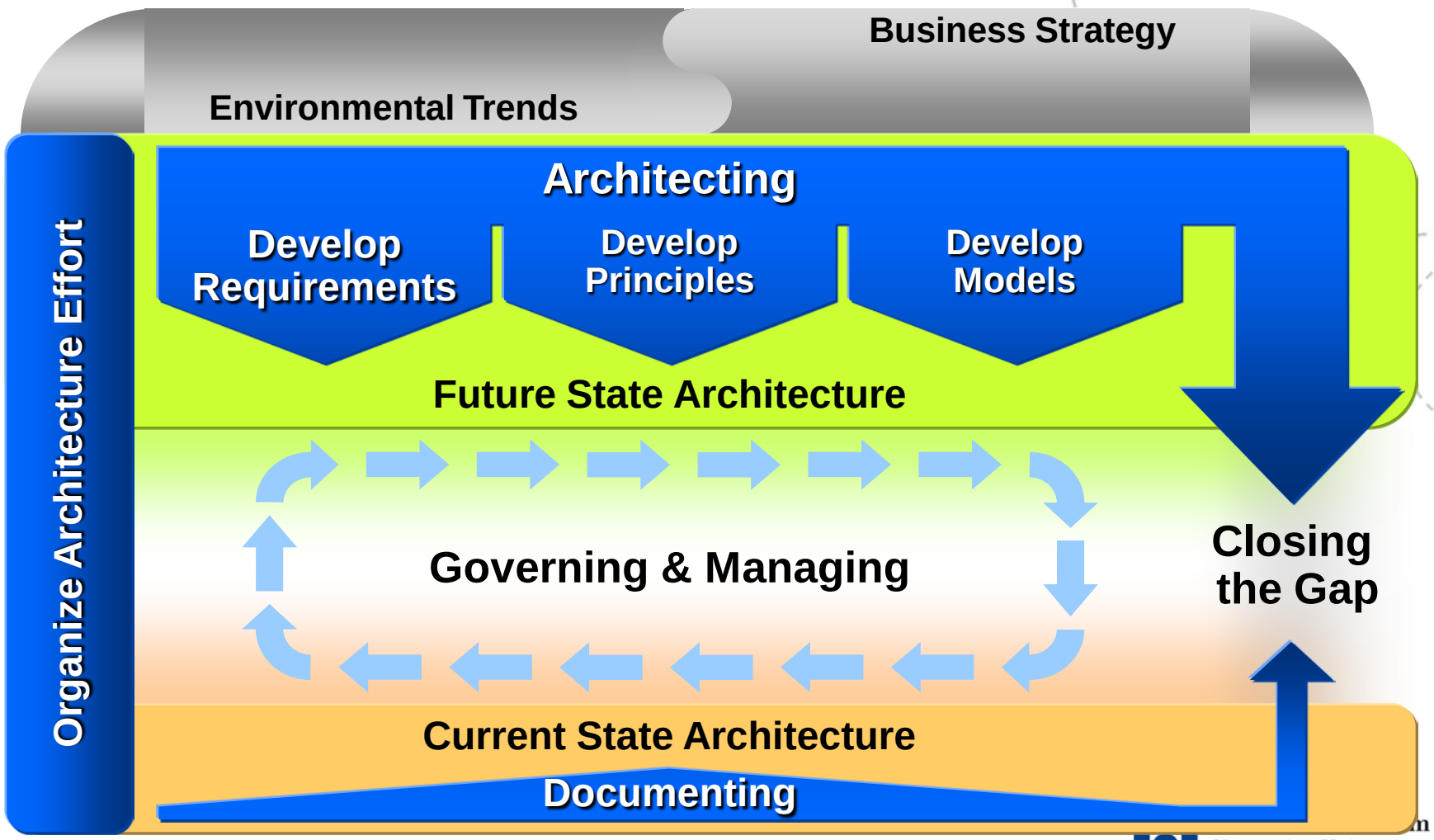
Technology Architecture

- Defines and describes the current- and future- state models of the infrastructure and technology platforms required for the solution architecture and which enables rapid engineering, solutions development and technical innovation

Solution Architecture

- Combining and reconciling (integration) the loosely coupled and often conflicting viewpoints of the primary stakeholders into a unified architecture
- Having divided to conquer, we must reunite to rule
- SA is a consistent architectural description of a specific enterprise solution
- An intersection of viewpoints

Gartner Enterprise Architecture Process Model



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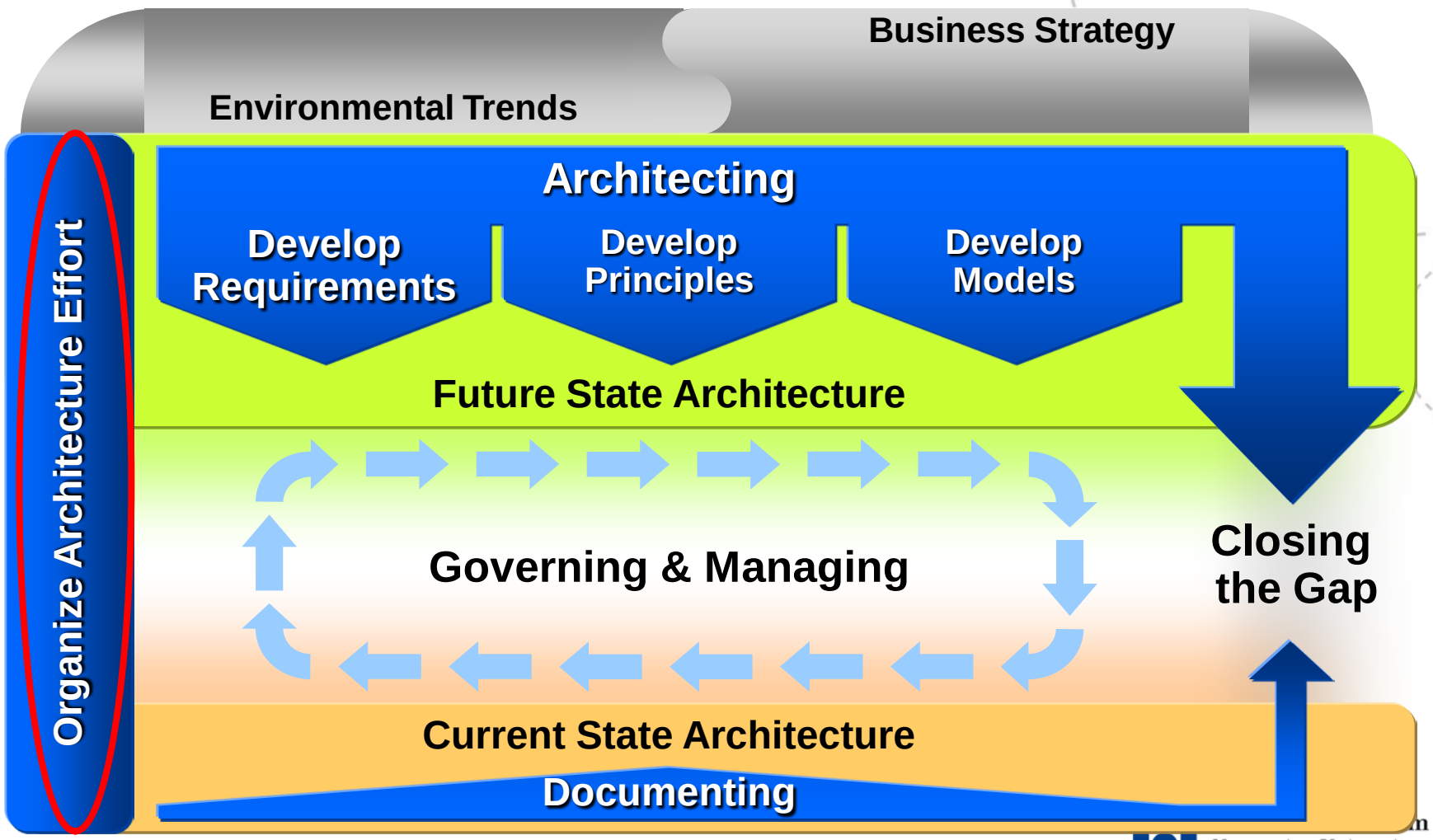
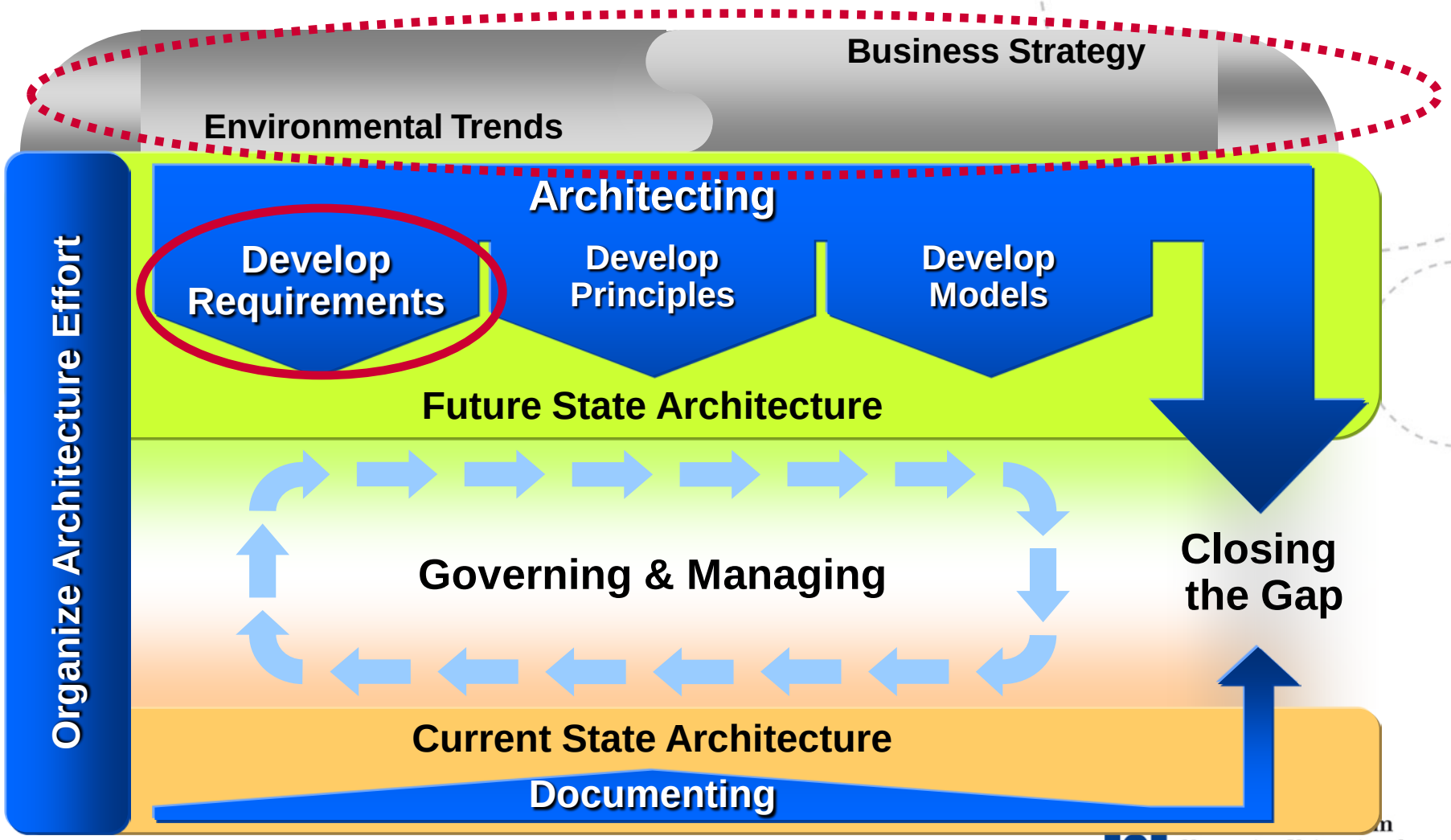
Organise Architecture Effort



Organise Architecture Effort - Activities

- State the goals
- Scoping
- Buy-in and commitment
- Stakeholder analysis
- Set time box
- Establish EA team

Develop Requirements



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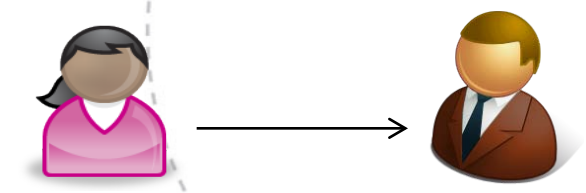
CRV - from strategy to business requirements

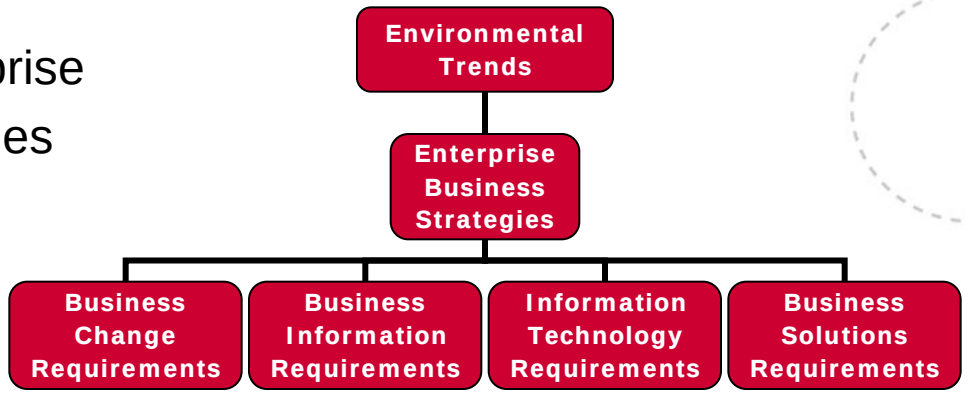


- Greg asks Cath to specify her visions in business (not technical terms).
- The visions are prioritised.
- Cath decides the highest priority is "MedAMore will reduce its purchasing costs by 10% by consolidating all regional purchasing into a central system".

➢ CRV = Common Requirements Vision

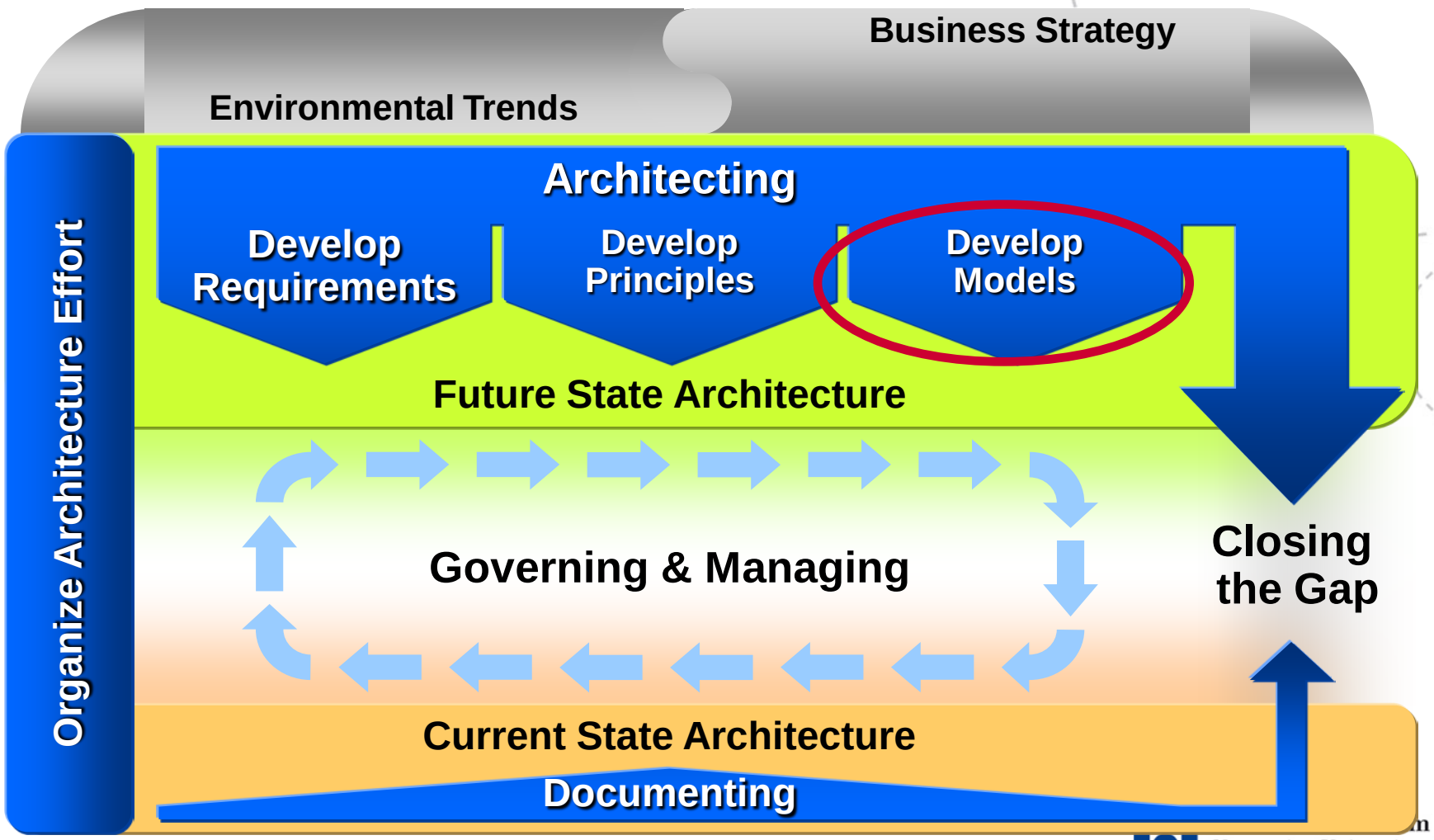
What is CRV?

- A process for capturing, discussing and documenting a shared common view of the strategic requirements driving the enterprise:
  - Position on the impact of environmental trends to the enterprise
  - Set of enterprise business strategies
  - Set of common strategic requirements derived from enterprise business strategies



The CRV document is an articulation of what will drive the enterprise's future state

Develop Models



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Gartner's 4 Architectural Viewpoints (1)

Business Architecture

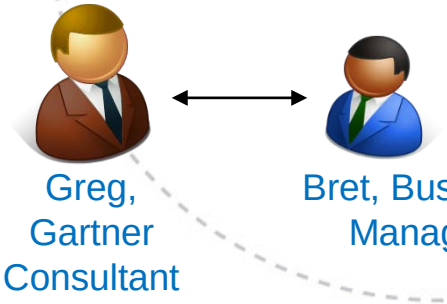
- Defines and describes the future- state models of business activities (processes, assets and organization structure)

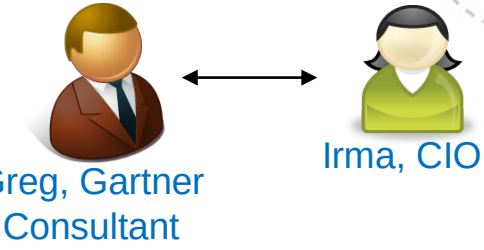
Information Architecture

- Defines and describes the future- state models of the information value chain, key information artifacts (concepts), information flows

Technology Architecture

- Defines and describes the future- state models of the infrastructure and technology platforms required for the solution architecture and which enables rapid engineering, solutions development and technical innovation



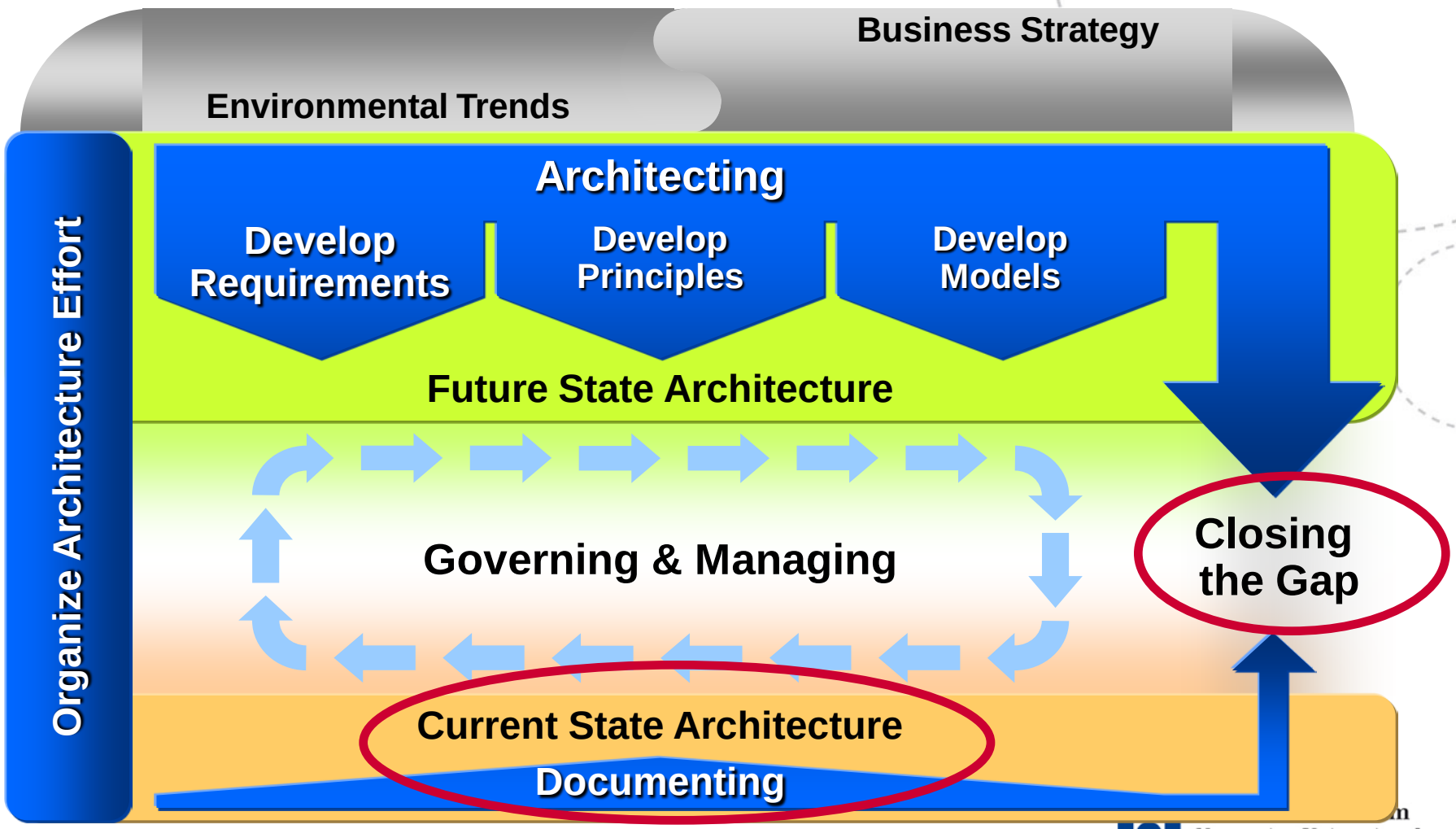


Gartner's 4 Architectural Viewpoints (2)

Solution Architecture

- Combining and reconciling (integration) the loosely coupled and often conflicting viewpoints of the primary stakeholders into a unified architecture
- Having divided to conquer, we must reunite to rule
- SA is a consistent architectural description of a specific enterprise solution
- An intersection of viewpoints.

Current state and the gap



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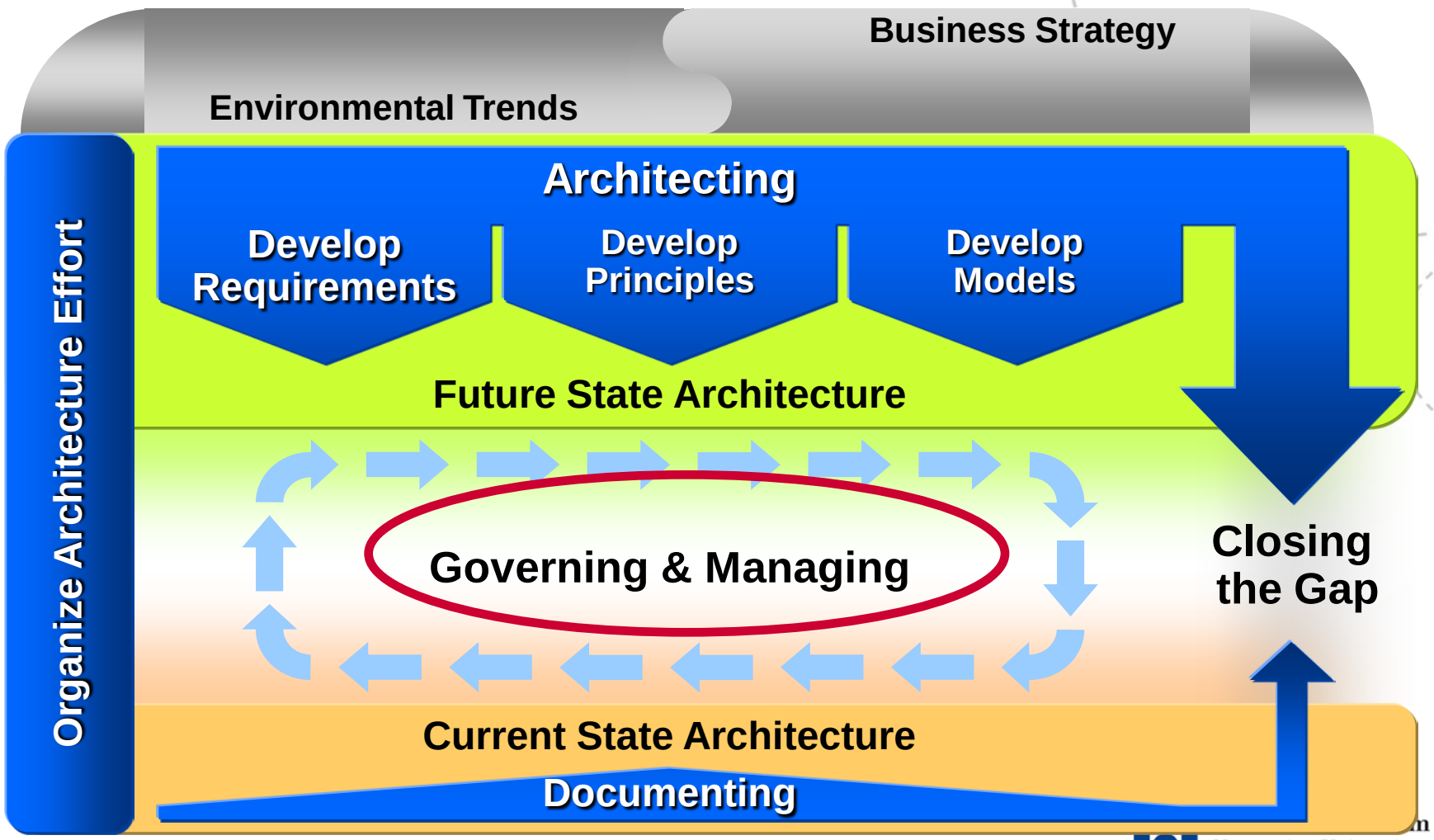
Governing and Managing



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Gartner- benefits

+ Process completeness – the methodology fully guides you through a step-by-step process for creating EA.
+ Practical guidance.
+ Business focus.
+ Provides a methodology that can support governance.
÷ Does not provide a complete taxonomy.
÷ Not much information available about it.

What is FEAF?

- FEAF (Federal Enterprise Architecture Framework) provides an organised structure and a collection of common terms by which Federal segments can integrate their respective architectures into the FEA (Federal Enterprise Architecture).
- FEA is a strategic information asset base that defines the business, information necessary to operate the business, technology necessary to support the business operations and transitional processes for implementing new technologies in response to the changing needs of the business.

Why FEAF?

Why develop a Federal Enterprise Architecture Framework?

A Federalwide collaboration tool is needed to collect common architecture information and build a repository for storing this information. A Federal Enterprise Architecture Framework is such a tool and repository. The Framework allows the Federal Government to accomplish the following.

- Organize Federal information on a Federalwide scale
- Promote information sharing among Federal organizations
- Help Federal organizations develop their architectures
- Help Federal organizations quickly develop their IT investment processes
- Serve customer needs better, faster, and cost effectively

Value of FEAF

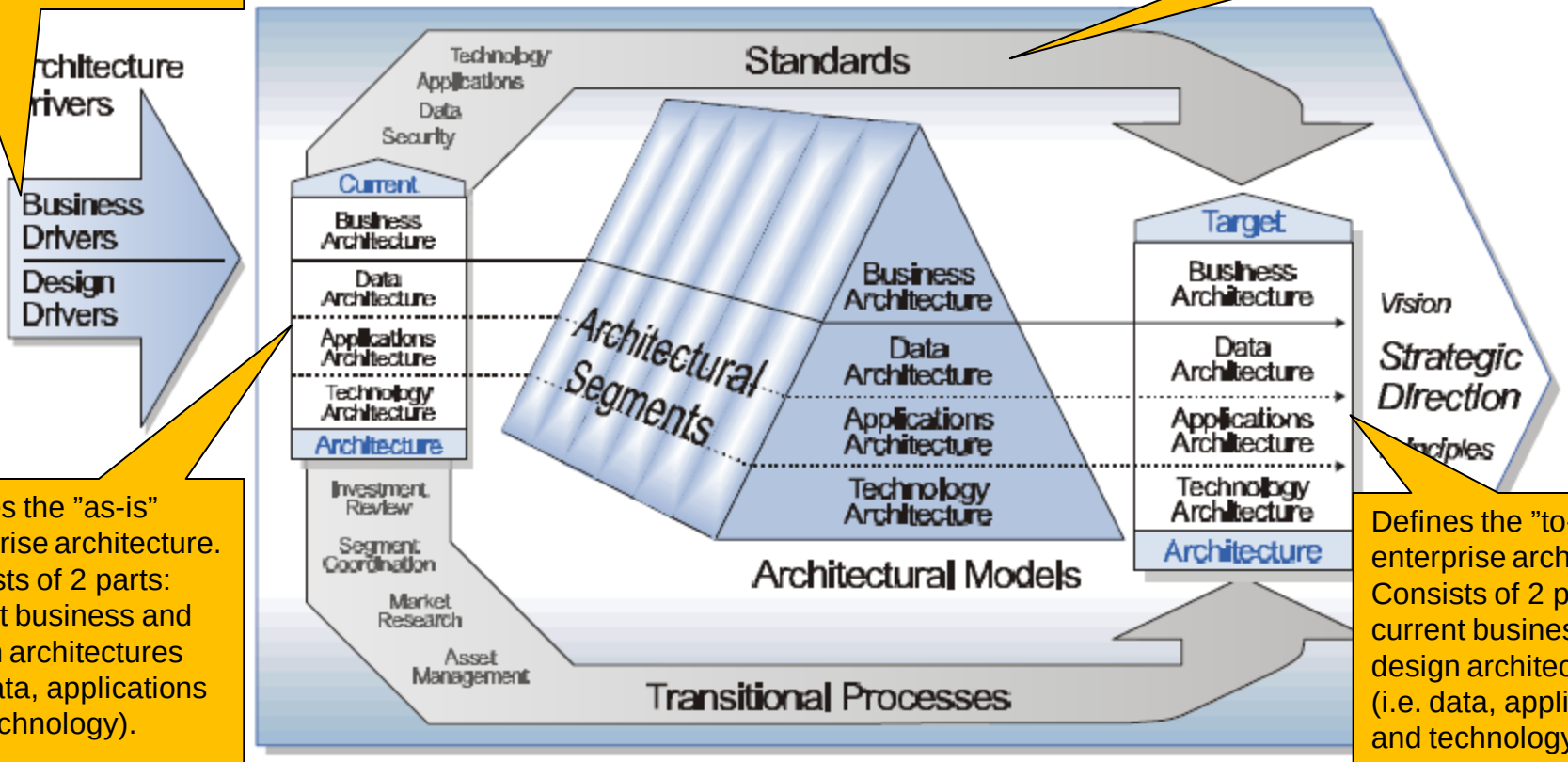
What is the value of a Federal Enterprise Architecture Framework?

- Promote Federal *interoperability*
- Promote Agency *resource sharing*
- Provide potential for Federal and Agency *reduced costs*
- Improve ability to *share information*
- Support Federal and Agency *capital IT investment planning*

FEAF Components (1)

External stimuli or change agents for the enterprise architecture.

Refer to all standards (some of which may be mandatory), guidelines and best practices.



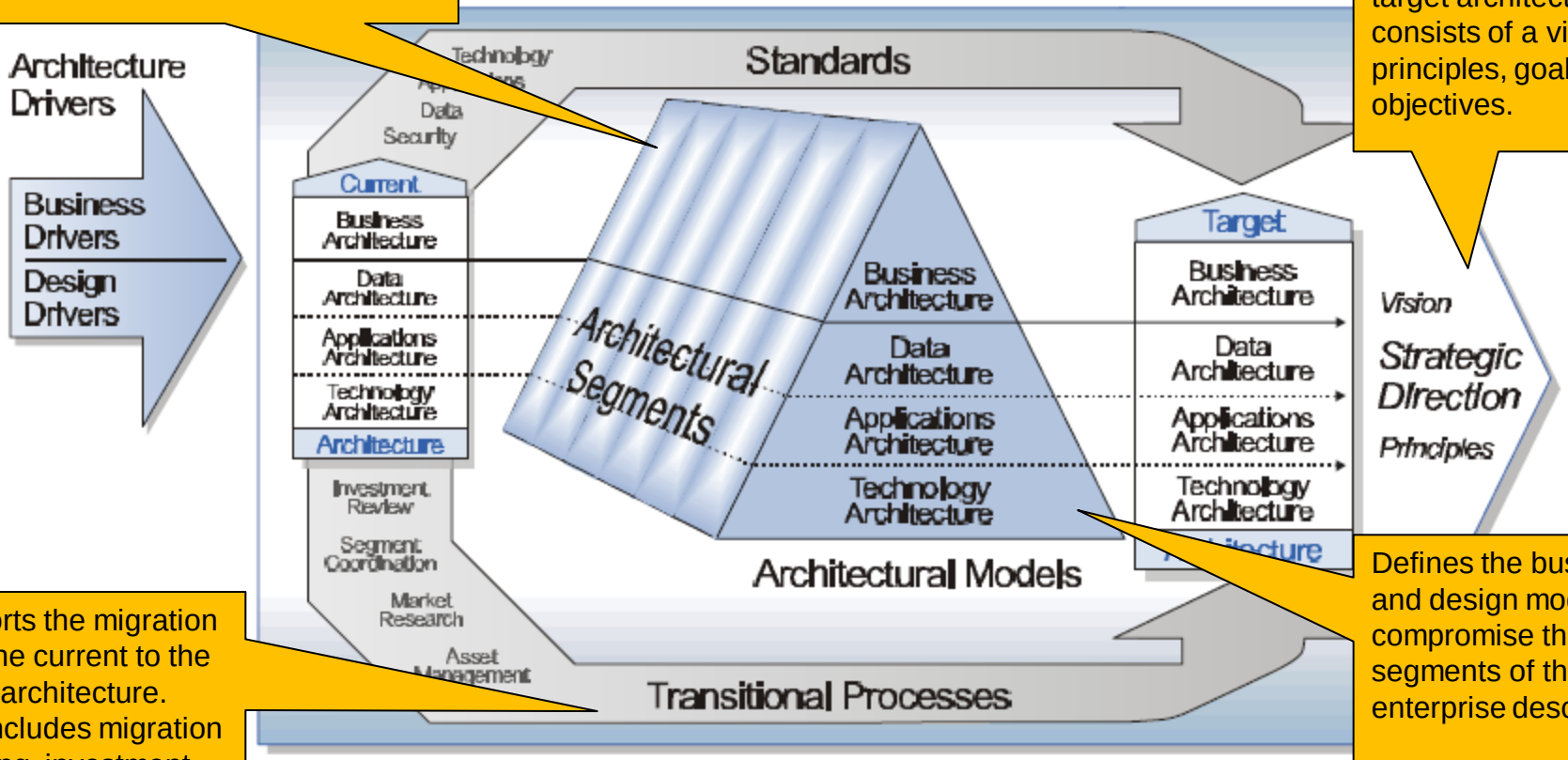
Defines the ”as-is” enterprise architecture. Consists of 2 parts: current business and design architectures (i.e. data, applications and technology).

Defines the ”to-be” enterprise architecture. Consists of 2 parts: current business and design architectures (i.e. data, applications and technology).

FEAF Components (2)

Consists of focused architecture efforts on major cross-cutting business areas and program areas.

Guides the development of the target architecture and consists of a vision, principles, goals and objectives.



Supports the migration from the current to the target architecture. This includes migration planning, investment planning, engineering change control, etc.

Defines the business and design models that compromise the segments of the enterprise descriptions.

FEAF - Segments

- FEAF allows critical parts of the overall Federal Enterprise, called architectural segments, to be developed individually, while integrating these segments into the larger Enterprise Architecture.

FEA – Federal Enterprise Architecture

- FEA is the latest attempt by the US federal government to unite its agencies and functions in a single common and ubiquitous enterprise architecture.
- FEA is the most complete methodology. It has a:
  - A comprehensive taxonomy, like Zachman's framework.
  - An architectural process, like TOGAF.
- FEA can be viewed as either a methodology for creating an enterprise architecture or the result of applying that process to a particular enterprise.
- FEA includes everything necessary for building an enterprise architecture.

FEA – Reference Models

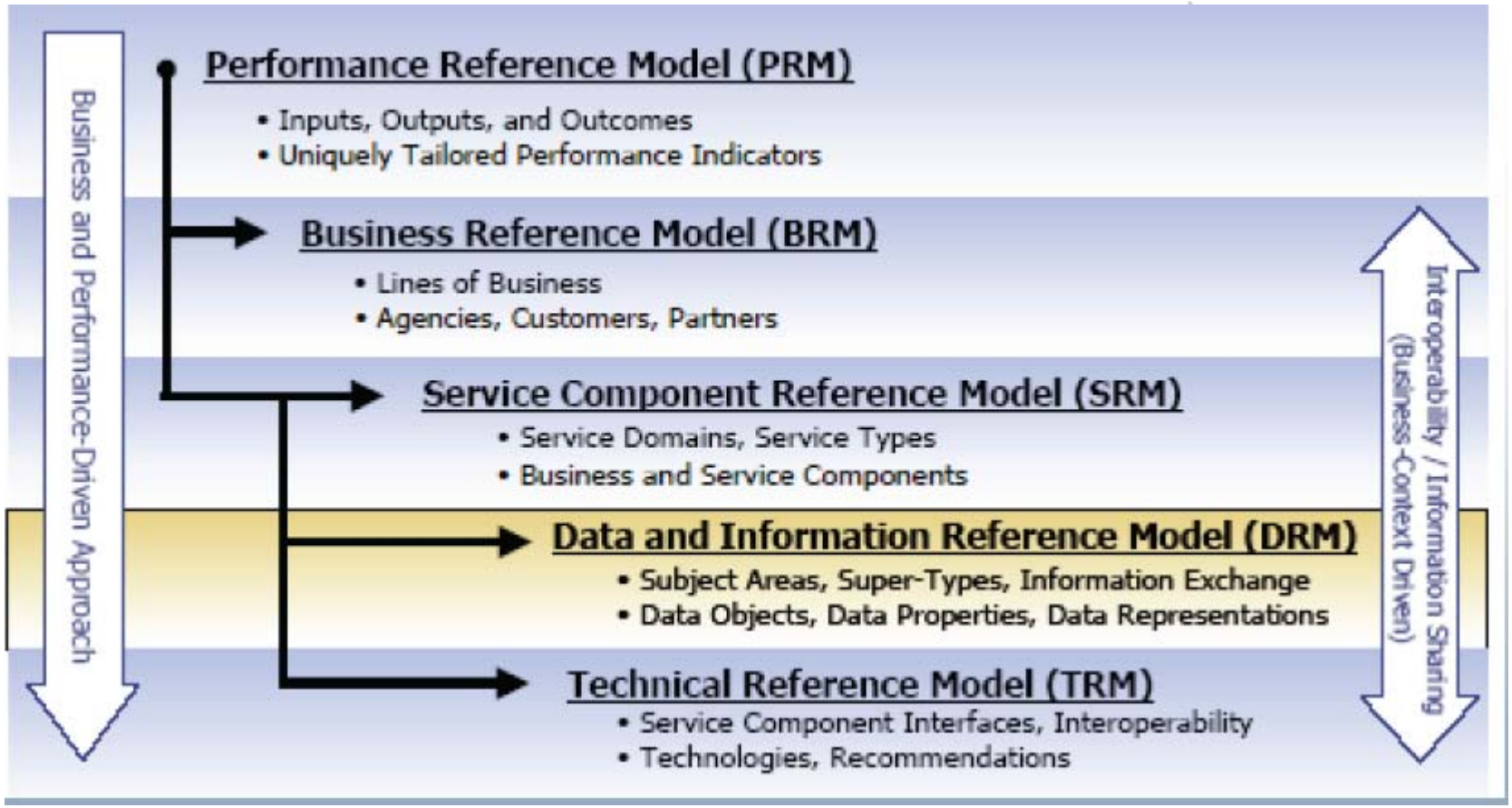
•The goal of the reference models is to provide standardised terms and definitions for the domain of enterprise architecture and thereby facilitate collaboration and sharing across the federal government.

•It's all about establishing a common language.

•Collectively, the reference models comprise a framework for describing important elements of the FEA in a common and consistent way.

FEA – Reference Models

FEA consists of 5 reference models:



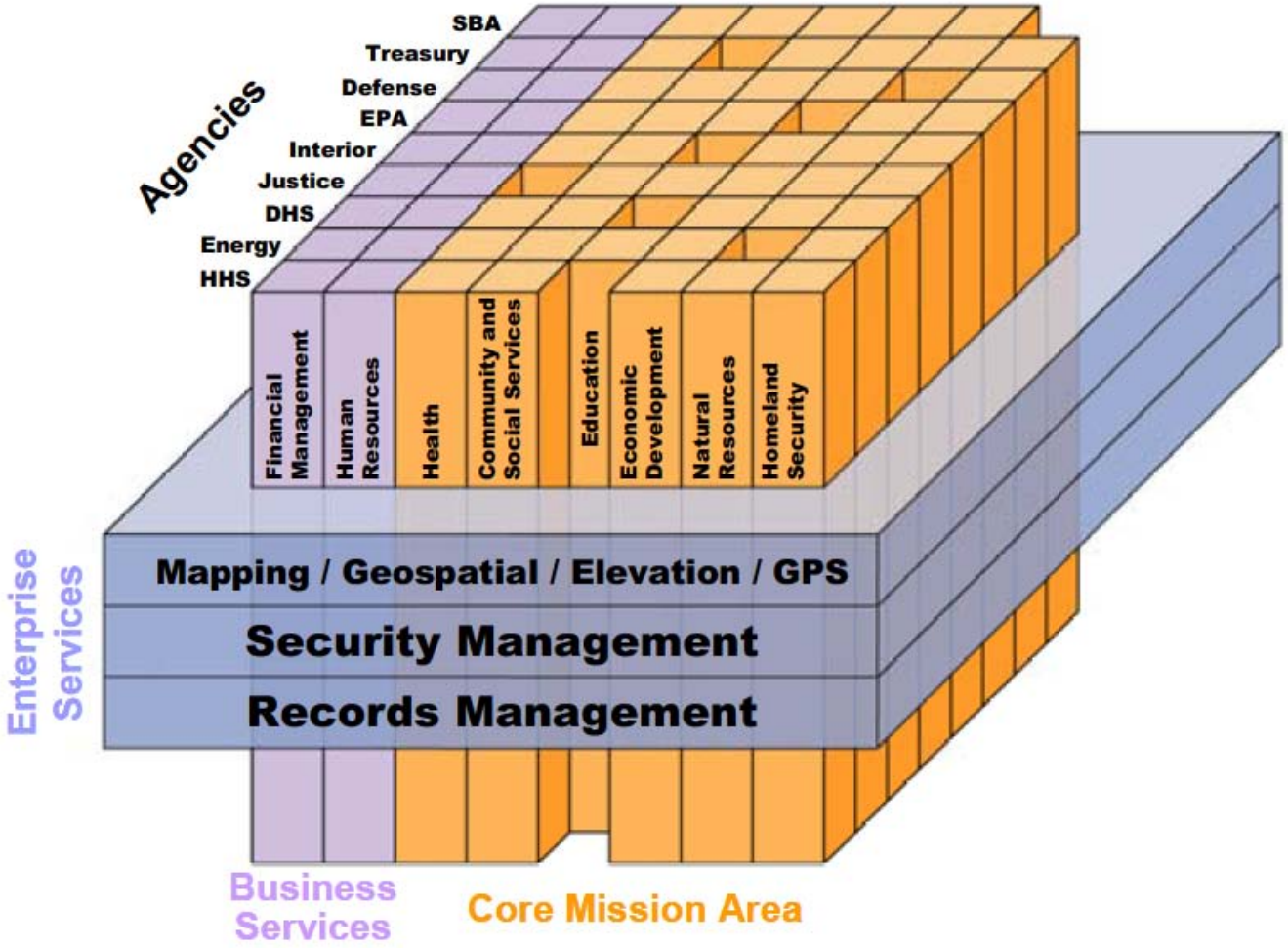
FEA – Reference Models: descriptions

- Business Reference Model (BRM):
  - Gives a business view of the various business functions.
- Service Components Reference Model (CRM):
  - Gives a more IT view of systems that can support business functionality.
- Technical Reference Model (TRM):
  - Defines the various technologies and standards that can be used in building ITsystems.
- Data Reference Model (DRM):
  - Defines standard ways of describing data.
- Performance Reference Model (PRM):
  - Defines standard ways of describing the value delivered by enterprise architecture.

FEA – Segment architecture approach

- FEA perspective on EA: an enterprise is built of segments.
- A segment is a major line-of-business functionality, such as human resources.
- Although segments function at the political level (the agency), they are defined at the enterprise level (government).
- Segments are defined globally to facilitate reuse across the the different enterrpises.

FEA – Segment Map



Segments (vertical columns): spans a single organisation.

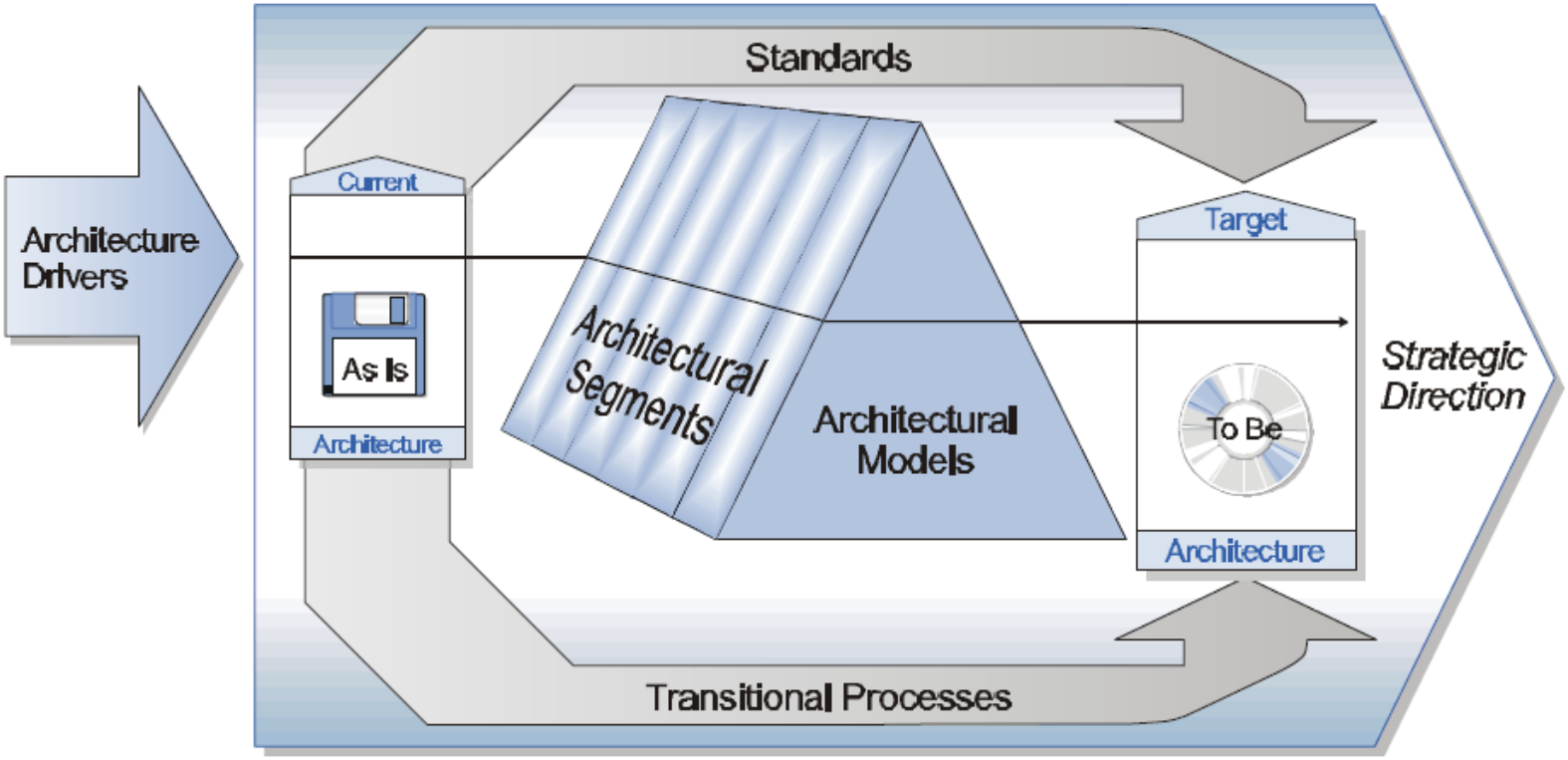
Enterprise Services: have a scope across the entire enterprise.

FEA Process (1)

- FEA Process is primarily focussed on creating a segment architecture for a subset of the overall enterprise.
- Segment architecture development process:
  - Step 1: Architectural analysis.
  - Step 2: Architectural definition.
  - Step 3: Investment and funding strategy.
  - Step 4: Program management plan and execute projects.

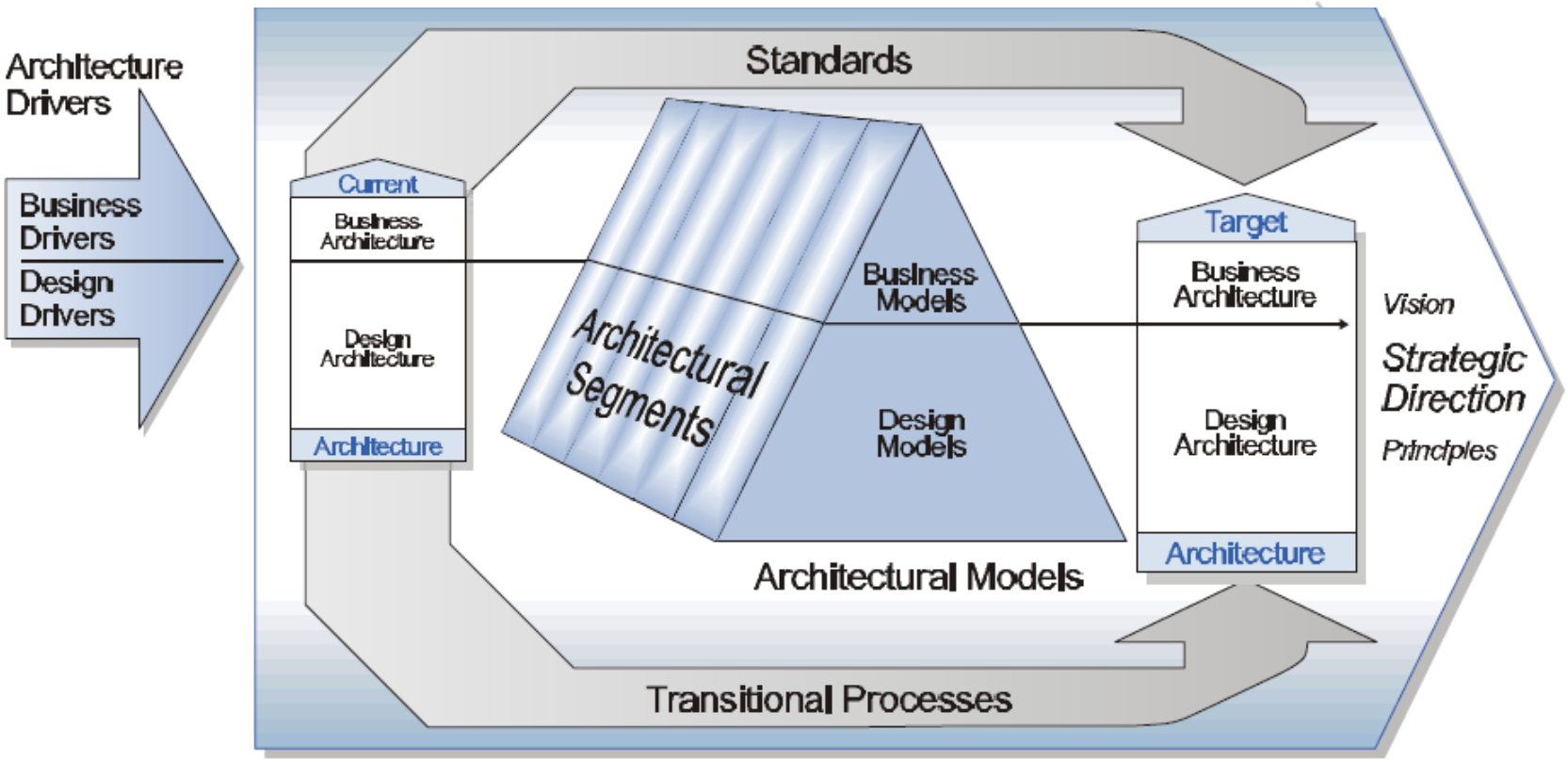
FEA Process, Level I

High level



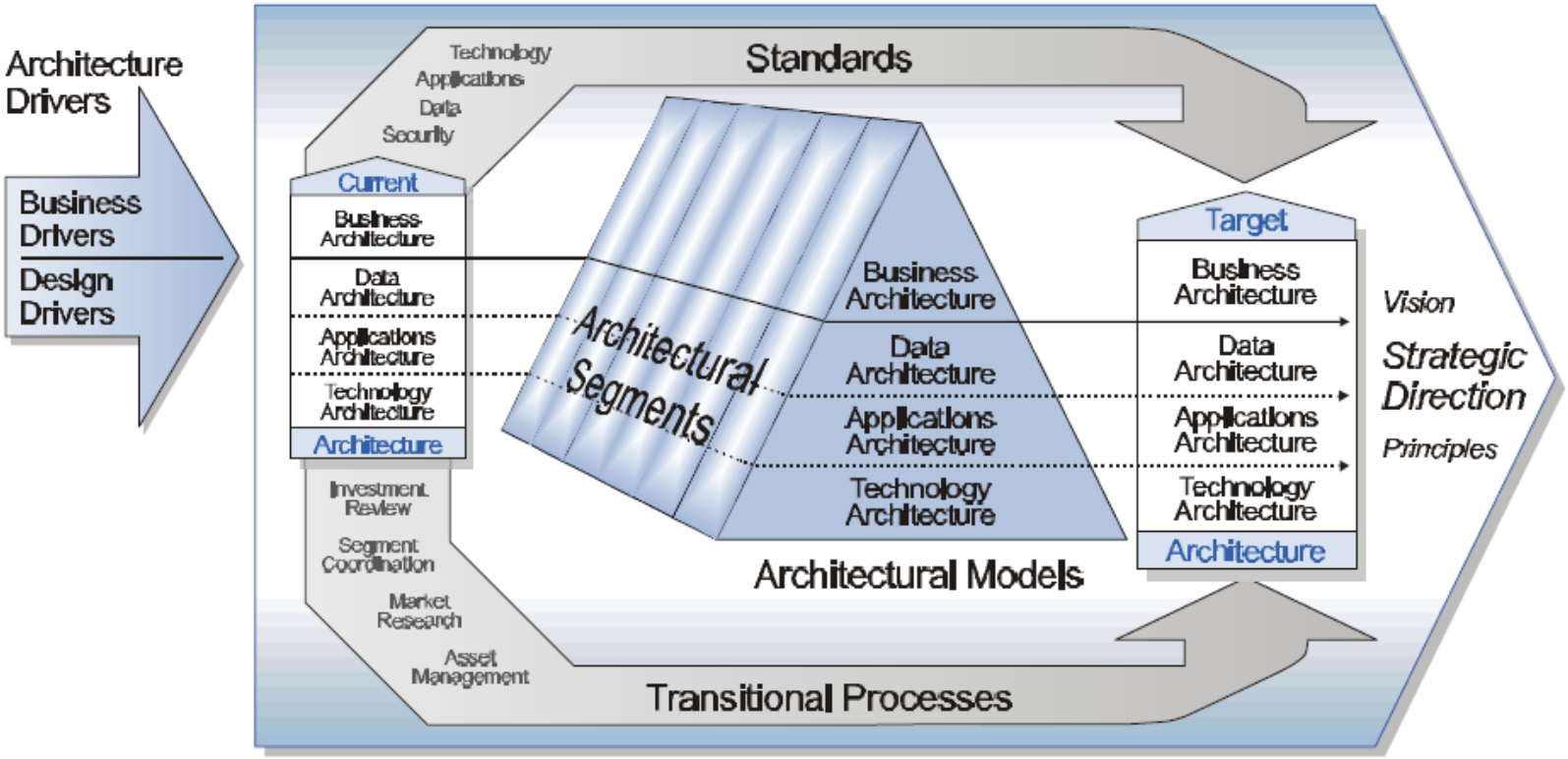
FEA Process – Level II

More detail – the business and design pieces of the architecture and how they are related.



FEA Process – Level III

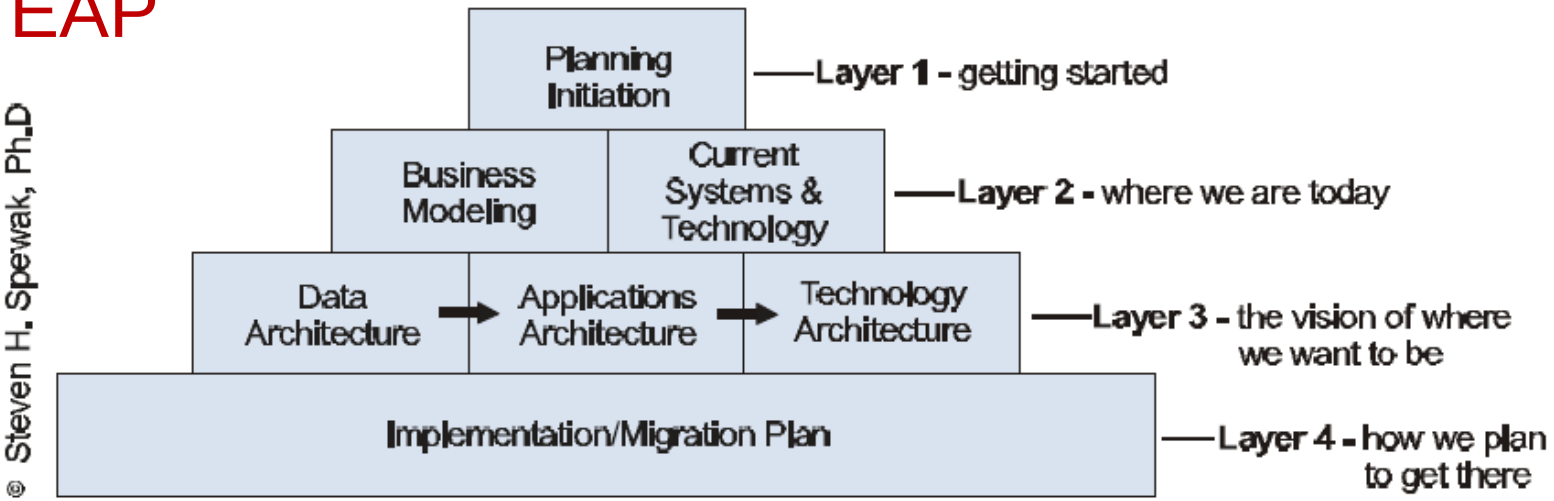
Expand the design pieces of the framework to show the 3 design architectures: data, application and technology.



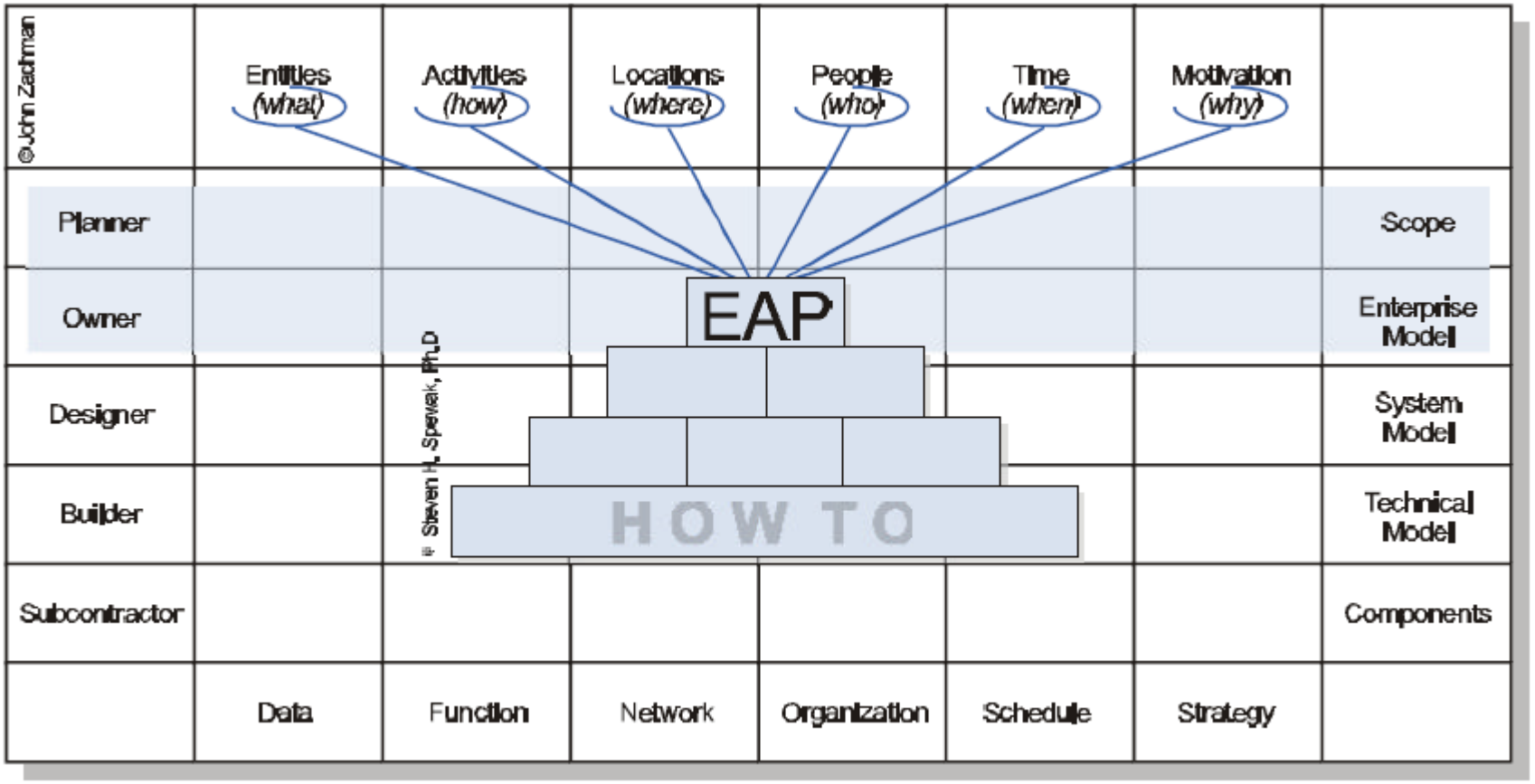
FEA Process – Level IV

- Identifies the kinds of models that describe the business architecture and the three design architectures (data, applications and technology).
- It also defines Enterprise Architecture Planning (EAP).
- EAP focuses on defining what data, applications and technology architectures are appropriate for and support the overall enterprise.

EAP

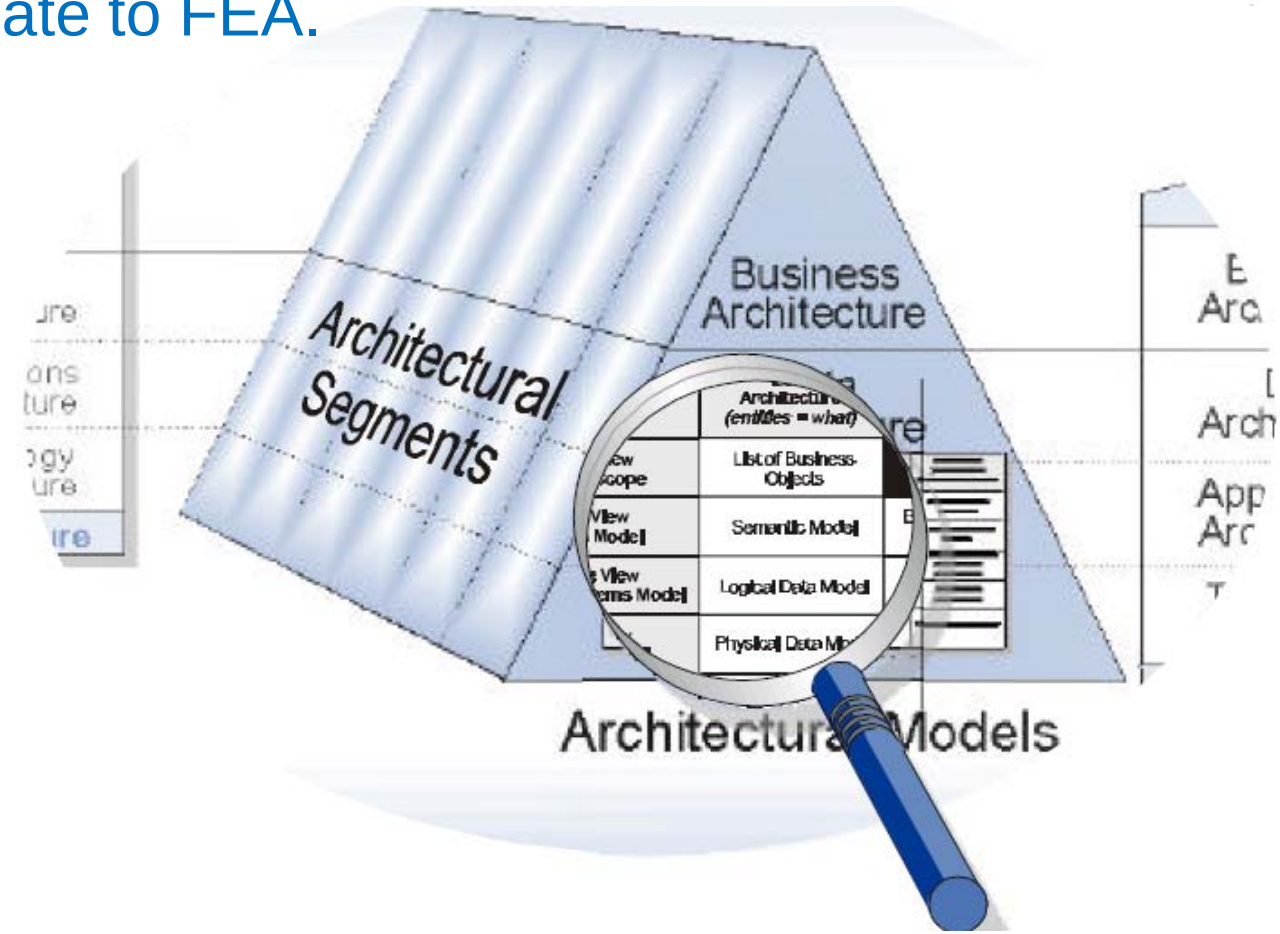


EAP and Zachman



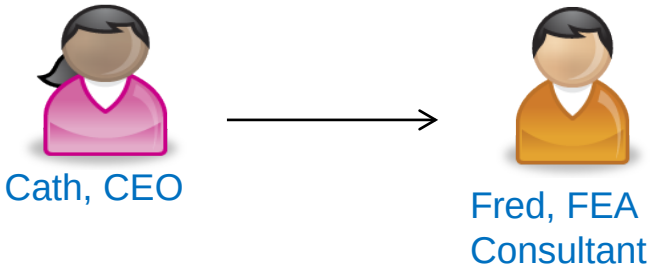
FEA Models

How the models (according to Zachman's framework) relate to FEA.



Discussion and example case

- FEA and FEAF were originally designed for the federal US government.
- Can FEA be applied to private enterprises?



FEA and MAM-EA

Fred, FEA Consultant

- Build enthusiasm for MAM-EA.
- Build a governance structure – FEA Project Management Office (PMO).
- Create reference models (PRM, BRM, TRM, DRM, SRM) that can be used by all the organisations across MedAMore.
- Create a description of a reference architecture as it applies to MedAMore.
- Test-drive the segment architecture process.
- Analyse and prioritise the segments.
- Enterprise Architecture program assessment.
- Restart process with a new segment.

Comparing EA Approaches

	Ratings			
Criteria	Zachman	TOGAF	FEA	Gartner
Taxonomy Completeness	4	2	2	1
Process Completeness	1	4	2	3
Reference Model Guidance	1	3	4	1
Practice Guidance	1	2	2	4
Maturity Model	1	1	3	2
Business Focus	1	2	1	4
Governance Guidance	1	2	3	3
Partitioning Guidance	1	2	4	3
Prescriptive Catalog	1	2	4	2
Vendor Neutrality	2	4	3	1
Information Availability	2	4	2	1
Time to Value	1	3	1	4

How can we choose an EA methodology?

- Go through the criteria for comparing and evaluating EA methodologies, that are important for your organisation.
- Rate the methodologies.

➢ What you may find out is that you need a blended approach, in which you create your own enterprise architecture, taking parts of different methodologies that provide the highest value for your specific needs.

Discussions

- Several different EA Methodologies, quite different from one another.
- Some of the methodologies complement one another, e.g. Zachman framework provides a taxonomy while TOGAF provides a process.
- Enterprise architecture is a path, not a destination.
- Main goal: to bring alignment to the business side and the technology side.

Summary

- We have looked at several Enterprise Architecture methodologies: Zachman, TOGAF, Gartner and FEA.
- We have compared them by using a case study.

- Can we see similarities and differences between EA and Enterprise Modelling as we have discussed in this course?

What next?

- Next week: resentation of own models
- AKM – Active Knowledge Modelling
- Summary lecture