

## Module 10 : Indexed View of Arch Assets

### (Enterprise Continuum – Architecture Continuum)

How to Proceed :

- A. **Part 1** : First read the immediate portion, which is a **Summary portion** : **Part 1** is for reading right now. This portion is important for
  1. Understanding TOGAF for practical purposes – Supplement class session understanding with this
  2. For Certification purposes, Level 1 and Level 2
- B. **Part 2** : Go through and workout the exercises in the **Part 2 : Module10Questions&Answers**. Very helpful for Certification preparation
- C. **Part 3** : Later when you find more time, do go through portion which says **Part 3 : Detailed Courseware**. That portion is useful for getting extra grades in Certification and for more proper understanding of TOGAF. Some sections of it are quoted from internet sources and from good authors as discovered by our Participants in earlier courses.

In this **Part 3, Case Study** and its boxes with samples are for understanding purpose only. **Not relevant for Certification**.

## Part 1 : Summary portion

### You may like to first read this Quick Look : Glossary and Acronym

Enterprise Continuum : A categorization mechanism useful for classifying architecture and solution artifacts, both internal and external to the Architecture Repository, as they evolve from generic Foundation Architectures to Organization-Specific Architectures

Architecture Continuum: A part of the Enterprise Continuum. A view of the repository of architectural elements with increasing detail and specialization.

This Continuum begins with foundational definitions like reference models, core strategies, and basic building blocks. From there it spans to Industry Architectures and all the way to an (Enterprise) Organization-Specific Architecture

Note : TOGAF sometimes refer to a department as Organization. Here it means the Enterprise and not just a department of it

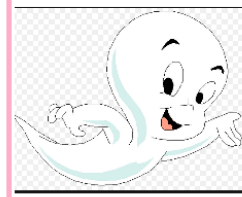
The **Enterprise Continuum**, which is another core component of TOGAF, is a

"virtual repository" of all architecture assets

-- **models, patterns, architecture descriptions, and other artifacts**

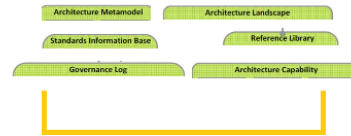
-- that exist not only within the Enterprise itself but also in the IT industry at large

**Why virtual ? What is Physical then ?**



**Virtual**  
not  
**Physical**

**Physical**  
is



**Virtual Access Mechanism**  
:

**Enterprise Continuum**

**Any in this list how may not use it ?**

**Architects / Designers;**

**Developers - PMO,  
Testers, Installation team,  
- Operations**

**And others including LOB**

**Physical :**

**Architectural  
Repository**

**Storage Schema need  
to be known only to  
those in EA department  
Can confuse others,  
who may not need it**



## Enterprise Continuum

Virtual Repository : indexed View of Contents

Physical one is in Architectural Repository and External Resources

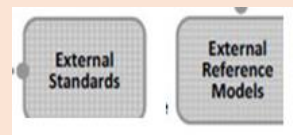
Six Sections :

Some align with Governance

Some for EA more than others

Some for Segment Architects

Has external links too :



Physical Contents

# Enterprise Continuum

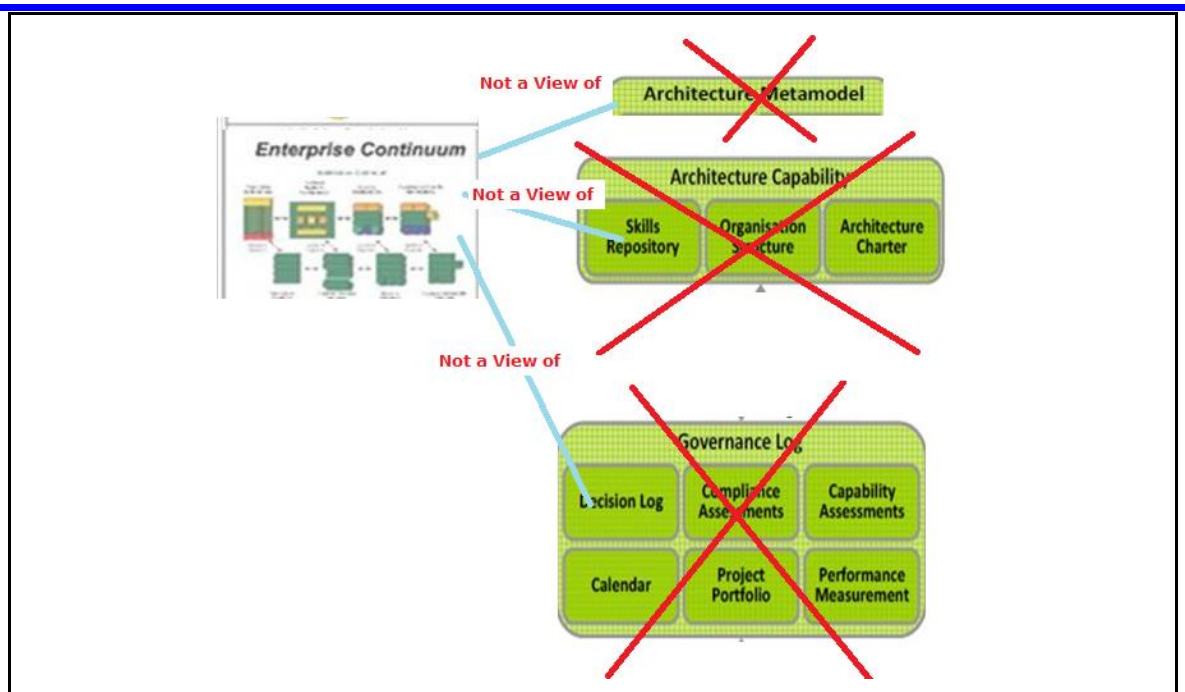
Continuum : Meaning : A **continuous extent**, succession, or whole, no part of which can be distinguished from neighbouring parts except by arbitrary division.



**Continuum** – A **large repository** : Library of **what is made by this organization or what is made by others but is referable** for re-use purposes.

It is a **View of the Library of Architectural Assets, Architectural Models** etc.,

**Not one** to refer to  
Capability Process  
TOGAF itself as a document  
Governance results



Storage Schema need to be known only to those in EA department

Can confuse others, who may not need it



Continuum : A sequence running between

...

Generic to Specific, Four distinct steps



**Generic – Simple details, more uses**  
**Specific – the opposite**

Ideally **implemented as a Content Management Portal** with menu-based access. **Data Architect** sets this up for the Enterprise.

Under modern technology, it should be made accessible from Web, Mobile handhelds as also Desktop Dashboard.

Enterprise Continuum

sets the broader context for an architect and explains

how generic solutions can be leveraged and specialized

# The Enterprise Continuum,



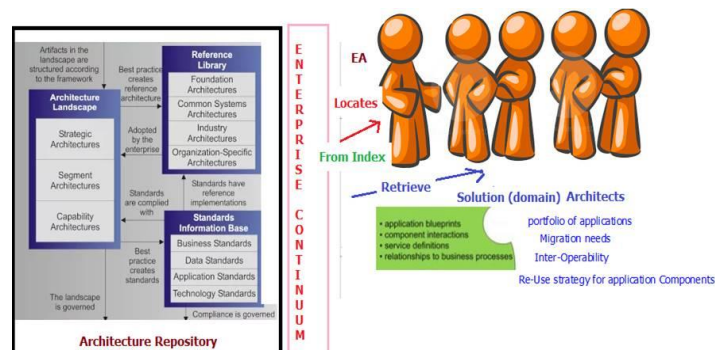
which is a "**virtual repository**" of

**all the architecture assets** - models, patterns, architecture descriptions, etc.,

- that exist both within the Enterprise and in the IT industry at large,

which the Enterprise considers itself to have available for the development of architectures

- To **Architects** – EAs, Segment and Solution Architects, speciality Architects
- To anyone else connected to Architecture PMO  
Operations Team  
LOB Business Owners who are interested



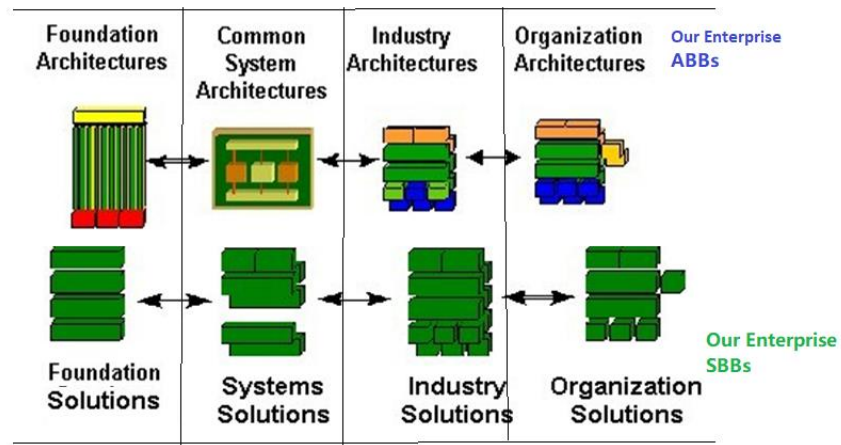
Why **virtual Repository** :

It is **not about physical sections** of the Repository

**Not a content placement classification**



It is more for locating assets by a eight portion index



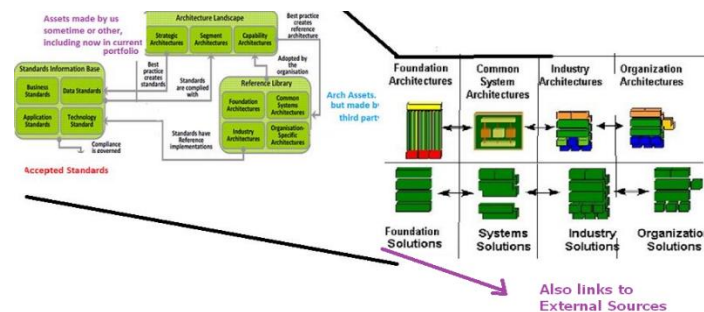
## Search Schema



Generic to Specific, Four distinct steps

Four Architecture steps for **ABB**

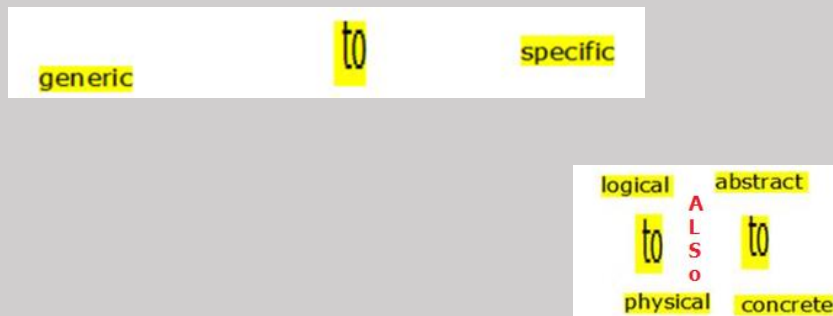
Four Solutions steps for **SBB**



Six here, Eight there

Storage Schema -> Search Schema

## In a Nutshell :



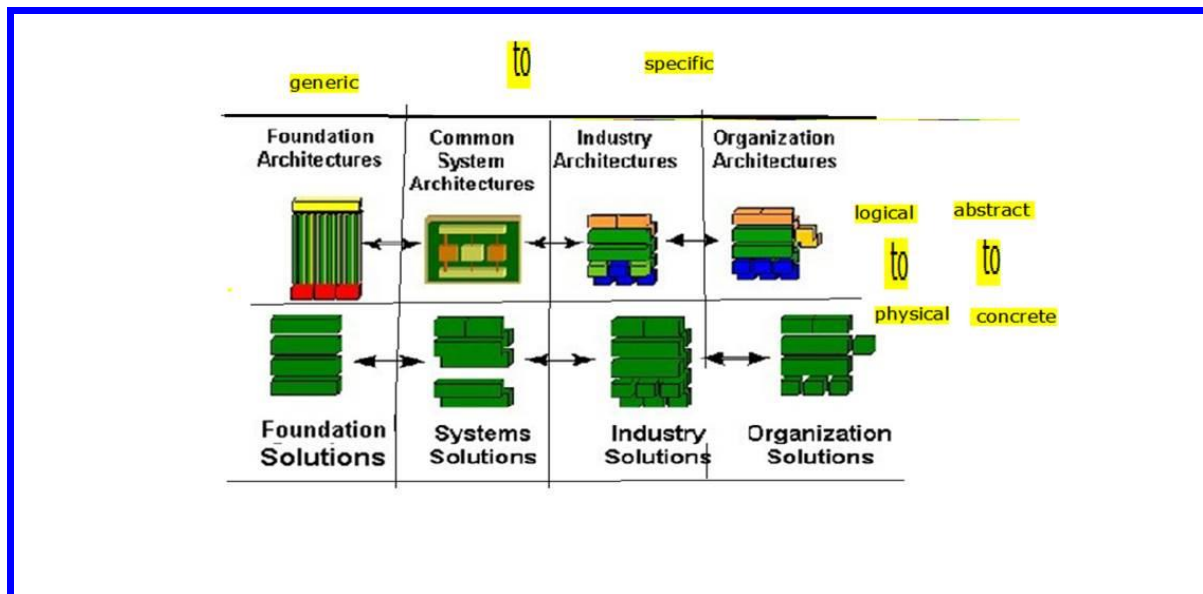
Enterprise Continuum is [a view of the Architecture Repository](#)

that provides methods for classifying architecture and solution artifacts

as they evolve from generic Foundation Architectures

to Organization-Specific Architecture

This view shows the evolution of these related architectures from generic to specific, from abstract to concrete, and from logical to physical.

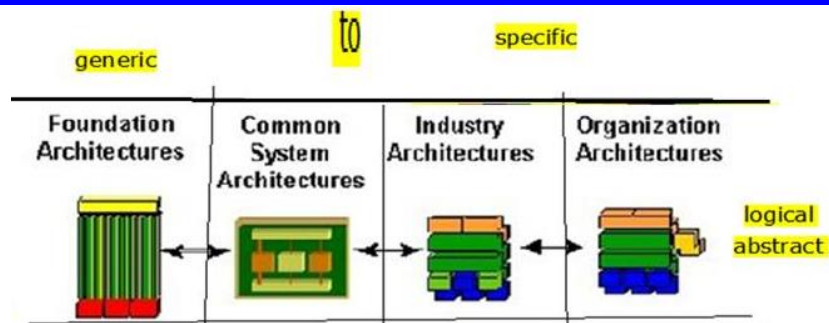


## Architecture Continuum - More relating to ABBs

AC -> ABB

- ✓ The **Architecture Continuum** offers a consistent way to define and understand the rules, representations, and information system without being concrete in its implementation.
- ✓ The Architecture Continuum represents a structuring of highly re-usable architecture assets.

Architecture Continuum  
Abstract  
Highly Re-usable  
Arch assets



## TOGAF Architecture Continuum



### ABBs

concept, abstract, explanatory  
Patterns, POCs, Feasibility Studies

White Papers, Plan Documents

Platform Independent Components,  
API Components, Library Components  
Purchase guidelines, General Specs

**Not ready for Coding or Procurement or Installation  
But can combine them and move towards solution  
with additional Architectural work**

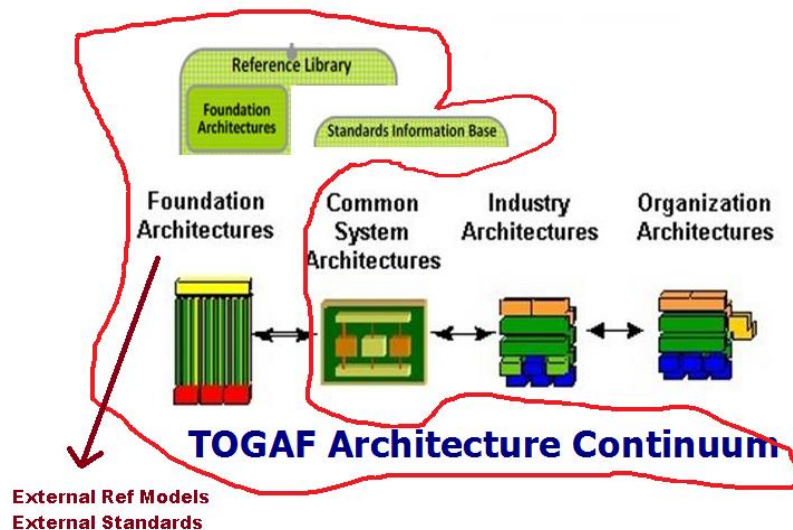
# Foundation Architecture of Architecture Continuum

## In a Nutshell :

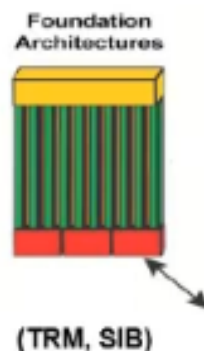
Useful in so many places of Architecture, as a very basic reference

Naturally any project in any industry in any Enterprise may find a need for it

We also locate it and study it when needed



Provides a foundation on which more specific architectures can be built



**Think :** Why is re-use of architectural asset so important ?

**Answer :** Because it is very basis on which TOGAF, as an Enterprise wide framework, is formulated.

At later Phase ( Phase E), service centric approach ( say Microservices with heavy re-use) is promoted by TOGAF

#### A RELATED QUESTION, IN LEVEL 1 :



1001

**Q :** Which of the following architectures in the Architecture Continuum contains the **most re-usable** architecture elements ?

- A. Common Systems Architectures
- B. Foundation Architectures
- C. Industry Architectures
- D. Organization-Specific Architectures

**Answer : B    More to left, more the re-use potential**

**Explanation :**

It is obvious that Foundation Architectures, lying in top-left corner of Enterprise Continuum will have maximum re-use potential. It will not only be used in building rest of three Architectures in Architecture Continuum but also in the Solutions Continuum

# Common Systems Architectures

## In a Nutshell :

Useful as a group,

or as a Client to Server connection area

in so many places of Architecture, as a next level of reference

Naturally any project in any industry in any Enterprise may find a need for it

We also locate it and study it when needed

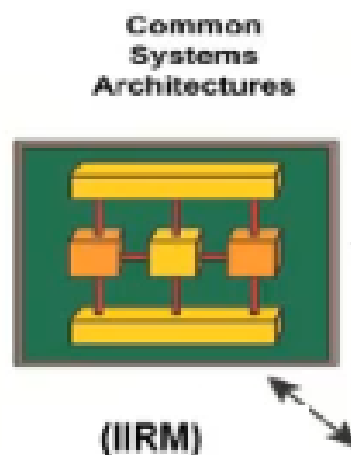
Common Systems : Grouped elements. More akin to a Component

Very similar to the idea of Foundation Architectures of Architecture Continuum

However, it is group of foundation elements which

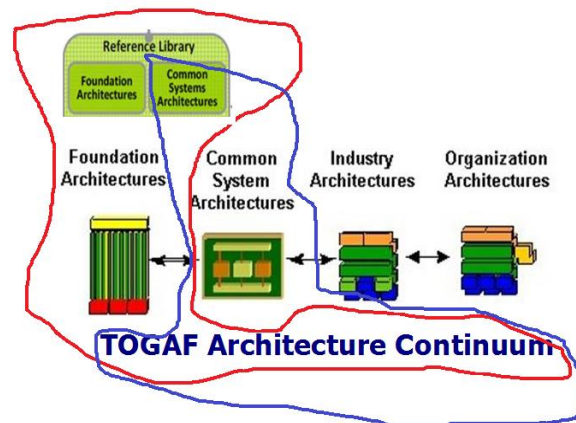
Work together

Are Rereferred together





## Technology models relevant to Common Systems Architectures are placed here



**Think :** Is the TRM the only technical reference that an Enterprise should be having ?

**Answer :** No. It just a sample provided by TOGAF. We should think of many more relevant ones. This task starts right from Preliminary Phase

### A RELATED QUESTION, IN LEVEL 1



:

1002

**Q :** Which of the following **best describes** the TOGAF Technical Reference Model ?

- A. It is a detailed data model that can be tailored to specific industries
- B. It is an example of a Common Systems Architecture
- C. It is a fundamental architecture upon which more specific architectures can be based
- D. It is a model of application components and application services software, including brokering applications

**Answer :** C TRM is foundation. Others are built on it.

### ANOTHER RELATED QUESTION, IN LEVEL 1



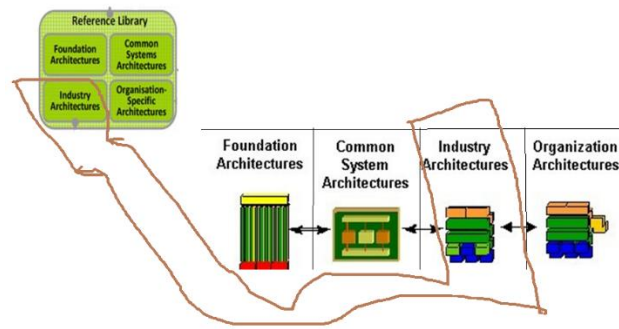
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1003

**Q :** Which of the following **best describes** the III-RM

- A. It is a detailed data model that can be tailored to specific industries
- B. It is an example of a Common Systems Architecture
- C. It is a fundamental architecture upon which more specific architectures can be based
- D. It is a model of application components and application services software, including brokering applications

**Answer : B Used between Consumer and Provider systems, So, Common systems**



**Industry Architectures**  needed for verticals include :

## In a Nutshell :

Readymade pieces ( or even wholesale) of Architecture  
**Applicable for our Vertical Industry ONLY**

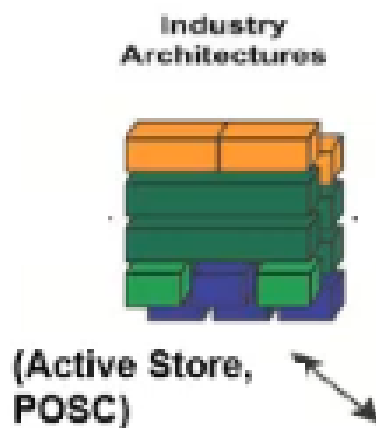


EC : AC : Industry Architecture

Needed only by one Vertical  
 For which the Architecture is Prepared

Examples of external architecture and solution artifacts are

the wide variety of industry reference models and architecture patterns that exist, and are continually emerging



A typical example of an industry-specific component is a Data Model representing the business functions and processes specific to a particular vertical industry, such as the retail industry's "Active Store" architecture, or an industry architecture that incorporates the Petrotechnical Open Software Corporation (POSC) Data Model.

## See Quick to understand examples :

Vertical Industry	Name of Architectural samples with Platform independent approach ( ABBs, not final Architecture with Platform solutions)
Banking	BIAN
Insurance	IBM Reference Architecture
Telecom	TMF – Infrastructure Technology Model for this industry
Retail	ARTS – Data Architecture Model for this industry
Petrochemical	Energetics – Data Architecture Model for this industry

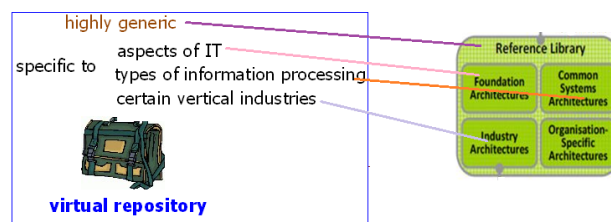
Those specific to certain types of information processing, such as e-Commerce, supply chain management, etc.;

and those specific to certain vertical industries, such as the models generated by vertical consortia like

TMF (in Telecommunications sector),

ARTS (Retail),

Energistics (Petrochemical), etc.



**Architecture, ABB, for one vertical only**

**Think:** Why is TOGAF quoting some Industry standard Reference models ?

**Answer :** There are many more, almost one or more for every vertical. TOGAF only provides a few representative samples. It is the task of the EA to pick the right ones relevant to the industry of the Enterprise

**A RELATED QUESTION, IN LEVEL 1 :**

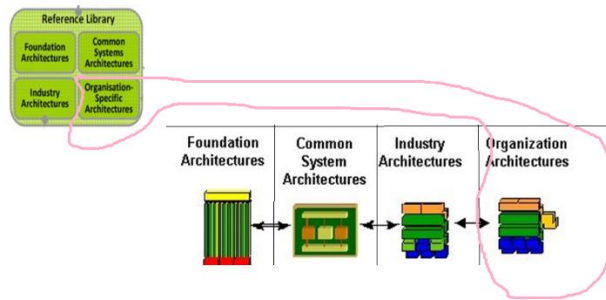


1004

**Q :** The pair which qualifies as **Data Architecture Model** ( Industry Architecture) is

- A. III-RM and TRM
- B. Ones provided by Tele Management Forum (TMF) , ebXML group (www.ebxml.org )
- C. ARTS and Energistics
- D. ArchiMate, Red Books form IBM

**Answer : C Data related BBs. One for Retail, other for Petrochemical vertical**



# Organization-Specific Architectures = (Your) Enterprise Specific

## In a Nutshell :

Our own Building Blocks of Architecture

**Used by us ONLY**, never to be shared

**Prepared by the Enterprises**

**Used only for the projects of the Enterprise**

**In short, all ABBs prepared in Phases B to D**

- **For Current Portfolios**
- **From all previous Projects / Programmes / Charters relating to IT**



EC : AC : Our Enterprise-Specific  
Architecture

Prepared by us – the EA Team  
Reuse ABBs for our Arch projects

TOGAF calls the **most specific level** the ***Organizational Architectures***. These are the **architectures that are specific to a given Enterprise**

**For ABB for my Enterprise only**

**Organization means your Enterprise here**

Same as what is produced in B D A T ?

Yes.



## **This Scenario : Where would it fit ?**

### **What is the focus ?**

In TOGAF documentation, a whole Part ( Part V) appears as :

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#### **Part V - Enterprise Continuum and Tools**

- 34. Introduction to Part V
- 35. Enterprise Continuum
- 36. Architecture Partitioning
- 37. Architecture Repository
- 38. Tools for Architecture Development

#### **34. Introduction to Part V**

It is usually impossible to create a single unified architecture that meets all requirements of all stakeholders for all time. Therefore, the Enterprise Architect will need to deal not just with a single Enterprise Architecture, but with many related Enterprise Architectures.

Each architecture will have a different purpose and architectures will relate to one another. Effectively bounding the scope of an architecture is therefore a Critical Success Factor (CSF) in allowing architects to break down a complex problem space into manageable components that can be individually addressed.

The Enterprise Continuum provides a view of the Architecture Repository that shows the evolution of these related architectures from generic to specific, from abstract to concrete, and from logical to physical.

This part of the TOGAF standard discusses the Enterprise Continuum; including the Architecture Continuum and the Solutions Continuum. It describes how architectures can be partitioned and organized within a repository. It also describes tools for architecture development.

Part V: Enterprise Continuum & Tools is structured as follows :

- The Enterprise Continuum describes a view of the Architecture Repository that provides methods for classifying architecture and solution artifacts, showing how the different types of artifact evolve, and how they can be leveraged and re-used
- Architecture Partitioning describes the various characteristics that can be applied to classify and then partition architectures
- The Architecture Repository shows how the abstract classifications of architecture can be applied to a repository structure so that architectures can be organized and easily accessed
- Tools for Architecture Development provides guidelines on selecting a toolset to create and manage architectural artifacts

## **Part 2 : Module 10 Questions and Answers**

### **(Also Explanations)**

Please answer questions appearing below on a piece of paper and then check the answer and explanation appearing immediately below the questions. Some Questions may be on earlier modules too.

You can choose the ones you want to answer now and keep the rest for a workout on your own later on.

**The pictures that appear next to the question is only to break the monotony and has no special meaning.**

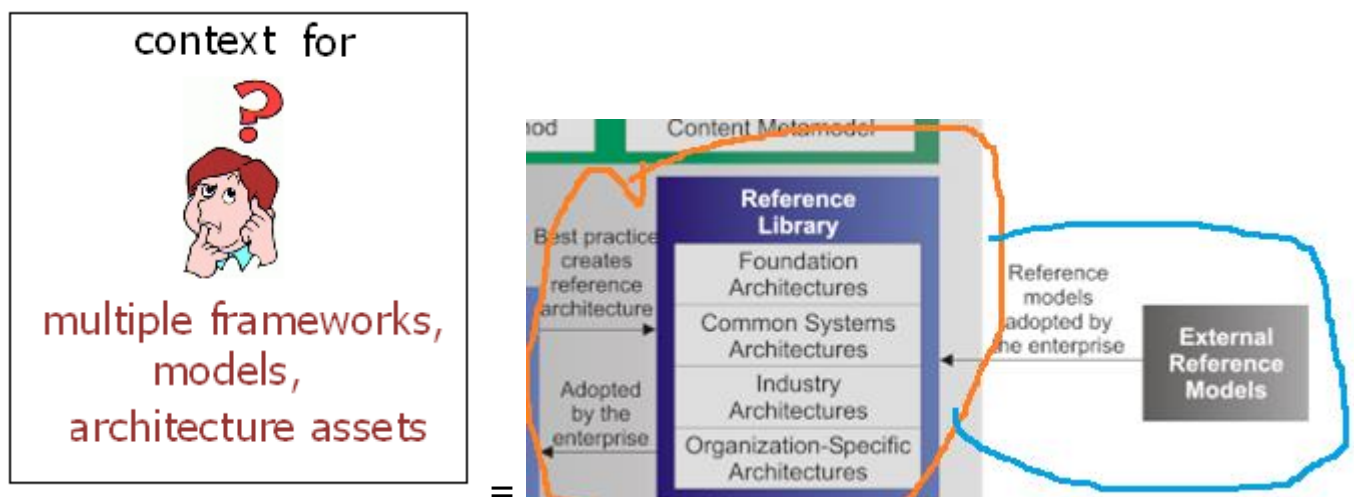
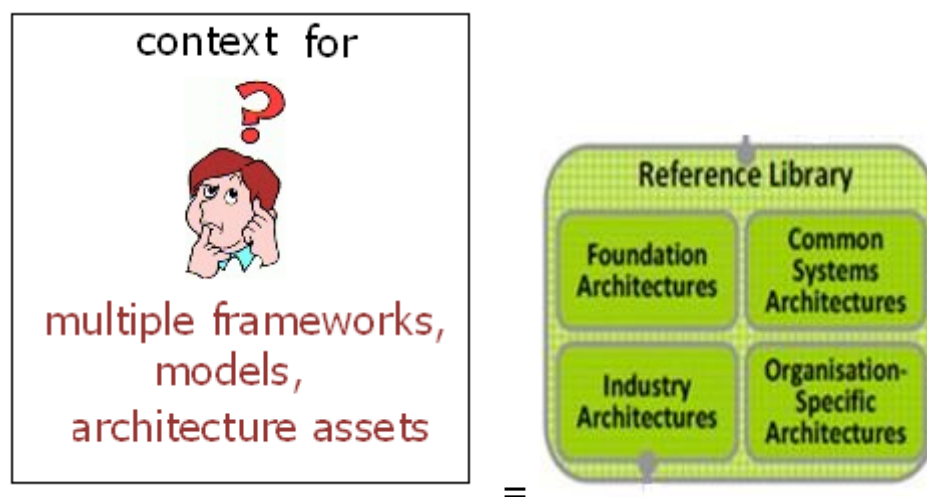
**The star rating gives you a clue of the relative importance of questions, from Certification viewpoint. Three-star questions may appear more often than two star and so on**

## Why Enterprise Continuum ?

The **Enterprise Continuum** provides methods for classifying architecture and solution artifacts, both internal and external to the Architecture Repository, as they evolve from generic Foundation Architectures to Organization-Specific Architectures.

The Enterprise Continuum enables the organization of re-usable architecture artifacts and solution assets to maximize the enterprise architecture investment opportunities

Enterprise Continuum provides a context for the use of multiple frameworks, models, and architecture assets in conjunction with the TOGAF ADM.



Enterprise Continuum is a "**virtual repository**" of all the architecture assets - models, patterns, architecture descriptions, and other artifacts - that exist both within the enterprise and in the IT industry at large.

**Think :** Why is re-use of architectural asset so important ?

**Answer :** Because it is very basis on which TOGAF, as an enterprise-wide framework, is formulated.

At later Phase ( Phase E), service centric approach ( say Microservices with heavy re-use) is promoted by TOGAF



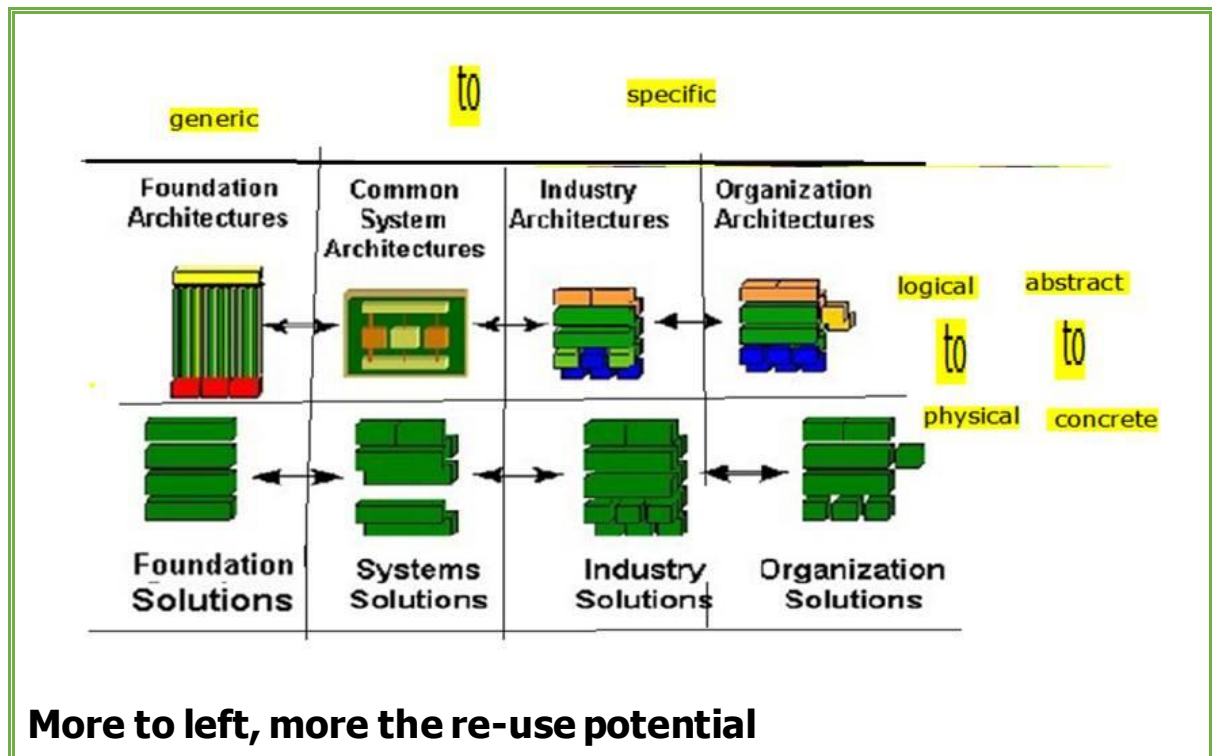
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**Answer : B**

**Explanation :**

It is obvious that Foundation Architectures, lying in top-left corner of Enterprise Continuum will have maximum re-use potential. It will not only be used in building rest of three Architectures in Architecture Continuum but also in the Solutions Continuum



**Think:** Is the TRM the only technical reference that an Enterprise should be having ?

**Answer :** No. It just a sample provided by TOGAF. We should think of many more relevant ones. This task starts right from Preliminary Phase



1002

Which of the following best describes the TOGAF Technical Reference Model ?

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- B. It is an example of a Common Systems Architecture
- C. It is a fundamental architecture upon which more specific architectures can be based
- D. It is a model of application components and application services software, including brokering applications

**Answer : C**

**Explanation :** The very reason why TRM is placed under Foundation Architecture is based on the fact that by itself the Architecture there is fundamental and the Actual project Architecture must be built upon it.

**TRM is foundation. Others are built on it**

For A : Detailed data models are not part of TRM. Note that it is a "technical" reference model.

For B : III-RM is cited as an example of Common Systems Architecture

For D : It refers to a model that is developed more on the lines of III-RM



1003

Which of the following best describes the III-RM

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- C. It is a fundamental architecture upon which more specific architectures can be based
- D. It is a model of application components and application services software, including brokering applications

**Answer : B**

Explanation :

III-RM deals with elements on Service Provider and Service Consumer and so it is a grouping of basic elements, qualifying itself to be a Common systems Architecture

**Used between Consumer and Provider systems, So, Common systems**



**Think :** Why is TOGAF quoting some Industry standard Reference models ?

**Answer :** There are many more, almost one or more for every vertical. TOGAF only provides a few representative samples. It is the task of the EA to pick the right ones relevant to the industry of the Enterprise



**1004** The pair which qualifies as Data Architecture Model ( Industry Architecture) is

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- B. Ones provided by TeleManagement Forum (TMF) , ebXML group (www.ebxml.org )
- C. ARTS and Energistics
- D. ArchiMate, Red Books form IBM

**Answer : C**

**Explanation :**

**Data related BBs. One for Retail, other for Petrochemical vertical**

Choice A are generic Architecture models and not for Data Architecture domain; Is more related to Application / Technology Architecture

Choice B is more related to Application Architecture

Choice D : ArchiMate is a tool suggested for entire EA modelling. Red books are reference model for Business Architecture



1005



Which one of the following represents the detailed construction of the architectures defined in the Architecture Continuum ?

- A. Architecture Building Blocks
- B. Conceptual Models
- C. Foundation Architectures
- D. Reference Models
- E. Solution Building Blocks

**Answer : A**

**Explanation :** The Solutions Continuum defines what is available in the organizational environment as re-usable Solution Building Blocks (SBBs).

The **Architecture Continuum** offers a consistent way to define and understand the generic rules, representations, and relationships in an architecture, including traceability and derivation relationships (e.g., to show that an Organization-Specific Architecture is based on an industry or generic standard).

The Architecture Continuum represents a structuring of Architecture Building Blocks (ABBs) which are re-usable architecture assets. ABBs evolve through their development lifecycle from abstract and generic entities to fully expressed Organization-Specific Architecture assets. The Architecture Continuum assets will be used to guide and select the elements in the Solutions Continuum (see below).

The Architecture Continuum shows the relationships among foundational frameworks (such as TOGAF), common system architectures (such as the III-RM), industry architectures, and enterprise architectures. The Architecture Continuum is a useful tool to discover commonality and eliminate unnecessary redundancy.

The **Solutions Continuum** provides a consistent way to describe and understand the implementation of the assets defined in the Architecture Continuum. The Solutions Continuum defines what is available in the organizational environment as re-usable Solution Building Blocks (SBBs). The solutions are the results of agreements between customers and business partners that implement the rules and relationships defined in the architecture space. The Solutions Continuum addresses the commonalities and differences among the products, systems, and services of implemented systems.



1006



An association of companies has defined a data model for sharing inventory and pricing information. Which of the following best describes where this model would fit in the Architecture Continuum ?

- A. Foundation Architecture
- B. Common Systems Architecture
- C. Industry Architecture
- D. Organization Specific Architecture
- E. Product Line Architecture

**Answer : C**

**Explanation :**

This association is an industry association. They have produced Reference Architecture for this industry.



1007



Where does the Integrated Information Infrastructure Reference Model fit in terms of the Enterprise Continuum ?

- A. Common Systems Architectures
- B. Foundation Architectures
- C. Industry Architectures
- D. Organization-Specific Architectures

**Answer : A**

**Explanation :** The TOGAF Integrated Information Infrastructure Reference Model (III-RM) is a Common Systems Architecture that focuses on the requirements, building blocks, and standards relating to the vision of Boundaryless Information Flow.

With the emergence of Internet-based technologies in recent years, for many organizations the main focus of attention, and the main return on investment in architecture effort, has shifted from the Application Platform space to the Application Software space. (Indeed, this has been one of the drivers behind the migration of TOGAF itself from a framework and method for Technology Architecture to one for overall enterprise architecture.)

The TOGAF Technical Reference Model, TRM, focuses on the Application Platform space.

This section describes a reference model that focuses on the Application Software space, and "Common Systems Architecture" in Enterprise Continuum terms. This is the Integrated Information Infrastructure - Reference Model (III-RM).

The III-RM is a subset of the TOGAF TRM in terms of its overall scope, but it also expands certain parts of the TRM - in particular, the business applications and infrastructure applications parts - in order to provide help in addressing one of the key challenges facing the enterprise architect today: the need to design an integrated information infrastructure to enable Boundaryless Information Flow.

Refer to TOGAF 9.2 online documentation while starting to prepare for Level 2 Questions

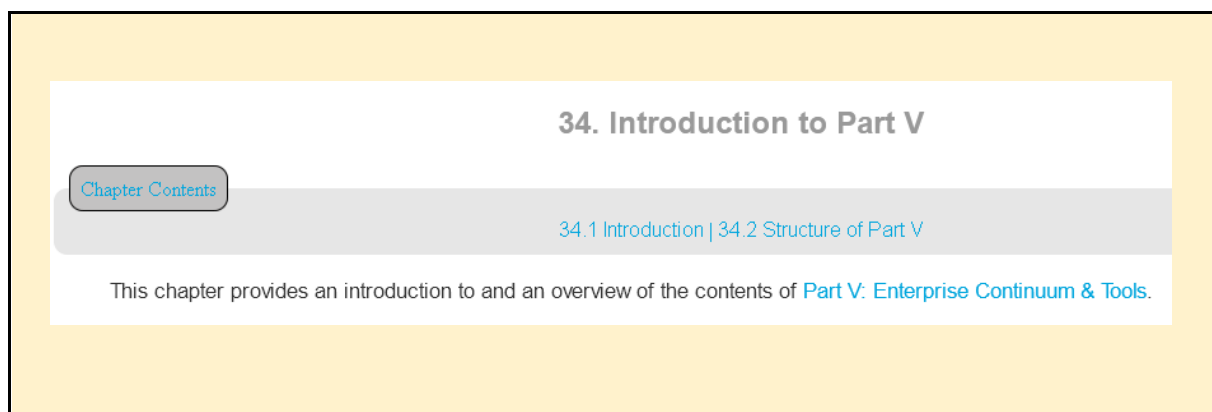
**Very important to get to know parts of TOGAF documentation**

<https://pubs.opengroup.org/architecture/togaf9-doc/arch/>

You will need this link to be open most of the time in this course

Similar content will **open during your Level 2 Exam.**

**Sorry, not during Level 1 Exam**



The introduction Chapter shown above and the next Chapter 35 are about the two sections of Enterprise Continuum. This module covered the Architecture Continuum section only.

Since the Enterprise Continuum is the logical mapping of the Architecture Repository ( a component of Enterprise Architecture that has direct control of Governance Body ) possibility of a Level 2 question is not ruled out.

## Part 3 : Detailed Courseware

A video talk on Enterprise Continuum

<https://www.youtube.com/watch?v=Bos18yPAVQI>

Nice to Know Box

The **physical implementation** of the **Enterprise Continuum** will typically take the form of an **Architecture Repository** that includes reference architectures models and patterns, not leaving out the current state of Building Blocks that are used in organization today

This **Enterprise Continuum** concept of TOGAF **helps to provide cooperation and collaboration between architects and ALL Others who are connected to the IT outputs of the Architecture.**



For Most of the work done by Sr EA, EA, Segment Architects :

What is done ? : Producing Architectural BBs as per ADM

As per what Specification ? : Tailored TOGAF : Metamodel

What to refer during the work ? :

Architecture Repository, through Enterprise Continuum,  
which provides the Retrieval route

What is more specifically referred ? :

Reference Models

Standards

Landscape : Previously accepted Building Blocks : For re-use and as guidance

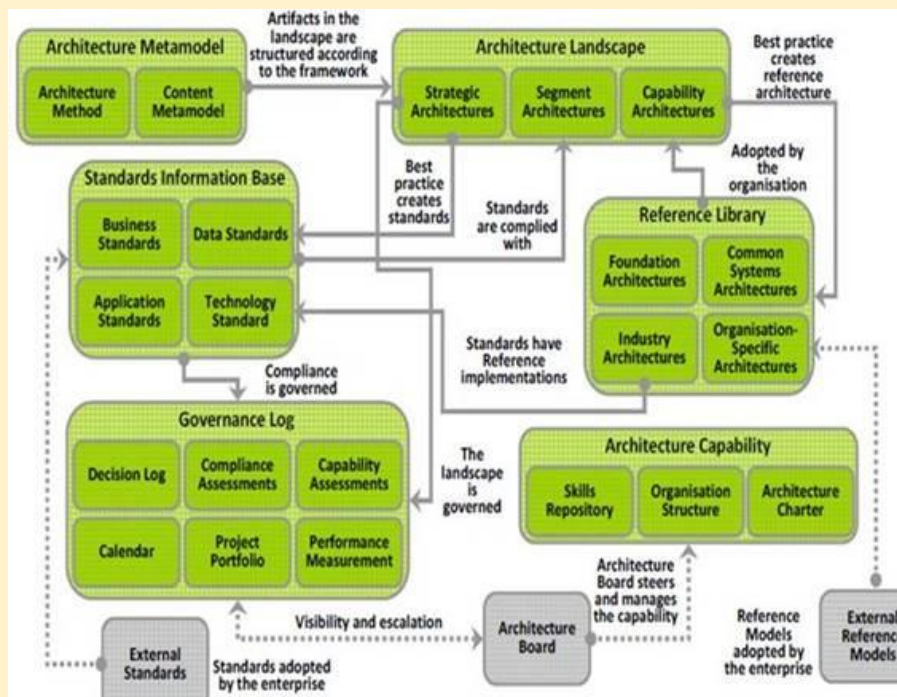
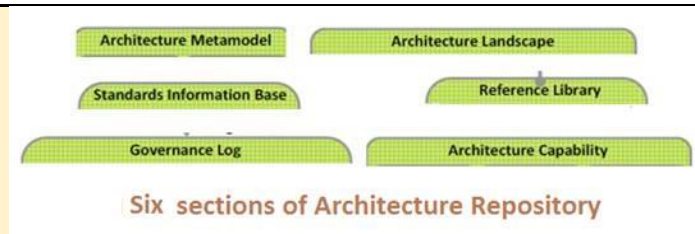
What is the net Result ? : Improved Capability for the Enterprise

Who has ultimate oversight of the work of EA Team ? :

Architectural Governance Board

Where does such oversight records get stored ? :

Governance Log



## Quiz Time

### Role of EA, Segment Architect in above

Organize (Architecture Repository)

Organized by EA, Governed by ??

Produced by SAs

Stored by ?

Made easy for retrieval ( Enterprise Continuum)

Managed by ?

Retrieved by : Many. At different situations

"Enterprise Continuum" is a categorization mechanism useful for classifying architecture and solution artifacts, both internal and external to the Architecture Repository, as they evolve from generic Foundation Architectures to Organization-Specific Architectures.

The simplest way of thinking of the "Enterprise Continuum" is as a easy to access view of the "repository" of all the architecture assets! It enables the architect to articulate the broad perspective of what, why, and how the Enterprise Architecture has been designed with the factors and drivers considered.

**It is an important aid to communication and understanding.** Without an understanding of "where in the continuum you are", people discussing Architecture can often talk at cross-purposes because they are referencing different points in the Continuum at the same time, without realizing it.

If you are talking with someone from a vendor organization (a company which specializes a product used in your "industry") and talk about something very specific to your organization which is not an industry standard then there will be lot of gap in understanding of Architecture, whereas if you declare at the start that you are referring only to organization specific aspect then there will be no confusion - this declaration is nothing but indicating "where in the continuum you are"!!

#### Nice to Know Box

One key thing to note here is : The TOGAF standard is intended to be a framework for conducting Enterprise Architecture and as a result many of the assets that reside within the Enterprise Continuum are beyond the specific consideration of the TOGAF framework.

However, Architectures are fundamentally shaped by concerns outside the practice of Architecture and it is therefore of paramount importance that any Architecture must accurately reflect external context.

The Enterprise Continuum enables the architect to articulate the broad perspective of what, why, and how the Enterprise Architecture has been designed with the factors and drivers considered.

The Enterprise Continuum is an important aid to communication and understanding, both within individual enterprises, and between customer enterprises and vendor organizations.

Any Architecture is context-specific; for example, there are Architectures that are specific to individual customers, industries, subsystems, products, and services.

Architects, on both the buy side and supply side, must have at their disposal a consistent language to effectively communicate the differences between Architectures. Such a language will enable engineering efficiency and the effective leveraging of Commercial Off-The-Shelf (COTS) product functionality.

The Enterprise Continuum provides that **consistent language**.

The Enterprise Continuum **enables the organization of re-usable Architecture artifacts and solution assets to maximize** the Enterprise Architecture investment opportunities.

**Examples of internal Architecture and solution artifacts are the deliverables of previous architecture work, which are available for re-use.**

**Examples of external Architecture and solution artifacts** are the **wide variety of industry reference models and architecture patterns that exist**, and are continually emerging, including those that are **highly generic (such as the TOGAF Technical Reference Model (TRM))**; those specific to certain aspects of IT (such as a **web services architecture, or a generic manageability architecture**); those specific to certain types of information processing, such as e-Commerce, supply chain management, etc.; and **those specific to certain vertical industries, such as the models generated by vertical consortia like TMF (in the Telecommunications sector), ARTS (Retail), Energistics (Petrotechnical), etc.,**

#### Nice to Know Box

The Enterprise Architecture determines which architecture and solution artifacts an organization includes in its Architecture Repository. **Re-use is a major consideration in this decision.**

The **Enterprise Continuum** is the outermost **continuum** and classifies assets related to the context of the overall Enterprise Architecture. The Enterprise Continuum classes of assets may influence architectures, but are not directly used during the ADM architecture development.

The Enterprise Continuum **classifies contextual assets used to develop architectures**, such as policies, standards, strategic initiatives, organizational structures, and Enterprise level capabilities.

The Enterprise Continuum can also classify **solutions** (as opposed to descriptions or specifications of solutions). Hence, the **Enterprise Continuum** contains two specializations, namely the **Architecture** and **Solutions Continua**.

The **Architecture Continuum** offers a consistent way to define and understand the generic rules, representations, and **relationships in an architecture**, including **traceability and derivation relationships** (e.g., to show that an Organization-Specific Architecture is based on an industry or generic standard).

The **Architecture Continuum** represents a **structuring of Architecture Building Blocks (ABBs) which are re-usable architecture assets**. ABBs evolve through their development lifecycle from abstract and generic entities to fully expressed Organization-Specific Architecture assets.

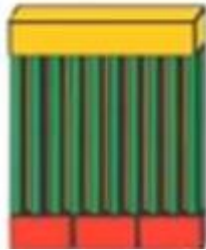
The **Architecture Continuum assets will be used to guide and select the elements in the Solutions Continuum**. The **Architecture Continuum** shows the relationships among foundational frameworks (such as TOGAF), Common System Architectures (such as the III-RM), Industry Architectures, and Enterprise Architectures. The Architecture Continuum is a useful tool to discover commonality and eliminate unnecessary redundancy.

The **Solutions Continuum** provides a consistent way to describe and **understand the implementation of the assets** defined in the Architecture Continuum. The Solutions Continuum defines **what is available in the organizational environment as re-usable Solution Building Blocks (SBBs)**.

The solutions are the results of agreements between customers and business partners that implement the rules and relationships defined in the architecture space. The Solutions Continuum **addresses the commonalities and differences among the products, systems, and services of implemented systems**.

Nice to Know Box

Foundation  
Architectures



Examples of

Can be **standalone Patterns which find heavy re-use** :

GOF Patterns :

Singleton, Prototype, Flyweight, Façade, Iterator, Adapter, Decorator, Composite

GRASP Patterns :

Information expert, Controller, Polymorphism, Low Coupling, High Cohesion

Can be descriptions of any feature of standalone Architecture



The **ADM** is also useful to populate the **Foundation Architecture** of an Enterprise. Business requirements of an enterprise may be used to identify the necessary definitions and selections in the Foundation Architecture.

This could be a set of re-usable common models, policy and governance definitions, or even as specific as overriding technology selections (e.g., if mandated by law).

Population of the Foundation Architecture follows similar principles as for an Enterprise Architecture, with the difference that requirements for a whole enterprise are restricted to the overall concerns and thus less complete than for a specific Enterprise.

Graphics & Image	Graphics, Image : Multimedia : GIF, JPEG
Data Management	Data Management : DBMS, SQL
Data Interchange	Data Interchange : XML, JSON, CSV
User Interface	UI : GUI, NUI, Speech, ...
International Operations	i18n : cha support, Global, Local
Location & Directory	Directory : LDAP; ADIS
Transaction Processing	TP: Compensate, Universal, OTS
Security	Security : TLS, MLS, crypto
Software Engineering	SW Engg : RPC, MOM, Integration
System and Network Management	SNMP : Health Monitors



EC : AC : Foundation Architecture

Generic units of Components,  
inter-relationships,  
SW Engineering Principles, and  
Guidelines

An element in Architecture : of most basic  
functionality

Used often within a higher group : Can be used in  
any appropriate group called Component, in any  
project, in any industry in any Enterprise

Incomplete – may not be useful as standalone : Most  
re-usable

## **Interaction Point : For Practical purposes beyond Certification**

We understand that this portion of the Continuum is meant to access, as and when required, **basic information about the very basic artifacts that makes up the Architecture.**

That is why this is defined to be one that is about **generic components,**  
**inter-relationships,**  
principles and concepts

The only aim is to provide a view of the most foundation pieces of the Architecture.

**All other Building Blocks of Architecture is built on top of the Foundation Architecture.**

**Components** would include hardware, software elemental units.

Could be related to applications, databases and platforms.

For example :

**What makes a network** : Sockets, Proxies, Data Link Layer elements...

**What makes a hardware platform** : Physical boxes with specification, Logical boxes through virtualization, devices ...

What protects a network : Firewalls, Authentication elements, Authorization elements. Keys, Certificates, Tokens ... Encryption algorithms, SSO, ....

**What protocols do we use** : Tcp, Http, UDP, REST, AMQP - Advanced Message Queuing Protocol, ...

What are our UI elements : Window, Forms, Frames, Dialogues, .... DOM, ....

What are the actions related to UI : Styling (CSS) , Forms ( pagination), Validation, ..., Backend Driven ( Backend For Frontends)

What are the **Data Artifacts** : Operational Data, OLTP, Warehoused Data. OLAP, ....

**Interface between** ... ( ..... )

**For developers** : Languages, JIT and AOT, Functional programming and Lambda, Stream processing, ..... Reactive programming, ... Concurrency, ... Reflection, Obfuscation,

Towards **finer elements** : i18n and resource bundles, Currency representation and conversion, ...

Business Process Management (BPM) platforms : BPM, Workflow design, ...

This is an **infinite list**. Understand Architecture Continuum and Foundations Architecture therein, from the context of whatever Architecture you are connected with and familiar with

The Foundation Architecture, in effect, will include the main elements of your target operation model (IT and Business).

Note that you will have to understand your current model and gaps in moving from the current to the future target model. That is why such a library stored as Architecture Repository and viewed on demand as Foundation Architecture when needed is important.

#### Nice to Know Box

Common Systems Architectures guide the selection and integration of specific services from the Foundation Architecture to create an architecture useful for building common (i.e., highly re-usable) solutions across a wide number of relevant domains.

Examples of Common Systems Architectures include : a security architecture, a management architecture, a network architecture, an operations architecture, etc.,

Each is incomplete in terms of overall system functionality, but is complete in terms of a particular problem domain (security, manageability, networking, operations, etc.), so that solutions implementing the architecture constitute re-usable Building Blocks for the creation of functionally complete operating states of the Enterprise.

For example, The Open Group has a Reference Model for Integrated Information Infrastructure (III-RM)



EC : AC : Common Systems Architecture

Group of  
Generic units of Components,  
inter-relationships,  
and  
Guidelines

Nice to Know Box

Common Systems Architecture :

Used together as a group

Can be used in any project, in any industry in any Enterprise

Incomplete - overall system functionality to be claimed as a Sub System

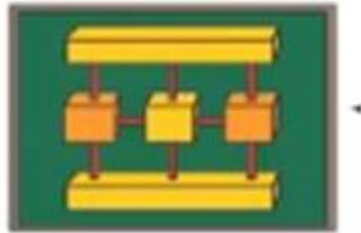
Complete - in a particular problem domain

(security, manageability, networking, operations, etc.)

Must be re-usable

Nice to Know Box

### Common Systems Architectures



Examples of

Can be **group interaction Patterns** which find heavy re-use :

GOF Patterns :

Mediator, Observer, Proxy, Factory Method, Abstract Factory, Bridge, visitor, Builder, Chain Of Responsibility, Command

**Architectural Patterns :**

Tier, Layer, Broker, MVC, MV-VM, MVP, Publisher - Subscriber

**Advanced Patterns** and Techniques :

DDD – Domain Driven Design

Can be descriptions of any group behavior feature of Architecture : Distributed Transactions, Container in Cloud Native



Nice to Know Box

Is not Foundation Architecture same as Common Systems Architecture ?

There is a subtle difference.

**Foundation Architecture** is more of **single stand-alone Artifacts**.

**Common Systems Architectures** are always **grouped Artifacts**, as a **basic Component** which **work together towards a clearly named purpose**.

## TOGAF documentation points several Pattern Resources. These are also Common Systems Architecture

- The [Patterns Home Page](#) (refer to [hillside.net/patterns](http://hillside.net/patterns)) hosted by the Hillside Group provides information about patterns, links to online patterns, papers, and books dealing with patterns, and patterns-related mailing lists
- The [Patterns - Discussion FAQ](#) (refer to <http://purl.org/theopengroup/pd-FAQ>) maintained by Doug Lea provides a very thorough and highly readable FAQ about patterns
- [Patterns and Software: Essential Concepts and Terminology](#) by Brad Appleton (refer to [www.bradapp.com/docs/patterns-intro.html](http://www.bradapp.com/docs/patterns-intro.html)) provides another thorough and readable account of the patterns field
- The [Service-Oriented Architecture \(SOA\) Patterns](#) community website (refer to [www.soapatterns.org/](http://www.soapatterns.org/)), dedicated to the ongoing development and expansion of the SOA design pattern catalog
- The [Cloud Computing Design Patterns](#) community website (refer to [www.cloudpatterns.org](http://www.cloudpatterns.org))

## **Interaction Point : For Practical purposes beyond Certification**

The purpose of a Common Systems Architecture is to provide a referable platform in which there are **common, reusable solutions across many domains**. This would include the **integration of services** from the Foundation Architecture to create a unified architectural view.

Some examples of these would include:

**Security Architecture**, ( Kerberos, SAML (Security Assertion Markup Language), ...

**System Management Architecture**, (SEBoK, integrated, distributed and mixed, Process modelling, ....)

**Operations Architecture** ( Organisational-level, Operating-level, ITIL ....)

**Hosting Architecture** ( Paas, Saas, ....., Layers)

**Device Accessing Architecture** ( Edge Computing, Fog Computing, 3 Tier to N Tier, .....,)

..... Architecture

..... Architecture

**Development Systems** : Agile, SAFe - Scaled Agile Framework, Lean, DevOps, DevSecOps, ...

Each 'sub'-architecture is incomplete if we look at overall system functionality, but within its own domain or scope, it should provide a complete solution to that specific problem. This will mean that solutions implementing re-usable Building Blocks for the creation of functionally to complete operating states of the Enterprise.

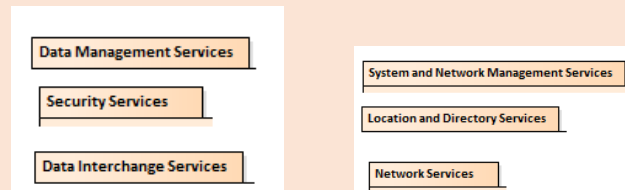
Common Systems Architectures **also include** :

- Requirements specific to a generic problem domain
- Building Blocks specific to a generic problem domain
- Business, data, application, or technology standards for implementing the Building Blocks
- Building Blocks for easy re-use and lower costs

Note that you will have to understand your current model and gaps in moving from the current to the future target model. That is why such a library stored as Architecture Repository and viewed on demand as Common Systems Architecture when needed is important.



## TRM: Platform Services



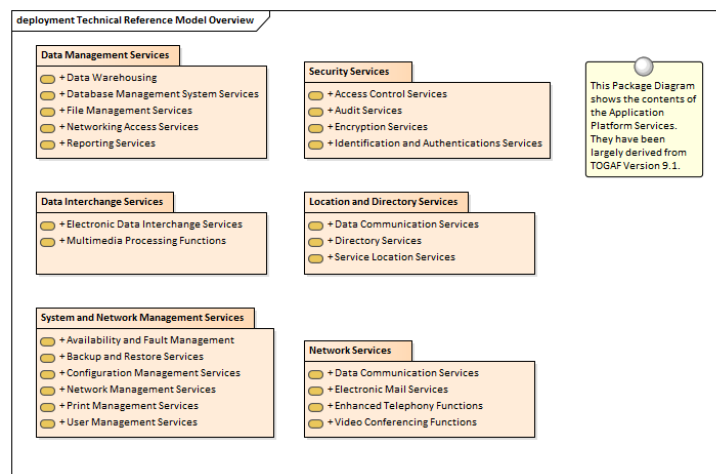
Software Engineering Services International Operation Services

Transaction Processing Services User Interface Services

Object Request Broker (ORB) Services Common Object Services

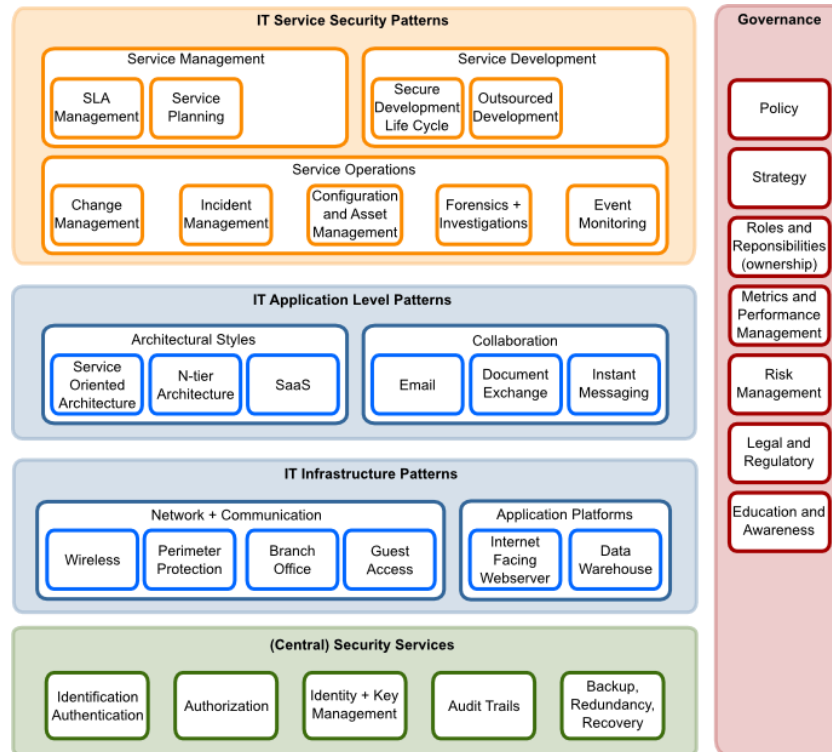
### Nice to Know Box

The **Platform Services** are elements that can be linked to other model elements, including the applications that rely on the service and also with the underlying mechanisms that provide the service



## Nice to Know Box

Patterns, the mainstay of matured Architectural approach, have their spread over various areas of IT and do contain ideal Common Systems Architectures :



# Loyalty Management Industry

## Incentives

- ✓ Reward catalog
- ✓ Eligibility engine
- ✓ Scheduler
- ✓ Unique codes generator

## Promotion

- ✓ Email
- ✓ Mobile (SMS/push notifications)
- ✓ Landing pages
- ✓ Triggers
- ✓ Reminders
- ✓ Excel/CSV export/import

## Reporting

- ✓ CMO view
- ✓ Finance view

## Web API

- ✓ Reward distribution
- ✓ Campaign control
- ✓ Webhooks
- ✓ Reward redemption
- ✓ Export
- ✓ Rate limiter
- ✓ Earning rules
- ✓ Loyalty tiers

## Maintenance

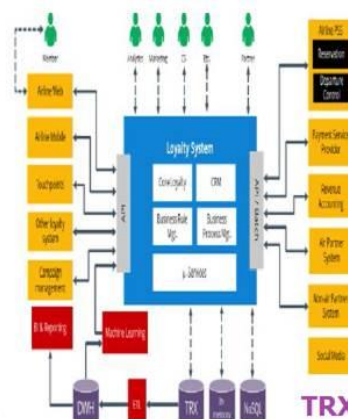
- ✓ Marketer dashboard
- ✓ Single customer view
- ✓ Customer support view
- ✓ Audit logs
- ✓ Approval workflow
- ✓ User roles
- ✓ Customer cockpits
- ✓ Start and expiry dates

## CRM

- ✓ Attributes
- ✓ Purchase history
- ✓ Reward history
- ✓ Segmentation
- ✓ Consents

**Airline Web**  
**Airline Mobile**  
**Touchpoints**  
**Other Loyalty System**  
**Campaign Management**  
**Reporting** **M/c Learning**

**DWH ETL**



**Payment Service Provider**  
**Revenue Accounting**  
**Air Partner System**  
**Non-Air Partner System**  
**Social Media**

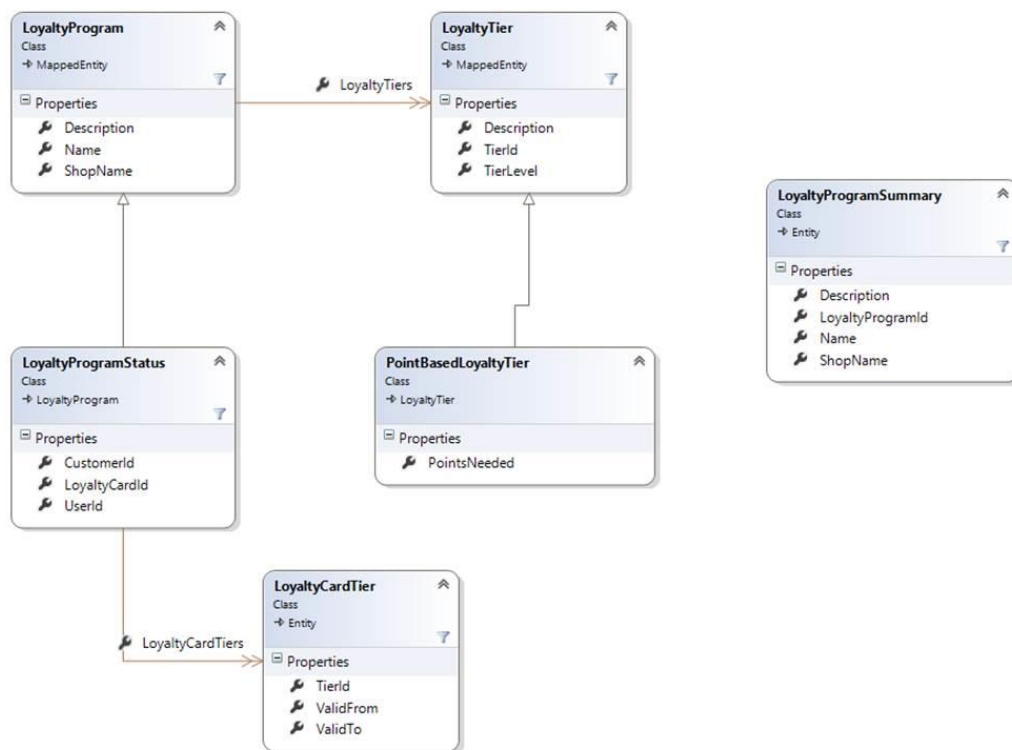
**TRX In-Memory NoSQL**

**Core Loyalty Business Rule Mgt**  
**CRM Business Process Mgt Services**

## Recommended Application Architecture System Loyalty XYZ Company

Application Architecture is recommended for the loyalty system for XYZ Company. In the recommended application architecture, there are several add-ons to improve effectiveness, facilitate monitoring, and report generator.

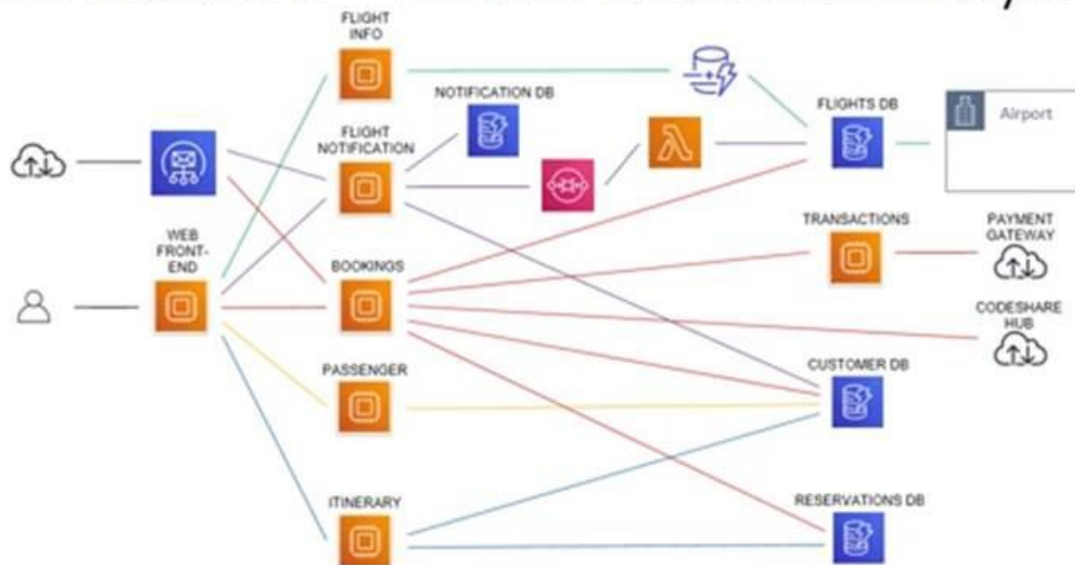
With SOA as base, the type of communication between core system and support system is done through API or Batch.





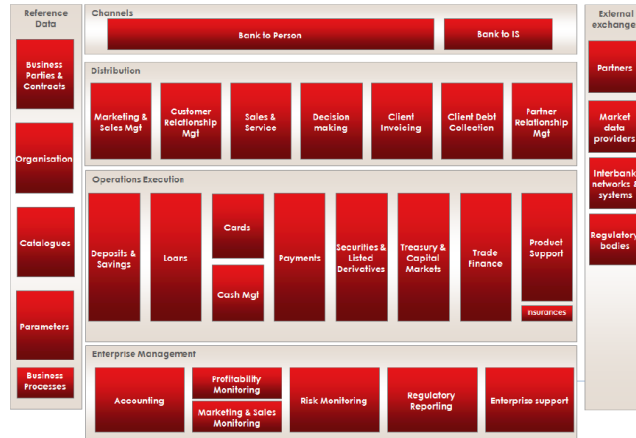
## Interfacing with an eCommerce, such as Airline Booking

### Architecture – Airline Reservation System



Nice to Know Box

## Banking Industry : BIAN – Industry Specific Architecture Reference



# HealthCare Industry : Industry Specific Architecture Reference



Healthcare Payer Reference Architecture

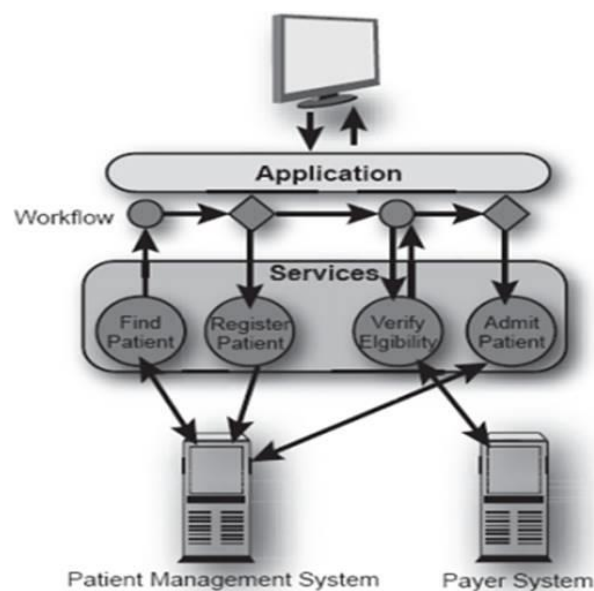
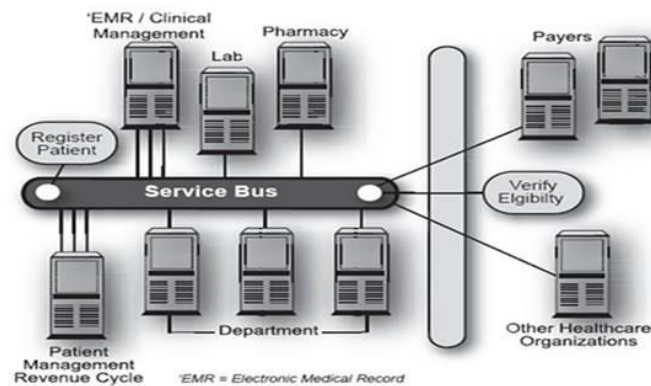
Reporting Findings

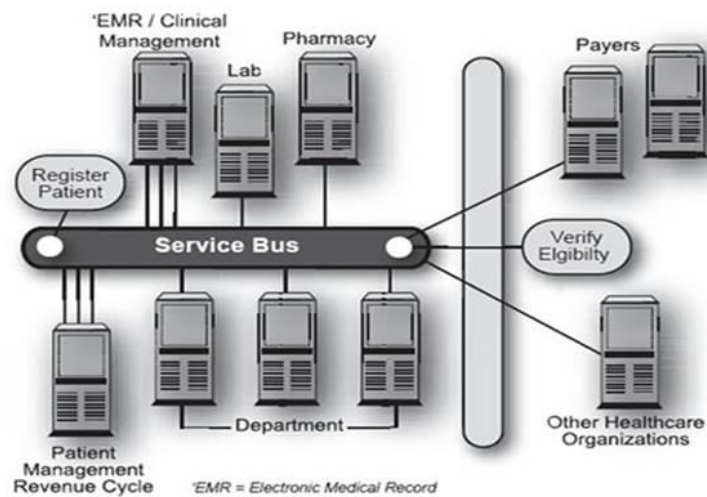
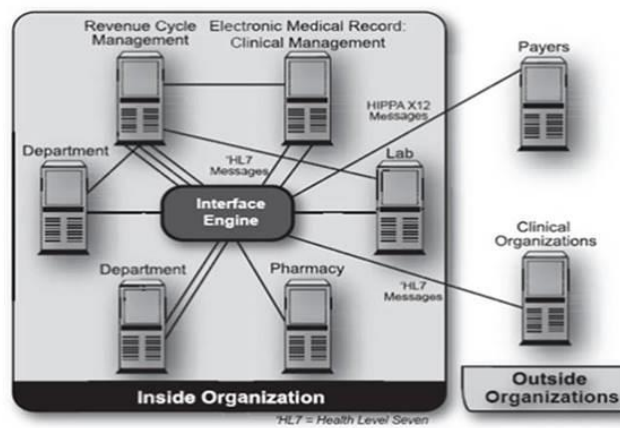
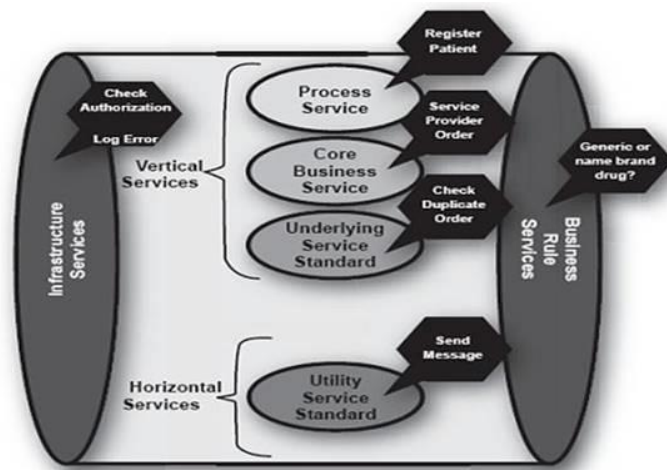
Testing and Analyzing

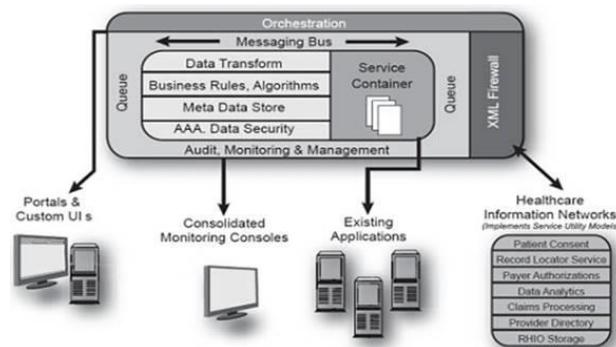
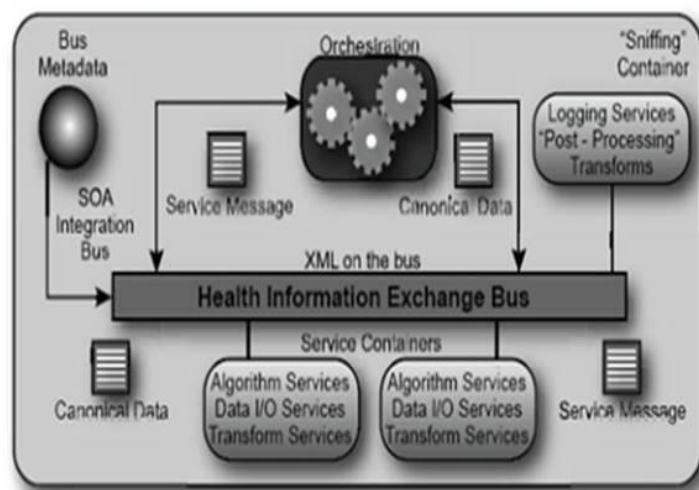
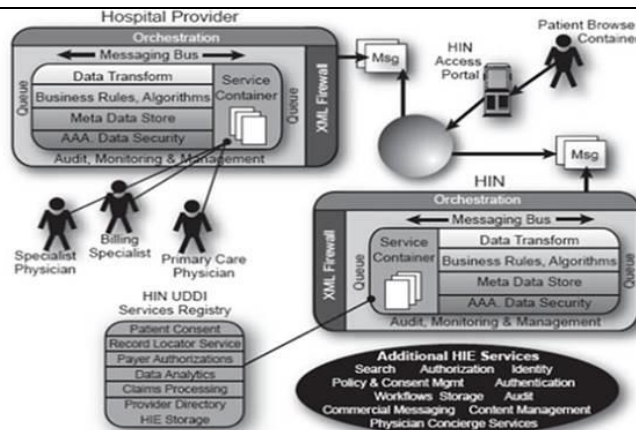
Collecting and Examining the Evidence (aka the Data)

Preserving Data and Information

Alternative Computing Models – e.g. Cloud





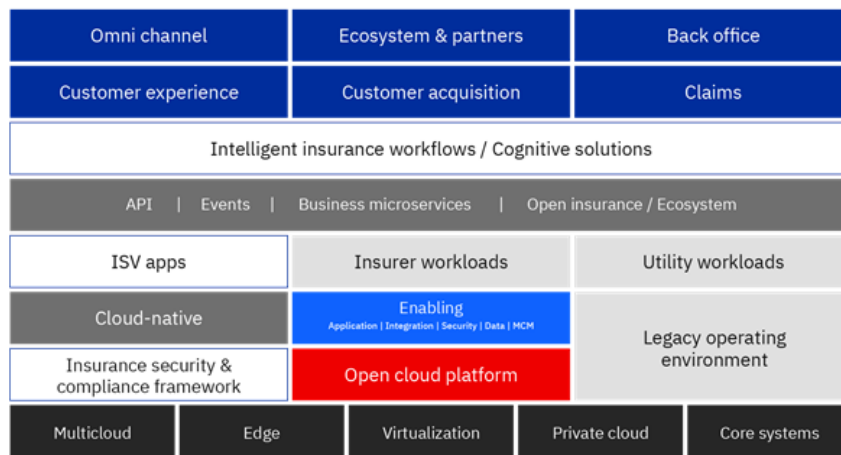
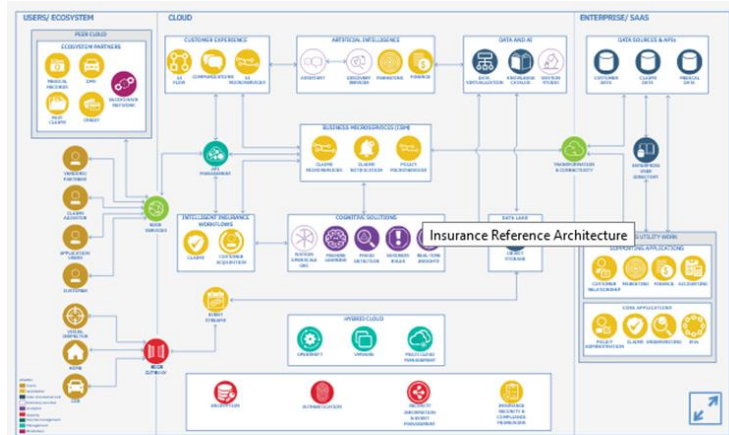


Source : <https://www.infoq.com/articles/soa-healthcare>

Nice to Know Box

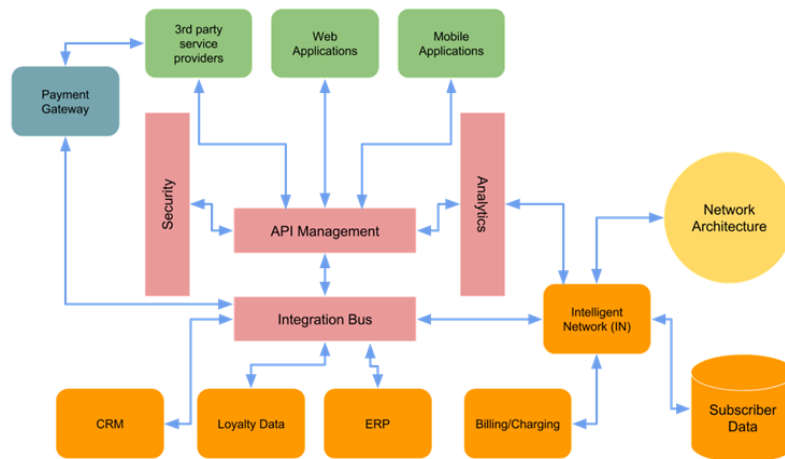
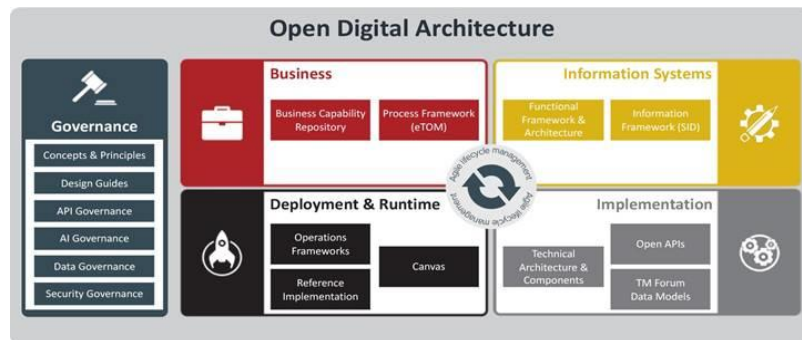
# Insurance Industry : Industry Specific Architecture Reference

## IBM Reference Architecture



Nice to Know Box

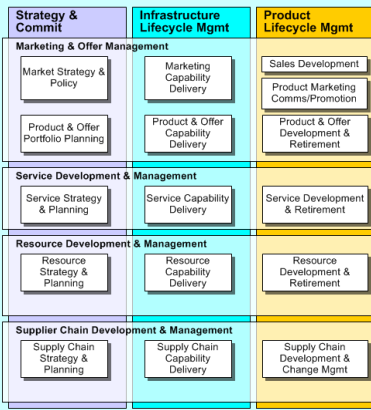
## Telecom Industry : Industry Specific Architecture Reference



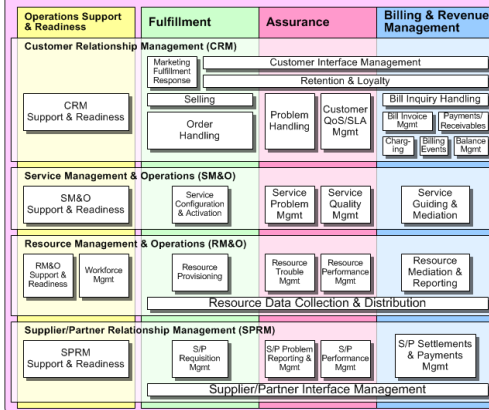
## Classic eTOM – V12

### Customer

#### Strategy, Infrastructure & Product



#### Operations



#### Enterprise Management

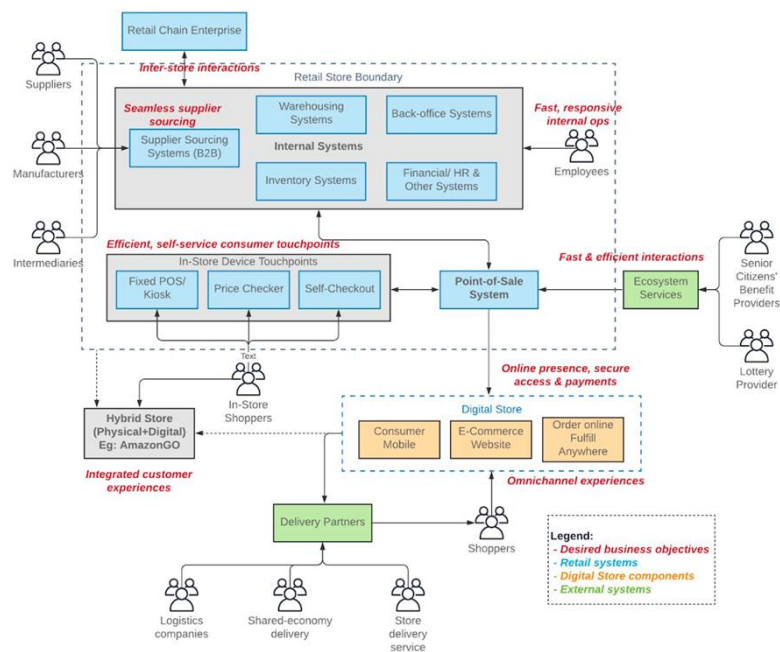


### Network

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## Retail Industry : Industry specific Architecture Reference



When all the activities associated with a TOGAF ADM deliverable are done a deliverable document will be automatically generated and archived in the Enterprise Continuum – Architecture Continuum slot named Organization-Specific Architectures. It is the Enterprise Specific Architecture prepared for all the projects and IT activities till date.

TOGAF provides a method for you to "architect" the systems in your Enterprise. **Your architecture organization will have to deal with each type of architecture described above.**

For example, it is recommended that you have your **own Foundation Architecture that governs all of your systems.**

You should also have your **own Common Systems Architectures that govern major shared systems** - such as the networking system or management system.

The above two will contain only those 'Architectures; which you have used or using in one or more of projects. The IT industry at large may have much more, but your Continuum captures only what is relevant to you.

You may have **your own industry-specific architectures** that govern the way your systems must behave within your industry.

**Finally, any given department or organization within your business may need its own individual Organization-Specific Architecture to govern the systems within that department.**

Your department will either adopt or adapt existing architectures, or will develop its own Architectures from the ground up. **In either case, TOGAF is a tool to help.**

It provides a method to assist you in generating / maintaining any type of architecture within the Architecture Continuum while leveraging architecture assets already defined, internal or external to your organization.

The TOGAF ADM helps you to re-use architecture assets, making your architecture organization more efficient and effective.

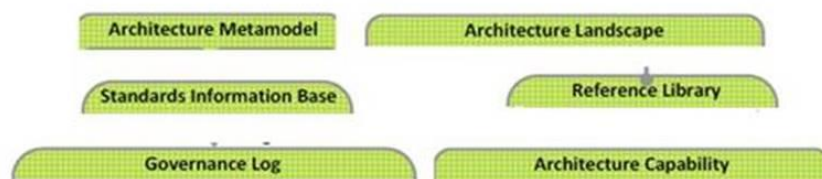
How do you think the Architecture Continuum will be made use of by you or your Team ?

## Points to Ponder

### Scenario Approach : Where would it fit ?

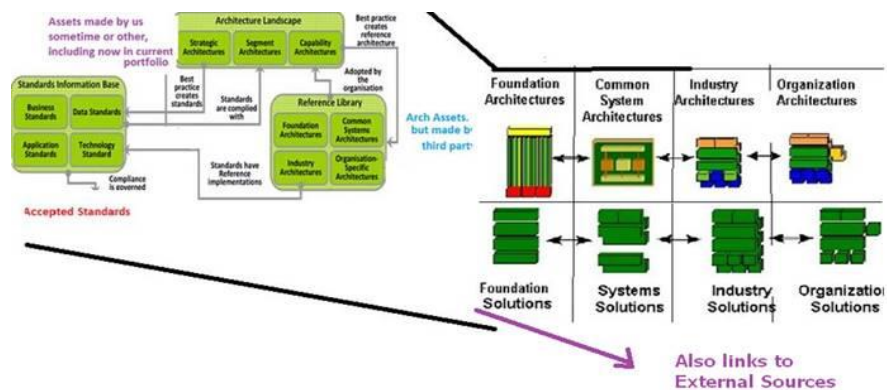
We are supposed to know about the various parts of TOGAF and have an overall idea of the concept behind each Component

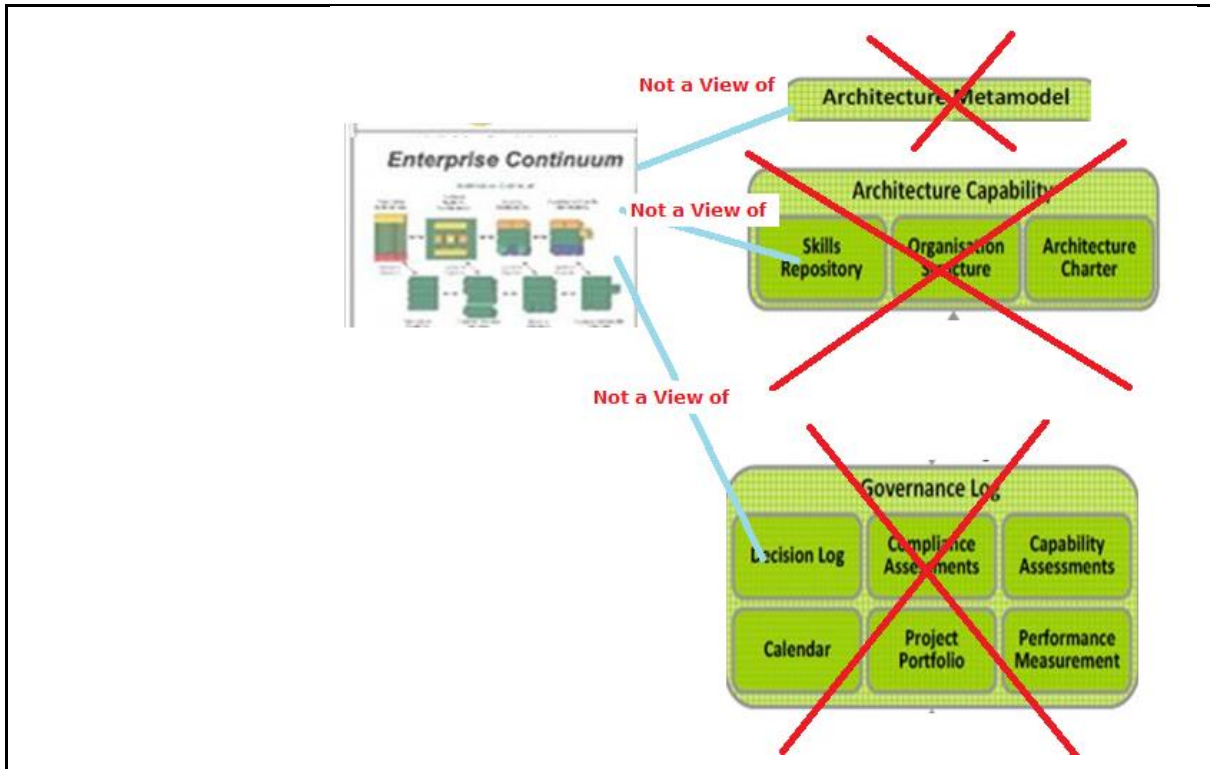
Expect questions on which Section of Architecture Repository stores what



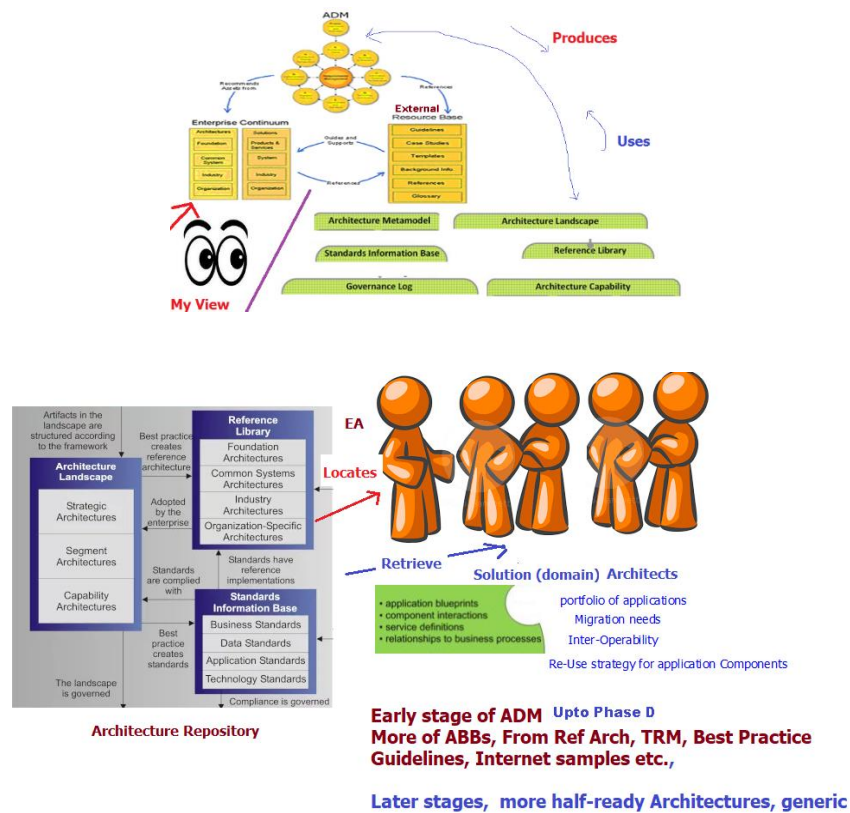
Six sections of Architecture Repository

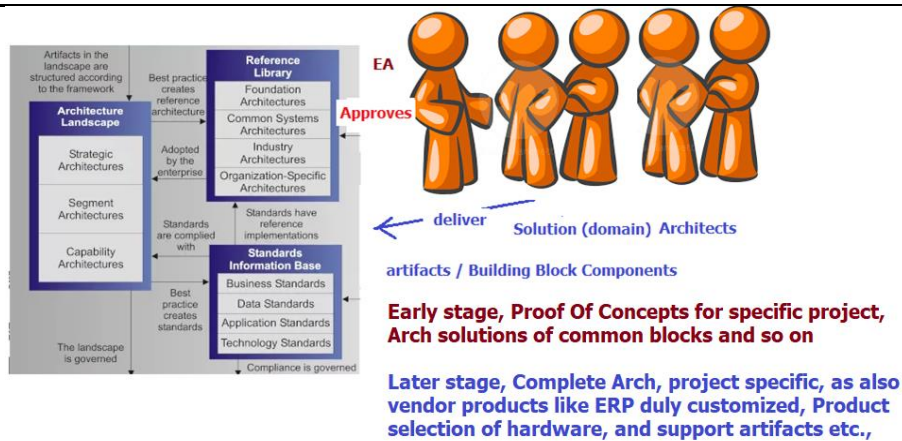
Which three parts of the Architecture Repository gets reviewed and retrieved through Enterprise Continuum ?





## Nice to Know Box





We have seen how assets are stored.  
But how to View them ?  
Ideally though an **indexed View**  
**Enterprise Continuum View**

**What is 'continued' ?**

Relating to the **Comprehensive Case Study**

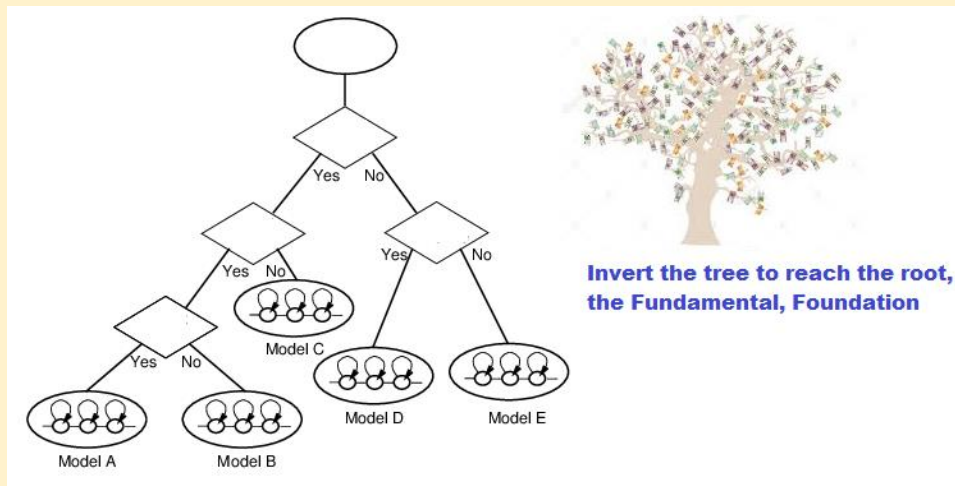
Nice to Know Box

### Points of Essence :

**The idea is to provide a Knowledge Tree path, for all those involved with Architecture. They are ...**

The person interested in such ABB style information can start anywhere and travel up or drill down till the necessary information is found.

Only Architectural and related ( Development, Operational ...) information is reachable through this Continuum.



It can be Sub-Sub-Sub System to ... System to .. Ecosystem

Take wholistic view and see where we are

Or

Go to fundamentals, to a reasonable extent, as needed

Smallest unit of Architecture in my area in our projects happened to be : ..

Ecosystem is the Architectural details of all the projects which are in use in our Enterprise now



#### Nice to Know Box

The Enterprise Continuum classifies architecture assets that are applicable across the entire scope of the Enterprise Architecture. These assets, which may be referred to as Building Blocks, can represent a variety of elements that collectively define and constrain the Enterprise Architecture. They can take the form of business goals and objectives, strategic initiatives, capabilities, policies, standards, and principles.

The Enterprise Continuum is intended to represent the classification of all assets that are available to an Enterprise. It classifies assets that exist within the enterprise along with other assets in the wider environment that are relevant to the enterprise, such as products, research, market factors, commercial factors, business strategies, and legislation.

The specific contextual factors to be identified and incorporated in an Architecture will vary from architecture to architecture. However, typical contextual factors for architecture development are likely to include :

- External influencing factors, such as regulatory change, technological advances, and competitor activity
- Business strategy and context, including mergers, acquisitions, and other business transformation requirements
- Current business operations, reflecting deployed architectures and solutions

By observing the context for Architecture, it can be seen that **Architecture development activity exists within a wider enterprise lifecycle of continuous change.**

**ABBs are defined in relation to a set of contextual factors and then realized through SBBs.**

**SBBs are deployed as live solutions and become a part of the baseline operating model of the Enterprise.** The operating model of the Enterprise and empiric information on the performance of the Enterprise **shapes the context and requirements for future change.** Finally, these new requirements for change create a feedback-loop to influence the creation of new Target Architectures.