Architecture Description Framework for Enterprise Systems - A Layered Approach

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Acronyms used in this document
• AD / M – Application Development / Maintenance
• BU – Business Units
• EA – Enterprise Architecture
• LOB – Line of Business
Our Views on Enterprise Architecture
Enterprise Architecture – Definition & Drivers

• Enterprise architecture is defined as “the set of architectural concepts, principles, guidelines, blueprints, standards, and other enterprise-wide deliverables that guide an enterprise through acquiring, outsourcing, integrating, connecting, developing, modifying, operating, and retiring the elements (internal and external to the enterprise) of an IT portfolio.

  - Cutter Consortium

• Why Enterprise Architecture?
  – Need for an efficient, faster, consistent, flexible and predictable technology support to the businesses
  – Need for faster time to market
  – Complex integration issues due to inconsistent and unsound technology
  – Chaotic technology landscape due to mergers and acquisitions
  – Lack of processes (architecture definition, technology selection, EA team funding, IT procurement etc.)
  – Lack of proper technology strategy planning in line with business planning
Architecture in an Enterprise can be viewed in 3 Layers

**Components of Architectures**

- Enterprise Business Vision and Principles
- Enterprise Technology Vision and Principles
- Technology / Product standards
- Process definition and document templates – LOB architecture definition process, Application architecture definition process, Strategic governance process, Funding process etc.
- Business and IT investment and Procurement Strategy

- As-Is and To-Be Business process models and Process-Application Mapping (Application Portfolio Rationalization)
- LOB level technology / product standards
- Technology Roadmap (List of Initiatives)
- Architecture Blueprint / Components (Software, Standard operating environment, Integration, Security, Global data)

- Application architecture based on Enterprise and LOB architecture blueprints
- Strong adherence to defined technology standards and principles
- Integration of architecture and software development (e.g. RUP) processes

**Critical Success Factors**

- Existence of a Governance model that is followed across the organization.
- Striking the balance between degrees of freedom and standardization

- Besides models and guidelines, there needs to be specific reusable and infrastructure components delivered
- The speed of the deliverables needs to match the expectations from the project teams that need them.
- A funding model needs to be in place that can charge-back the development of the reusable components to Projects.

- The Governance model needs to be evangelized and audited formally to ensure adherence
Degrees of freedom Vs Standardization

• At EA level, there should be multiple but finite number of paths to be selected by the LOBs
• At LOB architecture level, the degrees of freedom should be minimal
• At project architecture level, the degree of freedom should be very much constrained

Example
• EA level
  – Different types of technology stacks with specific products in each – (ex) Microsoft stack, IBM J2EE stack, Open source stack
• LOB level
  – An LOB can adopt only one among the above stacks as its technology goal and strive to rationalize its existing systems towards the defined stack
• Project level
  – Could select one among multiple reference architectures defined at LOB level
Our Proposition on Enterprise Architecture

Key Focus

- Focus on the rationalization of the gamut of old technologies as well as the large application portfolio to a more manageable and efficient set of new technologies and applications
- Provide a future direction for the architecture and technologies to be adopted and a roadmap to achieve that from the current state.

Current State

- A large application portfolio spread across number of business units
- Myriad of technologies including unsupported, stable as well as leading-edge
- Various business pain-points

Future State

- Continuous rationalization of approved technology / product standards
- Definition of business process models, IT roadmaps and architecture blueprints for lines of business

An end-to-end approach for architecture blueprint definition that is well integrated to ensure that the high-level enterprise and the Line of Business architecture blueprints get implemented in the right manner.
Benefits

- Client would be able to optimize the TCO to a level lower than what is achieved through outsourcing of application development and maintenance.
- Helps in:
  - Standardizing technology / products
  - Rationalizing application portfolio
  - Adhering to business vision and principles
  - Streamlining application development and maintenance

Utilize the savings on TCO achieved due to outsourcing of application development and maintenance for architecture blueprint definition and continuous rationalization in order to further optimize the TCO.
Architecture Description Framework (ADF) for Enterprise Applications
Among the various steps in EA definition, the focus is to prescribe the right description framework for project architecture and LOB architecture

- Business Case preparation involves carrying out a cost-benefit analysis of the architecture blueprint definition initiative and showing how it can help further optimize the TCO for the enterprise.
- The organization set-up for Enterprise Architecture and LOB architecture needs to have the agreement from all stakeholders without which the success of initiative is under question.
- This is followed by the Enterprise Architecture and LOB architecture blueprint definitions. The project architecture is defined in adherence with the defined enterprise / LOB architecture blueprints.

Focus of this presentation
- Layered description for project architecture of enterprise applications
- Synergy between project architecture and enterprise / LOB level architectures
Need for the “right” description of architecture of enterprise applications

- The architecture should describe the whole system at different levels of granularity depending on the hierarchy level of stakeholder.
- The architecture should describe different architectural aspects of the system focusing one at a time so as to help separate concerns of the stakeholders.
- The software architecture of the system should take into account the enterprise and LOB level standards as well as architectural principles.

- To achieve the above, the Architecture Description Framework (ADF) should
  - Provide guidelines and best practices for easy adoption
  - Provide tight coupling between the LOB target architecture and project architectures
The project architecture is
– represented in 2 layers of abstraction (Logical and Physical)
– traceable to different LOB architecture models
## LOB Architecture Models

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional</td>
<td>Process Application Map (PAM), High level business process models</td>
</tr>
<tr>
<td>Information</td>
<td>Standard entity definition, Entity to Application CRUD (Create, Read, Update, Delete) matrix</td>
</tr>
<tr>
<td>Technology</td>
<td>Technology / product blueprint</td>
</tr>
<tr>
<td>Software organization</td>
<td>N/A</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Standard operating environment for different types of applications (intranet, internet, extranet)</td>
</tr>
</tbody>
</table>
Coupling between project architecture and LOB architecture – Functional Viewpoint

LOB Architecture – Functional Viewpoint

- Generate Demand
- Buy Product
- Hold & Manage Product
- Product Value Add Services
- Sell Product
- Logistics Value Add Services
- Financial Services
- Bill & Collect

- Assure
- Customer Liability
- Obsolescence
- Forecasting
- Supply Planning
- Process Operations
- Control
- Manugistics System
- Process Planning
- Sales Planning
- Demand Planning
- Partners
- Integration
- Cable Assembly
- Service Mgmt
- Process Ops
- Control
- Asset Mgmt
- Service Fulfillment
- Partners
- Ship & Debit

- ProSeries
- Partner Data Mgmt
- Marketing
- Campaign Mgmt
- Imaging
- Vendor Returns
- Customer Returns
- Stock Rotation
- Commissions
- B1
- B2
- B3
- B4
- B5
- B6
- B7
- B8
- B9
- B10
- B11
- B12
- B13

- A1
- A3
- A5
- A2
- A4
- A6

- Imaging
- A0

- Suppliers
- A0

- C1
- C2
- Ship & Debit
- Price Protection

- Detailed business process models for the application
- Business use cases

- = mainframe/open VMS
- = client server
- = web applications
- = COTS
- = in development
Coupling between project architecture and LOB architecture – Information Viewpoint

• The LOB architecture’s information viewpoint has
  – Standard entity descriptions across functional areas
  – Create, Read, Update and Delete (CRUD) matrix (Entities Vs applications)

• The project architecture’s information viewpoint
  – Selects all the data entities that the application uses (creates, reads, updates or deletes)
  – Checks if the data entities are already owned by other applications; resolve any ownership conflicts
  – Elaborate data entities that are owned by this application
  – Arrive at the logical data model
  – Provide inputs to physical data model
Coupling between project architecture and LOB architecture – Technology Viewpoint

LOB Architecture – Technology Viewpoint

Content Delivery Servers
- Content Rendering Services
- Form Processing Services
- HTTP Servers
- FAX Servers
- Wireless Servers
- Term Servers

Enterprise Information Portal Servers
- Content Mgmt
- Session Mgmt
- Personalization
- Discovery Agents
- Single Sign on
- Collaboration

Enterprise Apps
- Business Intelligence
  - HR* (Lawson)
  - Financial* (QSP)
  - Others...
- B2B Apps
- Common Services
  - Security
  - Auditing
  - Directory Lookup
  - Logging
  - Imaging
  - Internationalization
  - Localization

Workflow
- Enterprise Integration Platform
- Adapters
- Transformation Services
- Rules

Data Access Layer
- ETL Services
- Data Replication
- Database Drivers
- Database Gateways

Data
- Data Warehouse
- ODS
- Directory Server
- Content Repository
- OLTP DBMS
Conclusions

• ADF provides a simple yet powerful framework to ensure the architecture of critical enterprise applications are represented to the right type of audience at the right granularity
• ADF also helps in providing a tight coupling between the target LOB architecture and the project architectures
• The notations currently have not been formalized at LOB level. This is an area of future work.
Thank You!