Enterprise Architecture – an ITLC Update
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Agenda

- Why an Enterprise Architecture in AdCom?
- Technical Reference Architecture
- Our EA Repository
- Current Architecture Initiatives
- Web Services/SOA in AdCom Today
- Realized Value
- Q&A
Why an Enterprise Architecture?

- **Strategic information repository**
  - Define current and target architecture environments
  - Plan change and impact

- **Life cycle management, governance**
  - Control proliferation and retirement of technology
  - How many databases engines do we own? Where are they used?

- **Application and data security** for HIPAA, PCI, and California Privacy compliance - NASA

- **Extraction of “Common Requirements”** across projects into patterns of reusable tested components and eventually business processes
What did we do?

  - maintain technology lifecycle and architectural control
- Adopted Zachman Enterprise Architecture Framework
  - powerful thinking and organization tool
  - logical – not J2EE, .Net, Portal, or WebServices
- Typically, organizations store redundant lists of “stuff” in Word, Excel, Visio...
  - application lists, critical business cycles…
What did we do, continued

- Adopted Stanford’s Protégé Knowledgebase & Ontology Tool
  - Created a taxonomy model that answers specific questions
  - Minimizes redundancy, increases consistency of information
- Populated the Model
  - Protégé auto-generates forms for capturing information
  - Forms based on our ontology and class definitions
  - Cross-link important facts (Projects to Technologies, etc) for slicing
- Documented SDLC and a change management process
Our Governance

- Technical Reference Architecture
  - used by campus community
- Protégé Strategic EA Information Repository
  - quarterly review by management in AdCom
- EA Infrastructure Planning
  - monthly meetings - EA Technical Team and Project Leaders agree on common requirements and define reusable components
- Working on more formal and broader governance methods
Technical Reference Architecture

- Documented principles, guidelines, and best practices of Architecture Domains:

- Lifecycle Management
  - Adopt the “4 year/16 Quarter Sliding Window Methodology”
  - Identifies technologies that are “Approved”, “Maintained but not Upgraded”, in “Sunset”, “Retired”, or “By Approval Only”.
**Product/Technology Life Cycle Matrix**

This is a sliding 16 quarter window in Calendar years. The date range of the Calendar year is January 1 through December 31 and corresponds to industry conventions.

<table>
<thead>
<tr>
<th>Key</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Watch - This product has been placed on a watch list of technologies to follow. It has not been approved for use.</td>
</tr>
<tr>
<td>R</td>
<td>Research - Product should be used only for pre-approved, proof-of-concept projects. Technology may be under evaluation.</td>
</tr>
<tr>
<td>P</td>
<td>Pilot - Technology approved for small-scale production use only.</td>
</tr>
<tr>
<td>I</td>
<td>Invest - Technology recommended for wide-spread deployment.</td>
</tr>
<tr>
<td>C</td>
<td>Invest with Caution - Although this technology is regularly maintained and upgraded, it should be used only when alternative technologies are not feasible. Technology can only be used by exception, after review and approval by Administrative Computing Services Architectural Steering Committee.</td>
</tr>
<tr>
<td>M</td>
<td>Maintain - New implementations are not encouraged. Existing systems may continue to rely upon these components and extend existing implementations. Product may be maintained but not planned for upgrades except bug fixes.</td>
</tr>
<tr>
<td>D</td>
<td>Drain/Invest - Technology is in the process of being phased out</td>
</tr>
<tr>
<td>O</td>
<td>Obsoleted - Vendor or industry support is gone. Tool should no longer be used.</td>
</tr>
<tr>
<td>V</td>
<td>Vetoed - Investigated and found not to meet organization’s needs - rejected.</td>
</tr>
</tbody>
</table>

**Database/File Storage Systems**

<table>
<thead>
<tr>
<th>Tool/Technology</th>
<th>Platform</th>
<th>Usage/Type</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2</td>
<td>Mainframe</td>
<td>EDB/PPS, WebPAN</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>DB2</td>
<td>Intel, Solaris</td>
<td>J2C RFP resulted in preference for DB2</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>VSAM</td>
<td>Mainframe</td>
<td>File, DIS and PAL</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Sybase 12.x</td>
<td>Solaris</td>
<td>DWH, SBS, Depreciation, TRA, EGS, StateClaim, SAMS, PBS, SNAP, CyberPay, CostSharing, HR FastClass, HR QuickTemp, HR Unemployment, Inc., ServiceDesk</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>MS SQL Server 2000</td>
<td>Windows</td>
<td>Approval needed for HIPAA, PCI, or SB1388 personal data. GreenTree, QuickRec, 8BS Student Bill Query, Facilities Apps, Parking, CIES Timesheet</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>MS SQL Server 2005</td>
<td>Windows</td>
<td>Approval needed for HIPAA, PCI, or SB1388 personal data.</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>W</td>
</tr>
<tr>
<td>MySQL</td>
<td>Solaris, Linux, Windows</td>
<td>Open source RDMS. Used for DojProject, WebPAN Archive, DWH Ledger. Approval needed for HIPAA, PCI, or SB1388 personal data.</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>PostgreSQL</td>
<td>Solaris, Linux, Windows</td>
<td>Open source RDMS.</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>W</td>
</tr>
<tr>
<td>SAP DB</td>
<td>Solaris, Linux, Windows</td>
<td>Open source RDMS.</td>
<td>W</td>
<td>W</td>
<td>W</td>
<td>W</td>
</tr>
<tr>
<td>Oracle</td>
<td>Solaris, Linux, Windows</td>
<td>Used by openLDAP and SunOne LDAP.</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>LDAP/Berkeley DB</td>
<td>Solaris, Linux, Windows</td>
<td>Used by openLDAP and SunOne LDAP.</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>
Our EA Repository

- model uses Zachman EA Framework concepts
- stores strategic information – a subset of the Technical Reference Architecture
- goals articulated
- initiatives, roadmaps, projects linked to goals
- technology linked
- change strategy
- communication tool
Modernizing and Web enabling the Financial and Purchasing Systems and making them accessible from SNAP, the campus business portal, is one of the most important changes that campus users have asked for. Additionally, for a number of years, AdCom has been interested in moving from the IBM platform to a more cost effective, flexible, and less complex technology. Of concern is that the demographics of the labor force makes it difficult to recruit IT professionals with knowledge.
Instance: **Modernize and Web-enable core Financial and Purchasing Systems**

**Instance of Class: A&BS_Initiatives**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Value</th>
</tr>
</thead>
</table>
| roadmap _or_project_for_initiative | 1. Kuali System Migration Roadmap (RoadMap)  
2. Web Farm Implementation Roadmap (RoadMap)  
3. Decommission of the IBM Mainframe (Active_Projects)  
4. Mobius Replacement (Active_Projects)  
5. EDB/PPS Migration to UCOP (Active_Projects)  
6. Campus Administrative Portal Roadmap (RoadMap)  
7. UCI Data Warehouse (RoadMap) |

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Value</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>initiative_name</td>
<td>Modernize and Web-enable core Financial and Purchasing Systems</td>
<td>String</td>
</tr>
<tr>
<td>scope</td>
<td></td>
<td>String</td>
</tr>
<tr>
<td>comment</td>
<td></td>
<td>String</td>
</tr>
<tr>
<td>initiative_description</td>
<td>Modernizing and Web enabling the Financial and Purchasing Systems and making them accessible from SNAP, the campus business portal, is one of the most important changes that campus users have asked for. Additionally, for a number of years, AdCom has been interested in moving from the IBM platform to a more cost effective, flexible, and less complex technology. Of concern is that the demographics of the labor force makes it difficult to recruit IT professionals with knowledge of the complex IBM environment. The modern IT workforce is trained on and has greater interest in more modern technologies such as Web, Java, and .Net. Once the core financial, payroll and purchasing applications are migrated to non-IBM platforms, the IBM is too expensive to maintain.</td>
<td>String</td>
</tr>
</tbody>
</table>
| realizes_goal    | 1. Leverage Open Source solutions (Reduce_Cost_of_IT_Operations)  
2. Minimize IT skill sets (Reduce_Cost_of_IT_Operations)  
3. Optimize return on investment (Reduce_Cost_of_IT_Operations)  
4. Reduce training (Reduce_Cost_of_IT_Operations)  
5. Improve IT agility and flexibility (Improve_Productivity) | Instance |
Instance: HR Fast Class Reclassification System

Instance of Class: Applications_Developed

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>life_window</strong></td>
<td><strong>HR Reclassification/Classification System</strong> (Project Enhancement Request)</td>
</tr>
<tr>
<td>project_request</td>
<td><strong>HR Reclassification/Classification System</strong> (Project Enhancement Request)</td>
</tr>
</tbody>
</table>
| development_technology      | 1.  ✔️ Java Expresso - Application Development Framework (Development Platform)  
                                           2.  ✔️ HTML/JavaScript/CSS (Development Platform)  
                                           3.  ✔️ WebAuth Campus Authentication (Authentication)  
                                           4.  ✔️ Expresso Security Access Control (Authorization and User Group Role Mgmt)  
                                           5.  ✔️ SAMS Security Access Maintenance System (Authorization and User Group Role Mgmt)  
                                           6.  ✔️ Drupal Workflow Engine (Workflow Engine)  
                                           8.  ✔️ Sybase RDBMS (Database)  
                                           9.  ✔️ Mozilla Web Browser (Web Browser)  
                                          10.  ✔️ Netscape Web Browser (Web Browser)  
                                          11.  ✔️ emie.adcom.ucr.edu Solaris Platform (Solaris Server)  
                                          12.  ✔️ helios.adcom.ucr.edu Solaris Platform (Solaris Server)  
                                          13.  ✔️ IE Web Browser (Web Browser) |
| technology_life_state       | UseAndInvest                                                          |
| version                     |                                                                     |
| project_status              | InProductionMaintenance                                              |
| URL                         | http://apps.adcom.uci.edu/expresso                                    |
| project_using_technology    | **HR Classification/Reclassification Streamlining** (Completed Projects) |
| disaster_recovery_level     |                                                                     |
| technology_name             | HR Fast Class Reclassification System                                 |
| cycle_important_for_project |                                                                     |
| sponsoring_party            | Human Resources (Stakeholder)                                         |
| supporting_party            | 1.  ✔️ Ying Kuusmann (Employees)                                      
                                           2.  ✔️ Katia Casalini (Employees) |
Current Architecture Initiatives

- Windows VMWare Virtualization Server Infrastructure 3
- LDAP
  - group/role membership, attributes
- SunOne Java Messaging Service (JMS)
  - for Publish/Subscribe, asynchronous and event-driven messaging
- Web Farm Implementation
  - Load Balancers (2 - Sun N1400)
  - Solaris SAN
  - LDAP, JMS, and Web application redundancy and clustering
  - Scalability, flexibility, reliability - 24/7 uptime
- Apache/SunOne UDDI and Web Services
  - HTTP/SOAP for Request-Reply, JMS for Event-driven services
Web Services in AdCom

- Data Warehouse
- Tririga Facilities Management System
  - Web Services/SOAP to update building, people, org data.
  - WSDL for integration (authentication, query, update)
- Web Services implemented and published to UDDI
  - getWorkflowTasks
  - getSeparatedEmployeeList
    - uses both HTTP and JMS Publish/Subscribe Protocols
    - reuses Data Warehouse “Employee” Java business objects
- Full Accounting Unit Validation Web Service
Web Services, UDDI, JMS

openLDAP
(stores JMS configuration)

SunOne JMS
Publish/Subscribe
Employee
Change Service

Apache Web Services
(Axis2)
webservices.adcom.uci.edu

JMS Subscriber (SSL)

Apache jUDDI
uddi.adcom.uci.edu

Employee
Change Web Services Client

Find Service

DWH - Employee Java Domain Object - Employee Change Notification

Java HTTP
Post or Direct Instantiation

Java RMI

SOAP over HTTPS

SNAP or Campus Workflow Client

Autonomy Workflow Engine Service
Realized Value

- Technologies retired or consolidated
  - database and windows servers consolidated
  - reduced Admin and DBA costs
  - CICS and Foxpro retirement in progress

- Applications are Java focused and database neutral (JDBC)

- Reduced development costs
  - tested code reuse (business process/SOA reuse is future challenge)
  - reuse of staff skill sets
  - common infrastructure for development that is platform independent
Benefits

♦ Comprehensive approach to enterprise strategic planning that encompasses business, technology, data and logical modeling.

♦ Management decisions based on more accurate and timely information.

♦ A strategic road map for change with careful project selection, sequencing, and planning and technology management.

“Projects done without architecture planning cost significantly more in the long term” (John Zachman)
UC Irvine’s EA Web Site: apps.adcom.uci.edu/EnterpriseArch
Zachman Framework: www.zifa.com/
Sloan School of Management’s “Matrix of Change”: ccs.mit.edu/MoC
Ontology and Knowledgebase: protege.stanford.edu/
UC Irvine’s Administrative Portal: snap.uci.edu uses JA-SIG uPortal software: www.ja-sig.org/
jUDDI, Web Services and XML/XSLT: www.apache.org
Java Application Dev. Framework, CMS: www.jcorporate.com/
LDAP: www.openldap.org/