

Report Contents

- **Introduction**
- **Engagement Objectives**
- **Engagement Findings**
 - *General Observations*
 - *SLU-ID Management System*
 - *Encouraging Observations*
 - *Observations of Concern*
- **SLU Documentation Review**
- **Recommendations**
- **Enterprise Architect Vision as described by SLU.**

Introduction:

Saint Louis University (SLU) continues to implement and upgrade their Information Technology and Administrative systems taking advantage of new, more efficient systems that offer increased functionality and allow for higher levels of departmental user productivity and control. SLU's Enterprise Systems provide a more Service Oriented Architecture placing emphasis on Departmental services and shifting "ownership," decision making and first-line functional support from the IT organization to the Business Process Owners. New application systems are engineered for integrated, cross-functional processes rather than isolated single-step tasks.

This new paradigm presents different challenges to SLU to insure that just as processes are integrated, the underlying support systems must stay "connected" and properly integrated into the University's Enterprise Systems.

Recognizing the critical need to administer, monitor and maintain the advantages of an Enterprise System strategy while allowing greater latitude to the University's functional organizations, SLU has established the role of Enterprise Systems Architect (ESA). ESA serves as the custodian of maintaining and documenting how all SLU systems integrate, interface or connect with each other both physically and/or logically providing support for the institution's data integrity initiatives as well as system-to-system interdependencies. Where possible, consistent user interfaces will be provided and efficiencies will be shared across systems.

Engagement Objectives

- Review existing documents, current architecture, integrations and concerns.
- Review in detail the Magis ID Management System and related interfaces.
- Assist SLU to establish policies and procedures to support the Enterprise Architecture Role.

Engagement Findings

CIBER was engaged by SLU to help “jump start” their new Enterprise (Integration) Architecture Administration initiative. We were asked to review the documents, strategies, organization structure, staffing requirements and speak to the benefits of formalizing/continuing the Architecture management process and function.

Integration, of course is simply the process of making a whole by bringing multiple parts together, or *unify*. Clearly, a primary prerequisite is that we identify what parts are to be integrated, and the points of integration. When we expand that simple concept to the entire *Enterprise*, the function becomes exponentially complex and missed elements can have a profound impact on the institution.

To maximize the benefits of this short duration engagement, CIBER’s activities began with the review of all available SLU documentation identifying the primary SLU components. This documentation was provided in advance, and the review and initial assessment was conducted before joining the SLU team on campus.

On campus activities began by meeting with Jim Hooper, SLU Enterprise Architect, who provided additional documentation as well as verbal background information to describe and identify the various system components. Interviews and meetings were conducted with a number of the technical staff and management culminating in a large group meeting on Monday afternoon at which a detailed look at the SLU ID Management System was reviewed.

General Observations:

During the discovery process of documentation review and staff interviews, a familiar and not uncommon pattern soon became apparent. A great deal of new “work” of all sizes and shapes are coming into the organization at a rapid pace. It's complicated work and there are continuous interruptions and changes to the plans. These demands work counterproductively to the orderly process of systems development.

The technical staff, striving to be responsive, often makes quick, unilateral decisions simply to be effective at satisfying the stated business needs. Unfortunately, this reactionary approach often leaves little time to properly document the developed work products and how they integrate with other systems in the enterprise.

The SLU IT organization is under enormous pressure to deliver systems and services and satisfy their user-customers. Effective prioritization requires institutional support and cooperation. While adding excessive controls could easily result in a negative impact, there is no question that attention must be given to strengthening prioritization and project development procedures. We recognize the current efforts at institutionalizing a formal Project Management Framework and believe that SLU is on track to a more effective IT workload management and communications methodology.

Procedures to prioritize projects, strengthen the communications and synchronize expectations between IT and Departmental user community are needed. Additionally the IT organization

needs to be attentive to their own internal procedural needs to ensure long term viability through standardized IT practices. The management team must provide guidance and direction towards the creation and maintenance of a body of documentation that defines the primary enterprise level elements of the system that define the IT operations and business support systems.

During our brief engagement it became apparent that a significant part of SLU's integration challenges result from a lack of structured documentation to define the existing components, systems, data elements and interfaces. This lack of published and available documentation is a serious inhibitor toward the overall evolution and development of the information technologies required to support the business needs of Saint Louis University.

Lastly, as the task of creating documentation is launched, SLU should implement documentation standards and naming conventions to add significant value to your document libraries and file/retrieval systems. The ability to reference, navigate and obtain specific documents is heavily depended on a coordinated set of standards and naming conventions.

SLU-ID Management System:

During this engagement, the SLU-ID Management System was a component specific of interest. As defined by Jim Hooper, SLU-IDMS V1.5 is the single unit representing both the SLU-ID system joined with the SLU Magis system. These two components represent the two roles of SLU-IDMS. SLU-ID performs the internal communication with Banner organizing the information in preparation for Magis. Magis then provides the communication and publication of security and ID information to all other systems.

Encouraging Observations:

During this engagement as an example to demonstrate a proactive documentation efforts, formal technical detail was gathered for SLU-IDMS V1.5 and published to the team.

Overall, our assessment of the effectiveness of the SLU-ID Management System would be a “passing” grade because it is indeed operational. When compared to the many hundreds of other organizations and similar systems, the SLU-ID Management System ranks on the top half of all systems if for no other reason than the fact it does work.

During this two day engagement, several positive events occurred.

- The SLU-ID Management System was confirmed as operational and effective.
- Substantial discovery of information occurred during the past two days.
- Formal announcement to technical team of SLU-IDMS V1.5 in production.
- Announcement to technical team of proposed SLU-IDMS V1.6 anticipated in the end of August 2006

Overall, the spirit of the organization appears to be guardedly optimistic. Both management and staff appear committed towards excellence yet there is also a level of awareness among staff and management that the organization is moving quickly. The high level of expectations from the other departments within the university is causing the I.T. department to work with an ever increasing level of urgency. This urgency appears to be the justification towards reduced concern towards an orderly systems development process and the necessary related documentation. Unfortunately this disregard for order, process and documentation is precisely the wrong direction to go. With the increased demands of the organization an increase in process and documentation will allow the I.T. department to continue it's successes.

Observations of Concern:

While there are a lot of solid points, a number of areas presented themselves as situations to cause cautious concern. While none of these issues by themselves support the need for alarm, collectively, each of these concerns conspires against the overall effectiveness of the organizational goals.

Overall communication and documentation within the SLU technology department is fragmented and often incomplete. Much of this situation appears to be created due to the rushed atmosphere of the organization. When an organization reaches this state of behavior, it becomes imperative that a committed effort take place to communicate in clear, complete language and document the results. The ability to generate and catalog mission critical documents of the systems being created is the only viable plan to ensure on-going success.

As an example, ineffective process, documentation and understanding of requirements lead to a disconnected understanding of timing issues related to various interfaces within SLU-IDMS. The Banner to SLUID interface drives all other components of the SLU-IDMS system and occurs nightly. The SLUID to Magis interface depends on the Banner to SLUID interface, but runs real time. While this is not a critical issue, it illustrates a complete misunderstanding of the goals and objectives of the systems development effort.

Areas in need of attention:

- **Lack of a defined Systems Development Process:** Insufficient controls and procedures in place for the development of systems allows for systems to be created without appropriate documentation. An orderly progression of system development cycles should be embraced to ensure appropriate system documentation.
- **Lack of Orderly Documentation:** The lack of documentation and ordinary system development procedures leads an organization to develop a dependence on “maverick” technical staff. The talented professionals that build the systems then become the singular authority of a system. This requires staff members with needs to interact with components of the system to waste both their own time as well as that time of the one individual authority of the system while acquiring the needed information.

- **Lack of Enterprise Systems Documentation:** Insufficient formal SLU documentation of existing systems. When details of a particular subsystem are needed, generally it requires a direct request to the technician that developed the system. This wastes time and resource of both the requestor and provider of that information while also creating a constraint to effective communication and progress of development efforts.
- **Lack of Enterprise Data Dictionary:** Poor documentation leads to poorly understood data structures. Data structures are the essence that defines the enterprise level data dictionary available for reference for all other components of the enterprise. Poorly understood data dictionaries lead to confusion on data sources as well as redundant and duplicate maintenance of data.
- **Multiple Database Platforms:** Multiple database vendors are currently in use. After a brief survey of existing database technologies both Oracle and Microsoft SQL Server were both found to exist within the SLU-ID Management System. Both database platforms certainly have their merit. This concern is not a criticism of the technology, but rather that having multiple database platforms requires a split in skills within the technical staff and multiplies the complexity of systems in use.

From an Enterprise Architecture and Integration point of view, multiple databases are not necessarily a problem. However multiple databases platforms increase the overall complexity without offering any substantive value. Additionally the cost and challenge of maintaining a technical team is significant when maintaining a uniform skill set on one platform. Having the team split their skills among multiple databases and platforms splits the team's effectiveness, potentially creates dissension, increases training costs and diminishes the overall flexibility of the team.

Conclusion:

The impact and risks associated with insufficient and inaccurate documentation are substantial. SLU is not in "critical" condition, but as the demands on the IT department continue to increase and the complexity continues to grow, there is an ever increasing risk of confusion as systems' complexities increase against the finite resource of the IT organization. Without improving each of these observed concerns, the predictable future will challenge the IT department's ability to support the business needs of SLU.

SLU Documentation Review

The key CIBER activity was to review and assess/validate SLU's existing Enterprise Architecture (EA) documentation. CIBER strongly believes that documentation and communications are among the key critical success factors in effective Enterprise Systems Integration/Architecture, and agrees with SLU's approach to conduct this documentation review and analysis.

The Reviewed Enterprise Architecture documentation included the following:

1. Global SLU Enterprise Schematic. This document is a "traditional" diagram of the overall SLU Enterprise Systems. At the highest level, there isn't anything wrong with this kind of document, but there are several questions that arise when we drill down a little deeper:

- Who is the real audience of this? It doesn't have enough detail for technicians and it's too complex for business people. Additionally it simply isn't accurate.
- When drawing this type of document, the author is forced to choose shapes and lines of various formats in attempts to define what is happening with a specific portion of the system. Unfortunately whatever choices are made, they are fundamentally a random selection since the audience of the chart is fundamentally unknown. Consequently the shapes and lines rarely convey information of real value.
- On a more positive note, the diagram does offer a visual aid to facilitate discussion of various systems. The visual would be greatly improved if augmented with a series of lists of the components in a textual manner. This chart signifies two or three lists:
 1. SLU Systems
 2. SLU Interfaces
 3. SLU Systems Processes
 4. etc....
- The lists of components generally provide far more pertinent data that more accurately describes the behaviors of the various components and behaviors involved in the system. The remainder of this document will attempt to outline many of these lists.

As a note to maintaining data in list form, information in a list can easily have other significant value. Textual lists can easily be included in other reports, databases, tables etc. Textual lists are highly malleable and usable in a wide variety of software and technical tools. Graphic pictures tend to trap data in the picture. Getting the information out of a picture and into other systems is difficult at best and generally first requires the information be re-keyed in a textual form.

Component lists were unavailable at the time of this visit but should be created and be the basis for future visual presentations and drawings.

2. Information Security Infrastructure - 7/17/06 - This is an excellent example of a "big picture" document of plans for policy and procedure. This should be published on

the Enterprise Architecture Website (EAW) and continually maintained with increasing granularity as appropriate.

3. Identity Management Strategy – Draft dated 5/3/2006 - Again, this is another excellent example of a big picture document describing concepts that guide SLU's efforts. Push this document through its "draft" status and publish it as an official version on the EAW. Again, maintain it and increase its granularity as appropriate.

4. Luminis Project Proposal - June 29, 2006 - This is a short proposal document that is not substantial but contains pertinent and valuable plans. Assuming this is a genuine proposal; it should be published on the EAW catalog of documents and treated as such.

5. Interchange Proposed Statement of Work 5/5/06 - The first impression is that this Statement Of Work (SOW) is unimpressive. It is an ordinary SOW that looks to have been written by the vendor with little input by SLU. Its language is written in an obvious attempt to be vague and non-committal, with the only clarity given to price points and cost. The Interchange SOW is behind you now so our only suggestion is that SLU get more involved with the drafting of SOWs in the future with explicit emphasis towards a robust, detailed section of the SOW specifying the deliverables. Most vendors have their own SOW format, but SLU should have an internal template, format or checklist that outlines the mandatory elements of a SOW. That SOW guide should be stored on the EAW and it should become part of the institution's standard operating procedures.

6. Gateway Program Architecture Forum – 6/19/2006 - An action items list that is excellent and limited. This information must be included on the definitive department action items and related issues log.

7. Saint Louis University Gateway II Program Status – 6/28/2006 - This report contains potentially sensitive information and certainly needs to be treated appropriately. This was the most valuable document to review to get a genuine understanding of the current status of the SLU efforts.

8. Enterprise Architecture Vision - This document is an excellent start for defining and the various tasks that will support an orderly system development and documentation process. Publish this document with a Version number and incorporate it in the discussions and refinements of the Enterprise Architecture Role. The language is certainly open for evolution and refinement. This report will also offer additional thoughts on information that could be included in this Enterprise Architectural Strategy. Additionally, as a point of the Enterprise Architect Role, the singular most critical point of the Enterprise Architect Role is not to create content or the strategy, but to evangelize, publish and promote the strategy. Keeping the EAW current and proactively used would be a key cornerstone of the role.

Recommendations

1. Implement an orderly IT Systems Development Methodology. The objective of such a methodology is to more tightly couple the satisfaction of business needs through appropriate documentation of the functional “how” and the technical detail required to support the business need.

In general terms, an IT Systems Development Methodology will provide the following documentation trail:

- a. Business Case Justification
 - b. Functional understanding of how to support the business need.
 - c. Technical documentation of the details of the system developed to enable the functional operation.
 - d. Technical migration documentation to catalog and manage the migration process of a technical body of work from a development environment, to a test environment and on to the final production environment.
2. Implement a repository to hold, maintain and publish the documentation generated from the IT Systems Development Methodology. Suggested is an Enterprise Architecture Website (EAW) that will contain all the documentation from the development cycle as well as a series of documents enumerating all the major components of the Enterprise Architecture. Examples of these items are inventory reports of major enterprise systems, enterprise interfaces and IT policies and procedures. Extensive details of potential ideas for the EAW are presented at the conclusion of this report.
 3. Implement the role of Enterprise Architect as currently being considered. This role will be responsible among other things to encourage the SLU I.T. department to follow a prescribed systems development methodology and encourage the collection and publication of appropriate documentation via the Enterprise Architecture website.

The Enterprise Architecture Role

The SLU document titled “Enterprise Architecture Vision” does a good job of addressing details of the new Enterprise Architecture role. As a suggestion for further clarification, use the role of Enterprise Architect for gathering, organizing and publishing the existing documentation while mentoring new to fill holes in the library. It is evident that numerous documents already exist for business processes, policies and procedures, functional specifications, technical specification and test cases. Optimally, this information that already exists will be gathered, organized and published via an SLU Enterprise Architecture specific web site. As this body of knowledge comes together in a single point, the missing elements will be easily identified.

The Enterprise Architecture Website (EAW) could be a powerful ally in allowing management's voice to be heard clearly and uniformly among the staff. The EAW should be considered to be the **ONLY** place to go for authoritative information on the technologies of the enterprise. Additionally, management should make the expectation that all members of the organization have a duty to read, edit, correct, contribute and submit content to be included on this website. The organization's Enterprise Architect then has the obligation and duty to maintain and groom this information and publish it as appropriate on the EAW

The Enterprise Architecture Website becomes the definitive "gospel" of the Information Technology components of the Enterprise. If the information is on the EAW, it can be depended on. If it isn't there, for all practical purposes, it doesn't exist. This type of ruling provides a rock solid foundation for the decision processes of both management and the technical staff. Note the objective of the EAW is not to reproduce any effort that already occurs in the main SLU.edu web site. Where appropriate, pointers can be used to link to SLU.edu or any other appropriate external website. The objective of the EAW is to provide a publication mechanism for the internal needs of the SLU Information Technology department.

The objective of the EAW is to provide order to the complex process of matching a multitude of business requirements and processes to an equally complex array of technical systems, databases, interfaces and components. Business people have one place to go to view the current state of the IT architecture, and the IT department has a singular point to reference for business facts as well as the state of other components of the IT architecture.

The EAW needs to be fluid and continuously maintained. SLU should encourage, mandate and enforce that all pertinent knowledge and data that would normally drive the organization be driven through the EAW. If a proposal is to be made for a new system, the specifications of that system must be posted to the EAW before development begins. If development of a subsystem is completed, the specifications must be posted before the system is put into production. Communication of any data or information via any other channel should be discouraged, or at minimum, closely aligned and coordinated with the EAW.

The Following is the Enterprise Architect Vision document provided by Jim Hooper.

Enterprise Architecture Vision

I. Definition

Enterprise Architecture is defined in the IT industry in a multitude of ways. One appropriate definition for SLU is “a blueprint that explains and guides how ITS elements interact with strategic and business-level functions to accomplish SLU’s mission. It must accurately characterize SLU’s current architectural state. The target state toward which SLU is driving, and lay out a sequenced migration plan via a gap analysis between the current and target states. It is a holistic effort that takes into account SLU’s business. Performance measures, information, and work flows.”

II. Purpose

Why implement an Enterprise Architecture team within ITS at SLU? In order to help SLU achieve its mission and its vision to be the finest Catholic university in the United States, ITS must be seen as an enabler, not a cost center. In order to help ITS be seen as an enabler, its architecture should be standardized, simplified, understood, and well documented. An Enterprise Architecture team will accomplish these goals.

III. Roles and Responsibilities

The Enterprise Architecture team should be composed of two roles: an Enterprise Architect and several Functional Architects. Functional Architects represent a particular hardware, software, or information component; the Enterprise Architect is responsible for integrating the various components into the technology stacks. Specific roles and suggested people to fill those roles are detailed here:

Role	Suggested Person
Enterprise Architect	Jim Hooper
Functional Architects:	
Application	Geoff Strom
Database/Information	Kevin Ballard
Desktop	Mourad Halim
Ed Tech	Time Heidemann
Network	Mike Moore
Plant/Cable	Brad Frischkorn
Security	Rob Rossi
Server	Dave Gudermuth
Storage	Jim Hooper
Telecom	Tracy Piedmont
Web	Geoff Strom

Responsibilities of the Enterprise Architect:

- Create and evangelize the overall enterprise architectural vision for SLU
- Build and maintain the Product Item Master (PIM)
- Charter and chair the Architects Council
- Integrate architecture reviews, etc., into the project management framework.
- Sit on the Change Control Board (CCB)
- Sit on the Security Operations Group (SOG)
- Maintain the Documentation Repository (do we want this?)
- Enforce cross-functional, enterprise-wide standards
- Reduce the overall number of supported products/platforms
- Participate in planning and coordination meetings with partner institutions (SSM and Tenet)
- Represent the University's enterprise architectural initiatives at conferences such as Educause and AJCU.
- Author and present strategy papers for emerging and production technologies.
- Coordinate architectural design for Special Projects (i.e. HER, Research Center, etc.)
- Identify strategies and tactics for cost saving and consolidation.

Responsibilities of the Functional Architects:

- Help develop and maintain their respective section of the PIM
- Maintain a dotted-line relationship to the Enterprise Architect (they directly report up within the functional area they represent)
- Sit on the Architects Council
- Represent specific changes at the change control board (CCB)
- Enforce standards within their functional area
- Perform Research and Development (R&D) within their functional area