

IT Architecture Priorities

| Number | Year | Task | Status |
|--------|------|--|---|
| 1 | 2009 | IT Architecture Planning & Guidebook (specifically to be implemented as a wiki) | Completed, the content is available for on-going reference and discussion. |
| 2 | 2009 | IT Architecture Review Process | Proposed templates and review process have been proposed, but no standing committee or regular review has yet been implemented. |
| 3 | 2009 | Source Code Version Control | Subversion has been implemented in production and socialized within the UTS integration team and parts of R&HS. We need to continue to educate and train staff to use Subversion and organize content appropriately into the future. |
| 4 | 2009 | Software Configuration Management | Subversion has been implemented in production and is in use for managing configurations of new SOA and Java applications. We need to continue to educate and train staff to use Subversion for other appropriate types of configurations. |
| 5 | 2009 | Enterprise Application Integration (EAI) and Service Oriented Architecture (SOA) analysis, development, deployment, and training | Completed extensive proof-of-concept initiatives and we are presently implementing the EAI and SOA infrastructure in development. The architecture and integration teams have completed extensive training and UTS, R&HS, and OIT Architecture have implemented several integrations already using these technologies. |
| 6 | 2010 | Initiate and Participate in IT Architecture Review Committee Meetings for UTS and R&HS | Completed the process convening the Architecture Review Team and integrating the architecture review into UTS project management lifecycle. Research & Health Sciences has begun participating in the architecture review. |
| 7 | 2010 | Web Application Development Patterns & Framework | Completed the selection, development, and packaging of a model office application (Job Family System) and re-implemented this application in Flex, a new rich internet application (RIA) framework. Next we should complete an assessment of current web application architectures throughout OIT and define a target architecture. |
| 8 | 2010 | Application User Authorization & Management | Deployed Grid Grouper as part of the ACTSI Biomedical Informatics Program architecture initiative to evaluate its feasibility as core authorization infrastructure. UTS is also evaluating Grouper and we plan to bring these evaluations together in 2011. |
| 9 | 2010 | Application User Authentication & Single Sign-on | Worked with UTS and R&HS to implement Shibboleth for user authentication and single sign-on in a manner that can be extended to federated authentication to serve as research collaboration infrastructure for the Atlanta Clinical & Translational Science Institute and other collaborations. |

| | | | |
|----|------|--|---|
| 10 | 2010 | Collaborate with CCI on projects using new SOA and EAI Infrastructure at Emory | Completed the initial ACTSI Biomedical Informatics Program architecture document with the Center for Comprehensive Informatics, R&HS, and other BIP participants. Deploying the ACTSI Biomedical Informatics Proof-of-Concept Grid . |
| 11 | 2010 | Collaborate with R&HS on Demonstrating and Implementing Applications with Semantic Web Technologies | No opportunity has presented itself to work specifically with R&HS on Semantic Web Technologies. However, Emory IT Architecture has taken the lead in the PESC EdUnify project for creating a registry of web services across higher education based on the BioCatalogue web service registry. This application support the registration, discovery, annotation, and monitoring of web services and may serve as the basis for other registries such as Emory's own registry, ACTSI BIP, or other collaborations. |
| 12 | 2010 | Support the completed initiatives 1, 3, 4, 5 with Training, Measure Continued Progress, and Report on Status | Completed additional training courses for Subversion and EAI and SOA . |
| 13 | 2011 | Collaborate with OIT Units on the OIT-wide Architecture Review Process | One of the recommendations of Emory's OneIT Experience initiative was to establish OIT-wide IT architecture reviews to provide a checkpoint for documenting IT standards and practices and reviewing projects' compliance with those standards. OIT leadership resolved to convene two IT Architecture Review Teams, one for Emory University and one for Emory Healthcare with the goal of merging these review processes in the future. The University IT Architecture Review is comprised of representatives from University Technology Services and Research & Health Sciences IT with participation from OIT Information Security and OIT Architecture. The Emory Healthcare Technical Review Team includes representatives from Emory Healthcare, OIT Information Security, and OIT Architecture. |

| | | | |
|----|------|---|---|
| 14 | 2011 | Implement Emory Web Service Registry | <p>Emory Healthcare and Emory University have both implemented contemporary, service-oriented architectures for integration. These technologies and skills help integrate information systems. For example, when a researcher needs lab results from Emory Healthcare for patients participating in their study, OIT can route messages containing this data between Emory Healthcare and University research systems with appropriate logging, auditing, and security. In order to make the best use of these integration resources, Emory has begun registering all of its Web Services into a web service registry at https://demo.webservices.emory.edu. All OIT units are actively registering web services here, so any member of the Emory community may view what web services are available. In 2012 Emory will implement a production web service registry and encourage broader participation by all Emory units creating web services.</p> |
| 15 | 2011 | Complete Atlanta Clinical & Translational Science Institute Biomedical Informatics Grid Proof-of-Concept with Research PACS and other Scenarios | <p>OIT Architecture and the Center for Comprehensive informatics completed a proof-of-concept deployment of core grid services and sample applications. This work was done on cloud-based virtual hosting resources. Further work and use of Emory resources on this project was withheld, pending approval for the necessary funding for this project. No funding has yet been identified to deploy this infrastructure on Emory OIT virtual hosting resources and operate this infrastructure. The cloud-based deployments have been quiesced.</p> |

| | | | |
|----|------|---|--|
| 16 | 2011 | Develop Web Application Standards and Reference Implementations | <p>OIT Architecture, University Technology Service, and Research & Health Sciences IT collaborated to explore Flex and Google Web Toolkit as candidate web application development frameworks. Before selecting these two candidate frameworks many other were considered, but these two were deemed the most feature rich and flexible. The group achieved consensus on using Google Web Toolkit, primarily because Flex does not work on iPad browsers. OIT Architecture worked with University Technology Services (UTS), Research & Health Sciences IT (RHSIT), and on its own web application development projects to develop patterns for using Google Web Toolkit and Adobe Flex. Additionally, OIT Architecture provided detailed documentation and reference implementations that demonstrate typical uses of these frameworks.</p> <p>OIT Architecture provided guidance and assistance for UTS who used Adobe Flex to build the LMS Extended Control Panel (LMSXCP) application which is an application that helps course administrators manage courses maintained in Black Board. The decision to use Flex was made before GWT was chosen as a longer-term strategy. The assumption is this application will be re-platformed when appropriate. The good thing about the patterns used with both of these frameworks is that much of the business and data logic is completely separate from the user interface. Therefore, it should be feasible to migrate LMSXCP from Flex to GWT in a reasonable amount of time when resources are available to do so.</p> <p>OIT Architecture also provided guidance and assistance to RHSIT who used Google Web Toolkit to build an administrative application called RAPID that helps researchers maintain and meet documentation and project reporting requirements about the projects they're involved with. These patterns are now in their second revision.</p> |
| 17 | 2011 | Implement Business Process Management Infrastructure | <p>OIT Architecture worked briefly with Research & Health Sciences IT and University Technology Services to deploy and provide a rudimentary web services interface to jBPM. jBPM is an open source business process management engine that Research & Health Sciences IT was interested in using with eCOI and potentially other applications. After several intensive meetings on this project, Research & Health Sciences IT decided that they were not interested in implement BPM infrastructure in the short term and the initiative ended.</p> |

| | | | |
|----|------|--|---|
| 18 | 2011 | Implement EdUnify Web Service Registry for Higher Education Beta | <p>OIT Architecture is involved in both the BioCatalogue Project and the Ed Unify Project. The BioCatalogue Project is an initiative to develop and operate a web service registry for life sciences. The project is led by the University of Manchester (UK) and the European Bioinformatics Institute. The EdUnify Project is an initiative to implement a web service registry for higher education. The goal is to accomplish this by adapting the BioCatalogue web service registry to serve the needs of higher education. In pursuit of this goal, Emory has made valuable contributions to both EdUnify and the BioCatalogue. In October 2011, EdUnify launched its production web service registry based on the BioCatalogue. To date EdUnify has 57 services, 47 service providers, and 71 registered members. BioCatalogue has 2066 web services, 147 service providers, and 552 registered members.</p> |
| 19 | 2011 | Work with Office of Technology Transfer (OTT) to establish iPhone Application Procedures and Sell and Distribute iPhone Applications for Emory | <p>OIT Architecture worked with the Emory OTT and Legal Counsel to develop a process through which mobile applications are reviewed and channeled through reviews. This process helps legal counsel and tech transfer review projects for potential legal and brand liability and identify institutional resources to assist in the development and commercialization of mobile applications. OIT Architecture developed a comprehensive proposal to implement IT infrastructure to support mobile applications and staff a service center for Emory. The Proposal for the emMobile Application Platform and Competency Center contains details of many mobile application projects and a plan to support mobile application development at Emory.</p> |
| 20 | 2011 | Complete 5.0 Release of the OpenEAI Foundation and Toolkit Console | <p>OIT Architecture has completed a release candidate for OpenEAI 5.0 and the OpenEAI Toolkit Console. The University of Illinois and other owners of the OpenII Toolkit for OpenEAI have nearly concluded an agreement to open source the OpenII Toolkit as the OpenEAI Toolkit and Console. Redline versions of this agreement are being circulated for final modifications. Once this process is complete, we anticipate a general release in two months. If the agreement between OpenII Toolkit Owners is not concluded by October 2011, the OpenEAI Software Foundation will work to release OpenEAI 5.0 separately without the Toolkit Console.</p> |

| | | | |
|----|------|---|--|
| 21 | 2012 | Emory Application Inventory (OneIT Experience Architecture Review Process Recommendation) | Proposed, but was removed from FY2012 priorities after some disagreement among OIT management about the importance and value of the project. In the several months between its proposal and removal from the list, the group completed a phase I prototype. If and when there is interest, this could be demonstrated and completed. An IP disclosure should be completed and submitted to the Office of Technology Transfer for the prototype. |
| 22 | 2012 | Production Emory Web Service Registry (OneIT Experience Architecture Review Process Recommendation) | Proposed and accepted as a final FY2012 priority. OIT Architecture is working with UTS on this deployment of the Emory Demo Web Service registry as a production service. This project has been delayed due to UTS staffing issues, but we anticipate completion in August 2012. |
| 23 | 2012 | Demonstrate DICOM and PACS integrations with Emory Healthcare | Proposed and accepted as a final FY2012 priority, but then removed due to the infeasibility of collaborating with Healthcare IT without a business driver. In 2012, Neuroradiology submitted a proposal for a research PACS, which may provide the impetus for collaboration. OIT Architecture and RWIT has met with Neuroradiology, updated the proposal, and is meeting with Healthcare IT to complete a technical design to implement the proposal. Recommend this be added as an FY2013 priority if EU and EHC can agree upon a candidate design. |
| 24 | 2012 | OpenEAI Web Service facade to automatically expose all ESB services as web services | Proposed and accepted as a final FY2012 priority. Web Service Facade generator is complete, documented, and demonstrable. We have used it to generate web service facades for the national nutrition database service and the Master Patient Participant Index Service. We are scheduling training for the UTS Integration team. |
| 25 | 2012 | Work with UTS to implement an ESB documentation and data access request site to complement their ESB related integration services | Proposed and accepted as a final FY2012 priority. UTS completed this documentation as part of their ESB Continuous Service Improvement project in May 2012. The ESB and integration document is much improved and more useful to both technical staff and business analysts. Recommend we work closely with RWIT to ensure the documentation of their integrations is correct and complete in FY2013. UTS provided basic information about these integrations from deployment and administration artifacts, but there is more background documentation for CHD, MPPI, and the new Glenn integrations that should be added. |

| | | | |
|----|------|--|--|
| 26 | 2012 | Work with UTS and RHSIT to implement a business service to support units in using First Data credit card processing with Cascade | Proposed and accepted as a final FY2012 priority. OIT Architecture and UTS completed a prototype implementation and demo credit card processing site using Cascade. UTS worked with RWIT to implement credit card processing on a client project and the RWIT web design group now offers this capability as a service. We should write an article and publish information about this service through appropriate channels. |
| 27 | 2012 | Evaluate eCommerce solutions potential user groups like the Carlos Museum and submit recommendations | Proposed and accepted as a final FY2012 priority. OIT Architecture and UTS worked with Carlos Museum to evaluate several eCommerce platforms. The team selected Amazon Web Store as the service with which to implement an initial prototype. The team developed the web store layout, entered inventory, resolved tax and accounting issues, and implemented a proof-of-concept web store, which is now in production and publicly available at http://webstore.carlos.emory.edu . |
| 28 | 2012 | Assist UTS Integration Team in replacement of SonicMQ with IBM MQ Series (OneIT Experience Architecture Review Process Recommendation) | Proposed and accepted as a final FY2012 priority. This project was deferred until late in FY2012 due to other UTS staffing priorities. The project ready to begin in July 2012. Recommend we consider this deferred to FY2013, which likely means that item 29 should be deferred to FY2014. |
| 29 | 2012 | Assist UTS Integration Team in the replacement of JBoss application server infrastructure with IBM WebSphere (OneIT Experience Architecture Review Process Recommendation) | Proposed and Deferred to FY2013. Due to the late inception of item 28, recommend this item be deferred to FY2014. It is likely not feasible to implement both a message transport migration and an application server migration in the same year. |
| 30 | 2013 | Document GWT Mobile Web Application and Mobile App Application Architectures | Adopted as an FY2013 priority. |
| 31 | 2014 | OpenEAI ESB Console Release 5.0 - implement HIPAA compliance measures for integration middleware and a list of enhancements proposed by the UTS integration and LITS architecture teams. | In progress, candidate to extend into 2015. Should review in light of proposal #39. |
| 32 | 2014 | Develop the initial release of Emory Web Application and EAI/SOA plugins for Eclipse to accelerate web application and integration development | Deferred in favor of mobile application distribution mechanism, mobile app policies, and massive transfusion protocol app. Should review in light of proposal #39. |
| 33 | 2015 | Certificate Issuing Service for Mobile App Clients* | A service to issue client certificates to mobile applications to ensure that only authorized clients may attempt authentication with Emory web services. |
| 34 | 2015 | Client Certificate Integration for App Servers* | Propagate client certificates to appropriate application server clusters for authenticating mobile app clients. |

| | | | |
|----|------|---|--|
| 35 | 2015 | HIPAA Audit Logging Service Web Application* | An application to view and perform rudimentary searches of the HIPAA Audit Logging Service. This is required to implement HIPAA compliance policies for at least four application that are in production or going into production within the next few months. |
| 36 | 2015 | HIPAA Audit Logging Service and SIEM Integration* | Transmit HIPAA audit log entries to the SIEM for short-term analysis by the security team. Integration development work is completed in 2014, but must be deployed in QA and testing and deployed in production. |
| 37 | 2015 | CloudHub Integration Platform as a Service Feasibility and Cost Study | Perform a feasibility, service cost, and migration cost assessment for migrating ESB function to Mulesoft CloudHub. Note that this feasibility assessment will not result in a recommendation to migrate to or otherwise adopt Mule or CloudHub. A separate assessment would need to be performed with a larger group once the migration feasibility and cost assessment are complete. |
| 38 | 2015 | Application Server Platform as a Service Feasibility and Cost Study | Perform a feasibility, service cost, and migration cost assessment for migrating Java applications to application server platforms as a service, specifically Google App Engine and AWS Elastic Beanstalk. Note that this feasibility assessment will not result in a recommendation to migrate or otherwise adopt one of these platforms. A separate assessment would need to be performed with a larger group once the migration feasibility and cost assessment are complete. |
| 39 | 2015 | DevOps Proof of Concept | Developers and architects have identified a number of problems impeding the development, deployment, and testing processes. There are a number of practices and supporting tools we might use to address each one. We propose enhancing our development, QA, deployment, and administration processes to address these problems. We will propose some new infrastructure to support these enhanced processes. The following are some of the problems identified along with some of the potential infrastructure to support enhanced processes: |

1. There are issues when moving applications that are developed on developers machines through the managed environments (DEV, QA, PROD) due to inconsistencies in configuration.
 1. Containerization (Docker) - Ensures that application will run the same regardless of where it runs.
 2. Configuration Management (Puppet) - Create consistent environments for developers to work in and for artifacts to be deployed to.
2. It is difficult for developers to collaborate when they are developing locally.
 1. Containerization (Docker) - Increases the isolation and portability of applications so developers can easily collaborate.
 2. Configuration Management (Puppet) - Provides a mechanism for creating consistent environments so additional environments can be provisioned.
3. Developing in a shared environment can impact other development environments.
 1. Containerization (Docker) - Provide isolation for applications so they don't affect each other.
4. It is difficult/time consuming for each developer to get shibboleth /authentication setup for each development environment.
 1. Configuration Management (Puppet) - Define configuration as a code so that shibboleth /authentication setup can be automated for new environments.

| | | | |
|----|------|--|--|
| | | | <ul style="list-style-type: none"> 5. The build, test, and deploy process requires a lot of manual steps to be carried out by developers. <ul style="list-style-type: none"> 1. Continuous Integration (Jenkins) - Automates the building, testing, and deploying of artifacts in a standardized manner. 6. Create a standardized way to monitor applications within containers. <ul style="list-style-type: none"> 1. Configuration Management (Puppet) - Once this standard is created, define it in code and make sure all containers adhere to the standard. |
| 40 | 2015 | Complete the Service Launch for the Emory Mobile App Catalog | Launch the Emory Mobile App Catalog as LITS service. |