An Introduction to Integration and Interoperability

An SCT Position Paper

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An Introduction to Integration and Interoperability

Integrated solutions achieve superior interconnectivity, service delivery, and information access by offering the means to bring content and business logic together, regardless of the source, into one seamless user interface with single sign-on and authentication. In short, integrated solutions mean infinite possibilities because of the interoperability they create. That's why integration across software applications is at the heart of the enterprise system and the core of SCT's e-Education Infrastructure, a strategic framework for leveraging an institution's technology, systems, and services for greater operational effectiveness in teaching, learning, research, and administration.

SCT recognizes the need to support enterprise integration among users, departments, and applications at the presentation, data architecture, workflow and processing layers. As a result, SCT has developed a comprehensive integration and interoperability strategy to support these requirements and offer a seamless user experience by role. This strategy is a fundamental component of SCT's vision of unifying the digital campus to promote individual achievement, enhance institutional performance, and foster educational communities worldwide.

With the advent of self-service applications, the lines between administrative systems and academic systems are blurring.
An Introduction to Integration and Interoperability (cont.)

The world of technology has changed

The expectation of an administrative system, with a single shared database managing all aspects of the enterprise, is essentially an obsolete concept. Today, enterprise wide systems are comprised of many components, some homegrown and some third party products in addition to the core administrative system modules. Library, bookstore, parking, medical services, housing, security, athletics, counseling, facility management, and many other subsystems have been deployed, often independently from the core administrative system. SCT calls this the emergence of the Enterprise Interoperable System (EIS).

Why change is needed:

- To simplify and streamline access to the applications, information and other resources each user needs from the ever-growing list of campus applications with different presentation, data and process layers.
- To aggregate data across the enterprise to provide a complete reporting and analysis facility into which all applications would feed.
- To establish an enterprise architecture addressing rising operational costs and issues inherent in the deployment of applications from different sources.
- To satisfy demanding user expectations, department policies, and institutional practices respecting the integrity of data, security and confidentiality.

Integration and the SCT e-Education Infrastructure

For over 35 years, SCT has developed technology solutions to address the needs of higher education. As a trusted advisor to over 1,300 institutions, SCT has recognized several important tenets about the environment of higher education. First, institutions have unique constraints, complexities, demographics and business practices and, therefore, one solution does not necessarily fit every institution’s requirements. Second, each institution has a different life cycle driving the use of their information systems, their expectations, and their ability to implement technology at the right time. Third, building systems based upon proprietary tools is costly. Fourth, open systems broaden choices.

It is clear to SCT that one requirement spans all institutions, regardless of size — enterprise systems have to be designed to support interoperability. A key factor in achieving an interoperable environment is establishing a flexible, scalable and robust infrastructure. To meet these needs, SCT has developed the SCT e-Education Infrastructure, with integration and interoperability at its core. SCT’s e-Education Infrastructure incorporates multiple methods of application integration to provide solutions that are both scalable and flexible and to provide a framework to integrate new and already existing business solutions in a consistent, efficient and productive manner.
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<table>
<thead>
<tr>
<th>Approach</th>
<th>Layer</th>
<th>What</th>
<th>Type</th>
<th>Why</th>
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<tr>
<td>Portal Integration (with single sign-on)</td>
<td>Presentation</td>
<td>Channels, portlets, web parts, authentication, identity management</td>
<td>Interactive</td>
<td>Provide user-centric and role-based access</td>
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<td>Process Automation</td>
<td>Application</td>
<td>Workflow</td>
<td>Near real time interchange</td>
<td>Orchestrate business processes</td>
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<td>Publish-Subscribe Messaging</td>
<td>Application</td>
<td>Enterprise XML messages, middleware</td>
<td>Near real time interchange</td>
<td>Synchronize changes to enterprise data</td>
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<tr>
<td>Point-to-Point Messaging</td>
<td>Application</td>
<td>Request and reply XML messages, SOAP, middleware</td>
<td>Near real time interchange</td>
<td>Request services, data, or changes to data</td>
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<td>Method Invocation</td>
<td>Application</td>
<td>Remote procedure calls, CORBA, Java RMI, .Net Remoting</td>
<td>Near real time interchange</td>
<td>Provide tight coupling – limited to core modules</td>
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<td>Batch / ETL</td>
<td>Data</td>
<td>Fixed transfers of data in blocks</td>
<td>Scheduled</td>
<td>For bulk data loads</td>
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<tr>
<td>Database Replication &amp; Sharing</td>
<td>Data</td>
<td>Database to database at the table level</td>
<td>Near real time interchange</td>
<td>Share data when applications use same data model</td>
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Enterprise integration is essential to realizing SCT's e-Education Infrastructure. Beyond point-to-point integration solutions, enterprise integration provides a means to support application architecture that offers plug and play capabilities across components, seamless data synchronization across applications, presentation access, and combined workflows that allow users to span applications with a single sign-on with authentication and identity management. Enterprise integration offers a unified framework to support the enterprise wide application environment, embracing standard application communication and abstracted methods to support users without the barriers of security, variations in user interface and workflow.

Institutions can rely on the SCT e-Education Infrastructure to provide an unprecedented user-centric approach, built to the highest standards of excellence and offering personalized Web-based services and superior online experiences to students, faculty, staff, and other campus communities. SCT creates a seamless experience for all institutional constituencies where registration, research, assessment, financial services, portfolios, and other administrative, academic, personal, and community functions are intuitive and unified.

Can one buy enterprise integration out of the box that supports all the applications one institution has employed today? Not yet. SCT is uniquely prepared to lead the development of a broad, cross-technology, cross product enterprise framework because of our large installed client base and our significant partner base that supports many mutual clients. SCT is already committed to working with and sponsoring several key open source initiatives that align with the EIS framework we are building into our components, including the JAG-SIG and OpenEAI foundations.
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Components of SCT's approach to integration
SCT will align our core products, client developed applications and partner supplied products using SCT’s standard application integration model. The model will be published as a series of business objects and transaction objects using XML messages and rendered in an Operational Data Store (ODS) to support enterprise reporting and information access.

The first part of the framework is the unified portal and the infrastructure tools provided within it. Using u-Portal1 as the foundation of SCT Luminis, SCT offers the means to integrate across applications at the presentation layer supporting single sign-on and authentication. Luminis brings together content, regardless of the source, into one seamless user interface. SCT is building standard u-Portal channels to render our application products and content from shared applications in the portal, including a common enterprise calendar, e-mail, and task management supporting user and department workflow.

SCT is taking the hard work out of data integration by creating a new library of business objects and events documenting the aspects and properties that drives integration spanning the enterprise applications. From the creation of a person or organization record, purchase order or budget, SCT’s event-driven model reflects the publication of standard enterprise messages and the rules that govern their production, consumption and definition.

SCT co-developed the OpenEAI2 Message Protocol, which defines messaging semantics and a message structure to support data integrity across a messaging enterprise. SCT is an active participant in the OpenEAI open source project, has implemented messaging applications and gateways using OpenEAI foundation software, and practices an integration methodology that extends the OpenEAI Integration Methodology.

Planning for the future
SCT is the only vendor delivering on this e-Education framework through real-time integration among disparate campus systems today, and we are looking beyond this to institutions' business and technology requirements for tomorrow.

SCT is committed to the development and deployment of a full range of Software Development Kits (SDKs) across our core products and technologies; to exposing the business logic across our applications and tools to enable clients, partners and SCT services to deploy interface programs at the proper layer and minimize the complexity of accomplishing scalable integrations; and to providing standard interfaces needed to support our strategic partners and assisting them in maintaining their interfaces to our core products.

We will continue to push forward building awareness and understanding of our integration and interoperability strategy. Our clients and partners are an integral part of this strategy and how well we serve our constituents long term is partially based upon how well accepted and deployed our architecture framework is in the higher education marketplace.

SCT’s vision and mission is to offer a full range of solutions that unify teaching, learning, and administration for all education communities around the world. These integrated products and services enable higher education institutions to achieve superior interconnectivity, service delivery and information access.

Forward Thinking
This document contains or may contain statements of future direction concerning possible functionality for SCT’s software products and technology. All functionality and software products will be available for license and shipment from SCT only if and when generally commercially available. SCT disclaims any express or implied commitment to deliver functionality or software unless or until actual shipment of the functionality or software occurs. The statements of possible future direction are for information purposes only and SCT makes no express or implied commitments or representations concerning the timing and content of any future functionality or releases.

1uPortal is an open source Portal created by the JA-SIG foundation and sponsored actively by SCT.
2OpenEAI is an open source foundation created by the University of Illinois, SCT and members interested in enterprise application integration. OpenEAI is based upon industry standards and specifies an XML message protocol, an integration methodology, and foundation software. OpenEAI supports publish/subscribe and point-to-point messaging, message content and protocol transformation, and intelligent routing. OpenEAI guides the development of message sets that will define the standard interchange and synchronization of data sets governed by the interaction of events across the enterprise.
An Introduction to Integration and Interoperability (cont.)