Agenda

- Support for Research Computing
  - Overview
  - Discussion

- Kuali Student Review
  - Review Committee recommendation
  - Discussion

- Draft Criteria and Guidelines
  - IT Service Investment Board input
  - Ranking criteria and portfolio prioritization update
Support for Research Computing
Topics

- **Research Support Overview** (20 minutes)
  - Support Ecosystem
  - UW-IT Cyber-Infrastructure (CI)
  - UW-IT Concerns & Comparables
  - UW-IT Current Efforts

- **Strategy Discussion** (20 minutes)
Research Support Ecosystem

Office of Research Information Systems (Research Admin)
Office of the Provost (Funding)
UW Libraries (Data Curation)

Strategic Sourcing *

eScience Institute
Data Driven Discovery

Research Collaboratory / Commons

UW-IT CyberInfrastructure

Joint Tool Development & Support

Consulting & Support

Stimulate Research & Teaching
Best Practice & Tool Development

CI Operations
CI Engineering

* Strategic planning & execution for on- and off-campus resources.
UW-IT Research Support Goals

- Be a broker and partner for research technology support
- Provide an alternative to managing CI locally
- Reduce friction
  - Improve "science/other-stuff" ratio
  - Increase the speed of science
  - Provide more time to investigate the data
UW-IT Cyber-Infrastructure

- Design, acquisition, deployment, & support
  - Networking & “Science DMZ”
  - High Performance Computing (HPC)
  - High Throughput Computing (HTC)
  - Big Data (velocity, variety, volume)
  - And the usual computing infrastructure, too

- Re-usable technology solutions
- Custom consulting solutions
UW-IT Cyber-Infrastructure

Campus Research Data Center

GPFS

Iolo Scalable Storage

GPFS/TSM

Hyak Scalable HPC

8 Gbs Fibre Channel

10 Gbs Ethernet

Backup Data Center

Tape

Remote Data Center

Tape

Research Internet

Campus Network
UW-IT Computing Infrastructure

- Jan 2008: Nebula deploys Boinc
- Mar 2009: Chem Cluster Replaced (90kVA)
- May 2009: Testbed Deployed
- Jun 2010: Initial Science DMZ
- Jan 2011: lolo deployed
- Nov 2011: Backfill Queue Operational
- Nov 2012: 150k Sponsorships
- Mar 2013: Phase II Build Out begins

- May 2010: UW Tower Data Center online (designed for research)
- Jun 2010: Phase I deployed
- Sep 2011: 90% utilization milestone
- Feb 2011: 50% cpu utilization
- Dec 2012: Year End Stats:
  - 800 TB archive
  - 32 MCPU hours
  - 29 citations
  - 5 FAC recruitments
- Apr 2013: UW-IT +1 FTE
- May 2013: Plan 6PB Genome archive

Legend:
- Hyak
- Other
- lolo
UW-IT CI Support Concerns

- Financial: Start-up cost, rates, sustainability
- Limited collaboration with peer Universities
- More tools needed, along with expertise to support
- Very limited support capacity for non-expert clients
UW-IT Archive Storage Financial Example
Support Resource Importance

What Motivates PIs to use Central

- Tech Support
- Limited Local Infra
- Relief from IT work
- It Looks Free
- Equip Subsidy
- Require todo
- Other

Importance
Top Few and Long Tail

Hyak HPC Cycle Usage

- Nuclear Physics
- Biochemistry
- Chemical Engineering
- Climate Science
- Astro & Aero Engineering
- Evaluation
- Astronomy
- Electrical Engineering
- Applied Math

Example of FTE CI Support Impact

New User Adoption of Clemson's Palmetto Cluster

June 2010: Galen Collier hired + development of new training classes and additional user support offered.
There is room to improve the effectiveness of research computing practices and strategies. Even institutions of high research intensity did not rate any of their research computing practices/strategies any higher than ‘somewhat effective’ on average.
CI Staffing as Percentage

Figure 3. RC Staffing at High, Medium, and Low Research Intensity Institutions

UNIVERSITY of WASHINGTON
CI Support Efforts

Figure 5. Research Computing Services Provided by IT
Research Support: Topic 1

Efficiencies and Effectiveness

- Consolidation and sharing
  - Hardware and software, roles and skills
  - Backfill queues - Condor - BOINC
  - Department -> UW -> cloud rate of transition
  - Central application lifecycles (SAGE, FIDS)
  - Network bandwidth, Science DMZ

- Best practices and policies
  - “Local” deployments
  - Central inventories (skills, assets, usage, ...)
  - Security and compliance
Research Support: Topic 2

Financial Topics

- Subsidies and investments
  - Consulting rates, Hyak sponsorship, Data Center co-location
  - Service rates - large use, small use
- F&A on storage and compute services
- Initial deployment cost depreciation
- Purchase lifetime (monthly, "one-time")
- R&D efforts to increase technology portfolio
- “Cash for Clunkers”
- Sustainability
Research Support: Topic 3

Consulting

- Availability/Partnerships
  - More coordinated support
  - Condo of Condo facilitators
  - Rate setting

- UW-IT Service Management
  - Service Catalog entries
  - CAMS - Customer or Technology oriented

- Build support communities
  - Virtual, physical
  - UW-IT Central Help Desk
  - Long Tail
UW-IT Current Efforts

- **Active Project: Campus Research Enhancements** (Aug 2014)
  - 100G Connection - UW Data Centers, PNWGP (done)
  - Campus backbone 10G->40G. Extendable to on-campus locations
  - Science DMZ - Open Flow/Software Defined Networking
  - 10TB lolo storage for any researcher to use

- **Active Project: Hyak Phase II** (July 2013)

- **IT Service Management initiative:**
  - Service Catalog - add or flag more entries for research support
  - help@uw.edu request routing
  - New IT Connect Web site will have Research as top level menu
  - Add SQL Share to Service Catalog

- **Engineering Staff +1 FTE from IT SMB recommendation**
UW-IT Near Term

- Submitted NSF STC proposal with Clemson (+2 FTE for 4 years)
- Submitted NSF 13 528 - HPC proposal for Hyak Phase III
- Discussing 6PB tape storage project for Genome Sciences (extend DMZ)
- Discussing 1PB storage project for Ocean Observatory (extend DMZ)
- Joining Coalition for Academic Scientific Computation
- Net+ services on horizon: Amazon AWS, Microsoft Azure
CI Support Efforts

Figure 5. Research Computing Services Provided by IT
Questions & Discussion

Given UW-IT’s limited resources, what should our strategy be for supporting UW research computing?
Research Support Ecosystem

Office of Research Information Systems (Research Admin)
Office of the Provost (Funding)
UW Libraries (Data Curation)

Strategic Sourcing *
Research Collaboratory / Commons
Joint Tool Development & Support

eScience Institute Data Driven Discovery

UW-IT CyberInfrastructure

Stimulate Research & Teaching
Best Practice & Tool Development
Consulting & Support
CI Operations
CI Engineering

* Strategic planning & execution for on- and off-campus resources.
Kuali Student
MoU Renewal Assessment
Summary & Recommendations
Kuali Student Investment History

May 2008
Strategic Roadmap planning complete

UW Staffing allocated to Kuali Student

Curriculum Management (CM) 1.0

MyPlan development starts

State of WA and BOR approval to invest in Kuali Student

CM 1.2

CM 2.0

Student Accounts Development begins

UW CM implementation initiated

2008

2009

2010

2011

2012-13

KS MOU renewal?

MyPlan Year 1 released

Enrollment Development begins

MyPlan proposed to STFC

UNIVERSITY of WASHINGTON
Committee Process

**Charge:** Assess rationale for the UW’s ongoing investment in Kuali Student and issue recommendations related to renewing the UW’s founding partner MoU.

**The Committee met four times to:**
- Refine evaluation criteria
- Gather updated peer institution data
- Consider vendor offerings
- Discuss outcomes to date and risks
- Develop recommendations

**Committee Members:**
- Gary Quarfoth (Chair), Associate Vice Provost, Office of Planning and Budgeting, Kuali Student Board
- Julia Carlson, Director Graduate Enrollment Management Services
- Virjean Edwards, UW Registrar
- Sara Gomez, Associate Vice President for Information Management, Kuali Student Board
- Michaelann Jundt, Assistant Dean, Undergraduate Academic Affairs
- Kay Lewis, Assistant Vice President for Student Life, Director of Financial Aid and Scholarships
- Kevin Mihata, Associate Dean for Educational Programs, College of Arts & Sciences
- Greg Miller, Chair of Civil and Environmental Engineering
- Phil Reid, Associate Vice Provost, UW-IT Academic Services, Professor of Chemistry
- Darcy Van Patten (ex-officio), Director of Student Program, UW-IT
Assessment Criteria

- Strategic drivers
- Strategic framework for replacement
- Architecture and integration
- Costs
- Kuali Foundation stability
- Vendor marketplace
- Peer benchmarking
- Outcomes to date
- Current risk profile
Strategic Drivers: Flexibility to address emerging needs

High-level entities define core services

New types can be defined as needed
Strategic Drivers:
Improve the student experience

Inform Decisions, Guide Exploration

Institutional Information
Personal Information

Requirements
Goals

Possibilities

Information about the experiences of others
Strategic Framework for Replacement

- Commodity (Buy)
- Market Availability to Meet Needs
- Custom (Build)

- Important Value to Mission
- Transformative

- EDW
- Enterprise Portal
- Workflow

- Academic HR
- eFECS
- Research
- Student

- Budget
- Finance
- Payroll
- Staff HR
- Procurement

UNIVERSITY of WASHINGTON
Architecture and Integration

MyPlan demonstrates value of Kuali Student’s service oriented architecture:

- Incremental adoption
- Deliver more value from legacy systems
Cost Profile

- Lower overall cost to implement and maintain than vendor solutions
- No upfront procurement and licensing fees
- UW controls level and speed of expenditures

UNIVERSITY of WASHINGTON
## Kuali Foundation Overview

### Stability Metrics:
- 72 foundation members
- 9 commercial affiliates
- 2011 total assets: $23,959,434

### Growth Metrics:

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Members</td>
<td>7</td>
<td>10</td>
<td>22</td>
<td>33</td>
<td>37</td>
<td>57</td>
<td>58</td>
<td>72</td>
</tr>
<tr>
<td># of Projects</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td># of Investing Partners</td>
<td>5</td>
<td>13</td>
<td>22</td>
<td>31</td>
<td>44</td>
<td>63</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>Kuali Days Attendees</td>
<td>120</td>
<td>219</td>
<td>207</td>
<td>520</td>
<td>350</td>
<td>690</td>
<td>815</td>
<td>816</td>
</tr>
</tbody>
</table>
Kuali Product Profiles
(does not include Ready, Mobility, Open Library, and Personnel Management)

<table>
<thead>
<tr>
<th>System</th>
<th>Investors</th>
<th>In Production</th>
<th>In Progress</th>
<th>Investors/Implementers Short-list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kuali Financial System (5.0)</td>
<td>11</td>
<td>13</td>
<td>4</td>
<td>Indiana University, Michigan State University, University of Arizona, Cornell, University of Southern California, Colorado State University, UC Davis</td>
</tr>
<tr>
<td>Kuali Coeus (5.0.1)</td>
<td>18</td>
<td>8</td>
<td>8</td>
<td>Indiana University, MIT, Johns Hopkins, University of Hawaii, UC Irvine, University of Arizona, Cornell, Michigan State University, Colorado State University</td>
</tr>
<tr>
<td>Kuali Student (2.0)</td>
<td>8</td>
<td>3</td>
<td>6</td>
<td>University of Toronto, University of Maryland College Park, University of Southern California, Indiana University, University of Utah</td>
</tr>
<tr>
<td>Kuali Rice (2.2)</td>
<td>6</td>
<td>21</td>
<td>8</td>
<td>UC Davis, UC Irvine, UC San Diego, University of Arizona, Cornell, University of Maryland College Park, Michigan State University</td>
</tr>
</tbody>
</table>
SIS Vendor Marketplace

Ellucian Banner
- Not seen as a viable option for UW’s size and complexity

Oracle/PeopleSoft Campus Solutions
- After assessment, Committee does not consider an acceptable solution
- Technology platform from the 1990s
- Some attempts to modularize and provide improved integration
- No significant functional innovations over the last 20 years
- Oracle’s higher education market is ½ of 1% of their business
## Peer Benchmarking

<table>
<thead>
<tr>
<th>Oracle/PS</th>
<th>Kuali Student (future): Oracle/PS (legacy)</th>
<th>Kuali Student</th>
<th>Undecided (evaluating options)</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Michigan</td>
<td>Indiana University</td>
<td>University of Maryland, College Park</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>University of Wisconsin, Madison</td>
<td>University of Utah</td>
<td>University of Toronto</td>
<td>University of Texas, Austin</td>
</tr>
<tr>
<td>University of Minnesota</td>
<td></td>
<td>University of Southern California</td>
<td>Iowa State University</td>
</tr>
<tr>
<td>Washington State University</td>
<td></td>
<td></td>
<td>Penn State University</td>
</tr>
</tbody>
</table>

- Institutions on burning platforms (**shown in red**) are forced to go with a vended solution if Kuali Student’s timeline does not align to institutional timeline.

- Institutions with time have flexibility to select a SIS based on institutional priorities and constraints. Three of the five ‘undecided’ organizations (**shown in green**) have been exploring Kuali Student, as demonstrated through their participation in Kuali Days and outreach to peer institutions (including the UW) for information.
Kuali Student Software to Date

**MyPlan (2012)**
Live at UW; Contribution underway

**Curriculum Management 2.0 (2012)**
UW implementing

**Enrollment (2013-16)**
In development

**Student Accounts (2013)**
In development
Other Outcomes to Date

- User Experience style-guide and technology platform leveraged for MyPlan development
- Alignment of local activities to long-term vision and needs
  - Project portfolio
  - Skills
  - Infrastructure
- Governance and processes to support legacy data conversion
- Cross-institutional collaboration and best practices
- Kuali Rice enables business process automation – tuition change process, supplier registration
Kuali Student Roadmap

- Curriculum Management
- Core Slice
- Course Offering
- Course Registration
- Live at UW
- KS Release
- MyPlan Year 1
- MyPlan Year 2
- Founders Releases
- Student Accounts

Not on this KS roadmap: Financial Aid, Admissions, Scheduling, Program Audit
# Current Kuali Student Risk Profile

<table>
<thead>
<tr>
<th>Risk Categories</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectural Approach</td>
<td>↓</td>
<td>No major architectural decisions pending. SOA architecture reaffirmed in 2012 by taskforce and through MyPlan.</td>
</tr>
<tr>
<td>Geographical Distribution</td>
<td>↓</td>
<td>No longer a risk. Team organizations, processes, and skills have effectively adapted to needs of geographic distribution.</td>
</tr>
<tr>
<td>Partnership Changes</td>
<td>→</td>
<td>Remains a risk, but overall stability of the project has minimized churn associated with partner transitions. 2012 brought departure of UC Berkeley and addition of University of Utah.</td>
</tr>
<tr>
<td>Community Dynamics</td>
<td>→</td>
<td>Remains a risk. With other partners significantly increasing their investment in Kuali Student, the inherent risk that the UW’s voice and level of influence is diminished.</td>
</tr>
<tr>
<td>Inadequate Staffing</td>
<td>↑</td>
<td>Increased risk because of scale of enrollment module and need to coordinate across four development streams. Strategic Roadmap sub-committee of the KS Board is evaluating priorities and recommending shifts in priorities and resource additions.</td>
</tr>
</tbody>
</table>
Preliminary Recommendations

- **Renew**: Continue the UW’s founding partner investment in Kuali Student by signing a three year MoU

- **Accelerate**: Consider additional investment to speed up delivery of a fully working core student information system and increase the UW’s influence on the remainder of the project

- **Communicate**: Create and rollout communication plan to remind campus of rationale and update on Kuali outcomes

- **Manage Expectations**: Develop concrete plans on when a student replacement project could realistically begin, based on other major campus-wide IT projects (e.g., HR/P)
Revised Criteria and Guidelines for Project Prioritization
Criteria from Strategy Board and Service Investment Board

- Strategy and Goals
- Improve Efficiency and Reduce Costs
- Data
- Balance
- Breadth
- Probability of Success
- Enterprise Risk
- Resilience and Business Continuity
- Build vs. Buy (Competitive Advantage)
Service Investment Board Ranking

Criteria

- Strategy and Goals
- Improve Efficiency and Reduce Costs
- Data
- Balance
- Breadth
- Probability of Success
- Enterprise Risk
- Resilience and Business Continuity
- Build vs. Buy (Competitive Advantage)
Ranking Results

4.6 - Enterprise Risk
4.5 – Mission, Strategy, and Goals
4.3 - Resilience and Business Continuity
4.2 - Improve Efficiency and Optimize Costs
4.1 - Probability of Success
3.9 - Build vs. Buy (Competitive Advantage)
3.7 - Balance
3.5 - Impact (Breadth)
3.4 - Data
Approach to Project Prioritization

- Categorize Criteria
  - Importance
  - Probability of success
  - Guidelines

- Assign Weight and Value of Criteria to Projects
  - Scale: 0 – 5

- Plot on a 2-Dimensional Grid
Revised Criteria and Guidelines

Importance

- Mission, Strategy, Goals
- Enterprise Risk
- Resilience and Operational Risk
- Improve Efficiency and Optimize Costs
- Impact – Breadth and Magnitude
- Pre-Positioning (Long-term)

Probability of Success

- Implementation Risks
  - Staff Resources
  - Vendor/Contractor
- Implementation Costs and ROI
- Sustainability – Ongoing Costs
- Technical Sustainability

Guidelines for Selecting a Solution

- Sourcing Spectrum (Build vs. Buy)
- Data and Analytics
Criteria: 2-Dimensional Perspective

For illustration purposes only
## Criteria Ranking Worksheet

**IMPORTANCE**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Weight</th>
<th>Criterion</th>
<th>Condition</th>
<th>Enter Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MISSION, STRATEGY and GOAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Sustain</td>
<td></td>
<td></td>
<td>Multiple Strategic Goals (5)</td>
<td>5.0</td>
</tr>
<tr>
<td>• Academic excellence and mission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Financial stability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Compete</td>
<td>4.5</td>
<td>Does this project directly support the mission, strategy, and goals of UW?</td>
<td>Single Goal - High Priority (3)</td>
<td></td>
</tr>
<tr>
<td>• Attract the best students, faculty, and staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase and diversify funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Transform</td>
<td></td>
<td></td>
<td>Single Goal without High Priority (1)</td>
<td></td>
</tr>
<tr>
<td>• Embrace technology and interdisciplinary collaboration of a diverse and dispersed student body</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Invest in people and infrastructure to meet 21st century challenges</td>
<td></td>
<td></td>
<td>No Goal Supported (0)</td>
<td></td>
</tr>
<tr>
<td>Does the decision improve the University’s competitiveness by lowering barriers to collaboration in research, instruction, or other University efforts across organizational, regional, or global boundaries?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**UNIVERSITY of WASHINGTON**
Evaluate Project Rankings
IT Projects Oversight
Questions & Discussion
Appendices
# UW-IT Project by Strategic Goal

## Service Goals

### Excellent infrastructure and foundation services

<table>
<thead>
<tr>
<th>Programs</th>
<th>Project 1</th>
<th>Project 2</th>
<th>Project 3</th>
<th>Project 4</th>
<th>Project 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephony Network</td>
<td>Telecom Core Refresh</td>
<td>UW Medicine Switch Tech Refresh UWMC</td>
<td>K-20 Operations Expansion</td>
<td>Wi-Fi Technology Refresh FY2013</td>
<td>Centralized Address Translation and Firewall Services</td>
</tr>
<tr>
<td>Storage</td>
<td>Upgrade Enterprise SAN Storage (EMC refresh)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Advanced productivity and collaboration tools

<table>
<thead>
<tr>
<th>Personal Productivity</th>
<th>Office 365</th>
<th>UW Event Calendar Replacement</th>
<th>IT Connect Redesign</th>
</tr>
</thead>
</table>

### Improved global research support

<table>
<thead>
<tr>
<th>Teaching &amp; Learning</th>
<th>Canvas</th>
<th>Tegrity</th>
<th>eTexts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Admin Systems</td>
<td>Course Availability Notifications</td>
<td>Curriculum Management Implementation</td>
<td>MyPlan, Year 2</td>
</tr>
</tbody>
</table>

### Improved student experience

<table>
<thead>
<tr>
<th>Enterprise Data Warehouse</th>
<th>Student Course Enrollment</th>
<th>Tableau Business Intelligence Tools</th>
<th>EDW Infrastructure Renewal</th>
<th>Migration &amp; Academic Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR/Payroll</td>
<td>HRP Replacement System Procurement &amp; Contract Negotiations</td>
<td>Enterprise Pilot</td>
<td>Feasibility Assessment</td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td>UW-IT Financial Management System Implementation</td>
<td>My Financial Desktop</td>
<td>JDE Upgrade 2012</td>
<td></td>
</tr>
<tr>
<td>Recruitment</td>
<td>Recruiter 2.0 Deployment</td>
<td>MS Dynamics CRM Proof of Concept</td>
<td>Kuail Rice</td>
<td></td>
</tr>
<tr>
<td>Kuali</td>
<td>Kuali Student</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Modern information management and business systems

<table>
<thead>
<tr>
<th>Business Continuity, Security and Privacy</th>
<th>FY13 Geographic Redundancy</th>
<th>UW NetID Password Policy Foundations Project</th>
</tr>
</thead>
</table>

### Business continuity, security, and privacy

<table>
<thead>
<tr>
<th>Organizational Goals</th>
<th>Exemplary organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Service Management</td>
<td>ITSM Toolset Selection</td>
</tr>
<tr>
<td>ITSM Toolset Deployment</td>
<td>Request Fulfillment</td>
</tr>
<tr>
<td>Incident Management</td>
<td></td>
</tr>
</tbody>
</table>

### Strong strategic partnerships

<table>
<thead>
<tr>
<th>Gigapop</th>
<th>PNWGP WA 40G Network</th>
</tr>
</thead>
</table>

### Culture of exploration and sharing

- Strong strategic partnerships
- Culture of exploration and sharing
## Proposed 2013 Timeline

<table>
<thead>
<tr>
<th>Month</th>
<th>IT Strategy Board Topic</th>
</tr>
</thead>
</table>
| February 4          | - Priorities and work plan  
                        - Oversight responsibilities  
                        - Kuali Student review plan  
                        - IT project and priorities |
| May 13              | - Kuali review recommendations and action  
                        - Revised Criteria and Guidelines  
                        - Support for research computing |
| October/November    | - Beyond MOOCS, what is next? Other disruptive learning technologies  
                        - Consumerization and personalization for students  
                        - Review of 2013 IT Strategy Board  
                        - Strategic IT priorities for 2014 |