

Unit Name: UW Information Technology

- 1. Academic Units:** Please provide a 1-2 page description of how your unit will fund growth plans identified in the Annual Academic Plan workbook through current or anticipated incremental revenue to your unit. Please provide specific fund source names and projections (in dollars). If these plans assume additional Provost Reinvestment Funds (supplement), please make that clear in this section.
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Not applicable

- 2. Academic Units:** If you are recommending the creation of a new tuition category, please identify the original tuition category, the proposed category, a suggested tuition rate for FY14 and a percentage increase for FY15. If you plan to move only a subset of your programs into a new category, please identify those programs.
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Not applicable

- 3. Administrative Units:** Please provide a 1-2 page overview of your current strategic plan and include a summary of any operational risks that the UW must work to mitigate over time. Note that there are very few Provost Reinvestment Funds, so your summary should provide a clear sense of how your unit intends to minimize risk, maximize service, and if necessary, repurpose existing funds to do so.
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UW Information Technology (UW-IT) is the central information technology organization for the University of Washington, responsible for strategic planning, oversight, and direction of the UW's IT infrastructure, resources, and services. We provide critical technology support to all three campuses, UW medical centers, and research operations around the world. UW-IT has units devoted to administrative systems and information management, networking, telecommunications, data centers, information security and privacy, academic and collaborative applications, computing infrastructure, IT services and strategic sourcing, accessible technology, customer service, and technology business continuity. We partner with the UW community to enable innovation, learning, discovery, and service.

Our Mission

- Enable UW students, faculty and staff to be more effective
- Help the UW manage risks and resources
- Foster a community of innovation

UW-IT Strategic Goals

- 1. Excellent foundation services and infrastructure:**
Deliver highly functional, reliable and invisible infrastructure that just works—and doesn't get in the way
- 2. Improved collaboration and productivity tools:**
Enable easy, secure collaboration with partners at the UW and beyond
- 3. Advanced global research support:**
Support UW research with up-to-date tools and resources
- 4. Innovative teaching and learning tools:**
Provide technology to support and improve the learning experience
- 5. Information for decision making:**
Provide access to better business information for planning and analysis
- 6. Modern business information systems:**
Provide modern, flexible and integrated business information systems to support a complex, global research institution
- 7. Business continuity, security and privacy protection:**
Support UW's risk management and compliance objectives

Details on both recent accomplishments and what's next are provided in Appendix A.

Operational Risks

Cyber Security

The University risks a host of potential and obvious liabilities related to information security and privacy. At the heart of the University's risk exposure is its reputation and leadership role in Higher Education and healthcare.

"Threat actors" are targeting the UW in order to access cutting-edge research, intellectual property, financial or confidential information. The threat actors are highly motivated, have significant resources, and sophisticated methodologies and tools. Building upon the existing strength of UW-IT's Office of the Chief Information Security Officer, additional resources are needed to help mitigate the increased risk and to support schools, colleges, and departments in identifying, understanding, and developing strategies for managing information security and privacy risks.

Research Competitiveness

The UW is a top-tier research university, with over \$1.5 billion in sponsored research funds. The ability to meet increased demand for network capacity is critical to supporting research and keeping the UW competitive.

Without expanding our network capacity, the University may face any or all of the following risks:

- Current network will not scale to "Big Data" research needs
- Intensive research activities in the network will disrupt other network traffic
- Important research grants will not be awarded due to the limits of infrastructure
- Ongoing loss of important research grants will jeopardize Tier 1 research institution status
- Ability to recruit and retain top research talent will be limited

Maintaining Critical Administrative Business Systems and Core Infrastructure During Ongoing Budget Reductions

The cumulative budget reduction of UW-IT's GOF/DOF resources from 2009 through 2013 is 26.7 percent.

Despite the implementation of the Technology Recharge Fee in FY 2011, UW-IT has continued to incur staff reductions that have brought us to critical levels in most operational areas. Further reductions are not sustainable and dramatically increase the University's vulnerability to service disruptions. The following describe impacts to key areas:

Support for Administrative Systems

- Core staffing to support the UW's Financial, Purchasing, HR, and Student systems is at a minimum, increasing our risk in managing these aging systems
- Reduction in our capacity to develop and deliver efficiencies and enhancements to the UW's aging administrative business systems to keep up with the UW's changing business needs
- Reduction of our ability to support new initiatives critical to meeting the University's expanding information needs, including support of data management, development of Web services, and build-out of the Enterprise Data Warehouse

Network Systems

- Increased risk of unexpected system outages
- Delays in troubleshooting and resolving system outages, along with decreased support for after-hour responses
- Certain delays in infrastructure replacement or upgrades in the UW network backbone
- Slowed expansion of the UW Wi-Fi network

Computer Operations and Infrastructure

- Deferred maintenance and replacement of administrative system hardware and server upgrades
- Delays in troubleshooting and resolving system issues in computer operations, along with decreased support for after-hour responses

Routing Centers

The Seattle campus' eight network routing/communication sites are highly vulnerable to a significant service disruption related to overheating and power-outages. A study completed by an independent consultant has identified over \$9.8M of needed upgrades to HVAC and installation of emergency power to these network hubs.

A phased approach to address these critical upgrades is required to mitigate the risk of a major disruption of network and telephone services to the Seattle campus. A major service disruption could last weeks or even months. The cost of emergency repairs and the business disruption for campus units would be enormous.

- 4. Academic and Administrative Units:** Considering your strategic plans (particularly if they assume growth) please provide a short summary (1-2 pages at most) that relates these plans to your current space assignment. In particular, you might consider the following questions when drafting your response:
- a) Does your current space inventory meet current programmatic requirements? Contrarily, does the type or quality of the space place any constraints on your ability to meet program requirements? If not, please provide specific quality or space type concerns (location, specific quality concern, etc.).
 - b) Will your unit be able to accommodate your growth plans within existing inventory of space? If additional space will be necessary, please describe the amount, type, or quality of *additional* space you may need to meet programmatic objectives and growth plans.
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The HR/Payroll Replacement Project is a UW sponsored effort to replace the Higher Education Payroll Personnel System (HEPPS, our current legacy system) and provide the UW with an integrated Human Resources Information System (HRIS) for the first time. The project is currently in a pre-implementation phase that includes the procurement and contracting for a new system and a university-wide business process design effort.

Starting in Summer 2013, the HR/Payroll Replacement Project will ramp up for the implementation phase of the project. Between Summer 2013 and Winter 2014, we anticipate needing additional space to accommodate additional FTE, between 50 and 70; this estimate will be refined as we complete planning. UW-IT is currently working with Planning & Budgeting to identify appropriate space.

5. Academic and Administrative Units: Should the 2013 Legislature lift the ongoing salary freeze and allow increases, we certainly hope that state funding will be provided for GOF increases. In the event that state funding for compensation is not available, all units should have plans to cover GOF/DOF salary increases out of tuition or other fund sources. Should no tuition revenue be available to your unit, Provost Reinvestment Funds may be dispatched to provide support for increases. Please provide your units' plans to cover expenses associated with salary increases. A salary and tuition revenue model is available on the OPB website; this model is designed to give you a sense of the magnitude of the support that will be required at various percentage increases.

UW Information Technology has a salary and benefit base of \$57M. Funding sources include GOF/DOF (Provost Reinvestment Funds), Self-Sustaining Revenue, and the Technology Recharge Fee.

Staff and benefits attributed to each source:

GOF/DOF	57.7%
Self-Sustaining Revenue	21.3%
Technology Recharge Fee	21.0%

We anticipate the Provost will provide funding for the salary and benefit increases for our GOF/DOF funded positions through the Provost Reinvestment Funds, outlined in FY 2012 Budget Instruction Letter of October 18, 2012:

“As administrative and university units do not generate revenue, these units should generally assume that any agreed to compensation increases will be covered through Provost Reinvestment Funds.”

Increases for salary and benefits for positions in our Self-Sustaining operations will be covered initially by self-sustaining reserve balances and subsequently by incremental service rate increases in FY 2015, if necessary.

Increases for salary and benefits for positions supported through the Technology Recharge Fee will NOT be covered by increasing the Technology Recharge Fee. We will identify cost savings and reductions in our expenditure base.

6. Academic and Administrative Units: Your unit may have identified growth plans in the Annual Academic Plan workbook; if so, as part of question 1 your unit should have included a description of the funds necessary, including Provost Reinvestment Funds, to support such growth. For this section, however, please provide specific requests of Provost Reinvestment Funds for new initiatives. Please provide a one-page summary of these requests, articulating how much funding is requested by an initiative, whether temporary or permanent funds are requested, and how the funds would be spent (new positions, systems, etc.).

UW Information Technology is engaged in a new governance structure that includes an IT Service Investment Board.

The charge of the IT Service Investment Board includes the following:

- Review services provided by UW Information Technology
- Conduct an annual review of Technology Recharge Fee (TRF) and recommend changes as needed
- Review of major UW-IT projects
- Make recommendations about investment priorities

During Fall 2012, the Service Investment Board is engaged in reviewing a series of new investment proposals for FY 2014. A recommendation will be made in January 2013 on whether one or more should be included in the Technology Recharge Fee, or whether a request will be made for Provost Reinvestment Funds. A decision by the IT Service Investment Board on funding recommendations will be made prior to the UW-IT and Provost budget discussion.

The three investment priorities in FY 2014 for UW-IT are:

Information Security & Privacy

\$1,016,300 yr

Increased funding to the Office of the Chief Information Security Officer (CISO) to help address information security and privacy risks, meet the current demands of the University, support future research, and provide consulting services to help UW colleges, schools, and departments develop and enhance their information security and privacy strategy.

40G Campus Research and Science Network

\$1,400,000 yr

This project will design, implement and support a dedicated 40G Research and Science Network, with 10G bandwidth to 15 research locations, including Hyak (UW high-performance computing cluster), and data storage.

Cyber-Infrastructure Support

\$280,000 yr

Develop additional services to address un-met demand for expertise and infrastructure in support of UW research computing. Services include:

- Providing subsidized, fee-for-service assistance in the tools and techniques of scalable computing, including domain-specific application selection, workflow optimization, code tuning, and data management
- Providing lower-cost, enterprise-class storage for research data
- Offering partnership opportunities and easy access with NW Climate Center, NW Transportation Center, and the Coalition for Academic Scientific Computation, and services to improve research computing

The specific investment proposals are included as Appendix B.

Request for Capital Funds to Address a University Operational Risk

UW-IT is also requesting support of up to \$9.8M of capital funds over the next biennium to upgrade the Seattle campus' eight critical network routing/communications sites. These locations, which are critical network hubs for the Seattle campus, are in need of upgrades to HVAC and installation of emergency power. Without these upgrades, these network hubs are highly vulnerable to overheating and power outages, resulting in a major disruption of network and telephone services to the Seattle campus.

A major service disruption could last weeks or even months. The cost of emergency repairs and the business disruption for campus units would be enormous.

On March 12, 2012 Seattle City Light (SCL) caused a campus-wide power outage that lasted for four hours. This outage took down all campus router sites and disrupted network and telephone services that UW-IT provides to campus. Two specific sites, Atmospheric Sciences/Geophysics (ATG) and Kane Hall, were particularly hard hit. In sum, one-third of campus phone service went down, including service to the EOC at the Tower, the UW Medicine call center, and numerous other sites. Wireless systems failed. ATG and Kane experienced equipment-operating temperatures that rose above safe levels for equipment operation, causing some systems to shut down on thermal overload. At Kane Hall, direct current rectifiers and battery plants not supported by emergency power kept some equipment online, but the off gassing of acid from the batteries made the site unsafe for any personnel to enter, further compounding our risk.

Coincidentally, UW-IT had just engaged a consultant, Notkin Mechanical Engineers (Notkin), to evaluate and make recommendations on upgrades to the campus's eight critical campus network routing/communications sites. Notkin was in the midst of this study when the outage occurred, thus providing them with a first-hand look at how this infrastructure performed. They subsequently recommended \$9.8M worth of improvements to the eight critical campus router centers.

Although UW-IT provides and supports the routing/communications equipment for each of these sites, the facilities are a University responsibility. UW-IT has a maintenance contract with Facilities Services for break and fix response, and it is now partnering with Facilities Services to present the issue of needed upgrades to the Office of Planning & Budgeting.

To evaluate the highest priority areas, UW-IT technical staff reviewed Notkin's recommendations and identified approximately \$2M of improvements needed to Kane and Atmospheric Sciences as a first phase of critical upgrades. In June 2012, we began meeting with Planning & Budgeting to discuss this issue and requested the first phase funds at that time.

With Planning & Budgeting's support, we hope to have this first phase completed in FY 2013. We are requesting additional capital funding for FY 2014 and FY 2015 to continue to address this critical operational risk.

Locations of Seattle campus routing/communication centers:

- Atmospheric Sciences - Geophysics Building - 003 & 003B
- Kane Hall - 69F
- Chemistry Building - B056
- Magnuson Health Sciences Center - AA100B
- Magnuson Health Sciences Center - G137
- Magnuson Health Sciences Center - H008
- Gerberding Hall - B057

Appendix A – Supplement to Question 1

UW Information Technology (UW-IT) is the central information technology organization for the University of Washington, responsible for strategic planning, oversight and direction of the UW's IT infrastructure, resources, and services. We provide critical technology support to all three campuses, UW medical centers, and research operations around the world. UW-IT has units devoted to administrative systems and information management, networking, telecommunications, data centers, information security and privacy, academic and collaborative applications, computing infrastructure, IT services and strategic sourcing, accessible technology, customer service, and technology business continuity. We partner with the UW community to enable innovation, learning, discovery, and service.

Our Mission

- Enable UW students, faculty, and staff to be more effective
- Help the UW manage risks and resources
- Foster a community of innovation

UW-IT Strategic Goals

1. Excellent foundation services and infrastructure:

Deliver highly functional, reliable and invisible infrastructure that just works—and doesn't get in the way

What We've Accomplished:

- Major phone system upgrade, bringing main campus and medical centers' switches onto a stable platform
- Network upgrade to IPv6, allowing unlimited networking addresses to the UW domain to meet the growing demand of mobile devices and network monitored equipment on campus
- New network architecture, improving resiliency, disaster recovery, and lowering maintenance and operating costs
- Wi-Fi upgrade, faster speeds, expanded coverage to 95% of campus through 7,000 new access points
- Promoting green computing
 - **SmartGrid 2 Virtual Private Network**, enables energy savings by installing "intelligent" electrical meters, water meters, and lighting controls in most UW Seattle buildings through participation in the Pacific Northwest Smart Grid Project, and in partnership with other UW business units
 - **PC power/patch management**, reducing desktop power consumption at the Seattle campus through widely distributed power management software
 - **UW data center consolidation** is well underway to reduce the number of sites from five to three. Substantial cost savings, reductions in UW's environmental footprint, and increased operational efficiencies will be realized through dense computing

What's Next:

- Improved cellular coverage in and around UW Seattle, including AT&T and T-Mobile 4G LTE updates
- Improved HuskyTV service for UW Housing, UW Medical Center patients, and campus locations
- Encrypted Wi-Fi to protect home networks when connecting to the UW

2. Improved collaboration and productivity tools:

Enable easy, secure collaboration with partners at the UW and beyond

What We've Accomplished:

- Software licensing agreements with Microsoft and Apple
- MyUW Mobile app for students

- UW Exchange 2010 upgrade
- SpaceScout mobile app for students to find UW Seattle study places
- Partner with Gig.U, a national consortium of more than 30 research universities, to deliver ultra-high-speed networks to local communities, including Seattle, with the goal of attracting startup companies, bolstering economic development and stimulating innovation

What's Next:

- **UW Exchange 2010 migration to the cloud**, offering Office 365 with a 25GB mailbox, ubiquitous calendaring, and FERPA and HIPAA compliance
- **EduRoam** gives visiting researchers convenient access to the Internet using their home campus NetID, and conversely our researchers access to the Internet via their UW NetID on EduRoam-enabled campuses around the country

3. Advanced global research support:

Support UW research with up-to-date tools and resources

What We've Accomplished:

- Upgrade UW Data Centers with uninterrupted power supplies to improve energy efficiency
- Upgrades to Hyak High-Performance computing cluster for research
- Supporting SQLShare for use in teaching data management to undergraduates; SQLShare is a database service that makes it easier for researchers to manage and query large datasets
- Offering Iolo, a scalable, file-based storage service for research computing

What's Next:

- Tripling the size of the Hyak High-Performance computing cluster
- Adding Condor compute scheduler to Hyak to enable higher use and more shared computing resources
- Providing regional leadership through partnerships with the NW Climate Center, NW Transportation Center, and the Coalition for Academic Scientific Computation
- Implementing Science DMZ, a new network architecture optimized for high-performance scientific applications supported and promoted by NSF. Science DMZ helps institutions protected by firewalls to quickly and safely share information, avoiding security delays and reducing barriers to data movement critical to modern cross-discipline scholarship
- Implementing an OpenFlow-enabled testbed pilot among a subset of buildings at UW Seattle to improve network traffic management. Funded by the NSF and in collaboration with Computer Science & Engineering
- Implementing a 10G research backbone. The UW's new cyberinfrastructure network, funded by the NSF and in place 2014, will meet demand for bandwidth, enhance security, and enable researchers to compete for Big Data science projects

4. Innovative teaching and learning tools:

Provide technology to support and improve the learning experience

What We've Accomplished:

- Canvas learning management system (LMS) piloted and selected as the uniform LMS for the UW
- Tegrity Web-based video lecture capture deployment
- eText book pilots to evaluate student and satisfaction
- MyPlan online academic planning tool released in September, allows students to chart a multi-year academic plan
- Support UW's participation in Coursera Massive Open Online Courses (MOOCs)

What's Next:

- Washington's K-20 network, connecting 99.8 percent of Washington state classrooms, will self-fund the upgrade and expansion of operations
- Assess student experience with Coursera Massive Open Online Courses (MOOCs)
- Expand implementation of Quali Student Curriculum Management system, to migrate and manage core information about the curriculum that gets published in the UW General Catalog
- MyPlan enhancements planned for FY 2013 include mobile access for students, advisor-created sample plans, and Time Schedule information to support planning

5. Information for decision making:

Provide access to better business information for planning and analysis

What We've Accomplished:

- Research administration data added to the Enterprise Data Warehouse (EDW)
- Additional student enrollment data added to the EDW
- Institutionally agreed upon data definitions developed
- New ability to visualize data allows spotting trends and patterns in EDW data
- Self-service report usage grows to over 120,000 runs annually
- Better self-help tools for students to review, plan, and accept student loans

What's Next:

- Continue to build out the EDW and to deliver integrated analytics and reports, including data marts like the Financial Cube that provide enhanced decision support analytics
- Deliver a new EDW visualization tool pilot that will provide decision makers with the ability to quickly and easily visualize data to spot trends and see patterns in large volumes of data
- Provide student credit hour data in the EDW, needed to support Activity Based Budgeting

6. Modern business information systems:

Provide modern, flexible and integrated business information systems to support a complex, global research institution

What We've Accomplished:

- HR/Payroll replacement effort launched; RFP issued
- Enterprise Document Management System RFP released
- MyFinancial Desktop enhancements
- Online review of faculty effort certification reports
- Online supplier registration in partnership with Financial Management

What's Next:

- Move forward with HR/Payroll system replacement and complete the Business Process Redesign Project. Next steps include assessing bids from vendors for a new system, recommending a vendor, and seeking Board of Regents' approval to issue a contract (Fall 2013). Start system implementation in early 2014; deliver functionality in phases starting 2017
- Expand on current efforts to modernize procurement applications to a broader Procure-to-Pay initiative
- Continue enhancements to faculty effort certification and cost sharing that support grant tracking, management and compliance with federal reporting requirements
- Implement an Enterprise Document Management system to increase efficiencies by capturing, storing and managing electronic content

- Improve UW-IT business processes and streamline financial information with a new financial accounting and reporting system, Microsoft Dynamics AX

7. Business continuity, security and privacy protection:

Support UW's risk management and compliance objectives

What We've Accomplished:

- Geographic redundancy for data centers
- Business Impact Analysis for critical business applications
- Student data encryption
- UW Policy for Information Security and Operational Practices
- Online training for information security, privacy awareness
- Improving UW's ability to respond to disasters and emergencies and quickly recover critical IT services through creation of a permanent Unit Response Center facility for UW-IT and by designing IT solutions for other UW Emergency Operations Centers
- Collaborated with the University Office of Risk Management to obtain information security and privacy insurance for the University
- Published University Social Media Guideline
- Published Computer Whole Disk Encryption Guideline
- Developed new and improved spam detection and mitigation capabilities in close collaboration with UW-IT email Engineering and Customer Services staff
- Published online training modules on the following topics: Passwords; Mobile Devices; Social Media at the University; Social Security Numbers

What's Next:

- Building out TierPoint, UW's new, remote data center in Eastern Washington as a pre-requisite to achieving geographic redundancy—setting up the physical and network infrastructure and developing standard operating and remote support procedures before migrating critical infrastructure systems
- Publish a risk assessment tool to help business units assess risks and make calculated decisions about information security and privacy risks
- Publish online training modules on the following topics: Phishing; Records Management, and Security and Privacy 101, 201, and 301
- Update Administrative Policy Statement (APS) 2.4 Information Security and Privacy Roles, Responsibilities, and Definitions and APS 2.5 Information Security and Privacy Incident Management Policy
- Develop a student internship program for information security and privacy communication and education

Appendix B – Supplement to Question 6**Budget Request*****Enhancing Information Security and Privacy*****Objectives**

Increase funding to the Office of the Chief Information Security Officer (CISO) to help address information security and privacy risks, meet the current demands of the University, support future research, and provide consulting services to help UW colleges, school, and departments develop and enhance their information security and privacy strategy.

Strategic Context

The University's mission is dependent on dynamic technologies and an enormous volume of information for academic, research, and administrative purposes. This comes with unique security and privacy challenges, a growing threat spectrum, and compliance responsibilities. The UW Office of the CISO is building and expanding a security and privacy program that delivers trusted, reliable, and effective services for the UW community. This pragmatic risk management-based security and privacy program is key to identifying and reducing inevitable and evolving risks related to the UW.

Key Benefits

- Develop new tools and services to help identify gaps
- Consult with UW colleges, schools, and departments regarding information security and privacy risks and potential impacts
- Provide insight and solutions for addressing information security and privacy issues on UW's network
- Assist units in developing strategies for managing risks
- Support network monitoring for malicious traffic or specific information security and privacy issues
- Develop tools that provide an understanding of risks and potential threats, intelligence for executives and their support staff, and support for new research opportunities

Risks

The University risks a host of potential and obvious liabilities related to information security and privacy. At the heart of the University's risk exposure is its reputation and leadership role in Higher Education and healthcare. "Threat actors"¹ are targeting the UW in order to access cutting-edge research, intellectual property, financial information, or confidential information. The threat actors are highly motivated, have significant resources, and sophisticated methodologies and tools.

At current funding levels, the Office of the CISO remains in a reactive and limited state of capability that only provides minimal services for the UW:

- **Gaps:** UW does not have a comprehensive and clear view of campus systems and data that cause information security and privacy pain points

¹ "Threat actors" is a term of art in the security field, meant to convey the notion that responding to these threats effectively requires a good understanding of the people behind the threats, and their motivations and incentives.

- **Incident Management:** Incidents are remediated in silos at an individual system or unit level, which makes UW susceptible to repeat incidents for identical data sources on similar or dependent systems
- **Big Data:** Employees are combining and analyzing data sources, and there is a lack of understanding about the information security and privacy implications
- **Mobility:** Traditional control methodologies are too cumbersome for the current landscape, where technology and data are rapidly evolving and becoming more mobile
- **Compliance:** UW does not have a cohesive strategy for addressing 27 different laws that contain information security and privacy regulations. Federal regulators will likely increase requirements for cyber security, data protection, cloud computing, and security of research data

With adequate funding, the Office of the CISO can develop capabilities in threat and risk awareness and predictive analytics that provides context for informed decisions about information security and privacy:

- **Intelligence:** Provide UW and campus units analytics on systems and data that present information security and privacy risks. Campus units have the tools and consulting resources needed to assist them in managing risks and developing strategic plans for information security and privacy
- **Incident Management:** Remediate risks and incidents at the root cause across the institution so repeat incidents are avoided
- **Big Data:** Work with business partners and researchers to understand how they are using data, explore security implications and solutions, and support accessibility
- **Mobility:** Develop a variety of security solutions that are flexible and can be used by campus units to meet a large variety of needs and uphold a due care position with regulators.
- **Compliance:** Prepare UW for new regulatory requirements and provide researchers with tools to evaluate, address, and properly account for security requirements in grant/contract proposals

Budget Request

Option A – Fund the Office of the CISO budget to provide a comprehensive program to help address information security and privacy risks, meet the current demands of the University, support future research, and provide consulting services to help UW colleges, school, and departments either develop or enhance their information security and privacy strategy.

Description		Fiscal Year Expense
Salaries, wages, and benefits for 5 FTE	Develop new tools and services to help identify gaps; consult with UW colleges, schools, and departments on information security and privacy risks and potential impacts; provide insight and solutions for addressing information security and privacy issues on UW’s network; and assist units.	\$596,300
Training	Minimal training for Office of the CISO staff.	\$5,000
Equipment	Support monitoring network for specific information security and privacy issues, development of new virtualization and reporting tools that provide situational awareness and intelligence for executives and their support staff, and support of new research opportunities for the campuses.	\$415,000
Total		\$1,016,300

Option B – Fund the Office of the CISO budget to maintain a minimum due care approach for information security and privacy, and produce self-assessment tools and services for UW colleges, school, and departments.

Description		Fiscal Year Expense
Salaries, wages, and benefits for 4 FTE	Develop a minimum set of resources that can be utilized by UW colleges, schools, and departments to develop their own strategies for addressing information security and privacy risks and threats.	\$469,000
Equipment	Minimal equipment necessary for staff to perform job duties.	\$25,000
Total		\$494,000

40G Campus Research and Science Network

Objectives

This project will design, implement and support a dedicated 40G Research and Science Network, with 10G bandwidth to 15 research locations, including Hyak (UW high-performance computing cluster) and data storage. By taking advantage of flexible architecture, software defined network protocols, and utilizing high-performance computing/storage clusters, the campus 40G network will then connect to the advanced 100G Pacific Northwest Gigapop and Internet2 fabric.

Strategic Context

The UW is a top-tier research university, with over \$1.5 billion in sponsored research funds. The ability to meet increased demand for network capacity is critical to supporting research and keeping the UW competitive. The following statements speak to the importance of this project in supporting research across the University.

“The advent of a high-speed research network will transform how data is analyzed and enable the Genome Sciences Genomic Resources Center to share this amazing wealth of data with other researchers at UW and throughout the United States.”

- *Robert H. Waterston, Genome Sciences*

“Increased research bandwidth is essential to driving our research forward.”

- *Thomas P. Ackerman, Atmospheric Sciences*

“This project will serve as an exemplar for the interoperability between UW resources and national resources, with the two forming a single, coherent, user-to-platform cyberinfrastructure.”

- *Thomas R. Quinn, Astronomy and Physics*

“The network upgrades described here benefit every element of our workflow. Improved bandwidth between the Science DMZ and external networks will improve our ability to download large data sets for analysis on Hyak as well as share the data produced locally.”

- *Martin Savage, Physics*

“To keep the University of Washington among the nation's leading research-intensive universities—to enable the cutting-edge discovery, learning, and engagement that define us—the single most important thing that UW-IT can do is to keep UW at the leading edge of R&E (research and education) networking...It's essential, now, that we move forward with the proposed upgrade of the campus backbone network and our connectivity to the Pacific Northwest Gigapop. Major projects such as the Ocean Observatories Initiative depend on it. But so do a broad range of data-driven research and education initiatives across the campus. The demand for networking, and the nature of networking, are changing rapidly. UW needs to keep pace.”

- *Edward Lazowska, Computer Science & Engineering*

Key Benefits

- Allow greater response to NSF, NIH, DOE and other federal grant requirements, creating a competitive edge when applying for grants
- Dramatically enhance the capabilities for a broad range of science programs involving faculty, postdoctoral fellows, research scientists, and graduate and undergraduate students
- Increase accessibility to key UW facilities and data for the research and science community regionally, nationally, and internationally
- Replace ad hoc approaches with sustainable, dedicated solutions that better meet the requirements of the research community
- Remove the barrier to entry for data-driven discovery for the entire campus community

Risks

Not funding this effort might have any or all of the following serious negative impacts:

- Current network will not scale to “Big Data” research needs
- Intensive research activities in the network will disrupt other network traffic
- Important research grants will not be awarded due to the limits of infrastructure
- Ongoing loss of important research grants will jeopardize Tier 1 research institution status
- Ability to recruit and retain top research talent will be limited

Budget Request

Leveraging current NSF grants, UW-IT is requesting additional funding of \$1,400,000 beginning in fiscal year 2014 (FY 2014) to implement a phased approach to implementing a 40G campus Research and Science Network.

FY 2013 and FY 2014

UW received two NSF grants totaling \$800,000 for FY 2013 and 2014. Out of this, \$350,000 will be used to purchase the dedicated research routers at the UW Tower and 4545 Building data centers that will connect the 40G campus network to the 100G R&E networks.

Phase 1 – FY 2014

\$1,861,886

- Network backbone upgraded to 40G at the six campus aggregation routers
- Dedicated eScience/Research routers established at Tower and 4545 data centers connected at 100G to national high-speed R&E networks and to campus at 40G
- 100G L2 network installed and activated between Tower and 4545 data centers, interfacing with HYAK, storage and research equipment
- Dedicated 10G capacity established to 15 research locations, specific labs, or aggregated buildings

Phase 2 – FY 2015

\$953,858

- 40G backbone upgraded to remaining four campus aggregation routers
- 40G backbone upgraded to two campus border routers

Description	Phase 1 FY 2014	Phase 2 FY 2015	Total
Capital Expense: Chassis and 40G Interface Boards	\$1,786,480	\$926,200	\$2,713,040
Operation Exp. Maintenance	\$75,406	\$28,998	\$104,404
Total	\$1,861,886	\$953,858	\$2,817,444

All labor provided by current staff in network and data systems.

Funding Requested via the Technology Recharge Fee – FY 2014 & FY 2015

\$1,400,000 yr

Funds in FY 2016 and beyond will be used for equipment replacement, ongoing maintenance, and further expansion of the network to support research and science.

Cyber-Infrastructure Support

Objectives

Develop additional services to address un-met demand for expertise and infrastructure in support of UW research computing.

Consulting – Provide subsidized, fee-for-service assistance in the tools and techniques of scalable computing, including domain-specific application selection, workflow optimization, code tuning, and data management. This consulting would address the broad range of large-scale computational challenges confronted by UW scholars today, enabling not only established High-Performance Computing (HPC) users, but also enlarging the cohort of UW researchers prepared to apply computational resources to their research. This consulting would complement, and be offered in partnership with, services provided by the eScience Institute.

Storage – Provide lower cost, enterprise-class storage for research data by changing the lolo storage cost model to be on-par with “departmental” storage options. The lolo storage system includes separate services for data archiving and data sharing. Both are designed to scale in capacity and performance as an enterprise resource. Both are also situated in a campus Science DMZ, which makes the data available for access by large-scale CPU resources (e.g., Hyak) via high performance networks (on and off campus). By reconfiguring the lolo service to use a condo pricing model, researchers would pay lower storage costs overall, while protecting against the data security risks and loss associated with lower-cost, non-enterprise class storage options.

Collaboration – Offer partnership opportunities and easy access to services and communities to improve research computing. By joining consortia such as Coalition for Academic Scientific Computation (CASC), Open Science Grid, and Xsede, the UW will enhance its ability to anticipate and adapt solutions for new use cases and new technologies. UW researchers will also have easier access to new HPC options and services through: 1) the addition of a Web site specifically for Scalable Scientific Computing and 2) an update to the UW-IT service catalog to provide a portfolio view of services available to researchers.

Strategic Context

UW is a top-tier research university, yet we provide minimal central IT support for researchers despite the increasingly IT-intensive nature of research. During a September 2012 meeting of research-focused universities at Clemson, the ten participating universities (including Harvard, ASU, USC, Wisconsin, and Stanford) compared FTEs devoted to high-performance computing support for research. The UW is on the low-end when compared with these peers.

Going back to at least 2005, researchers on campus have emphasized the need for access to Cyber-Infrastructure resources, including scalable CPU, storage and networking, as well as access to the expertise necessary to exploit these resources. This was a key point in the 2009 in-depth “Conversations with the University of Washington’s Researcher Leaders” report. The Hyak Governance Board recently reviewed the motivation and goals articulated in the formation of the eScience Institute and identified the same list. UW has an opportunity to build on the foundation laid by the first three years of success with Hyak and lolo by making the investments detailed here.

Key Benefits

- Improve the effectiveness and efficiency of UW researchers as their work becomes more IT-intensive
- Increase competitiveness of UW researcher proposals and faculty recruitment
- Enable the “long tail” of UW faculty and researchers to also make use of HPC resources
- Establish additional centrally available skills to provide quality assistance to researchers in choosing among complex and rapidly changing technology options, and promote collaboration and sharing of services and knowledge throughout the organization and beyond
- Replicate the existing Hyak HPC computing model for storage in order to promote shared and standardized services
- Enable research data to be easily shared and processed over our highest speed networks

Risks

Not funding this proposal, could result in the following:

- UW spends more money overall than necessary as departments duplicate costly storage options
- Researchers use less secure storage, putting their data at risk of loss or compromise
- Research grant proposals are less competitive due to lack of adequate cyber infrastructure and support, thereby placing the University’s status as a top research university at risk

Budget Request

UW-IT is requesting additional funding of \$280,000 per year to develop a new service area for support of Cyber-Infrastructure:

- **Consulting** - Provide consulting resources to help with high-performance computing selection, workflow optimization, code management, and system operation. The 1.0 FTE to be hired would ideally be hired as two half-time positions – one senior and one junior – to maximize flexibility while controlling costs. This service will be offered for-fee, but at subsidized rates (i.e., not full cost recovery) to be competitive to graduate student labor costs
- **Storage** – Subsidize lolo data services to provide a storage cost model on-par with “departmental” storage options. Reconfigure this enterprise-class service to use the same condo model as is used with Hyak and cover its fixed infrastructure costs
- **Collaboration** – Pay dues to join Coalition for Academic Scientific Computation (CASC). An improved Web presence and participation in other consortia (e.g., Open Science Grid, and Xsede) are already funded by UW-IT

Budget Request:

Description	Total
Consulting – 1 FTE (½ senior, ½ junior) Sal/Ben	\$170,000
Storage – Subsidy of lolo data services by covering infrastructure costs of the service	\$100,000
Collaboration – Fees to join CASC	\$10,000
Total	\$280,000