Office of Information Technology

The SW Office of Information Technology provides statewide IT services that support the core mission of all of the University of Alaska’s campuses, not simply the Statewide offices. OIT provides and maintains the University’s wide area network that connects all campuses to each other, the lower 48 and the Internet to support teaching, learning and research.

OIT provides and maintains the hardware and software for the University of Alaska’s systemwide HR, Finance and Student information systems used by all campuses as well as all system back-ups and disaster recovery. This includes support of systemwide programs that exchange information to and from that main system such as Degreeworks, degree audit and planning tool, OnBase, system-wide document and record retention software, OneCard system that supports all campus student and staff Id and access cards to name a few.

The SW OIT also provides and maintains the system-wide, videoconference network which contributes not only to teaching and learning, but to reduction in academic and administrative travel for meetings and committee work across the UA system.

The SW OIT also provides and maintains the Butrovich Data Center which serves as a central data center for all UA system-wide computing services, the Arctic Region Supercomputing Center, the Alaska Volcano Observatory, Alaska Earthquake Information Center and the Alaska Satellite facility. This data center is maintained 24 x7 as it is responsible for the life safety alert notification systems contained therein.

A vast majority of the expenditures within the Statewide Office of Information Technology are dedicated to providing infrastructure and services directly or indirectly to the campuses and are not discretionary.

1. What are the primary functions of your unit/departments as it supports UA’s mission and strategic goals? Please provide a high-level summary and functional organization chart (example and templates attached).

See attached Template.

Broad areas:

Policy, Regulation, Oversight, Compliance and Security
Enterprise Systems management
System wide Networking and management
System wide Videoconferencing
Data center operations, management,
Server and database administration
Customer support, helpdesk, computer repair and troubleshooting
Business operations, procurement and contract management
2. Explain any significant changes in your unrestricted operating budget and/or staffing levels from FY11 to FY15.

(See Attached from Debbie Carlson and Attached Venn Diagram indicating Budgets and functions.)

3. Identify and briefly explain any University Regulations, Regent’s Policies, Federal or State regulations or laws, or accreditation standards which define/direct each major function's existence.

Regent’s Policy 02.02.070 establishes the position and responsibility of the Chief Information Officer. Duties under this policy and 02.07.xx Information Resources guides the functional organization of OIT.

4. What could your department stop doing? Describe the expected impact on: (a) the university (b) other university departments, (c) students, (d) stakeholders such as the State of Alaska and (e) the Alaska communities if this function is reduced or phased out.

I am not sure the consumers of our services would allow anything to be stopped. Since FY10, OIT has downsized personnel and consolidated functions in response to tightening fiscal conditions.

5. How will reducing or phasing out this/these function(s) impact UA’s ability to fulfill its core mission?

6. Describe the specific resources (e.g. personnel FTE, general fund, space, major equipment), including amount(s) that will become available if this/these function(s) is/are phased out. If there is any adverse impact to revenue, please describe.
7. As an alternative to phasing out a function, please describe ways to significantly improve the effectiveness and/or increase the efficiency of each function. What are the benefits and limitations of each alternative?

Services in SW could be significantly improved if the entirety of SW embraced the accountability training provided by Partners in Leadership (the OZ Principle). The overwhelming drive to “downsize” SW has nothing to with size and everything to do with service. Rather than address the individual(s) not taking accountability and providing service, we tear the services apart. In the end, it will cost more and provide a less cohesive function/service than exists today.

a. Are there opportunities for certain functions to continue within Statewide, but in a different format (via consolidation/restructure with another Statewide department, or service reduction)?

OnBase functionality and administration could move to OIT. Shaping AK’s future and assistant could move to marketing. K-12 Programs could be removed from SW and moved to a campus School of Ed.

b. Could a university deliver this or a similar function/service?

The functions that are best suited for moving to a campus are those that are user-facing: training, service desk, desktop support. In the case of SW, those few positions and funding could be moved to UAF.

c. Are there places where expanding or enriching a service makes sense?

Not sure expanding is the word. Consolidation is more like it. There is $18M in central SW IT that really goes to support the entire system. There is an additional $52M or so spread out among the campuses, in some cases duplicating services already in existence. The same exists at the campus level. Approximately $35M exists between the 4 centralized IT units: SW, UAF, UAA, and UAS (although UAS has the best handle on this of all the MAUs). That still leaves an additional $35M in IT spend distributed throughout the campus departments. This is not efficient. Local campus consolidation should take place before decentralization of SW services takes place.
One could also argue that the UACN model in place many years ago, where all IT was one systemwide organization, could also create more efficiencies than campuses trying to run system wide services.
Office of Information Technology Functional Service Areas

OIT Business Office
- Financial Management and Planning
- Recharge Centers
- Human Resources and Event Planning
- Travel and Contract Services
- Procurement and Property

Application Services
- Core Applications
  - Enterprise Applications: HR, Student & Finance
  - Web Design and Development
  - Programming Services
  - Course Management
  - Email & Calendaring

Infrastructure Technology Service
- Data Center Operations
- System Wide Networks, Design, Ops, Support
- Server and Database Administration
- Telephone Services

User Services
- Email, Classrooms & Instructional Technology
- Website Content & Development
- Desktop Support
- Faculty and Staff Training/Development
- Online Textbooks
- Knowledge Management

Technology Oversight Services
- Strategic Planning
- UA Program & OIT Project Management
- Communications
- Monitoring & Compliance
- Security Oversight
- IT Policy
- Identity Management & Access

Office Of the Chief Information Technology Officer

External Relationships
### OIT Administration Labor org FY15 FY11 Variance FY15 FY11

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<thead>
<tr>
<th>Unrestricted Operating Budget</th>
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### Infrastructure Technology Labor org FY15 FY11 Variance FY15 FY11

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### Applications

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**Positions:**

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<td>1</td>
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<tr>
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<td><strong>Application Software (labor)</strong></td>
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### User Services

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**Positions:**

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<td><strong>OIT Support Ctr - Help Desk (lab)</strong></td>
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<td><strong>OIT Desktop Support (labor)</strong></td>
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### Computer Upgrades

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### Technology Oversight

<table>
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</tr>
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**Table Notes:**

- **Unrestricted Operating Budget**
  - **Positions:**
    - **Student Programmer in Pgm Dev**
    - **OIT Enterprise Apps Serv (labor)**
    - **OIT Web Infrastructure (labor)**
    - **Research Info (labor) FY02I**
    - **OIT Apps Services Director (labor)**
    - **Application Software (labor)**
    - **Information Architecture (labor)**
  - **Total Positions:** 21

- **User Services**
  - **Positions:**
    - **OIT Support Center - Training (la)**
    - **OIT Support Ctr - Help Desk (lab)**
    - **OIT Desktop Support (labor)**
  - **Total Positions:** 8

- **Computer Upgrades**
  - **Unrestricted Operating Budget**
  - **Positions:**
    - None

- **Technology Oversight**
  - **Unrestricted Operating Budget**
  - **Positions:**
    - None

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**Table Data:**

- **Unrestricted Operating Budget:**
  - **FY11 to FY15 Variance:**
    - **Applications:**
      - **Unrestricted Operating Budget:**
        - **FY11:** $2,818.8
        - **FY10:** $2,637.6
      - **Positions:**
        - **Student Programmer in Pgm Dev:** 1
        - **OIT Enterprise Apps Serv (labor):** 14
        - **OIT Web Infrastructure (labor):** 2
        - **Research Info (labor) FY02I:** 1
        - **OIT Apps Services Director (labor):** 1
        - **Application Software (labor):** 1
        - **Information Architecture (labor):** 2
        - **Total Positions:** 21
    - **User Services:**
      - **Unrestricted Operating Budget:**
        - **FY11:** $1,025.2
        - **FY10:** $910.2
      - **Positions:**
        - **OIT Support Center - Training (la):** 1
        - **OIT Support Ctr - Help Desk (lab):** 4
        - **OIT Desktop Support (labor):** 3
        - **Total Positions:** 8
    - **Computer Upgrades:**
      - **Unrestricted Operating Budget:**
        - **FY11:** $294.5
        - **FY10:** $294.5
      - **Positions:** None
    - **Technology Oversight:**
      - **Unrestricted Operating Budget:**
      - **Positions:** None
### Unrestricted Operating Budget

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<th></th>
<th>FY11</th>
<th>FY15</th>
<th>Variance</th>
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<td></td>
<td>$</td>
<td>$</td>
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<tr>
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<tr>
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<td>89080 4</td>
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<td>OIT External Relations</td>
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<tr>
<td>OIT Project Office (labor)</td>
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<tr>
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### Recharge

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<tr>
<td>OIT Video Conferencing Recharg</td>
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<td>Total Positions</td>
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### Total Unrestricted Operating Budget

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<th></th>
<th>FY11</th>
<th>FY15</th>
<th>Variance</th>
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</thead>
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<td>Total Unrestricted Operating Budget</td>
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In examining possibilities for outsourcing certain aspects of IT services, we examined currently level of service provided by OIT, availability of outsourcing, current cost and potential savings.

We examined the following services:

- Helpdesk/call center
- Banner Programming
- DataCenter
- Project Management
- Videoconferencing

1. HELPDESK/CALLCENTER

The current Helpdesk service includes telephone support and troubleshooting, walk up support, change management, management of service catalog, and business processing of accounts for activation and termination.

We have two full-time SW employees providing support with an annual salary and benefits total of approximately $175,000. This is down from three in FY14. As a merged organization, we also have three (3) UAF funded employees with a combined salary and benefits of approximately $302,000. This totals $477,000 in salary and benefits for the entire helpdesk/call center service.

The five (5) year average call volume for OIT is ~38,000 requests, with ~27,000 telephone calls. This does not reflect any metrics for after hours calls managed by our 24/7 Data Center staff. For FY14, there were ~41,000 requests logged by the OIT Service Desk. Self service requests were ~1,500k and email ~7,000k. Walk in, account requests, etc... make up the remainder.

Number of service tickets recorded (FY14):

<table>
<thead>
<tr>
<th></th>
<th>statewide</th>
<th>UAF</th>
<th>around the system</th>
<th>Total</th>
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<tr>
<td>Total</td>
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<td>20,000</td>
<td>9,700</td>
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<tr>
<td>First contact</td>
<td>6,800</td>
<td>14,000</td>
<td>6,200</td>
<td>27,000</td>
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<tr>
<td>resolution</td>
<td></td>
<td></td>
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<tr>
<td>Escalated</td>
<td>3,600</td>
<td>6,000</td>
<td>3,500</td>
<td>13,100</td>
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</table>
If helpdesk was outsourced, the following work completed by the OIT Service Desk would need to transition to other teams in OIT, be discontinued, or added to the agreement with an outsourced helpdesk provider, if applicable:

- Support for walk in customers
- Account management processing
- ELMO management support (self-service password tool)
- ITSM involvement (processes and tool)
- New UA student/employee orientations
- Service Level Management responsibility
- Oncall coordination for OIT
- Outage/Activity communication for UA users
- Software contract/licensing management for UAF and UA

- Access to all OIT knowledge management repositories would have to be granted to outsourced vendor staff.

We contacted a national helpdesk provider: Ellucian. Ellucian bases their fees on a cost per call. They offer the same hours we have now 7:30 am to 10:00 pm or a 24/7/365. If we used the 24/7 option, this could replace after hours calls that ring through to the Network Operations Center (Data Center) attendant on night shift. *(Note: that the datacenter is monitored 24/7 as we have critical life-safety systems under our care. Shifting after hours calls would not eliminate the data center attendant position)*

- Ellucian would send their assigned service desk manager for an initial onsite visit, meet with Tier-2 staff, OIT leadership, and appropriate business customers to develop an understanding of the organizational needs and structure. This manager would not be onsite but may visit periodically.

- Weekly meetings would be required between OIT leadership and Ellucian to discuss service desk operations.
• UA would be assigned a service desk team, however this team is also assigned to other higher ed institutions for support. They would assigned the appropriate level of service desk staff to support our volume and be able to adjust of our peak call times.

• Service Desk would be located in Orlando, Florida.

• Ellucian staff would answer the phone "University of Alaska".

• Ellucian, or any remote call center, would not be onsite and could not support walk-in customers.

• Ellucian does not have Tier-2 escalation (TSS) for outsourcing. More research is required to determine options in these areas or Tier-2 would be referred back to on-site UA staff.

• Ellucian uses Service Now to manage “tickets.” Other service providers may use different software ticketing system(s). The options for UA would be to integrate Cherwell (UA helpdesk tracking system) with Service Now or abandon our investment in Cherwell and use Service Now as our interface to the vendor. This would require further discussion with Ellucian as we did not discuss how escalation of requests would work with Tier-2 OIT staff, costs, changes to meet our needs, etc...

• Based on a telephone call volume of 25,000 calls (reflects total FY14 numbers) we would be looking at ~$25k per month or $300,000 per year for a call-only helpdesk service.

COST ANALYSIS

Based on current call volume, SW Office and Systemwide calls account for nearly 50% of all support center calls and we are currently contributing about 25% of the staffing expense. If we look at Statewide Offices calls only, it accounts for about 25% of the call volume. This would indicate that we appear to be right-sized for our current usage and expense.

Looking at the entire call volume for SW and UAF, there appears to be about 65% of the calls that are resolved upon first contact, meaning that the problem can be solved, or was solved, over the telephone without having to visit the person’s workstation, classroom or other location. It is possible that this volume of calls could be outsourced.

Based on a 65% telephone vs. walk-in ratio, the current in-house cost of helpdesk/call center is 65% of $477,000 or $313,000.
OUTSOURCED COST ESTIMATE: $300,000
IN-HOUSE COST: $313,000

With the multi-tasking that the support center staff do, and the other tasks listed about that would have to be reassigned, this does not appear to be a good candidate for outsourcing.

OUTSOURCE RECOMMENDATION: NOT AT THIS TIME

2. BANNER PROGRAMMING
Banner is UA’s ERP (Enterprise Resource Planning) software. Current Banner programming and support happens in three business process areas: Student services, human resources and financial systems. Banner is a highly customizable relational database system and runs all student services (registration, transcripts, financial aid), financial and business processes (budget and accounting, grants) and HR employee information (positions, payscale, payroll benefits). Many of the day to day business processes have been designed to meet the needs of the business customers at each of the three campuses and statewide. As the functional users need modifications to changing processes or changes based on compliance, regulatory changes and mandates or efficiency needs, those requests come to the Banner programming team within OIT.

This team is also responsible for upgrades and testing of the Banner software itself, programming of data extracts for other programs that rely on Banner for data, programming of integrations to other systems such as OnBase, Degreeworks, Adirondak Housing Solution, Blackboard, and so on.

We currently have twelve (14) Banner programmer/analysts, with two of those currently vacant, to cover all those needs. We currently engage five (5) outside vendors/consultants for contracting excess programming work.

Salaries and benefits account for $1,200,000 in Banner support and programming.

Here’s a summary of the rates we’re paying to outsource Banner programming. By their nature some projects require that we rely on Ellucian. Otherwise, we try to arrive at a list of named consultants who we follow no matter who they work for, each adept with a specific software technology and has mastery with the ERP module database schema:

<table>
<thead>
<tr>
<th>Outsource Firm Name</th>
<th>Hourly Rate (hi to lo)</th>
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Banner is currently in the process of modernizing its program. They are on an aggressive timeline for total update by mid 2016. They are accelerating this transformation in order to offer a cloud hosted solution by the end of 2016. Modernization on their new platform has promise for reducing amount of custom programming needed and their hosted offering has the potential to reduce effort needed for performing upgrades and testing. In addition, a cloud offering would have the added benefit of reducing the amount of hardware support and datacenter space.

Certain tasks lend themselves better than others to outsource. General programming needs or larger scale projects work well. Those that are intimately tied to UA business processes are more suited for internal programming due to familiarity with the business process owners.

**OUTSOURCED COST ESTIMATE: ADD'L $80,000**

**IN-HOUSE COSTS: $1.2 M**

Our recommendation is to leave the two programming positions vacant and utilize part of the salary savings to outsource Banner programming tasks and to accelerate our transition to Banner 9. Reevaluate in 2016 for potential to move to the cloud and reduce internal staffing further.

**OUTSOURCE RECOMMENDATION: PARTIAL OUTSOURCE**

### 3. PROJECT MANAGEMENT

The Project Management Office (PMO) was developed to assist in raising the efficiency, performance, and effectiveness of all project delivery within the University of Alaska system. To achieve these goals, the PMO facilitates and develops program management tools to help with business practices and strategies to further each project’s success.

The Project Management Office provides a directional structure that aids in completing projects on time, within budget, and with the expected results. When departments launch new projects, project managers may with work with the PMO to receive project management support, templates, tools, and mentoring on the best practices to utilize for the current project.

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<thead>
<tr>
<th>Company</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ellucian Company, L.P.</td>
<td>$198/hr to $215/hr.</td>
</tr>
<tr>
<td>Global Source IT</td>
<td>$150/hr.</td>
</tr>
<tr>
<td>Oxford Global</td>
<td>$149/hr (normal rate $165/hr.)</td>
</tr>
<tr>
<td>Tech Proven / Ultimate Consulting LLC</td>
<td>$125/hr.</td>
</tr>
<tr>
<td>N2 Services / N2N</td>
<td>$90/hr.</td>
</tr>
</tbody>
</table>
stage. The PMO offers training for project managers and teams to ensure alignment of project goals to strategic objectives.

The project management office is currently staffed with three (3) project managers and one (1) business analyst. These employees

- Add focus to UA projects and objectives
- Improve the strategic visions of project outcomes
- Produce measurable project results
- Increase communication among teams
- Support management decisions

by leading throughout the entire project lifecycle. To clarify the involved process of taking a project from an idea to operational production, we have developed a graphical representation of the “UA System IT Project Lifecycle”. The Lifecycle consists of four phases: Discovery, Initiate & Planning, Execute Monitor & Control, and the Closeout. Being aware of where a project is in the Lifecycle makes appropriate decision making possible. Decision points are laid out in each stage of the Lifecycle and help to keep the project on track and moving forward.

Examples of successful projects include the digital signage initiative, the VoIP telephone upgrade, the HR UAKjobs replacement, non-credit tracking & training software, Risk Management insurance claims project (ORIGAMI) and the Alertus project. Travel and Expense Management (TEM) implementation is an example of a program that did NOT utilize an OIT project manager.

We contacted two project management firms: Project Management Alliance (PMAlliance) and World Wide Technologies (WWT).

Cost Estimates, PMAlliance:
- A potential $12,750 set up fee for the project
- $5,200 for project charter and project kickoff
- $1,600 per day for project management. The number of days depends on the frequency and length of the engagement.
- Travel expenses are not included in this pricing

Cost Estimates, World Wide Technologies:
- $164 to $219 per hour. Note: $200 per hour is in line with PMAlliance’s $1,600 per day rate

If one assume ($1,600 per day) times (45 weeks per year) times (5 days per week) the cost is $360,000 per outsourced project manager full-time equivalent (FTE) per year.

The cost for OIT to provide this service is about $105,000 per project manager FTE based on:
- $100,826 for a Grade 82 Project Manager with benefits
- $3,500 ongoing support (training, refresh computer, other minor expenses)

OIT project managers manage multiple projects at a time. Outsourced estimates were quoted based on a per project, per project manager cost. Four managed projects going on at the same time could cost UA $6,400 per day compared with $1,600 per day for four internal project managers multitasking several more than four projects.

The alternative is to not provide project management services. Unfortunately we have seen what lack of project management delivers: often projects that are not well thought out or implemented, missing components or efficiencies, and lack of consensus in operation.

At the current time the services we offer are more cost effective delivered in-house.

**OUTSOURCED COST ESTIMATE:** $360,000 per FTE project manager  
**IN-HOUSE COST:** $105,000 per FTE project manager

**OUTSOURCE RECOMMENDATION:** NOT AT THIS TIME

### 4. VIDEOCONFERRING

OIT’s Video Conferencing Services group (OIT/VCS), manages the University of Alaska’s system wide video conferencing network, which allows conferencing hardware and software systems to communicate and collaborate using voice, video, and content. Video conferencing is used for instruction, thesis defenses, e-learning, interviews, academic and administrative meetings, delivering alternative expertise, and collaboration with other institutions. OIT/VCS bridges conferences with health organizations, state and federal governments, K-12 institutions, universities and other video sites around the world.

Video Conferencing Services is a recharge department, with costs being funded by the three Universities and Statewide and provides the following services:

- video conferencing scheduling
- conferencing troubleshooting Monday-Friday 7:30am-10pm, Saturday and Sunday during scheduled conferences
- 24hr on call assistance
- H.323 Video conferencing, Webstreaming, Video Recording, Desktop Conferencing
- Room consultation, design, installation and validation
- installation, support, configuration, upgrade and maintenance of back end videoconferencing equipment: Bridges, gatekeepers, codecs, streaming servers

FY14 Video Statistics
- In FY14, VCS supported over 16,000 hours of video conferencing
- 22 Video Conferencing Room Builds/Room refresh
  - 11 new room builds
    - 5 small conference rooms
    - 7 large classrooms
  - 11 Room refreshes

Total FY14 Budget For Video Conferencing Services for infrastructure and labor costs = $897,971.00

We contacted two outsourcing vendors that provide videoconference services: GCI and Chariot Group. The options explored to outsource existing levels of service provided by UA VCS were divide by function: video conferencing and room design and builds

GCI provides conference scheduling, support, and infrastructure
The Chariot Group provides room consultation, design, installation and validation services.

GCI
The table below outlines the costs of service if GCI were to offer the same support and infrastructure services currently provided by OIT.

<table>
<thead>
<tr>
<th>Video Conferencing Infrastructure</th>
<th>QTY</th>
<th>Cost ea/mo</th>
<th>Extended Monthly Cost (GCI)</th>
<th>Yearly cost (GCI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge ports*</td>
<td>160</td>
<td>$450</td>
<td>$72,000</td>
<td>$864,000</td>
</tr>
<tr>
<td>Recording ports</td>
<td>30</td>
<td>$25</td>
<td>$750</td>
<td>$9,000</td>
</tr>
<tr>
<td>Live stream ports</td>
<td>2</td>
<td>Does not exist</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Endpoint Prescheduling</td>
<td>270</td>
<td>$25</td>
<td>$6,750</td>
<td>$81,000</td>
</tr>
<tr>
<td>Endpoint Maintenance</td>
<td>273</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Chariot Group
The Chariot Group in Anchorage was contacted for cost estimates on future room consultation, design, installation and validation.

Jeff Schutt, Integrated Solutions Manager for the Chariot group estimates videoconference room builds at about **$23,000 per room.** They would provide final design, installation and programming services. They would provide final AV line diagrams and wall elevations noting locations of displays and electrical requirements. The scope of work would also include full Extron system programming. This price estimate includes installation but it does not include travel for two technicians nor does it include the cost of equipment.

In FY14, OIT completed 22 room builds. This would have cost **$506,000** if outsourced. This is strictly labor, design and programming services this does not include the cost of equipment. Individual schools, colleges and departments typically pay for the cost of equipment.

This does not take into consideration how the vendor and UAF/UAA/UAS facilities work would be coordinated. Currently design, build and validation services provided by OIT are not billed out separately, but are covered by the existing usage recharge revenues and delivered as part of the integrated services.

**OUTSOURCED COST ESTIMATE: $1,460,000** (Videoconferencing management $954,000/yr; room design, installation and programming services ~$500,000/yr)

**IN-HOUSE COST: $897,000**

<table>
<thead>
<tr>
<th>Support</th>
<th>VCS</th>
<th>GCI</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Phone Support</td>
<td>7:30am-10p mMon-Sat 12pm-10pm Sun</td>
<td>10am-5pm all Week</td>
<td>$954,000</td>
</tr>
</tbody>
</table>
Currently VCS staff perform infrastructure installation, upgrades and support, conference scheduling, monitoring and endpoints, and room consultation, design services and installations.

**OUTSOURCE RECOMMENDATION: NOT AT THIS TIME**

**5. DATACENTER**

The Butrovich Computing Facility (BCF), or Data Center, is mission critical to the University of Alaska System and University of Alaska Fairbanks. In addition to the core of IT functions, such as networking, Enterprise student, HR and finance systems, academic and research computing systems, several critical, life-safety, public response systems are supported: Alaska Volcano Observatory, Alaska Earthquake Information Center and Arctic Region Supercomputing Center.

Given the criticality of systems within the center, 24/7/365 data center monitoring is provided.

The center has approximately 12,000 sq-ft of raised floor space and is operating at about 75% of capacity.

In examining the potential to outsource, we utilized Amazon Web Services (AWS) as our choice for cloud services provider.

We estimated the number of on-premise servers and amount of storage that we could consider replacing with a cloud offering such as AWS. There are many variables in the out-sourcing cost calculation equation some of which are not so easy to estimate such as data egress fees (the rates are different as you move data in and out vs simply storing it).

AWS server instances are available to purchase via 3 different billing options:

1. On-demand:
   - pay by the hour with no commitment (highest price and no guarantee that you can start all the servers, processing and memory you want/need)

2. Reserved:
   - significantly cheaper than on-demand but requires an up front investment (servers, processing, etc. will always be available to run)
3. Spot:

- cheapest, but servers will be shut down by AWS if the spot prices exceeds the customer's max price, as in **shutdown** with no warning or advance notice

More detail can be found here:


It's clear that we don't want to utilize Spot pricing as UA Systems need to be operational. An analysis of Options 1 & 2 follows.

**Scenario #1 On-demand instances:**

- year 1 monthly: $81K yearly: $972K
- year 2 monthly: $81K yearly: $972K
- year 3 monthly: $81K yearly: $972K

3-year total $2.9M

**Scenario #2A Reserved instances, 1 year partial payment up front:**

- year 1 one time: $222K
- year 1 monthly: $44K yearly: $528K
- year 2 monthly: $44K yearly: $528K
- year 3 monthly: $44K yearly: $528K

3-year total $1.8M

**Scenario #2B Reserved instances, 3 year partial payment up front:**

- year 1 one time: $338K
- year 1 monthly: $42K yearly: $504K
- year 2 monthly: $42K yearly: $504K
- year 3 monthly: $42K yearly: $504K

3-year total $1.8M

**Scenario #2C Reserved instances, 3 year all up front payment:**

- year 1 one time: $950K
- year 1 monthly: $22K yearly: $264K
- year 2 monthly: $22K yearly: $264K
Comparing the totals above to what we’re currently paying for Butrovich Computing Facility (BCF) electricity is an interesting exercise. Although, according to the datacenter manager, almost half (49%) of the electricity consumed by the BCF is powering ARSC equipment and another 10% powers ASF equipment. The #’s plugged in to the AWS monthly calculator do not take non-OIT equipment into consideration.

I estimate that OIT Tech Services alone has spent ~$1M/year over the course of the last 7 years to purchase, upgrade or replace:

- Servers
- Storage
- Licenses (to run proprietary software such as HPUX, Solaris, VMWare etc)
- Support
- Annual maintenance
- etc

We arrived at the number by adding up all the costs of all the applicable purchases that took place between 2007 - 2014. That figure does not take into account the purchases made by the former Windows System Administration department and/or servers/storage purchased by other OIT departments. I would estimate that between 2000 - 2007 tech Services spent $4M on servers, storage, licensing, support etc. That’s a rough estimate based on the fact that we paid $3M for the Toklat cluster and associated storage and tape devices etc. That was purchased in 2003 and deployed in 2004.

The following numbers were fed in to the AWS simple monthly calculator (http://calculator.s3.amazonaws.com/index.html) to come up with the scenario estimates above. The server numbers below were arrived at using an "aggressive spring cleaning" mentality, meaning that if we were to move to the cloud we would perform a serious evaluation of exactly what we would need moving forward and throw out the rest. An example of this was that each application would have only 1 non-production environment associated with its production environment instead of 2, 3 or 4 that may exist today in the data center.

- 50 production Linux servers of size m3.xlarge with 100% monthly utilization
- 30 production Linux servers of size m1.xlarge with 100% monthly utilization
- 25 production Linux servers of size m3.xlarge with 80% monthly utilization
- 20 production Linux servers of size m1.xlarge with 80% monthly utilization
- 100 non-production Linux servers of size m1.medium with 15% monthly utilization
- 50 production Windows servers of size m3.xlarge with 100% monthly utilization
30 production Windows servers of size m1.xlarge with 100% monthly utilization
25 production Windows servers of size m3.xlarge with 80% monthly utilization
20 production Windows servers of size m1.xlarge with 80% monthly utilization
100 non-production Windows servers of size m1.medium with 15% monthly utilization

100 500Gb general purpose solid state storage volumes for misc use
1 1Tb general purpose solid state storage volume for Blackboard-Learn content

25 IP addresses in addition to the IP address that is assigned to each server instance
(for load balancing etc)

15 Tb/month data transfer out (i.e. data egress)
50 Load balancers processing 5Tb of data/month

1 on-demand Oracle instance of size db.m1.small with 10% monthly utilization (Banner - NWSD)

1 reserved Oracle instance of size db.m1.small with 33% monthly utilization (Banner - TEST)

1 reserved Oracle instance of size db.m3.xlarge with 33% monthly utilization (Banner - LRGP)

1 reserved Oracle instance of size db.m3.2xlarge with 100% monthly utilization (Banner - PROD)

The actual simple monthly calculator for “Scenario #2A Reserved instances, 1 year partial payment up front” can be seen here:

http://calculator.s3.amazonaws.com/index.html#r=PDX&key=calc-37EDD31D-B393-4A43-A5CE-1BFC2160B644

Scenario #2 is estimated to cost about $28,000/mo.

OUTSOURCED ESTIMATED COST:$600,000 per year
IN-HOUSE COSTS: $1,700,000 per year

I believe moving our infrastructure to the cloud has the greatest potential for cost savings, workload reductions and electrical cost avoidance of all the options explored. While staffing will still be required to install maintain systems in the cloud, the potential exists to dramatically reduce the never ending hardware refresh cycle and reduce the large number of preproduction and backup systems we have in place.
OUTSOURCE RECOMMENDATION: AGGRESSIVELY EXPLORE in FY16