Administrative Excellence
Data Center Aggregation Implementation Team

Status Update for Administrative Council - September 26, 2013
Goal Statement

Develop a new model of server and data center structure to serve the needs of the University’s academic, research, and administrative communities, leveraging industry-leading practices for server administration, virtualization, and management to save costs, improve service levels, and minimize data security risks.
## Projected Future State – Drafted by Phase II Team

<table>
<thead>
<tr>
<th>Current State</th>
<th>Future State</th>
</tr>
</thead>
<tbody>
<tr>
<td>97+ data center/server room facilities with varying degrees of energy efficiency, security, and performance</td>
<td>Limited number of high-efficiency data centers, held to minimum security and performance standards to be defined</td>
</tr>
<tr>
<td>Units/departments/end users are responsible for picking the best product, whether hardware or software, and obtaining value</td>
<td>Centralized purchasing of servers, software, and related equipment will ensure best practices/prices</td>
</tr>
<tr>
<td>Service level is dependent upon level of expertise and resources at the unit/department level</td>
<td>A consistent level of service is provided to all departments that is easy to use and flexible</td>
</tr>
<tr>
<td>Private service provider options are either ignored or considered on an ad-hoc, sporadic basis</td>
<td>Central service provider will monitor the private market, match solutions with needs, and support the negotiation of contracts</td>
</tr>
<tr>
<td>Some departments don’t have the resources to effectively take advantage of virtualization technology</td>
<td>Virtualization will be a core service of the proposed organization; tools and process support will be provided to all units/departments at the best price to campus</td>
</tr>
<tr>
<td>Minimal collaboration between campus units/departments on data center best practices</td>
<td>Central service provider will provide a vehicle for collaboration and engagement across campus</td>
</tr>
</tbody>
</table>
The vast majority of data centers do not meet recommended minimum standards.

Some service providers are eager to have at least some of their needs met by a central service.

Cost and funding options will be the key motivation for campus participation.

Much of campus is already engaged in virtualization (roughly 60%).

Anticipated growth, particularly in research, will quickly exceed campus capacity.

Internal and external audits have identified the need for increased geographical diversity.
• Establish a campus-level data center services unit

• Extend DoIT’s Data Center Operations team to be a campus resource

• Align with Campus Governance & CIO reporting structure

• The new campus-level data center services unit should follow a multi-year approach to incrementally drive aggregation

• Develop a funding and staffing model that supports the services unit and provides campus with financial incentives to participate
Assessment of the Data Center Landscape

Established four categories to structure how we think about the facilities landscape

**Potential Campus Aggregation Facility**
- **Sample Criteria:**
  - Meet, or nearly meet, the recommended minimum standards
  - Campus supported
- **Examples:**
  - Dayton
  - Medical School

**Campus “Dedicated Use”**
- **Sample Criteria:**
  - Built for a specific purpose
  - Unique application or output
  - Self-funded
- **Examples:**
  - Space Science
  - WID
  - Ice Cube
  - Etc...

**On-Your-Own**
- **Sample Criteria:**
  - Serves local specific need but does not scale to larger campus use
  - Does not meet campus minimum standards

**Decommission Over Time**
- **Sample Criteria:**
  - Use city water
  - Not dedicated use space
  - Environmentally risky
  - Significant data risks
Both units have direct linkages to the Enterprise IT Decision Making structure and the CIO office.
Data centers not designated “Potential Campus Aggregation Facilities” continue to operate as-is.
Though the foundation of this structure already exists, we recommend adjustments to existing reporting lines and the transition / reallocation of staff to fill specific gaps.
The Campus-Level Data Center Services Unit Will Provide:

**Core Infrastructure:**
- Facility
- Power (Street)
- Generator
- UPS
- A-side/B-side distribution of power
- HVAC / CRAC’s
- Fire Suppression
- Physical Security (Cameras, Door access pads…)
- Environmental monitoring & alerting
- KVM’s
- Rack
- Asset Inventory

**Core Services:**
- (Working down from most basic then building out the core service layer)
- Networking
- Firewall
- Switches
- Network devices
- Compute (Virtual Server pools: Windows, Solaris, AIX, Linux…)
- Storage
- Backup / Restore
- Archive
- Databases (Oracle, SQL, MySQL…)
- Repositories
- Service Monitoring
- COOP / Redundancy & Failover
- DR (Disaster Recovery)
Campus Data Center Services Unit: Customer Engagement Process

Customer engagement process

Campus partner request

Discussion
Customer contacts campus data center service team to begin discussion

Services Review
Data center services representative discusses customers business requirements

Facilities Review
Campus Data Center representative reviews potential options

Decision point
Customer chooses a Data Center option that meets their business requirements

Implementation
Data center services representative facilitates customer fulfillment.

Continuous discussion to identify customers requirements

Elicit business and application requirements

Elicit Data Center Service requirements

Service Level Assessment
<table>
<thead>
<tr>
<th>Service Attribute</th>
<th>Customer Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>Business hours 6am-6pm</td>
</tr>
<tr>
<td>Physical access</td>
<td>Limited access required</td>
</tr>
<tr>
<td>Data management</td>
<td>Customer will provide storage array</td>
</tr>
<tr>
<td>Virtualization</td>
<td>Will want to migrate from physical to virtual</td>
</tr>
<tr>
<td>Etc...</td>
<td>Enumerated customer needs</td>
</tr>
</tbody>
</table>

Customer Data Assessment
<table>
<thead>
<tr>
<th>Data Attributes</th>
<th>Customer needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archive and compliance</td>
<td>Redundant backups</td>
</tr>
<tr>
<td>Access and security</td>
<td>Annual audits</td>
</tr>
<tr>
<td>Assurance</td>
<td>Card with PIN and video on door</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Card with PIN and video on door</td>
</tr>
<tr>
<td>University risk</td>
<td>1 in 18 data sets contain confidential student info</td>
</tr>
</tbody>
</table>

Matrix for establishing "best match" for customers needs (Examples...)

<table>
<thead>
<tr>
<th>Potential Availability</th>
<th>Customer Needs</th>
<th>Base Facility offering</th>
<th>Research Oriented</th>
<th>Enterprise level (With or without PDFM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Chemistry</td>
<td>Education</td>
<td>Additional sites</td>
</tr>
<tr>
<td>Fixtures</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Security</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Longevity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Business hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/7 Security</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Etc...</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Last Updated 8-16-2013 (RCG)
The Steering Committee Charged the Team with Developing a Standard Data Center Cost Model:

- Serves as an easy-to-understand foundation for a fully-burdened cost model, applicable to any data center on campus
- Captures costs to individual campus units as well as those typically paid at the University level (e.g. power and cooling utilities)
- Help the Central Service determine various costs, at a line level of detail, associated with upgrading an existing data center to meet the recommended minimum specifications
- Provides the Central Service with a tool with which to evaluate the relative efficiency of campus data centers
- Enables the project team to identify and test incentive and disincentive alternatives to determine their relative impact on both the Central Service, and move forward with Central Service budget modeling

Individual unit costs and costs paid by the University are captured
Three Specific Cost Assessments Relevant to Implementation:

**Current Costs**
- Applicable to all data centers
- Breaks out one-time and ongoing costs
- Includes utilities, power & cooling

**Transition Costs**
Costs associated with a transition to a central campus data center, colocation facility, or third-party solution

**Upgrade Costs**
Costs associated with upgrading a current facility to meet minimum recommended attribute standards

Individual unit costs *and* costs paid by the University are captured
Proposed Financial Incentives to Drive Adoption Over Time

- On October 4th, the team will share a proposed set of financial incentives with the Steering Committee.

- Their purpose is to make utilizing the Central Service a very attractive option to campus units, incrementally driving data center aggregation over time.

- The proposed incentives impact three stakeholder groups:
  - Central Service unit: budget and staff support
  - Campus-level data centers: infrastructure support
  - Campus units: subsidies to bring central service pricing below market

- Representatives from the Budget Office, Business Services, DoIT Financial Services, campus unit data centers, and team members are currently discussing the mechanics of the team’s proposal.

Customers indicate that the price of services is their primary decision factor.
The primary objective of year one is to establish and promote a set of attractive core service offerings, supported by financial incentives, that will incrementally drive data center aggregation.
Questions and Comments

For more information, please visit the project website at:
https://datacenterservices.wisc.edu

Email your questions and comments to the team:
ae-dca-governance@lists.wisc.edu