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

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

• 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
DCA Implementation Team: Recommendations

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

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

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

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

- **Decommission Over Time**
  - **Criteria:**
    - Use city water
    - Not dedicated use space
    - Environmentally risky
Campus Data Center Services Unit – Structure

Office of the CIO

Campus-Level Data Center Services Unit

Campus Data Center Operations (Facilities)

- Central Campus Data Center Services Unit: Focuses on leadership & service delivery
- Campus Data Center Operations: Focuses on operation of on-campus physical facilities and integration with third-party providers

- Data centers not designated “Potential Campus Aggregation Facilities” will 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
Campus Data Center Services Unit: Customer Engagement Process

Service Level Assessment to elicit business and application requirements

Customer contacts campus data center service team to begin discussion on solutions or opportunities

Data center services representative conducts needs assessment and discusses customers business requirements

Campus Data Center representative reviews options with customer until solution is found

Customer decides on a Data Center option that matches their needs and budget

Data center services representative facilitates customer fulfillment.

Iterative process to refine options based on needs

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 need</td>
</tr>
</tbody>
</table>

Customer Data Assessment to elicit Data Center Service requirements

Data Attributes

- Archival and compliance
- Access and security audits
- Access security
- University risk

Customer needs

- Redundant backups
- Annual audits
- Card with PIN and Video on doors
- 1 in 18 datasets contain confidential student information

Matrix for establishing "best match" for customer needs

<table>
<thead>
<tr>
<th>Potential Attributes</th>
<th>Customer Needs</th>
<th>Base facility offering</th>
<th>Research oriented</th>
<th>Enterprise wide (Will or won't PDM?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access &amp; Security</td>
<td>Annual</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Card + PIN</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Business hours</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>24x7x365</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Monitoring</td>
<td>24 hour</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Environmental Controls</td>
<td>Variable</td>
<td>?</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Etc...</td>
<td>As defined</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Last Updated 8-13-2013 (BCG)
Campus Data Center Services Unit

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, Linus…)
- Storage
- Backup / Restore
- Archive
- Databases (Oracle, SQL, MySQL…)
- Repositories
- Service Monitoring
- COOP / Redundancy & Failover
- DR (Disaster Recovery)
Roadmap for Campus-Level Data Center Services Unit – Year 1

**Form the Campus-Level Unit**
- Fund and staff the unit (full time, adjunct appointments)
- Operationalize financial incentives
- Assess a small handful of existing data centers in detail

**Develop Campus-Level Data Center Operations**
- Initial centers: Dayton & Medical School / MFCB
- Core service offerings available to campus
- Common infrastructure & processes (security, documentation)

**Begin Aggregation**
- Bring in a small number of willing customers

**Process Development**
- Refine operational factors such as funding, new and existing customer on-boarding,
- Continue to build suite of services

Primary objective of Year 1 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