Data Center Strategic Planning and Resource Coordination

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Outline

- The Computer Space Problem -- Factors driving the data center issue
- Viewing the data center through the 4 lenses
- Exercise/Lab
- Wrap-up

Why is This Data Center Issue Important?

- Data centers are large, complex, and expensive problems and opportunities (viewpoint)
- Cost of utilities such as power are becoming a significant factor in the university budget
- Opportunity cost of space (significant esp. for an urban/space constrained campus)
- Dollar scale for utilities and space costs can easily range from $10M – $ 75M or more over a 10 year data center lifetime
- Opportunity costs to position the university for new/expanded research opportunities
- Faculty recruitment

The Computer Space Problem
Real Estate Factors

- Proliferation of ever larger computer hardware and peripheral systems on campus (driven by relatively low-cost HPC clusters and server hardware)
- The location and placement of this computer equipment in appropriate campus space has become a thorny issue
- It is now more costly as to where and how to house the equipment rather than the actual costs of the computer hardware and peripheral equipment cost itself
- Deans, academic and administrative departments and lab directors are under increasing pressure to provide multiple prime site campus locations for what are essentially redundant computer machine rooms with similar functionality

Cost Factors
Six Major Cost Categories

1. Building construction/renovation
2. Network/connectivity
3. Capital equipment and IT infrastructure
4. Operating costs
5. Lease or rental costs (if applicable)
6. Power costs

Computer Space Options and Categories

1. Options for location of future data centers
   a) Campus
   b) Commuting distance
   c) Remote location
2. Within the 3 major categories there may theoretically be up to three options
   a) Own
   b) Rent
   c) Lease
3. Regional collaboration with other universities or organizations

Is This All That Is Needed? Why Is Data Center Strategic Planning Still Such A Challenge?

First Step

- Before any data center strategic plan can be proposed one needs to ask --
  - > What are the key strategic planning requirements that must be identified and satisfied -- from whose point of view?
  - > Which resources are critical and should be coordinated can be heavily weighted based on the perspective from where one is viewing the problem

Data Centers Viewed Through The Four Lenses

- Propose that there are 4 distinct lenses or perspectives shaping any strategic plan for data centers
  - > Users
  - > University administration
  - > Funding agencies
  - > University IT organization
- How can one build a workable data center operation and sustainable business model that satisfies all of these constituencies?

The CSG Computer Space Task Force
Whirlwind tour through Data Center Strategic Planning and Resource Coordination

- MIT has been actively engaged in this issue
  (Computer Space Task Force – Sc/Eng faculty, senior IT and admin)
- Fortunately there is a very knowledgeable team with expertise and hands-on experience that has been assembled here in Madison
- For the next hour we are going to create a Common Solutions Group Computer Space Task Force --
  (you are all hereby appointed to the committee)
- In this next hour this group is charged to
  - > View the DC issue through each of the 4 lenses and identify the key strategic planning issues and resources that must be coordinated to select a prioritized location for a future data center
  - > Propose/identify a workable and sustainable model(s) for a future university data center that can be implemented

Users

- What users?
  - > Users from administrative units
  - > Users from academic departments
  - > University researchers
- How do these users view the requirements for a data center from
  - > Technical architecture and network connectivity
    Is the architecture critical? Network access and configurations?
  - > What about the data (security, ownership, responsibilities)
  - > Community (vertical within the university or extended, machine huggers - prototype versus production)
  - > Management (control?, accountability? Does each group rank the management issues in the same order or even agree on what are the management issues? Should researchers pay for use of a data center? Inequitable university support of research infrastructure? Is all of this dependent on the data center location?)

University

- What are the university's requirements and constraints for resources and strategies for data centers?
- The university has a dual role as potential customer for the administrative and academic departments and as a landlord
  - > Technical architecture and network connectivity
  - > Data (university data policies – where does it apply?)
  - > Community (which one?)
  - > Management ("boiling frog" problem)

Funding Agencies

- How do the funding agencies view their role or participation in university data centers?
- Do funding agencies consider themselves as a key component in the strategic planning and resource requirements for data centers?
  - > Technical architecture and network connectivity (supported HW architectures, software, networks, TCO?)
  - > Data (ownership, custodianship, distribution to other research groups)
  - > Community (do university organizational boundaries matter?)
  - > Management (PMP, collaborations, who in the university is accountable?)

University IT Organization

- What strategic planning components must be incorporated into a data center from the university IT organization perspective
  - > Technical architecture and network connectivity

    (supported architectures and infrastructures, what level, SLAs, obligations (if any) to service unsupported architectures and infrastructures?)
  - > Data (who is responsible and accountable)
  - > Community (within the university and extended?)
  - > Management (sustainable facility operations, cost versus price, services offered – what type(s) and to whom?, does it vary based on the selection of the data center location?)

Wrap-up

- Exercise in the complexity of data center strategic planning and resource coordination and the associated high financial stakes and risks
- What emerged as a consensus of critical factors needed in a future data center(s)?
- Common ground?
- Key road blocks
  - > Financial?
  - > Technical?
  - > Organizational?
- Options, creative proposed solutions, prototypes?
- Final thoughts

Last slide