COMMODITIZING THE DATACENTER
Exploring the Impacts of the Shift to Virtualization and Cloud Computing

3/5/2015
AGENDA

- Changing Environments
- What Is The Datacenter
- Why Do We Use Them
- Adapting To A Changing Environment
- Determining The Right Approach
- Questions

CHANGE IS GOOD. You go first!
DATA CENTERS
CHANGING ENVIRONMENTS
CHANGING ENVIRONMENTS

- Datacenters are continuing to grow at an expanding rate.

- The need for computing power and access to data continues to become more vital in our society.
CHANGING ENVIRONMENTS

• Surveys show that innovation and improvements are needed, but the top drivers are not a focus.

• IT Systems have remained consistent for many years.
• Disruptive change is now here in the IT environment.
“The Datacenter” is becoming less critical as datacenters become more critical.

- What serves a business need is not the datacenter, the server, or the network.
- The business need is served by the applications and the output from those applications.
CHANGING ENVIRONMENTS

• IT Platforms are moving away from hardware dependency
  – Multiple pieces of hardware to boost computing power
  – Redundancy via IT hardware to maintain availability
  – Communication protocols removing proximity limits
  – Real time processing and replication across vast distances
CHANGING ENVIRONMENTS

• Removing the Dependency of IT from Hardware
  – More computing power
  – More scalability
  – More consistency
  – More availability
  – More speed
  – More flexibility
Emerging technologies and innovative design concepts are created to meet the needs of the ever changing systems that they are used to support.

These innovations need to be evaluated based on their benefits as well as understanding any risks they may create.
WHY DO WE HAVE THEM?
WHY DO WE HAVE THEM

– A Business need requires computing power and data storage to maintain business operations
– Computers can process information faster than people
– Analyzing data, trends, etc. faster using computers
– Easier to share information between business, colleagues, and customers.
WHY DO WE HAVE THEM

• Computers Can Be Used To:
  – Improve efficiency
  – Manage processes
  – Track transitions
  – Manage Business Growth
  – Increase visibility to vital business KPIs.
  – Provide a service
WHY DO WE HAVE THEM

• How Do We Identify a Datacenter
  – Large purpose constructed facility
  – Grouped computers and storage
  – Generators, UPS, PDUs
  – Air Handlers, CRAHs, Chillers
  – Monitoring and Control
  – Security
  – Minimal Personnel
WHY DO WE HAVE THEM

• What Makes Up a Datacenter
  – Diverse Paths
  – Redundant Communication
  – Fault Tolerance
  – Real Time Monitoring
  – Secured/Limited Access
  – Latest Technology
  – Innovative Designs
WHY DO WE HAVE THEM

• Use the Datacenter to attack the real business need

INCREASE PROFITS
REDUCE RISK
DATA CENTERS

ADAPTING TO CHANGE
CHANGING ENVIRONMENTS

• Change is Happening

• Growth is Continuing

• How Do We Know What to Change?
ADAPTING TO CHANGE

• Managing Change
  – Business Need
  – Impact to Profitability
  – Growth Ability
  – Technology Adaption
  – Market Fluctuations
  – Data Security
  – Data Access

“I want you to find a bold and innovative way to do everything exactly the same way it’s been done for 25 years.”
ADAPTING TO CHANGE

• Location
  – Connectivity latencies decreasing
  – More datacenters for lease bring options
  – Mobile computing shifts computing loads
  – Datacenters employ few staff members
  – Utility Costs
  – Environmental Regulations
  – Land cost and availability
ADAPTING TO CHANGE

• Redundancy
  – Additional Components add cost
  – Where is redundancy best applied
  – Virtualization
  – Mobile connectivity
  – Cost of Downtime/switchover
ADAPTING TO CHANGE

• Client Requirements
  – Short ROI’s
  – Minimal Capital Output
  – Secure
  – Reliable
  – Flexible
  – **Improve Business Efficiency**
  – Expandable
  – Short Design and Construction Time
  – Minimal Operating Expense
DETERMINING THE RIGHT APPROACH
"If you want to make enemies, try to change something."
— Woodrow Wilson
What does it mean?

- Less Dependence on IT Hardware
- Flexible Computing Environment
- Faster Connectivity
- Mobile Computing

“The Datacenter” becomes less critical as Datacenters become more critical.
• Changing How IT Availability is Viewed, Changes How the Infrastructure is Applied.

– Decrease facility cost
– Diversify IT Assets
– Stay Nimble in a Changing Environment
– Evaluate Capital Expenses vs Operating Expenses
– Standardization Drives Quality
– Facilities and IT must work together
– Re-Evaluate Business Drivers
DETERMINING THE RIGHT APPROACH

- Standardizing
  - Repeatable Designs
  - Construction Efficiency
  - Project to Process
  - Technology Adaption
  - Quality Control
DETERMINING THE RIGHT APPROACH

- Redundancy
  - At the Application Level
  - Virtual Computing migrates for load demand and failures
  - Shift Redundancy Down the Chain
  - Simplified Infrastructure
Estimated construction costs are as follows

- **Tier I** data center (99.671% availability—about 28.8 hours of downtime per year): $450 per square foot

- **Tier II** data center (99.749% availability—about 22.0 hours of downtime per year): $700* per square foot

- **Tier III** data center (99.982% availability—about 1.6 hours of downtime per year): $1,000 per square foot

- **Tier IV** data center (99.995% availability—about 0.4 hours of downtime per year): $1,400* per square foot

*Uptime Institute
• Datacenter Cost Break Down
DETERMINING THE RIGHT APPROACH

- Design requires 5,000 servers to meet business needs
- Client wants datacenters on the East and West coasts
  - $2,500 average server cost
  - $350 average networking cost per server
  - 10 servers per rack average
  - Tier 2 design adds 60% footprint to white space*
  - Tier 4 design adds 100% footprint to white space*

*Uptime Institute
DETERMINING THE RIGHT APPROACH

<table>
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<tr>
<th>Tier IV Design</th>
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<tr>
<td>5000 Servers</td>
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<tr>
<td>500 Racks</td>
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<tr>
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<td><strong>Tier II Design</strong></td>
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DETERMINING THE RIGHT APPROACH

East, West, and Central

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<td>$69.9M Total for 3 facilities</td>
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East and West

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<tr>
<td>$73.4M Total for 2 facilities</td>
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- Savings of $3.5M.
- 3 Facilities vs 2
- Redundancy across IT Systems
QUESTIONS AND ANSWERS

“Information is Not Knowledge“

— Albert Einstein