Change in the Air: Economics of Cloud

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Why does scale matter?

- Supply side economies
- Demand side economies
Supply Side Economies of Scale

DATA CENTER PROJECTS (LAST 12 MO.)

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>DC Cost ($M)</th>
<th>DC Size* (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSA (July ‘09)</td>
<td>Camp Williams, UT</td>
<td>$2,000</td>
<td>130</td>
</tr>
<tr>
<td>Apple (May ‘09)</td>
<td>Maiden, NC</td>
<td>$1,000</td>
<td>65</td>
</tr>
<tr>
<td>Social Security Admin (Feb ‘09)</td>
<td>Baltimore, MD</td>
<td>$400</td>
<td>27</td>
</tr>
<tr>
<td>Facebook (Feb ‘10)</td>
<td>Princeville, OR</td>
<td>$215</td>
<td>15</td>
</tr>
<tr>
<td>Internet Villages (July ‘09)</td>
<td>Annandale, Scotland</td>
<td>$1,600</td>
<td>107</td>
</tr>
<tr>
<td>Lockerbie Data Centers (Dec ‘09)</td>
<td>Lockerbie, Scotland</td>
<td>$1,500</td>
<td>100</td>
</tr>
<tr>
<td>Next Generation Data (Mar ‘10)</td>
<td>Wales, UK</td>
<td>$301</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: Company press releases
* Estimates based on $15M/MW build out cost

• Cost of hardware
• Cost of labor
• Cost of power
Demand Side Economies of Scale

Variability: Random Usage Patterns

EXAMPLE LOB APPLICATION SERVER LOAD

CPU Utilization %

15% 17% 19% 21% 23% 25% 27% 29% 31%

12:00 AM 3:00 AM 6:00 AM 9:00 AM 12:00 PM 3:00 PM 6:00 PM 9:00 PM
Demand Side Economies of Scale

Variability: Seasonality

~4x normal load
(Holiday shopping)

Jan 2009

~10x normal load
(Tax season)

Jan 2009

Source: Alexa

Source: Alexa
Demand Side Economies of Scale

Variability: Time of Day

BING SEARCHES – JAPAN VS. UK

Query Volume

12:00 AM  3:00 AM  6:00 AM  9:00 AM  12:00 PM  3:00 PM  6:00 PM  9:00 PM

Japan  Great Britain

Source: Microsoft
Public cloud, private cloud
Public Cloud, Private Cloud

Source: Microsoft
Public Cloud, Private Cloud

Midsize Company Example

Public Cloud Economics

HPC/Batch
Dev/Test
Web
Comm & Collab
File/Servers

Private Cloud Preference

Packaged Biz Apps
Custom Biz Apps

Source: Microsoft
Public Cloud, Private Cloud

Public Cloud

Private Cloud

Virtualized Datacenter

Traditional Datacenter

Department

Corp IT

3rd Party Provider

Windows Azure

SQL Azure

Windows Server

Hyper-V

Windows Server

SQL Server
Takeaways

✓ It’s about scale
✓ Economic forces driving the shift
✓ Pace of uptake increasing
✓ Hybrid clouds in the interim
✓ Consistency matters
We’re all in.