EXECUTIVE REPORT

Scalability & Capacity Planning: Build vs. Buy
Overview

This paper explores issues that arise when planning for growth of Information Technology infrastructure. The paper explains how colocation of data centers can provide scalability, enabling users to modify capacity quickly to meet fluctuating demand.

Managers, directors, technical staff, and others interested in learning about the relative merits of building on-premises data centers vs. leasing space/infrastructure in colocation centers.

Target Audience

In information technology, scalability is defined as having IT costs rise linearly with increases in IT capacity. Infrastructure on demand (the ability to modify data-processing capacity quickly in response to demand) is the ultimate reflection of a scalable data center because it protects against under- or overinvestment in IT infrastructure.

Unfortunately, on-premises data-center modifications take time, so changes must be made with an anticipation of future computational needs so as not to be obsolete upon completion. Predicting future computational capacity requirements is surprisingly difficult—even for a one-to-two year horizon. Further complicating matters is the need during infrastructure modifications to maintain continuity of service, data integrity, privacy, fault tolerance, and transaction monitoring for regulatory compliance.

Three Basic Options for Modernization

In-house data centers are often constrained by physical limitations (square footage, electrical cooling capacity, etc.) and often reach a point at which modernization requires one of three basic choices: building a new facility, retrofitting the existing facility, or contracting with a colocation provider.

Choosing among these options is not simple, because the large number of factors to consider creates a combinatorial explosion of possible approaches. Predicting costs of new construction and retrofits is highly complex by itself. Determining likely downtime (and the costs to the business of the downtime) is similarly fraught with uncertainty. For each possible approach, there are considerations relating to data security, physical security and resilience in the face of power and cooling. Strategic decision-making requires analysis of the operational impacts arising from each approach.
Table 1 - Operational impacts of decision to build, retrofit, or buy data center services

<table>
<thead>
<tr>
<th>ISSUE</th>
<th>BUILD/RETROFIT</th>
<th>COLOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>Fixed</td>
<td>Scalable</td>
</tr>
<tr>
<td>Start-up time</td>
<td>24 to 36 months</td>
<td>On demand</td>
</tr>
<tr>
<td>Data security/reliability</td>
<td>Internal controls</td>
<td>External controls</td>
</tr>
<tr>
<td>Emergency resources</td>
<td>Can be outsourced</td>
<td>Included</td>
</tr>
<tr>
<td>Capital expenditures (typical)</td>
<td>$15K per kw @ 5MW utility load</td>
<td>None</td>
</tr>
<tr>
<td>Operational expenditures</td>
<td>Variable</td>
<td>Set by contract</td>
</tr>
</tbody>
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Pros and Cons – Build/Retrofit vs. Colocation of Data Center Services

Scalable IT infrastructure, whether internal or remotely located, provides the agility required for a business to maintain its competitive edge. Any of these three options (build, retrofit, colocate) can be tailored to meet the needs of a particular enterprise, although Total Cost to Operate (TCO) will vary widely. Options 1 and 2 involve hefty capital expenditures (CAPEX), potential increased operational expenses (OPEX), plus heightened technical risk.

Options 1 and 2 also involve substantial expenditures over time for maintenance and upkeep. Potential benefits include direct control over IT equipment, operations and staffing. Option 3 provides the closest approximation of immediate IT infrastructure on demand. Consensus is building among IT managers and CIOs that this approach offers the best balance of risk vs. reward.
Table 2 - IT Infrastructure: Decision Points

<table>
<thead>
<tr>
<th>OPTION 1</th>
<th>OPTION 2</th>
<th>OPTION 3</th>
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</thead>
<tbody>
<tr>
<td>Build New Data Center</td>
<td>Retrofit Existing Data Center</td>
<td>Colocation</td>
</tr>
<tr>
<td>• Buy or lease hardware?</td>
<td>• Include additional cooling and power capacity?</td>
<td>• Place enterprise-owned or leased hardware in the colocation center?</td>
</tr>
<tr>
<td>• Outsource maintenance of hardware?</td>
<td>• Upgrade existing or buy/lease new hardware?</td>
<td>• Include operation and maintenance in colocation contract or choose other service provider?</td>
</tr>
<tr>
<td>• Develop and support own software or outsource?</td>
<td>• Outsource maintenance of hardware or staff internally?</td>
<td>• Provide and support own software?</td>
</tr>
<tr>
<td>• Develop or buy computational services provided in the cloud (email, web services, etc.)</td>
<td>• Develop and support own software or outsource?</td>
<td>• Include cloud computational services (email, web services, etc) in colocation contract?</td>
</tr>
<tr>
<td></td>
<td>• Develop or buy computational services provided in the cloud (email, web services, etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CAPEX savings</td>
<td></td>
</tr>
</tbody>
</table>

Pros and Cons – Build/Retrofit vs. Colocation of Data Center Services

Data Center Knowledge (DCK) conducts an annual survey to identify key issues and challenges faced by their clients. The list of top seven challenges (Table 3) is drawn from DCK’s August 2011 results, based on more than 200 respondents in a broad range of public and private sector enterprises. Most of these challenges can be expressed in terms of overarching goals of network reliability, cost effectiveness and data security.
Table 3 - Top Seven IT Infrastructure Management Challenges

1. Scalability: Create a flexible, optimized IT infrastructure.
2. Capacity planning: Leverage IT for strategic business outcomes.
3. Data center extensibility: Ensure sufficient space for growth. Avoid risks of under or over building.
4. Implementation of new technologies: Modernize while maintaining data security and reliability.
5. Power & cooling: About 25-50% of data center costs are attributed to power consumption. Achieving optimal power distribution is paramount.
7. Trends: Support emerging trends, including a move to virtualized servers, cloud based systems, web-based interfaces and mobile infrastructure with heterogeneous operating systems.

Looking Toward the Future: Cloud Computing and Colocation

“CyrusOne is the foundation that brings data-center technologies and services together. Whether a customer is placing its own corporate production servers into our facility or having its preferred service provider offer turnkey services in the safety and vendor neutrality of one of our facilities, we are the foundation that protects critical data processing applications. Service providers are building and maintaining cloud environments within our facilities.”

What does this mean to the ecosystem?

Everyone wins. Customers who have used us for the corporate production data center feel more comfortable dipping their toes into cloud-based services hosted here, and getting started is as simple as extending a cross-connect from our facility to a cloud provider. The cloud providers don't have to build the data center to support the cloud, and they tap into an immediate customer base with CyrusOne.”

1Comments by Caroline Brelsford-Caldarera, CyrusOne - 9/08/2011
Summary: Minimize Risk by Choosing Colocation

To build or retrofit a secure, reliable data center requires a long-term commitment and heavy up-front investment. Excess IT capacity ties up valuable capital, while under-investment in IT capacity leads to revenue loss. And because data-center requirements are in constant flux, a right-sized data center will not remain that way for long.

Colocation provides immediate access to a flexible, scalable data center without CAPEX investment. Aligning OPEX with revenues provides the competitive edge that comes from concentrating on the core business and not dealing with constant IT headaches, which include complex and domain-specific challenges like ensuring that data and applications are secure. Colocation provides optimal redundancy, efficiency, security and future-proof reliability with minimal technical risk. In addition, a scalable data center that quickly and precisely meets a company's changing business needs without redundancy is the inherently green solution. Furthermore, peace of mind comes from connecting with customers, partners, and suppliers across a secure, reliable network.

Revenue enhancement, cost avoidance, operational efficiencies and a smooth path to expansion: these are all immediate, concrete and measurable reasons to choose colocation.
About CyrusOne

With over two dozen data centers across the globe, CyrusOne helps many of the world’s largest global businesses – including 9 of the global Fortune 20 companies and over 135 of the Fortune 1000 – and companies of all sizes take advantage of the latest data center technology and realize top operational efficiencies through:

- **Flexible, Scalable Solutions** – Receive flexible data center solutions that readily scale to match the needs of your growing business.

- **Proven, Innovative Technology** – Benefit from the latest data center innovations CyrusOne expert technicians can put to work for your IT environment.

- **Exceptional Service** – Enjoy personalized, consultative service through all stages of the relationship - design, build, installation, management, and reporting.

- **CyrusOne National IX** – Offers low-cost metro connectivity and city-to-city transport in an ever growing number of cities across the US.

About the Author

*Scott Brueggeman* oversees the management of CyrusOne’s global marketing, product development, inside sales, and corporate communications including branding, demand creation, and public relations. His 20 years of marketing and sales experience includes Fortune 50 firms, as well as smaller high-growth companies. Prior to CyrusOne, he spent several years with running marketing at a data center hosting and managed services company, as well as Chief Marketing Officer at PEAK6 Investments, an international financial services firm. Prior to that he was VP Marketing for CareerBuilder, and also held leadership positions at AT&T and PepsiCo. Brueggeman serves on several advisory boards.