The Rapidly Evolving Data Center

Jim Metzler
Ashton, Metzler & Associates
jim@ashtonmetzler.com

In the last IT Impact Brief we described the results of a survey that NetScout and I recently conducted. Those survey results were used in that brief to provide insight into the classes of projects that will have the greatest impact on IT organizations over the next year. This IT Impact Brief will examine in detail two classes of projects that the survey respondents indicated will also have a major impact. Those projects are the consolidation of servers out of branch offices and into centralized data centers, as well as the consolidation of the data centers themselves.

Server Consolidation

Fifty-five percent of the survey respondents indicated that consolidating servers out of branch offices would have an impact on their IT organization over the next year. One key driver of server consolidation is the requirement for companies to comply with a growing number of governmental regulations.

To understand the role that compliance plays it is helpful to note that a large percentage of companies are facing increased government regulation such as:

- **The Sarbanes-Oxley Act:** This act requires management to make a written assertion stating their responsibility for establishing and maintaining an adequate control structure and procedures for financial reporting.
- **HIPAA:** HIPAA (the Health Insurance Portability and Accountability Act) requires companies in the health care industry to provide administrative simplification, security, and privacy.
- **The Gramm-Leach-Bliley Act:** This act requires companies to give consumers privacy notices that explain the institution's information-sharing practices and to give consumers the right to limit some of the sharing of its information.

Each of these acts requires that companies put a greater emphasis on assuring the accuracy, security and confidentiality of data. It is very difficult to do this when there are multiple copies of the company's data on servers in each of the company's branch offices. Centralizing the servers and storage in data centers makes these tasks notably easier to accomplish.

Another driver of server consolidation is the requirement to continually cut costs. There is considerable cost associated with having servers in a branch office. In addition, to the servers themselves, there are also the licenses for the software, and the cost of administering and maintaining the servers.

One of the ways that server consolidation saves cost is that when IT organizations centralize servers they often begin the migration to virtualized servers and storage. Virtualization is an emerging approach that is designed to maximize the utilization of IT resources. In a typical data center, there are isolated islands of IT resources (i.e., servers, storage) each dedicated to a particular application. While this may be less costly than having servers and storage distributed in branch offices, it is still highly inefficient. In a virtualized data center, IT resources are pooled and available to all users, based on strict security guidelines.

Some of the early attempts to consolidate servers resulted in disastrous performance. For example, there were many cases in which after servers had been consolidated into a centralized data center it would take several minutes for a user in a branch office to open a Microsoft Word document that was resident on a distant server. Without a thorough understanding of the problem, some companies blindly added bandwidth on their branch office networks. In those cases, the only effect of adding WAN bandwidth was to increase cost.

The cause of the problem is that once the servers that previously resided in branch offices now reside in data centers. Chatty file access protocols such as Common Internet File System (CIFS) and Network File System (NFS) that were designed to run over a LAN, now have to run over the WAN. As mentioned, adding bandwidth does virtually nothing to alleviate this problem.

Once they understood the problem's true cause, a number of companies addressed it by deploying Wide Area File Services (WAFS). The goal of WAFS is to make file access over the WAN perform as it would over the LAN. Deploying a WAFS solution may or may not be the right solution on a going forward basis as there is a growing belief that the newest version of the Microsoft operating system, which is now in beta testing, will eliminate most of the problems that WAFS solved.

Data Center Consolidation

Fifty-nine percent of the survey respondents indicated that consolidating data centers would have an impact on their IT organization over the next year. Digging deeper into the data shows that two somewhat contradictory trends are occurring. Driven by the need to provide for the highest levels of availability, many

medium sized companies that used to have a single data center have implemented a second data center. In addition to supporting unique applications, each data center also provides at least some level of backup for the other data center's applications, servers, storage and Internet access.

At the same time that many medium sized companies have added a data center, large companies are reducing the number of data centers that they support. A good example of this is a large multinational pharmaceutical company that I recently talked to about data center consolidation. As of a year ago, this company had over a dozen data centers of varying sizes around the globe. They are slowly reducing the number of data centers that they have. Their goal is to have three data centers - one each in the Americas, EMEA (Europe, Middle East and Africa), and the Pacific Rim.

Companies that are reducing the number of data centers that they support are motivated by some of the same factors that are driving server consolidation; i.e., reduce cost and ease the burden of complying with governmental regulations. For example, having fewer data centers makes it easier to develop and implement standard support models, and, implementing these models tends to both lower cost and increase availability.

However, there are other factors that are driving companies to consolidate data centers. Data center consolidation often enables the IT organization to do things that were not feasible when the company had several data centers. For example, assume that a company has a set of global applications - meaning applications that have to be accessed by the company's employees on a global basis. It is notably easier to support these global applications if they are hosted in three data centers than if they were hosted in fifteen data centers. Analogously, it is notably easier to implement effective security in three data centers than it would be in fifteen data centers.

As companies begin the process of consolidating data centers, it is necessary for the network organization to begin to document the existing traffic patterns and model how those traffic patterns will change after data center consolidation. This will enable effective capacity planning which will allow them to identify all of the costs that it will incur as a result of data center consolidation. It will also give them sufficient time implement the necessary changes to the network.

As noted, many companies with multiple data centers have implemented procedures whereby each data center provides at least some level of backup for the other data center's applications, servers, storage and Internet access. However, the vast majority of companies prefer to never implement these procedures. These companies prefer to have a WAN infrastructure with as high a level of availability as possible. One approach that companies have taken in order to increase the availability of their WAN is to put a greater emphasis on network management in general, and proactive end-to-end monitoring in particular.

Data center consolidation is a good-news/bad-news situation. The bad news is that data center consolidation creates somewhat of an "all of your eggs in one basket" syndrome. As a result, there is more pressure on the network organization to effectively manage and monitor the network within the data centers as well as the WAN that connects them to the rest of the company. The good news is that once the IT organization has reduced the number of data centers, it is much easier for the network organization to effectively manage and monitor a smaller number of data centers.

Conclusions

Driven by tactical factors such as cost savings, as well as strategic factors such as the need to comply with governmental regulations and to ensure business continuity, significant changes are occurring to the enterprise data center. However, as was described in this brief, consolidating servers into a centralized data center can have a serious impact on application performance.

The best way to ensure the success of a server/data center consolidation initiative is to get back to the basics relative to network management. That includes:

- Identifying the applications that are running on the network
- Baselining the current performance of the network and that of the company's key applications
- Modeling the impact of the proposed changes in general, and on key applications in particular
- Planning for the required additional WAN capacity
- Monitoring the network - particularly during and shortly after implementation of the changes

By using effective management tools to help you understand the impact of these consolidations, you will be in a good position to deal with the changes this causes. Without these tools, you are toast.