

THE TOP TRENDS IT MANAGERS NEED TO BE AWARE OF WHEN DESIGNING AND MANAGING A DATA CENTER: CONSOLIDATION AND VIRTUALIZATION



With more than 3 trillion bits of data created every second, the world's appetite for more feature-rich information keeps growing, and with it, comes the need for data centers to store and process that information. Consequently, the data center growth rate is roughly 50 percent a year. However, as the worldwide pool of data grows, corporations are increasingly consolidating and centralizing data center operations to save costs associated with their operation and maintenance, such as real estate, taxes, utilities and other physical support groups (e.g., security, electrical and mechanical systems). These new high-density data centers save on physical costs by reducing equipment and floor space costs for servers in remote offices, cutting software licenses and distribution costs, and reducing operating expenses.

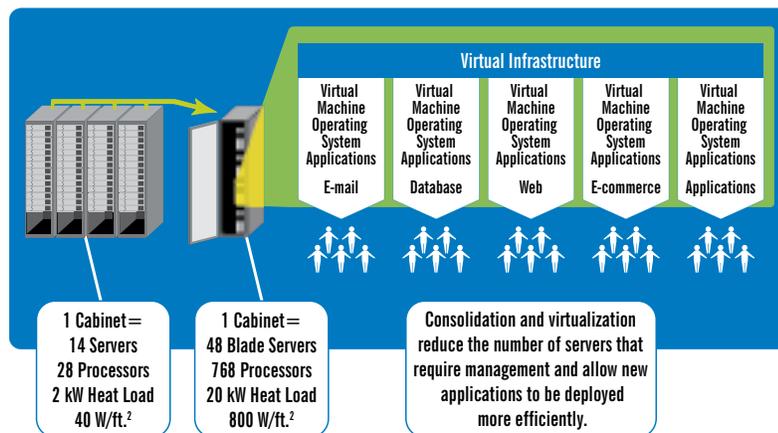
One consolidation strategy is server virtualization, which harnesses the computing power of multiple servers into logical groupings, known as virtual servers, running concurrently on the corporate network. Virtualization essentially breaks the link of the physical server and the software applications that run on it. Because the software applications run on virtual machines, virtualization realizes greater computing and power efficiencies by maximizing the utilization of the physical servers that support the software. Virtualization provides network administrators with essential flexibility and agility in managing data center environments while delivering rapid deployment, rapid adoption of change and flexible disaster recovery.

From a physical hardware perspective, the use of high-density blade server technology facilitates server virtualization. By containing multiple servers in a single chassis-based enclosure, blade servers maximize CPU processing power per watt of power consumed. However, its higher density platform changes the design paradigm on which traditional data centers were built. As computing resources consolidate into smaller physical footprints, the kW usage per square foot increases as does the associated cooling requirements. With next-generation data centers consuming upward of 1 megawatt of electricity and producing as much as 20 kW of heat on a per cabinet basis, data center managers will need to contend with power and thermal management challenges as well as increased distances between standalone and redundant data centers. Even with these concerns, organizations are finding it increasingly difficult to maintain a network of servers distributed across the country or world and are turning to data center consolidation to cut IT costs, tighten data security, meet regulatory requirements and improve operational efficiency.

To fully realize the many organizational benefits of consolidation and virtualization, there are inherent design challenges that must be overcome. An understanding of the complexities associated with provisioning of high-output, high-efficiency 3-phase power distribution systems used to support blade server technology is essential.

Once the power requirements for supporting the computing load is understood, the correct thermal management or cooling strategy can then be developed. A passive or active cooling solution with the ability to provide enough capacity for upwards of 20 kW a cabinet heat loads will be needed. Virtualization also requires an improvement of network bandwidth and latency performance. High-bandwidth technologies such as 10 Gigabit Ethernet using laser-optimized 50-micron fiber (ISO OM3) and Category 6A (ISO Class EA) twisted-pair cabling will alleviate the potential bottlenecks associated with aggregating computing resources using virtualized servers and storage platforms. Lastly, following the ANSI/TIA-942-A and other global data center standards will create a cabling infrastructure that is designed to effectively support virtualized server environments as well as scale with network growth.

Server Consolidation: Greater Power and Heat Densities



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