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Compaq Computer Corporation

Contents

Compaq Ultra-dense Server Deployment Solutions Overview

Abstract: *This white paper provides an overview of solution choices for high volume deployment of the Compaq ultra-dense server, the CompaqÔ ProLiantÔ DL360. The paper outlines key product features, options and solutions that enable the deployment of many Compaq ProLiant DL360 servers in a rack. This paper is intended for Field Service Engineers (FSEs) and customers (IT managers, system managers, and account managers).*

Executive Summary

Compaq ProLiant DL360 ¾ the first ultra-dense server optimized for high-volume deployment

Today's Internet world drives the need for unprecedented levels of server based computing. Enterprises and Service Providers have found that many of their network infrastructure and web applications work best on dedicated servers. This has driven the need for more and smaller servers to fit into existing server rooms and data centers. Compaq fulfills this need with the density-optimized line of ProLiant servers. The ProLiant DL360, at just 1U tall, supports up to 42 servers in a single rack. While the space-saving benefits are clear, the ultra-dense server also presents new challenges such as the need for rapid deployment of servers into a rack, as well as environmental and cable management challenges once the servers are deployed.

Development of the ProLiant DL360 server is the result of close customer collaboration and the long Compaq tenure in developing servers for space constrained rack environments. Compaq engineers have produced innovations in the ProLiant DL360 that make it easier to deploy. Compaq engineers have developed key deployment and cable management options to enable the rapid volume deployment and improved cable management for large installations of ProLiant DL360 servers into a variety of rack or non-racking environments.

To complete the total solution, Compaq offers a set of detailed white papers to expedite ultra-dense high volume deployment.

Notice

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Compaq Ultra-dense Server Deployment Solutions Overview
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Compaq Solutions for Ultra-dense Server Deployment

Compaq designed the ultra-dense ProLiant DL360 with high volume deployment in mind. Focused on developing a complete solution that works well in a variety of environments, Compaq designed options that simplify rapid, high volume deployment of ultra-dense servers. Below is a description of key Compaq server product features and deployment choices that address issues in ultra-dense server deployment.

Server Features

Compaq engineers considered ease of deployment and service when designing the ProLiant DL360. They also considered customers' server environments, notably around thermal and power conditions.

The ProLiant DL360 is ready to rack out of the box. The fixed server mounting rails are already attached to the server, and the rack rails snap into the rack, enabling rapid deployment.

When a service event does occur, the Compaq ProLiant DL360 is easy to repair. All internal components can be quickly accessed and serviced without any tools. And with only a single internal cable, it is impossible to plug a cable into the wrong connector. Optional ball-bearing slide rails enable in-rack serviceability. The summation of these features allows any internal component to be replaced in 15 minutes or less.

With up to 42 servers in a single rack, it can be difficult to properly locate a unit for servicing. Compaq provides a Unit Identification switch/LED on the front and back of each server. Pushing the Unit ID (UID) button on either the front or rear of the server lights a blue LED on both the front and back of the server. This makes it easy to walk from the front of a rack to the rear (or vice versa) and easily locate the desired server.

The ProLiant DL360 has a highly efficient cooling system that draws air into the front of the unit and efficiently blows it across critical components such as the hard drives and CPUs before exhausting the air out of the back of the unit. Even the cable management systems are designed to not restrict airflow behind the server. As a result, up to 42 ProLiant DL360 servers in a single rack can be properly cooled, even with ambient room temperatures outside the rack up to 35° C (95° F).

Server Deployment Choices

Compaq recognized that it was not sufficient to develop just a 1U product that could be deployed into Compaq racks. Complete deployment offerings are necessary to meet customer needs. While the rack solutions for Compaq racks are superior, Compaq also offers optimized solutions for deploying the ProLiant DL360 in third party and telecommunications (telco) racks as well as a unique desktop stacking enclosure.

Deployment in Compaq Racks

From slide rails to cooling to power distribution, Compaq has designed optimal solutions for Compaq 7000 and 9000 series racks.

Rapid deployment of many servers in a rack requires simple installation. The ProLiant DL360 server is out-of-the-box ready to provide fast and easy setup into Compaq racks. Each server comes with spring-loaded fixed rack rails that quickly snap into Compaq racks without requiring

any tools. The cable management tray included with the server attaches to the rack rail and the server with thumbscrews. The tray holds cables so that if the server is removed from the rack, the cables will remain in place in the tray, eliminating cables falling to the floor and tangling with other cables.

The optional sliding rail and cable management solution allows the server to slide forward without removing its cabling. When in its fully retracted position, the top cover of the ProLiant DL360 can be removed easily and all the components can be accessed. The cable management system that comes with this option allows the customer to manage cabling neatly at the rear of the rack, and still allow convenient rear access to connectors.

Compaq offers a vertical-mount PDU bracket with high voltage cable kit, for high-voltage (208V) installations. This kit includes Y-shaped power cables and the proper brackets to connect up to 42 servers to two power distribution units (PDUs) in a high-line voltage (208V) environment. Two vertical-mount PDU bracket with high voltage cable kits provide the power cabling for an entire rack of 42 servers. Compaq offers a vertical-mount PDU bracket option kit for low-line voltage (110V) environments. The cables that come with the ProLiant DL360 are intended for low-line voltage.

Compaq 7000 and 9000 series racks are designed to provide proper cooling and power for full configurations of ProLiant DL360 servers (up to 42 in a rack). Thus, customers do not need to be concerned about these issues as long as the external rack environmental conditions meet Compaq specifications.

Compaq has developed rack-mount best practices for deploying the ProLiant DL360. The white paper *Compaq Ultra-dense Server Deployment in Compaq Racks* provides detailed procedures for configuring Compaq 7000 and 9000 series racks for optimum use with the ProLiant DL360. The paper includes equipment lists, where to put each device in the racks, where to connect power, and ideal cabling choices to eliminate cable clutter. Customers can use this white paper as a resource to assist with deploying large volumes of ProLiant DL360 servers into their Compaq racks.

Deployment in Third Party Cabinet Racks

Recognizing that not all customers utilize Compaq racks, Compaq engineers have designed the ProLiant DL360 to be deployed in third party cabinet racks.

Compaq offers an optional rail kit and cable tray for third party cabinet racks. This kit includes variable length rail guides that can be mounted in a variety of third party cabinet racks. Customers can adjust the length of the rack rail to match the depth of their particular racks. This kit will support racks from depths of 21 inches (610 mm) to 29.13 inches (740 mm). These rack rails allow the factory-mounted fixed rails on the ProLiant DL360 to slide easily into the rack, reducing deployment time.

Compaq also provides a solution white paper called *Compaq Ultra-dense Server Deployment in Third-party Cabinet Racks*. This paper describes the environmental parameters for the ProLiant DL360, such as power consumption, cooling requirements, and weight, to help customers adequately prepare their rack environments for ProLiant DL360 deployment. The paper also describes best practice cabling options to minimize cable clutter. Customers can use this white paper as a resource to assist with deploying large volumes of ProLiant DL360 servers into their racks.

Deployment in Telco Racks

Many data centers are equipped with telecommunications (telco) racks. Recognizing the need to support these customers, Compaq has designed the ProLiant DL360 to be deployed into telco racks.

Compaq offers an optional rail kit for mounting into telco racks. The kit includes rack rails that can be mounted onto telco racks. It also includes several screws to allow attachment of the rack rails to a variety of different telco racks. The factory-mounted fixed rails on the ProLiant DL360 allow the server to easily slide into the rack. Thumbscrews attach the server to the rack.

Compaq also provides a solution white paper called *Compaq Ultra-dense Server Deployment in Telecommunications (Telco) Racks*. This paper describes the environmental parameters for the ProLiant DL360, such as power consumption, cooling requirements, and weight, so that customers can adequately prepare their rack environment to deploy the ProLiant DL360 into their telco racks. Customers can use this white paper as a resource to assist with deploying large volumes of ProLiant DL360 servers into their telco racks.

Desktop Stacking

In environments where a smaller number of servers are deployed, some customers may stack their servers one on top of another.

Compaq offers an optional desktop stackable chassis. This desktop/stackable chassis acts as a hood for the server and can withstand a heavy monitor on top. The standard factory-mounted fixed rails on each ProLiant DL360 server work with the rails located inside the desktop chassis. Up to six servers and in chassis can be stacked one on top of another. The hood has rubber feet at the bottom and matching rectangular holes at the top, to keep the stack aligned when sliding an individual server out.

Console Management

There are several methods customers use to provide console access to their servers. Many customers prefer the superior remote management capabilities offered by the Compaq Remote Insight Lights-Out Edition option. Others continue to use keyboard-video-mouse (KVM) switches to access a single server in a rack. Others still prefer completely headless operation rather than network management, and only connect keyboard and video when a server requires direct access. Compaq has ensured optimum support for the ProLiant DL360 regardless of customers' preference for console management.

Lights-Out Management

Compaq's Remote Insight Lights-Out Edition is a technological innovation allowing hardware-based graphical remote console that is completely OS-independent. The Compaq remote console provides IT Administrators highly efficient and cost-effective remote management. Remote servers can be managed from any a web browser interface. Because it is hardware based, remote management works even if the server is turned off or the operating system is not running.

The Remote Insight Lights-Out Edition provides access to the server through a dedicated Ethernet port located on the PCI board.

A special connector and auxiliary power circuitry inside the ProLiant DL360 connect directly to this Remote Insight Board so that the external keyboard/mouse loop-back cable and the external power supply module are not required. This means complete remote console management can be

implemented with a single Ethernet cable, drastically reducing cable clutter in the rear of the server.

Keyboard-Video-Mouse Switches

The ProLiant DL360 is designed to operate with the Compaq 8-port Keyboard-Video-Mouse (KVM) switches. Customers choosing local consoles can use KVM switches, and can find best practice information explained in the white paper, *Compaq Ultra-dense Server Deployment in Compaq Racks*. The white paper also includes information on optimal cabling of KVM switches in a fully populated rack of servers. KVM switches can be used in conjunction with the Compaq 1U keyboard/mouse and 2U flat panel monitor to provide easy console management at the rack.

Headless Operation

The ProLiant DL360 is designed to operate without a keyboard, mouse, or monitor attached. When a server requires console access, users may simply plug in a keyboard and monitor without shutting down the server and get immediate access to the server console. The server has logic on the motherboard to properly support hot-plugging a keyboard into the server.

Conclusion

As the first vendor to offer density-optimized computers, Compaq understands customer needs for density best. Compaq has put tremendous effort into understanding customers' needs for optimizing ultra-dense server deployment. As a result, Compaq offers a comprehensive set of solutions to enable high volume deployment of the Compaq ProLiant DL360 server.