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Contents

Deployment Solutions Overview for Compaq ProLiant DL320 and ProLiant DL360 Ultra-Dense Servers

Abstract: This white paper provides an overview of solutions for high-volume deployment of Compaq ultra-dense servers, the Compaq *ProLiant™* DL320 and ProLiant DL360. The paper outlines key product features, options, and solutions that enable the deployment of many Compaq ProLiant DL320 and ProLiant DL360 servers in a rack. This paper is intended for Compaq Field Systems Engineers (FSEs) and customers (IT managers, system managers, and account managers).

Executive Summary

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 DL320 and ProLiant DL360, at just 1U tall, support 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 deployments of servers into a racks, as well as environmental and cable management challenges once the servers are deployed.

The development of the ProLiant DL320 and ProLiant DL360 servers 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 DL320 and ProLiant DL360 that make it easier to deploy. Compaq engineers have developed key deployment and cable management options to enable the rapid high-volume deployment and improved cable management for large installations of ProLiant DL360 servers into a variety of rack or non-rack environments.

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

Notice

Compaq Solutions for Ultra-Dense Server Deployment

Compaq designed the ultra-dense ProLiant DL320 and ProLiant DL360 servers 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 the ease of deployment and service when designing the ProLiant DL320 and ProLiant DL360. They also considered customers' server environments, notably thermal and power conditions.

Both the ProLiant DL320 and ProLiant DL360 servers are 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 DL320 and ProLiant DL360 are easy to repair. Both servers provide tool-free entry and easy access to internal components. With the ProLiant DL360, all internal components can be quickly accessed and serviced without tools. 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. These features enable 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 solutions for Compaq racks are superior, Compaq also offers optimized solutions for deploying the ProLiant DL320 and 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 DL320 and ProLiant DL360 servers are 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 remain in the tray, eliminating cables falling to the floor and tangling with other cables.

The optional sliding rail and cable management solution enables the server to slide forward without removing its cabling. When in its fully retracted position, the top cover of the ProLiant DL320 or ProLiant DL360 can be removed easily allowing easy access to components. The cable management system that comes with this option enables customers to manage cabling neatly at the rear of the rack, and still enables convenient rear access to connectors.

Compaq offers a Vertical-Mount PDU Bracket with High Voltage Cable option kit, for high voltage installations. This kit includes Y-shaped power cables and the proper brackets to connect up to 21 servers to two power distribution units (PDUs) in a high-voltage environment. Two Vertical-Mount PDU Bracket with High Voltage Cable option kits provide the power cabling for an entire rack of 42 servers. Compaq offers a Vertical-Mount PDU Bracket option kit for low-voltage environments. Compaq 9000- and 7000-series racks are designed to provide proper cooling and power in conditions when the rack is fully populated with servers. However, it is important that customers follow warnings and guidelines when deploying 42 fully configured ProLiant DL320 or ProLiant DL360 servers in a single rack. Refer to the *Compaq ProLiant DL320 Ultra-Dense Server Deployment in Compaq Racks* or *Compaq ProLiant DL360 Ultra-Dense Server Deployment in Compaq Racks* white papers for greater detail.

Compaq has developed rack-mount best practices for deploying the ProLiant DL320 and ProLiant DL360. The white papers *Compaq ProLiant DL320 Ultra-Dense Server Deployment in Compaq Racks* and *Compaq ProLiant DL360 Ultra-Dense Server Deployment in Compaq Racks* provide detailed procedures for configuring Compaq 7000- and 9000-series racks for optimum use with the ProLiant DL320 and ProLiant DL360. The papers include equipment lists, the location in the racks for each device, the location of the power connection, and ideal cabling choices to eliminate cable clutter. Customers can use these white papers as a resource to assist with deploying large volumes of ProLiant DL320 and ProLiant DL360 servers into their Compaq racks.

Deployment in Third-Party Racks

Recognizing that not all customers use Compaq racks, Compaq engineers have designed the ProLiant DL320 and ProLiant DL360 to also 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 supports racks from depths of 22 inches (55.88 cm) to 33 inches (83.82 cm). These rack rails enable the factory-mounted fixed rails on the ProLiant DL320 and ProLiant DL360 to slide easily into the rack, reducing deployment time.

Compaq also provides a solution white paper titled *Deploying the Compaq ProLiant DL320 and ProLiant DL360 in Third-Party Racks.* This paper describes the environmental parameters for the ProLiant DL320 and ProLiant DL360, such as power consumption, thermal dissipation, and weight to help customers adequately prepare their rack environments for ProLiant DL320 and ProLiant DL360 deployments. Customers can use this white paper as a resource to assist with deploying large volumes of ProLiant DL320 and 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 DL320 and ProLiant DL360 to also 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 the attachment of the rack rails to a variety of different Telco racks (frame thickness of 2 inches [5.08 cm] to 5.375 inches [13.653]). The factory-mounted fixed rails on the ProLiant DL320 and ProLiant DL360 enable the server to easily slide into the rack. Thumbscrews attach the server to the rack.

Compaq also provides a solution white paper titled *Deploying the ProLiant DL320 and ProLiant DL360 in Telecommunications (Telco) Racks.* This paper describes the environmental parameters for the ProLiant DL320 and ProLiant DL360, such as power consumption, thermal dissipation, and weight so that customers can adequately prepare their rack environment to deploy the ProLiant DL320 and ProLiant DL360 into their Telco racks. Customers can use this white paper as a resource to assist with deploying large volumes of and ProLiant DL320 and 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 on top of each other.

Compaq offers an optional desktop stackable chassis. This desktop stackable chassis acts as a hood for the server and can hold a monitor on top. The standard factory-mounted fixed rails on each ProLiant DL320 and ProLiant DL360 server work with the rails located inside the desktop chassis. Up to six servers can be stacked one on top of another in the desktop chassis. The hood has rubber feet on the bottom and matching rectangular detents at the top, to keep the stack aligned when sliding an individual server out. The ProLiant DL320 and ProLiant DL360 each have a unique desktop stackable chassis option due to the differences in chassis dimensions between the two servers.

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 keyboards and video when a server requires direct access. Compaq has ensured optimum support for the ProLiant DL320 and ProLiant DL360 regardless of customers' preference for console management.

Lights-Out Management

Compaq Remote Insight Lights-Out Edition is a technological innovation enabling hardware-based graphical remote console management 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 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 also includes many other powerful features such as virtual power button, virtual floppy drive, DNS/DHCP IP auto-configuration, and ROM-based setup configuration.

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

A specially designed connector and auxiliary power circuitry inside the ProLiant DL320 and 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. Therefore, complete remote console management can be implemented with a single Ethernet cable, drastically reducing cable clutter at the rear of the server.

Keyboard-Video-Mouse Switches

The ProLiant DL320 and ProLiant DL360 can be used with the Compaq 8-port KVM switches. Customers choosing local consoles can use KVM switches, and can find best practice information explained in the white papers *Compaq ProLiant DL320 Ultra-Dense Server Deployment in Compaq Racks* or *Compaq ProLiant DL360 Ultra-Dense Server Deployment in Compaq Racks.* These white papers also include 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 DL320 and ProLiant DL360 are 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 to gain 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 DL320 and ProLiant DL360 servers.