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Top 10 Concerns of Data Center Managers in 2018

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Executive Summary

A recent article by Steve Gillaspy of Intel outlined many of the challenges faced by those responsible for designing, operating, and sustaining the IT and physical support infrastructure found in today's data centers.[1] This paper targets four of the five macro trends discussed by Gillaspy, how they influence the decision-making processes of data center managers, and the role that power infrastructure plays in mitigating the effects of the following trends:

HYPER GROWTH AND HYPERSCALE

Edge and cloud computing are seeing rampant growth, causing the build-out of new data centers both large and small, with growth coming so fast that traditional approaches to construction and management are unable to keep up.

NEW WORKLOADS

Big data, AI/ML/DL, Internet of Things (IoT) and other new types of workloads are placing increasing demands on most data centers and networks.

HYPER DENSITY

The need to minimize OPEX and CAPEX costs while increasing the efficiency of the data center is causing a drive towards consolidation, virtualization, containerization on the compute side, while the increasing number of both data sources and data consumers is driving the growth in demand for storage capacity.

NEW HARDWARE

Specialized silicon is now being deployed in many data centers, with the intent of improving throughput and latency in support of the new workloads. FPGAs and ASICS for AI, GPUs for AI and cryptocurrency mining. Along with new chips, there are different types of storage, processors, and interconnects available to choose from and support that makes it difficult to standardize on "one-size-fits-all" hardware.

[1] http://www.datacenterdynamics.com/content-tracks/servers-storage/why-the-data-center-needs-a-new-architecture/99700.article

Macro Trend Impacts on the Data Center

Since the year 2000, the world has seen the rise of numerous companies that have achieved phenomenal amounts of growth thanks to the expansion of the internet and the applications that run on it. Google, Facebook, Apple, Microsoft, Amazon, Uber, and countless others have all seen incredible success around the world through business models that rely on the presence of ubiquitous internet service combined with rapid access to applications running in company-owned data centers that they designed and built themselves. And with each additional data center they construct, these companies make successive leaps in productivity, energy efficiency, and profitability, all while managing the stresses that come from rapid growth, changing workloads, growing storage requirements, and accommodating new hardware technologies.

Choosing to build a new data center or retrofit an existing one is a risky decision for many enterprises today. Committing money to design, build, and operate a facility devoted solely to the well-being of IT equipment and the few people overseeing it can be a capital-intensive task that may not pay off for the company. Knowing why the data center needs to be built is crucial to achieving a successful outcome. Does the company already have a successful product or service that requires the support of a data center? What is the growth rate of that product or service? Is the user or customer latency sensitive? If the customer wants more of the product or service, is the infrastructure that delivers it scalable? Would we be better served building the application in the cloud, and migrating it later to our own data center?

Once the decision has been made to start construction on a data center, most companies want to bring the new asset on line as rapidly as possible, sometimes without even knowing exactly what they are going to deploy in the data center until after construction is already under way. Will the next generation of processors be available in volume when the data center is ready to be outfitted? If not, can the CPUS be changed out in the servers once the newest processor generation becomes available? The drive to maximize return on investment (ROI) demands the data center "go live" as soon as the hardware arrives, yet the goal for energy efficiency dictates that the latest (fastest) generation always be installed as soon as possible. Short lead times and flexible configurations are a must for satisfying many data center applications.

Most data center designers and managers resort to setting standards early in the conception phase of a data center for power distribution architecture (480V/415V/208V to the rack), power density (5/10/20/50kW per rack), cooling (air, liquid, immersion, containment), rack size (42U/48U/52U/etc.), lighting, and so forth. These parameters become the boundary conditions for decisions that follow, such as what equipment goes into each rack, and how much air or water cooling capacity must be delivered to the rack to enable the equipment to operate reliably.

Meanwhile, software applications that run in the data center are being written or tweaked daily. New versions or entirely new applications can create increased user uptake, along with creating new data types and new volumes of data that will have to be accommodated in the data center that is already under construction. Data from "internet of things" (IoT) devices or from driverless vehicles may suddenly be added to the mix of applications requiring support within the data center, and may in turn foster new workloads such as big data analytics or artificial intelligence (AI) to be implemented.

"Today's data centers are increasingly called upon to run much larger, more complex workloads that are often very different from one another — so the hardware requirements to run them may vary widely from workload-to-workload, and may also change over the course of a day or even an hour. For example, some workloads might need more, and some less, processing or memory capacity. Still others might require NVMe storage or special purpose processors. Furthermore, to lower TCO it might also be desirable to leverage higher-end devices across multiple workloads at different times."

[2] http://www.datacenterdynamics.com/content-tracks/servers-storage/why-the-data-center-needs-a-new-architecture/99700.article

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Top 10 Concerns of Data Center Managers in 2018

DESIGN

1. "Future proofing" the design of a data center to accommodate changing hardware and application requirements that scale over time without forcing frequent "rip and replace"

2. Figuring out how to facilitate the automation of the data center to minimize both headcount and downtime

3. Creating a data center that can be run as hot as possible in the hot aisle, but still be accessible for people to enter to work on the equipment while in operation

INSTALLATION AND CONFIGURATION

4. Provisioning hardware for new applications can take days or weeks, and may require numerous specialists

OPERATION

5. Virtualized and containerized environments rarely exceed 50 percent average utilization, and non-virtualized data centers run at 20-30 percent.

6. Interoperability across equipment and management software from different software vendors is often problematical, limiting functionality and programmability

7. Maintaining security from external bad actors seeking to disrupt or disable the data center operation

UPGRADE AND RETROFIT

8. CPU upgrades often require replacement of an entire server chassis and all the resources in the server, retiring storage, power supplies, fans, and network adapters sooner than necessary

9. Identifying where there is available power capacity within a circuit or rack to accommodate new hardware

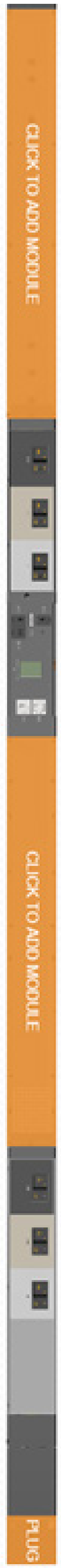
10. Technicians in the data center can be slowed by the current requisition, deployment, validation, and provisioning processes when hardware fails

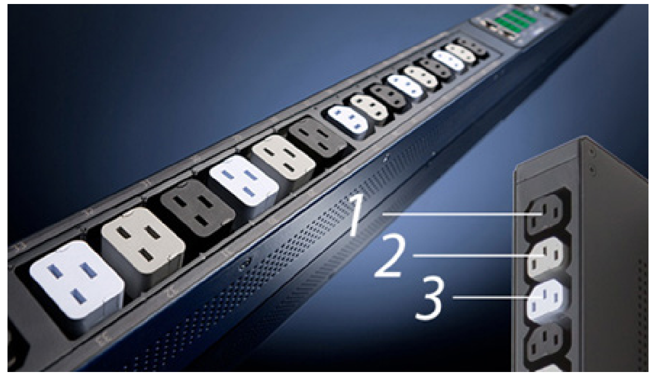
Mitigating the Pain Points

The concept of "Software-Defined Everything" (SDE) is one of the most talked-about trends in the evolution of data center design philosophy. "Software-defined networking (SDN), software-defined storage (SDS), and software-defined data center are part of a general movement towards infrastructure that decouples the bare metal that executes point data transactions from the software layer that orchestrates them."[2] Rather than the individual elements of compute, storage, and networking, SDE treats infrastructure as a set of resources that are joined together through software and tailored to a specific workload. "Composable infrastructure" and "rack scale design (disaggregated server architecture)" are two approaches to achieving SDE in the data center, and go a long way towards addressing many of the previously stated pain point.

SDE assumes that all hardware is on and always available. For those data centers that want to go another step on the SDE journey, taking hardware offline (powered off) when not in use, implementing a high density, remotely managed power distribution unit within the IT rack provides another level of composability and control. By deploying intelligent PDUS with high outlet density and a mix of C13 and C19 outlets, physical hardware changes in the rack can easily be accommodated.

Choosing suppliers that can bring together racks, PDUs, cable management, cooling, cabling and containment all with short lead times enable the data center designer and manager to make last second decisions in how to finish equipping the data center, helping to avoid the "rip andt replace" problem experienced with buying the wrong gear too early in the provisioning process.





HDOT PDU with Alternating-Phase

How HDOT PDUs from Server Technology help the data center manager

In 2015, anticipating the confluence of many of these trends and pain points, Server Technology introduced the first intelligent rack PDU in the data center industry to support mass customization of outlet configuration, power density, feature set, and colorization. The HDOT (High Density Outlet Technology) family of rack PDUs, with Alternating Phase, from Servertech was a breakthrough in convenience, speed, flexibility, and simplicity for the data center market. Using just a few standard enclosure sizes, HDOT units accommodate a variety of modules having different outlet configurations and feature sets (remotely monitored outlets, remotely managed/switched outlets, alternating-phase outlets, etc.)

The self-service nature of the Build-Your-Own-PDU (BYOPDU) of the Server Technology website enables the customer to, in four easy steps, choose the PDU form factor, input voltage, input amperage, outlet count, outlet type, feature set, and PDU color banding for a configure-to-order (CTO) product that can be ordered and shipped in volume in just two weeks or less. Each PDU going through the BYOPDU website will receive its own custom datasheet, generated interactively by the BYOPDU website. This gives the data center manager the flexibility to accommodate changing rack configurations during the build out or retrofit of the IT portion of data center construction.

[3] https://www.wired.com/insights/2013/05/are-you-ready-for-software-defined-everything/

Having multiple outlet modules in an HDOT PDU also means that the PDU can be specified with extra C19 outlets for the bottom half of the rack, while putting more C13s in place for the top of the rack if needed. With over 10,000 possible configurations for an HDOT PDU, the data center manager truly can have each unit be exactly what is needed for a given rack. In those cases where new hardware technologies and new workloads are frequently being brought into the data center, having a rack-level power plan based on the HDOT PDU technology makes good sense for the data center manager.

Ordering and installing a PDU is only half the story. Those familiar with deploying and provisioning hardware know that intelligent PDUS also require configuration in firmware to be able to deliver the most functionality for the data center. All Pro2 HDOT PDUS come with support for Zero-Touch-Provisioning, enabling thousands of PDUS to be brought up and configured for networked operation in minutes instead of days. ZTP is simple, fast, and efficient.

Once configured, the remote power measurement capabilities of Smart, Switched, and Per Outlet Power Sensing (POPS) enable the data center manager to use software to quickly and easily identify available power capacity within the rack, the row, or the entire data center, all from a single pane of glass.
The remote management capabilities of Switched and Switched POPS products are ideal for software companies with developers and data centers in different geographies, IT labs where server lockup is frequent, "lights-out" hyperscale data centers that avoid having manpower in the data center until absolutely necessary, edge data centers located in the field far away from IT personnel, and enterprises that desire to have scheduling of IT asset availability.

About Server Technology

Server Technology®, a brand of Legrand, only focuses on power. Top performing data centers around the world rely on our rack power distribution units to maintain uptime, ensure efficiency and facilitate capacity planning. Our customers state that our quality is the number one reason why they choose Server Technology Rack PDUs.

HDOT Delivers

If any of the pain points describe your situation in the data center, shouldn't your next PDU be an HDOT unit from Server Technology?

Flexibility – the right outlets in the right locations

Density – more outlets per RU than other wider competing solutions

Capacity – the power you need, where you need it

Delivery - most orders ship in two weeks or less

Scalability – whether it's one unit or thousands, Server Technology has the capacity to accommodate your data center build-out

Simplicity - power on a per-receptacle basis (Alternating Phase) provides benefits in the form of simplified cabling, better airflow, better load balancing and greater efficiencies.

Interested in learning more about how Server Technology can help you manage and distribute power in your datacenter?
Visit us online at: www.servertech.com/products

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