



GE
Critical Power

Containerized Data Centers – A Case History for Enterprise Deployments

Many information technology (IT) professionals have a narrow view of the potential of modular data centers, seeing them as just a way to scale existing data centers with increased server capacity but at substandard availability. In the past 18 months, new approaches and technologies are becoming more accepted in the typically conservative data center market. Data center operators – from hyper-scale companies to enterprise facilities like we see in healthcare or financial services – are deploying containerized data centers with higher efficiency, lower total cost of ownership (TCO) from lower capital expenses (CapEx) and operational expenses (OpEx), and more flexible and scalable capacity with as good or better availability.

At the recent [7x24 Exchange 2013 Conference](#) in San Antonio, Texas representatives from Hewitt Packard and GE's Critical Power business hosted a presentation exploring how containerized data centers are growing for enterprise deployments. In the session, they detailed what's driving the move to containerized data centers, now estimated to expand globally by a 33 percent compounded annual growth rate (CAGR) over the next five years⁽¹⁾. Certainly demand for data storage and the need to deploy capacity quickly are two of the primary rationales for the growth of modular data centers.

Capacity – Deploying HP's EcoPOD*

Modular data centers are able to create a fast-track to expanded capacity and keep pace with the unrelenting demand for data. In 2012, the scope of global data increased to 2.7 zettabytes, an increase of 48 percent over the prior year. Given that a zettabyte is 1.1×10^{12} gigabytes (GB), or more than 1 trillion GB, this increase is roughly the equivalent of 30 billion 32-GB Apple iPods*.

When it comes to meeting increased data demands, HP has deployed their HP 240a EcoPOD modular data center for several of their customers. The HP EcoPOD is an IT container system that packs the equivalent of a typical 9,000-square-foot data center into a single, pre-tested compact 1,440 square-foot package that can reduce upfront capital costs by up to 75 percent compared to traditional facilities.

The HP EcoPOD offers up to 1.3 megawatts (MW) of server, storage and networking capacity, and can manage average rack densities up to 30 kilowatts (kW), available in redundant or non-redundant configurations. The critical power is provided by GE's new [PowerMOD*](#) containerized power systems platform, supplying backup critical power to keep the HP EcoPODs up and running. Ranging in capacity from 200 kW to 1,500 kW, the PowerMOD supplies the most efficient critical power, as it uses the GE TLE uninterruptible power supply (UPS) that can operate in energy-efficient eBoost* mode.

Time-to-Deployment – Clear, and Subtle, Benefits

It's well understood that modular data centers can be fast-tracked to bring new capacity to stand-alone facilities. Yet new information from recent data center installations shows some even stronger and surprising time-to-deployment benefits and returns when using containerized systems.

The 7x24 Summit presentation showed that modular data centers using the EcoPOD and PowerMOD containerized systems can be deployed as quickly as four to six months, compared with up to two years for traditional brick-and-mortar construction, or 70-80 percent faster. Those numbers also translate to reduced up-front capital costs by up to 70 percent compared to standard data center facilities. In addition, deploying modular power systems, such as GE's PowerMOD, can effectively reduce power infrastructure costs for modular data centers by 25 percent.

Scaling data center capacity in months versus years also creates the flexibility to ramp up capacity as needed. Given the long lead time needed to construct brick-and-mortar facilities, they are often over-specified and, initially, under-utilized. That puts a tremendous stress on both CapEx and OpEx costs. By collapsing the deployment timeline for data centers from years to months, data center designers can scale capacity as needed and deploy newer more efficient equipment at every phase of expansion.

This is particularly important to existing data centers that have run out of critical power capacity but still have stranded raised-white-floor space. With the shrinking size of IT equipment driven by Moore's Law, it takes fewer servers to provide the same computing capacity compared to five years ago. However, that has driven the power consumption in a single rack configuration to higher levels such as 10-15kW or more. This means data center facilities that were hard-wired for a certain power capacity have seen that power used up with fewer racks than they planned to put into their facility. To reclaim this unused raised-white-

floor space, data center owners can now deploy a PowerMOD outside their facility to get as much as an additional 1.5MW in a single standard-sized container.

Energy Efficiency – OpEx Savings

A third major element in creating a rationale for modular data centers is the energy efficiency reductions and savings created by new power-efficient technologies. Energy OpEx savings are an increasingly important key factor for customers deploying HP's EcoPODs for their data center needs.

Both HP's EcoPOD and GE's PowerMOD generate OpEx savings from self-compensating adaptive cooling technology that reduces the carbon footprint of the data center while maintaining peak performance. Depending on load and environmental conditions, the cooling systems automatically optimize the cooling modes between economization (i.e., free air-cooling) and direct expansion (DX) cooling modes, greatly improving energy efficiency over legacy data center designs.

The GE PowerMOD containerized power system also adds to the overall OpEx savings by maximizing the integration of the electrical equipment into a single electrically efficient system. The PowerMOD incorporates GE's automatic transfer switches, switchboards and transformers, along with GE's TLE Series* UPS, which provides up to 97 percent power efficiency in double-conversion mode and up to 99 percent efficiency in [eBoost](#) or multi-mode operation. With GE's efficient TLE UPS at the heart of the PowerMOD's system, the containerized data center has a lower overall system energy expense and a power usage effectiveness (PUE) of 1.1 on average and, in some cases, a PUE as low as 1.05.

It's clear that new modular data center deployments can offer comparable data capacity to traditional brick-and-mortar facilities, coupled with rapid deployment, flexible scaling and significant energy savings. So much so that "modular" and "containerized" is increasingly part of the vocabulary for every data center manager.

For more information: info.criticalpower@ge.com

#

(1) [IHS, The World Market for Containerized Data Centers – 2012 Edition, September 2012, Elizabeth Cruz](#)

(*) indicates a trademark owned by each of the respective companies cited.

