

Sea Change Series: Scale in the Mega Data Center

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Abstracts

Next generation mega data center technology is able to leverage scale to implement cloud computing that is better than most of what is out there now. Scale is a vital part of the technology used to support next generation data centers. The study is targeted to C-level executives that need to move quickly and surely to improve IT. Automation of IT depends on understanding the business market opportunity from an independent perspective.

Vendors are smart but they are committed to the technology they are pushing, the Sea Change Series from WinterGreen Research is able to provide a perspective not available anywhere else. Extreme scale is what brings enough pathways inside a Mega data center to create a non-blocking (CLOS) networked server architecture. Non-blocking network architecture benefits the business because it permits launching thousands of virtual servers on demand at the application layer. In this manner, innovation can be made to happen quickly. Using a mega data center, DevOps and/or automated processes can request and deploy additional resource without backing the Dell truck up to the data center every week to provide on-demand capacity.

Automated deprovisioning handles freeing of surplus resources, while being virtual means not having stacks of surplus hardware to dispose of as underutilized capital assets. Modern data centers are organized into processing nodes that manage different applications at a layer above infrastructure. Data is stored permanently and operated on in place. These are the two technologies to check for when choosing a data center. These architectural features provide economies of scale that greatly reduce the IT spend while offering better quality IT. Once scale is in place, then the economies of scale kick in. When negotiating for cloud capability, managers need to check to see that sufficient multiple pathways are available to reach any node in a non-blocking manner.

Non-blocking architecture is more efficient than other IT infrastructure and supports

better innovation for apps and smart digitization. Not all cloud architectures offer this business benefit.

The Cloud 2.0 mega data center platform fabric technologies support the digital economy by creating scale with a network internal to the mega data center system image. Without scale, there are not enough pathways inside the data center to enable elimination of bottlenecks.

Access to every node in the fabric, and multiple duplicate pathways to every node are needed to enable real time application connectivity. With sufficient scale, if one pathway is blocked, there are enough other pathways to get to the desired node resources. The theme of this study is that scale matters. Scale can be implemented by IT, but the executive needs to understand that there is a difference between different technologies. In a mega data center, the system is implemented as a fabric: servers are linked to top of rack switches, which are made from merchant silicon chips, mostly Broadcom, some switch ASICs.

A pod of server racks are linked to each other through an edge aggregation switch. A pod of server racks is based on the same ASICs as in the top of rack switches. The importance of nonblocking architecture is compelling. Aggregation switches are lashed together through a set of non-blocking spine switches. All switches are based on the same chip. This is precisely the way Facebook is building its own Wedge and 6-pack open switches— nine years after Google did it. The amazing thing is that Facebook had not done this already.

The four superstar companies that are able to leverage IT to achieve growth, Microsoft, Google, Facebook, and the leader AWS all use Clos architecture. What is significant is that systems have to hit a certain scale before Clos networks work. Clos networks are what work now for flexibility and supporting innovation in an affordable manner. There is no dipping your toe in to try the system to see if it will work, it will not and then the IT says, “We tried that, we failed,” but what the executive needs to understand is that scale matters. A little mega data center does not exist. Only scale works.

Maybe scale is not the only answer, maybe in 20 years, Quantum computing will bring a new data center system, but for now, Clos architecture and scale dominate those IT centers that have the strongest growth engine. Business leaders are challenged to move their enterprises to the next level of competition. An effective digital business player, transformer, and disruptor position depends on the effectiveness of employing digital technologies and leveraging connected digital systems. Organizational,

operational, and business model innovation are needed to create ways of operating and growing the business using mega data center cloud technologies, systems are evolving. It is a journey to achieve the connected enterprise, ultimately connecting all employees and a trillion connected devices.

Many companies are using digital technology to create market disruption. Amazon, Uber, Google, IBM, and Microsoft represent companies using effective disruptive strategic positioning. As entire industries shift to the digital world, once buoyant companies are threatened with disappearing. A digital transformation represents an approach that enables organizations to drive changes in their business models and ecosystems leveraging cloud computing, and not just hyperscale systems but leveraging mega data centers.

Just as robots make work more automated, so also cloud based communications systems implement the IoT digital connectivity transformation. Disruption in the business markets represents major opportunity for vendors with cloud offerings. This is part of a larger digital transformation, a digital approach to interconnecting everything that enables organizations to drive changes in their business models and ecosystems.

Disruptive cloud systems are provided by Amazon (AWS), Microsoft, Google, and Facebook. Data centers are in a class by themselves, they have functioning fully automatic, self-healing, networked mega datacenters that operate at fiber optic speeds to create a fabric that can access any node in any particular data center because there are multiple pathways to every node. In this manner, they automate applications integration for any data in the mega data center. By leveraging digital competencies, businesses can grow faster than they would otherwise.

A digital strategy, in conjunction with the appropriate unified communications solution permits the implementation of innovative communications services. Digital connectivity with combined voice, video and file transfer can help organizations and their end users innovate and compete more effectively. It is imperative that organizations have a digital communications strategy in place. This is an era where the distinction between the technologies and processes that businesses deploy is tightly linked. Digital technology directly impacts customers and markets.

The boundary between internal operations of the enterprise and its external ecosystem is rapidly disappearing. Customers, markets, competitors, partners, and regulators are inextricably linked. According to Susan Eustis, lead author of the team that prepared the study, "Mega data centers need to be understood by all senior executives whether they

move in that direction or not. These are the IT used by the fastest growing organizations Google, AWS, Microsoft, and Facebook. There are 25 Sea Change Data Center study modules describing different aspects of the move to mega data centers.

The Scale module describes that it is not sufficient just to try certain cloud techniques. “Scale is an essential aspect of the data center positioning for these leading companies. These companies use Clos networks as their data center implementations. This module addresses how and why scale in the mega data center is important. The market shift to non-blocking network inside data center building means companies have to hit a certain scale before Clos networks work.”

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