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Sea Change Series: Orchestration Software in the Mega Data Center

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Abstracts

The mega data center described in the study is effective because it leverages the economies of scale. This orchestration software infrastructure study module is part of a longer study that addresses the business issues connected with data center modernization.

There are 26 module parts to the larger study comprised of detailed analysis of how new infrastructure layers will work to support management of vast quantities of data. Business growth depends on technology spending. Intelligent, automated process, not manual labor systems are what speed business growth.

We have had the situation in the data center where 93% of spending is just to keep current systems running, many of those plagued with manual input. Mega data centers change that pattern of IT manual process. The Internet has grown by a factor of 100 over the past 10 years. To accommodate that growth, mega data centers have evolved to provide processing at scale.

Facebook for one, has increased the corporate data center compute capacity by a factor of 1,000, virtually eliminating much manual process. Orchestration software is a key aspect of that process. To meet future demands on the Internet over the next 10 years, companies with that capacity need to increase capacity by the same amount again while the other companies struggle to catch up.

Nobody really knows how to get to increasing compute capacity by another factor of 1,000. Business growth depends on technology spending. Intelligent, automated process, not manual labor systems are what speed business growth. We have had the situation in the data center where 93% of spending is just to keep current systems

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running, many of those plagued with manual input.

Mega data centers change that pattern of IT manual process. Realigning data center cost structures is a core job of orchestration software. The enterprise data centers and many cloud infrastructure operations all have similar problems of being mired in administrative expense. Containers address that issue by creating vastly more efficient operations for data center infrastructure.

According to Susan Eustis, lead author of the team that prepared the study, “The only way to realign cost structure is to automate infrastructure management and orchestration. Mega data centers automate server and connectivity management using orchestration software to manage multiple application containers. Other systems automate switching and storage, along with hypervisor, operating system, and virtual machine provisioning.

“As IT relies more on virtualization and cloud mega data center computing, the physical infrastructure is flexible and agile enough to support the virtual infrastructure. Comprehensive infrastructure management and orchestration is essential.

The Enterprise Data Center has become a bottleneck, it needs to be completely replaced. Category 5 and Category 6 Ethernet cable is spread throughout the existing enterprise data centers and is too slow to handle all the digital data coming through the data center. Cat 5 and Cat 6 Ethernet utilized by the servers to achieve data transport using that cable does not keep up with the data coming through the data center the way optical cable and optical transceivers do.

The existing servers and cable are a problem because they are too slow for modern systems. The cable is too slow to handle all the data coming at us in the new digital age, and the associated technology that operates at Ethernet category 5 and category 6 cable speeds is too slow as well, this is why the entire set of existing enterprise data centers is a bottleneck. Mobile data traffic is set to increase by a factor of eight between 2015 and 2020. Growth is anticipated at 53 percent per year, faster than systems revenue or industry revenue.

The theme of this study is that the pace of data expansion creates the need for more modern means of managing data. There are some companies that are doing a better job, better than others of adapting to IT infrastructure to the wild influx of data.

The four superstar companies that are able to leverage IT to achieve growth, Microsoft,

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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.

Many companies are using digital technology to create market disruption. Amazon, Uber, Google, IBM, and Microsoft represent companies using effective strategic positioning that protects the security of the data. 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.

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