

# DELL EMC DSS 9000

IT AT SCALE FOR CARRIERS, SERVICE PROVIDERS AND BEYOND

## SUMMARY

Innovation in information technology enables the convergence of telecommunications and entertainment business models – distribution and content creation – and creates new monetization opportunities. Megamergers such as AT&T–Time Warner and Verizon–AOL have the potential to redefine entire business segments. However, a key underpinning to this success is the ability for IT organizations to standardize on a common platform architecture to reduce capital expenditures (CapEx), operational expenditures (OpEx) and gain the benefits of scale, open management, virtualization and cloud-based service efficiencies.

Carriers and service providers seek a “digital transformation” and new business opportunities with IT that deliver quick time to value, real-time performance, high availability, automated provisioning, cost containment and rapid service development. Legacy IT infrastructures in these industries simply cannot deliver these benefits. Additionally, these stakeholders see an ever-growing threat from hyperscale solution providers and wish to emulate their success. Deployment of hyperscale architectures based on open designs will translate to rapid 5G network readiness, thereby creating new monetization opportunities and efficiencies. Internet content delivery with Over the Top (OTT), Internet of Things (IoT)-based services, and big data analytics will all be key business drivers. Ultimately, the ability for carriers and service providers to balance innovation and efficiency will maintain their competitiveness in a rapidly changing environment.

Dell EMC is a leader in the implementation of rack-scale architecture among original equipment manufacturers (OEM) and this is evident in its open and flexible design of the DSS 9000. Conforming to industry-aligned standards and frameworks such as DMTF Redfish and Intel Rack Scale Design, the DSS 9000 promotes hardware interoperability and universal management. While others offer rack-based solutions, Dell EMC, with the Dell EMC DSS 9000, offers a good balance of innovation and efficiency and should be evaluated in customer buying decisions.

## DIGITAL IT TRANSFORMATION CONSIDERATIONS

Customers are rapidly moving from legacy IT systems to more open, software-defined infrastructure. The benefits are obvious — lower cost, greater flexibility to run multiple workloads, faster deployment and management simplicity. Often, digital IT transformation is the catch-all term that is used to encompass many different considerations based on the industry or vertical. However, with respect to workload applications for carriers, operators and service providers, digital IT transformation is best captured by four key technology considerations- hyperscale architecture, network functions virtualization and software-defined networking, edge computing and composable infrastructure. Not every customer will require each of these capabilities, but a vendor's capability to provide a total solution will position itself favorably among others.

### **Hyperscale Architecture**

Hyperscale architecture is the ability of a computing architecture to scale as increased demand is added to the system. Compute, memory, storage, networking fabric and other resources can be dynamically allocated to a set of nodes in a distributed network. Hyperscale architecture supports the underlying foundation for public, private and hybrid cloud topologies as well as big data analytics, but one size does not fit all. Often the requirements for the handling of end user data dictates the way hyperscale solutions are deployed. Hyperscale is the new datacenter standard, and both carriers and service providers are eager to mimic the same agility and efficiency so that efforts directed at “break/ fix” can be re-directed to more value-added activities. Dell EMC brings significant capabilities to bear for customers considering hyperscale architectures given its Extreme Scale Infrastructure (ESI) division's heritage began by serving this market before hyperscale was a standard IT term.

### **Network Functions Virtualization (NFV) & Software Defined Networking (SDN)**

NFV is an initiative to virtualize network services such as load balancing, firewalls and intrusion-prevention systems away from dedicated hardware. On the other hand, SDN is a series of network objects — switches, routers, firewalls — all deployed in a highly automated manner. Deploying both NFV and SDN can assist service providers and carriers in mitigating service delivery cost and improving service time to market. The foundation of each comprises an open architecture, standards based, multi-vendor management implementation such as Dell EMC's utilization of Redfish and cloud-based technology leverage. The next generation 5G wireless network rollout, expected to

begin in late 2018 or early 2019, will be costly and complicated. However, the benefits will far outweigh the costs given higher data throughput speed and lower latency that will support new monetization opportunities. Subsequently, NFV and SDN have the potential to accelerate the transition from present 4G networks to 5G networks faster than prior iterations, thus delivering significant efficiencies for new carrier service delivery.

### **Modular Datacenter (MDC) & Edge Computing**

Modular Datacenters (MDCs) consist of pre-fabricated building blocks that can be deployed in a fraction of the time of a brick and mortar datacenter and include all the necessary IT, power, cooling, fire protection and access control elements. The modular approach can help grow an existing datacenter in small increments, while maintaining optimum utilization. Modules can also be easily shipped to areas where building a permanent datacenter is impractical. The size and portable nature of smaller MDCs also makes them suitable for mobile network providers, who are increasingly turning to distributed datacenters as the platform to run network function virtualization (NFV) at the network edge to improve quality of service. The competitive advantage for carriers and service providers in deploying MDCs is the flexibility that the infrastructure can offer in providing consistency and scalability from the edge to the network core. Dell EMC's Extreme Scale Infrastructure (ESI) division has compelling capabilities with respect to its MDC offerings given its flexible solutions for different environments and environmental conditions.

### **Composable Infrastructure**

Composable infrastructure is widely defined in the public domain as a framework where compute, storage and networking are all disaggregated and treated as a service. Resources are pooled so that they do not have to be physically configured. Rather, the resources are allocated based on the definition of policies and APIs so they can be pooled, provisioned, deployed and decommissioned as workload needs change. There are a handful of solution providers deploying composability including Dell EMC. Given its nascent maturity, however, IT stakeholders should understand what resources are composable today and what will be composable in the future, without confusing the two.

## **DELL EMC DSS 9000 OVERVIEW**

ESI's vision for the Dell EMC DSS 9000 is to offer carriers and service providers IT at scale with a flexible hyperscale infrastructure that is based on open standards and

readily optimized to run multiple workloads. As an example, the ability for carriers and solution providers to run OpenStack and VMware on the same rack is a powerful value proposition.

At its core, the DSS 9000 provides compute, storage, networking, power and cooling with open management in a pre-integrated rack built to a specific customer's requirement. The rack scale infrastructure can be rolled into the datacenter or edge environment, plugged into facility power and networking, and managed at the rack level across the entire infrastructure via an open, industry-standard API.

To fully realize the potential of "IT at scale," this construct should be based on open standards, facilitate simple management, deliver scalability and consistency across the entire infrastructure and provide greater business agility by dynamically composing resources based on workload-specific demands.

### **Rack Level Management Delivers Simplicity**

Legacy management technologies force IT professionals to set up, deploy and manage individual hardware elements. The resulting efforts impede progress and increase administration complexity. With the DSS 9000, customers can provision and manage at the rack level as well as across the entire infrastructure with a single interface to enable new levels of efficiency.

Born out of the Distributed Management Task Force (DMTF), Redfish is an open industry specification with standard APIs that ensures interoperability with heterogeneous systems. It also facilitates easy and secure management of scale-out platform hardware. Given that the DMTF encourages extensions and enhancements to the specification, Redfish has rapidly addressed many components in the datacenter with its consistent API, security and stability.

Dell EMC is both a co-founder and strategic alliance member furthering the specification through its deployment on the DSS 9000. To learn more about Redfish, reference the latest on the standard [here](#).

### **Open Standards-based Architecture and Fabric Choice**

An open approach to any technology deployment typically brings with it faster implementation and lower cost. To accomplish the objective of creating an open platform, the ESI division built the DSS 9000 based on an open architecture leveraging modular Dell PowerEdge components.

As an Open Compute Project (OCP) Inspired platform that utilizes Redfish, the DSS 9000 facilitates standard management across multi-vendor datacenter environments. Furthermore, with an open networking approach, customers can select a network fabric of their choosing to support both NFV and SDN initiatives. This open networking approach is unique to Dell EMC relative to its competitors and further serves as a proof point around the deployment flexibility of the DSS 9000.

### **Consistency and Scalability from Edge to Core**

From a form factor perspective, the DSS 9000 comes in variety of rack heights and accommodates full, half and third-width compute and storage sleds. This flexibility enables the platform to easily scale from low, medium and high density based on a customer's requirements. An OpenIT Bay also accommodates standard equipment so that customers can adopt a mix-and-match approach that delivers exceptional flexibility and investment protection.

In its newest generation announced in September 2017, Dell EMC claims that the DSS 9000 will have the capability to scale to 96 nodes per rack, employ the latest Intel Xeon Scalable processing technology, offer 50 percent greater memory bandwidth and provide a dedicated internal 1GbE management network to each node. It stands to reason that given these new enhancements among others, the latest iteration of the DSS 9000 should dramatically improve scalability and performance without introducing complexity at both the edge and the core, and everything in between.

With respect to edge computing, Dell EMC offers a micro Modular Data Center (MDC) solution that is complimentary to the DSS 9000. Also, designed to a specific set of customer requirements, micro MDCs deliver pre-integrated IT (such as the DSS 9000), power and cooling in a pre-integrated solution that comes equipped with software that monitors and manages multiple MDCs and the associated IT from a single portal. With a compact footprint that is smaller than half a parking space, these micro MDCs are easily deployable solutions that can be placed indoors or outdoors.

The Dell EMC micro MDC platform delivers a flexible, easy-to-deploy solution that can speed the storage, processing, and analysis of nearby data. It can leverage outside air or mechanical cooling technologies, be built with a half rack to three racks of IT and configured with all IT equipment or a mixture of IT and power and cooling.

## Real World Composability

The power of hyperscale architectures are their ability to manage at scale and quickly deploy compute, storage and fabric based on changing workload needs. With carriers and service providers, workload requirements can change quickly, driving the need to turn hardware capacity on and off in real time. With the DSS 9000, organizations can leverage such capabilities.

Intel Rack Scale Design (RSD) provides IT with the ability to disaggregate hardware resources that can subsequently be pooled, provisioned, deployed and decommissioned at the rack or pod level and across the larger infrastructure.

Customers can create composable systems in the cloud environment of their choice, delivering simple yet solid provisioning of compute, storage, networking fabric, power, and cooling. Dell EMC leverages the Intel RSD topology to offer this highly utilitarian capability with the DSS 9000.

A good example that points to Dell EMC's capability around composability is within an OpenStack environment. OpenStack is quickly becoming the standard for massive scale-out environments based on its open, global developer community, modularity to integrate new and legacy infrastructure and proven time-tested reliability. Subsequently, Dell EMC has developed a toolkit to ease migration to an OpenStack datacenter or edge environment with the DSS 9000. These kickstart components work in conjunction with Redfish, Intel RSD/ POD Manager and orchestration tools to speed deployment. For further details, reference the [Dell EMC OpenStack Kickstart Guide for the DSS 9000](#).

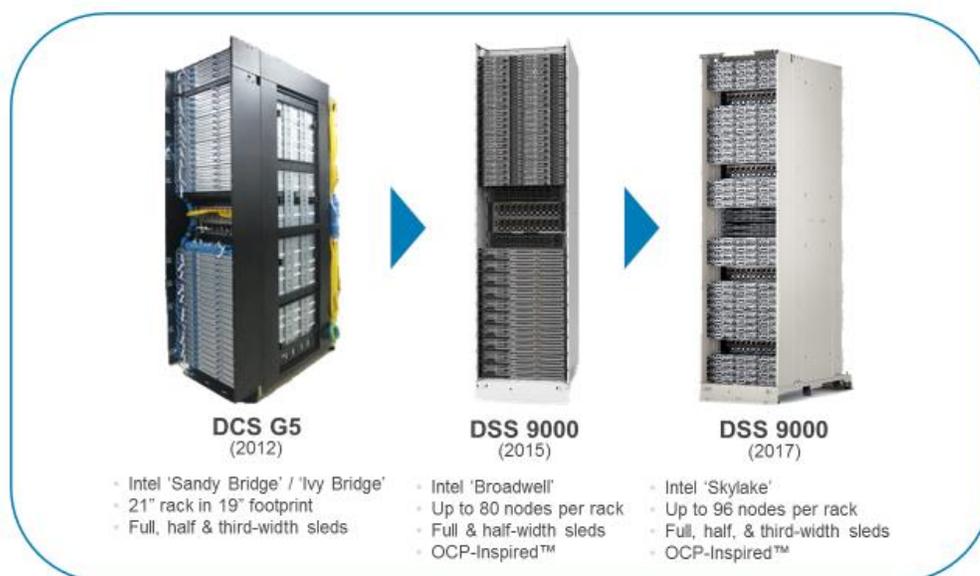
## DELL EMC EXTREME SCALE INFRASTRUCTURE DIVISION AS TRUSTED ADVISOR

With roots in the hyperscale market that position it as a pioneer, Dell EMC's ESI division focuses on delivering tailored solutions to large scale customers which include carriers, service providers and financial service institutions that are all rapidly shifting towards cloud-based architectures. ESI is well positioned to meet these customers unique and diverse set of needs given its decade-long experience optimizing infrastructure solutions for hyperscale cloud vendors.

With respect to its rack-scale infrastructure, the Dell EMC ESI division has a history with the architecture dating back to 2012 and its "G5" offering. Subsequently, the DSS 9000 represents a culmination of valuable learnings. The realization of disaggregated

hardware and the ability to more efficiently manage compute, storage and fabric with open management provides carriers and service providers of any size or scale the ability to stand up, manage and orchestrate IT infrastructure dynamically. Additionally, Dell EMC’s global support and supply chain capabilities should provide carriers and service providers deployment confidence and peace of mind.

**FIGURE 1: DELL EMC RACK SCALE PRODUCT EVOLUTION**



*(Source: Dell EMC Extreme Scale Infrastructure Division)*

## DELL TECHNOLOGIES CAPABILITY

In addition to ESI’s ability to offer a compelling open, pre-integrated architecture with the DSS 9000, Dell Technologies has an impressive depth of expertise across its companies — Dell, Dell EMC, Pivotal, RSA, SecureWorks, Virtustream and VMware. At an aggregate level, the conglomeration claims 100-percent penetration with top telecom providers and 90-percent penetration with IaaS and SaaS organizations through its capability to provide data, storage and security for global IT infrastructure and software. In an early August 2017 interview with Fortune Magazine, CEO Michael Dell claimed that the company stores just over half the mission critical data in the world and is an enabler for global multinational companies, governments and institutions to jump into (IT) digital transformation.

Dell EMC's set of validated solutions, high-performance computing platforms, blueprints, and reference architectures also bring unique capabilities to bear as the company has aligned with industry leading partners to deliver integrated offerings. Dell EMC's IT Support and Lifecycle Services capability is focused on professional consulting, deployment, education, asset recovery and recycling and support services. Additionally, Dell EMC asserts that its multi-channel global footprint and product portfolio synergy, arising from the acquisition of EMC in early 2017, brings the organization scale and deep reach given the combined intellectual property and workforce experience.

## CUSTOMER TESTIMONIAL: CENTURYLINK

CenturyLink built its CenturyLink Private Node and some of its public cloud offerings on the Dell EMC DSS 9000 based on the flexibility and scalability of the platform.

From a flexibility perspective, the Dell EMC DSS 9000 supported the requirements of its cloud environments while providing consistent management. Subsequently, CenturyLink customers can easily manage hybrid environments in a single tenancy and management console.

From a scalability perspective, with the CenturyLink Private Node, CenturyLink can offer its customers the ability to build up in quarter rack increments from 16 nodes to 64 nodes in a single rack.

"The DSS 9000 allowed a lot of flexibility in our design and infrastructure to be able to do a build-to-order customized private cloud solution," says Steve Nolen, Senior Product Manager for CenturyLink Technology Solutions.

## CALL TO ACTION

Carriers and service providers are faced with mounting pressure to innovate, operate more efficiently and determine how to specifically address digital IT transformation given a rapidly changing market landscape. Innovation will translate to increased customer value, and, given the expected demand for new consumer and commercial wireless broadband services, it will also serve to create customer "stickiness" for these stakeholders. Equally important are the demands to control CapEx and OpEx, speed IT infrastructure deployment and safeguard customer privacy and security.

The Dell EMC DSS 9000 has the capability to help IT solve both innovation and efficiency challenges through a simplified rack-scale infrastructure. It addresses the key technology vectors around hyperscale architecture, network functions virtualization and software-defined networking, edge computing and composable infrastructure.

It is also worth mentioning that the simplicity of the Dell EMC DSS 9000 rack-scale infrastructure makes it a compelling platform for consideration. It is easy to optimize with highly flexible and validated configuration options. It is easy to deploy with pre-configured, pre-integrated and fully tested complete rack solutions. It is easy to manage through a single, open management interface that addresses the entire infrastructure with multi-vendor support. It is easy to scale with the ability to add fully configured sleds or full racks at any time with plug-and-play simplicity. Finally, it is easy to maintain with a modular component framework supported by Dell EMC's global service network.

The transition from a legacy IT environment involving manual intervention, inefficiency, and higher OpEx/ CapEx to one of automation, virtualization and simplicity is complex. Many carriers and service providers need assistance to implement such a topology. Given the capability of the DSS 9000 and the ESI division's legacy and experience to function as a trusted advisor, carriers and service providers should consider Dell EMC to make digital IT transformation a reality.

## IMPORTANT INFORMATION ABOUT THIS PAPER

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