DELL BETS ON INTELLIGENT AUTOMATION FOR CONVERGED SYSTEMS STRATEGY

DELL ACTIVE SYSTEM MANAGER & DELL SYSTEM BUILDER PROVIDE POINTS-OF-DIFFERENTIATION FOR DELIVERING SERVICE-DEFINED INFRASTRUCTURE

EXECUTIVE SUMMARY

Converged Systems are an increasingly important segment of IT Infrastructure, as they provide increased agility and time-to-market for delivering private clouds. Moor Insights & Strategy (MI&S) sees the infrastructure market transitioning from a hardware-centric deployment and management approach to an approach that is defined by the services that are being delivered by the cloud. One of the key enablers of service-defined infrastructure is an intelligent automation control plane that controls all available infrastructure resources. MI&S expects the intelligent automation control plane to be a key point-of-differentiation for IT infrastructure vendors over the next several years.

Dell has been investing in innovation around intelligent automation for many years and has established a foundation for service-defined infrastructure with Dell Active System Manager and Dell System Builder. In addition, Dell's pending acquisition of EMC will provide the company with additional enterprise strength and product breadth. IT organizations looking to deploy next generation intelligent automation capabilities should speak with Dell to understand if the company's current and future datacenter solutions align with their needs.

MARKET DRIVERS FOR INTELLIGENT INFRASTRUCTURE AUTOMATION

MI&S sees **service-defined infrastructure** as the next inflection point that will drive next generation converged systems and will serve as a key enabler for future-ready hybrid clouds. With service-defined infrastructure, IT can dynamically provision (and re-provision) all resources to keep up with user requirements, provide support for continuous operations, and adhere to consistent end user service levels. Service-defined infrastructure will allow IT to get new mission-critical services up and running faster, utilize resources more efficiently, and improve ongoing service quality for the entire lifecycle of the service. MI&S laid out the key requirements that will drive the future of service-defined infrastructure in an earlier paper.

A critical element to enable a robust set of requirements for service-defined infrastructure is **intelligent infrastructure automation**. The foundation for this

automation capability is a unified systems management plane that controls network, storage, and compute resources and integrates with public cloud resources. The control point must support all assets and services across the organization and support new technologies as they emerge. The unified control plane is responsible for system configuration, automated resource provisioning, and ongoing lifecycle management such as service level monitoring and proactive service remediation. Intelligent infrastructure automation should encompass multi-vendor support via open standards and public APIs. As service-defined infrastructure enablement comes to fruition over the next several years, heterogeneous infrastructure and application environments will be managed under one umbrella. MI&S expects leading vendors to battle for the infrastructure automation control point, and we expect to see consolidation as this market matures.

DELL'S APPROACH TO INTELLIGENT AUTOMATION

Dell sees intelligent infrastructure automation capability as the lynchpin to future-ready hybrid clouds. Dell has been investing in innovation around intelligent automation for many years, beginning with the acquisition of Gale Technologies in 2012. Today, Dell's automation engine for converged systems consists of two primary elements: **Dell System Builder** and **Dell Active System Manager (ASM)**.

Figure 1 provides an overview of Dell's automation engine capability as a part of a service-defined infrastructure delivery model.

FIGURE 1: DELL'S AUTOMATION ENGINE FOR SERVICE-DEFINED INFRASTRUCTURE
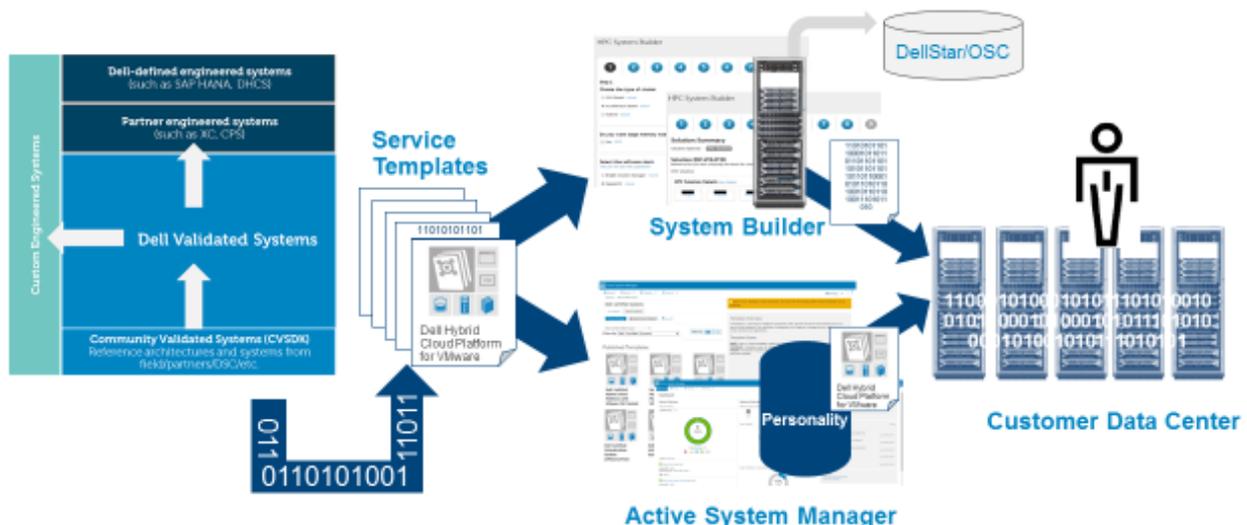
# DELL SYSTEM BUILDER AUTOMATES SYSTEM CONFIGURATION & ORDERING PROCESS

The automated system configuration process begins with Dell System Builder, where Dell sales teams and channel partners can work with their customers to identify a set of requirements. These include workloads, operating profile, system preferences, deployment size, and other specific optimization considerations to meet customers' specific needs. Based on these inputs, Dell System Builder evaluates system configuration options to prepare an integrated solution recommendation (servers, storage, networking, and in some cases software) that includes Dell reference architectures and engineered solutions.

Dell System Builder provides a variety of outputs to make the ordering and deployment process easier based on this recommendation.

- **Documentation**: Includes detailed bills of materials (BOMs), performance benchmarks, solutions documentation, and reference architecture details if applicable.
- **Solution Identification**: Provides a solutions ID that can help sales, channel, and supply chain teams link to Dell's ordering management system to help identify fully populated BOMs to simplify the order management process.
- **Dell ASM Template**: Creates a Dell Active System Manager (ASM) Service template to facilitate the initial onboarding and configuration of infrastructure that has been racked and stacked.
- **Deployment & Consulting Services Options**: Recommend the type and scope of support required from ProSupport Plus through ProDeploy to requiring a custom SOW.

Figure 2 provides an example of a visual solution summary built using Dell System Builder.

FIGURE 2: DELL SYSTEM BUILDER SOLUTION SUMMARY EXAMPLE
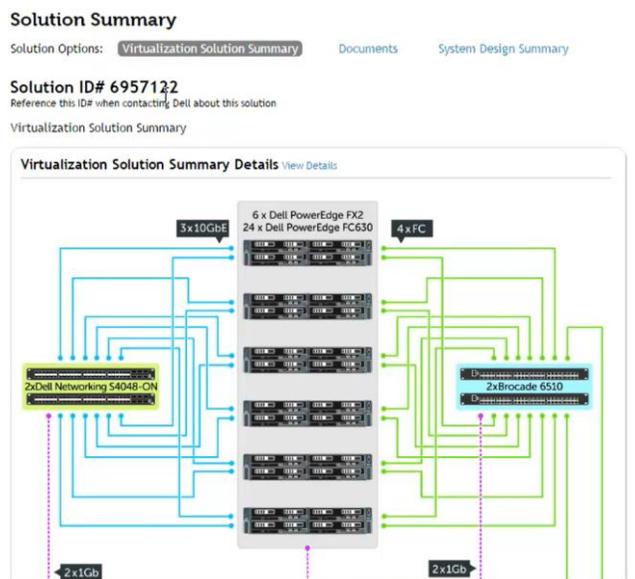
Dell System Builder helps provide customers and partners choice to create the scalable system right for their environment. Once the right solution is chosen and deployed, this system can be added to a customer's resource inventory and managed by Dell Active Systems Manager.

DELL ASM PROVIDES TEMPLATE-BASED SERVICE DELIVERY & MANAGEMENT

Dell Active System Manager serves as Dell's **unified automation and orchestration control point** for converged systems and has capabilities in some of the key areas of service-defined infrastructure as defined here. MI&S expects that Dell will begin to address the remaining elements of service-defined infrastructure in future releases of Dell ASM.

- **Automated Provisioning**: Using a catalog of available hardware, Dell ASM converts the hardware into pools of infrastructure resources that can be used to deliver applications and services. These pools are made available to users on demand, and unused components can be released back into the pools for re-use. Using the ASM user interface or its Rest APIs, capacity from various resources can be allocated to services based on their specific needs. Today, ASM uses server pools and intelligent selection to align service required to physical servers.
- **Workload / Application Centric**: Through service templates, ASM delivers a system personality (the "soul" of the system) optimized to deliver a specific

service or application. This personality is the instantiation of a template, deployed to a set of hardware or virtual machine resources, and maintained for the entire lifecycle of the service. The requirements of the personality are matched to the available resources, and a detailed validation of the user requirements from the template confirms if an appropriate set of infrastructure resources is available to support the service requirements. Once ASM validates that the right resources are available, the service is deployed using an intelligent selection algorithm ensuring the best match of workload to infrastructure. In addition, ASM helps make it simpler for IT to scale a service by adding resources based on the configuration information of the existing resources being used by the service. Figure 3 shows Dell ASM's unified dashboard and graphical template builder.

FIGURE 3: DELL ACTIVE SYSTEM MANAGER USER INTERFACE
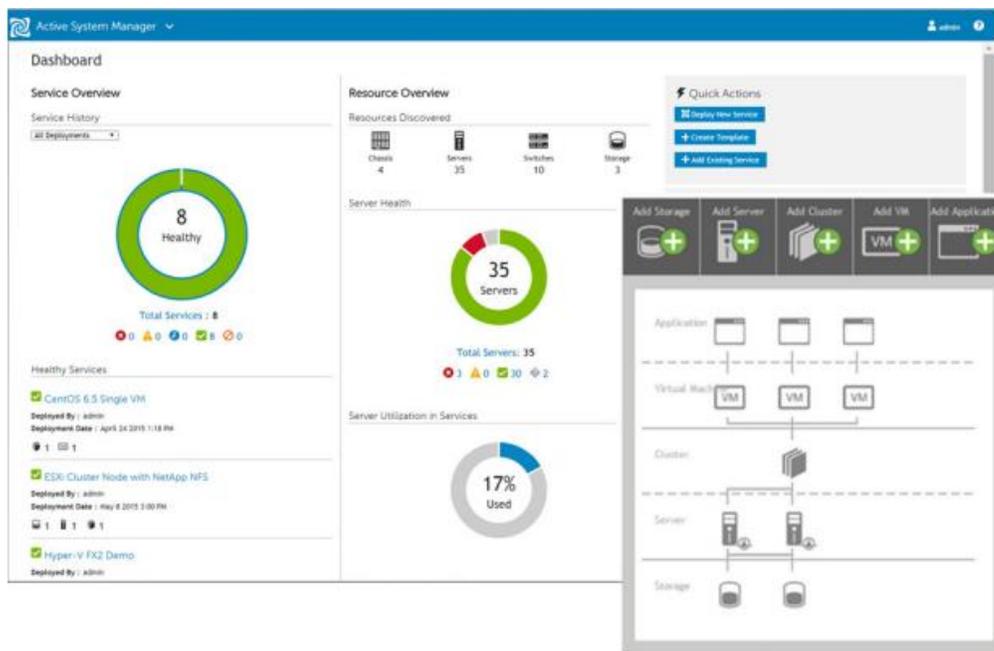
- **Solution Stack Level Support for Multiple Deployment Models**: ASM supports a growing list of system personalities for both traditional and cloud-native workload environments. As a starting point, Dell currently has a catalog of published ASM templates available for order. The services and application catalog is updated on a regular basis and is extensible via an ASM application SDK built on the open source Puppet application configuration framework. Channel partners, service providers, and end customers can download the Puppet modules (over 4,000 available today) or create new modules themselves to extend the capabilities of ASM.

- **Service Level Monitoring**: Once deployment is completed, ASM continues to monitor the ongoing service health and compliance of the system resources and personalities. ASM provides the appropriate alerts and remediation services when a service is compromised or needs attention. ASM uses a non-disruptive update model for system maintenance like firmware and BIOS updates. To help facilitate the update process, ASM releases firmware bundles that have been tested and validated against all hardware in the compatibility list across servers, storage, and networking. ASM also delivers compliance checking across compute, network, and storage, ensuring the firmware levels meet expectations.
- **Multi-vendor Support via Open Standards & Public APIs**: Dell has invested in system management capabilities for the underlying hardware platforms that help provide insight into the system-level details required to enable intelligent automation. ASM integrates with Dell's system management platforms including Dell iDRAC (servers), Dell CMC (chassis), Dell FTOS (networking), and Enterprise Manager (storage) to provide the intelligence for component automation. Dell also has a public API for ASM that allows other IHVs or ISVs to integrate into ASM for infrastructure configuration and management. Dell ASM is tightly integrated with leading management frameworks such as Microsoft System Center and VMWare vCenter. These integrations allow IT to automate their operational processes and design their workflows around enterprise needs using the same tools and frameworks they are already using today.

WHERE WILL DELL GO WITH INTELLIGENT AUTOMATION IN THE FUTURE?

MI&S expects to see a number of areas of innovation from Dell as the company continues to invest in intelligent automation.

- More workload / use case optimizations will become available as predefined personality templates within Dell ASM.
- Dell will expand support for more non-Dell systems in the Dell automation framework with a likely first step of bringing more VCE solutions into the fold once the EMC acquisition becomes final.
- Dell ASM does not yet support OpenStack, and we expect this support over time as EMC brings to the table OpenStack enablement capabilities.
- Dell ASM will provide enhanced infrastructure automation capabilities at the application layer and an enablement strategy for partners to add vertical and application specific services.

- Dell ASM will include expanded sophistication to enable composable infrastructure in the future, as fully disaggregated compute, storage, and fabric resources become a reality over the next several years.

CALL TO ACTION

The intelligent automation control plane will be the battleground for IT vendors as they look to enable the service-defined infrastructure of the future. Sophistication of automation capabilities and ease of use are important factors when comparing various solution approaches. However, there are a number of other elements to consider for IT organizations that are evaluating vendor solutions in this space.

- **Open, Extensible Support for Heterogeneous Environments**: IT organizations that operate heterogeneous environments should consider vendors who plan to offer intelligent automation capabilities for a wide range of hardware, cloud operating systems, services, and applications. Support for heterogeneous architecture enables seamless workload portability, efficient use of all infrastructure resources, and automated migration on demand.
- **Integration with Leading Systems Management Tools**: API-based integrations with third-party configuration management tools, DevOps tool chains, and widely used infrastructure management platforms allow IT organizations to automate operational processes and design workflows with the same tools and frameworks they already use.
- **Intelligent Automation of the Entire Solution Stack (Not Just the Hardware)**: Service-defined infrastructure requires management capabilities beyond just hardware; it must include hypervisor, cloud operating system, and application level management as well. Service-defined infrastructure must encompass automated management of all infrastructure models under one umbrella including traditional IT, private cloud (on premise physical and virtual) infrastructure, and public cloud resources. In this model, IT organizations must be able to rely on a single vendor for service and support regardless of the underlying infrastructure.

Dell's vision of an open, extensible intelligent automation approach aligns with where MI&S believes the market is heading. In addition, Dell's pending acquisition of EMC will provide the company with additional enterprise strength and product breadth. IT organizations looking to deploy next generation intelligent automation capabilities for future-ready hybrid clouds should speak with Dell to understand if the company's current and future datacenter solutions align with their needs.

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