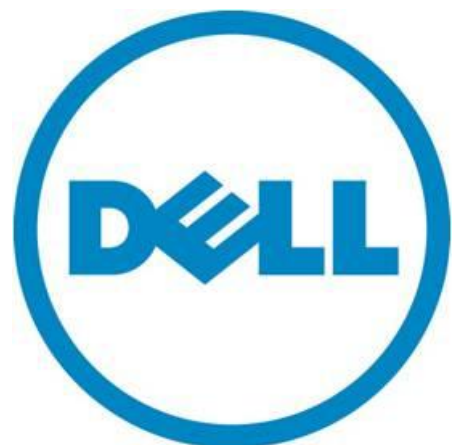# Global Solutions Engineering Value Adds for Reference Architectures and vStarts

Release 1.0

Dell Virtualization Solutions

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1 Introduction

This document provides high level details about the value add that the Global Solutions Engineering organization brings to Dell's vStart Solutions and Reference Architecture (RA) portfolios. Dell's Solutions Engineering team has extensive experience, expertise, and talent focused on designing, documenting, integrating, sustaining, and validating solutions that span a myriad of technology building blocks and ecosystems.   Dell's Solutions Engineering team has solved for complex IT solutions thousands of times. We have packaged the best of these designs into a solution family or reference architecture that you can leverage in your business, saving you time, money and reducing your deployment risks. While not an exhaustive list, the following areas introduce and highlight the path that solutions take from concept to delivery and while focusing on key Engineering solution value ads and differentiators for vStart Solutions and RAs.

2 Solution Design

vStart Solutions and RAs are designed with the following key design principles and technology features.

Maximize Redundancy
The solution is designed so that there is no single point of failure and redundancy is incorporated into all critical components of the solution. Network redundancy for the critical components is achieved with redundant network interface controllers (NICs), multiple host servers, storage arrays with raided disks, and multi-path connections with redundant switches.
For example, hypervisor virtual switches provide failover and NIC teaming functionality across the redundant network interfaces. Similarly, for iSCSI storage, redundancy is achieved with redundant NICs, switches, multi-pathing to the array and dual storage controllers. For both network and iSCSI traffic, the redundant NICs are selected in such a way that they are mapped across the LAN On Motherboards (LOMs) and add-in controllers to avoid any single point of failure. Hypervisor host level clustering provides HA for VMs by restarting the VMs on other hypervisor servers if a failure is detected on one of the other clustered hypervisor servers. The solutions also include redundant power supplies connected to separate PDUs.

Separation of LAN and iSCSI SAN Traffic
Dedicated NICs and switches are provided for iSCSI storage traffic to isolate the storage traffic from LAN traffic. This ensures minimal latency for storage I/O operations.

Separation of multiple LAN traffic types
Virtual Local Area Networks (VLANs) are used to provide security and logical separation of various traffic types required for virtualization and management traffic.

Requirements for Integration into an Existing Data Center
Thinking beyond just integration and validation, Engineering considers and documents data center requirements that a vStart or RA solution requires. This enables customers with their Dell Sales and Services teams to plan ahead of time, and successfully deploy the solution. This approach saves customers valuable time and enables a faster time to achieve a RoI on their infrastructure investment. Dell vStart and RA Solutions help minimize design and implementation mistakes that could occur if a less structured or less-rigorous planning and implementation approach is adopted.

Lifecycle Management

Virtualization ecosystem management products like VMware vCenter or Microsoft System Center Virtual Machine Manager, along with Dell developed management appliances like Dell OpenManage Plug-in, and Dell EqualLogic Host Integration Tools Virtual Edition for vCenter Server are integral parts of the solution RA and design. Hypervisor host level management capabilities are further enhanced and extended by fully integrating Dell OpenManage Server Administrator features that work in conjunction with the appliances, and Dell's iDRAC family of Out-of-Band Management solutions.

Dell vStart designs and Reference Architectures can also provide a basis for a Private Cloud infrastructure. Certain configurations have been certified as part of the Microsoft Fast Track for Private Cloud program – providing an integrated solution that uses Microsoft System Center management software to augment the vStart architecture and provide a platform for Private Cloud deployments. VMware's vCloud Plug-in for vCenter Server is also available as part of the vStart solution, thus providing customers the flexibility and choice to burst into the cloud as their business IT demands require.

While not a comprehensive list, the referenced products provide a perspective on how Dell's solutions are architected and designed to support and enable your preferences for in or out of band management, single pane of glass management, via individual host level management tools; or a combination that suites your operational and technology requirements.

3 Solution Development

After solution requirements are agreed upon Engineering locks on the design and integrate the various technology building blocks like hypervisors, management systems, servers, storage, and switches in the lab. Dell's engineers take the best practices of each of the solution components into account during the development phase. Once the solution is built to the design requirements and specifications, engineers validate that the building blocks as assembled work per the design. This phase along the solution path is more than just racking and cabling equipment in a 42U rack. The validation efforts are laser focused on implementing customer specific use cases and design details.

For example, consider a use case where a LAN (Local Area Network) switch loses power. The remaining redundant switch, along with the hypervisor virtual switches, VLAN, and teamed network adapter, implementation should continue to provide seamless network access to and no downtime with the hypervisor hosts, the virtual machines (VMs) and their related workloads.

Validation use case results are carefully logged in detail and undergo peer reviews to ensure that even a passing use case result stands on its own merit. Validation plans and use cases are not static, and are updated in real-time based upon customer feedback, technology specific requirements and changes, and internal learnings.

Along with validation, extensive design reviews are performed to ensure the architecture meets the requirements set forth in the solution definition, and that they perform as expected when configured.

4 Solution Packaging and Deployment

Engineering's role does not stop after design, integration, and validation phases are complete. As early as possible in the design and integration phases the engineering teams begin documentation development. Reference Architectures, Solution Overview, and Solution Design guides, are a sampling of the documents that are created for each solution.

vStarts are pre-configured solutions building blocks, as shown in Figure 1 below, that are assembled in our factory, shipped ready to be rapidly deployed on-site. One of Dell's technicians will arrive with the equipment to do the actual deployment of the solution, setting up the servers, storage, and management tools to ensure the infrastructure is ready to receive your workloads using your environmental settings.

The Reference Architectures are written for the technical IT community and explore the design principles, architecture, and technology elements that comprise a particular solution. Customers can use the RAs as a starting point to design and deploy the solution on their own, or engage Dell Services to fine tune the RA for the customer's environment; and if needed, deploy the RA as a solution for the customer.

Solution Designs are documents that dig deeper and provide specific design details. For example, specifications for virtual switch, port group, and uplink to physical NIC mappings for a hypervisor host are diagramed and explained in detail. Those mappings are then matched to the appropriate LAN or SAN switch ports, which in turn connect to the appropriate SAN array controller ports. VLANs that provide security and performance enhancements are also fully explored and explained.   vStarts go one step further with LAN and SAN switch configuration files that support the design by incorporating best practices like segmented LAN and iSCSI traffic, and traffic type isolation for management, hypervisor, or virtual machine traffic. As indicated earlier, the designs and implementation are fully validated prior to the release of any new solution.

Whether customers choose to implement a vStart or RA, the engineering behind these solutions is solid, based on years of experience and the latest technology from Dell.

Figure 1. The Dell vStart 50, 100, and 200 Family

For more information on vStarts and other Dell Solutions, please see www.dell.com/vstart