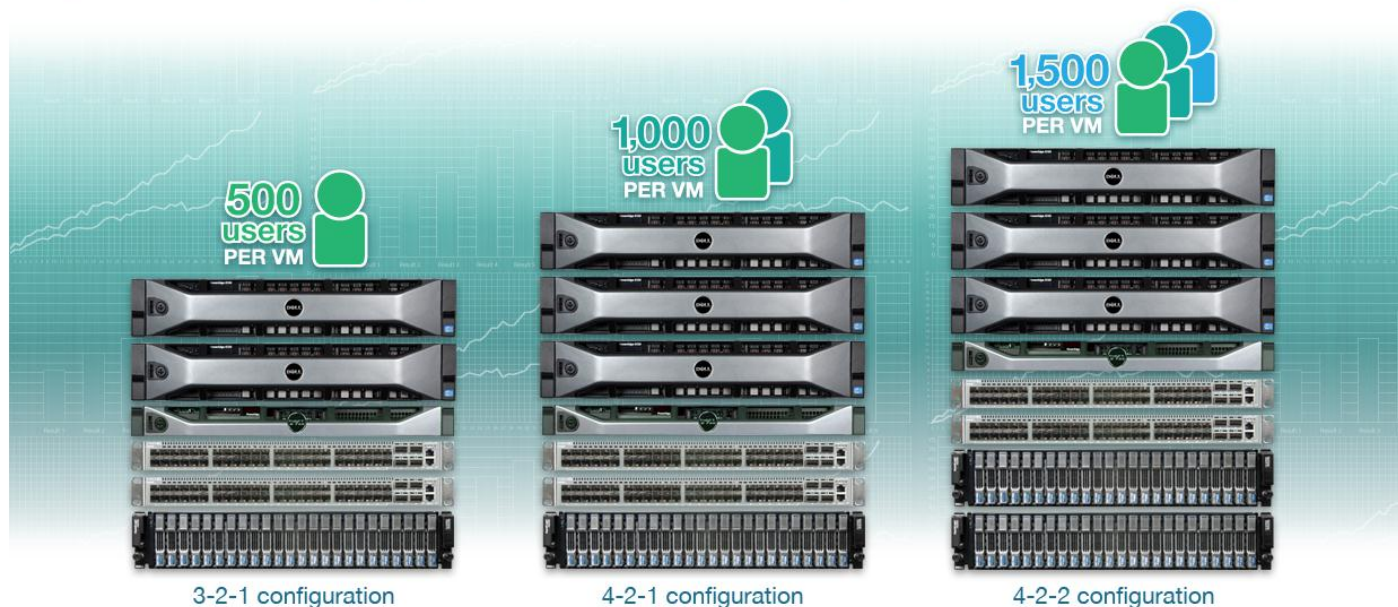**PERFORMANCE REPORT** | **CONFIGURATION GUIDE**

Dell™ Reference Configurations delivered scalable, high-availability performance for up to 1,500 users per VM

Dell 3-2-1 Reference Configurations provide your business with virtualized infrastructure solutions that are simple to deploy, manage, and upgrade. Consisting of a Dell PowerEdge™ R620 management server, Dell PowerEdge R720 application servers, Dell Force10™ S4810P 10G switches, and Dell EqualLogic™ PS6110XV storage, these robust solutions deliver the performance your business needs while reducing the likelihood of extended downtime due to their highly available architecture.

In Principled Technologies' labs, our testing showed that these configurations supported up to 500 users per VM for the 3-2-1 configuration, 1,000 users for the 4-2-1 configuration, and 1,500 users for the 4-2-2 configuration.

Upgrading these configurations is easy. To upgrade from a 3-2-1 configuration to a 4-2-1 configuration, where you add an additional Dell PowerEdge R720 server, is a 16-step process taking under two hours. A further upgrade from a 4-2-1 to a 4-2-2 configuration, where you add an additional Dell EqualLogic PS6110XV storage array, is even simpler—a 5-step process taking under 30 minutes.

Finally, your IT administrator can manage the entire virtualization infrastructure solution from a single access point via the management server, in conjunction with Microsoft® System Center 2012 and Microsoft Windows Server® 2012 Hyper-V™ and Failover Cluster management tools.

Proven performance

The Dell 3-2-1 Reference Configurations provide a solid platform upon which to build a virtualization infrastructure. To test each configuration, we ran a mixed workload such as a typical business would generate. We ran 500, 1,000, and 1,500 users against each of the following four VMs hosted on the 3-2-1, 4-2-1, and 4-2-2 configurations, respectively:

- Two database application VMs running Microsoft SQL Server® 2012
- One mail server VM running Microsoft Exchange Server 2010 SP2
- One collaboration application VM running Microsoft SharePoint® Server 2010 SP1

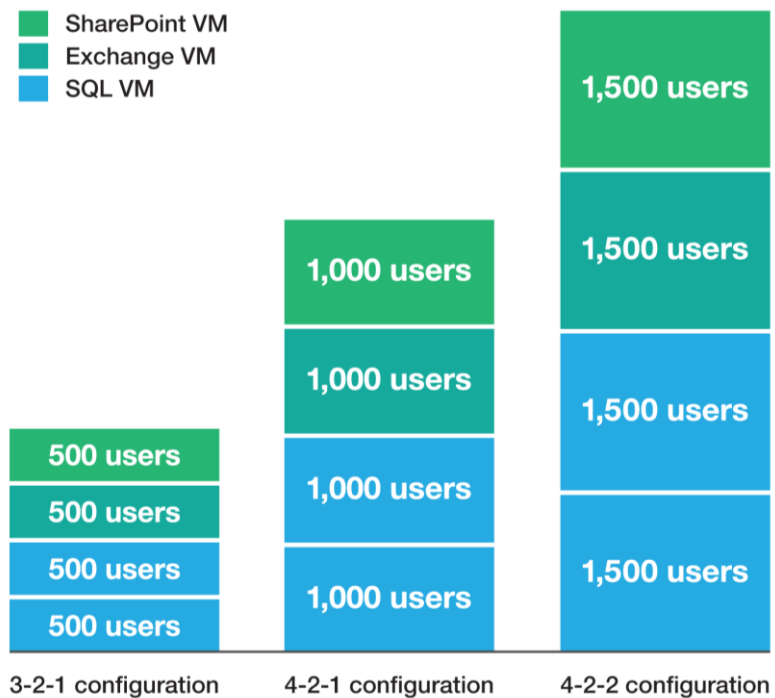Figure 1 summarizes the users that each configuration supported on each of the VMs.

Figure 1. Dell Reference Configurations supported anywhere from 500 users to 1,500 users per VM.

Please see our performance report[1] for additional information from our testing.

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[1] http://www.principledtechnologies.com/clients/reports/Dell/R720_321_upgrade_performance.pdf

Simplified scalability

Dell designed the 3-2-1 reference configuration with scalability in mind, making it easy to install and configure additional components as your business grows.

The 3-2-1 base configuration can be upgraded to a 4-2-1 configuration by adding a third Dell PowerEdge R720 server. As Figure 2 shows, there are only 16 major steps involved in the upgrade, which can be completed in less than two hours.

Major steps to upgrade a 3-2-1 configuration to a 4-2-1 configuration by adding a third Dell PowerEdge R720 server
1. Unbox and rack the new Dell PowerEdge R720 server.
2. Connect power and networking cables.
3. Power the server and configure initial BIOS and iDRAC settings.
4. Log in and rename your server in Windows Server 2012.
5. Create a teamed NIC for your Public-VM traffic and assign an IP address.
6. Create VLANs on the 10Gb dual port NICs and assign IP addresses.
7. Join the server to the domain.
8. Install the Hyper-V role, Failover Cluster feature, and Multipath I/O feature.
9. Install the Dell EqualLogic Host Integration Toolkit.
10. Configure MPIO settings in the Dell EqualLogic Remote Setup Wizard.
11. Log into the Dell EqualLogic Web interface and add iSCSI access.
12. Configure iSCSI Initiator on your new server and connect to the volumes.
13. Create the external virtual switches for your cluster in Hyper-V Manager.
14. On the management server, shut down the VMs and offline the cluster disks.
15. Complete the Add Node wizard to add the additional Hyper-V host server.
16. Run the Configure Cluster Quorum Settings wizard.

Figure 2. Summary of steps required to upgrade the 3-2-1 configuration to a 4-2-1 configuration.

Upgrading a 4-2-1 configuration to a 4-2-2 configuration by adding a second Dell EqualLogic PS6110XV array is an even simpler process. As Figure 3 shows, there are only five major steps involved in the upgrade that can be completed in less than 30 minutes.

Major steps to upgrade a 4-2-1 configuration to a 4-2-2 configuration by adding a second Dell EqualLogic PS6110XV array
1. Unbox and rack the new Dell EqualLogic PS6110XV.
2. Connect power and networking cables.
3. Connect to the array via serial port and terminal utility.
4. Complete the initial setup wizard, entering the existing storage group name and credentials when prompted.
5. Log into the Dell EqualLogic Web interface and set the RAID level.

Figure 3. Summary of steps required to upgrade the 4-2-1 configuration to a 4-2-2 configuration.

Robust management

The Dell 3-2-1 Reference Configurations come with a Dell PowerEdge R620 management server, allowing you to manage the entire solution from a single access point. System Center 2012 Virtual Machine Manager and Operations Center work in unison to provide a simplified management experience for a virtual environment. Using the improved failover cluster and Hyper-V manager in Windows Server 2012, and the Dell Server PRO Management Pack, administrators can monitor Dell systems and virtual machine health with increased ease and take action to resolve issues more efficiently.

The new Integrated Dell Remote Access Controller (iDRAC) 7 is featured on both the Dell PowerEdge R620 and R720 servers. iDRAC 7 increases remote management and troubleshooting capabilities, providing the ability to mount media remotely, monitor hardware status, and view the hardware console via a Web browser.

Please see our guide[2] for additional information on configuring, managing, and upgrading your new Dell 3-2-1 Reference Configuration.

CONCLUSION

Dell 3-2-1 Reference Configurations provide a range of virtualized infrastructure solutions to meet your business's needs today and in the future. Easy to deploy, manage, and upgrade, these robust solutions can grow as your business does, all the while reducing the likelihood of extended downtime due to their highly available architecture.

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[2] http://www.principledtechnologies.com/clients/reports/Dell/R720_321_upgrade_configuration.pdf

ABOUT PRINCIPLED TECHNOLOGIES

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Principled Technologies, Inc.
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We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help our clients assess how it will fare against its competition, its performance, its market readiness, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.