



**SPC BENCHMARK 1™  
EXECUTIVE SUMMARY**

**DELL, INC.  
DELL EQUALLOGIC PS6210XV ARRAY**

**SPC-1 V1.14**

**Submitted for Review: June 9, 2014  
Submission Identifier: A00144**

**EXECUTIVE SUMMARY****Test Sponsor and Contact Information**

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**Revision Information and Key Dates**

<b>Revision Information and Key Dates</b>	
<b>SPC-1 Specification revision number</b>	V1.14
<b>SPC-1 Workload Generator revision number</b>	V2.3.0
<b>Date Results were first used publicly</b>	June 9, 2014
<b>Date the FDR was submitted to the SPC</b>	June 9, 2014
<b>Date the Priced Storage Configuration is available for shipment to customers</b>	currently available
<b>Date the TSC completed audit certification</b>	June 6, 2014

## Tested Storage Product (TSP) Description

Built on an advanced, peer storage architecture, EqualLogic storage simplifies the deployment and administration of consolidated storage environments, enabling:

- Perpetual self-optimization with automated load balancing across disks, RAID sets, connections, cache and controllers.
- Efficient enterprise scalability for both performance and capacity without fork-lift upgrades.
- Powerful, intelligent and simplified management.
- Improved productivity and streamlined IT infrastructure through unified block and file storage capabilities.

What's more, EqualLogic products include a comprehensive software portfolio with easy-to-use array software, host integration tools and no licensing fees. EqualLogic virtualized-storage offers a simple path to rapid deployment, comprehensive data protection, enterprise-class performance and reliability, and seamless pay-as-you grow expansion. All EqualLogic PS Series arrays are completely interoperable and can be mixed and matched to build tiered storage within a single storage pool or across multiple pools.

EqualLogic PS6210 Series arrays bring a new level of performance to service more of your most demanding applications and virtualization requirements, while delivering the simplicity of the EqualLogic management experience. Featuring six array configurations, including 2U/2.5" drive options with All Flash and Hybrid Arrays, it is ideal for companies and organizations with growing data and performance needs.

## Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: Dell EqualLogic PS6210XV Array	
Metric	Reported Result
SPC-1 IOPS™	25,147.22
SPC-1 Price-Performance™	\$3.87/SPC-1 IOPS™
Total ASU Capacity	6,023.786 GB
Data Protection Level	Protected 2 ( <i>mirroring</i> )
Total Price	\$97,402.81
Currency Used	U.S. Dollars
Target Country for availability, sales and support	USA

SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

SPC-1 Price-Performance™ is the ratio of **Total Price** to SPC-1 IOPS™.

**Total ASU** (Application Storage Unit) **Capacity** represents the total storage capacity available to be read and written in the course of executing the SPC-1 benchmark.

A **Data Protection Level** of **Protected 2** using **Mirroring** configures two or more identical copies of user data..

**Protected 2:** *The single point of failure of any component in the configuration will not result in permanent loss of access to or integrity of the SPC-1 Data Repository.*

**Total Price** includes the cost of the Priced Storage Configuration plus three years of hardware maintenance and software support as detailed on page 9.

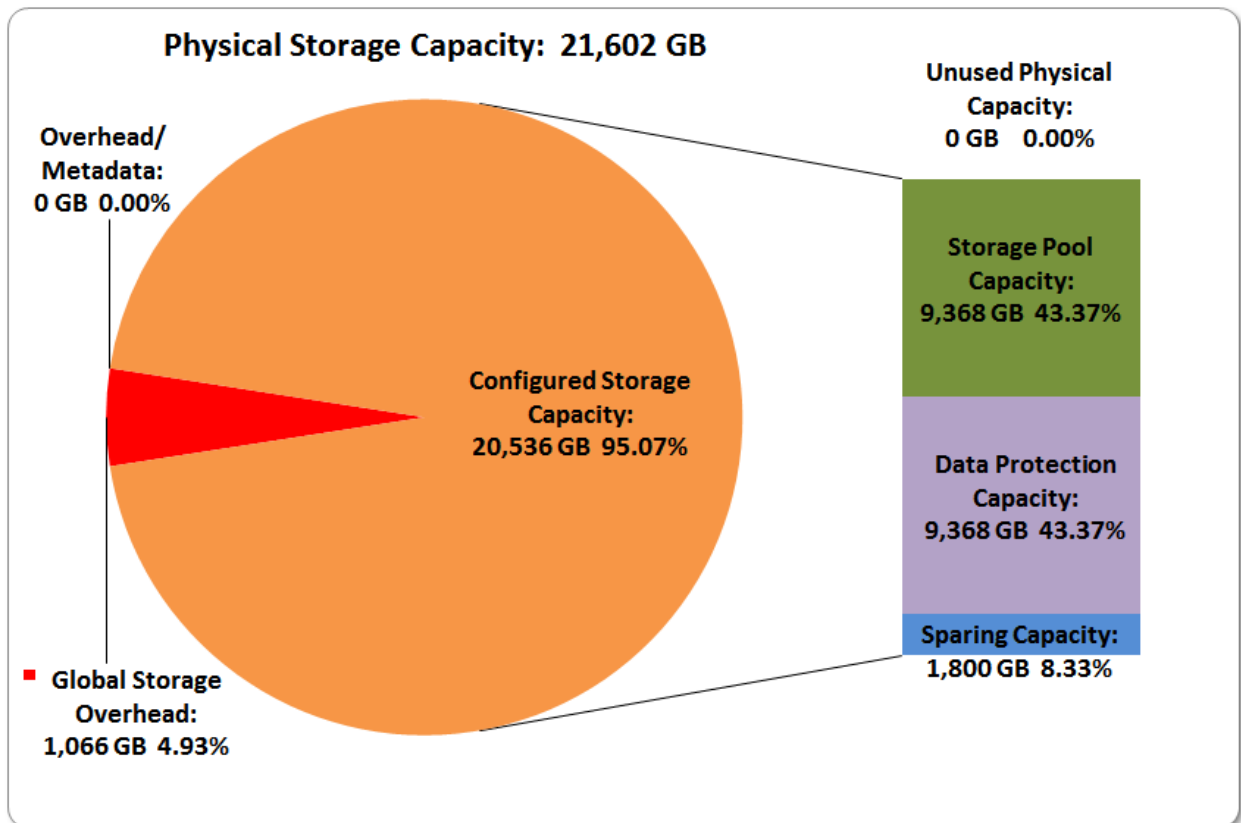
**Currency Used** is formal name for the currency used in calculating the **Total Price** and **SPC-1 Price-Performance™**. That currency may be the local currency of the **Target Country** or the currency of a difference country (*non-local currency*).

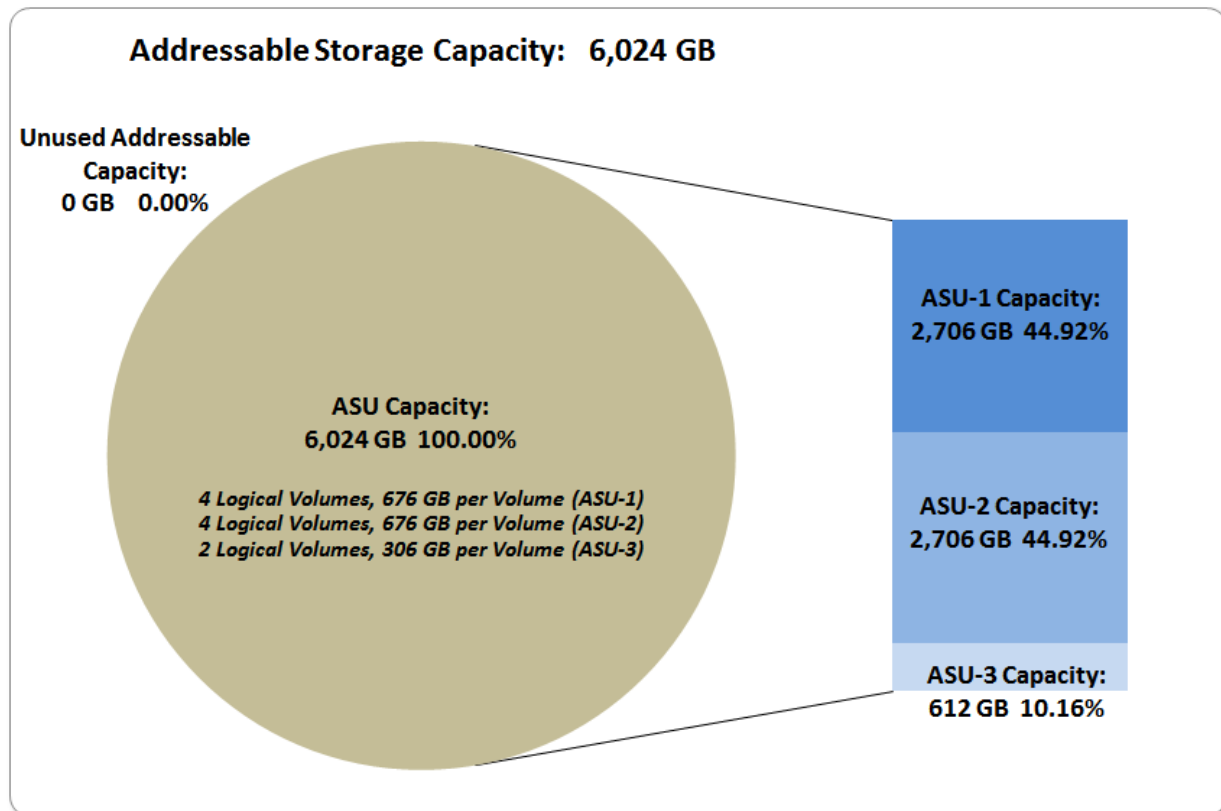
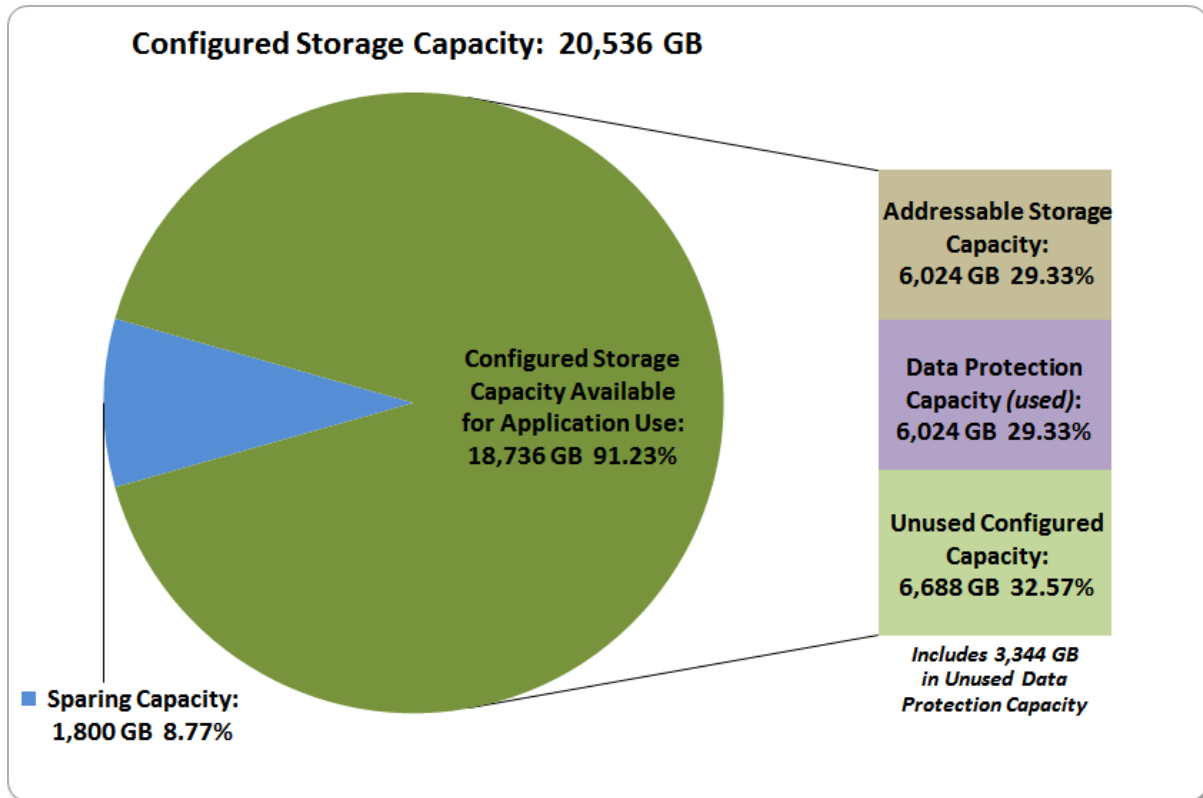
The **Target Country** is the country in which the Priced Storage Configuration is available for sale and in which the required hardware maintenance and software support is provided either directly from the Test Sponsor or indirectly via a third-party supplier.

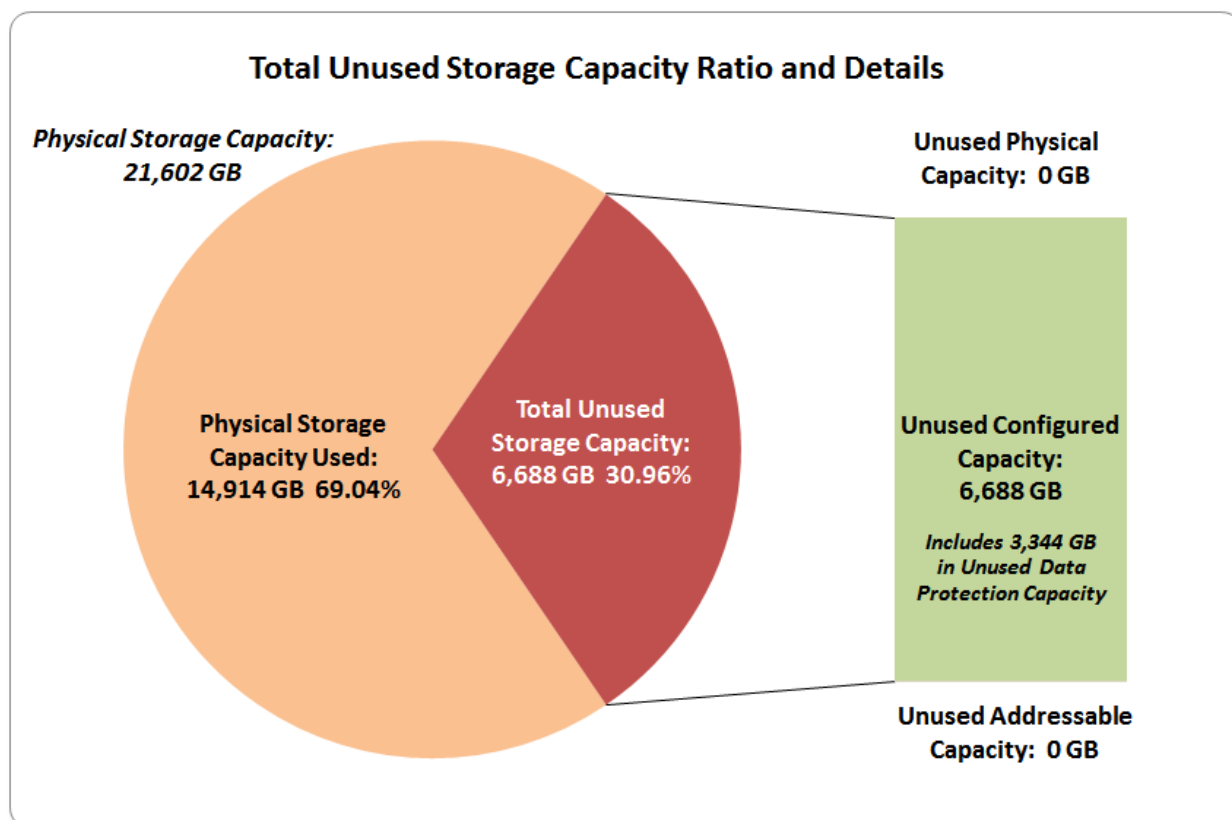
### Storage Capacities, Relationships, and Utilization

The following four charts and table document the various storage capacities, used in this benchmark, and their relationships, as well as the storage utilization values required to be reported.

The capacity values in each of the following four charts are listed as integer values, for readability, rather than the decimal values listed elsewhere in this document.







SPC-1 Storage Capacity Utilization	
Application Utilization	27.89%
Protected Application Utilization	55.77%
Unused Storage Ratio	30.96%

**Application Utilization:** Total ASU Capacity (6,023.786 GB) divided by Physical Storage Capacity (21,601.657 GB).

**Protected Application Utilization:** (Total ASU Capacity (6,023.786 GB) plus total Data Protection Capacity (9,367.839 GB) minus unused Data Protection Capacity (3,344.072 GB)) divided by Physical Storage Capacity (21,601.657 GB).

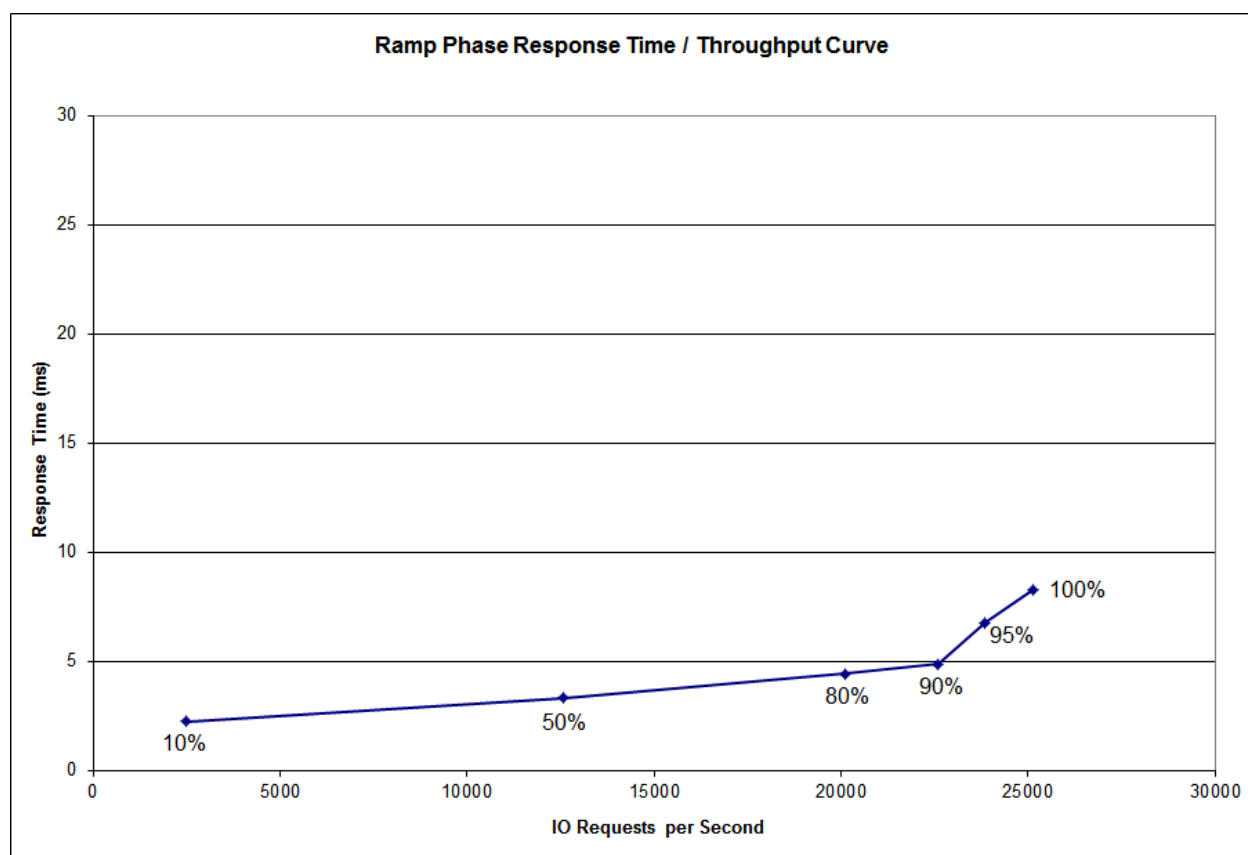
**Unused Storage Ratio:** Total Unused Capacity (6,688.143 GB) divided by Physical Storage Capacity (21,601.657 GB) and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 24-25 in the Full Disclosure Report.

## Response Time – Throughput Curve

The Response Time-Throughput Curve illustrates the Average Response Time (milliseconds) and I/O Request Throughput at 100%, 95%, 90%, 80%, 50%, and 10% of the workload level used to generate the SPC-1 IOPS™ metric.

The Average Response Time measured at the any of the above load points cannot exceed 30 milliseconds or the benchmark measurement is invalid.



## Response Time – Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
<b>I/O Request Throughput</b>	2,501.17	12,555.69	20,100.50	22,593.98	23,847.64	25,147.22
<b>Average Response Time (ms):</b>						
<b>All ASUs</b>	2.25	3.33	4.43	4.86	6.78	8.30
<b>ASU-1</b>	3.03	4.46	5.68	6.18	8.55	10.41
<b>ASU-2</b>	2.39	4.41	7.45	8.56	12.65	15.95
<b>ASU-3</b>	0.52	0.45	0.44	0.45	0.46	0.48
<b>Reads</b>	4.59	6.94	9.73	10.83	15.63	19.43
<b>Writes</b>	0.72	0.98	0.97	0.97	1.02	1.05



## Priced Storage Configuration Pricing

Quantity	Part Number	Description	Discount Percentage	Reference Price	Extended Price
3	210-ABPJ	Dell EqualLogic PS6210XV, 2 controller nodes, each with 16GB non-volatile cache of memory, 2 10GBASE-T RJ45 auto-sensing (10Gb/1Gb/100Mb) ports, 2 10GbE SFP+ ports for fibre or copper cabling, 24 300GB 15k 2.5" SAS drives + 3 Yr Pro Support Maintenance	43%	\$ 48,372.00	\$ 82,716.12
2	225-3586	Dell PowerConnect 8132 SFP Layer 3 10GbE + 3 Yr Pro Support Maintenance	55%	\$ 15,813.00	\$ 14,231.70
1	A3612382	Intel E10G42BTDA Server Adapter X520-DA2 10Gbps	9%	\$ 499.99	\$ 454.99
		<b>Total System Price</b>			<b>\$ 97,402.81</b>

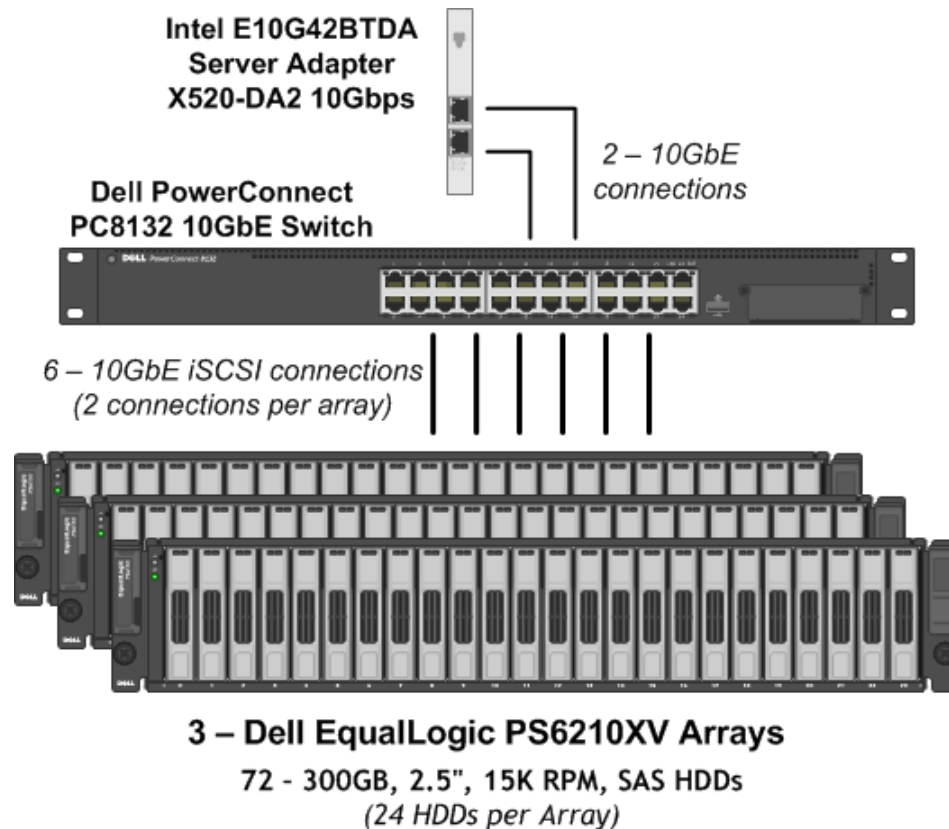
The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems within four (4) hours.
- Onsite presence of a qualified maintenance engineer or provision of a customer replaceable part within four (4) hours of the above acknowledgement for any hardware failure that results in an inoperative Priced Storage Configuration that can be remedied by the repair or replacement of a Priced Storage Configuration component.

### Differences between the Tested Storage Configuration (TSC) and Priced Storage Configuration

A second Dell PowerConnect 10GbE switch was included in the Priced Storage Configuration as a spare to fulfill one of the requirements for a data protection level of [Protected 2](#).

## Priced Storage Configuration Diagram



## Priced Storage Configuration Components

Priced Storage Configuration
1 – Intel E10G42BTDA Server Adapter X520-DA2 10Gbps
2 – Dell PowerConnect PC8132 10GbE Switches (second switch included as a spare)
<b>3 – Dell EqualLogic PS6210XV Arrays</b> each array with: <ul style="list-style-type: none"> <li>2 – controller nodes with 16 GB cache (6 controller nodes total)</li> <li>2 – 10GBASE-T auto-sensing (10Gb/1Gb/100Mb) ports (6 ports total)</li> <li>2 – 10GbE SFP+ front-end ports (6 ports total, 6 ports used)</li> <li>1 – 6Gb SAS connection (3 total, 3 used)</li> <li>24 – 300 GB, 2.5", 15K RPM, SAS HDDs (72 HDDs total)</li> </ul>