



Initial investment payback analysis summary report: Dell PowerEdge R710 solution vs. Dell PowerEdge 2850 solution

Executive summary

Dell Inc. (Dell) commissioned Principled Technologies (PT) to estimate how many months it would take to recapture initial investment costs when consolidating multiple 4-year-old Dell™ PowerEdge™ 2850 server and storage solutions onto a Dell PowerEdge R710 server and storage solution. In this report, we estimate both the number of older solutions each Dell PowerEdge R710 solution can replace and the payback period for replacing those older solutions. We compare the following two solutions:

- Intel® Xeon® Processor X5550-based Dell PowerEdge R710 server with 48 GB of memory and Dell™ EqualLogic™ PS6000XV storage (Dell PowerEdge R710 solution)
- Intel Xeon Processor 3.6 GHz-based Dell PowerEdge 2850 server with 4 GB of memory and Dell PowerVault™ 220S storage (Dell PowerEdge 2850 solution)

KEY FINDINGS

- Each Dell PowerEdge R710 solution can replace up to nine Dell PowerEdge 2850 solutions, and could yield a payback in around 9 months.¹ (See Figure 1.)
- The Dell PowerEdge R710 solution delivered over nine times the OPM performance of the Dell PowerEdge 2850 solution.¹
- The Dell PowerEdge R710 solution used little more than 1/7th of the power, 1/9th of the software costs, and 1/9th of the data center rack space of the nine Dell PowerEdge 2850 solutions.¹

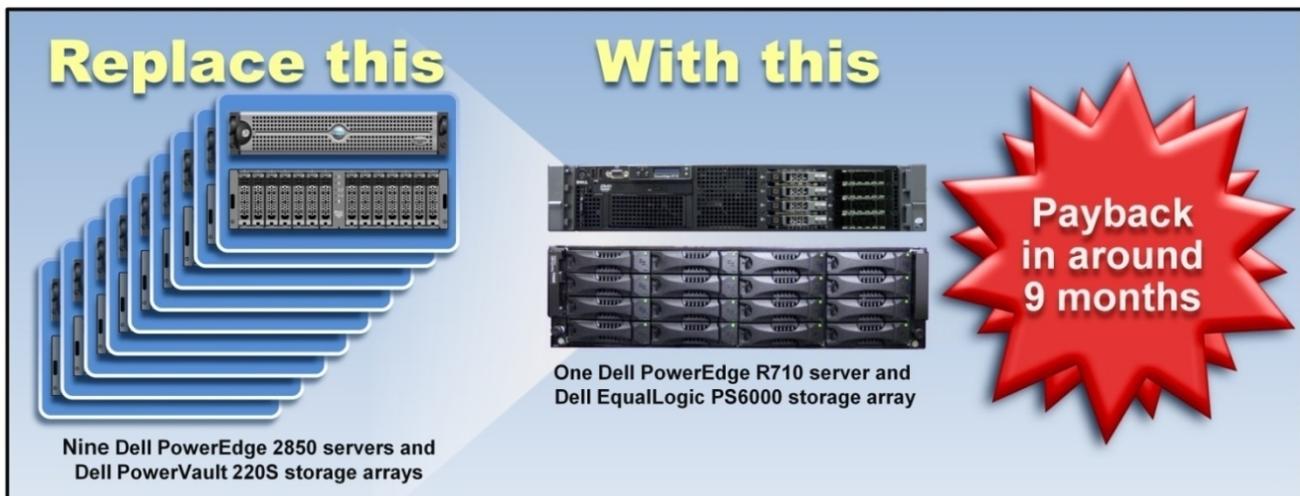


Figure 1: A single Intel Xeon Processor X5550-based Dell PowerEdge R710 solution allows you to consolidate nine Intel Xeon Processor 3.6 GHz-based Dell PowerEdge 2850 solutions, with an initial investment payback period of around 9 months. We base this estimation on our specific database workload.

Our test case modeled a typical enterprise datacenter with multiple legacy Dell PowerEdge 2850 solutions running high-demand database workloads. The legacy servers each used 4 GB of memory. The enterprise in this test case seeks to consolidate several of these legacy workloads onto Dell PowerEdge R710 solutions configured with sufficient processors, memory, and storage to handle these workloads.

We used benchmark results from the Dell DVD Store Version 2.0 (DS2) performance benchmark to determine the number of older servers with accompanying storage that a Dell PowerEdge R710 solution could replace. To define the replacement factor, we measured the number of orders per minute (OPM) that the Dell PowerEdge

¹ Based on the Principled Technologies report, "Initial investment payback analysis: Dell PowerEdge R710 solution vs. Dell PowerEdge 2850 solution," commissioned by Dell, May 2009.

2850 solution could perform when running a demanding DS2 workload. We then ran a similar workload on the Dell PowerEdge R710 solution and measured the maximum OPM that this newer solution could perform. We divided the OPM for the Dell PowerEdge R710 solution by the OPM for the Dell PowerEdge 2850 solution to determine the replacement factor. Based on our specific workload, the replacement factor is 9.4. Figure 1 depicts this replacement factor for replacing nine Intel Xeon Processor 3.6 GHz-based Dell PowerEdge 2850 solutions with a single Intel Xeon Processor X5550-based Dell PowerEdge R710 solution, as well as the initial investment payback time of around 9 months.

Figure 2 graphs the payback period and the cost savings of the Dell PowerEdge R710 solution. Savings continue after the initial investment payback period. By the end of year one, we project a savings of \$11,658. The line representing the Dell PowerEdge R710 solution accumulates the initial investment cost and the monthly costs of the solution. The initial investment cost includes the list price of the server and half of the cost of the shared storage, as well as the costs of migrating from the Dell PowerEdge 2850 solution to the newer Dell PowerEdge R710 solution. The line for the Dell PowerEdge 2850 solution shows the accumulated monthly costs of that solution. The lines cross at the end of the payback period.

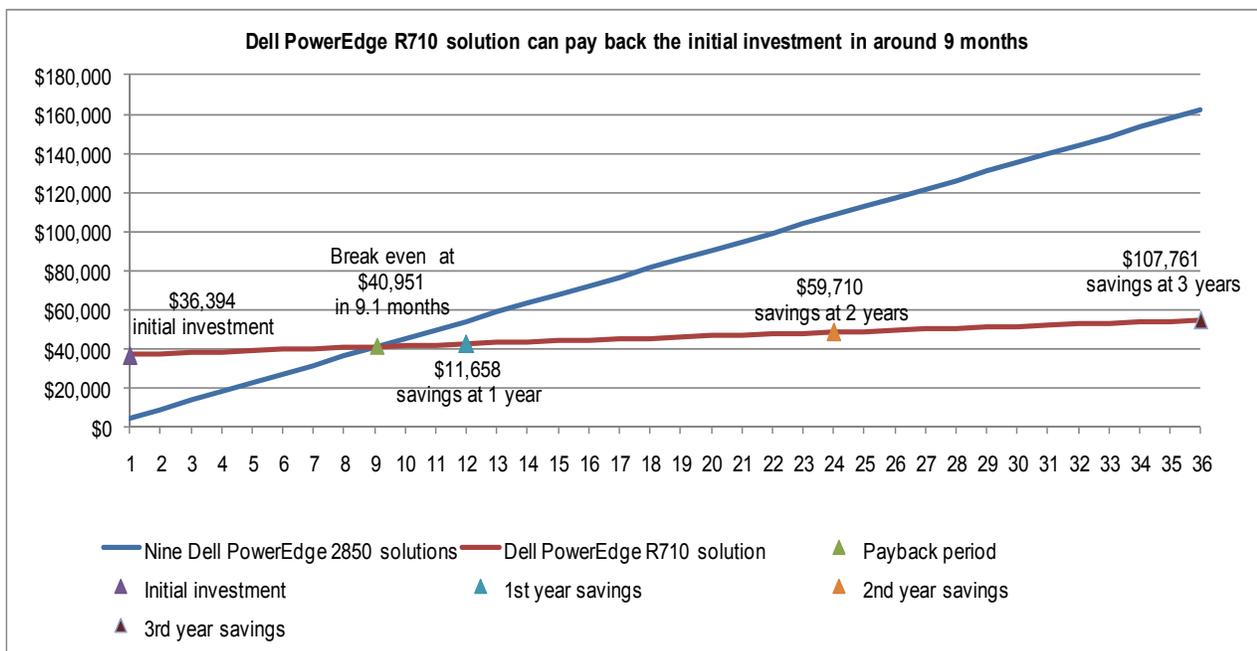


Figure 2: The payback period and cumulative estimated costs for the nine Dell PowerEdge 2850 solutions and the Dell PowerEdge R710 solution. Lower costs and higher savings are better.

Four benefits of the Dell PowerEdge R710 solution contribute significantly to the cost savings for this solution:

- **Replaces up to nine Dell PowerEdge 2850 servers with Dell PowerVault 220S storage arrays.** The increased I/O capacity, database performance, and memory efficient design of the Dell PowerEdge R710 solution enables consolidation of multiple older systems for the specific workload we tested.
- **Uses slightly more than one-seventh of the power of the nine Dell PowerEdge 2850 solutions it replaces.** The consolidated Dell PowerEdge R710 solution provides considerable energy savings because it requires little more than 16 percent of the power of the older Dell PowerEdge 2850 solutions that it replaces. We gain additional savings in energy costs because the test workload requires at most half the shared storage array.
- **Requires approximately one-ninth of the Windows Server® and Windows® SQL Server® licenses.** Consolidation provides immediate savings for the organization that maintains software assurance agreements. Other organizations would need to wait until they could retire the inactive licenses or transfer them to another solution before they could to realize the license savings. We do not include license costs for either solution, as the enterprise would already have paid for the licenses used on the older solution

and would transfer them to the new solution. We do include the costs of ongoing software agreements. For the calculations in this paper, we assume that the target organization maintains software agreements for OS and database software.

- **Requires approximately one-ninth of the data center rack space.** The consolidated Dell PowerEdge R710 solution requires 2u of rack space for the server and 3u for the storage array. The older Dell PowerEdge 2850 solution requires 5u for each of the nine server-and-storage-array pairs, for a total of 45u; by contrast, the single Dell R710 solution consumes only 5u.

Server configuration information

Figure 3 presents detailed information for the test servers we used in this report.

Servers	Dell PowerEdge R710	Dell PowerEdge 2850
CPU name	Dual Intel Xeon Processor X5550	Dual Xeon Processor 3.6 GHz
CPU core frequency (GHz)	2.66	3.60
System/vendor and model number	Dell PowerEdge R710	Dell PowerEdge 2850
RAM	48GB PC3-10600 DDR3	4GB PC2-3200 DDR
RAM speed (MHz)	1,333	400
RAM speed in the system currently running @ (MHz)	1,066	400
Operating system	Windows Server 2008 Enterprise Edition x64	Windows Server 2003 R2 Enterprise Edition
SQL Server version	SQL Server 2008	SQL Server 2005
Storage arrays	iSCSI-attached Dell EqualLogic PS6000XV with 16 450GB 15K RPM SAS drives	SCSI-attached Dell PowerVault 220S with 14 146GB 10K RPM U320 SCSI drives

Figure 3: Detailed system configuration information for the two test servers.

For more information on these tests, and to see the full test report, visit: www.principledtechnologies.com.

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