

Introduction to EMC Oracle Optimized Warehouse Reference Configurations

EMC and Oracle have worked together to test and document a set of data warehousing reference configurations that provides customers with “best practices” based on extensive experience from leaders in the data warehousing industry. The configurations are optimized for different scales of customer data warehouse requirements, aligning software, hardware, storage, I/O, and networking together into a comprehensive solution based on joint technical knowledge and customer experience.

Reviewing the data warehouse raw data size (from 1 TB to 144 TB) and workload data, customers can select the configuration that is best suited for their performance, scalability, and time-to-deployment needs. These include:

- Balanced hardware solutions across external and internal components
- Choice of operating system/platform
- Small to very large data warehouses
- Standardized components to accelerate implementations
- Design assistance from EMC Consulting

Each of the reference configurations is designed to eliminate bottlenecks and provide a balance of processing power and throughput across all tiers of the infrastructure, including database, server, storage, and connectivity. The reference configurations are designed as balanced, modular building blocks that can easily scale by adding CPUs, nodes, channels, and drives as the needs of the DW grow.

Customers can seamlessly grow their Oracle data warehouse either through scale-up (vertical) or scale-out (horizontal) architectures with director-class Fibre Channel fabrics and one or more storage systems, depending on required bandwidth.

Workloads

EMC® Oracle Optimized Warehouse Reference Configurations are designed to support the three most common workloads (high-performance, mainstream, high-capacity) observed by Oracle engineers.

High-Performance System: These systems are very high-performance systems, suitable for the most demanding workloads.

Mainstream Data Warehouse: This will be the most common configuration in customer environments. In a typical customer configuration, the use of database features such as indexes and partitioning vastly reduce the amount of large table scans; thus, good query performance can be achieved with this system.

High-Capacity Data Warehouse: This configuration will be used for applications that have a specific requirement of storing large amounts of data without stringent response times or heavy concurrency. These systems will be very cost-effective on a per-TB basis.

Processor and Operating System

EMC was an initial partner with Oracle's Enterprise Linux initiative and continues to support the Oracle software infrastructure stack across a wide selection of popular server vendors. EMC's exhaustive E-Lab™ testing process qualifies Oracle Enterprise Linux, Red Hat Enterprise Linux, HP HP-UX, IBM AIX, and Sun Solaris with the Oracle Database, RAC, ASM EMC storage platforms and solutions spanning Emulex, Qlogic, Brocade, and Cisco.

Servers and Storage

Reference configurations utilize both vertical and horizontal scalability, plus different CPU architectures for optimum choice and flexibility. Vertical scalability is accomplished by symmetric multi-processor (SMP) compute architectures with large memory and I/O capabilities. These systems typically run UNIX and Linux operating systems. Horizontal scalability is accomplished by cost-effective racked and blade servers taking advantage of the Oracle Grid architecture and Real Application Clusters (RAC). All configurations are sized to support high-performance, mainstream, and high-capacity workloads.

EMC is the market leader in data warehouse deployments and is consistently selected as the storage infrastructure of choice for large enterprise Oracle environments (source: Winter Corporation). The Dell/EMC/Oracle partnership produced the first Oracle Optimized Warehouse. EMC engineering has full-time resources engaged with the qualification of new technology and performance testing of EMC/Oracle data warehouses on EMC's industry-leading Symmetrix® and CLARiiON® storage systems.

EMC Symmetrix DMX-4 is the world's most-trusted storage platform and market leader for high-end information storage systems, providing the highest levels of information availability, massive storage consolidation, performance, application integration, power efficiency, and information-centric security.

The EMC CLARiiON CX4 series is the latest generation of the market-leading CLARiiON family of networked storage systems, with more than 300,000 systems installed and a midrange-storage-leading benchmark of "five nines" availability—99.999 percent uptime.

The CLARiiON CX3 series has been tested extensively with Oracle DW Workloads, and provides a great price/performance option, matching up to many popular server types for similar economic advantages. The previous generation CX3-10 represented the storage architecture making up the initial DELL/Oracle/EMC/Brocade OWI Building Block. Oracle Global IT has deployed this same configuration for their internal IT deployment of OWI.

Please visit the following link for an in-depth description of EMC Symmetrix and CLARiiON storage solutions: <http://www.EMC.com/products/category/storage.htm>.

Reference Configurations

EMC and Oracle created the following data warehouse reference configuration matrix based on extensive customer and engineering experience. If these configurations do not meet the current technology demands of your organization, please contact Oracle and/or EMC to discuss a custom configuration that meets your demand.

EMC CLARiiON-based Scale-out OWI Reference Configurations: (These calculations are theoretical I/O throughput. They have been derived from testing with similar architectures in an Oracle DW environment.)

The following configurations are linear scale-out models encompassing twelve configurations of DW sizes from 0.5 to 51 TB. Three configurations use the EMC CLARiiON CX4-120 and nine configurations use the EMC CLARiiON CX4-960 storage array. Each storage array in the configuration has eight additional vault and hot-spare disks not included in the following configurations.

Dell 2950/R900 – EMC CX4 – Oracle 10g, 11gR1 Scale out

	First of 12 Config 7 of 12	Config 7 of 12	Last of 12 Config 12 of 12
DW Size			
High-Performance DW (TB)	0.5	5.3	14.3
Mainstream DW (TB)	1.4	16.0	42.8
High-Capacity DW (TB)	1.6	17.0	45.4
Server Specs			
Architecture	Single Node	Cluster	Cluster
# Nodes	1	3	8
CPU Type	x86-64	x86-64	x86-64
# CPUs	2	4	4
# Cores per CPU	2	4	4
Memory per node (GB)	16	64	64
Storage Specs			
Storage Disk Array Name / Model	CX4-120	CX4-960	CX4-960
# Storage Arrays	1	3	8
# Data Disks per array	40	90	90
# Total Disks	40	270	720
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	4.7	51.0	136.1

HP Integrity rx7640/rx8640 – EMC CX4 – Oracle 10g, 11gR1 Scale out

	First of 12 Config 7 of 12	Config 7 of 12	Last of 12 Config 12 of 12
DW Size			
High-Performance DW (TB)	0.5	7.1	16.0
Mainstream DW (TB)	1.4	21.4	48.1
High-Capacity DW (TB)	2.3	22.7	51.0
Server Specs			
Architecture	Single Node	Cluster	Cluster
# Nodes	1	4	9
CPU Type	Itanium	Itanium	Itanium
# CPUs	2	4	4
# Cores per CPU	2	4	4
Memory per node (GB)	16	64	64
Storage Specs			
Storage Disk Array Name / Model	CX4-120	CX4-960	CX4-960
# Storage Arrays	1	4	9
# Disks per array	40	90	90
# Total Disks	40	360	810
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	4.7	68.0	153.1

HP 9000 rp4440/rp7440 – EMC CX4 – Oracle 10g, 11gR1 Scale out

	First of 12 Config 7 of 12	Config 7 of 12	Last of 12 Config 12 of 12
DW Size			
High-Performance DW (TB)	0.5	7.1	16.0
Mainstream DW (TB)	1.4	21.4	48.1
High-Capacity DW (TB)	2.3	22.7	51.0
Server Specs			
Architecture	Single Node	Cluster	Cluster
# Nodes	1	4	9
CPU Type	PA-RISC	PA-RISC	PA-RISC
# CPUs	2	4	4
# Cores per CPU	2	4	4
Memory per node (GB)	16	64	64
Storage Specs			
Storage Disk Array Name / Model	CX4-120	CX4-960	CX4-960
# Storage Arrays	1	4	9
# Disks per array	40	90	90
# Total Disks	40	360	810
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	4.7	68.0	153.1

The following configurations are linear scale-out models encompassing nine configurations of DW sizes from 0.5 to 51 TB. All configurations use the EMC CLARiiON CX4-960 storage array.

HP Proliant ML500 – EMC CX4 – Oracle 10g, 11gR1 Scale out

	First of 9 Config 1 of 9	Config 5 of 9	Last of 9 Config 9 of 9
DW Size			
High-Performance DW (TB)	1.8	12.5	16.0
Mainstream DW (TB)	5.3	37.4	48.1
High-Capacity DW (TB)	5.7	39.7	51.0
Server Specs			
Architecture	Single Node	Cluster	Cluster
# Nodes	1	7	9
CPU Type	x86-64	x86-64	x86-64
# CPUs	4	4	4
# Cores per CPU	4	4	4
Memory per node (GB)	64	64	64
Storage Specs			
Storage Disk Array Name / Model	CX4-960	CX4-960	CX4-960
# Storage Arrays	1	7	9
# Disks per array	90	90	90
# Total Disks	90	630	810
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	17.0	119.1	153.1

Sun Blade X6460 – EMC CX4 – Oracle 10g, 11gR1 Scale out

	First of 9 Config 1 of 9	Config 5 of 9	Last of 9 Config 9 of 9
DW Size			
High-Performance DW (TB)	1.8	8.9	16.0
Mainstream DW (TB)	5.3	26.7	48.1
High-Capacity DW (TB)	5.7	28.4	51.0
Server Specs			
Architecture	Single Node	Server Specs Cluster	Server Specs Cluster
# Nodes	1	5	9
CPU Type	x86-64	x86-64	x86-64
# CPUs	4	4	4
# Cores per CPU	4	4	4
Memory per node (GB)	64	64	64
Storage Specs			
Storage Disk Array Name / Model	CX4-960	CX4-960	CX4-960
# Storage Arrays	1	5	9
# Disks per array	90	90	90
# Total Disks	90	450	810
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	17.0	85.1	153.1

IBM Power 570 – EMC CX4 – Oracle 10g, 11gR1 Scale out

	First of 9 Config 1 of 9	Config 5 of 9	Last of 9 Config 9 of 9
DW Size			
High-Performance DW (TB)	1.8	8.9	16.0
Mainstream DW (TB)	5.3	26.7	48.1
High-Capacity DW (TB)	5.7	28.4	51.0
Server Specs			
Architecture	Single Node	Cluster	Cluster
# Nodes	1	5	9
CPU Type	x86-64	x86-64	x86-64
# CPUs	4	4	4
# Cores per CPU	4	4	4
Memory per node (GB)	64	64	64
Storage Specs			
Storage Disk Array Name / Model	CX4-960	CX4-960	CX4-960
# Storage Arrays	1	5	9
# Disks per array	90	90	90
# Total Disks	90	450	810
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	17.0	85.1	153.1

Sun Fire X4450 – EMC CX4 – Oracle 10g, 11gR1 Scale out

	First of 9 Config 1 of 9	Config 5 of 9	Last of 9 Config 9 of 9
DW Size			
High-Performance DW (TB)	1.8	8.9	16.0
Mainstream DW (TB)	5.3	26.7	48.1
High-Capacity DW (TB)	5.7	28.4	51.0
Server Specs			
Architecture	Single Node	Cluster	Cluster
# Nodes	1	5	9
CPU Type	x86-64	x86-64	x86-64
# CPUs	4	4	4
# Cores per CPU	4	4	4
Memory per node (GB)	64	64	64
Storage Specs			
Storage Disk Array Name / Model	CX4-960	CX4-960	CX4-960
# Storage Arrays	1	5	9
# Disks per array	90	90	90
# Total Disks	90	450	810
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	17.0	85.1	153.1

EMC CLARiiON-based Scale-up OWI Reference Configurations: (These calculations are theoretical I/O throughput. They have been derived from testing with similar architectures in an Oracle DW environment.)

HP Superdome – EMC CX4 – Oracle 10g, 11gR1 Scale up

	First of 9 Config 1 of 9	Config 5 of 9	Last of 9 Config 9 of 9
DW Size			
High-Performance DW (TB)	1.8	8.9	16.0
Mainstream DW (TB)	5.3	26.7	48.1
High-Capacity DW (TB)	5.7	28.4	51.0
Server Specs			
Architecture	Single Node	Single Node	Single Node
# Nodes	1	1	1
CPU Type	Itanium	Itanium	Itanium
# CPUs	8	40	72
# Cores per CPU	2	2	2
Memory per node (GB)	64	320	576
Storage Specs			
Storage Disk Array Name / Model	CX4-960	CX4-960	CX4-960
# Storage Arrays	1	5	9
# Disks per array	90	90	90
# Total Disks	90	450	810
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	17.0	85.1	153.1

HP Superdome (PA-RISC) – EMC CX4 – Oracle 10g, 11gR1 Scale up

	First of 9 Config 1 of 9	Config 5 of 9	Last of 9 Config 9 of 9
DW Size			
High-Performance DW (TB)	1.8	8.9	16.0
Mainstream DW (TB)	5.3	26.7	48.1
High-Capacity DW (TB)	5.7	28.4	51.0
Server Specs			
Architecture	Single Node	Single Node	Single Node
# Nodes	1	1	1
CPU Type	PA-RISC	PA-RISC	PA-RISC
# CPUs	8	40	72
# Cores per CPU	2	2	2
Memory per node (GB)	64	320	576
Storage Specs			
Storage Disk Array Name / Model	CX4-960	CX4-960	CX4-960
# Storage Arrays	1	5	9
# Disks per array	90	90	90
# Total Disks	90	450	810
Storage configuration	RAID 5	RAID 5	RAID 5
Usable Storage (TB)	17.0	85.1	153.1

IBM Power 595 – EMC CX4 – Oracle 10g, 11gR1 Scale up

	First of 4 Config 1 of 4	Last of 4 Config 4 of 4
DW Size		
High-Performance DW (TB)	1.8	7.1
Mainstream DW (TB)	5.3	21.4
High-Capacity DW (TB)	5.7	22.7
Server Specs		
Architecture	Single Node	Single Node
# Nodes	1	1
CPU Type	Power 6	Power 6
# CPUs	8	32
# Cores per CPU	2	2
Memory per node (GB)	64	256
Storage Specs		
Storage Disk Array Name / Model	CX4-960	CX4-960
# Storage Arrays	1	4
# Disks per array	90	90
# Total Disks	90	360
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	17.0	68.0

IBM x3950M2 – EMC CX4 – Oracle 10g, 11gR1 Scale up

	First of 4 Config 1 of 4	Last of 4 Config 4 of 4
DW Size		
High-Performance DW (TB)	1.8	7.1
Mainstream DW (TB)	5.3	21.4
High-Capacity DW (TB)	5.7	22.7
Server Specs		
Architecture	Single Node	Single Node
# Nodes	1	1
CPU Type	x86-64	x86-64
# CPUs	8	32
# Cores per CPU	2	2
Memory per node (GB)	64	256
Storage Specs		
Storage Disk Array Name / Model	CX4-960	CX4-960
# Storage Arrays	1	4
# Disks per array	90	90
# Total Disks	90	360
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	17.0	68.0

EMC Symmetrix-based Scale-out OWI Reference Configurations: (These calculations are theoretical I/O throughput. They have been derived from testing with similar architectures in an Oracle DW environment.)

The following configurations are linear scale-out models encompassing nine configurations of DW sizes from 2.3 to 72 TB. All configurations use the EMC Symmetrix DMX storage array.

Dell R900 – EMC DMX4 – Oracle 10g, 11gR1 Scale out

	First of 5 Config 1 of 5	Last of 5 Config 5 of 5
DW Size		
High-Performance DW (TB)	2.3	11.5
Mainstream DW (TB)	6.9	34.6
High-Capacity DW (TB)	14.4	72.0
Server Specs		
Architecture	Cluster	Cluster
# Nodes	2	10
CPU Type	x86-64	x86-64
# CPUs	4	4
# Cores per CPU	4	4
Memory per node (4 GB min per core) - GB	64	64
Storage Specs		
Storage Disk Array Name / Model	DMX-4 2500	DMX4 4500 + DMX4 4500 + DMX4 2500
# Storage Arrays	1	3
# Disks per array	192	192
# Total Disks	192	960
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	43.2	216.0

IBM x3850m2 – EMC DMX4 – Oracle 10g, 11gR1 Scale out

	First of 5 Config 1 of 5	Last of 5 Config 5 of 5
DW Size		
High-Performance DW (TB)	2.3	9.6
Mainstream DW (TB)	6.9	28.8
High-Capacity DW (TB)	14.4	72.0
Server Specs		
Architecture	Cluster	Cluster
# Nodes	2	10
CPU Type	x86-64	x86-64
# CPUs	4	4
# Cores per CPU	4	4
Memory per node (GB)	64	64
Storage Specs		
Storage Disk Array Name / Model	DMX-4 2500	DMX4 4500 + DMX4 4500 + DMX4 2500
# Storage Arrays	1	3
# Disks per array	192	192
# Total Disks	192	960
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	43.2	216.0

HP Proliant ML500 – EMC DMX4 – Oracle 10g, 11gR1 Scale out

	First of 5 Config 1 of 5	Last of 5 Config 5 of 5
DW Size		
High-Performance DW (TB)	2.3	9.6
Mainstream DW (TB)	6.9	28.8
High-Capacity DW (TB)	14.4	72.0
Server Specs		
Architecture	Cluster	Cluster
# Nodes	2	10
CPU Type	x86-64	x86-64
# CPUs	4	4
# Cores per CPU	4	4
Memory per node (GB)	64	64
Storage Specs		
Storage Disk Array Name / Model	DMX-4 2500	DMX4 4500 + DMX4 4500 + DMX4 2500
# Storage Arrays	1	3
# Disks per array	192	192
# Total Disks	192	960
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	43.2	216.0

IBM Power 570 – EMC DMX4 – Oracle 10g, 11gR1 Scale out”

	First of 5 Config 1 of 5	Last of 5 Config 5 of 5
DW Size		
High-Performance DW (TB)	2.3	9.6
Mainstream DW (TB)	6.9	28.8
High-Capacity DW (TB)	14.4	72.0
Server Specs		
Architecture	Cluster	Cluster
# Nodes	2	10
CPU Type	Itanium	Itanium
# CPUs	4	4
# Cores per CPU	4	4
Memory per node (GB)	64	64
Storage Specs		
Storage Disk Array Name / Model	DMX-4 2500	DMX4 4500 + DMX4 4500 + DMX4 2500
# Storage Arrays	1	3
# Disks per array	192	192
# Total Disks	192	960
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	43.2	216.0

HP Integrity rx8640 – EMC DMX4 – Oracle 10g, 11gR1 Scale out

	First of 5 Config 1 of 5	Last of 5 Config 5 of 5
DW Size		
High-Performance DW (TB)	2.3	9.6
Mainstream DW (TB)	6.9	28.8
High-Capacity DW (TB)	14.4	72.0
Server Specs		
Architecture	Cluster	Cluster
# Nodes	2	10
CPU Type	Itanium	Itanium
# CPUs	4	4
# Cores per CPU	4	4
Memory per node (GB)	64	64
Storage Specs		
Storage Disk Array Name / Model	DMX-4 2500	DMX4 4500 + DMX4 4500 + DMX4 2500
# Storage Arrays	1	3
# Disks per array	192	192
# Total Disks	192	960
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	43.2	216.0

Sun M5000 – EMC DMX4 – Oracle 10g, 11gR1 – Scale out

	First of 4 Config 1 of 4	Last of 4 Config 4 of 4
DW Size		
High-Performance DW (TB)	4.6	18.4
Mainstream DW (TB)	13.8	55.3
High-Capacity DW (TB)	28.8	115.2
Server Specs		
Architecture	SMP	SMP
# Nodes	2	8
CPU Type	Sparc64 VII	Sparc64 VII
# CPUs	8	8
# Cores per CPU	4	4
Memory per node (GB)	128	128
Storage Specs		
Storage Disk Array Name / Model	DMX-4	DMX-4
# Storage Arrays	1	4
# Disks per array	384	384
# Total Disks	384	1536
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	86.4	345.6

Sun Fire X4450 – EMC DMX4 – Oracle 10g, 11gR1 Scale out

	First of 5 Config 1 of 5	Last of 5 Config 5 of 5
DW Size		
High-Performance DW (TB)	2.3	11.5
Mainstream DW (TB)	6.9	34.6
High-Capacity DW (TB)	14.4	72.0
Server Specs		
Architecture	Cluster	Cluster
# Nodes	2	10
CPU Type	x86-64	x86-64
# CPUs	4	4
# Cores per CPU	4	4
Memory per node (4 GB min per core) - GB	64	64
Storage Specs		
Storage Disk Array Name / Model	DMX-4 2500	DMX4 4500 + DMX4 4500 + DMX4 2500
# Storage Arrays	1	3
# Disks per array	192	192
# Total Disks	192	960
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	43.2	216.0

EMC Symmetrix-based Scale-up OWI Reference Configurations: (These calculations are theoretical I/O throughput. They have been derived from testing with similar architectures in an Oracle DW environment.)

HP Superdome – EMC DMX4 – Oracle 10g, 11gR1 Scale out

	First of 4 Config 1 of 4	Last of 4 Config 4 of 4
DW Size		
High-Performance DW (TB)	2.3	7.7
Mainstream DW (TB)	6.9	23.0
High-Capacity DW (TB)	14.4	57.6
Server Specs		
Architecture	SMP	SMP
# Nodes	1	1
CPU Type	Itanium	Itanium
# CPUs	16	64
# Cores per CPU	2	2
Memory per node (GB)	128	512
Storage Specs		
Storage Disk Array Name / Model	DMX-4 2500	DMX4 4500 + DMX4 4500
# Storage Arrays	1	2
# Disks per array	192	192
# Total Disks	192	768
Storage configuration	RAID 5	RAID 5
Usable Storage (TB)	43.2	172.8

Pre-Configured Oracle Optimized Warehouse from DELL/EMC

As part of the Oracle Optimized Warehouse Initiative, in addition to the reference configurations, EMC and Oracle have developed pre-configured and pre-installed (out-of-the box) data warehouse solutions. Oracle Optimized Warehouses for DELL/EMC are fully configured data warehouse products that are sold and supported as a single product, thus reducing risk and deployment times. Oracle software is pre-installed, pre-configured, and tested on EMC and Oracle co-developed reference configurations based on EMC servers, storage, and the Oracle Enterprise Linux Operating System. The pre-configured, calibrated, and validated solutions undergo a rigorous set of tests to produce balanced configurations that provide exceptional and predictable performance.

FAQ Section

- Q** How can I order an Oracle Optimized Warehouse Reference Configuration?
- A** A reference configuration is a set of guidelines and best practices designed as a starting point to assess new requirements with existing customer infrastructures. To jointly come up with an actual design that will meet your exact business requirements. EMC's architecture and assessment services in partnership with Oracle will ensure the reference architecture meets your requirements.
- Q** How can I order an Oracle Optimized Warehouse?
- A** EMC has partnered with Dell as the supplier for the entire DW solution. Dell can supply either Symmetrix or CLARiiON systems as a pre-tested, preconfigured optimized warehouse configuration.
- Q** I like the idea of Dell, EMC, and Oracle working together for pre-defined architectures, but my preferred server is not on the Dell/EMC/Oracle Optimized configurations, or the EMC, ORACLE Reference Configurations. Can I still deploy an Oracle Data Warehouse on EMC storage?
- A** EMC and Oracle support hundreds of server and OS combinations. Use the described contacts and let EMC and Oracle assess your requirements. Depending on the requirements of your warehouse implementation and the architecture of choice, new submissions into the OWI approval process can occur.

Q I have more questions. Who should I contact to discuss my exact requirements?

A Please contact Dan Thacker in EMC Americas Sales (thacker_dan@EMC.com) for assistance in the U.S. or Ike Kuiper (kuiper_ike@EMC.com) in EMEA, or send an e-mail to oracleonemc@EMC.com, the EMC Consulting Practice for Oracle. Another contact point to discuss the details of the joint EMC/Oracle configurations is Jeff Barnard, Technical Alliances Architect (barnard_jeff@EMC.com).

Please visit Dell for an in-depth description and instructions to engage with the purchase of an optimized data warehouse:

<http://www.dell.com/oracle>

The following is the Oracle site describing the Oracle OWI initiative:

http://www.oracle.com/solutions/business_intelligence/feature-optimized-warehouse-initiative.html

Please visit the following to learn more about EMC services for the Oracle environment:

www.EMC.com/oraclesolutions

EMC and Oracle

EMC and Oracle have been working together for more than 15 years to deliver the ultimate in secure, reliable, and scalable enterprise-class data centers to thousands of customers around the world.

Take the next step

To learn more about EMC Oracle Optimized Warehouse Reference Configurations, visit the websites listed above, contact one of the named individuals listed, or your local EMC sales representative.



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