

Oracle Database Appliance X7-2 Model Family

MANAGING ORACLE DATABASE WITH A PURPOSE BUILT SYSTEM

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Introduction

The Oracle Database Appliance, introduced in 2011, is an Oracle Engineered System that is simple, optimized, and affordable. Through five generations of the Oracle Database Appliance, it has been enormously popular for customers deploying Oracle Database in a variety of production scenarios.

The latest generation of the Oracle Database Appliance portfolio has been updated with the Oracle Database Appliance X7-2S, Oracle Database Appliance X7-2M, and the Oracle Database Appliance X7-2-HA. The Oracle Database Appliance X7-2 model family offers the lowest hardware price for an Oracle Engineered System, with the Oracle Database Appliance X7-2S starting at a fourth of the price of the Oracle Database Appliance X7-2-HA hardware. Combined with flexible Oracle Database software licensing, the Oracle Database Appliance X7-2 model family brings Oracle Engineered Systems to within reach of every organization.

The Oracle Database Appliance X7-2S, and X7-2M expand the reach of the database appliance to support various deployment scenarios and database editions. They are designed for customers requiring only single-instance databases. Whereas, the Oracle Database Appliance X7-2-HA is optimized to run clustered databases with Oracle Real Application Clusters where high availability is required.

The Oracle Database Appliance X7-2 model family is ideal for customers who seek to avoid the complexity, tuning requirements, and higher costs of “build-your-own” database solutions. Customers can now take advantage of Oracle Engineered Systems that meet their budget and deployment requirements while realizing the benefits of an optimized database solution with built-in Oracle best practices and single vendor support.

Oracle Database Appliance – A History of Proven Success

Organizations of all sizes and types find it difficult, time consuming, and risky to deploy and maintain robust database environments. Oracle has addressed this by developing the Oracle Database Appliance X7-2 model family - a simple, optimized, and affordable converged systems portfolio with integrated compute, storage, networking, and software. The Oracle Database Appliance enables customers to quickly deploy, maintain, and support Oracle Database environments.

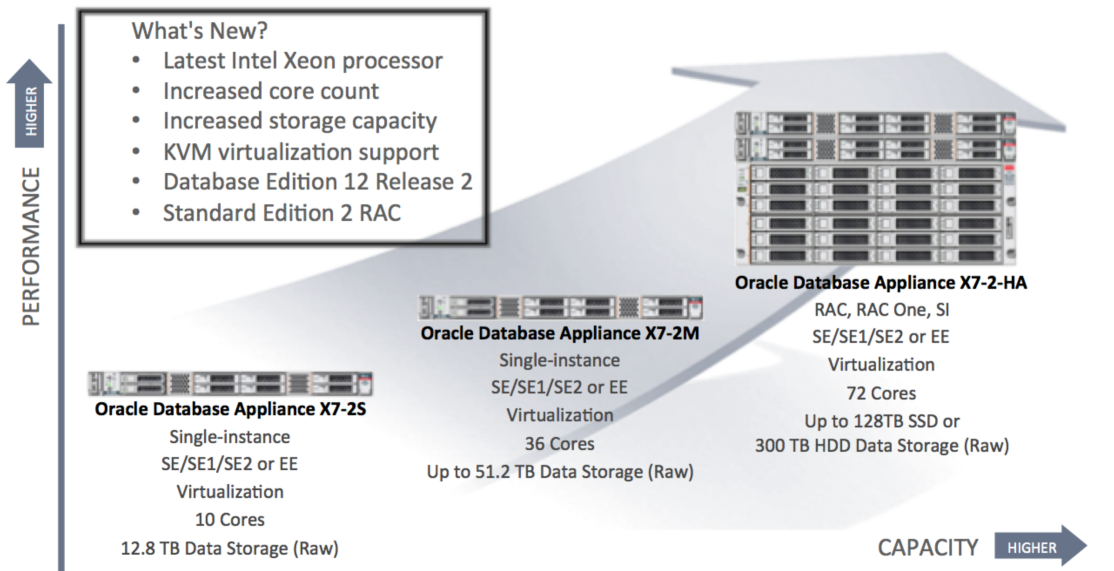
Since its initial release in 2011, the Oracle Database Appliance has become popular for a variety of use cases, including deployment as a centralized or branch office database server, as test and development environments, and as all-in-one ISV solutions containing both applications and databases.

Oracle Database Appliance X7-2 Model Family – Oracle Engineered Systems within Reach for Every Organization


The Oracle Database Appliance X7-2 model family is the sixth generation of Oracle Database Appliances. Each appliance consists of hardware and software that save customers time and money by simplifying deployment, maintenance, and support of Oracle Database environments. Exhibit 1 below illustrates the broad range of performance and capacity choices provided by the Oracle Database Appliance X7-2 model family.

EXHIBIT 1. THE ORACLE DATABASE APPLIANCE X7-2 MODEL FAMILY OFFERINGS SPAN A BROAD RANGE OF CAPACITY AND PERFORMANCE CAPABILITIES

Oracle Database Appliance X7-2 Model Family



Built using the world's most popular database, Oracle Database, the appliances offer customers fully integrated systems of software, servers, storage and networking that deliver optimized database services for a wide range of custom and packaged OLTP, Data Warehousing, and In-Memory Database workloads.



All Oracle Database Appliance Models are optimized to run Oracle Database Standard Edition and Enterprise Edition. With Oracle Database Enterprise Edition, customers can take advantage of capacity on demand licensing, which enable customers to align software spending with business growth. The Oracle Database Appliance X7-2S and Oracle Database Appliance X7-2M are ideal for customers who require single instance databases on an engineered platform. The Oracle Database Appliance X7-2-HA is ideal for customers who are looking to consolidate multiple databases onto a highly available and scalable-engineered platform.

Simple to Implement, Manage, and Support

Simple to Implement

The hallmark of the Oracle Database Appliance is its simplicity. Each appliance is a complete system consisting of hardware and software integrated to work together to save customers time and money.

To deploy and use the Oracle Database Appliance, simply unpack it, plug in the power cords, plug in the network cables, and run the Oracle Appliance Manager installation to provision a highly optimized database system. The Oracle Database Appliance accelerates time-to-value as a single database administrator (DBA) can deploy a highly optimized Oracle database in less than one hour.

Simple to Manage and Support

Maintaining systems and keeping all the associated software elements current with the latest patches is often one of the most time consuming and error-prone tasks confronting administrators. The Oracle Database Appliance and its specially engineered software streamlines patching for all the elements of the software stack - firmware, operating system, storage management, and database software, through appliance patch bundles. It eliminates the guesswork of mixing and matching patches for various elements of the hardware and software stack. This reduces human error and ultimately results in less planned downtime and higher system reliability due to the fully tested patch bundles that can be quickly and safely applied.

The appliance simplifies storage management by automatically detecting performance and availability issues and performing corrective actions. In addition, the Auto Service Request (phone home) feature will generate support requests for replacement hardware components such as power supplies, fans, etc. if they fail.

When a problem occurs with a “build-your-own” system, DBAs spend a lot of time initially trying to discern the source of the problem to determine which vendor to call first. With the Oracle Database Appliance troubleshooting is much simpler and faster because all the elements, software and hardware, are supported by Oracle. Rather than requiring a DBA or System Administrator to manually search for and compile all the logs and system history when issuing a support request, the Appliance Manager automatically collects and compiles the relevant logs and history, allowing issues to be processed, analyzed, and fixed much more quickly.

An Optimized, Engineered Database Solution

All the appliances in the Oracle Database Appliance X7-2 model family are engineered together at both the hardware and software level to work in a holistic fashion as a platform optimized to run the Oracle Database.

The Oracle Database is also configured with database-sizing templates that ensure system resources are optimized for the database according to Oracle best practices.

Server

As shown in Table 1 – the entry model, the Oracle Database Appliance X7-2S is a one rack unit (RU) server that contains one 10-core Intel® Xeon® Silver 4114 processor, providing up to 10 enabled-on-demand processor cores and 192 GB of memory (expandable to 384 GB) per appliance.

The Oracle Database Appliance X7-2M is also a one rack unit (RU) server but contains more cores and memory. This appliance contains two 18-core Intel® Xeon® Gold 6140 processors, providing up to 18 enabled-on-demand processor cores and 384 GB of memory (expandable up to 768 GB) per appliance.

The Oracle Database Appliance X7-2-HA is the only appliance which provides two servers in the base configuration that contain two 18-core Intel® Xeon® Gold 6140 processors per server, providing up to 72 enabled-on-demand processor cores and 768 GB of memory expandable to up 1.5 TB per appliance.

TABLE 1. ORACLE DATABASE APPLIANCE X7-2 MODEL FAMILY SUMMARY

	Oracle Database Appliance X7-2S	Oracle Database Appliance X7-2M	Oracle Database Appliance X7-2-HA
Size	One rack unit server	One rack unit server	Six rack unit server/storage
Processor	One 10-core Intel® Xeon® Silver 4114	Two 18-core Intel® Xeon® Gold 6140	Two 18-core Intel® Xeon® Gold 6140 per server
Memory	192 GB - expandable to 384 GB	384 GB - expandable to 768 GB	384 GB – expandable to 768 GB per server
Networking	Two 10GBase-T ports (RJ45) or two 10/25 GbE ports (SFP28)	Two 10GBase-T ports (RJ45) or two 10/25 GbE ports (SFP28)	Two 10GBase-T ports (RJ45) or two 10/25 GbE ports (SFP28) per server
Storage	Two 6.4 TB NVMe SSDs - offering 12.8 TB (raw) or 6.4 TB (usable) double mirrored, not expandable	Base System: two 6.4 TB NVMe SSDs offering 12.8 TB (raw) or 6.4 TB (usable) double mirrored Expandable to 32 TB and 51.2 TB Configurations	Base System: five 3.2 TB SSDs offering 16 TB (raw), 8 TB (usable) double mirrored or 5.3 TB (usable) triple mirrored Expandable to 32 TB, 48 TB, 64 TB and 128 TB SSD configurations or 150 TB, 300 TB HDD configurations.
Oracle Database	11g Release 2 Standard Edition, Standard Edition One, or Enterprise Edition 12c Standard Edition 2 or Enterprise Edition Release 1, Release 2	11g Release 2 Standard Edition, Standard Edition One, or Enterprise Edition 12c Standard Edition 2 or Enterprise Edition Release 1, Release 2	11g Release 2 Standard Edition, Standard Edition One, or Enterprise Edition 12c Standard Edition 2 or Enterprise Edition Release 1, Release 2
Database Deployment	Single Instance	Single Instance	Single Instance, RAC and RAC One Node
Virtualization	Oracle Linux KVM	Oracle Linux KVM	Oracle VM

Networking

All models in the Oracle Database Appliance X7-2 model family provide 10/25 GbE SFP28 (fiber) or 10GBase-T (copper) external networking connectivity, ensuring the systems will be compatible with any data center.

Storage

The Oracle Database Appliance X7-2S and X7-2M incorporate NVMe Express (NVMe) flash storage to increase database performance and system reliability. The number of processor cores, amount of main memory, and NVMe Express (NVMe) storage capacity in each fully integrated system is balanced to provide optimal database performance for a wide range of enterprise application workloads. Both the Oracle Database Appliance X7-2S and X7-2M have 12.8 TB of raw NVMe storage. The Oracle Database Appliance X7-2M is expandable up to 51.2 TB of raw NVMe storage.

The Oracle Database Appliance X7-2-HA servers share a direct-attached storage enclosure, offering high availability and performance for mission critical workloads. The storage shelf in the base system is partially populated with five solid-state drives (SSDs) totaling 16 TB of raw storage capacity. The Oracle Database Appliance X7-2-HA also supports optional storage expansion that enables the appliance to scale up to 64 TB SSD or 150 TB HDD of raw data storage by fully populating the storage shelf with an additional fifteen 3.2 TB SSDs or fifteen 10 TB HDDs, respectively. The storage capacity of the appliance with a fully populated storage shelf can be doubled with the addition of a second storage shelf.

To expand storage outside of the Oracle Database Appliance X7-2 models, external NFS storage is supported for online backups, data staging, or additional database files.

All of the Oracle Database Appliance X7-2 models incorporate Oracle Automatic Storage Management (ASM) that in conjunction with the Appliance Manager automatically configures, manages, and monitors storage performance and availability.

Software

The models in the Oracle Database Appliance X7-2 model family support the following database, operating system and management software:

TABLE 2. DATABASE AND OS SOFTWARE FOR ORACLE DATABASE APPLIANCE X7-2 MODEL FAMILY

Oracle Operating System and Appliance Manager Software

- Oracle Linux – Pre-installed
 - Oracle Appliance Manager – Pre-installed
 - Oracle VM – Optional on X7-2-HA
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Database Software (Installed using the Appliance Manager)

- Choice of Oracle Database Software:
 - Oracle Database 11g Enterprise Edition, Release 2 and Standard Edition, Standard Edition One
 - Oracle Database 12c Enterprise Edition, Release 1, Release 2 and Standard Edition 2
 - Oracle Real Application Clusters (Supported on X7-2-HA)
 - Oracle Real Application Clusters One Node (Supported on X7-2-HA)
 - Oracle Automatic Storage Management (ASM)
 - Oracle ASM Cluster File System (ACFS)
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Oracle Database Software Licensing

As shown in Table 2, the Oracle Database Appliance X7-2S and X7-2M support Oracle Database Enterprise Edition and Oracle Database Standard Edition, Standard Edition One or Standard Edition 2. Combined with Oracle Database Standard Edition, these entry appliances are ideal for small enterprises, line-of-business departments, and branch office deployments that don't require enterprise class features, enabling them to realize the benefits of the Oracle Database Appliance to reduce costs and improve productivity.

The Oracle Database Appliance X7-2-HA is optimized as a high availability database solution using Oracle Real Applications Clusters (RAC) or Oracle Real Applications Clusters One Node (RAC One Node) for "active-active" or "active-passive" database server failover. As a result, the Oracle Database Appliance X7-2-HA offers the highest availability of any system in its class.

Customers who choose to deploy Oracle Database Enterprise Edition databases on any appliance within the Oracle Database Appliance X7-2 model family can take advantage of a unique capacity-on-demand database software licensing model to quickly scale utilized processor cores without any hardware upgrades. Customers can deploy the system and license as few as 2 processor cores in the appliance, and incrementally scale up to the maximum physical processor cores in each system. This enables customers to deliver the performance and reliability that enterprise business users demand, and align software spending with business growth.

Virtualization

The Oracle Database Appliance X7-2 models enable customers and ISVs to quickly deploy both database and application workloads in a single appliance on a virtualized platform. The Oracle Database Appliance X7-2S/X7-2M/X7-2-HA models support running applications in KVM-based virtual machines on the host OS. Oracle Database Appliance X7-2-HA also offers a virtualized stack based on Oracle VM that takes advantage of capacity-on-demand licensing for multiple workloads by leveraging Oracle VM hard partitioning. Support for virtualization adds additional flexibility to the already complete and fully integrated database solution while providing benefit of a complete solution that efficiently utilizes resources.

Affordable – The Oracle Database Appliance Cost Advantage

The Oracle Database Appliance X7-2 model family offers purpose-built, affordable hardware and software solutions for all businesses. Combined with the flexibility to run various Oracle Database software editions and capacity on demand licensing, the Oracle Database Appliance X7-2 model family provides capital expenditure savings. All the appliances also offer low operational costs throughout the life of the machines, through a dramatic reduction in time spent on hardware and software maintenance, a direct result of the efficiencies and increased automation provided by the Oracle Appliance Manager.

Capacity-On-Demand Licensing

For customers who choose to deploy Oracle Database Enterprise Edition databases on any appliance within the Oracle Database Appliance X7-2 model family, they can deploy the system and license as few as 2 processors cores to run their database servers, and incrementally scale up to the maximum number of processor cores in each system. This unique Oracle Database software licensing advantage provides customers with significant up front capital expenditure cost savings.

Operating Expenditure Savings

In addition to offering purpose-built, affordable hardware and flexible Oracle Database software licensing, the Oracle Database Appliance X7-2 model family has much lower cost of ownership than a "build-your-own" system. Customers save time they would ordinarily spend researching compatible components, creating and processing

multiple orders across multiple vendors, waiting for all the various elements to arrive, and then assembling and validating the “build-your-own” system. More importantly, a “build-your-own” system will not have the Oracle Appliance Manager.

The Appliance Manager is a comprehensive, easy-to-use utility that makes deployment, patching, and support of the Oracle Database Appliance easy, quick, and intuitive. It provides intelligent storage management features that monitor the health of the storage and quickly resolve any issues that may affect performance and availability.

Savings can be realized in all three stages of the system’s lifecycle: from the initial deployment, to performing on-going maintenance, and to resolving support issues. Table 3 highlights the difference in tasks required for a “build-your-own” system versus the tasks required for the models in the Oracle Database Appliance X7-2 model family.

TABLE 3. COMPARATIVE SAVINGS WITH ORACLE DATABASE APPLIANCE X7-2 MODEL FAMILY

Lifecycle stage	“Build-your-own”	Oracle Database Appliance X7-2 Model Family
Initial Deployment	<ul style="list-style-type: none"> • Sizing • Create orders with multiple vendors with different business terms • Research best practices • Assemble • Install, patch, and configure • Test unique configuration • Resolve issues 	<ul style="list-style-type: none"> • Order Oracle Database Appliance • Unpack, plug-in • Run Oracle Appliance Manager
Maintenance	<ul style="list-style-type: none"> • Research patch dependencies • Download individual patches for firmware, operating system, database • Test unique configuration 	<ul style="list-style-type: none"> • Download Patch Bundle for Oracle Database Appliance • Run Oracle Appliance Manager
Support	<ul style="list-style-type: none"> • Troubleshoot configuration with support • Locate log files • File SRs with one or more system component vendors • Wait 	<ul style="list-style-type: none"> • Run Oracle Appliance Manager • Configure Auto Service Request (ASR)

Common Use Cases

The Oracle Database Appliance X7-2 model family supports a variety of common use cases including:

- » Simple, Optimized, Affordable Database System
- » Database Platform for Growing Deployments
- » Consolidation Platform for Databases and Applications
- » Remote Branch Office Deployments
- » Rapid Provisioning of Test and Development Environments



Simple, Optimized, Affordable Database System

The models in the Oracle Database Appliance X7-2 model family will appeal to customers looking for affordable, optimized database systems that are easy to implement and maintain. Deploying highly optimized database systems can be challenging and time consuming, often requiring experienced systems, database, and storage administration skills.

With the Oracle Database Appliance, a single DBA can deploy a highly optimized database platform in less than an hour.

Database Platform for Growing Environments

New projects about to be put into production can take several years to ramp up to the expected workload levels. Often times, the “expected workload levels” are just a guess – the real workload ramp up can vary considerably from the initial forecast or plan. Hence, IT organizations are leery of purchasing and deploying excess capacity up front prior to the point at which it is actually needed. With the affordability of the Oracle Database Appliance, customers can now deploy the fully provisioned system and grow into the software capacity they need over time by activating only the cores they need when they need them.

And, optional memory and storage expansion allows customers the flexibility to add that additional capacity to each Oracle Database Appliance model as needed.

Consolidation Platform for Databases and Applications

Many IT shops are pursuing database consolidation by taking the databases running on standalone systems and co-locating them on an optimized database system. The Oracle Database Appliance offers a great low-cost solution suited for consolidation efforts. Administrators save time and money by managing a single solution, rather than a multitude of separate servers, operating systems and databases.

The Oracle Database Appliance X7-2-HA with its optional Oracle VM virtualization platform, can host a complete solution in a single appliance. By hosting multiple databases and applications on a single appliance, significant operational efficiencies in terms of backups, system patching, and upgrades can be achieved. ISV partners can quickly distribute application solutions with Oracle Database Appliance as a solution-in-a-box. Customers benefit from standardized application deployments, reduced deployment time, and lower support costs.

Remote Branch Office Deployments

Many organizations have a need to deploy solutions for remote branch office locations where IT environments may reside in little more than closets. Customers can configure the entire solution and quickly deploy it in a remote location, reducing or possibly eliminating the cost of on-site administrators. Similarly, maintenance and support can be easily performed remotely using the Appliance Manager and the Integrated Lights Out Manager (iLOM) tools built into every appliance in the Oracle Database Appliance X7-2 model family.

Rapid Provisioning of Test and Development Environments

Developers require access to database environments for development and testing. Given that the appliances in the Oracle Database Appliance X7-2 model family can be quickly procured and provisioned, administrators can quickly and reliably provide developers with complete Oracle database test and development environments that improve productivity and efficiency.

The Oracle Database Appliance X7-2-HA enables quick and space-efficient creation of database copies with ASM Cluster File System (ACFS) snapshots and rapid cloning of virtual machines. Combining these features together, administrators can quickly provision each developer with complete test and development environments that improves productivity and efficiency.



Integrated with the Oracle Cloud

The Oracle Database Appliance provides a bridge between on-premises deployments and the Oracle Cloud, enabling you to protect your hardware and software investments by offering you the ability to run the same stack in both locations using the same skills and tools. This makes it easy to implement both an on-premises and cloud strategy to support backup, test/dev, or even disaster recovery environments in the cloud.

For example, Oracle Database Appliance customers can easily and seamlessly migrate a database from their on-premise appliance to the Oracle Database Cloud Service by simply unplugging a Pluggable Database (PDB) running on the Oracle Database Appliance and then plugging it into a Container Database running in the Oracle Cloud.

Customers can also easily backup their on-premise Oracle Database Appliance databases to the Oracle Database Backup Cloud Service without having to change any applications, acquire any special training or expertise, or create any detailed backup job scripts.

Conclusion

For customers seeking a simple, optimized, and affordable database solution, the Oracle Database Appliance X7-2 model family offers optimized purpose-built hardware choices for every organization.

The Oracle Database Appliance is engineered across every level of the technology stack, resulting in easier deployment and upgrades, and more efficient management. With the Oracle Database Appliance X7-2 model family, customers can bring new services to the market quickly while improving their service levels – adding business value to their company.

To learn more about the Oracle Database Appliance X7-2 model family, visit:

www.oracle.com/goto/databaseappliance




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Hardware and Software, Engineered to Work Together

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