ORACLE

Oracle Database Appliance X8 Model Family

SIMPLE. OPTIMIZED. AFFORDABLE

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INTRODUCTION

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

The Oracle Database Appliance portfolio has been updated and the latest generation model family includes the Oracle Database Appliance X8-2S, Oracle Database Appliance X8-2M, and Oracle Database Appliance X8-2-HA. The Oracle Database Appliance X8 model family offers the lowest hardware price for an Oracle Engineered System, with the Oracle Database Appliance X8-2S starting at a quarter of the price of the Oracle Database Appliance X8-2-HA. Combined with flexible Oracle Database software licensing, the Oracle Database Appliance X8 model family brings Oracle Engineered Systems to within reach of every organization.

The Oracle Database Appliance X8-2S, and X8-2M 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 X8-2-HA is optimized to run clustered databases with Oracle Real Application Clusters where high availability is required.

The Oracle Database Appliance X8 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.

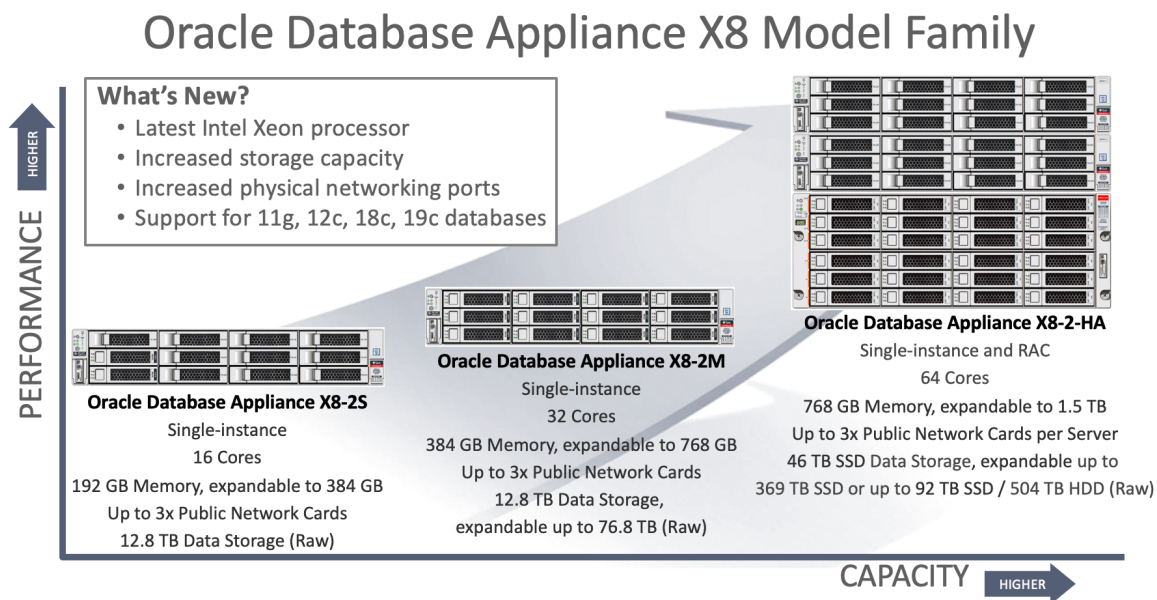# ORACLE DATABASE APPLIANCE – A HISTORY OF PROVEN SUCCESS

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 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 solution, as test and development environments, and as all-in-one ISV solutions containing both applications and databases. Customers benefit from the cost savings associated with consolidating multiple database and other workloads on a single system as well as from capacity-on-demand licensing. They also experience operational and time savings from simple and integrated high availability, full stack patching, and disaster recovery.

ORACLE DATABASE APPLIANCE X8 MODEL FAMILY – ORACLE ENGINEERED SYSTEMS WITHIN REACH FOR EVERY ORGANIZATION

The Oracle Database Appliance X8 model family is the seventh generation of the Oracle Database Appliance. 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 X8 model family.

EXHIBIT 1. THE ORACLE DATABASE APPLIANCE X8 MODEL FAMILY OFFERINGS SPAN A BROAD RANGE OF CAPACITY AND PERFORMANCE CAPABILITIES

Oracle Database Appliance X8 Model Family

What's New?
- Latest Intel Xeon processor
- Increased storage capacity
- Increased physical networking ports
- Support for 11g, 12c, 18c, 19c databases

Oracle Database Appliance X8-2S
Single-instance
16 Cores
192 GB Memory, expandable to 384 GB
Up to 3x Public Network Cards
12.8 TB Data Storage (Raw)

Oracle Database Appliance X8-2M
Single-instance
32 Cores
384 GB Memory, expandable to 768 GB
Up to 3x Public Network Cards
12.8 TB Data Storage,
expandable up to 76.8 TB (Raw)

Oracle Database Appliance X8-2-HA
Single-instance and RAC
64 Cores
768 GB Memory, expandable to 1.5 TB
Up to 3x Public Network Cards per Server
46 TB SSD Data Storage, expandable up to
369 TB SSD or up to 92 TB SSD / 504 TB HDD (Raw)

PERFORMANCE — HIGHER

CAPACITY — HIGHER

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 spend with business growth. The Oracle Database Appliance X8-2S and Oracle Database Appliance X8-2M are ideal for customers who require single instance databases on an engineered platform. The Oracle Database Appliance X8-2-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.
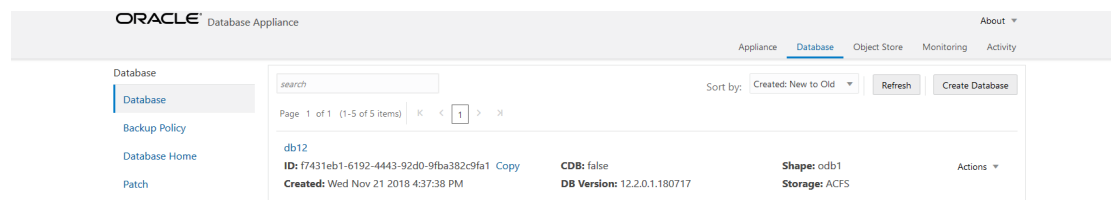
To deploy and use the Oracle Database Appliance, simply unpack it, plug in the power cords, plug in the network cables, and run the Oracle Appliance Manager installation to provision a highly optimized database system. The browser user interface (BUI) quickly gathers all the configuration parameters to streamline system provisioning with a few easy steps. 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. To patch the entire system, simply select the appropriate patch bundle in the Appliance Manager BUI to validate it and update the full software stack.

Database lifecycle management is simplified with Oracle Database Appliance. Databases can be easily provisioned according to Oracle's best practices through the Appliance Manager BUI and patched with a few easy steps. Database backup and recovery is integrated into the Appliance Manager with the option to backup locally, to external storage, or to the Oracle Cloud directly through the browser user interface.

Exhibit 2. ORACLE DATABASE APPLIANCE – APPLIANCE MANAGER BROWSER USER INTERFACE (BUI)

The appliance automates storage management with Automatic Storage Management (ASM) integration and by automatically detecting performance and availability issues and performing corrective actions. The Appliance Manager also tracks system and database information, and displays the information directly in the BUI. In addition, the Auto Service Request (phone home) feature will generate support requests for replacement of failed hardware components such as power supplies, fans, etc.

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 X8 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 X8-2S, is a two-rack unit (2RU) server that contains one 16-core Intel® Xeon® Gold 5218 processor, providing up to 16 enabled-on-demand processor cores and 192 GB of memory (expandable to 384 GB) per appliance.

The Oracle Database Appliance X8-2M is also a 2RU server but contains more cores and memory. This appliance contains two 16-core Intel® Xeon® Gold 5218 processors, providing up to 32 enabled-on-demand processor cores and 384 GB of memory (expandable up to 768 GB) per appliance.

The Oracle Database Appliance X8-2-HA is the only appliance which provides two 2RU servers in the base configuration that contain two 16-core Intel® Xeon® Gold 5218 processors per server, providing up to 64 enabled-on-demand processor cores and 768 GB of memory expandable up to 1.5 TB per appliance.

TABLE 1. ORACLE DATABASE APPLIANCE X8 MODEL FAMILY SUMMARY

	Oracle Database Appliance X8-2S	**Oracle Database Appliance X8-2M**	**Oracle Database Appliance X8-2-HA**
Size	Two rack unit (2RU) server	Two rack unit (2RU) server	Eight rack unit (8RU) server/storage
Processor	One 16-core Intel® Xeon® Gold 5218	Two 16-core Intel® Xeon® Gold 5218	Two 16-core Intel® Xeon® Gold 5218 per server
Memory	192 GB - expandable to 384 GB	384 GB - expandable to 768 GB	384 GB – expandable to 768 GB per server (1.5TB per appliance)
Networking	4 x 10GBase-T ports (RJ45) expandable up to 12 x 10GBase-T ports **or** 2 x 10/25 GbE ports (SFP28) expandable up to 6 x 10/25 GbE ports	4 x 10GBase-T ports (RJ45) expandable up to 12 x 10GBase-T ports **or** 2 x 10/25 GbE ports (SFP28) expandable up to 6 x 10/25 GbE ports	Per server: 4 x 10GBase-T ports (RJ45) expandable up to 12 x 10GBase-T ports **or** 2 x 10/25 GbE ports (SFP28) expandable up to 6 x 10/25 GbE ports
Storage	Two 6.4 TB NVMe SSDs - offering 12.8 TB (raw) Not expandable	Base System: two 6.4 TB NVMe SSDs offering 12.8 TB (raw) Expandable up to 76.8 TB (raw)	Base System: six 7.68 TB SSDs offering 46 TB (raw) Expandable up to 369 TB SSD or up to 92 TB SSD / 504 TB HDD (Raw)
Oracle Database	- Oracle Database 19c Enterprise, Edition, Standard Edition 2 - Oracle Database 18c Enterprise - Edition, Standard Edition 2 - Oracle Database 12c Enterprise Edition Release 1, Release 2, Standard Edition 2	- Oracle Database 19c Enterprise, Edition, Standard Edition 2 - Oracle Database 18c Enterprise - Edition, Standard Edition 2 - Oracle Database 12c Enterprise Edition Release 1, Release 2, Standard Edition 2	- Oracle Database 19c Enterprise, Edition, Standard Edition 2 - Oracle Database 18c Enterprise - Edition, Standard Edition 2 - Oracle Database 12c Enterprise Edition Release 1, Release 2, Standard Edition 2
DB Deployment	Single Instance	Single Instance	Single Instance, RAC, RAC One Node
Virtualization	Oracle Linux KVM	Oracle Linux KVM	Oracle VM, Oracle Linux KVM

NETWORKING

All models in the Oracle Database Appliance X8 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 X8-2S and X8-2M incorporate NVM Express (NVMe) flash storage to increase database performance and system reliability. The number of processor cores, amount of main memory, and NVM 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 X8-2S and X8-2M have 12.8 TB of raw NVMe storage. The Oracle Database Appliance X8-2M is expandable up to 76.8 TB of raw NVMe storage.

The Oracle Database Appliance X8-2-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 six solid-state drives (SSDs) totaling 46 TB of raw storage capacity. The Oracle Database Appliance X8-2-HA also supports optional storage expansion that enables the appliance to scale up to 369 TB SSD or 92 TB SSD and 504 TB HDD of raw data storage by fully populating the storage shelf with an additional eighteen 7.68 TB SSDs or eighteen 14 TB HDDs, respectively and adding a second fully populated storage shelf.

To expand storage outside of the Oracle Database Appliance X8 models, external NFS storage is supported for online backups, data staging, or additional database files.

All of the Oracle Database Appliance X8 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 X8 model family support the following database, operating system and management software:

TABLE 2. DATABASE AND OS SOFTWARE FOR ORACLE DATABASE APPLIANCE X8 MODEL FAMILY

Oracle Operating System and Appliance Manager Software

- Oracle Linux – Pre-installed
- Oracle Appliance Manager – Pre-installed
- Oracle Linux Kernel-based Virtual Machine (KVM) – Pre-installed and optional to use

Database Software (Installed using the Appliance Manager)

- Choice of Oracle Database Software:
  - Oracle Database 19c Enterprise Edition, Standard Edition 2
  - Oracle Database 18c Enterprise Edition, Standard Edition 2
  - Oracle Database 12c Enterprise Edition Release 1, Release 2, Standard Edition 2

- Oracle Real Application Clusters (Supported on X8-2-HA)
- Oracle Real Application Clusters One Node (Supported on X8-2-HA)
- Oracle Automatic Storage Management (ASM)
- Oracle ASM Cluster File System (ACFS)

ORACLE DATABASE SOFTWARE LICENSING

As shown in Table 2, the Oracle Database Appliance X8-2S and X8-2M 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 X8-2-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 X8-2-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 X8 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 spend with business growth.

INTEGRATED VIRTUALIZATION SUPPORT

Virtualization provides IT cost savings and better resource utilization through consolidation of multiple physical servers as Virtual Machines in an Oracle Database Appliance. It helps reduce space, power, and cooling for data centers and provides isolation for workloads to improve service quality for applications and databases.

Oracle Database Appliance supports two types of Kernel-based Virtual Machines (KVM) that can be quickly deployed using built-in user interfaces: Application KVM and Database KVM (a.k.a. database system). In an application KVM, customers manage the installation and maintenance of the application, while in the Database KVM, the Oracle Database Appliance manages the installation and maintenance of the Oracle Database.

KVM database systems enable hard partitioning for Oracle Database licensing, where each KVM database system can have its own CPU pool that is automatically assigned during KVM database system creation or share a CPU pool. Oracle Database Appliance simplifies the management of KVM database systems with built-in user interfaces. Oracle Database Appliance X8-2-HA also provides built-in high availability features, auto-restart, and failover for applications KVMs.

SOLUTION-IN-A-BOX THROUGH VIRTUALIZATION

Oracle Database Appliance X8-2-HA enables customers and ISVs to quickly deploy database and application workloads on a single Oracle Database Appliance. Support for virtualization adds additional flexibility to the already complete and fully integrated database solution by providing isolation between database and application instances.

Customers and ISVs benefit from a complete solution that efficiently utilizes resources and takes advantage of capacity-on-demand licensing for multiple workloads by leveraging Oracle KVM hard partitioning.

AFFORDABLE – THE ORACLE DATABASE APPLIANCE COST ADVANTAGE

The Oracle Database Appliance X8 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 X8 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 X8 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 X8 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 X8 model family.

TABLE 3. COMPARATIVE SAVINGS WITH ORACLE DATABASE APPLIANCE X8 MODEL FAMILY

Lifecycle stage	"Build-your-own"	Oracle Database Appliance X8 Model Family
Initial Deployment	- Sizing - Create orders with multiple vendors with different business terms - Research best practices - Assemble - Install, patch, and configure - Test unique configuration - Resolve issues	- Order Oracle Database Appliance - Unpack, plug-in - Run Oracle Appliance Manager
Maintenance	- Research patch dependencies - Download individual patches for firmware, operating system, database - Test unique configuration	- Download Patch Bundle for Oracle Database Appliance - Run Oracle Appliance Manager
Support	- Troubleshoot configuration with support - Locate log files - File SRs with one or more system component vendors - Wait	- Run Oracle Appliance Manager - Configure Auto Service Request (ASR)

COMMON USE CASES

The Oracle Database Appliance X8 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
- Branch Office and Departmental Deployments
- Rapid Provisioning of Test and Development Environments

SIMPLE, OPTIMIZED, AFFORDABLE DATABASE SYSTEM

The models in the Oracle Database Appliance X8 model family will appeal to customers looking for affordable, optimized database systems for online transaction processing (OLTP) and data warehousing workloads 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. The broad product offerings of the Oracle Database Appliance X8 model family of systems also provides a range of availability and disaster recovery implementation options to meet various SLA requirements.

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. Because of this uncertainty, 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. In addition, optional memory and storage expansion allows customers the flexibility to expand 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 with optional virtualization 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.

BRANCH OFFICE AND DEPARTMENTAL DEPLOYMENTS

Many organizations have a need to deploy database environments in remote branch office locations or where IT resources are limited or for departmental solutions requiring dedicated resources. Customers can configure the entire solution and quickly deploy it in a remote location or for a departmental application, 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 X8 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 X8 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.

All the Oracle Database Appliance models (bare metal) enable quick and space-efficient creation of database copies with ASM Cluster File System (ACFS) snapshots. Combining these features together, administrators can quickly provision each developer with complete test and development environments that improve 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.

Customers can also easily backup their on-premises Oracle Database Appliance databases to the Oracle Cloud without having to change any applications, acquire any special training or expertise, or create any detailed backup job scripts. This makes it easy to implement both an on-premises and cloud strategy to support test/dev or even disaster recovery environments in the cloud.

Oracle Database Appliance customers can also seamlessly migrate databases from their on-premises appliance to the Oracle Cloud 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.

CONCLUSION

For customers seeking a simple, optimized, and affordable database solution, the Oracle Database Appliance X8 model family offers optimized purpose-built hardware and software 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 X8 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 X8 model family, visit: www.oracle.com/oda

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