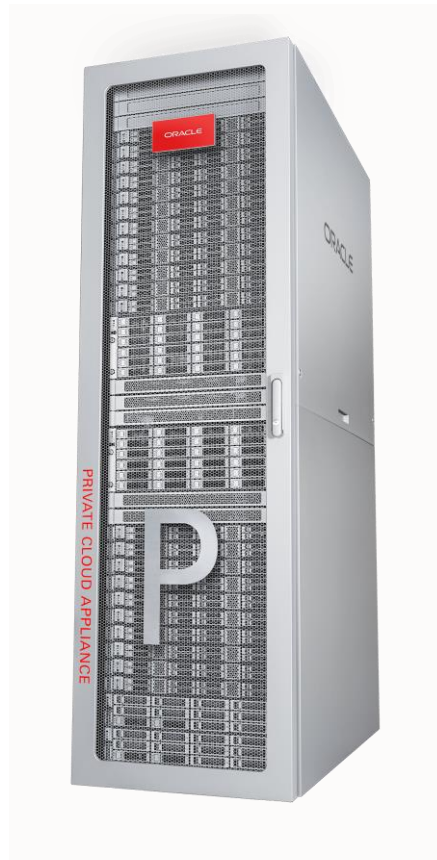# Oracle Private Cloud Appliance X8-2 with X9-2 Compute Nodes Datasheet

Oracle Private Cloud Appliance is an on-premises cloud native converged infrastructure that allows customers to efficiently consolidate business critical middleware and application workloads. Oracle Private Cloud Appliance is cost effective, easy to manage, and delivers better performance than disparate build-your-own solutions. Oracle Private Cloud Appliance together with Oracle Exadata Machine provides powerful, single-vendor, application and database platforms for today's data driven enterprise.

Oracle Private Cloud Appliance runs enterprise workloads alongside cloud-native applications to support a variety of application requirements. Oracle Private Cloud Appliance together with Oracle Cloud Infrastructure provides customers with a complete solution to securely maintain workloads on both private and public clouds. Oracle Private Cloud Appliance's converged architecture integrates the Oracle Linux Cloud Native Environment, decoupling the workloads from the infrastructure to provide a scalable framework for effortless workload portability to Oracle Cloud Infrastructure.

"Oracle Private Cloud Appliance has enabled us to fast track our strategy to success by generating return on investment 30% faster than we had planned."

Gustau Serra Salido
CEO
Media Cloud

TURNKEY ENTERPRISE DATA CENTER SOLUTION

Oracle Private Cloud Appliance is an easy-to-deploy, "turnkey" solution that integrates compute, network, and storage resources in a software-defined fabric to enable agile and efficient data center deployments. With Oracle Private Cloud Appliance, you get a converged infrastructure that can be scaled linearly, one server at a time. In addition, Oracle Private Cloud Appliance allows the customer to deploy applications rapidly by leveraging Oracle VM Templates that are available for download from Oracle. Oracle VM Templates hide underlying complexity and allow customers to quickly configure Oracle virtual Machines with key Oracle technologies. Each Oracle VM template is packaged using Oracle best practices, which eliminate installation and configuration costs, reduces risk and dramatically shortens deployment timelines. There are over 100 Oracle VM Templates that provide support for Oracle Applications, Oracle Database, Oracle Middleware, and so forth.

Furthermore, Oracle Private Cloud Appliance fits easily into your existing data center by supporting the operating systems you already run and connecting to your choice of external storage including all-flash, disk-based and hybrid configurations of Oracle ZFS Storage Appliance and NFS or iSCSI storage from other vendors.

By leveraging this integrated platform, administrators are free to focus on addressing strategic needs and delivering business agility, rather than investing valuable resources on integrating and managing infrastructure.

ORCHESTRATED POWER UP, INSTALLATION, AND CONFIGURATION

With Oracle Private Cloud Appliance, users need only to move the rack into place, connect power, network, and storage cables, and power on the system to get going. The embedded controller software automatically powers up, installs, and configures the hardware and software environment. Within hours, the system is ready, and users can add VMs by using standard Oracle VM Templates or by creating them from scratch.

Oracle software that has been certified for use with Oracle VM / Oracle Linux is certified for the Oracle Private Cloud Appliance, which includes the Oracle Linux CNE, Oracle Database, Oracle Fusion Middleware, Oracle Applications, and Oracle Real Application Clusters.

Oracle Private Cloud Appliance offers exceptional value in the following areas:

- **Accelerate time to value**. Oracle Private Cloud Appliance speeds up deployment of the full hardware-to-applications stack, so you can get applications to users within hours, not days or weeks.

- **Reduce complexity with a wire-once converged infrastructure**. This solution leverages a software-defined network fabric, allowing installation and configuration of servers and storage to be accomplished through software. No more physical re-cabling to reconfigure your environment.

- **Reduced total cost of ownership**. For one price, you can get all hardware and software needed, including virtualization software. Premier support for Oracle Linux and Oracle Solaris is also included. In addition, Trusted Partitioning enables efficient Oracle software licensing, so you only pay for the cores you use and not for the full system capacity.

Oracle Private Cloud Appliance

Oracle Private Cloud Appliance provides IaaS out of the box to securely deploy applications in Virtual machines and application containers using Oracle Linux Cloud Native Environment.

Oracle Private Cloud Appliance

Highly Available, Integrated Cloud Native Environment:

- Simplify, Automate, Deploy and auto-scale Kubernetes Clusters in 30 minutes!

- Enable DevOps, modernization and application portability

- Easily extend and/or migrate workloads to Oracle Cloud Infrastructure

Converged Engineered System for middleware and apps:

- Consolidate enterprise and cloud native workloads

- Cost-effective and scalable

- Single pane of glass management – Applications to Disk

- Up to 40% better price/performance than build-your-own

Seamless integration with Oracle Exadata Machine:

- Single vendor support for Applications, Middleware, Database and Infrastructure

- **High Availability.** Oracle Engineered Systems are built with zero single points of failure which means, application high availability through upgrades and maintenances as well. It leverages Oracle's proven MAA (Maximum Availability Architecture) design for five nines. In addition, Oracle Site Guard can be used to implement Oracle VM Disaster Recovery between multiple Oracle Private Cloud Appliance sites.

- **Future Proof your investments** by scaling compute and storage linearly over time to meet performance demands and business growth. The solution also integrates into existing data centers with support for the operating systems and storage you use today.

INTEGRATED CLOUD NATIVE ENVIRONMENT FOR APPLICATION MODERNIZATION

Oracle Private Cloud Appliance comes fully integrated with a production-ready Oracle Private Cloud Appliance Cloud Native Environment (OPCACNE) that simplifies and automates the lifecycle of Kubernetes workloads. Oracle Linux Cloud Native Environment is a curated set of open source Cloud Native Computing Foundation® (CNCF®) projects that can be easily deployed, have been tested for interoperability, and for which enterprise-grade support is offered. With the Oracle Linux Cloud Native Environment, Oracle provides the features for customers to develop microservices-based applications that can be deployed in environments that support open standards and specifications.

Oracle Private Cloud Appliance allows you to easily manage creation, deletion and scaling of highly available Kubernetes clusters with a few mouse clicks or by using the CLI. The integrated Kubernetes dashboard offers a single pane of glass GUI based management for clusters.

Oracle Private Cloud Appliance offers you the most optimized platform to consolidate your enterprise, mission-critical workloads, and your modern cloud-native containerized workloads. It provides you with the simplest path to modernize your workloads and helps you accelerate the digital transformation to meet your changing business needs.

Components in Oracle Linux Cloud Native Environment are made available via Oracle Linux yum server or Oracle Container Registry.

EASILY BUILD AND MANAGE CLOUD SERVICES WITH ORACLE ENTERPRISE MANAGER

By adding Oracle Enterprise Manager to your Oracle Private Cloud Appliance deployment, you can quickly build and manage a private cloud within your data center and offer services like Infrastructure as a Service (IaaS) and Database as a Service (DBaaS). Oracle Enterprise Manager enables business users and developers to get rapid and self-service access to cloud services while allowing cloud administrators to centralize governance. Both self-service users and administrators can access usage data and create chargeback reports to assess the service consumption.

SIMPLIFIED JOURNEY TO CLOUD

Oracle Private Cloud Appliance offers a simple and automated method to export selected VM(s) from Oracle VM (OVM) to Oracle Cloud Infrastructure. This requires the customer to identify an Oracle Cloud Infrastructure tenancy to serve as the target for this migration.

Cloud Native Environment for Containers, Microservices, and DevOps

- Oracle Private Cloud Appliance delivers a *Cloud Native Framework* with container runtime environment for application development, and Kubernetes for container orchestration

- Oracle is a platinum member of the Cloud Native Computing Foundation® (CNCF®) and the Linux® Foundation

- Support for Oracle Linux Cloud Native Environment (OLCNE) to automate deployment, scaling and management of containerized applications

- Automated container lifecycle tool leverages Kubernetes to eliminate complexity when creating containers

- Oracle Private Cloud Appliance allows DevOp projects to quickly and easily scale compute and storage capacity up or down as projects require

- Run enterprise workloads alongside cloud-native applications to support a variety of application requirements

- Oracle Private Cloud Appliance can segment users into numerous DevOp teams allowing multiple DevOps projects to run simultaneously

- Use containers to move microservices-based applications between Oracle Cloud Infrastructure, public and hybrid clouds

- Wizards in Oracle Enterprise Manager take input from the user to create Kubernetes master, VMs, networks, and storage for container deployment

Oracle Private Cloud Appliance also offers automated backup of all critical components and configuration data to Oracle Cloud Infrastructure object store. This cloud backup takes advantage of the Oracle Cloud Infrastructure object store APIs on the integrated ZFS Storage Appliance to create periodic snapshots of critical data needed to recover a PCA to a running state after a catastrophic event. These snapshots are automatically backed up to the customer tenancy in Oracle Cloud Infrastructure.

EFFICIENT LICENSING REDUCES TCO

Oracle Private Cloud Appliance is an engineered system and supports "Trusted Partitions", therefore, customers have the flexibility to license Oracle software based on what they use, and not on the system's total capacity, enabling efficient software licensing.

EXTREME ENTERPRISE STORAGE PERFORMANCE

Oracle Private Cloud Appliance integrates Oracle ZFS Storage Appliance ZS7-2 with a usable capacity of 100TB. Oracle ZFS Storage ZS7-2 provides scalable, unified storage with extreme performance and superior efficiency required by demanding enterprise applications and unpredictable cloud workloads. It has been co-engineered with Oracle Private Cloud Appliance to deliver the following capabilities:

- **Direct Access to ZFS shares from virtual machines on Oracle Private Cloud Appliance.** Oracle Private Cloud Appliance administrators can create custom networks that allow customers to access iSCSI and NFS shares on the internal ZFSSA from within individual virtual machines. This allows for maximum scalability and highest performance for workloads hosted on Oracle Private Cloud Appliance.

- **Accelerated performance for applications and workloads deployed on Oracle Private Cloud Appliance.** It is optimized for IOPS–intensive workloads, such as OLTP databases, as well as for bandwidth-driven workloads including data warehousing, business intelligence analytics, and video processing. In addition, Oracle Database's unique Hybrid Columnar Compression feature, when used in conjunction with Oracle Private Cloud Appliance, reduces the amount of storage needed for data warehouses.

- **Advanced set of management and real-time analytics tools,** which allow customers to visualize and drill down into specific workloads to understand where congestion occurs and why. It can even allow them to examine and manage the storage aspects of Oracle Private Cloud Appliance environments all the way down to the VM level.

SYSTEM SCALABILITY AND GROWTH TO FUTURE PROOF INVESTMENTS

Oracle Private Cloud Appliance is built to be highly scalable in terms of both compute and storage as the business needs grow over time. A single Private Cloud Appliance rack can scale up to 1408 cores and 3.3PB of storage. The included controller software automatically provisions new nodes to be ready for VM provisioning.

In addition, as the customer workloads grow, the ZFS storage for a single rack can be expanded by connecting up to 23 additional disk shelves for Oracle ZFS Storage Appliance ZS7. The storage expansion trays for ZS7 can be various combinations of Oracle Storage Drive Enclosure DE3-24C and DE3-24P All-Flash disk shelves.

Key Features

- Integrates with Oracle Enterprise Manager for unified IT as a service cloud management
- Oracle VM included
- Premier Support for Oracle Linux and Oracle Solaris included
- Support for Oracle VM Templates enables deployment of applications in hours, not days
- Trusted Partitioning enables efficient database software licensing
- Zero downtime upgrades
- The "wire-once" design reduces operational complexity
- Single vendor support for full hardware and software stack
- Consolidation of distributed data centers and elimination of build-your-own has shown an estimated 40% cost savings

KEY SOFTWARE COMPONENTS

The following software, included with the Oracle Private Cloud Appliance, enable scalability, software-defined networking, and GUI-based management:

- **Oracle VM Server.** Oracle VM server virtualization is designed to be highly scalable and built to enable rapid application deployment. Oracle VM supports up to 128 vCPUs and a variety of guests such as Linux, Oracle Solaris, and Microsoft Windows. Entire Oracle application stacks such as Oracle Database and Oracle enterprise applications can be deployed in minutes to hours using Oracle VM Templates. The ability to quickly and easily deploy applications to a highly scalable virtualized environment enables IT to meet SLAs and reduce time to market for the business.

- **Oracle Private Cloud Appliance controller software.** The controller software allows users to manage and monitor the systems hardware, perform software upgrades, create and manage virtual resources (virtual servers, virtual networks, and storage), and monitor utilization of all system resources in real-time. The controller software runs on two dedicated management nodes that are configured for high availability with automatic failover in the event of a failure. It is accessible via a GUI dashboard.

In addition, the following software components can be downloaded for Oracle Private Cloud Appliance:

- **Oracle Enterprise Manager**
- **Oracle Linux**
- **Oracle Solaris**

KEY HARDWARE COMPONENTS

Oracle Private Cloud Appliance rack consists of the following main hardware components:

- **Compute Nodes.** Compute nodes include Oracle Server X9-2 systems powered by two Intel® Xeon® P8358 with 32 cores per socket. The X9-2 compute nodes can be ordered in three different memory configurations – 512 GB, 1 TB and 2 TB. With 45% performance improvement over last generation, Oracle Server X9-2 provides the optimal balance of cores, memory, and I/O throughput for enterprise applications.

  Each compute node runs Oracle VM Server for x86 to provide server virtualization. Compute nodes may be added or removed from the Oracle Private Cloud Appliance configurations without any downtime. A Private Cloud Appliance rack can support up to 1,408 compute cores.

- **Switches.** Ethernet switches used for the data network and management network in a Private Cloud Appliance. The different types of switches used are:

  - **Leaf Switches** - (2) 36 port 100GbE switches used for high-speed internal communication between the internal hardware components (Compute Nodes, system disk, management servers) in a Private Cloud Appliance solution

  - **Spine Switches** - (2) 36 port 100GbE switches used for high-speed communication between the Private Cloud Appliance and other Engineered Systems, storage or the data center network. The Spine switches form the backbone of the network and perform routing tasks.

Related Products

- Oracle Private Cloud at Customer
- Exadata Cloud at Customer
- Oracle Enterprise Manager
- Oracle VM
- Oracle Linux

Key Business Benefits

- Application portability with fully supported Oracle Linux Cloud Native Environment
- Automate deployment, scaling and management of containerized applications
- Reduce ongoing software licensing and support costs, infrastructure software included with Oracle Private Cloud Appliance
- Efficiently consolidate business critical middleware and application workloads
- Easily manage cloud services with Oracle Enterprise Manager
- Protect investments by easily scaling compute, one node at a time
- Improve security by easily isolating up to 8 tenant groups with complete network and storage isolation
- Oracle Private Cloud Appliance makes it easier for Public Sector entities to maintain compliance for stringent data sovereignty regulations

- **Management Switch** - (1) 48 port switch used to provide easy management of all internal hardware components (Compute Nodes, system disk, fabric interconnects, management servers) in a Private Cloud Appliance.

High speed low latency SDN is implemented on top of 100GbE leaf and spine switches. These offer 100GbE connectivity for all communication between internal rack components and allow for flexible 10/25/40 or 100 GbE connectivity to customer datacenter.

- **Integrated Storage.** Oracle Private Cloud Appliance features a fully integrated, enterprise-grade Oracle ZFS Storage ZS7-2 for providing extreme performance and superior efficiency required by demanding enterprise applications running in VMs. This storage subsystem is designed to be fully redundant for maximum fault tolerance and serviceability in production. The Oracle Private Cloud Appliance storage subsystem is loaded with high-performance DIMM and flash memory for optimal read/write performance under the most demanding file storage workloads.

Related Services

The following services support Oracle Private Cloud Appliance:

- Advanced Customer Services
- Oracle Premier Support for Systems
- Oracle Platinum Services
- Oracle Consulting Services
- Oracle University

ORACLE PLATINUM SERVICES

Oracle Platinum Services customers maximize the availability and performance of Oracle Private Cloud Appliance with 24/7 remote fault monitoring, industry- leading response times, and patch deployment services. Highly trained, specialized Oracle support experts deliver these services, helping to reduce the costs and complexity of ongoing maintenance and support. Oracle Premier Support for Engineered Systems provides a fully integrated system support with a single point of accountability. Qualifying customers can receive the enhanced coverage of Oracle Platinum Services at no additional cost. This Oracle service is typically not available in a build-your-own solution and provides a major benefit for Oracle Private Cloud Appliance customers.

"Oracle Private Cloud Appliance includes everything we need to host our customers' applications in a virtual environment. And it is versatile enough to meet our diverse clients' needs."

Rob Guidarelli
CEO
Tier1 Inc.

ORACLE PRIVATE CLOUD APPLIANCE HARDWARE SPECIFICATIONS

Oracle Private Cloud Appliance X8-2 With X9-2 Compute Nodes Hardware and Environmental Specifications

COMPONENT/ ATTRIBUTE	DETAIL FOR ORACLE PRIVATE CLOUD APPLIANCE X8-2 WITH X9-2 COMPUTE NODES
Oracle Server X8-2 Management Nodes: **2**	• (2) Intel® Xeon® 5218 2.3 GHz, 16 core processors (Total 32 cores) • 12X32 GB DDR4 DIMMs (384 GB RAM total) • (2) 1.2 TB HDDs (RAID1) • (1) Dual-port 100Gbit Ethernet HCA (CX5) • (1) GbE management port (BASE-T) • 1 Gbit + 2 X 10/25 Gbit embedded Ethernet ports • Redundant power supplies, cooling fans and disks
Oracle Server X9-2 Compute Nodes: **2 to 22***	• (2) Intel® Xeon® P8358 2.6 GHz, 32 cores, 250 watts processors (Total 64 cores), up to 1408 cores per rack • 3 memory configurations with 512 GB, 1 TB and 2 TB RAM

COMPONENT/ ATTRIBUTE	DETAIL FOR ORACLE PRIVATE CLOUD APPLIANCE X8-2 WITH X9-2 COMPUTE NODES
*22 server maximum is possible when the PDU used is 24 KVA. With 22 KVA PDUs, the maximum number of compute nodes is 20 and with 15KVA PDUs, the maximum is 10 Compute Nodes	• (2) 240GB M.2 internal SSD • (1) Dual-port 100Gbit Ethernet NIC (Mellanox CX5-OCP) • (1) GbE management port (BASE-T) • Hot-swappable and redundant disks, cooling fans and power supply units
Oracle ZFS Storage ZS7-2: **Dual Controllers**	• (2) 7.68 TB Readzilla SSDs (Read Cache) • (20) 14 TB serial-attached SCSI (SAS) HDDs (100 TB usable) • (2) 200 GB Write Flash Accelerators
Leaf Data Switch	• (2) 36-Port 10/25/40/100 Gbps flexible speed switches using QSFP28 ports
Spine Data Switch	• (2) 36-Port 10/25/40/100 Gbps flexible speed switches using QSFP28 ports
Management Switch	• (1) 48 ports Ethernet Switch
Power in Watts	• Maximum (Base/Full): 7,833 / 23,553 • Typical (Base/Full): 5,483 / 16,487
Cooling in BTU/Hr.	• Maximum (Base/Full): 26,742 / 80,410 • Typical (Base/Full): 18,719 / 56,287
Airflow in CFM	• Maximum (Base/Full): 1,238 / 3,723 • Typical (Base/Full): 867 / 2,606
Weight	• Rack Weight with Shipping Pallet (Base/Full): 530kg (1170lb)/ 970 kg (2,138 lbs) • Installed Rack Weight (Base/Full): 420kg(927lb)/ 860 kg (1,897 lbs)
Operating Temperature	• 5 degrees Celsius to 32 degrees Celsius (59 degrees Fahrenheit to 89.6 degrees Fahrenheit), 10% to 90% relative humidity, non-condensing • Altitude operating temperature: Up to 10,000 feet (3,048 m), maximum ambient temperature is derated by 1 degree Celsius for every 300 m above 900 m, except in China where regulations may limit installations to a maximum altitude of 6,560 feet (2000 m)
Physical Dimensions	• Height: 42U, 78.66 in 1998 mm • Width: 23.62 in – 600 mm • Depth: 47.24 in – 1,200 mm
Preinstalled Software	• Oracle Private Cloud Appliance controller • Oracle VM Server • Oracle VM Manager • Storage Operating System Software

COMPONENT/ ATTRIBUTE	DETAIL FOR ORACLE PRIVATE CLOUD APPLIANCE X8-2 WITH X9-2 COMPUTE NODES
Downloadable Software	• Oracle Enterprise Manager 13c • Oracle Linux • Oracle Solaris
Regulations[1,2,3]	**Safety** • UL/CSA 60950-1, EN 60950-1, IEC 60950-1 CB Scheme with all country differences • EMC • Emissions: FCC CFR 47 Part 15, ICES-003, EN 55032, EN61000-3-11, EN61000-3-12 • Immunity: EN 55024, KN35
Certifications[2,3]	• North America (NRTL), European Union (EU), International CB Scheme, HSE Exemption (India), EAC (EAEU including Russia), BSMI (Taiwan), CCC (PRC), RCM (Australia), KC (Korea), VCCI (Japan)
European Union Directives[3]	• 2014/35/EU Low Voltage Directive • 2014/30/EU EMC Directive • 2011/65/EU RoHS Directive • 2012/19/EU WEEE Directive
Support Services	• Hardware Warranty: 1 year with a 4-hour web/phone response during normal business hours (Mon-Fri 8AM-5PM), with 2 business day on-site response/Parts Exchange • Oracle Premier Support for Systems includes Oracle Linux support and 24x7 with 2-hour on-site hardware service response (subject to proximity to service center) • Oracle Premier Support for Operating Systems • Oracle Customer Data and Device Retention • System Installation Services • Oracle Auto Service Request (ASR)

[1]All standards and certifications referenced are to the latest official version. For additional details, please contact your sales representative.
[2]Other country regulations/certifications may apply.
[3]Regulatory and certification compliance were obtained for the shelf-level systems only

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