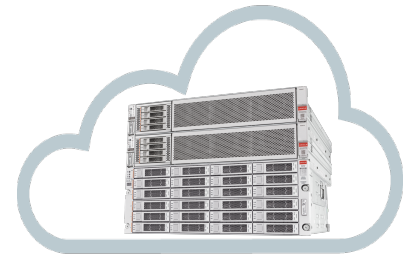




Base Database Cloud@Customer X11



Simple, unified hybrid cloud for private AI, data, and applications at customer locations, anywhere

Oracle Base Database Cloud@Customer

Oracle Base Database Cloud@Customer runs Oracle AI Database Enterprise Edition and Standard Edition while providing automation for database lifecycle management and online elastic compute scaling. It combines the world's #1 database technology, Oracle AI Database, with Oracle-managed data infrastructure, delivering the simplicity, security, and economics of a cloud deployment model at customer locations. All Oracle AI Database features and options are supported and subscribed to as a service with pay-per-use database licensing to lower costs.

Base Database service runs on Data Infrastructure Cloud@Customer, providing a service and automation experience similar to the public cloud while ensuring compatibility across public cloud and customer locations. Customers have full access to database instances, database homes, and Grid Infrastructure, along with root access to the database virtual machines (VMs) and full DBA privileges for the databases they provision. Customers can configure the database VMs as required and deploy additional software, such as applications, and backup and monitoring agents. With 100% Oracle AI Database compatibility, existing database deployments on commodity hardware and their applications can migrate to Base Database Cloud@Customer with minimal risk and effort.

Base Database Cloud@Customer is deployed according to best practices that have been proven with Oracle customers around the world. Oracle Cloud Operations manages the infrastructure, reducing administration costs and risk, and freeing IT to focus on higher business value tasks that improve overall efficiencies and business results. Customers use powerful cloud automation to control many aspects of the service, which provides database capabilities similar to their on-premises environments while facilitating the transition from on-premises to the cloud with no application changes.

Data Infrastructure Cloud@Customer

The high performance Data Infrastructure Cloud@Customer hardware is an 8U rack-mountable system containing two Oracle X11 database servers and one storage shelf. Each server features 60 usable x86 processor cores, 660 GB of usable memory, and a choice of either two dual-port 25-Gigabit Ethernet (GbE)

“Oracle Base Database Cloud@Customer brings cloud automation to provisioning, scaling, and ongoing management - helping us support the stringent requirements of timely, reliable postal delivery. We were especially impressed by the all-flash performance in load testing, as well as the streamlined, cost-conscious cloud service wherever we need it.”

Bernhard Weber

PO Database Oracle
Swiss Post AG

“Our experience with the new Oracle Base Database Cloud@Customer has been flawless. It delivered smooth provisioning and its performance exceeded our expectations. We look forward to our customers embracing this new product offering.”

Charles Kim

CEO, Founder
Viscosity

SFP28 or two quad-port 10GBase-T PCIe network adapters for external networking connectivity. The two servers are interconnected via a 25 GbE interconnect for cluster communication and share direct-attached high-performance SAS storage. The base storage shelf is partially populated with six 7.68 TB solid-state drives (SSDs) for data storage that's triple-mirrored, totaling 11.6 TB of usable database storage capacity. The storage shelf can be expanded up to twenty-four 7.68 TB SSDs, totaling 47.2 TB of usable database storage capacity.

Powerful Cloud Automation for Lifecycle Management

Customers provision the Data Infrastructure Cloud@Customer system and create database VM Clusters running Oracle Linux. VM Clusters can host multiple container databases and one or more pluggable databases within each container database. Lifecycle operations for the Base Database service are performed using the web browser UI or REST API-driven automation available through the Cloud Control Plane, including provisioning, scaling, updating, and backup. Operating system and database updates are applied by customers based on their preferred schedule. The underlying infrastructure including the servers, storage, network, hypervisor, and system software, is deployed, monitored, and managed by Oracle. An infrastructure maintenance window is provided to customers by Oracle Cloud Operations with the ability to delay maintenance to a later time that better aligns with their business activities.

Customers can easily scale their VM Cluster resources, including ECPUs, memory, file system storage, and database storage capacity allocated to the VMs, as business conditions change. Flexible scaling avoids the costly practice of sizing for the highest possible peak workload, which is often required for on-premises systems. Use cases that leverage dynamic scaling are workloads whose busy periods vary depending on the time of day, week, month, quarter, or year. Databases remain completely online while ECPUs are scaled in this manner.

Customers can enable automatic database backups, to destinations such as local disk, Zero Data Loss Recovery Appliance, or a preferred NFS target. Data Guard configuration and lifecycle operations are also available through the Cloud Control Plane to protect mission-critical databases from unplanned failures or to reduce downtime for planned maintenance activities.

Customers can deploy all currently supported Oracle AI Database versions. Review MyOracle Support Note PNEWS1360: Release Schedule of Current Database Releases for the latest supportability status of Oracle databases.

Maximum Availability Architecture (MAA)

Base Database Cloud@Customer is engineered to provide high levels of availability with completely redundant hardware and software. It is optimized for both single-instance or clustered databases and designed around Oracle Maximum Availability Architecture (MAA), a set of tiered best practices and blueprints for the use of Oracle's High Availability (HA) and Disaster Recovery (DR) technologies. These technologies include Real Application Clusters (Oracle RAC), ASM, RMAN, Flashback, Active Data Guard, and Application Continuity,

Key Benefits

- Simple, reliable, affordable database cloud at customer locations
- Fastest transition to the cloud with minimal disruption
- On-premises data residency meets compliance and security requirements
- Compatible with on-premises and public cloud databases
- Infrastructure management by Oracle reduces effort and risk
- Cloud UI and REST APIs simplify provisioning and lifecycle management
- CapEx to OpEx cloud economics
- Pay-per-use aligns usage with costs and lowers TCO
- Database and application consolidation multiplies value

Elastic Compute

- 5th Generation AMD EPYC™ Processors
- Up to 120 usable server cores available to VMs
- 1,320 GB of usable DDR5 DRAM

Scalable Storage

- Up to 47.2 TB usable database storage capacity (high redundancy, without compression)

Fast Networking

- 25 Gbps interconnect between servers
- 10 Gbps or 25 Gbps for client and backup connections

Related Products

- Oracle Database 26ai and 19c
- Real Application Clusters
- Active Data Guard
- Multitenant

and optimize availability to meet the business continuity requirements of critical applications. Oracle databases are deployed with MAA best practices enabling customers to use cloud automation to take immediate advantage of key HA and DR features including Oracle RAC and Active Data Guard.

Hybrid Cloud for Database, Applications, and AI

Multiple database VM Clusters and application VMs can be provisioned on Data Infrastructure Cloud@Customer to increase workload consolidation and maximize infrastructure utilization. Each VM provides an isolated operating environment with dedicated access controls, network configurations, and customizable compute, memory, and storage resources. Database VM Clusters support Oracle Linux 8 and can be deployed across both servers for high availability or on a single server to better align resources with workload requirements. Application VMs support Oracle Linux 8 and 9 and are restarted on the available server if their host server fails. All VMs are provisioned and managed through the Oracle Cloud control plane.

Customers and Independent Software Vendors (ISVs) can consolidate complete database and application environments on the same system while maximizing availability. By combining application VMs on Data Infrastructure Cloud@Customer with Oracle Private AI Services Container and Oracle AI Database Private Agent Factory, customers can deploy end-to-end agentic AI workloads using private data entirely at their location, behind their firewall.

Data Residency and Compliance Requirements

Data residency laws, industry regulations, corporate policies, network connectivity, security requirements, and the impracticality of moving databases away from tightly coupled on-premises infrastructure often prevent organizations from adopting public cloud database services. These considerations apply to core database environments in centralized data centers as well as departments, branch offices, and remote sites. With Base Database Cloud@Customer, organizations can run customer-managed database services anywhere with a low entry cost for the infrastructure, while retaining full physical control of their data and still benefiting from cloud automation and Oracle-managed infrastructure to simplify operations.

Cloud Control Plane

The Cloud Control Plane is a sophisticated software suite that runs in the Oracle Public Cloud on Oracle Cloud Infrastructure (OCI). Base Database Cloud@Customer administrators can connect to the Cloud Control Plane through a secure link using a web browser, command line interface (CLI), REST APIs, or language-specific SDKs.

The Cloud Control Plane includes a sophisticated identity management system that allows multiple departments or groups to share an Oracle Cloud Infrastructure tenancy. Compartments enable access control across resources and provide an effective mechanism to organize and control access to resources within a single tenancy.

The Cloud Control Plane is used to deploy the infrastructure and VMs running on the system. It is also used to perform database lifecycle operations such as provisioning, patching, backup, and configuring Data Guard. Policies can be used to grant fine-grain permissions within a single database for separation of duty. Another key function of the Cloud Control Plane is to track customer usage and bill only for what is used.

The Cloud Control Plane is the same as the one in the Oracle Public Cloud. This allows customers to have similar experience in both the public cloud and at their location, using the same UX and REST APIs.

Cloud Control Plane instructions are sent through a dedicated secure tunnel between the Data Infrastructure Cloud@Customer and the Cloud Control Plane. Two Control Plane Proxy Services (CPS) VMs running on the infrastructure servers host secure tunnel endpoints and act as a gateway for access to the infrastructure. They also host components that orchestrate the cloud automation, aggregate and route telemetry messages to Oracle Support,

- Database In-Memory
- Partitioning
- Advanced Compression
- Hybrid Columnar Compression
- Advanced Security
- Real Application Testing
- Advanced Analytics
- Enterprise Manager

and host software images and updates. Interruptions in the connectivity between the Cloud Control Plane and the Data Infrastructure Cloud@Customer system do not impact database and application VM availability.

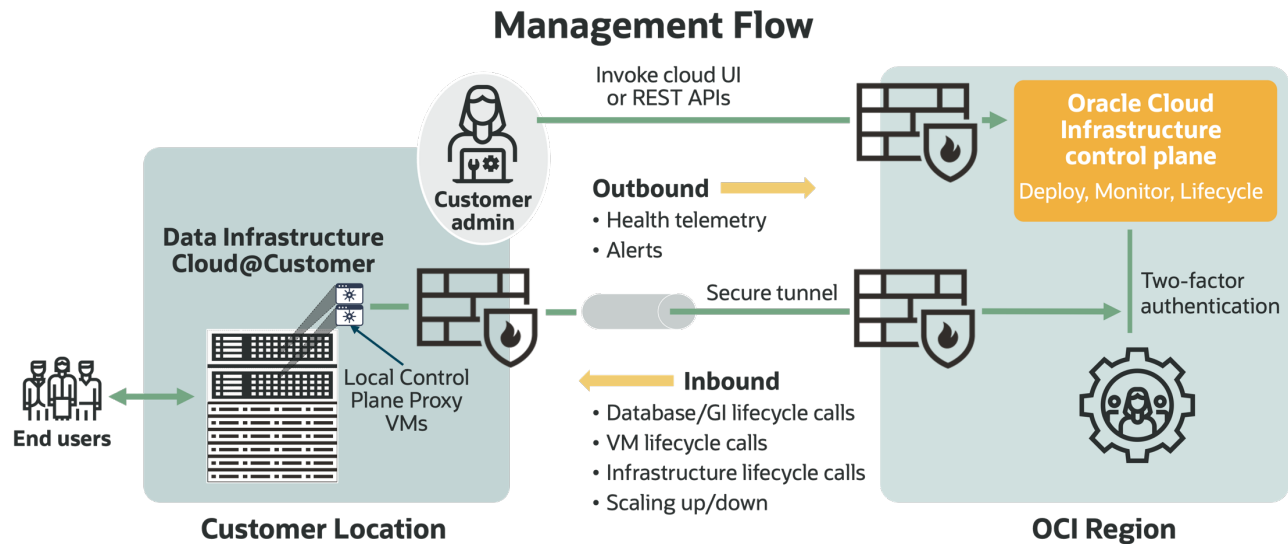


Figure 1: Management Flow for Data Infrastructure Cloud@Customer

Enterprise Class Security

Oracle Database services and infrastructure benefit from scrutiny by Oracle and industry security experts around the world, as well as validation using leading security technologies. Base Database Cloud@Customer provides the physical protection of a customer location and delivers comprehensive security measures deployed in the infrastructure, network, and Oracle Database. Security features segregate customer data access and Oracle Cloud Operations and secure data that enters, leaves, and resides on the system, authenticate access to the system, and validate Oracle provided software that runs on the system. Oracle Cloud automation further enhances security by encrypting data for all databases, enforcing strong passwords, and making it fast and easy for customers to keep databases updated with the latest security updates from Oracle.

Infrastructure security protects the physical servers and components that are the building blocks of the system. Customers have full control of the data in Oracle AI Database so it can only be accessed by users with explicit rights to access that data. Oracle Cloud Operations does not access customer data when managing the infrastructure.

Infrastructure security features include:

- Vendor signed firmware on most hardware components from the vendor that supplies the component
- Virtual machines to provide secure isolation between customer data and Oracle Cloud Operations

Network security is implemented with isolated networks, and each network is equipped with additional security measures to secure critical data processing tasks. Network security features include:

- Internal network: Secure interconnect isolates and protects storage and Oracle RAC network traffic
- Customer client network: Oracle Net Encryption secures application traffic to databases
- Customer backup network: Oracle Net Encryption secures traffic for high-bandwidth use cases such as backup, data loading, and disaster protection using Data Guard
- Customer controlled VLANs mapped directly to the database and application VMs

Platform security leverages virtual machine isolation. The operating system includes:

- A minimal Linux distribution so just the packages needed to run Oracle Database are installed and enabled
- Minimal open ports and running services that minimize attack surfaces
- Comprehensive logging and auditing that tracks access and modification

Customers have full root access to the database virtual machines using Token-based SSH access, and they can add additional tools to implement their existing security best practices such as installing software agents, configuring the iptables firewall, and LDAP authentication.

All enterprise security features of Oracle AI Database are also supported. TDE encryption keys are stored in either a password protected Oracle wallet in the customer's database VM or in an external key store such as Oracle Key Vault.

Oracle Cloud Operations

Oracle Cloud Operations manages, monitors, and maintains the infrastructure components.

Components managed include:

- Physical database servers and storage shelf
- Power distribution units (PDUs)
- Management network
- Oracle KVM (hypervisor)
- Control plane proxy virtual machines
- Data Infrastructure system software and all firmware

Monitoring activities include:

- Data Infrastructure Cloud@Customer layer incident monitoring, management and root cause analysis
- Threshold performance analysis

Maintenance activities include:

- Bug and security fixes inside hypervisor
- System software updates and upgrades
- Firmware updates and upgrades to any of the hardware components including storage and networking components
- Proactive infrastructure upgrades to update software and firmware as required

Cloud Subscription Overview

Infrastructure Subscription

Data Infrastructure Cloud@Customer is available through an infrastructure subscription offering that requires a minimum term of 4 years with an optional 1-year extension. Customers subscribe to a fixed server configuration with customizable storage capacity enabling them to properly size their hardware infrastructure to match their database size requirements.

All the disk/flash, IOPS and memory for the configuration chosen is included in the subscription price. There is no charge for network communication. Detailed specifications are provided in Table 1.

Database License Subscription

Oracle AI Database licensing is offered through two database software subscription models:

- License Included
- Bring Your Own License (BYOL)

Database software licensing is based on ECPUs allocated to a VM Cluster. Customers can scale ECPUs online, thus only paying database licensing for the processing power they require.

License Included

This subscription model provides access to all Oracle AI Database Standard Edition and Enterprise Edition capabilities through a choice of four option tiers. It is ideal for customers without existing Oracle AI Database licenses or those seeking access to features beyond their current licensed entitlements.

Bring your own license (BYOL) or choose license-included options

Standard Edition	Enterprise Edition	Enterprise High Performance	Enterprise Extreme Performance
Standard Edition 2 Database features including...	Enterprise Edition Database features including...	Enterprise Edition features PLUS...	High performance features PLUS...
• Tablespace Encryption • Machine Learning • Spatial and Graph • Up to 3 PDBs	• Data Guard • Real Application Testing • Data Masking and Subsetting Pack • Tuning Pack and Diagnostic Packs • True Cache • Hybrid Columnar Compression	• Partitioning • Advanced Compression • Advanced and Label Security, Database Vault, SQL Firewall • Multitenant • OLAP • Lifecycle and Cloud Management Packs	• Active Data Guard • Real Application Clusters • Database In-Memory • Application Continuity

BYOL includes Transparent Data Encryption (TDE) and Data Safe at no additional cost

Figure 2: Oracle AI Database License-Included Cloud Editions

Bring Your Own License (BYOL)

Bring Your Own License (BYOL) is designed to minimize costs when migrating to the cloud. In a BYOL model, customers can deploy their existing Oracle AI Database and Database Option licenses. This subscription model is ideal for customers that already have on-premises Oracle AI Database license entitlements.

Application VM Subscription

Customers subscribe to Application VMs based on the number of allocated OCPUs, which can be provisioned and scaled online using cloud automation to match changing workload requirements. Each Application VM has a maximum of 8 GB of memory per OCPU.

Zero Downtime Migration

Full compatibility with existing Oracle databases makes migration to Base Database Cloud@Customer simple and low risk. Oracle recommends using Zero Downtime Migration (ZDM) as a best practice for moving your database workloads. Oracle ZDM makes it easy to migrate online, and from Linux x86, AIX and Solaris platforms. For more information on moving your databases to Oracle Cloud, visit www.oracle.com/goto/move

Conclusion: Transform IT, Unleash Business Potential

Base Database Cloud@Customer provides a simple, unified hybrid cloud for private AI, data, and applications at customer locations. Online ECPU scaling and flexible storage capacity enable pay-per-use database licensing while allowing customers to right-size infrastructure resources for workload requirements, providing a lower-cost entry point for on-premises cloud deployments. Oracle-managed infrastructure and built-in powerful automation for common lifecycle tasks simplify system and database management, while support for databases, applications, and AI capabilities enables complete environments to be deployed on a single system, maximizing hardware utilization and reducing infrastructure costs.

Data residency laws, industry regulations, corporate policies, network connectivity, and application requirements can now be addressed across core database environments in centralized data centers as well as localized deployments for departments, branch offices, and remote sites while customers retain full physical control of their data. Organizations that must keep databases on premises can benefit from operational simplicity, security, and cloud economics, anywhere.



Enterprise-proven Oracle AI Database capabilities maximize productivity, reduce risk, and accelerate time-to-value. Organizations can adopt cloud operations without compromising SQL compatibility, performance, availability, transactional integrity, or support for existing data models. Existing on-premises applications continue to run without modification, simplifying migration to the cloud and enabling a hybrid cloud strategy. Customers can also bring their existing Oracle AI Database software licenses, protecting prior software investments.

Oracle uniquely delivers Base Database service in both the public cloud and on Oracle Data Infrastructure Cloud@Customer, enabling organizations to modernize Oracle databases at their private customer locations with a consistent hybrid cloud.

For more information, visit www.oracle.com/database/base-database-service/

Table 1: Data Infrastructure Cloud@Customer X11: Technical Specifications

Service item	Specification
Number of Servers per System	2
Number of Storage Shelves (JBOD) per System	1
Total Usable Cores per System	120
Total ECPUs per System	480
Total Memory Available for VMs (GB)	1320
Minimum # of ECPUs per Database VM	4
Minimum Memory per Database VM (GB)	11
Minimum # of OCPUs per Application VM	1
Minimum Memory per Application VM (GB)	8
Maximum Memory per Application VM OCPU (GB)	8
Maximum # of VMs per Server	8
Maximum # of VM Clusters per System	12
Network Connectivity ¹	Client and Backup network ports per Server • 4 x 10/25 GbE (SFP28), or • 4 x 10 GbE (RJ45) Control plane network ports per Server • 2 x 10 GbE (RJ45)

Number of Solid-State Drives (SSDs) ²	Six	Twelve	Eighteen	Twenty-four
Total Usable Storage Capacity (TB) ³	11.6	23.4	35.3	47.2
Maximum SQL Read IOPS ^{4,7}	1,100,000	not measured		1,500,000
Maximum SQL Write IOPS ^{5,7}	900,000	not measured		1,100,000
Maximum SQL Scan Throughput (GB/s) ^{6,7}	11	not measured		16
Lowest Measured Read Latency (μs)	150			

¹ Choice of Dual Port 10/25GbE SFP28 or Quad Port 10GbBase-T NICs for client and backup networks.

² Base storage shelf contains six solid-state drives (SSDs); additional SSDs must be added in groups of six.

³ Usable storage capacity is based on operating system conventions where 1 TB equals 1,024 GB; it is the actual space available after taking into account space needed for ASM high-redundancy, recovering from a disk failure and 250GB allocated to the CPS VMs for Oracle infrastructure management.

⁴ Based on 8K I/O requests running SQL.

⁵ Based on 8K I/O requests running SQL; write I/Os measured after ASM mirroring, which issues multiple storage I/Os to maintain redundancy.

⁶ SQL Scan throughput assuming no database compression.

⁷ Measured on VM clusters, with each VM provisioned with 64 ECPUs and 256 GB of memory.

Table 2: Data Infrastructure Cloud@Customer X11: Environmental Specifications

System Metric	Measurement
Rack units (RU)	8U (2U per server; 4U per storage shelf)
Height	86.9 mm (3.4 in) per server; 175 mm (6.9 in) per storage shelf
Width	445.0 mm (17.5 in) per server; 483 mm (19.0 in) per storage shelf
Depth	775.0 mm (30.5 in) per server; 630 mm (24.8 in) per storage shelf
Weight	23.8 kg (52.5 lb.) per server; 38 kg (84 lbs) per storage shelf
Acoustic noise (operating)	8.9 Bels (8.5 Bels per server; 8.1 Bels per storage shelf)
Airflow at maximum usage ²	333 CFM total: 131 CFM per server; 71 CFM per storage shelf
Airflow at typical usage ²	234 CFM total: 92 CFM per server; 50 CFM per storage shelf
Server Power	Two 1,400 W hot-swappable, redundant power supplies per server - Voltage (nominal) 200 to 240 VAC - Input current (maximum) 10.0A at 200-240 VAC - Frequency (nominal) 50/60 Hz (47-63 Hz range)
Storage Shelf Power	Two 580 W hot-swappable, redundant power supplies per storage shelf - Rated line voltage: 100 to 240 VAC - Rated input current: 100 VAC 8A and 240 VAC 3A
Maximum power usage	827 W (0.84 kVA) per server; 449 W (0.46 kVA) per storage shelf; 2.1 KW (2.14 kVA) total
Typical power usage ¹	579 W (0.59 kVA) per server; 314 W (0.32 kVA) per storage shelf; 1.47 KW (1.5 kVA) total

Cooling at maximum usage	2,822 BTU/hr (2,977 kJ/hr) per server; 1,532 BTU/hr (1,616 kJ/hr) per storage shelf; 7,176 BTU/hr (7,570 kJ/hr) total
Cooling at typical usage	1,976 BTU/hr (2,084 kJ/hr) per server; 1,072 BTU/hr (1,131 kJ/hr) per storage shelf; 5,024 BTU/hr (5,299 kJ/hr) total

- Operating temperature/humidity: 5 °C to 32 °C (41 °F to 89.6 °F), as measured by an industry grade temperature measurement device directed at the front bezel of the servers, 10% to 90% relative humidity, non-condensing
- Altitude Operating: Up to 3,048 m, max. ambient temperature is de-rated by 1° C per 300 m above 900 m

¹ Typical power usage varies by application load

² Airflow must be front-to-back

Table 3: Data Infrastructure Cloud@Customer X11: Regulations and Certifications

Regulations ^{1,2,3}	Product Safety:	UL/CSA 60950-1, EN 60950-1, IEC 60950-1 CB Scheme with all country differences UL/CSA 62368-1, EN 62368-1, IEC 62368-1 CB Scheme with all country differences
	Emissions:	FCC CFR 47 Part 15, ICES-003, EN55032, KS C 9835, EN61000-3-11, EN61000-3-12
	Immunity:	EN55024, KS C 9835
Certifications ^{2,3}	North America (NRTL), CE (European Union), International CB Scheme, HSE Exemption (India), BSMI (Taiwan), KC (Korea), RCM (Australia), VCCI (Japan), UKCA (United Kingdom)	
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, 2009/125/EC ErP Directive	

¹ All standards and certifications referenced are to the latest official version at the time the data sheet was written.

² Other country regulations/certifications may apply.

³ In some cases, as applicable, regulatory and certification compliance were obtained at the component level.

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