

Oracle Cloud Onboarding Guide for IT Organizations

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Table of Contents

Disclaimer	1
Introduction to Oracle Cloud for IT Organizations	5
Moving to Oracle Cloud	6
Evaluating Your Migration Goals and Priorities	7
Understanding Your Migration Strategy Options	8
Defining a Complete Migration Strategy	9
Options for Moving to Oracle Cloud	12
Options for Data Management	13
Preparing Your IT Staff for Oracle Cloud	14
Division of Management Responsibilities	14
Management Responsibilities for PaaS	15
Management Responsibilities for IaaS	17
Management Responsibilities for SaaS	18
Changes to the Roles of Your IT Staff	20
Training Your IT Staff for Oracle Cloud	20
Using the Oracle Learning Library	21
Taking Advantage of Oracle University Training	21
Taking a Massive Open Online Course (MOOC)	21
Taking Training Offered by Oracle Partners	22
Using Oracle Cloud User Assistance	22
Oracle Cloud Infrastructure Security	22



Adopting an Effective Security Strategy	23
Understanding the Oracle Cloud Shared Responsibility Model	23
Customer and Oracle Security Responsibilities	23
About Cloud Security Concerns	25
Oracle's Security Philosophy	26
Security Challenges in a Cloud Migration	26
Defining and Categorizing Your Assets on the Cloud	26
Designing Your Information Security Management System to Protect Your Assets	27
About Network Security	27
Network Access Control	28
Network Bandwidth and Latency	28
Firewalls	28
User Identity and Access	28
Identity Management and Access Control Best Practices	29
Extending Your SSO Identity Provider to Oracle Cloud	29
Administering the Oracle Cloud Enterprise	30
Taking Advantage of a Free Trial Subscription	30
Taking Advantage of Free Credits	30
Deciding on a Subscription Type	30
Managing Subscriptions	31
About Administrative User Roles	31
Managing Oracle Cloud Notifications	33
About Billing and Payment	33



Integrating Oracle Cloud into Your Corporate Network	33
About Oracle Cloud VPN Choices	33
About FastConnect	35
Migrating Existing Application Workloads and Data to Oracle Cloud	35
Migrating Your Data to Oracle Cloud	36
Migrating Your Applications to Oracle Cloud	37
Migrating Applications with Oracle Java Cloud Service ApptoCloud Tooling	37
Migrating Applications with WLST Commands	38
Migrating Applications with Developer Tools	38
Migration Scenarios	38
Lift and Shift Migration: Scenario One	38
Lift and Shift Migration: Scenario Two	39
Monitoring and Tuning Oracle Cloud Services	40
About Monitoring Resources and Quotas	40
About Monitoring Metrics	41
About Monitoring Alerts	41
About Oracle Management Cloud	41
Automating Provisioning and Management Workflows Through Orchestration	42
Improving Performance	42
Backing Up and Restoring Data	43
Deciding on a Backup Strategy	43
About Oracle Database Backup Cloud Service	44
Recovering Your Data	45



Frequently Asked Questions	45
Contacting Oracle Support	45
Chatting Online with an Oracle Support Representative	46
Contacting Oracle	46



Introduction to Oracle Cloud for IT Organizations

Used by organizations worldwide, from large enterprises and the most demanding governments to small enterprises, Oracle Cloud offers a comprehensive infrastructure as a service (IaaS), database as a service (DBaaS), platform as a service (PaaS), and software as a service (SaaS) portfolio that includes services such as Compute, Storage, Networking, Database, Java, Process, Mobile, Data Management, and Business Analytics.

Oracle's mission is to enable and guide all organizations through their transition to a cloud era, where they can, with agility and efficiency, build and deliver any solution needed to drive their business success. Oracle Cloud is a broad set of industry standards-based, integrated services that provide customers with subscription-based access to Oracle platform services, application services, and social services all supported by Oracle.

Oracle Cloud is the industry's broadest and most integrated public cloud. It offers best-in-class services across infrastructure as a service, database as a service, platform as a service, and software as a service, and even lets you put Oracle Cloud in your own data center. Oracle Cloud helps organizations drive innovation and business transformation by increasing business agility, lowering costs, and reducing IT complexity.

- » Oracle Software as a Service (Oracle SaaS) applications provide you with the speed and innovation of best-of-breed cloud software in a complete, secure, and connected cloud suite. Embedded with modern, best-practice processes and built-in social, mobile, and analytic capabilities, Oracle Cloud applications help you deliver the experiences your customers expect, the talent to succeed, and the performance the market demands.
- » Oracle Infrastructure as a Service (Oracle IaaS) is a comprehensive set of integrated, subscription-based infrastructure services that enable businesses to run any workload in an enterprise-grade cloud that's managed, hosted, and supported by Oracle.
- » Oracle Platform as a Service (Oracle PaaS) helps enterprise IT and independent software vendor (ISV) developers rapidly build and deploy rich applications—or extend Oracle Cloud SaaS applications—using an enterprise-grade cloud platform based on the industry's #1 database and application server.

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- » Oracle Cloud Machine delivers Oracle Cloud services in your data center, fully managed by Oracle, so that you can take advantage of the agility, innovation and subscription-based pricing of Oracle Cloud while meeting data-residency and latency requirements.

Moving to Oracle Cloud

Oracle Cloud was developed to offer secure infrastructure and platform services that are used by enterprise customers to run their mission-critical enterprise workloads and store their data. It is important for organizations to understand the potential benefits of incorporating cloud computing as part of their overall IT strategy. They should understand why Oracle cloud is particularly suited for enterprise workloads and what the key steps are that must be considered to successfully transition to a cloud environment.

Key benefits for moving to the cloud include:

- » Faster expansion, offering new services, expanding sales, without a huge upfront investment
- » Driving efficiencies by enabling companies to provision and pay for only what they need right now versus what they may need 1 or 2 years down the road (time value of money)
- » Business agility. Fast provisioning means that the business can respond rapidly to new business opportunities or threats by scaling the infrastructure during peak business periods or delivering new applications.
- » Business assurance because cloud-based infrastructure typically follows best practices for availability and security as part of the service, shifting this responsibility to the cloud provider that has expertise in this area. This enables the organization's IT staff to focus on developing, testing, and delivering new functionality.
- » Lower development costs
- » Acceleration of application development with instant access to new development and test environments.
- » Increase in developer/IT productivity by eliminating the need to set up and manage infrastructure for development and test environments.
- » Improved security by masking sensitive production data for nonproduction use.
- » Lower total cost of ownership (TCO) by reducing data center footprint and need for in-house hardware for enterprise apps
- » Faster on-boarding of cloud apps and users by synchronizing on-premises identity repositories
- » Capability to leverage existing investments in platform, applications, and technical skills
- » True application portability, not only from development to test to production, but also between different prototyping and proof-of-concept environments

Why are enterprises choosing Oracle Cloud solutions? The answer is simple---enterprise customers get a unique value from Oracle that isn't offered by other vendors:

- » Oracle offers the most complete portfolio of integrated infrastructure and platform services with depth and breadth of functionality.
- » Oracle Cloud offers a hybrid cloud, allowing easy management and monitoring of services from on premises as well as easy migration of workloads.
- » Oracle Cloud solutions were built using standards-based technologies that customers are familiar with.

Migrating to cloud from an on-premises IT environment necessitates some thinking and preparation:

- » Setting your organization's cloud vision and business objectives
- » Defining your target technical and business requirements that meet your business objectives
- » Analyzing workloads in your current IT environment and identifying candidate workloads suitable for migration
- » Planning for migration and implementation



Evaluating Your Migration Goals and Priorities

Every line of business, department, and application within your organization is likely to have its own unique reasons, goals, and priorities for transitioning to a cloud environment. You should evaluate your migration goals and prioritize the order in which you migrate applications and workloads. Consider these goals—you may have others:

- » Migrate rapidly
- » Leverage existing investments
- » Minimize capital expenditures (CapEx) and operating expenditures (OpEX)
- » Modernize applications and deliver new capabilities
- » Gain operational efficiencies
- » Broaden access, for example adding devices and consumers
- » Support scalability requirements
- » Free up server capacity or data center space

- » Integrate with other applications in the cloud or on the web

Understanding Your Migration Strategy Options

You should understand your migration options:

Retire
Application end of life
Retain
Leave as-is, no migration
Rehost
Lift and shift, minimum changes, some Replatform with IaaS
Replatform
Move to Cloud aligned technology, mainly PaaS
Refactor
Targeted changes, leverage common cloud services PaaS++
Reuse
Consolidate, Develop common services / products
Replace
Replace with SaaS, build Cloud Native Apps

Of these options, the following are probably best for an initial migration:

- » Rehost: Redeploy your applications to a different hardware environment, such as moving a virtual machine (VM) that contains your applications to the cloud. This option is the quickest to implement and takes the least work. For example:
 - » Rehost to infrastructure as a service with Oracle Compute Services. Oracle Compute Services is an enterprise-grade infrastructure service that provides a rapidly provisioned virtual compute environment to easily migrate workloads and run them at scale with predictable, consistent performance, control and visibility.
 - » Rehost using Oracle Ravello Cloud Service to Oracle Cloud. [Oracle Ravello Cloud Service](#) seamlessly deploys existing VMware or kernel-based virtual machine (KVM) based data center workloads on Oracle Public Cloud, without any modification to the VMs, network, or storage. Oracle Ravello Cloud

Service enables complex applications to run on public clouds exactly as those applications run in the data center: Everything about the VMs stays the same—the same operating system, application settings, network settings, VMware tools, and so on.

- » **Replatform:** Move to cloud-aligned technology. For example:
 - » Move to PaaS with Oracle Cloud platform services. You can move your application development to Oracle Java Cloud Service or database management to Oracle Database Cloud Service.
 - » Bring your own containers, including open source containers, and run them effortlessly in Oracle Container Cloud Service. You can move the containers from on premises to cloud or from one cloud to another without any changes.
- » **Refactor:** Make targeted changes and leverage common cloud services, such as PaaS, to unlock the full potential of your enterprise in the cloud by aligning your existing technology with the cloud. For example:
 - » Make changes to your application or database to implement best practices, such as using compression, that weren't implemented on premises.
 - » Make changes to the application code or configuration to connect to cloud services.
 - » Develop a better architecture, such as a high availability (HA) database.

Defining a Complete Migration Strategy

It's important that you define a complete migration strategy when you move your enterprise workloads to the cloud. Most enterprise application deployments are complex. They contain databases, application servers, web servers, load balancers, network components, firewalls, and so on. You also must determine migration time frames for your data and applications. You may choose to migrate everything to the cloud all at once, but this can be a challenging—and risky—proposition. It's often more effective to break down the migration by workload, starting with less critical applications.

When making your decision, evaluate your overall hardware and infrastructure investment, as well as application performance and other issues.

Developing a complete migration strategy involves:

- » Assessing your workload to determine its suitability for migration to the cloud
- » Understanding the characteristics of your application deployment to identify what it contains
- » Evaluating options to migrate your databases
- » Analyzing the compute infrastructure requirements based on server specifics and the configuration in your current IT environment
- » Analyzing and choosing the right networking connectivity options
- » Selecting storage migration options based on the storage requirements of your application and database workloads

As the first step, you should get answers to these questions:

Task	Key Questions to Answer
Assessing your workload to determine its suitability for migration to the cloud	<ul style="list-style-type: none"> » Is the workload or data suitable for migration to the cloud? » Do you have very large amounts of identity data (users, roles, groups) and access policies to move to the cloud? If yes, do you want to continue maintaining this data in your on-premises IT



	<p>environment and consider using integration options, such as federated single sign-on or OAuth?</p> <ul style="list-style-type: none">» Do you have large amounts of data (structured or unstructured) that isn't frequently accessed by your applications?» What type of environment do you want to migrate? Is it production, test, development, or all?» Are you moving your data center to the cloud, or are you moving parts of your workloads to the cloud?» If you intend to use the cloud for backup and disaster recovery (DR), what are your specific recovery time objective (RTO) and recovery point objective (RPO)?
Understanding the characteristics of your application deployment to identify what it contains	<ul style="list-style-type: none">» What are the various components of your application architecture?» Are you moving from a physical environment, a non-Oracle cloud environment, or a hybrid cloud environment that spans on premises and cloud?» What type of enterprise applications do you want to migrate to the cloud? Are they Oracle applications or non-Oracle applications?» Are you moving from a physical environment or from a virtualized environment?» If you're using a virtualized environment, what's your source hypervisor? Is it XEN, VMWare, KVM, or HyperV?» What are the operating systems being used? Are they Linux, Windows, or Solaris?» Does your application deployment have any internal application networking requirements, such as complex networking topologies (virtual switches, etc), high availability, access control lists (ACLs), load balancers, and multiple subnets?
Evaluating options to migrate your databases	<ul style="list-style-type: none">» What's the version of the database that you want to migrate?» What's the physical size of your largest database?» What are the maximum processor and memory requirements for a single database, Oracle RAC, or non-RAC deployments in your current IT environment?



	<ul style="list-style-type: none">» Are you using Oracle Exadata as your hardware platform?» Do you have service-level agreements (SLA) or any specific database performance requirements?» Do you want to store the database on Oracle Automatic Storage Management (ASM) with a single instance database?» What options are you using for your database?<ul style="list-style-type: none">▪ Do you need only database standard edition features?▪ If you're interested in the database enterprise edition, do you want to use it without any options?» What is the primary workload for this database, OTLP or reporting and analytics?» Will you be using your on-premises license in the cloud
Analyzing compute infrastructure requirements based on server specifics and configuration in your current IT environment	<ul style="list-style-type: none">» Are you moving from VMware to Oracle Cloud?» Are you moving from the Oracle Exalogic virtualized platform to Oracle Cloud?» Are you moving from a KVM-type or HyperV type of source hypervisors?» Are you using operating systems with or without support for PVHVM drivers?» Are you using any OS-specific drivers or controllers?» What types of storage do you need? Physical, virtual, or shared?» What type of application are you migrating? Can the application be fully or partially migrated to an Oracle platform cloud service?» What are the operating systems being used? Is it Linux, Windows, or Solaris?» What are the typical sizes and shapes of your VMs?» What's your typical network usage during peak hours?» What are your typical storage I/O per second (IOPS) and SLA requirements during peak hours?

Analyzing and choosing the right networking connectivity options

- » What are the specific bandwidth and availability requirements driven by your SLA?
 - » What are the latency requirements?
 - » Do you have any location constraints, such as the data center location where your cloud service will be hosted?
 - » Do you need internal custom domain name system (DNS) names?
 - » Do you want to have platform (PaaS) and infrastructure (IaaS) services on the same subnet?
 - » Do you use a complex networking topology involving multiple subnets, multiple virtual network interface cards (vNICs) per VM, routing between different subnets, or virtual network devices?
-

Options for Moving to Oracle Cloud

When you're considering moving to Oracle Cloud, your organization is presented with a wide variety of deployment options. These range from deploying your entire application in Oracle Cloud or pursuing a hybrid approach.

You may be considering moving to Oracle Cloud by:

- » Moving your entire enterprise from on premises to Oracle Cloud.
- » Moving part of your enterprise from on-premises to Oracle Cloud and maintaining part of your enterprise on premises. This hybrid approach allows for easy management and monitoring of services from on premises as well as easy migration of workloads.
- » Moving from another cloud provider to Oracle Cloud. Oracle Cloud uses industry-standard technologies and open standards, so you can easily migrate enterprise workloads from any cloud provider to Oracle Cloud often without modifying or rewriting your applications.

One option for moving from one cloud provider to another is [Oracle Ravello Cloud Service](#). Oracle Ravello Cloud Service seamlessly deploys existing VMware or KVM-based data center workloads on Oracle Public Cloud, without any modification to the VMs, network, or storage.

- » Moving your data to Oracle Cloud Machine. Oracle Cloud Machine delivers Oracle Cloud services in your data center, fully managed by Oracle, so that you can take advantage of the agility, innovation and subscription-based pricing of Oracle Cloud while meeting data-residency and latency requirements.

Consider this option if data sovereignty, residency, compliance, and other business requirements restrict you from moving all of your data to the cloud.

Not all enterprises can move all of their workloads to the Public Cloud. There are some constraints that may make it difficult to move to the cloud:

- » **Latency:** You may need to connect to backend mainframes, databases, enterprise resource planning (ERP), and so on, with near zero latency, and your dedicated infrastructure offers lower latency
- » **Data sovereignty:** If you must comply with regulatory, legal, and privacy requirements, you may need to maintain sensitive data on premises or implement custom security standards.

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- » Control: You may need to keep 100% control over business-critical systems, including using your own firewalls, load balancers, hardware, and Virtual Private Networks (VPNs). You may need to conform to extremely strict service-level agreements.

In these situations, you can still take advantage of the cloud, choosing one of these options:

- » Run the cloud on premises, using Oracle Cloud Machine, which delivers Oracle Cloud services in your data center.
- » Use both public and on-premises cloud. In this case, you'll have the same experience across public and on-premises clouds.

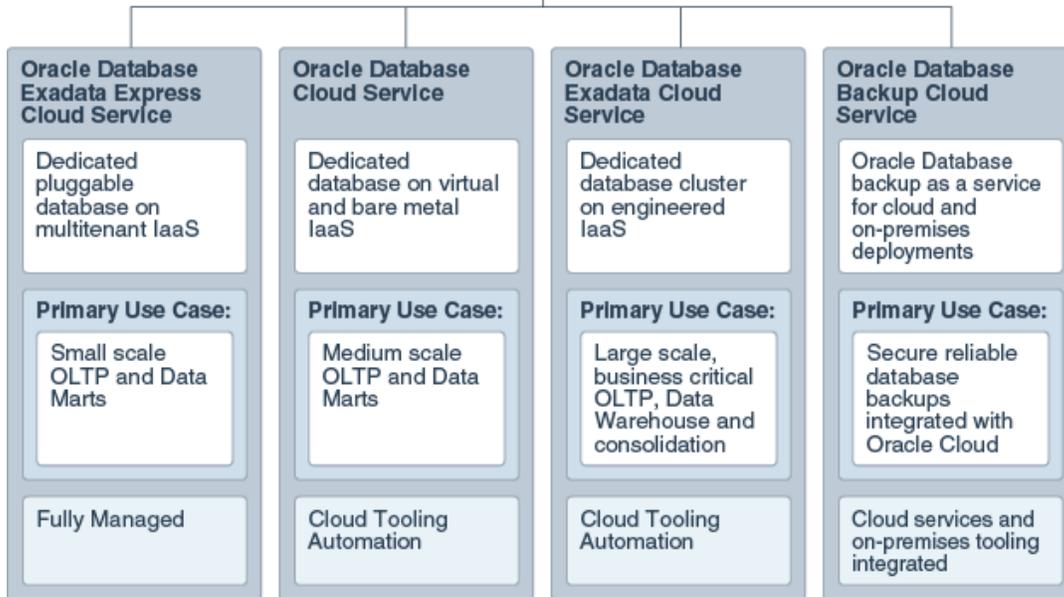
Options for Data Management

Oracle offers several options for storing your data in the cloud:

- » Oracle Database Cloud Service: Offers elastic database services for application development, test and production deployment. The service delivers an easy to use web console user interface and RESTful API to provision and administer Oracle Database on Oracle Compute Cloud Offerings.
- » Oracle Database Exadata Cloud Service: Brings the full power of Exadata to the Oracle Cloud. The service includes all the benefits of Exadata performance and 100% compatibility with existing business-critical applications and databases that are on premise, ensuring a smooth transition to the cloud.
- » Oracle Database Exadata Express Cloud Service: Provides your own Oracle Database Enterprise Edition running the latest database release on Exadata for a full Oracle experience. It's a fully managed service packed with features for modern application development and great for small to medium sized data.
- » Oracle Database Backup Cloud Service: Capacity on demand, which eliminates storage hardware.

In addition, Oracle offers:

- » MySQL: An open source database, delivering a secure, cost-effective and enterprise-grade MySQL database service for your modern applications.
- » NoSQL: A scale-out, low latency key-value database service including support for JSON and Table data types. Built-in high availability, transactions, parallel query, and more.
- » Big Data: A secure, automated, high-performance service, which can be fully integrated with existing enterprise data in Oracle Database and Oracle Applications.
- » Oracle Event Hub Cloud Service: A managed streaming data platform integrated with the rest of Oracle's Cloud.



In addition to these options, Oracle also offers the following for data management:

- » MySQL: An open source database powered by the Oracle Cloud, delivering a secure, cost-effective and enterprise-grade MySQL database service for your modern applications.
- » NoSQL Database: A scale-out, low latency key-value database service including support for JSON and Table data types. Built-in high availability, transactions, parallel query, and more.
- » Big Data: A secure, automated, high-performance service, which can be fully integrated with existing enterprise data in Oracle Database and Oracle Applications.
- » Big Data –Compute Edition: A managed, elastic, integrated platform – for streaming, batch and interactive analysis.
- » Event Hub: A managed streaming data platform integrated with the rest of Oracle’s Cloud.

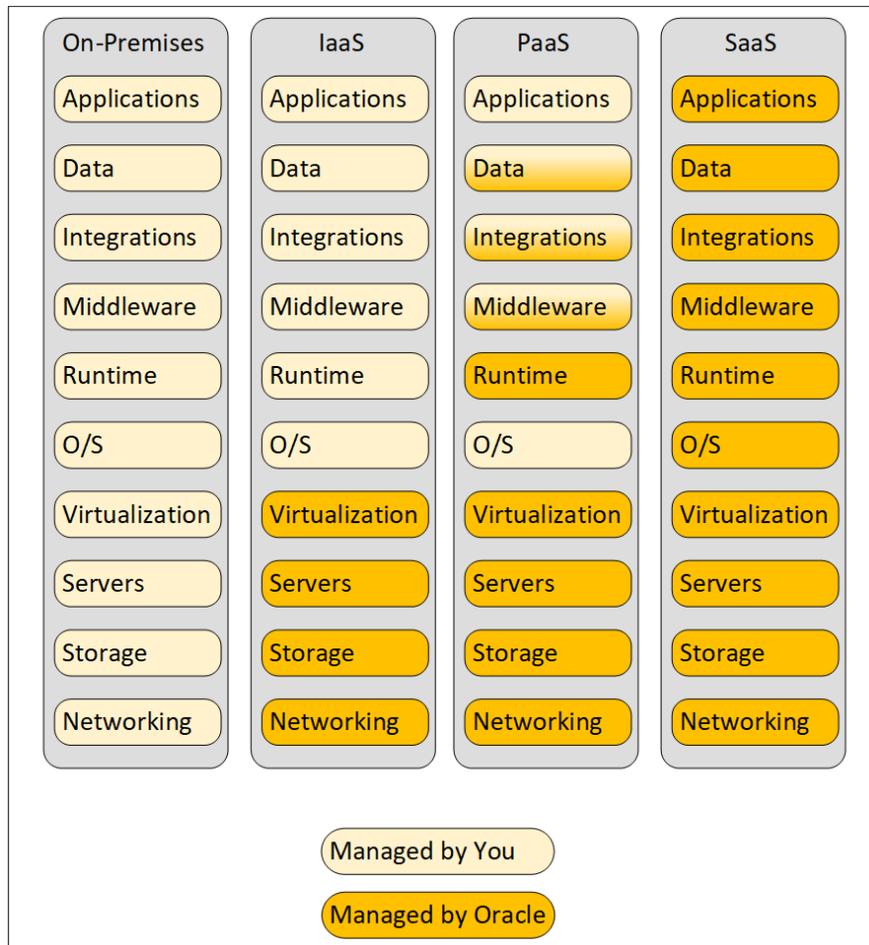
Preparing Your IT Staff for Oracle Cloud

Preparing your IT staff for the adoption of Oracle Cloud involves these key steps:

- » Understanding who controls what parts of your application deployment and infrastructure in the cloud
- » Enabling your staff to understand how their roles and tasks are likely to change
- » Encouraging your IT staff to develop new skills by attending training offered by Oracle and Oracle partners

Division of Management Responsibilities

Oracle provides a standardized and secure enterprise-grade cloud platform. While the Oracle Cloud platform hides much of the operational complexity, you have direct control over some of the components. This diagram shows you the division of responsibilities.



Management Responsibilities for PaaS

If you're a subscriber of any of the Oracle platform services (PaaS), note that Oracle is responsible for managing the underlying infrastructure, such as the following:

- » Physical servers running source hypervisors or bare metal servers
- » Operating system running on hypervisors or directly on bare metal servers
- » Network at the hardware and operating system levels
- » Storage equipment and configuration

Oracle also provides some PaaS services, such as Oracle Exadata Express Cloud Services, that are managed services. In those cases, Oracle provides operational administration.

This table shows the common administrative tasks for PaaS in more detail and who performs each of them:

Administrative Task	Performed by
Provisioning of system, software, and application with its dependent components	Oracle Cloud operations
Network setup, configuration, and management	Oracle Cloud operations
Upgrade of hardware and software	Oracle Cloud operations
Patching of software	Customer
Data migration (for example, production to test)	Customer
Data backup and restoration	Customer
Disaster recovery	Customer
Monitoring	Customer
Tuning and optimization	Customer

This table shows the common administrative tasks for the fully-managed PaaS offerings in more detail and who performs each of them:

Administrative Task	Performed by
Provisioning of system, software, and application with its dependent components	Oracle Cloud operations
Network setup, configuration, and management	Oracle Cloud operations
Upgrade of hardware and software	Oracle Cloud operations
Patching of software	Oracle Cloud operations
Data migration (for example, production to test)	Oracle Cloud operations
Data backup and restoration	Oracle Cloud operations
Disaster recovery	Oracle Cloud operations
Monitoring	Oracle Cloud operations
Tuning and optimization	Oracle Cloud operations

This table shows the common administrative tasks for DBaaS in more detail and who performs each of them.

Administrative Task	Performed by
Provisioning of system, software, and application with its dependent components	Oracle Cloud operations
Network setup, configuration, and management	Oracle Cloud operations
Patching of software	Customer
Data migration (for example, production to test)	Customer
Data backup and restoration	Customer
Disaster recovery	Customer
Monitoring	Customer
Tuning and optimization	Customer

Management Responsibilities for IaaS

If you're a subscriber of Oracle infrastructure services (IaaS), note that Oracle is responsible for managing the underlying infrastructure, such as the following:

- » Physical servers running source hypervisors or bare metal servers
- » Operating system running on hypervisors or directly on bare metal servers
- » Network at the hardware and operating system levels
- » Storage equipment and configuration

This table shows the common administrative tasks for IaaS in more detail and who performs each of them:

Administrative Task	Performed by
Provisioning of system, software, and application with its dependent components	Oracle Cloud operations
Network setup, configuration, and management	Oracle Cloud operations
Upgrade of hardware and software	Oracle Cloud operations
Patching of software	Customer
Data migration (for example, production to test)	Customer
Data backup and restoration	Customer

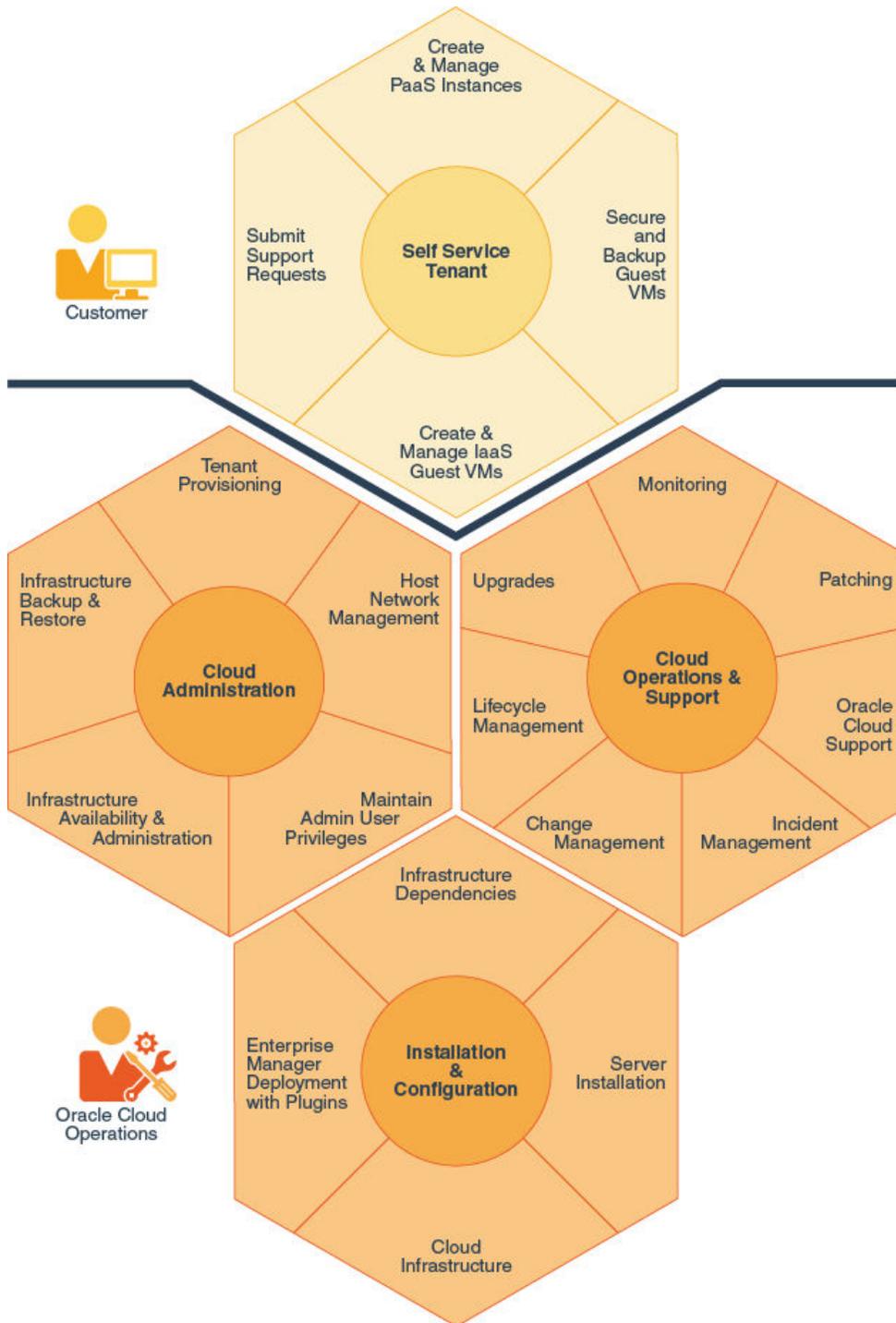


Disaster recovery	Customer
Monitoring	Customer
Tuning and optimization	Customer

Management Responsibilities for SaaS

If you're a subscriber of Oracle application services (SaaS), note that Oracle is responsible for managing everything, including applications, data, integrations, and runtime components.

This figure shows the tasks performed by you and those performed by Oracle for SaaS:



This table shows the common administrative tasks for SaaS in more detail and who performs each of them:

Administrative Task	Performed by
Provisioning of system, software, and application with its dependent components	Oracle Cloud operations
Network setup, configuration, and management	Oracle Cloud operations
Upgrade of hardware and software	Oracle Cloud operations
Patching of software	Oracle Cloud operations
Data migration (for example, production to test)	Oracle Cloud operations
Data backup and restoration	Oracle Cloud operations
Disaster recovery	Oracle Cloud operations
Monitoring	Oracle Cloud operations
Tuning and optimization	Oracle Cloud operations

Changes to the Roles of Your IT Staff

With the evolution of cloud computing, some of the roles of your IT staff are changing. These roles aren't going away, but they're essentially changing to more strategic, business- partner-type roles. In the cloud world, there's less need for support type of roles. The more important need is for IT staff that can think strategically, devise cloud-based solutions to drive the business, and focus more on enhancing the customer experience.

Business leaders must understand that these types of role transitions can be difficult for people currently working in traditional IT roles. Generally speaking, IT knowledge workers are used to change because they work in an industry that's constantly evolving. Still, management must create an environment and a culture that will enable current IT staff to successfully make the transition to cloud computing. Without them, the organization will fail to meet its goals. To help with the transition, provide the following:

- » Training and time to explore the cloud environment
- » A clear understanding of how their current role will be adapted for the cloud
- » A clearly articulated business case for using cloud technologies

Training Your IT Staff for Oracle Cloud

You can prepare your organization for the Oracle Cloud by investigating and offering training and courses provided by Oracle and Oracle partners.

Select from a wide range of courses and training:

- » [Using the Oracle Learning Library](#)

- » [Taking Advantage of Oracle University Training](#)
- » [Taking a Massive Open Online Course \(MOOC\)](#)
- » [Taking Training Offered by Oracle Partners](#)
- » [Using Oracle Cloud User Assistance](#)

Using the Oracle Learning Library

The Oracle Learning Library (OLL) is dedicated to hosting free instructional content developed by Oracle subject-matter experts. Use the Search function to find tutorials, overview videos, and Oracle by Example (OBE) tutorials.

For example, to find videos related to PaaS, go to [OLL Advanced Search](#) and in the **Search** field, enter PaaS.

Taking Advantage of Oracle University Training

Oracle University offers Oracle Cloud training solutions that will show you how to migrate to, implement, administer, optimize, and use Oracle Cloud applications and platforms.

Oracle University provides five flexible training formats to match your learning style:

- » **Classroom training:** You can attend training in person at an Oracle or Oracle partner facility. You learn from in-class demonstrations that teach you concepts and participate in hands-on labs and class discussions.
- » **Live virtual class:** You can learn from anywhere with an internet connection. Instructors teach live in a virtual classroom; you attend these courses online, in real time.
- » **Training on demand:** You can access streaming lectures and lab activities with the ability to search video, pause or rewind. You can learn online from anywhere with an internet connection, at any time. These courses are recorded.
- » **Self-study courses:** You can download the courses online, and you can learn when and where you want, at your own pace.
- » **Private events:** You can set up a training session for your employees at an Oracle site or at your company site. The content can be tailored to match your organization's specific needs, and you can set the time and the place.

For information about Oracle University, see <http://education.oracle.com>.

Taking a Massive Open Online Course (MOOC)

Oracle offers Massive Open Online Courses (MOOC). MOOCs are intended to address a broad audience, providing access to hands-on tasks that quickly allow end users to achieve a specific outcome.

Typically, they're offered for free to a large number of students.

To support multiple time zones, schedules, and languages, a MOOC doesn't have any synchronous content delivery – everything is prerecorded and available online. However, just like a traditional course, there are set start and end times, homework assignments, and quizzes. In addition, like a course, there's an award at the end for those who complete the quizzes and pass with a specific score.

Some of the cloud-related MOOCs are:

- » [Java Microservice MOOC](#)

- » Oracle Cloud DevOps Tools and Solutions MOOC

To see the event calendar listing the MOOCs for a given month, see

<https://apexapps.oracle.com/pls/apex/f?p=44785:143:105681035909753::NO:143::>

Taking Training Offered by Oracle Partners

Oracle partners offer training related to Oracle Cloud through the Oracle Partner Network.

With the Oracle Partner Network, you can:

- » Access training given by Oracle or Oracle partners
- » Find training for a specific job role, such as a developer or an administrator, and for particular solutions, such as Oracle Cloud.
- » Become an Oracle Partner Network Specialist.
- » Track your progress along a role-based, guided, learning path.
- » You can track your individual progress or, if you're a partner administrator, you can check your company's progress.

Using Oracle Cloud User Assistance

The Oracle Help Center provides documentation, tutorials, infographics, and videos so that you can learn about Oracle Cloud.

Use the Oracle Help Center to guide you through getting and using a trial subscription, including requesting a trial subscription, activating your trial subscription, and setting up your service. It describes how to buy a nonmetered or metered subscription, activating and managing your subscription, and setting up your service.

You can learn about each Oracle Cloud service, such as the SaaS, PaaS, and IaaS offerings.

To get started using the Oracle Help Center, go to <http://docs.oracle.com/en/cloud/get-started/index.html>.

Oracle Cloud Infrastructure Security

Oracle's Cloud infrastructure is used to provision a variety of SaaS, PaaS, and IaaS services. The Oracle Cloud infrastructure includes facilities, network, hardware, and operational software that support the provisioning of these services. The cloud infrastructure was developed to offer secure infrastructure and platform services that are used by Oracle customers to run their mission-critical enterprise workloads and store their data. You can be assured that you're building scalable enterprise cloud solutions using Oracle's compute, storage, networking, and platform services that run on top of some of the most secure cloud infrastructure in the world.

Oracle provides:

- » Physical security safeguards

Oracle provides secured computing facilities for both office locations and production cloud infrastructures. The exterior perimeter of each data center has concrete vehicle barriers, closed-circuit television coverage, alarm systems, and manned guard stations, all of which help defend against non-entrance attack points.

- » Restricted access to authorized personnel



Access to cloud systems is controlled by restricting access to authorized personnel. System access controls include system authentication, authorization, access approval, provisioning, and revocation for employees and any other Oracle-defined users.

» Measures to minimize employee risks

Oracle implements measures to minimize risks associated with human error, theft, fraud, and misuse of facilities, including background checks, personnel screening, confidentiality agreements, and security awareness education and training, with enforcement of disciplinary actions.

» Oracle corporate network segregation

The Oracle Cloud production network is segregated from the Oracle corporate network and requires a separate set of credentials for logical access. Oracle Cloud developers and administrators on the corporate network who need to access Oracle Cloud components to maintain them must explicitly request access credentials. All requests are reviewed and approved by the applicable service owner.

Adopting an Effective Security Strategy

Oracle Cloud was developed to offer secure infrastructure and platform services that are used by enterprise customers to run their mission-critical enterprise workloads and store their data.

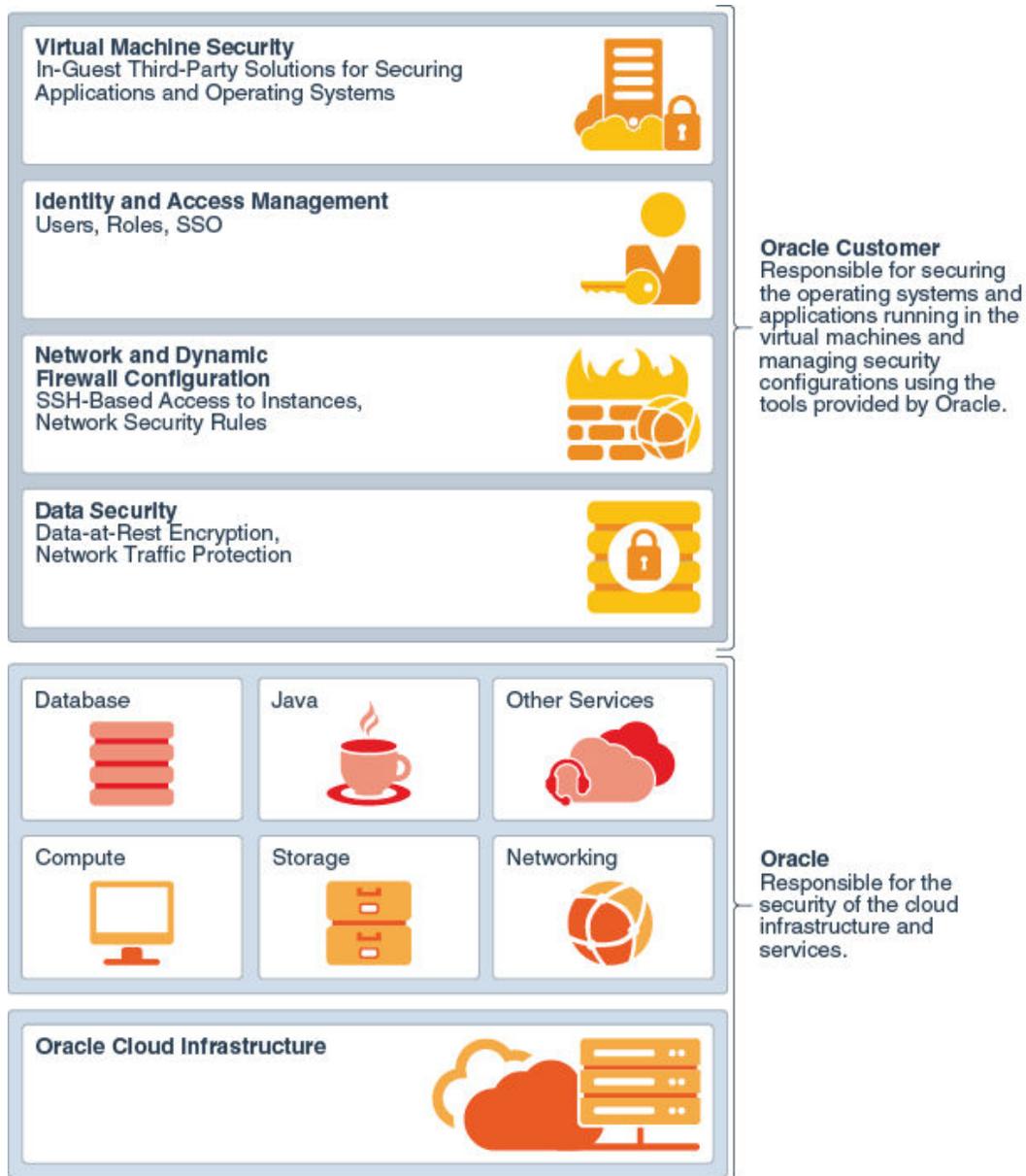
Security is a top priority for Oracle Cloud solutions. Oracle's vision is to create the most secure and trusted public cloud infrastructure and platform services for enterprises and government organizations. Oracle's mission is to build a secure public cloud infrastructure and platform services where there's greater trust—where enterprise customers have effective and manageable security to run their workloads with more confidence, and build scalable and trusted, secure cloud solutions.

Understanding the Oracle Cloud Shared Responsibility Model

Oracle is responsible for providing secure infrastructure (facilities, physical security of hardware, network and virtualization infrastructure) and services. The customer is responsible for securing operating systems, applications, data at rest, data in transit, credentials (accounts, tokens, SSH keys), policies, and configuration.

Customer and Oracle Security Responsibilities

As a customer, the services that you use determine the configuration work you must perform as part of your security responsibilities. Oracle Cloud infrastructure and platform services operate under a shared responsibility model. Oracle is responsible for the security of the underlying cloud infrastructure, and you're responsible for securing your workloads as well as platform services such as Oracle Database and Oracle WebLogic Server. This figure shows the shared security responsibilities.



As a customer, you're responsible for securing the operating systems and applications running in the virtual machines and managing security configurations using the tools provided by Oracle. Your responsibilities vary depending on the type of services you've purchased. Some of these responsibilities include:

- » Protecting your Oracle Cloud services access credentials and setting up individual user accounts. You're responsible for managing and reviewing access for your own employee accounts as well as for all activities that occur under those accounts.
- » Maintaining appropriate security, protection, archiving, and backup of your content, which may include the use of application or in-guest encryption technologies to protect your content from unauthorized access.



Oracle is responsible for protecting the global infrastructure that runs all of the services offered in Oracle Cloud. This infrastructure consists of the hardware, software, networking, and facilities that run Oracle Cloud services.

About Cloud Security Concerns

The cloud computing environment presents an additional set of security challenges layered on existing challenges that customers and service providers already face, because you must implement ways to integrate your existing security mechanisms with the cloud infrastructure that's owned and operated by an outside party.

Many of the features such as self-service, elasticity, and resource pooling that make cloud computing attractive can also be at odds with traditional monolithic security models and controls. Some of the concerns are:

» **Reduced control**

In the traditional on-premises environments, the customer organizations exercise complete control over governance, risk, and compliance. When moving to the cloud environment, the organizations may lose some control of these aspects to the cloud provider. This may cause you some anxiety until the security expectation gaps are addressed between the customer organization and the cloud provider.

» **Responsibility ambiguity**

In the on-premises environments, the customer organizations design and implement security policies themselves. In the cloud environment, the responsibility of designing and implementing security policies is shared with the cloud service provider. An ambiguity in understanding this shared responsibility can be a cause of concern and a cause of a security lapse.

» **Authentication and authorization**

The security of access mechanisms and interfaces in the cloud may vary from those that are on premises. To have seamless access between a cloud and an on-premises environment heightens the need to establish with certainty the identity of a user, especially if the users include employees, contractors, partners, and customers.

» **Isolation**

Multitenancy and shared resources are defining characteristics of cloud computing. The category covers the failure of mechanisms separating the use of storage, memory, and routing.

As cloud services evolve, the security standards in the cloud service implementation are also evolving. In this environment, customer organizations may find it difficult to compare the security provided by cloud service providers to the security provided by their organizations, so that they can identify any security gaps.

Oracle Cloud customers primarily want these security capabilities from Oracle:

» **Control**

Security mechanisms to control who can access data and under which conditions

» **Auditing**

Ability to audit resources to maintain their security configuration

» **Visibility**

Logs that provide visibility into accounts and resources

» **Assurance**



Ability to independently verify how data is being stored, accessed, and protected against unauthorized access and modification

» **Security**

Services that are designed, coded, tested, deployed, and managed securely

» **Out-of-the-box integration with existing Oracle technologies**

Seamless integration with existing Oracle solutions such as identity and access management

Oracle's Security Philosophy

Oracle's security philosophy is built around these approaches:

- » Oracle's preventive strategy is based on defense-in-depth. Oracle believes that there's a need to drive down the perimeter and add security controls closer to the data.
- » Oracle continues to develop strong and effective processes for breach detection, incident response, and effective remediation.
- » Oracle is working to define security and trust models that work well for cloud computing. For example, Oracle believes that the traditional administrator model based on the powerful, full-privileged administrator concept should be replaced with a model that places more power with the customer. Oracle should manage only the infrastructure objects, and doesn't have any channels to access customer data.

Security Challenges in a Cloud Migration

A cloud migration can often disrupt an organization's security strategy. For example, security methods that worked for traditional on-premises systems might not work in the cloud. And, as organizations move data to the public cloud, enterprise control decreases, and more responsibility falls on the cloud providers.

Therefore, you must rethink your security strategies to rely less on internal security and control, and more on your cloud provider's offerings. Enterprises also should ensure that the provider's certifications are up to date.

Some of the challenges include:

- » The location of the data. If the location of the data changes, new regulations may apply due to the new geographic location of the data.
- » The need to learn to manage data security in the cloud. This may involve learning new skills and putting new business processes in place.
- » The need to implement a robust cloud security plan. Security concerns are a common deterrent for organizations considering cloud migrations, so it's important to plan ahead for potential breaches, failover, and disaster recovery.

Defining and Categorizing Your Assets on the Cloud

Developing a security strategy includes identifying your most critical assets, such as mission-critical applications and sensitive data, and recognizing the standards and compliance requirements of your industry.

For example, if you have contracts with a government entity, you must take into account the specific requirements of the government regarding security. In some cases, you may be concerned about moving your data to an off-premises data center. In that case, you can subscribe to Oracle Cloud Machine, which delivers Oracle Cloud services in your data center.

Designing Your Information Security Management System to Protect Your Assets

Establish a standard for implementing, operating, monitoring, and reviewing your information security management system.

- » Design your Information security management system to protect your assets.
Establish a standard for implementing, operating, monitoring and reviewing your information security management system.
- » Manage your cloud account, users, and groups, and apply the **least privilege** principle.
Use the identity and access control concepts to manage users and assign them only those permissions that are required for them to perform their tasks using existing built-in groups. Regularly run least-privilege checks. Remove or disable unnecessary user accounts.
- » Manage operating system-level access to compute instances using SSH and a built-in firewall.
Successfully authenticate at the operating-system level before you access your instances. Create network security rules to control ingress and egress traffic for each instance. Restrict access to instances from a limited Internet Protocol (IP) range using network security rules.
- » Create subnets to define isolated network for each workload or organizational entity.
Depending on your security policies and related isolation needs, create arbitrary network topologies within your cloud account to define isolated networks.
- » Encrypt your data before uploading it to Oracle Storage Cloud Service.
Use client-side encryption to protect your data before uploading it. Manage the life cycle of encryption keys well by using a key management service.
- » Monitor your workloads and protect them from malware.
Implement operating-system and higher-level monitoring to detect anomalies in your instances. Protect your workloads as you would protect a conventional infrastructure from threats such as viruses, rootkits, botnets, and spam.
- » Build threat protection layers.
Layered security is a best practice for protecting a network infrastructure. Use a combination of firewall rules at the hypervisor layer alongside host-based firewalls and intrusion detection systems (IDS) and instructions per cycle (IPC) systems to create a layered solution for network security.

About Network Security

The Oracle Cloud network provides significant protection against traditional network security issues such as distributed denial of service (DDoS) attacks, man-in-the-middle attacks, IP spoofing, and port scanning.

Oracle uses network protection devices, such as firewalls, to monitor and control network communications at the external boundary of the network and at internal boundaries within the network. These network boundary devices employ security mechanisms such as traffic flow policies and ACLs, to enforce security.

Firewalls are deployed in multiple layers to filter the packets and identify authorized sources, destinations, and traffic types. Oracle Cloud services use network vulnerability assessment tools to identify security threats and vulnerabilities.

Formal procedures are in place to assess, validate, prioritize, and remedy any identified problems. Oracle subscribes to vulnerability notification systems to stay apprised of security incidents, advisories, and other



related information. Oracle takes action on the notification of a threat or risk after it's confirmed that a valid risk exists, that the recommended changes are applicable to service environments, and that the changes won't otherwise adversely affect the services.

DDoS protection or mitigation is delivered primarily through a certified firewall appliance with dedicated denial of service (DOS) protection enabled. Devices are scaled to support large amounts of traffic and maintain a connection. This provides layer 3-7 attack prevention capabilities. Whether the attack is volumetric (trying to overload connections per second capacity), falsifying legitimate connections, or trying to exhaust memory, the load balancer allows inspection and a response for each connection to either absorb or drop, as appropriate.

The load balancers are designed to actively terminate sessions for protocol inspection, content examination, and web application (Layer 7) firewall. These devices also provide technologies such as SYN cookie encryption, high-capacity connection tables, pattern matching, flow validation, Internet Control Message Protocol (ICMP) flood limiting, and strict TCP forwarding.

Network Access Control

Oracle Cloud operations teams access customer environments through a segregated network connection, that's dedicated to environment access control and is isolated from Oracle's internal corporate network traffic. Authentication, authorization, and accounting are implemented through standard security mechanisms designed to ensure that only approved operations and support engineers have access to the systems.

Network Bandwidth and Latency

Oracle monitors its own networks and will work to address internal issues that may affect availability. Oracle isn't responsible for customer's network connections or for conditions or problems arising from or related to a customer's network connections such as bandwidth issues, excessive latency, network outages, and so on, or issues caused by the Internet.

Firewalls

Oracle Cloud services use firewalls to control access between the internet and Oracle Cloud services by allowing only authorized traffic. Oracle-managed firewalls are deployed in a layered approach to perform packet inspection with security policies configured to filter packets based on protocol, port, source and destination IP address, as appropriate, to identify authorized sources, destinations, and traffic types.

User Identity and Access

Oracle Cloud offers a shared identity and access management solution used by all Oracle Cloud services including PaaS and IaaS services. Identity is a core feature that enterprise customers rely on to provide secure access to Oracle's PaaS and IaaS services. The Oracle Cloud feature that brings users, services, and applications together in a secure manner is shared identity.

A tenant in Oracle Cloud represents a customer who subscribed to one or more services from Oracle Cloud. Typically, there's a one-to-one correspondence between an Oracle Cloud tenant and an Oracle customer. An identity domain in Oracle Cloud represents the namespace assigned for a tenant. An identity domain is used to identify and associate the assets of a tenant and thereby enable isolation of data assets and transactions of



a tenant from that of other tenants. A tenant's assets include subscribed services and data assets including security artifacts such as users, groups, tokens, cookies, and policies. An Oracle customer can be associated with more than one Oracle Cloud identity domain.

Access management within an identity domain depends on users and their roles. Users with administrative roles manage local cloud identities and their rights.

There are two types of users in an identity domain to manage:

- » Standard users: Add user accounts or import a batch of user accounts
- » SFTP users: Set passwords for secure FTP (SFTP) user accounts. SFTP user accounts are used to sign in to an SFTP server to perform FTP operations related to Oracle Cloud services.

There are two types of roles in an identity domain to manage:

- » Predefined roles: View a list of all the predefined roles created by Oracle Cloud, and link to a list of users assigned to the role you select.
- » Custom roles: View, add, and remove roles that you created for customized access to your Oracle Cloud services.

[About Administrative User Roles](#) describes the administrative roles in Oracle Cloud.

Identity Management and Access Control Best Practices

These are some of the best practices to be followed for identity management.

- » Implement user identity lifecycle management.
 - » Develop policies for new users.
 - » Grant access to an Oracle Cloud service only to employees who require the service.
 - » Examine user credentials routinely. Ensure employee systems and identities in Oracle Cloud are updated and synchronized.
 - » Remove access to Oracle Cloud services from any employee who is suspended or terminated.
- » Implement proper role segregation.
- » Assign roles only to those whose job requires the privileges associated with the role. For example, assign administrative roles such as Service Administrator or Identity Domain Administrator carefully.
- » Enforce a strong password policy.
- » Implement a portal that provides single access to Oracle Cloud services.

Extending Your SSO Identity Provider to Oracle Cloud

You can federate your corporate identity and your identity domain and thereby achieve single sign-on (SSO) between on premises and Oracle Cloud. A federated environment enables business partners to integrate in the identity management realm, by providing a mechanism for companies to share identity information across their respective security domains.

The SSO service enables users to log in to one domain and access another domain without logging in again. Oracle Cloud uses the open standard Security Assertion Markup Language (SAML) 2.0 to implement single sign-on for browser-based access. The SSO service enables you to provide access to one domain to users



who are authenticated to a different domain or to an on-premises identity store. For example, you might want your users to log in to the cloud by using a local directory such as Active Directory or Oracle Unified Directory.

The Oracle Cloud identity infrastructure stores identities using LDAP schemas. Like most identity management systems, Oracle Cloud includes an identity store. The format and rules for defining users, groups, and roles are determined by specific LDAP directory schemas.

You don't have to link your on-premises SSO with Oracle Cloud SSO. In that case, you can use a non-federated SSO, where the user identities are stored on one local identity management system. These user identities are associated only with Oracle Cloud. As a result, they're known only to Oracle Cloud.

Administering the Oracle Cloud Enterprise

When you consider managing an enterprise in Oracle Cloud, you must understand the subscription types available, how to manage those subscriptions, and what the administrative roles are.

Taking Advantage of a Free Trial Subscription

You can get a free 30-day trial subscription for an Oracle Cloud service, to both nonmetered Oracle Cloud services and metered Oracle Public Cloud services from the Oracle Cloud website.

See [Requesting a Trial Subscription](#) for complete details.

Taking Advantage of Free Credits

You can sign up for free credits to try out the Oracle Cloud services.

You can use these free credits to try out the cloud services for a period of 30 days.

See www.cloud.oracle.com for the latest details.

Deciding on a Subscription Type

Oracle Cloud services offers several pricing and service levels to suit the needs and budget of your organization.

You can choose:

» Metered service offerings

With the metered service offerings, you're billed (in arrears) based on your actual usage. The metered offerings apply to Oracle's Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) cloud services. You can purchase metered cloud services by choosing one of the following purchase models:

- » Prepaid Subscription: You commit to a prepaid subscription and receive a custom rate card attached to your Cloud Ordering Document. The Cloud Ordering Document identifies the specific Oracle IaaS and Oracle PaaS services that you can activate and use with your Oracle Cloud Services account. The standard term for a Prepaid offering is 12 months, and it's a use it or lose it model.



Select this option when you don't know the number of resources that you need. It provides you with the flexibility to purchase a pool of funds that can be applied towards the usage of eligible Oracle Public Cloud services.

- » Pay as You Go: The Pay as You Go model allows you to pay for the actual usage of all Oracle Public Cloud Services that you consume within your Oracle Public Cloud Services account. You're billed monthly, in arrears, based on your actual usage at the predetermined Pay as You Go rates.

Select this option when you know the specific resources that you need (number of users, data size, OCPUs).

See [Viewing Service Details in My Account for Metered Oracle Cloud Services](#) for information about how to view your metering usage and balance.

» Nonmetered service offerings

With the nonmetered service offerings, you pay for a set amount of users over the course of the service period. You're billed up front, based on that committed quantity. The nonmetered offerings can be applied to Oracle IaaS, Oracle PaaS, and Oracle SaaS cloud services (as well as a handful of other offerings).

These offerings are sold via a usage-based metric, such as `hosted named user` or `hosted environment`.

Managing Subscriptions

After you have a subscription to Oracle Cloud, you'll need to manage the subscriptions, activate them, order additional subscriptions, or terminate a subscription.

Oracle Cloud provides a My Account application, which lets you monitor the status of services for an entire account, across multiple data centers and identity domains. My Account displays information about active, expired, and pending services. You use My Account to activate your services and to view the status calendar. If you're also a buyer, you can access the Oracle Store from My Account.

From My Account, you can:

- » Display all your orders or only those orders that satisfy the criteria you select from the menu.
- » View the status of subscriptions.
- » Activate trial or paid subscriptions.
- » Buy services. You can go to the Oracle Store, and purchase subscriptions to Oracle SaaS applications or Oracle PaaS services.

To terminate a paid subscription, if you're a buyer, you sign in to your Oracle Store account and terminate your paid subscription to the service. Oracle will process your request and terminate the subscription at the end of the appropriate monthly billing cycle.

About Administrative User Roles

Oracle Cloud provides administrative user roles. A role can include privileges that let the user purchase an Oracle Cloud service, manage one or more Oracle Cloud services, or manage the accounts of the users who can access a service.

As you prepare to purchase and activate an Oracle Cloud service, one or more members of your organization adopt these roles:

- » Buyer

The buyer controls the buying process, purchasing the Oracle Cloud service in the Oracle Store on behalf of a company or an organization. The buyer can change and terminate the paid subscription to the service. The buyer also designates a person to be the initial account administrator for the Oracle Cloud service. When a subscription to an Oracle Cloud service is purchased, the buyer or another person must be designated as the account administrator.

» Account administrator

The account administrator can activate the Oracle Cloud service, and monitor and manage one or more Oracle Cloud services. The account administrator can create identity domain administrators and other account administrators.

After an Oracle Cloud service is activated, the designated service administrator and identity domain administrator (if different) receive a postactivation email from Oracle Cloud:

» Service administrator

The service administrator can verify that services are up and running, develop and administer services for an identity domain, view service details, monitor utilization, and view notifications and historical uptime.

» Identity domain administrator

The identity domain administrator has most of the same privileges as the service administrator, but the identity domain administrator can add and manage users, and grant roles to those users.

Here are the common administrative tasks that you perform after your Oracle Cloud service is activated and which role is needed to perform each task:

Task	Who Can Perform This Task
Verify that a service is up.	Identity domain administrators or service administrators
Manage and monitor a service.	Identity domain administrators or service administrators
Lock and unlock services.	Identity domain administrators or service administrators
Add and manage users in your identity domain. Note: Users must be added before they can sign in and use a service.	Identity domain administrators
Grant roles to users. Note: The appropriate roles must be explicitly granted to individual users according to the service type they're allowed to access.	Identity domain administrators or service administrators
Add custom roles.	Identity domain administrators
Reset user passwords.	Identity domain administrators

Manage applications.	Identity domain administrators or service administrators
Grant roles to users. Note: The appropriate roles must be explicitly granted to individual users according to the service type they're allowed to access.	Identity domain administrators or service administrators
Add custom roles.	Identity domain administrators
Reset user passwords.	Identity domain administrators
Manage applications.	Identity domain administrators or service administrators
Create service instances.	Identity domain administrators or service entitlement administrators

Managing Oracle Cloud Notifications

Oracle Cloud provides notifications of ongoing service outages and planned service outages that Oracle schedules for service maintenance.

Users who have the service administrator privileges can view the notifications through the My Services page or you can set it up to send the notifications to an email address or to SMS as a text message.

If you choose email or SMS, decide who will receive the messages and how they will communicate those messages to the appropriate personnel in your organization.

About Billing and Payment

When you set up your online account profile, you enter billing and payment details in the profile.

Integrating Oracle Cloud into Your Corporate Network

When you're investigating moving your enterprise into Oracle Cloud, you must consider which network connectivity options to choose. Oracle Cloud offers VPN solutions and FastConnect as networking options.

About Oracle Cloud VPN Choices

Oracle Cloud offers VPN as a network option, which is a secure, reliable, and cost-effective solution for expanding your private network.

Oracle Cloud provides these VPN options:

- » VPN for Compute, which offers two distinct solution options:

- » Deploying Oracle's Corente Services VPN Gateway (CSG) in your on-premises data center. Oracle's Corente Cloud Services Exchange (Corente CSX) is a cloud-based, software-defined networking (SDN) service that enables distributed enterprises to deliver trusted connectivity services to and from any location with less complexity, in significantly less time, and at a greatly reduced cost, when compared to more traditional approaches. The Corente Services VPN Gateway is a distributed virtual appliance located at the network edge that provides secure endpoints for virtual private networks over any IP network with zero-touch installation.

- » Leveraging your existing third-party VPN software or hardware solution in your data center.

The on-premises VPN gateway (Oracle's Corente Services Gateway or a third party device) connects to Oracle Public Cloud over a secure 256-bit encrypted IPSec tunnel.

Virtual machines in Oracle Public Cloud communicate with your on-premises data center over this IPSec VPN tunnel.

Multiple gateways can be set up for redundancy, increased throughput, and to connect multiple data centers to the cloud in a mesh network.

- » VPN for Dedicated Compute, Oracle Network Cloud Service—Site to Site VPN, which is a secure, reliable, and cost-effective solution for expanding your private network. Enterprises can securely connect to Oracle's Dedicated Compute zone over IPSec tunnels as part of their virtual private network. Oracle Network Cloud Service – Site to Site VPN eliminates the need to invest in leased lines for more security and peace of mind.

Oracle Network Cloud Service—Site to Site VPN is based on the IPSec protocol that creates a virtual tunnel between your data center and Oracle's cloud. With a few clicks, enterprises can securely connect their data centers to Oracle's cloud to take advantage of the benefits of cloud computing. Secure and simple by design, Oracle Network Cloud Service—Site to Site VPN enables businesses to fulfill the ever-growing demands for compute resources without worrying about the security of their data.

It provides:

- » Data encryption
Data between an enterprise's data center and Oracle Cloud uses 128-bit Advanced Encryption Standard (AES).
- » Configurable preshared key
Symmetric key encryption using a preshared key enhances security and overall performance. You can change the key any time on your services page.
- » Multiple tunnels
You can set up multiple tunnels with the Oracle Cloud Compute zone.
- » Configurable subnets
You can configure a range of IP addresses for compute instances.
- » Built-in redundancy
Customers can benefit from VPN devices configured as a cluster for high availability.
- » Cloud access
Instances can access other Oracle services in the cloud.
- » Public IP address
You can configure public IP addresses so that data can traverse the internet when applications want to access external websites or resources.

For this option, take into consideration your service-level agreement, latency, throughput, and bandwidth requirements. In addition, take into account the geographical distance between on premises and the target Oracle Cloud data center.

About FastConnect

FastConnect provides a high-bandwidth connection between your data center and Oracle Cloud services.

FastConnect addresses one of the most important issues that affect migration to a cloud service: the unpredictable nature of the internet. With FastConnect, you can create a high-speed, dedicated, and low latency extension that allows you to take advantage of the benefits of a true hybrid cloud setup. It also offers better security than exchanging your data over the internet.

The availability of this service highly depends on the geography and location of both the cloud data centers and the customer's on premises. FastConnect is a service provided by multiple providers, such as Equinix, BT, and Verizon.

FastConnect provides:

- » Multiple port speed
You can pick between 1 Gbps or 10 Gbps port speeds, depending on the use case and the data transfer profile for your usage.
- » Standard Layer 3 routing
FastConnect leverages industry-standard Border Gateway Protocol (BGP) routing to manage the exchange of routes between Oracle Cloud and your networks.
- » Non metered usage
FastConnect is offered at a fixed price for data transferred between your network and Oracle Cloud.
- » Redundancy
FastConnect can be delivered as a fully redundant service with two physical connections from your network edge to Oracle's network edge either directly or through a partner to ensure the high level of availability that you expect from Oracle Cloud services.
- » Single connection, multiple services
You can access all supported public-facing Oracle Cloud services within a city by using your single connection.

Migrating Existing Application Workloads and Data to Oracle Cloud

After you decide on a migration strategy and analyze your workload, the next step of moving to the cloud is to migrate your existing applications and data.

You must plan your data migration, ensuring that the data is migrated securely and efficiently.

If you plan to move a large amount of data from an on-premises system to Oracle Cloud, these tips can help improve the performance of your data migration:

- » The portable pluggability of a pluggable database (PDB) makes it the ideal vehicle to migrate databases to the cloud – or back again.
- » Using parallel threads to move or copy files from your source into the cloud service instance for Oracle Storage Cloud Service or storage.
- » Copying files into a latency volume gives better performance than copying files to a throughput volume.
- » If you're using an Oracle object store as a staging area for data migration, then it's better to go directly to Oracle Storage Cloud Service end points instead of going to Oracle Storage Cloud Service over an Oracle Compute Cloud Service instance. The Oracle Compute Cloud Service instance has its own overhead,

which can slow down large-volume file transfers. Oracle Storage Cloud Service uses HTTPS and is already secured.

Migrating Your Data to Oracle Cloud

There are many methods to migrate your data to Oracle Cloud. The choice of method depends on many factors, including:

- » The source and destination versions, character sets, platform Endian formats, and uptime requirements.
- » Whether you need a multitenant or full database instance.
- » Whether you upgrade to a new version of Oracle Database while you migrate. Oracle Database Cloud supports Oracle Database 12c and 11g.

Oracle provides several tools to help migrate your data. Choose the one that meets your needs.

Migration Methods with Downtime Options

Migration Tool	Features and Benefits
Oracle Data Pump export and import	<ul style="list-style-type: none"> » High-speed movement of data and metadata within and between Oracle databases » Migrate tables, schemas, and databases, including to new releases of Oracle Database software » Downtime based on data size
Oracle Data Pump full transportable export and import	<ul style="list-style-type: none"> » Quickly moves an entire database, including non-transportable tablespaces such as SYSAUX and SYSTEM » Transports encrypted tablespaces » Can migrate from a noncontainer database to a PDB, from one PDB to another, or from a PDB to a noncontainer database » Downtime based on data size. Faster than traditional export and import because moving entire files is faster than logical methods.
Oracle Database Cloud Service with Enterprise Manager Hybrid Cloud	Quickly clone an on-premises PDB and plug it into the cloud.
Oracle SQL Developer	Quickly clone an on-premises PDB and plug it into the cloud.

Migration Methods with Minimal Downtime

Migration Tool	Features and Benefits
----------------	-----------------------

Oracle Database Backup Cloud Service	<ul style="list-style-type: none"> » Instantiate an Oracle Database Cloud service using databases backed up by the Oracle Database Backup Cloud Service. » Minimal downtime.
RMAN incremental backups combined with Cross-Platform Transportable Tablespaces (XTTS)	Minimal downtime. Total downtime based on the change rate and metadata size.
Oracle Data Guard	<ul style="list-style-type: none"> » With Oracle Database 11g, you can start with a physical standby, which will be converted to a logical standby in the process (transient standby). » With Oracle Database 12c, you can use the Rolling Upgrade method of Oracle Active Data Guard to run different releases of an Oracle database on primary and standby databases. » Minimal downtime.
Oracle GoldenGate Cloud Service	<ul style="list-style-type: none"> » Use one of the methods in the table “Migration Methods with Downtime Options” for the initial load. » Oracle GoldenGate Cloud Service uses log-based nonintrusive change data capture from an on-premises database. » Real-time data loading from on premises to cloud for fast onboarding of cloud databases. » Real-time data replication to data stores for operational reporting and real-time data warehousing. » Minimal downtime

Migrating Your Applications to Oracle Cloud

There are many methods to migrate your applications to Oracle Cloud. The choice of method depends on many factors, including the types of applications.

For applications running on Oracle WebLogic Server, you can use:

- » [Oracle Java Cloud Service ApptoCloud Tooling](#)
- » [WebLogic Scripting Tool \(WLST\) Commands](#)
- » [Oracle Developer Tools](#)

Migrating Applications with Oracle Java Cloud Service ApptoCloud Tooling

ApptoCloud tooling lets you export existing WebLogic Server domain configurations and Java applications. The export is then imported to a new Oracle Java Cloud Service instance with the same domain resources and applications.



Migrating Applications with WLST Commands

With the WLST `exportPartition` command, you can create a partition archive. It copies a partition's configuration into the archive file as well as (optionally) the partition's applications and libraries. This command also creates the `attributes.json` file that you can use to modify the partition's configuration when you import the partition archive. With the `importPartition` command, you can import the partition archive into your cloud instance.

With the WLST templates, you can automatically create:

- » Data sources, including multidata sources
- » JMS modules
- » Persistence stores
- » Domains and partitions

Migrating Applications with Developer Tools

You can use the following tools to migrate applications, deploying them to your cloud instance:

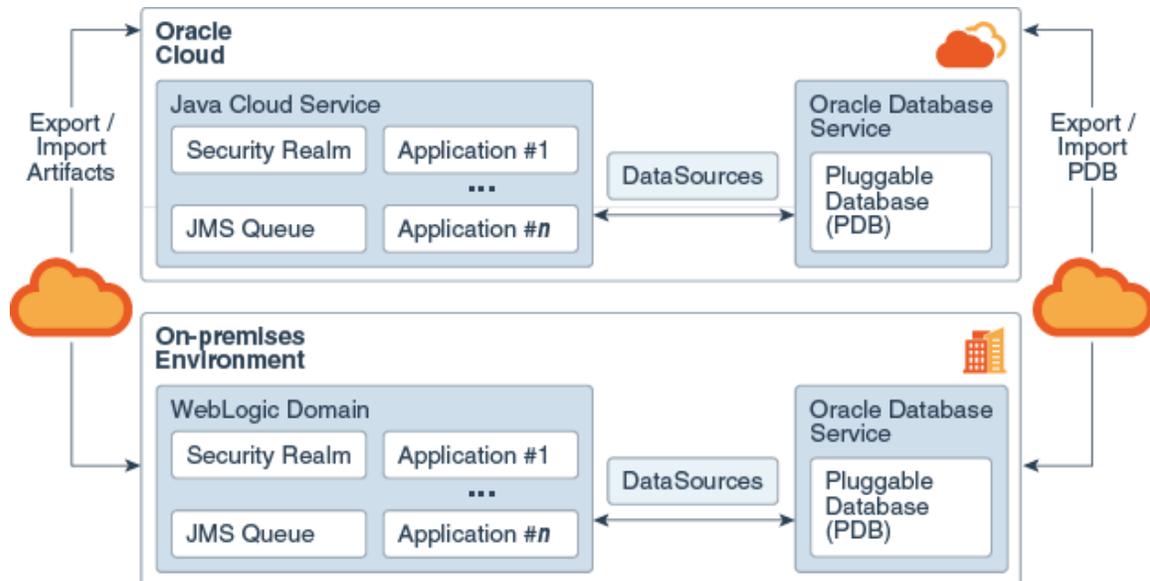
- » Fusion Middleware Control or WebLogic Server Administration Console
- » Oracle JDeveloper or Oracle Enterprise Pack for Eclipse
- » Oracle Enterprise Pack for Eclipse with Oracle Developer Cloud Service
- » Oracle Java Cloud Service (deploying directly to the service)

Migration Scenarios

As you've read, you can migrate your data and applications using various methods. Here we outline two scenarios.

Lift and Shift Migration: Scenario One

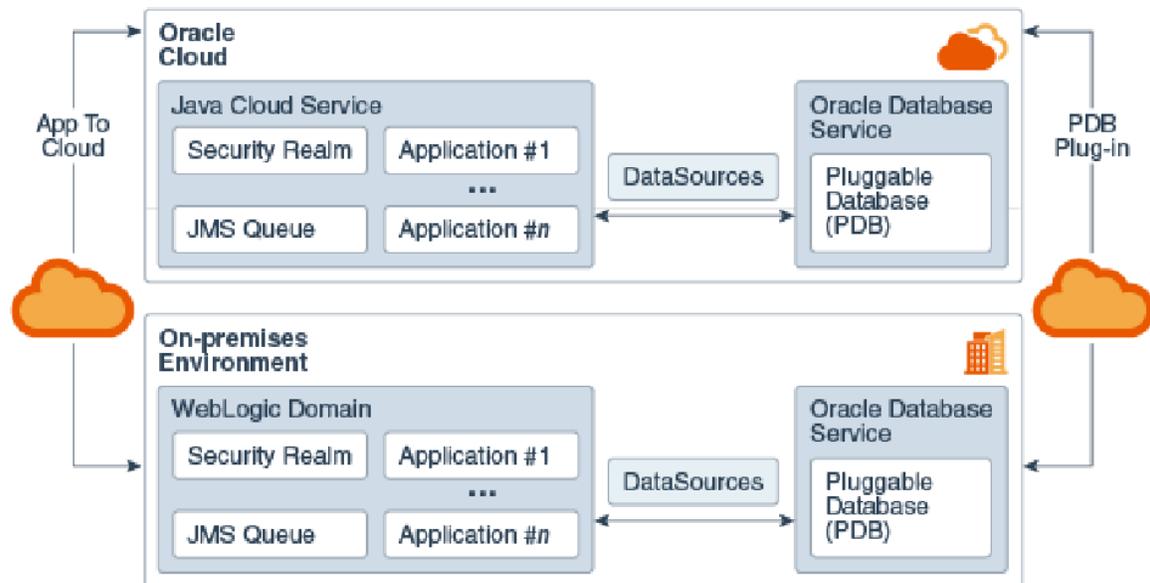
This method uses Oracle Data Pump to migrate the data and uses WLST commands to move the application configuration.



1. Use Oracle Data Pump to export the application database, as a PDB, from on premises, and import it to Oracle Database Cloud Service.
2. Use prebuilt WLST scripts to move the application objects to the Oracle WebLogic Server instance in Oracle Java Cloud Service. The scripts perform these actions:
 - » Deploy a Java Database Connectivity (JDBC) data source in the WebLogic Server instance of Oracle Java Cloud Service.
 - » Configure a security realm to authenticate.
 - » Create Java Message Service (JMS) objects (ConnectionFactory and Queue) used by the application.
3. Deploy the Java EE application to the WebLogic Server instance of Oracle Java Cloud Service.

Lift and Shift Migration: Scenario Two

This scenario uses the PDB plug-in method to migrate the data and uses Oracle Java Cloud Service AppttoCloud tooling to migrate applications.



1. Use the PDB plug-in method to migrate the on-premises database as a PDB to the Oracle Database Cloud Service instance.
2. Use Oracle Java Cloud Service ApptoCloud tooling to migrate the on-premises Java application to the Oracle Java Cloud Service. If not all artifacts are migrated, use WLST to migrate those artifacts.
3. Deploy the Java EE Application to the WebLogic Server instance in Oracle Java Cloud Service.

Monitoring and Tuning Oracle Cloud Services

You can monitor your Oracle Cloud services, including purchased resources, quotas, alerts, and metrics.

You use the My Account application to monitor your Oracle Cloud service performance and usage, and to make operational decisions based on that information.

About Monitoring Resources and Quotas

With Oracle Cloud, you can monitor your purchased resources, including status history, availability history, usage metrics, and additional information for the selected service.

You view this information using the My Account application. Important information to monitor includes:

- » The historical status of this service (Month view), and historical availability (uptime), of this service, either quarterly or yearly.
- » Resource quotas including the type of resources, the purchased limit or quota, and the available balance of these resources.
- » Business metrics, including the historical usage data collected per day for the date range that you specify for this service. The usage data collected depends on the type of service.

About Monitoring Metrics

You can monitor the utilization data to help you determine whether the service resource allocations are underutilized or overutilized.

You can view current usage and historical usage:

- » If a service is underutilized, evaluate and consider deployment of additional applications, additional users, additional customers, and so on (depending on the type of service).
- » If a service is overutilized, consider changing your subscription level, adding additional services instances, or clustering to improve load management.

You can select the types of metrics you want to monitor, and you can retrieve the details about those metrics for various time periods:

- » Historical usage: Displays the usage data in the form of a graph. The data is collected per day for the current service for the past 7 days (by default). You select the metrics that you want to graph, and specify the date range for which you want to view the data.
- » Latest usage: Displays a snapshot of the last set of metrics collected and when those metrics were collected.
- » Latest metrics: Displays the most recent usage data of the service instance.

If you've subscribed to an entitlement to create instances of an Oracle Cloud Service, you can view the metrics pertaining to each service instance.

About Monitoring Alerts

You can configure rules to generate alerts when metrics exceed or are below specified thresholds for a specific time period. Service administrators receive the alert notifications.

A single metric is monitored over a specific time period in regard to a defined threshold value. An alert is sent to the service administrators when there's a change in the metric behavior for a sustained period of time that's defined by you. The threshold state can be either true (satisfied) or false (unsatisfied) depending on the change in the metric behavior.

An alert is sent only when the threshold state changes:

- » A metric isn't within the defined threshold for a sustained period of time, and the threshold state changes from either true to false or vice versa.
- » A metric is within the defined threshold for a sustained period of time, and the threshold state changes from either true to false or vice versa.

You can select the instance and the metric to monitor, and specify the threshold value.

Consider which metrics are important to monitor.

About Oracle Management Cloud

Oracle Management Cloud is a suite of next-generation integrated monitoring, management, and analytics solutions delivered as a service in Oracle Cloud. Oracle Management Cloud is an optional subscription.

- » Designed for today's heterogeneous environments: on premises, Oracle Cloud, and third-party cloud services.

- 
- » Built on a horizontally scalable big data platform with high-throughput processing to provide real-time analysis and deep insights across technical and business events.
 - » Configured for automatic analysis of data using machine learning, proactive monitoring, real-time analysis, and correlation across all Oracle Management Cloud services. No need to worry about having multiple information silos across end-user and infrastructure data.

Operational data, including machine-generated data, can be of different types and dimensions. The data that you need to answer your questions is often in multiple systems.

With Oracle Management Cloud, your uploaded data is stored in a single, unified, big data platform. This data is automatically correlated and processed by a robust and scalable pipeline that offers high throughput processing of very large amounts of data.

Cloud services enabled by this platform offer real-time monitoring, alerts, rapid diagnostics, operational insight, and business analytics.

Oracle Management Cloud includes:

- » **Application Performance Monitoring**
Provides development and operations teams with the information that they need to find and fix application issues fast. All your end-user and application performance information (with associated application logs) are brought together into Oracle Management Cloud's secure, unified, big data platform.
- » **Infrastructure Monitoring**
Monitors the status and health of your entire IT infrastructure—on premises or on the cloud—from a single platform. Proactive monitoring across tiers enables administrators to be alerted on issues, troubleshoot, and resolve these issues before they affect end users.
- » **Log Analytics Cloud Service**
Monitors, aggregates, indexes, and analyzes all log data from your applications and infrastructure—enabling users to search, explore, and correlate this data to troubleshoot problems faster, derive operational insight, and make better decisions. This service is built on Oracle Management Cloud's secure, unified, big data platform.

Automating Provisioning and Management Workflows Through Orchestration

You can define all the attributes for multiple, high availability-enabled virtual machines of varying shapes and machine images in an orchestration. You can then easily create, remove, and reprovision all of the virtual machines and associated resources as required through the orchestration.

For example, you can use orchestrations to create and manage a collection of instances hosting a multitiered application stack with all the necessary networking, storage, and security settings.

At any time, you can delete and re-create all the instances in an orchestration just by stopping and restarting the orchestration. Storage attachments, security lists, and so on are reassigned automatically. When the HA policy in an orchestration is set to `active`, then if an instance in this orchestration goes down, the instance is re-created automatically.

Improving Performance

To maximize the performance of your Oracle Cloud service, you must understand some basic best practices.



Keep in mind the following:

- » Use of a bootable storage volume
Use a bootable storage volume for a boot disk instead of local, ephemeral volumes.
- » Placement of services to reduce network latency
Reduced network traffic between components can improve performance. If network latency is critical for performance, then place all services in the same data center, if your account allows.
- » DOS-Compatible mode disabled for storage volumes
For better I/O performance, don't enable DOS-Compatible mode. Creating disk partitions in DOS-Compatible mode can affect performance.
- » Oracle Database redo logs and data files mapped to latency volumes
For improved I/O performance, ensure that Oracle Database redo logs and temporary data files are placed in latency volumes.
- » Configuration of HugePages for Oracle Database in Linux
Enable the HugePages feature for an Oracle E-Business Suite database so that the operating system can support memory pages larger than the default (usually 4 KB). Other application databases might also benefit with HugePages.
- » Oracle Database row prefetching
Query performance can improve if you increase the number of rows fetched from the database by each fetch call.
Increasing the Oracle Database row prefetch size helps performance if you have relatively large latency between the database and middle tier (more than 20 msec), and your application is fetching more than 100 rows in result sets for your queries.
- » Maximum heap size
Tune the maximum heap size for your Java process according to the maximum amount of operating system memory available in the shape of your Oracle Cloud Service instance.

For complete information about performance and tuning Oracle Cloud, see *Oracle Cloud Performance and Tuning Best Practices*.

Backing Up and Restoring Data

By backing up your Oracle Database Cloud Service database deployments, you can protect the software, configuration, and database against loss if a failure occurs. By restoring from a backup, you can restore the deployment's software, configuration, and database to their state at the time of the backup.

It's your responsibility to back up your data. Alternatively, you can subscribe to the Oracle Database Backup Cloud Service to back up your data.

Oracle Database Cloud Service provides a backup feature that backs up:

- » The database
- » Database configuration files
- » Grid Infrastructure configuration files (on deployments hosting an Oracle RAC database)
- » Important system and cloud tooling files

Deciding on a Backup Strategy



When you create a database deployment, you choose one of the following backup destinations:

» Both Cloud Storage and Local Storage

Backups are configured to be created automatically and stored both on local compute node storage and on an Oracle Storage Cloud Service container. The container must be created before creating the Oracle Database Cloud Service database deployment.

» Cloud Storage Only

Backups are configured to be created automatically and stored on an Oracle Storage Cloud Service container. The container must be created before creating the Oracle Database Cloud Service database deployment.

» Local Storage Only

Backups are configured to be created automatically and stored only on local storage on the compute nodes associated with the deployment.

» None

No backup configuration is created.

The backup configuration created when you choose a destination (other than None) follows a set of Oracle best-practice guidelines:

» Full backup of the database followed by rolling incremental backups on a 7-day cycle (a 30-day cycle for the Cloud Storage Only destination)

» Full backup of selected database configuration files

» Full backup of selected system files

» Automatic backups daily at a time between 11:00 PM and 3:00 AM, with the specific time set during the database deployment creation process

» Retention period:

» Both Cloud Storage and Local Storage: 30 days, with the 7 most recent days' backups available on local storage

» Cloud Storage Only: 30 days

» Local Storage Only: 7 days

» Encryption:

» Both Cloud Storage and Local Storage: All backups to cloud storage are encrypted; backups of Oracle Database Enterprise Edition databases to local storage are encrypted; backups of Oracle Database Standard Edition databases to local storage aren't encrypted.

» Cloud Storage Only: All backups to cloud storage are encrypted.

» Local Storage Only: Backups aren't encrypted.

If the defaults don't meet your needs, you can customize the backup configuration for your database deployment.

About Oracle Database Backup Cloud Service

[Oracle Database Backup Cloud Service](#) is a data protection service designed for the unique needs of Oracle Database customers with direct, cost-effective integration with the familiar Recovery Manager (RMAN), so you can take advantage of cloud-based data protection with current IT processes and staff.



To use Oracle Database Backup Cloud Service, you subscribe to the service, install the Oracle Database Cloud Backup Module, and configure your environment to send backups to the cloud. You can then use RMAN commands to perform backup, restore, recovery, and maintenance operations. You can also use other tools for your cloud backups.

Recovering Your Data

You may need to recover your data because of media failure, user errors, or application errors that corrupt data blocks.

You can recover your data from different backups:

- » From the most recent backup and perform a complete recovery on an Oracle Database Cloud Service database deployment
- » From a specific backup
- » From a specific point in time

Frequently Asked Questions

Here are answers to some frequently asked questions:

How can I try out Oracle Cloud?

You can get a free 30-day trial subscription for an Oracle Cloud service, to both nonmetered Oracle Cloud services and metered Oracle Public Cloud services from the Oracle Cloud website.

Because of government regulations, we must keep our data in our data center. Can we still benefit from the cloud?

Yes, you can migrate your applications and workload to the cloud, but keep your data on premises. Or you can run the cloud on premises, using the Oracle Cloud Machine which delivers Oracle Cloud services in your data center.

What versions of Oracle Database can I provision with Oracle Database Cloud Service?

Currently 11g and 12c instances are supported.

Is there any additional charge for support besides my subscription fee?

No, support is included with the subscription fees.

What is Oracle's maintenance schedule? Will I be notified of planned downtime?

Oracle publishes its maintenance schedule on its customer facing support portal. Currently, maintenance on its platform services is scheduled on the 1st, 2nd or 3rd Friday of each month. Customers are notified 7 days in advance, at the time of service and finally when the service is completed.

Contacting Oracle Support

You can contact us to get help with your cloud services.

Chatting Online with an Oracle Support Representative

To start a live online chat with an Oracle Support representative, click the Chat icon  at the right edge of any Oracle Cloud page.

Enter your questions and get immediate assistance from a support representative.

Contacting Oracle

To contact Oracle, click the Contact Us icon  located on any Oracle Cloud page. This displays a toggle window with the contact information.

Click the icon again to collapse the toggle window.

You can:

- » Call us at the specified 800 number, or click **Global Contacts** to look up contact information for Oracle offices around the world.
- » Link to the My Oracle Support website, sign in, and get help from Oracle Technical Support.
- » Link to the Oracle Cloud discussion forums where you can post a message, start a new thread, or search the current discussions for answers. Oracle product managers, development, support, and operations team members respond to threads on the forum.
- » Start a live online chat with an Oracle Support representative.

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Integrated Cloud Applications & Platform Services

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Oracle Cloud Onboarding Guide for IT Organizations
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