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Introduction to IaaS

Objectives

After completing this lesson, you should be able to:

- Define Infrastructure as a Service (IaaS)
- Explain the benefits of IaaS
- Explain how the IaaS layer provides infrastructure for applications and platforms
- Describe Oracle IaaS services

What Is Infrastructure as a Service (IaaS)?

- A form of cloud computing that provides infrastructure services over the Internet
- Required by all applications, databases, and middleware deployments
- Users can access:
  - Computer processors
  - Storage
  - Networks
  - And other infrastructure resources
- One of three "service models" in cloud computing
  - The other two:
    - SaaS – Software as a Service
    - PaaS – Platform as a Service

Infrastructure as a Service (IaaS) is a form of cloud computing that provides infrastructure services over the Internet. One of the main features of IaaS is that users can access their applications and data from anywhere, as long as they can access the Internet. IaaS provides the following benefits:

- The user has access to the foundation level of the computing "task"—compute capacity, network bandwidth, and storage capacity.
- The IaaS provider is responsible for providing the hardware, maintenance, and cloud infrastructure up to the virtualization level.
- The user can create virtual machines as required and decide what operating system and/or apps to use.

The other two service models in cloud computing are:

- **Software as a Service (SaaS):** The user has access only to the applications provided by the SaaS provider. The provider has full control of the entire infrastructure including applications.
  - Example: An email provider
- **Platform as a Service (PaaS):** The user is able to deploy applications using programs and tools provided by the provider. The provider has full control of the infrastructure up to the point where the user is able to modify their applications and environment.
  - Example: A web hosting provider that offers tools and programs to deploy a website

What Are the Benefits of IaaS?

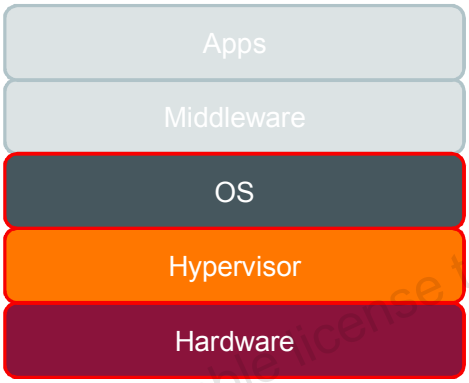
- Customizable application environments
- Pay for what you need
- No maintenance or upgrade hassle for the infrastructure
- Elastic and scalable infrastructure
- High degree of flexibility and control over the environment

- IaaS allows users to build their application environments without having to buy hardware or rent physical space.
- Subscribers save money because they pay for only the services and resources that they need.
- Maintenance, software and hardware upgrades, and troubleshooting are handled by the IaaS provider, allowing users to focus on more relevant, customizable aspects of their infrastructure.
- Users can create as many VMs as they need, when they need them.
- Users can dynamically control their environment, such as selecting the operating systems of VM and changing the applications that they want to install.
- IaaS provides elasticity and scalability, enabling users to add or remove VMs or other resources easily, whenever required.

All organizations can benefit from IaaS, from small startup businesses to large, well-established corporations. Cloud-based services can be adjusted to meet their varied business needs regardless of size, or computing and storage demands.

Role of IaaS in Cloud Computing

- It provides the infrastructure for:
  - Platforms
  - Applications
- Components of IaaS:
  - Hardware
    - Servers, CPU, storage, network, and so on
  - Software
    - Databases
    - Middleware

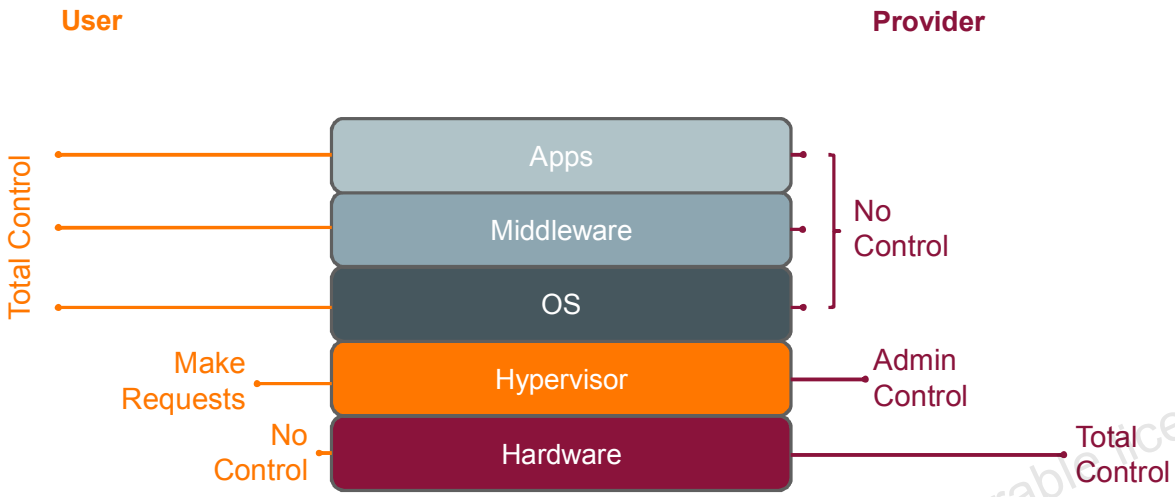


IaaS provides the infrastructure for platforms and applications. IaaS makes it possible for users to deploy virtual machines, install operating systems, and customize their own apps environment.

The main components of IaaS are:

- **Hardware:** Includes as servers, powerful CPUs, large amounts of storage capacity, and network bandwidth
- **Databases:** All the data needs to be administered, controlled, and stored
- **Middleware:** Software that allows communication between servers and users. In other words, this middleware layer makes it possible to input/output data from two different operating systems regardless of what platform they are using.

In IaaS, Who Controls What?

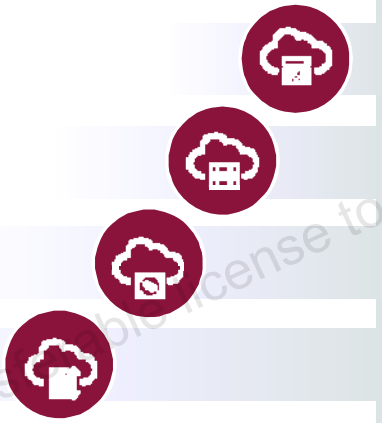


The user has total control starting from the operating system level and above. Users can also make requests at the hypervisor level; however, the IaaS provider has to approve the requests before proceeding.

The provider has total control only at the hardware level, but can approve the user's requests at the hypervisor level. The provider has zero control starting at the operating level and above.

What IaaS Services Does Oracle Offer?

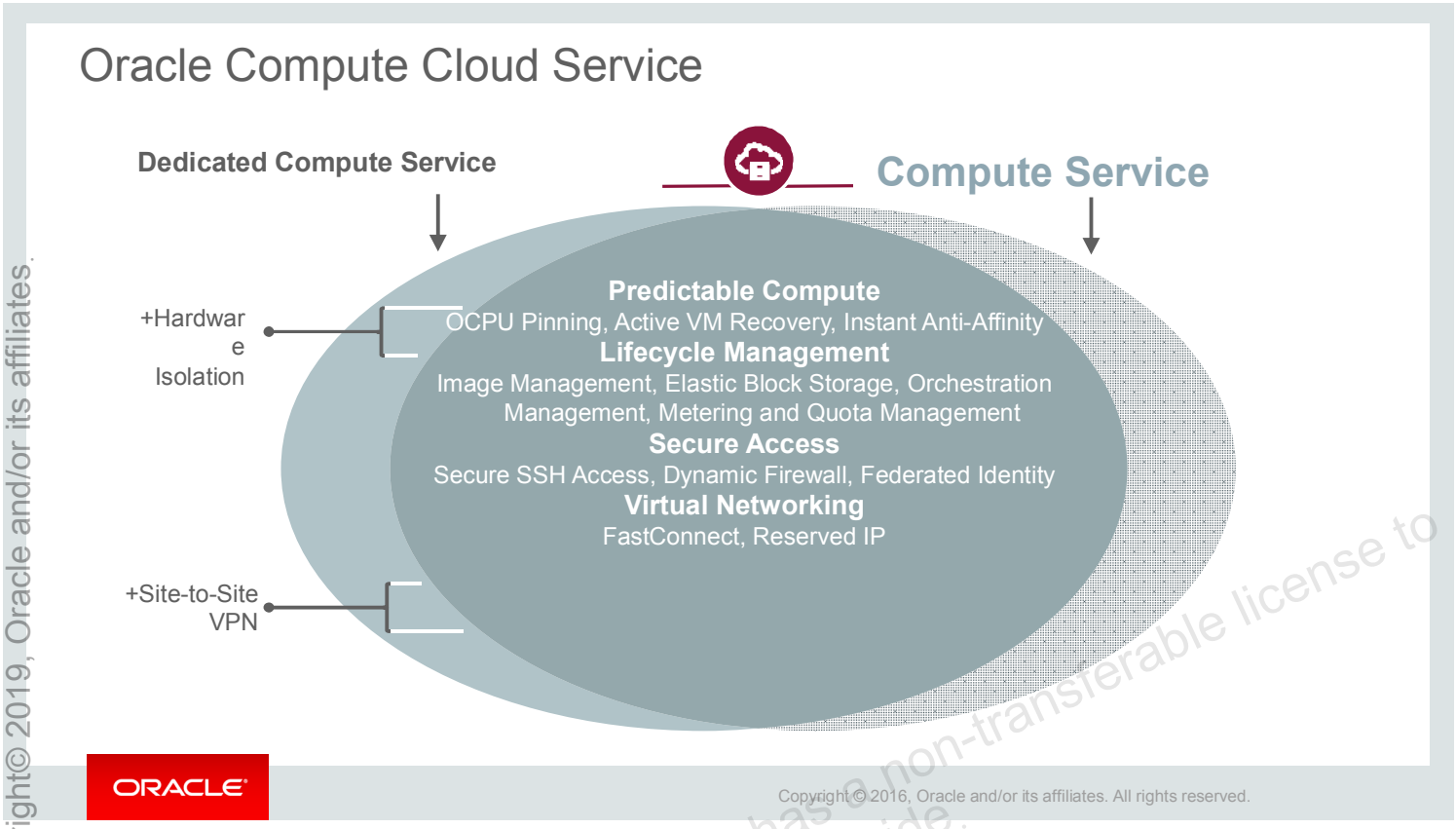
- **Leverage Infrastructure:** Run any workload in the cloud
- **Compute:** Elastic compute capacity to address growing business needs
- **Storage:** Online storage at your fingertips
- **Network:** Connect you datacenter to the cloud



Oracle Cloud Infrastructure as a Service (IaaS) offers a set of core infrastructure capabilities, such as elastic compute and storage to provide customers the ability to run any workload in the cloud.

Specifically for developers, infrastructure services include:

- **Oracle Compute Cloud Service:** To leverage elastic compute capacity to address growing business needs
- **Oracle Storage Cloud Service:** To provide a secure, scalable, reliable, and simple storage solution to meet all of a customer's enterprise needs
- **Oracle Network Cloud Service:** Offers Site-to-Site VPN for dedicated Compute users and FastConnect for all Oracle Cloud customers. Site-to-Site VPN securely extends customers' on-premises network to their dedicated Oracle Compute zone. FastConnect provides a high bandwidth connection between the customers' data centers and Oracle Cloud services.



Oracle Compute Cloud Service offers the following:

- **Predictable Compute:**
  - **OCPU Pinning:** Allocate OCPUs to VM instances with no over subscription.
  - **Active VM Recovery:** Configure HA policies to automatically recover failed VMs.
  - **Hardware Isolation (ONLY for Dedicated Compute Service):** Launch dedicated instances on single-tenant hardware.
- **Lifecycle Management:**
  - **Image Management:** Provision virtual machines using pre-packaged images or build your own images.
  - **Elastic Block Storage:** Store data and applications in persistent block storage volumes. Maintain persistence at OS-level using bootable storage volumes.
  - **Orchestration Management:** Automate provisioning and lifecycle operations of virtual compute topologies.
- **Secure Access:**
  - **Secure SSH Access:** Access Oracle Compute Cloud Service instances from a remote host by using a secure shell.
  - **Dynamic Firewall:** Control network traffic among individual instances and/or between group of instances.

The Dedicated Compute offering of Oracle Compute Cloud Service offers everything that Oracle Compute Cloud Service offers. In addition, instances:

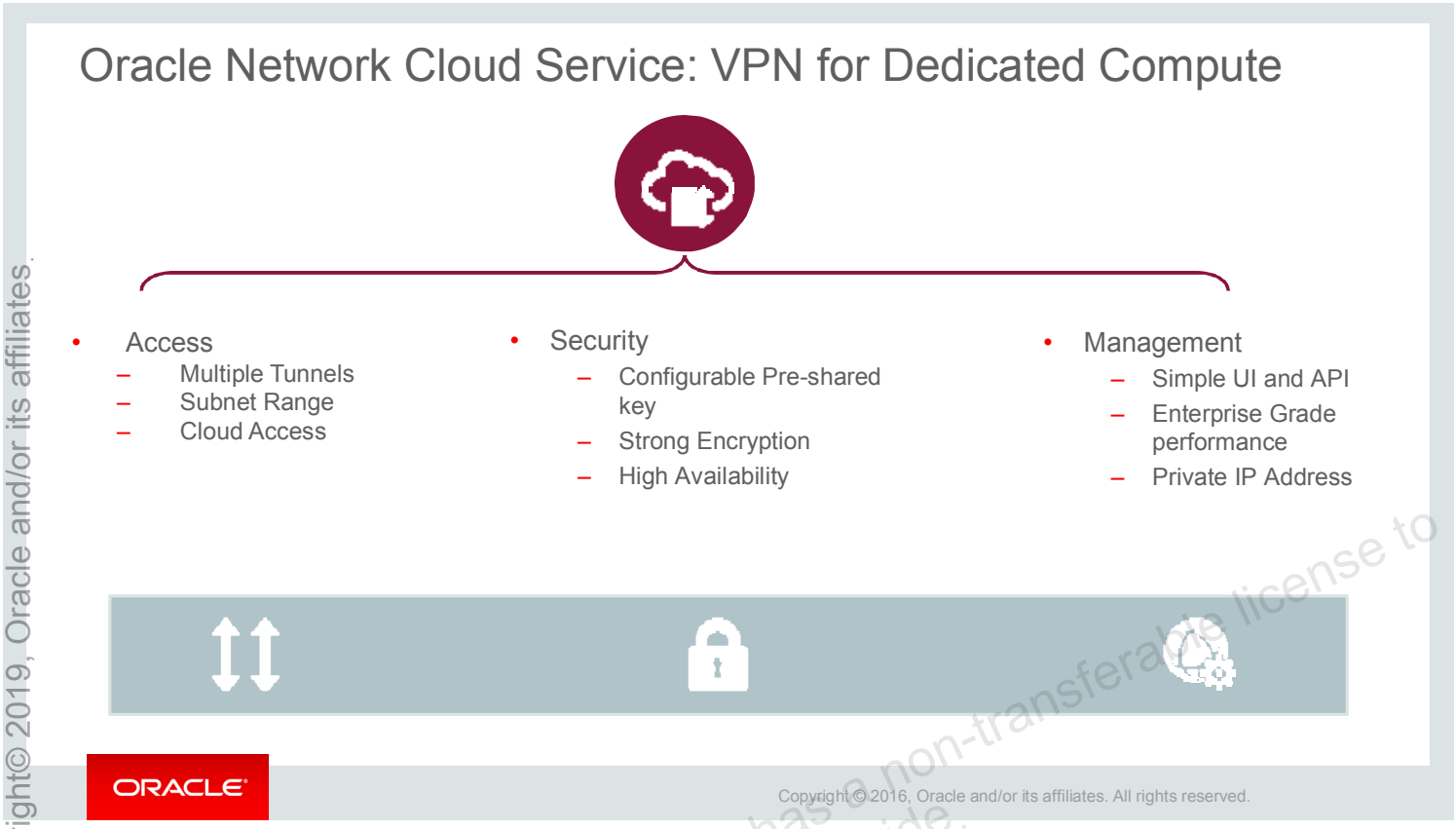
- Run on dedicated hardware with network isolation
- Can be accessed using secure site-to-site VPN (more about this later)

Oracle Storage Cloud Service

- Storage Cloud Service
- Storage Cloud Archive Service
- Shared File Storage Service
- Storage Cloud Software Appliance

Oracle Storage Cloud Service provides secure and scalable, eventually consistent, object storage solution for storing and accessing data from any environment connected to the Internet.

- Oracle Storage Cloud Service
  - Secure and scalable storage
  - Easy to access from anywhere on the Internet
  - Enterprise-class data protection
- Oracle Storage Cloud Archive Service
  - Most cost-effective solution in the industry
  - Designed for large-scale and infrequently accessed data
  - Long-term data retention
  - Rich media content
  - Scientific research archives
  - Cultural preservation



Oracle Storage Cloud Service securely extends your on-premises network to include instances in your Oracle Compute Cloud Service site.

Access

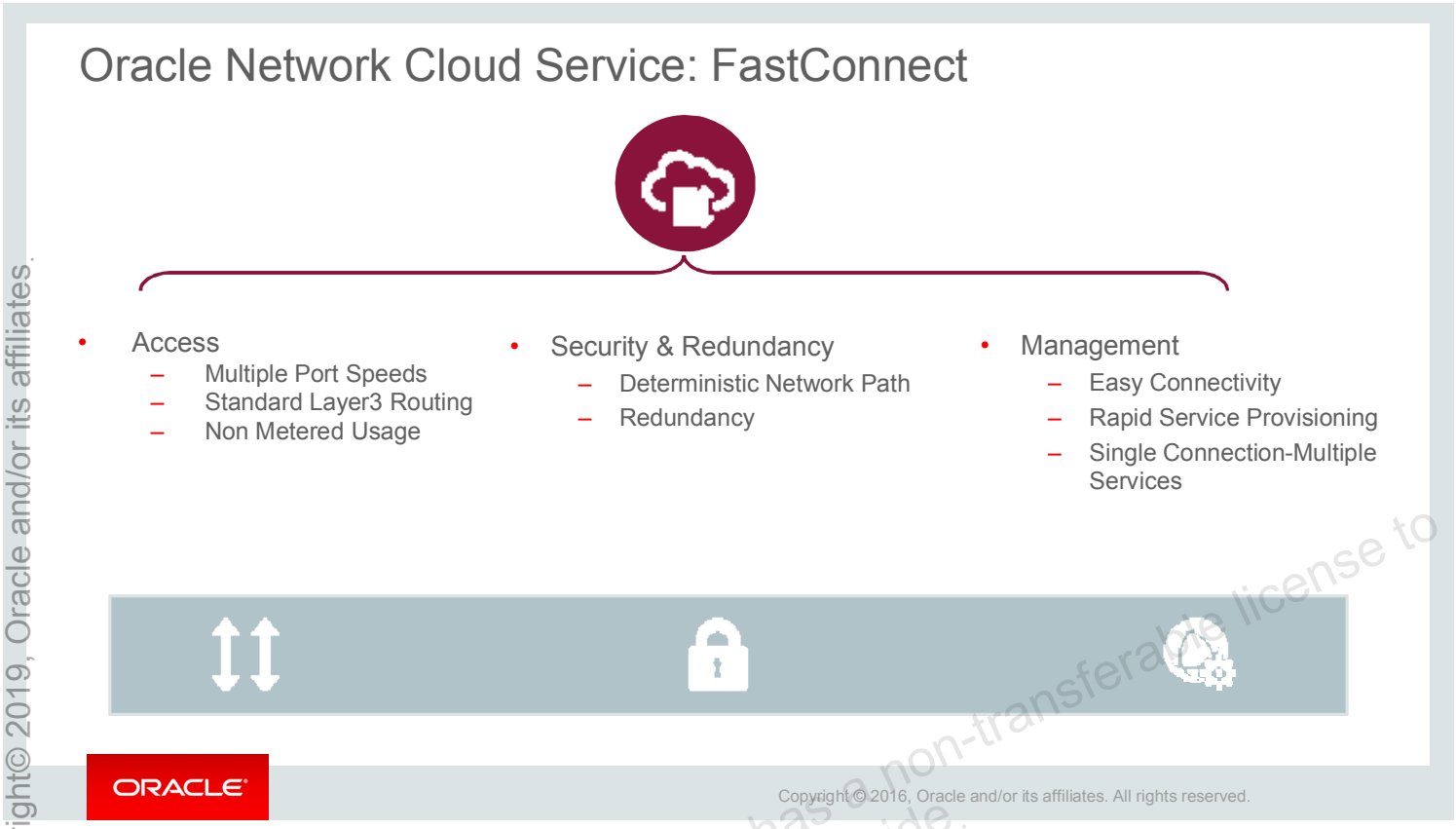
- **Multiple Tunnels:** Multiple site-to-site tunnels can be set up.
- **Subnet Range:** Users can configure a range of private IP addresses for their compute instances.
- **Cloud Access:** Users can access other Oracle services in the cloud.

Security

- **Configurable Pre-shared key:** Symmetric key encryption using Pre-shared key enhances the security as well as overall performance. Users can change it at any time from the services page.
- **Strong Encryption:** All the data between the user's data center and the Oracle Compute Cloud Service site is encrypted using 128 bit AES encryption.
- **High Availability:** VPN devices are configured as a cluster for high availability.

Data Management

- **Simple UI and API:** With few steps, you can create and manage your VPN connections.
- **Enterprise Grade performance:** Ensure that your data is secure while traversing the Internet.
- **Private IP Address:** Private IP addresses can be configured to enable users to access their instances as an extension of their data center.



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

Access

- **Multiple Port Speeds:** Customers can pick between 1 Gbps or 10 Gbps port speeds depending on the use case and the data transfer profile for their usage.
- **Standard Layer3 Routing:** FastConnect Partner Edition leverages industry standard BGP routing to manage the exchange of routes between Oracle Cloud and customers' networks.
- **Non Metered Usage:** FastConnect Partner Edition offers unlimited data transfer between customers' network and Oracle Cloud.

Security and Redundancy

- **Deterministic Network Path:** FastConnect Partner Edition provides predetermined path for data transfer unlike the public Internet thus offering better security as the data never leaves trusted boundaries.
- **Redundancy:** FastConnect Partner Edition is delivered as a fully redundant service with two physical connections from customers' network edge to Equinix Cloud Exchange to ensure high availability.

Data Management

- **Easy Connectivity:** FastConnect Partner Edition is available at Equinix datacenters through a fiber cross connect to the Equinix Cloud Exchange platform.
- **Rapid Service Provisioning:** FastConnect Partner Edition can be turned up rapidly (in minutes) if customers are already connected to Equinix Cloud Exchange.
- **Single Connection-Multiple Services:** FastConnect Partner Edition allows customers to access all supported public facing Oracle Cloud services within a city using a connection through Equinix Cloud Exchange.

Quiz

Infrastructure as a Service (IaaS) is a form of cloud computing that provides only storage services over the Internet.

a. True
b. False

Quiz

IaaS is the only service model in cloud computing.

a. True
b. False

Quiz

How do users benefit when using IaaS?

a. Users save money because they pay for only the services they need.
b. Users can build their application environments without having to buy hardware.
c. Users are not responsible for hardware upgrades.
d. All of the above.
e. None of the above.

Quiz

IaaS provides the infrastructure for platforms and applications. IaaS makes it possible for users to deploy virtual machines, install operating systems, and customize their own applications environment.

a. True
b. False

Summary

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