



Robert Marz – Independent Consultant

Primary Role

Senior Technical Architect
with database centric view of the world

DOAG (German Oracle User Group)

Active Member of Database Community
Responsible for Cloud Topics



Databees.



DATABEE
Die IT-Architekten



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Oracle ACE
Pro



500+ technical experts helping peers globally

The **Oracle ACE Program** recognizes and rewards community members for their technical and community contributions to the Oracle community

3 membership tiers



For more details on Oracle ACE Program:
ace.oracle.com



Nominate
yourself or someone you know:

ace.oracle.com/nominate





Cloud: Definitions





Cloud?



There is no cloud
it's just someone else's computer



Begriffsbestimmung Cloud

"Cloud Computing ist ein **Modell**, das es erlaubt **bei Bedarf**, **jederzeit** und überall bequem über ein Netz auf einen geteilten Pool von konfigurierbaren **Rechnerressourcen** [...] zuzugreifen, die **schnell** und mit **minimalem Managementaufwand** oder **geringer Serviceprovider-Interaktion** zur Verfügung gestellt werden können."

BSI (basierend auf der NIST-Definition von 2011)



Cloud Computing

Cloud Computing bezeichnet das **dynamisch** an den Bedarf **angepasste**, **hochautomatisierte**

- Anbieten
- Nutzen
- Abrechnen

von IT-Dienstleistungen über ein Netz.



BSI (basierend auf der NIST-Definition von 2011)



Cloud: Charakteristische Eigenschaften

On-demand Self Service

Die Provisionierung der Ressourcen (z. B. Rechenleistung, Storage) läuft automatisch **ohne Interaktion** mit dem Service Provider ab.

Broad Network Access

Die Services sind mit Standard-Mechanismen **über das Netz** verfügbar und nicht an einen bestimmten Client gebunden.

Resource Pooling

Die Ressourcen des Anbieters liegen in einem Pool vor, aus dem sich viele Anwender bedienen können (Multi-Tenant Modell). Dabei **wissen die Anwender nicht, wo die Ressourcen sich befinden**, sie können aber vertraglich den Speicherort, also z. B. Region, Land oder Rechenzentrum, festlegen.

Rapid Elasticity

Die Services können schnell und elastisch zur Verfügung gestellt werden, in manchen Fällen auch automatisch. **Aus Anwendersicht scheinen die Ressourcen daher unendlich zu sein.**

Measured Services

Die **Ressourcennutzung kann gemessen** und überwacht werden und entsprechend bemessen auch den Cloud-Anwendern zur Verfügung gestellt werden.



Cloud Geschmacksrichtungen

Public Cloud

Im Internet
von jedem
buchbar

- Amazon AWS
- MS Azure
- Google Cloud
- Oracle Cloud

Private Cloud

Betrieb on
premises
alle Cloud
Eigenschaften

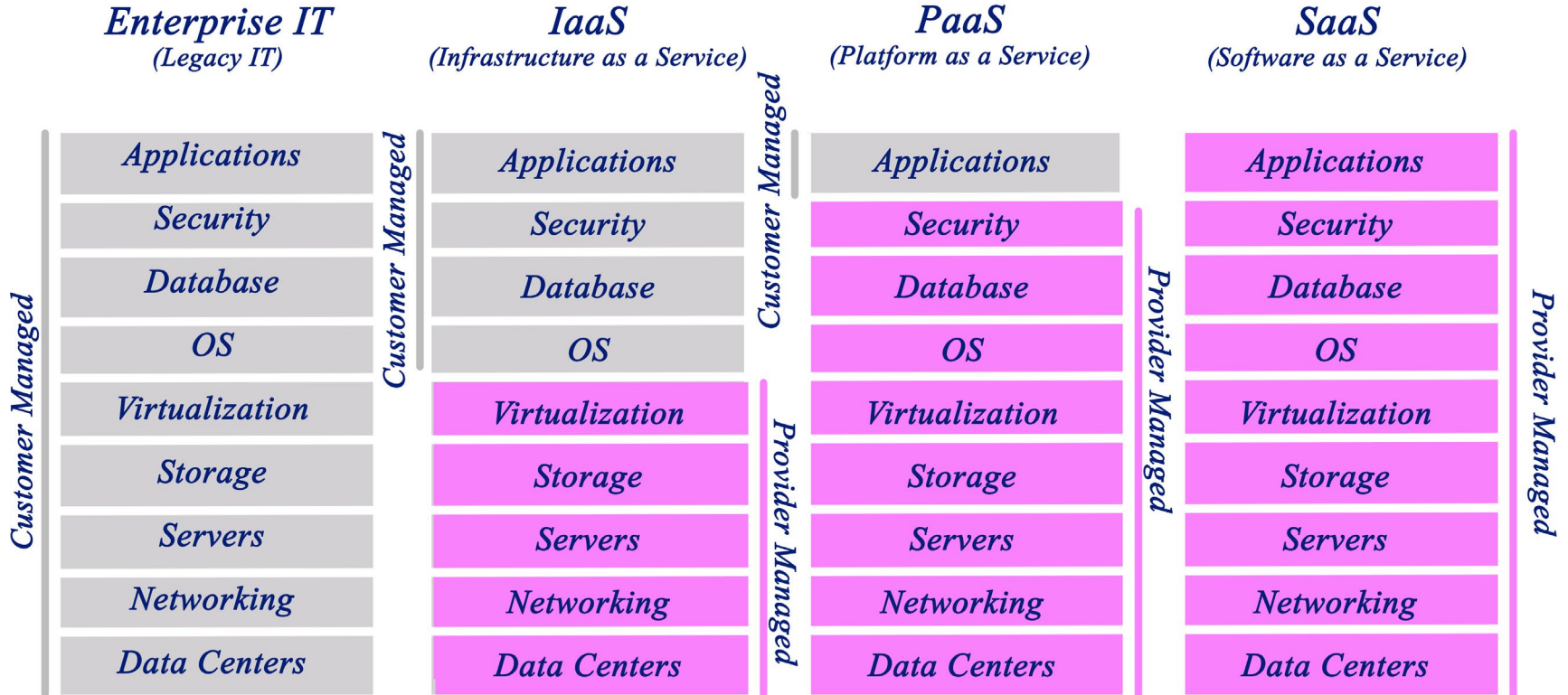
- OpenStack
- Oracle Cloud
Machine
- MS Azure Stack

Multi-Cloud

Mischung von
Public
Clouddiensten
verschiedener
Anbieter



Cloud Service Models



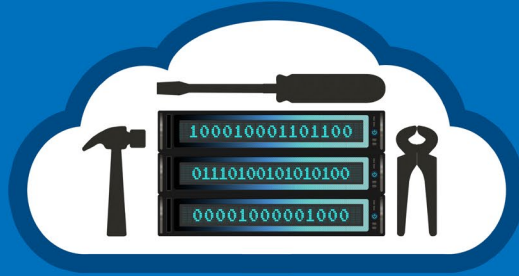


Cloud Service Models



IaaS

host



PaaS

build



SaaS

consume

Virtual Machines

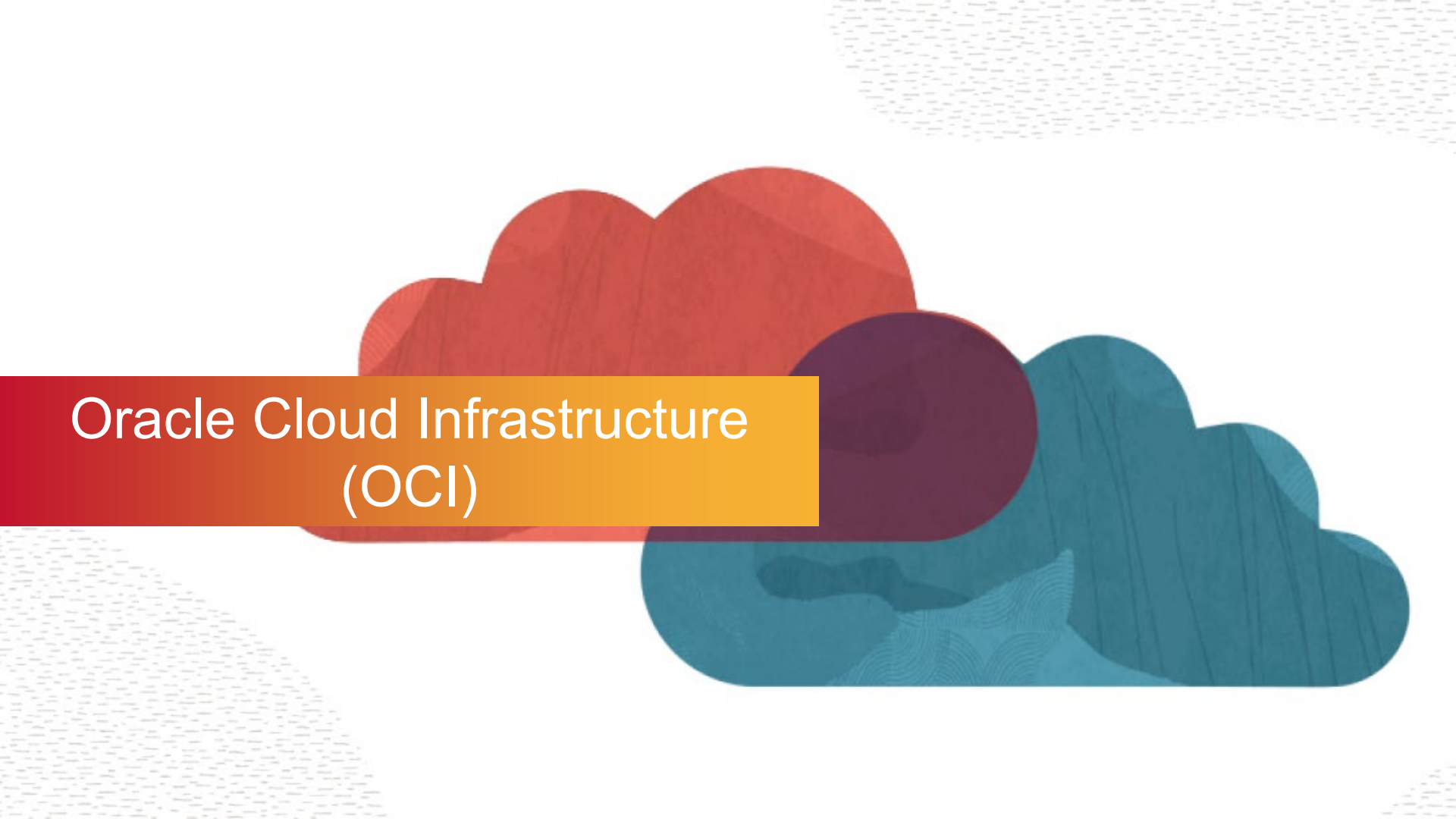
Storage

Oracle APEX

Autonomous Database

Subscribed Apps

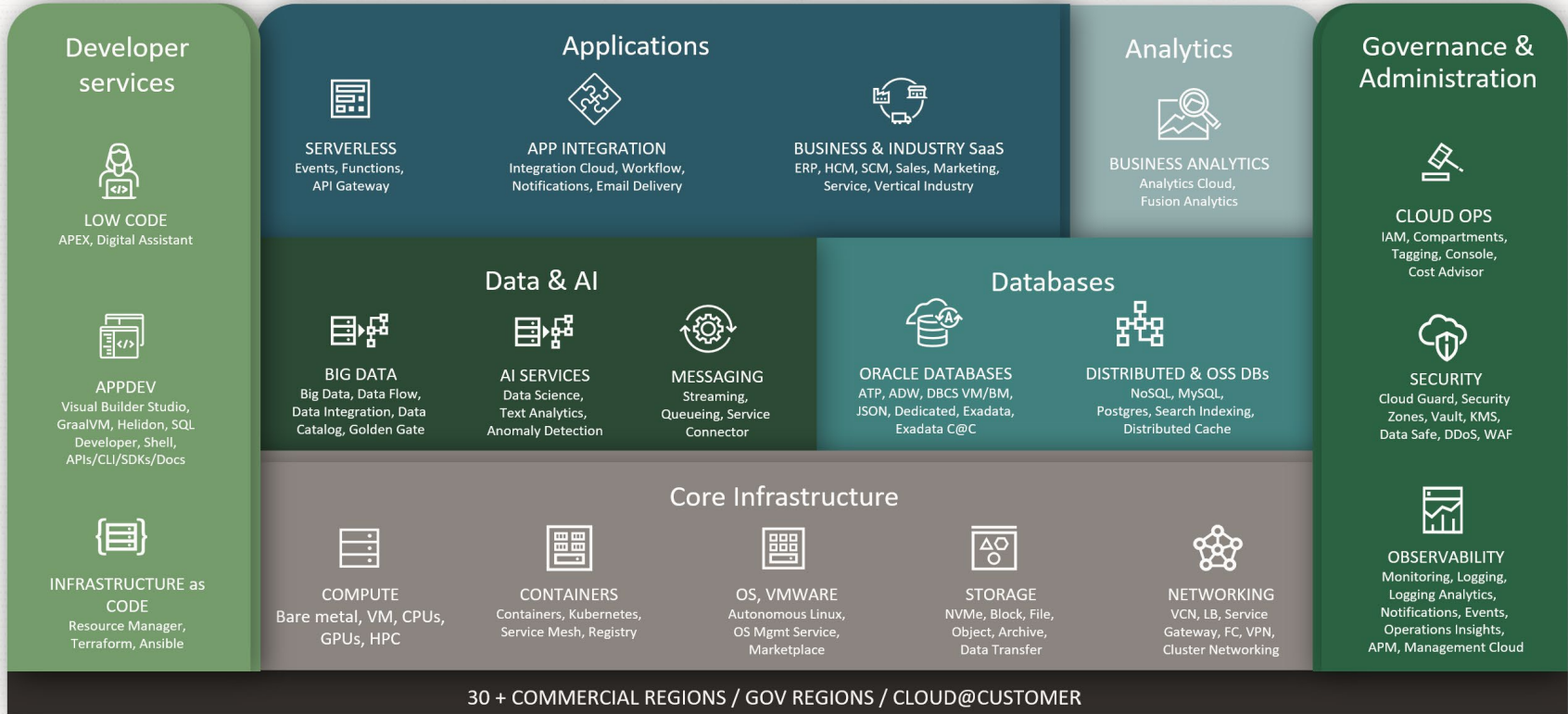
Rented Services



Oracle Cloud Infrastructure (OCI)



Complete cloud capabilities

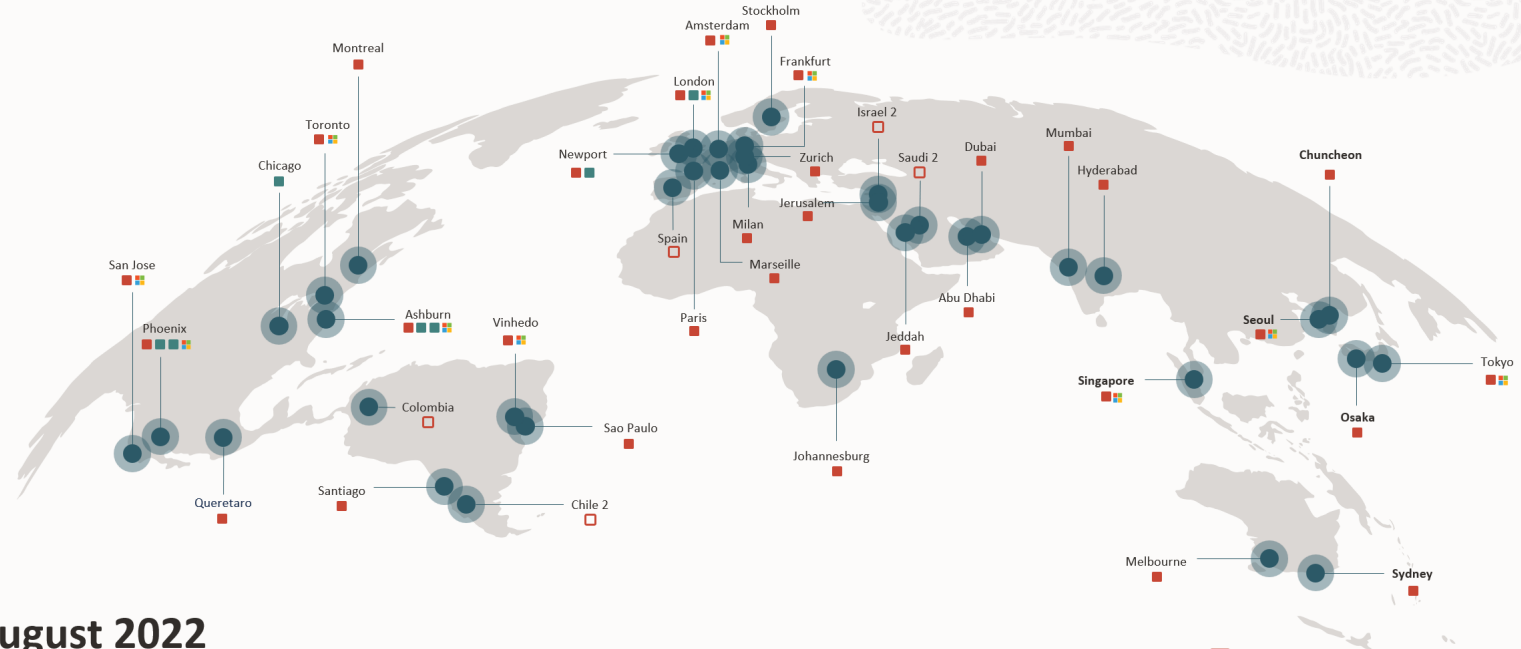


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Oracle Cloud Infrastructure Global Locations



August 2022

39 regions; 5 more planned

11 Azure Interconnect Regions

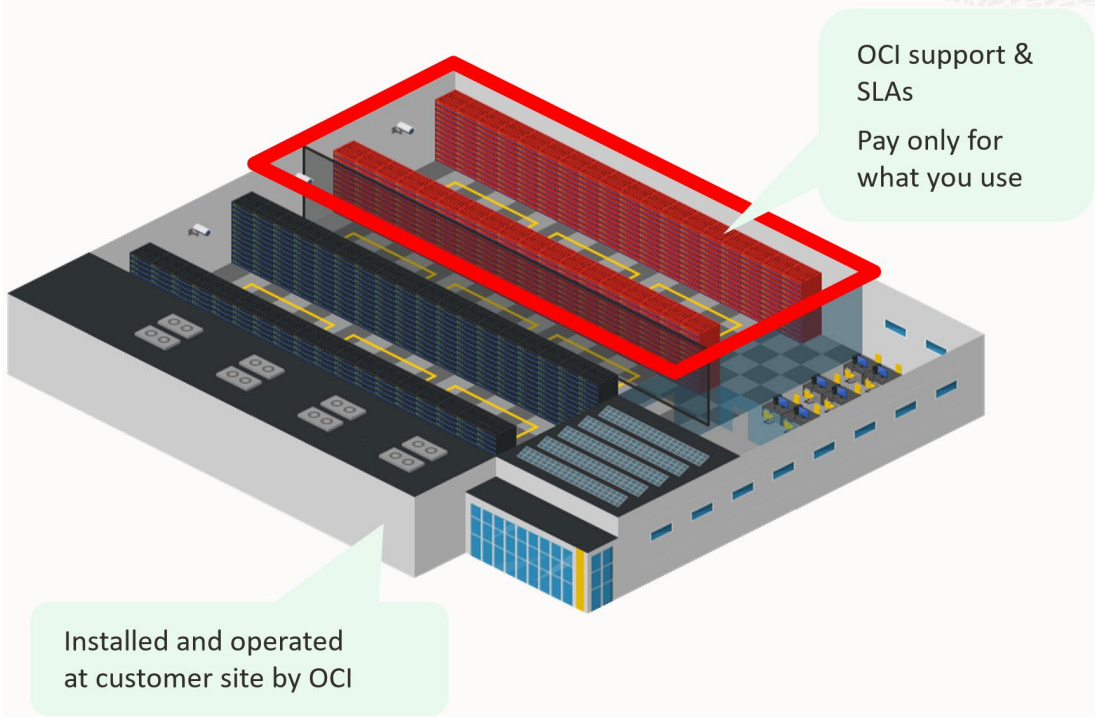
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Oracle Dedicated Region Cloud@Customer

All the capabilities of an Oracle public cloud region, delivered on-premises



80+ OCI CLOUD SERVICES

Latest compute, storage, networking, security services

Modernize Data Platform: Autonomous Database, Exadata, MySQL + Heatwave, Object Storage Data Lake, Big Data services like Spark, Data Science

Optimize Apps: Observability and Management

Modernize Applications: Developer Services like Container Engine, Kubernetes, DevOps

SaaS in your own data center: Oracle Cloud Applications like ERP, HCM, ACX

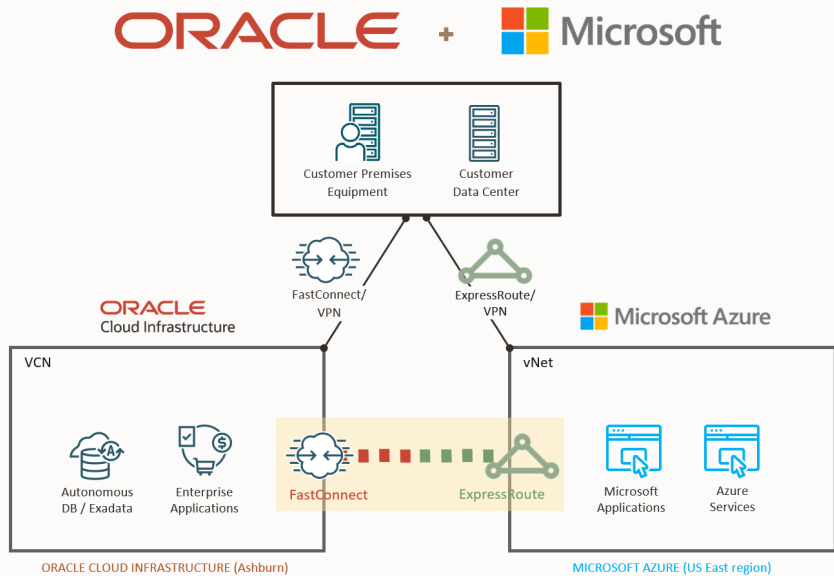
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Oracle Cloud + Microsoft Azure Interconnect

Multicloud solution



- ✓ Microsoft Azure and Oracle Cloud are **interconnected today**, so you can migrate and run mission-critical enterprise workloads across clouds
- ✓ **FastConnect and ExpressRoute** direct connection with 2 millisecond latency and no intermediate service provider required
- ✓ **Unified identity and access** management via single sign-on with automated user provisioning to easily manage resources across clouds
- ✓ **Collaborative support** of workloads across clouds, for example, custom and Oracle Applications on Azure with Oracle Database cloud services – connect best-in-class services across clouds
- ✓ **Available Now:** Ashburn, San Jose, Vinhedo, Toronto, London, Frankfurt, Amsterdam, Tokyo
- ✓ **Coming Soon:** Government, Asia, Europe regions





WATCH
LIVE



OCI Demo 01: Login

Open <https://cloud.oracle.com> in your Browser

OCI

Services Solutions Why OCI Customers Pricing Learn Developers Support Marketplace

Sign in to Oracle Cloud

ORACLE Cloud

Cloud Account Name

robertdatabee

Next

Forgot your cloud account name? [Get help](#)

Do you have a Traditional Cloud Account? [Sign In](#)

Not an Oracle Cloud customer yet?

Sign Up

Cloud Infrastructure

ORACLE Cloud

robertdatabee

Oracle Cloud-A

Domain ⓘ
Default

Benutzername

Benutzername oder E-Mail-Adresse

Kennwort

Kennwort

Forgot Password?

Anmelden

Benötigen Sie Hilfe bei der Anmeldung?



OCI Demo 02: OCI Dashboard

ORACLE Cloud

Germany Central (Frankfurt)

Get started Dashboard

Service links

PINNED

- Instances Compute
- Virtual cloud networks Networking

RECENTLY VISITED

You haven't visited anything yet.

RECOMMENDED - For the profiles you selected [\(Update\)](#)

- DB Systems MySQL
- Cluster Networks Compute

Your tenancy **robertdatabee**

All services operational [View health dashboard](#)

Usage

Analyze costs

Subscription 29907652
€250.00 Free Trial credits

€0.00 used €250.00 left

2 of 30 days

OCI mobile app

Review alarms, access billing and usage data, and manage resources on the go.

[Install now](#)

Get early access to OCI features

Try out upcoming features and share your feedback

Click on
Hamburger
Menu



OCI Demo 03: Hamburger Menu – Identity & Security - Compartments

The screenshot shows the Oracle Cloud console interface. At the top, there is a navigation bar with the Oracle Cloud logo, a search bar, and the region 'Germany Central (Frankfurt)'. Below this is a left-hand navigation menu (hamburger menu) with various service categories. The 'Identity & Security' category is highlighted. The main content area displays the 'Identity & Security' page, which includes a sub-menu with 'Compartments' selected. Two red callout boxes with lines pointing to the 'Identity & Security' and 'Compartments' items in the sub-menu contain the text 'Click „Identity & Security“' and 'Click „Compartments“' respectively.

ORACLE Cloud

Germany Central (Frankfurt)

Search

Identity & Security

Identity

- Overview
- Domains
- Network Sources
- Policies
- Compartments

Cloud C...

- Overview
- Problems
- Recommendations
- Threat monitoring
- Targets
- Responder activity
- Detector recipes
- Responder recipes
- Managed lists
- Data masking
- Settings

Related services

- Virtual cloud...
- Private Endp...
- OS Management
- Data Safe -...

Help

- Security Ser...
- Security Testin...
- Security Best...
- Government Clou...
- All Security...
- Identity and Acces...

Home

Compute

Storage

Networking

Oracle Database

Databases

Analytics & AI

Developer Services

Identity & Security

Observability & Management

Hybrid

Migration & Disaster Recovery

Billing & Cost Management

Governance & Administration

Marketplace

Click „Identity & Security“

Click „Compartments“



OCI Demo 04: Compartments – create new Compartment

ORACLE Cloud Germany Central (Frankfurt)

Compartments

Create Compartment

Name	Status	OCID	Authorized	Security Zone ⓘ	Subc
robertdatabee	Active	ocid1..jjhysa	Yes	Not Enabled	1
Managed CompartmentFor PaaS	Active	ocid1..lowhaa	Yes	Not Enabled	0

Showing 2 items < 1 of 1 >

Filters: State: Active | Deleting

Tag filters: [add](#) | [clear](#)

no tag filters applied

Click „Create Compartments“



OCI Demo 05: Create Compartment

The screenshot shows the Oracle Cloud console interface. At the top, the Oracle Cloud logo and the region 'Germany Central (Frankfurt)' are visible. The left sidebar contains navigation options: Identity, Overview, Domains, Network Source, Policies, Compartments (highlighted), Filters, State, Active | Deleting, and Tag filters. The main content area displays the 'Create Compartment' dialog box. The dialog has a title bar with 'Create Compartment' and a 'Help' link. It contains the following fields and options:

- Name:** A text input field containing 'Always-Free-Stuff'.
- Description:** A text input field containing 'My Always Free Demo Deployments'.
- Parent Compartment:** A dropdown menu showing 'robertdatabee (root)'.
- Tagging:** A section with the heading 'Add tags to organize your resources. [What can I do with tagging?](#)'. It includes a table with columns for 'Tag namespace', 'Tag key', and 'Tag value'. The 'Tag namespace' dropdown is set to 'None (add a free-f...)'. There is an 'Add tag' button below the table.
- Buttons:** A 'Create Compartment' button is located at the bottom left of the dialog.

Enter meaningful Name & Description

Click „Create Compartment“



OCI Demo 06: open Hamburger Menu – Oracle Databases

The screenshot shows the Oracle Cloud console interface. At the top, it displays 'ORACLE Cloud' and the region 'Germany Central (Frankfurt)'. A search bar is visible on the left. The main navigation menu on the left includes: Home, Compute, Storage, Networking, **Oracle Database** (highlighted), Databases, Analytics & AI, Developer Services, Identity & Security, Observability & Management, Hybrid, Migration & Disaster Recovery, Billing & Cost Management, Governance & Administration, and Marketplace. The 'Oracle Database' section is expanded, showing a list of services: **Autonomous Database**, Autonomous Data Warehouse, Autonomous JSON Database, Autonomous Transaction Processing, **Autonomous Dedicated Infrastructure**, **Oracle Base Database (VM, BM)**, **Exadata on Oracle Public Cloud**, **Exadata Cloud@Customer**, **External Database**, **Data Safe - Database Security**, Overview, Target Databases, and Security Center. A red callout box with the text 'Click „Autonomous Database“' points to the 'Autonomous Database' link in the list. At the bottom of the console, there is a 'RECOMMENDED' section with a link to '(Update)' and a note about getting early access to OCI features.

Click „Autonomous Database“



OCI Demo 07: Create Autonomous Database

ORACLE Cloud

Germany Central (Frankfurt)

Overview > Autonomous Database > Autonomous Databases

Autonomous Database

Autonomous Databases *in* Always-Free-Stuff *Compartment*

Autonomous Database delivers fast performance and requires no database administration. It performs all routine database maintenance tasks while the system is running, without human intervention. Autonomous Databases located in the Oracle cloud can run on dedicated or shared infrastructure. [Learn more.](#)

Create Autonomous Database

Display Name	State	Dedicated	Compute	Storage	W
No items					

Displaying 0 Autonomous Databases < 1 of 1 >

Compartment: Always-Free-Stuff

Filters: Workload type: All

Click „Create
Compartment“



OCI Demo 08: Create Autonomous Database Wizard

ORACLE Cloud Search resources, services, documentation, and Marketplace

Create Autonomous Database

Provide basic information for the Autonomous Database

Compartment: Always-Free-Stuff **Choose your Compartment**

Display name: ADB-19c-TP-AFree-01 **Enter meaningful Names**

Database name: ADB19cAdree01 **Enter meaningful Names**

Choose a workload type

- Data Warehouse
- Transaction Processing
- JSON

Choose a deployment type

- Shared infrastructure
- Dedicated infrastructure

Configure the database

Always Free **Check „Always Free“**

Choose network access

Access type

- Secure access from everywhere
- Secure access from allowed IPs and VCNs only
- Private endpoint access only

Require mutual TLS (mTLS) authentication

Create administrator credentials

Username: ADMIN **Enter & confirm password**

Password: **Enter & confirm password**

Confirm password: **Enter & confirm password**

Choose network access

Bring your own license (BYOL)

License included

Contact Email: robert.marz@database.org **Enter your email address**

Create Autonomous Database **Click „Create Autonomous Database“**



OCI Demo 09: Autonomous Database is provisioning

ATP

PROVISIONING

Announcements

- New Feature: Introducing a new disaster recovery option - Backup-Based Disaster Recovery. [Learn more.](#)
- New Feature: You can now export data to object storage in Parquet format using DBMS_CLOUD. [Learn more.](#)
- Learn about other [new features in Autonomous Database here.](#)

ADB-19c-TP-AFree-01 Always Free

Database actions Database connection Performance hub Manage scaling More actions

Autonomous Database information Tools Tags

General information

Database name: ADB19cAdres01
Workload type: Transaction Processing
Compartment: robertadabee (root)/Always-Free-Stuff
OCID: ...67562a [Show](#) [Copy](#)
Created: Sun, Mar 26, 2023, 18:38:29 UTC
OCPU count: 1
OCPU auto scaling: Disabled ⓘ
Storage: 20 GB
Storage auto scaling: Disabled ⓘ
License type: License included
Database version: 19c
Lifecycle state: Provisioning
Instance type: Free [Upgrade to Paid](#)
Mode: Read/write [Edit](#)

APEX instance

Instance name: [ADB-19c-TP-AFree-01](#)

Infrastructure

Dedicated infrastructure: No

Disaster recovery ⓘ

Role: -

Backup

Last automatic backup: No active backups exist for this database.
Next long-term backup: -
Long-term backup schedule: [Schedule](#)

Network

Access type: Allow secure access from everywhere
Access control list: Disabled [Edit](#)
Mutual TLS (mTLS) authentication: Required [Edit](#) ⓘ

Maintenance ⓘ

Patch level: Regular ⓘ
Customer contacts: Configured ⓘ [Manage](#)

Data Safe ⓘ

Status: Not registered [Register](#)

After a couple of minutes icon color will change to green and status to „AVAILABLE“

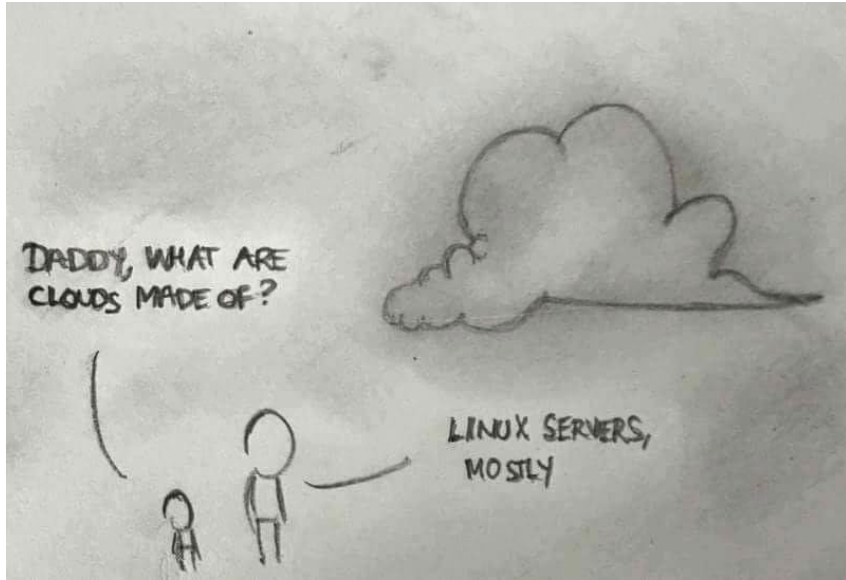


Public Clouds: Fundamental Similarities





Public Clouds - Fundamentals



What are Clouds made of?

Linux Servers

Mostly

MS Azure: also Windows Server

Network Components

Other supporting stuff

Software Defined (SDx)

Everything is Virtual

For Cloud-Users



Infrastructure as a Service (IaaS)

Compute

VMs /
Containers

x86 & ARM Cores

RAM

Predefined or Custom Images

Storage

Multiple Performance Tiers

Files / Blobs / Block Devices

Network

Gateways

Filters

Route Tables





Web Interface

Web Interface

- Every Cloud Provider has one

All follow their own

- UX
- Layout / Design
- Naming Conventions

ORACLE®

Cloud Infrastructure

Google Cloud

aws



Azure



Automation: REST Interfaces & SDKs

REST API



“The Master”

All SDKs, CLI & The WebUI use it

Provides Access

to ALL Resources and Options



Encapsulate

the complexity of REST API

Multiple Languages

Java, Python, Ruby, Go

REST API and SDKs are incompatible among Cloud providers



Automation: CLIs

Virtual Every Cloud Provider provides a CLI

AWS Shell

aws

Azure CLI

az

Google Cloud SDK

gcloud, gsutil, kubectl, bq

Oracle Cloud Infrastructure CLI

oci

CLIs purposes

ad hoc Changes

Batch Scripts

Syntax / Naming Conventions

Incompatible among Cloud Providers

1 running, 179... id, 0,8 wa, 0,0...
1,2 sy, 0,0 ni, 97,2... free, 93...
total, 2814304 used, 954160 free, 93...
total, 0 used, 4192928 free. 1177

NI	VIRT	RES	SHR	S	%CPU	%MEM	
0	944140	77152	58752	S	3,3	2,0	0
0	2964784	177576	53704	S	0,7	2,1	0
0	3656688	197012	88396	S	0,7	5,2	0
0	342424	12612	189044	S	0,3	0,3	0
0	26240	3080	52492	R	0,3	0,1	0
0	1005180	50736	31004	S	0,3	1,3	0
0	33792	4276	2628	S	0,0	0,1	0
0	0	0	0	S	0,0	0,0	0
0	0	0	0	S	0,0	0,0	0
0	0	0	0	S	0,0	0,0	0
0	0	0	0	S	0,0	0,0	0
0	0	0	0	S	0,0	0,0	0
0	0	0	0	S	0,0	0,0	0
0	0	0	0	S	0,0	0,0	0
0	0	0	0	S	0,0	0,0	0
0	0	0	0	S	0,0	0,0	0

@AlexandrOPR - stock.adobe.com



OCI Command line Interface

Use to

make small changes
utility batch scripts
set up small environments (demos, etc)

OCI CLI

Python Based CLI

Platforms

MacOS, Unix, Linux
Windows

OpenSource

Hosted on GitHub
Developed & Maintained by Oracle





Scripting means Automation: Infrastructure as Code

Building up and tearing down of virtual environments happens frequently in the Cloud



Some changes can only be made by **recreating** the resource



Provisioning Cloud Resources by Clicking the UI is tedious and error prone



Use the Web-UI for Orientation only



Scripting is automation and documentation at the same time: **Software Defined Infrastructure**



Automation: CLI Best Practices

The CLI is the key to your datacenter

- do not put it on a laptop
- do not deploy it to the Cloud
- Limit access

Script everything

- Scripts are automation and documentation
- Learn how to deal with json
 - JMESPath
 - Tools like jq
- Use Variables for common parameters and IDs

Store your scripts without credentials

- Especially, when you version control them
- Use a key vault





Building complex Infrastructures: Hashicorp Terraform

Used to

plan, define and provision a datacenter infrastructure

Scripting

across all Major IaaS Providers

OCI Provider

developed by Oracle

De facto Standard

for Scripting Cloud Resources



HashiCorp

Terraform



Configuration Management Tools

Used to

change multiple Machines
to a desired state at once

e.g. Ansible

Agentless Orchestration and Automation

OCI Module

provided by Oracle

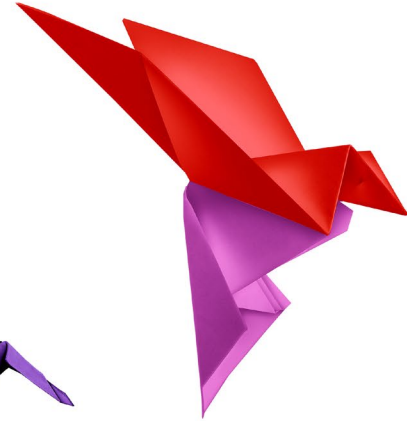
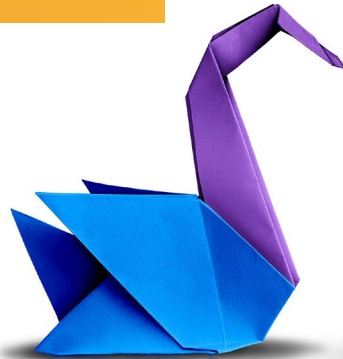
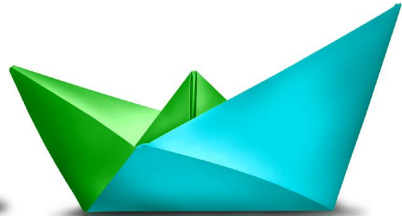
Other CM Tools

- Chef
- Puppet
- SaltStack
- ...



Red Hat Ansible

Moving into the Cloud: Same Same, but different





Cloud Account is a new Datacenter

A new IaaS Cloud Account

is an empty virtual Datacenter
Chance for a fresh Start

Start with Networking

Plan Ahead
Use only “new” IP-Ranges for Networks
as small as possible
as big as necessary
at least one Subnet for every Availability Domains

Quick and Dirty Trials

Don't let them become productive
Destroy and rebuild
→ Script everything



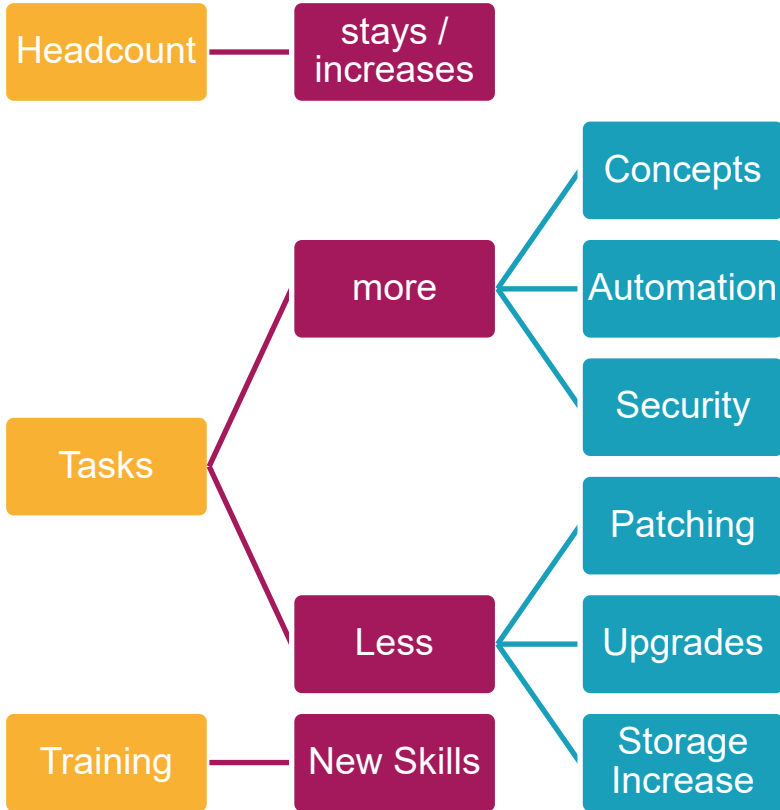
Instant Savings

- Rooms
 - Energy
 - Cooling
 - physical Access Control
- Spare Hardware Parts
- Scale Up Hardware





Cloud: Changes to IT Staff





Cloud native Apps

- New Developments only
- Different
 - Architecture
 - Deployment
- New Skillsets required

→ This is where the savings starts





Cloud: Backup / Disaster Recovery

There is no need for Backups in the Cloud – it's done by the Provider



„The OVH Cloud
escaping it's
Datacenter“
OHV Strasbourg Fire,
March 2021



Cloud: High Availability

HA / Backup in the Cloud

Same as on Premises

HA is not a product

it's a goal

Replicate / Backup

Across Regions
Across Cloud Providers
→ Multi Cloud

Drill your staff

Test Restore

Backup Complete?
Do you know your restore times?





Cloud Gotchas

Internet Connectivity

becomes crucial

Latency

increases
Gotcha for real time and legacy apps

Endless Capacity / Elasticity

can produce endless costs

Dead Data

generates costs



Conclusion





Public Clouds

