



ORACLE

Get some relief by setting up Database-as-a-Service onsite and in the cloud for Developer and DevOps use

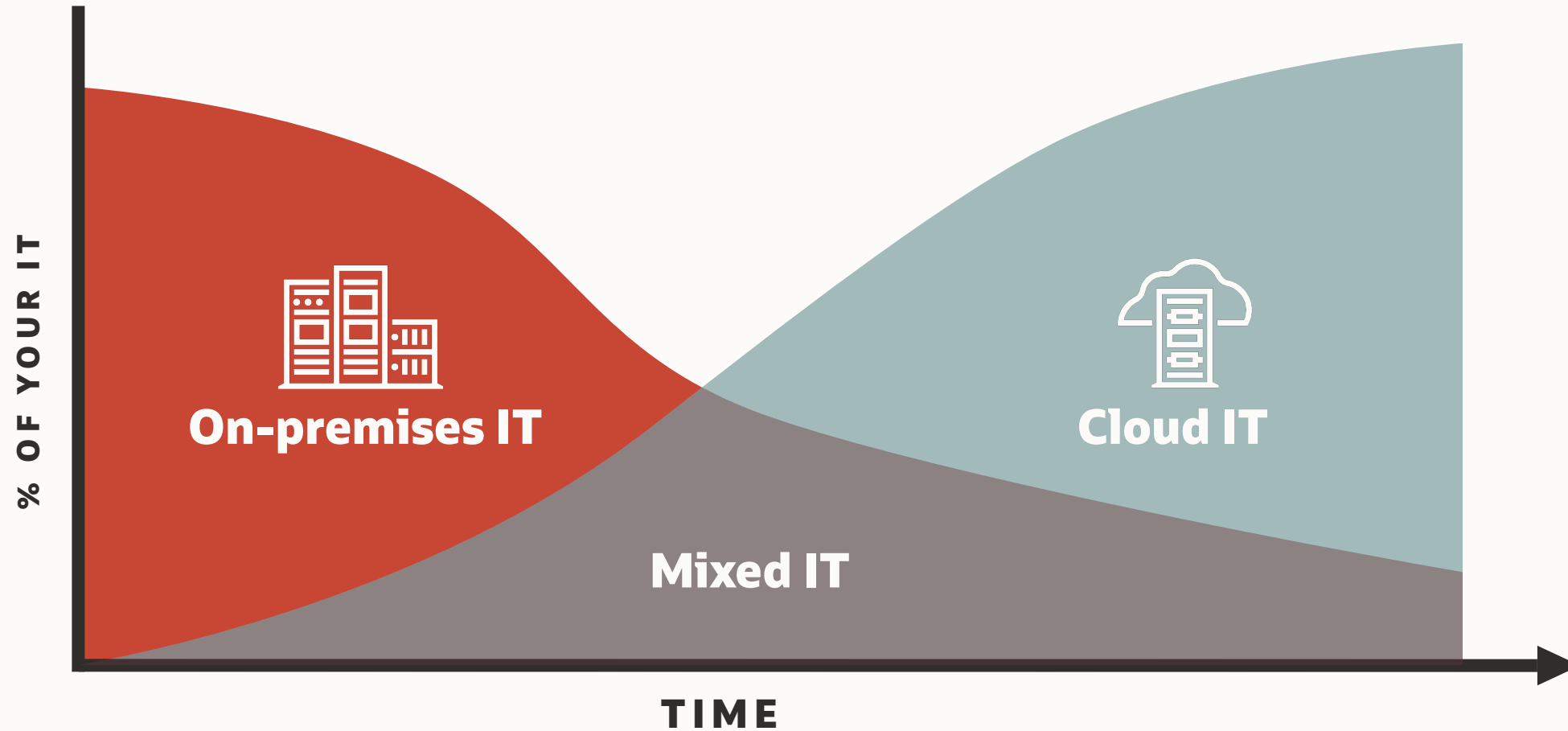
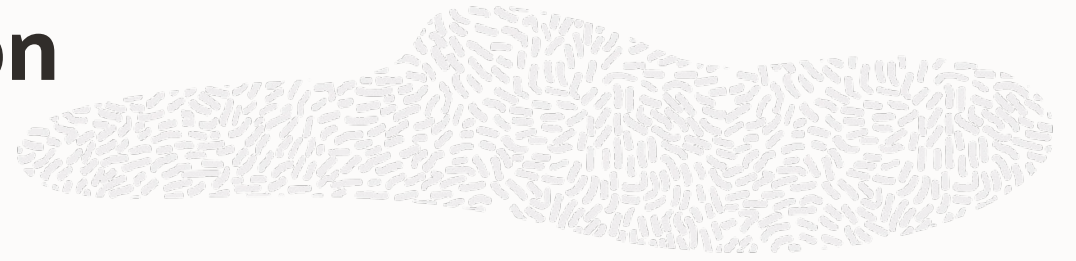


Sravanth Mouli
Product Manager

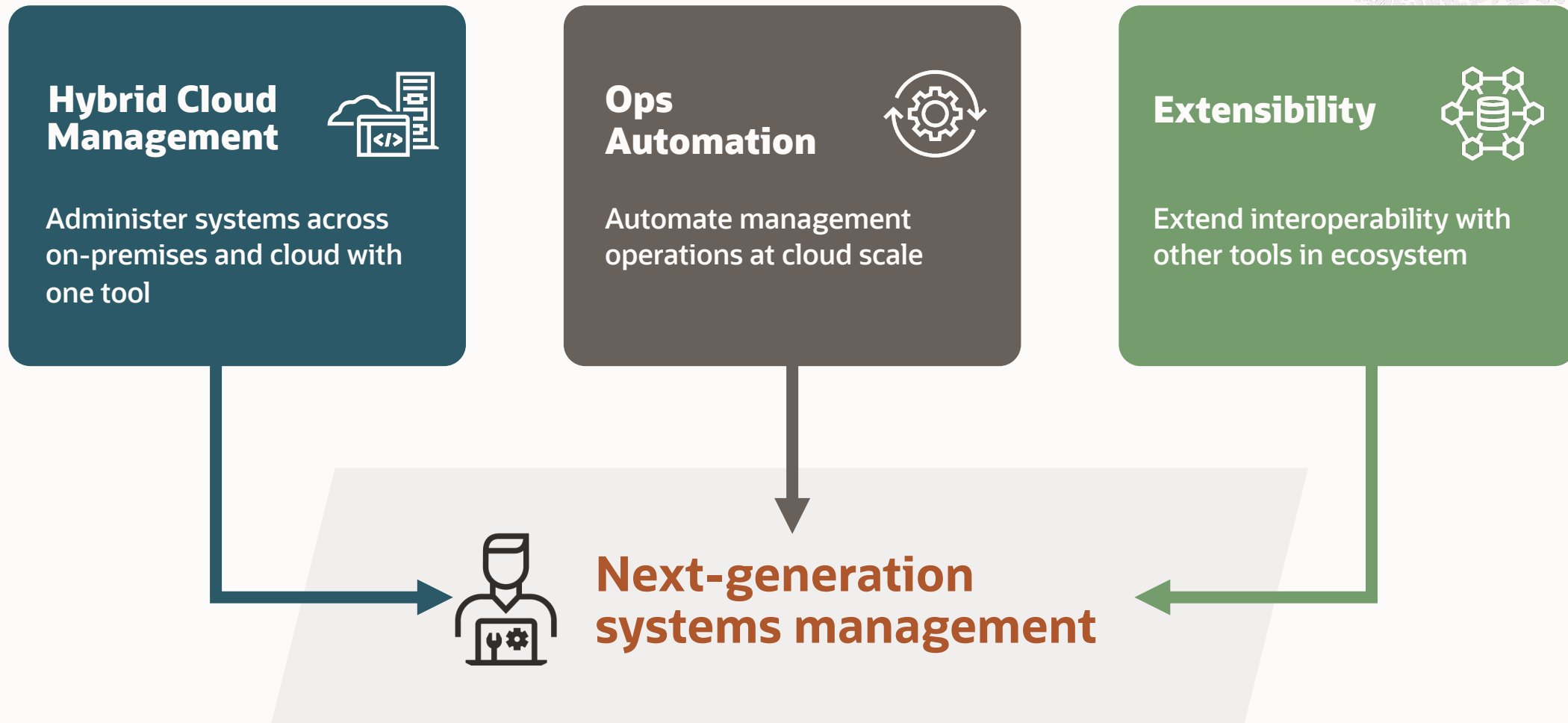


IT management cloud transition

Most enterprises have mixed IT



Systems Management requirements are also evolving



Hybrid Multicloud Management

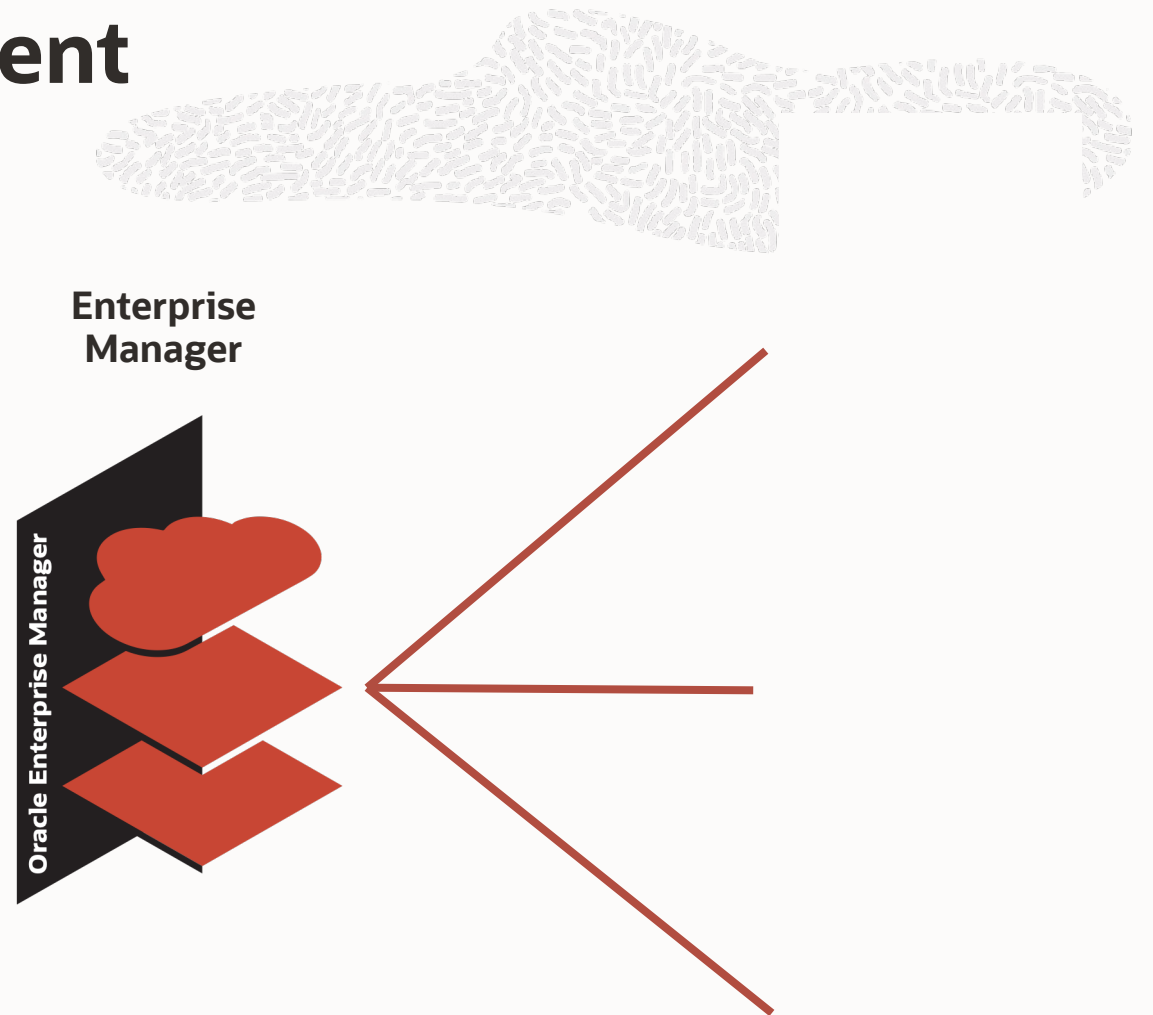
Fleet-wide management of hybrid estate

Monitor and manage your hybrid fleet

- New cloud-aware target types for Autonomous Databases including ExaCC and ExaCS
- Seamlessly manage public cloud (AWS, others) resources
- Enterprise-wide fleet dashboard for finding “hot spots”
- Integrated with OCI platform for management of cloud targets
- Lifecycle management of cloud targets (startup, backup, migrate, etc.) via cloud-native APIs

Hybrid Database-as-a-Service (DBaaS)

- Self-service deployment across on-premises and Oracle Cloud (VM, BM, ExaCC/ExaCS), and hybrid public cloud
- Self-service governance tools for effective cloud resource utilization (Quotas/Showback)



Cloud Management pack overview

Enable DevOps by rapid, on-demand deployment of standardized database configurations

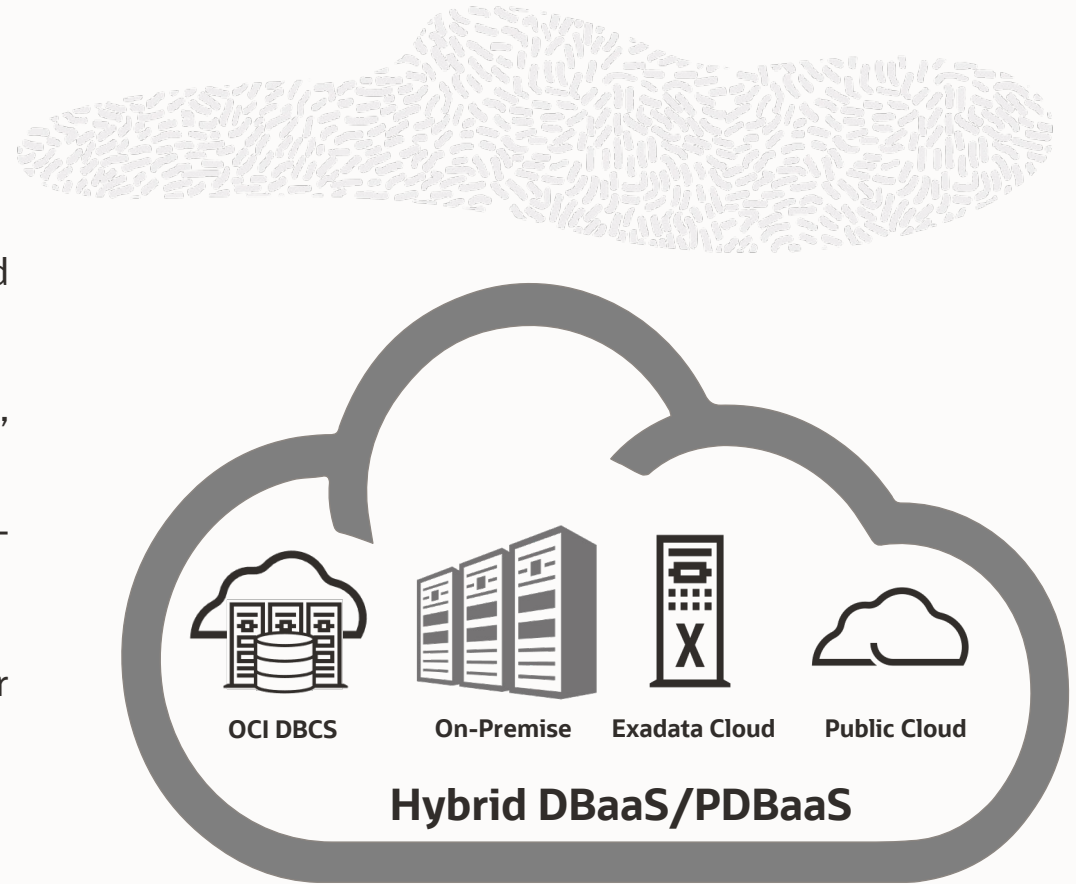
Deploy hybrid multicloud and operate database services on-premises, private and public cloud

Maximize visibility, monitoring and reporting to ensure adherence to IT standards and corporate policies

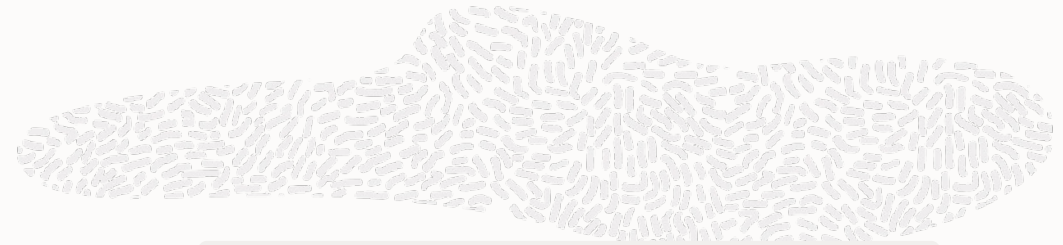
Intuitive Self Service interface for AppDev, and OpDev to provision or clone sanitized databases using templates in service catalog

Automate DevOps scenarios with REST APIs

Rapid and space efficient snap cloning of large databases



Cloud Management pack benefits



Increasing Quality of Service

In terms of performance, availability and security
Enforce unified identity and security infrastructure as part of standardized provisioning



Resource Elasticity

Ability to grow and shrink capacity provides applications the flexibility to meet business demands



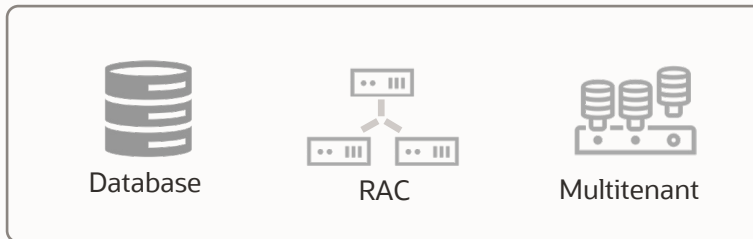
Enable Faster Deployment

DBaaS built using standard components, configurations and tools enables automated, streamlined and simplified deployment process

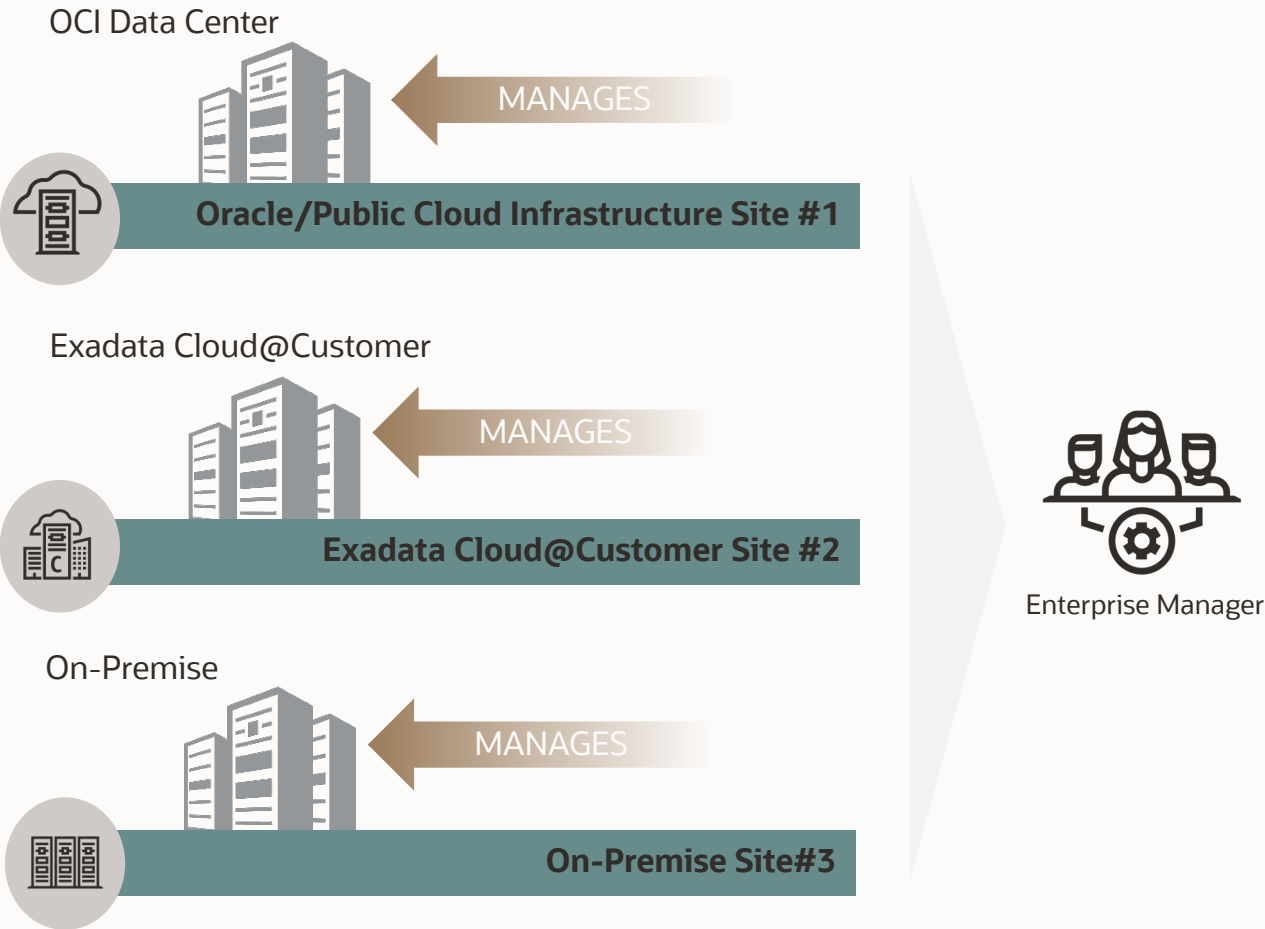


Rapid Provisioning

Agility in application development
Reduces time in deploying databases via self-service interface



Hybrid multicloud management



Simplify database management and accelerate deployment across on-premises and cloud

- Centralized governance across on-premises and cloud
- Quick deploy, same set of inputs regardless of platform
- Automate with DevOps tools and Orchestration engines

Operational consistency across hybrid environments

- One-stop visibility across on-premises and cloud assets
- Lifecycle management of database at scale, with less effort
- Enforce effective standardization, and reduce management overhead

Cloud Management Pack Scenarios



Hybrid PDBaaS

Effective consolidation of compute across data centers, Oracle/Public Cloud and Exadata Cloud.

Pluggable Database as a Service (PDBaaS) using standard deployment templates



Self Service Portal

Out-of-box Self Service Portal utilising service catalogs.

Role-based access control for provisioning, update, delete, and restore (hydrate and dehydrate use cases)



DevOps and Automation

Leverage REST APIs to automate end-to-end database operations.

Integrate with orchestration engine for automation and standardized deployments.



Snap Clone

Rapid and space efficient cloning of large databases.

Functional copies with very minimal storage requirement, with a potential storage saving of 90%

Hybrid Pluggable Database as a Service



Hybrid Pluggable Database as a Service

DevOps
Users



Self Service Application
Administrator

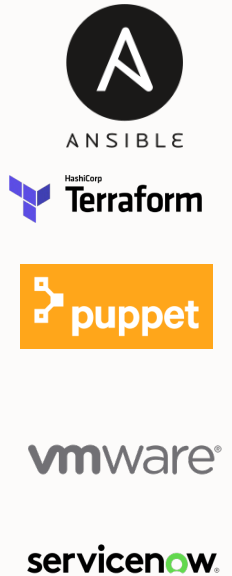
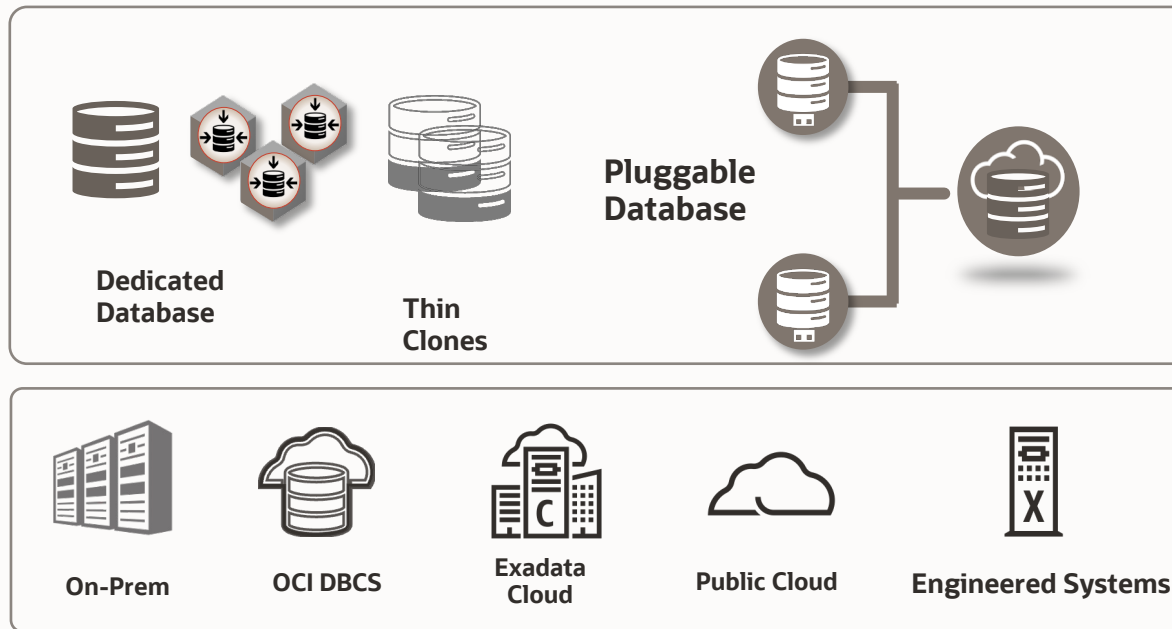


1 Consolidated

2 Elastic

3 Efficient

4 Accessible



PDB as a Service : Benefits



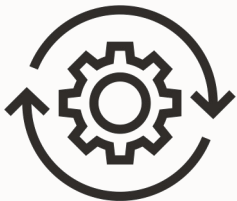
Consolidation

- Reduce IT complexities, eliminate redundant resources
- Unify data centers and cloud resources, optimize utilization
- Scale up and down without downtime



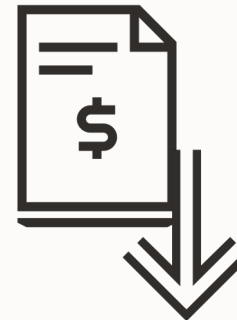
Standardization

- Self-service model, faster database provisioning for test/dev
- Streamline operational processes, leverage rich catalog
- Reduce database sprawl and security risk



Automation at Scale

- Easiest administration, with options for partial to full automation
- Automate time-consuming and error prone operations like provisioning, cloning, patching, and upgrade



Lower Total Cost of Ownership

- Improves resource utilization
- Increases productivity, faster time to market
- Leverage resource optimization techniques like storage snapshotting to save on CAPEX and OPEX wherever applicable



Deploy Private Cloud for Self-Service User Consumption

User Roles and Actions

DevOps
Users



Select from catalog



Configure database

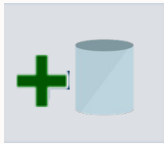


Configure backups



Database ready for use

Cloud Administrator



PaaS Zone/PDB Pool

Consolidate compute and database resources



Quotas

Define resource limit against each user



Service Template

Standardize deployments using pre-defined template



Chargeback

Define and assign chargeback plans, and generate charge back report



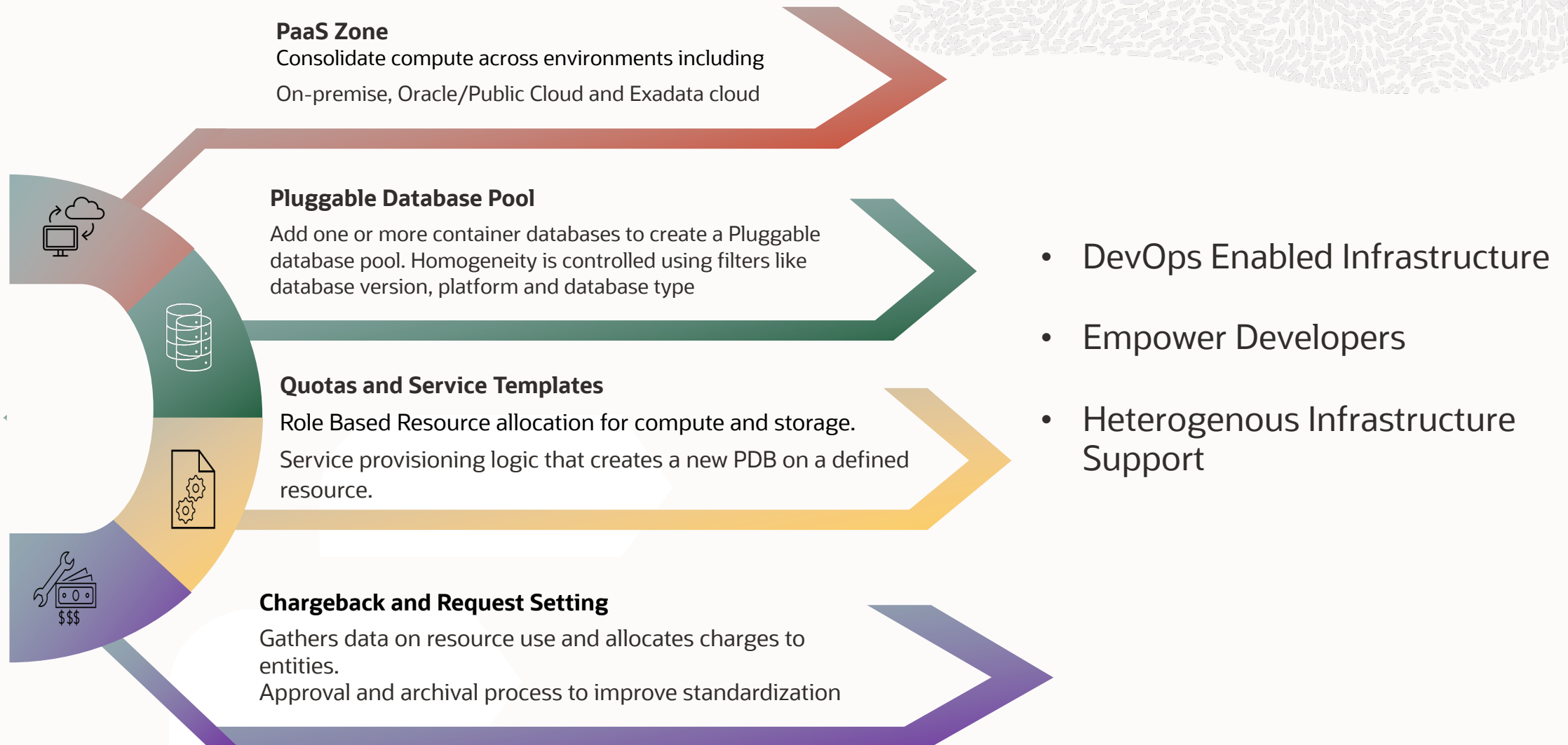
Request settings

Define request related policies for user or service types



Database
Cloud
platform is
ready

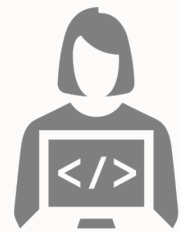

Pluggable Database as a Service Automation



Secure DevOps enablement

Roles driven usage, adapt to IT transformation



Self Service User	Dev	Ops Administrator
<ul style="list-style-type: none">• Request Database Services• Request Data Services• Monitor and Manage Deployed PDBs• Patch, Upgrade and Delete PDBs• Dedicated portal – Self Service Portal 		<ul style="list-style-type: none">• Platform Mgmt. (Zone, Pools)<ul style="list-style-type: none">✓ Database Home Deployment✓ CDB Deployment✓ Data• Quota & Placement management• Service Template Creation• Service Catalog management• Fleet Maintenance 



Standardized Catalog Templates

DevOps
Users



Self Service Application
Administrator



Operator

Access to Service Catalog and Features for users

Administrator

PLATINUM

19c PDB on
OCI/Public Cloud
VM

GOLD

19c PDB on
Exadata with
Standby

SILVER

Create 19c CDB

BRONZE

19c Pluggable

Service Catalog

Service Settings

PDB Shapes

Quota Management

Placement Algorithms

Service definition

- Define tiers: Platinum, Gold, Silver or Bronze
- Establish footprint for tiers: S/M/L

Service catalog

- Collection of standardized services
- On demand, self-service deployment

Benefits

- Enforce effective standardization
- Repeatable deployment process
- Identify service costs
- Reduce management overhead

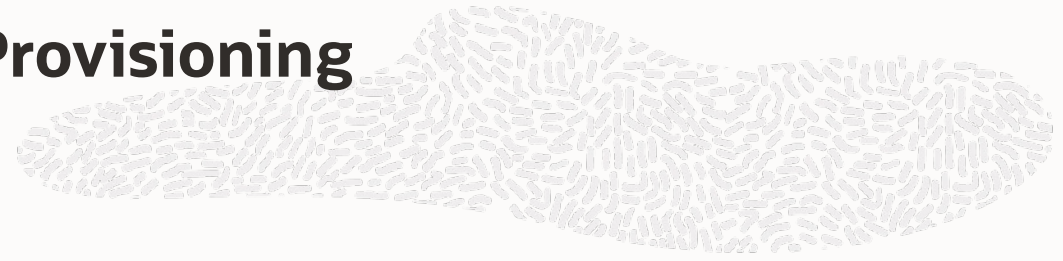


Self Service Portal



Self Service Portal: Pluggable Database Provisioning

Request a PDB from Self Service Portal



SSA Administrator

- Creates template based profile for PDB
- Creates Service Template for PDB

ORACLE Enterprise Manager Cloud Control 13c

Service Templates

General Configurations Initialization Parameters Customization Roles Review

Back Step 1 of 6 Next Cancel

Edit Service Template: General

* Name NewEmptyPDB Template

Description Service template to create an empty 19c PDB on the DemoPool

Pluggable Database Create Empty Pluggable Database

Create Pluggable Databases from Profile

Profile

Create Pluggable database using Data Profile selected by SSA user at request time.

Pools and Zones

A service template can be configured to provision pluggable databases in one or more pools. Select the zone and associated pools that this service template can provision pluggable databases into.

Name	Resource Pool
DemoZone	DemoPool

SSA User

- Requests Pluggable Database from Self Service Portal

ORACLE Enterprise Manager Cloud Services

CYRUS

Database Cloud Self Service Portal

Create Pluggable Database

Submit Cancel

Pluggable Database Configuration

Service Template NewEmptyPDB Template

* PDB Name Demopdb

* Database Service Name Service_demopdb

* Size Small(CPU-0.2 cores, Memory-0.2 GB, Sessions-20 units, Storage-1 GB)

Pluggable Database Administrator Account

* Administrator Name PDBADMIN

* Password

* Confirm Password

Tablespaces

Please enter the name of the tablespace to be created as part of this request.

Tablespace Name

pdb_tbs1

Instance Details

* Request Name CYRUS - Wed Mar 29 2023 07:36:50 GMT

* Zone DemoZone

Properties

Name	Value
Optional	

Instance Duration

If Start Date is set to "Immediately", the timezone "Greenwich Mean Time (GMT 0:00)" will be used for End Date.

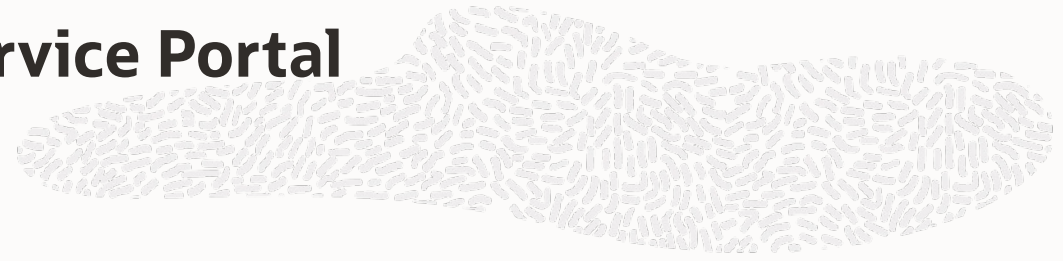
Start Immediately Later (UTC+00:00) C

Duration Indefinitely Until 4/5/2023 7:37:13 AM



Pluggable Database as a Service : Self Service Portal

Unified , Dedicated Provisioning Portal



Provision and Manage

- Non-Container DB
- Non-Container DB Clone
- Container DB
- Empty PDB
- PDB with Schema
- PDB using SSA user data profiles

ORACLE Enterprise Manager Cloud Services

Database Cloud Services

Page Refreshed Sep 22, 2017 11:38:09 AM EDT

Instances: 4 Up (4 Up)

Expiry: 0 Today, 0 This Week, 4 Future

Usage: Normal

Memory (%): 14

Storage (%): 9

Home

Actions Show Active Search Name Create Instance

Name	Status	Resource Provider	Creation Date	Expires In	Created By
thincln.us.oracle.com	Up	East Coast Zone	Sep 20, 2017 12:55:31 PM	25 Days	CYRUS
svdc_orders	Up	East Coast Zone	Sep 20, 2017 6:24:01 AM	24 Days	CYRUS
pcdb.us.oracle.com_EPDB	Up	East Coast Zone	Sep 19, 2017 10:53:39 AM	23 Days	CYRUS
sidb.us.oracle.com	Up	East Coast Zone	Sep 19, 2017 9:10:56 AM	23 Days	CYRUS



Self Service Portal : PDB Management

ORACLE Enterprise Manager Cloud Services

31 CYRUS

Page Refreshed Mar 29, 2023 8:03:39 AM GMT

Database Cloud Self Service Portal > Pluggable Database Instance: cdb19c.subnet.vcn.oraclevcn.com_DEMOMYPDB

Shutdown Startup **Update Database** Resize

19.12.0.0.0 Version

0 Days, 23 Hours Up Time

100% Availability for Last 7 Days

N/A Last Backup

Summary

PDBADMIN User Name

Load and Capacity

0.84 Storage (GB)

0.06 Memory (GB)

High Availability

N/A Last Backup Status

Requests

0 Running

0 Execution Error

Connection Details

Connect String (DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=emcc.marketplace.com)(PORT=1527)))(CONNECT_DATA=(SERVICE_NAME=Service_demomypdb)(INSTANCE_NAME=cdb19c)(UR=A)(SERVER=DEDICATED)))

User Name PDBADMIN

Resource Usage

Resource	Expected Workload	Actual Workload
Memory (GB)	0.2	0.06
Storage (GB)	2	0.84

Patching

Performance Monitoring

Resource Usage



Patch and Upgrade Using Self-Service Portal

- Fleet maintenance integration with self-service portal
- Update Database allows application administrators to patch self-service databases in convenient patching window
- Update Database relocates PDB to new CDB
- REST APIs for integrating with 3rd party applications

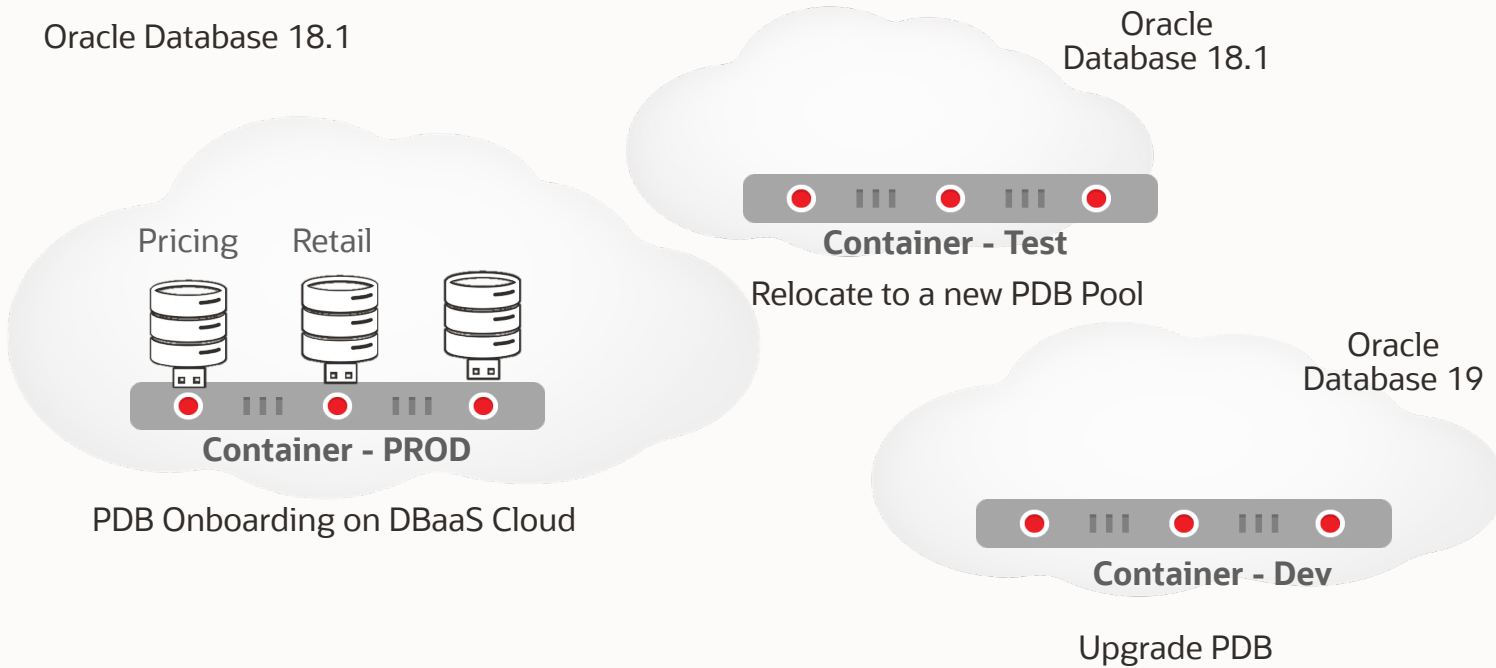
The screenshot displays the Oracle Enterprise Manager Cloud Services interface for a database instance. The top navigation bar includes the Oracle logo, 'Enterprise Manager Cloud Services', a user profile 'CYRUS', and a notification bell with '31' alerts. The page title is 'cdb19c.subnet.vcn.oraclevcn.com_DEMOMYPDB'. Below the title, there are control buttons: 'Shutdown', 'Startup', 'Update Database', and 'Resize'. A status bar shows the version '19.12.0.0.0', '0 Days, 23 Hours' up time, '100%' availability for the last 7 days, and 'N/A' last backup status. The main content area is divided into several sections: 'Summary' (with 'PDBADMIN' user name), 'Load and Capacity' (0.84 Storage (GB), 0.06 Memory (GB)), 'High Availability' (N/A Last Backup Status), and 'Requests' (0 Running, 0 Execution Error). The 'Connection Details' section shows the connect string: '(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=emcc.marketplace.com)(PORT=1527)))CONNECT_DATA=(SERVICE_NAME=Service_demomypdb|INSTANCE_NAME=cdb19c)(UR=A)(SERVER=DEDICATED))' and the user name 'PDBADMIN'. The 'Resource Usage' section contains a table with columns 'Resource', 'Expected Workload', and 'Actual Workload':

Resource	Expected Workload	Actual Workload
Memory (GB)	0.2	0.06
Storage (GB)	2	0.84



Pluggable Database as a Service : PDB Lifecycle

Pluggable database relocate and upgrade



PDB Onboarding on DBaaS Cloud

Relocate PDB without moving data file(s).

Hydrate/Dehydrate PDB

Backup an existing PDB as profile, restore the PDB into the same or different CDB

Create PDB with or without data

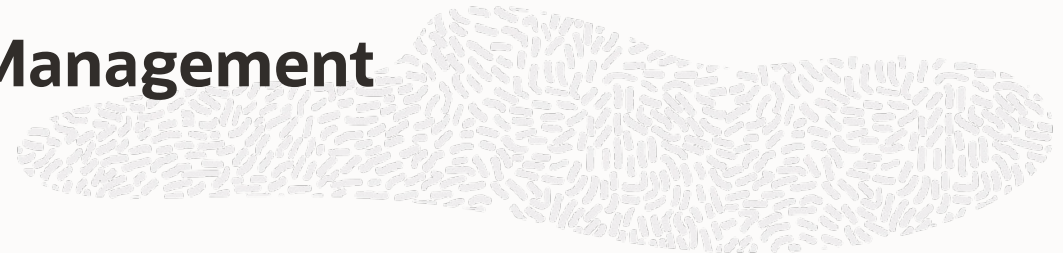
Create an PDB with or without data in one or more pools using placement algorithm

Relocate PDB :

- 1 Different CDBs,
- 2. Across environments
- 3. Lower to higher version



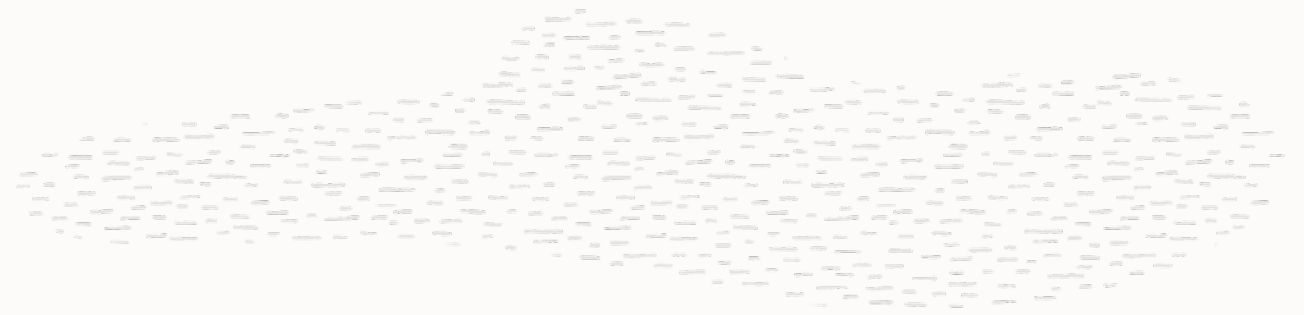
Self Service Portal: Advanced Database Management



- Administrators control access to these options at 2 levels
 - EM Level privileges to enable options on UI
 - Database Level privileges in Service Template to perform DB Management operations

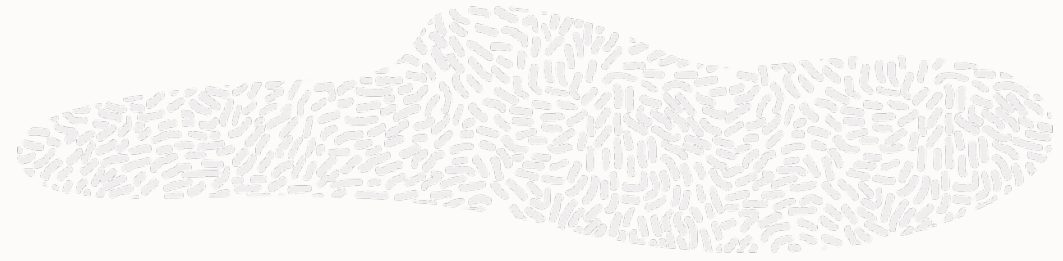


Automation



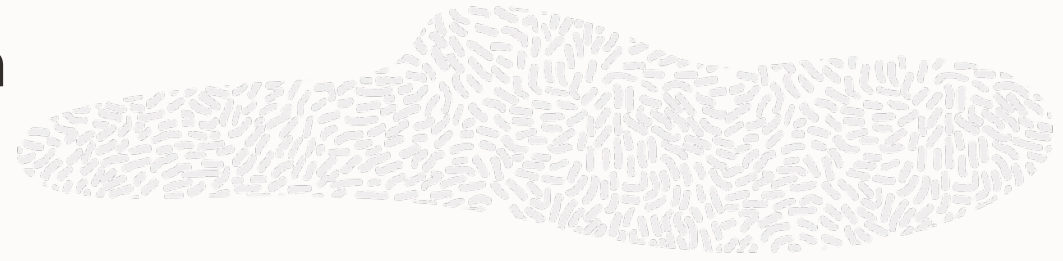
Database Management Options

Complete Control of your Hybrid Cloud



Oracle Database as a Service Automation

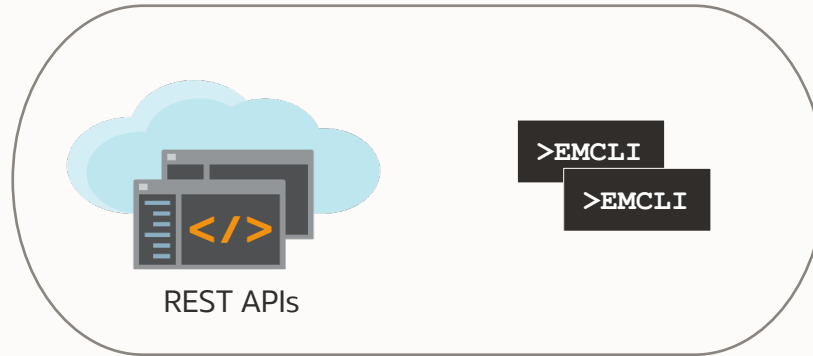
Complete Control of your Private Cloud



vmware®

servicenow®

Orchestration Engines



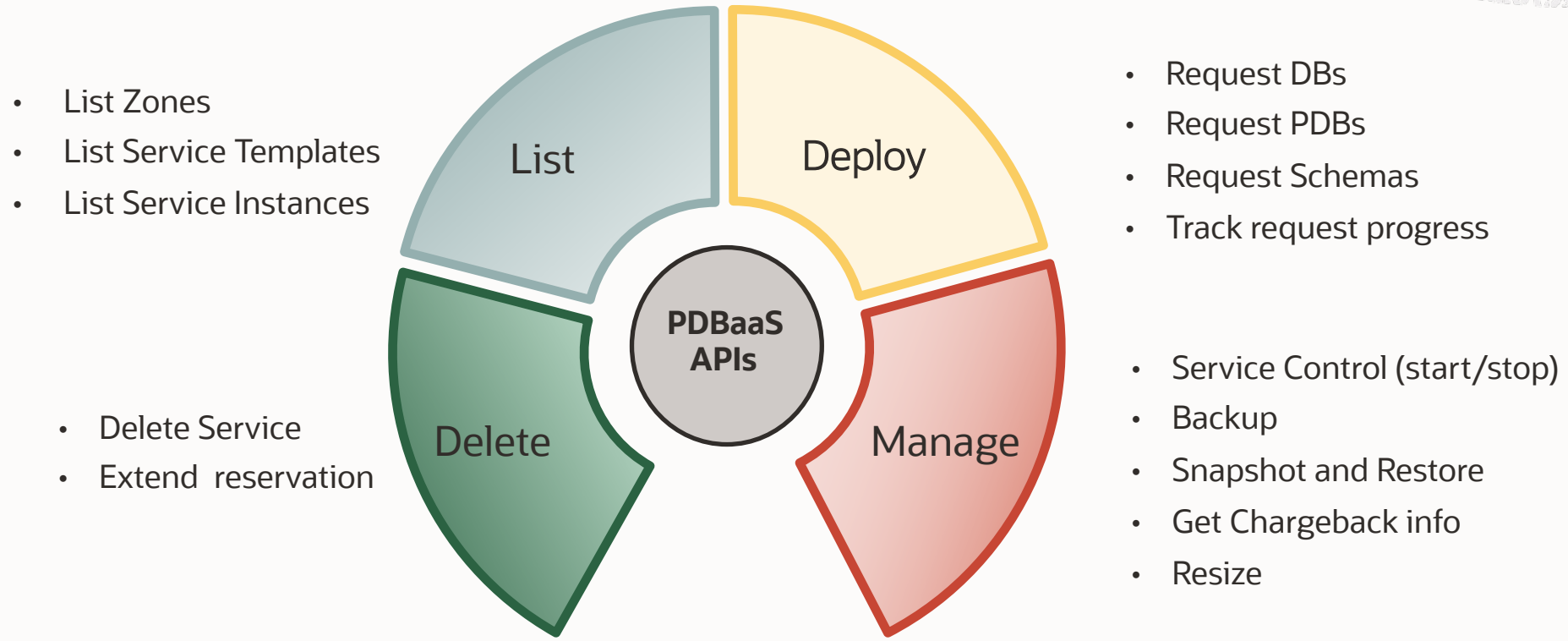
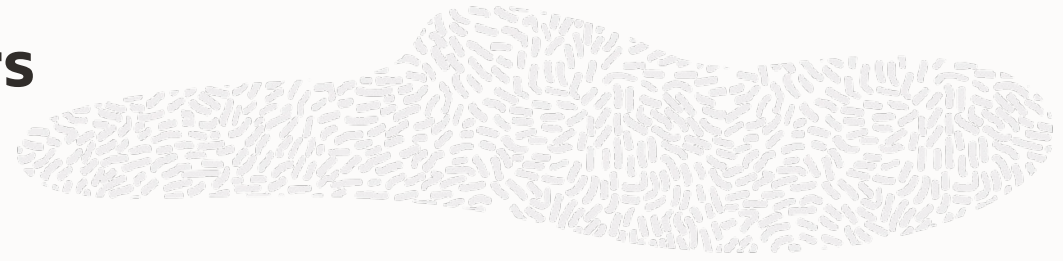
DevOps Tools



- Integration with broad ecosystem with tools like Ansible, Chef, Terraform
- Integrate with 3rd party Orchestration Engines
- Easy to build, run and manage



APIs for PDBaaS providers and consumers



PDBaaS Providers:
EMCLI Verbs for CRUD operations on Zones / Pools / Service templates / Profiles / Quota / etc



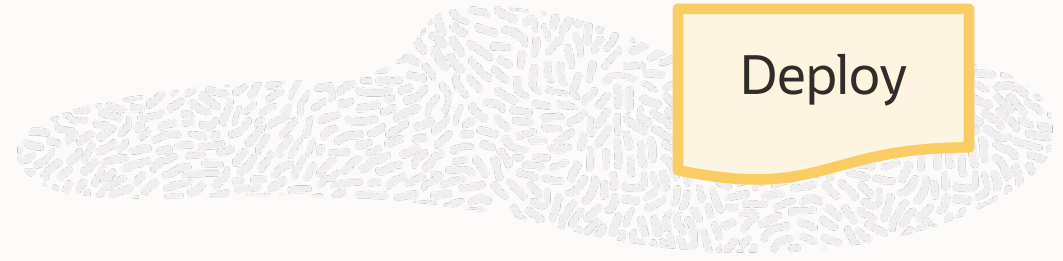
PDBaaS for DevOps

Request a PDB using Ansible



```
tasks:  
  
- name: Request PDB  
  uri:  
    url: https://emcc.marketplace.com:7803/em/cloud/dbaas/zone/BE3E75753F97FDB6976A229AA7C1D2E3  
    method: POST
```

```
body:  
{  
  "based_on": "/em/cloud/dbaas/pluggabledbplatformtemplate/1",  
  "name": "API_Request_PDB",  
  "end_date": "{{ nextdate }}",  
  "params":  
  {  
    "username": "PDBADMIN",  
    "password": "welcome1",  
    "pdb_name": "pdb_api1",  
    "workload_name": "Small",  
    "service_name": "SRVPDBA1",  
    "tablespaces":  
    [  
      "pdb_tbs1"  
    ]  
  }  
}
```



REST APIs

<https://<EM URL>:<EM Port>/em/cloud/dbaas/zone/BE3E75753F97FDB6976A229AA7C1D2E3>

```
body:  
{  
  "based_on": "/em/cloud/dbaas/pluggabledbplatformtemplate/1",  
  "name": "API_Request_PDB",  
  "end_date": "{{ nextdate }}",  
  "params":  
  {  
    "username": "PDBADMIN",  
    "password": "welcome1",  
    "pdb_name": "pdb_api1",  
    "workload_name": "Small",  
    "service_name": "SRVPDBA1",  
    "tablespaces":  
    [  
      "pdb_tbs1"  
    ]  
  }  
}
```



PDBaaS for DevOps

Request a PDB using Ansible

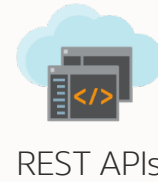


Deploy

```
TASK [Print returned json dictionary] *****
ok: [emcc.marketplace.com] => {
  "results.json": {
    "based_on": "/em/cloud/dbaas/pluggabledbplatformtemplate/1",
    "canonicalLink": "/em/websvcs/restful/extws/cloudservices/service/v0/ssa/em/cloud/dbaas/pluggabledbplatforminstance/byrequest/61",
    "connect_string": "(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=emcc.marketplace.com)(PORT=1523)))(CONNECT_DATA=(SERVICE_NAME=SRVC_PDB_API1)(INSTANCE_NAME=sales)(UR=A)(SERVER=DEDICATED)))",
    "context_id": "61",
    "created": "2021-11-18 19:09:00",
    "db_version": "18.3.0.0.0",
    "destination_zone": "/em/cloud/dbaas/zone/BE3E75753F97FDB6976A229AA7C1D2E3",
    "media_type": "application/oracle.com.cloud.common.PluggableDbPlatformInstance+json",
    "name": "sales.subnet.vcn.oraclevcn.com_SSAPDB_API1",
    "resource_state": {
      "messages": [
        {
          "date": "2021-11-18T20:24:03+0000",
          "text": "Delete Request ID is : 62",
          "uri": "/em/cloud/dbaas/pluggabledbplatforminstance/byrequest/62"
        }
      ]
    },
    "state": "READY"
  },
  "status": "RUNNING",
  "target_type": "oracle_pdb",
  "template": "Empty PDB",
  "uri": "/em/cloud/dbaas/pluggabledbplatforminstance/byrequest/61",
  "workloads": "Small(CPU-0.1 cores, Memory-0.1 GB, Storage-0.1 GB, Sessions-1 units)"
}
```

PDBaaS for DevOps

Shutdown PDB using Ansible



Manage

```
- name: Shutdown PDB
  uri:
    url: https://emcc.marketplace.com:7803/em/cloud/dbaas/pluggabledbplatforminstance/byrequest/61
    method: POST
```

https://<EM URL>:<EM Port>/em/cloud/dbaas/pluggabledbplatforminstance/byrequest/61

```
body:
  {
    "operation": "SHUTDOWN"
  }
```



```
body:
  {
    "operation": "SHUTDOWN"
  }
```

```
uri: /em/cloud/dbaas/pluggabledbplatforminstance/byrequest/62
  },
  "state": "READY"
},
"status": "STOPPED",
"target_type": "oracle_pdb",
"template": "Empty PDB",
"uri": "/em/cloud/dbaas/pluggabledbplatforminstance/byrequest/61",
"workloads": "large(CPU-0.4 cores, Memory-0.4 GB, Storage-0.4 GB, Sessions-4 units)"
}
```



Oracle Database as a Service Automation

PDBaaS Administrator

PaaS Zones

- a. Create, Update and Delete PaaS Zone
- b. View details of PaaS Zone
- c. Create/Delete/Search Images

Software Pools

- a. Create, and Update Database Pool
- b. Create, and Update PDB Pool
- c. Create, and Update Schema Pool
- d. Delete DB/PDB/Schema Pools
- e. View details of Software Pool resource/capacity

DB Request and Quota Settings

- a. Creating DB request settings
- b. Viewing details of the DBaaS request settings
- c. Create, Update and Delete Quota for a role

Service Template

- a. Creating DB request settings
- b. Viewing details of the DBaaS request settings
- c. Create, Update and Delete Quota for a role
- d. Create, Delete Service Template for SI/PDB/RAC for RMAN, Standby, Snap Clone, etc.

PDBaaS SSA User

Database as a Service

- a. Create, Update and Delete Database instance
- b. Lifecycle operations on a Database instance
- c. Lifecycle operations on a Snap Clone instance

Schema as a Service

- a. Create, and Delete Schema Service
- b. View details of Schema Service Creation
- c. Lifecycle operations of a Schema Service

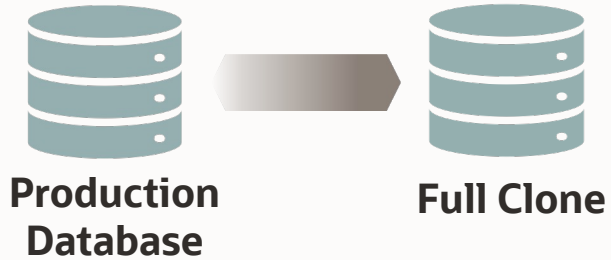
Pluggable Database as a Service

- a. Create, and Delete Pluggable Database instance
- b. Lifecycle operations on a Pluggable Database instance
- c. Resize a Pluggable Database service instance

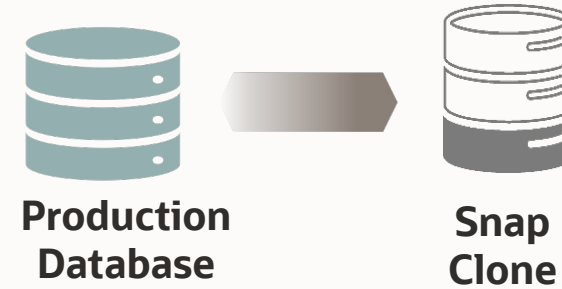
Snap Clone



Enterprise Manager Snap Clone



Lack of Automation
Traditional Cloning Slow
Data Explosion
Archaic Processes
Different Priorities



Rapid Cloning & Space Efficient
Storage Agnostic
Data Refresh & Time Travel
Integrated Database Lifecycle Management
RESTful APIs to Integrate
Supports Oracle Database versions from 10g to 19c

Enterprise Manager Snap Clone Benefits

Rapid Cloning

- ~ 2 minutes to provision a 1 TB database

Space Efficient

- Over 90% storage savings

Storage Agnostic

- Supports NAS and SAN storage

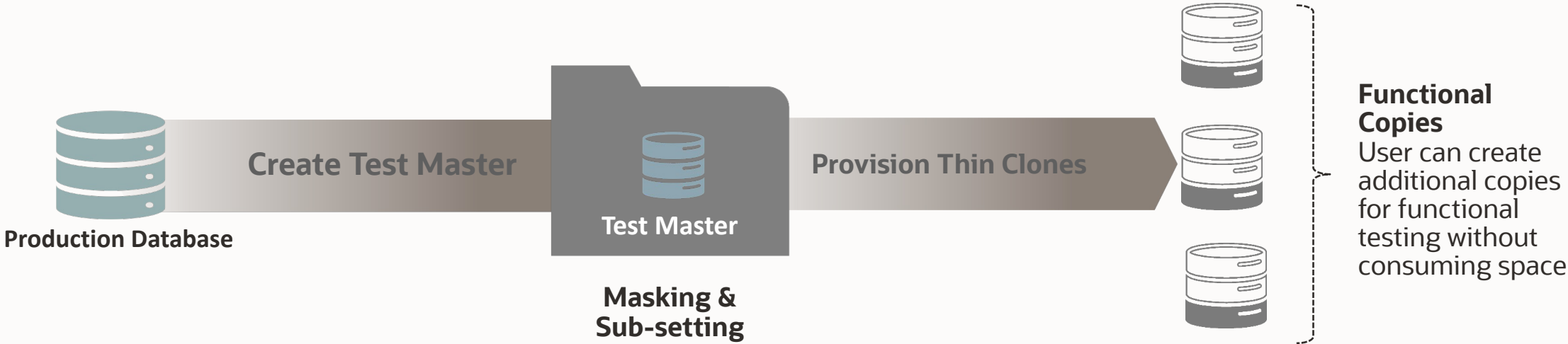
Data Refresh

- Refresh from production

Integrated DB Lifecycle Mgmt.

- Masking, subsetting, lineage and association

Complete On Premise & Cloud Solutions



Snap Clone Solutioning

Hardware Solution [Vendor Specific]



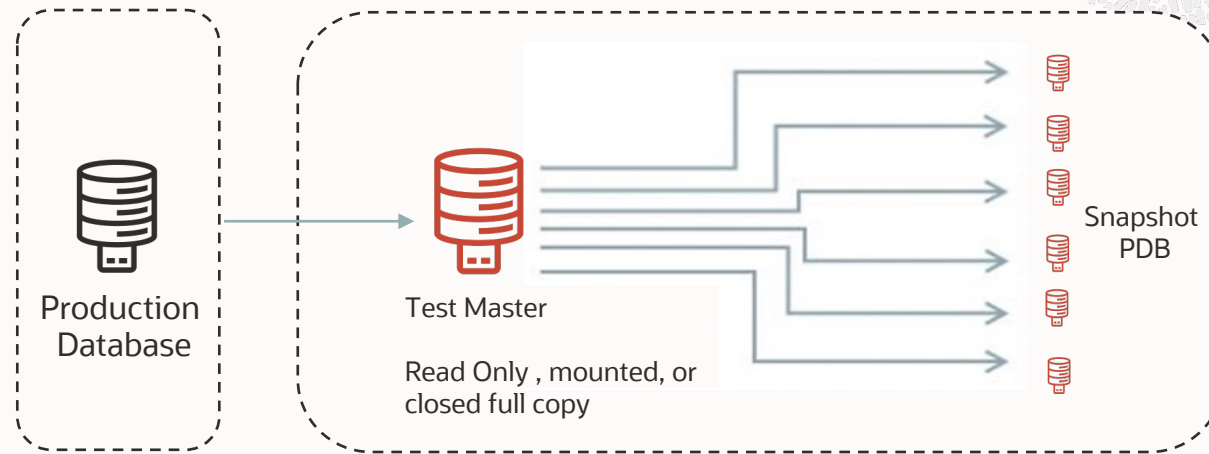
Software Solution [Vendor Agnostic]



- Support for Exadata and ZFS Storage Appliance
- Snap Clone on Exadata leverages 'sparse diskgroups' and provides fast, space-efficient snapshot database creation
- Software solution for other appliances with ZFS filesystem, CloneDB and ACFS

Snap Clone on Exadata Cloud@Customer

Leveraging Sparse Clones



Snap clone Pluggable Database

- **Rapid Cloning**
~ 2 minutes to provision a 1 TB database
- **Space efficient**
Over 90% storage savings
- **Data Refresh**
Refresh from Production
- **Storage Agnostic**
Supports NAS and SAN storage
- **Create Test Master using RMAN**





Customer References



Cloud Management Pack Customers

American Financial Company with ~8,000+ Oracle databases, 100+ Exadata

- Hybrid Cloud User , enabled self-service users to provision databases on demand
- Automation using RESTAPI with very minimum manual intervention
- Patching automation using Fleet Maintenance integration

Telecom Operator in EMEA , ~50 million customer base

- Power users of private cloud across multiple regions in EU
- Enabled Self service users to provision databases on demand in Private Cloud
- DB Provisioning time reduced from 4 days to <1 hour.

Leading Logistical Company with offices in 70+ countries

- Key issues with Long provisioning cycles and quality concerns with database deployment
- Enable self services for application owners to request new or modify environments with standardized service templates.



Learn More

1. [Oracle.com/manageability](https://oracle.com/manageability) or oracle.com/enterprise-manager/#rc30p2
2. Video Series: youtube.com/OracleEnterpriseMgr
3. Blog: blogs.oracle.com/observability
4. Documentation: [EM 13.5 Cloud Management Pack](#)
5. [Try out our Livelabs now](#)



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