ORACLE

OCI Full Stack Disaster Recovery

An overview of features and capabilities

Alexandre Fagundes

Cloud Architect, Oracle Latin America

Safe harbor statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.

Agenda

1 Principles & risks

2 Full Stack DR benefits

3 Key technical concepts

4 Live demonstration

Principles & risks of disaster recovery

Principles & Risks

Challenges with Disaster Recovery

Reduce Downtime

Application Downtime cause significant financial impact and reputation

Additional Infrastructure

Need to maintain additional data centers for DR purpose

Managing complexity
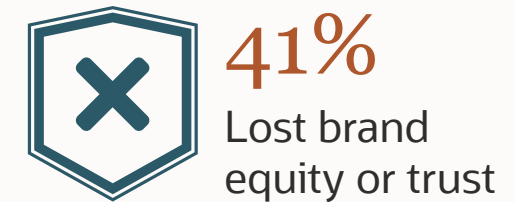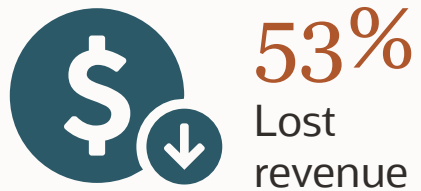
Complex environments with stringent RTO and RPO

Ensuring compliance

Need to comply with various regulatory guidelines

Revenue, productivity, and lost loyalty
Cost of downtime

53%
Lost revenue

47%
Lost productivity

41%
Lost brand equity or trust

Which of the following costs does your organization face due to planned and unplanned downtime?"
Base: 100 IT directors in large US enterprises (Rank top 3)
Source: A commissioned study conducted by Forrester Consulting on behalf of IBM, August 2019

Is the threat existential? Or merely crippling?

50%

of businesses fail to reopen after experiencing a disaster

Example: $500M business, 2 weeks to recover

- **$9.6M lost revenue per week***

- **$19.2M total**

Is your number higher or lower?

*does not include cost of lost productivity or loyalty.

Real life business continuity breakdowns

Computer outage affects 11,000 US flights

- The ground stop forced a halt to all U.S. passenger departing traffic for almost two hours

- FAA has since taken steps "to ensure that bad data from a database cannot affect a backup database."

Source: Reuters

Surgeries paused at Wichita hospitals due to data center outage

- Outage at Wichita data center brought down hospital's IT and phone services

- Surgeries and procedures at hospitals across Wichita had to be paused.

Source: Data Center Dynamics

West Virginia DMV suffers outage due to hardware failure

- Failure due to an antiquated mainframe

- Impacted driver record updates, vehicle renewals, new license issuals.

- Outage shut down operations for several days

Source: WSAZ West Virginia

Lufthansa IT outage leaves thousands stranded

- Outage caused by severed cable due to construction work

- More than 200 flights cancelled and 100 flights were delayed

- Ripple effect across major European airports

Source: Fox Business

Landscape for disaster recovery has changed

ZIFF DAVIS MEDIA
CIO INSIGHT 2016
Best Practices for IT Business Leaders

"Dissatisfaction with DR Solutions"

- 54% said "too expensive"
- 37% said "too difficult to use"

"After their last downtime incident"

- 55% changed DR strategy

In other words – it didn't work right!

Oracle Cloud today

- Up to 56% less expensive

- Up to 50+% faster to implement

- Less risk, easier to test, scale

Benefits Full Stack DR provides

Business continuity at the click of a button, less effort to manage, lower cost to maintain

OCI - Full Stack Disaster Recovery

Orchestrates disaster recovery at scale in the cloud

Full Stack DR is a fully managed disaster recovery (DR) service providing:

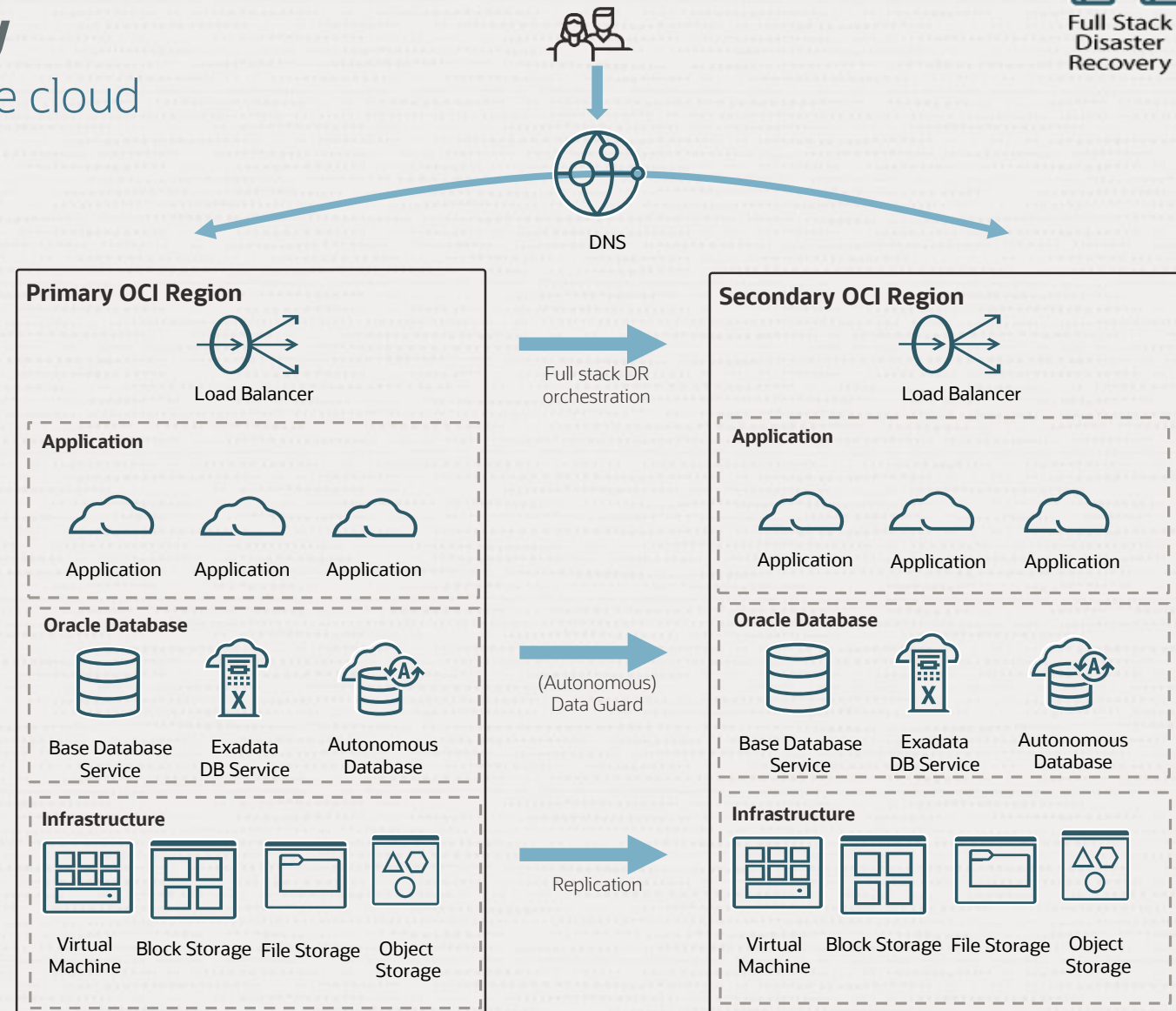Disaster recovery for the entire application stack:

- Orchestrated single-click DR for compute, databases & applications

Automated DR plan creation:

- Built-in intelligent modules automatically generate prepopulated DR plans

Unified management :

- Validate and monitor the execution of DR runbooks for one or more systems using a single pane of glass

DNS

Primary OCI Region

Load Balancer

Application

Application   Application   Application

Oracle Database

Base Database Service   Exadata DB Service   Autonomous Database

Infrastructure

Virtual Machine   Block Storage   File Storage   Object Storage

Full stack DR orchestration

(Autonomous) Data Guard

Replication

Secondary OCI Region

Load Balancer

Application

Application   Application   Application

Oracle Database

Base Database Service   Exadata DB Service   Autonomous Database

Infrastructure

Virtual Machine   Block Storage   File Storage   Object Storage
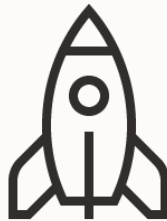
Full Stack Disaster Recovery

Recovery made easy for many business systems

Single pane of glass

Full Stack DR normalizes the way DR operations are executed and monitored for vastly different business systems using a single pane of glass

DR at Scale

Full Stack DR is designed to handle DR workflows at scale without involving a cadre of technical experts when the time comes to recover many systems at the same time

Simple execution

Any authorized user can execute and monitor recoveries without needing to understand anything about the complex processes each business system requires

Validate DR before its needed

Validate DR readiness of business systems before a recovery or transition to another OCI region needs to happen using built-in pre-checks

Capitalize on your existing effort
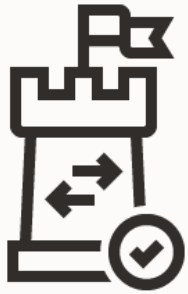
Keep current DR processes

No need to change anything about the way a business system is already deployed across two OCI regions for DR

Keep existing DR automation

No need to discard any existing scripted automation or Oracle functions that are used right now to recover systems

Design new DR processes

Design DR for a new business system using any DR deployment architecture that fits the need

Flexible, highly scalable, highly extensible and customizable

Use any DR topology

Use OCI to deploy business systems using any deployment architecture:
- Cold
- VM failover
- Pilot Light
- Warm standby
- Hot standby
- Active/active

Built-in modules reduce effort

Built-in intelligent modules generate custom DR plans prepopulated with the right steps to recover in the right order

Easily add, change and reshape DR plans to fit your unique requirements

Fast deployment using APIs

Quickly create DR protection groups and DR plans and deploy resources using REST APIs, CLI, SDK, Terraform, and Resource Manager

Serverless architecture

Full Stack DR does not require specialized snapshot storage, conversion servers, image servers, snapshot servers, or management servers of any kind

Full Stack DR region roadmap

Available Now

Available Now

*Dates are approximate and subject to change without notice.

FY23Q2-Q3	FY23Q3	FY23Q4	FY24Q1

Phase 1

- OC1 APAC
  - Hyderabad
  - Melbourne
  - Mumbai
  - Sydney
- OC1 EMEA
  - Amsterdam
  - Frankfurt
  - London
- OC1 NA
  - Ashburn
  - Phoenix
  - San Jose

Phase 2

- OC1 APAC
  - Osaka
  - Singapore
  - Tokyo
- OC1 EMEA
  - Dubai
  - Jeddah
- OC1 LAD
  - Sao Paulo
  - Vinhedo
  - Santiago
- OC1 NA
  - Montreal
  - Toronto

Phase 3

- OC1 EMEA
  - Madrid
  - UK West (Wales)
- OC1 LAD
  - Queretaro
- OC1 NA
  - Chicago
- OC17 DRCC
  - IFP
  - GCN
  - YUM

Phase 4

- OC1 APAC
  - Chuncheon
  - Seoul
- OC1 EMEA
  - Abu Dhabi
  - Jerusalem
  - Johannesburg
  - Marseille
  - Milan
  - Paris
  - Stockholm
  - Zurich
- OC14 DRCC
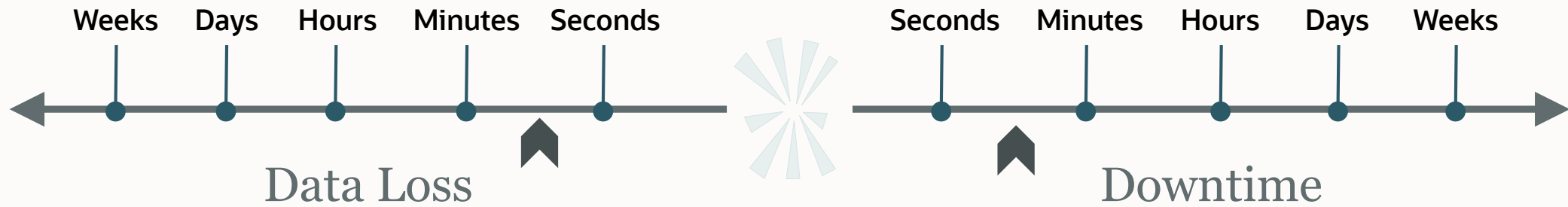 - Dublin
  - Milan
  - Ratingen

Key Technical Concepts

Fundamental building blocks to help understand features and capabilities of OCI Full Stack DR

Recovery Point and Recovery Time Objectives
Recovery point and time are a function of standard OCI services

Weeks | Days | Hours | Minutes | Seconds | Seconds | Minutes | Hours | Days | Weeks

Data Loss

Downtime

Recovery Point Objective (RPO)

Tolerance for data loss (sec's, hours, days); determines frequency of backups and replication approaches

- RPO for Oracle databases is configured when Data Guard is enabled through standard OCI Oracle Database services for Autonomous DB, BaseDB, ExaCS
- RPO for compute is configured when enabling cross-region replication for block or file system

Recovery Time Objective (RTO)

The shorter the Recovery Time Objective (RTO) the quicker you get back to business

- RTO for Oracle databases is based on how long it takes Data Guard to recover a database
- RTO for compute is based on how long it takes OCI to start virtual machines
- RTO for applications is based on how long it takes your application to start

Full Stack DR Fully Automates Recovery Steps for Existing Applications

The application is deployed

The application already exists & is deployed for DR to both OCI regions

Use familiar OCI services – nothing new to learn

DR workflow is documented

The line of business already knows all steps required for DR failover

Use the recovery workflow you already created & documented

Script to start app exists

The line of business has created automation for tasks not handled by built-in modules

Use the custom scripts you already spent time developing & tuning

The concept of movable compute
Virtual machines "move" between two OCI regions

OCI Region

Virtual Machine · Virtual Machine · Virtual Machine · Virtual Machine · Virtual Machine

OCI Region
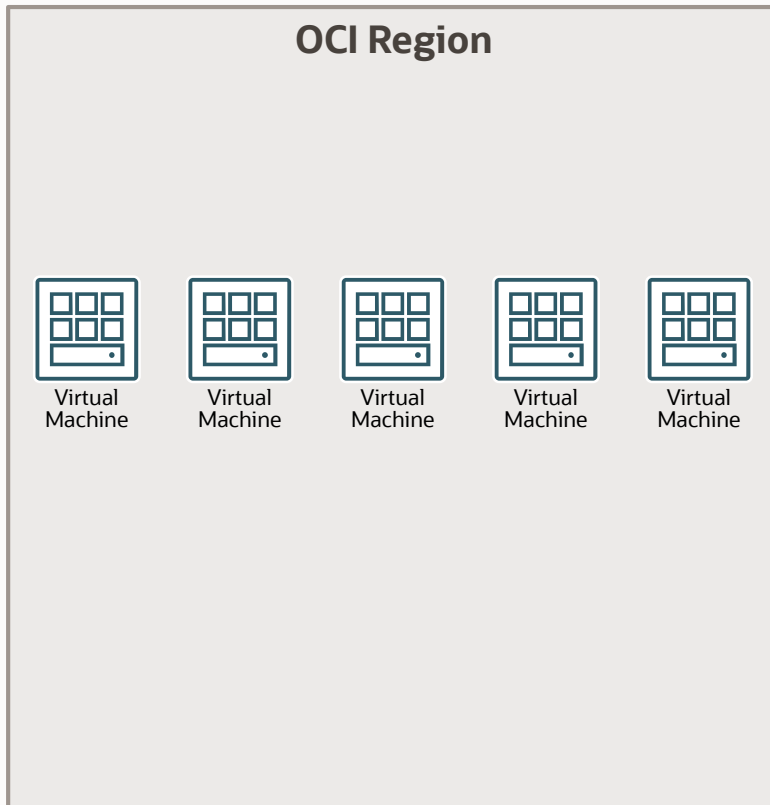
Use "movable" compute to automate recovery for active/passive type DR strategies:

- VM failover with database
- VM failover without database
- cold standby
- pilot light
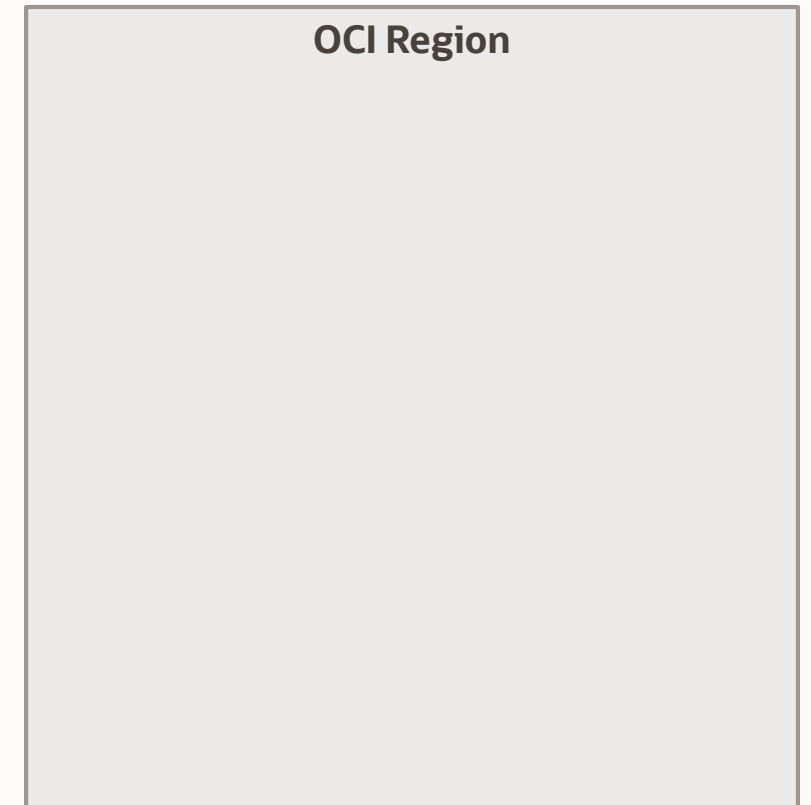
The concept of non-movable compute

Unique virtual machines exist at both OCI regions & stop/start as needed

OCI Region

Virtual Machine Virtual Machine Virtual Machine Virtual Machine Virtual Machine

OCI Region

Virtual Machine Virtual Machine Virtual Machine Virtual Machine Virtual Machine
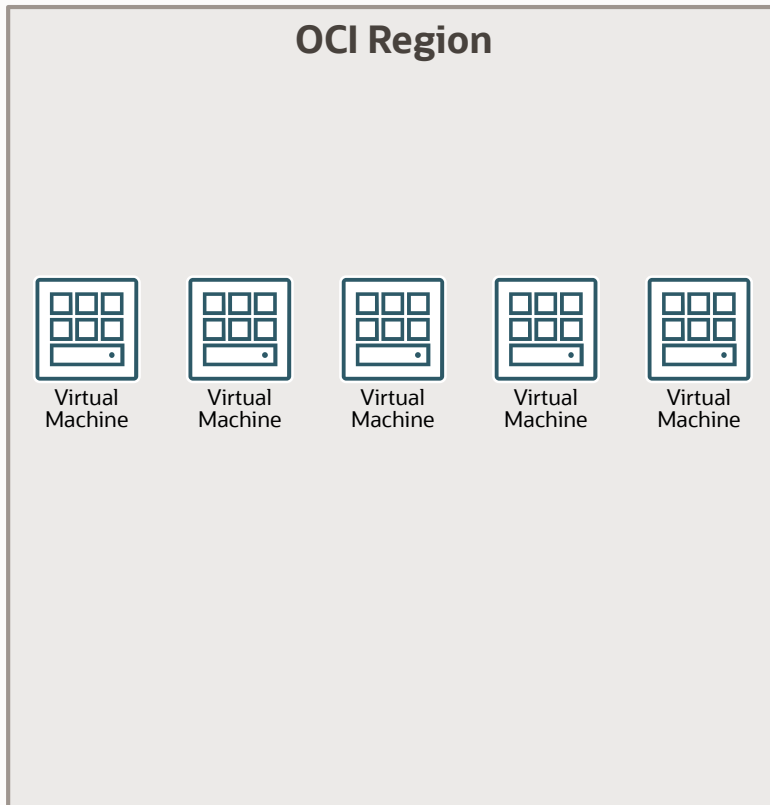
Use "non-movable" compute to automate recovery for active/active and active/standby type DR strategies:

- active/active

- warm standby

- hot standby
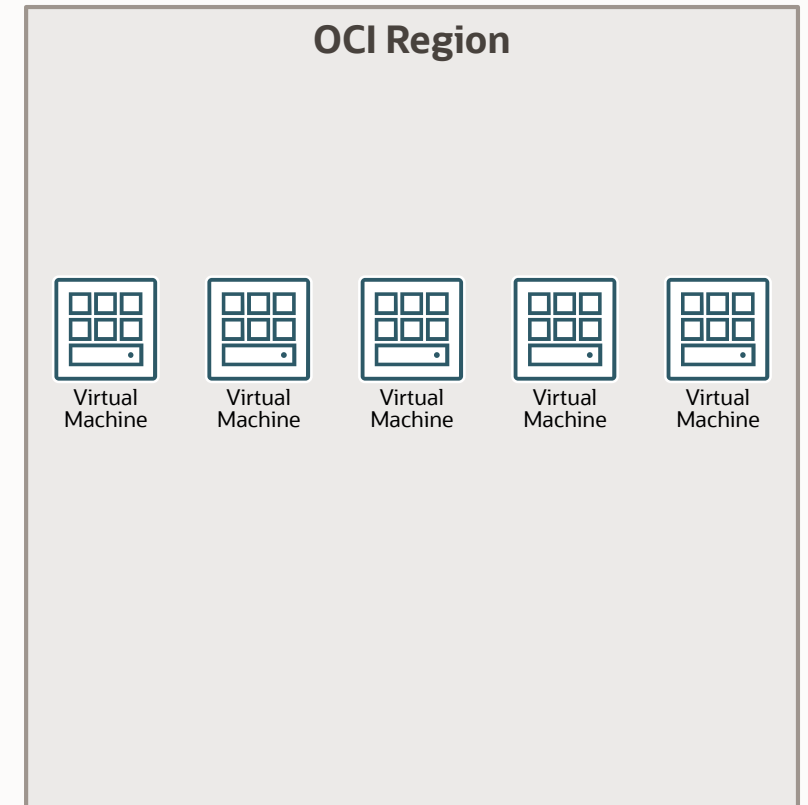
DR Protection Groups

The fundamental building blocks that make Full Stack DR flexible, scalable and extensible

OCI Region 1

Protection Group: mygroup_region1
Role: standby

members
- compute (optional)
- storage (optional)
- database (optional)

plans
- my_failover_from_region2
- my_switchover _from_region2

OCI Region 2

Protection Group: mygroup _region2
Role: primary

members
- compute (optional)
- storage (optional)
- database (optional)

plans
- my_failover_from_region1
- my_switchover _from_region1

associated
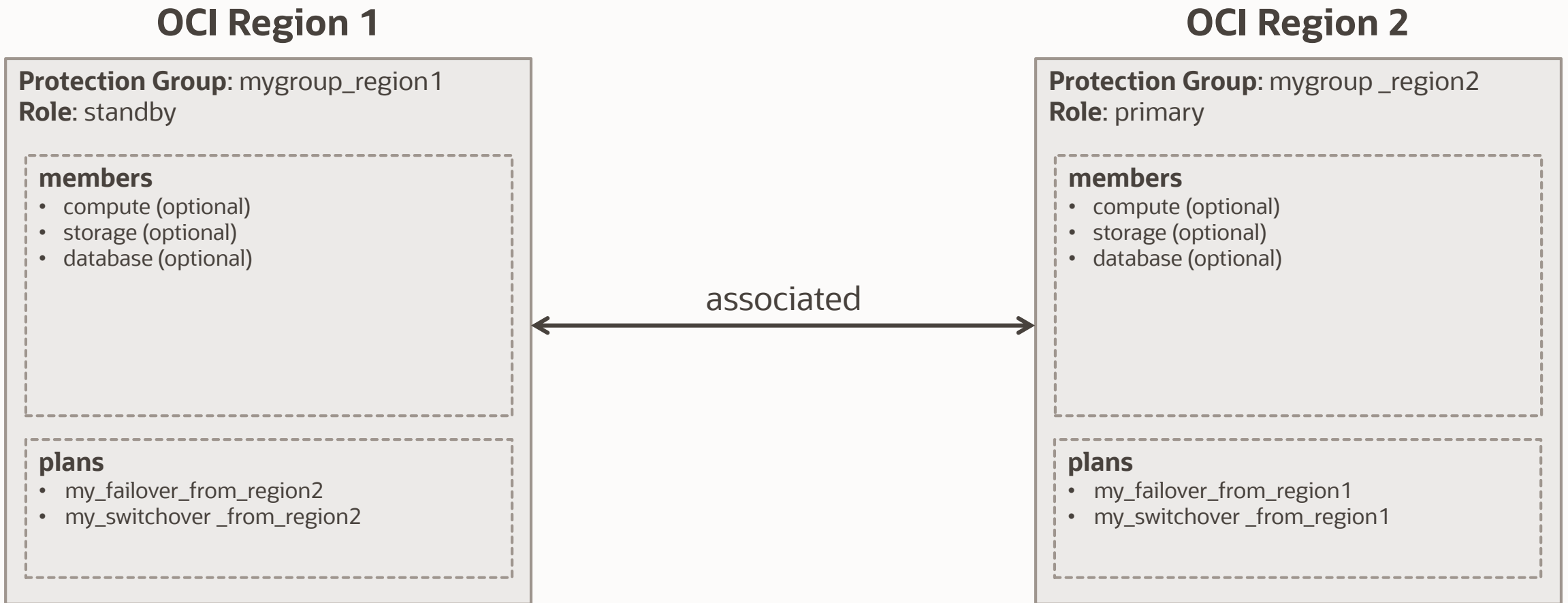
DR Protection Groups with "movable" compute

Virtual machines "move" between two OCI regions (no database)

Ashburn

Protection Group: app02_iad
Role: standby

members
- None

plans
- failover_from_phx
- switchover_from_phx

Phoenix

Protection Group: app02_phx
Role: primary

members
- Compute
  - app02vm01
  - app02vm02
  - app02vm03
- Volume groups
  - app02_vg01ad1_move
  - app02_vg02ad2_move
  - app02_vg03ad3_move

plans
- failover_from_iad (inactive)
- switchover_from_iad (inactive)

associated

Copyright © 2023, Oracle and/or its affiliates
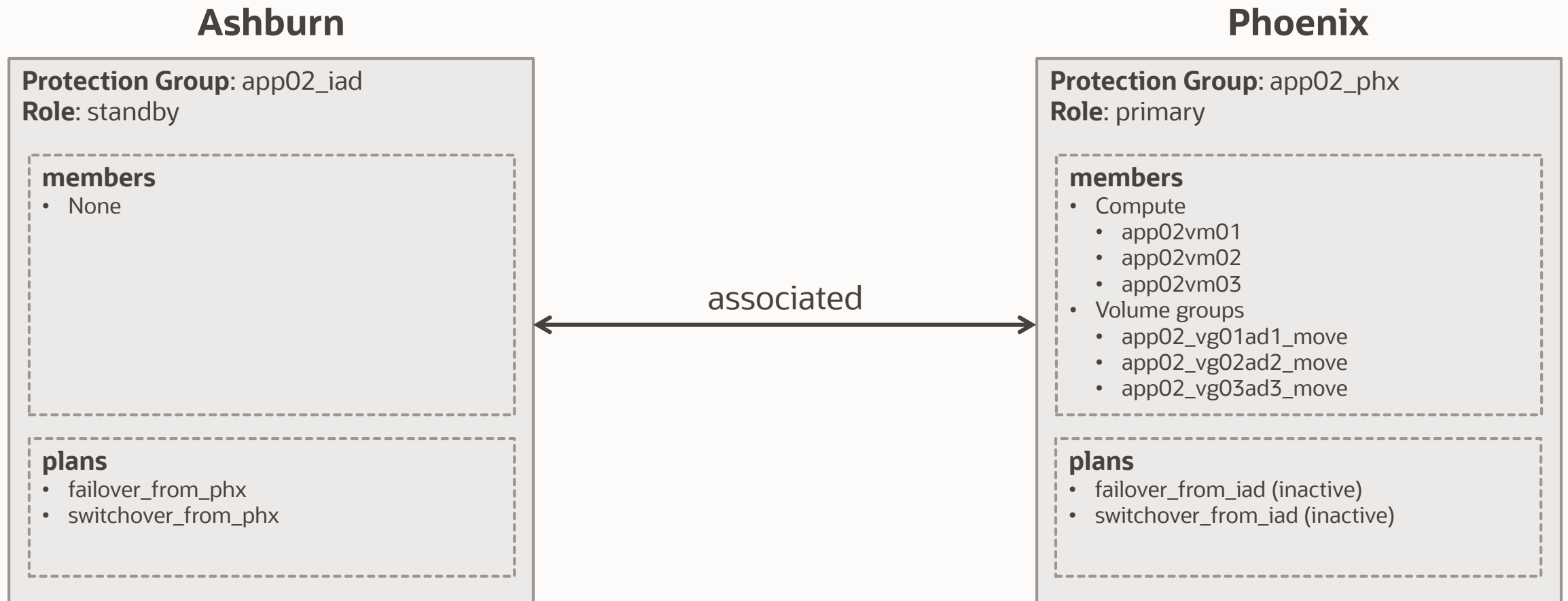
DR Protection Groups with "movable" compute
Virtual machines "move" between two OCI regions (with Oracle database)

Ashburn

Protection Group: app02_iad
Role: standby

members
- Database
  - app02adb01_remote (standby)

plans
- failover_from_phx
- switchover_from_phx

associated

Phoenix

Protection Group: app02_phx
Role: primary

members
- Compute
  - app02vm01
  - app02vm02
- Volume groups
  - app02_vg01ad1_move
  - app02_vg02ad2_move
- Database
  - app02adb01 (primary)

plans
- failover_from_iad (inactive)
- switchover_from_iad (inactive)

DR Protection Groups with "non-movable" compute

Virtual machines always stay in one OCI region

Ashburn

Protection Group: app02_iad
Role: standby

members
- Compute
  - app02vm01
  - app02vm02
  - app02vm03
- Volume groups
  - None
- Database
  - app02adb01_remote (standby)

plans
- failover_from_phx
- switchover_from_phx

Phoenix

Protection Group: app02_phx
Role: primary

members
- Compute
  - app02vm04
  - app02vm05
  - app02vm06
- Volume groups
  - None
- Database
  - app02adb01 (primary)

plans
- failover_from_iad (inactive)
- switchover_from_iad (inactive)

associated

DR Plans

DR protection groups define relationships, DR plans define the recovery steps

switchover with movable compute

plan groups	region	out-of-the-box
prechecks	both	built-in
stop compute	primary	built-in
launch compute	standby	built-in
switchover database	standby	built-in
switchover VGs	standby	built-in
remove compute from DRPG	primary	built-in
terminate compute	primary	built-in
reverse VG replication	standby	built-in
remove VGs from DRPG	primary	built-in
terminate VGs	primary	built-in

failover with movable compute

plan groups	region	out-of-the-box
prechecks	standby	built-in
failover VGs	standby	built-in
switchover database	standby	built-in
launch compute	standby	built-in

Live demonstration

A quick tour of Full Stack DR using the OCI console