ORACLE

WebLogic Hybrid Disaster Recovery

Primary on-premises, Secondary in OCI

Maximum Availability Architecture team

September 2022

Agenda

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2. WebLogic Hybrid Disaster Recovery Topology
3. Main Features and Considerations
4. Playbook Overview
5. Resources for Automation

Introduction

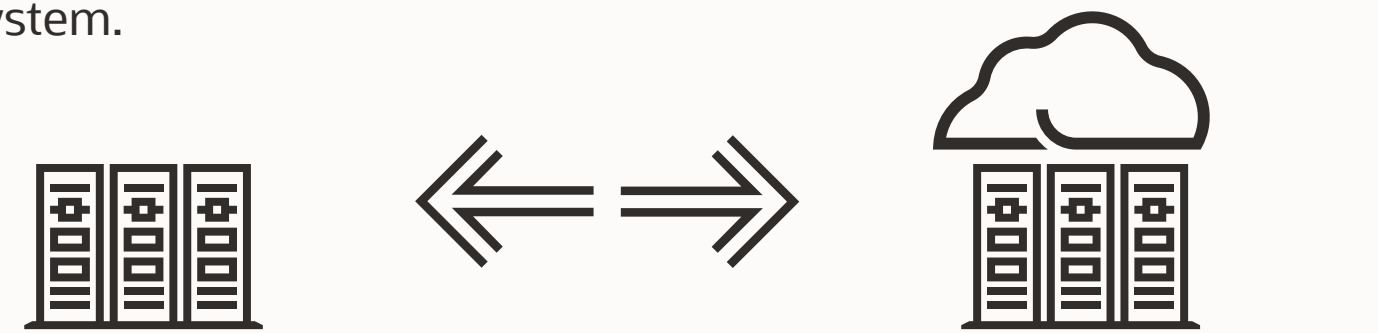
WebLogic Hybrid Disaster Recovery

Introduction
Disaster Recovery Solutions

Introduction

WebLogic Hybrid DR solution

- The **WebLogic Hybrid DR solution** provides **Disaster Recovery between** a primary system in **on-premises and** a secondary system in **Oracle Cloud Infrastructure (OCI)**.
- Appropriate High Availability best practices are expected to be already implemented in the on-premises system.



- **Other** MAA documents for WebLogic DR:
  - On-premises to On-premises: Oracle Fusion Middleware Disaster Recovery Guide
  - OCI to OCI: Oracle WebLogic Server for Oracle Cloud Infrastructure Disaster Recovery

Introduction

Benefits of the Hybrid DR

- Provides an entry point for OCI adoption
  - Moves applications to cloud
  - Provides a test environment for Cloud features with an existing/real production application (open secondary for validations)
- Leverages OCI High Availability and Reliability features
  - Compute, FD, ADs, OCI LBR, Storage, DB, backup …
- Reduces the costs implicit to a full-blown standby in on-premises:
  - OCI Licensing model
  - Total Cost Ownership (TCO) (Oracle managed infrastructure)

WebLogic Hybrid Disaster Recovery Topology

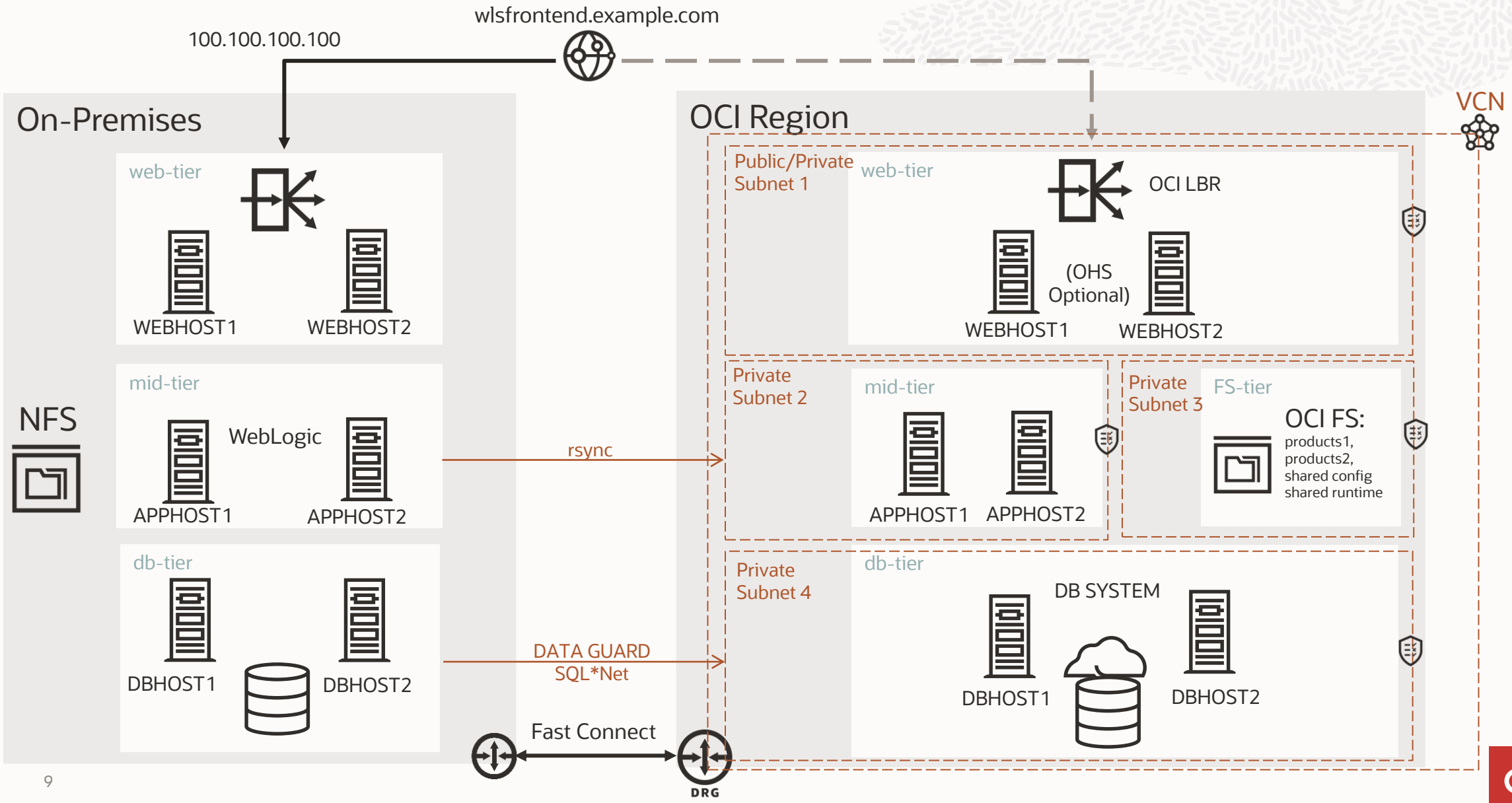
WebLogic Hybrid Disaster Recovery

WebLogic Hybrid Disaster Recovery Topology

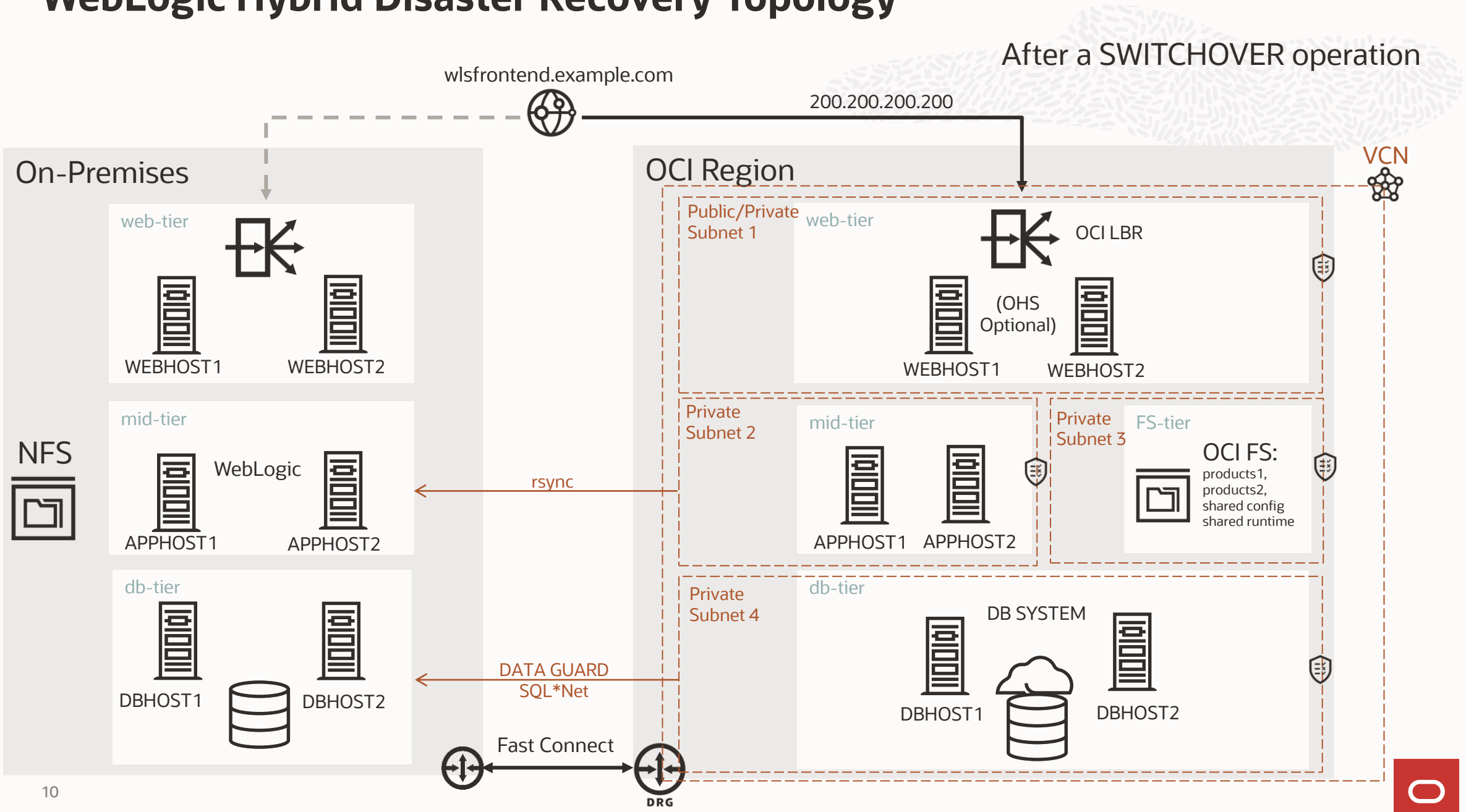
Description

- **Active-Passive** model.
  - Primary on-premises, secondary in OCI.
- The **db-tier**, leverages all the benefits implicit to Data Guard
  - All the changes in the database are automatically replicated to secondary
- In the secondary **mid-tier**:
  - WebLogic Server for OCI **images** (not WebLogic Server for OCI **stack** domain)
  - Binaries and configuration are replicated from primary (rsync *)
  - Same listen address than in primary (added as aliases*)
- In the secondary **web-tier**:
  - Oracle HTTP servers (optional) and OCI Load Balancer
- There is **unique front-end** address to access to the system
  - Resolved to the IP of the Load Balancer that has the primary role

WebLogic Hybrid Disaster Recovery Topology



WebLogic Hybrid Disaster Recovery Topology



Main Features and Considerations

WebLogic Hybrid Disaster Recovery

Main Features and Considerations

WebLogic Hybrid Disaster Recovery Solution

Topology

- The primary system is an existing on-premises environment
- The secondary system on OCI is created from zero
- Primary and secondary systems are symmetric
  - Only the web-tier can be different. Oracle HTTP Servers in OCI are optional.
- Primary and secondary use similar resources (CPU, memory)
  - MAA ALWAYS recommends symmetric DR

Main Features and Considerations

WebLogic Hybrid Disaster Recovery Solution

Network

- Connectivity between on-premises and OCI datacenter
  - OCI Fast Connect recommended. Dedicated bandwidth, predictable latency.
  - Site-to-Site VPN alternatively. Lower bandwidth, variable latency.
- Disable connectivity between mid-tier hosts and remote database
- Virtual hostnames used as listener addresses in on-premises
- Virtual IP only for Administration Server (for Admin server HA)
- Load Balancer both in primary and secondary
- Virtual front-end address entry point, resolved with the IP of the LBR with primary role
- Document uses maximum network isolation in OCI
  - a subnet for each layer
  - details about required security rules provided

Main Features and Considerations

WebLogic Hybrid Disaster Recovery Solution

Storage

- Document uses EDG directory structure as reference
  - Separated domain folder for administration and managed servers.
  - Uses a combination of shared and private folders, to address variations and multiple different use cases.
- Shared folders in OCI (e.g. shared config, runtime)
  - OCI File Storage (OCI FS) as the network file system solution
  - DBFS for runtime folder supported
- Private folders in OCI (e.g. binaries, local config)
  - OCI Block Volumes or OCI FS mounted privately.
  - Redundant binaries homes can use OCI FS shared between various servers.
- Storage Replication
  - Rsync (valid for all the file system artifacts)
  - DBFS also supported for replicating runtime and configuration (using staging DBFS mount)
- TLOGS and JMS in JDBC WebLogic persistent stores

Main Features and Considerations

WebLogic Hybrid Disaster Recovery Solution

Operating Systems

- The mid-tier and web-tier compute instances must use the OS image and compute shape that are most similar to the OS and shape used by the on-premises hosts.
- Mid-tier hosts
  - An Oracle WebLogic Server running on Oracle Cloud Infrastructure (OCI) must be covered with a valid License and support contract in addition to the License and support contract for on-premises .
  - The compute instances can be created with the **WebLogic Server for OCI images**: these images include the entitlement to run Oracle WebLogic Server and are billed per OCPU/Hour when they are in a running state.
    - These images are available for Oracle Linux 7.9 and Oracle Linux 8.5 operating systems.
- Web-tier hosts
  - An Oracle HTTP Server running in OCI is required to be covered with a valid License and support contract in addition to the License and support contract for on-premises.
  - Similar to the mid-tiers: compute instances can be created with the **WebLogic Server for OCI images**, which include the entitlement to run Oracle HTTP Server.
- When using WebLogic Server for OCI images the solution is restricted to the OS version used by them (right now Oracle Linux 7.X or 8.X)

Main Features and Considerations

WebLogic Hybrid Disaster Recovery Solution

Oracle WebLogic server

- Products on top
  - can benefit from the procedures described in this playbook, but the specifics of other products are out of the scope of this document.
- Oracle WebLogic Server edition
  - The document procedure is focused on Oracle WebLogic **Suite** Edition.
  - Because, when the database is an Oracle RAC, only the Oracle WebLogic Suite Edition includes the entitlement to use GridLink Datasources.
- JRF-Enabled domains
  - This document applies to domains with Java Required Files (JRF) components enabled and basic domains.
  - JRF-enabled domains have more dependencies on the database than basic domains.
  - Basic domains have more flexibility for DR, but a DR model valid for a basic domain, may not apply to a JRF-enabled domain because it doesn't consider WebLogic JRF database dependencies.
  - Document is based on JRF-enabled domains; therefore, it applies to both type of domains.

Main Features and Considerations

WebLogic Hybrid Disaster Recovery Solution

Database

- Multitenancy
  - Primary database must be multitenant database. Required to configure the standby in OCI.
- Patch level
  - Primary and standby database must be same patch level.
- High Availability
  - Use Oracle Real Application Clusters (Oracle RAC) in primary and OCI.
- Database service (not the default)
- OCI DB System
  - VM, BM or EXACS.
  - ATP (Autonomous database) out of scope.
- TNS Alias in connect string of the WebLogic data sources
  - Secondary WLS domain config is a copy from primary configuration.
  - To avoid changing the db connect string after the copy, use TNS alias approach in datasources.
  - Same TNS alias in the config (jdbc:oracle:thin:@mypdbservice) but different tnsnames.ora in each site.

Main Features and Considerations

WebLogic Hybrid Disaster Recovery Solution

Identity Management

- The system can use an external LDAP for authentication
  - It must be reachable from both the primary and standby systems.
- The disaster recovery solution for any external LDAP service is out of the scope of this document
  - should be provided by the specific LDAP product.
  - should provide a unique way to access to it (typically a virtual host name), that does not change when there's a switchover in the LDAP system.

Main Features and Considerations

WebLogic Hybrid Disaster Recovery Solution

Summary of most relevant aspects **NOT SUPPORTED**

- Operating systems in primary different than the available OS in OCI (WebLogic Server for OCI images or OCI compute images)
- Asymmetric topologies
- File stores for JMS and TLOGS
- Autonomous Database in OCI
- WebLogic Enterprise Edition with RAC (or in other words, Multi Data Sources with RAC)
- Non-multitenancy database (OCI restriction, requires PM approval)
- Using WebLogic Server for OCI stacks to create secondary domain

(*) successfully tested with minor differences between primary and OCI: 7.7 in primary, 7.9 in OCI

Playbook Overview

WebLogic Hybrid Disaster Recovery

Playbook Overview

WebLogic Hybrid Disaster Recovery Solution

Book in Oracle Architecture Center

https://docs.oracle.com/en/solutions/weblogic-server-dr-on-cloud/

- Detailed list of considerations
- Every setup step documented in detail
- Based on an example consistent along the document
- Diagrams and examples provided
- Lifecycle operations included
- Resources for automation setup steps

Resources for automation

WebLogic Hybrid Disaster Recovery

Resources for automation

Published in GitHub

https://github.com/oracle-samples/maa/hybrid_dr

Terraform scripts

- To create resources in OCI:
  - Network: VCN, subnets, security rules
  - DB System
  - Compute instances (WLS for OCI)
  - OCI File Storage resources
  - OCI Load Balancer and its configuration
  - DNS private view for aliases
- Modular:
  - A set of terraform scripts for each step, that run independently
- Easy to use:
  - Customize the terraform.tfvars with env values
  - Run “terraform plan”

ORACLE Cloud Infrastructure + Terraform

Scripts to setup Data Guard

- Set of shell scripts to automate the Data Guard setup
- General purpose
- Valid for Hybrid and non-Hybrid scenarios
- Instructions in README.md (reduced) and in a separated Architecture Center playbook

Scripts for rsync copy

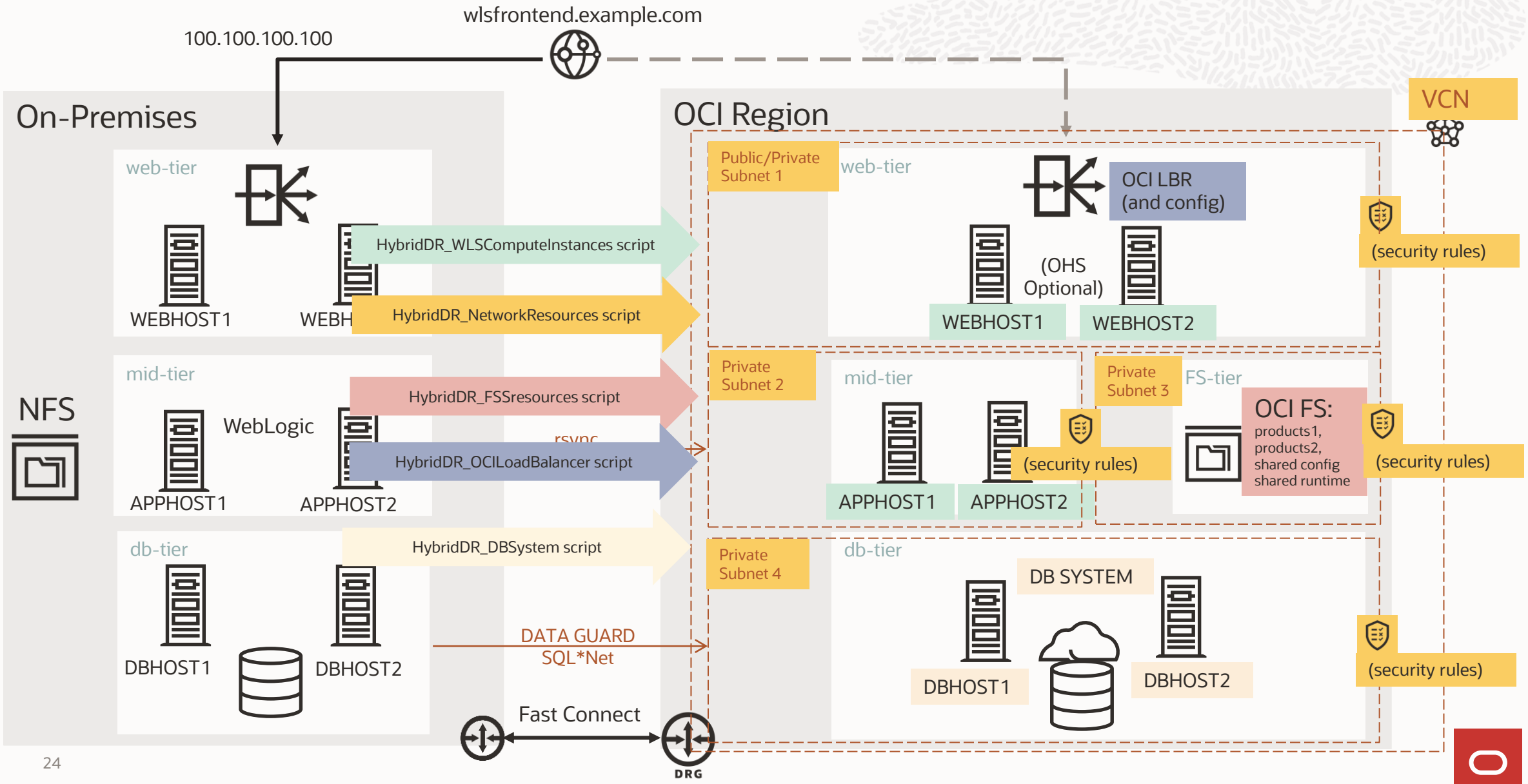
- Base unit script that performs remote rsync and validation
- Examples of usage for copying products folders, shared config folder, etc.

Others

- Script to replace the database connect string in WebLogic configuration files
  - Help when setting up the TNS alias
- Script to configure a DBFS mount in a host
  - Install the db client and configure a DBFS mount, that can be used for shared runtime

Resources for automation

Resources that can be provisioned with the provided terraform code scripts

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