Oracle Fusion Cloud Service
Business Continuity and Disaster Recovery Status Report 2019

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CONTENT

This document summarizes the aggregated test results of various Disaster Recovery (DR) switchover and failover scenarios for the Oracle Fusion Cloud Service and Applications: Oracle Customer Relationship Management (CRM), Oracle Fusion Enterprise Resource Planning (ERP), Oracle Fusion Human Capital Management (HCM) and Oracle Fusion Supply Chain Management (SCM). These tests were conducted to verify the DR capabilities of the Oracle Fusion Cloud Service. Each test case was completed one or more times. Test results and timings may vary based on real-time scenarios. The results below document the two Oracle Fusion Cloud Service DR exercises which were completed on May 25, 2019

Disaster Recovery Test Preparedness

The disaster recovery test preparedness process has been developed following industry standards and best practices. This ensures that Oracle Fusion Cloud Service follows a repeatable defined process to ensure proper adherence to Oracle standards for Disaster Recovery. During Disaster Recovery testing the following components are validated in addition to application recovery.

****All DR Plan documentation is for Oracle internal use only**

Oracle Fusion Cloud Service Disaster Recovery Plan

Document Component	Document Verified as Accurate and Complete	Most Recent Review Date
Prerequisites and Dependencies	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Resource Requirements	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Technical Staff Roles and Responsibilities	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Components and Architecture	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Disaster Recovery Workflow	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Recovery Procedures	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Application Verification Procedures	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Reconstitution procedure	Documentation reviewed quarterly, verified as complete.	May 25, 2019

Oracle Fusion Cloud Service Communication Plan

Document Component	Document Verified as Accurate and Complete	Most Recent Review Date
Disaster Declaration Flow	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Declaration Roles and Responsibilities	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Conference Bridges and Distribution Lists	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Escalation Paths	Documentation reviewed quarterly, verified as complete.	May 25, 2019
Internal Communication Flow	Documentation reviewed quarterly, verified as complete.	May 25, 2019
External Communication Flow	Documentation reviewed quarterly, verified as complete.	May 25, 2019

All documentation is in a standard format for all Oracle Cloud Services to ensure continuity. Documentation is updated in conjunction with production changes as part of the Oracle Fusion Cloud Service and Applications (CRM – ERP – HCM and SCM) standard change management processes. Disaster Recovery governance processes are in place to ensure that the Oracle Fusion Cloud Service is continually recoverable in the event of disaster declaration.

Disaster Recovery Test Process

The disaster recovery testing includes all components of the cloud service. This ensures that full end to end testing is vetted. The switchover tests include both positive and negative test cases. Switchover/Failover tests are exercised annually, and tabletop tests are exercised quarterly.

DR support occurs between a production and an alternate facility that are geographically separated. Oracle does not disclose the physical details of its data centers or POD level details about any of its customer deployments. DR occurs within a particular geographic region and Oracle may make changes to production and alternate sites as needed. Oracle cannot disclose any details beyond this.

In the event of an Oracle declared disaster, Oracle will resume production services at an alternate facility.

To ensure thoroughness, a full failover of Fusion's was conducted to the corresponding recovery facility. The Oracle Fusion Cloud Service disaster recovery test consists of the following activities:

- **Disaster Simulation**: Simulation of a disaster, such as Production Datacenter failure.
- **Database Failover**: Recovery and associated activities necessary to bring databases online.
- **Application Failover**: Application recovery and reconfiguration to ensure full functional service resumption including DNS, configuration and content backups.
- **Service Restoration**: A series of configuration management tools maintained by replicating configuration changes and preventing configuration drift, the application consistency between the production site and alternate sites.
- **Validation Testing**: Post restoration functional testing to ensure application functionality.
- **Service Reconstitution**: Fail back to original site

Failover / Switchover Test Cases

The below highlight the outcome of various component failovers pertaining to the recovery of the service. Successful completion ensures the ability to successfully recover all aspects of the service. Also note that several of the tests are executed in parallel to ensure optimal RTO.

Test Case	Function/Task	Expected Behavior	Results	Duration	Comments
1	Planned switchover using Oracle Site Guard GUI	Pre-checks and switchover should succeed	Passed	~ 120 minutes	
2	Planned switchover using the Enterprise Manager Command Line Interface (EMCLI) tool	Pre-checks and switchover should succeed	Passed	~ 62 minutes	
3	Test DNS Connections	Traffic redirects to Alternate site should succeed	Passed	~ 15 minutes	
4	RTO/RPO Constraints	RPO of 1 hour and RTO of 12 hours should succeed	Passed	< 1 hr RPO & < 12 hr RTO	
5	Functional testing – App stack is performing as designed	Functional testing should succeed	Passed	~ 15 minutes	

Disruptive Test Cases

These test cases are designed to ensure that Oracle Site Guard can successfully handle invalid input, unexpected user behavior, and unexpected system configuration.

EMCC

The EMCC-related test cases represent scenarios around abnormal console statuses or Enterprise Manger agent activity.

EMCC RELATED DISRUPTIVE TEST CASES

Case No	Test Scenario	Expected Behavior	Test Results	Test Duration
1	Switchover when one or more agents on the production or alternate hosts are down	Pre-checks should fail	Passed	3 minutes, 41 seconds
2	Switchover or failover is attempted when the underlying database is already role reversed	Pre-checks should detect this state and fail with appropriate error message	Passed	1 minute
3	Switchover is attempted with errors in DB Transport service or DB Apply Log service	Pre-checks should fail	Passed	4 minutes, 23 seconds
4	Switchover or failover is performed when only one instance of the standby RAC database is up	Switchover or failover should succeed	Passed	1 hour 20 minutes
5	Switchover or failover is attempted when all instances of the standby RAC database are down	Pre-checks should fail	Passed	3 minutes 55 seconds
6	Switchover is attempted when the production or alternate database is not reachable	Pre-checks should fail	Passed	3 minutes 55 seconds
7	Switchover or failover is attempted with invalid DB sysdba credentials for Alternate database in EM credential store	Pre-checks should fail	Passed	4 minutes 9 seconds
8	Switchover operation is attempted when Oracle Data Guard Broker reports any error or warning in broker configuration	Pre-checks should fail	Passed	3 minutes 20 seconds
9	Switchover operation is attempted when Data Guard Monitor (DMON) process is down on production or alternate database	Pre-checks should fail	Passed	3 minutes 41 seconds

Key Findings

These test cases are designed to ensure that Oracle can successfully recover the Fusion environment and Applications (CRM – ERP – HCM and SCM) to an alternate facility and restore business operations. Testing resulted in both a Successful Failover exercise and a Successful Switchover exercise on May 25th, 2019.

Glossary of Terms

Asynchronous (replication) - Process by which data is written to the production storage first and then data is copied to the replica.

Dataguard – Provides a set of services that create, maintain, manage, and monitor one or more standby databases to enable production Oracle databases to survive disasters and data corruptions.

RPO – Recovery Point Objective is defined as the maximum targeted period in which data might be lost from an IT service due to a disaster. For instance, if the RPO is set to one-hour, off-site replication must be continuously maintained to ensure that data loss will be less than one hour.

RTO – Recovery Time Objective, is the targeted duration of time within which a business process must be restored after a disaster. It includes the time for the recovery, testing, and communication to the service subscribers.

ZFS – File system and logical volume manager used for highly scalable storage systems.