

# Deep Dive into Oracle Identity Governance 12.2.1.4.0 Performance on Oracle Cloud Infrastructure Container Engine for Kubernetes

Oracle Technical Brief

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## Purpose Statement

This paper discusses performance recommendations and sizing for Oracle Identity Governance as part of Oracle Identity Management Suite 12.2.1.4.0 on Oracle Cloud Infrastructure (OCI) Container Engine for Kubernetes Release.

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## Introduction

Oracle Identity Governance provides self-service, compliance, provisioning, and password management services for applications residing on-premises or in the cloud.

With increasing requirements for high scalability and performance with Oracle Identity Governance, Oracle has conducted scalability benchmarks for Oracle Identity Governance (OIG) as part of Oracle Identity Management (IDM) Release 12.2.1.4.211010. The environments for Oracle Identity Governance benchmarks were deployed on Oracle Cloud Infrastructure (OCI) Container Engine for Kubernetes (OKE) and DBaaS shapes in OCI.

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**Note:** The recommendations also apply to the later versions of Oracle Identity Governance releases.

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## Topology

The following diagram describes the test configuration with all required Oracle Identity Governance tiers, collocated in the same network segment to eliminate network latencies in the scalability runs.

- The Oracle Identity Governance cluster domain consists of Admin, Oracle SOA, Oracle Identity Manager 1 (OIM1), and Oracle Identity Manager 1 (OIM2) servers.
- In this document, all references to Oracle Identity Manager refer to an Oracle Identity Governance server.

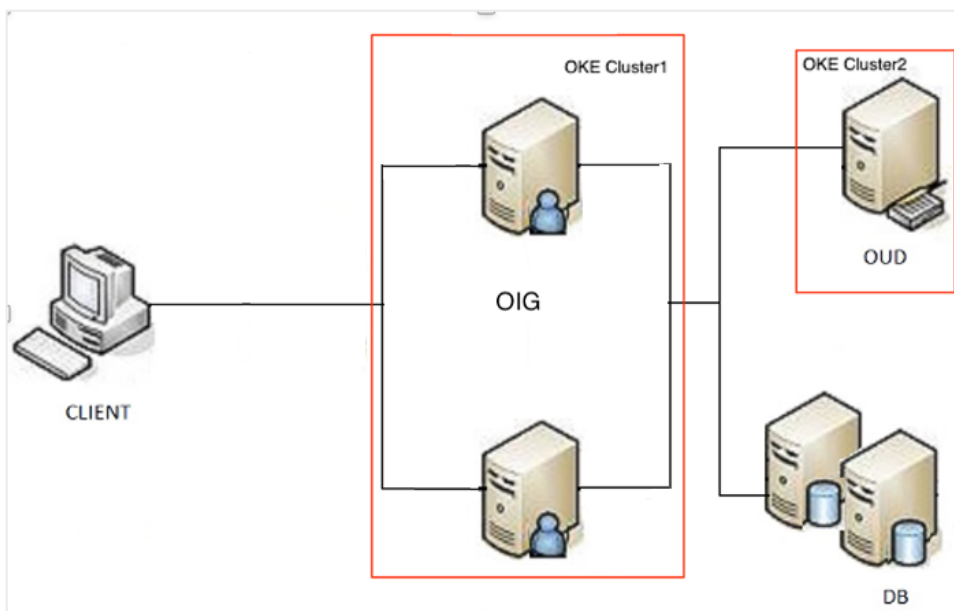


Figure 1-1: Topology

## Hardware Configuration

This section covers recommended hardware shapes offered in OCI Compute for the concurrent load and future growth. Oracle Identity Governance customers can use the OCI Compute shape specifications as guidance for deploying comparable on-premises Oracle Identity Governance configurations. For more information about OCI Compute shapes, see [docs.oracle.com/iaas/Content/Compute/References/computeshapes.html](https://docs.oracle.com/iaas/Content/Compute/References/computeshapes.html).

**Table 1-1: Hardware Configurations**

Configuration	Oracle Identity Governance	Database	Oracle Unified Directory
OCI shape for node	VM.Standard.E3.Flex	Standard2.8	VM.Standard.E3.Flex
OCI shape RAM, GB	128	128	128
OCI shape OCPUs	8	8	8
Nodes	2	2	1
Containers	2	2 instances on RAC	1

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**Note:** Default settings were used for the OCI Container Engine for Kubernetes containers.

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## Oracle Identity Governance Test Case Overview

The following test cases were conducted. Results are shown in the following sections.

- [Certification](#): Identity certification is the process of reviewing user entitlements and access privileges within an enterprise to ensure that users haven't acquired entitlements that they're not authorized to have. It also involves either approving (certifying) or rejecting (revoking) each access privilege.
- [Catalog Blank Search and String Search](#): Using keyword search in the access catalog, you can search based on entity name, entity display name, or user-defined tags that an administrator has provided for that catalog item.
- [Audit Scan](#): The identity audit feature detects segregation of duties (SoD) violations or identity audit policy violations, which occur when a user has been assigned privileges that should not be held individually or in combination.
- [Trusted Reconciliation](#): If data is reconciled from a system that drives the creation of users, roles, role memberships, or role hierarchies in an Oracle Identity Manager repository, then that reconciliation mode is called *identity reconciliation*, authoritative source *reconciliation*, or *trusted source reconciliation*.
- [Target Reconciliation](#): If the target system identities are accounts that get reconciled to Oracle Identity Manager, then that is *target resource reconciliation* or *account reconciliation*.

## Certification

Measure the performance of the certification for up to 100,000 users and 8,000 managers, 100 groups with each user being a member of 50 groups, in Oracle Unified Directory (OUD).

Oracle Identity Governance certification performance demonstrated linear scaling of CPU with an increase in concurrency and the number of entitlements.

**Table 2-1: Certification Creation Results**

Managers	Entitlements	Avg Time in Minutes	Avg CPU%					
			OIM DB1	OIM DB1	Admin	SOA	OIM	OUD
520	10,000	13.00	4.09	6.03	3.19	8.44	16.56	0.20
	20,000	23.80	4.03	6.69	6.01	16.35	16.35	0.45
1,250	10,000	15.50	3.09	7.07	3.02	13.65	18.78	0.22
	20,000	26.28	3.95	7.85	9.88	18.11	18.11	0.45
2,000	10,000	17.50	4.94	5.70	2.62	15.54	20.16	0.49
	20,000	28.23	4.23	6.65	11.15	19.13	19.13	0.21
8,000	100,000	136.65	5.46	5.23	3.27	9.89	18.07	0.43

## Catalog Blank Search and String Search

Perform Catalog Search Operations for both Blank Search and String Search, performed by regular users and users with admin roles. In parallel with search operations, run Trusted Recon and Access Policy Evaluation Jobs in the background. The scenario applies to the directory of two million records in OUD, with 20% of the records representing end-user organizations, and each end-user organization maintaining its hierarchy while publishing more than 10% of total Catalog entities to its child organizations.

Oracle Identity Governance demonstrated consistent performance while performing search operations under the load from both search and its background jobs.

**Table 3-2: Catalog Blank Search Results**

User	Avg Time in Seconds	Avg CPU%						
		OIM DB1	OIM DB1	Admin	SOA	OIM1	OIM2	OUD
Regular	5.41	30.23	23.77	4.39	5.47	255.30	458.10	1.11
Admin	6.62	34.40	22.37	3.05	7.46	314.40	436.80	0.69

**Table 3-3: Catalog String Search with Background Jobs**

Normal User	Avg Time in Seconds	Avg CPU%						
		OIM DB1	OIM DB2	Admin	SOA	OIM1	OIM2	OUD
Exact search	0.85	31.30	26.90	3.64	5.59	215.09	354.66	0.78
Partial search (11 records)	1.14	31.20	28.70	3.36	6.85	271.95	467.16	1.15
Partial search (1104 records)	3.26	30.20	28.00	3.68	7.03	260.78	467.01	1.22
Partial search (11056 records)	5.40	29.83	30.33	4.23	6.66	254.15	442.27	0.91
Admin User	Avg Time in Seconds	Avg CPU%						
		OIM DB1	OIM DB2	Admin	SOA	OIM1	OIM2	OUD
Exact search	0.87	22.20	27.90	3.86	4.80	219.87	342.18	0.66
Partial search (11 records)	1.25	31.20	22.43	4.31	4.74	280.88	502.30	0.72
Partial search (1104 records)	3.52	31.17	20.17	3.17	5.99	245.89	453.16	1.02
Partial search (11056 records)	6.80	25.20	25.57	3.88	7.84	264.65	501.10	1.20

## Audit Scan

Measure the performance of the Audit scan for up to 100,000 users with 100% policies run in Oracle Identity Governance with 10 and 20 threads.

Oracle Identity Governance audit scan performance demonstrated linear scaling of CPU with an increase in concurrency and the number of users and policies.

**Table 4-4: Audit Scan Results**

Scenario	Avg Time in Minutes	Avg CPU%				
		OIMDB1	OIMDB2	Admin	SOA	OIM
10,000 users and 25% policies	6.15	16.44	17.66	7.45	78.36	284.86
25,000 users and 25% policies	12.47	22.86	22.46	8.83	96.78	239.77
50,000 users and 50% policies	42.93	27.00	24.65	6.24	89.17	445.37
75,000 users and 75% policies	53.31	16.59	15.81	8.96	90.67	544.64
100,000 users and 100% policies with 20 threads	57.90	11.99	9.56	7.81	72.48	518.94
100,000 users and 100% policies with 10 threads	82.78	7.37	4.73	4.87	23.07	408.69

## Trusted Reconciliation

Measure the performance of the trusted reconciliation job with 500 and 2,000 batch size, which will synchronize the users created in Oracle Unified Directory with Oracle Identity Governance.

Delete performance during trusted reconciliation in OIG demonstrated consistent CPU usage and overall time with an increase in the number of concurrent users. The delete reconciliation fetches all the records from Oracle Unified Directory before validating and deleting the unwanted records.

**Table 5-5: Trusted Reconciliation—Create and Update Results**

Scenario	Avg Time in Seconds	Avg CPU%						
		OIM DB1	OIM DB2	Admin	SOA	OIM1	OIM2	OUD
2,000 create and 7,500 update	48	7.16	8.00	2.04	6.93	9.79	53.15	1.07
5,000 create and 18,750 update	112	12.95	9.21	2.36	4.72	113.55	102.51	1.09
10,000 create and 37,500 update, 2000 batch	426	14.73	10.93	3.66	7.11	323.82	157.54	0.92
10,000 create and 37,500 update, 500 batch	471	17.39	11.30	3.92	8.58	170.74	397.53	0.72

**Table 5-2: Trusted Reconciliation—Delete Results**

Scenario	Avg Time in Minutes	Avg CPU%						
		OIMDB1	OIMDB2	Admin	SOA	OIM1	OIM2	OUD
500 delete, 2000 batch	23	3.30	3.01	2.22	6.57	2.89	50.12	1.74
1,250 delete, 2000 batch	23	2.68	3.18	4.09	3.91	3.40	49.25	0.90
2,500 delete, 2000 batch	20	3.22	2.80	2.96	5.02	4.60	45.64	1.37
2,500 delete, 500 batch	21	3.28	2.54	4.33	5.78	5.56	46.83	0.91

## Target Reconciliation

Measure the performance of the target reconciliation job with 500 and 2,000 batch size, which will synchronize the accounts created in Oracle Unified Directory with Oracle Identity Governance.

Delete performance during target reconciliation in OIG demonstrated consistent CPU usage and overall time with an increase in the number of concurrent users. The delete reconciliation fetches all the records in the reconciliation process before validating and deleting the unwanted records.

**Table 6-6: Target Reconciliation—Create and Update Results**

Scenario	Avg Time in Seconds	Avg CPU%						
		OIMDB1	OIMDB2	Admin	SOA	OIM1	OIM2	OUD
2,000 create and 7,500 update	75	8.45	8.12	3.65	5.1	29.29	4.34	5.16
5,000 create and 18,750 update	195	15.79	14.99	5.16	5.6	41.57	166.9	5.4
10,000 create and 37,500 update, 2000 batch	324	18.55	30.25	4.24	6.9	178.5	49.63	5.5
10,000 create and 37,500 update, 500 batch	334	24.42	23.31	5.18	6.5	172	53.85	5.03



**Table 6-2: Target Reconciliation—Delete Results**

Scenario	Avg Time in Minutes	Avg CPU%						
		OIMDB1	OIMDB2	Admin	SOA	OIM1	OIM2	OUD
500 delete, 2000 batch	21	3.01	2.87	4.99	8.04	5.88	54.55	15.89
1,250 delete, 2000 batch	21	3.45	2.73	5.5	5.52	7.26	54.05	16.21
2,500 delete, 2000 batch	22	3.41	2.9	4.32	5.48	8.58	54.88	15.93
1,250 delete, 500 batch	22	3.87	2.62	4.35	5.55	9.44	50.71	16.08

## Performance Tuning

The performance tuning recommendations are common for all configurations.

### Standard Tuning

Refer to the “Oracle Identity Governance Performance Tuning” section of the [Tuning Performance Guide](#) for product tuning recommendations.

### Database Tuning for Specific Cases

We recommend the following tuning for the databases in trusted reconciliation and target reconciliation.

```
TRUSTED RECON - ROW CACHE LOCK ON SEQUENCE DIAG_LOG_DTLS_SEQ - SQLID FA970G8M2R31N
```

```
alter sequence DIAG_LOG_DTLS_SEQ CACHE 10000;
```

**OUD TARGET RECON:**

```
alter table OCI_OIM.UD_OAMOUDTA PCTFREE 20 INITRANS 20;
```

```
alter table OCI_OIM.UD_OAMOUDTA move parallel;
```

```
select index_name,status from dba_indexes where table_name='UD_OAMOUDTA';
```

```
alter table OCI_OIM.UD_OAMOUDTA move tablespace OCI_OIM LOB ("UD_OAMOUDTA_NOTE") store as
SYS_LOB0000123852C00008$$ (tablespace OCI_OIM);
```

```
alter index OCI_OIM.RDX_UD_OAMOUDTA_NSUNIQUAC6A939 rebuild online PCTFREE 20 INITRANS 20 parallel ;
```

```
alter index OCI_OIM.RDX_UD_OAMOUDTA_NSUNIQUAC6A939 noparallel;
```

```
alter index OCI_OIM.PK_UD_OAMOUDTA rebuild online PCTFREE 20 INITRANS 20 parallel ;
```

```
alter index OCI_OIM.PK_UD_OAMOUDTA noparallel;
```

```
alter index OCI_OIM.IDX_UD_OAMOUDTAORC_KEY rebuild online PCTFREE 20 INITRANS 20 parallel ;
```

```
alter index OCI_OIM.IDX_UD_OAMOUDTAORC_KEY noparallel;
```

```
alter table OCI_OIM.UD_OUDTARGE PCTFREE 20 INITRANS 20;
```

```
alter table OCI_OIM.UD_OUDTARGE move parallel;
```

```
alter table OCI_OIM.UD_OUDTARGE move tablespace OCI_OIM LOB ("UD_OUDTARGE_NOTE") store as
SYS_LOB0000123176C00008$$ (tablespace OCI_OIM);
```

```
select index_name,status from dba_indexes where table_name='UD_OUDTARGE';
```

```
alter index OCI_OIM.RDX_UD_OUDTARGE_NSUNIQUE691ADD5 rebuild online PCTFREE 20 INITRANS 20 parallel ;
alter index OCI_OIM.RDX_UD_OUDTARGE_NSUNIQUE691ADD5 noparallel;
alter index OCI_OIM.PK_UD_OUDTARGE rebuild online PCTFREE 20 INITRANS 20 parallel ;
alter index OCI_OIM.PK_UD_OUDTARGE noparallel;
alter index OCI_OIM.IDX_UD_OUDTARGEORC_KEY rebuild online PCTFREE 20 INITRANS 20 parallel ;
alter index OCI_OIM.IDX_UD_OUDTARGEORC_KEY noparallel;
```

## Conclusion

This document describes the best practices and recommendations for sizing Oracle Identity Governance 12.2.1.4.0 to ensure best performance and scalability.

## Glossary

- OCI: Oracle Cloud Infrastructure
- OKE: Container Engine for Kubernetes
- IDM: Oracle Identity Management
- OIG: Oracle Identity Governance
- OIM: Oracle Identity Manager
- OHS: Oracle HTTP Server
- OUD: Oracle Unified Directory
- RAC: Oracle Real Application Cluster
- RT: Response time
- SOA: Service-Oriented Architecture
- TPS: Transactions per seconds

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