

Oracle® Communications

Cloud Native Core, Unified Data Repository

Benchmarking Guide



Release 25.2.201

G56880-01

July 2026

ORACLE®

Copyright © 2022, 2026, Oracle and/or its affiliates.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software, software documentation, data (as defined in the Federal Acquisition Regulation), or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software," "commercial computer software documentation," or "limited rights data" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle®, Java, MySQL, and NetSuite are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Oracle customer access to and use of Oracle support services will be pursuant to the terms and conditions specified in their Oracle order for the applicable services.

Contents

1	Introduction	
1.1	Purpose and Scope	1
1.2	References	1
2	Deployment Environment	
2.1	Deployed Components	1
2.2	Deployment Resources	1
2.2.1	CNE Observability Services	1
3	UDR Benchmark Testing	
3.1	Test Scenario 1: SLF Call Model: 34k lookup TPS + 1.44k Provisioning TPS	1
3.2	Test Scenario 2: EIR 10K TPS and 10k Diameter S13 Interface TPS (300 K Subscribers)	6
3.3	Test Scenario 3: UDR Call Model: 25K N36 300 Notifications and 600 Provisioning (SOAP) Profile (40M Subscribers)	10
3.4	Test Scenario 4: UDR Call Model: 17.2K N36 + 10K SH+1.2K Notifications and 600 Provisioning (SOAP) Profile (40M Subscribers)	15

Preface

- [Documentation Accessibility](#)
- [Diversity and Inclusion](#)
- [Conventions](#)

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support

Oracle customer access to and use of Oracle support services will be pursuant to the terms and conditions specified in their Oracle order for the applicable services.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

My Oracle Support

My Oracle Support (<https://support.oracle.com>) is your initial point of contact for all product support and training needs. A representative at Customer Access Support can assist you with My Oracle Support registration.

Call the Customer Access Support main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. When calling, make the selections in the sequence shown below on the Support telephone menu:

- For Technical issues such as creating a new Service Request (SR), select **1**.
- For Non-technical issues such as registration or assistance with My Oracle Support, select **2**.
- For Hardware, Networking and Solaris Operating System Support, select **3**.

You are connected to a live agent who can assist you with My Oracle Support registration and opening a support ticket.

My Oracle Support is available 24 hours a day, 7 days a week, 365 days a year.

Acronyms

The following table provides information about the acronyms and the terminology used in the document.

Table Acronyms and Terminologies

Acronym	Description
AMF	Access and Mobility Management Function
AUSF	Authentication Server Function
CNE	Oracle Communications Cloud Native Core, Cloud Native Environment
CPU	Central Processing Unit
EIC	Equipment Identity Check
EIR	Equipment Identity Repository
GPSI	Generic Public Subscription Identifier
HTTP	Hypertext Transfer Protocol
MPS	Messages Per Second
NF	Network Function
NRF	Oracle Communications Cloud Native Core, Network Repository Function
PVC	Persistent Volume Claim
RAM	Random Access Memory
SLF	Subscriber Location Function
SOAP	Simple Object Access Protocol
SUPI	Subscription Permanent Identifier
TPS	Transactions Per Second
UDM	Unified Data Management
UDR	Oracle Communications Cloud Native Core, Unified Data Repository
vCNE	Virtual Cloud Native Environment

What's New in This Guide

This section introduces the documentation updates for Release 25.2.2xx.

Release 25.2.201 - G56880-01, July 2026

- Added the [Test Scenario 1: SLF Call Model: 34k lookup TPS + 1.44k Provisioning TPS](#) test scenario.
- Updated the following test scenarios:
 - [Test Scenario 2: EIR 10K TPS and 10k Diameter S13 Interface TPS \(300 K Subscribers\)](#)
 - [Test Scenario 3: UDR Call Model: 25K N36 300 Notifications and 600 Provisioning \(SOAP\) Profile \(40M Subscribers\)](#)
 - [Test Scenario 4: UDR Call Model: 17.2K N36 + 10K SH+1.2K Notifications and 600 Provisioning \(SOAP\) Profile \(40M Subscribers\)](#)

1

Introduction

Oracle Communications Cloud Native Core Unified Data Repository (UDR) is a key component of the 5G Service Based Architecture. It is implemented as a cloud native function and offers a unified database for storing application, subscription, authentication, service authorization, policy data, session binding, and application state information. For more information about UDR architecture, see *Oracle Communications Cloud Native Core, Unified Data Repository User Guide*.

1.1 Purpose and Scope

This document is designed to measure the performance and capacity of UDR, UDR microservices, SLF, EIR, and deployment environment setup software such as Cloud Native Environment (CNE) and cnDBTier.

It is recommended that UDR is run through a benchmark on the target cloud native infrastructure to determine the capacity and performance in the target infrastructure. This information can be used to adjust the initial deployment resources and to predict resource requirements when UDR is scaled up.

1.2 References

- *Oracle Communications Cloud Native Core, Unified Data Repository Installation, Upgrade, and Fault Recovery Guide*
- *Oracle Communications Cloud Native Core, Unified Data Repository User Guide*
- *Oracle Communications Cloud Native Core, Unified Data Repository REST Specification Guide*
- *Oracle Communications Cloud Native Core, Unified Data Repository Troubleshooting Guide*
- *Oracle Communications Cloud Native Core, Provisioning Gateway Installation Guide*
- *Oracle Communications Cloud Native Core, Provisioning Gateway Interface Specification Guide*

2

Deployment Environment

This section provides information about the cloud native infrastructure used for UDR, SLF, and EIR benchmarking.

2.1 Deployed Components

Deployment Platform

Oracle Communications Cloud Native Environment (OCCNE) and BareMetal is used for performing benchmark tests.

Observability Services

The following table lists services that are used for UDR benchmark tests. These services fetch UDR metrics, alerts, logs, and traces. For more information about mentioned software and versions, see *Oracle Communications Cloud Native Core, Unified Data Repository Installation, Upgrade, and Fault Recovery Guide*

Table 2-1 Observability Services

Service
Opensearch
Prometheus
Grafana
OpenSearch Dashboard
Jaeger

Cloud Native Orchestrator

Kubernetes is used for managing application pods across the cluster.

cnDBTier

cnDBTier is used for performing benchmark tests.

For more information about above mentioned components, see *Oracle Communications Cloud Native Core, Unified Data Repository Installation, Upgrade, and Fault Recovery Guide*.

2.2 Deployment Resources

The performance and capacity of UDR can vary based on the chosen environment and how UDR is deployed. This section provides information about CNE resources used to perform benchmark tests.

2.2.1 CNE Observability Services

The following table provides information about number of pods required by each CNE service.

Table 2-2 CNE Observability Services

Service Name
alertmanager
occne-alertmanager-snmp-notifier
occne-bastion-controller
occne-cert-exporter-cert-manager
occne-egress-controller
occne-fluentd-opensearch
occne-kube-prom-stack-grafana
occne-kube-prom-stack-kube-operator
occne-kube-prom-stack-kube-state-metrics
occne-kube-prom-stack-prometheus-node-exporter
occne-lb-controller-server
occne-metallb-controller
occne-metallb-speaker
occne-metrics-server
occne-opensearch-cluster-client
occne-opensearch-cluster-data
occne-opensearch-cluster-master
occne-opensearch-dashboards
occne-promxy
occne-promxy-apigw-nginx
occne-tracer-jaeger-collector
occne-tracer-jaeger-query
prometheus-occne-kube-prom-stack-kube-prometheus

3

UDR Benchmark Testing

This chapter describes UDR, SLF, and EIR test scenarios.

3.1 Test Scenario 1: SLF Call Model: 34k lookup TPS + 1.44k Provisioning TPS

This test scenario describes performance and capacity of SLF functionality offered by UDR and provides the benchmarking results for various deployment sizes. This test scenario reflects the resource requirements for a single site in a four-site georedanduncy model.

The following features are enabled for SLF in this testcase:

- Overload Handling
- Support for LCI and OCI Header
- Network Function Scoring for a Site
- Conflict Resolution
- Ingress Gateway Pod Protection Using Rate Limiting
- Support for Default Group ID in SLF
- Support for User-Agent Header

The following feature is enabled for Provisioning Gateway in this testcase:

- Auditor Service

You can perform benchmark tests on SLF for compute and storage resources by considering the following conditions:

- Signaling (SLF Look Up): 34K TPS
- Provisioning: 1.44 K
- Total Subscribers: 20 Million
- Profile Size: 700 bytes

The following table describes the benchmarking parameters and their values:

Table 3-1 Traffic Model Details

Request Type	Details	TPS
Lookup 34k	SLF Lookup GET Requests	34K
Provisioning (1.44K using Provgw)	CREATE	210
	DELETE	210
	UPDATE	510
	GET	510

The following table describes the testcase parameters and their values:

Table 3-2 Testcase Parameters

Input Parameter Details	Configuration Values
SLF Version Tag	25.2.201
Target TPS	34K Lookup + 1.44K Provisioning
Traffic Profile	SLF 34K Profile
SLF Response Timeout	900ms

The following table describes consolidated resource requirement:

Table 3-3 Consolidated Resource Requirement per Site

Resource	CPU	Memory	Ephemeral Storage(Gi)	PVC
cnDBTier	93	189Gi	21Gi	1053Gi
SLF	162	120Gi	40Gi	NA
ProvGw	32	32Gi	10Gi	NA
Buffer	50	50Gi	20Gi	200Gi
Total	337	391Gi	91Gi	1253Gi

The following table provides cnDBTier resources:

Table 3-4 cnDBTier Resources

Micro Service Name	Container Name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	PVC Allocation Per Pod	Total Resources
Management node (ndbmcmd)	mysqlndbcluster	2	2 CPUs	9 Gi	1 Gi	16 Gi	4 CPUs 18 Gi Memory PVC: 32 Gi Ephemeral Storage: 2 Gi
Data node (ndbmt)	mysqlndbcluster	4	4 CPUs	15 Gi	1 Gi	23 Gi (Backup: 12 Gi)	16 CPUs 60 Gi Memory PVC: 140 Gi Ephemeral Storage: 4 Gi Data memory :10Gi

Table 3-4 (Cont.) cnDBTier Resources

Micro Service Name	Container Name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	PVC Allocation Per Pod	Total Resources
APP SQL node (ndbappmysqld)	mysqlndbcluster	4	8 CPUs	10 Gi	1 Gi	20 Gi	32 CPUs 40 Gi Memory PVC: 80 Gi Ephemeral Storage: 4 Gi
SQL node (Used for Replication) (ndbmysqld)	mysqlndbcluster	6	4 CPUs	10 Gi	1 Gi	125 Gi	24 CPUs 60 Gi Memory PVC: 750 Gi Ephemeral Storage: 6 Gi
DB Monitor Service (db-monitor-svc)	db-monitor-svc	1	4 CPUs	4 Gi	1 Gi	N/A	4 CPUs 4 Gi Memory Ephemeral Storage: 1 Gi
DB Backup Manager Service (backup-manager-svc)	backup-manager-svc	1	100m CPU	128 MB	1 Gi	N/A	100m CPU 128 MB Memory Ephemeral Storage: 1 Gi
Replication Service (Multi-site Leader) (db-replication-svc)	db-replication-svc	1	8 CPUs	2 Gi	1 Gi	51 Gi	8 CPUs 2 Gi Memory PVC: 51 Gi Ephemeral Storage: 1 Gi
Replication Service (Multi-site Non-Leader) (db-replication-svc)	db-replication-svc	2	2 CPUs	2 Gi	1 Gi	N/A	4 CPUs 4 Gi Memory Ephemeral Storage: 2 Gi

The following table describes SLF resources:

Table 3-5 SLF Resources

Microservice Name	Container Name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Total Resources UDR
Ingress-gateway-sig	ingressgateway-sig	11	6 CPUs	4Gi	66 CPUs 44Gi Ephemeral Storage: 11Gi
Ingress-gateway-prov	ingressgateway-prov	2	4 CPUs	4Gi	8 CPUs 8Gi Ephemeral Storage: 2Gi
Nudr-dr-service	nudr-drservice	10	6 CPUs	4Gi	60 CPUs 40Gi Ephemeral Storage: 10Gi
Nudr-dr-provservice	nudr-dr-provservice	2	4 CPUs	4Gi	8 CPUs 8Gi Ephemeral Storage: 2Gi
Nudr-nrf-client-nfmanagement	nrf-client-nfmanagement	2	1 CPU	1Gi	2 CPUs 2Gi Ephemeral Storage: 2Gi
Nudr-egress-gateway	egressgateway	2	1 CPU	1Gi	2 CPUs 2Gi Ephemeral Storage: 2Gi
Nudr-config	nudr-config	2	2 CPUs	2Gi	4 CPUs 4Gi Ephemeral Storage: 2Gi
Nudr-config-server	nudr-config-server	2	2 CPUs	2Gi	4 CPUs 4Gi Ephemeral Storage: 2Gi
alternate-route	alternate-route	2	1 CPU	1Gi	2 CPUs 2Gi Ephemeral Storage: 2Gi
app-info	app-info	2	1 CPU	1Gi	2 CPUs 2Gi Ephemeral Storage: 2Gi
perf-info	perf-info	2	1 CPU	1Gi	2 CPUs 2Gi Ephemeral Storage: 2Gi

Table 3-5 (Cont.) SLF Resources

Microservice Name	Container Name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Total Resources UDR
Nudr-dbc-auditor	nudr-dbc-auditor-service	1	2 CPUs	2Gi	2 CPUs 2Gi Ephemeral Storage: 1Gi

Note

The same resources and usage are used for all sites.

Table 3-6 Provisioning Gateway Resources

Microservice Name	Container Name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Total Resources
provgw-ingress-gateway	ingressgateway	2	4 CPUs	4Gi	8 CPUs 8Gi Memory Ephemeral Storage: 2Gi
provgw-egress-gateway	egressgateway	2	4 CPUs	4Gi	8 CPUs 8Gi Memory Ephemeral Storage: 2Gi
provgw-service	provgw-service	2	4 CPUs	4Gi	8 CPUs 8Gi Memory Ephemeral Storage: 2Gi
provgw-config	provgw-config	2	2 CPUs	2Gi	4 CPUs 4Gi Memory Ephemeral Storage: 2Gi
provgw-config-server	provgw-config-server	2	2 CPUs	2Gi	4 CPUs 4Gi Memory Ephemeral Storage: 2Gi
provgw-auditor-service	auditor-service	1	2 CPUs	2Gi	2 CPUs 2Gi Memory Ephemeral Storage: 1Gi

The following table provides observation data for the performance test that can be used for the benchmark testing to scale up SLF performance:

Table 3-7 Result and Observation

Parameter	Values
TPS Achieved	34K SLF Lookup + 1.44K Provisioning
Success Rate	100%
Average SLF processing time for signaling requests	24ms
Average SLF processing time for provisioning requests	15ms

3.2 Test Scenario 2: EIR 10K TPS and 10k Diameter S13 Interface TPS (300 K Subscribers)

This test scenario describes performance and capacity improvements of EIR functionality offered by UDR and provides the benchmarking results for various deployment sizes.

The following features are enabled for this testcase:

- Support for EIR International Mobile Equipment Identity Software Version (IMEISV) Fallback
- Overload Handling
- Ingress Gateway Pod Protection Using Rate Limiting
- Diameter S13 Interface
- International Mobile Subscriber Identity (IMSI) Fallback Lookup

EIR is benchmarked for compute and storage resources under the following conditions:

- EIR Look Up: 20K
- Total Subscribers: 300 K
- Profile Size: 130 bytes

The following table describes the benchmarking parameters and their values:

Table 3-8 Traffic Model Details

Request Type	Details	TPS
EIR GET	N17 GET Request	10K
ECR message	Diameter S13 Interface ECR	10K

The following table describes the testcase parameters and their values:

Table 3-9 Testcase Parameters

Input Parameter Details	Configuration Values
UDR Version Tag	25.2.201
Target TPS	10K EIR GET + 10K S13 EC
Traffic Profile	20K

The following table describes the consolidated resource requirements:

Table 3-10 Consolidated Resource Requirement per Site

Resource	CPUs	Memory	Ephemeral Storage	PVC
cnDBTier	56	141 Gi	16 Gi	516 Gi
EIR	141	97 Gi	34 Gi	NA
Buffer	50	50 Gi	20 Gi	50 Gi
Total	247	288 Gi	70 Gi	566 Gi

The following table describes cnDBTier resources:

Table 3-11 cnDBTier Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	PVC Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
Management node (ndbmcmd)	mysqlndbcluster	2	2 CPUs	12 Gi	16 Gi	1 Gi	4 CPUs 24 Gi Ephemeral Storage: 2 Gi PVC: 32 Gi
Data node (ndbmt)	mysqlndbcluster	4	4 CPUs	20 Gi	28 Gi + backup: 56 Gi	1 Gi	16 CPUs 80 Gi Ephemeral Storage: 4 Gi PVC: 336 Gi
APP SQL node (ndbappmysql)	mysqlndbcluster	5	4 CPUs	4 Gi	10 Gi	1 Gi	20 CPUs 20 Gi Ephemeral Storage: 5 Gi PVC: 50 Gi
SQL node (Used for Replication) (ndbmysqld)	mysqlndbcluster	2	4 CPUs	5 Gi	16 Gi	1 Gi	8 CPUs 10 Gi Ephemeral Storage: 2 Gi PVC: 32 Gi
DB Monitor Service (db-monitor-svc)	db-monitor-svc	1	4 CPUs	4 Gi	N/A	1 Gi	4 CPUs 4 Gi Ephemeral Storage: 1 Gi

Table 3-11 (Cont.) cnDBtier Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	PVC Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
DB Backup Manager Service (backup-manager-svc)	backup-manager-svc	1	1.1 CPU	1 Gi	N/A	1 Gi	1.1 CPU 1 Gi Ephemeral Storage: 1 Gi
Replication Service (db-replication-svc)	db-replication-svc	1	2 CPU	2 Gi	66 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 1 Gi PVC: 66 Gi

The following table describes EIR resources:

Table 3-12 EIR Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
Ingress-gateway-sig	ingressgateway-sig	4	6 CPUs	4 Gi	1 Gi	24 CPUs 16 Gi Ephemeral Storage: 4 Gi
Ingress-gateway-prov	ingressgateway-prov	2	4 CPUs	4 Gi	1 Gi	8 CPUs 8 Gi Ephemeral Storage: 2 Gi
Nudr-dr-service	nudr-dr-service	3	6 CPUs	4 Gi	1 Gi	18 CPUs 12 Gi Ephemeral Storage: 3 Gi
Nudr-dr-provservice	nudr-dr-provservice	2	4 CPUs	4 Gi	1 Gi	8 CPUs 8 Gi Ephemeral Storage: 2 Gi
Nudr-diam-gateway	nudr-diam-gateway	2	6 CPUs	4 Gi	1 Gi	12 CPUs 8 Gi Ephemeral Storage: 2 Gi

Table 3-12 (Cont.) EIR Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
Nudr-diameterproxy	nudr-diameterproxy	8	6 CPUs	4 Gi	1 Gi	48 CPUs 32 Gi Ephemeral Storage: 8 Gi
Nudr-config	nudr-config	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Nudr-config-server	nudr-config-server	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Alternate-route	alternate-route	2	2 CPUs	2 Gi	1 Gi	4 CPUs 4 Gi Ephemeral Storage: 2 Gi
Nudr-nrf-client-nfmanagement-service	nrf-client-nfmanagement	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
App-info	app-info	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Perf-info	perf-info	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Nudr-dbcrauditor-service	nudr-dbcrauditor-service	1	2 CPUs	2 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 1 Gi

The following table provides observation data for the performance test that can be used for the benchmark testing to scale up EIR performance:

Table 3-13 Result and Observation

Parameter	Values
TPS Achieved	20K
Success Rate	100%
Average EIR processing time (Request and Response)	9 ms
EIR Response Timeout	2.7s
N17 Latency:	6 ms
S13 Latency	7 ms

3.3 Test Scenario 3: UDR Call Model: 25K N36 300 Notifications and 600 Provisioning (SOAP) Profile (40M Subscribers)

You can perform benchmark tests on UDR for compute and storage resources by considering the following conditions:

- Signaling: 25K TPS
- Provisioning: 600 TPS
- Total Subscribers: 40 Million

The following features are enabled for this testcase:

- Auto Enrollment and Auto Create Features
- Overload Handling
- ETag (Entity Tag)
- Ingress Gateway Pod Protection Using Rate Limiting
- Support for User-Agent Header
- 3gpp-Sbi-Correlation-Info Header
- Suppress Notification
- Support for Post Operation for an Existing Subscription
- Subscriber Activity Logging

The following table describes the benchmarking parameters and their values:

Table 3-14 Traffic Model Details

Request Type	Details	TPS
N36 traffic 25K TPS	subs-to-notify POST	5K (20%)
	sm-data GET	5K (20%)
	subs-to-notify DELETE	5K (20%)
	sm-data PATCH	10K (40%)
SOAP PROVISIONING 600 TPS	GET	100
	UPDATE QUOTA	50
	UPDATE DYNAMIC QUOTA	50

Table 3-14 (Cont.) Traffic Model Details

Request Type	Details	TPS
	UPDATE STATE	100
	UPDATE SUBSCRIBER	100
	CREATE SUBSCRIBER	100
	DELETE SUBSCRIBER	100

The following table describes the test case parameters and their values:

Table 3-15 Testcase Parameters

Input Parameter Details	Configuration Values
UDR Version Tag	25.2.201
Target TPS	25K TPS Signaling + 600 SOAP
Notification Rate	300

Table 3-16 Consolidated Resource Requirement per Site

Resource	CPU	Memory	Ephemeral Storage	PVC
cnDBTier	164 CPUs	643 Gi	29 Gi	2070 Gi
UDR	270 CPUs	192 Gi	57 Gi	NA
PROVGW	28	28	10	NA
Buffer	50 CPUs	50 Gi	20 Gi	200 Gi
Total	519 CPUs	913 Gi	116 Gi	2270 Gi

The following table describes cnDBTier resources:

Table 3-17 cnDBTier Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	PVC Allocation Per Pod	Total Resources
Management node (ndbmcmd)	mysqlndbcluster	2	2 CPUs	10 Gi	1 Gi	15 Gi	4 CPUs 20 Gi Ephemeral Storage: 2 Gi PVC: 30 Gi
Data node (ndbmt)	mysqlndbcluster	4	9 CPUs	124 Gi	1 Gi	134 Gi	36 CPUs 496 Gi Ephemeral Storage: 4 Gi PVC: 1416 Gi

Table 3-17 (Cont.) cnDBTier Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	PVC Allocation Per Pod	Total Resources
APP SQL node (ndbappmysqld)	mysqlndbcluster	18	6 CPUs	4 Gi	1 Gi	8 Gi	108 CPUs 72 Gi Ephemeral Storage: 18 Gi PVC: 144 Gi
SQL node (Used for Replication) (ndbmysqld)	mysqlndbcluster	2	4 CPUs	24 Gi	1 Gi	110 Gi	8 CPUs 48 Gi Ephemeral Storage: 2 Gi PVC: 220 Gi
DB Monitor Service (db-monitor-svc)	db-monitor-svc	1	4 CPUs	4 Gi	1 Gi	NA	4 CPUs 4 Gi Ephemeral Storage: 1 Gi
DB Backup Manager Service (backup-manager-svc)	backup-manager-svc	1	1 CPU	1 Gi	1 Gi	NA	1 CPU 1 Gi Ephemeral Storage: 1 Gi
Replication service (Multi site cases)	replication-svc	1	2 CPUs	2 Gi	1 Gi	260 Gi	2 CPUs 2 Gi Ephemeral Storage: 1 Gi PVC: 260 Gi

The following table describes UDR resources:

Table 3-18 UDR Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
Ingress-gateway-sig	ingressgateway-sig	13	6 CPUs	4 Gi	1 Gi	78 CPUs 52 Gi Ephemeral Storage: 13 Gi

Table 3-18 (Cont.) UDR Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
Ingress-gateway-prov	ingressgateway-prov	2	4 CPUs	4 Gi	1 Gi	8 CPUs 8 Gi Ephemeral Storage: 2 Gi
Nudr-dr-service	nudr-dr-service	21	6 CPUs	4 Gi	1 Gi	126 CPUs 84 Gi Ephemeral Storage: 21 Gi
Nudr-dr-prov-service	nudr-dr-prov-service	3	4 CPUs	4 Gi	1 Gi	12 CPUs 12 Gi Ephemeral Storage: 3 Gi
Nudr-notify-service	nudr-notify-service	3	6 CPUs	5 Gi	1 Gi	18 CPUs 15 Gi Ephemeral Storage: 3 Gi
Nudr-egress-gateway	egressgateway	2	6 CPUs	4 Gi	1 Gi	12 CPUs 8 Gi Ephemeral Storage: 2 Gi
Nudr-config	nudr-config	2	1 CPUs	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Nudr-config-server	nudr-config-server	2	1 CPUs	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Alternate-route	alternate-route	2	2 CPUs	2 Gi	1 Gi	4 CPUs 4 Gi Ephemeral Storage: 2 Gi
Nudr-nrf-client-nfmanagement-service	nrf-client-nfmanagement	2	1 CPUs	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi

Table 3-18 (Cont.) UDR Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
App-info	app-info	2	1 CPUs	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Perf-info	perf-info	2	1 CPUs	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Nudr-dbcr-auditor-service	nudr-dbcr-auditor-service	1	2 CPUs	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 1 Gi

The following table describes Provisioning Gateway resources:

Table 3-19 Provisioning Gateway Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
provgw-ingress-gateway	ingressgateway	2	4 CPUs	4 Gi	1 Gi	8 CPUs 8 Gi Memory Ephemeral Storage: 2 Gi
provgw-egress-gateway	egressgateway	2	4 CPUs	4 Gi	1 Gi	8 CPUs 8 Gi Memory Ephemeral Storage: 2 Gi
provgw-service	provgw-service	4	2 CPUs	2 Gi	1 Gi	8 CPUs 8 Gi Memory Ephemeral Storage: 4 Gi
provgw-config	provgw-config	2	2 CPUs	2 Gi	1 Gi	4 CPUs 4 Gi Memory Ephemeral Storage: 2 Gi

The following table provides observation data for the performance test that can be used for the benchmark testing to scale up UDR performance:

Table 3-20 Result and Observation

Parameter	Values
TPS Achieved	25K Signaling + 600
UDR Request Average Latency	30ms
Success rate	100%
UDR Response Timeout	2.7s
Signaling Requests Latency Recorded	24ms
Provisioning Requests Latency Recorded	38ms

3.4 Test Scenario 4: UDR Call Model: 17.2K N36 + 10K SH+1.2K Notifications and 600 Provisioning (SOAP) Profile (40M Subscribers)

You can perform benchmark tests on UDR for compute and storage resources by considering the following conditions:

- Signaling : 17.2K N36 + 10K SH
- Provisioning: 600 TPS
- Total Subscribers: 40 Million

The following features are enabled for this testcase:

- Auto Enrollment and Auto Create Features
- Overload Handling
- ETag (Entity Tag)
- Ingress Gateway Pod Protection Using Rate Limiting
- Support for User-Agent Header
- 3gpp-Sbi-Correlation-Info Header
- Suppress Notification
- Subscriber Activity Logging
- Diameter Gateway Pod Congestion Control
- Support for Post Operation for an Existing Subscription

The following table describes the benchmarking parameters and their values:

Table 3-21 Traffic Model Details

Request Type	Details	TPS
N36 17.2K TPS	subs-to-notify POST	3.44K (20%)
	sm-data GET	3.44K (20%)
	subs-to-notify DELETE	3.44K (20%)
	sm-data PATCH	6.88K (40%)
SH 10K TPS	UDR	4K

Table 3-21 (Cont.) Traffic Model Details

Request Type	Details	TPS
SOAP PROVISIONING 600 TPS	PUR	1.2K
	SNR	4.8K
	GET	100
	UPDATE QUOTA	50
	UPDATE DYNAMIC QUOTA	50
	UPDATE STATE	100
	UPDATE SUBSCRIBER	100
	CREATE SUBSCRIBER	100
	DELETE SUBSCRIBER	100

The following table describes the test case parameters and their values:

Table 3-22 Testcase Parameters

Input Parameter Details	Configuration Values
UDR Version Tag	25.2.201
Target TPS	17.2K N36 + 10K SH + 600 SOAP
Notification Rate	1.2K

Table 3-23 Consolidated Resource Requirement per Site

Resource	CPU	Memory	Ephemeral Storage	PVC
cnDBTier	155 CPUs	642 Gi	25 Gi	2038 Gi
UDR	288 CPUs	206 Gi	60 Gi	NA
PROVGW	28 CPUs	28 Gi	10 Gi	NA
Buffer	50 CPUs	50 Gi	20 Gi	200 Gi
Total	528 CPUs	926 Gi	115 Gi	2238 Gi

The following table describes cnDBTier resources:

Table 3-24 cnDBTier Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	PVC Allocation Per Pod	Total Resources
Management node (ndbmgmd)	mysqlndbcluster	2	2 CPUs	10 Gi	1 Gi	15 Gi	4.5 CPUs 21 Gi Ephemeral Storage: 2 Gi PVC: 30 Gi
	db-infra-monitor-svc		200m CPU	256 MB			

Table 3-24 (Cont.) cnDBTier Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	PVC Allocation Per Pod	Total Resources
Data node (ndbmqd)	mysqlndbcluster	4	9 CPUs	124 Gi	1 Gi	134 Gi (backup: 220 Gi)	45 CPUs 501 Gi Ephemeral Storage: 4 Gi PVC: 1416 Gi
	db-infra-monitor-svc		200m CPU	256 MB			
	db-backup-executor-svc		2 CPU	1 Gi			
APP SQL node (ndbappmysqld)	mysqlndbcluster	14	6 CPUs	4 Gi	1 Gi	8 Gi	89 CPUs 63 Gi Ephemeral Storage: 14 Gi PVC: 112 Gi
	db-infra-monitor-svc		200m CPU	256 MB			
	init-sidecar		100m CPU	256 MB			
SQL node (Used for Replication) (ndbmysqld)	mysqlndbcluster	2	4 CPUs	24 Gi	1 Gi	110 Gi	9 CPUs 49 Gi Ephemeral Storage: 2 Gi PVC: 220 Gi
	db-infra-monitor-svc		200m CPU	256 MB			
	init-sidecar		100m CPU	256 MB			
DB Monitor Service (db-monitor-svc)	db-monitor-svc	1	4 CPUs	4 Gi	1 Gi	NA	4 CPUs 4 Gi Ephemeral Storage: 1 Gi
DB Backup Manager Service (backup-manager-svc)	backup-manager-svc	1	1 CPU	1 Gi	1 Gi	NA	1 CPU 1 Gi Ephemeral Storage: 1 Gi
Replication service (Multi site cases)	replication-svc	1	2 CPUs	2 Gi	1 Gi	260 Gi	2.1 CPUs 2.3 Gi Ephemeral Storage: 1 Gi PVC: 260 Gi
	init-discover-sql-ips		100m CPU	256 MB			

The following table describes UDR resources:

Table 3-25 UDR Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
Ingress-gateway-sig	ingressgateway-sig	9	6 CPUs	4 Gi	1 Gi	54 CPUs 36 Gi Ephemeral Storage: 9 Gi

Table 3-25 (Cont.) UDR Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
Ingress-gateway-prov	ingressgateway-prov	2	4 CPUs	4 Gi	1 Gi	8 CPUs 8 Gi Ephemeral Storage: 2 Gi
Nudr-dr-service	nudr-dr-service	17	6 CPUs	4 Gi	1 Gi	102 CPUs 68 Gi Ephemeral Storage: 17 Gi
Nudr-dr-prov-service	nudr-dr-prov-service	3	4 CPUs	4 Gi	1 Gi	12 CPUs 12 Gi Ephemeral Storage: 3 Gi
Nudr-notify-service	nudr-notify-service	3	6 CPUs	5 Gi	1 Gi	18 CPUs 15 Gi Ephemeral Storage: 3 Gi
Nudr-egress-gateway	egressgateway	2	6 CPUs	4 Gi	1 Gi	12 CPUs 8 Gi Ephemeral Storage: 2 Gi
Nudr-diam-gateway	nudr-diam-gateway	2	6 CPUs	5 Gi	1 Gi	12 CPUs 10 Gi Ephemeral Storage: 2 Gi
Nudr-diameterproxy	nudr-diameterproxy	9	6 CPUs	4 Gi	1 Gi	54 CPUs 36 Gi Ephemeral Storage: 9 Gi
Nudr-config	nudr-config	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Nudr-config-server	nudr-config-server	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi

Table 3-25 (Cont.) UDR Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
Alternate-route	alternate-route	2	2 CPUs	2 Gi	1 Gi	4 CPUs 4 Gi Ephemeral Storage: 2 Gi
Nudr-nrf-client-nfmanagement-service	nrf-client-nfmanagement	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
App-info	app-info	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Perf-info	perf-info	2	1 CPU	1 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 2 Gi
Nudr-dbcrauditor-service	nudr-dbcrauditor-service	1	2 CPUs	2 Gi	1 Gi	2 CPUs 2 Gi Ephemeral Storage: 1 Gi

The following table describes Provisioning Gateway resources:

Table 3-26 Provisioning Gateway Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
provgw-ingress-gateway	ingressgateway	2	4 CPUs	4 Gi	1 Gi	8 CPUs 8 Gi Memory Ephemeral Storage: 2 Gi
provgw-egress-gateway	egressgateway	2	4 CPUs	4 Gi	1 Gi	8 CPUs 8 Gi Memory Ephemeral Storage: 2 Gi

Table 3-26 (Cont.) Provisioning Gateway Resources

Micro service name	Container name	Number of Pods	CPU Allocation Per Pod	Memory Allocation Per Pod	Ephemeral Storage Per Pod	Total Resources
provgw-service	provgw-service	4	2 CPUs	2 Gi	1 Gi	8 CPUs 8 Gi Memory Ephemeral Storage: 4 Gi
provgw-config	provgw-config	2	2 CPUs	2 Gi	1 Gi	4 CPUs 4 Gi Memory Ephemeral Storage: 2 Gi

The following table provides observation data for the performance test that can be used for the benchmark testing to scale up UDR performance:

Table 3-27 Result and Observation

Parameter	Values
TPS Achieved	17.2K N36 + 10K SH + 600
UDR Request Average Latency	31ms
Success rate	100%
UDR Response Timeout	2.7s
Signaling Requests Latency Recorded	31ms
Provisioning Requests Latency Recorded	45ms
Diameter (SH) Requests Latency Recorded	18ms