

Oracle AI Cloud Database Service Professional Workshop (2025)

Student Guide
D111158GC10

Learn more from Oracle University at education.oracle.com



Copyright © 2025, Oracle and/or its affiliates.

Disclaimer

This document contains proprietary information and is protected by copyright and other intellectual property laws. The document may not be modified or altered in any way. Except where your use constitutes "fair use" under copyright law, you may not use, share, download, upload, copy, print, display, perform, reproduce, publish, license, post, transmit, or distribute this document in whole or in part without the express authorization of Oracle.

The information contained in this document 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.

Restricted Rights Notice

If this documentation is delivered to the United States Government or anyone using the documentation on behalf of the United States Government, 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" or "commercial computer software documentation" 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.

Trademark Notice

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.

Third-Party Content, Products, and Services Disclaimer

This 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.

----- **Important Note** -----

Oracle AI Cloud Database has replaced **Oracle Cloud Database**. This change was announced at Oracle AI World in October 2025. The architecture, concepts, and features presented in this course remain fully relevant.

Table of Contents

- Oracle Base Database Service Overview 18**
 - Oracle Base Database Service 19
 - Automated Database Life Cycle Operations under Customer Control 20
 - Choice of Licensing Models for Maximum Value 21
 - License Included Oracle Database OCPU Consumption Options 22
 - Virtual Machines 23
 - Virtual Machine Database System Options 24
 - Shapes for Virtual Machine Database Systems 25
 - Base Database Service Storage Architecture 26
 - Fault Domains, Availability Domains, and Regions 27
 - Oracle Maximum Availability Architecture (MAA) 28
 - Integrated Security from Data to Identity 30
 - Data Safe – Database Security Control Center 31
- Provision Oracle Base Database Service 32**
 - Objectives 33
 - OCI Networking Concepts (Region, VCN, Subnet, AD) 34
 - Identity and Access Management Service 35
 - Identity and Access Management (IAM) Policy: Syntax 36
 - Prerequisites to Launch a Base Database Service Instance 37
 - Log in to OCI Console 38
 - Launch Console to Create a VCN 39
 - Create a VCN 40
 - Use Console to Create Base Database Service DB System 41

| | |
|--|-----------|
| Create Base Database Service DB System | 42 |
| Fill In Information Required for Creating DB System | 43 |
| Viewing DB System Provisioning from OCI Console | 44 |
| Using the Console to Check the Status of a DB System | 46 |
| DB System Tags | 47 |
| Create and Manage Tags | 48 |
| DB System OS Users | 49 |
| Base Database Service DB System OS Users | 50 |
| DB System SSH Connection | 51 |
| Connect to Base Database Service VM with SSH | 52 |
| Summary | 53 |
| Manage Oracle Base Database Service | 54 |
| Objectives | 55 |
| DB System Management | 56 |
| Cloud Automation for Life Cycle Management | 57 |
| View DB System and Database Details | 58 |
| Oracle Cloud Infrastructure Console | 59 |
| Display Base Database Service DB System Details | 60 |
| View Database Details | 61 |
| Scale Storage | 62 |
| Scale Storage Up | 63 |
| Scale CPU | 64 |
| Scale OCPUs for Base Database Service DB Systems | 65 |
| Create Database from Backup | 66 |
| Create Database | 67 |
| Find Available Database Backups | 68 |

| | |
|---|-----------|
| Create Database Based on Point-In-Time Restore | 69 |
| Clone Database | 70 |
| Clone a Base Database Service DB System | 71 |
| Enable Data Guard | 73 |
| What is Oracle Data Guard? | 74 |
| Oracle Cloud Network Topology with Data Guard | 75 |
| Benefits of Implementing Oracle Data Guard | 76 |
| Benefits of Implementing Oracle Active Data Guard | 77 |
| Role Transitions: Switchover and Failover | 78 |
| Data Guard: Reinstate | 79 |
| Data Guard Configuration Options: Protection Modes | 80 |
| Redo Transport Configuration Options | 81 |
| Base Database Service: Enable Data Guard | 82 |
| Start, Stop, Reboot DB System Nodes | 83 |
| Start, Stop, and Reboot a DB System Node | 84 |
| PDB Management | 85 |
| PDB Life Cycle Management | 86 |
| Terminate DB System | 90 |
| Terminate a Virtual Machine DB System | 91 |
| Summary | 92 |
| Oracle Base Database Service - Backup & Recovery | 93 |
| Objectives | 94 |
| Backup Types | 95 |
| Cloud Automation for Backups | 97 |
| Cloud Automation for Backup Operations | 98 |
| Backup Destinations | 99 |

| | |
|--|------------|
| Zero Data Loss Autonomous Recovery Service | 101 |
| Backup Retention Periods | 102 |
| Automatic Backup Retention Periods | 103 |
| Configuring Automatic Backups | 104 |
| Edit Backup Settings for Existing DB in Public Cloud | 105 |
| Configure DB Automatic Backups to Recovery Service | 106 |
| Configure DB Automatic Backups to Object Storage | 107 |
| Configure Automatic Backup During DB Creation | 108 |
| List Available Backups | 109 |
| View a List of Available Backups with the Console | 110 |
| Create On-Demand Database Backups | 111 |
| Create an On-Demand Full Backup of a Database | 112 |
| Restore Database Options | 113 |
| Backup and Restore from Standby | 115 |
| Backup and Restore Options from Standby | 116 |
| Backup and Recovery Summary | 117 |
| Backup and Restore Features for Base Database Service | 118 |
| Summary | 119 |
| Oracle Base Database Service Updates & Upgrades | 120 |
| Objectives | 121 |
| Best Practices | 122 |
| DB System Update and Upgrade Best Practices | 123 |
| Update DB System | 124 |
| Update a DB System | 125 |
| Updating (Patching) the Operating System | 126 |
| Update Grid Infrastructure (GI) | 127 |

| | |
|---|------------|
| Update Database Home | 128 |
| Update a Database Home | 129 |
| View DB System and Database Patch History | 130 |
| Preparing for 12c to 19c Database Upgrade | 131 |
| Understanding the Database Upgrade Operation | 132 |
| Upgrading a Database with a Data Guard Association | 133 |
| Upgrade 12c Database to 19c | 134 |
| Summary | 135 |
| Exadata Database Service - Exadata Database Service Overview | 136 |
| Exadata Overview | 137 |
| Exadata Database Machine: What is it? | 138 |
| Exadata Vision | 139 |
| Exadata Optimizations | 140 |
| Fastest OLTP | 141 |
| Fastest Analytics | 142 |
| Best Consolidation | 143 |
| Thousands of Critical Deployments, On Premises, and in the Cloud | 144 |
| Exadata Database Service | 145 |
| What is the Exadata Database Service? | 146 |
| Exadata in Oracle Cloud: Most Complete Database Service Available | 147 |
| Exadata Database Service | 148 |
| Choice of Deployment Locations 100% Compatible | 149 |
| Exadata Database Service on Dedicated Infrastructure | 150 |
| Exadata Database Service on Cloud@Customer | 151 |
| Exadata Database Service | 152 |
| Exadata Database Service: Management Responsibilities Simple Cloud Management Model | 153 |

| | |
|--|------------|
| Automated database lifecycle operations under customer control | 154 |
| Exadata Database Service | 155 |
| Exadata in Oracle Cloud Architecture | 156 |
| Hybrid Cloud: Public Cloud Simplicity and Elasticity Behind your Firewall | 157 |
| Exadata Database Service Cloud@Customer Architecture | 158 |
| Exadata Database Service | 159 |
| Cost-Effective Software Licensing Models | 160 |
| Elastic OCPU Scaling - Pay Only for What You Use | 161 |
| Exadata Database Service | 162 |
| Integrated Security from Data to Identity | 163 |
| Operator Access Control (OpCtl) | 164 |
| Change Log | 165 |
| Exadata extreme performance, now available in every leading cloud | 166 |
| Exadata Database Service - Provisioning Exadata Cloud@Customer Instance | 167 |
| Objectives | 168 |
| Exadata Database Service | 169 |
| Network Architecture | 170 |
| Provisioning ExaDB-C@C Infrastructure Process | 172 |
| ExaDB-C@C: Planning for the Control Plane Configuration | 173 |
| ExaDB-C@C: Plan for Exadata System Networks | 174 |
| ExaDB-C@C: Plan for DNS & NTP servers | 175 |
| Activate ExaDB-C@C Infrastructure | 178 |
| ExaDB-C@C: VM Cluster Network Overview | 181 |
| ExaDB-C@C: VM Cluster Resource Overview | 184 |
| Summary | 186 |
| Change Log | 187 |

| | |
|--|------------|
| Exadata Database Service - Exadata Infrastructure and VM Cluster Management | 188 |
| Objectives | 189 |
| Exadata Database Service | 190 |
| Managing Exadata Cloud Infrastructure Overview | 191 |
| Exadata Database Service: Responsibility Matrix | 192 |
| Exadata Database Service | 193 |
| Identity and Access Management Service | 194 |
| Identity & Access Management (IAM) Policy: Syntax | 195 |
| Exadata Database Service | 196 |
| Infrastructure Maintenance Process | 197 |
| Infrastructure Update Types | 198 |
| Critical Infrastructure Update Process | 199 |
| Infrastructure Maintenance Scheduling Policies | 200 |
| Automatic Infrastructure Maintenance Scheduling | 201 |
| Edit Scheduled Infrastructure Maintenance | 202 |
| View Infrastructure Maintenance History | 203 |
| Impact of Infrastructure Maintenance | 204 |
| Exadata Database Service | 205 |
| Scale Exadata Infrastructure | 206 |
| Exadata Database Service | 208 |
| Scale Exadata VM Cluster Resources | 209 |
| Exadata Database Service | 212 |
| Multi-VM on Exadata Database Service | 213 |
| VM Cluster Node Subsetting | 214 |
| Networking with Node Subsetting | 215 |
| Provision VM Cluster on Subset of DB Servers | 216 |

| | |
|--|------------|
| Shrink a provisioned VM cluster by removing VM(s) | 217 |
| Exadata Database Service | 218 |
| ExaDB: Updating License Type | 219 |
| Exadata Database Service | 220 |
| VM Power Management | 221 |
| Exadata Database Service | 222 |
| Relocate VM Cluster to another Compartment | 223 |
| Summary | 227 |
| MySQL HeatWave - Describe MySQL HeatWave | 228 |
| Objectives | 229 |
| MySQL Is the #1 Open-Source Database | 230 |
| Innovative Enterprises Across Many Industries Run MySQL | 231 |
| MySQL Is Optimized for OLTP, Not Designed for Analytic Processing | 232 |
| MySQL HeatWave Features Overview | 233 |
| One database Is Better than Two | 234 |
| MySQL HeatWave: One Database for OLTP, OLAP, ML & Lakehouse | 235 |
| Massive Amount of Data Stored in Files | 236 |
| MySQL HeatWave Lakehouse | 237 |
| Need to ETL Data to a Separate ML Solution for Training and Inference | 238 |
| Machine Learning with HeatWave ML No ETL, secure, saves effort, no additional cost, faster | 239 |
| What is MySQL Autopilot? | 240 |
| MySQL HeatWave Security and Ease of Use | 241 |
| MySQL HeatWave: Ease of Use | 242 |
| MySQL HeatWave: Security First | 243 |
| MySQL HeatWave: Security and Regulatory Compliance | 244 |
| MySQL HeatWave: Enterprise Ready | 245 |

| | |
|--|------------|
| MySQL HeatWave: Focus on Your Business | 246 |
| Remember: Describe the MySQL HeatWave | 247 |
| Summary | 248 |
| MySQL HeatWave Resources | 249 |
| MySQL HeatWave - Provision and connect to MySQL HeatWave | 250 |
| Agenda | 251 |
| Access MySQL HeatWave from Oracle Cloud Console | 252 |
| MySQL HeatWave Architecture | 253 |
| MySQL HeatWave System Build | 254 |
| Create MySQL HeatWave System | 255 |
| Create MySQL DB System | 256 |
| Create Compute Instance | 259 |
| MySQL HeatWave Connect and Load | 260 |
| SSH Compute and MySQL Shell | 261 |
| SSH and Workbench | 262 |
| Load Sample Data into MySQL HeatWave | 263 |
| MySQL HeatWave - Migrate MySQL On-Premises to MySQL HeatWave | 264 |
| Agenda | 265 |
| Why Migrate from MySQL On-Premises to MySQL HeatWave | 266 |
| Some Considerations Before Starting Migration | 267 |
| Plan MySQL Migration | 268 |
| Export MySQL Migration Data from On-Premises | 269 |
| Import MySQL Migration Data MySQL HeatWave | 270 |
| Migrate a MySQL Instance to MySQL HeatWave | 271 |
| MySQL HeatWave - Explain HeatWave OLAP, AutoML, and Lakehouse | 272 |
| Agenda | 273 |

| | |
|--|------------|
| Overview: Description | 274 |
| Heatwave + Cluster Architecture | 275 |
| HeatWave Cluster Prerequisites | 276 |
| Adding Cluster to MySQL HeatWave System | 277 |
| Adding Cluster to MySQL HeatWave - Estimate Node Count | 278 |
| Loading Data into the HeatWave Clusters | 279 |
| Running Queries in HeatWave | 280 |
| Machine learning in action with MySQL HeatWave | 281 |
| MySQL HeatWave Lakehouse | 282 |
| HeatWave Cluster Start and Stop | 283 |
| HeatWave Cluster Delete | 284 |
| MySQL HeatWave + Cluster | 285 |
| MySQL HeatWave - Operating MySQL HeatWave | 286 |
| Agenda | 287 |
| Manage MySQL HeatWave | 288 |
| Maintain MySQL HeatWave | 290 |
| Monitor MySQL HeatWave | 291 |
| MySQL HeatWave Performance | 292 |
| MySQL HeatWave Backup | 293 |
| Oracle NoSQL Database Cloud Service Overview | 295 |
| Oracle NoSQL Database | 296 |
| Product Licensing Options | 297 |
| NoSQL Databases | 298 |
| Oracle NoSQL Database Cloud Service | 299 |
| Feature Overview | 305 |
| Oracle NoSQL Database Cloud Service | 306 |

| | |
|--|------------|
| Pricing Model | 309 |
| Oracle NoSQL Database Cloud Service | 310 |
| Oracle NoSQL Database Cloud Service (NDCS) | 311 |
| Oracle NoSQL Database Cloud Service | 312 |
| Throughput Capacity | 314 |
| Write Unit and Read Unit | 315 |
| Oracle NoSQL Database Cloud Service | 316 |
| Seamless Multi-Model | 323 |
| Feature Overview | 324 |
| Fully Managed Cloud Service | 329 |
| Differentiators | 331 |
| Oracle NoSQL Database Cloud Service | 332 |
| Oracle Cloud Customer Connect | 333 |
| Oracle NoSQL Database Cloud Service Security | 334 |
| Agenda | 335 |
| Oracle NoSQL Database Cloud Service | 336 |
| Oracle NoSQL Database Cloud Service Instant Elasticity at Table Level | 337 |
| Oracle NoSQL Database Cloud Service | 338 |
| Oracle NoSQL Database Cloud Service Data Models | 339 |
| Agenda | 340 |
| Oracle NoSQL Database Cloud Service | 341 |
| Seamless Multi-Model | 348 |
| Feature Overview | 349 |
| Oracle NoSQL Database Cloud Service Throughput | 350 |
| Agenda | 351 |
| Oracle NoSQL Database Cloud Service | 352 |

| | |
|---|------------|
| Feature Overview | 353 |
| Throughput Capacity | 354 |
| Write Unit, Read Unit | 355 |
| Connecting Applications to Oracle NoSQL Database Cloud Service | 356 |
| Objectives | 357 |
| Credentials for Connecting to Oracle NoSQL Database Cloud Service | 359 |
| Connecting to Oracle NoSQL Database Cloud Service from Any Application | 360 |
| Connecting a Java Application to Oracle NoSQL Database Cloud Service | 361 |
| Connecting Using API | 362 |
| Connecting Using Configuration File | 363 |
| Connecting a Python Application to Oracle NoSQL Database Cloud Service | 364 |
| Connecting a Node.js Application to Oracle NoSQL Database Cloud Service | 365 |
| Connecting from Node.js Directly | 366 |
| Connecting from Node.js Using Configuration File | 367 |
| Connecting from Node.js Using IAMCredentialsProvider Object | 368 |
| Connecting a Go Application to Oracle NoSQL Database Cloud Service | 369 |
| Connecting a .NET Application to Oracle NoSQL Database Cloud Service | 371 |
| Connecting from .NET Directly | 372 |
| Connecting from .NET Using Configuration File | 373 |
| Data Regions | 374 |
| Service Endpoints for Data Regions 1/3 | 375 |
| Service Endpoints for Data Regions 2/3 | 376 |
| Service Endpoints for Data Regions 3/3 | 377 |
| External and Oracle Cloud Databases | 378 |
| Agenda | 379 |
| Database Management Service | 380 |

| | |
|---|------------|
| OCI Database Management | 381 |
| Key Use Cases | 382 |
| Monitoring and Management | 386 |
| Database Administration | 389 |
| Autonomous Database | 390 |
| Cloud Databases | 391 |
| External or On-Premises Databases | 392 |
| OCI Database Management Service | 393 |
| Database Management Supported Deployments | 394 |
| Database Management | 395 |
| Oracle Observability and Management Platform | 396 |
| Bare Metal, Virtual Machines, and Exadata Cloud | 397 |
| Agenda | 398 |
| Oracle Cloud Infrastructure Database Management Service | 399 |
| Database Management Service | 400 |
| Prerequisites and Permissions | 402 |
| Database Management | 403 |
| Architecture for Oracle Cloud Databases | 409 |
| Database Management | 411 |
| Enabling Database Management for Oracle Cloud Databases | 414 |
| Database Management | 418 |
| Database Management Pricing | 421 |
| Monitor Cloud Databases | 422 |
| Agenda | 423 |
| OCI Database Management | 424 |
| Cloud Database Metrics | 425 |

| | |
|---|------------|
| Alarm Definition | 426 |
| Alert Logs | 427 |
| Out-of-the-Box Dashboards | 428 |
| Custom Dashboards | 429 |
| Preferred Credentials | 430 |
| Diagnostics and Tuning of Cloud Databases | 431 |
| Agenda | 432 |
| OCI Database Management | 433 |
| Performance Hub | 434 |
| Real-Time SQL Monitoring | 435 |
| Exadata Monitoring | 436 |
| Top Activity Lite | 437 |
| Oracle Real Application Clusters (RAC) Monitoring | 438 |
| AWR Explorer | 439 |
| SQL Tuning Advisor | 440 |
| SQL Plan Management | 441 |
| Administration of Cloud Databases | 442 |
| Agenda | 443 |
| OCI Database Management | 444 |
| Database Administration | 445 |
| Schema Management 2/2 | 447 |
| Tablespace Management | 448 |
| Monitoring and Analyzing Optimizer Statistics | 449 |
| Database Scheduler Jobs | 450 |

