

Billing and Revenue Management: Cloud Native Implementation

Student Guide
D1103804GC10



Copyright © 2022, 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 and Java 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.

Table of Contents

Lesson 1: Introduction	15
Agenda	16
DevOps and cloud native	17
The Past: Monolithic Applications	18
Cloud Native Definitions	19
DevOps and Cloud Native: The New Normal for Enterprise IT	20
Modernize your IT, Increase Your Control	21
Cloud Native Principles	22
Docker & Kubernetes	23
Customer Benefits of Cloud Native	24
BRM Cloud Native Deployment Option	25
Oracle – a Leader in Cloud Native	26
Agenda	27
M&O Cloud Native Portfolio	28
The Importance of Cloud Native to Monetization & Orchestration	29
BRM Cloud Native Deployment Option – The New Norm	30
Easier Installs	31
Runs on Dynamic Cloud Native Infrastructure	32
Lesson 2: Oracle Cloud Infrastructure	33
Agenda	34
OCI offers cloud regions and multicloud around the world	35
OCI Region – HA Building Blocks	36
Inside an AD – High Scale, High Performance Network	37

Off-box Network Virtualization	38
Oracle Cloud Infrastructure Services	39
Virtual Cloud Network (VCN)	40
IP address range for your VCN	41
Subnet	42
Bare Metal, VM and Dedicated Hosts	44
Compute Shapes	45
Database Editions and Options	46
Compartments	47
Resource Identifiers	48
Security re-envisioned in the Cloud	49
Agenda	51
Universal Credits: flexible consumption - Unlimited access to all Oracle Cloud services	52
Two Free Trial Options	53
Always Free – What’s Included	54
Agenda	55
Three Ways to Run Kubernetes on OCI - Roll Your Own, Pre-Built Installer, Managed Service	56
Introducing Container Engine for Kubernetes - OKE	57
Oracle Kubernetes-as-a-Service	58
Working with OKE and OCIR on OCI	59
OKE Quick Create	60
OKE/OCIR Pricing and Packaging	61
Oracle Cloud Infrastructure	62
Terraform Kubernetes Installer for OCI	63
Terraform OKE Installer for OCI	64
Summary	65

Lab Overview	67
Labs Overview	68
Lab 1 – OCI Configuration	69
Lab 2 – Cluster Configuration	70
Lab 3 – Database Installation	71
Lab 4 – Ingress	72
Lab 5 – Monitoring	73
Lab 6 – Logging	74
Lab 7 – BRM Init DB	75
Lab 8 – NFS	76
Lab 9 – WKO	77
Lab 10 – BRM Installation	78
Lab 11 – Load Pricing	79
Lab 12 – ECE Installation	80
Sizing	81
Lesson 3: Docker, Kubernetes and Helm	83
Agenda	84
Containers: part of the Multi-Dimensional Evolution of Computing	85
From servers to containers	86
Container vs. Virtual Machine	87
Containers	88
Historic Timeline of Unix Containers	89
Agenda	90
What is Docker?	91
Docker Image	92
Docker File	93

Docker Container	94
Agenda	95
Container Orchestration	96
What is Kubernetes (K8S)?	97
K8S Cluster - Master Node	98
K8S Cluster - Worker Nodes	99
K8S Resources - Pods	100
K8S Resources - Controllers	101
K8S Resources – Replica Sets	102
K8S Resources - Deployments	103
K8S Resources – Stateful sets	104
K8S Resources - Services	105
K8S Resources - Namespace	108
K8S Storage - Volumes	109
K8S Storage – Volume type examples	110
K8S Storage resources	111
K8S Storage – Access Modes	112
K8S Resources - Config Maps	113
kubectl – Common commands	114
kubectl - Example	115
Agenda	116
Helm	117
Helm Charts	118
Helm Repository	119
Templates	120
Values file	121

Lifecycle	122
Summary	124
Lesson 4: Prerequisites	125
Agenda	126
Kubernetes Cluster	127
Oracle Kubernetes Engine (OKE)	128
Google Kubernetes Engine (GKE)	129
Amazon Web Services	130
Microsoft Azure (AKS)	131
Agenda	132
Database Options	133
Oracle Database Offerings in OCI	134
Multi-tenant database	135
Existing BRM database	136
Agenda	137
Other prerequisites (I)	138
Other prerequisites (II)	139
Lesson 5: Ingress	141
Exposing BRM	142
Implementation Options: NodePort	143
Implementation Options: LoadBalancer	144
Ingress	145
Sample Setup	146
Explanation: Overview	147
Explanation: Traefik helm chart	148
Explanation: Load Balancer	149

Explanation: Ingress	150
Explanation: Destination service	151
Lesson 6: Operational Aspects: Monitoring	153
Agenda	154
Multi-Service Cloud Native Architecture	155
Introduction	156
Agenda	157
Introduction	158
Main Features	159
Architecture	160
Agenda	161
Introduction	162
Features	163
Agenda	164
Installation Pre-Requisites	165
Installation Steps (1)	166
Installation Steps (2)	167
Log into Grafana	168
Access a standard Grafana Dashboard	169
Example #1: ECE Monitoring Enablers – Grafana ECE Dashboard	170
Example #2: ECE Monitoring Enablers – Latency and Throughput	171
Agenda	172
Using Grafana Query Language	173
Importing Dashboards	174
Lesson 7: Operational Aspects: Logging	175
Agenda	176

Kubernetes: Logging Overview	177
Node Level Logging Agent	179
Using a Sidecar Container	180
OpenSearch and Fluentd Overview	181
BRM Cloud Native Deployment	182
Agenda	183
OpenSearch/Fluentd/OpenSearch Dashboards (EFK)	184
Kubernetes and Centralized Logging	185
Daemonsets	186
Sidecars	187
Logs in OpenSearch Dashboard	188
Agenda	189
Installing OpenSearch	190
Installing Fluentd: Daemonset	191
Installing Fluentd: Config Map	192
OpenSearch Dashboards UI	193
Agenda	194
Step 1: Launch OpenSearch Dashboards	195
Step 2: Create an Index Pattern	196
Step 3: Select the Index Pattern	197
Step 4: Select the Time Filter	198
Step 5: Discover Logs	199
Step 6: Filter Logs	200
Lesson 8: Installation	201
Installation steps	202
BRM Cloud Native Deployment	203

Installation steps	204
BRM Cloud Native Deployment Architecture	205
BRM Cloud Native Deployment Artifacts	206
Installation steps	207
Docker registry	208
Installation steps	209
BRM Cloud Native Helm Charts	210
Configure the BRM Cloud Native Deployment Package	212
Configuring Global Values in Helm Chart	213
Installation steps	214
Configure the BRM Cloud Native Deployment Package	215
Lesson 9: Persistent Storage	217
Agenda	218
Scenario	219
Options	220
NFS provisioner	221
OCI FSS	222
OCI Block storage	223
NFS with OCI Block storage	224
Agenda	225
BRM Volumes	226
Example: PVT volume	227
ECE Volumes	228
Billing Care Volumes	229
BOC Volumes	230
PDC Volumes	231

Lesson 10: WebLogic Kubernetes Operator	233
Agenda	234
Tools for operations	235
Kubernetes Controllers - Limitations	236
Operators – Introduction	237
Operators – Core Features	238
Operators – Examples	239
Agenda	240
Weblogic Kubernetes Operator (WKO)	241
Agenda	242
Operator job helm chart (oc-cn-op-job-helm-chart)	243
BRM Helm chart (oc-cn-helm-chart)	244
Lesson 11: Architecture	245
Agenda	246
BRM Cloud Native Deployment Artifacts	247
BRM Cloud Native Deployment Architecture	248
Agenda	249
K8S Internal Networking - Services	250
Example: DM-oracle service (1)	251
Example: DM-oracle service (2)	252
Agenda	253
Helm template	254
Configuration files	255
Readiness and Liveliness	256
Overall configuration file	257
Config map volumes	258

Lesson 12: Operating BRM	259
Agenda	260
Kubernetes Jobs	261
Configuration Changes	262
Configuration file changes	263
Rolling Update on Configuration Changes	264
Restarting BRM components	265
Agenda	266
Configurator job	267
Agenda	269
brm-apps job	270
Agenda	273
PDC jobs	274
ImportExportPricing	275
SyncPDC	276
Agenda	277
Simpler Updates and Efficient Scaling	278
Scaling Multi-Replica PODs: Options	279
Lesson 13: Elastic Charging Engine	281
Agenda	282
Kafka	283
Zookeeper	284
NoSQL	285
Agenda	286
Multi-Service Cloud Native Architecture – ECE PODs	287
One image, many pods,	

Stateful sets	290
Agenda	291
Startup	292
Republishing pricing data	293
Restarting ECE	294
ECE services	295
ECE state	296
Lesson 14: Customization	297
Agenda	298
Overview	299
Docker files	300
Docker files for base images	301
Base Image	302
Agenda	303
Required steps for customizing BRM & BC	304
Agenda	310
Required steps for customizing ECE	311
Agenda	317
Interim Patches	318
Patch sets	319

