Monitoring
Level 100
Safe Harbor Statement

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Objectives

After completing this lesson, you should be able to:

• Describe the OCI Monitoring Service
• Understand Metrics, Alarms, monitoring query language
• Create a query in the Metrics Explorer and trigger an alarm
OCI Monitoring Service

- OCI Monitoring service enables you to monitor your cloud resources
- Currently, supports Metrics and Alarms features
- Current supported services include compute, VCN, Load Balancer, Block and Object storage
- Metrics feature relays metric data about the health, capacity, and performance of your cloud resources
  - Offers a standard set of pre-defined metrics for most common OCI resources
  - Includes advanced Monitoring Query Language (MQL) for deeper insights
  - Supports custom metrics (customer can bring their own metrics)
- Alarms feature to notify you when metrics meet alarm-specified triggers
  - Notifications sent via the OCI Notification service for Email and PagerDuty
- OCI Monitoring service is available via the OCI Console, API, SDK, and Terraform
Metrics

• Metric: a measurement related to health, capacity, or performance of a given resource. E.g. CpuUtilization metric measures usage of a compute instance

• Metric -> Namespace + Dimension + Metadata
  • Namespace: an indicator of the resource, service, or application that emits the metric. E.g. the CpuUtilization metric lists the metric namespace oci_computeagent as its source
  • Dimension: a qualifier to filter or group metric data. E.g. dimension name-value pair for filtering by AD: availabilityDomain = "VeBZ:PHX-AD-1"
  • Metadata: A reference provided in a metric definition. E.g. unit (bytes), for oci_computeagent metricDiskBytesRead (provides additional information for a metric)

• Metric Stream: An individual set of aggregated data for a metric. A stream can be either specific to a single resource or aggregated across all resources in the compartment
Compute Metrics

<table>
<thead>
<tr>
<th>Metric Namespace*</th>
<th>Resource OCID</th>
<th>Where measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>oci_computeagent</td>
<td>Instance OCID</td>
<td>On the instance. Metrics in this namespace are aggregated across all the related resources on the instance. E.g., DiskBytesRead is aggregated across all the instance’s attached storage volumes, and NetworkBytesIn is aggregated across all the instance’s attached VNICs</td>
</tr>
<tr>
<td>oci_blockstore</td>
<td>Boot/Block OCID</td>
<td>By the Block Volume service. The metrics are for an individual boot/block volume</td>
</tr>
<tr>
<td>oci_vcn</td>
<td>VNIC OCID</td>
<td>By the Networking service. The metrics are for an individual VNIC</td>
</tr>
</tbody>
</table>

Other namespaces include oci_lbaas, oci_objectstorage, oci_notification
Metric Queries

- Monitoring Query Language (MQL) expression can be used to evaluate returning aggregated data. The query must specify a metric, statistic, and interval.
- Syntax: `metric[interval]{dimensionname=dimensionvalue}.groupingfunction.statistic`
  - Interval: frequency at which data points are aggregated. E.g. 5 min
  - Statistic: available functions include count, max, mean, rate, min, sum, and percentile

Examples
- Max CPU utilization at 1 min intervals, `CpuUtilization[1m].max()`
- Maximum CPU Utilization at a one-minute interval, filtered to a single resource, `CpuUtilization[1m]{resourceId="ocid1.instance.oc1.phx.exampleuniqueID"}.max()`
- All read IOPS at a one-minute interval, filtered to a compartment, aggregated for the maximum, `IopsRead[1m]{compartmentId="ocid1.compartment.oc1.phx..exampleuniqueID"}.grouping().max()`
Alarms

• The Alarms feature of the Monitoring service publishes alarm messages to configured destinations managed by the OCI Notification service

• Monitoring Query Language (MQL) expression can be used to evaluate for the alarm. An alarm query must specify a metric, statistic, interval, and a trigger rule (threshold or absence)

• Alarm states
  • Firing
  • Reset - The alarm is not detecting the metric firing; the metric is no longer being emitted
  • Suspended
Use case

• Service Metrics: same metrics as the resource specific ones, but for all the resources in a compartment. Allows for filtering with Dimensions
• Metric Explorer: Dive into detail on a specific metric and show multiple resource metrics together. Also includes a powerful Metric Query Language (MQL) interface for complex queries
• Alarm Definition: create an alarm based on a metric and create a notification via OCI Notifications Service (email and PagerDuty)
• Alarms Status: review the status of the configured firing alarms
• Both Monitoring pages plus the Resource specific charts allow the customer to create Alarms directly, prepopulating the query
Service Metrics

Monitor health, capacity, and performance of your Oracle Cloud Infrastructure resources through default queries provided by the selected service.

**COMPARTMENT:** Training

**METRIC_NAMESPACE:** oci_computeagent

**Dimensions**

**START TIME:** 2019-02-06 03:35

**END TIME:** 2019-02-06 04:39

**Not seeing all of your resources?**

---

**CPU Utilization**

**Options**

**Interval:** 1 minute

**Statistic:** Mean

---

**Memory Utilization**

**Options**

**Interval:** 1 minute

---

**Disk Read I/O**

**Options**

**Interval:** 1 minute

**Statistic:** Rate

---

**Disk Write I/O**

**Options**

**Interval:** 1 minute

**Statistic:** Rate
Define alarm

<table>
<thead>
<tr>
<th>ALARM NAME</th>
<th>CPU-AD1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALARM SEVERITY</td>
<td>Critical</td>
</tr>
</tbody>
</table>

**ALARM BODY**

Enter notification content. Example: High CPU usage alert. Follow runbook instructions for resolution.

Limited to 1000 characters (0/1000)

**Tags (optional)**

Tagging is a metadata system that allows you to organize and track alarms within your tenancy.

<table>
<thead>
<tr>
<th>TAG NAMESPACE</th>
<th>TAG KEY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>(apply a freeform tag)</td>
<td></td>
</tr>
</tbody>
</table>

**Metric description**

The metric to evaluate for the alarm.

<table>
<thead>
<tr>
<th>COMPARTMENT</th>
<th>METRIC NAMESPACE</th>
<th>METRIC NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>oci_computeeagent</td>
<td>CpuUtilization</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERVAL</th>
<th>STATISTIC</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1m</td>
<td>Mean</td>
<td></td>
</tr>
</tbody>
</table>
Metric dimensions (optional)

<table>
<thead>
<tr>
<th>DIMENSION NAME</th>
<th>DIMENSION VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>availabilityDomain</td>
<td>dKYS:US-ASHBURN-AD-1</td>
</tr>
</tbody>
</table>

AGGREGATE METRIC STREAMS

Trigger rule

The condition for putting the alarm in the firing state.

<table>
<thead>
<tr>
<th>OPERATOR</th>
<th>VALUE</th>
<th>TRIGGER DELAY MINUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>greater than</td>
<td>50</td>
<td>1</td>
</tr>
</tbody>
</table>

CPU Utilization

Query 1 (6 metric streams)

CpuUtilization([m](availabilityDomain = "dKYS:US-ASHBURN-AD-1").mean())
Notifications

Destinations

<table>
<thead>
<tr>
<th>DESTINATION SERVICE</th>
<th>COMPARTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notification Service</td>
<td>Training</td>
</tr>
<tr>
<td>Interacotive</td>
<td>(root)/Training</td>
</tr>
</tbody>
</table>

Create a new topic

<table>
<thead>
<tr>
<th>TOPIC NAME</th>
<th>TOPIC DESCRIPTION</th>
<th>OPTIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU-AD1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBSCRIPTION PROTOCOL</th>
<th>EMAIL ADDRESSES (COMMA OR SPACE SEPARATED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td><a href="mailto:rohit.rahi@oracle.com">rohit.rahi@oracle.com</a></td>
</tr>
</tbody>
</table>

- [Create topic and subscription]  [Cancel]

- [REPEAT NOTIFICATION IF ALARM CONTINUES TO EXIST]
- [NOTIFICATION INTERVAL]
  - 60 minutes

- [SUPPRESS NOTIFICATIONS]

- [ENABLE THIS ALARM]

This alarm applies to 6 metric streams.

- [Save alarm]  [Cancel]
SUMMARY
Alarm fires when the max() of this metric is greater than the threshold value of 80, with a trigger delay of a minute.

ALARM SEVERITY
Critical

EVALUATION
Compartment: Training-sub1
Namespace: oci_computereagent
Metric: CPUUtilization
Statistic: max()
Interval: 1m
Aggregation: None
Dimensions: resource=odd1.instance-oct1-lad-abuwej-tbds-iKbna1b0tcc;98twpvPdcniu0b8jpx4vks4v3jcfy7h06a
Notifications: 1 destination (don'ts)
Repeat notification: Repeats every 5 minutes
Suppression: Not suppressed
Last updated: 2019-02-06 04:10 GMT

TAGS
No tags applied

Alarm history

<table>
<thead>
<tr>
<th>START TIME</th>
<th>END TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019-02-06 00:17</td>
<td>2019-02-06 08:17</td>
</tr>
</tbody>
</table>

Query 1 (1 metric stream)

Transition time

<table>
<thead>
<tr>
<th>Transition time</th>
<th>Transition state</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019-02-06 06:02 GMT</td>
<td>Ok</td>
</tr>
<tr>
<td>2019-02-06 05:58 GMT</td>
<td>Firing</td>
</tr>
<tr>
<td>2019-02-06 04:03 GMT</td>
<td>Ok</td>
</tr>
<tr>
<td>2019-02-06 03:56 GMT</td>
<td>Firing</td>
</tr>
</tbody>
</table>
Monitoring Demo
Design Considerations

- OCI Monitoring service doesn’t support OCI DB Systems and ATP/ADW
- OCI Monitoring service doesn’t support FastConnect/VPN to report on availability, connectivity and performance between customer data centers and VCNs
- OCI compute instances need to have a public IP in order to emit metrics
Pricing

• OCI Monitoring Ingestion:
  • Price $0.0025 per 1 million data points ingested, first 500 Million data points ingested per month free

• OCI Monitoring Retrieval:
  • Price $0.0015 per 1 million data points analyzed, first 1 Billion data points analyzed per month free