



ORACLE



The background features abstract, textured shapes in shades of grey, red, and teal. The red shape is at the top right, the teal shape is below it, and a grey shape is on the left. There are also some small orange and yellow rectangular accents scattered around.

# Traffic Management Policies

## Level 100

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Oracle Cloud Infrastructure

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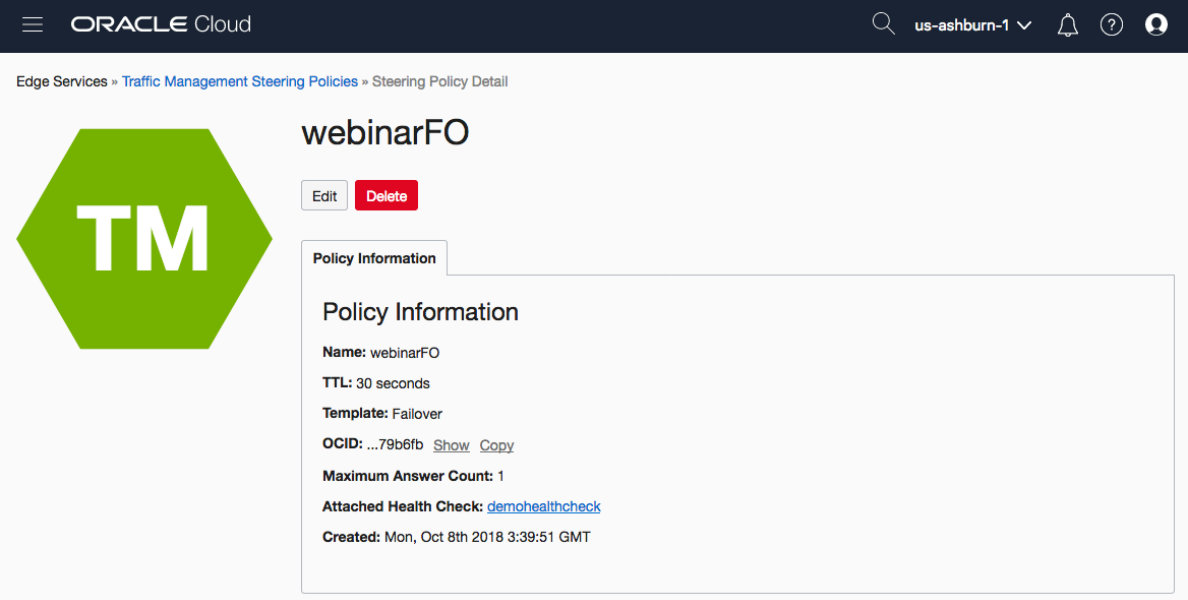
# Objectives

After completing this lesson, you should be able to:

- Traffic Management
  - Traffic Steering Use Cases
  - OCI Traffic Management Policies

# Traffic Management

- Traffic Management allows customers to configure routing policies for serving intelligent responses to DNS queries.
- Different answers may be served for a query according to the logic in the customer-defined Traffic Management Steering Policy, thus sending users to the most optimal location in your infrastructure.



The screenshot displays the Oracle Cloud console interface for a Traffic Management Steering Policy. The breadcrumb navigation shows 'Edge Services » Traffic Management Steering Policies » Steering Policy Detail'. The policy name is 'webinarFO', accompanied by a green hexagonal icon with 'TM' in white. There are 'Edit' and 'Delete' buttons. The 'Policy Information' tab is active, showing the following details:

- Name:** webinarFO
- TTL:** 30 seconds
- Template:** Failover
- OCID:** ...79b6fb [Show](#) [Copy](#)
- Maximum Answer Count:** 1
- Attached Health Check:** [demohealthcheck](#)
- Created:** Mon, Oct 8th 2018 3:39:51 GMT



# When should I use DNS Traffic Management?

## Common Use Cases

Failover



Cloud Migration



Load Balancing  
For Scale



Hybrid  
Environments



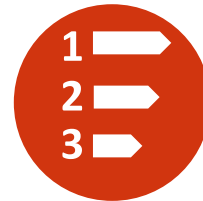
Worldwide  
Geolocation  
Steering



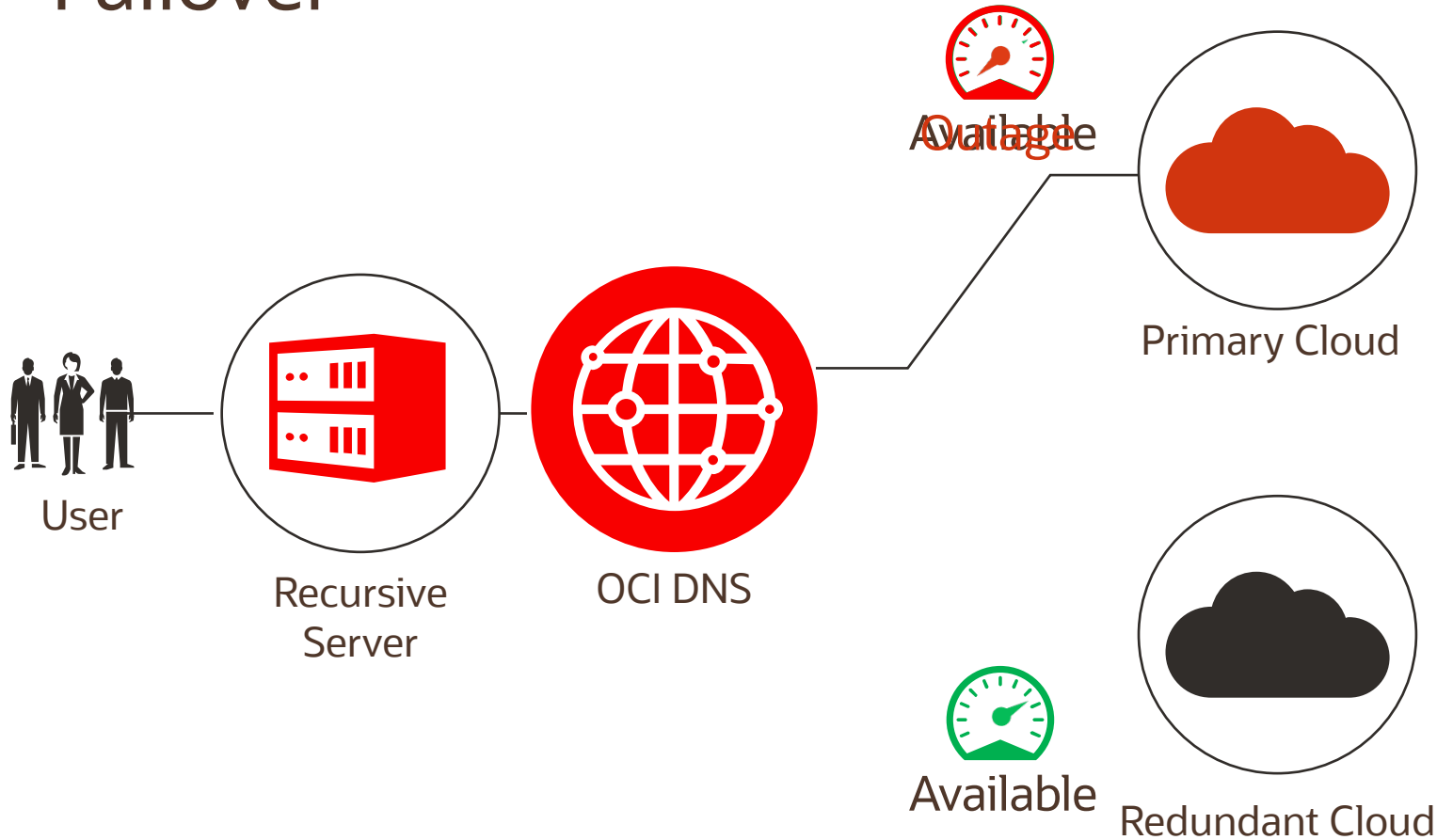
IP-Based  
Steering



Zero-Rating  
Service



# Failover



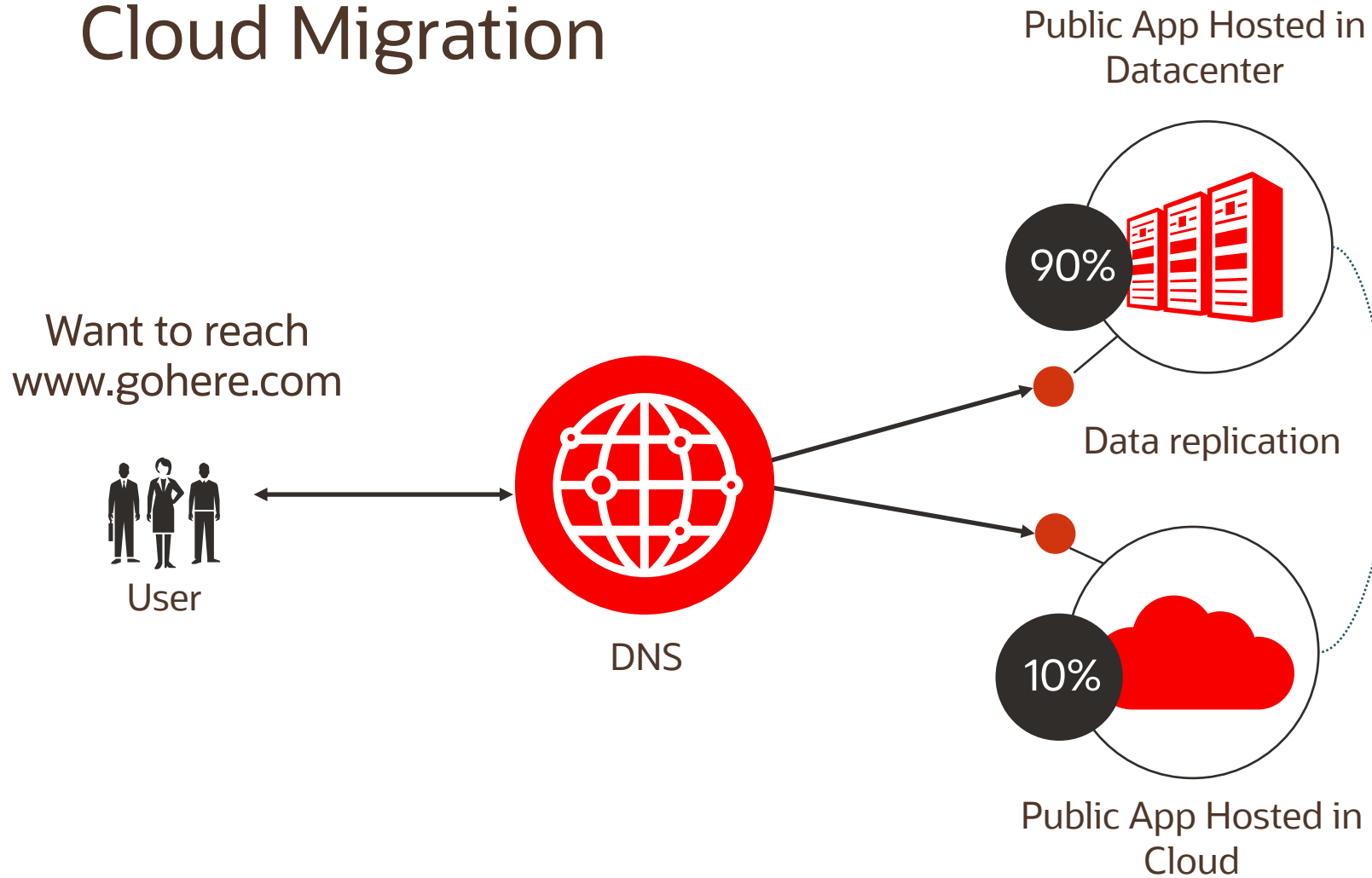
## A -> B Failover

Primary asset is monitored from multiple points via Oracle Health Checks

Traffic is automatically directed to a different endpoint as soon as service fails to respond

Monitoring is powered by Oracle Health Checks

# Cloud Migration

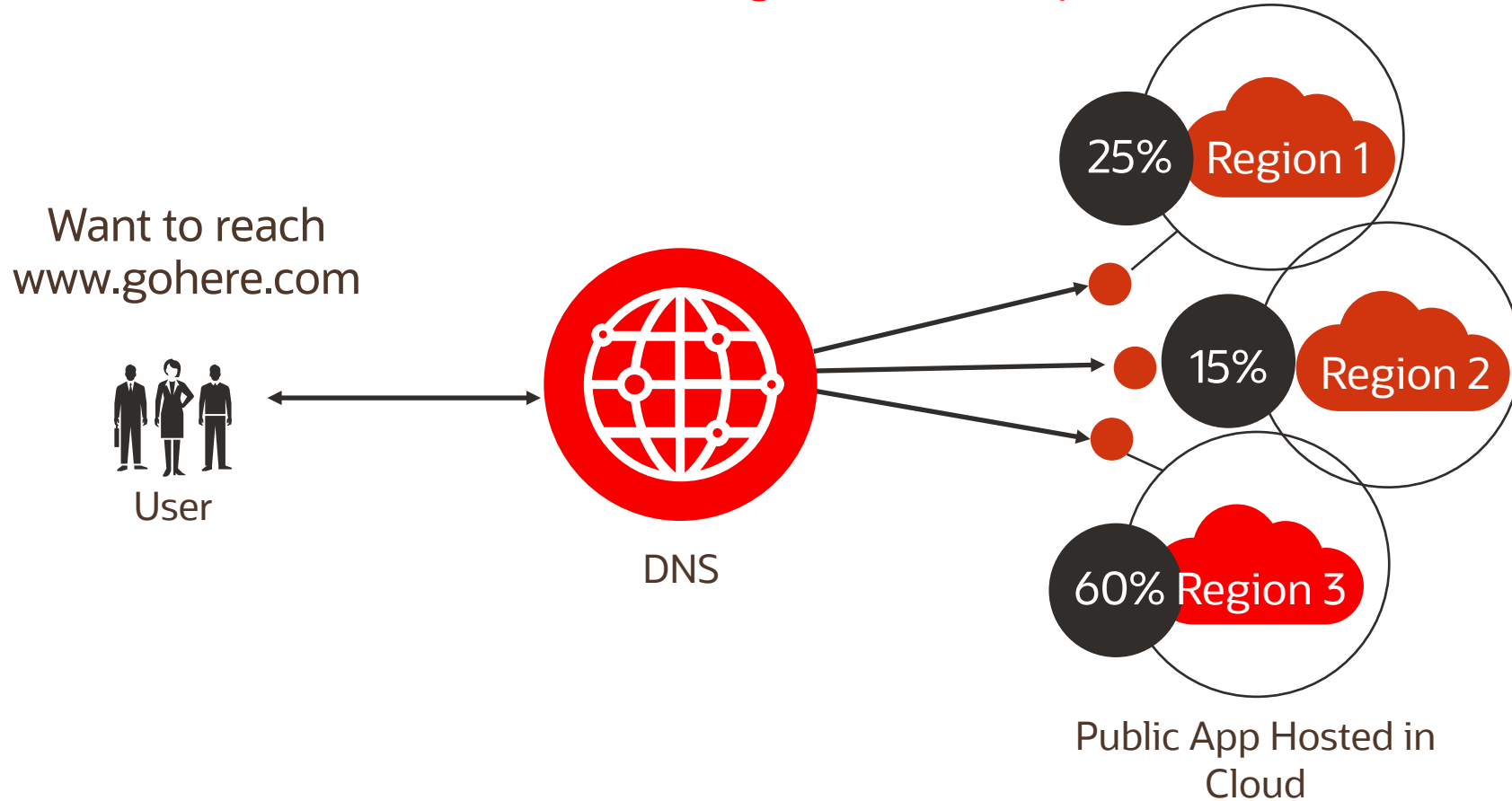


Utilize Ratio Load Balancing to migrate fractions of traffic to new cloud-hosted resources and test and validate access

Gradually migrate more traffic when confident in user experience

# Load Balancing for Scale

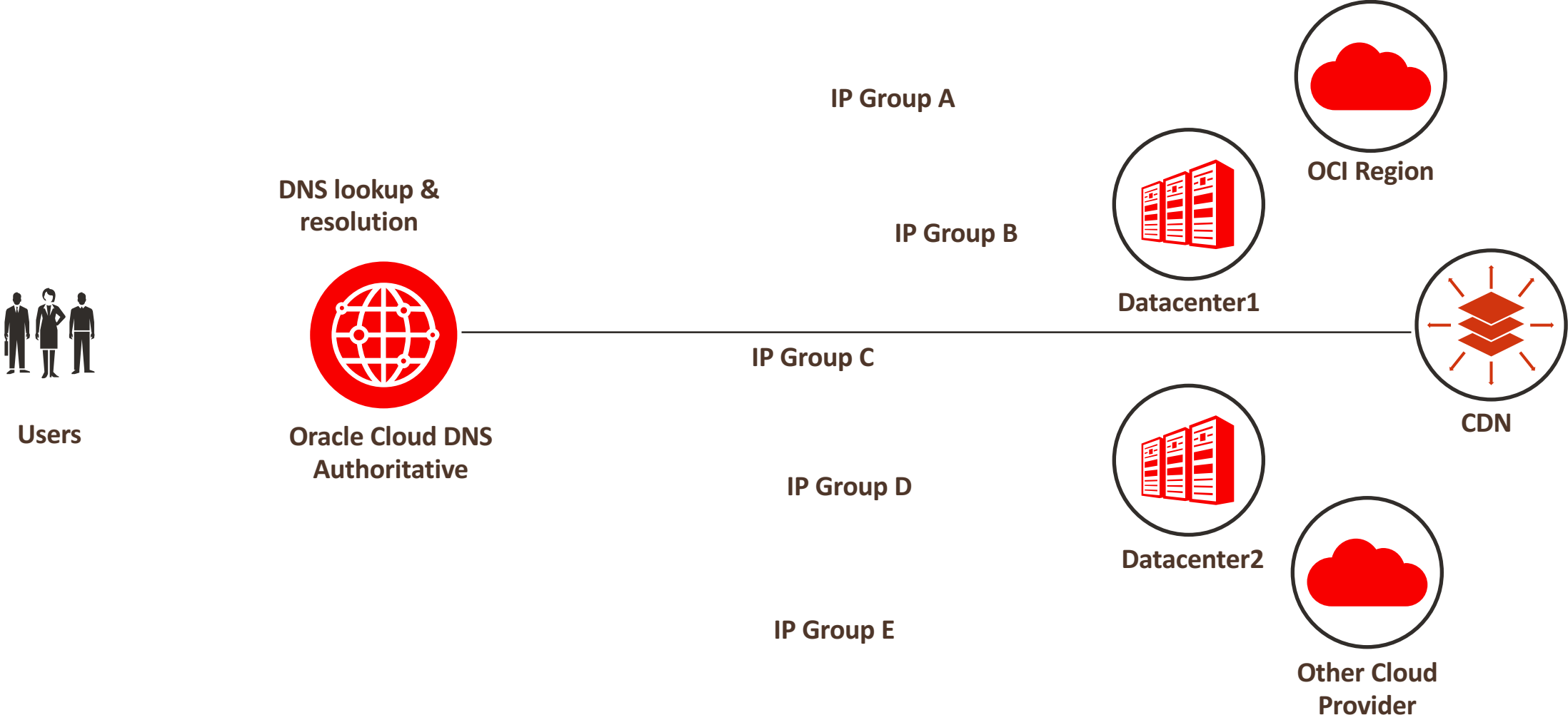
Change these to compute instances



For scaling, distribute load across multiple compute instances

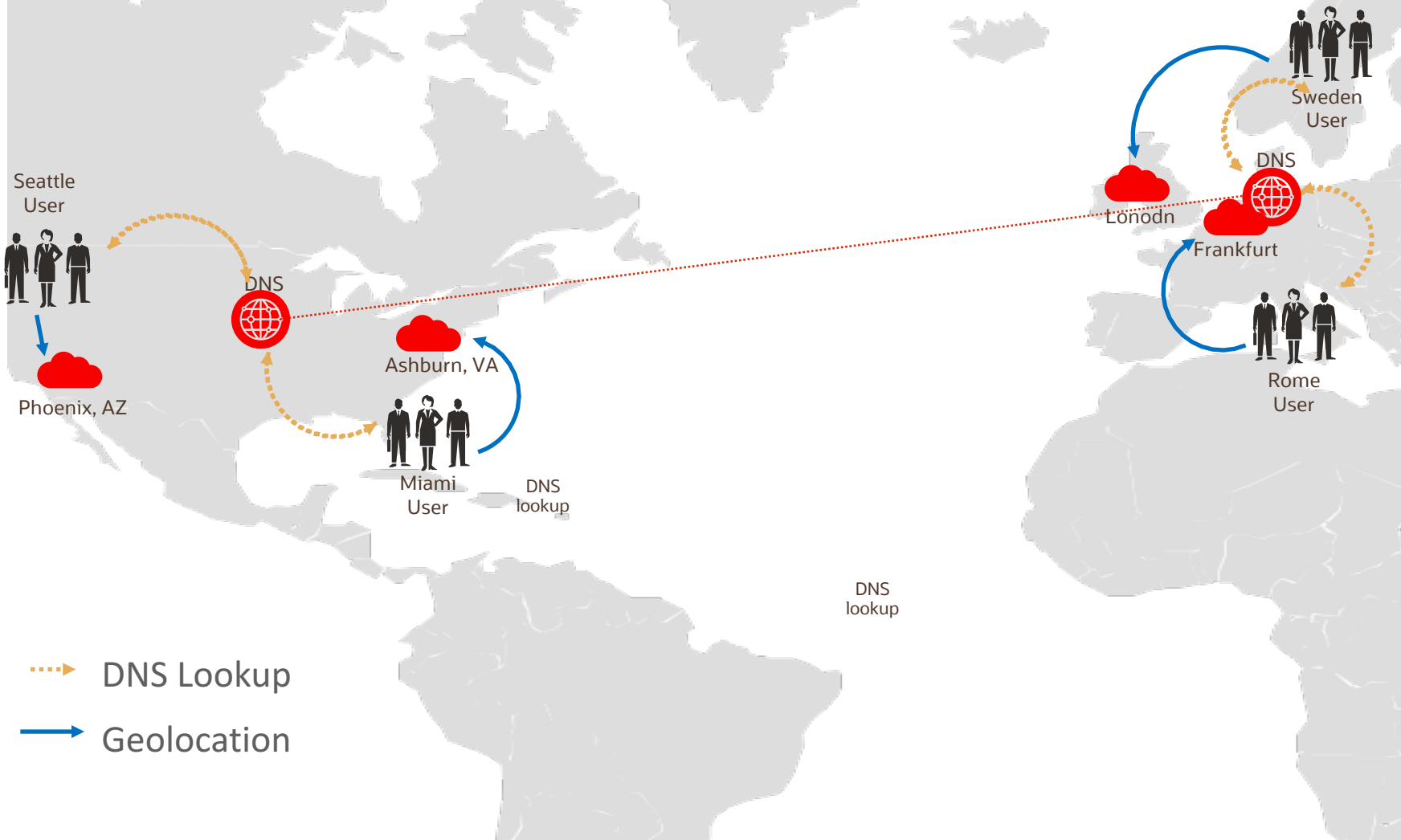
Leverage Oracle Health Checks to ensure users are sent to healthy endpoints

# Hybrid/Multi-cloud Environments





# Geolocation Steering

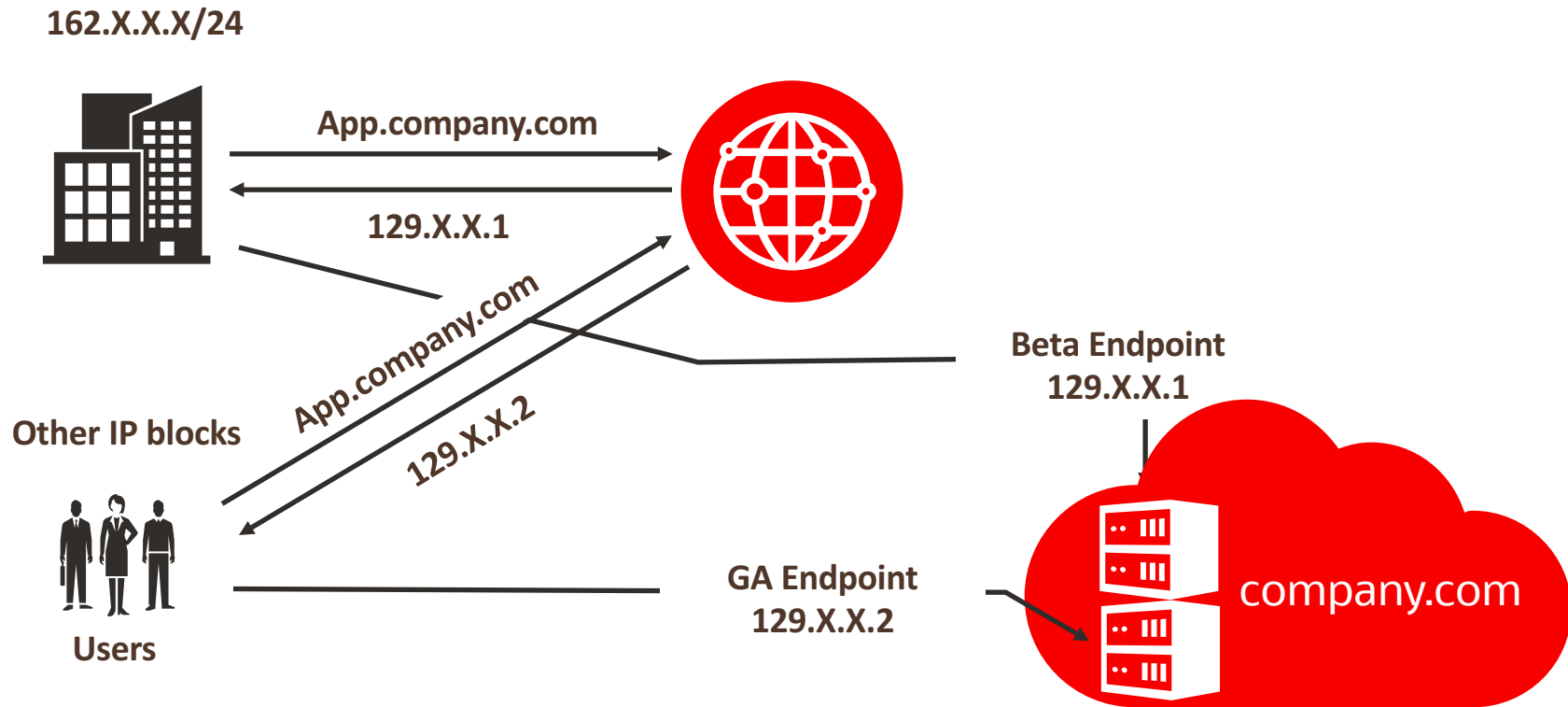


Specify which endpoint a user will be steered to based on their location

Select from predefined regions, such as US East or US West, or customize regions

Combine with Oracle Health Checks to fail over from one region to another

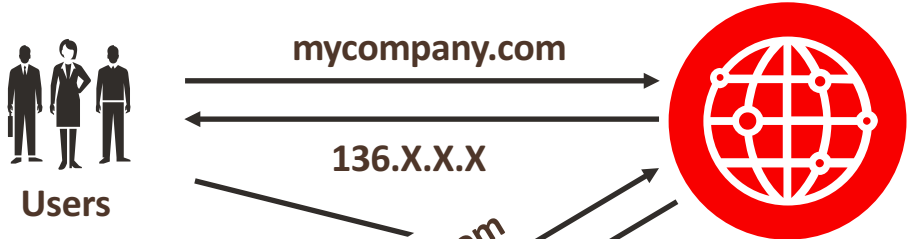
# Canary Testing



Limit access to new/beta features before rolling out for General Availability

# Zero Rating Services

ASN### (Preferred)



Preferred Endpoint

All Other ASN



Standard Endpoint

company.com

Conditional steering can be based on the originating enterprise, mobile operator, or other communications provider. Preferred ASNs can be directed to free resources while all other traffic can be directed to paid resources.

# Traffic Management Steering Policies



**Load Balancer:** (Global Server Load Balancing) Round-robin load balancing can be used to distribute traffic among multiple servers to optimize performance. Traffic can be split evenly among endpoints or weighted via ratio assignment.



**Failover:** It's easy to set up a simple Active-Active failover between two public assets. OCI will monitor the primary endpoint (via Oracle Health Checks) and reroute all traffic to a failover location if the primary endpoint is unresponsive.



**Geolocation Steering:** Traffic Steering policies can also route traffic based on the source of the query. Geolocation Steering dynamically routes requests to the appropriate Response Pool based on the physical location of the originating request.



**ASN Steering:** Dynamically routes traffic requests based on the originating ASN



**IP Prefix Steering:** Dynamically routes traffic requests based on originating IP prefix (e.g. 172.16.1.0/24)

# Traffic Management Concepts

- **Steering Policies:** A framework to define the traffic management behavior for your zones. Steering policies contain rules that help to intelligently serve DNS answers.
- **Attachments:** Allows you to link a steering policy to your zones. An attachment of a steering policy to a zone occludes all records at its domain that are of a covered record type, constructing DNS responses from its steering policy rather than from those domain's records. A domain can have at most one attachment covering any given record type.
- **Rules:** The guidelines steering policies use to filter answers based on the properties of a DNS request, such as the requests geo-location or the health of your endpoints.
- **Answers:** Answers contain the DNS record data and metadata to be processed in a steering policy.



# Load Balancer Policy

The Time To Live for responses from the steering policy. If not specified, the system will set this value on the steering policy.

The maximum number of answers returned for the policy. Answer pools contain the group of answers that will be served in response to DNS queries.

Create Traffic Management Steering Policy [cancel](#)

**POLICY TYPE**

- LOAD BALANCER**  
Distributes traffic over several servers to optimize performance.
- FAILOVER**  
Automatically redirects traffic to the next highest priority server when primary server is unavailable.
- GEOLOCATION STEERING**  
Dynamically routes traffic requests based on originating geographic conditions (e.g. New Jersey or China).
- ASN STEERING**  
Dynamically routes traffic requests based on originating ASN number (e.g. 6185).
- IP PREFIX STEERING**  
Dynamically routes traffic requests based on originating IP prefix (e.g. 172.16.1.0/24).

**POLICY NAME** ⓘ

LoadBalancerPolicyExample

**POLICY TTL** ⓘ

30 Seconds

**MAXIMUM ANSWER COUNT** ⓘ

1



# Load Balancer Policy (contd.)

A number between 0 and 255 used to determine how often an answer is served in relation to other answers. Answers with higher values are more likely to be served.

The domain, under the selected zone, that the policy will be attached to. This is concatenated with the zone name to generate the full attached domain name.

### Answer(s)

NAME <small>(i)</small>	TYPE <small>(i)</small>	RDATA <small>(i)</small>	WEIGHT <small>(i)</small>
<input type="text" value="webserverexample"/>	<input type="text" value="A"/>	<input type="text" value="132.145.151.100"/>	<input type="text" value="10"/>

ELIGIBLE (i)

### Attached Domain(s) (Optional)

DOMAIN <small>(i)</small>	ZONE <small>(i)</small>
<input type="text" value="loadbalancerexample"/>	<input type="text" value="oci-demozone.net"/>

# Load Balancer Policy (contd.)

The period of time between health checks of the target.

The network protocol used to interact with your endpoint, such as HTTP protocol, which initializes an HTTP handshake with your endpoint.

Port: The port for the monitor to look for a connection. The default is port 80. For HTTPS, use port 8080.

Path (Optional): The specific path on the target to be monitored.

Method: Select the HTTP method used for the health check.

Timeout: Select the maximum time to wait for a reply before marking the health check as failed.

Header Name: (Optional) The name displayed in the request header as part of the health check. Avoid entering confidential information.

Header Value: (Optional) Specifies the data requested by the header. Click + Add Header to add multiple headers in succession.

## Attach Health Check

Health checks let you configure settings to monitor the availability of a target. Targets are generated from pool answers and will be monitored from a geographically distributed set of vantage points, which can be managed from the health check service.

SELECT EXISTING  ADD NEW  NONE

HEALTH CHECK NAME ⓘ

HealthCheckExample

INTERVAL ⓘ

30 Seconds

PROTOCOL ⓘ

HTTP

Hide Advanced Options

PORT OPTIONAL ⓘ

80

PATH OPTIONAL ⓘ

/health

METHOD OPTIONAL ⓘ

GET

TIMEOUT OPTIONAL ⓘ

30 Seconds

### Headers (Optional)

HEADER NAME ⓘ

X-Example

HEADER VALUE ⓘ

40

+ Additional Header



## Create Traffic Management Steering Policy

[cancel](#)

### POLICY TYPE

LOAD BALANCER

Distributes traffic over several servers to optimize performance.

FAILOVER

Automatically redirects traffic to the next highest priority server when primary server is unavailable.

GEOLOCATION STEERING

Dynamically routes traffic requests based on originating geographic conditions (e.g. New Jersey or China).

ASN STEERING

Dynamically routes traffic requests based on originating ASN number (e.g. 6185).

IP PREFIX STEERING

Dynamically routes traffic requests based on originating IP prefix (e.g. 172.16.1.0/24).

### POLICY NAME <sup>i</sup>

FailoverPolicyExample

### POLICY TTL <sup>i</sup>

30

Seconds

### MAXIMUM ANSWER COUNT <sup>i</sup>

1

For priority-based policies, the first valid answer is always returned.

## Answer Pool(s)

Answer pools contain the records that will be provided as answers for DNS queries. They are an effective way to group similar or related answers together to make managing them easier.

### Answer Pool 1

Actions ▾

#### ANSWER POOL NAME <sup>i</sup>

Example\_PoolA

#### Answers:

##### NAME <sup>i</sup>

Webserver\_Ashburn

##### TYPE <sup>i</sup>

A

##### RDATA <sup>i</sup>

132.145.151.100

ELIGIBLE <sup>i</sup>

+ Additional Answer

### Answer Pool 2

Actions ▾

#### ANSWER POOL NAME <sup>i</sup>

Example\_PoolB

#### Answers:

##### NAME <sup>i</sup>

Webserver\_FrankFurt

##### TYPE <sup>i</sup>

A

##### RDATA <sup>i</sup>

129.213.81.170

ELIGIBLE <sup>i</sup>

+ Additional Answer

+ Additional Pool



# Failover Policy (Contd.)

Failover priority rules specify the priority of answers that are served in a policy. If the primary answer is unavailable, traffic is steered to the next answer in the list.

**Pool Priority** ⓘ

**POOL**

1. Pool 1 - Example\_PoolA ⇅

**POOL**

2. Pool 2 - Example\_PoolB ⇅

Select a Health Check to be included as part of the policy.

The domain name you want to attach to the policy. Additional domains can be added in this section.

**Attach Health Check**

Health checks let you configure settings to monitor the availability of a target. Targets are generated from pool answers and will be monitored from a geographically distributed set of vantage points, which can be managed from the health check service.

SELECT EXISTING  ADD NEW  NONE

**HEALTH CHECK NAME** ⓘ

Example

**INTERVAL** ⓘ

30 Seconds ⇅

**PROTOCOL** ⓘ

HTTP ⇅

[Show Advanced Options](#)

**Attached Domain(s) (Optional)**

<b>DOMAIN</b> ⓘ	<b>ZONE</b> ⓘ
FailoverExample	oci-demozone.net ⇅

[+ Additional Attached Domain](#)



# Geolocation Steering Policy

Create Traffic Management Steering Policy

[cancel](#)

## POLICY TYPE

LOAD BALANCER

Distributes traffic over several servers to optimize performance.

FAILOVER

Automatically redirects traffic to the next highest priority server when primary server is unavailable.

GEOLOCATION STEERING

Dynamically routes traffic requests based on originating geographic conditions (e.g. New Jersey or China).

ASN STEERING

Dynamically routes traffic requests based on originating ASN number (e.g. 6185).

IP PREFIX STEERING

Dynamically routes traffic requests based on originating IP prefix (e.g. 172.16.1.0/24).

## POLICY NAME <sup>(i)</sup>

GeoLocationSteering

## POLICY TTL <sup>(i)</sup>

30

Seconds

## MAXIMUM ANSWER COUNT <sup>(i)</sup>

1

For priority-based policies, the first valid answer is always returned.

## Answer Pool(s)

Answer pools contain the records that will be provided as answers for DNS queries. They are an effective way to group similar or related answers together to make managing them easier.

### Answer Pool 1

Actions ▾

#### ANSWER POOL NAME <sup>(i)</sup>

PoolA

#### Answers:

##### NAME <sup>(i)</sup>

WebserverA

##### TYPE <sup>(i)</sup>

A

##### RDATA <sup>(i)</sup>

129.213.81.170

ELIGIBLE <sup>(i)</sup>

+ Additional Answer

### Answer Pool 2

Actions ▾

#### ANSWER POOL NAME <sup>(i)</sup>

PoolB

#### Answers:

##### NAME <sup>(i)</sup>

WebserverB

##### TYPE <sup>(i)</sup>

A

##### RDATA <sup>(i)</sup>

132.145.151.100

ELIGIBLE <sup>(i)</sup>

+ Additional Answer

+ Additional Pool



# Geolocation Steering Policy (Contd.)

Geolocation-based steering distributes DNS traffic to different endpoints based on the location of the end user. Customers can define geographic regions composed of originating continent, countries or states/provinces (North America) and define a separate endpoint or set of endpoints for each region.

For example: North American users traffic is routed to PoolA first, if PoolA fails only then the traffic is routed to PoolB.

Adding a global catch-all allows you to specify answer pools for queries that do not match any of the specified rules you have added. No global catch-all means that queries not matching any of the above rules will receive a random answer.

## Geolocation Steering Rules

The order of the rules, from top to bottom, is the order in which they will be evaluated. The first matching rule will be executed and stop subsequent matching rules from being executed.

Once a rule is executed, the order of the pools in the rule, from top to bottom, is the order in which pools will be evaluated. An answer in the first available pool will be served and stop subsequent pool answers from being served.

### Rule 1

Actions ▾

#### GEOLOCATION

North America ×

Pool Priority: ⓘ

#### POOL

1. Pool 1 - PoolA

#### POOL

2. Pool 2 - PoolB

### Global Catch-all

Actions ▾

Pool Priority: ⓘ

#### POOL

1. Pool 1 - PoolA

#### POOL

2. Select a pool...

# ASN Steering Policy

ASN steering rules specify the priority of answers that are served in a policy. If the primary answer is unavailable, traffic is steered to the next answer in the list.

ASN: an Autonomous System Number (ASN) that will be used to distribute DNS traffic.

You can also attach a Global Catch-all policy.

## ASN Steering Rules

The order of the rules, from top to bottom, is the order in which they will be evaluated. The first matching rule will be executed and stop subsequent matching rules from being executed.

Once a rule is executed, the order of the pools in the rule, from top to bottom, is the order in which pools will be evaluated. An answer in the first available pool will be served and stop subsequent pool answers from being served.

### Rule 1

#### ASN

64512 x 64513 x

Pool Priority: ⓘ

#### POOL

1. Pool 1

#### POOL

2. Pool 2

+ Additional Rule



This policy currently has no global catch-all. No global catch-all means that queries not matching any of the above rules will receive a random answer.

Add Global Catch-all

# IP Prefix Policy

IP prefix steering rules specify the priority of answers that are served in a policy. If the primary answer is unavailable, traffic is steered to the next answer in the list.

Subnet Address: A subnet address that will be used to distribute DNS traffic.

You can also attach a Global Catch-all policy.

## IP Prefix Steering Rules

The order of the rules, from top to bottom, is the order in which they will be evaluated. The first matching rule will be executed and stop subsequent matching rules from being executed.

Once a rule is executed, the order of the pools in the rule, from top to bottom, is the order in which pools will be evaluated. An answer in the first available pool will be served and stop subsequent pool answers from being served.

### Rule 1

#### SUBNET ADDRESS

1.1.1.1/24 x 2.2.2.2/24 x

Pool Priority: ⓘ

#### POOL

1. Pool 1

#### POOL

2. Pool 2

+ Additional Rule



This policy currently has no global catch-all. No global catch-all means that queries not matching any of the above rules will receive a random answer.

Add Global Catch-all



# Health Checks

# Health Checks

- **Availability & Performance Monitoring:** Monitor the availability and performance of any public-facing IP address or fully qualified domain name (FQDN).
  - Simple UI Configuration: Easy to configure Health Checks for external monitoring from Vantage Points around the globe.
  - Availability Monitoring: Monitor for the availability of any publicly visible IP address or FQDN from Vantage Points located around the globe.
  - Performance Monitoring: Monitor for latency metrics for any publicly visible IP address or FQDN from Vantage Points located around the globe.
  - On-Demand Testing: Perform tests on demand to gauge performance and troubleshoot endpoints.
- **DNS Traffic Management Failover Detection:** Detect failures and use DNS Traffic Management to failover in the event of a problem.
- **Alerting and API:** Fully integrated with Oracle Cloud Infrastructure Monitoring and backed by an extensive REST API.
- **Hybrid Monitoring:** Monitor endpoints within the Oracle cloud and across your hybrid infrastructure.

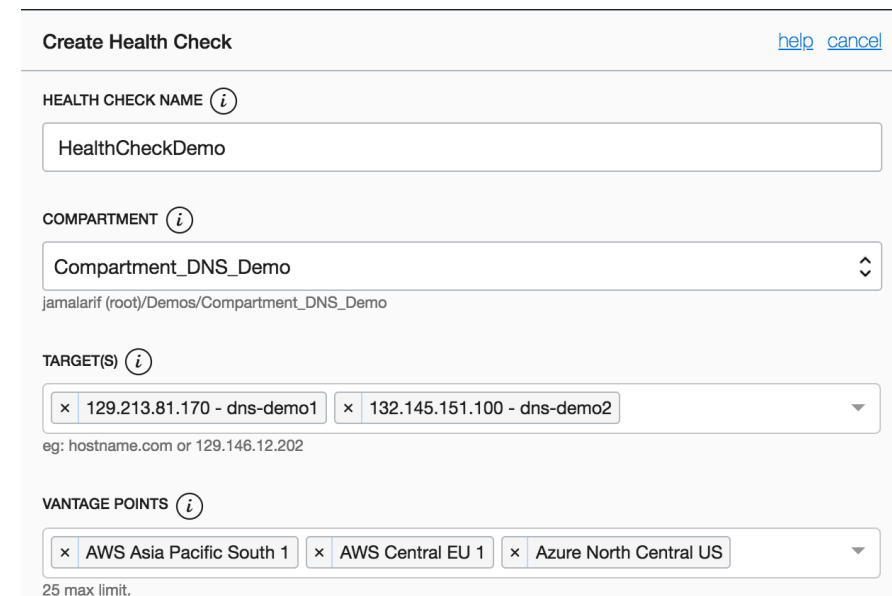
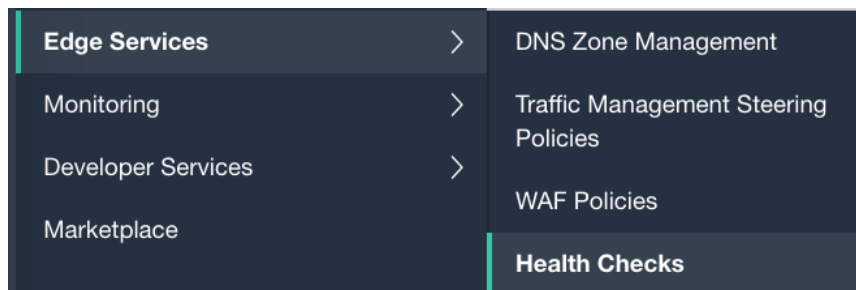


# Health Checks Service Components

- **Monitors:** Monitors allow you to continuously monitor the health of public-facing endpoints. You can configure monitors to use either HTTP and ping protocols.
- **On-demand probes:** On-demand probes allow you to execute a one-time probe to assess the health of a public-facing endpoint. You can configure on-demand probes to use either or both HTTP and ping protocols. This feature is currently only available via the [REST API](#).
- **Vantage points:** Vantage points are geographic locations from which monitors and probes can be executed to your specified target. Oracle Cloud Infrastructure maintains dozens of vantage points around the world.
- **Protocols:** The Health Checks service allows you to configure both HTTP and ping type monitors. Each type has respective protocols.

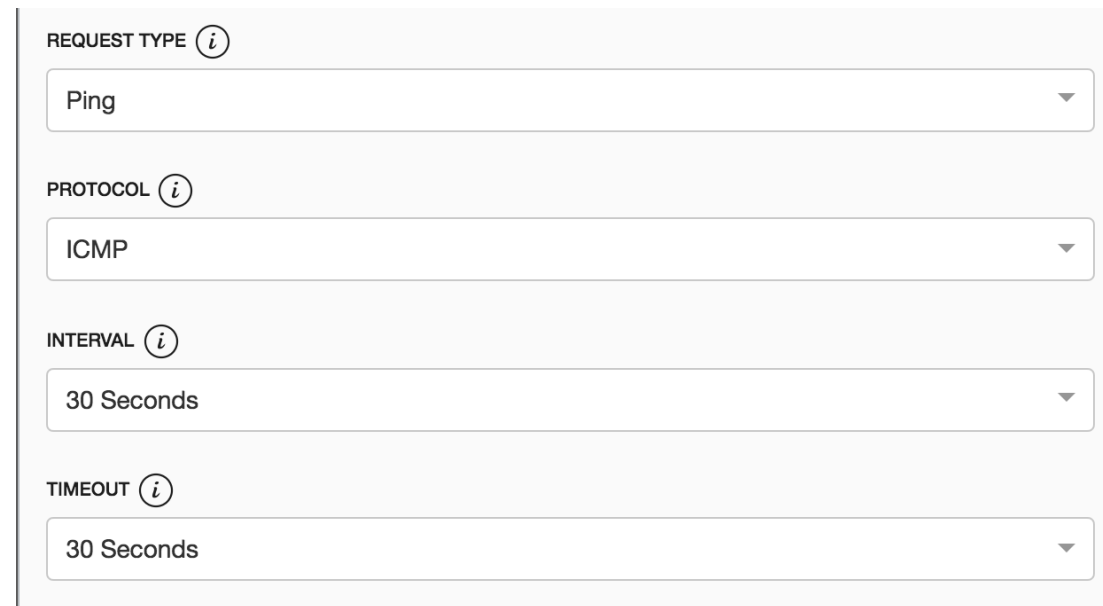
# Creating a Health Check

- From the Edge Services menu, navigate to Health Checks. In the Health Checks area, click Create Health Check, and enter the details of your check in the dialog box
- Provide a Name and compartment
- Add the target endpoints that you want to monitor. The Targets field is prepopulated with suggested endpoints drawn from public IP addresses already configured in your compartment. You can select one of these endpoints to monitor or add a new one.
- Select vantage points from which you intend to monitor the targets. These vantage points are located in locations around the globe, and we generally recommend selecting vantage points that are located in the same continent as your application.

A screenshot of a 'Create Health Check' dialog box. The dialog has a title bar with 'Create Health Check' and links for 'help' and 'cancel'. It contains several fields: 'HEALTH CHECK NAME' with the value 'HealthCheckDemo'; 'COMPARTMENT' with a dropdown menu showing 'Compartment\_DNS\_Demo' and the path 'jamalarif (root)/Demos/Compartment\_DNS\_Demo'; 'TARGET(S)' with a dropdown menu showing two entries: '129.213.81.170 - dns-demo1' and '132.145.151.100 - dns-demo2', with a note 'eg: hostname.com or 129.146.12.202'; and 'VANTAGE POINTS' with a dropdown menu showing three entries: 'AWS Asia Pacific South 1', 'AWS Central EU 1', and 'Azure North Central US', with a note '25 max limit.'.

# Creating a Health Check

- Select the type of test that you want to run—HTTP or HTTPS for a web page, or TCP or ICMP for a public IP address.
- Set the frequency of the tests as appropriate to the level of monitoring that your service requires. Current options include every 30 or 60 seconds for basic tests, and premium tests run at the higher frequency of every 10 seconds. An additional fee is calculated for premium tests.
- Add any tags to help you quickly search for this check in the future.
- Click Create Health Check.



REQUEST TYPE ⓘ

Ping

PROTOCOL ⓘ

ICMP

INTERVAL ⓘ

30 Seconds

TIMEOUT ⓘ

30 Seconds

# Creating a Health Check

After the check is created, a details page shows information specific to this check

The screenshot shows the Oracle Cloud interface for a Health Check named 'HealthCheck\_Demo'. The page includes a navigation breadcrumb 'Edge Services » Health Checks » HealthCheck\_Demo', a search bar with 'us-ashburn-1', and a user profile icon. A green hexagonal icon with 'HC' and the status 'ACTIVE' is displayed on the left. The main content area is divided into 'Health Check Information' and 'Tags' tabs. The 'Health Check Information' tab shows the following details:

- Health Check Name:** HealthCheck\_Demo
- Interval:** 30 Seconds
- Targets:** ...145.151.100 - dns-demo2 [Show](#) [Copy](#)
- Timeout:** 30 Seconds
- Vantage Points:** ...outh 1, AWS Central EU 1 [Show](#) [Copy](#)
- OCID:** ...chlrsaaxzgpbg7nf6nzjvba [Show](#) [Copy](#)
- Type:** PING
- Protocol:** ICMP
- Port:** 80

Below the information is a 'Health Check History' section with a table of results. The table has columns for Target, Vantage Point, Availability, and Timestamp. The history shows five successful checks with an 'Available' status.

Target	Vantage Point	Availability	Timestamp
129.213.81.170	AWS Asia Pacific NE 2	✓ Available	Mar 06, 2019 17:27:12 GMT
132.145.151.100	AWS Asia Pacific NE 2	✓ Available	Mar 06, 2019 17:27:12 GMT
129.213.81.170	AWS Asia Pacific South 1	✓ Available	Mar 06, 2019 17:27:12 GMT
132.145.151.100	AWS Asia Pacific South 1	✓ Available	Mar 06, 2019 17:27:12 GMT
129.213.81.170	AWS Central EU 1	✓ Available	Mar 06, 2019 17:27:12 GMT



**Oracle Cloud always free tier:**

[oracle.com/cloud/free/](https://oracle.com/cloud/free/)

**OCI training and certification:**

<https://www.oracle.com/cloud/iaas/training/>

<https://www.oracle.com/cloud/iaas/training/certification.html>

[education.oracle.com/oracle-certification-path/pFamily\\_647](https://education.oracle.com/oracle-certification-path/pFamily_647)

**OCI hands-on labs:**

[ocitraining.qcloudable.com/provider/oracle](https://ocitraining.qcloudable.com/provider/oracle)

**Oracle learning library videos on YouTube:**

[youtube.com/user/OracleLearning](https://youtube.com/user/OracleLearning)

