



Cloud Developers Certification Training

Section 3.2 - Summarize the Steps in building a Scalable Application

Lab Exercise

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Exercise 3.2: Prerequisites

Sign up for a 30-day free trial [IBM Bluemix account](#) if you don't already have one.

You also need the following software:

- A web browser supported by Bluemix:
 - Chrome: the latest version for your operating system
 - Firefox: the latest version for your operating system and ESR 31 or ESR 38
 - Internet Explorer: version 10 or 11
 - Safari: the latest version for the Mac

Build a Java application with one of these options:

- Build a sample Java application to configure the Auto-Scaling service.
- Use the existing Java application to configure the Auto-Scaling service.
- Use the Java Cache Web Starter boilerplate to configure the Auto-Scaling service.

Exercise 3.2.1: Adding the Auto-Scaling service to your application

Complete the following steps:

1. Go to the Bluemix Dashboard and click the **Bluemix-Sample-Java** application.
2. Click **Add a Service** and select the Auto-Scaling service.



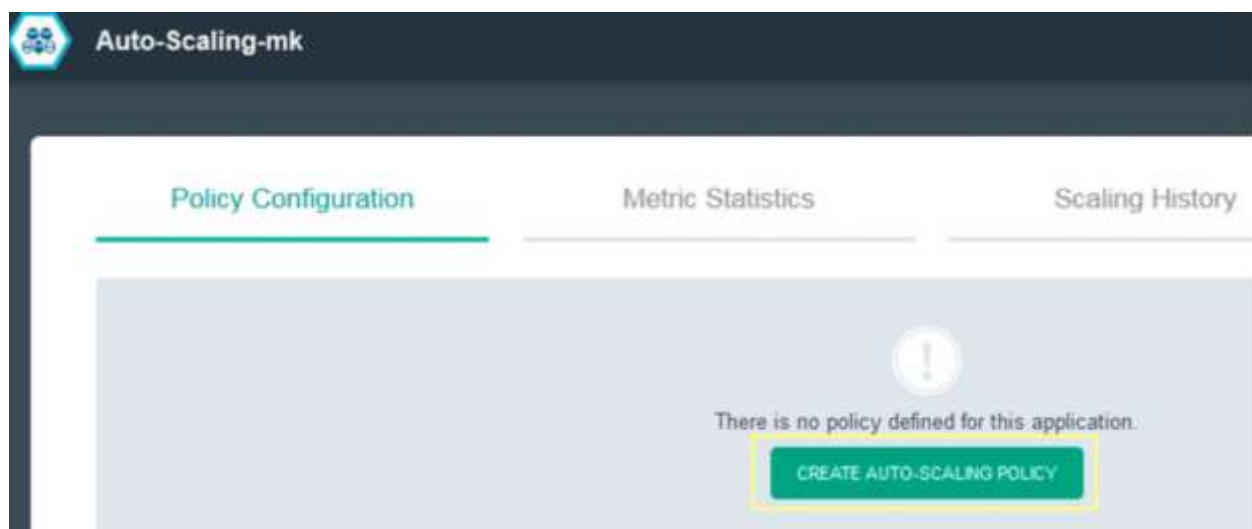
3. If you have multiple apps, select the **Bluemix-Sample-Java** app and click **CREATE**.
4. If you see a pop-up message to restage, click **RESTAGE**. Your new Auto-Scaling service will now be created and bind to your application.



Exercise 3.2.2: Creating and modifying auto-scaling policies

With an auto-scaling policy, you can create rules that determine when the Auto-Scaling service will increase or decrease the number of instances of your application. In this task, create and modify rules for your Java Liberty application. Complete the following steps:

1. In your application, click the **Auto-Scaling** service.
2. Click **CREATE AUTO-SCALING POLICY**.



3. Enter the parameters for the policy as follows:
 - a. Enter the name.
 - b. Enter minimum and maximum number of application instances:
 - Use the default configuration or configure as mentioned below.
 - Minimum: If the number of the instances equals this value, the Auto-Scaling service will not scale in the application any more.
 - Maximum: If the number of the instances equals this value, the Auto-Scaling service will not scale out the application any more.
 - c. Scroll to the Rule1 section and make these changes:

- Keep the Metric Type set to **Memory**.
- Change Scale Out percentage to 30 and change Scale In to 15.
- Expand the **Advanced Configurations** section.
- Set Statistic Window to 30 seconds.
- Set the value of 60 seconds for Breach Duration and both Cooldown periods. You'll use these smaller time frames for testing later.

These settings are much lower than in a typical production application. The values used are low enough to ensure that the Auto-Scaling service properly scales your application within a shorter test window during this exercise.

Scaling Rule(s)

Rule 1

Add 1 instance(s) if average Memory utilization exceeds 30% for 60 seconds.
Remove 1 instance(s) if average Memory utilization is below 15% for 60 seconds.

Metric Type: Memory

Scale Out: If average Memory utilization exceeds 30%, then increase 1 instance(s)

Scale In: If average Memory utilization is below 15%, then decrease 1 instance(s)

Advanced Configurations

Statistic Window: 30 seconds (30-1800)

Breach Duration: 60 seconds (30-3600)

Cooldown period for scaling out: 60 seconds (30-3600)

Cooldown period for scaling in: 60 seconds (30-3600)

ADD A RULE

There are unsaved changes.

SAVE

RESET

4. Click **ADD A RULE** to specify another rule.
5. This time, for Rule2 set the Metric Type to **throughput**. Keep the other values as they were for Rule 1.

Rule 2

DELETE

Add 1 instance(s) if average Throughput exceeds 60 requests/s for 60 seconds.
Remove 1 instance(s) if average Throughput is below 30 requests/s for 60 seconds.

Metric Type:

Throughput

Scale Out:
If average Throughput exceeds 60 requests/s, then increase 1 instance(s)

Scale In:
If average Throughput is below 30 requests/s, then decrease 1 instance(s)

Advanced Configurations

Statistic Window:
60 seconds (30-1800)

Breach Duration:
60 seconds (30-3600)

Cooldown period for scaling out:
60 seconds (30-3600)

Cooldown period for scaling in:
60 seconds (30-3600)

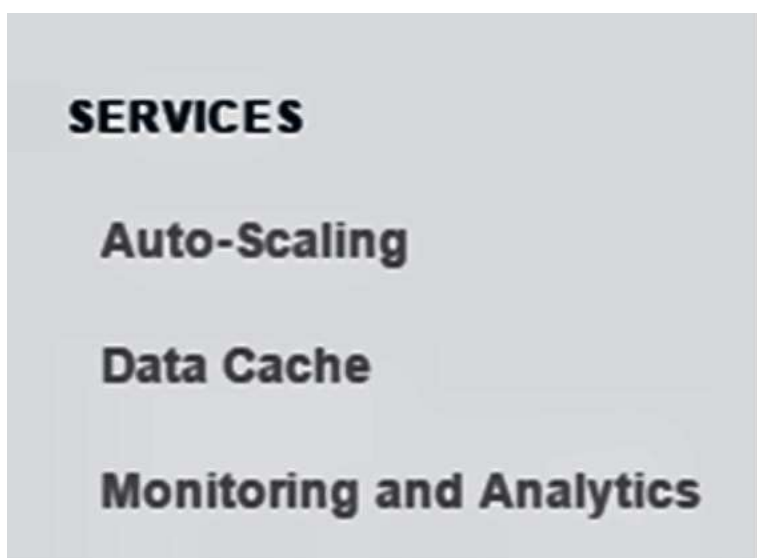
Your application can now automatically scale based on the policies you defined.

Exercise 3.2.3: Viewing auto-scaling metric statistics and history

You can examine the effects of the test on your auto-scaling policy rules. The metrics in this task show how effectively your auto-scaling policy worked.

Complete the following steps:

1. Return to the Bluemix Dashboard, and click an application.
2. Click **Auto-Scaling** as shown below. Services are listed in the left navigation bar.

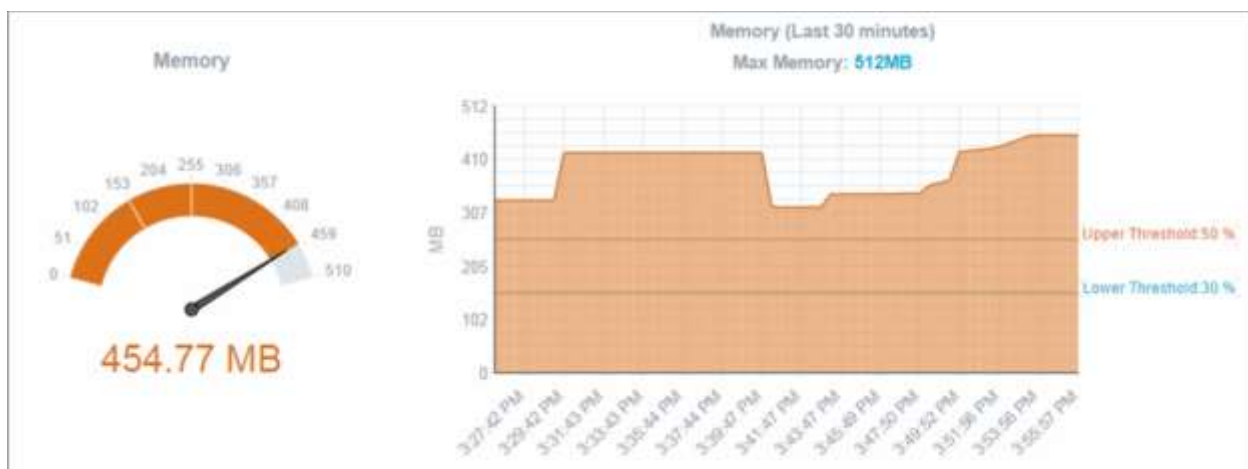


- Click the **Metric Statistics** tab to see graphs of usage statistics overtime for your Bluemix application. Scroll to see all the graphs. If you set up any scaling rules for a specific property, upper and lower threshold indicators show when your application will create or remove additional instances.

The following image shows throughput metrics:



The following image shows memory metrics:



If your application is stressed enough, you see that the scaling polices that you defined will take effect. Depending on the conditions, you see that the

applications scale out and scale in. To view the scaling history, click the **Scaling History** tab.

Policy Configuration		Metric Statistics		Scaling History		
Past Week		Past Month		Custom Range		
Scaling Status: Any		Scaling In/Out: Any		Refresh		
Status	Start Time	Duration	Event	Description	Instance number after scaling	
Completed	Jan 20, 2015, 3:42:31 PM	9 seconds 94 milliseconds	CPU utilization lower than 20% for 600 seconds.	Remove 1 instance.	1	
Completed	Jan 20, 2015, 3:31:31 PM	59 seconds 34 milliseconds	ResponseTime exceeds 50ms for 600 seconds.	Add 1 new instance.	2	
Completed	Jan 20, 2015, 1:33:24 PM	7 seconds 806 milliseconds	CPU utilization lower than 20% for 600 seconds.	Remove 1 instance.	1	
Completed	Jan 20, 2015, 1:22:33 PM	41 seconds 256 milliseconds	Memory usage exceeds 50% for 600 seconds.	Add 1 new instance.	2	
Failed	Jan 20, 2015, 1:22:17 PM	159 milliseconds	Memory usage exceeds 50% for 600 seconds.	Failed to scale out. The memory quota is not enough.	1	

As auto-scaling creates or removes instances of your application, you can see these changes reflected in your apps page from the Bluemix dashboard.

INSTANCES:

2

MEMORY QUOTA:

512

(MB per Instance)

AVAILABLE MEMORY:

0B

There are unsaved changes.

SAVE

RESET