Est. time 1:30

IBM WebSphere DataPower XC10: **HTTP session lab exercise**

What this exercise is about

The objective of this lab is to provide you with an understanding of how to configure a WebSphere Application Server application to use session management using IBM WebSphere DataPower XC10 Appliance.

Introduction

The IBM WebSphere DataPower XC10 Appliance is an easy-to-use caching appliance. It provides simplified deployment at the caching tier of your enterprise application infrastructure. XC10 client code is provided that easily plugs into an existing application on a WebSphere Application Server for seamless caching of HTTP session data on the DataPower XC10 Appliance. The integration is non-intrusive and only requires an integration of the session persistence framework to the DataPower XC10 through a simple web console configuration as shown in this lab.

What you should be able to do

At the end of this lab you should be able to:

- Create data grids on the IBM WebSphere DataPower XC10 Appliance
  - From the IBM WebSphere DataPower XC10 web console
  - From the WebSphere Application Server administrative console
- Configure WebSphere applications to store HTTP session data to a data grid on the IBM WebSphere DataPower XC10 Appliance through the WebSphere Application Server administrative console
- Verify session management processes are running and responsive by monitoring the session data grid's health and performance through the DataPower XC10 web console

Lab requirements

List of system and software required to complete the lab.

Hardware requirements

- IBM WebSphere DataPower XC10 Appliance with supported firmware level
    - **For example, 2.0.0.1-cf31124.67080** (fix pack 1)

Software requirements

You must install the WebSphere eXtreme Scale client for DataPower XC10 on top of a supported WebSphere Application Server. See the **Supported software** section below for software levels that were used in the creation and testing of this lab.

- This lab requires **Jakarta Jmeter** or a similar HTTP load generator installed on the WebSphere Application Server or on another computer or laptop which has web access to your WebSphere Application Server. Jakarta JMeter can be downloaded from http://jakarta.apache.org/jmeter/

Web browser requirements

The DataPower XC10 administrative console supports the following web browsers:

- Mozilla Firefox, version 3.5 and later
- Microsoft Internet Explorer, version 7 or 8

Supported software

The following software levels are recommended when running this lab:

- WebSphere Application Server Version 6.1.0.35 or later
- WebSphere Application Server Version 7.0.0.13 or later
- WebSphere eXtreme Scale Client Version 7.1 with supported client fix pack
- Recommended software setup:
    - WebSphere Application server v 7.0.0.13 or later.
    - WebSphere eXtreme Scale 7.1 client installed on WebSphere Application Server binaries
    - Deployment manager profile and at least one WebSphere Application Server profile

Lab Instructions

Some instructions in this lab are Windows® operating-system specific. If you plan on running the lab on an operating-system other than Windows, you will need to run the appropriate commands and use appropriate files (.sh or .bat) for your operating system. The directory locations are specified in the lab instructions using symbolic references, as follows:

Reference variable	Windows location	AIX® or UNIX® location
<WAS_HOME>	C:\WebSphere\AppServer	/usr/WebSphere/AppServer /opt/WebSphere/AppServer
<LAB_FILES>	C:\LabfilesXC10	/tmp/LabfilesXC10
<TEMP>	C:\temp	/tmp

Note for Windows users: When directory locations are passed as parameters to a Java™ program such as EJBdeploy or wsadmin, replace the backslashes with forward slashes to follow the Java convention. For example, replace C:\LabFilesXC10\ with C:/LabFilesXC10/

Part 1: Create a session data grid

You can create a session cache on the IBM WebSphere DataPower XC10 Appliance from the DataPower XC10 web console. The session data grid can be used for storing HTTP application session information. After creating a session cache, you can grant the other users in a user group access permission to monitor the session data grid you have just created by adding the group credentials to the **Access granted to…** property. By default, this does not limit who can access data in the cache, only who can view it in the XC10 console.

____ 1. Open the IBM WebSphere DataPower XC10 Appliance web console in a supported browser.

____ 2. Log in to the DataPower XC10 Appliance with your user credentials as provided by IBM.

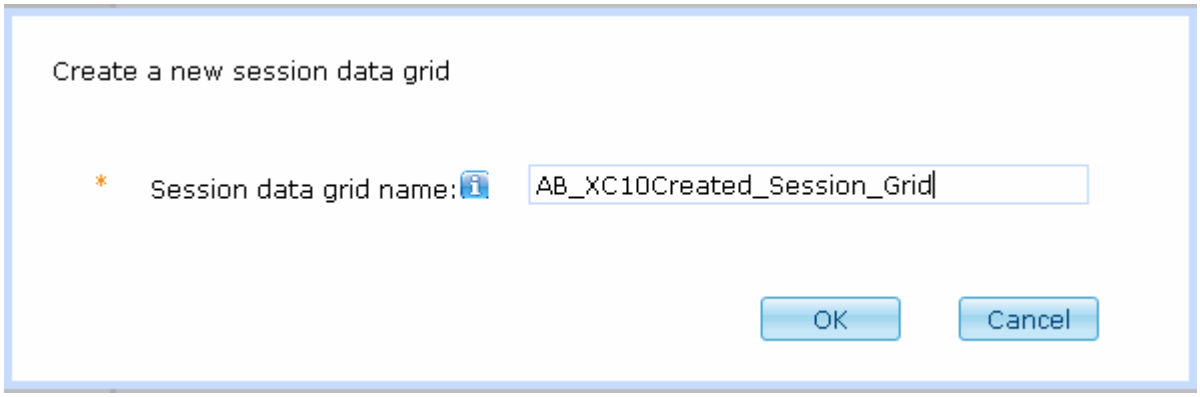
____ 3. Create a new session data grid.

__ a. Navigate to **Data Grid→Session.**

__ b. Click the  icon to create a new session cache.

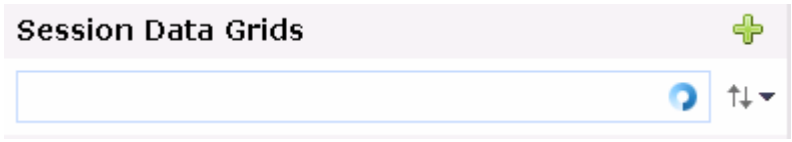
__ c. Data grid names must be unique on the appliance. Since this is a shared environment, consider the need to make your data grid names unique and standard. For this lab, add a prefix of your initials to the data grid name to help identify the caches you create. (Example: "XX_Your_Data_Grid_Name"). Note that multiple applications can share a session data grid.

__ d. Enter "<*xx*>_<Your_Data_Grid_Name>" in the "Session data grid name" entry field.



__ e. Press the **OK** button.

__ f. On the dialog asking whether you want to **Stay Here** or go to **Tasks View**, select **Stay Here**. It will take approximately 1 minute to create the grid. Refresh the screen by putting the cursor in the sort field and hitting Enter, until the new grid name appears. You could also choose to go to the tasks view and return to the cache details when the cache creation task is complete.

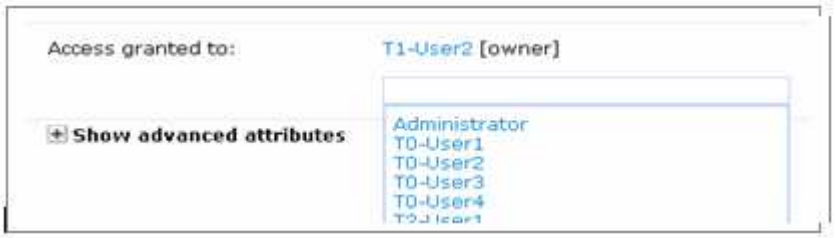


____ 4. Set permissions for your data grid, so other people in your group can monitor the cache.

Learn: Providing the appropriate User or User Group the *Appliance Monitoring* permission is not sufficient for monitoring a data grid; you must also update the data grid's permissions to allow the User or User Group (minimally) read access, since the data must be read to gather monitoring statistics.

__ a. Click the name of the session data grid you just created from the list on the left.

__ b. From the data grid properties shown on the right, navigate to the **Access granted to:** section and place the cursor in the **Add more…** entry field. When you click this field you will be presented with a list of users and groups you can add to your cache's authorization list.



__ c. Click the name of your user group (for example, Team 1) from the drop down box to add it to the **Access granted to:** list.

__ d. If you click on the [read] link, the allowed access will change from “read” to “write”. Subsequent clicks will change to “create”, then “all “, then back to “read”. For this exercise set the allowed access to “read”.

__ e. Allow the properties under Advanced Attributes to retain their default values.

Part 2: Configure session cache during application installation

The DataPower XC10 product provides client code that is easily installed as an extension to the WebSphere application server installation. The XC10 client must be installed as an extension to your WebSphere Application Server installation before your WebSphere applications can store HTTP session data to a data cache on the DataPower XC10 Appliance.

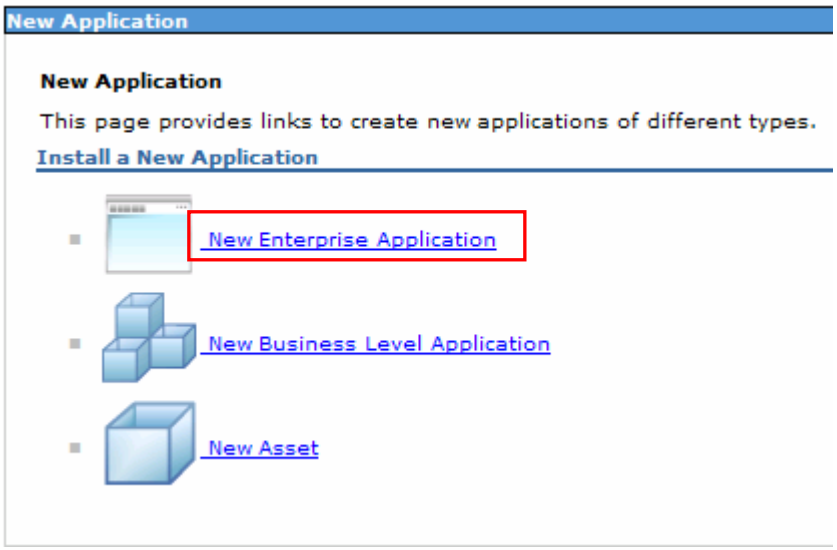
Part 1 and Part 2 provide a 2 step process for configuring session cache. In Part 1 you created the session data grid using the XC10 web console. In this section, you will configure your session data information to be cached in the session data grid you created in the previous section of the lab.

____ 5. Open a supported browser and navigate to the **WebSphere Integrated Solutions Console** (administrative console). The WebSphere console can be found at http://<dmgr_host>:9060/ibm/console.

____ **6.** Enter a User ID for WebSphere Application Server. If administrative security is not enabled the User ID can be any identifier. Click **Log In.**

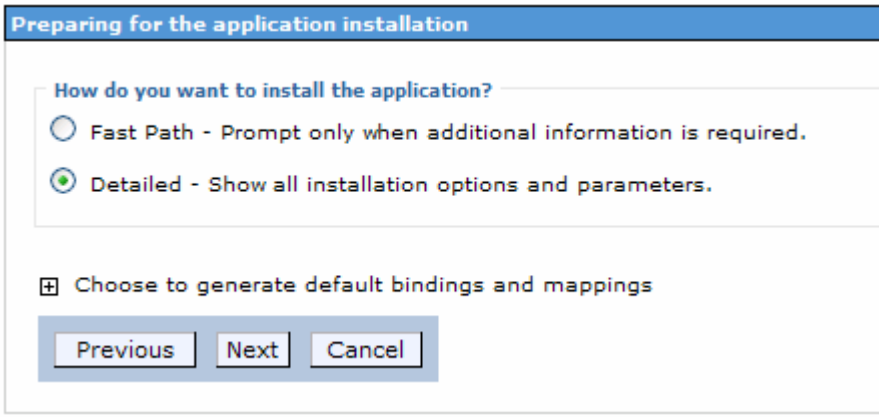
____ **7.** Navigate to **Applications → New Application.**

____ **8.** Click on **New Enterprise Application.**



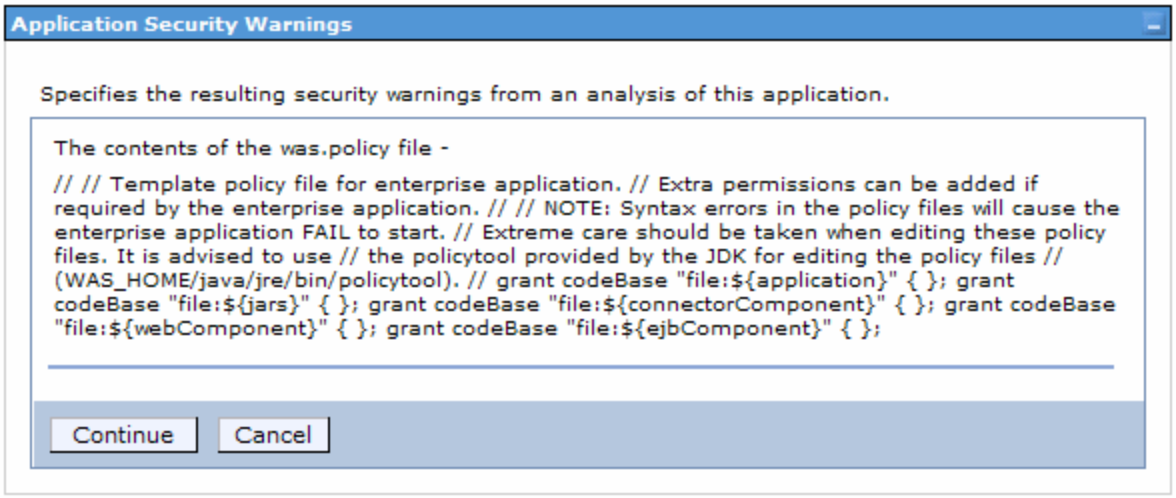
____ 9. Browse to <LAB_FILES> to locate the **XC10SessionTest.war** .

____ 10. Select **Detailed – Show all installation options and parameters** from the **How do you want to install the application** panel.

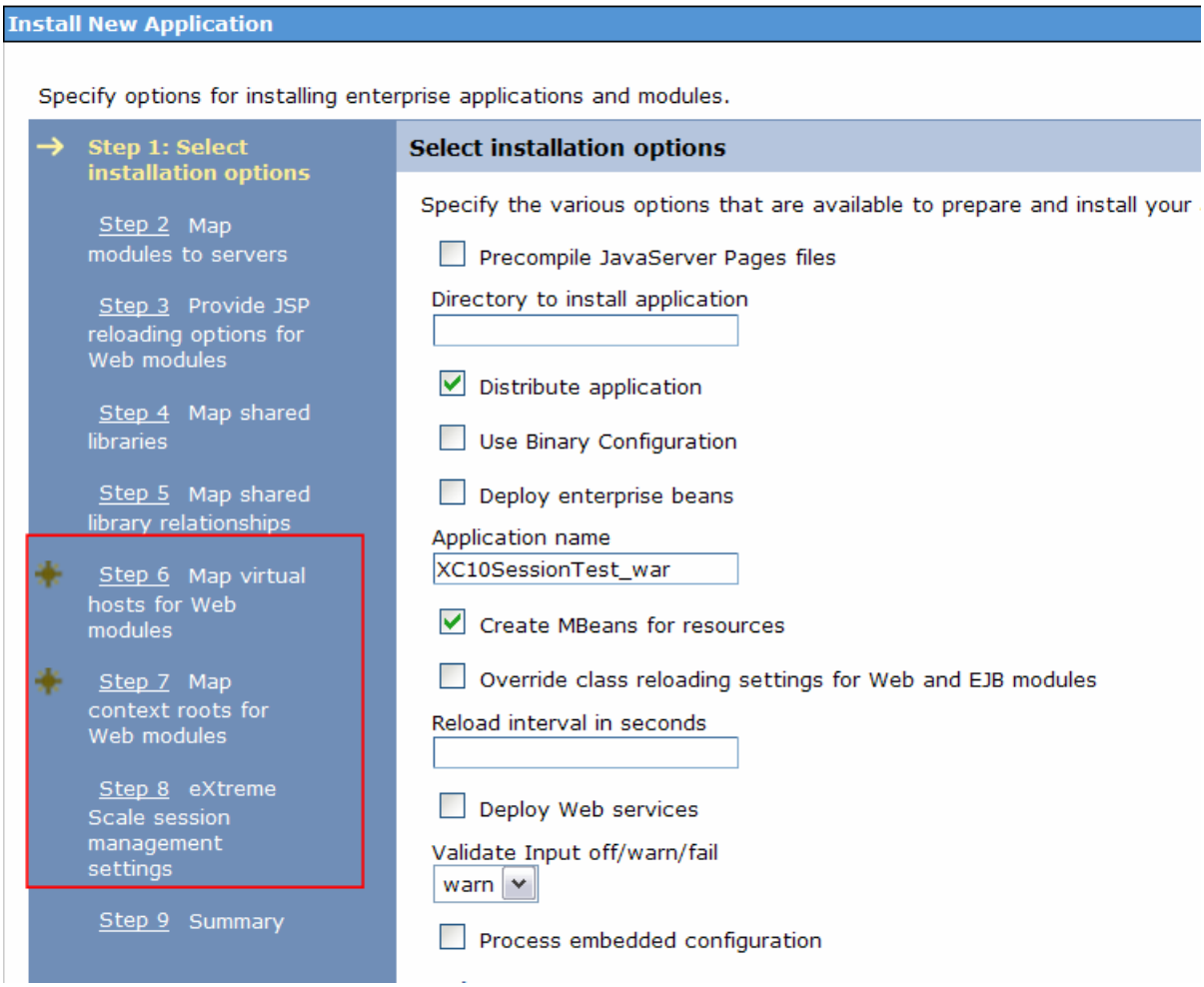


____ 11. Click **Next** button.

____ 12. Click **Continue** button if you see any **Application Security Warnings** like the one below.



Note: For the next three steps, you will need to click the step links highlighted in red below:



____ 13. Click the **Map virtual hosts for Web modules** step and keep the default settings by pressing **Next** from this panel. This step is necessary to ensure the virtual host is set properly.

____ 14. You will now be on the **Map context roots for Web modules** step; enter **/test** as the context root.

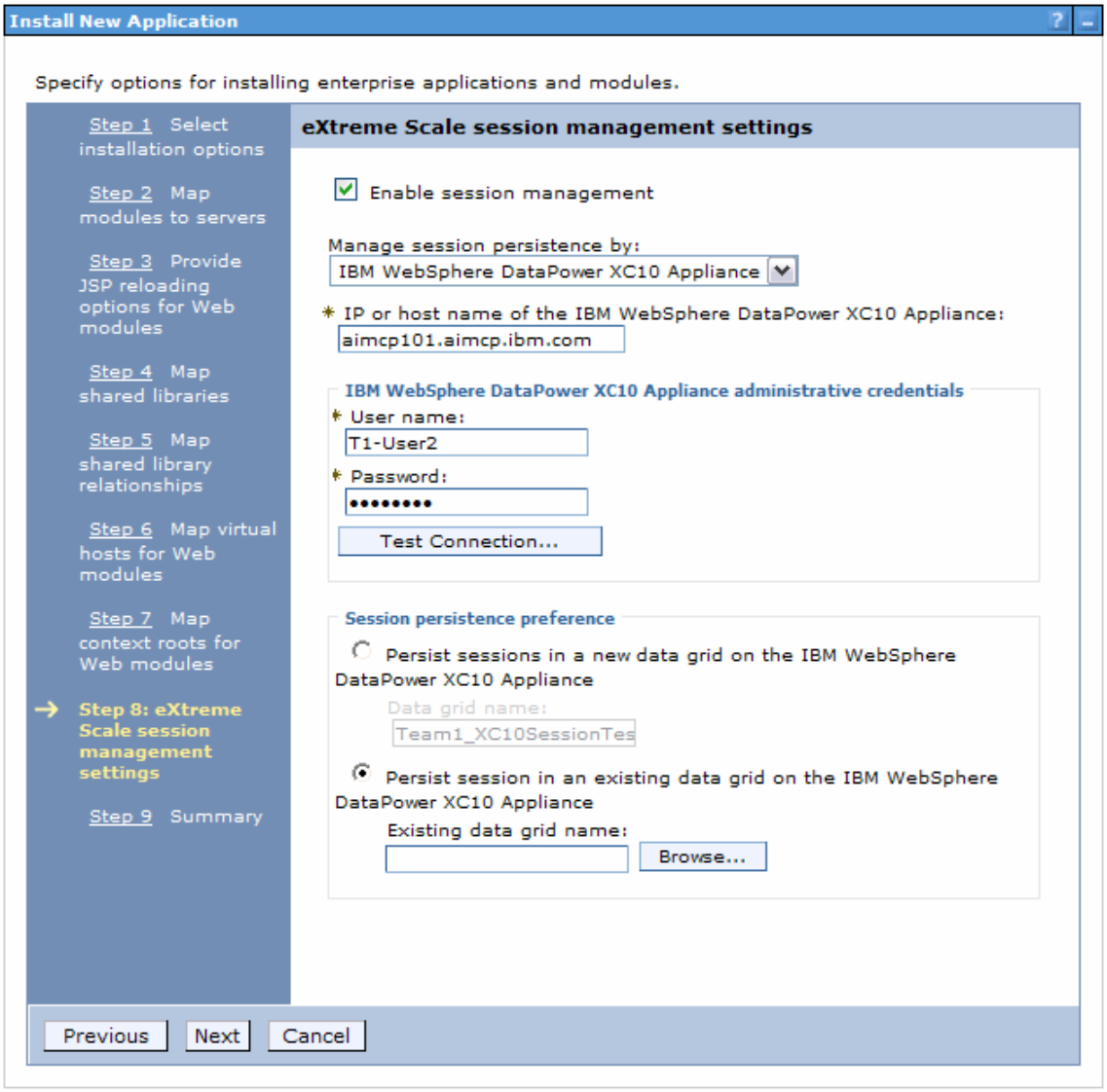
____ 15. Click on **eXtreme Scale session management settings** and enter the following parameters.

__ a. Select the check box for **Enable session management**.

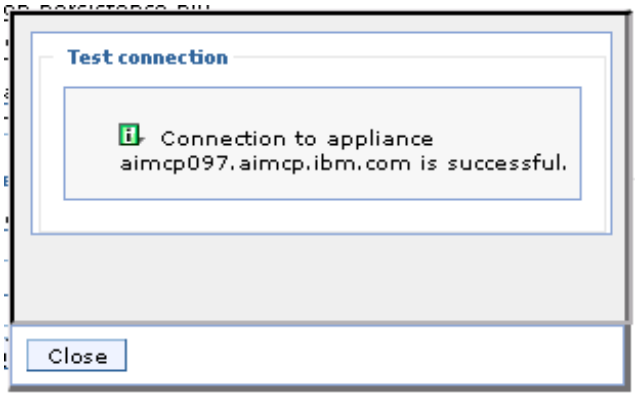
__ b. Select **IBM WebSphere DataPower** XC10 Appliance from the **Manage session persistence by:** drop down list.

__ c. Enter the appliance IP or host name.

__ d. Enter the appliance user name and password. This should be the same user name that you used to create the cache.

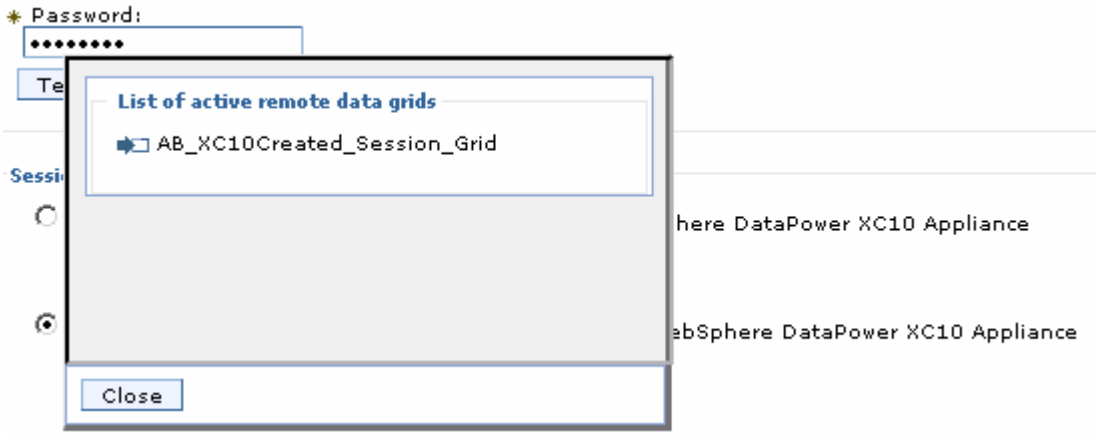


__ e. Click the **Test Connection…** button to confirm that you can connect successfully to the appliance.

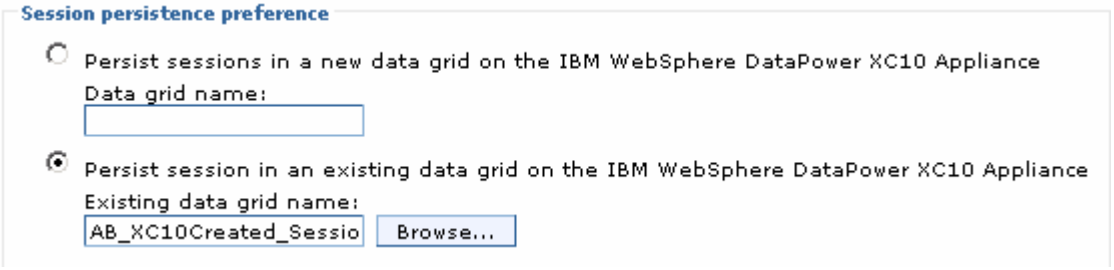


__ f. In the **Session persistence preference** section, click **Persist session in an existing data grid on the IBM WebSphere DataPower XC10 Appliance.**

__ g. Click the **Browse…** button to see a list of caches that you created or that you have been granted access to. Click on the cache you created in Part 2 of the lab.



__ h. The cache name will be entered into the “Existing data grid name” field.



____ 16. Click the **Next** button at the bottom of the installation dialog.

Learn: You can create a new cache on the DataPower XC10 appliance by selecting “Persist sessions in a new data grid…”. You will use this capability in Part 3 of this lab.

____ 17. Click **Finish** on **Summary** on the summary panel.

____ 18. Save the changes.

__ a. Click **Finish** button.

__ b. Click **Review** in the messages area.

__ c. On the Save panel, make sure that the check box **Synchronize changes with Nodes** is selected.

__ d. Click **Save.**

__ e. Click **OK** when the sync operation completes.

Part 3: Configure session cache for existing applications

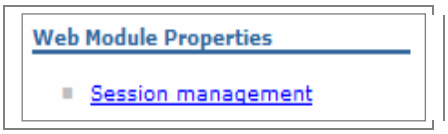
In this section of the lab, you will create a session cache and configure XC10 session caching for an existing application using only the Websphere administration console. You will walk through the session management settings panel for an existing application, which can also be used to edit appliance connection information if changes are required in the future. Then you will create a session cache (also through the application server console) on the IBM WebSphere DataPower XC10 Appliance.

You will then use the XC10 web console to grant the other users in your group access to the session data grid you have just created by adding your user group credentials to the **Access granted to…** property.

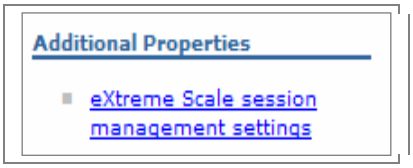
____ 19. From the WebSphere Application Server administrative console, navigate to **Applications → Application Types → WebSphere enterprise applications**.

____ **20.** Click the WebSphere Sample name, **DefaultApplication.**

____ 21. Under **Web Module Properties** section, click **Session management**.



____ **22.** Under **Additional Properties** section, click on **eXtreme Scale session management settings.**



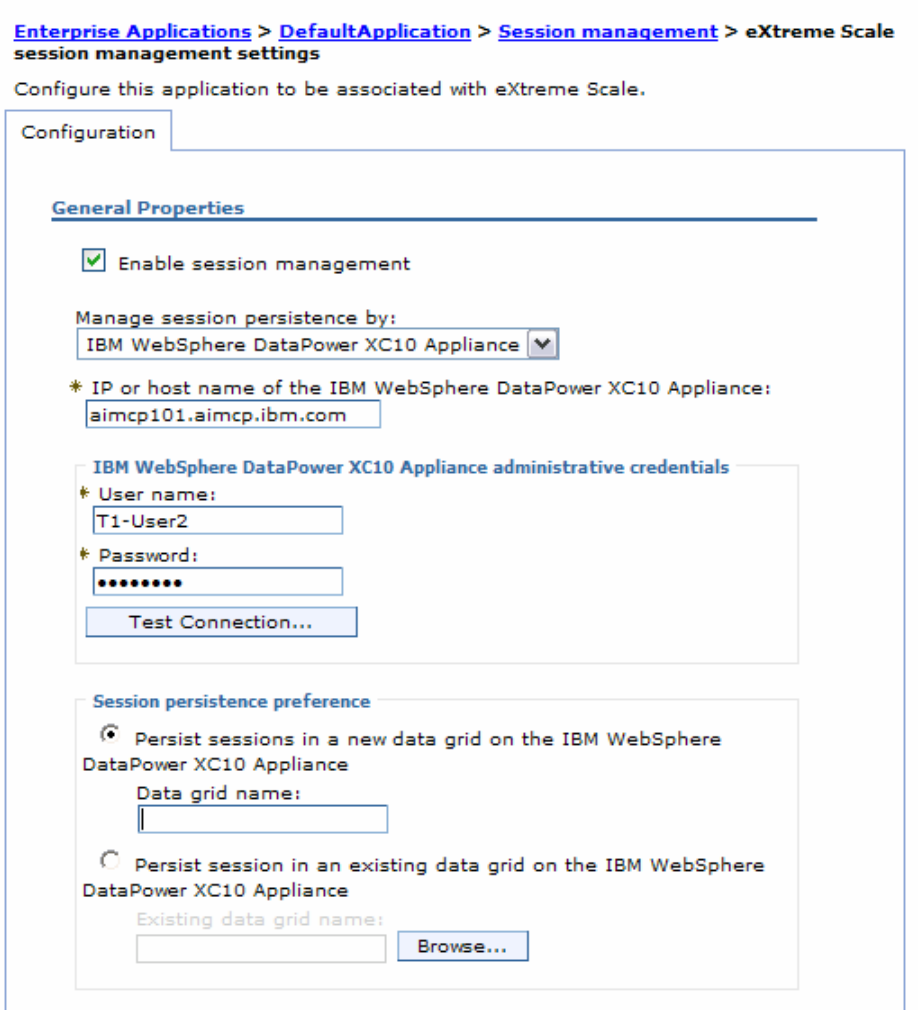
____ 23. Configure DefaultApplication to use the DataPower XC10 Appliance for session management.

__ a. Select the check box for **Enable session management**.

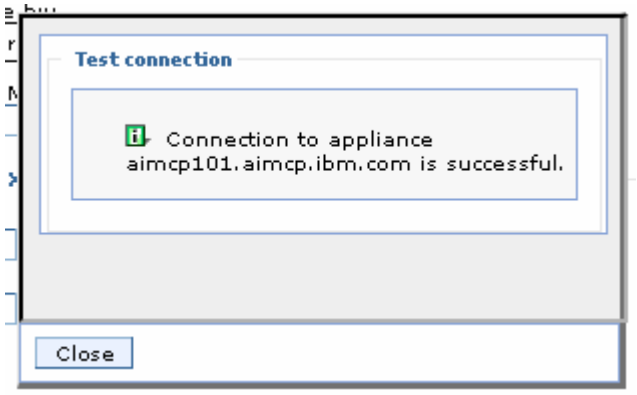
__ b. Select **IBM WebSphere DataPower XC10 Appliance** from the **Manage session persistence by:** drop down list.

__ c. Enter appliance IP or host name.

__ d. Enter User name and password.



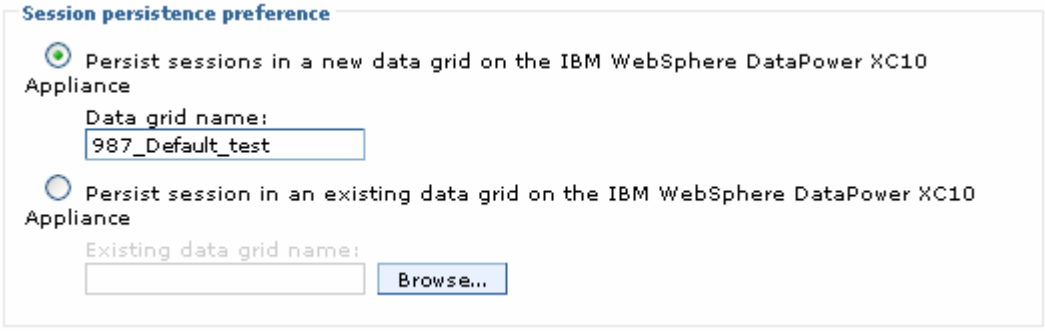
__ e. Click the **Test Connection…** button to confirm that you can connect successfully to the appliance.



__ f. In the **Session persistence preference** section, click **Persist sessions in a new data grid on the IBM WebSphere DataPower XC10 Appliance**

__ g. Data grid names must be unique on the appliance. Since this is a shared environment, consider the need to make your data grid names unique and standard. For this lab, add a prefix of your initials to the data grid name to help identify the caches you create. (Example: "XX_Your_Data_Grid_Name"). Note that multiple applications can share a session data grid.

__ h. Enter "<*xx*>_<Your_Data_Grid_Name>" in the "Session data grid name" entry field. For this lab's illustration purposes, the grid name 987_Default_test is used below.



____ 24. Click the **OK** button at the bottom of the page. When you click **OK** or **Apply** the administrative console client will immediately begin the process of creating the session cache on the appliance, rather than waiting for you to save your changes within the WebSphere configuration. Creating the session cache might take up to 1 minute. If you do not save the changes within the WebSphere configuration later, the session cache will still be present on the appliance.

Learn: You can use a cache that already exists on the DataPower XC10 appliance by selecting "Persist sessions in an existing data grid…". You used this capability in Part 2 of this lab.

____ 25. Save the changes.

__ a. Click **Review** in the messages area.

__ b. On the Save panel, make sure that the check box **Synchronize changes with Nodes** is selected.

__ c. Click **Save.**

__ d. Click **OK** when the sync operation completes.

____ 26. Set permissions for your data grid, so other people in your group can monitor the cache. See the HINT provided in the previous section for this similar step.

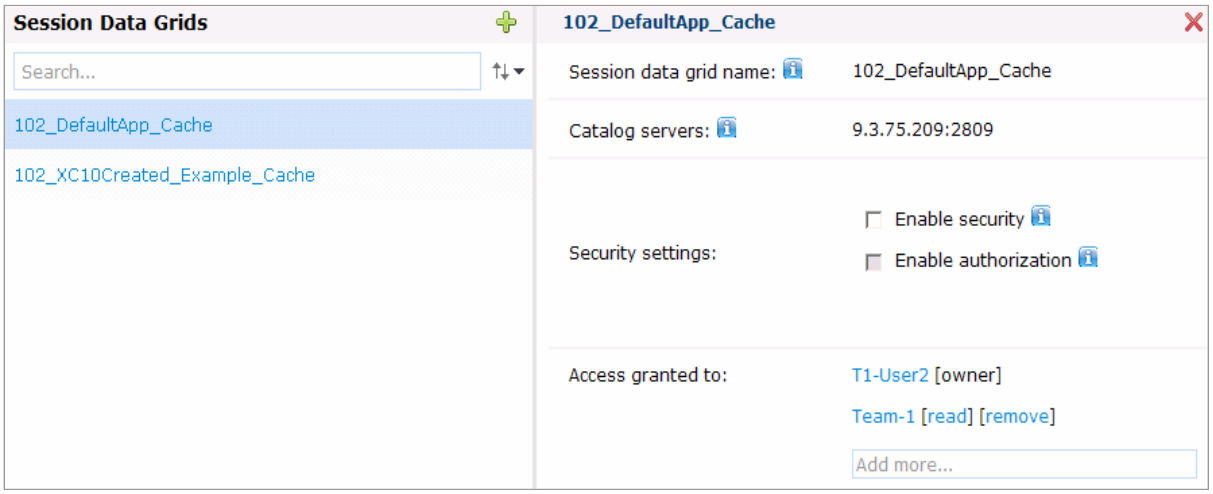
__ a. Open the IBM WebSphere DataPower XC10 Appliance web console in a supported browser.

__ b. Log in to the DataPower XC10 Appliance with your user credentials as provided by IBM.

__ c. Navigate to **Data Grid→Session .**

__ d. Click the name of the session data grid you just created from the list on the left. (For illustration purposes only, the grid below is not the same as the one created; in your case, select the data grid created in step 23 (h).

__ e. From the data grid properties shown on the right, navigate to the **Access granted to:** section.



__ f. Click the **Add More** field and select the name of your user group (Team 1) from the drop down box. Then toggle through the “read”, “write”, “create” and “all” options and set the **Access granted to:** ”read”.

Part 4: Monitor the session data grid

The DataPower XC10 web console includes monitoring capabilities to dynamically report key metrics pertaining to the overall performance of the data grids. In this section of the lab, you will use the JMeter tool to simulate multiple users generating load on the application you configured in Part 2. You can then monitor your session data grid in real time by reviewing the number of cache entries through the DataPower XC10 web console.

____ 27. Manually start the server, if it is not started already.

__ a. From the WebSphere Application Server administrative console, expand **Servers → Server Types → Application Servers**.

__ b. Select the check box next to **server1** and click **Start.**

__ c. Wait for confirmation that the server is started. This could take several minutes.

____ 28. Start the lab application, XC10SessionTest_war, if it is not already started.

__ a. In the Navigation panel, expand **Applications → Application Types → WebSphere enterprise applications.**

Note: In this lab you will use Apache JMeter to generate session data for the SessionTest_war application. This tool is freely available from http://jakarta.apache.org/JMeter/

____ 29. Start JMeter a Windows **Command prompt**.

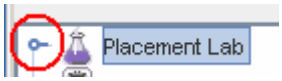
__ a. Open a Commmand Prompt (by clicking **Start→Run cmd.exe** and navigate to the directory where the jmeter test tool files are stored, for example **cd C:\jmeter\bin**

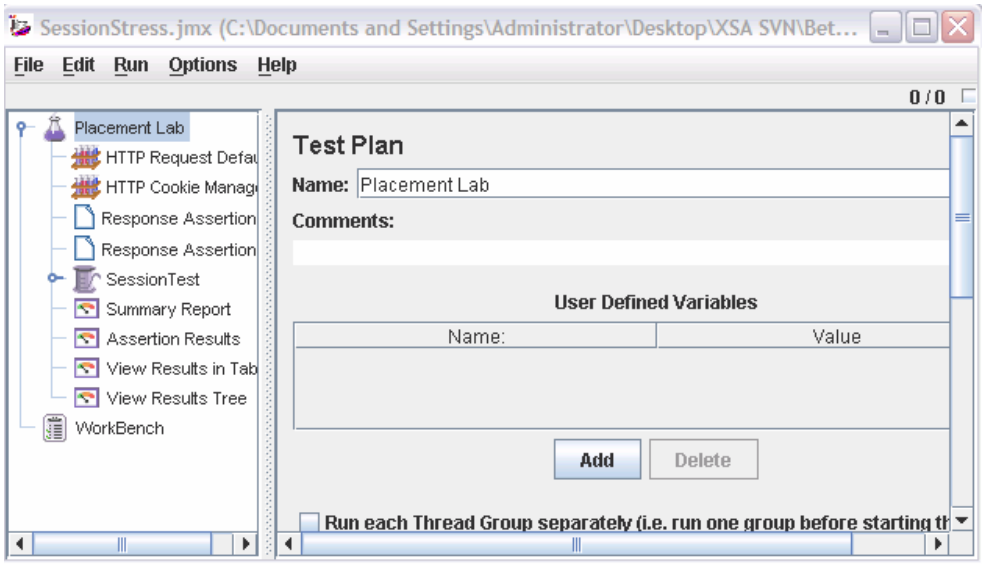
__ b. Type .**jmeter.bat** and press **enter.**

__ c. From the jmeter tool interface, click **File →Open** and navigate to <LAB_FILES>\HTTPSession. For example **cd C:\LabFilesXC10\HTTPSession**

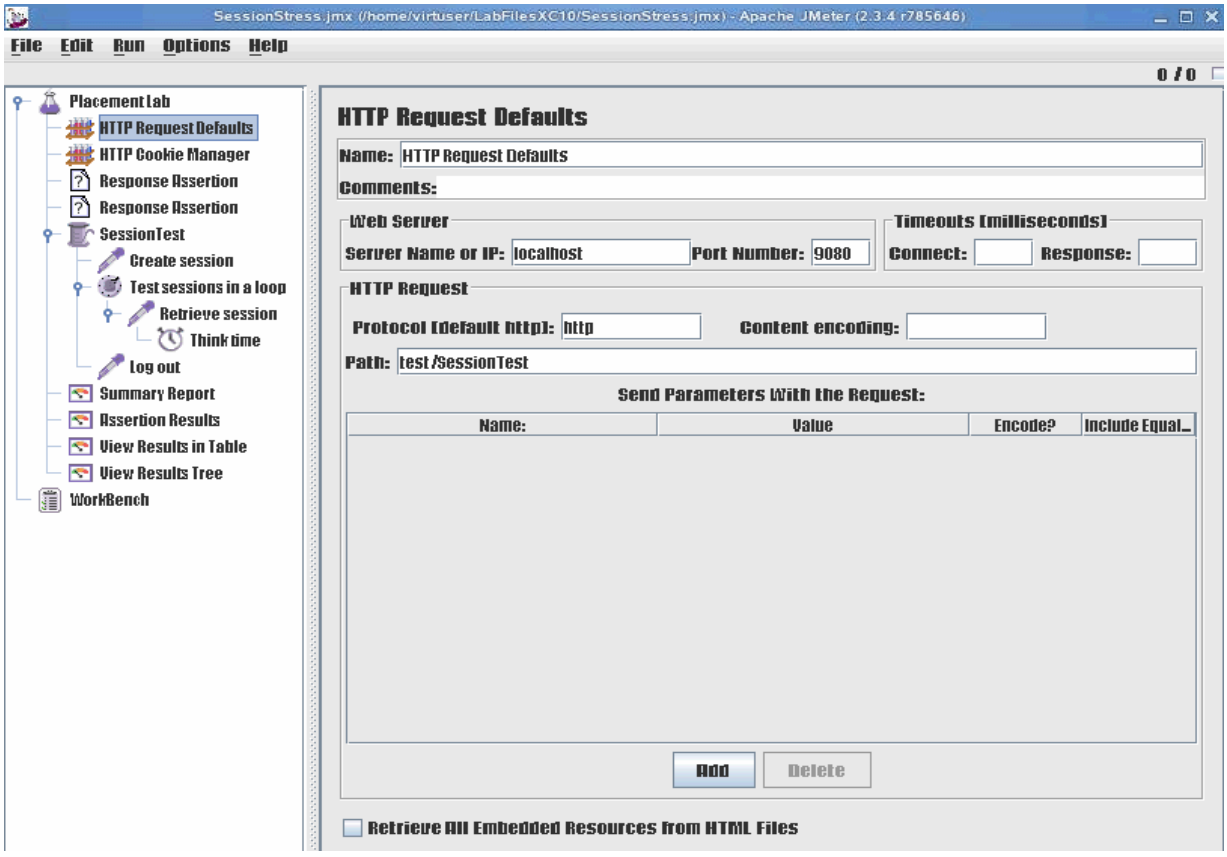
__ d. Click on the **SessionStress.jmx** and click **Open** button. The necessary jars will be loaded to run the test tool. Once that is complete, a dialog opens that allows you to run the test tool.

__ e. If the plan is not expanded, click this graphical symbol in the left pane.





__ f. Click **HTTP Request Defaults** and review the following (already set) parameters.



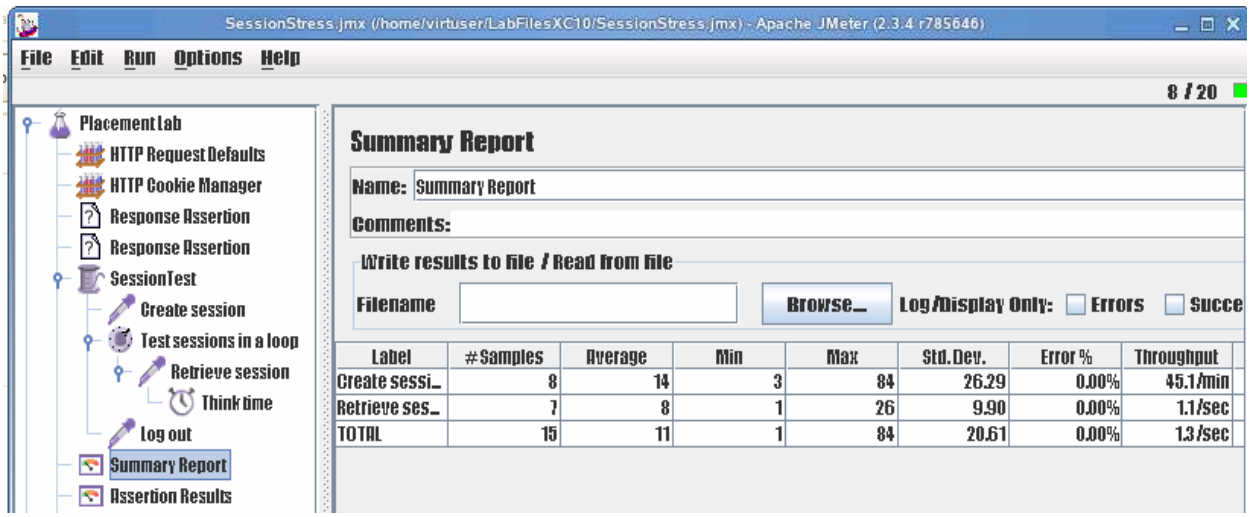
____ 30. **Optional:** Follow the instructions below to adjust the test plan for the amount of load/stress required.

__ a. Click "**SessionTest"** if you want to adjust "Number of Threads (users)" and "Ramp-Up Period"
__ b. Click "**Create Session**" and adjust **min/maxObjects** and **min/maxObjectSize** (in bytes). Do not change the login or logout parameters.

__ c. Click "**Test sessions in a loop**" and change the loop count to change number of times it calls the test servlet to retrieve the session data.

____ 31. Click **Run** then click **Start** to start the stress tool using these plan settings.

____ 32. Click **Summary Report** to ensure you see some data being populated.

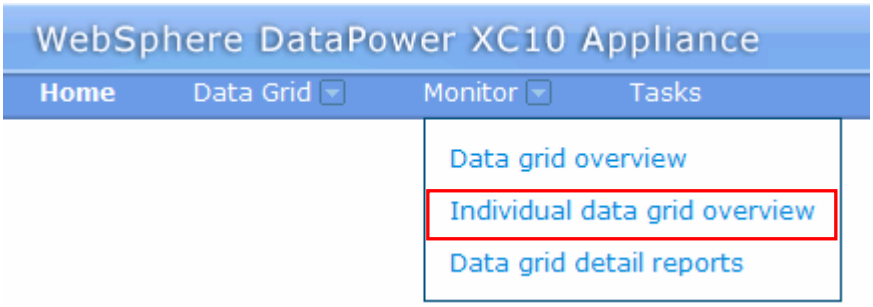


____ 33. You can verify that the DataPower XC10 Appliance is being used for session management by looking for the following string in the application server's SystemOut.log.

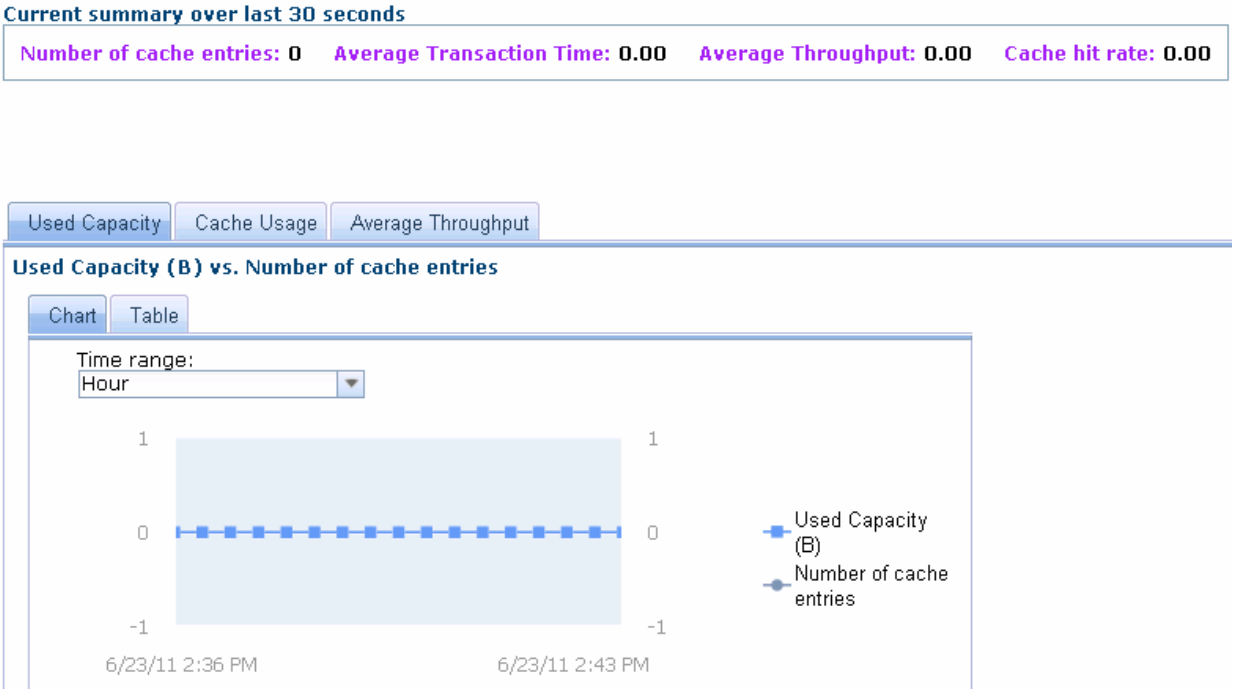
```
[6/22/11 15:49:37:258 CDT] 00000021 servlet       I
com.ibm.ws.webcontainer.servlet.ServletWrapper init SRVE0242I: [XC10SessionTest_war]
[/test] [Session test]: Initialization successful.
[6/22/11 15:49:37:305 CDT] 00000021 HttpSessionFi A   CWWSM0007I: Using the
ObjectGrid based Session Manager.
```

____ 34. Monitor the data grid from the DataPower XC10 web console.

__ a. From the DataPower XC10 web console, navigate to **Monitor → Individual Data Grid Overview.**

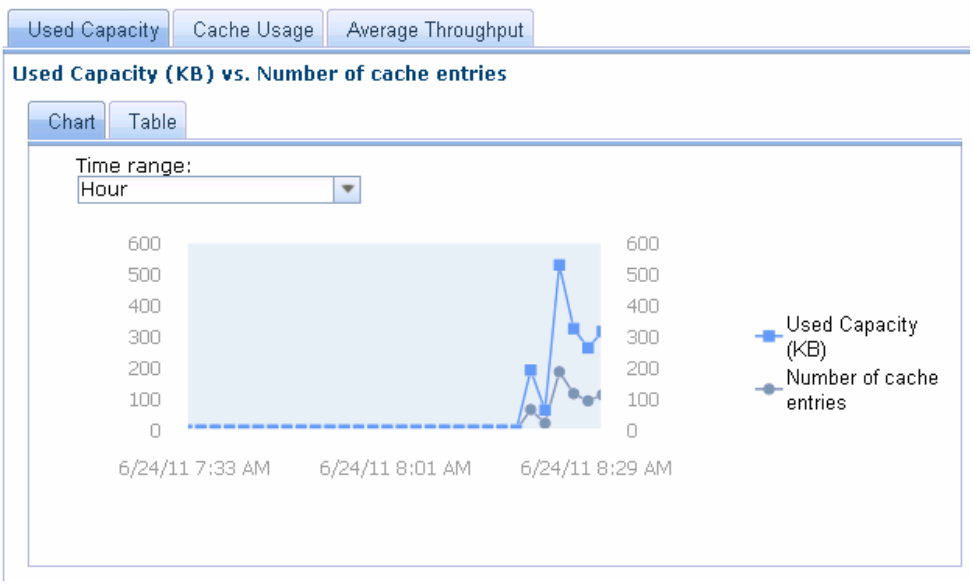


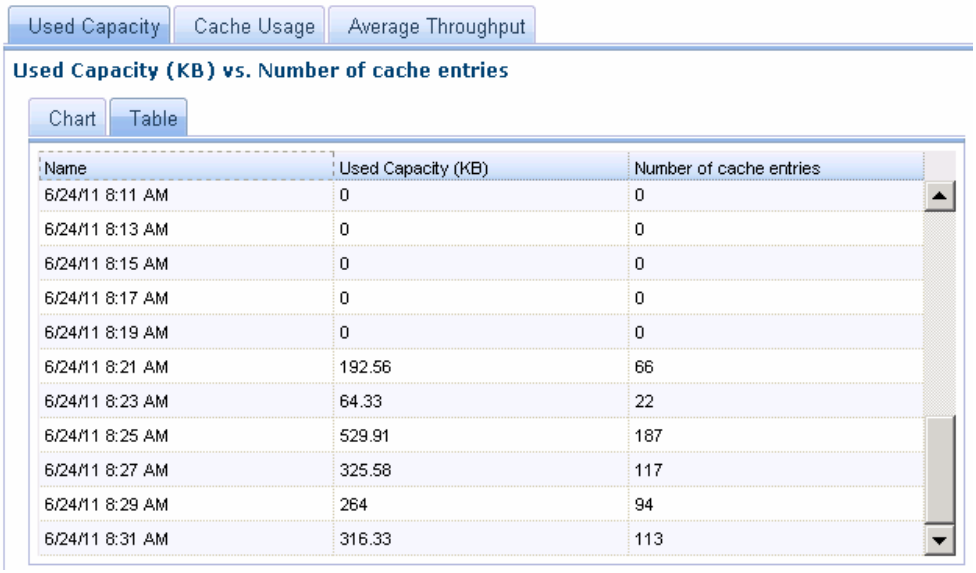
__ b. Click the name of the session data grid you configured for with the XC10SessionTest application from the left side of the panel. The screen capture below shows what will be displayed on the right side of the panel for the data grid before the testing starts.



____ 35. After the test has run for a few minutes,

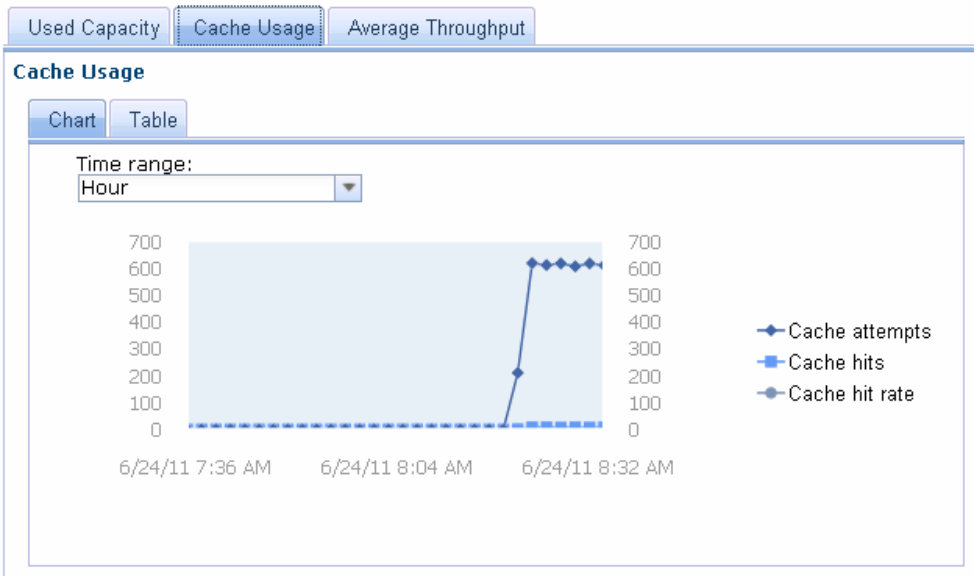
__ a. Observe both the **Chart** and **Table** views of the **Used Capacity tab** to verify that the session data grid is being used to cache data. NOTE: the number of cache entries may differ between this chart/table and the **Current Summary** at the top of the panel.

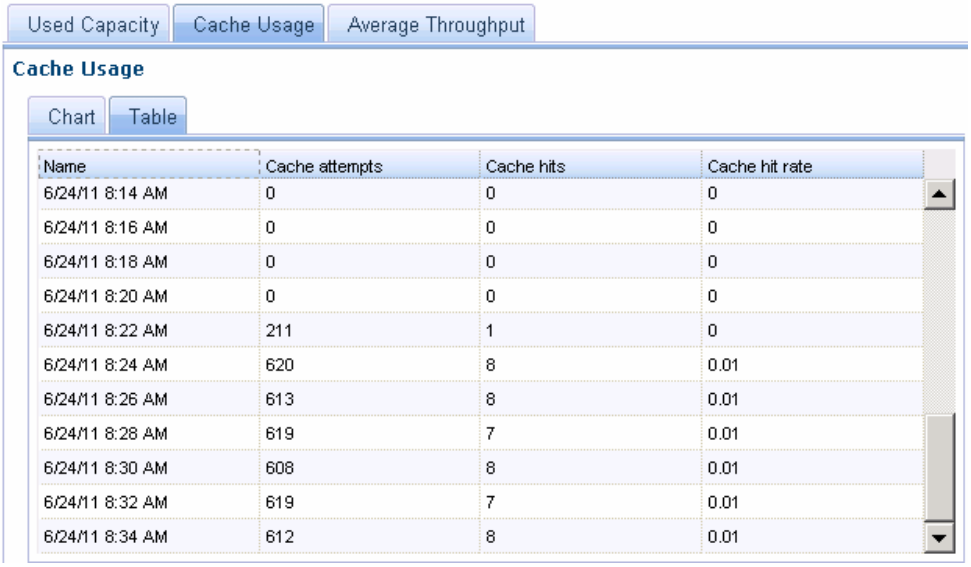




Name	Used Capacity (KB)	Number of cache entries
6/24/11 8:11 AM	0	0
6/24/11 8:13 AM	0	0
6/24/11 8:15 AM	0	0
6/24/11 8:17 AM	0	0
6/24/11 8:19 AM	0	0
6/24/11 8:21 AM	192.56	66
6/24/11 8:23 AM	64.33	22
6/24/11 8:25 AM	529.91	187
6/24/11 8:27 AM	325.58	117
6/24/11 8:29 AM	264	94
6/24/11 8:31 AM	316.33	113

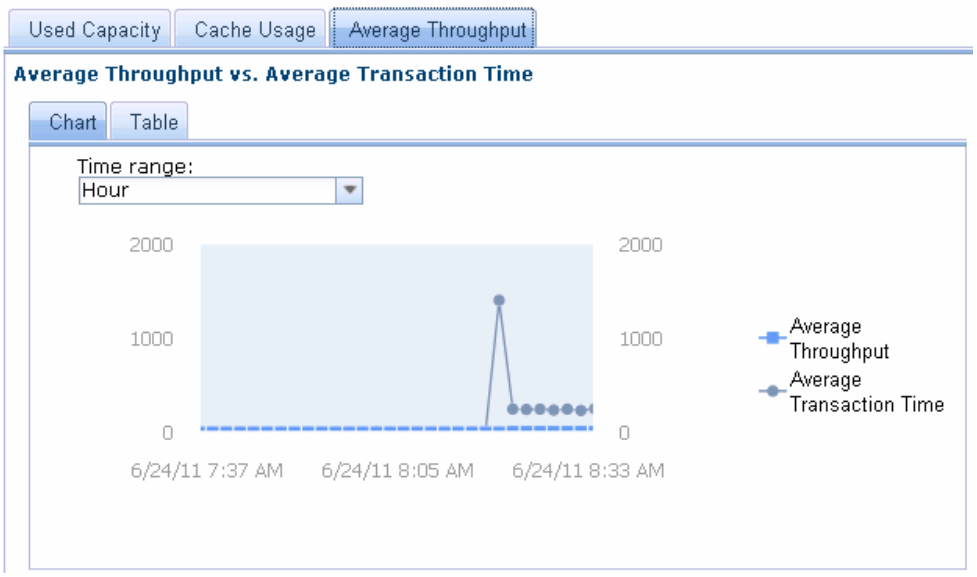
__ b. Observer both the **Chart** and **Table** views of the Cache Usage tab.

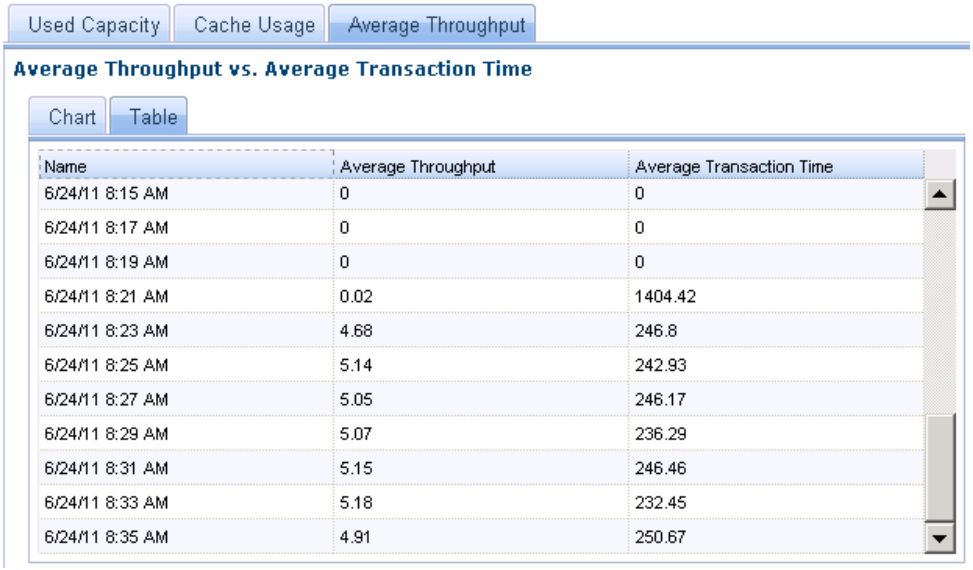




Name	Cache attempts	Cache hits	Cache hit rate
6/24/11 8:14 AM	0	0	0
6/24/11 8:16 AM	0	0	0
6/24/11 8:18 AM	0	0	0
6/24/11 8:20 AM	0	0	0
6/24/11 8:22 AM	211	1	0
6/24/11 8:24 AM	620	8	0.01
6/24/11 8:26 AM	613	8	0.01
6/24/11 8:28 AM	619	7	0.01
6/24/11 8:30 AM	608	8	0.01
6/24/11 8:32 AM	619	7	0.01
6/24/11 8:34 AM	612	8	0.01

__ c. Observer both the **Chart** and **Table** views of the Cache Usage tab.





Name	Average Throughput	Average Transaction Time
6/24/11 8:15 AM	0	0
6/24/11 8:17 AM	0	0
6/24/11 8:19 AM	0	0
6/24/11 8:21 AM	0.02	1404.42
6/24/11 8:23 AM	4.68	246.8
6/24/11 8:25 AM	5.14	242.93
6/24/11 8:27 AM	5.05	246.17
6/24/11 8:29 AM	5.07	236.29
6/24/11 8:31 AM	5.15	246.46
6/24/11 8:33 AM	5.18	232.45
6/24/11 8:35 AM	4.91	250.67

____ 36. Stop the stress tool within JMeter.

__ a. Click **Run** and then **Stop** menu in the stress tool.

What you did in this exercise

- In this exercise, you configured WebSphere applications to store HTTP session data to a data grid on the IBM WebSphere DataPower XC10 Appliance. You learned how to create the session data grids required to cache the HTTP session information in two ways, from the DataPower XC10 web console and from the WebSphere Application Server administrative console. You also learned how to grant specific users or user groups access to the data grids you created. The monitoring features of the DataPower XC10 product provide an easy and quick method to review the health and performance of the data grids. With a stress tool you were able to observe that the session management processes were running and responsive.

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