

Lab Exercise: z/OSMF Workload Management Hands-On Lab

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Introduction:

The IBM z/OS Management Facility (z/OSMF) provides system management solutions for z/OS in a task-oriented, browser-based user interface with integrated user assistance.

The Workload Management application introduced with z/OSMF 1.12 provides a simplified process for administering and operating WLM, and managing and editing WLM service definitions and policies. It is a valuable replacement for the existing WLM ISPF Administrative Application, because apart from a simpler and clearer state-of-the-art graphical user interface, it supports creating and modifying service definitions by best-practice checks and recommendations, and an integrated policy repository with serialization and operation history.

This hands-on lab will give you an opportunity to use the z/OSMF Workload Management function first-hand. Attendees will use z/OSMF Workload Management to create and edit service definitions, observe and implement various best-practice recommendations, and monitor WLM status in the Sysplex.

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Notes:

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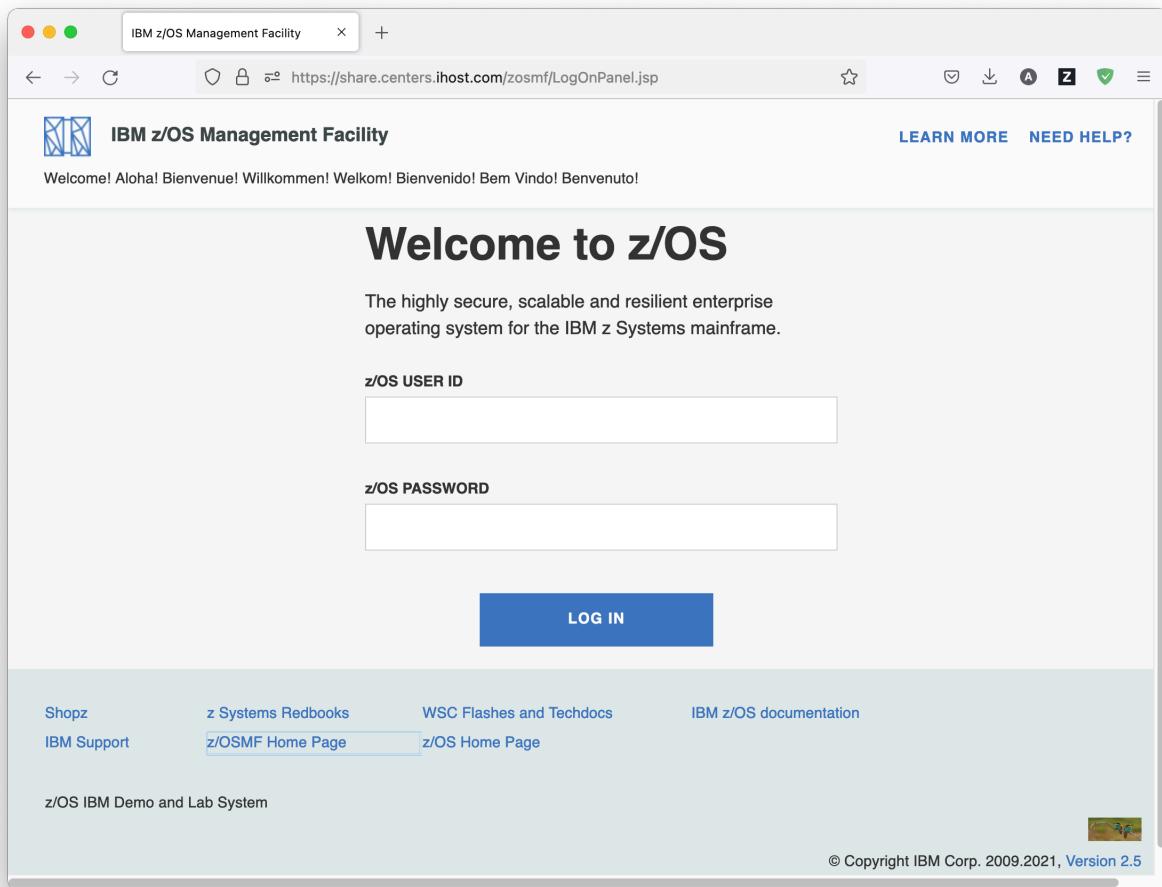
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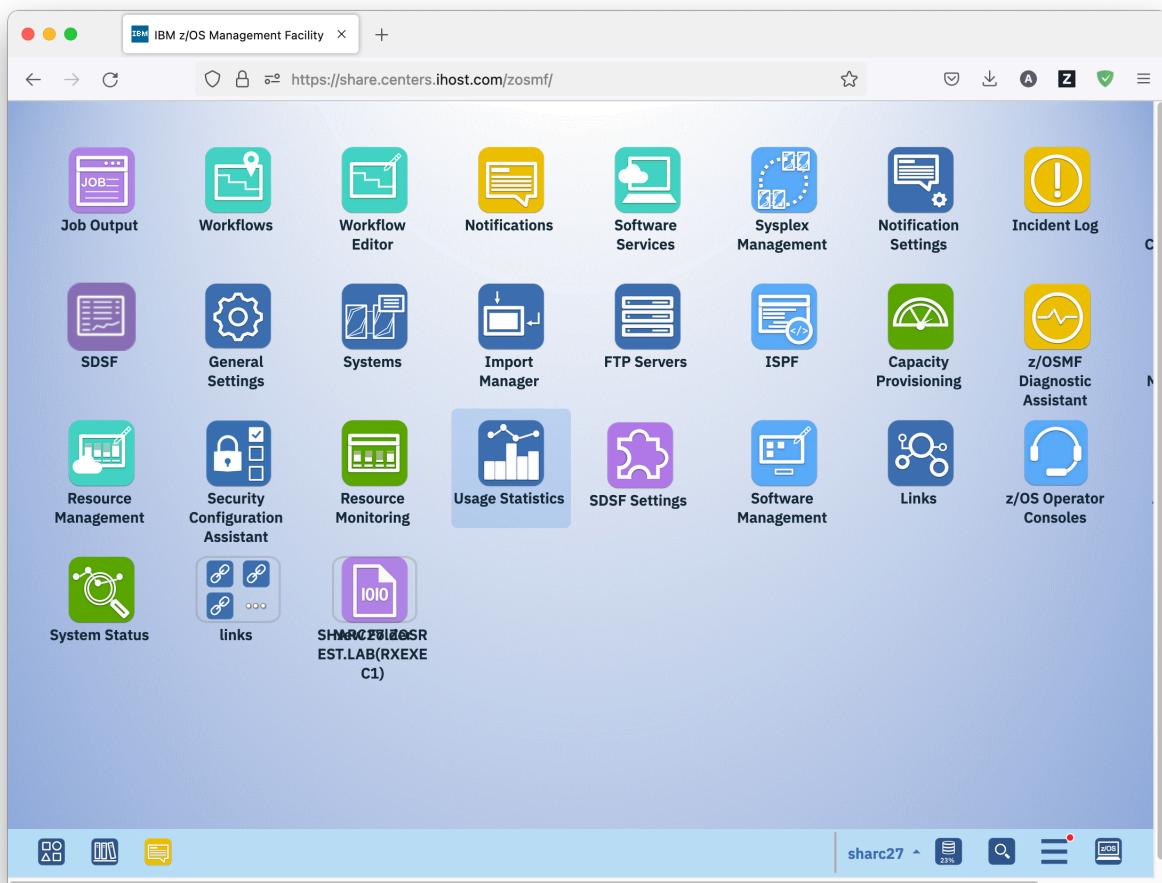
1. Connect and Login to z/OSMF

IBM z/OSMF is a Web 2.0 application that runs in a servlet container of the IBM z/OS WebSphere Application Server. Hence, no additional software has to be installed on your workstation. Everything you need is a web browser and then you are ready to connect instantly to the z/OS image where your z/OSMF main application and the corresponding plug-ins have been deployed.



Exercise:

- Launch the Mozilla Firefox browser
- Connect to z/OSMF: <https://share.centers.ihost.com/zosmf/>
 - If the browser asks to add exception for certificate, do so
 - You might see the warning message IZUG809W (unsupported web browser). Ignore and close this message
 - You might see the warning message IZUG810W (performance degradation through Firebug add-on). Ignore and close this message
- Login with your SHARE userid/pw
- Now view zOSMF Desktop pane and examine the various apps with the available tasks



2. Start the Workload Management Task

The Workload Management icon is located at the main Desktop panel. The first panel that opens is the Workload Management panel displaying the Overview tab which lists the major tasks.

These major tasks are:

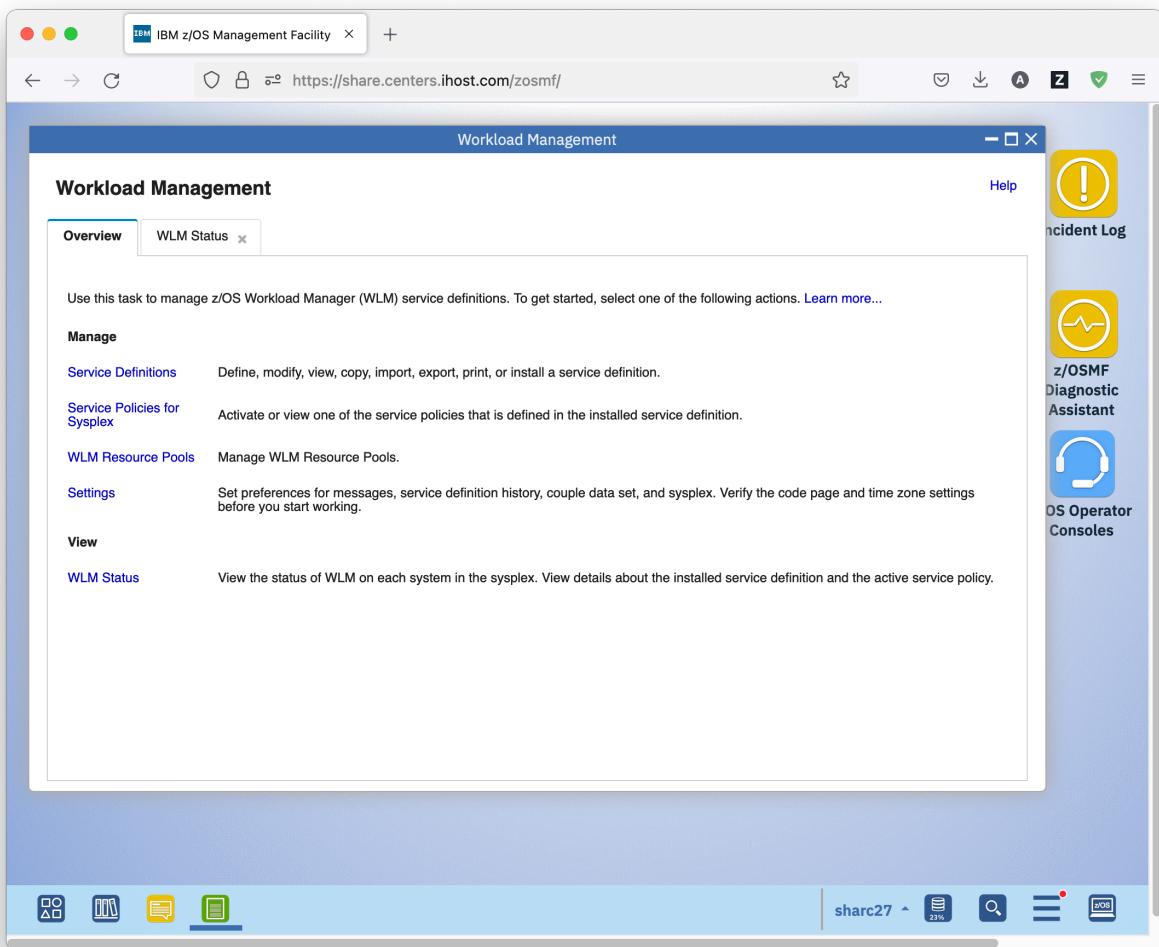
- Service Definitions: Allows defining, modifying, viewing, copying, importing, exporting, printing, or installing WLM service definitions.
- Service Policies for Sysplex: Allows activating or printing one of the service policies that is defined in the installed service definition.
- Settings: Allows setting user preferences and customizing general administrative settings for Workload Management.
- View WLM Status: Allows viewing the status of WLM on each system in the Sysplex.

More information about the Workload Management task is available when you click the *Learn more...* hyperlink. A new browser window opens that displays the requested information.

Furthermore, in the top right corner of the Workload Management panel, there is always a *Help* hyperlink, which opens the help window for the currently active tab.

Exercise:

- Double click on Workload Management icon
- View the Workload Management panel with the Overview tab
 - Click on the *Learn more...* hyperlink and review the information about the Workload Management task
 - Click top right on the *Help* hyperlink and review the help for the Overview tab.



3. View Service Definitions

The Manage Service Definitions task allows defining, modifying, viewing, copying, importing, exporting, printing, or installing WLM service definitions. Once you select this task from the Overview tab, the Service Definitions tab is opened and shows you all service definitions in the Service Definition Repository integrated in z/OSMF.

A service definition is a definition of the workloads and classification rules in an installation. It contains all information needed for Workload Management processing.

The Service Definition Repository refers to a directory in the z/OSMF data file system in which the data for the Workload Management task is stored. The service definitions that have been defined in z/OSMF are stored in this repository, and displayed in the Service Definitions tab. There can be multiple service definitions for a sysplex; however, only one service definition can be installed and active in the WLM couple data set for the sysplex.

The repository synchronizes automatically with the WLM couple data set: When the Service Definitions panel is launched or refreshed, z/OSMF checks if the service definition currently installed in the WLM couple data set is contained in the Service Definition Repository. If it is not contained, z/OSMF extracts the service definition automatically, displays it in the Service Definitions table, and marks it with the label „Installed“. Furthermore, the service definition that is currently used by z/OS WLM to manage the sysplex is marked with the label „Active“.

Exercise:

- On the Overview tab of the Workload Management task, click on the *Service Definitions* hyperlink
- View the service definitions present in the Service Definition Repository

The screenshot shows the IBM z/OS Management Facility Workload Management Service Definitions page. The URL is https://share.centers.ihost.com/zosmf/. The page title is "Workload Management". The "Service Definitions" tab is selected. A sidebar on the right contains icons for "Incident Log", "z/OSMF Diagnostic Assistant", and "z/OS Operator Consoles". The main content area displays a table of service definitions:

Name	Description	Activity	Sysplex
CHKTEST	Evaluate editor checks		
PRODJOEY	WLMPROD		
S2WLM (installed & active)	WLM Service Definition z23		SHARPLEX
S2WLM2	Backup Service Definition z23		
TESTJOEY	WLMTEST		
WLMPR21	WMLPROD to use for lab		
WLMPR28			
WLMPR99	WMLPROD to use for lab		

Total: 10 Selected: 0

Last refresh: Aug 10, 2022, 4:10:07 PM local time (Aug 10, 2022, 2:10:07 PM GMT)

4. Working with z/OSMF Tables

The z/OSMF Workload Management task displays service definitions and their sections in tables. All these tables are structured similarly. There are buttons for selecting, and deselecting all elements of the table. The Actions menu consists of three sections:

- Targeted actions are actions that apply to the selected items. To use a targeted action, you must select one or more items in the table. Targeted actions are specific for the current table, here, for example, they specifically apply to service definitions.
- General actions are actions that apply to the current table, here, for example, to service definitions. No selection is required.
- Table actions are actions that apply to the entire table such as sorting and filtering. No selection is required. These actions are the same for all tables in z/OSMF Workload Management.

So let's first concentrate on the table actions.

Description Filter	Activity Filter	Sysplex Filter
WLM Service Definition z23		SHARPLEX
Evaluate editor checks		
WLMPROD		
Backup Service Definition z23		
WLMTEST		
WLMPROD to use for lab		
WLMPROD to use for lab		

Exercise:

- On the Service Definitions tab of the Workload Management task, click on *Actions – Select All*. As result, all service definitions in the table are selected. You can also click the button on the left.
- Click on *Actions – Deselect All* to deselect all of the selected rows in the table. You can also click the button on the left.
- Click on *Actions – Configure Columns* to select which columns to display in the table, to specify the order of those columns, and to designate which columns should be fixed in position when the table is scrolled horizontally. Use the *Restore Defaults* button on the *Configure Columns* window to switch back to the default setup.
- Click on the 3 arrow icon () under *Actions* to build or remove filter criteria for each column in a table. You can also click on the *Filter* hyperlink in each column heading of the table to access the Modify Filters window.
- Click on *Actions – Hide Filter Row* to remove the filter row from view. This action is listed only when the filter row is displayed in the table.
- Click on *Actions – Show Filter Row* to display the filter row. This action is listed only when the filter row is not displayed in the table.
- Click on the *Clear Filters* link, next to the arrow icon to clear all of the filters specified in the table.
- Click on the column heading to sort the table ascending based on the values in the column. A second click sorts the table descending based on the values in the column, a third click removes the sort criterion.
- Click on *Actions – Clear Sorts* to clear the sort from all of the columns in the table.
- To locate items of interest, use the search box displayed top right in the table toolbar. If a search box is not provided, you cannot search the table. Searching a table highlights the content that matches the search string. The search does not reduce the number of items displayed in the table, so you might need to scroll to locate the matches.
- Click on *Actions – Clear Search* to clear the search results.
- Of course, you can also modify the size of the columns to fit the size of your browser window. All these settings are persistent between sessions.

5. Import Service Definitions from Files

Service definitions can be imported into the Service Definition Repository either from the local workstation or from a host data set.

The format for import and export is XML. This is helpful for migrating service definitions from the WLM ISPF Administrative Application.

Exercise

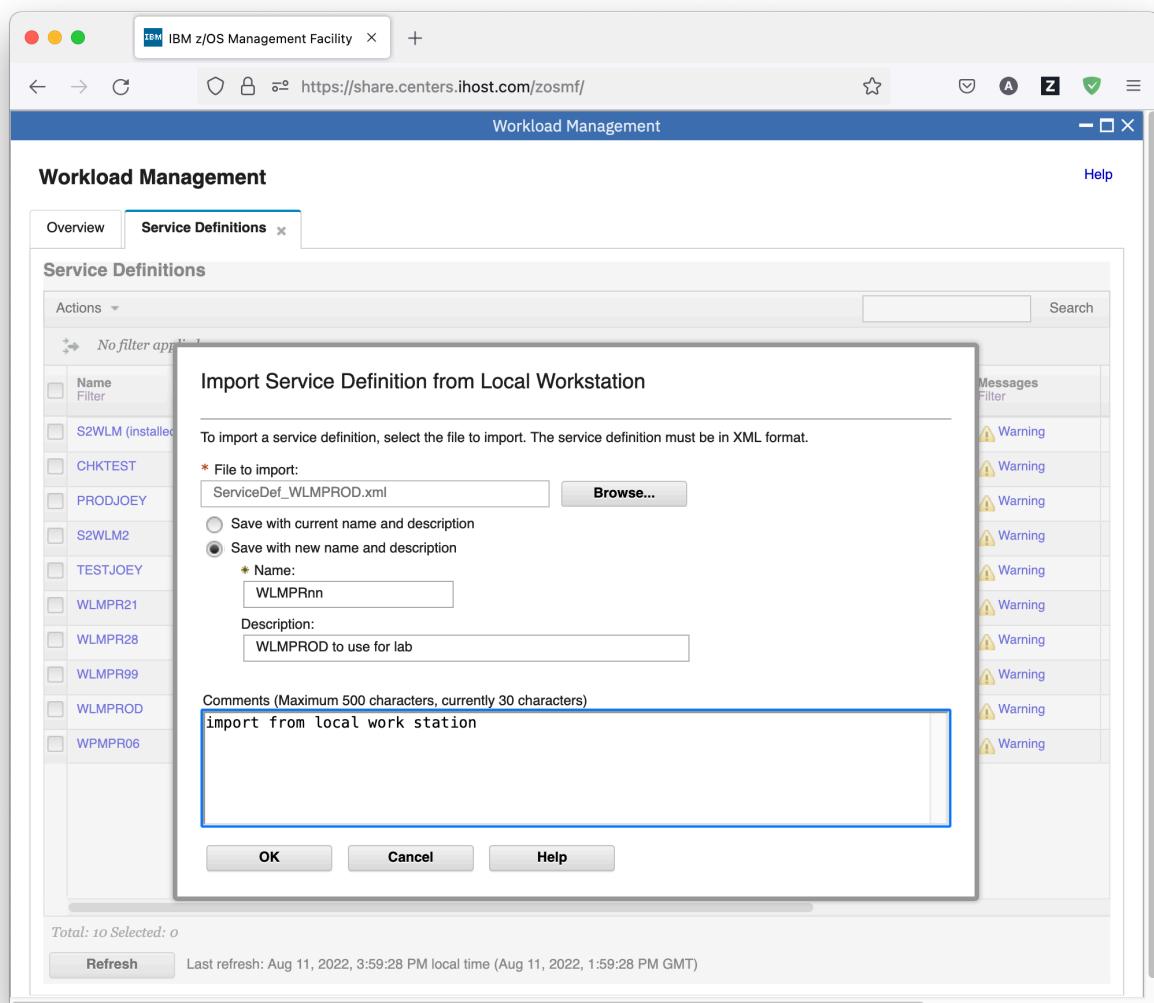
- On the Service Definitions tab of the Workload Management task, click on *Actions – Import – From Local Workstation*.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The browser title bar reads "IBM z/OS Management Facility". The main window title is "Workload Management". The navigation bar has tabs for "Overview" and "Service Definitions". The "Service Definitions" tab is selected. Below the tabs is a "Service Definitions" section with a table and a context menu. The context menu is open over the "Import" option in the "Actions" dropdown. The menu items are: Modify Service Definition, View Service Definition, View Messages, View History, Print Preview, Install and Activate..., Copy, Delete..., Export, View WLM Status, New..., Import, Select All, Deselect All, Configure Columns..., Hide Filter Row, Clear Sorts, and Clear Search. The "Import" option is highlighted. A sub-menu for "Import" shows two options: "From Local Workstation..." and "From Host Data Set...". The table below the menu lists several service definitions:

Description Filter	Activity Filter	Sysplex Filter
WLMPROD		
Backup Service Definition z23		
WLMTEST		
WMLPROD to use for lab		
Milen Dobrev		

At the bottom of the interface, there is a footer with icons for search, refresh, and help, and the text "sharc27 23%".

- In the dialog that opens, use the *Browse* button to select a service definition XML file on the local workstation. This file could either result from a previous export from z/OSMF WLM, or from the IBM Service Definitions Editor. For the purpose of the lab, such a file has been provided for you. Choose service definition `ServiceDef_WLMPROD.xml` from folder `zOSMF_WLM` on your local workstation's desktop. To avoid conflicts with other lab participants, select the *Save with new name and description* radio button, and provide `WLMPRnn` as unique name, where `nn` is the unique number (01 – 20) you got assigned for this lab. You also need to provide a comment. Click the *OK* button to import the service definition.



- You can ignore the message
IZUW143W As of z/OS V2R5, service coefficients are pre-set to CPU=1, IOC=0, MSO=0, and SRB=1. They cannot be specified or changed in the WLM service definition.
- The newly imported service definition then shows up in the Service Definitions table.

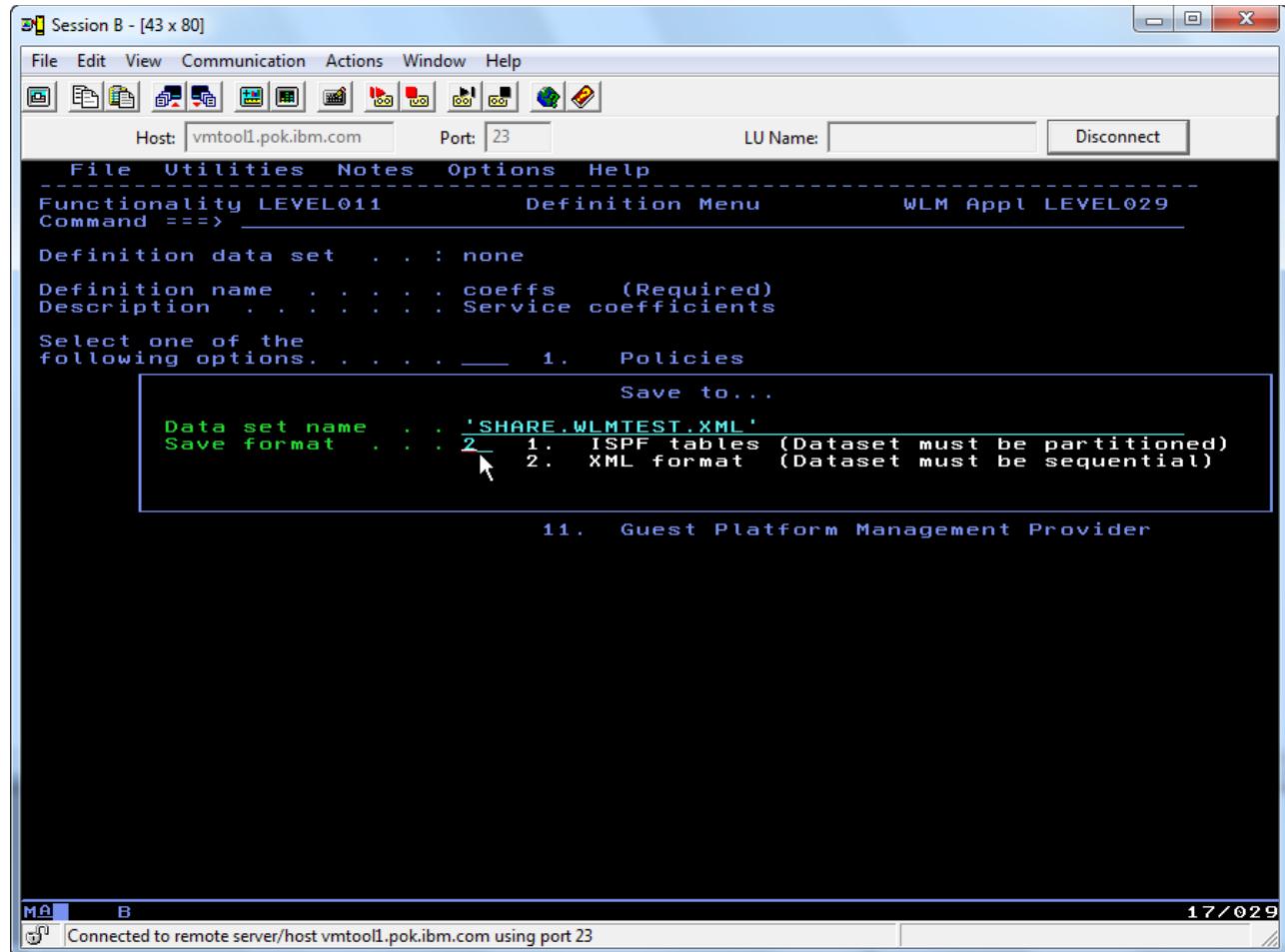
The screenshot shows the IBM z/OS Management Facility Workload Management Service Definitions page. The page has a header with tabs for Overview and Service Definitions. Below the tabs is a message banner: "Service definition 'WLMPRnn' with description 'WLMPROD to use for lab' was imported." The main area contains a table of service definitions:

Name	Description	Activity	Sysplex	Messages
CHKTEST	Evaluate editor checks			⚠ Warning
PRODJOEY	WLMPROD			⚠ Warning
S2WLM2	Backup Service Definition z23			⚠ Warning
TESTJOEY	WLMTEST			⚠ Warning
WLMPR21	WMLPROD to use for lab			⚠ Warning
WLMPR28				⚠ Warning
WLMPR99	WLMPROD to use for lab			⚠ Warning
<input checked="" type="checkbox"/> WLMPRnn	WLMPROD to use for lab			⚠ Warning
<input type="checkbox"/> WLMPROD	WLMPROD to use for z/OSMF lab			⚠ Warning
<input type="checkbox"/> WPMPR06	Milen Dobrev			⚠ Warning

Total: 11 Selected: 1

Refresh Last refresh: Aug 11, 2022, 4:00:47 PM local time (Aug 11, 2022, 2:00:47 PM GMT)

- Service definitions can also be imported into the Service Definition Repository from a host data set. This is helpful for migrating service definitions from the WLM ISPF Administrative Application.
Not part of the Lab: For example, if you have saved a service definition in ISPF table format in a host data set, you can open it with the WLM ISPF Administrative Application, and save it in XML format to a sequential data set, like we have done here for the Lab:



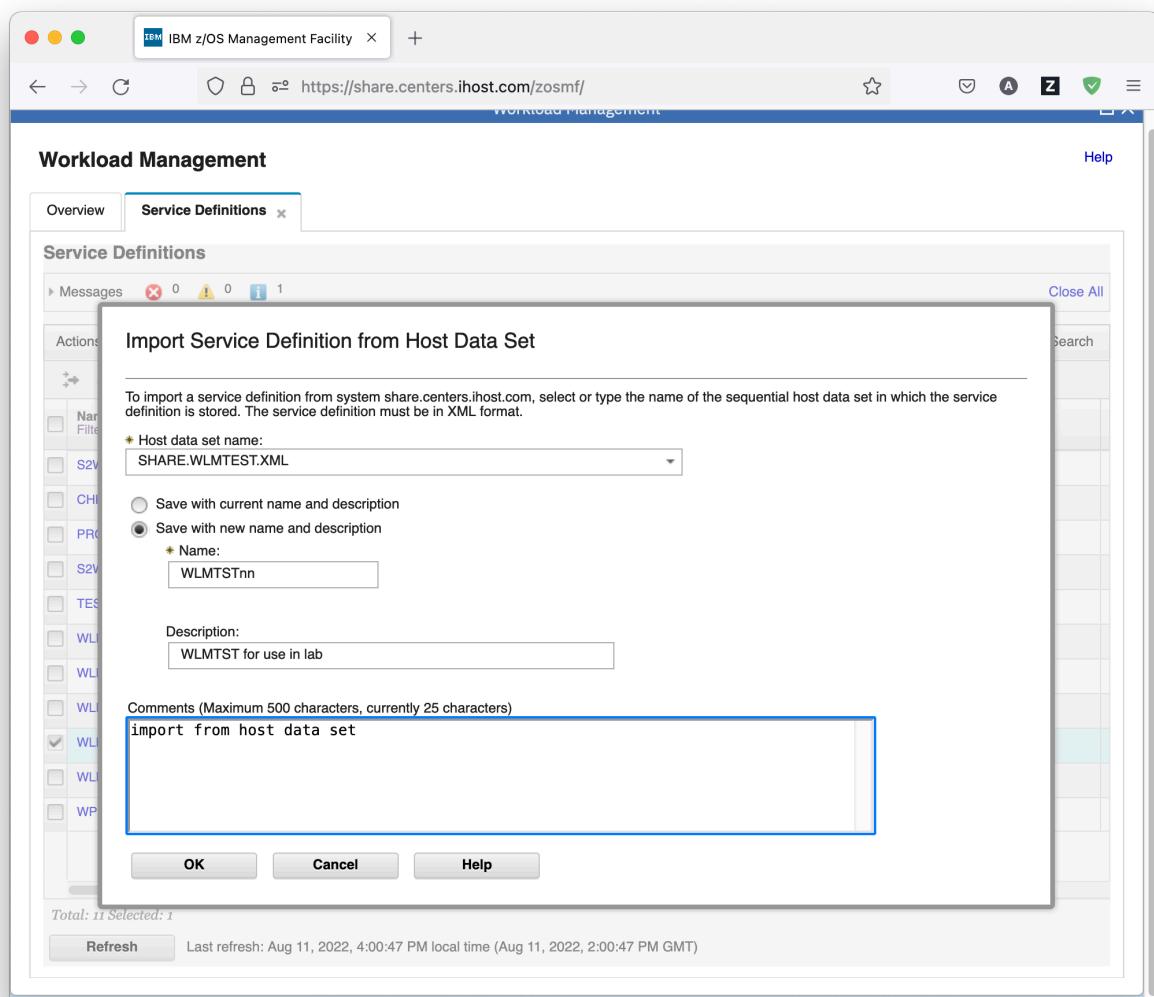
- This host data set can then be imported into the Service Definition Repository. To do so, on the Service Definitions tab of the Workload Management task, click on *Actions – Import – From Host Data Set*.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The browser title bar reads "IBM z/OS Management Facility". The main navigation bar has tabs for "Overview" and "Service Definitions", with "Service Definitions" being the active tab. Below the tabs, there is a message center with 0 errors, 0 warnings, and 1 information message. The main content area is titled "Service Definitions" and contains a table of service definitions. The table has columns for "Description Filter", "Activity Filter", "Sysplex Filter", and "Messages Filter". The data in the table includes:

Description Filter	Activity Filter	Sysplex Filter	Messages Filter
WLM Service Definition z23		SHARPLEX	⚠ Warning
Evaluate editor checks			⚠ Warning
WLMPROD			⚠ Warning
Backup Service Definition z23			⚠ Warning
WLMTEST			⚠ Warning
From Local Workstation...			⚠ Warning
From Host Data Set...			⚠ Warning
WLMPROD to use for lab			⚠ Warning
WLMPROD to use for lab			⚠ Warning
WLMPROD to use for z/OSMF lab			⚠ Warning
WPMPR06			⚠ Warning
Milen Dobrev			⚠ Warning

At the bottom left, it says "Total: 11 Selected: 1". At the bottom right, it says "Refresh" and "Last refresh: Aug 11, 2022, 4:00:47 PM local time (Aug 11, 2022, 2:00:47 PM GMT)".

- In the dialog that opens, type in the data set name you used to save the service definition. For the purpose of the lab, such a file is already provided for you in data set SHARE.WLMTEST.XML. To avoid conflicts with other lab participants, select the *Save with new name and description* radio button, and provide WLMTSTnn as unique name, where nn is the unique number (01 – 20) you got assigned for this lab. You also need to provide a comment. Click the OK button to import the service definition.



- The newly imported service definition then shows up in the Service Definitions table. Note also the Messages section in top of the Service Definitions table which informs you about the actions you have done. The Messages section can be collapsed or expanded, and you can remove single messages by clicking the X on the left hand side, or remove all messages by clicking the *Close All* link.

Workload Management

Service Definitions

Messages: 0 Errors, 1 Warning, 2 Informational

Name	Description	Activity	Sysplex	Messages
S2WLM (installed & active)	WLM Service Definition z23		SHARPLEX	Warning
CHKTEST	Evaluate editor checks			Warning
PRODJOEY	WLMPROD			Warning
S2WLM2	Backup Service Definition z23			Warning
TESTJOEY	WLMTEST			Warning
WLMPR21	WLMPROD to use for lab			Warning
WLMPR28				Warning
WLMPR99	WLMPROD to use for lab			Warning
WLMPRnn	WLMPROD to use for lab			Warning
WLMPROD	WLMPROD to use for z/OSMF lab			Warning
<input checked="" type="checkbox"/> WLMTSTnn	WLMTST to use for lab			Warning
WMPR06	Milen Dobrev			Warning

Total: 12 Selected: 1

Last refresh: Aug 11, 2022, 4:03:42 PM local time (Aug 11, 2022, 2:03:42 PM GMT)

6. Best Practice Messages for a Service Definition

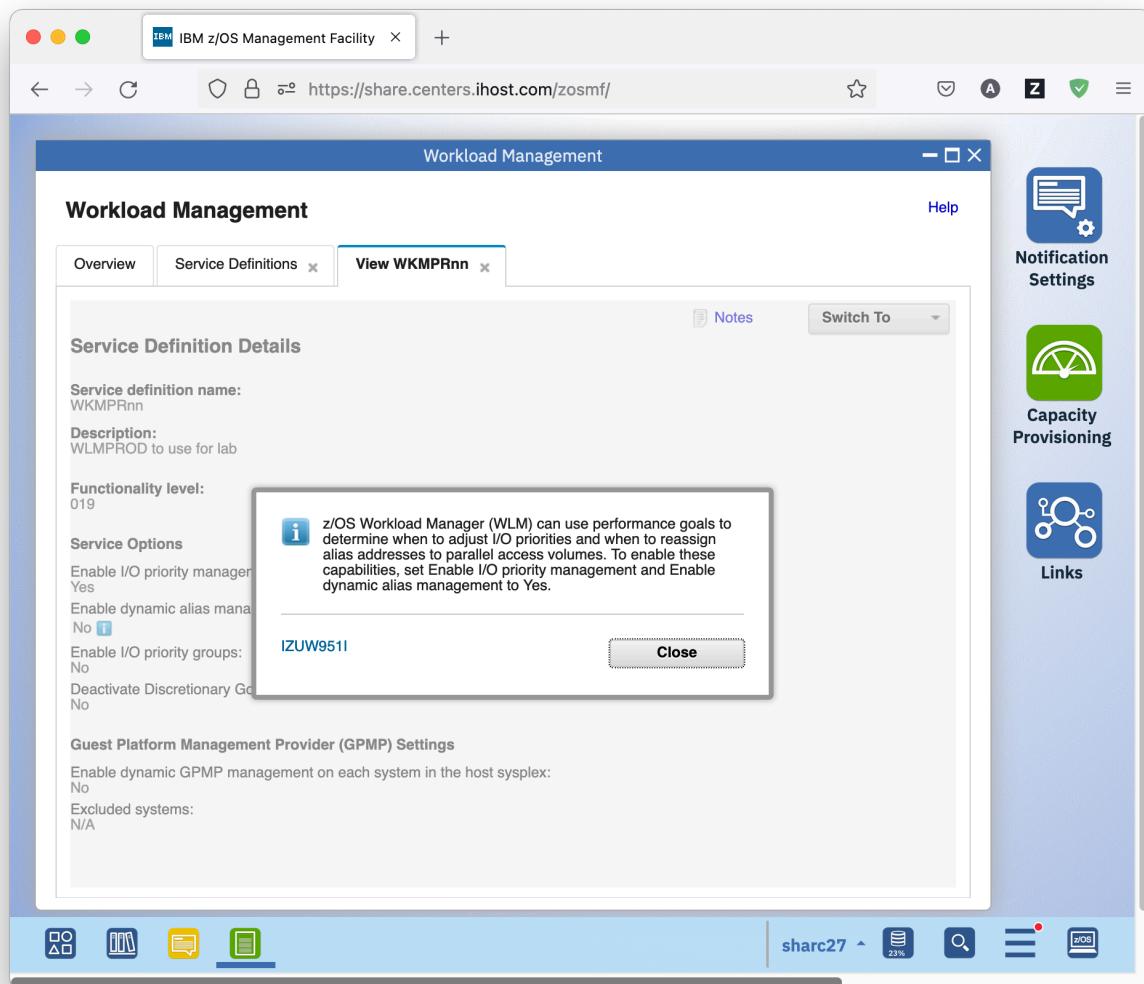
Creating and editing of WLM service definitions is supported by best practice checks. So let's have a closer look at them for our service definition.

Exercise

- Select service definition WLMPRN and either right-click it, or open the Actions menu, to see the targeted actions that are available for it. Under *View Service Definition*, a submenu lists the sections in the service definition. If messages exist for a section, a status icon is displayed to the left of its label. The status icon can indicate information, warning or error. So there is for example an information message for the *Service Definition Details*.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main window displays a list of Service Definitions. One row for 'WLN' is selected, and a context menu is open over it. The menu items include 'Modify Service Definition', 'View Service Definition' (which is currently selected), 'View Messages', 'View History', 'Print Preview', 'Install and Activate...', 'Copy...', 'Delete...', 'Export', and 'View WLM Status'. The 'View Service Definition' option has a submenu with items: 'Service Definition Details', 'Service Policies', 'Workloads', 'Service Classes', 'Resource Groups', 'Report Classes', 'Classification Groups', 'Classifications', 'Application Environments', 'Resources', 'Scheduling Environments', 'Tenant Resource Groups', and 'Tenant Report Classes'. The 'Service Definition Details' item is highlighted. The status bar at the bottom indicates 'Total: 11 Selected: 1' and 'Last refresh: Aug 11, 2022, 3:57:50 PM local time (Aug 11, 2022, 1:57:50 PM GMT)'.

- If you select *Service Definition Details* in the submenu, a new panel opens, and you can see which item requires attention: Service Option Enable dynamic alias management. You can either mouse over the information status icon to view the information message, or control-click on it to get a message window.



- In this message window, you can click on the message ID to get further help and information on the message.

The screenshot shows a web browser displaying the IBM Knowledge Center. The URL in the address bar is https://share.centers.ihost.com/zosmf/helps/SSB2H8_2.5.0/com.ibm.zosmfworkloadmgmt.messages.help.doc/IZUW951I.html. The page title is "IBM Knowledge Center". The main content area shows the details for message IZUW951I. The left sidebar contains a "Table of Contents" with a list of message IDs from IZUW928E to IZUW951I. The message IZUW951I is highlighted with a blue background. The right panel contains the message text, explanation, system programmer response, user response, and parent topic information.

IBM Knowledge Center

IBM Knowledge Center

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z/OSMF messages > z/OSMF messages > IZUW0001-IZUW9999 > IZUW951I

Explanation
WLM can use performance goals to determine when to adjust I/O priorities and when to reassign alias addresses to parallel access volumes. To enable these capabilities, set Enable I/O priority management and Enable dynamic alias management to Yes.

System programmer response
No action is required.

User response
To enable these capabilities, set Enable I/O priority management and Enable dynamic alias management to Yes.

Parent topic: [IZUW0001-IZUW9999](#)

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7. Removal of Best Practices Warning Messages from a Service Definition

There are more messages for the service definition. We will now check them and try to fix one of the more severe issues.

Exercise

- On the Service Definitions tab, select service definition WLMPRnn and either right-click it, or open the Actions menu, and choose *View Messages*. Alternatively, you can scroll to the right and click on the *Warning* hyperlink in the Messages column.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The title bar reads "IBM z/OS Management Facility". The main window is titled "Workload Management" and contains a "Service Definitions" list. The list shows several service definitions, including WLMPR28, WLMPR99, WLMPROD, WLMTST, and Milen Dobrev. A context menu is open over the row for WLMPR99, with the "View Messages" option highlighted. The interface includes a sidebar with icons for "Incident Log", "z/OSMF Diagnostic Assistant", and "z/OS Operator Consoles". The bottom of the screen shows a navigation bar with various icons and the user ID "sharc27".

- The View WLMPRnn panel is brought to the front and displays all messages for the service definition. You see that there are quite some of them.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The title bar reads "IBM z/OS Management Facility". The main navigation bar includes "Workload Management", "Help", and tabs for "Overview", "Service Definitions", and "View WLMPRnn" (which is currently selected). A sidebar on the right contains icons for "Incident Log", "z/OSMF Diagnostic Assistant", and "z/OS Operator Consoles". The main content area is titled "Messages" and displays a table of messages. The table has two columns: "Message ID" and "Message Text". The messages listed are:

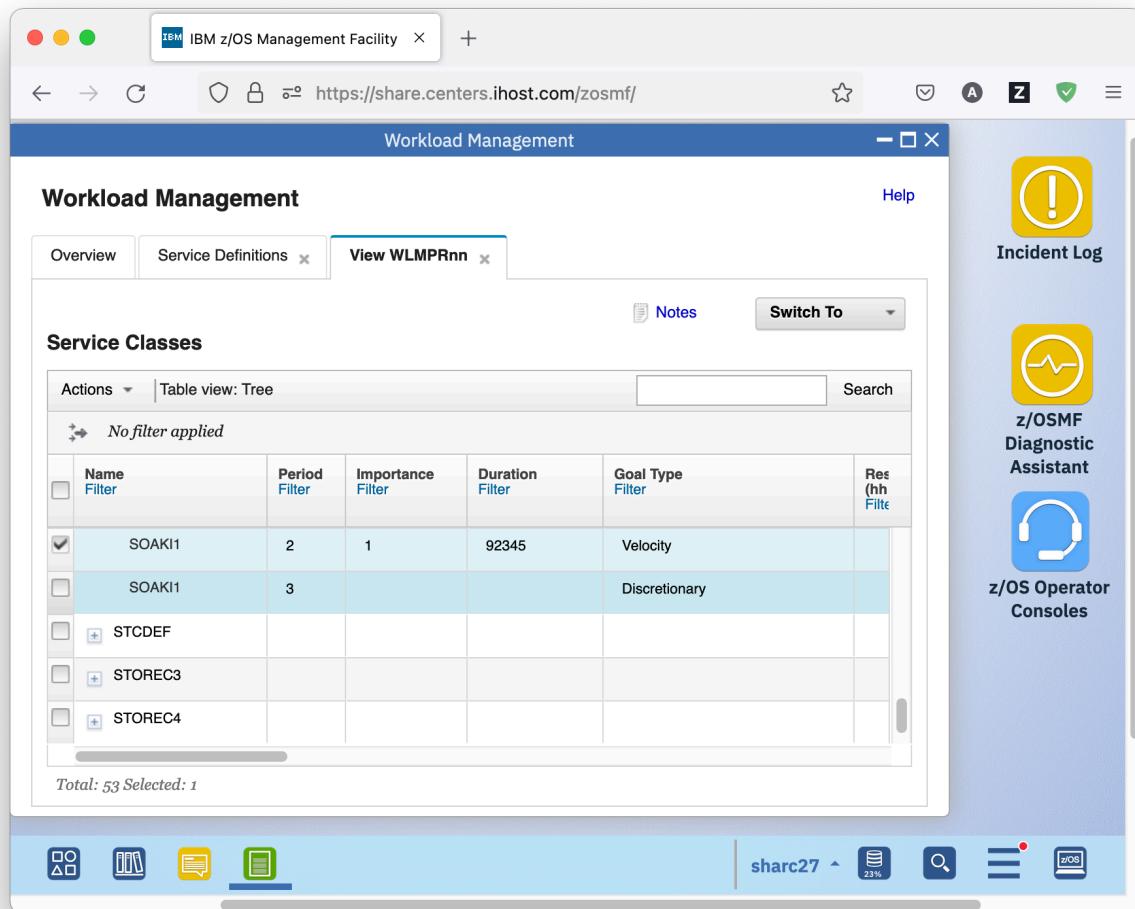
Message ID	Message Text
IZUW415W	The value specified for the capacity maximum is very small and can severely impact any workload as "QUIESCE".
IZUW921W	Periods with equal importance and only slightly different velocity levels have been specified. z/OS W be able to distinguish between the service class periods.
IZUW944W	In service policy "WLMSTTAV" , the total capacity minimum specified for resource groups with the typ "120" . The total should not exceed 99999 percent.
IZUW944W	In service policy "NSHIFT" , the total capacity minimum specified for resource groups with the type P. The total should not exceed 99999 percent.
IZUW952W	Velocity goals greater than 90% have been specified. Velocity goals in that range might force z/OS W

Total: 10

- As before, you can click on the message ID to get further help and information on the message.

The screenshot shows a web browser displaying the IBM Knowledge Center. The URL in the address bar is https://share.centers.ihost.com/zosmf/helps/SSB2H8_2.5.0/com.ibm.zosmfworkloadmgmt.messages.help.doc. The page title is "IBM Knowledge Center". The main content area displays a message detail page for IZUW415W. The breadcrumb navigation shows: z/OSMF messages > z/OSMF messages > IZUW0001-IZUW9999 > IZUW415W. The message text is: "The value specified for the capacity maximum is very small and can severely impact any workload assigned to resource group *rg-name*". Below this is the "Explanation" section: "The capacity maximum of the resource group is too small to seriously execute any workload. It is OK only if the resource group is meant for a QUIESCE service class." The "In the message text:" section contains the placeholder *rg-name*, defined as "Name of the resource group". The "System programmer response" section states: "No action is required." The "User response" section provides guidance: "If the resource group is meant for quiescing non-swappable work, no action is required. Otherwise, increase the capacity maximum value to at least 10 CPU Service Units. Resource groups that are meant for quiescing non-swappable work are defined with a very small capacity value, and assigned to a discretionary service class that is not used in". The left sidebar contains a "Table of Contents" with links to other messages like IZUW173E, IZUW180W, etc., and a "Search Results" section. The bottom navigation bar includes links for Contact, Privacy, Terms of use, Accessibility, and Feedback.

- But there is more information in the Messages table. If you scroll to the right, you see a link to the service definition item that is in error. For the second message, you will find a Service definition item called *Velocity of Service Class "SOAKI1"*, this is a service class period. In order to navigate to the service class period referenced by the second message click on the hyperlink. The following panel is displayed.



The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main window displays a table titled "Service Classes". The table has columns for Name, Period, Importance, Duration, Goal Type, and Res (hh). There are 53 rows in total, with one row selected. The selected row is for "SOAKI1" with a period of 2, importance of 1, duration of 92345, and goal type Velocity. The table also includes filters for Name, Period, Importance, Duration, Goal Type, and Res (hh).

Name Filter	Period Filter	Importance Filter	Duration Filter	Goal Type Filter	Res (hh Filter)
<input checked="" type="checkbox"/> SOAKI1	2	1	92345	Velocity	
<input type="checkbox"/> SOAKI1	3			Discretionary	
<input type="checkbox"/> STCDEF					
<input type="checkbox"/> STOREC3					
<input type="checkbox"/> STOREC4					

Total: 53 Selected: 1

The sidebar on the right contains links to other management tools: Incident Log, z/OSMF Diagnostic Assistant, and z/OS Operator Consoles.

- The Service Class table displays all service classes in the service definition. A service class is a named group of work within a workload with similar performance goals, resource requirements, or business importance. Each service class contains at least one and at most eight performance periods. You use performance periods to assign service goals and importance levels to a service class for a specific duration.

- If you scroll to the right, you see that for the first and second period equal importance (1) and only slightly different velocity levels (60 and 59) have been specified. z/OS Workload Management (WLM) might not be able to distinguish between the service class periods, which is the reason for the warning message. This message is also displayed in the Messages column of the Service Classes table, if you scroll further to the right.

Goal Type	Response Time Goal (hh:mm:ss.ttt)	Percentile Goal	Velocity Goal	CPU Critical	I/O Priority Group
Velocity			60		
<input checked="" type="checkbox"/> Velocity			59		
Discretionary				No	Normal
				No	Normal

Total: 53 Selected: 1

- To fix the issue correlated with the warning message you need to change the Velocity Goal of the second service class period to a lower value. First, you have to switch from view mode to modify mode via action *Editable Version of Service Definition* in the *Switch To* menu.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main window title is "Workload Management". Below it, the specific window title is "Service Classes". The interface includes a toolbar with tabs: "Overview", "Service Definitions", and "View WLMPRNn". A sidebar on the right contains icons for "Incident Log", "z/OSMF Diagnostic Assistant", and "z/OS Operator Consoles". The main content area displays a table of service classes:

Action	Goal Type	Response Time Goal (hh:mm:ss.ttt)	Percentile Goal
<input type="checkbox"/>	Velocity		
<input checked="" type="checkbox"/>	Velocity		
<input type="checkbox"/>	Discretionary		
<input type="checkbox"/>			
<input type="checkbox"/>			

Total: 53 Selected: 1

A context menu is open over the selected row ("Velocity"). The menu items include:

- Notes
- Switch To
- Service Definition Details
- Service Policies
- Workloads
- Service Classes
- Resource Groups
- Report Classes
- Classification Groups
- Classifications
- Application Environments
- Resources
- Scheduling Environments
- Tenant Resource Groups
- Tenant Report Classes
- Messages
- Editable Version of Service Definition

- The service definition is now editable. Editable table cells have a border around the value.

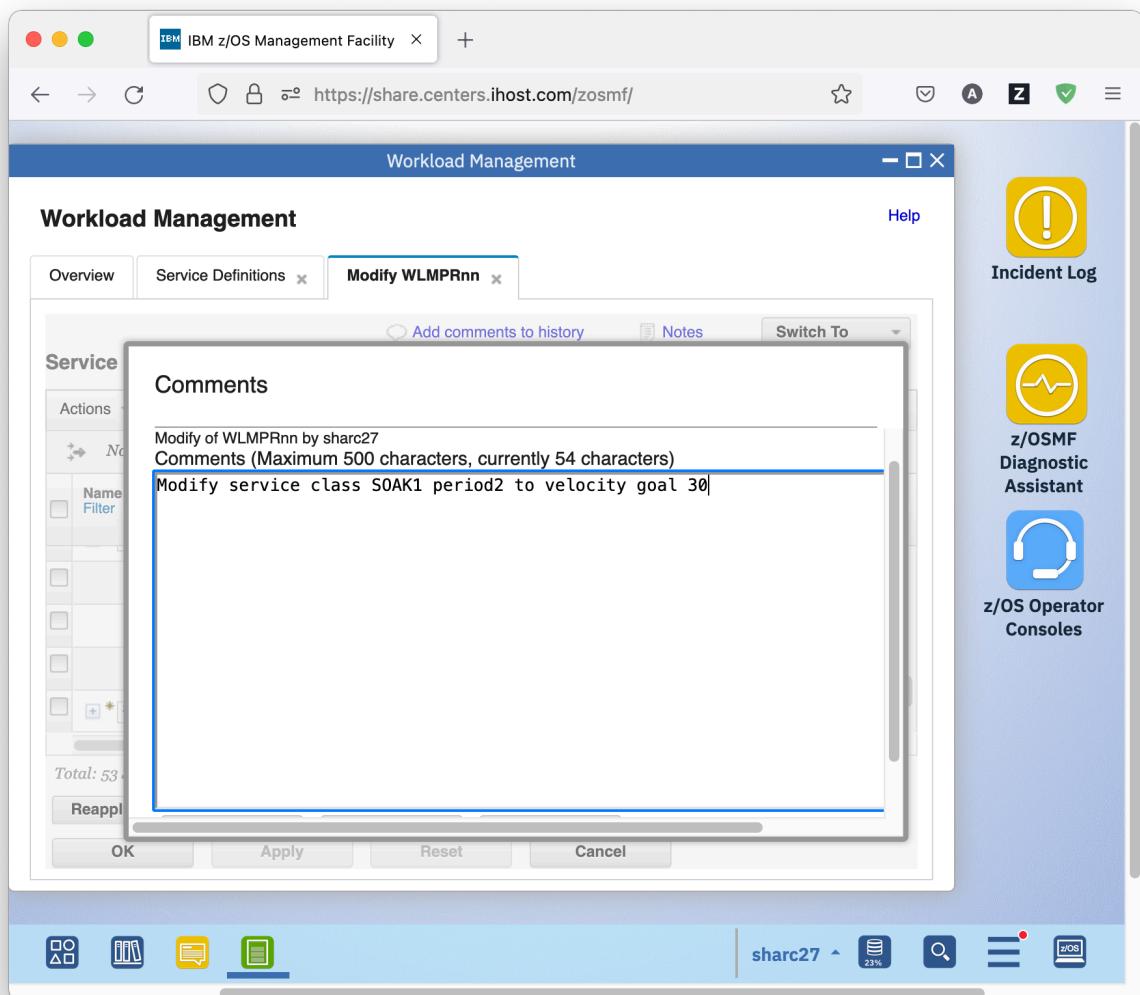
The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main window title is "Workload Management". The sub-header is "Service Classes". The table has columns: Name, Period, Importance, Duration, Goal Type, and Resp (hh:n). The table contains several rows, each with a checkbox and a name like SOAKI1 or STCDEF. The last row is highlighted with a yellow border. To the right of the table is a sidebar with icons for Incident Log, z/OSMF Diagnostic Assistant, and z/OS Operator Consoles. At the bottom of the main window are buttons for OK, Apply, Reset, and Cancel.

Name Filter	Period Filter	Importance Filter	Duration Filter	Goal Type Filter	Resp (hh:n) Filter
SOAKI1	1	* 1	* 102345	* Velocity	
SOAKI1	2	* 1	* 92345	* Velocity	
SOAKI1	3			* Discretionary	
STCDEF					

- In order to change the Velocity Goal of the second service class period, double click on the table cell, then type in value 30 and press the Enter key (to undo changes, press the ESC key). The warning icon disappears in the Messages column of the Service Classes table, if you scroll further to the right.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main window title is "Workload Management". The tab bar shows "Service Definitions" and "Modify WLMPRnn" (which is active). Below the tabs, there are buttons for "Add comments to history", "Notes", and "Switch To". The main content area is titled "Service Classes" and displays a table with columns: Actions, Response Time Goal (hh:mm:ss.tt), Percentile Goal Filter, Velocity Goal Filter, CPU Critical Filter, I/O Priority Group Filter, and Honor Priority Filter. A filter bar at the top of the table says "No filter applied". The table has several rows, with the second row containing a velocity goal of "60" and the third row containing a velocity goal of "30". The "Velocity Goal Filter" header has a tooltip "Double click to edit". At the bottom of the table, there are buttons for "Reapply Filter and Sort", "Last refresh: Aug 11, 2022, 4:14:33 PM local time (Aug 11, 2022, 2:14:33 PM GMT)", and "OK", "Apply", "Reset", "Cancel". To the right of the main window, there is a sidebar with icons for "Incident Log", "z/OSMF Diagnostic Assistant", and "z/OS Operator Consoles". The bottom of the screen shows the operating system's taskbar with various icons and the user "sharc27".

- Now that you have modified the service definition, there are different buttons at the bottom for proceeding.
 - The **OK** button saves your modifications and closes the **Modify WLMPRnn** tab.
 - The **Apply** button saves a temporary copy of your modifications to the server, and leaves the **Modify WLMPRnn** tab open.
 - The **Cancel** button discards your modifications and closes the **Modify WLMPRnn** tab.
 - And the **Reset** button discards your modifications, and leaves the **Modify WLMPRnn** tab open.
- This time, press the **OK** button to save the modified service definition and close the **Modify WLMPRnn** tab.
- Optionally, you can provide a comment for your modifications.



8. More on z/OSMF Tabs and Tables

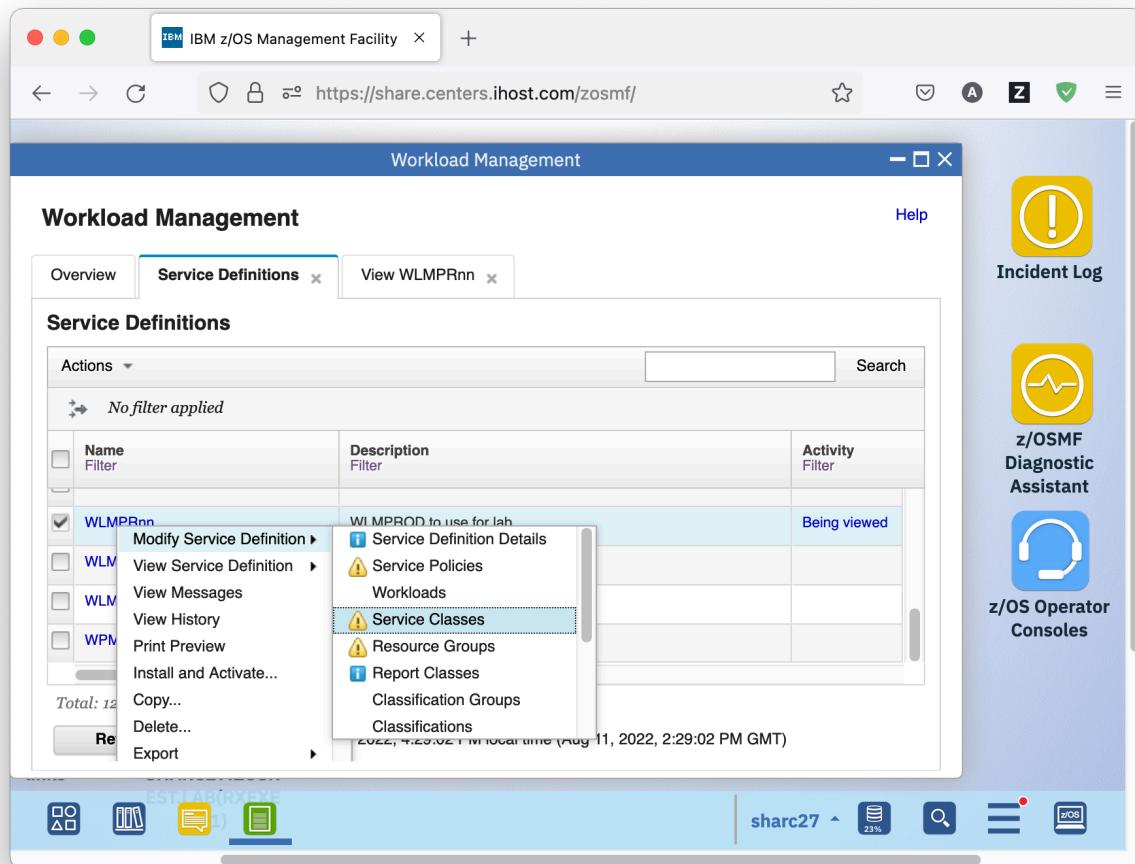
A word about the tabs z/OSMF WLM opens for viewing and modifying service definition. A service definition consists of different sections. Each of the sections is displayed in one panel. You can watch one panel at a time in the opened tab and you can switch between the panels using the *Switch To* menu, or by clicking links (as you already did for the service definition item that was in error), or by following cross references (as you might do later).

Exercise

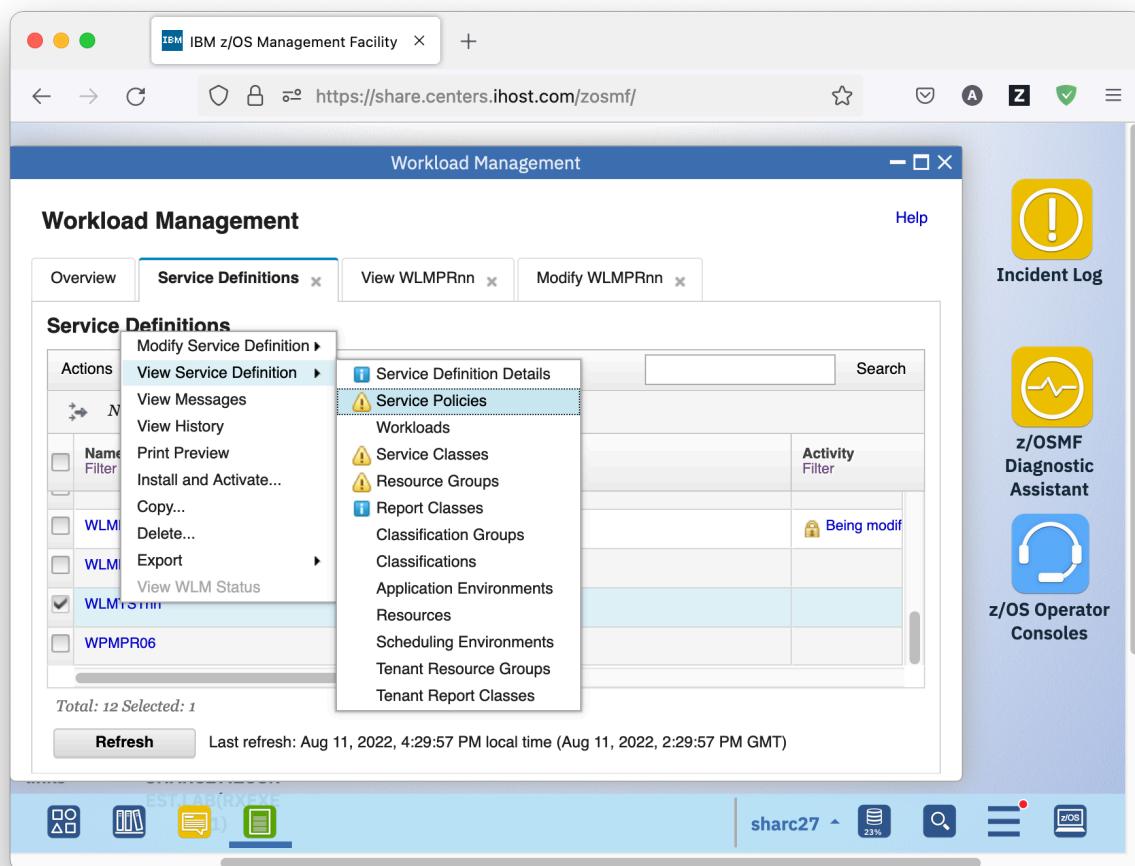
- As before, on the Service Definitions tab, select service definition WLMPRNn and either right-click it, or open the Actions menu, and choose *View Messages*. The View WLMPRNn tab opens, displaying all messages for the service definition. Note that one of them is gone because of your modification. If you want to view the service classes, you have to use the *Switch To* menu. Never use the browser back button; it is not going to work.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The title bar says "Workload Management". Below it, there's a navigation bar with tabs: "Overview", "Service Definitions", and "View WLMPRNn" (which is currently active). On the left, there's a section titled "Messages" with a table showing several messages. One message is highlighted: "IZUW415W: The value specified for the capacity maximum is very small." On the right, a "Switch To" menu is open, listing various service definition components. The "Service Classes" option is selected. To the right of the menu, there are three icons: "Incident Log" (yellow exclamation mark), "z/OSMF Diagnostic Assistant" (blue heart rate monitor), and "z/OS Operator Consoles" (blue headphones). The bottom of the screen shows a toolbar with various icons and the user ID "sharc27".

- You can simultaneously have a service definition open in View and Modify mode in two tabs. To do so, on the Service Definitions tab, select service definition WLMPRN and either right-click it, or open the Actions menu, and choose *Modify Service Definition – Service Classes*. The Modify WLMPRN tab opens, displaying all service classes for the service definition.



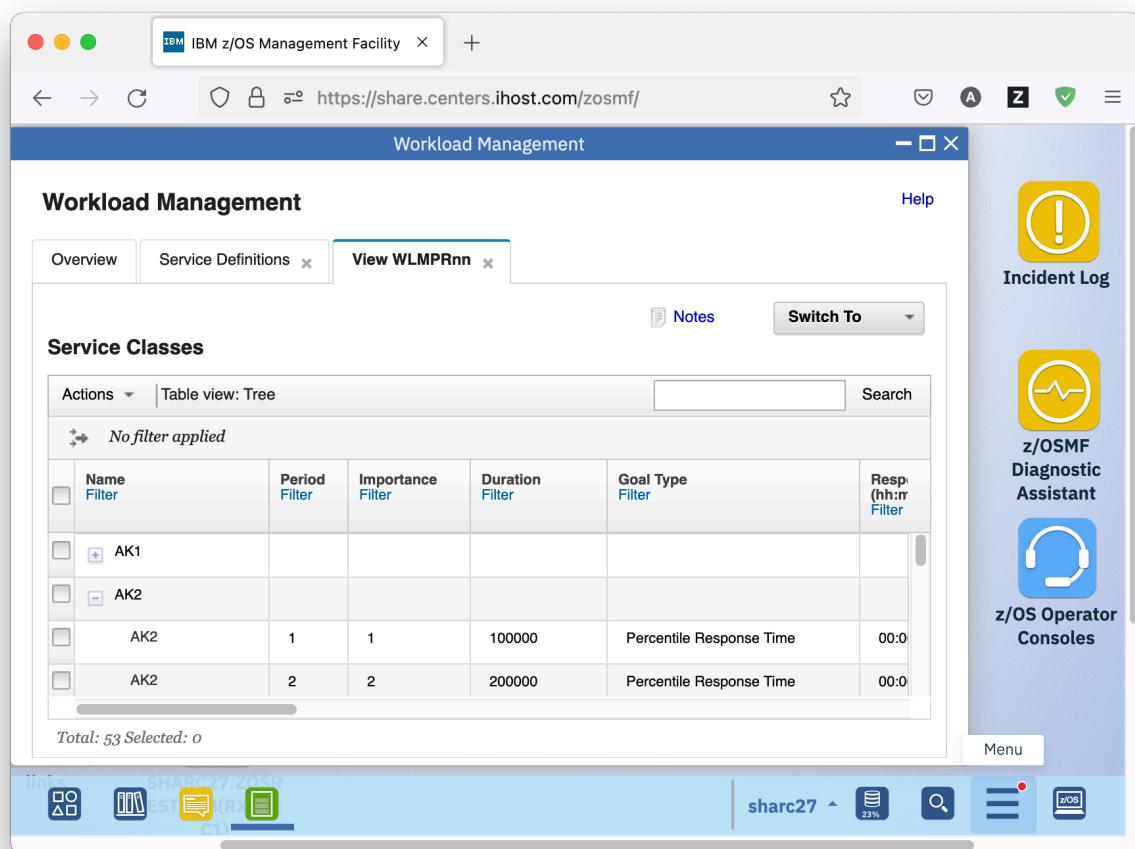
- You can also have several service definitions open in View or Modify mode. z/OSMF WLM supports up to 20 tabs at the same time. To do so, on the Service Definitions tab, select service definition WLMTSTnn and either right-click it, or open the Actions menu, and choose *View Service Definition – Service Policies*. The View WLMTSTnn tab opens, displaying all service policies for the service definition. A service policy is a named collection of service class and resource group-specific overrides. If your installation has performance goals or processing requirements that change at certain times, you can define multiple policies to address those changes and activate the service policy required during each time period. Doing so changes the performance goals and processing capacity boundaries specified in the service definition without requiring you to modify or re-install the service definition.



Another word about the Service Class panel you opened above. The table in the panel is different from the Service Definitions table. It is a tree table with all service classes in the service definition. The rows on level zero represent service class items. The nested rows represent the periods of the service classes. You can switch between tree view and non-tree view. The non-tree view is accessible, and provides additional sort capabilities, like sorting or filtering for period columns.

Exercise

- Switch to the View WLMPRnn tab you opened above which displays all service classes of the service definition. Only the service class items at level zero are displayed. To expand the service class periods of a service class, click the + sign left to the service class name, to collapse them again, click the – sign left to the service class name. You expand and collapse all by choosing *Actions – Expand All* or *Actions – Collapse All*.



The screenshot shows the IBM z/OS Management Facility Workload Management interface. The browser address bar indicates the URL is <https://share.centers.ihost.com/zosmf/>. The main content area is titled "Workload Management" and contains a "Service Classes" table. The table has columns for Name, Period Filter, Importance Filter, Duration Filter, Goal Type Filter, and Response (hh:mm) Filter. There are four rows in the table, each representing a service class named AK2. The first row has a plus sign icon to its left, indicating it is expanded to show its periods. The other three rows have minus signs to their left, indicating they are collapsed. The table also includes filters for Actions, Table view: Tree, Notes, and a Switch To dropdown. A sidebar on the right provides links to Incident Log, z/OSMF Diagnostic Assistant, and z/OS Operator Consoles. The bottom navigation bar includes icons for Home, Help, and various system status indicators.

Name	Period Filter	Importance Filter	Duration Filter	Goal Type Filter	Response (hh:mm) Filter
AK1					
AK2					
AK2	1	1	100000	Percentile Response Time	00:0
AK2	2	2	200000	Percentile Response Time	00:0

- You can also switch between Tree View and Non-Tree View by using *Actions – Switch to Non-Tree View* and *Actions – Switch to Tree View*.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main title bar reads "Workload Management". Below it, the sub-header "Workload Management" is displayed. The navigation tabs include "Overview", "Service Definitions", and "View WLMPRnn" (which is currently selected). A "Switch To" dropdown menu is open, showing options like "Table view: Tree" (which is selected) and "Switch to Non-Tree View". The main content area is titled "Service Classes" and displays a table with two rows of data. The columns are labeled "Importance Filter", "Duration Filter", "Goal Type Filter", and "Respon (hh:mm Filter)". The data rows are:

Importance Filter	Duration Filter	Goal Type Filter	Respon (hh:mm Filter)
1	100000	Percentile Response Time	00:0
2	200000	Percentile Response Time	00:0

On the right side of the interface, there is a sidebar with three items: "Incident Log" (yellow exclamation mark icon), "z/OSMF Diagnostic Assistant" (blue heart rate monitor icon), and "z/OS Operator Consoles" (blue headphones icon).

- The Non-Tree View provides additional sort capabilities, like sorting or filtering for period columns. For example, if you are interested in how many importance 1 periods exist in your policy, you switch to Non-Tree View, and click on the column heading of the Importance column to sort the table ascending based on the values in the column.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The title bar reads "IBM z/OS Management Facility". The main window is titled "Workload Management" and contains a sub-section titled "Service Classes". The interface includes a toolbar with tabs for "Overview", "Service Definitions", and "View WLMPRnn" (which is currently selected). Below the tabs is a search bar and a "Switch To" dropdown. The main content area displays a table of service classes with the following columns: Name, Period Filter, Importance Filter, Duration Filter, Goal Type Filter, and Response Time Go (hh:mm:ss.tt) Filter. The table lists several entries, including AK1, AK2, and various AK2 sub-classes (AK2 > AK2) with different importance levels (1, 2, 3, 4, 5, 6, 7, 8) and response times. A note at the bottom left says "Total: 53 Selected: 0". On the right side, there is a vertical sidebar with icons for "Event Log", "z/OSMF Diagnostic Assistant", and "Operator Roles". The bottom navigation bar includes icons for "Home", "Library", "Help", and "Logout".

Name Filter	Period Filter	Importance Filter	Duration Filter	Goal Type Filter	Response Time Go (hh:mm:ss.tt) Filter
AK1		1		Velocity	
AK2					
AK2 > AK2	1	1	100000	Percentile Response Time	00:00:10.000
AK2 > AK2	2	2	200000	Percentile Response Time	00:00:23.000
AK2 > AK2	3	3	300000	Percentile Response Time	00:00:30.000
AK2 > AK2	4	4	400000	Percentile Response Time	00:00:40.000
AK2 > AK2	5	5	500000	Percentile Response Time	00:00:50.000
AK2 > AK2	6	5	600000	Percentile Response Time	00:01:00.000
AK2 > AK2	7	5	700000	Percentile Response Time	00:01:10.000
AK2 > AK2	8			Discretionary	

- Now switch back to Tree View.

9. Removal of Best Practice Warning Messages from a Service Definition Continued

Now let's fix a second warning message related to service classes.

Exercise

- On the Modify WLMPRnn tab, switch to the messages for the service definition.

The screenshot shows the 'Workload Management' interface in the IBM z/OS Management Facility. The main window displays a table of 'Service Classes' with two entries: AK1 and AK2. A context menu is open over the table, with the 'Switch To' option selected. The 'Messages' option in this menu is highlighted. On the right side of the interface, there is a sidebar with icons for 'Incident Log', 'z/OSMF Diagnostic Assistant', and 'z/OS Operator Consoles'.

- This time you are going to fix the IZUW952W warning message. Scroll to the right to see a link to the service class period that is in error. In order to navigate to the service class period referenced by the error message click on hyperlink *Velocity of Service Class AK1* in the Messages table. The following panel is displayed.

The screenshot shows the 'Workload Management' interface in the IBM z/OS Management Facility. The main window displays a table titled 'Service Classes'. The columns are: Name, Period, Importance, Duration, Goal Type, Response Time Goal (hh:mm:ss.tt), Percentile Goal, and Velocity Goal. There are filters for each column. The table contains four rows: AK1 (selected), AK2, AK3, and AK4. AK1 has a value of 1 in all columns except Velocity Goal, which is set to 'Velocity'. AK2 and AK3 have empty fields. AK4 has empty fields. A sidebar on the right lists Network Configuration Assistant, Workload Management (selected), and Application Linking Manager. At the bottom, there are buttons for OK, Apply, Reset, and Cancel, along with a status bar showing 'sharc27' and '23%'. The URL in the browser is https://share.centers.ihost.com/zosmf/.

- You can see there is a warning icon for the velocity goal of the service class. You can either mouse over the warning status icon to view the information message, or control-click on it to get a message window.

The screenshot shows the 'Workload Management' section of the IBM z/OS Management Facility. In the 'Service Classes' table, the 'Velocity' goal type has a warning icon (yellow exclamation mark) next to its value '93'. A tooltip appears when hovering over this icon, stating: 'IZUW952W Velocity goals greater than 90% have been specified. Velocity goals in that range might force z/OS Workload Manager (WLM) to attempt to address delays which cannot be removed.' Below the table, there is a message bar indicating 'Total: 53 Selected: 3' and 'Last refresh: Aug 11, 2022, 4:40:36 PM local time (Aug 11, 2022, 2:40:36 PM GMT)'.

- As before, to fix the issue correlated with the warning message you need to change the Velocity Goal of the service class period to a lower value. Because you already are on the Modify WLMPRN tab, you can just double click the Velocity Goal table cell for the service class, then type in value 85, and press the Enter key. The warning icon disappears in the Messages column of the Service Classes table.

- Click the Apply button to save a temporary copy of your changes to the server.

10. Multi-User Synchronisation

While you are working with several service definitions, a word about synchronization:
The Service Definition Repository provides Multi-User Synchronisation through locking.
This ensures that a service definition is only modified by one user at a time.

- When a service definition is viewed, it is locked in shared mode. This means that others can view or modify the same service definition, but cannot delete it.
- When a service definition is modified, it is locked in exclusive mode. This means that others can view the same service definition, but cannot modify or delete it.

Exercise

- On the Service Definitions tab, view the current locking status in the Activity column of the Service Definitions panel. **WLMPRnn** is displayed as being modified, while **WLMSTnn** is displayed as being viewed.

Name	Description	Activity Filter	Sysplex Filter
WLMPR21	WMLPROD to use for lab		
WLMPR28			
WLMPR99	WMLPROD to use for lab		
WLMPRnn	WMLPROD to use for lab	Being modified	
WLMPROD	WMLPROD to use for z/OSMF lab		
WLMSTnn	WLMST to use for lab	Being viewed	
WPMPR06	Milen Dobrev		

11. Built-In Prevention against Data Loss

The z/OSMF Workload Management task provides built-in prevention against data loss. While you are editing a service definition in a *New/Copy/Modify* tab, the browser sends temporary copies of the service definition to the server when you

- Press the *Apply* button
- Switch to another service definition component using the *Switch To* menu

If you accidentally close the *Workload Management* task before saving your changes, you can open the last saved temporary copy of the service definition in a *Modify* tab and continue with editing.

In the *Service Definitions* table service definitions for which a temporary copy exist have in the Activity column the label

- *Changes pending* if a *Modify* tab was aborted
- *Temporary* if a *New* or *Copy* tab was aborted

Exercise

- Log off from z/OSMF by clicking the *Log out* hyperlink top right
- Log in again with your SHARE userid/pw
- Start the Workload Management task. To do so, in the navigation tree on the left hand side, under heading performance, click on Workload Management
- On the Overview tab of the Workload Management task, click on the *Service Definitions* hyperlink

View the service definitions present in the Service Definition Repository, and note that **WLMPRnn** is marked as *Changes pending* in the Activity column of the Service Definitions panel

The screenshot shows the IBM z/OS Management Facility (zOSMF) interface. The title bar says "IBM z/OS Management Facility". The address bar shows the URL "https://share.centers.ihost.com/zosmf/". The main window is titled "Workload Management" and has a sub-tab "Service Definitions" selected. The "Service Definitions" panel contains a table with columns: Name, Description, and Activity Filter. The table lists several entries:

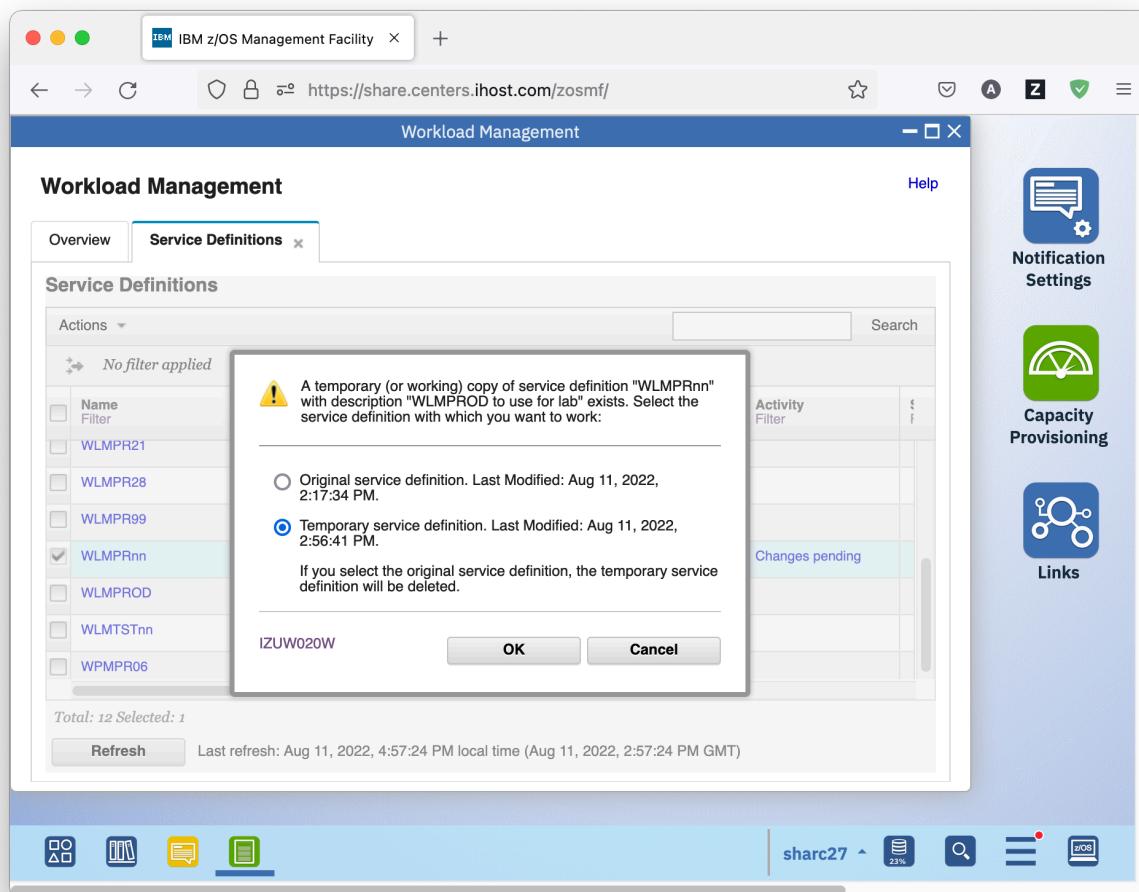
Name	Description	Activity Filter
WLMPR21	WMLPROD to use for lab	
WLMPR28		
WLMPR99	WLMPROD to use for lab	
WLMPRnn	WLMPROD to use for lab	Changes pending
WLMPROD	WLMPROD to use for z/OSMF lab	
WLMTSTnn	WLMTST to use for lab	
WPMPR06	Milen Dobrev	

Total: 12 Selected: 0

Refresh Last refresh: Aug 11, 2022, 4:57:24 PM local time (Aug 11, 2022, 2:57:24 PM GMT)

The right sidebar shows navigation links: Notification Settings, Capacity Provisioning, and Links.

- To continue modifying the service definition, on the Service Definitions tab, select service definition WLMPRnn and either right-click it, or open the Actions menu, and choose *Modify Service Definition – Service Classes*. A warning box opens that offers you to either continue working with the temporary copy, or the original service definition. If you select the original service definition, the temporary service definition will be deleted, and all your changes will be lost.



- Choose the temporary service definition to continue your work. Verify that the change you have done to the Velocity goal of the first period of service class AK1 is still there.
- Press the OK button to permanently save the modified service definition and close the Modify WLMPRnn tab. You can optionally enter a comment for your modifications.

12. View the History of a Service Definition

Now that you have worked so much with service definition WLMPRnn, you might want to check what actually happened. For that, the z/OSMF Workload Management task offers a history for the service definitions.

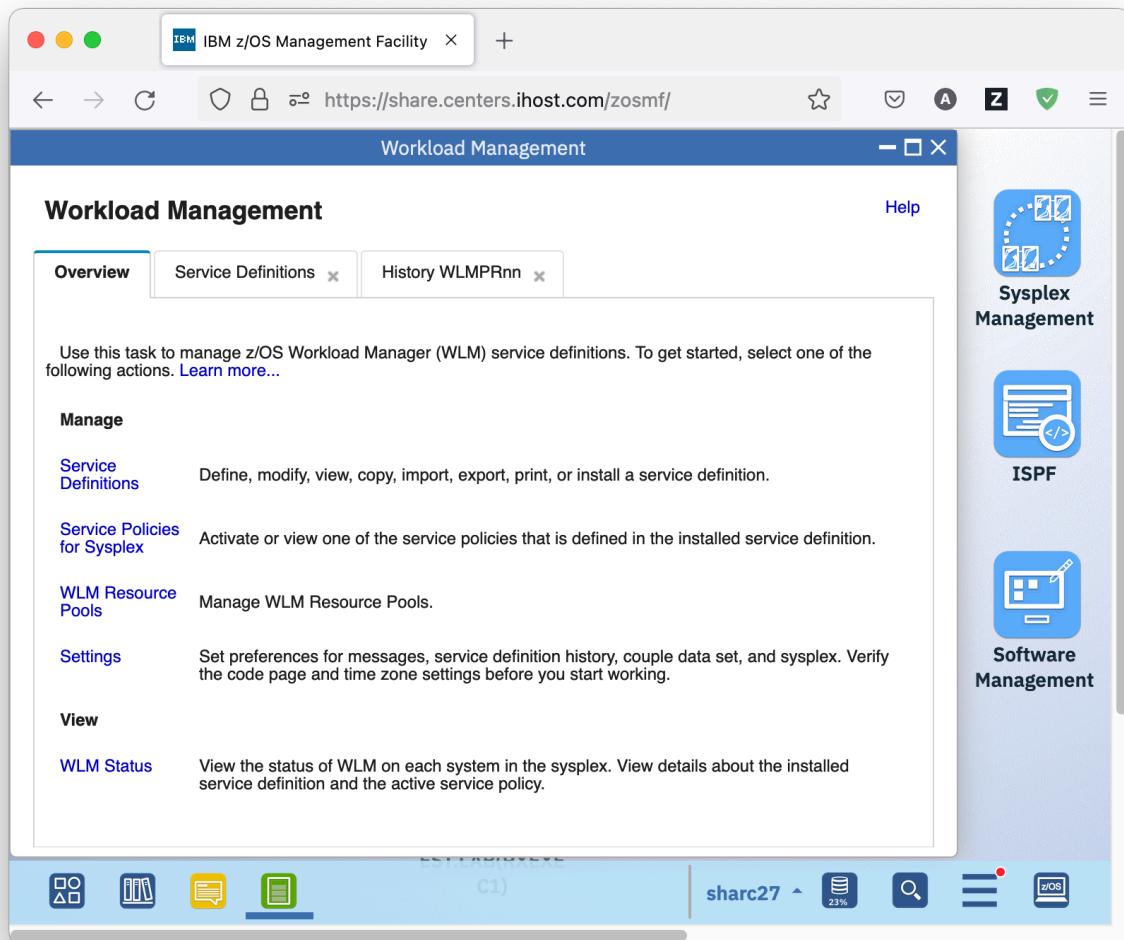
The service definition history is a log of the actions that have been taken against the service definition during a specified period of time. Logged actions can include details about when the service definition was modified, installed, activated, or when a backup copy was created.

Exercise

- On the Service Definitions tab, select service definition WLMPRnn and either right-click it, or open the Actions menu, and choose *View History*. The History WLMPRnn tab opens, displaying the history for the service definition. Note that the comments you entered for each step show up in the Comments column.

Sysplex Filter	Action Filter	Date and Time (GMT) Filter	User ID Filter	Comments Filter
	Modify	Aug 11, 2022, 3:01:58 PM	sharc27	<Aug 11, 2022 03:01:58 PM GMT sharc27> Modify service class AK1 velocity goal to 85
	Modify	Aug 11, 2022, 2:17:34 PM	sharc27	<Aug 11, 2022 03:04:05 PM GMT sharc27> Modify service class SOAK1 period 2 velocity g
	Import from local workstation	Aug 11, 2022, 2:00:46 PM	sharc27	<Aug 11, 2022 02:00:46 PM GMT sharc27> Import from local work station

- By default, the history information is captured for the last two months. In the Settings tab, you can specify how long to keep the service definition history. To view the Settings tab, switch to the Overview tab of the Workload Management task and click on the *Settings* hyperlink.



- The Settings tab allows you to specify how long to keep the service definition history, whether comments are required for service definition actions, what types of consistency checking is done, and other settings. Review the help available for the Settings tab by clicking the *Help* hyperlink top right.

The screenshot shows the 'Workload Management' section of the IBM z/OS Management Facility. The 'Settings' tab is selected. On the left, there are sections for 'Consistency Checking' and 'Sysplex Settings'. On the right, there is a sidebar with icons for 'Sysplex Management', 'ISPF', and 'Software Management'. The main content area includes dropdown menus for service definition history duration (2 months, default) and comments (No, default), and checkboxes for enabling consistency checking between z/OSMF and WLM (Yes) and tracking service policy activations (Yes). A note at the bottom of the main content area says 'Number of seconds between WLM status queries: 30 (default)'.

13. Print Preview of a Service Definition

Another thing you might want to do after having modified service definition WLMPRnn is printing it, to review your changes. For that, the z/OSMF Workload Management task offers a print preview for service definitions in HTML format.

Exercise

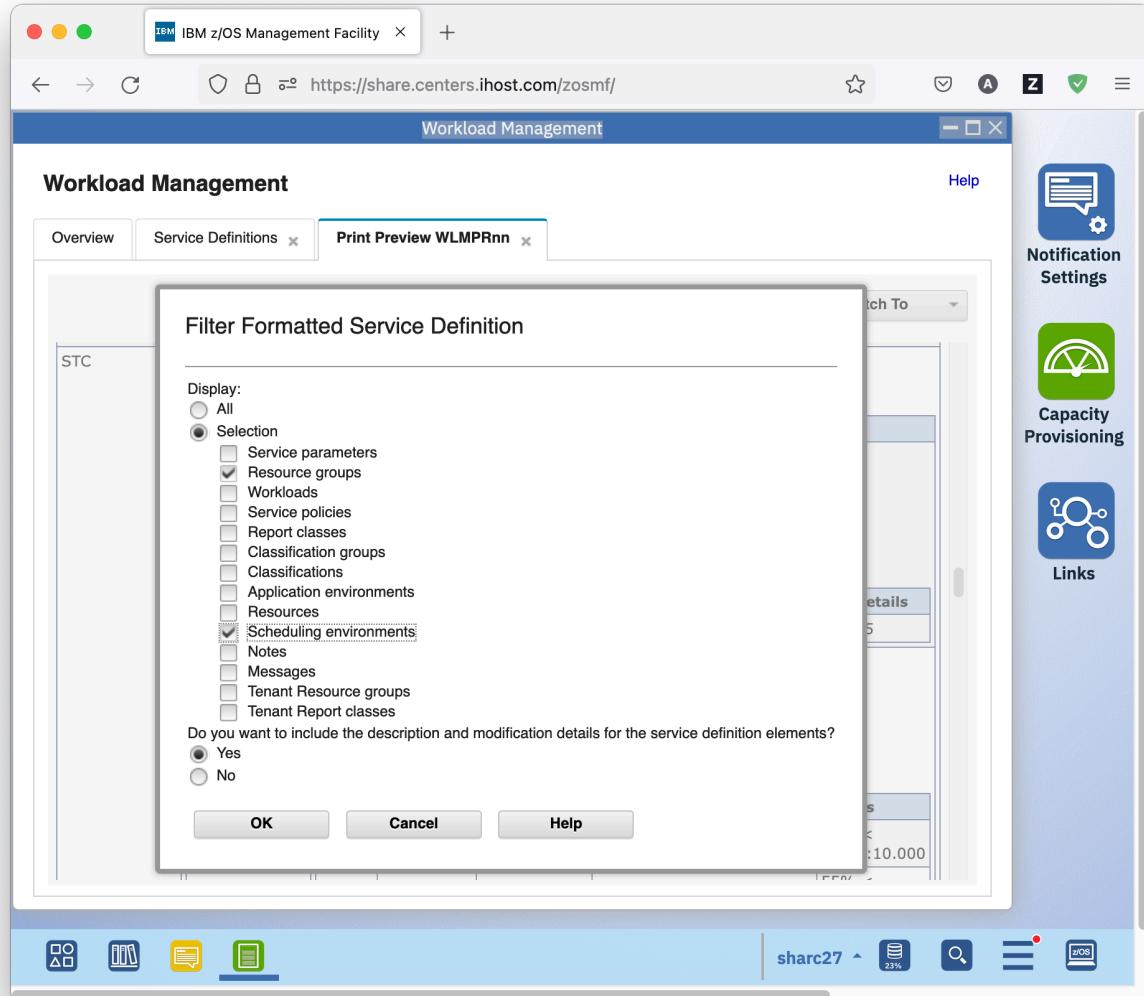
- On the Service Definitions tab, select service definition WLMPRnn and either right-click it, or open the Actions menu, and choose *Print Preview*. The Print Preview WLMPRnn tab opens, displaying the service definition in HTML format. You can see the same sections as in the View or Modify submenu of the Service Definitions panel, however, with a bit more structure. For example, information about a service class is displayed within the corresponding workload in the Workloads section.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main content area displays the details for the Service Class 'STC'. It includes a summary table and two detailed tables for Service Classes AK1 and AK2.

Summary Table:

Service Class	Details										
AK1	Description: Vel imp2 Last Modified (GMT): Aug 11, 2022, 2:44:06 PM Modified By: sharc27 CPU Critical: No I/O Priority Group: Normal Honor Priority: Default Resource Group: <table border="1"><thead><tr><th>Period</th><th>Importance</th><th>Duration</th><th>Goal</th><th>Details</th></tr></thead><tbody><tr><td>1</td><td>1</td><td></td><td>Velocity</td><td>85</td></tr></tbody></table>	Period	Importance	Duration	Goal	Details	1	1		Velocity	85
Period	Importance	Duration	Goal	Details							
1	1		Velocity	85							
AK2	Description: RT 8 per Last Modified (GMT): Jul 8, 2008, 2:37:37 PM Modified By: bmor CPU Critical: No I/O Priority Group: Normal Honor Priority: Default Resource Group: <table border="1"><thead><tr><th>Period</th><th>Importance</th><th>Duration</th><th>Goal</th><th>Details</th></tr></thead><tbody><tr><td>1</td><td>1</td><td>100000</td><td>Percentile Response Time</td><td>66% < 00:00:10.000</td></tr></tbody></table>	Period	Importance	Duration	Goal	Details	1	1	100000	Percentile Response Time	66% < 00:00:10.000
Period	Importance	Duration	Goal	Details							
1	1	100000	Percentile Response Time	66% < 00:00:10.000							

- You can also filter which pieces of the service definition are displayed in the print preview. To do so, click on the *Filter* hyperlink top right of the panel. A dialog opens that allows you to select which pieces are displayed.



- The Switch To menu top right allows you to choose between previewing the formatted service definition and its formatted service policies. The main difference between the two is that in the latter, the Service Policies section is omitted and the overrides are directly reflected in the corresponding service classes and resource groups.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main window displays a table of service classes under the heading 'Workload Management'. The table has columns for 'Service Class' and 'Details'. Under 'AK1', there is a table with columns 'Period', 'Importance', 'Duration', 'Goal', and 'Details'. The 'Goal' column for AK1 contains 'Velocity' and '85'. Under 'AK2', there is another table with similar columns, and the 'Goal' column for AK2 contains 'Percentile Response Time' and '66% < 00:00:10.000'. A context menu is open over the AK1 row, with the 'Switch To' option highlighted. The 'Switch To' menu also lists 'Formatted Service Definition WLMPRnn', 'Formatted Service Policy NSHIFT', and 'Formatted Service Policy WLMSTTAV'. The interface includes a sidebar on the right with icons for 'Notification Settings', 'Capacity Provisioning', and 'Links'.

- To actually print the service definition, press the *Print* hyperlink top right. A new web browser tab or window opens with the same content. From there you can print the service definition by pressing the *Send to Printer* hyperlink top right.

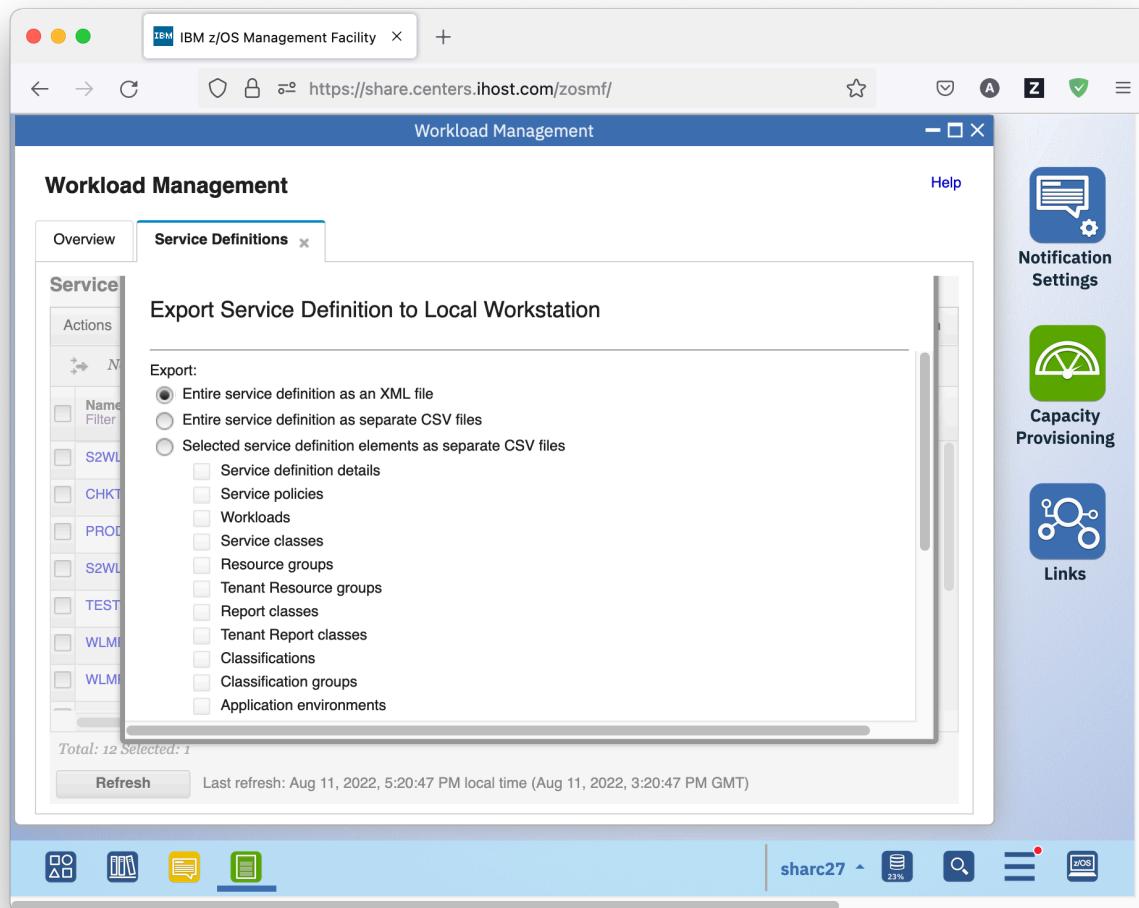
14. Exporting Service Definitions to Files

Another thing you might want to do after having modified service definition WLMPRNn is saving it to a file. For that, the z/OSMF Workload Management task offers action *Export*, either *To Local Workstation*, or *To Host Data Set*.

With that action, you can save the file to your local workstation, or to a host data set, from where you can import it, for example, into the Service Definitions table of a z/OSMF instance running on another Sysplex using the *Import From Local Workstation* action of the Service Definitions table.

Exercise

- On the Service Definitions tab, select service definition WLMPRNn and either right-click it, or open the Actions menu, and choose *Export – To Local Workstation*. A dialog opens where you can choose format and scope of the export.



- A browser dialog opens to saving the file to the local disk.

If you still have the time and feel like it, proceed with the optional exercises.

However, just make sure that you have 2 minutes left in the end for doing the cleanup described in the last section😊!

15. Optional: Editing a Service Definition

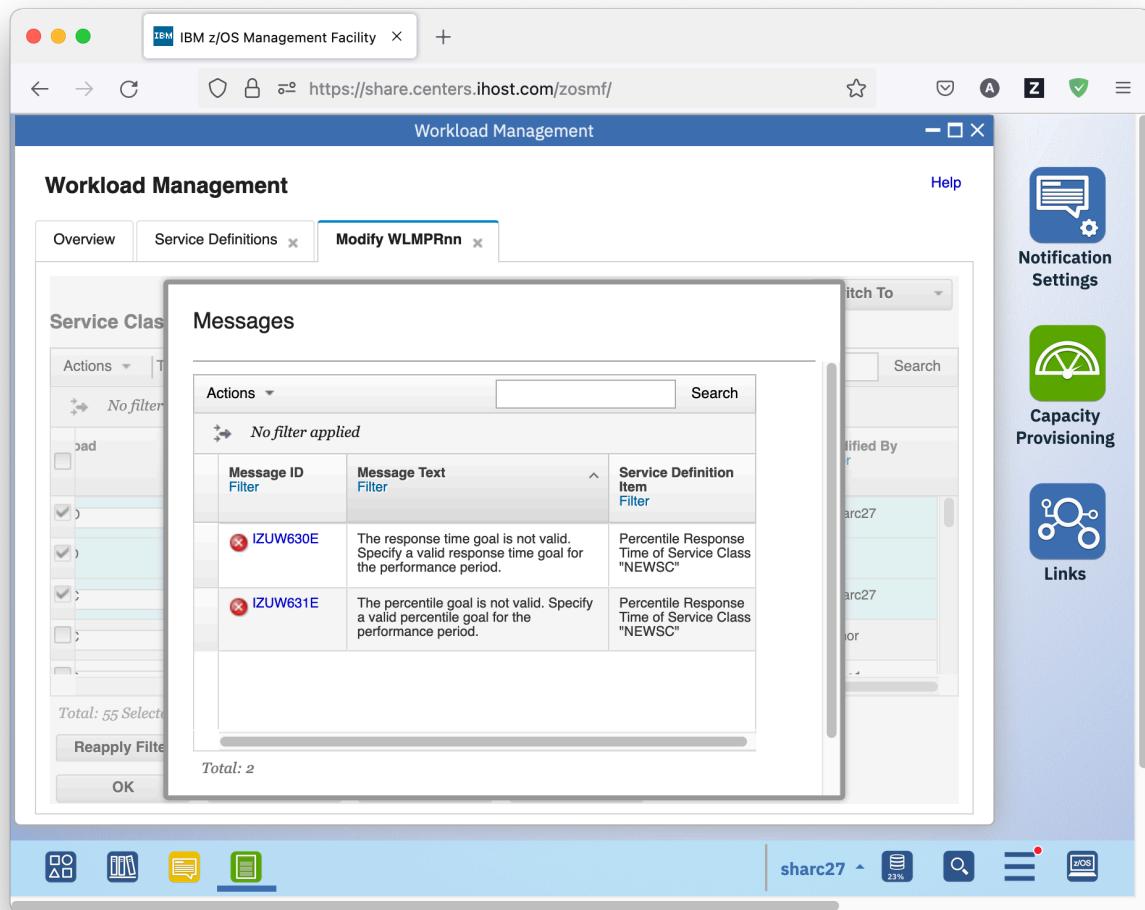
Suppose you want to modify your service definition by adding new service classes, new service class overrides, or new service policies. The z/OSMF Workload Management task provides much guidance for required fields and valid values – you get immediate feedback of what is going wrong. Furthermore, it allows copying and pasting various service definition elements within a service definition, or even between different service definitions.

Exercise

- On the Service Definitions tab, select service definition WLMPRnn and either right-click it, or open the Actions menu, and choose *Modify Service Definition – Service Classes*. On the Modify WLMPRnn tab that opens, select *Actions – New Service Class*.
- A new service class with empty name and a default discretionary period is created. Double click the name field, and enter a name, for example, NEWSC.
- If you scroll to the right, you see an error icon in the Workload column of the new service class. Mouse over it to view the detailed error message

The screenshot shows the 'Workload Management' interface in the IBM z/OS Management Facility. The current view is 'Modify WLMPRNn'. A table titled 'Service Classes' lists several entries. The first entry, 'Normal', has its 'Workload' field empty and is highlighted in red, indicating it is a required field. An error message box appears above the table stating: 'IZUW626E Workload is a required field. Select the workload to which to assign the service class.' The second entry, also 'Normal', has 'Workload' set to 'STC'. The interface includes tabs for 'Overview', 'Service Definitions', and 'Modify WLMPRNn'. A sidebar on the right contains icons for 'Notification Settings' (blue speech bubble), 'Capacity Provisioning' (green speedometer), and other management functions.

- Double click the Workload field, and select a workload for the new service class, for example, TSO. The error icon disappears.
- Now double click the Goal Type field of the service class period, and select *Percentile Response Time*. If you scroll to the right, you see that the Response Time Goal and Percentile Goal columns are in error. To view the detailed error messages, click on the *Error* hyperlink in the Messages column of the new service class. A Messages window opens that displays detailed information about the errors.



- To fix the errors, double click the Response Time Goal, and specify 00:00:01.000. Double click the Percentile Goal, and specify 90. This means that 90% of the transactions should complete in at most 1 second.

- You can also copy and paste service classes or service class periods. To do so, click the Deselect all action.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main window title is "Workload Management" and the sub-tab is "Modify WLMPRnn". The left side of the window shows a "Service Classes" table with columns: Importance Filter, Duration Filter, Goal Type Filter, and Response Time G (hh:mm:ss.ttt) Filter. The "Importance Filter" dropdown is set to "3". The "Duration Filter" dropdown is set to "Percentile Response Time". The "Goal Type Filter" dropdown is set to "00:00:01.000". The "Response Time G Filter" dropdown is empty. On the far left, there is a context menu with options like "Actions", "Delete...", "View Cross References", "View Messages", "View Performance of Selected", "Expand", "Collapse", "New Service Class...", "Paste Service Classes", "View Performance of All", "Select All" (which is checked), "Deselect All" (which is highlighted with a blue border), "Configure Columns...", "Hide Filter Row", "Clear Sorts", "Clear Search", "Expand All", and "Collapse All". At the bottom of the dialog box are "Reset" and "Cancel" buttons. The status bar at the bottom of the window shows the date and time: "Aug 11, 2022, 5:32:39 PM local time (Aug 11, 2022, 3:32:39 PM GMT)". The right side of the interface has a sidebar with three icons: "Notification Settings" (blue speech bubble icon), "Capacity Provisioning" (green sunburst icon), and "Links" (blue network icon). The overall interface is light blue and white.

- Then scroll to service class SOAKI1, expand it, and select its first period. Then click on Actions – *Copy to Clipboard*.

The screenshot shows the IBM z/OS Management Facility (zsmf) web interface. A context menu is open over a row in a table titled "Service Class". The menu options include:

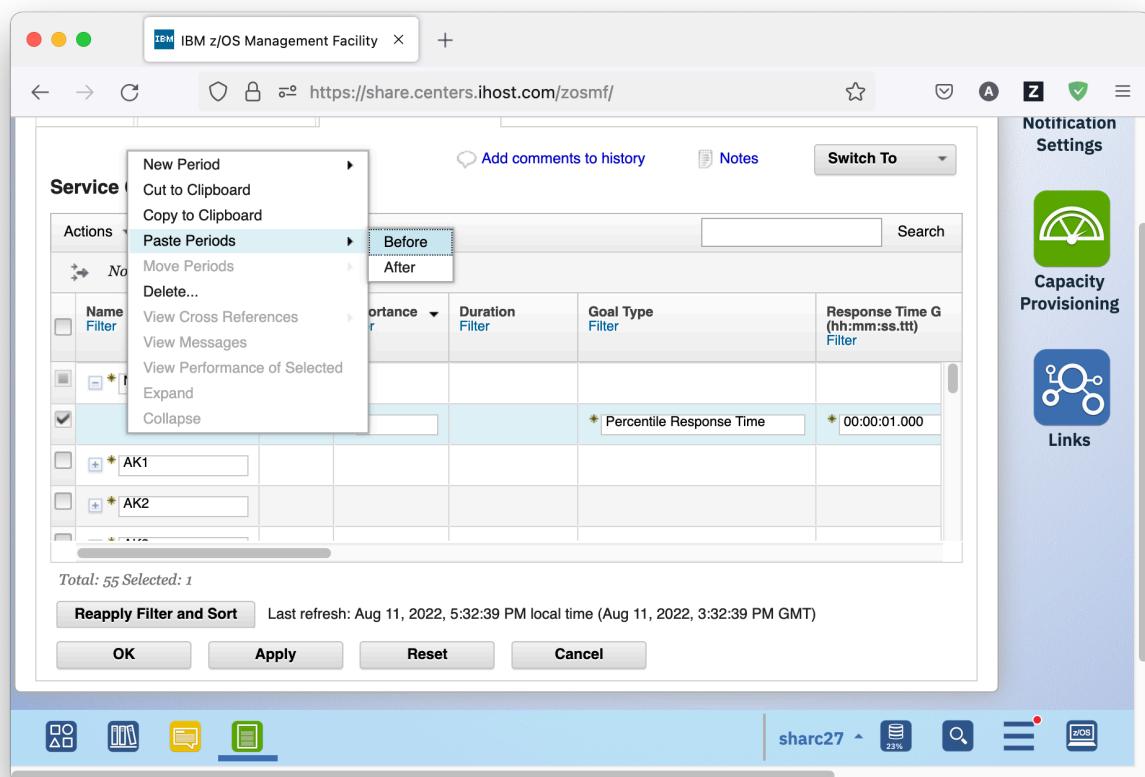
- New Period
- Cut to Clipboard
- Copy to Clipboard** (highlighted)
- Paste Periods
- Move Periods
- Delete...
- View Cross References
- View Messages
- View Performance of Selected
- Expand
- Collapse

The main table has columns for Duration Filter, Goal Type Filter, and Response Time G (hh:mm:ss.ttt) Filter. The first row has values: * 102345, * Velocity, and * 102345. The second row has values: * 92345, * Velocity, and * 92345. The third row has values: * Discretionary, * Discretionary, and * Discretionary.

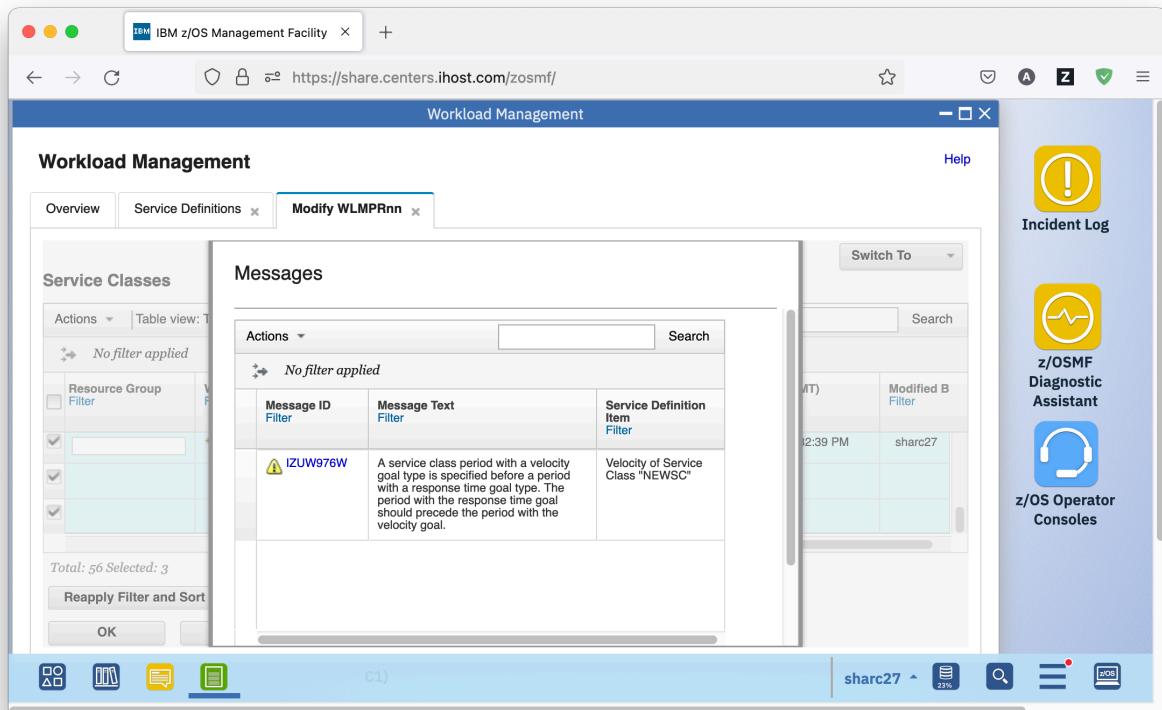
At the bottom of the interface, there are buttons: Reapply Filter and Sort, OK, Apply, Reset, and Cancel. The status bar at the bottom indicates: Last refresh: Aug 11, 2022, 5:32:39 PM local time (Aug 11, 2022, 3:32:39 PM GMT).

On the right side, there is a sidebar titled "Notification Settings" with sections for "Capacity Provisioning" (green icon) and "Links" (blue icon).

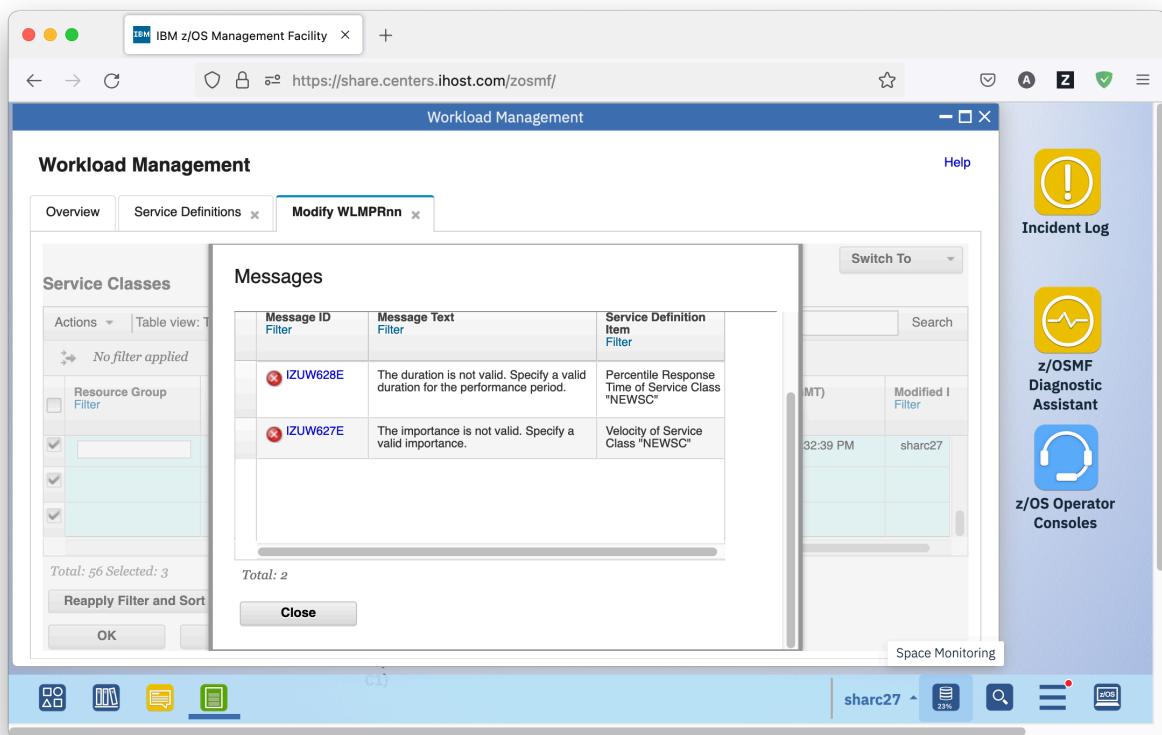
- Then, click again the Deselect all action again. Scroll to your new service class NEWSC, select its period, and click on *Actions – Paste Periods – Before*. It is important that just the period was copied and not the whole class, otherwise paste period will not work.



- If you scroll to the right, you see that there is a warning message for the second period in the Messages column. To view the detailed error messages, click on the *Error* hyperlink in the Messages column. A Messages window opens that displays detailed information about the error.

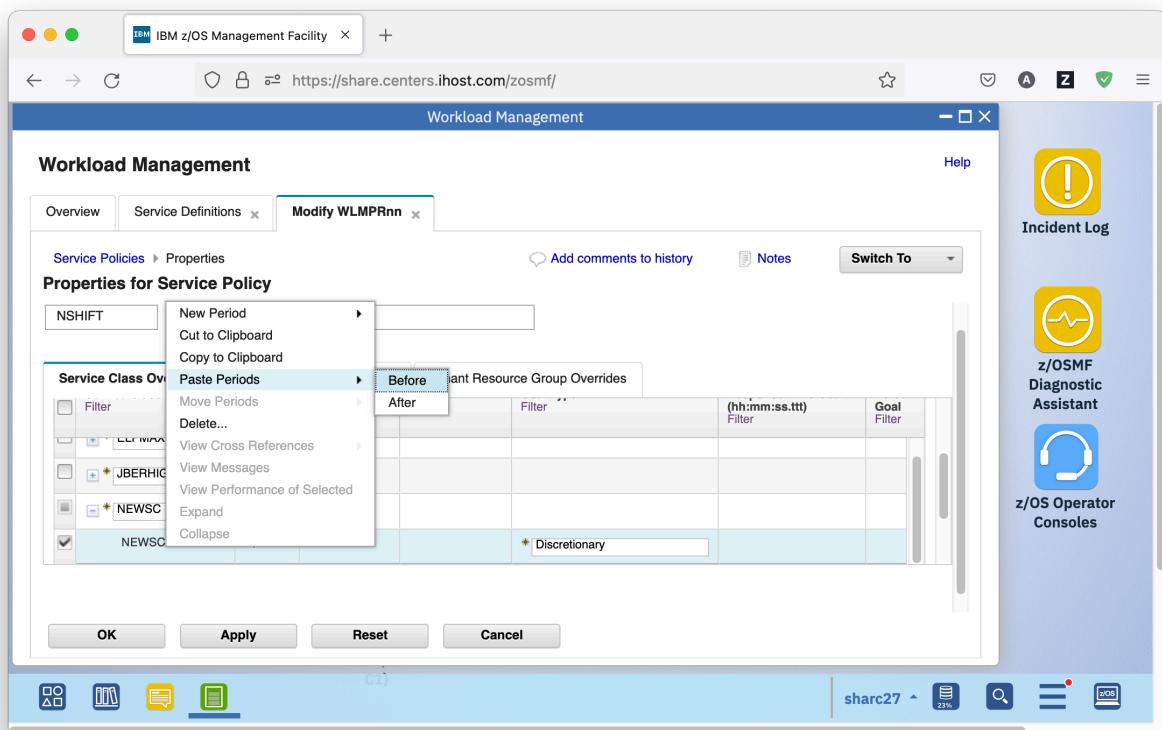


- To fix the error, select the velocity period of your new service class, and select *Actions – Move Periods – Down*. This moves the velocity period after the Percentile Response Time period. However, this leads to two new error conditions being indicated for the Importance and Duration columns. If you mouse over the error icons, you see that both fields are not valid. To see detailed information about the errors, scroll to the right, and click on the *Error* hyperlink in the Messages column of the new service class. A Messages window opens that displays detailed information about the errors. To see more detailed explanations, click on the Message IDs in the Messages window. There, you learn that a duration value must be specified for the (now first) Percentile Response Time Period, and that the importance of a period must not be greater than the importance of the preceding period.

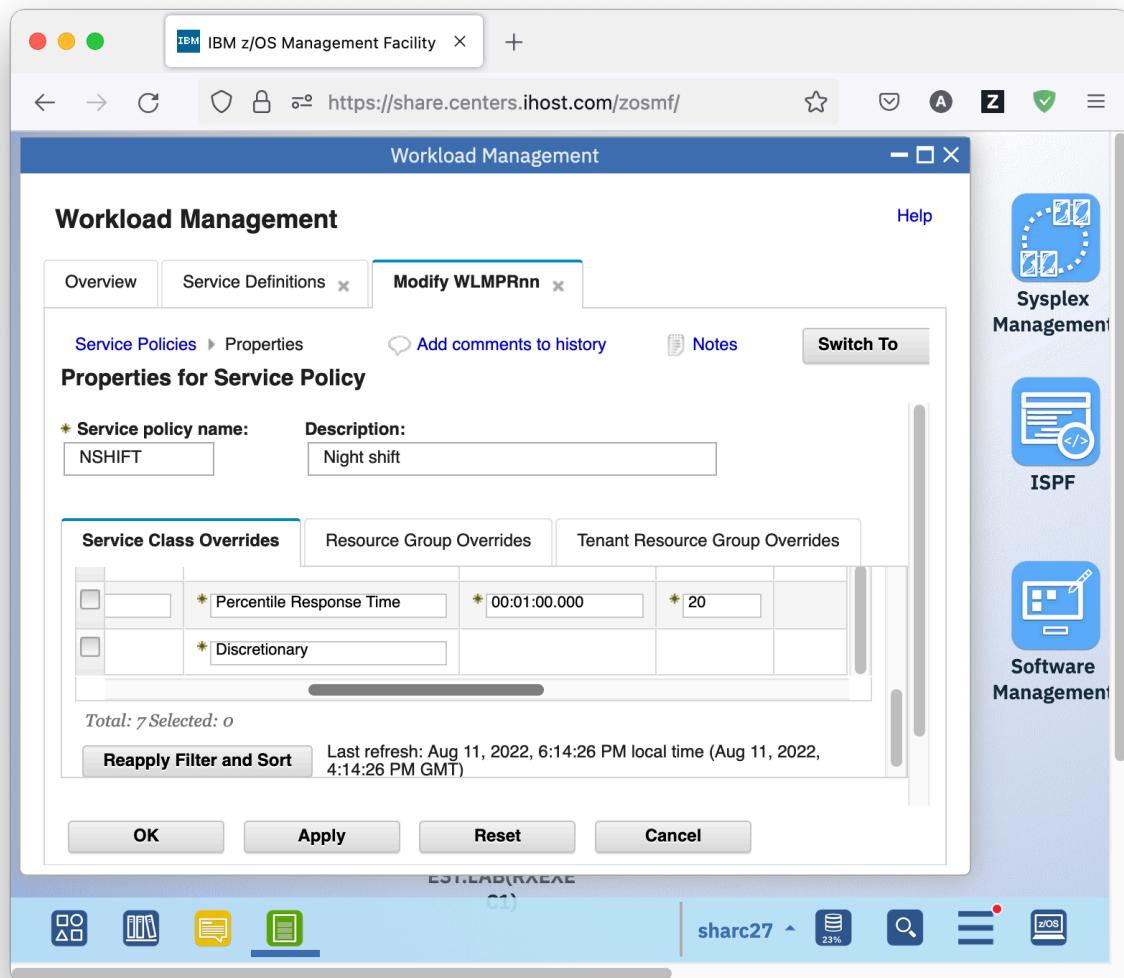


- To fix the problem, double click the Duration field of the Percentile Response Time Period, and enter a duration value, for example, 3333. Then, double click the Importance field of the velocity period, and select value 4. Now all error and warning messages are gone.

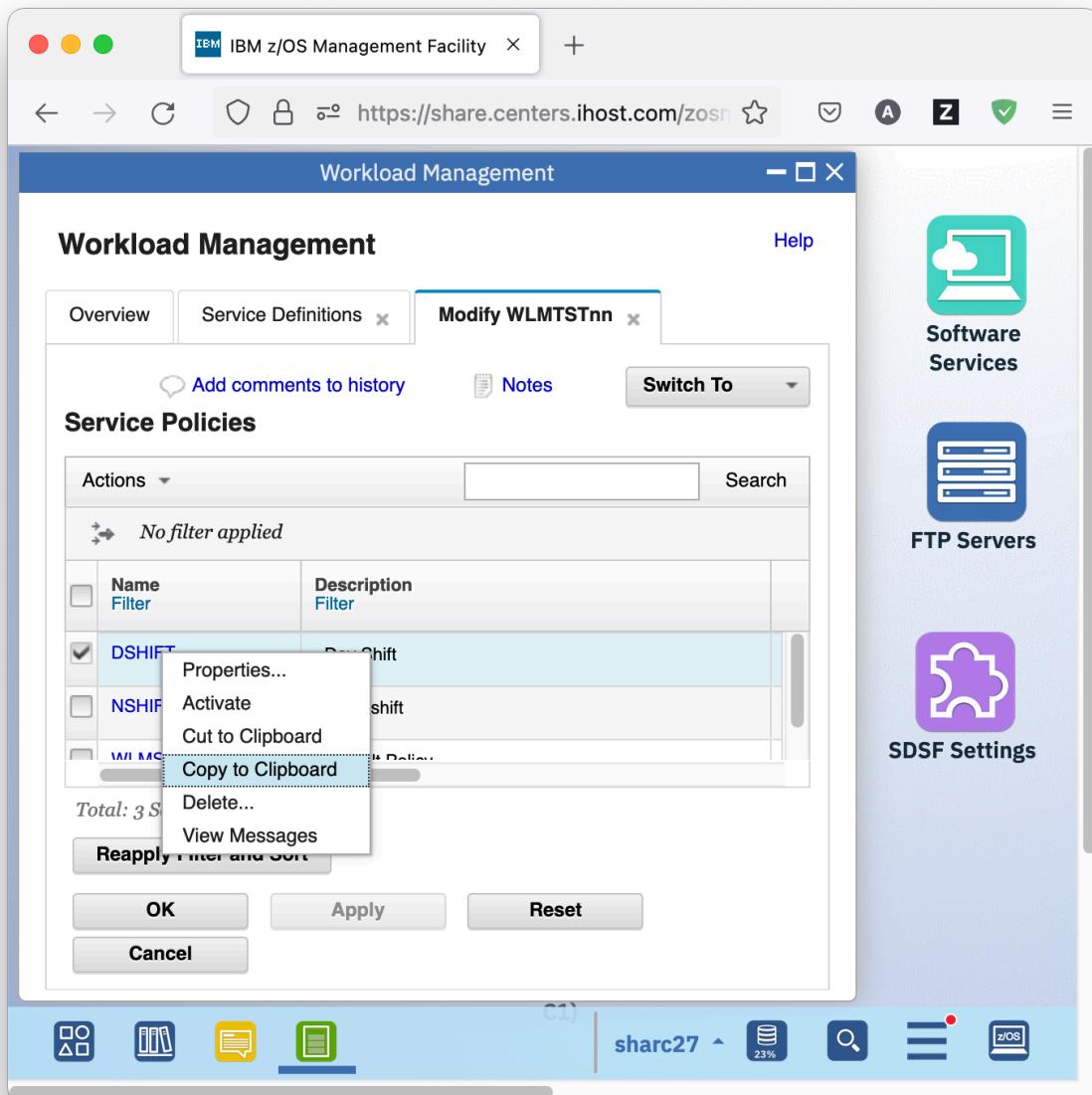
- The z/OSMF Workload Management task allows copying service definition elements not only inside one tab, but also between different tabs of a service definition. Suppose you want to specify a service class override for your new service class in your night shift policy NSHIFT. To do so, select the one service class periods of your new service class, and click on *Actions – Copy to Clipboard*.
- Navigate to the Service Policies tab by selecting *Switch To –Service Policies*. Click on the *NSHIFT* hyperlink to get to the night shift service policy. There, create a new service class override by selecting *Actions – New Service Class Override*. Double click the Service Class field, and select your new service class NEWSC. Then, select the default discretionary period of the service class override, and select *Actions – Paste Periods – Before*.



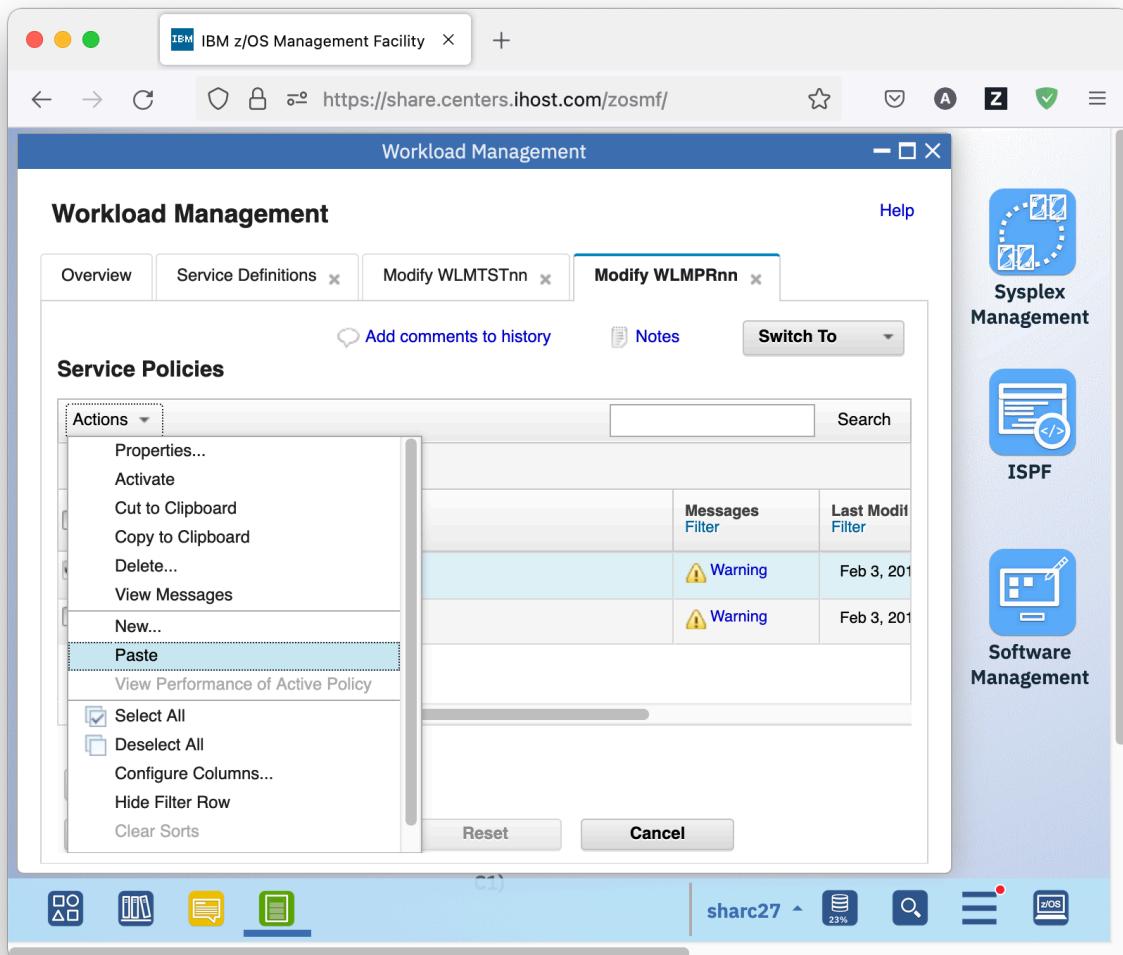
- Select the default discretionary period, and select *Actions – Delete*.
- Now you can modify your goals with more relaxed values for the night shift, for example, a Percentile Response Time Goal of 1 minute, and a Velocity Goal of 20.
- Click the Apply button to save a temporary copy of your changes to the server.



- Copy and paste even works between different service definitions. Now that you already are on the Service Policies tab, let's add a new service policy copied from another service definition. To do so, on the Service Definitions tab, select service definition WLMTSTnn and either right-click it, or open the Actions menu, and choose *View Service Definition – Service Policies*. On the View WLMTSTnn tab that opens, select the day shift policy DSHIFT, and select *Actions – Copy To Clipboard*.



- Open the Modify WLMPRnn tab, navigate to the Service Policies tab by selecting *Switch To –Service Policies*. Then, select *Actions – Paste* to paste the new service policy DSHIFT.



- Apart from this guidance, the z/OSMF Workload Management task also offers cross-referencing. So for example if you select a service class, you can view where it is used in the service definition, and which other items it references in the service definition.
- On the Modify WLMPRN tab, select *Switch To – Service Classes* to switch to the service classes. There, scroll to service class ELPMAX, and select *Actions – View Cross References*.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main panel displays a list of service classes, with 'ELPMAX' selected. A context menu is open over 'ELPMAX', showing options like 'New Period', 'Cut to Clipboard', 'Copy to Clipboard', 'Paste Periods', 'Move Periods', 'Delete...', 'View Cross References' (which is highlighted), 'View Messages', 'View Performance of Selected', 'Expand', and 'Collapse'. The 'View Cross References' option leads to a detailed view of its assignments. The interface includes tabs for 'Overview', 'Service Definitions', and 'Modify WLMPRN'. A sidebar on the right lists 'Sysplex Management', 'ISPF', and 'Software Management'. The bottom navigation bar includes icons for Home, Applications, and Help, along with user information 'sharc27' and system status '23%'. A footer note 'C1)' is visible at the bottom center of the main panel.

- The submenu that opens shows that service class ELPMAX is assigned to resource group ELPMAX and to workload BATCH, that there exist service class overrides for it in the night shift policy NSHIFT, and that it is used in classification rules for subsystem JES. Explore each of the entries. To get back to the Service Classes panel, use *Actions – View Cross References – Service Class ELPMAX* on each of the panels that opens.

- Press the OK button to permanently save the modified service definition and close the Modify WLMPR_{nn} tab. You have to enter a comment for your modifications. Also close the View WLMTST_{nn} tab.

16. Optional: Workload Management and Resource Monitoring

The definitions of Workload Management determine the performance behavior of the systems. Resource Monitoring visualizes the performance behavior. In z/OSMF, WLM and Resource Monitoring can be linked to each other. That is, when you work with your service definition, you can jump to Resource Monitoring to visualize the resulting performance, and vice versa, when you detect abnormal metric values in Resource Monitoring, you can jump to your service definition to look at what you have specified.

Exercise

- The z/OSMF Workload Management task allows viewing the WLM status in the sysplex. To do so, on the Overview tab of the z/OSMF Workload Management task, click the *View WLM Status* hyperlink. The WLM Status panel opens. It shows the Active Service Policy in the sysplex and on each system in the sysplex as well as the service definition installed in the WLM couple data set. Basically, it is the same information as the *display wlm* console command provides.

WLM Status for Sysplex SHARPLEX from System S2

Active Service Policy ([View performance of active policy](#))

Name:	S2WLM
Description:	WLM Basic Policy for SHARE
Activated:	Mar 31, 2020, 8:23:21 PM GMT
Activated by:	vanwag from system S2
Related service definition:	S2WLM
Functionality level:	8
Installed:	Mar 31, 2020, 8:22:49 PM GMT
Installed by:	vanwag from system S2

Systems ([View performance of systems](#))

Actions				Search
No filter applied				
Name Filter	Used Service Policy Filter	Activated (GMT) Filter	WLM Status Filter	
S2	S2WLM	Mar 31, 2020, 8:23:21 PM	Active	

- Apart from this information, there are hyperlinks *View performance of active policy* and *View performance of systems*. The former enables you to view the performance of the active service policy, the latter the performance of the systems in the sysplex. If the links are not displayed a provider of appropriate performance data is not available. On our system, RMF is up and running, so performance data is available.
- Start with the *View performance of systems* hyperlink. This link opens the System Status panel that is also directly accessible under heading Performance in the navigation tree on the left hand side. The System Status displays z/OS sysplexes (and other system complexes) that are monitored in the Resource Monitoring task. In our case you will see at least LOCALPLEX and SHARPLEX.

The screenshot shows the System Status page of the IBM z/OS Management Facility. The page title is "System Status". It displays a table of resources with the following columns: Actions, Resource Filter, System Type Filter, Connectivity Filter, Performance Index Status Filter, and Re. De. Fil. The table contains the following data:

Actions	Resource Filter	System Type Filter	Connectivity Filter	Performance Index Status Filter	Re. De. Fil
<input type="checkbox"/>	LOCALPLEX	z/OS	Connected	<input checked="" type="checkbox"/> PI <= 1 for all periods	S21
<input type="checkbox"/>	SHARA04PLEX	z/OS	Connected	<input checked="" type="checkbox"/> PI <= 1 for all periods	S21
<input checked="" type="checkbox"/>	SHARPLEX	z/OS	Connected	<input checked="" type="checkbox"/> PI <= 1 for all periods	S21
<input type="checkbox"/>	SHARPLEXshara14	z/OS	Connected	<input checked="" type="checkbox"/> PI <= 1 for all periods	S21

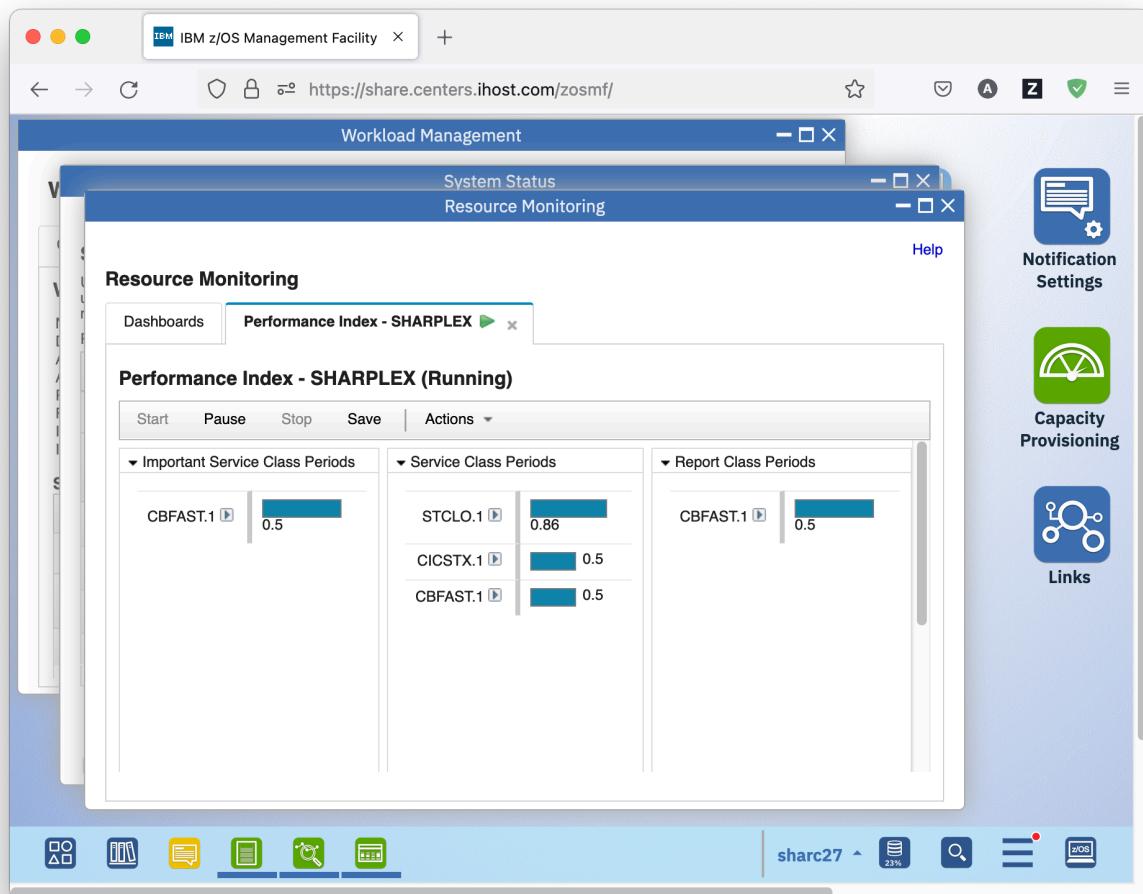
Total: 7 Selected: 1

Refresh Last refresh: Aug 11, 2022, 6:30:45 PM local time (Aug 11, 2022, 4:30:45 PM GMT)
 Automatic refresh

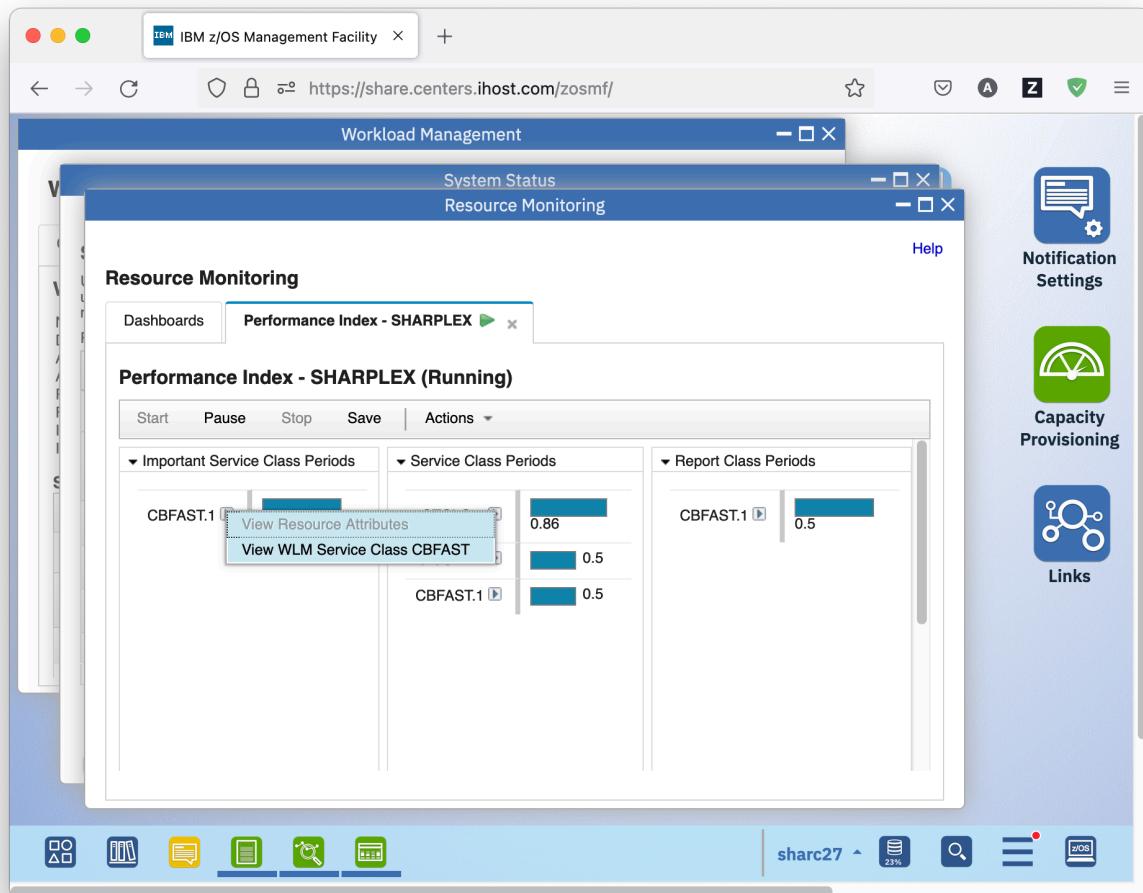
Navigation icons: Home, Systems, Workload Management, Performance, Security, Help, Logout.

- The table displays the system type, connectivity to Resource Monitoring, the Performance Index Status, WLM service definition, and policy. The Performance Index Status gives an overall view how the system is doing. It indicates whether all or some of the service class periods are achieving, exceeding, or missing their goal. The status column can have one of the following values:
 - PI \leq 1 for all periods (green). The PI is less than or equal to one for all active service class periods; therefore, all of the active service class periods are achieving or exceeding their goals.
 - PI > 1 for unimportant periods (yellow). The PI is greater than one for at least one service class period that has an importance level of three, four, or five; therefore, at least one unimportant service class period is not achieving its goal.
 - PI > 1 for important periods (red). The PI is greater than one for at least one service class period that has an importance level of one or two; therefore, at least one important service class period is not achieving its goal.

- You can now view the performance index details for our sysplex, either by clicking on the hyperlink in the Performance Index Status column, or by using *Actions – View Performance Index Details*.
- The Performance Index dashboard that opens in Resource Monitoring displays the performance index for important active service class periods, for all active service class periods, and for report classes. You see that there is not much activity on the systems when I did the screen shot, this might be different during the lab session.



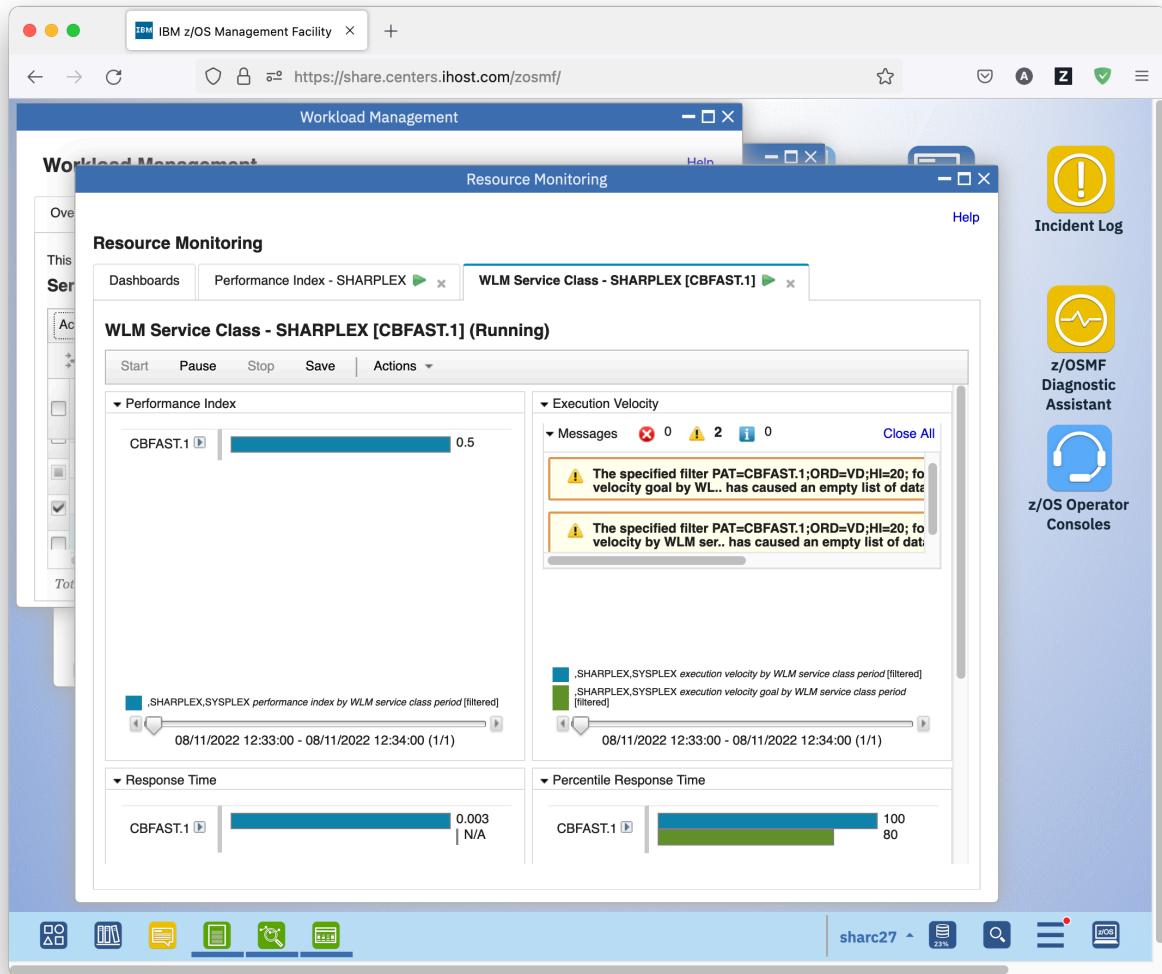
- When you click on the little arrow next to the service class name, you can view the service class definition in the active WLM service policy, and start thinking why the performance index is bad (if it is bad).



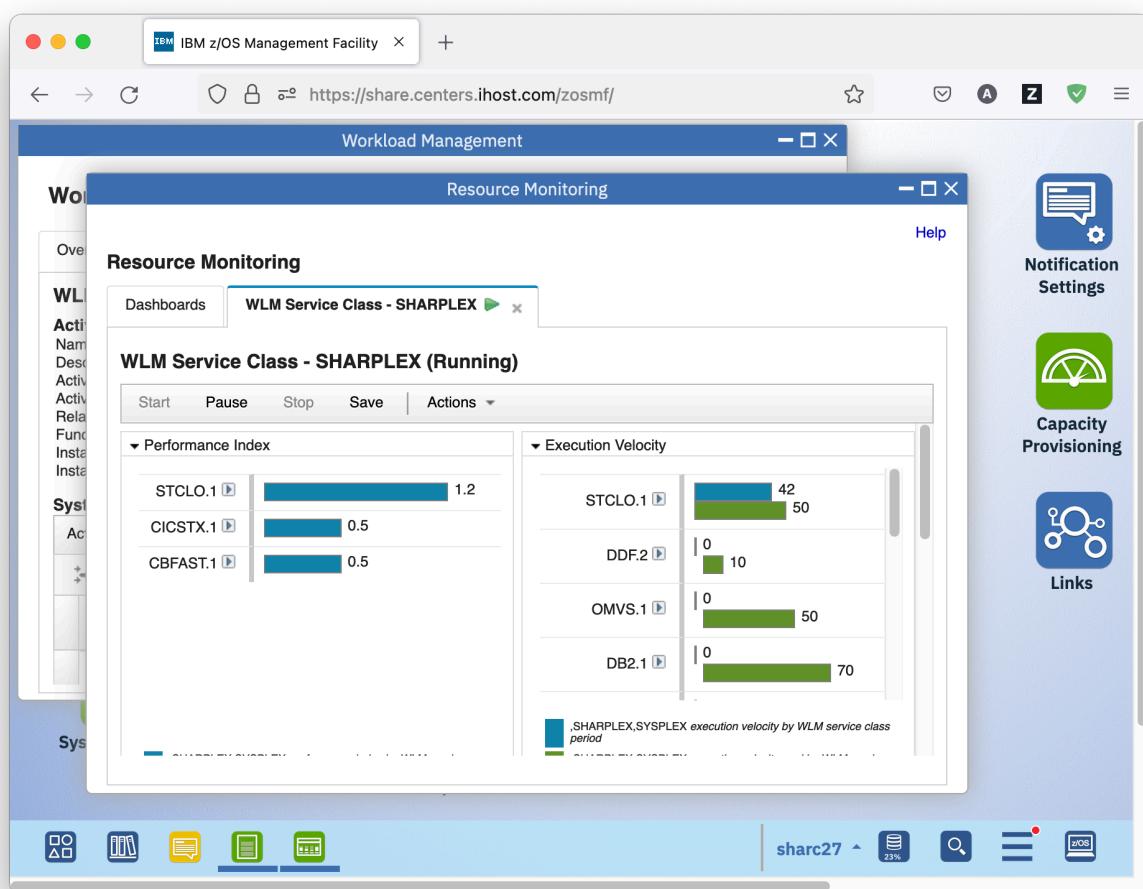
- From there, you can go back to Resource Monitoring by selecting *Action – View Performance of Selected*, to see more details about the performance index.

The screenshot shows the IBM z/OS Management Facility Workload Management interface. The main window title is "Workload Management". Below it, the sub-header "Service Classes" is visible. A table view displays several service classes: BATCH, BATCHH, CBFAST, and another CBFAST entry. The last CBFAST entry has a checkmark next to its name. A context menu is open over this checked entry, listing options: "Copy to Clipboard", "View Cross References", "View Messages", and "View Performance of Selected". The "View Performance of Selected" option is highlighted with a blue selection bar. The status bar at the bottom of the interface indicates "Total: 17 Selected: 1". To the right of the main window, a sidebar titled "Workload Management" lists three items: "Notification Settings" (with a speech bubble icon), "Capacity Provisioning" (with a green gauge icon), and "Links" (with a network icon). The URL in the browser bar is <https://share.centers.ihost.com/zosmf/>.

- The Resource Monitoring dashboard that opens displays more information about the performance of the selected service class. Because there was nearly no activity on the system when I took the screen shots, you see that the actual execution velocity of the service class is 100, which is way above the specified velocity goal of 80.



- Similar data is available for the active service policy. Go back to the WLM Status panel and click on hyperlink *View performance of active policy*. The Resource Monitoring tab that opens displays the performance index for all active service class periods, the execution velocity for velocity goals, the response time for average response time goals, and the percentile achieving the response time goal for percentile response time goals. As on the previous tab, you can get back to WLM by clicking on the little arrows next to the service class names, to view the service class definitions.



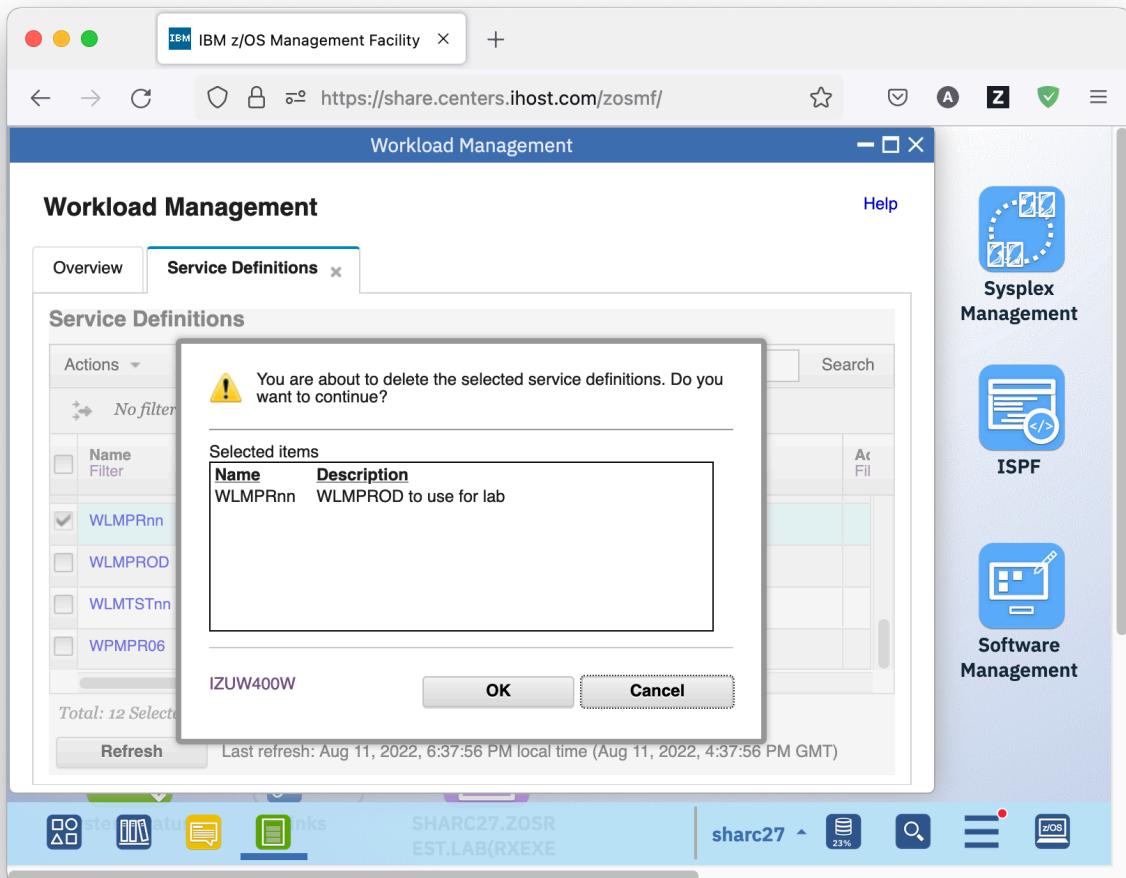
- Switching from the z/OSMF Workload Management task to Resource Management is supported for quite some entities in the service definition, for example the active policy, service classes, report classes, and workloads – watch out for actions *View performance of selected* and *View performance of all*.
 - And back from z/OSMF Resource Management to WLM, watch out for the little arrows next to the names of service and report classes.
 - Close all tabs that opened up, and do not forget to execute the cleanup exercise on the next page.

17. Cleanup

In order to wipe out all of your traces for the next lab participants there is just one easy exercise remaining:

Exercise

- In the Workload Management task, close all WLMPRnn, and WLMTSTnn tabs
- On the Service Definitions tab, select service definition WLMPRnn and either right-click it, or open the Actions menu, and choose *Delete*. A warning window opens where you need to confirm that you really want to delete the service definition. Click the *OK* button to confirm and continue.



- On the Service Definitions tab, select service definition WLMTSTnn and either right-click it, or open the Actions menu, and choose *Delete*. A warning window opens where you need to confirm that you really want to delete the service definition. Click the *OK* button to confirm and continue.
- Log off from z/OSMF by clicking the *Log out* hyperlink top right