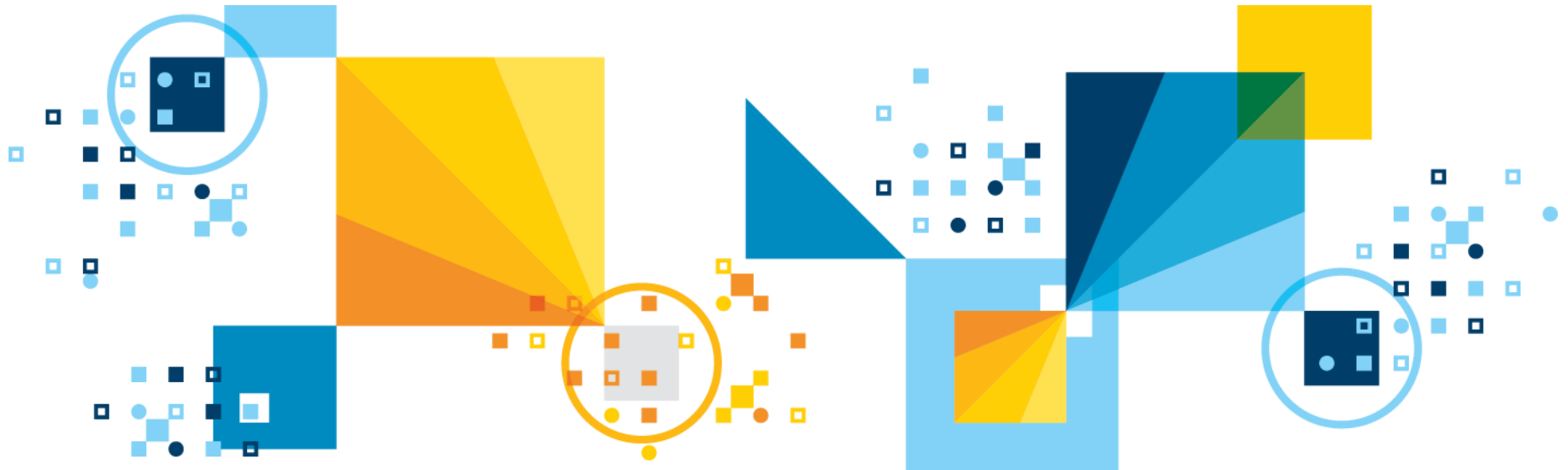


Paul Bird

October, 2017

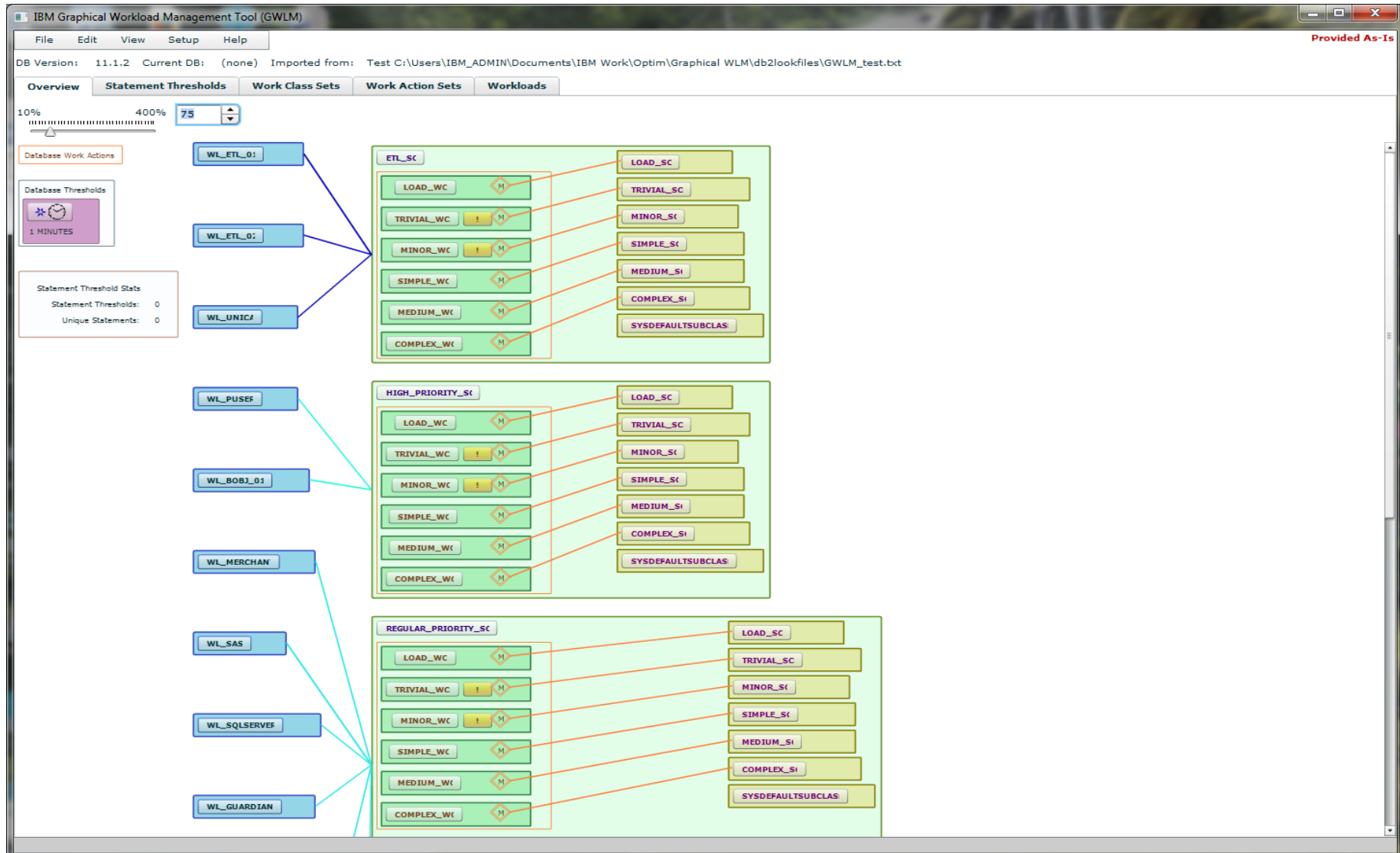
An introduction to the IBM Graphical Workload Management Tool (GWLM)



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But it doesn't have to be, thanks to GWLM!



The IBM Graphical Workload Management Tool (GWLM)

▪ What is it?

- A proof-of-concept experiment created by Kevin Beck and myself to explore the possibilities for a more natural graphical interface for Db2 workload management
- An application written using Adobe Flex and running under Adobe Air (and Java)

▪ What is it intended to do?

- Provide a visual overview of a workload management (WLM) configuration to show at a glance how work is categorized and controlled
- Allow you to explore and manipulate the details of the individual WLM entities in an intuitive manner

➤ Make all our (WLM) lives easier 😊

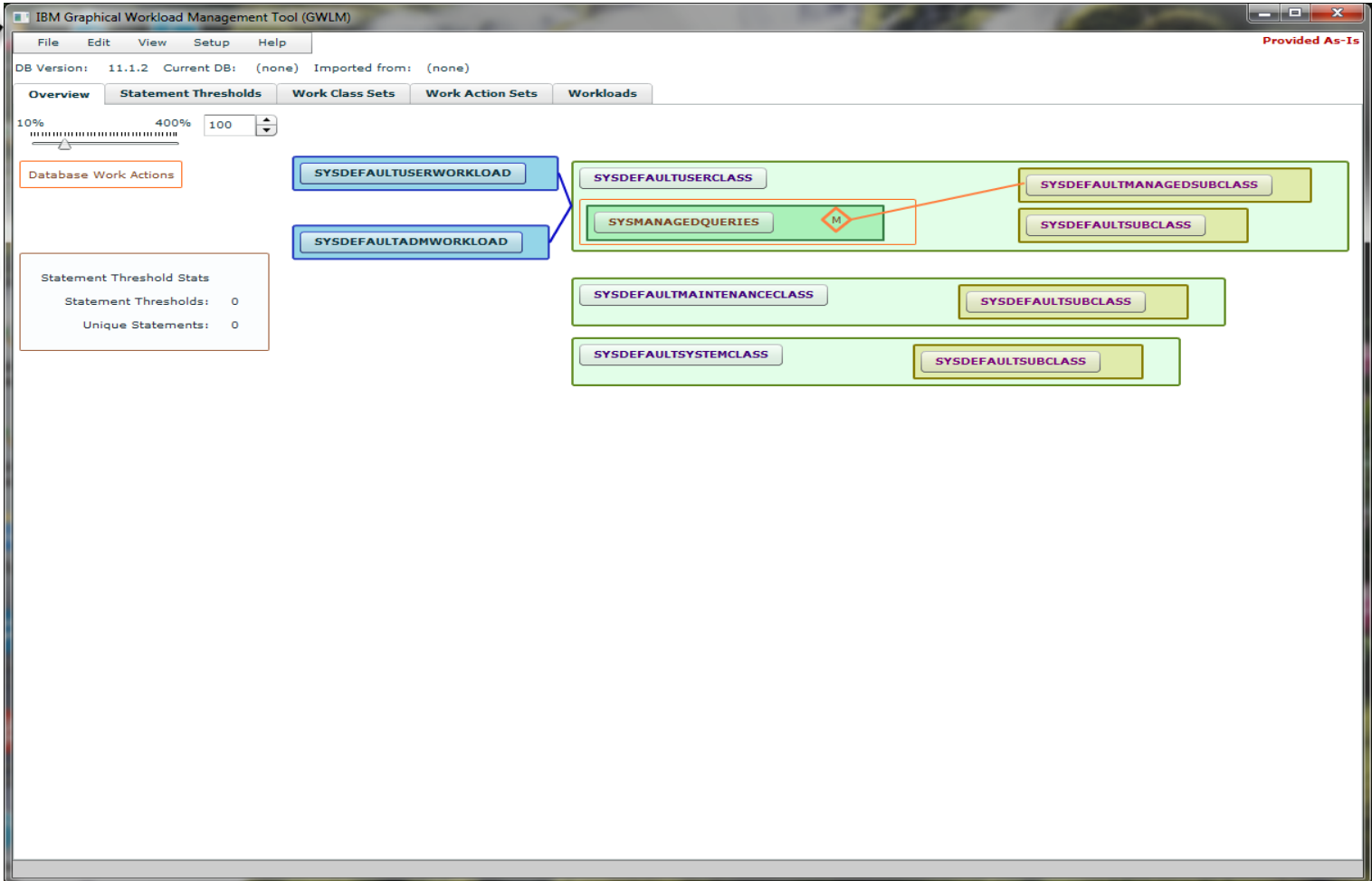
What else you need to know about GWLM

- It is provided **FREE, AS-IS** for your use and exploration
 - Support is on a best-efforts basis by me, myself, and I
 - Actual personnel will vary based on demands of my “day job”

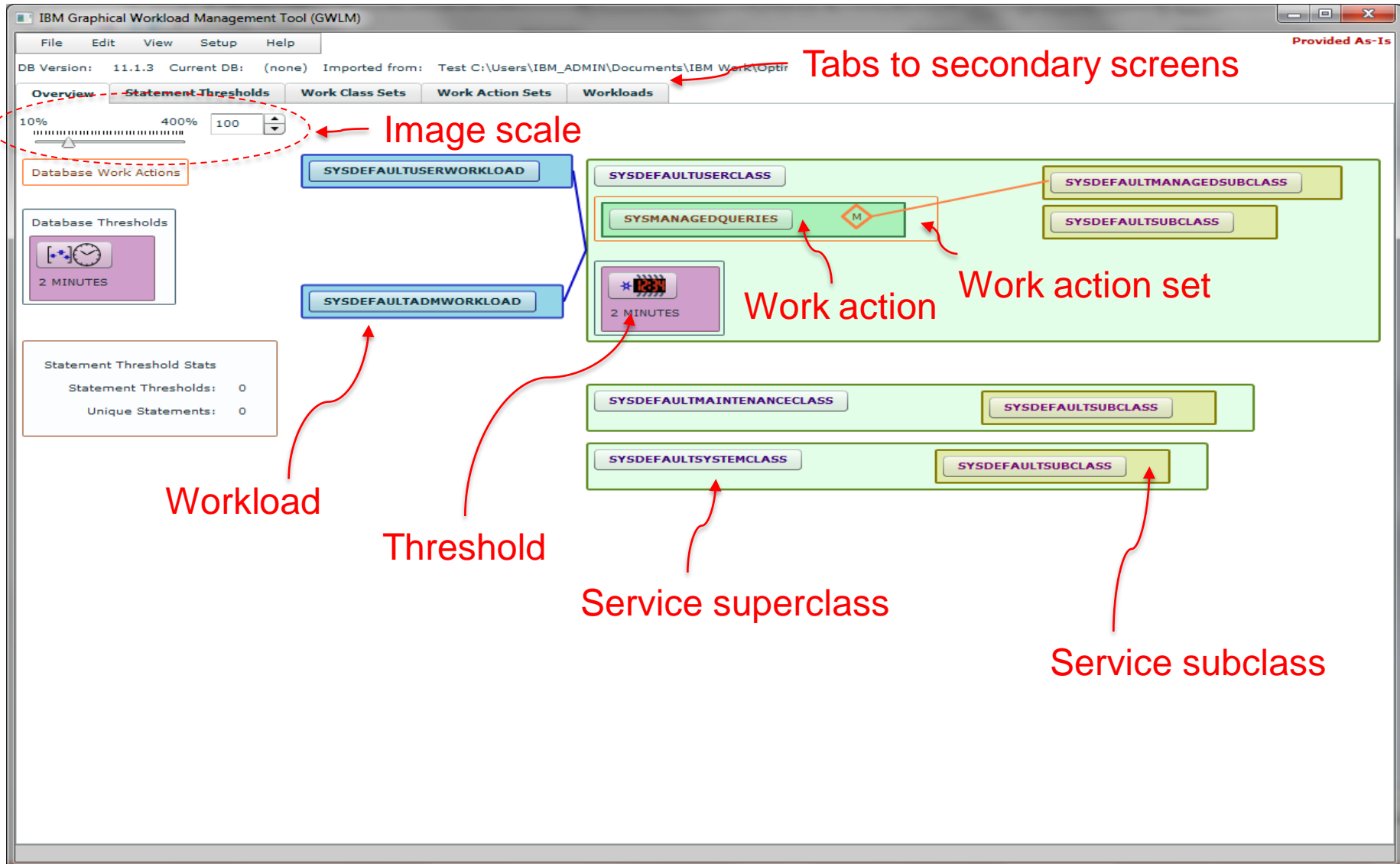
- **IMPORTANT LEGAL WORDS:**
 - This tool is not an official product nor does it represent any commitment by IBM to actually implement or provide a product such as this to the general public at a later date.

- Where can I get it?
 - IBM Graphical Workload Management (GWLM) Tool community in IBM developerWorks
 - <https://www.ibm.com/developerworks/community/groups/service/html/communityview?communityUuid=87992700-9b53-4137-83a5-1ed837e04858>

Invoking GWLM



Main screen



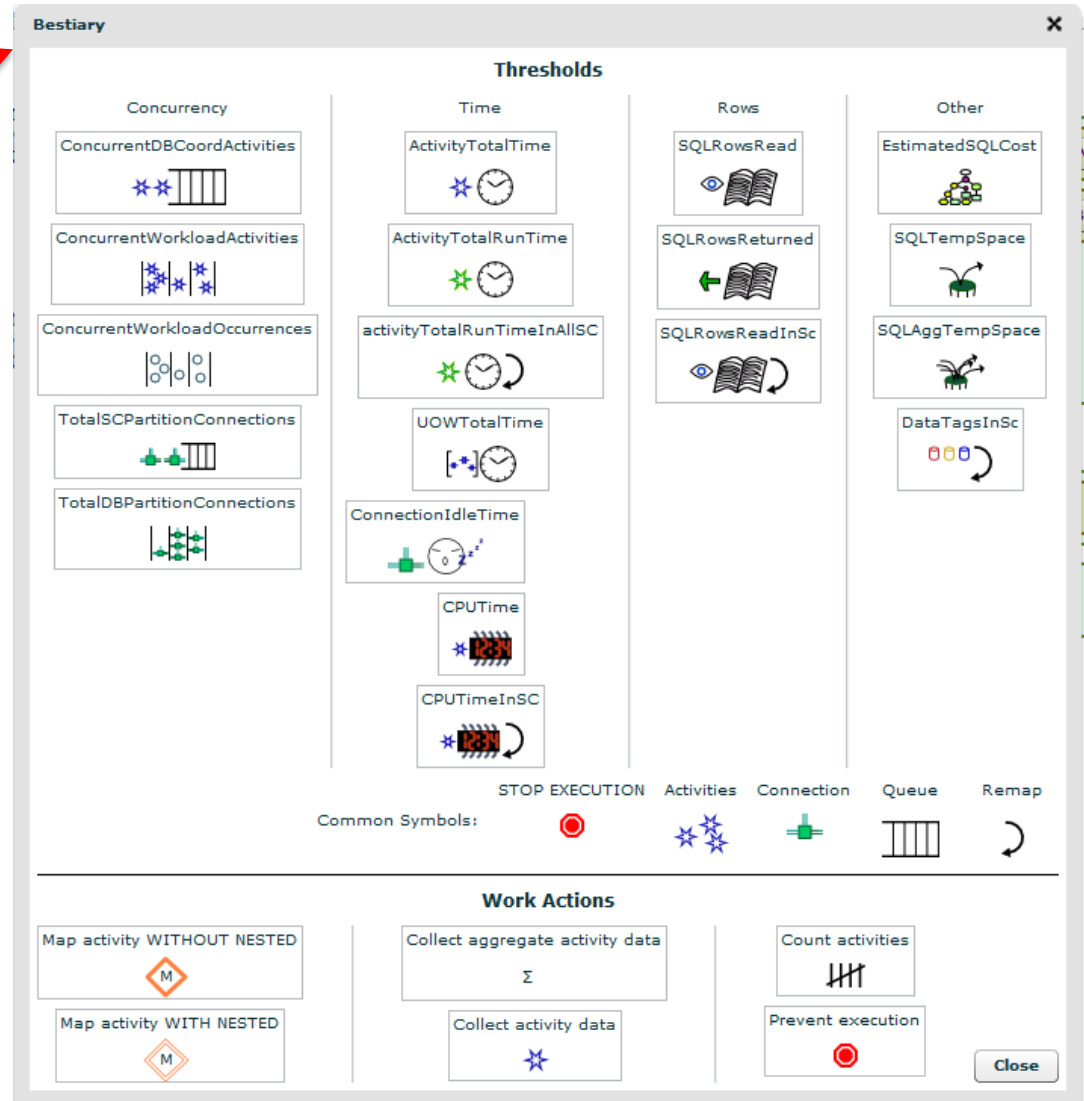
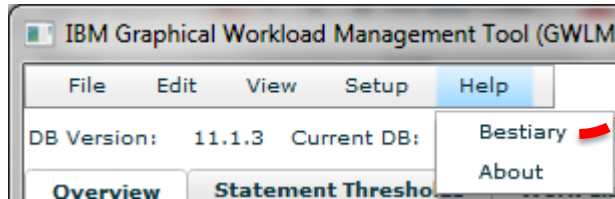
The screenshot displays the IBM Graphical Workload Management Tool (GWLM) interface. The window title is "IBM Graphical Workload Management Tool (GWLM)". The menu bar includes File, Edit, View, Setup, and Help. The status bar shows "DB Version: 11.1.3", "Current DB: (none)", and "Imported from: Test C:\Users\IBM_ADMIN\Documents\IBM Work\Opti". The "Provided As-Is" label is in the top right corner.

The main content area features several tabs: Overview, Statement Thresholds, Work Class Sets, Work Action Sets, and Workloads. The "Overview" tab is selected. It contains a "Database Work Actions" section with a "Database Thresholds" box showing a clock icon and "2 MINUTES". A "Statement Threshold Stats" box shows "Statement Thresholds: 0" and "Unique Statements: 0".

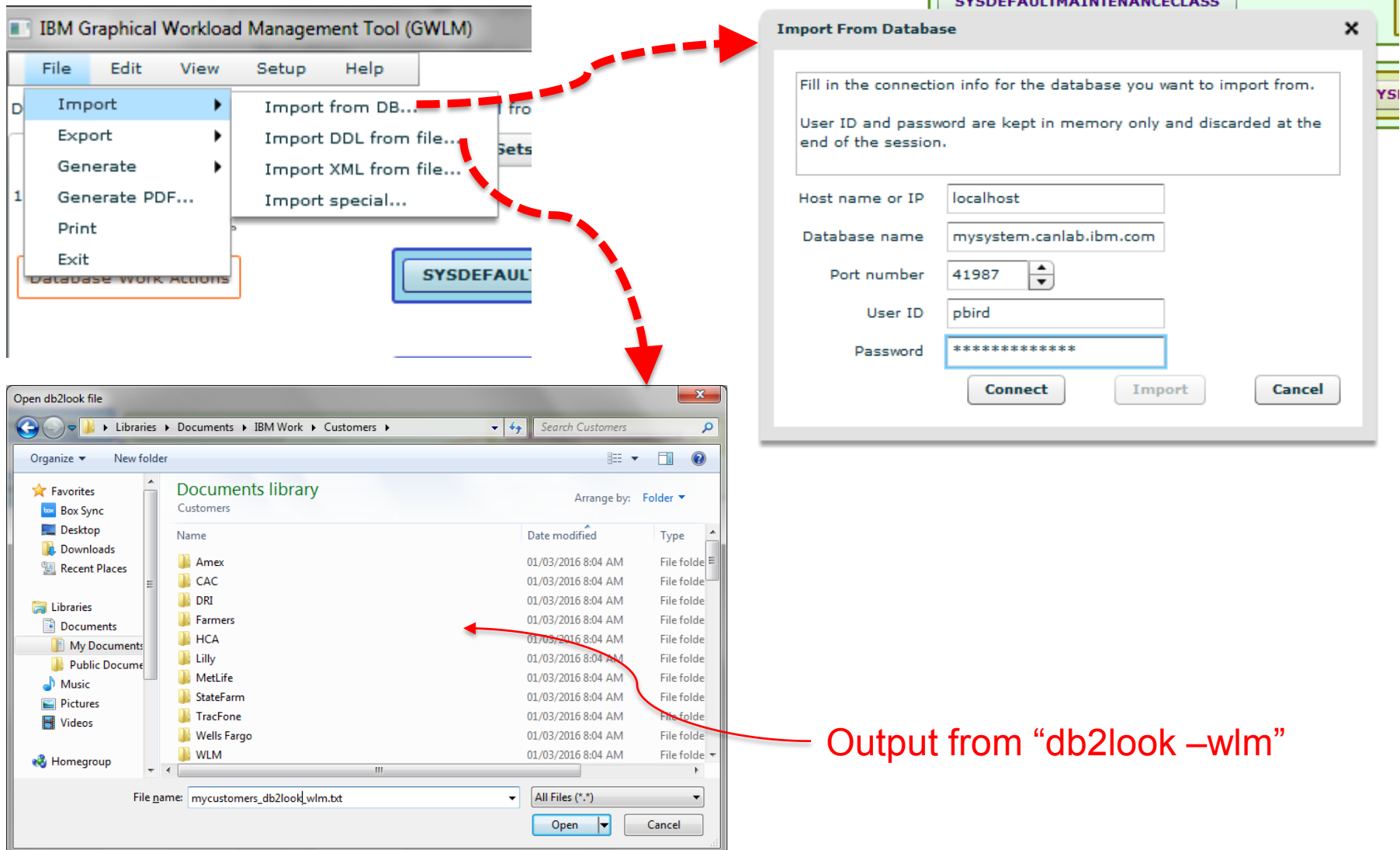
Annotations with red arrows point to various elements:

- Tabs to secondary screens**: Points to the "Statement Thresholds", "Work Class Sets", "Work Action Sets", and "Workloads" tabs.
- Image scale**: Points to a slider control with "10%", "400%", and "100" values.
- Workload**: Points to the "SYSDEFAULTUSERWORKLOAD" and "SYSDEFAULTADMWORKLOAD" boxes.
- Threshold**: Points to the "2 MINUTES" threshold box.
- Work action**: Points to the "SYSMANAGEDQUERIES" box.
- Work action set**: Points to the "SYSDEFAULTMANAGEDSUBCLASS" and "SYSDEFAULTSUBCLASS" boxes.
- Service superclass**: Points to the "SYSDEFAULTMAINTENANCECLASS" and "SYSDEFAULTSYSTEMCLASS" boxes.
- Service subclass**: Points to the "SYSDEFAULTSUBCLASS" boxes.

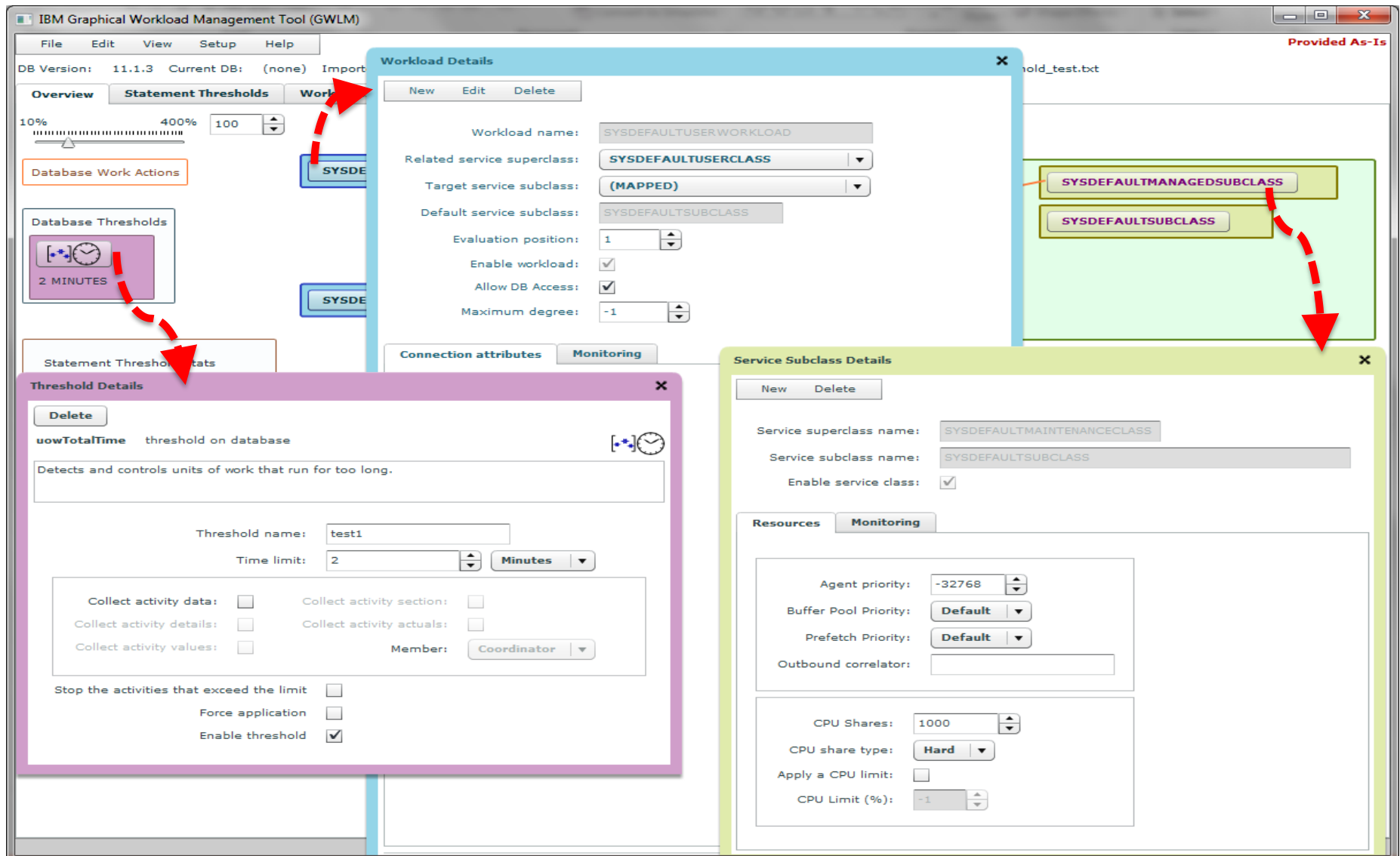
Help in figuring out the different symbols/icons



Getting Started!



Exploring object details



The screenshot displays the IBM Graphical Workload Management Tool (GWLM) interface. The main window shows the 'Workload Details' for 'SYSDEFAULTUSERWORKLOAD'. The 'Statement Thresholds' tab is active, showing a threshold of 100. A red dashed arrow points from the 'Statement Thresholds' tab to the 'Threshold Details' window. Another red dashed arrow points from the 'Database Work Actions' section to the 'Threshold Details' window. A third red dashed arrow points from the 'SYSDEFAULTMANAGEDSUBCLASS' button to the 'Service Subclass Details' window. The 'Threshold Details' window shows a threshold named 'test1' with a time limit of 2 minutes. The 'Service Subclass Details' window shows the service subclass name 'SYSDEFAULTSUBCLASS' and various resource settings.

IBM Graphical Workload Management Tool (GWLM)

File Edit View Setup Help

DB Version: 11.1.3 Current DB: (none) Import

Overview Statement Thresholds Workload

10% 400% 100

Database Work Actions

Database Thresholds

2 MINUTES

Statement Thresholds

Threshold Details

Delete

uowTotalTime threshold on database

Detects and controls units of work that run for too long.

Threshold name: test1

Time limit: 2 Minutes

Collect activity data: ☐ Collect activity section: ☐

Collect activity details: ☐ Collect activity actuals: ☐

Collect activity values: ☐ Member: Coordinator

Stop the activities that exceed the limit ☐

Force application ☐

Enable threshold ☒

Workload Details

New Edit Delete

Workload name: SYSDEFAULTUSERWORKLOAD

Related service superclass: SYSDEFAULTUSERCLASS

Target service subclass: (MAPPED)

Default service subclass: SYSDEFAULTSUBCLASS

Evaluation position: 1

Enable workload: ☒

Allow DB Access: ☒

Maximum degree: -1

Connection attributes Monitoring

Service Subclass Details

New Delete

Service superclass name: SYSDEFAULTMAINTENANCECLASS

Service subclass name: SYSDEFAULTSUBCLASS

Enable service class: ☒

Resources Monitoring

Agent priority: -32768

Buffer Pool Priority: Default

Prefetch Priority: Default

Outbound correlator:

CPU Shares: 1000

CPU share type: Hard

Apply a CPU limit: ☐

CPU Limit (%): -1

Making changes: Existing objects

The image displays two screenshots of the 'Workload Details' dialog box, illustrating the process of making changes to existing objects.

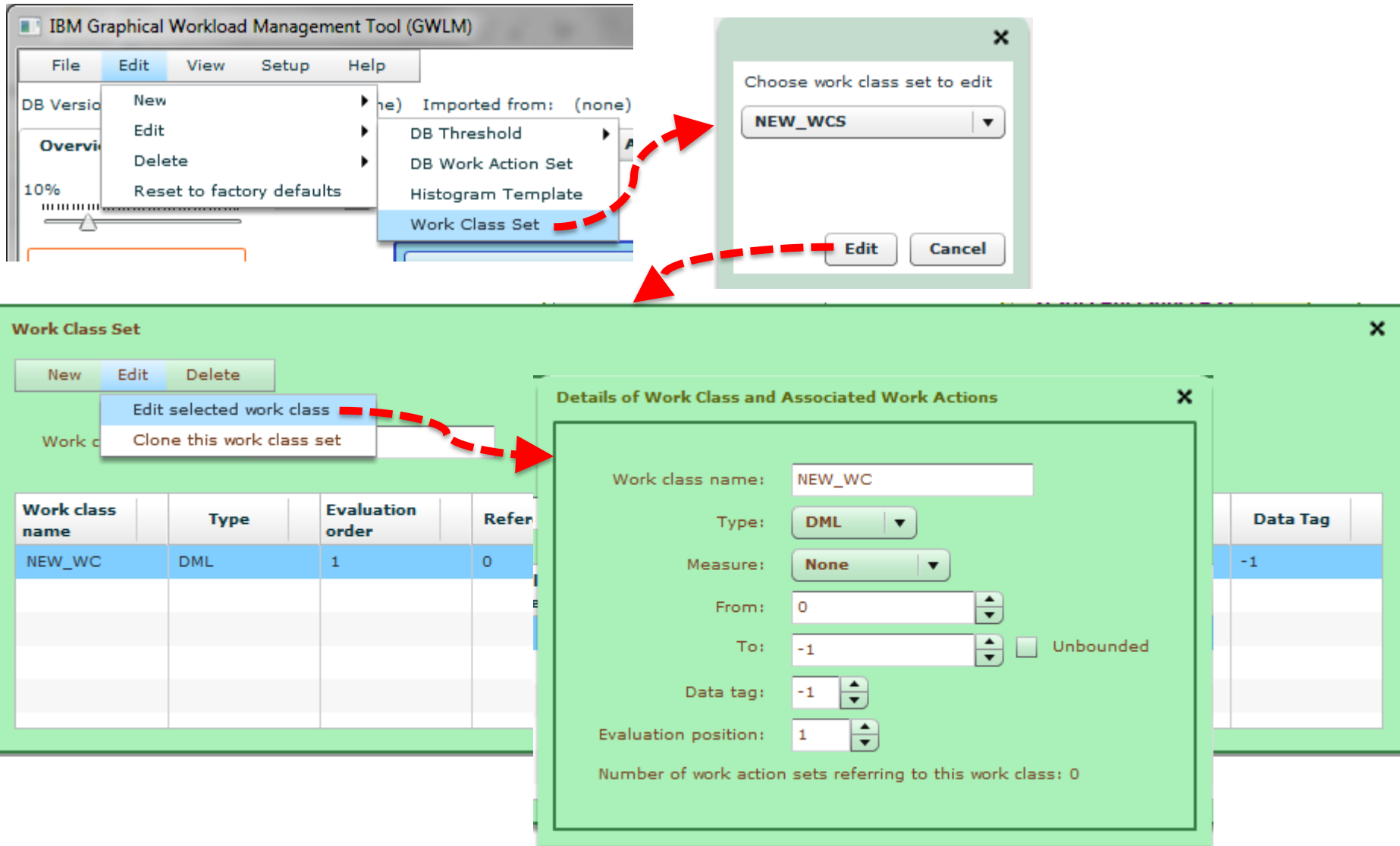
Left Screenshot (Connection attributes tab):

- Workload name:** NEW_WL
- Related service superclass:** NEW_SP
- Target service subclass:** (none)
- Default service subclass:** SYSDEFAULTSUBCLASS
- Evaluation position:** 1
- Enable workload:** ☒
- Allow DB Access:** ☒
- Maximum degree:** -1
- Additional connection attributes:** A dropdown menu is open, showing options: IP address, Application Name, **Session User Group ID** (highlighted), Session User Role ID, Client user ID, Client application name, Client workstation, and Client accounting string.
- System User ID:** (empty field)
- Session User ID:** 'ps' (with a dropdown arrow)

Right Screenshot (Monitoring tab):

- Collect activity data:** ☐
- Collect activity section:** ☐
- Collect activity details:** ☐
- Collect activity actuals:** ☐
- Collect activity values:** ☐
- Member:** Coordinator
- Collect Aggregate Activity Data:** None
- Histogram templates for collection:** Edit
- Collect lock timeout:** Without History
- Collect deadlock:** Without History
- Collect lock wait data:** None
- Lock wait time (milliseconds):** 1000
- Collect activity metrics:** None
- Collect aggregate UOW data:** None
- Collect UOW data:** None

Making changes: Existing work class sets



The screenshot illustrates the steps to edit an existing work class set in the IBM Graphical Workload Management Tool (GWLM).

Step 1: Main Application
The main window shows the **File** menu with options: **New**, **Edit**, **Delete**, and **Reset to factory defaults**. The **Edit** option is selected, leading to a submenu with: **Imported from: (none)**, **DB Threshold**, **DB Work Action Set**, **Histogram Template**, and **Work Class Set**. The **Work Class Set** option is highlighted.

Step 2: Choose work class set to edit
A dialog box titled "Choose work class set to edit" appears, showing a dropdown menu with **NEW_WCS** selected. **Edit** and **Cancel** buttons are at the bottom.

Step 3: Work Class Set
The **Work Class Set** window shows a table of existing work class sets. The **NEW_WC** row is selected, and the **Edit** button is clicked. A context menu appears with options: **Edit selected work class** and **Clone this work class set**. The **Edit selected work class** option is selected.

Step 4: Details of Work Class and Associated Work Actions
A dialog box titled "Details of Work Class and Associated Work Actions" for **NEW_WC** is shown. It contains the following fields:

- Work class name: **NEW_WC**
- Type: **DML**
- Measure: **None**
- From: **0**
- To: **-1** (with an **Unbounded** checkbox)
- Data tag: **-1**
- Evaluation position: **1**
- Number of work action sets referring to this work class: **0**

Table: Work Class Set

Work class name	Type	Evaluation order	Refer
NEW_WC	DML	1	0

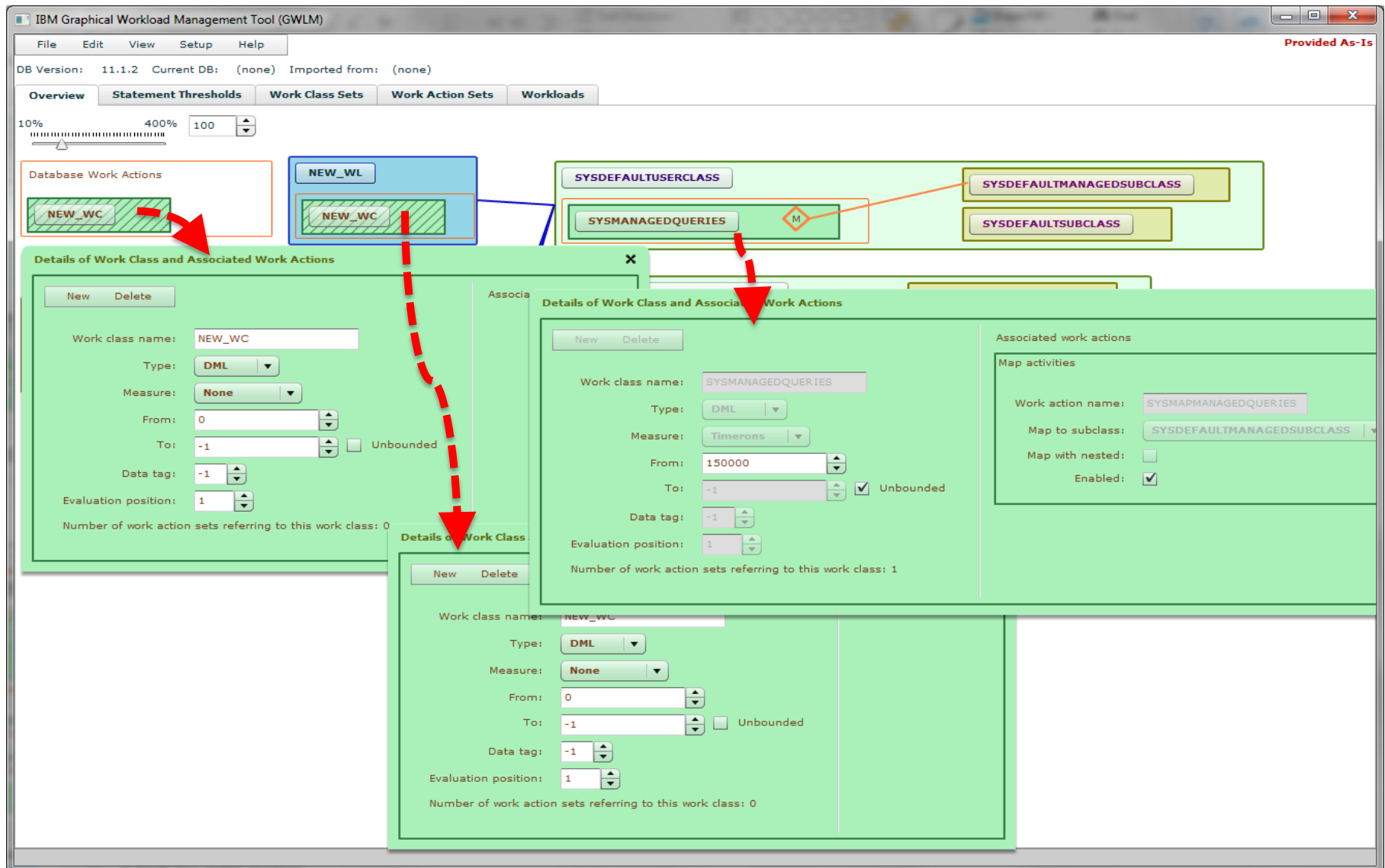
Table: Data Tag

Data Tag
-1

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Making changes: Existing work action sets



The screenshot shows the IBM Graphical Workload Management Tool (GWLM) interface. The main window displays a hierarchy of work classes and actions. The 'NEW_WC' work class is highlighted, and its details are shown in a pop-up window. The details window shows the work class name 'NEW_WC', type 'DML', measure 'None', and other configuration options. A red arrow points from the 'NEW_WC' work class in the main window to its details window. Another red arrow points from the 'SYSDEFAULTUSERCLASS' work class to its details window, which shows the 'SYSDEFAULTMANAGEDSUBCLASS' work action set.

IBM Graphical Workload Management Tool (GWLM)

DB Version: 11.1.2 Current DB: (none) Imported from: (none)

Overview Statement Thresholds Work Class Sets Work Action Sets Workloads

Database Work Actions

NEW_WC

NEW_WL

SYSDEFAULTUSERCLASS

SYSDEFAULTMANAGEDSUBCLASS

SYSDEFAULTSUBCLASS

SYSMANAGEDQUERIES

Details of Work Class and Associated Work Actions

New Delete

Work class name: NEW_WC

Type: DML

Measure: None

From: 0 To: -1 Unbounded

Data tag: -1

Evaluation position: 1

Number of work action sets referring to this work class: 0

Details of Work Class and Associated Work Actions

New Delete

Work class name: SYSMANAGEDQUERIES

Type: DML

Measure: Timerons

From: 150000 To: -1 Unbounded

Data tag: -1

Evaluation position: 1

Number of work action sets referring to this work class: 1

Associated work actions

Map activities

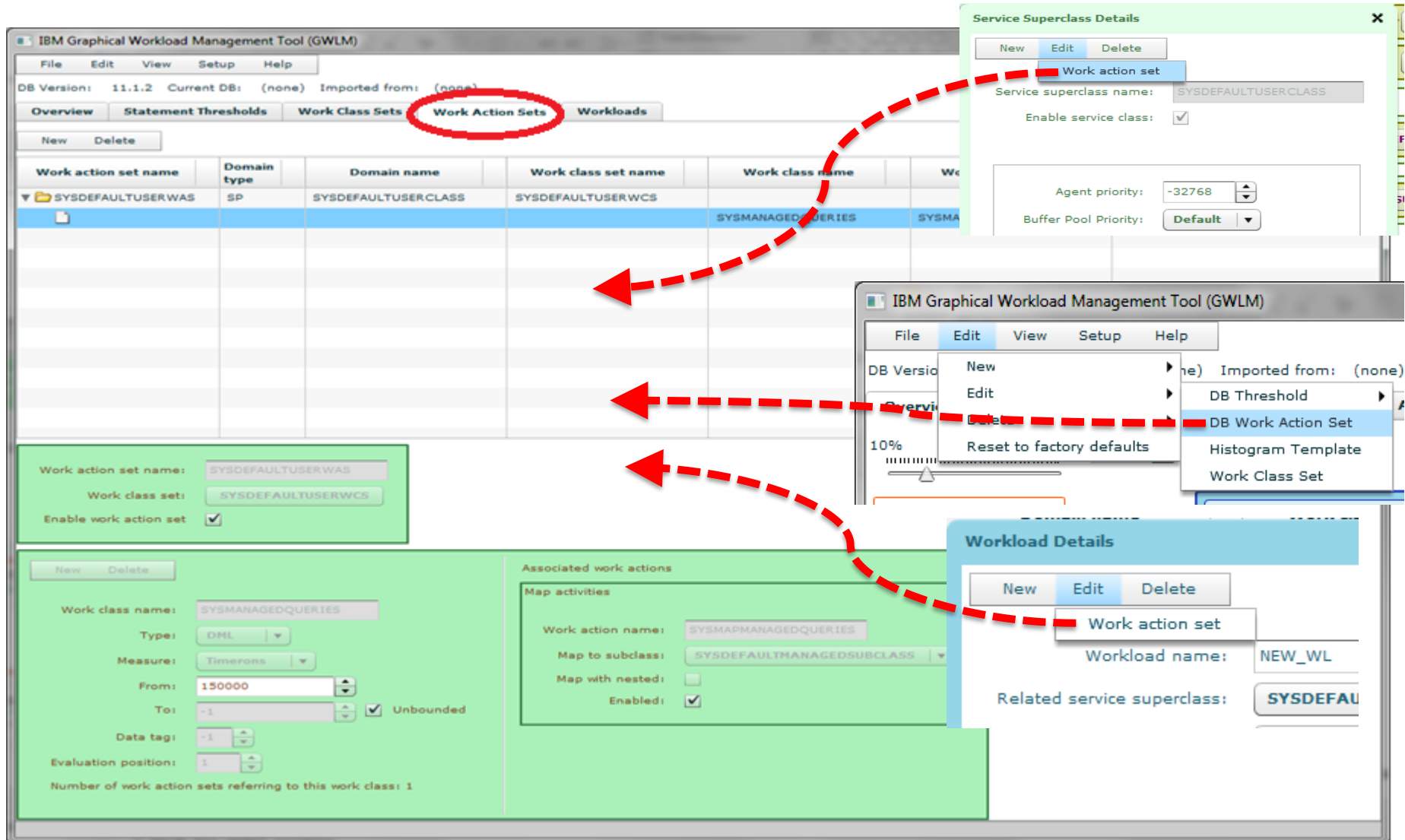
Work action name: SYSMAPMANAGEDQUERIES

Map to subclass: SYSDEFAULTMANAGEDSUBCLASS

Map with nested: ☐

Enabled: ☒

Making changes: Existing work action sets (alternatives)



The screenshot displays the IBM Graphical Workload Management Tool (GWLM) interface. The main window shows the 'Work Action Sets' tab, which is circled in red. Below the menu bar, the 'DB Version' is 11.1.2, 'Current DB' is (none), and 'Imported from' is (none). The 'Work Action Sets' tab is active, showing a table with columns: Work action set name, Domain type, Domain name, Work class set name, Work class name, and Work action name. The table contains one entry: SYSDEFAULTUSERWAS, SP, SYSDEFAULTUSERCLASS, SYSDEFAULTUSERWCS, SYSMANAGEDQUERIES, and SYSMANAGEDQUERIES.

Three red dashed arrows indicate the flow of the process:

- From the 'Work Action Sets' table to the 'Service Superclass Details' dialog.
- From the 'Service Superclass Details' dialog to the 'Edit' menu.
- From the 'Edit' menu to the 'Workload Details' dialog.

The 'Service Superclass Details' dialog shows the 'Work action set' button, 'Service superclass name' (SYSDEFAULTUSERCLASS), 'Enable service class' (checked), 'Agent priority' (-32768), and 'Buffer Pool Priority' (Default).

The 'Edit' menu shows options: New, Edit, Delete, DB Threshold, DB Work Action Set, Histogram Template, and Work Class Set.

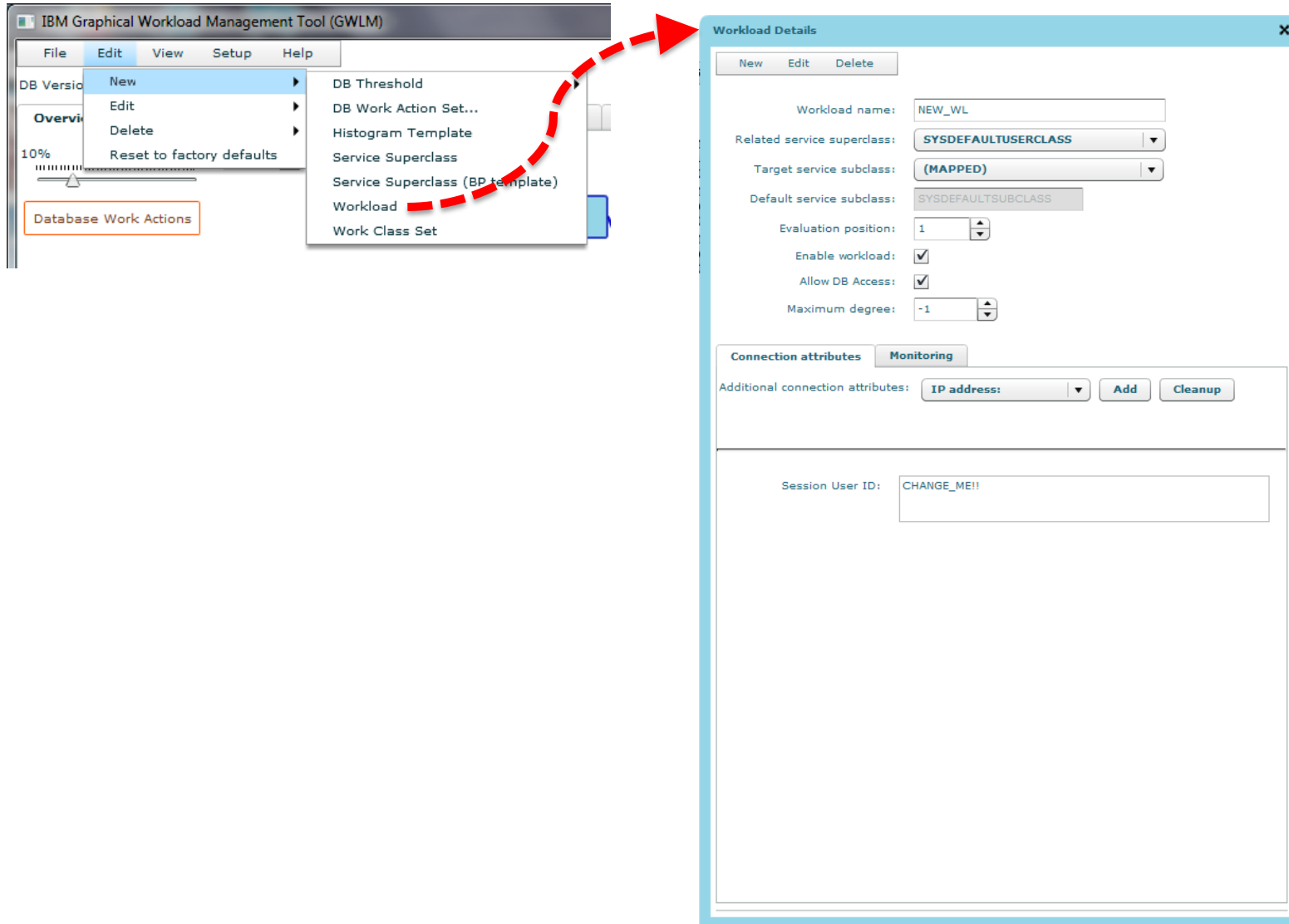
The 'Workload Details' dialog shows the 'Work action set' button, 'Workload name' (NEW_WL), and 'Related service superclass' (SYSDEFAULT).

Below the main table, there are two configuration panels:

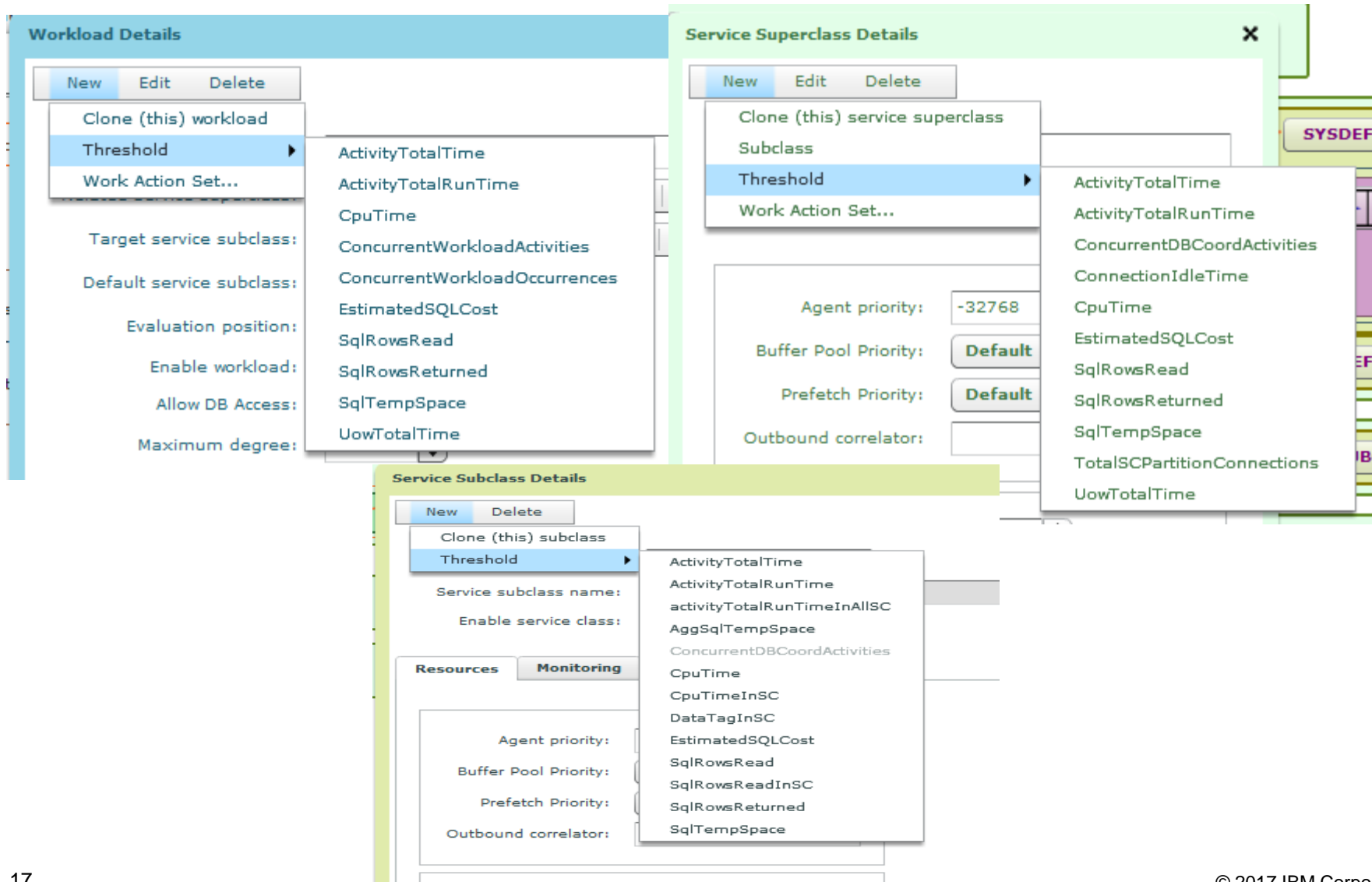
- Work action set configuration:** Work action set name: SYSDEFAULTUSERWAS, Work class set: SYSDEFAULTUSERWCS, Enable work action set: ☒.
- Work class configuration:** Work class name: SYSMANAGEDQUERIES, Type: DML, Measure: Timers, From: 150000, To: -1 (Unbounded), Data tag: -1, Evaluation position: 1, Number of work action sets referring to this work class: 1.

The 'Associated work actions' panel shows the 'Map activities' section with 'Work action name' (SYSMANAGEDQUERIES), 'Map to subclass' (SYSDEFAULTMANAGEDSUBCLASS), 'Map with nested' (unchecked), and 'Enabled' (checked).

Making changes: New database level objects



Making changes: New subordinate objects



The screenshot displays three overlapping panels in the IBM Analytics interface, each showing a 'Threshold' dropdown menu with a list of subordinate objects.

Workload Details Panel:

- Buttons: New, Edit, Delete
- Actions: Clone (this) workload, Threshold, Work Action Set...
- Fields: Target service subclass:, Default service subclass:, Evaluation position:, Enable workload:, Allow DB Access:, Maximum degree:
- Threshold dropdown options: ActivityTotalTime, ActivityTotalRunTime, CpuTime, ConcurrentWorkloadActivities, ConcurrentWorkloadOccurrences, EstimatedSQLCost, SqlRowsRead, SqlRowsReturned, SqlTempSpace, UowTotalTime

Service Superclass Details Panel:

- Buttons: New, Edit, Delete
- Actions: Clone (this) service superclass Subclass, Threshold, Work Action Set...
- Fields: Agent priority: -32768, Buffer Pool Priority: Default, Prefetch Priority: Default, Outbound correlator:
- Threshold dropdown options: ActivityTotalTime, ActivityTotalRunTime, ConcurrentDBCoordActivities, ConnectionIdleTime, CpuTime, EstimatedSQLCost, SqlRowsRead, SqlRowsReturned, SqlTempSpace, TotalSCPartitionConnections, UowTotalTime

Service Subclass Details Panel:

- Buttons: New, Delete
- Actions: Clone (this) subclass, Threshold
- Fields: Service subclass name:, Enable service class:
- Tabs: Resources, Monitoring
- Fields: Agent priority:, Buffer Pool Priority:, Prefetch Priority:, Outbound correlator:
- Threshold dropdown options: ActivityTotalTime, ActivityTotalRunTime, activityTotalRunTimeInAllSC, AggSqlTempSpace, ConcurrentDBCoordActivities, CpuTime, CpuTimeInSC, DataTagInSC, EstimatedSQLCost, SqlRowsRead, SqlRowsReadInSC, SqlRowsReturned, SqlTempSpace

Making changes: New work class sets

The screenshot illustrates the steps to create a new work class set in the IBM Graphical Workload Management Tool (GWLM).

Step 1: Accessing the Work Class Set menu

The main window shows the **Edit** menu open, with the **Work Class Set** option highlighted. A red dashed arrow points from the **Database Work Actions** button in the left sidebar to the **Work Class Set** menu item.

Step 2: Creating a new work class set

The **Work Class Set** dialog box is open, showing the **New** button selected. A red dashed arrow points from the **Add a work class** button to the **Details of Work Class and Associated Work Actions** dialog box.

Step 3: Details of Work Class and Associated Work Actions

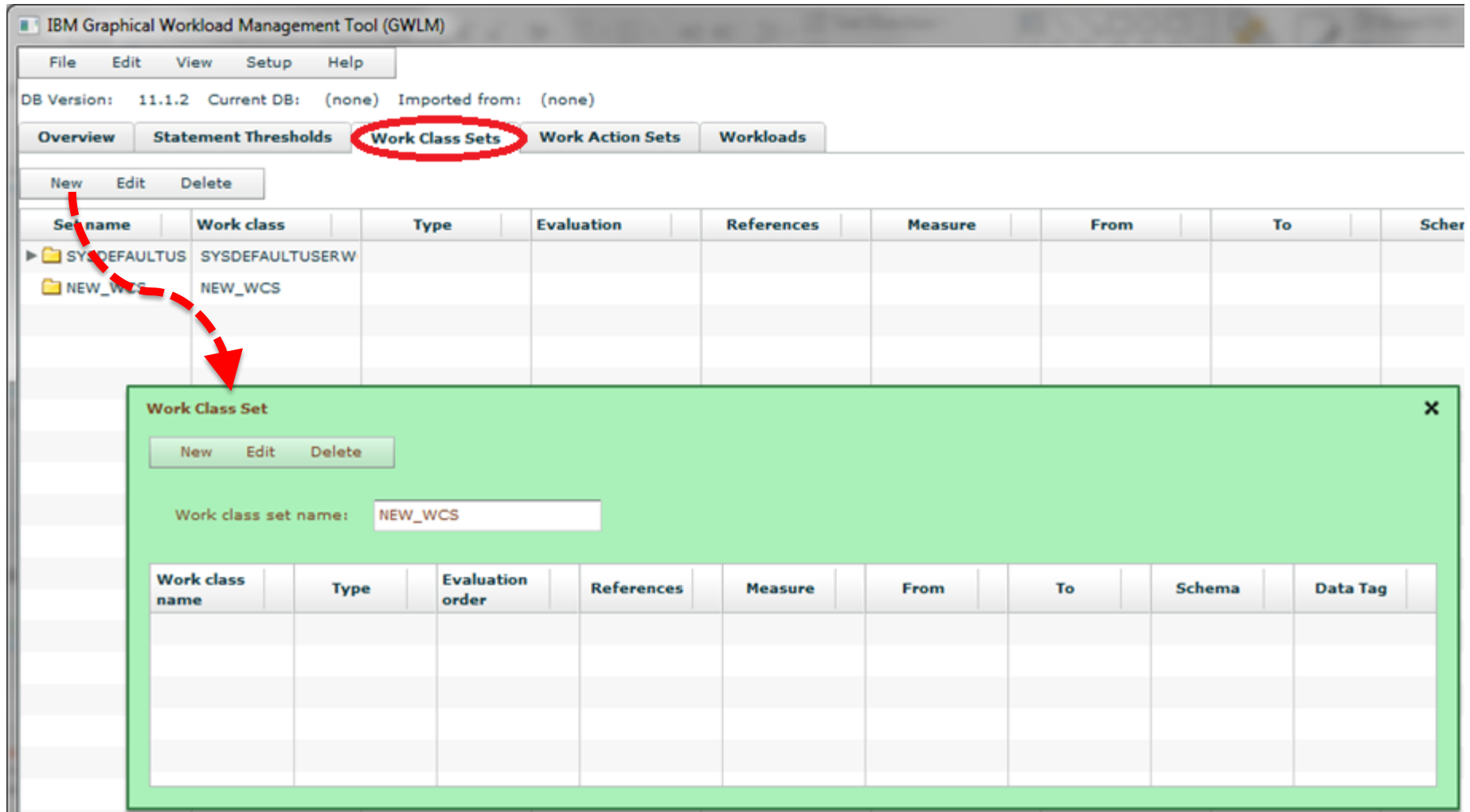
The **Details of Work Class and Associated Work Actions** dialog box shows the configuration for the new work class set:

- Work class name: **NEW_WC**
- Type: **DML**
- Measure: **None**
- From: **0**
- To: **-1** (Unbounded checkbox is checked)
- Data tag: **-1**
- Evaluation position: **1**
- Number of work action sets referring to this work class: **0**

Table: Work class set details

Work class name	Type	Evaluation order	References

Making changes: New work class set (alternative)



IBM Graphical Workload Management Tool (GWLM)

File Edit View Setup Help

DB Version: 11.1.2 Current DB: (none) Imported from: (none)

Overview Statement Thresholds **Work Class Sets** Work Action Sets Workloads

New Edit Delete

Set name	Work class	Type	Evaluation	References	Measure	From	To	Scher
▶ SYS_DEFAULTUS	SYSDEFAULTUSERW							
▶ NEW_WCS	NEW_WCS							

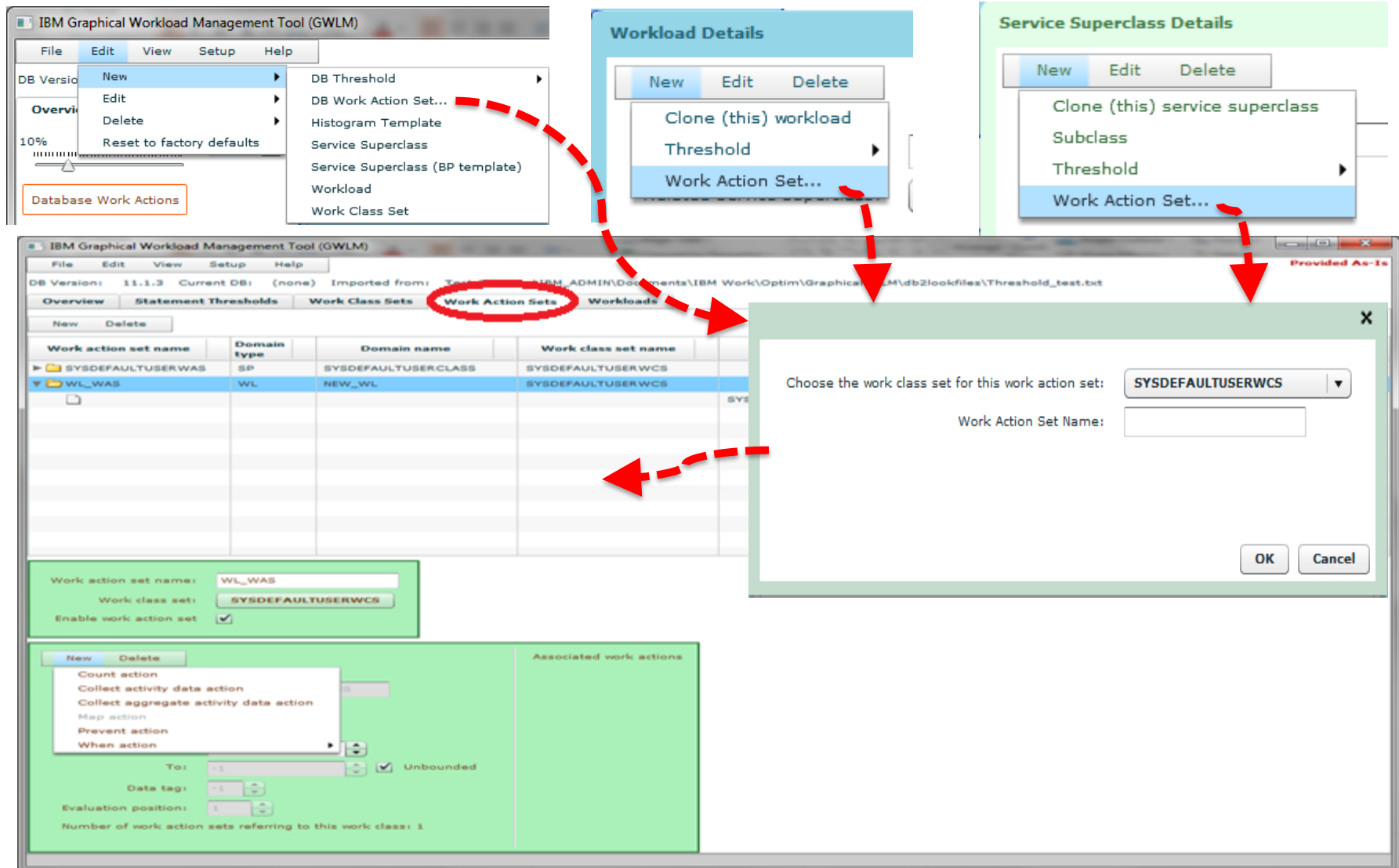
Work Class Set [X]

New Edit Delete

Work class set name:

Work class name	Type	Evaluation order	References	Measure	From	To	Schema	Data Tag

Making changes: New work action sets



The screenshot illustrates the steps to create a new work action set in the IBM Graphical Workload Management Tool (GWLM).

Top Left: File Menu

- File
- Edit
- View
- Setup
- Help

Top Center: Workload Details

- New
- Edit
- Delete
- Clone (this) workload
- Threshold
- Work Action Set...

Top Right: Service Superclass Details

- New
- Edit
- Delete
- Clone (this) service superclass
- Subclass
- Threshold
- Work Action Set...

Main Window: Work Action Sets

Work action set name	Domain type	Domain name	Work class set name
SYSDEFAULTUSERWAS	SP	SYSDEFAULTUSERCLASS	SYSDEFAULTUSERWCS
WL_WAS	WL	NEW_WL	SYSDEFAULTUSERWCS

Bottom Left: Work Action Set Details

Work action set name: WL_WAS

Work class set: SYSDEFAULTUSERWCS

Enable work action set: ☒

Bottom Center: New Work Action Set Dialog

Choose the work class set for this work action set: **SYSDEFAULTUSERWCS**

Work Action Set Name:

OK Cancel

Bottom Right: Associated work actions

- Count action
- Collect activity data action
- Collect aggregate activity data action
- Map action
- Prevent action
- When action

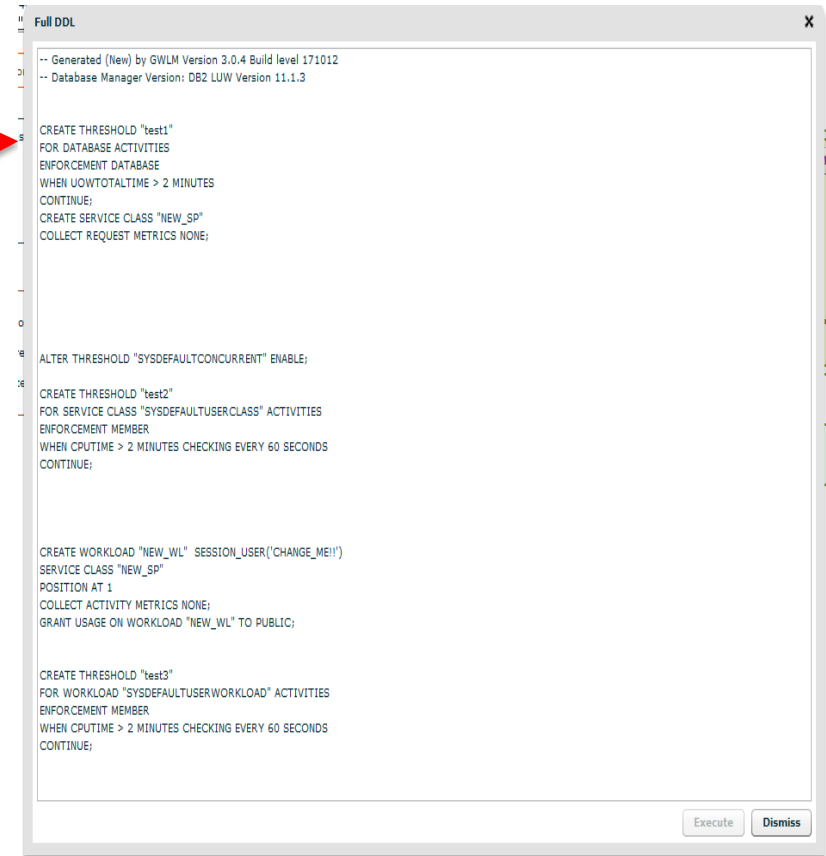
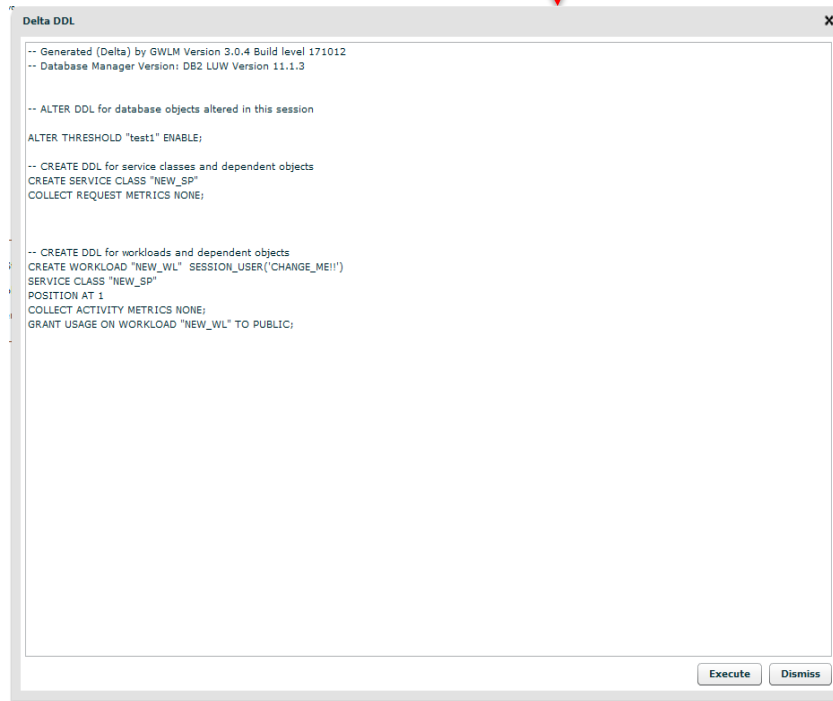
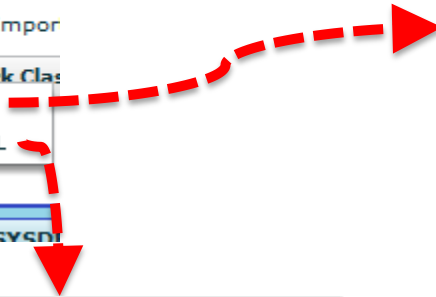
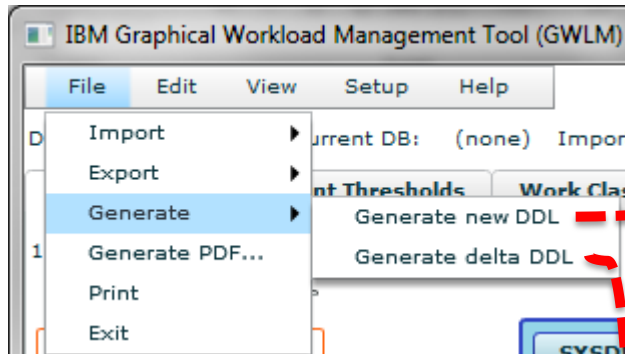
To: -1 Unbounded

Data tag: -1

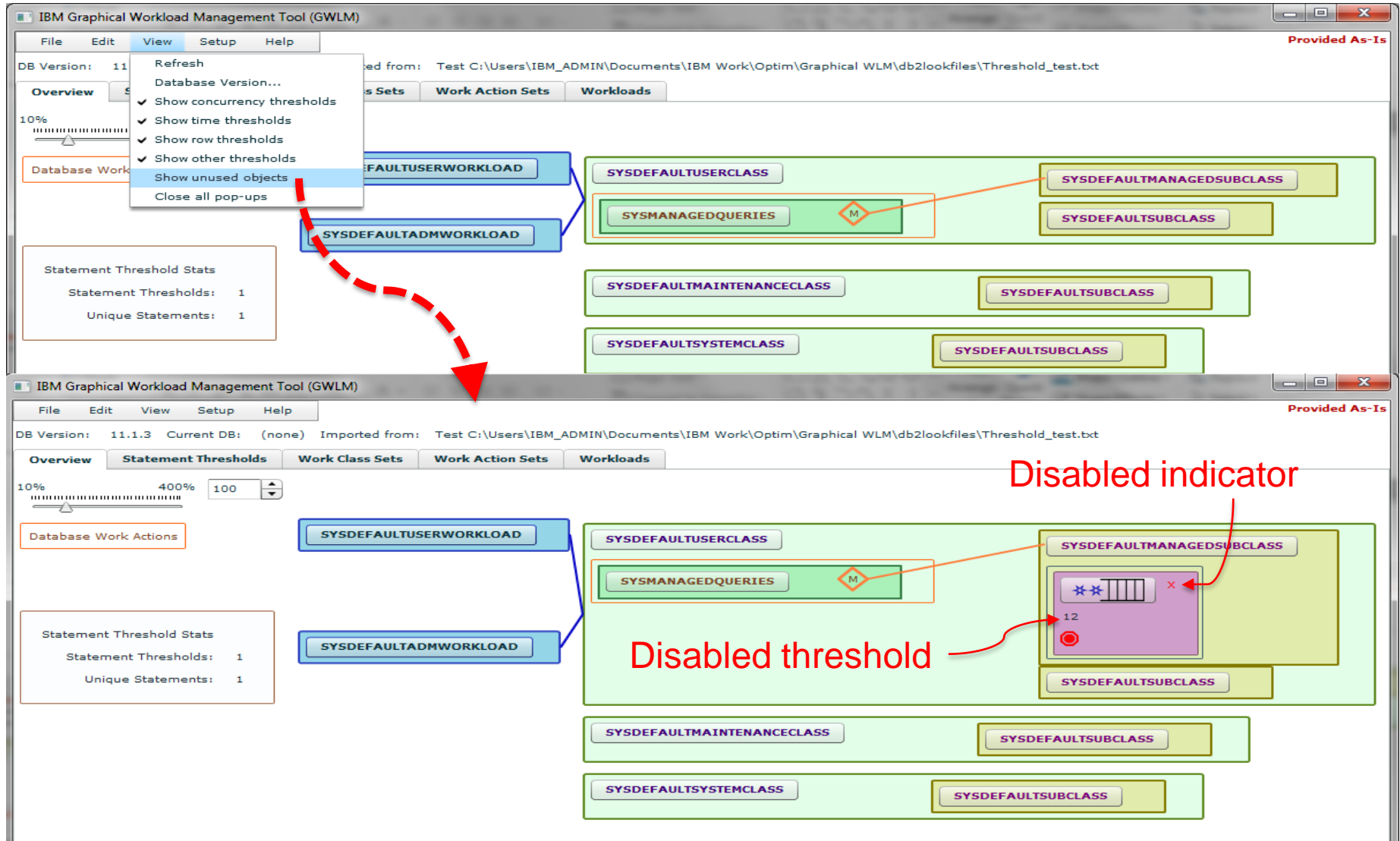
Evaluation position: 1

Number of work action sets referring to this work class: 1

Generating DDL



Unused objects

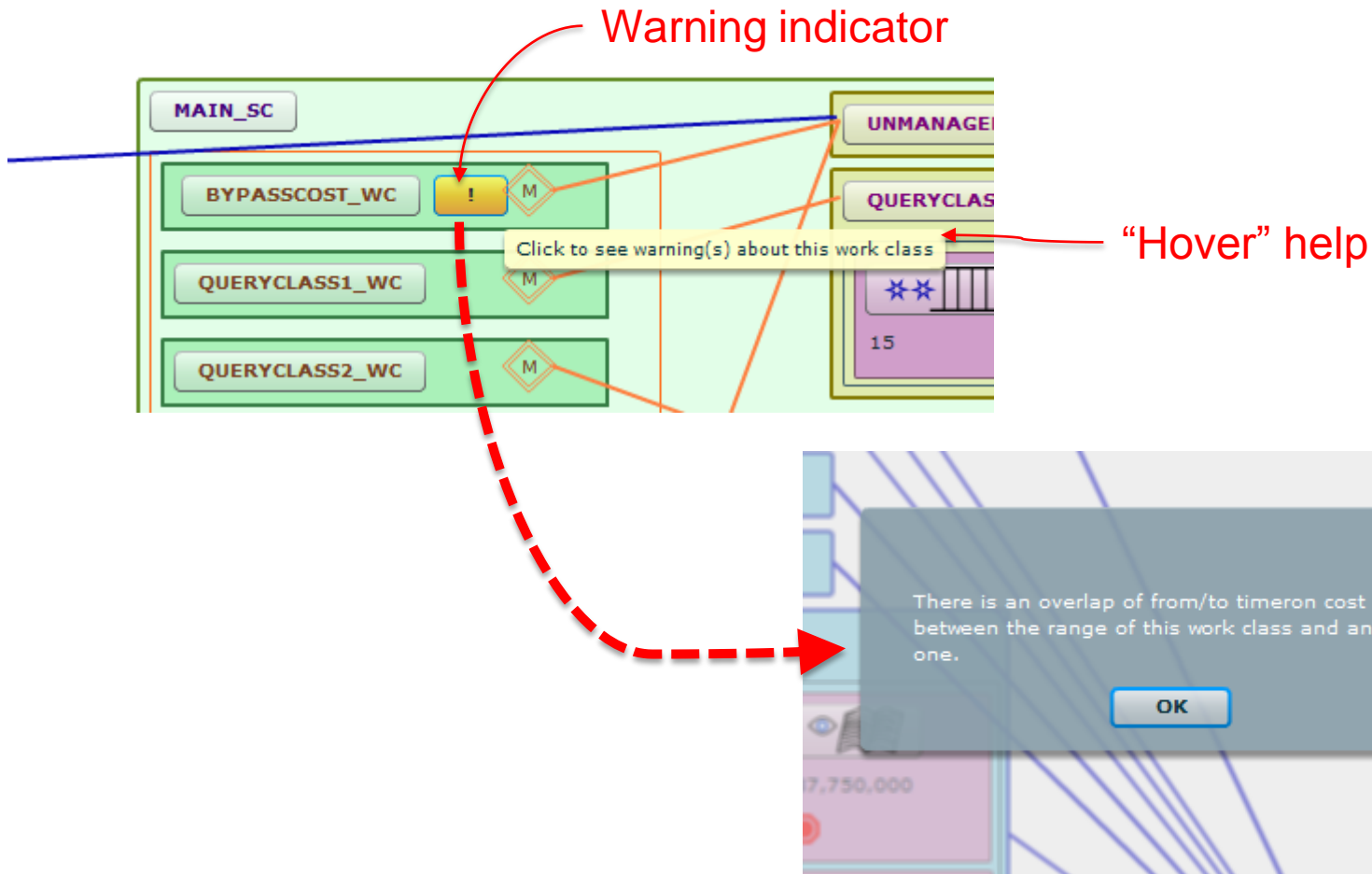


The image displays two screenshots of the IBM Graphical Workload Management Tool (GWLM) interface, illustrating the process of identifying and disabling unused objects.

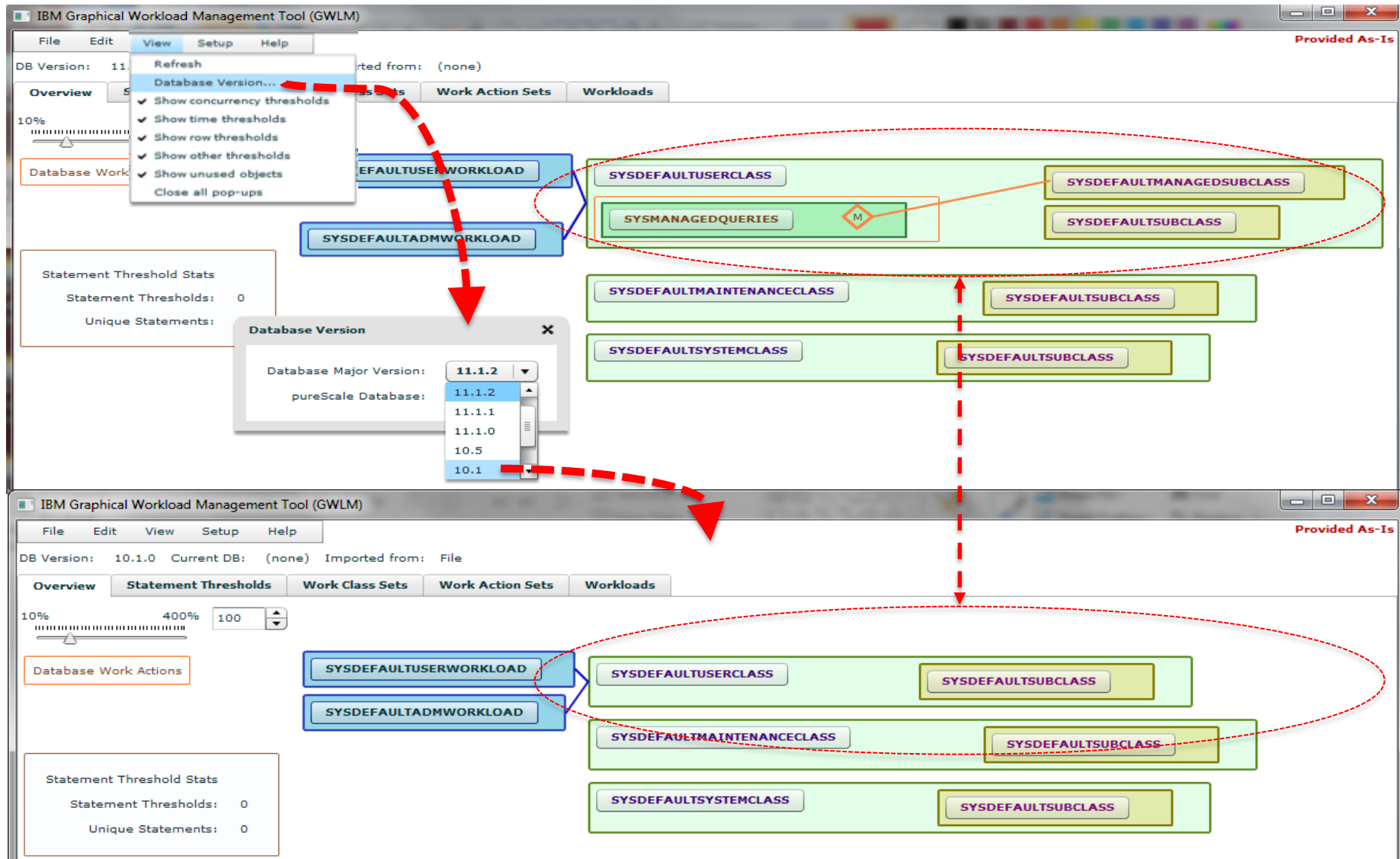
Top Screenshot: The "View" menu is open, showing options like "Refresh", "Database Version...", "Show concurrency thresholds", "Show time thresholds", "Show row thresholds", "Show other thresholds", "Show unused objects", and "Close all pop-ups". The "Show unused objects" option is highlighted. The main workspace shows a hierarchy of objects: **SYSDEFAULTUSERWORKLOAD** and **SYSDEFAULTADMWORKLOAD** (blue boxes) are connected to **SYSDEFAULTUSERCLASS** and **SYSDEFAULTMAINTENANCECLASS** (green boxes). These classes are further divided into subclasses: **SYSDEFAULTMANAGEDSUBCLASS** and **SYSDEFAULTSUBCLASS** (yellow boxes). The **SYSDEFAULTMANAGEDSUBCLASS** contains **SYSMANAGEDQUERIES** (green box) and **SYSDEFAULTSUBCLASS** (yellow box). The **SYSDEFAULTSUBCLASS** contains **SYSDEFAULTSUBCLASS** (yellow box). A red dashed arrow points from the "Show unused objects" menu item to the bottom screenshot.

Bottom Screenshot: The "Statement Thresholds" tab is selected. The "Database Work Actions" section shows a "Database Work Actions" button. The "Statement Threshold Stats" section shows "Statement Thresholds: 1" and "Unique Statements: 1". The main workspace shows the same hierarchy of objects as the top screenshot. A red circle with an "X" is placed over the **SYSDEFAULTMANAGEDSUBCLASS** box, indicating it is disabled. A red arrow points from the text "Disabled indicator" to this red circle. Another red arrow points from the text "Disabled threshold" to the **SYSDEFAULTMANAGEDSUBCLASS** box.

Warnings



DB2 version support



The image displays two screenshots of the IBM Graphical Workload Management Tool (GWLM) interface, illustrating the process of updating the database version and its impact on workload classes.

Top Screenshot:

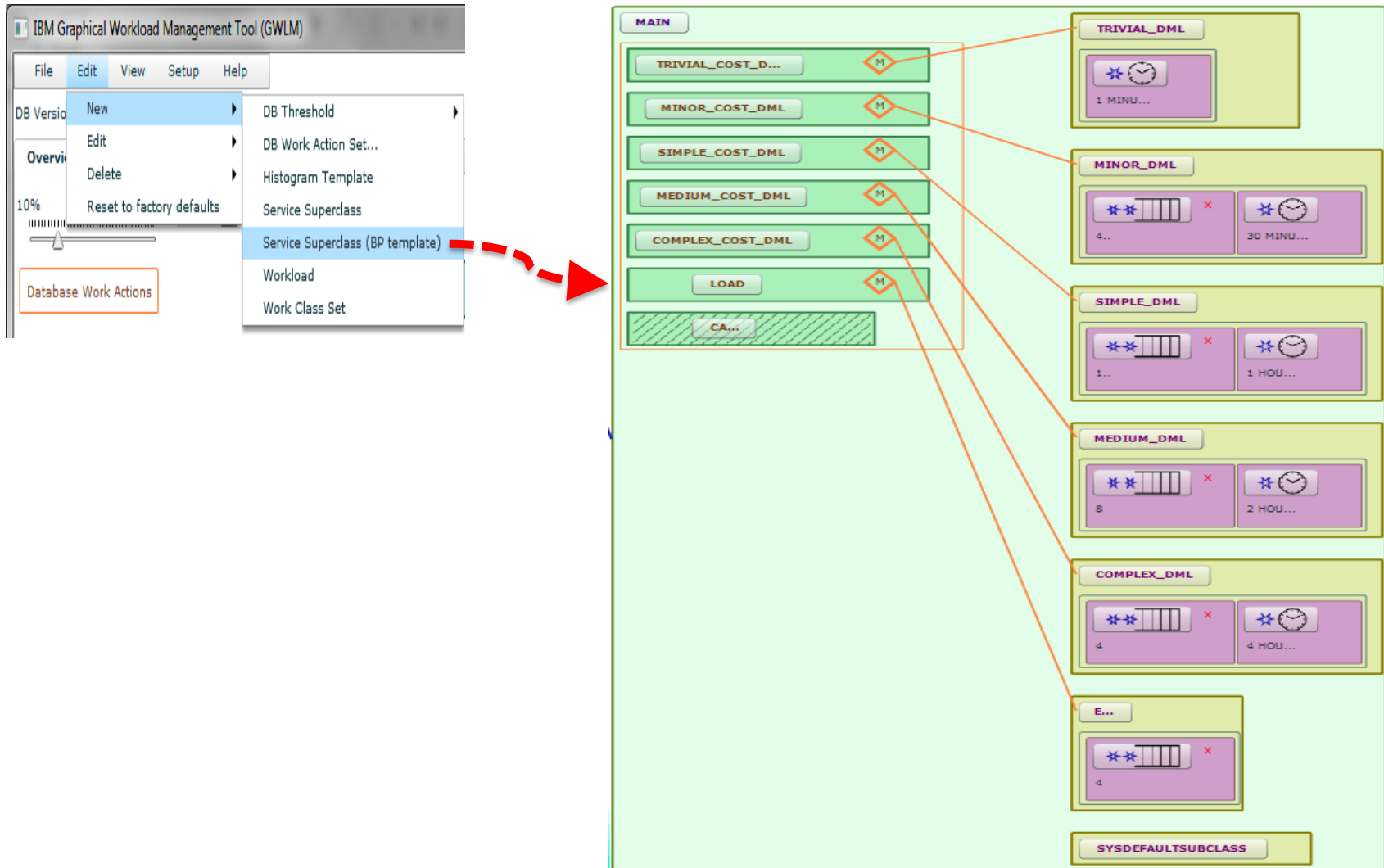
- The **DB Version** is 11.1.2.
- The **View** menu is open, showing options like **Refresh**, **Database Version...**, **Show concurrency thresholds**, **Show time thresholds**, **Show row thresholds**, **Show other thresholds**, **Show unused objects**, and **Close all pop-ups**.
- The **Database Work** tab is selected.
- The **Statement Threshold Stats** section shows **Statement Thresholds: 0** and **Unique Statements:**.
- The **Workload** section shows **SYSDEFAULTUSERWORKLOAD** and **SYSDEFAULTADMWORKLOAD**.
- The **Workload Class** section shows **SYSDEFAULTUSERCLASS**, **SYSDEFAULTMAINTENANCECLASS**, and **SYSDEFAULTSYSTEMCLASS**.
- The **Workload Subclass** section shows **SYSDEFAULTMANAGEDSUBCLASS**, **SYSDEFAULTSUBCLASS**, and **SYSDEFAULTSUBCLASS**.

Bottom Screenshot:

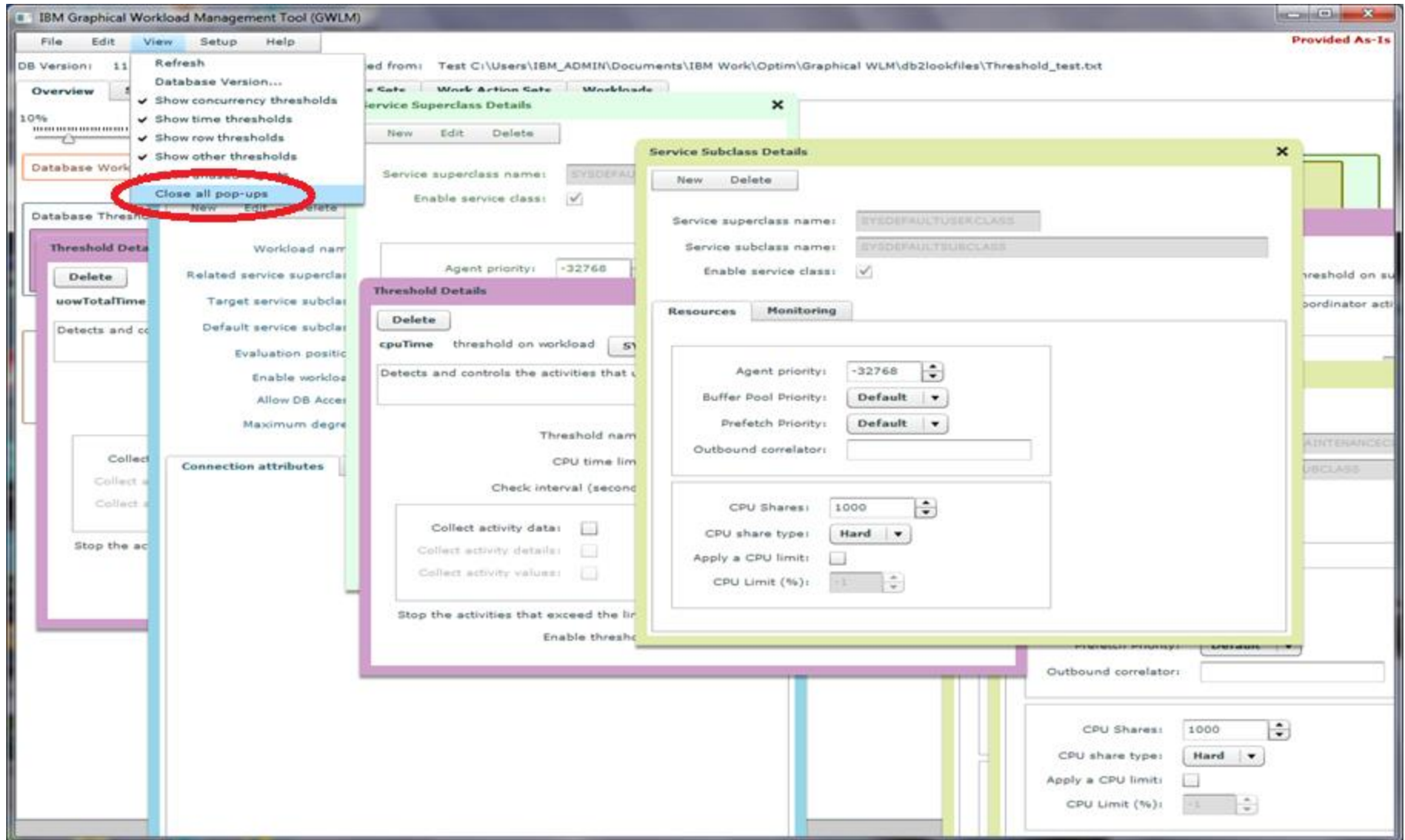
- The **DB Version** is updated to 10.1.0.
- The **Current DB** is (none).
- The **Imported from** is File.
- The **Statement Threshold Stats** section shows **Statement Thresholds: 0** and **Unique Statements: 0**.
- The **Workload** section shows **SYSDEFAULTUSERWORKLOAD** and **SYSDEFAULTADMWORKLOAD**.
- The **Workload Class** section shows **SYSDEFAULTUSERCLASS**, **SYSDEFAULTMAINTENANCECLASS**, and **SYSDEFAULTSYSTEMCLASS**.
- The **Workload Subclass** section shows **SYSDEFAULTSUBCLASS** and **SYSDEFAULTSUBCLASS**.

Red dashed arrows indicate the flow of the update process: from the **Database Version...** menu option to the **Database Version** dialog box, and then to the updated **DB Version** field. Another red dashed arrow points from the **SYSDEFAULTMANAGEDSUBCLASS** box in the top screenshot to the **SYSDEFAULTSUBCLASS** box in the bottom screenshot, indicating a change in the workload subclass configuration.

Service class: Best practices template



“Close all pop-ups”



Known limitations

▪ **Print and Generate PDF options are fairly crude**

- The print capability is limited to the currently displayed screen
 - The Generate PDF option produce a series of vertical screen images and does not compensate for configurations that exceed the display screen horizontally
- To minimize the impact of these limitations, you can reduce the size of the displayed image using the zoom slider

▪ **Functional limitations**

- Comments for any workload objects are not shown and cannot be added.
- Workload usage privileges are not modeled
- Support for statement thresholds is limited:
 - No ability to modify statement text
 - No ability to create new statement text thresholds
 - No support for generation of delta DDL

▪ **Display limitations**

- Disabled or unused work action sets are not hidden.
- A few other minor anomalies



To give GWLM a try !!



Questions?

