Tired of trying to figure out your workload management configuration from dense db2look output? Having trouble making even simple changes to your system without mistakes? Unable to remember all the DDL options available? Come learn about the free IBM Graphical Workload Manager (GWLM) tool that helps to unfold and make clear the mysteries of Db2 workload management in a simple, visual manner!

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Objectives

- Learn about what GWLM is and how you can get it
- See how GWLM transforms even complex db2look output into human-comprehensible diagrams
- Use GWLM to explore the different parts and options of Db2 workload management
- Learn how to use GWLM to generate DDL for both new and modified configurations

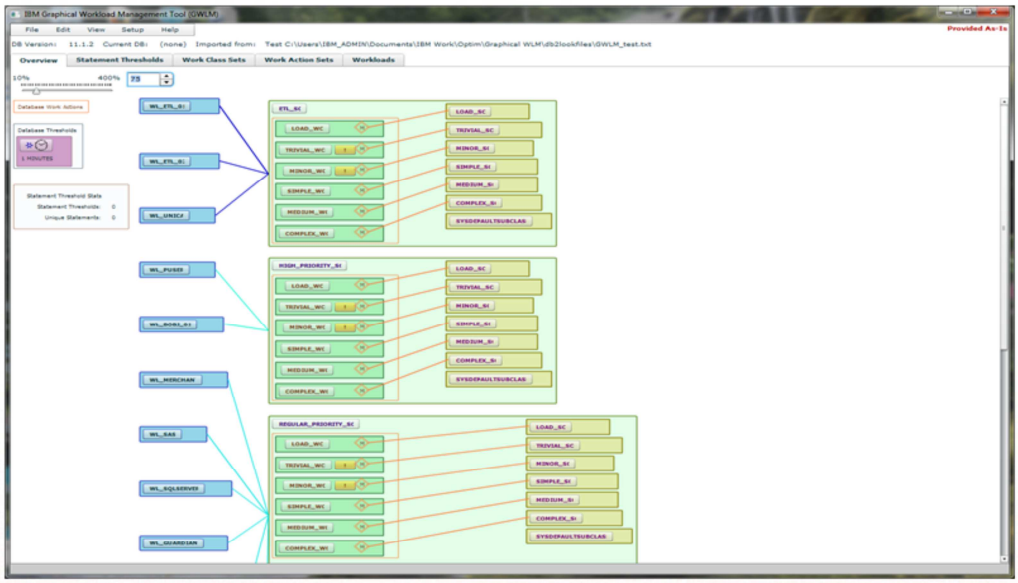
Motivation

- In order to properly tune and manage a Db2 workload management configuration, you must understand it
  - You can't change a configuration you don't understand, especially if it is in production!
- Understanding WLM means clearly knowing what has been defined, what is active, and how work will flow through the system
- The tool commonly used to look at WLM is db2look
  - i.e. "db2look –d <dbname> –wlm"

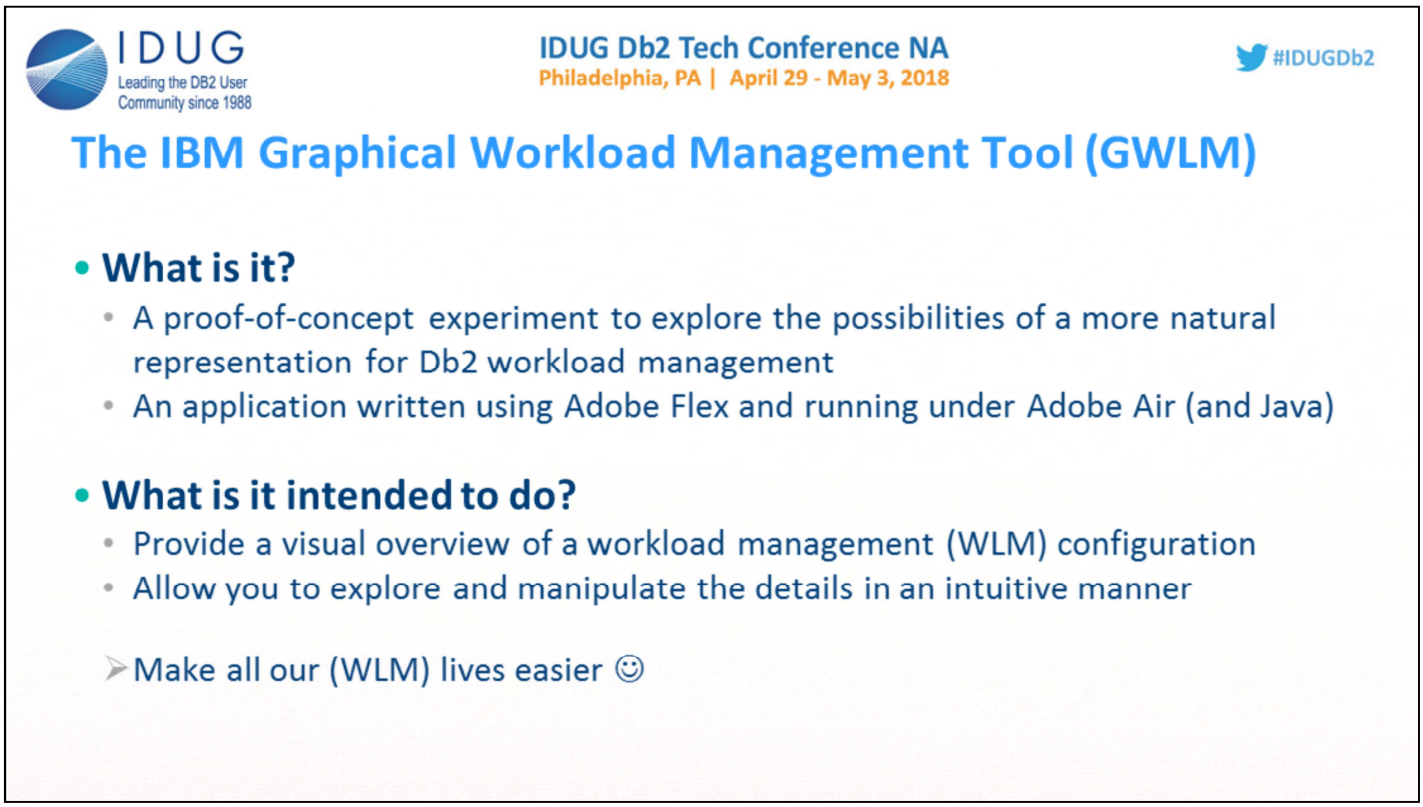
Deciphering db2look output can be difficult…

db2look output is not easy to understand especially for complex configurations!

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



The IBM Graphical Workload Management tool (aka GWLM) helps translate oodles of db2look output into clear, graphical images that you can quickly comprehend and easily explore in depth.



GWLM was created as an exercise to explore better ways to represent a Db2 WLM configuration in a GUI tool.

GWM is intended to display WLM in a way that shows you show at a glance how work is categorized and controlled and also allow you to explore and manipulate that configuration in a natural, intuitive manner.

The practical motivation was to make it easier for people who have to review and tune WLM configurations by speeding up one of the most painful parts of the process: understanding the current configuration.

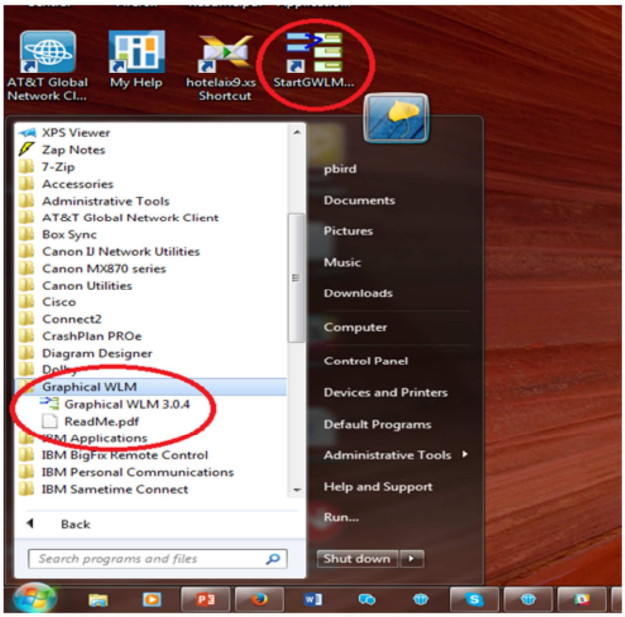
Problems with GWLM can be reported to me with fixes, if any, being on a best-efforts basis when my “day job” permits….

Installing GWLM

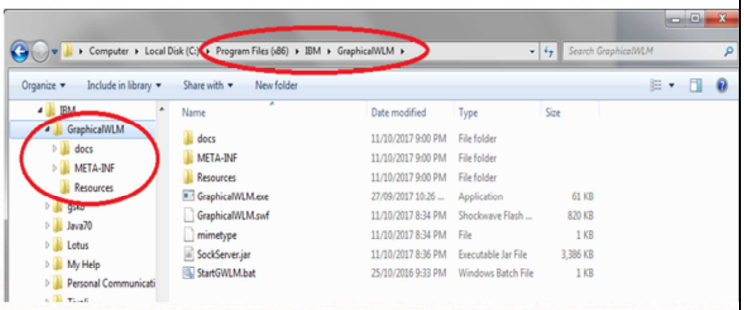
- **Prerequisite**
  - GWLM runs under the Adobe Air infrastructure so you will need to download and install Adobe Air in order to use this tool (http://get.adobe.com/air/)

- **Steps to install GWLM**
  1. Download latest GWLM zip file from community (@6 MB)
  2. Unzip the file
  3. Double-click on the windows installation file (GWLM-Install.msi)

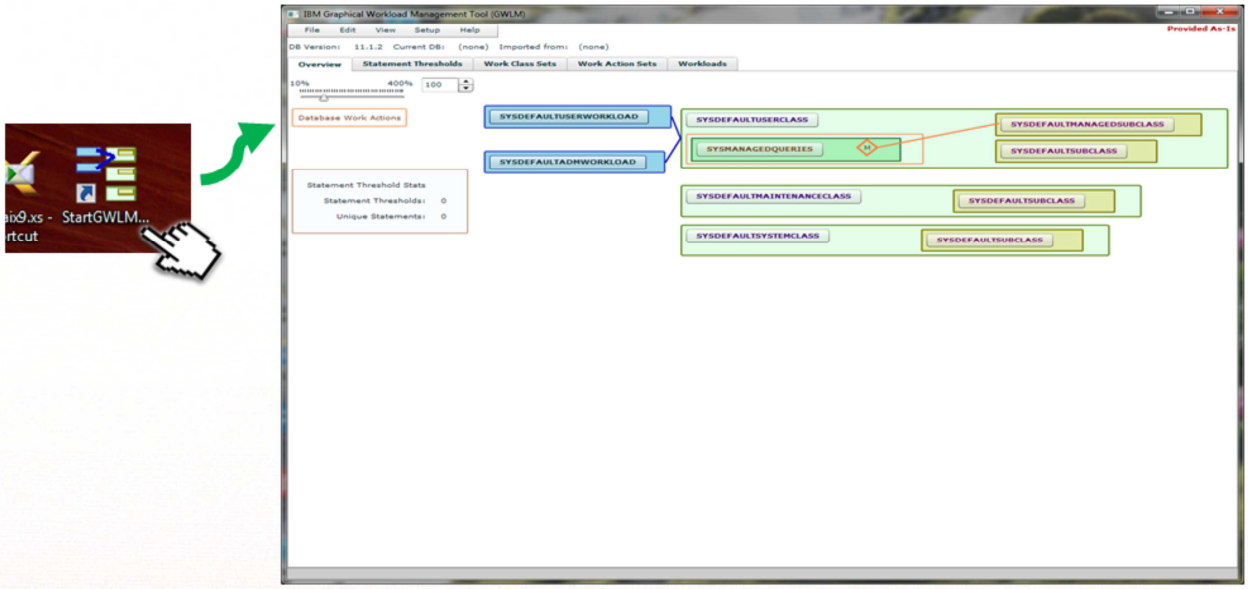
Installing GWLM will put an icon on your desktop



- Icon created on your desktop
- Graphical WLM added to your list of programs



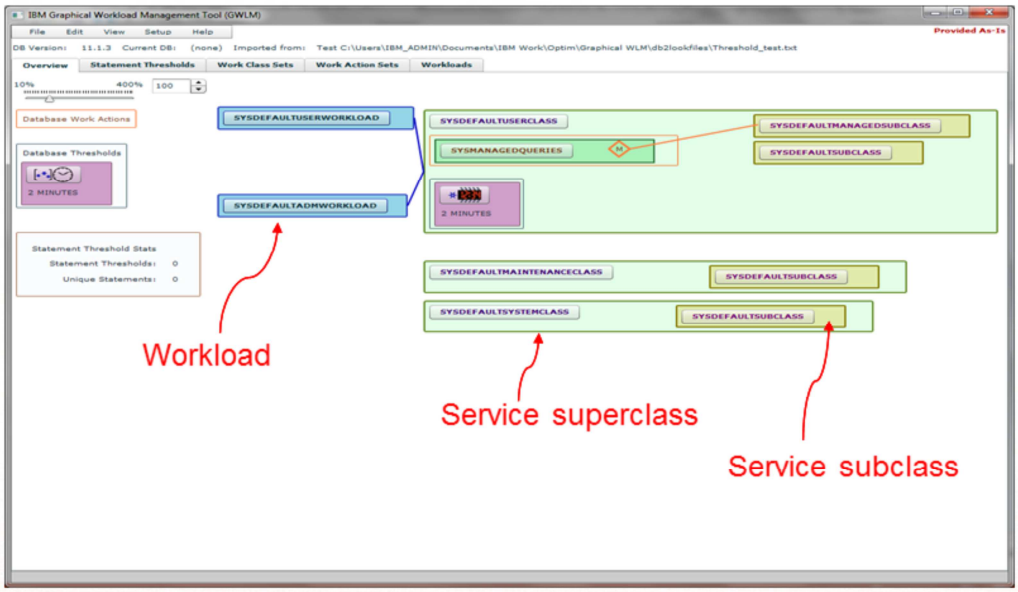
Invoking GWLM



To invoke GWLM, just click on the icon and the main screen will come up showing the current default Db2 configuration (i.e. the one first introduced in Db2 10.5). This screen is the anchor screen for GWLM and it is from here that you will explore and manipulate the configuration.

The next few slides take you through the key features of this screen.

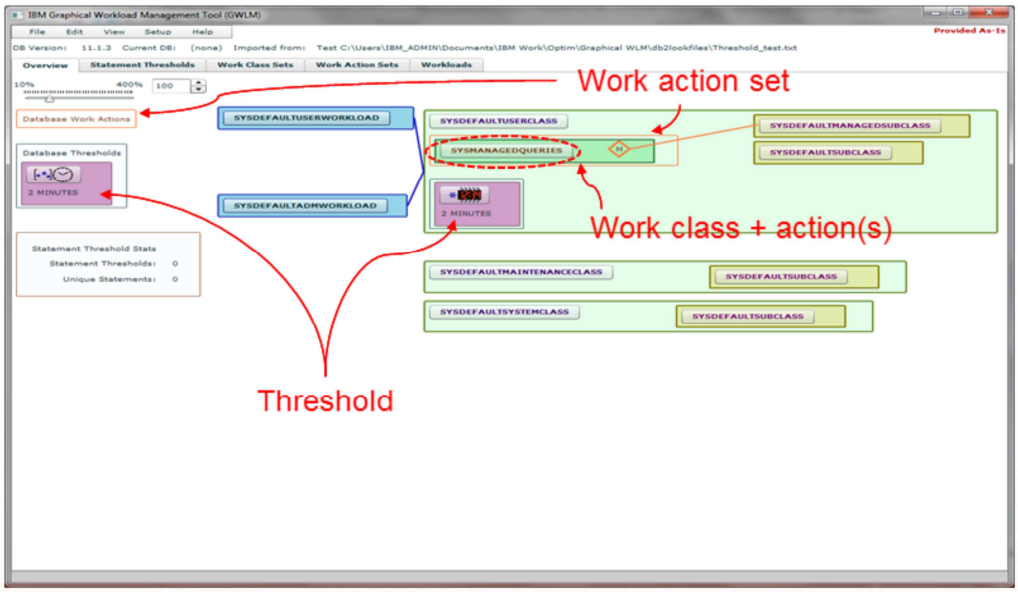
Overview screen



The first thing to learn is how the key WLM entities are represented. The flow of work is from left to right with the workload definitions represented by blue rectangles, the service superclasses represented by light green rectangles and the service subclasses represented by the darker green rectangles within the superclasses. You will see a connecting line from the workload directly to the service class associated with it in the workload definition.

For each of these, the defined name of the entity is shown within the object.

Overview screen (2)



Work action sets, if they exist, are shown using an orange outline within the object on which the work action set is defined.

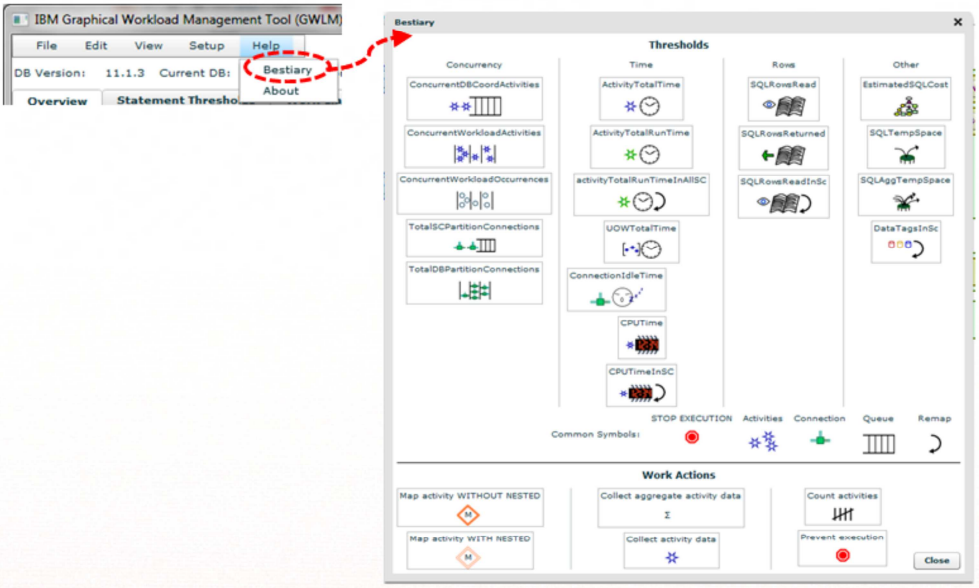
Here, we have an empty database work action set and a service superclass work action set defined in the SYSDEFAULTUSERCLASS service superclass. There are no workload work action sets in this configuration.

Within the work action set, each unique work class used by the work action set is shown as a dark green rectangle within the orange outline along with the name of the work action. Yes, I said work class name not work action name… this is to allow multiple actions defined on the same work class to be represented simply.

Each action defined on the class is down by a an icon or symbol within the work class object area. In this example, we have a work action which maps incoming work, including nested activities, to a specific service subclass, so you will see M within an orange diamond and a line to the subclass where the mapped work goes.

Thresholds are shown as purple rectangles within the entity on which they are defined along with an icon representing the type of threshold and the actual threshold value. In this case, we have a database threshold on UOWTotalTime for 2 minutes and a CPUTime for 2 minutes defined on the SYSDEFAULTUSERCLASS super service class.

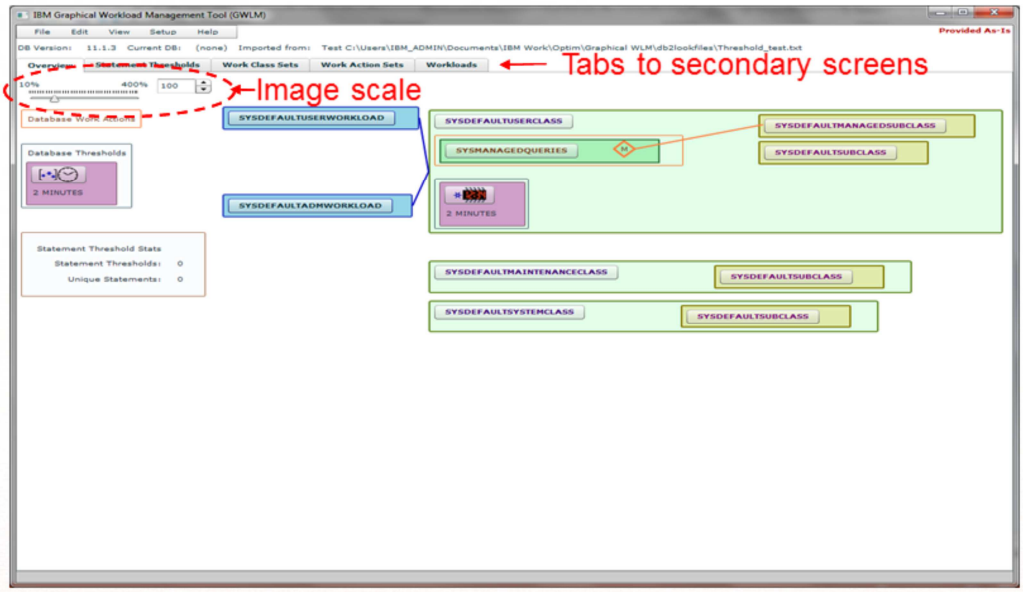
Help in figuring out the different icons & symbols



Don't worry, you don't have to memorize all the symbols and icons! If you click on the Bestiary option under the Help menu, you will see a handy display of what each represents.

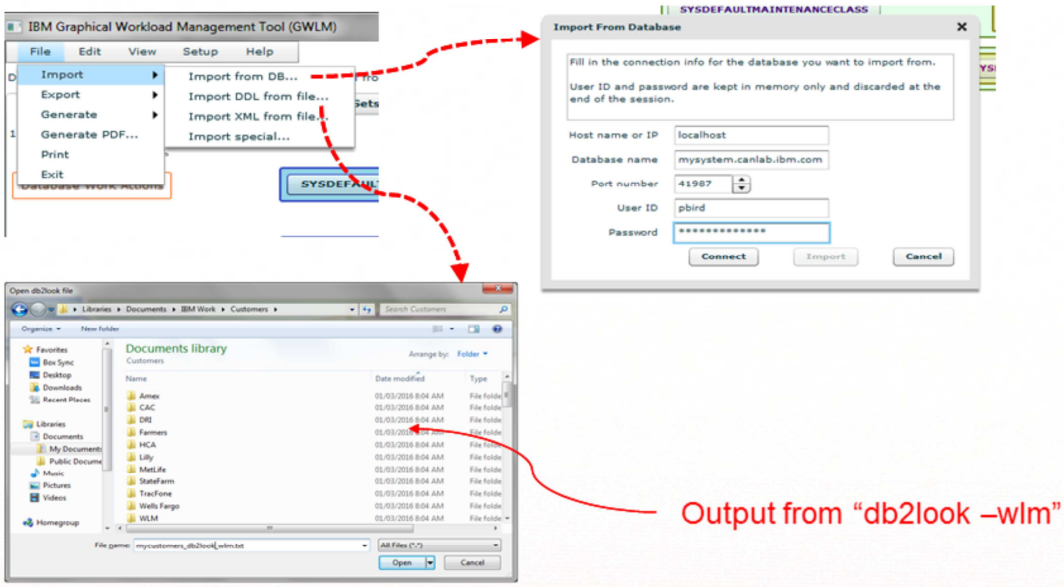
There are icons for threshold type shown in the top half and as well as ones for all the possible work actions that can be defined.

Overview screen (3)



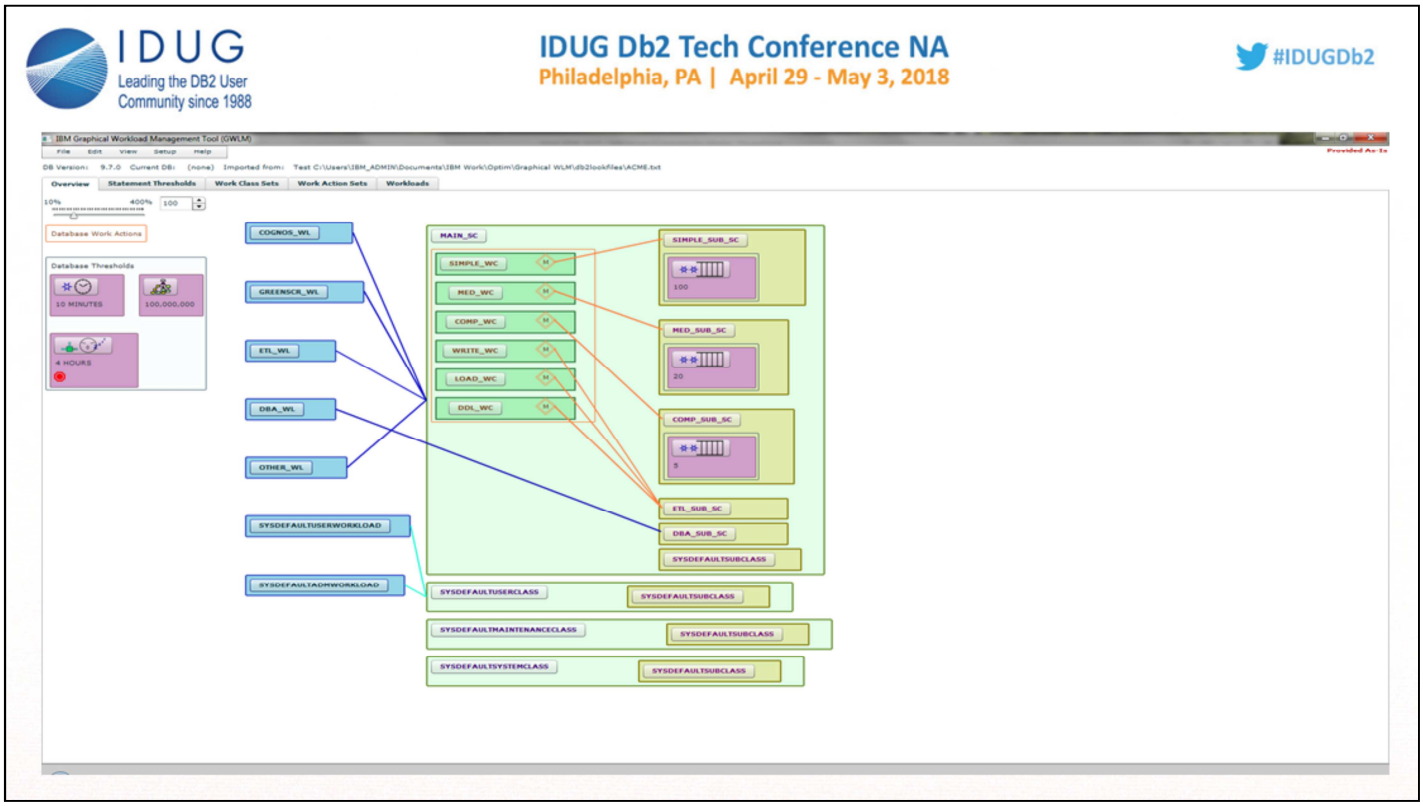
The final two features I want to show you on this main screen are the slider bar that can be used to scale the image up or down to help you explore extremely complex configurations and the series of tabs at the top that allow you to access some secondary screens which are useful for specific actions that I will talk about later.

Getting Started!



Let's get on to the good stuff! Now that you have installed GWLM, you probably want to bring in an existing WLM configuration to try out the tool. GWLM provides two ways to bring in a configuration: you can have GWLM connect directly to a database and bring it in or you can point GWLM to the output file from an execution of the "db2look –wlm".

Exploring a configuration



Here's an example of what you might see after importing in an existing configuration.

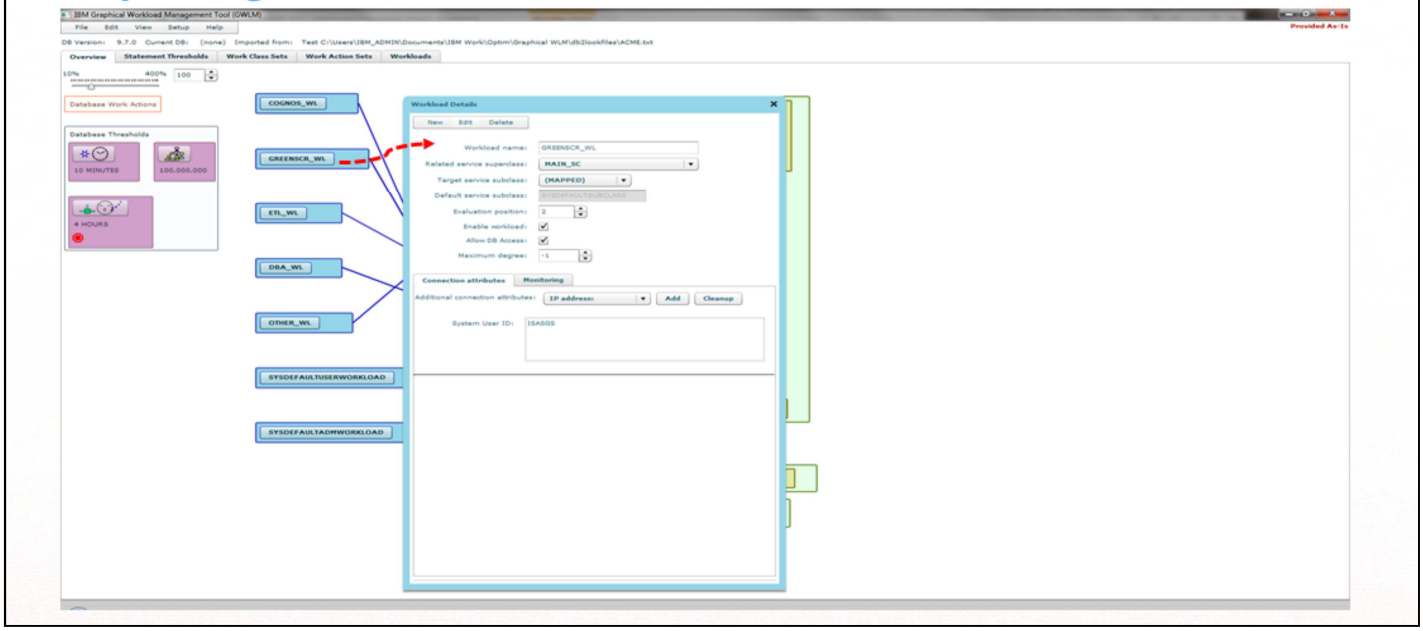
Right away, you can see a number of important things at a glance:

- what workloads are defined and where they direct incoming requests
- what work action sets exists and whether they redirect work coming to the service superclass to a specific subclass
- what thresholds are defined and where

Very quickly, you can understand what is in play and where you may want to focus your attention… but often the "devil is in the details" for WLM and you need to look at specific definition details.

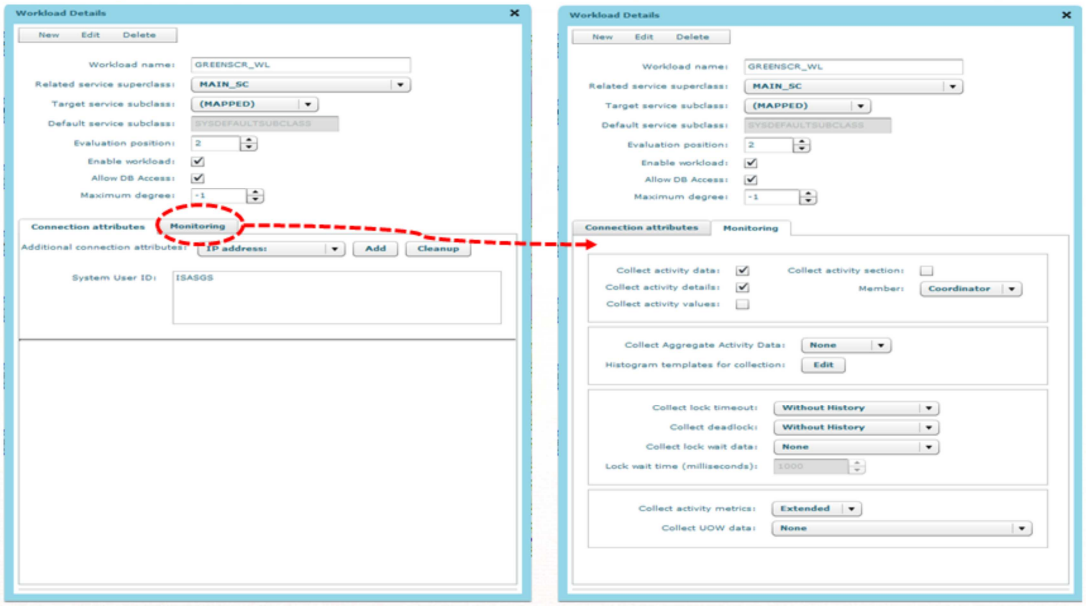
You can get those details by clicking on the name rectangle of any entity.

Exploring workload details



If we click on the name of a workload, the pop-up workload details object appears.

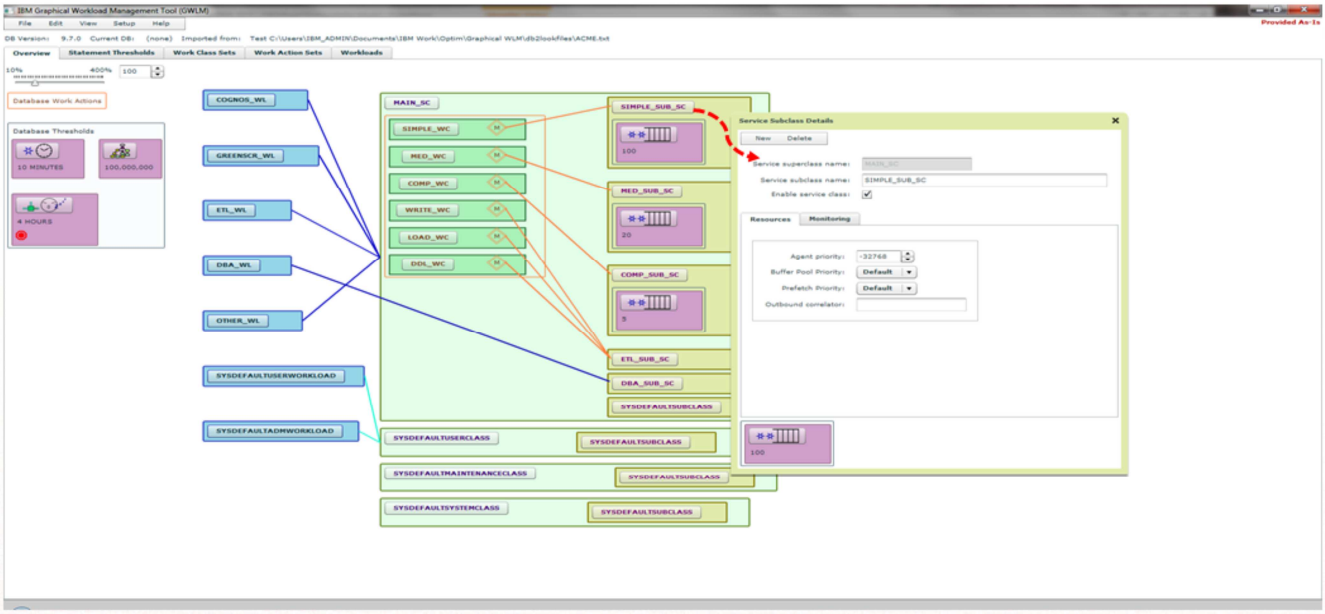
Exploring workload details (cont.)



The initial screen contains all the details about the workload definition and basic control options. You can find the other connection attributes in the drop down menu which chows “IP Address” in this example.

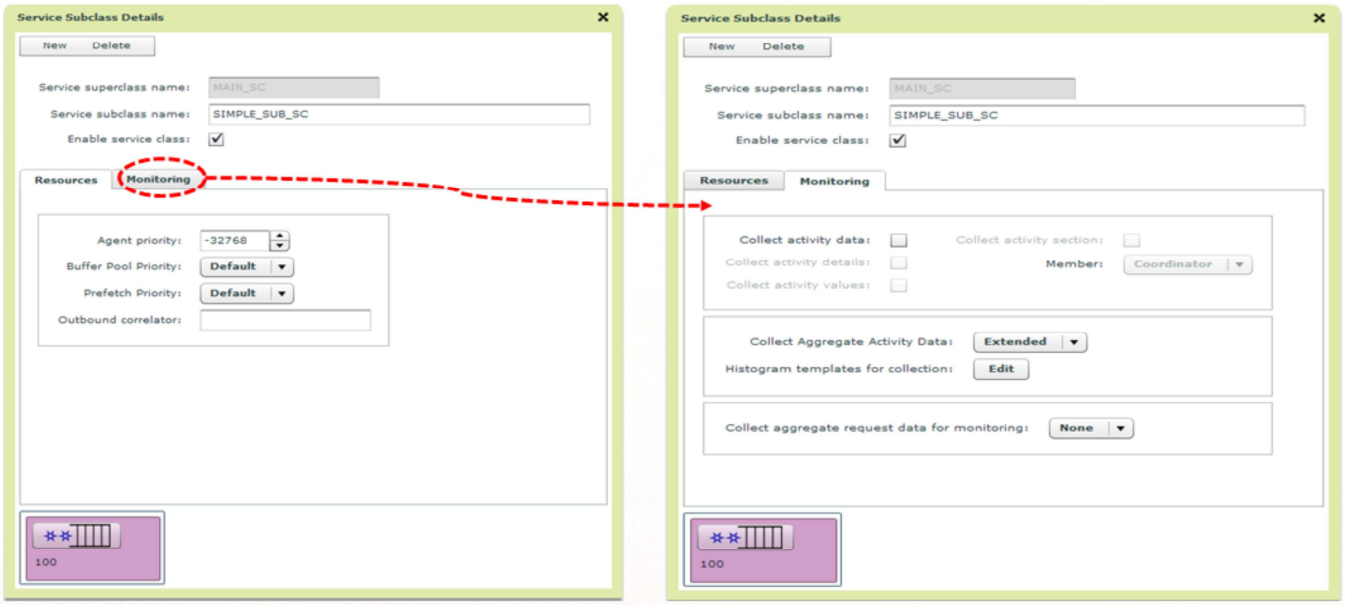
To see the monitoring controls for the workload, click on the Monitoring tab

Exploring service class details



If we click on the name of a service class, the pop-up service class details object appears.

Exploring service class details (cont.)

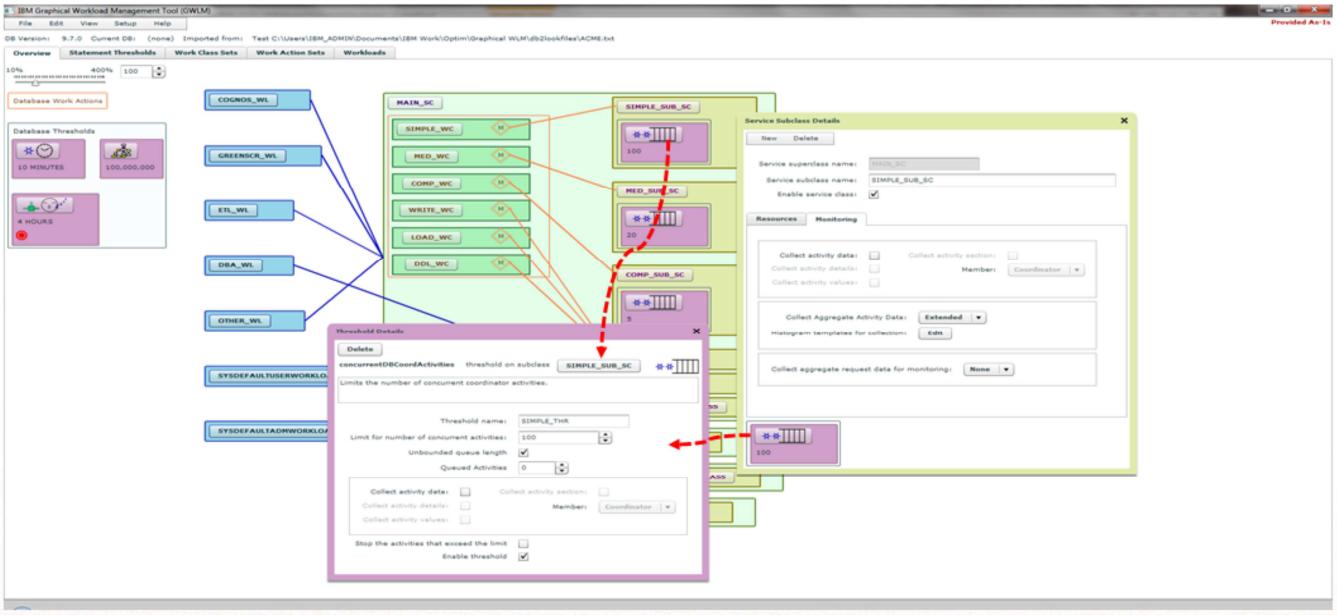


The initial screen shows the service class definition and resource controls.

To see the monitoring controls for the service class, click on the Monitoring tab

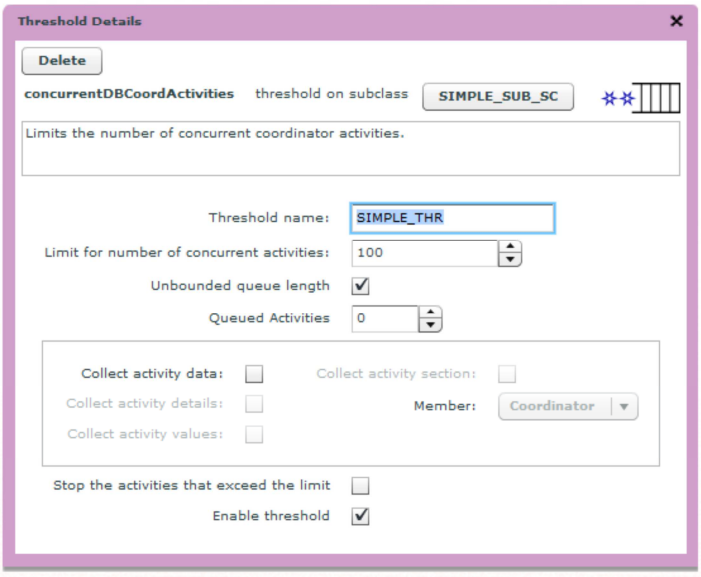
In this example, you can also see that the icon for any threshold defined on the service class appears at the bottom and this can be used for direct access to the threshold (in addition to the one shown on the main screen). This is true for workloads as well.

Exploring threshold details



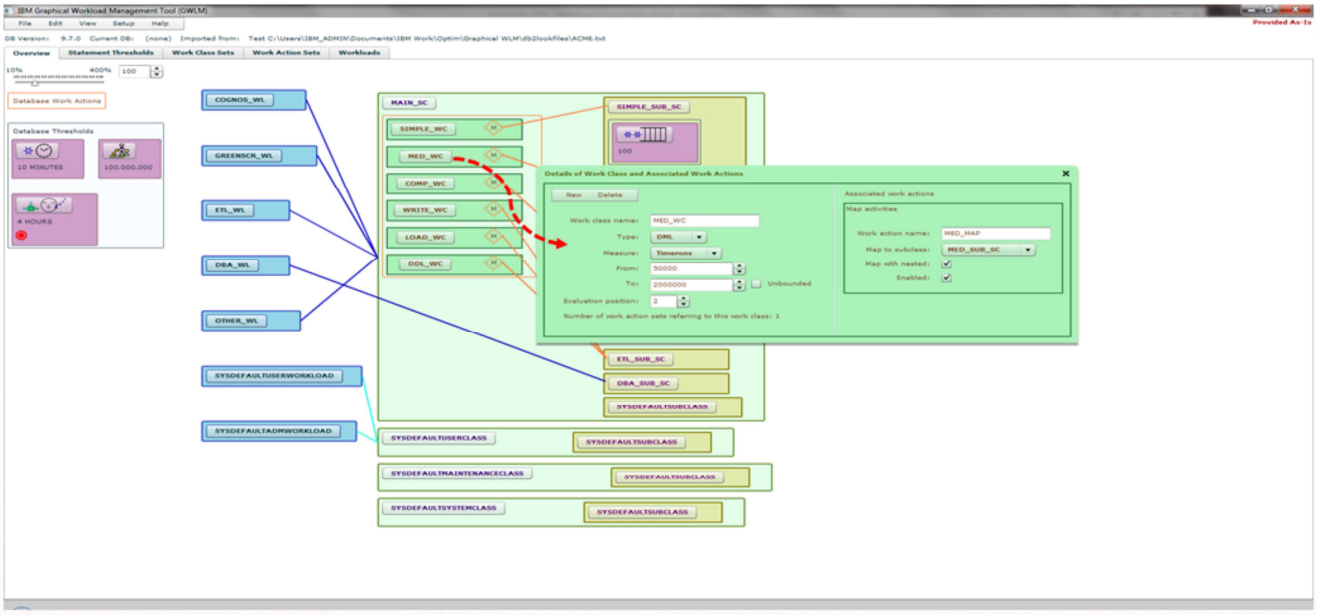
If we click on the name of a threshold, the pop-up threshold details object appears.

Exploring threshold details (cont.)



This is a bigger picture of the threshold details pop-up menu.

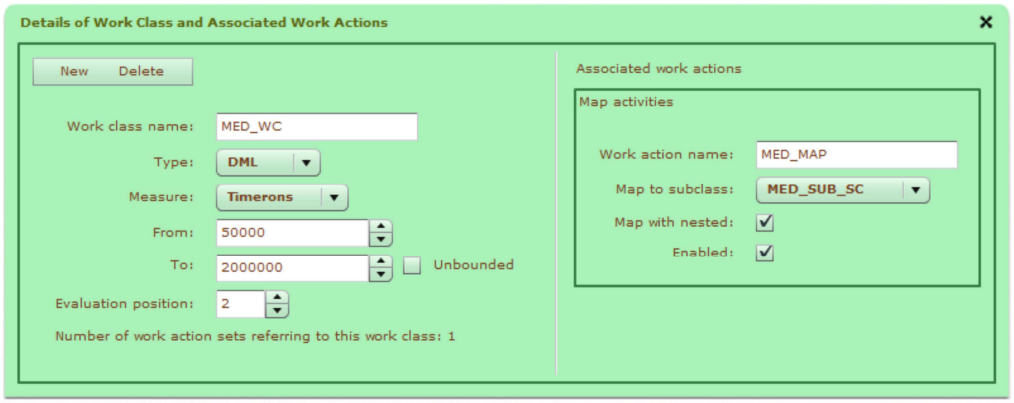
Exploring work action set details



A work action on the main screen shows the series of work classes for which actions have been defined and then has icons or symbols to represent the actions associated with that work class in this work action set.

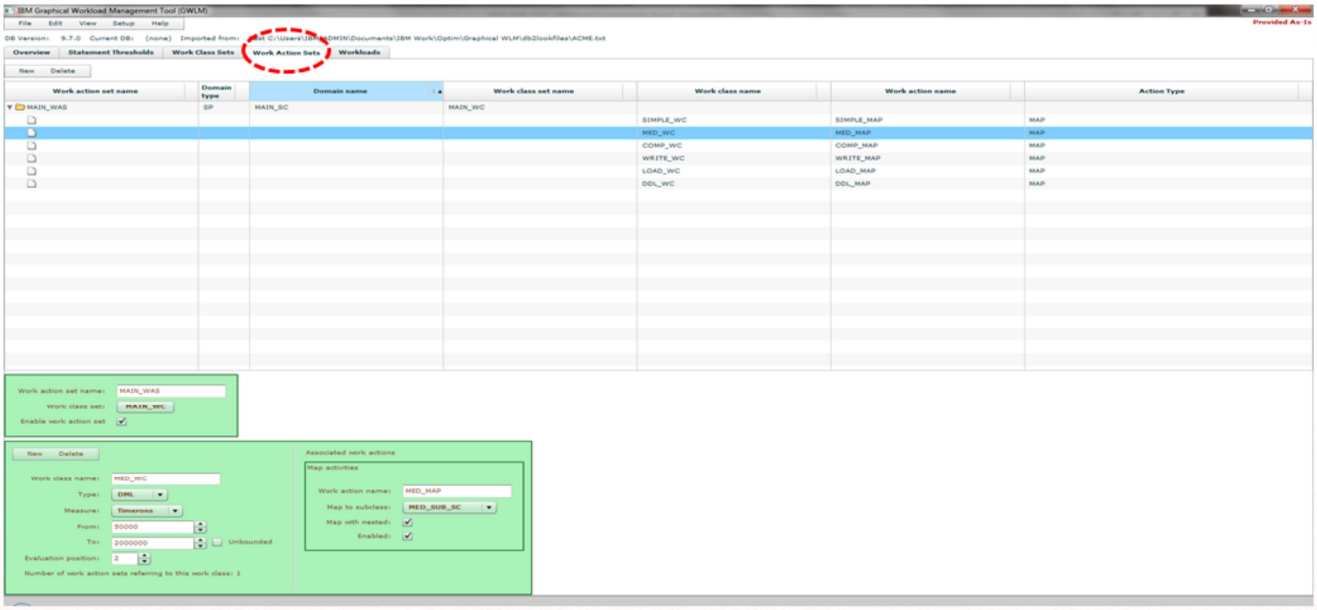
If we click on the name of a work class, the pop-up work action details object appears.

Exploring work action set details (cont.)



This is a bigger picture of the work action details pop-up menu. It has both the work class definition and, to the right , will be listed all the associated work actions (with their names!) as defined in the work action set. Each work action will be in its own dark green box.

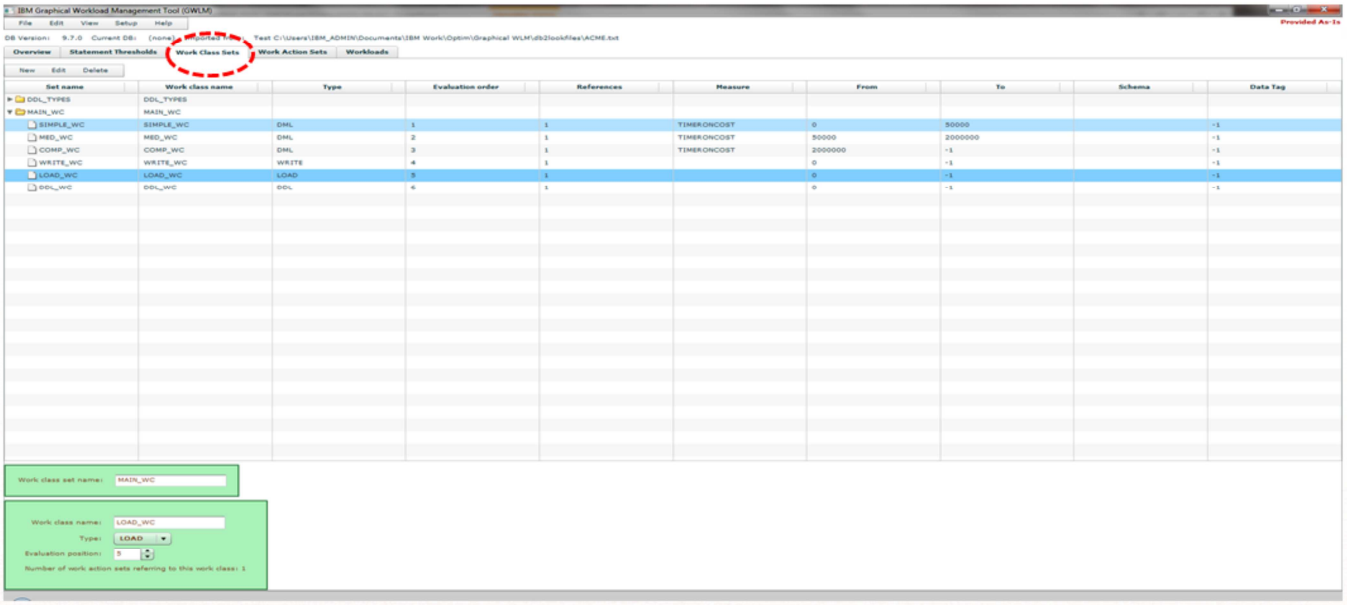
Exploring work action sets



If we want to look at the work action set as a whole, you can click on the work actions sets menu tab and you will be taken to this screen where you can view all the details for the work action set and its current work actions in one place.

The details for the current selected item of interest appear at the bottom.

Exploring work class sets

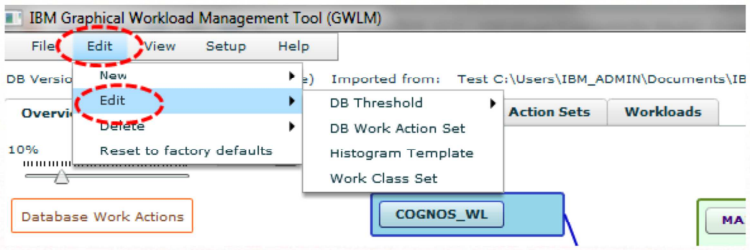


Similarly, you can do the same ting for work class sets using the work class set menu tab.

Modifying a configuration

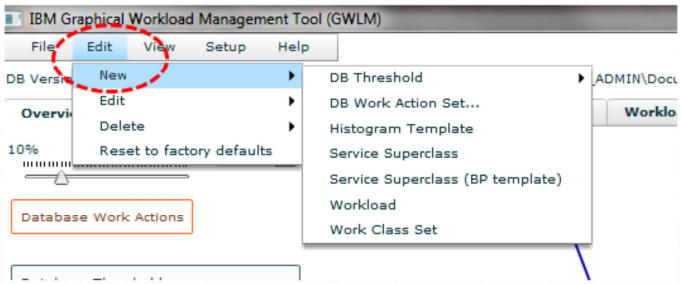
Making changes to existing objects

- **Changes can be made on any of the detailed pop-up menus that we just looked at… simply go ahead and modify them!**
  - Changes take place immediately
- **For database-level objects, you can also use the Edit option under the Edit menu**



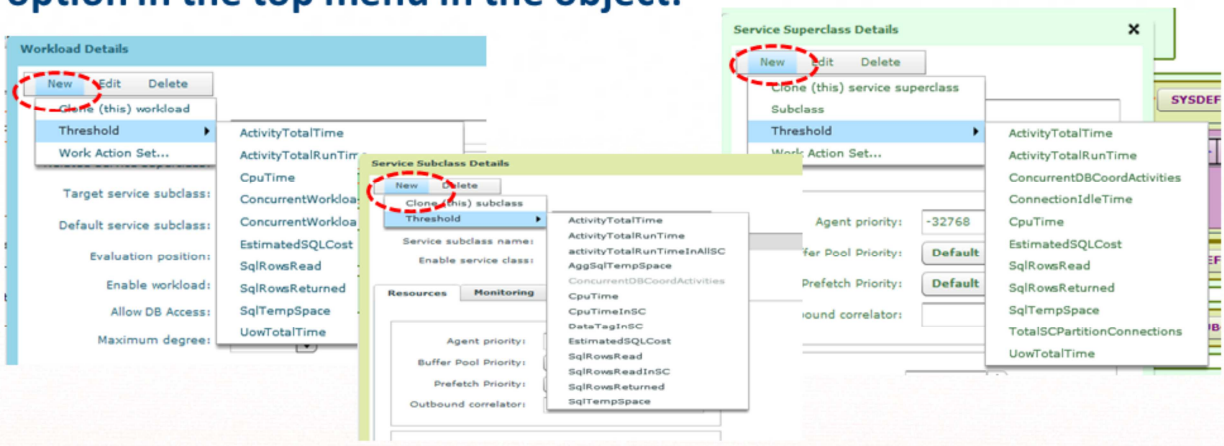
Adding new database objects

- New database level objects can be created using the New option under the Edit menu:

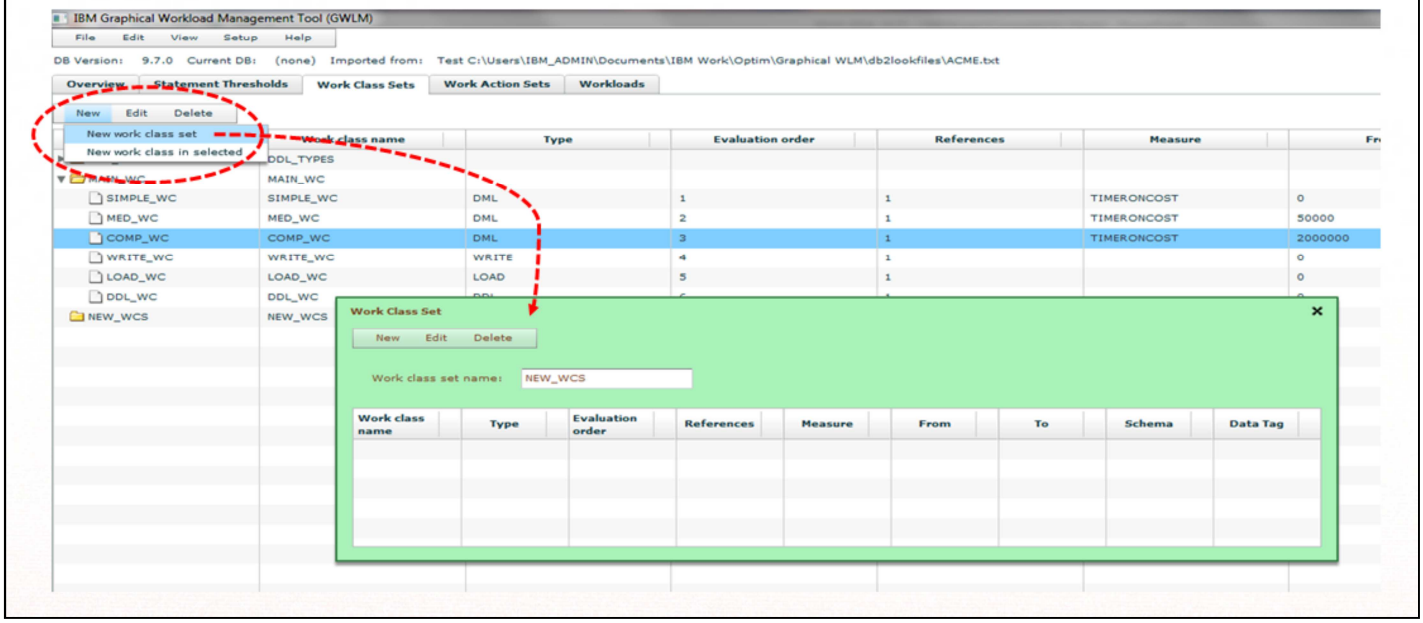


Adding new objects (workload and service class)

- To create new objects under other existing objects, choose the New option in the top menu in the object:

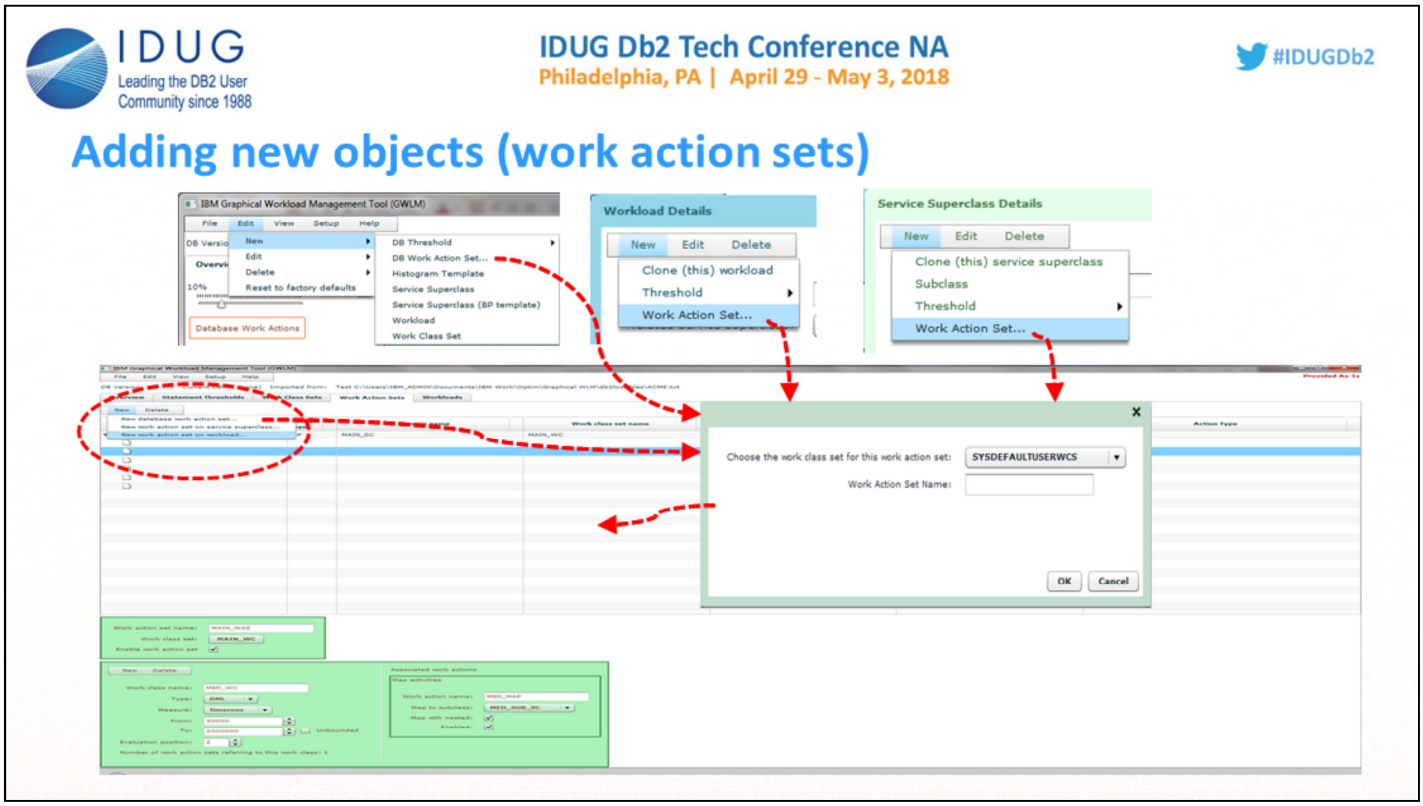


Adding new objects (work class sets and work classes)



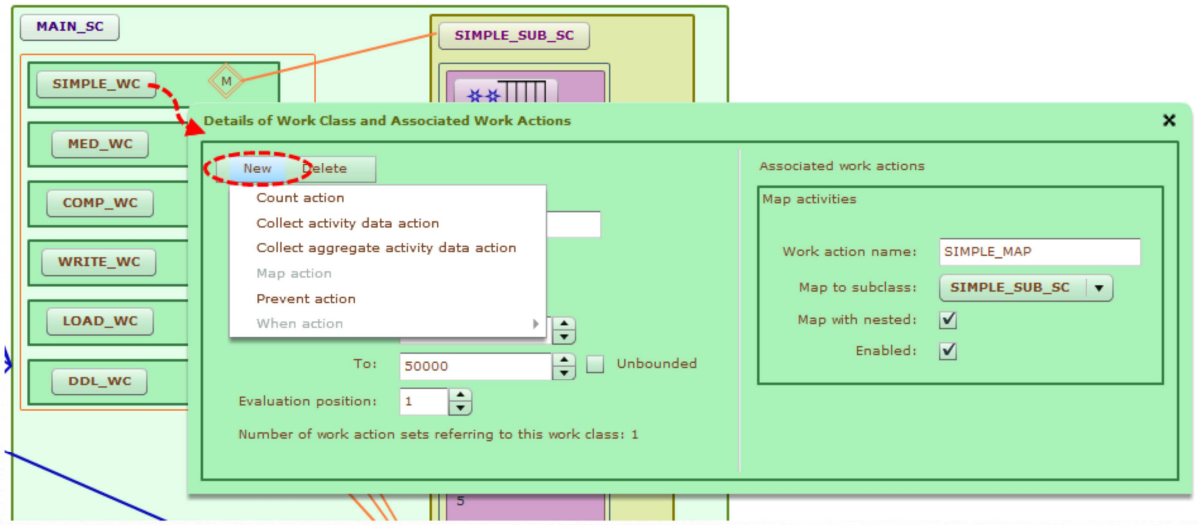
Work classes and work class sets can be modified or created on the associated menu screen. To create them, click on the New menu option and choosing what you want to do.

Adding new objects (work action sets)



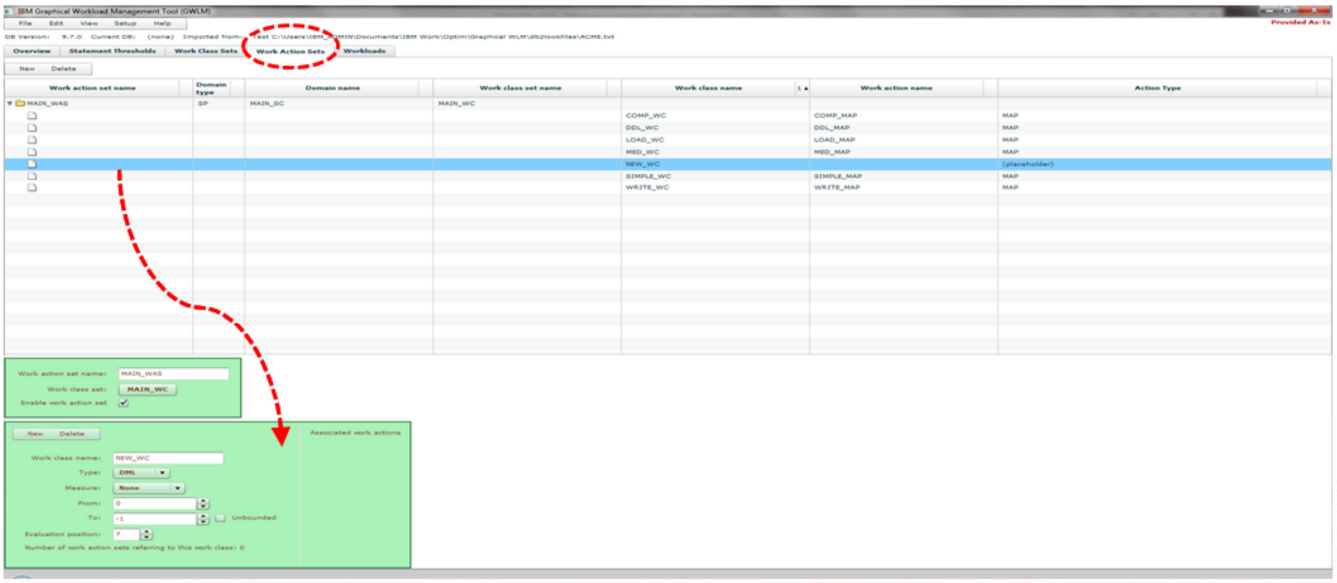
Work action sets can be added to all relevant objects (database, workload, service superclass) by using the New option in the object sub-menu or going to the Work Action Set menu screen and choosing the option you want there.

Adding new objects (new work action for old work class)



When there is an existing work action set which uses the work class to which you want to add the new work action, you can simply modify the existing work class from the main screen directly and add additional actions to it.

Adding new objects (new work action for new work class)

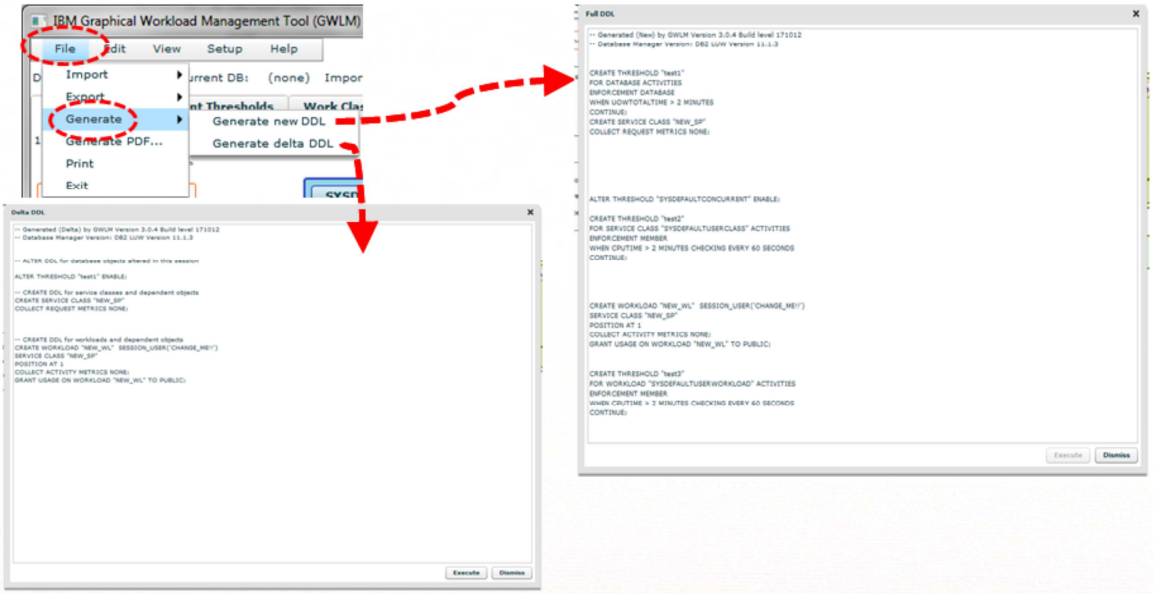


To add new work actions for work classes not currently being used in the set, go to the Work Action Set menu and select the work class you want to define the work action upon.

Removing objects

- **Just use the Delete option in the same menus where you found the New option**
  - You can delete contained objects or the object itself

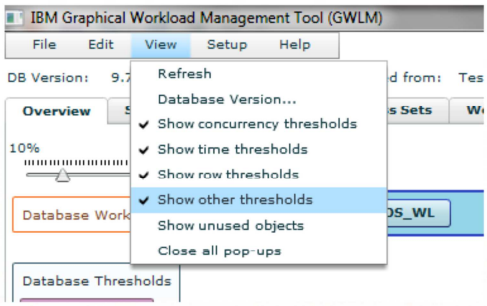
Generating DDL



Useful tidbits

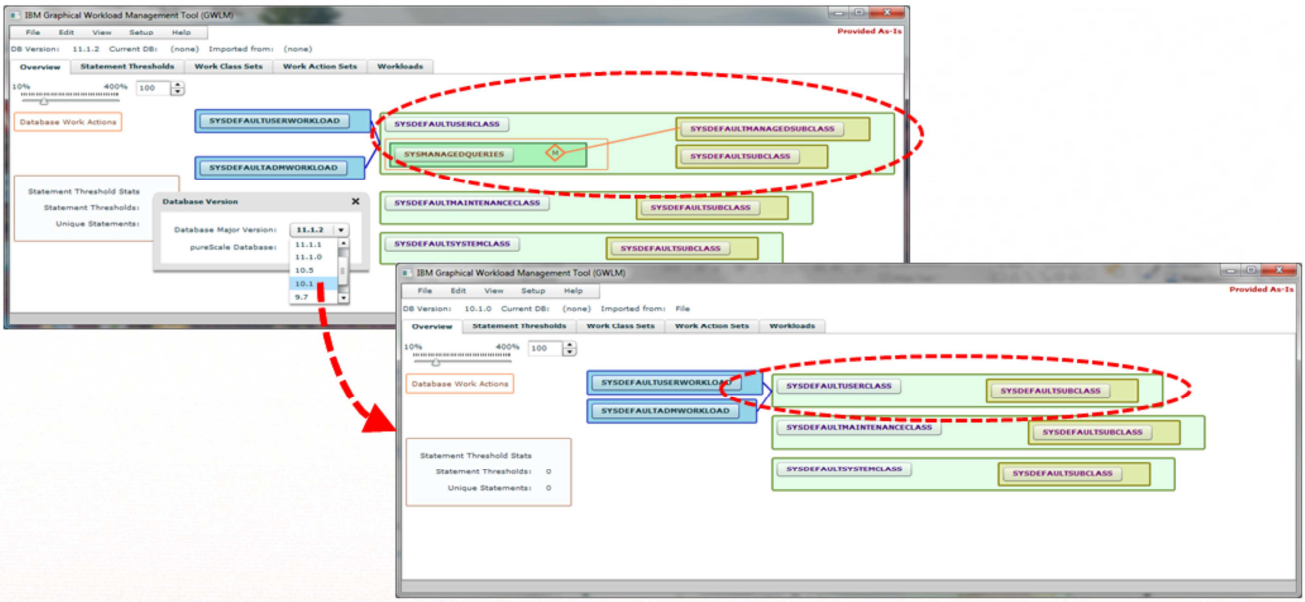
The View menu

- **This menu has many useful options !**



The View menu on the main screen has several useful options that you should know about…

View menu: Database version

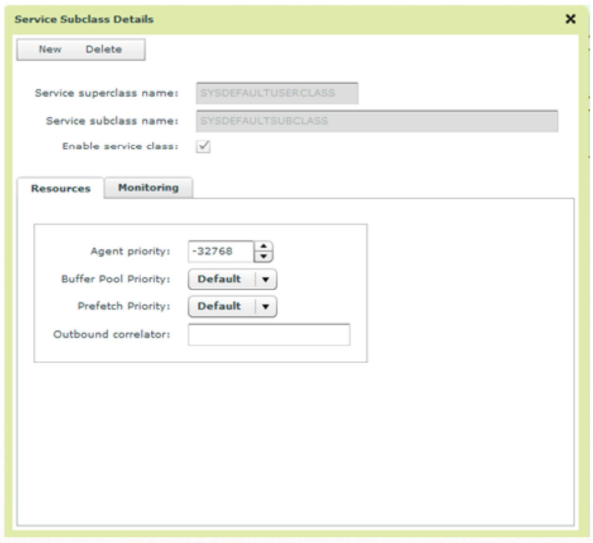


A quick point about something I said earlier. Db2 has changed its default configuration over the years and although GWLM by default will assume the most current default configuration, you can change that assumption by using the Database version option under the View menu. Similarly, GWLM will attempt to recognize the version of any imported configuration and properly reflect the default configuration for that version.

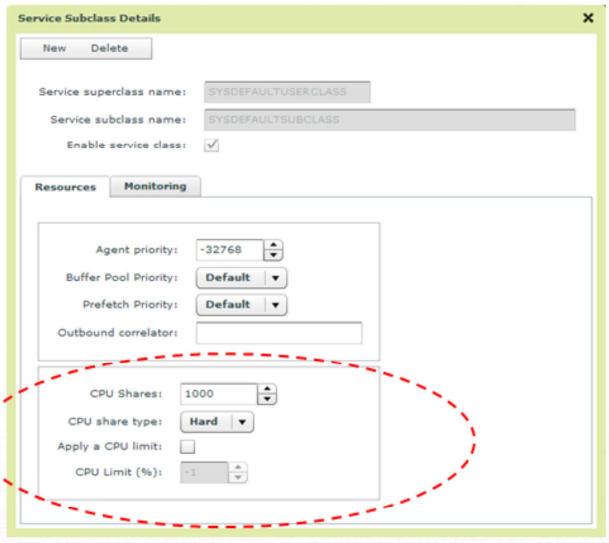
The example here shows how the two default configurations are different.

Version-sensitive context

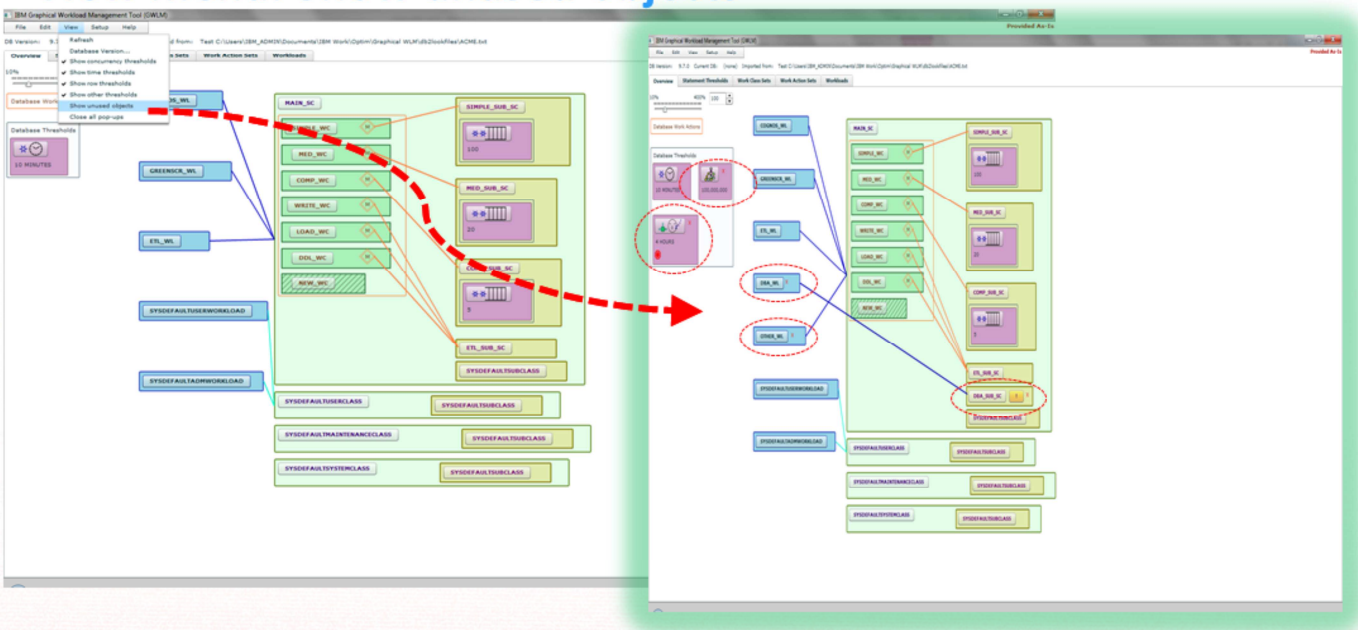
Db2 9.7



Db2 10.5

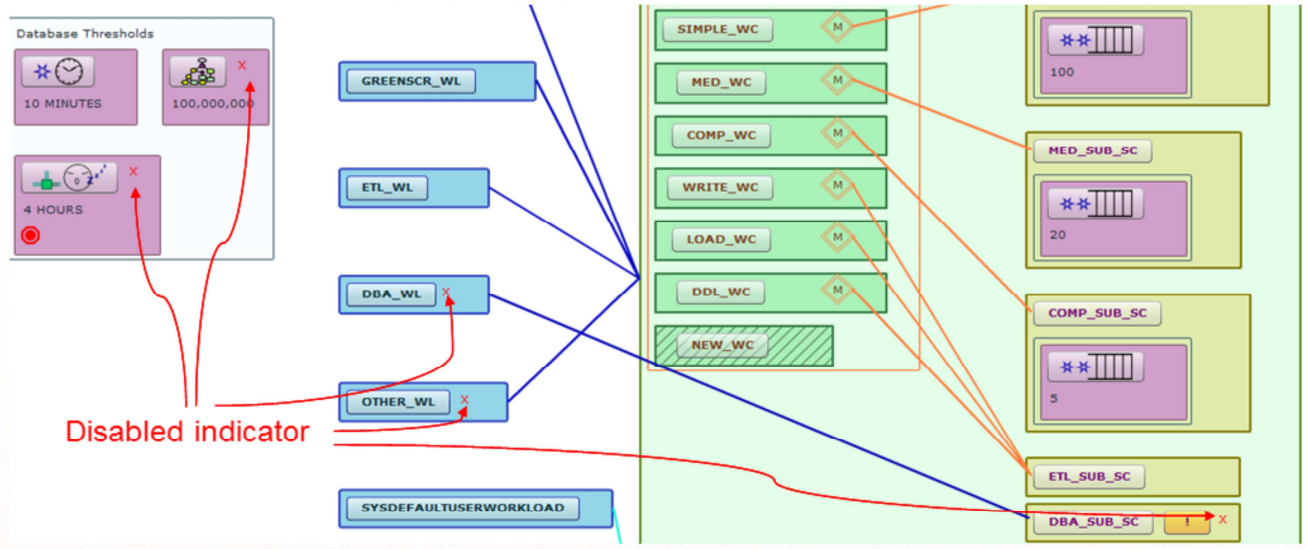


View menu: Show unused objects



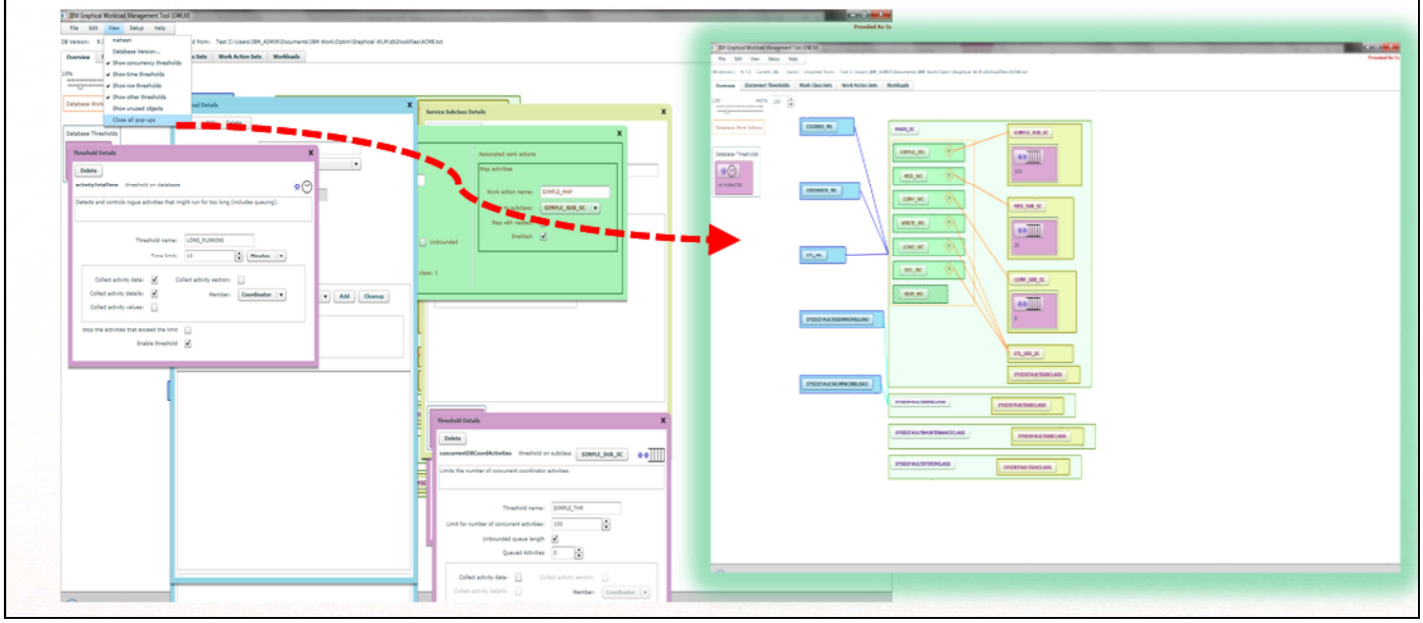
By default, GWLM will hide many objects that are not being used as they don't contribute to what is actually going on within the configuration. To see them, you need to select the show unused objects option in the View menu. You can see on the right the objects that were not shown in the default display because they were disabled and not active.

View menu: Show unused objects (cont.)



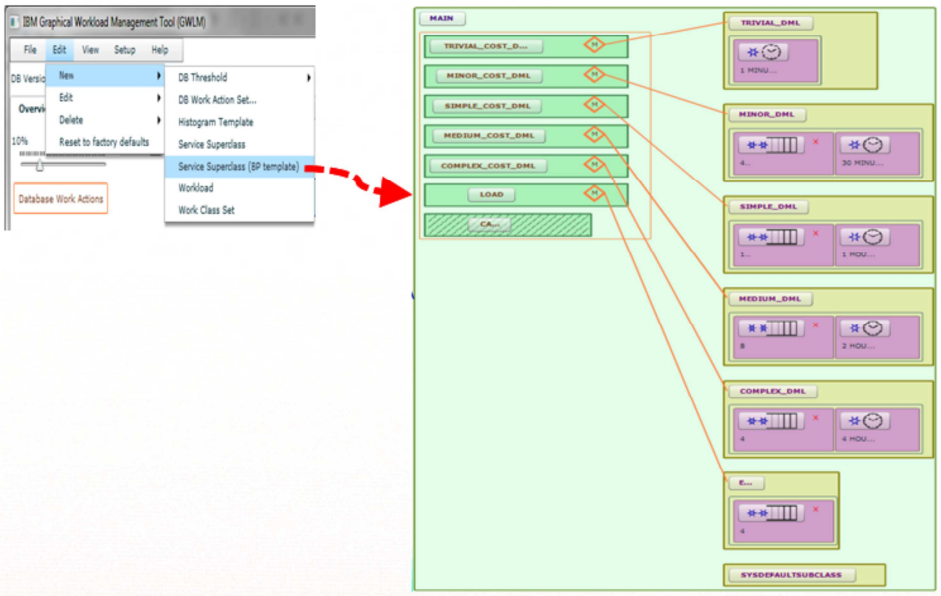
Here is a closer look at the objects that were not present in the default display. Notice the red 'x' symbol for objects that are not enabled in the configuration.

View menu: Close all pop-ups



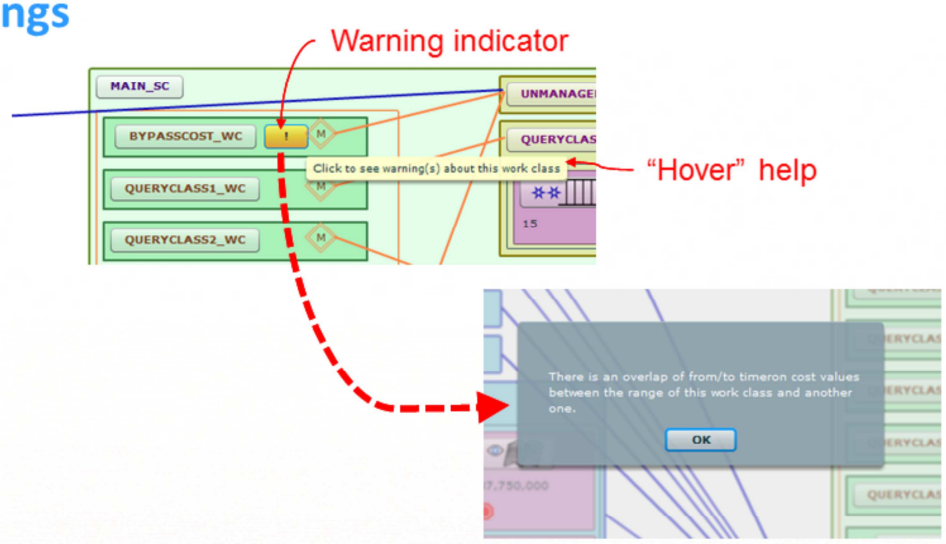
To get rid of a pop-up menu, you click on the 'x' in the top right corner. If you have a whole bunch of them opened, you can close them all using the Close all pop-ups option in the View menu.

Service class: Best practices template

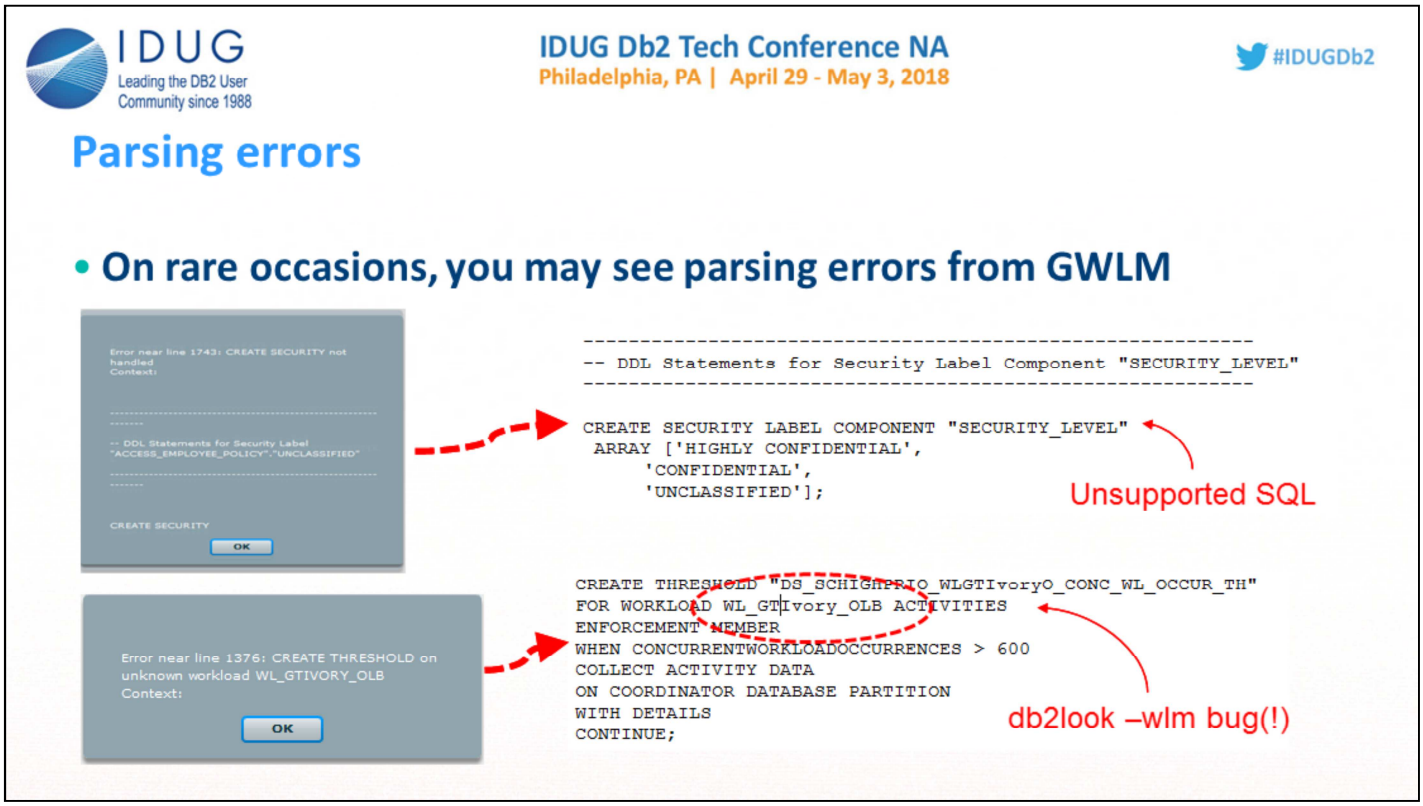


Another item that may be of interest is the ability to choose a service superclass based on the WLM best practices template from the New menu. This option lays a service superclass which uses the recommended starting template from the WLM best practices.

Warnings



You may have noticed a yellow exclamation point symbol in a couple of screens. These indicate a warning condition that GWLM has detected. For many things in GWLM, you can find out more about them by hovering your cursor over the item to see the "hover help". In this case, it tells you to click and what you are presented with is the text of the warning condition that was detected.



While no tool Is perfect, sometimes it is not GWLM's fault! ☺ There are a few cases where the db2look output has problems and GWLM chokes on the input file… or the input file contains things that GWLM doesn't support. In these cases, you will see one or more error pooping up during import. You can click OK to make them go away and the final result may be usable but in general, I recommend that you trim out or correct the input file until GWLM can consume it without error.

The examples here show:

1) db2lock output has LBAC definition DDL in it which GWLM does not support

2) db2look forgot to put quotes around a mixed case name! GWLM couldn't find a match to the name in the threshold definition since the original workload name was mixed case.

Known limitations: Functional

- **Assumes default DB2 WLM configuration with default concurrency threshold disabled**
  - Does not reflect DB2WORKLOAD=ANALYTICS or environments with different defaults such as Db2 Warehouse
- **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

Known limitations: Print

- **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

"Testimonials"

I use this tool frequently to look into strange, unknown WLM configurations that I am sent and it saves me tons of time in understanding the overall configuration!

- Paul B

With this tool, I can quickly put together a configuration proposal and the generate DDL feature saves me from having to look up all the syntax in the docs! I love GWLM!

- P. B.

I have found nothing better in the market at this price point!

- Anonymous IBMer

To give GWLM a try !!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