

# IBM Z AIOps Lab Series 2020

think

## Lab Guide



**IBM Z Operations Analytics powered by Watson Machine Learning**  
**Author: Lih M. Wang**

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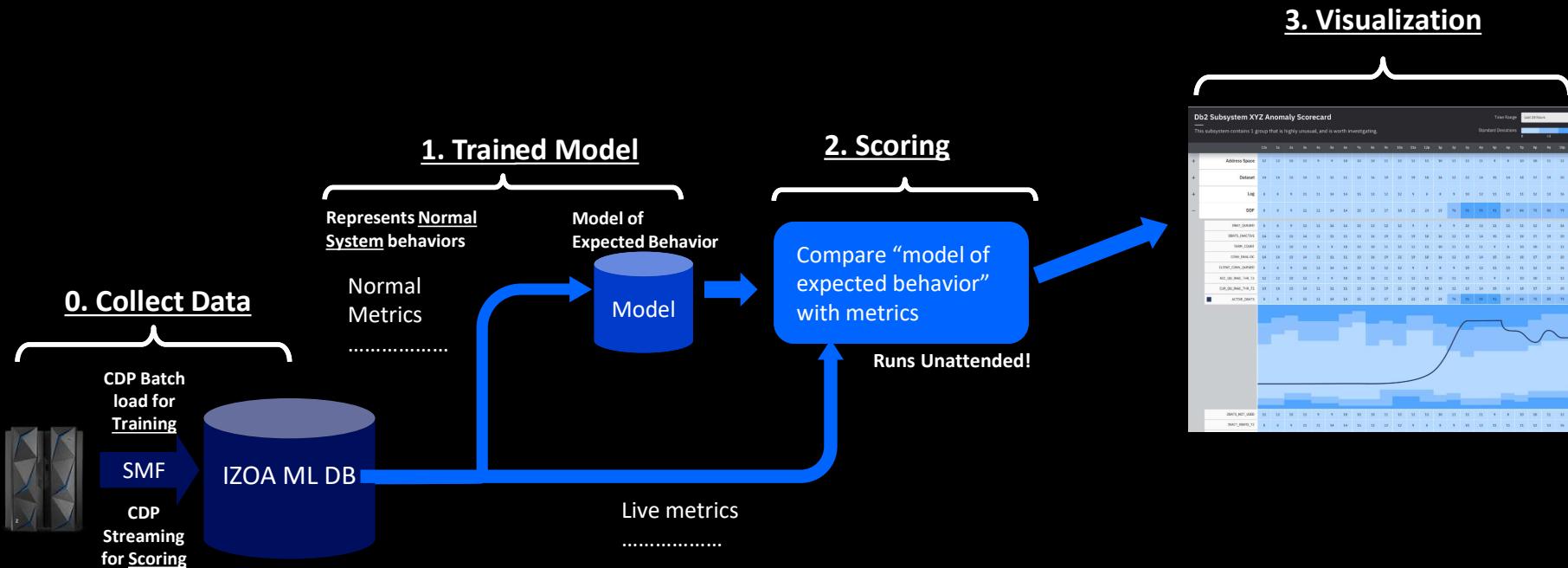
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  - Review Db2 Statistics KPI scorecards from a normal day
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# Objectives

- The purpose of this lab is to illustrate the value of using IBM Z Operations Analytics (**IZOA**) with Watson Machine Learning for z/OS (**WMLz**) for modernized anomaly detection
- Learn how IZOA leverages WMLz services to analyze and score big SMF data into insights
- You will get the first-hand experience in exploring IZOA V4.1.0 live with KPI data analytics
- IZOA 4.1.0 is the first release which integrates with WMLz, generally available in September 2019

# IZOA Machine Learning Data and Analytic Flow

## Training, Scoring, Anomaly Detection



## Exercise 1: Introducing IZOA Problem Insights User Interface

## Step 1 Logon to the IZOA Problem Insights UI

- Point your browser to the Lab URL (provided by the instructor)
- Obtain the Problem Insights ID/Password from the instructor



## Select and click on Subsystem Scorecards

A screenshot of the IBM Problem Insights Subsystem Scorecards page. The top navigation bar includes "Problem Insights" and "Subsystem Scorecards" (which is highlighted with a red circle). The main content area is titled "Subsystem Scorecards" and displays two sections: "Sysplexes" and "Subsystem Types". The "Sysplexes" section shows a message: "No data received between 1/20/2020, 11:38:47 AM and 1/20/2020, 11:53:47 AM.". The "Subsystem Types" section shows a message: "No data available.". Below these sections is a search bar with a "Search" button and a slider for "Minimum Anomaly Score" ranging from 10 to 90. A table header row is visible, with columns for "Sysplex", "System", "Subsystem", "KPI Count", and "Most Recent Anomaly". A note at the bottom says "Select data above to view in table."

- 1) Click the Time Range dropdown and Date and Time
- 2) Key in a Start Date of **7/26/2020** and
- 3) Key in the End Date of **7/27/2020**. (In US date format)
- 4) Click the **Apply** button.

**IBM Z Operations Analytics**

Problem Insights    **Subsystem Scorecards**

Subsystem Scorecards

Sysplexes ①  
No data received between 8/24/2020, 7:46:12 PM and 8/24/2020, 8:01:12 PM.

Subsystem Types ①  
No data available.

Time Range

Last 15 minutes

Relative Time ①

Date and Time ①

START DATE  
7/26/2020

12:00 AM

END DATE

End at the current time

- OR -

7/27/2020

12:00 AM

Apply

Log off →

1

2

3

4

- ❑ 1) Under **Sysplexes**, select the **LOCAL** checkbox,
- ❑ 2) Under **Subsystem Types**, select **DB2** to see a list of anomaly scorecards for Db2 subsystems during the provided time range.
- ❑ The **Subsystem Scorecards** summary shows the date/time of the most recent anomaly for each subsystem in the right column (and you have the ability to jump directly to that scorecard)
- ❑ 3) Click the **DB2:ARS3** subsystem to drill down to the anomaly scorecard for the ARS3 subsystem

**IBM Z Operations Analytics** Log off →

Problem Insights Subsystem Scorecards

**Subsystem Scorecards**

**Sysplexes** ⓘ  LOCAL

Deselect All Select All

**Subsystem Types** ⓘ  DB2

Deselect All Select All

Time Range 7/26/2020, 12:00:00 AM - 7/27/2020, 12:00:00 AM

Subsystem Scorecards Hide KPI Count of 0 ⓘ

10 90 Minimum Anomaly Score ⓘ

Search

Sysplex	System	Subsystem	KPI Count ⓘ	Most Recent Anomaly ⓘ
LOCAL	SYSC	<b>DB2:ARS3</b>	0	Not Applicable

- ❑ A message indicates “**No data is available for the selected time range and scoring ID.**”

By default the scorecard comes up in ‘continuous scoring’ mode (you see Scoring ID = “Continuous score (default)”), which would be the most recent information about the subsystem from scoring SMF records that are flowing **real-time**. In this exercise we have a set of historical SMF records that have been **batch scored** so we need to select the Scoring ID that has the batch scored data.

The screenshot shows the 'Evidence: Db2 ARS3 Subsystem Scorecard' page. At the top, there are navigation links for 'Problem Insights', 'Subsystem Scorecards', and 'ARS3'. The 'ARS3' tab is active. On the right, there's a 'Log off' button. Below the tabs, it says 'Sysplex: LOCAL', 'System: SYSC', and 'Db2 Subsystem: ARS3'. The main content area has a title 'Evidence: Db2 ARS3 Subsystem Scorecard'. At the top right of this area, there are dropdown menus for 'Time Range' (set to '7/26/2020, 1:00:00 AM - 7/27/2020, 12:00:00 AM') and 'Scoring ID' (set to 'Continuous score (default)'). Below these are 'Anomaly Level' controls with three checkboxes: 'Normal' (checked), 'Low' (checked), and 'High' (checked). At the bottom, there's a timeline with hour markers from 1:00a to 12:00a. A red arrow labeled '1' points to the 'Scoring ID' dropdown menu. A green arrow labeled '2' points to the 'Scoring ID' input field, which is highlighted with a red border. A message at the bottom states 'No data is available for the selected time range and scoring ID. Select another time range or scoring ID.'



- 1) Pull down the Scoring ID dropdown and
- 2) Select the radio button for the Scoring ID **SCORE-ARS3 2020-08-23 11:39:28.254**
- 3) Click the Apply button

The screenshot shows the 'Evidence: Db2 ARS3 Subsystem Scorecard' page. At the top, there are navigation links: Problem Insights, Subsystem Scorecards, and ARS3 (which is selected). The main area displays a timeline from 1:00a to 4:00p. A message at the bottom states: 'No data is available for the selected time range and scoring ID. Select another time range or scoring ID.'

On the right side, there are filtering options:

- Time Range:** Set to 7/26/2020, 1:00:00 AM - 7/27/2020, 12:00:00 AM.
- Scoring ID:** A dropdown menu is open, highlighted with a red box. It shows 'Continuous score (default)' and a list of scoring IDs. The option 'SCORE-ARS3 2020-08-23 11:39:28.254' is selected with a radio button and has a red arrow pointing to it, labeled '1'.
- Anomaly Level:** Set to 'Continuous score (default)'.
- Scoring ID (radio buttons):** Shows two options: 'SCORE-ARS3 2020-08-23 11:39:28.254' (selected) and 'SCORE-ARS3 2020-08-23 11:39:28.254' (disabled).

At the bottom right of the filtering area is a blue 'Apply' button, which also has a red arrow pointing to it, labeled '2'.

Three red arrows labeled '1', '2', and '3' point to the 'Scoring ID' dropdown, the selected radio button, and the 'Apply' button respectively, indicating the steps in the list above.

- We get the anomaly scorecard for the ARS3 subsystem for the time range **Jul 26, 2020 1am to Jul 27, 2020 12am**
    - Note that this scorecard does not show any significant anomalies, it would be considered a ‘normal’ day**
  - Note each column of the scorecard is for 1 hour
  - On the left side are groups of related KPIs
    - There are approximately 80 KPIs for Db2 that IZOA ML looks at, we group together related KPIs and roll up their anomaly scores so you can get a one-page view of health of the subsystem

IBM Z Operations Analytics

Log off -

Problem Insights Subsystem Scorecards ARS3 X

## Evidence: Db2 ARS3 Subsystem Scorecard

In this subsystem, no KPIs have high values.

Sysplex: LOCAL System: SYSC Db2 Subsystem: ARS3

Time Range: 7/26/2020, 1:00:00 AM - 7/27/2020, 12:00:00 AM

Scoring ID: SCORE-ARS3 2020-08-23 11:39:28.254

Anomaly Level: Normal (checked), Low (checked), High (checked)

		1:00a	2:00a	3:00a	4:00a	5:00a	6:00a	7:00a	8:00a	9:00a	10:00a	11:00a	12:00p	1:00p	2:00p	3:00p	4:00p	5:00p	6:00p	7:00p	8:00p	9:00p	10:00p	11:00p	12:00p	
+	Datasets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+	CPU time	0	11	23	0	11	11	0	11	23	0	0	0	0	0	23	23	23	11	0	0	0	11	0	0	
+	Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+	DDF	23	0	0	0	11	11	11	0	0	11	11	11	0	0	0	0	0	11	23	11	11	11	0	0	
+	Latch	23	11	23	45	56	34	34	11	23	23	23	11	68	23	11	34	23	34	23	11	11	11	23	11	
+	Logs	23	0	0	0	0	0	0	0	0	11	0	11	0	0	0	0	0	0	0	11	0	11	0	0	
+	Local Locking	45	11	23	23	23	11	11	23	34	11	23	11	0	11	11	11	11	23	23	34	23	34	0	0	
+	Parallel Groups	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	

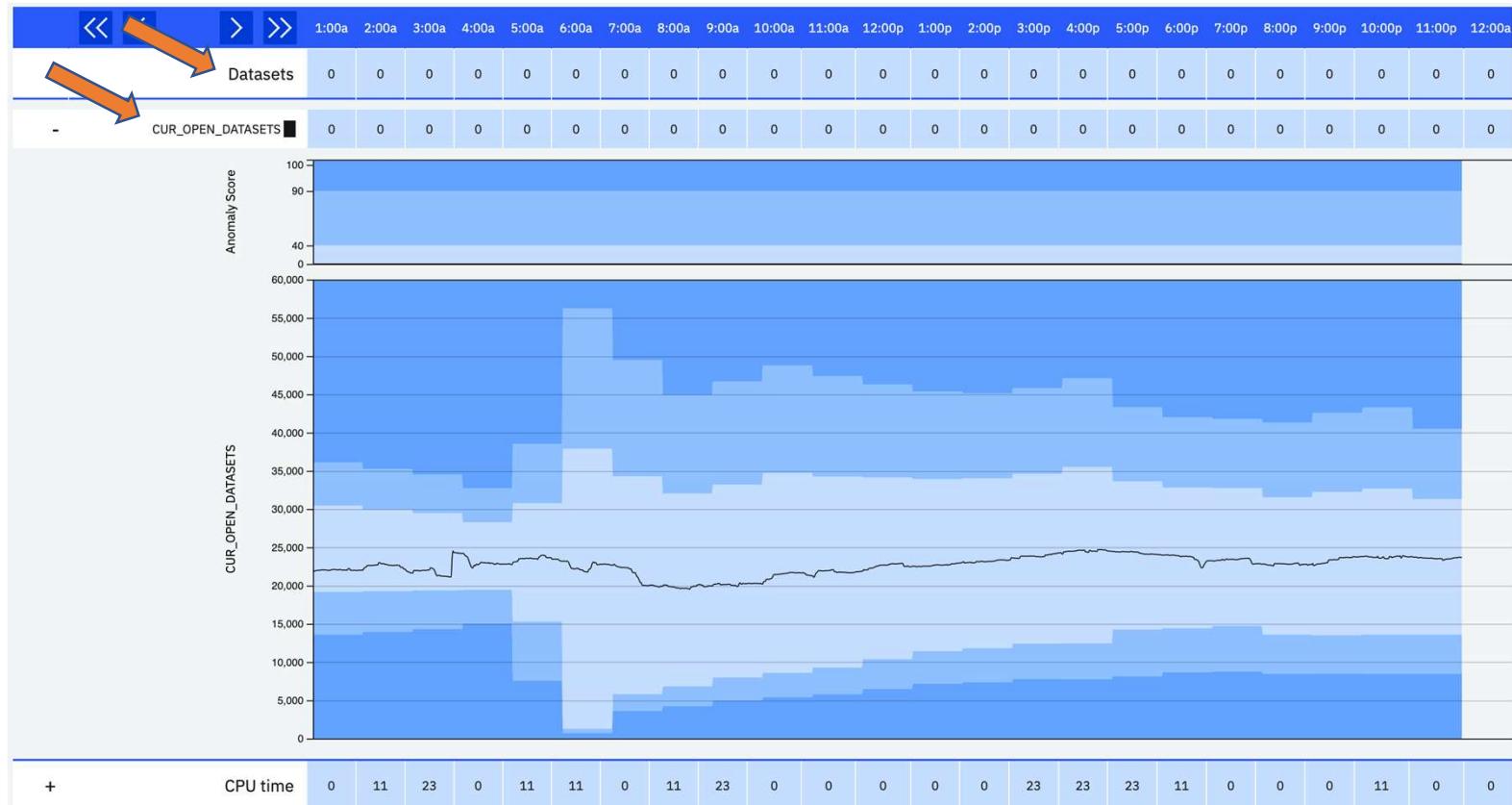
- ❑ Note the **Anomaly Level** color legend in the upper right, the colors in the cells of the scorecard provide a visual indicator of how anomalous the KPIs are during that 1 hour interval
    - ❑ Normal = lightest blue, the KPI(s) are within normal range
    - ❑ Low = middle blue, low anomaly, may not need investigated
    - ❑ High = darkest blue, indicates a significant anomaly that probably should be investigated

With the help of the checkboxes underneath the legend, you can filter the rows on the scorecard by anomaly level

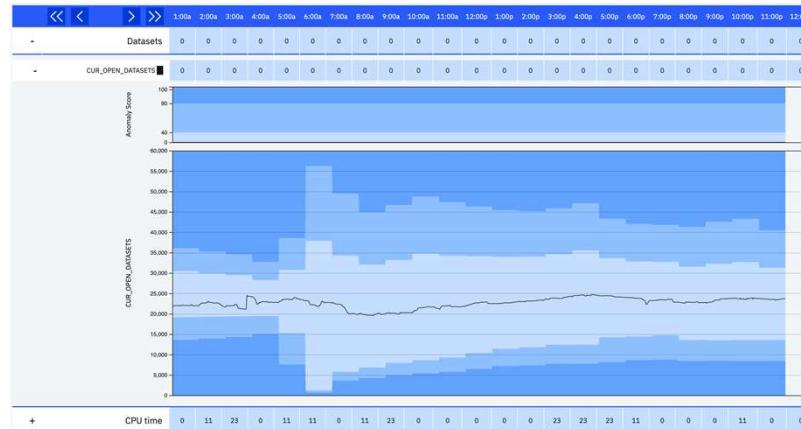
- ❑ The number in the cells provide a more detailed representation of how anomalous the KPIs are during that interval
  - ❑ In this scorecard all cells are light blue / lower numbers except for the “45” under Local Locking and “45”, “56” and “68” under Latch

- Let's start by expanding one of the KPI groups, click on **Datasets**, there is only 1 KPI in this group, **CUR\_OPEN\_DATASETS**, the number of currently open datasets.

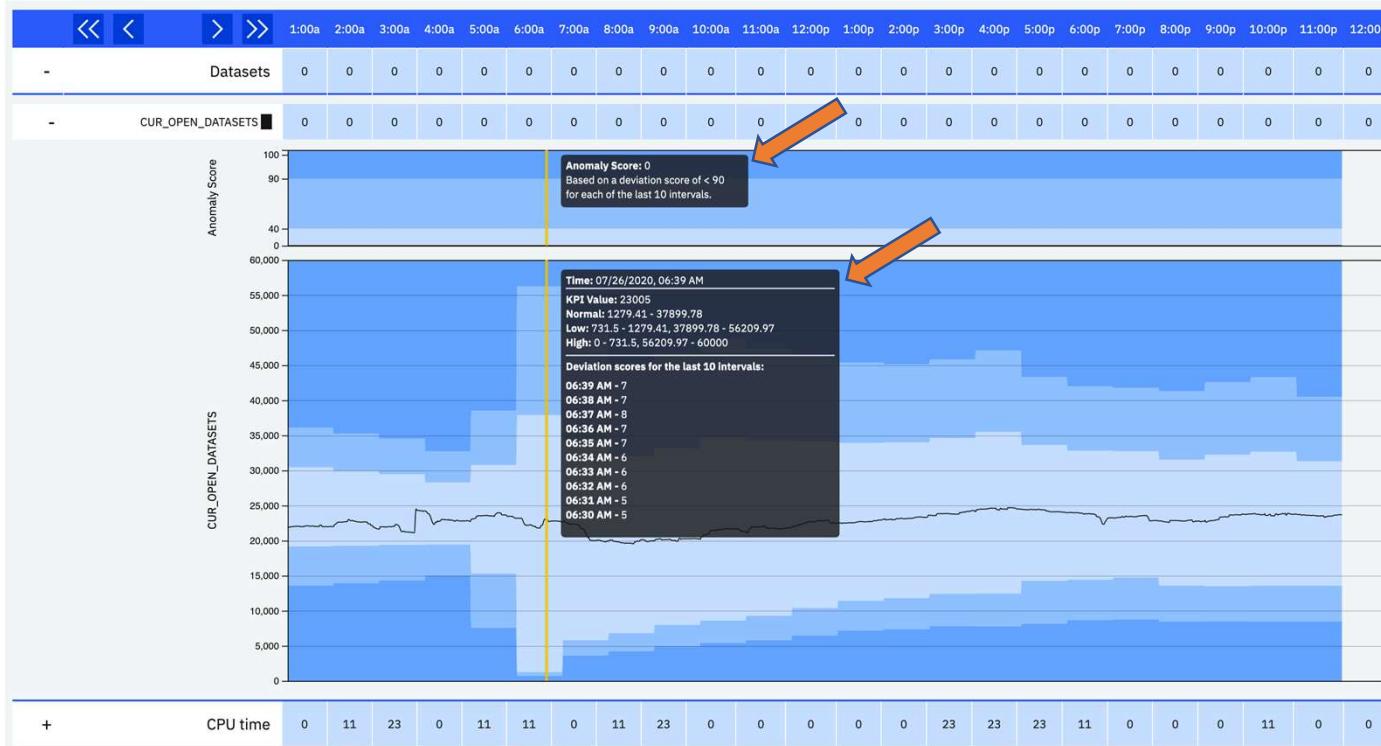
- Click on **CUR\_OPEN\_DATASETS**, this brings up the KPI graph



- ❑ The **black line** shows the actual KPI value during the time interval
- ❑ The blue colors in the background represent the trained model
  - ❑ **Lightest blue =anomaly score of 0-40** (between 0-3 standard deviations from what is normal)
  - ❑ **Middle blue = anomaly score of 40-90** (between 3-6 standard deviations away from what is normal)
  - ❑ **Darkest blue = anomaly score of 90-100** (greater than 6 standard deviations away from what is normal)
- ❑ Note how the **black line** is completely within the light blue for the entire scorecard (24 hours), this KPI (number of open datasets) is acting normally during this time period.
- ❑ Also note that **the trained model** (blue colors) indicates what is ‘normal’, which is different at different times of the day
  - ❑ What’s normal at **3am** on Wednesday is different than what’s normal at **10am** on Wednesday
  - ❑ What’s normal at 3am on Wednesday is different than what’s normal at 3am on Saturday
- ❑ Also note how the **trained model** for the day looks like an arrow pointing to the right... it’s interesting that you can see that around **6am/7am** it’s normal for the number of open datasets to vary more widely (the light blue gets wider around 6am/7am for a bit), this is probably attributed to certain jobs running at the start of a shift that open datasets.



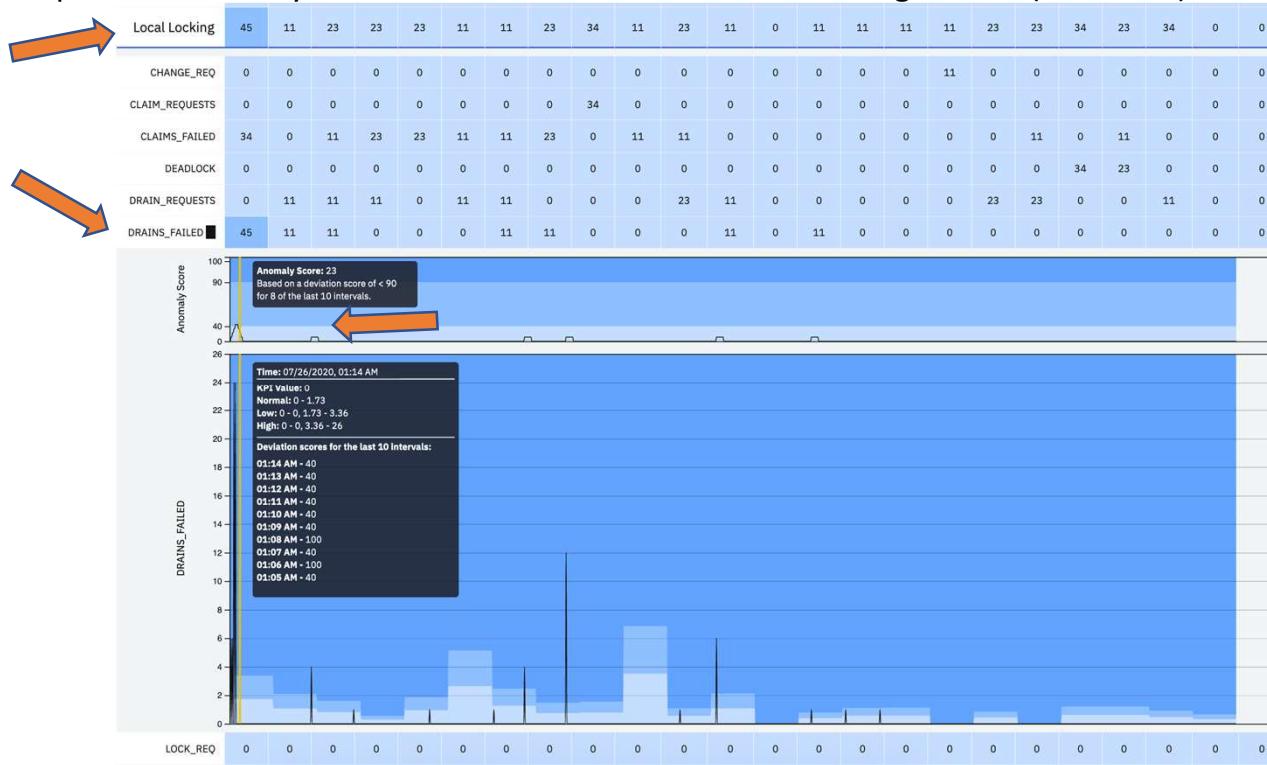
- Move your mouse over the graph, you can see the black hover popups that provide additional details
  - The bottom popup shows the exact minute of the data, the KPI value at that time, the normal/low/high ranges and **deviation scores for the last ten 1-minute intervals** (how far from normal was the KPI during each of the intervals)
  - The top popup shows the anomaly score, in this case 0, indicating overall how anomalous the KPI is
  - A **Statistical Process Control (SPC)** algorithm is used to determine the final anomaly score; the SPC process looks at the behavior of KPIs over a time interval and helps to filter out transient issues from the analysis.



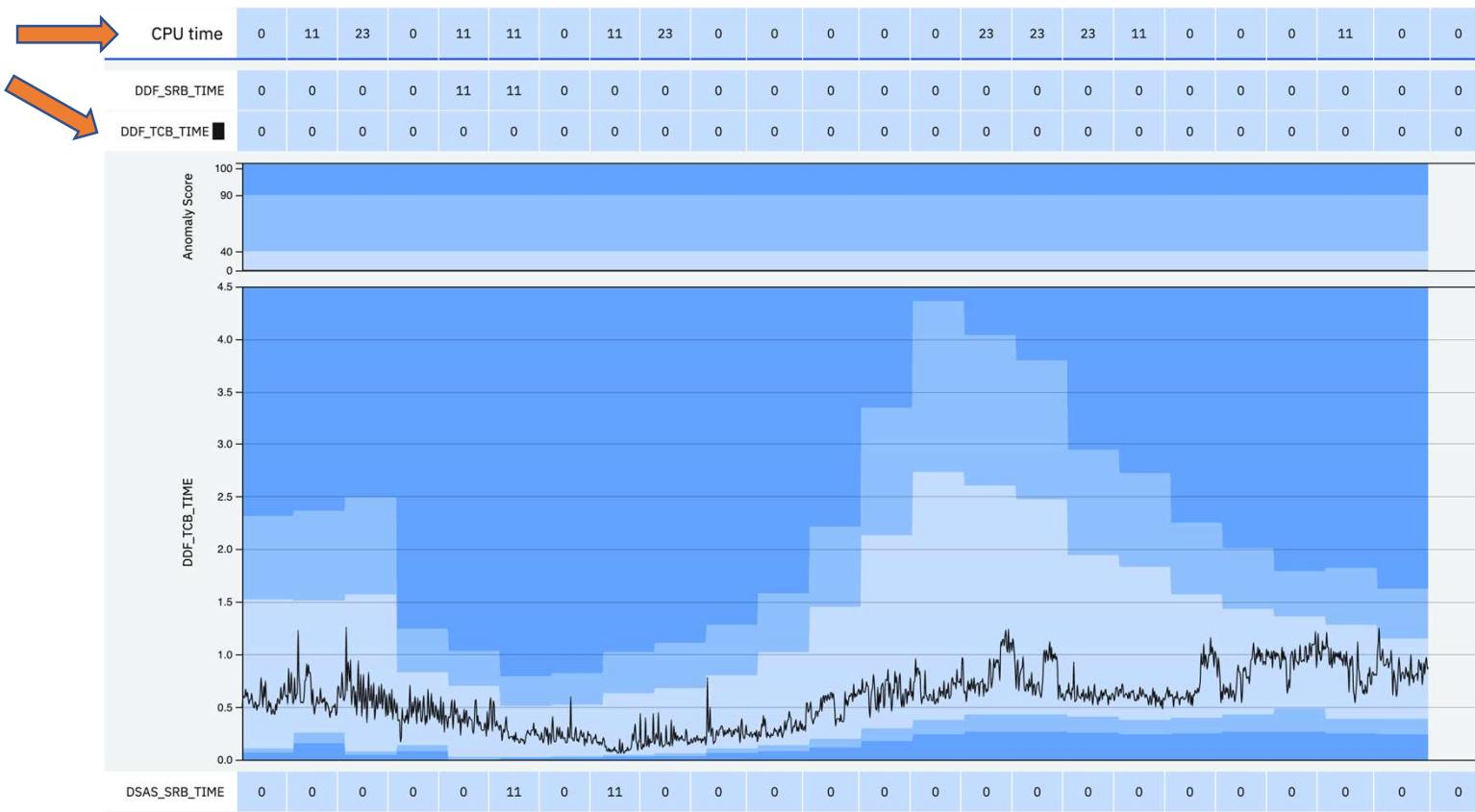
- Let's look at another KPI group. Click the **DDF** group then click **ACTIVE\_DBATS**. This KPI shows the number of active database access threads.
- Notice the **black line** (representing the actual KPI value) varies significantly between **3am and 6am**. Just looking at the data (black line) you may think this could be a concern, but the **trained model** (blue colors) indicates that it is very normal for the **ACTIVE\_DBATS** metric to vary more widely during this time.



- Let's look at one of the KPI groups that had a score of 45, click on the **Local Locking** group and then click on the **DRAINS\_FAILED KPI** (which has the score of 45).
- Note in the bottom hover **popup** it shows an anomaly score of 45 during that interval, and you can see some deviation scores at 100... but it wasn't consistent over 10 intervals so the overall anomaly score is not in the high range.
- On the **smaller overall anomaly graph** where the top popup is, you can see a hump at the Anomaly score 45 and a smaller hump at the Anomaly score 11. Neither of these indicates a significant (dark blue) anomaly in the rollup.



- ❑ Let's look at one more KPI on this normal day
- ❑ Click the **CPU time** group and click the **DDF\_TCB\_TIME** KPI
- ❑ Note how what's considered normal in the trained model (light blue) changes throughout the day, and how on this 'normal' day the actual KPI data (black line) follows the flow of the trained model



Exercise 2: Analyzing KPIs for an anomalous day

- ❑ Now let's go look at a 'problem' day, when the Db2 subsystem had a problem
- ❑ 1) Click the Time Range drop-down sign and key in the end time to **8/1/2020** (August 1, 2020)
- ❑ 2) To make sure that the entire time range we are interested in appears on the screen, also set the end time to **7:00 PM**
- ❑ 3) Click on the **Apply** button

**Evidence: Db2 ARS3 Subsystem Scorecard**

In this subsystem, no KPIs have high values.

Sysplex: LOCAL System: SYSC Db2 Subsystem: ARS3

	1:00a	2:00a	3:00a	4:00a	5:00a	6:00a	7:00a	8:00a	9:00a	10:00a	11:00a	12:00p	1:00p	2:00p	3:00p	4:00p
+ Datasets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ CPU time	0	11	23	0	11	11	0	11	23	0	0	0	0	0	23	23
+ Storage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ DDF	23	0	0	0	11	11	11	0	0	11	11	11	0	0	0	0
+ Latch	23	11	23	45	56	34	34	11	23	23	23	11	68	23	11	34

Time Range 7/26/2020, 1:00:00 AM - 7/27/2020, 12:00:00 AM

Scoring ID

Anomaly Level ⓘ

Select End Time ⓘ

End at the current time

- OR -

**8/1/2020** 07:00 PM

View ⓘ

Every hour (24 hours total)  
 Every 15 minutes (6 hours total)  
 Every 5 minutes (2 hours total)

**Apply**

- ❑ It clearly looks like this Db2 subsystem was under stress in the late evening (~8pm-1am)
- ❑ Almost all of the **KPI groups** are indicating there are KPIs with high scoring anomalies

**Evidence: Db2 ARS3 Subsystem Scorecard**

In this subsystem, 36 KPIs in 7 groups have atypical values that should be investigated.

Sysplex: LOCAL System: SYSC Db2 Subsystem: ARS3

Time Range: 7/31/2020, 8:00:00 PM - 8/01/2020, 7:00:00 PM

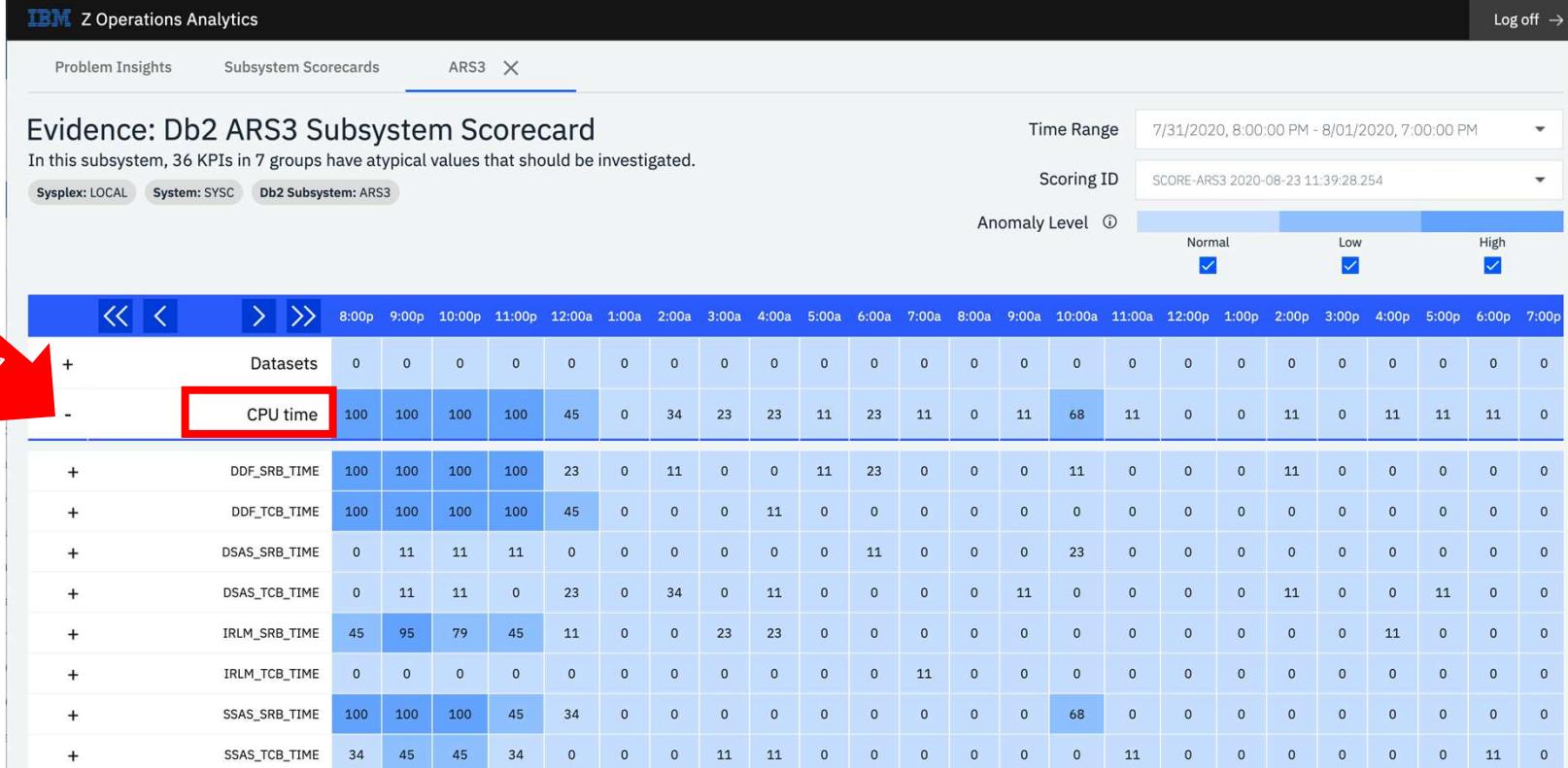
Scoring ID: SCORE-ARS3 2020-08-23 11:39:28.254

Anomaly Level: Normal (checked), Low (checked), High (checked)

	<<	<	>	>>	8:00p	9:00p	10:00p	11:00p	12:00a	1:00a	2:00a	3:00a	4:00a	5:00a	6:00a	7:00a	8:00a	9:00a	10:00a	11:00a	12:00p	1:00p	2:00p	3:00p	4:00p	5:00p	6:00p	7:00p
+ Datasets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ CPU time	100	100	100	100	45	0	34	23	23	11	23	11	0	11	68	11	0	0	11	0	11	11	11	11	11	11	0	
+ Storage	100	100	100	100	100	100	100	100	100	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+ DDF	100	100	100	100	100	79	79	0	11	23	34	0	11	34	68	11	11	11	11	0	34	0	56	0	0	56	0	
+ Latch	100	100	100	100	56	45	56	34	56	34	23	23	34	34	45	56	45	68	56	45	23	23	34	23	0	0	0	
+ Logs	100	100	90	34	11	0	0	0	0	0	0	0	0	0	45	0	0	0	0	11	0	0	0	11	0	0	0	
+ Local Locking	100	100	100	100	95	11	34	11	11	45	23	11	11	11	23	23	11	11	11	23	34	11	11	23	23	34	11	
+ Parallel Groups	100	100	100	100	90	0	23	0	34	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0

- Let's drill in and look at some of the anomalous KPIs

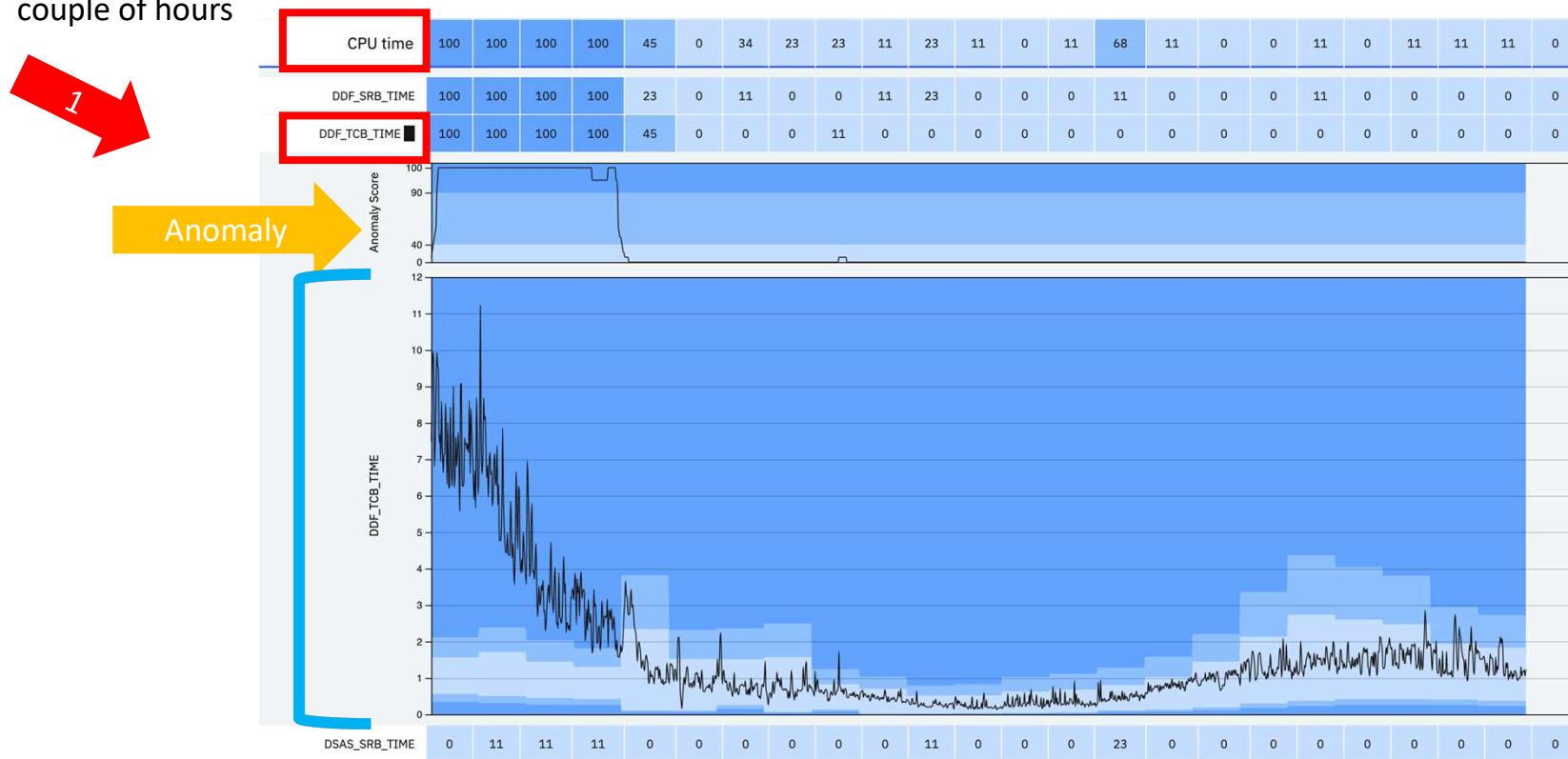
Click on the "+" sign next to the **CPU time** group, at a glance, you can see an overview for 8 sub-group's scoring for the last 24 hours



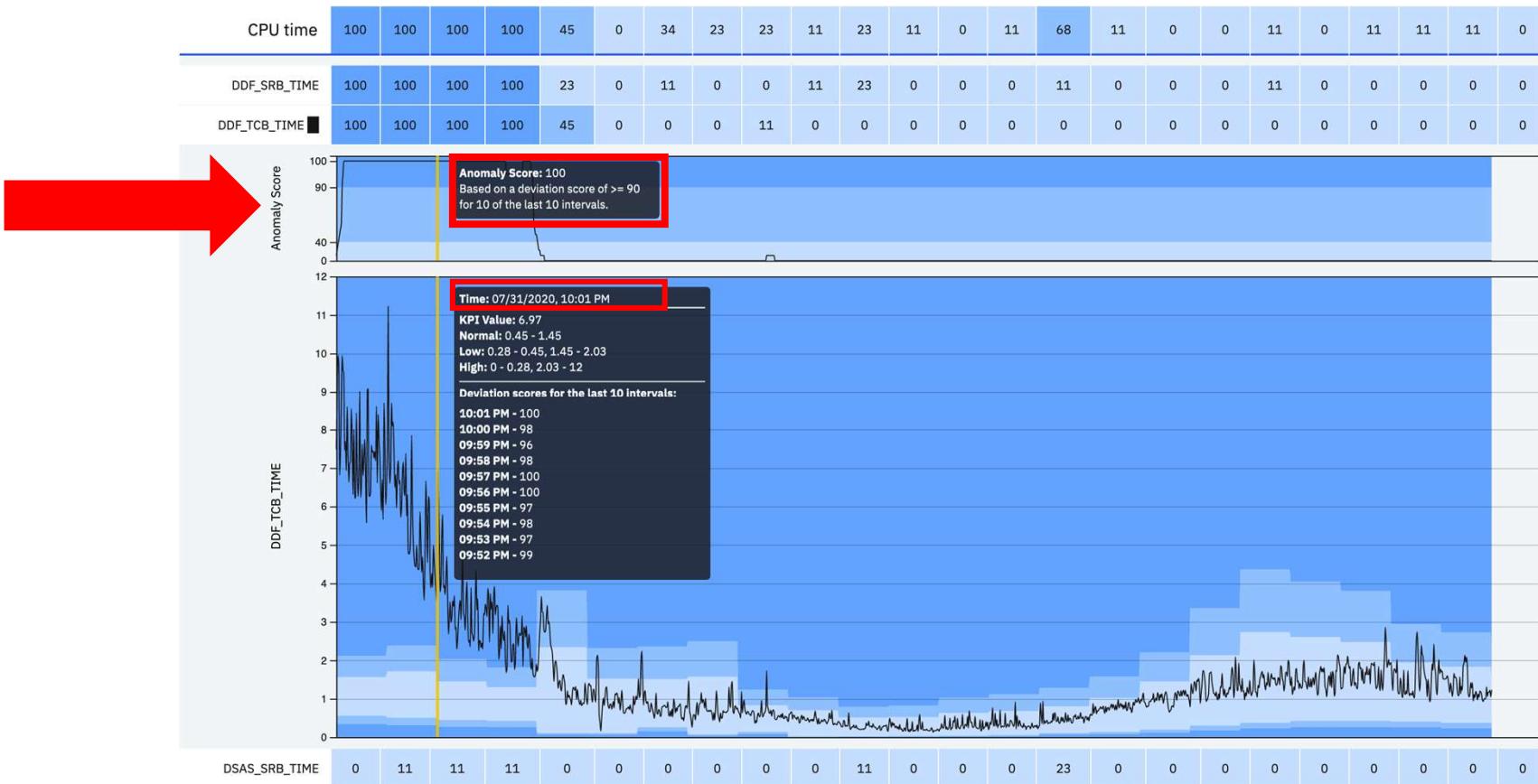
The screenshot shows the IBM Z Operations Analytics interface with the title "Evidence: Db2 ARS3 Subsystem Scorecard". The interface includes navigation tabs for "Problem Insights" and "Subsystem Scorecards" (selected), and a specific view for "ARS3". It features a search bar and filter options for "Sysplex: LOCAL", "System: SYSC", and "Db2 Subsystem: ARS3". The main content area displays a table of KPI data across 24 one-hour intervals from 8:00p to 7:00p. The table has two rows for each KPI: a summary row starting with a '+' sign and a detailed row starting with a '-' sign. The KPIs listed include Datasets, CPU time, DDF\_SRBC\_TIME, DDF\_TCB\_TIME, DSAS\_SRBC\_TIME, DSAS\_TCB\_TIME, IRLM\_SRBC\_TIME, IRLM\_TCB\_TIME, SSAS\_SRBC\_TIME, and SSAS\_TCB\_TIME. The "CPU time" row is highlighted with a red box and a red arrow points to the '+' sign next to it. The data table is as follows:

	8:00p	9:00p	10:00p	11:00p	12:00a	1:00a	2:00a	3:00a	4:00a	5:00a	6:00a	7:00a	8:00a	9:00a	10:00a	11:00a	12:00p	1:00p	2:00p	3:00p	4:00p	5:00p	6:00p	7:00p	
+	Datasets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-	CPU time	100	100	100	100	45	0	34	23	23	11	23	11	0	11	68	11	0	0	11	0	11	11	11	0
+	DDF_SRBC_TIME	100	100	100	100	23	0	11	0	0	11	23	0	0	0	11	0	0	0	11	0	0	0	0	0
+	DDF_TCB_TIME	100	100	100	100	45	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+	DSAS_SRBC_TIME	0	11	11	11	0	0	0	0	0	0	11	0	0	0	23	0	0	0	0	0	0	0	0	0
+	DSAS_TCB_TIME	0	11	11	0	23	0	34	0	11	0	0	0	0	11	0	0	0	0	11	0	0	11	0	0
+	IRLM_SRBC_TIME	45	95	79	45	11	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0
+	IRLM_TCB_TIME	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0
+	SSAS_SRBC_TIME	100	100	100	45	34	0	0	0	0	0	0	0	0	0	68	0	0	0	0	0	0	0	0	0
+	SSAS_TCB_TIME	34	45	45	34	0	0	0	11	11	0	0	0	0	0	0	0	11	0	0	0	0	0	11	0

- Click on the “+” to expand **DDF\_TCB\_TIME** KPI (how much time DDF processing spent in TCB mode)
- Notice the bottom graph shows KPI values consistently in the dark blue (highly anomalous from the trained baseline) for the first couple of hours... the popup shows deviation scores for the previous 10 minutes all highly anomalous.
- Notice the **top smaller overall anomaly graph** which shows consistently high overall anomalous behavior for the first couple of hours



- ❑ Hover the mouse in the top smaller overall anomaly window to see detailed scores over last 10 minutes
- ❑ Locate the time stamp slicer at **10:01 PM**, and review how the scores were rolled up
- ❑ Notice the anomaly **score 100** is based on a **deviation score of >=90** for **10 out of the last 10 intervals**.



- ❑ Let's look at another KPI group for **DDF** (Distributed Data Facility) analysis
- ❑ Click on the “-” sign next to the **CPU time** subgroups to **collapse** the view and return to the main overview panel
- ❑ Click on the “+” sign next to the **DDF** to expand the DDF KPI group for detailed analysis

**Evidence: Db2 ARS3 Subsystem Scorecard**

In this subsystem, 36 KPIs in 7 groups have atypical values that should be investigated.

Sysplex: LOCAL System: SYSC Db2 Subsystem: ARS3

Time Range: 7/31/2020, 8:00:00 PM - 8/01/2020, 7:00:00 PM

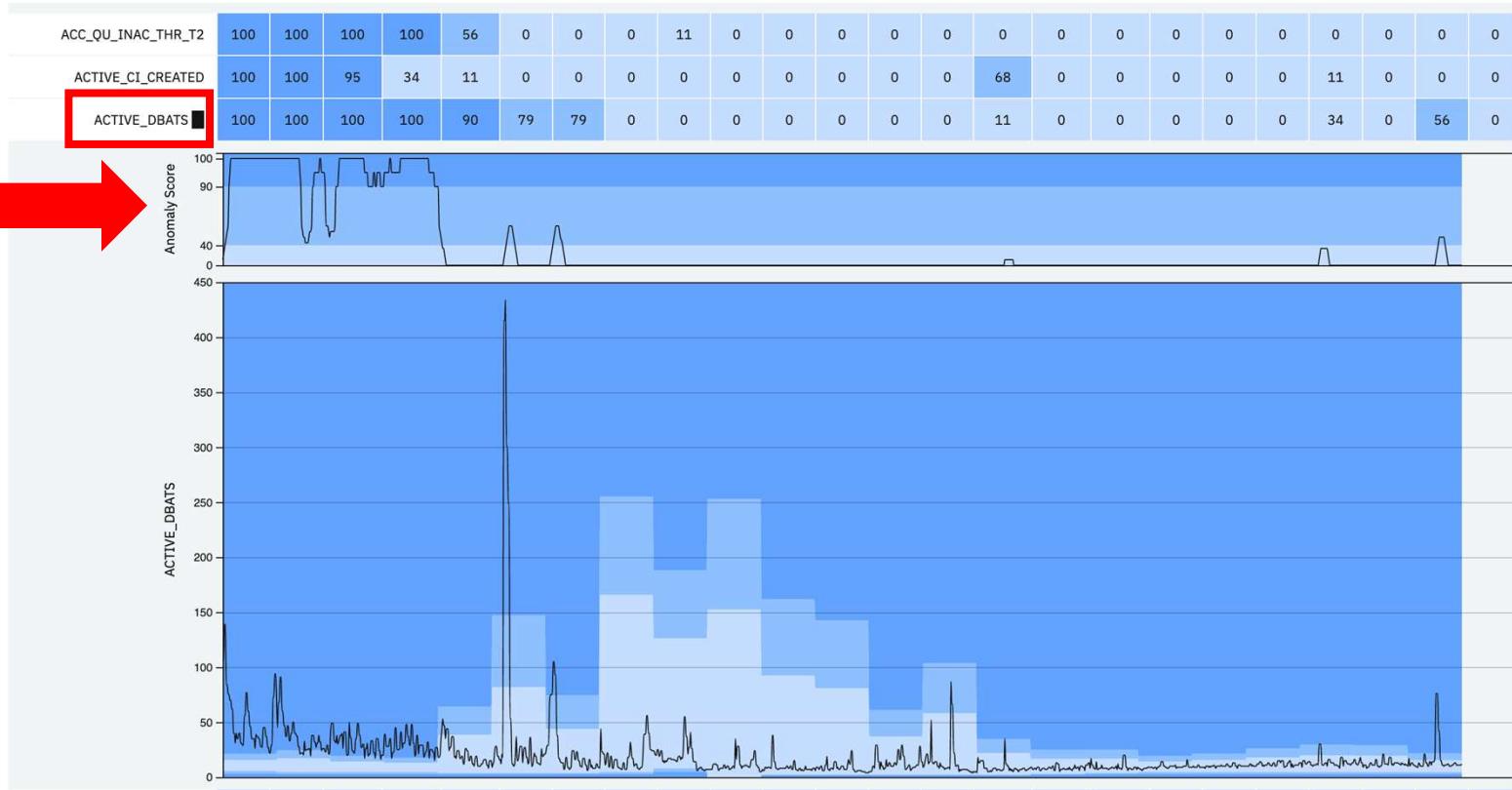
Scoring ID: SCORE-ARS3 2020-08-23 11:39:28.254

Anomaly Level: Normal (checked), Low (checked), High (checked)

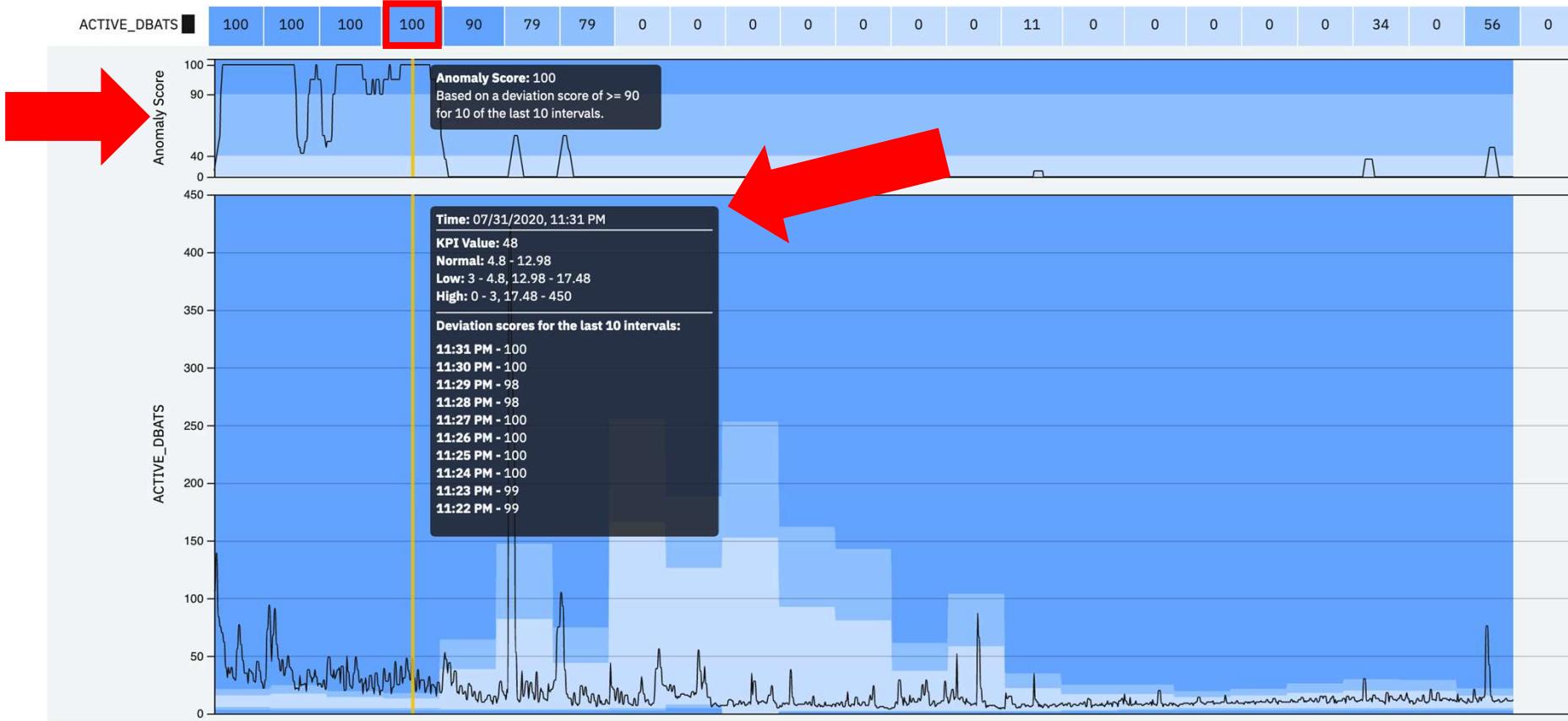
	<<	<	>	>>	8:00p	9:00p	10:00p	11:00p	12:00a	1:00a	2:00a	3:00a	4:00a	5:00a	6:00a	7:00a	8:00a	9:00a	10:00a	11:00a	12:00p	1:00p	2:00p	3:00p	4:00p	5:00p	6:00p	7:00p
+	Datasets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+	CPU time	100	100	100	100	45	0	34	23	23	11	23	11	0	11	68	11	0	0	11	0	11	11	11	11	11	0	
+	Storage	100	100	100	100	100	100	100	100	100	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
+	DDF	100	100	100	100	100	79	79	0	11	23	34	0	11	34	68	11	11	11	11	0	34	0	56	0	0		
+	Latch	100	100	100	100	56	45	56	34	56	34	23	23	34	34	45	56	45	68	56	45	23	23	34	23	23		
+	Logs	100	100	90	34	11	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	11	0	0	0	0		
+	Local Locking	100	100	100	100	95	11	34	11	11	45	23	11	11	11	11	23	23	11	11	11	11	23	34	11	11		
+	Parallel Groups	100	100	100	100	90	0	23	0	34	34	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0		

- ❑ There are **10** subgroups for DDF, 5 out of 10 subgroups rolled up each highest scores to the top DDF summary
  - ❑ **Click on the “+” sign next to Active\_DBATS to expand** and view the detailed KPI scoring

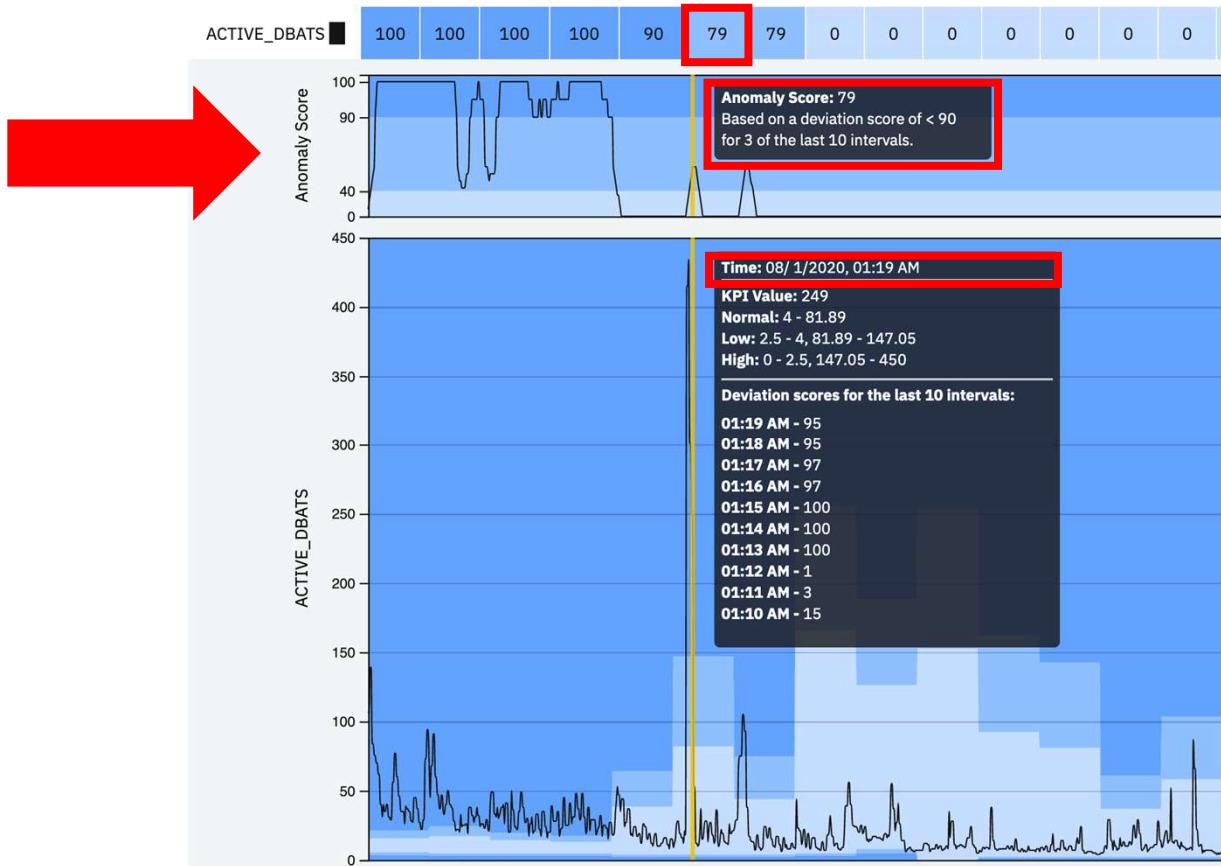
- Scroll your mouse** over different parts of the graph to see the **deviation scores** in the **popup boxes**
- Note how the **overall anomaly graph** at the top shows the KPI moving in and out of being highly anomalous during the first couple of hours



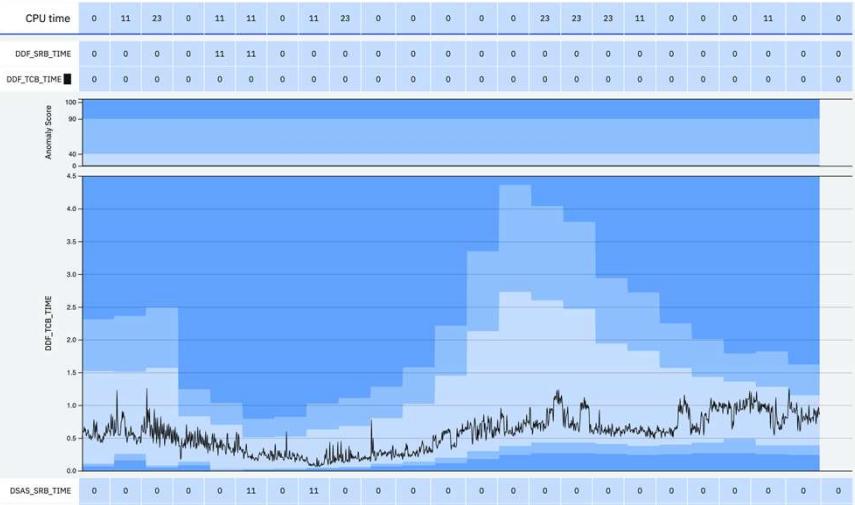
- Hover the mouse in the overall smaller Graph area to select the score 100 and see how ML evaluated.
- Locate the time slicer at **11:31 PM**, and review how the scores were rolled up
- Notice the anomaly score **100**, Why? (based on deviation scores, \_\_\_\_\_ of the last 10 intervals  $\geq 90$ )



- Hover the mouse in the smaller overall anomaly graph window to pick another anomaly score.
- Locate the time stamp slicer at **01:19 AM**, and review how the scores were rolled up
- Notice the anomaly score **79**, Why? (based on deviation scores, **7 of the last 10 intervals >90**)



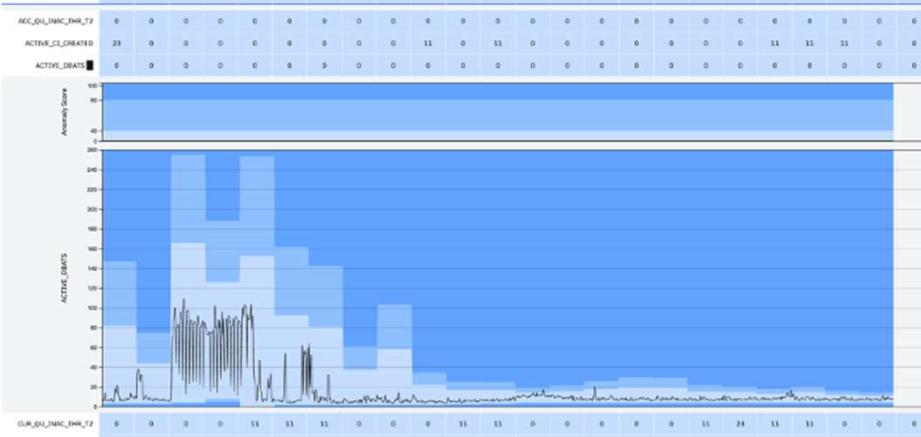
- ❑ Spend some time on your own exploring some other KPIs across different various KPI groups to see their KPI graphs showing anomalous behavior.
- ❑ The next few charts illustrate the ‘normal’ vs ‘anomalous’ behavior of a few KPs that you should have seen. Note the difference in the anomaly scores, color and KPI graphs for the same KPI on a normal day vs an anomalous day.



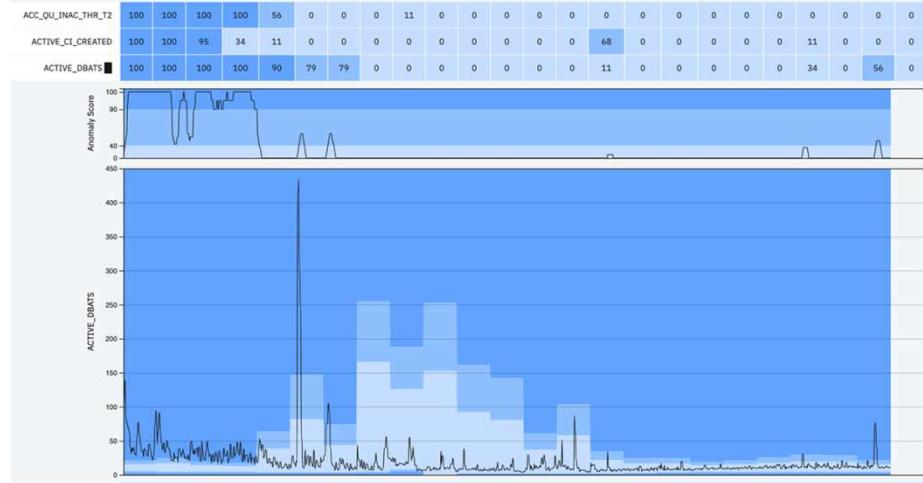
**CPU TIME => DDF\_TCB\_TIME – Normal Day**



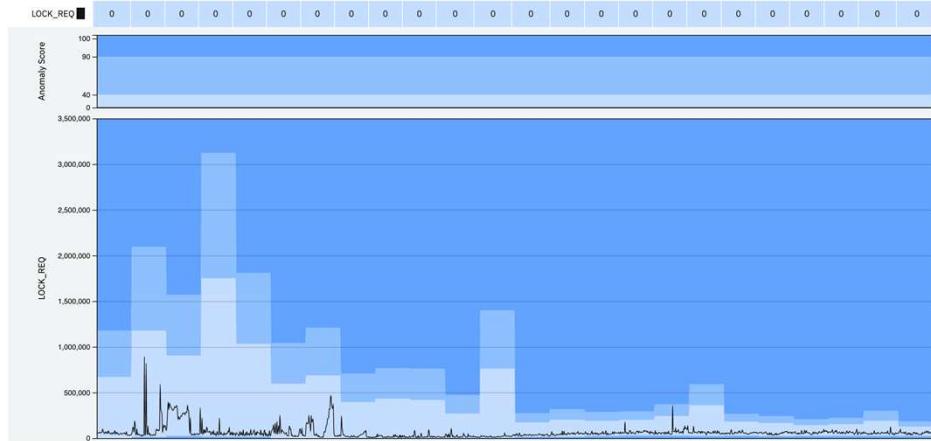
**CPU TIME => DDF\_TCB\_TIME – Anomalous from 8pm to 12am**



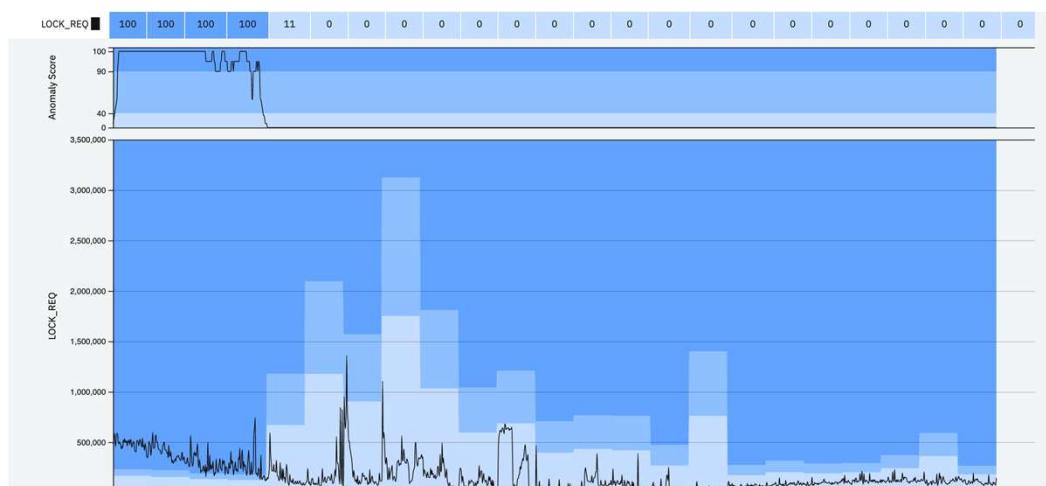
**DDF => ACTIVE\_DBATS – Normal Day**



**DDF => ACTIVE\_DBATS – Anomalous from 8pm to 1am**



**Local Locking => LOCK\_REQ – Normal Day**



**Local Locking => LOCK\_REQ – Anomalous from 8pm to 12am**

# Summary

- You learned how IZOA leverages machine learning (WMLz) to detect anomalous behavior and provides visualization of KPI scorecards based on the trained model profiling.
- Added Value: Identifying anomalies automatically at the machine speed, in real-time and batch modes.



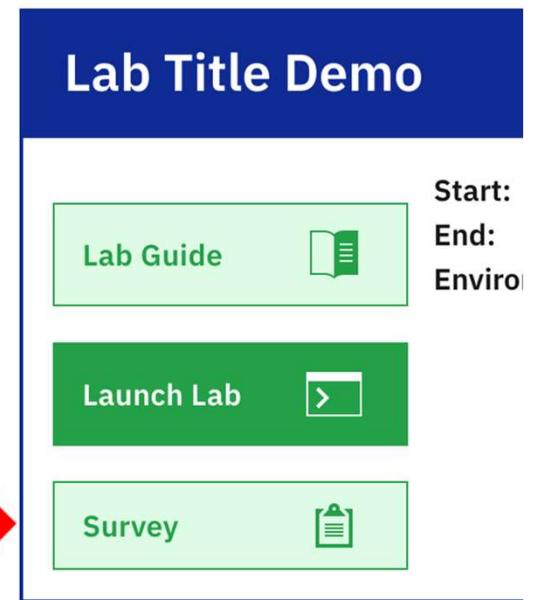
Congratulations! You have completed the IZOA-WML hands-on Lab.

# Thank you!

Please submit the survey form.

*Where is the survey form?*

- Return to the Hello main screen
- Click the **top browser tab**  
**"SOLEIL (IBM)"**
- Click on the Survey button



# Disclaimer

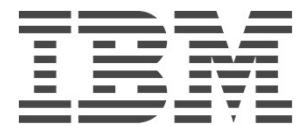
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