



Mastering Dashboards in Maximo Asset Monitor

Hands-on Lab

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1 Introduction to this lab

1.1 Welcome to the lab

‘Mastering Dashboards in Maximo Asset Monitor’

In this hand-on lab you will get a practical introduction to the use of dashboards in the IBM Maximo Asset Monitor solution.

You will start by exploring the sources of data that you will monitor. In this lab we will use data from simulated industry robots. You will then learn the steps of configuring an operational dashboard for monitoring the metrics, trends and anomaly alerts from your robots. You will use the monitor dashboard presentation techniques of value cards, graph cards, table cards and image cards with hot spots. You will also explore summary dashboards that provide data aggregation and filtering to monitor your performance KPIs.

1.2 About Maximo Asset Monitor

The IBM Maximo Asset Monitor is a fully managed, preconfigured cloud-hosted service available in IBM Cloud providing advanced AI-powered remote monitoring at enterprise scale for assets and operations. Essential insights for intelligent asset maintenance and operations.

Maximo Asset Monitor is a solution for bringing AI into the operational process control and asset maintenance worlds. With Maximo Asset Monitor, asset maintenance and operational leaders can aggregate IT data with operating state data and process parameters across existing control systems, historians, IoT sensors, and other repositories to provide enterprise-wide visibility into performance. Data can be fused in real time and the solution can be scaled quickly and easily across the enterprise.

AI brings asset monitoring to life, resulting in a full operationally-scalable monitoring solution. AI-powered anomaly detection and configurable dashboards ensures only the right alerts are identified while helping you understand complex relationships between factors causing failures. This empowers your OT and IT teams to act with confidence to understand when something has changed, explore root cause variables and drive digital re-invention.

The key capabilities of IBM Maximo Asset Monitor solution are

Configurable dashboards, alerts, & drill-down

Quickly customize dashboards and configure rules-based alerts to surface data that is tied to specific standards and KPIs. Easily drill down for root-cause analysis

Enterprise-wide view of operations



Integrate data from multiple systems, historians, IoT sensors, and other data sources across multiple sites and processes. Hybrid cloud-based solution designed to scale across the enterprise.

Workflow to drive ownership of issues

Configurable to existing workflows to ensure seamless ownership of business issues

Auto-generation of work orders

Able to integrate to Maximo Enterprise Asset Management or other asset management system for automated execution of critical tasks

Rapid data integration

Supports multiple integration approaches, including bulk data integration via REST APIs, message-oriented integrations to IoT gateways, and custom connectors

Hierarchical data filtering and management

Supports asset and systems hierarchies for easy data filtering and root-cause analysis

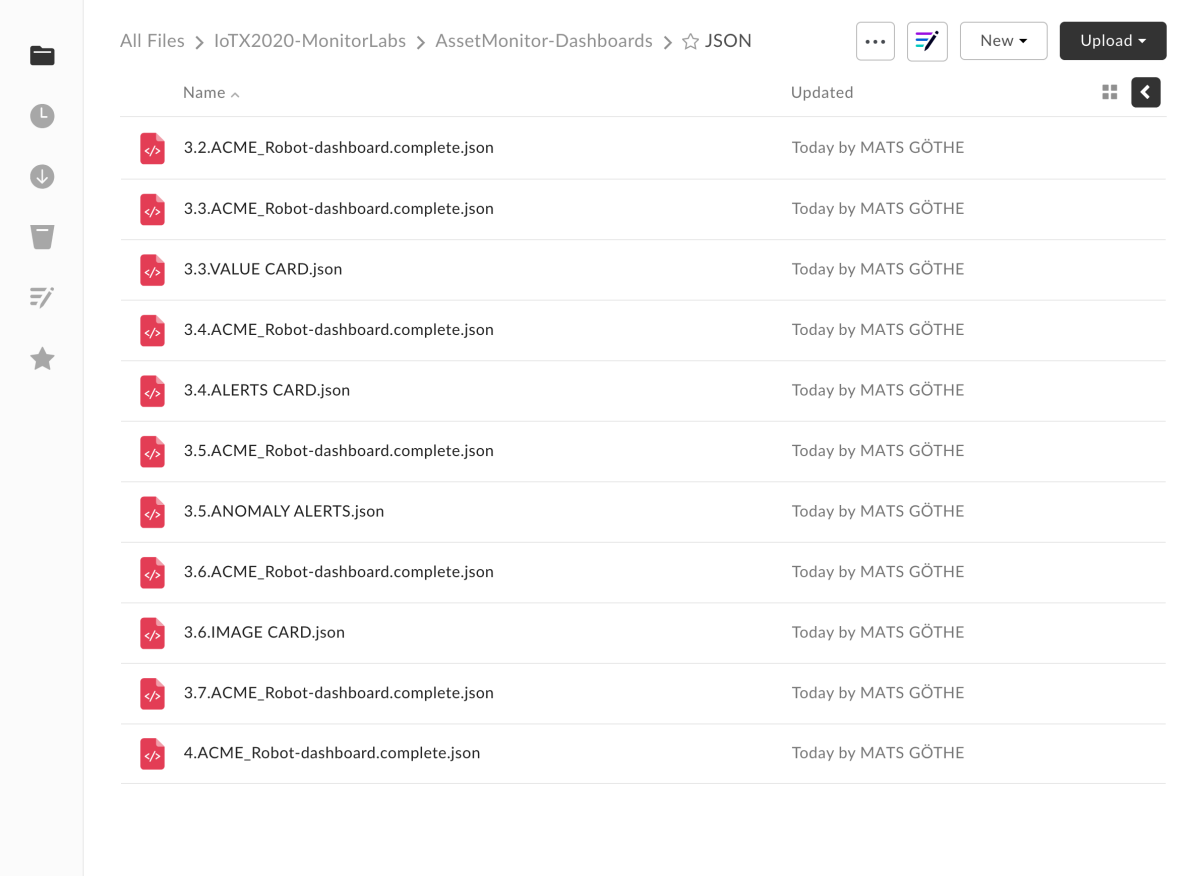
1.3 Starting your Workstation

In this lab you will use a workstation and a web browser to access the Maximo Asset Monitor running on IBM Cloud. If you are attending an on-line event you may use your personal workstation. If you are attending an IBM hosted event a workstation may be provided to you. At the start of this lab, all IBM provided workstations should have been started and ready for you to use with automatic login.

Note: If you fail to log into your IBM provided workstation, ask your lab facilitators for help.

1.4 Accessing Files

In this lab you will work with JSON configurations for your dashboards in Maximo Asset Monitor. We provide JSON code blocks that you can download. To access the files open a web browser and go to <https://ibm.biz/iotx2020-assetmonitor-labs>. Browse into the IoTX2020-MonitorLabs > AssetMonitor-Dashboards > JSON folder.



All Files > IoTX2020-MonitorLabs > AssetMonitor-Dashboards > ☆ JSON		...		New ▾	Upload ▾
Name ^	Updated				
3.2.ACME_Robot-dashboard.complete.json	Today by MATS GÖTHE				
3.3.ACME_Robot-dashboard.complete.json	Today by MATS GÖTHE				
3.3.VALUE CARD.json	Today by MATS GÖTHE				
3.4.ACME_Robot-dashboard.complete.json	Today by MATS GÖTHE				
3.4.ALERTS CARD.json	Today by MATS GÖTHE				
3.5.ACME_Robot-dashboard.complete.json	Today by MATS GÖTHE				
3.5.ANOMALY ALERTS.json	Today by MATS GÖTHE				
3.6.ACME_Robot-dashboard.complete.json	Today by MATS GÖTHE				
3.6.IMAGE CARD.json	Today by MATS GÖTHE				
3.7.ACME_Robot-dashboard.complete.json	Today by MATS GÖTHE				
4.ACME_Robot-dashboard.complete.json	Today by MATS GÖTHE				

Each file has a section reference to the lab. For example file “3.3. VALUE CARD.JSON” will contain JSON code blocks for section 3.3 as you are adding a value card to the dashbaord.

1.5 Logging into Maximo Asset Monitor

IBM Cloud is a cloud platform as a service (PaaS) developed by IBM. It supports several programming languages and services as well as integrated DevOps to build, run, deploy and manage applications on the cloud. IBM Cloud is based on Cloud Foundry open technology and runs on SoftLayer infrastructure.

In this lab you will use the Maximo Asset Monitor and the services running in IBM Cloud. All attendees in this lab will use a shared Maximo Asset Monitor tenant across all lab workstations.

To log into the Maximo Asset Monitor.

1. Open the Firefox browser on your workstation
2. Enter the tenant URL <http://ibm.biz/iotx2020-assetmonitor>

Or use the full tenant URL <https://dashboard-us.connectedproducts.internetofthings.ibmcloud.com/preauth?tenantid=Think-2019&isAPM=true>

3. The Maximo Asset Monitor login page opens

IBM Maximo Asset Monitor

Welcome to IBM Maximo Asset Monitor

You can use IBM Maximo Asset Monitor to turn your device data into meaningful insights. Use these data insights to optimize your business processes and inform the future design of your products or services. IBM Maximo Asset Monitor provides tools that allow you to process IoT data with both real-time and historical analytics, add "smarts" in the IBM Cloud for non-smart products, match appliances with customers, and securely connect your own existing apps and tools to the IBM Maximo Asset Monitor infrastructure.

[Log in to Monitor-Demo](#) [Learn more](#)

Usage / My cloud industrial plan 32%

Monitor your usage trends across the services that you are subscribed to and view details about these services.

All services (3)

Name	Usage	Subscribed	Consumed	Plan coverage	Status
Maximo IoT Platform Service	Click to hide details				
Data exchange	25,513 MB	0 MB			Active
Data analysis	25,513 MB	0 MB			
Edge data analysis	25,513 MB	0 MB			
IBM Workforce on Cloud	Expand to see usage (2 metrics)	✓			Active
IBM Event Streams	Expand to see usage (2 metrics)	✓			Active

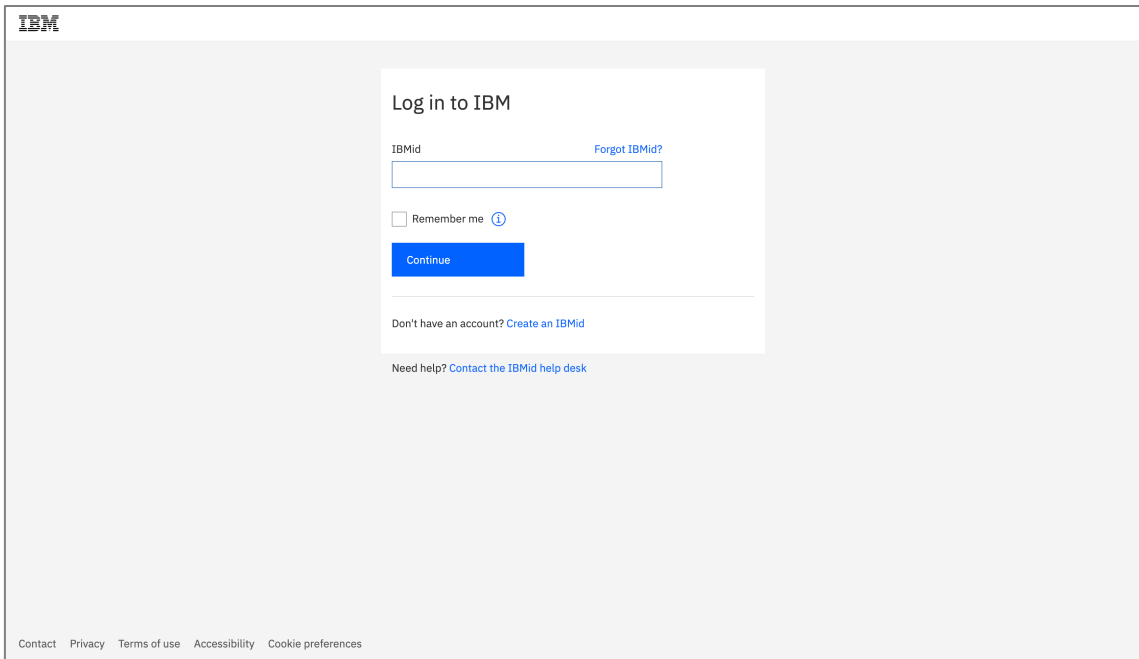
Need more information?

Need more information? Browse the documentation to learn more about getting started, product architecture, and how to access developer resources. If you still have questions, contact us, and we will help you find what you need.

[Go to IBM Knowledge Center](#) [Contact IBM](#)

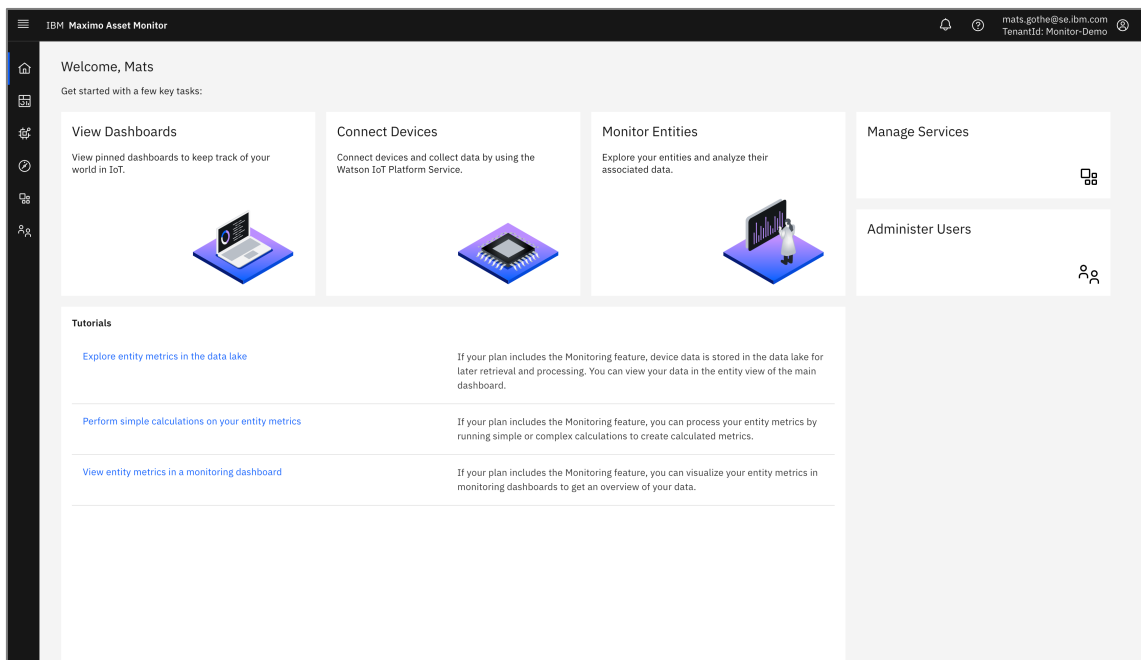
[Cookie Preferences](#)

4. Click on **Log in to Think-2019**
5. Enter the IBM ID “thinkiot@mail.com”
Enter the password provided by your workshop facilitator
6. Click **Log in**



The image shows the IBM login page. At the top left is the IBM logo. The main heading is "Log in to IBM". Below this is a form with an "IBMId" label and a text input field. To the right of the input field is a link "Forgot IBMId?". Below the input field is a checkbox labeled "Remember me" with a help icon. A blue "Continue" button is below the checkbox. At the bottom of the form, there is a link "Don't have an account? Create an IBMId" and a link "Need help? Contact the IBMId help desk". At the very bottom of the page, there are links for "Contact", "Privacy", "Terms of use", "Accessibility", and "Cookie preferences".

7. The Maximo Asset Monitor Home page is loaded.



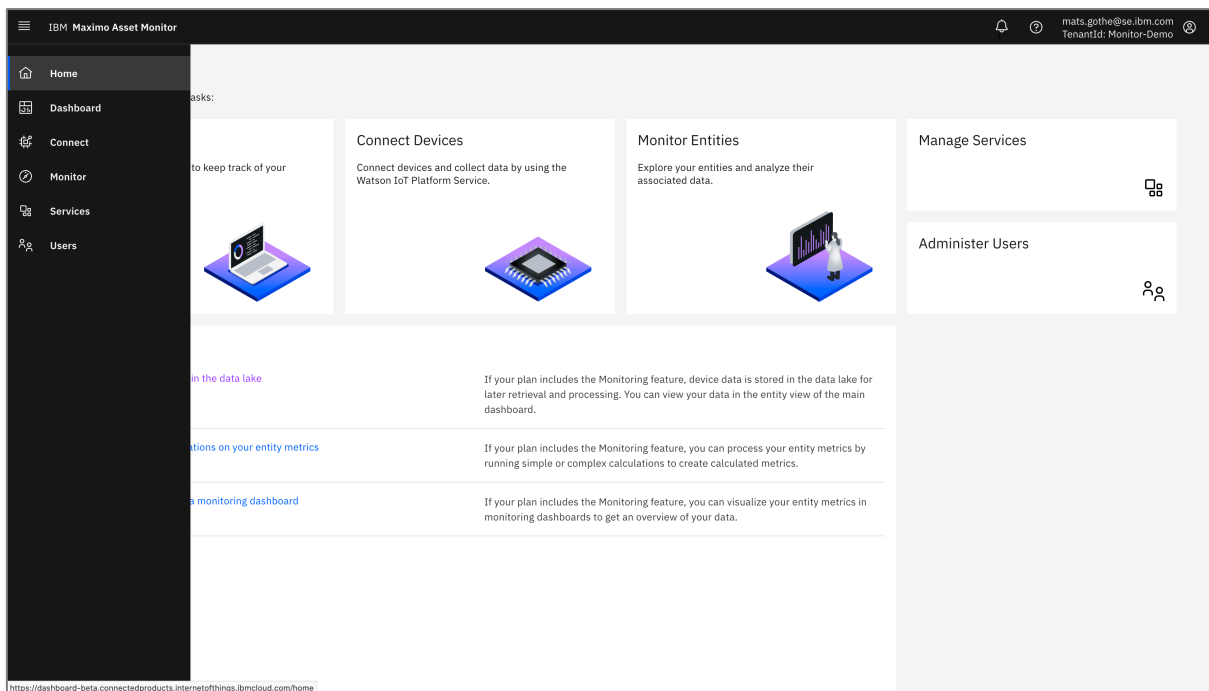
You have now successfully launched and logged into Maximo Asset Monitor.

1.6 Overview of Maximo Asset Monitor

The Maximo Asset Monitor home page presents the main capability sections:



- The **Home** section provides quick access to all main capability sections in Maximo Asset Monitor
- The **Dashboard** section provides quick access to your pinned dashboards for monitoring your Entities
- The **Connect** section launches the Watson IoT Platform Service used to connect and manage devices.
- The **Monitor** section provides access to the data lake and Entity time series data
- The **Manage Services** section provides access to the preconfigured services for messaging and data storage.
- The **Administer Users** section provides control of users and permissions.



In this lab we will use the **Monitor** section to explore the Robot and the operational metrics and performance KPIs on the monitor dashboards.

2 Exploring the Robot Data Metrics

2.1 About the Robots

In this lab we will use data from simulated industry robots.

The simulation of the robots is running as a NodeRed flow on the IBM Cloud producing. The simulation sends data events from the simulated robots every 5 minutes. The Maximo Asset Monitor tenant, that you will use in this lab, has been preconfigured by setting up a robot device type and robot devices for each lab attendee. The simulator has been running for a week to allow historical data to be ingested into the Maximo Asset Monitor data lake.

The following has been pre-configured

- **Device type:** ACME_Robot
- **Devices:** ACME_Robot_A, ACME_Robot_B, ACME_Robot_C, ACME_Robot_D

Note: In this lab you will get your unique device type and devices. A number has been appended for each type and device. The number corresponds to your workstation number, ranging from 1 to 20. As an example, workstation 1 will use the device type ACME_Robot1 and the robots Robot_A1, Robot_B1, Robot_C1, Robot_D1. Workstation 2 will use the robot type and robots appended with index 2, and so on. Ask your lab facilitators for help if you cannot find your workstation number.

The simulator sends robot data events every 5 minutes as MQTT messages to the Watson IoT Platform service included and preconfigured in Maximo Asset Monitor. The event contains robot data for *load*, *torque*, *speed* and *acceleration* using the following MQTT event message schema in JSON format.

```
{
  "load": 375.656,
  "torque": 10.855,
  "speed": 2.503,
  "acc": -0.164
}
```

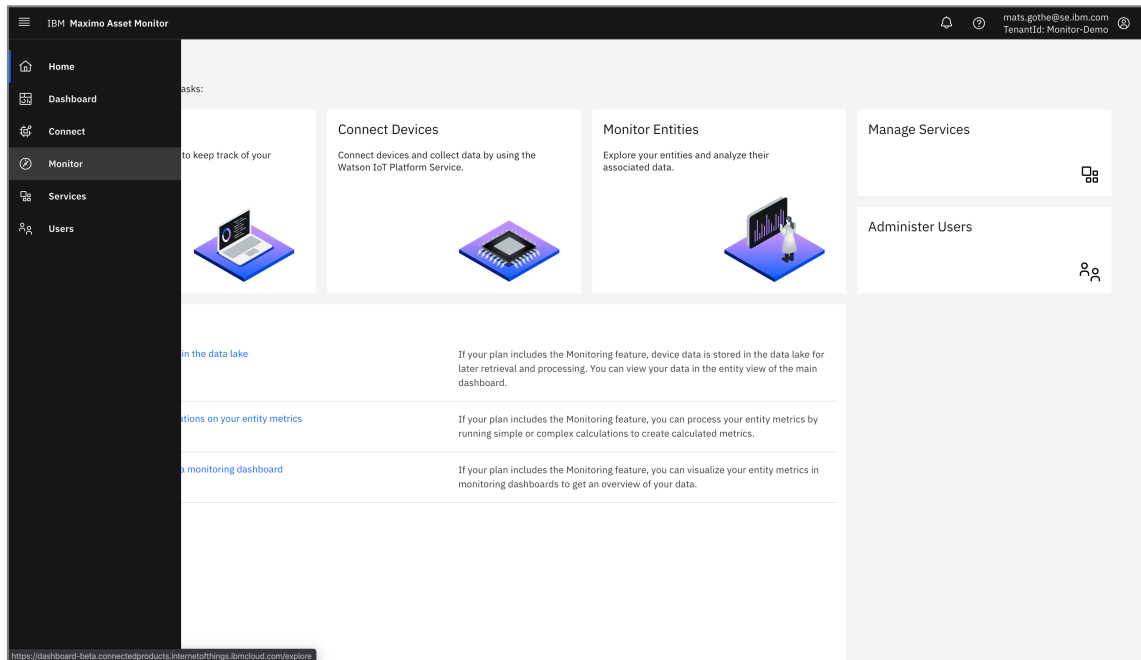
The simulated data is a mainly random values with a range for each metric. However, to simulate anomalies, data spike values are added to the torque data to show reoccurring abnormal data indicating a possible root-cause of a future robot failure.

2.2 Exploring the ACME_Robot Entities

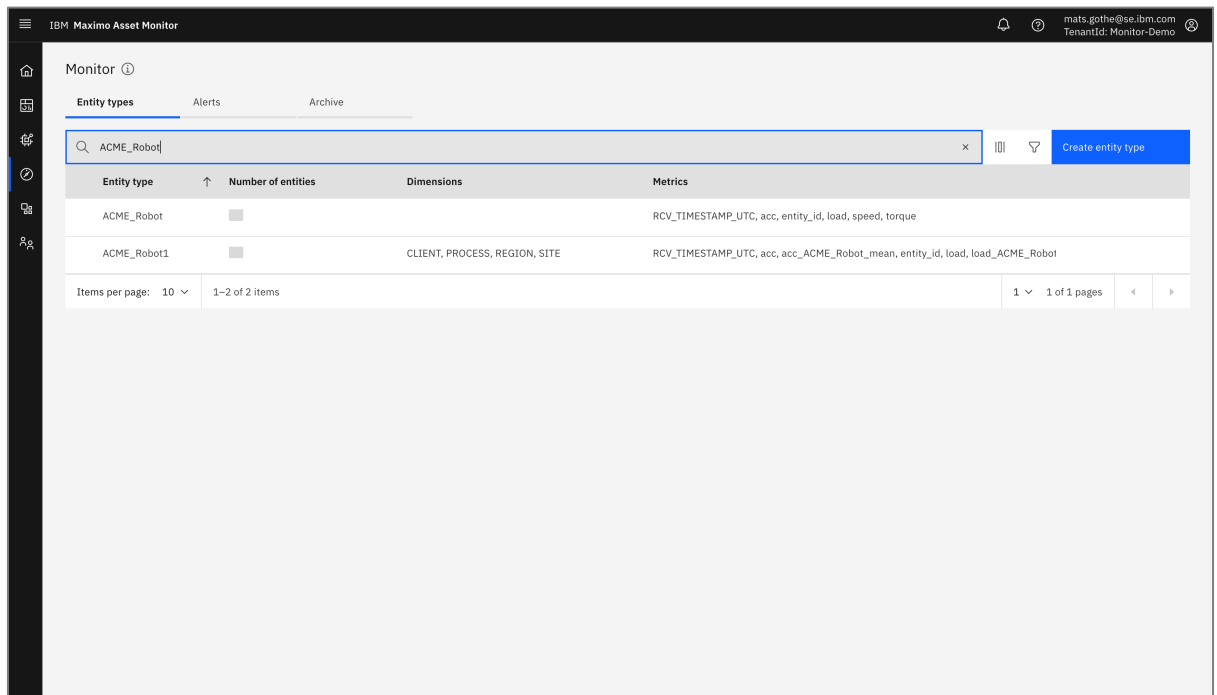
We are now ready to start exploring the robots and the data metrics.

To view your robots in Maximo Asset Monitor

1. Select the **Monitor** section on the Maximo Asset Monitor navigator.



2. The Entity Types page opens
3. Click the search icon and type in the search string **ACME_Robot**.



4. Click on your robot type name for your workstation; **ACME_Robot1** to **ACME_Robot20**.

5. The ACME-Robot type page opens

Entities / Type: ACME_Robot1

Dashboards Data Alerts

Summary Dashboards

ACME_Robot
Dimensions: SITE, PROCESS, CLIENT, REGION
Time: Hourly

New summary

Instance Dashboards

ID	Site	Rcv_timestamp_utc	Process	Client	Region
Robot_A1	Alphaville	2020-02-24T20:55:10.473+0000	Assembly	ACME	US
Robot_B1					
Robot_C1					
Robot_D1					

Items per page: 10 1-4 of 4 items 1 1 of 1 pages

6. Select the **Data** tab.

The Data pages loads and shows a Data Item panel to the left with an outline of the metrics available on the robot type.

The **Metric** section contains all device robot event data items. The **Metric (calculated)** section contains any data items computed by Maximo Asset Monitor, for example statistical metrics on the robot data and anomaly models. Finally, the **Alerts** section contains any alerts specifications.

Entities / Type: ACME_Robot1

Dashboards Data Alerts

Data items

Enter a value

Metric

Dimension

Metric (calculated)

Alert (calculated)

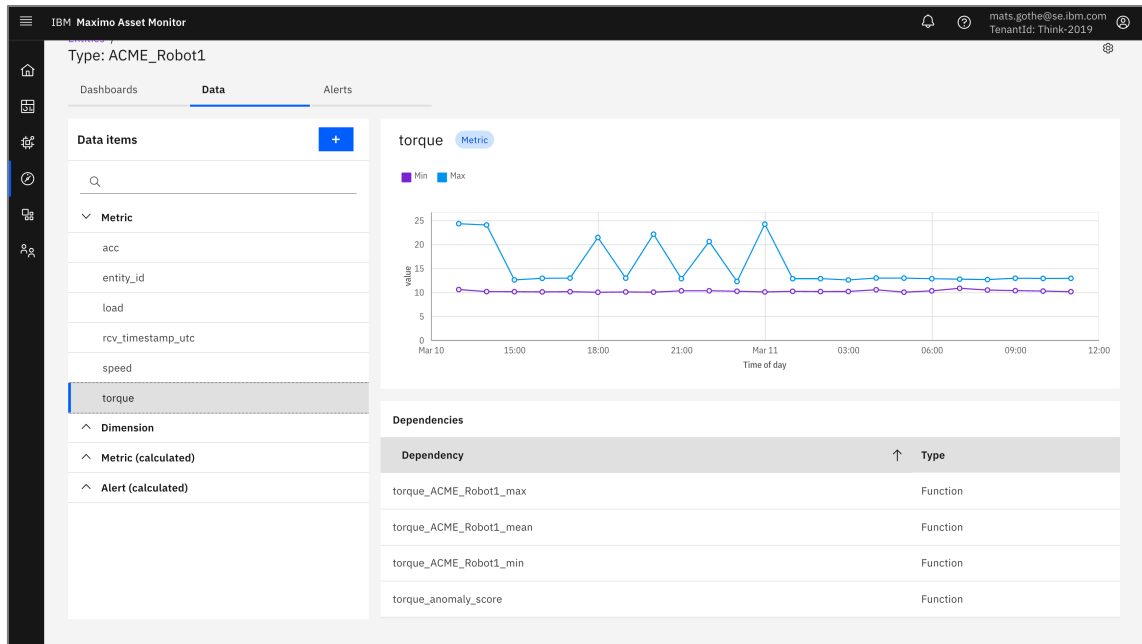
To view recent data, select a data item.

7. Expand the **Metric** section.

The outline shows the **acc**, **load**, **speed** and **torque** data items.

8. Click on the **torque** data item. The torque values are shown on a graph.

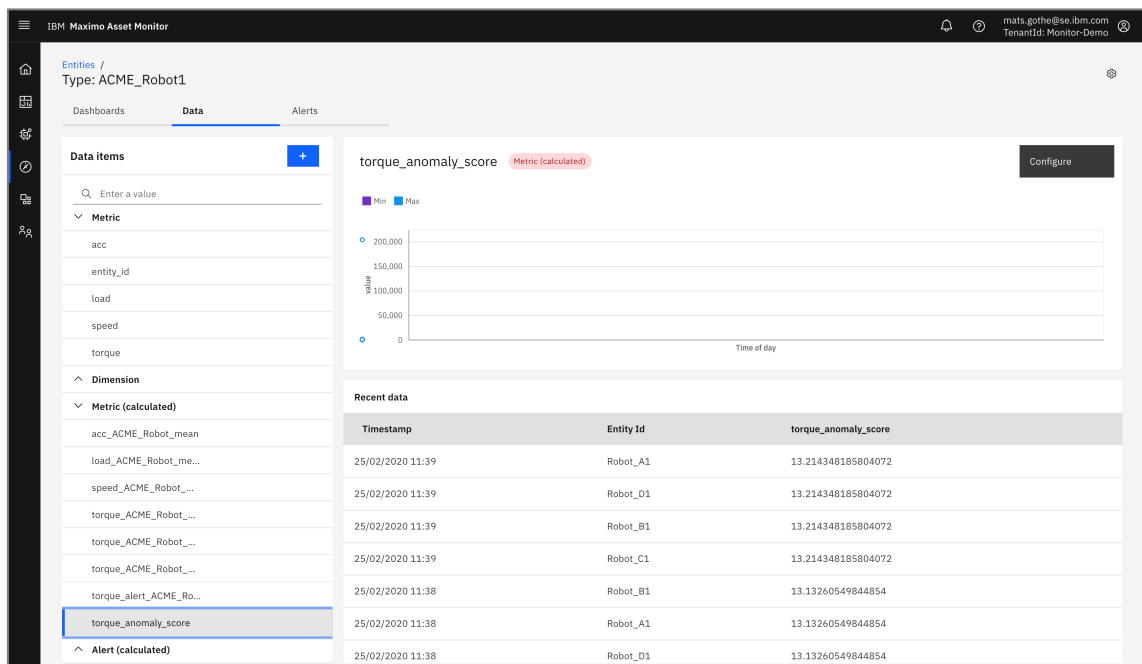
Note: The graph shows a statistical aggregation of the torque data item across all your robots. Hence the torque values may be shown as the Max and Min values of torque.



9. Click on the **Metric (calculated)** section.

A list of calculated metrics is shown. Scroll the list to find and select the **torque_anomaly_score** metric.

The torque anomaly metric represents the anomaly AI function computing an anomaly score based on the torque data item as an input. The function computes a likelihood on an anomaly. The higher the score, the higher the likelihood of an anomaly. We can confirm in the graph that the sort has peaks indicating a likely anomaly in the torque data.

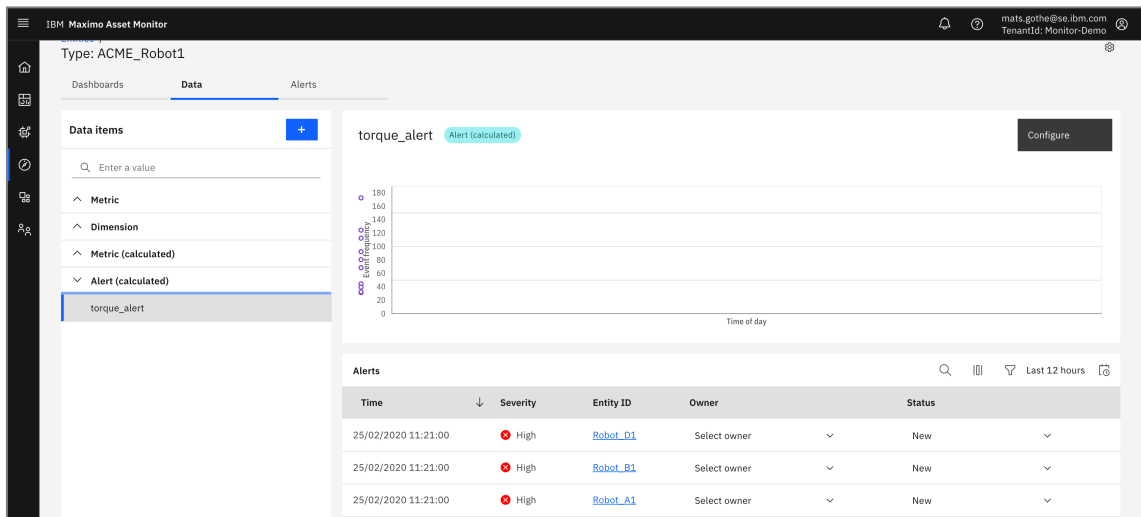


The data value table below the graph provides data scientist insights into the anomaly score values for each of the robots across the data values.

Timestamp	Entity Id	torque_anomaly_score
25/02/2020 11:39	Robot_A1	13.214348185804072
25/02/2020 11:39	Robot_D1	13.214348185804072
25/02/2020 11:39	Robot_B1	13.214348185804072
25/02/2020 11:39	Robot_C1	13.214348185804072
25/02/2020 11:38	Robot_B1	13.13260549844854
25/02/2020 11:38	Robot_A1	13.13260549844854
25/02/2020 11:38	Robot_D1	13.13260549844854
25/02/2020 11:38	Robot_C1	13.13260549844854
25/02/2020 11:37	Robot_A1	13.050862811093005
25/02/2020 11:37	Robot_C1	13.050862811093005
25/02/2020 11:37	Robot_B1	13.050862811093005
25/02/2020 11:37	Robot_D1	13.050862811093005
25/02/2020 11:36	Robot_B1	12.969120123737472
25/02/2020 11:36	Robot_D1	12.969120123737472
25/02/2020 11:36	Robot_A1	12.969120123737472

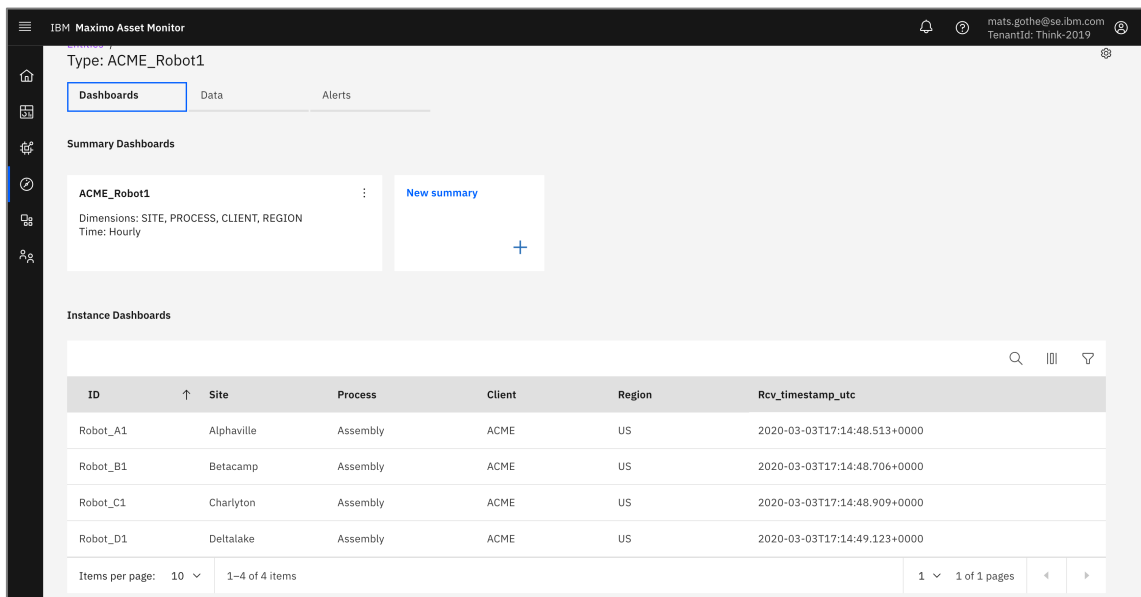
10. Click on the **Alert (calculated)** section.

A list of alerts is shown. Select the **torque_alert** metric. The page updates and shows alerts in graphical and tabular presentation.



11. On the tabs on the page, click on **Dashboards** tab.

The Dashboard page loads and shows a list of **Summary Dashboards** and a list of **Instance Dashboards**.



Note: There is one summary dashboard presenting aggregated and filtered performance KPI across all robots of the type. There is also a list of robots and a dashboard for each presenting the operational metrics on each robot, respectively.

We have now completed the first section with an overview of the robot type and data metrics.

In the next section you will explore the Instance dashboards and build out the default dashboard with a richer monitoring experience using the data items we just explored in the robot type. In the final section of this lab you will explore the Summary Dashboard with KPIs across your robots.

3 Configuring a Robot Instance Dashboard

3.1 About Instance Dashboards

An instance dashboard is a presentation of operational metrics in the context of a single entity, *i.e.* an industry robot. The data metrics of the robot are presented on the dashboard using cards. An instance dashboard is a configuration of cards and layout used across all entities of a type. Hence there is one instance dashboard configuration for all robots of the ACME_Robot type.

There are multiple types of cards to choose from when configuring a dashboard.

Value cards

A value card shows a single or multiple entity metric value. A value may be attributed with a title, a label and a unit. The value may be given a precision and rules on threshold levels.

A value card may be sized as a wide or tall card with big or small sized numbers.

Line graph cards

A line graph card shows time-series data from a single or multiple entities as a graph with time and value axes. The graph may be given a title and labels on the axes. The line graph may be shown in full screen mode and is added a data table with the metrics values plotted in the graph.

A line graph may also be overlaid with an Alert metric indicating any anomalies on the metric.

Table cards

A table card shows tabular data by columns. A table card is configured by referencing some data source for each column. The table may group data source values and present a count rather than each individual value.

An Alerts Table is a preconfigured table presenting alert information.

Image cards

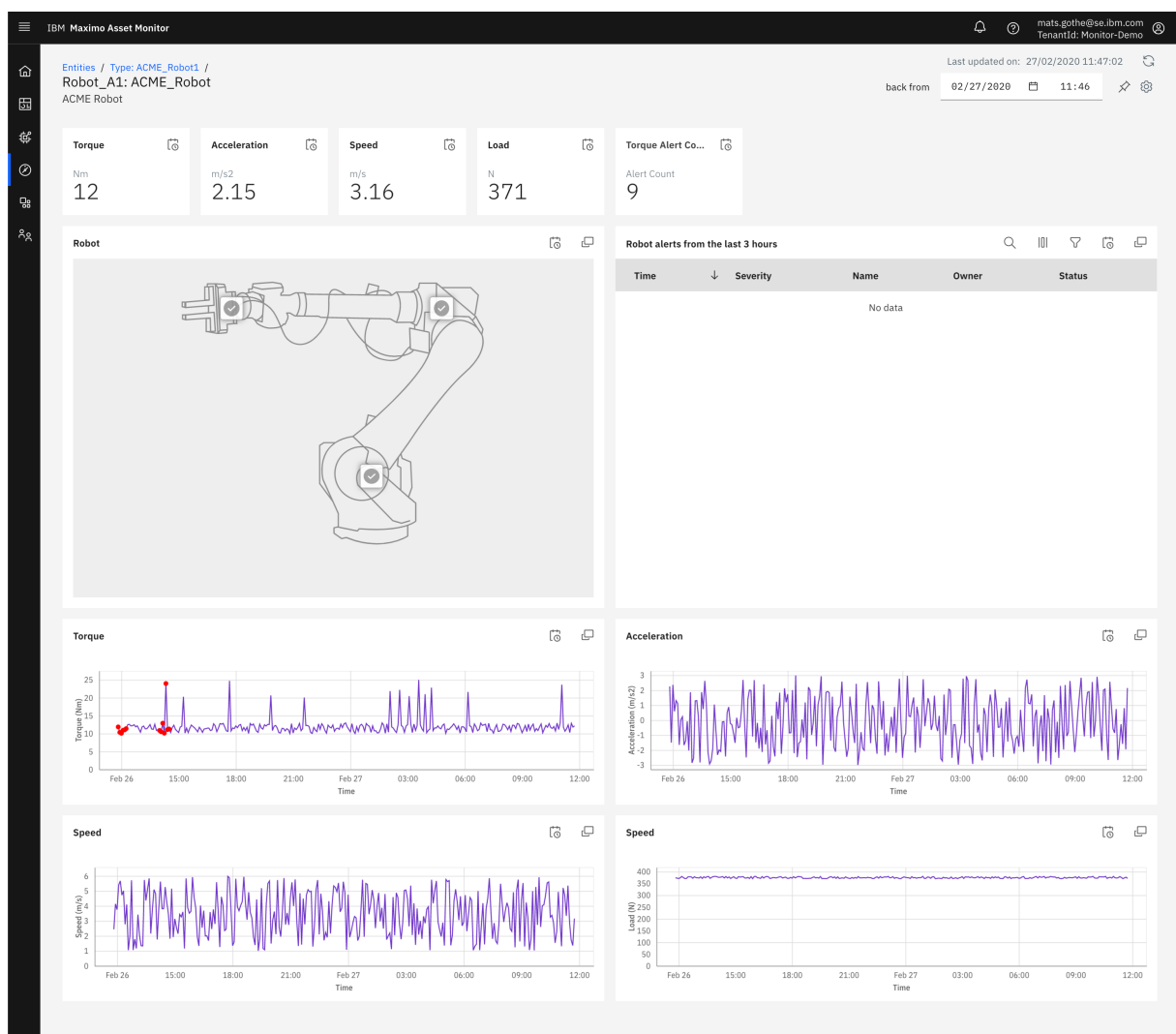
An image card shows as a custom image with configured hotspots. Each hotspot is indicated at a position on the image with an icon and configured as a value card with entity metrics. The value card is shown when clicking on the hot spot.

In this section of the lab you will configure the instance dashboard for robots of the ACME_Robot type. The desired design of the robot dashboard is shown in the screenshot below.

The robot dashboard should present:

- Current robot metric values for acc, load, speed, torque
- A table with anomaly alerts on the robot torque metric
- Time-series graph with torque, acc, load, speed metric values and anomaly alerts
- A robot image with a status hotspot showing robot metric values

Such a robot dashboard would look like this:



3.2 Viewing and Editing an Instance Dashboard

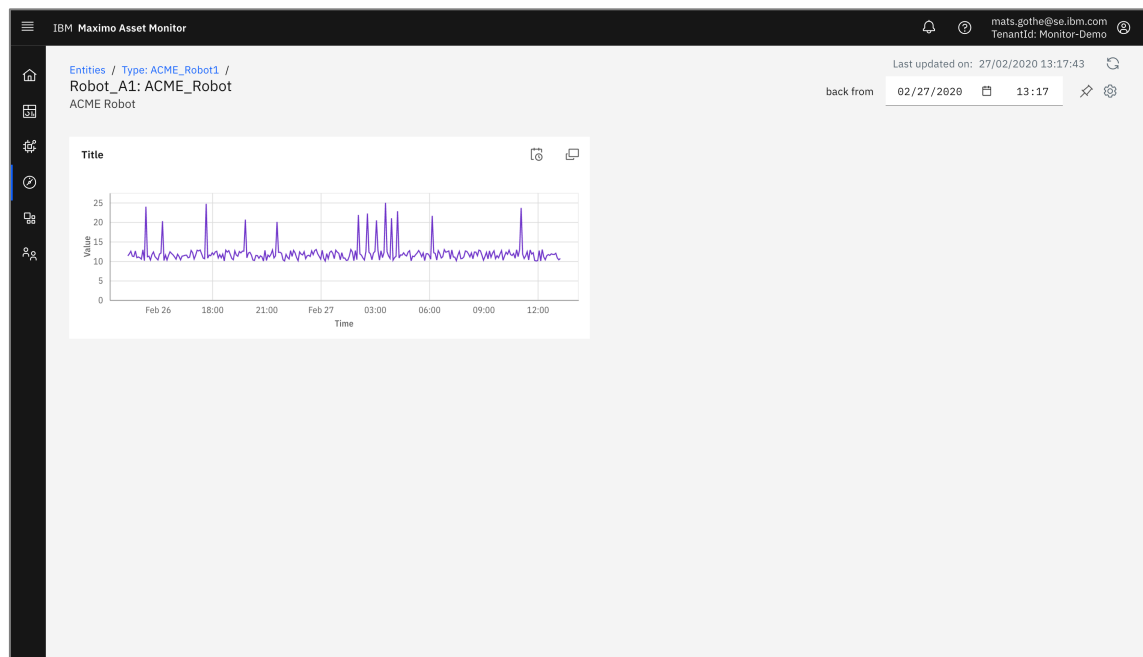
To view the robot instance dashboard

1. Make sure you have the **Type: ACME_Robot** entity type page open

ID	Site	Process	Client	Region	Rcv_timestamp_utc
Robot_A1	Alphaville	Assembly	ACME	US	2020-03-03T17:14:48.513+0000
Robot_B1	Betacamp	Assembly	ACME	US	2020-03-03T17:14:48.706+0000
Robot_C1	Charlyton	Assembly	ACME	US	2020-03-03T17:14:48.909+0000
Robot_D1	Deltalake	Assembly	ACME	US	2020-03-03T17:14:49.123+0000

Note: To open this page, choose **Monitor** in the left-hand navigator, then choose **Robot_A** on the list of entity types. Choose the robot index number 1 – 20 for your lab workstation.

2. In the **Instance Dashboard** table, click on one of the robots to open the instance dashboard.

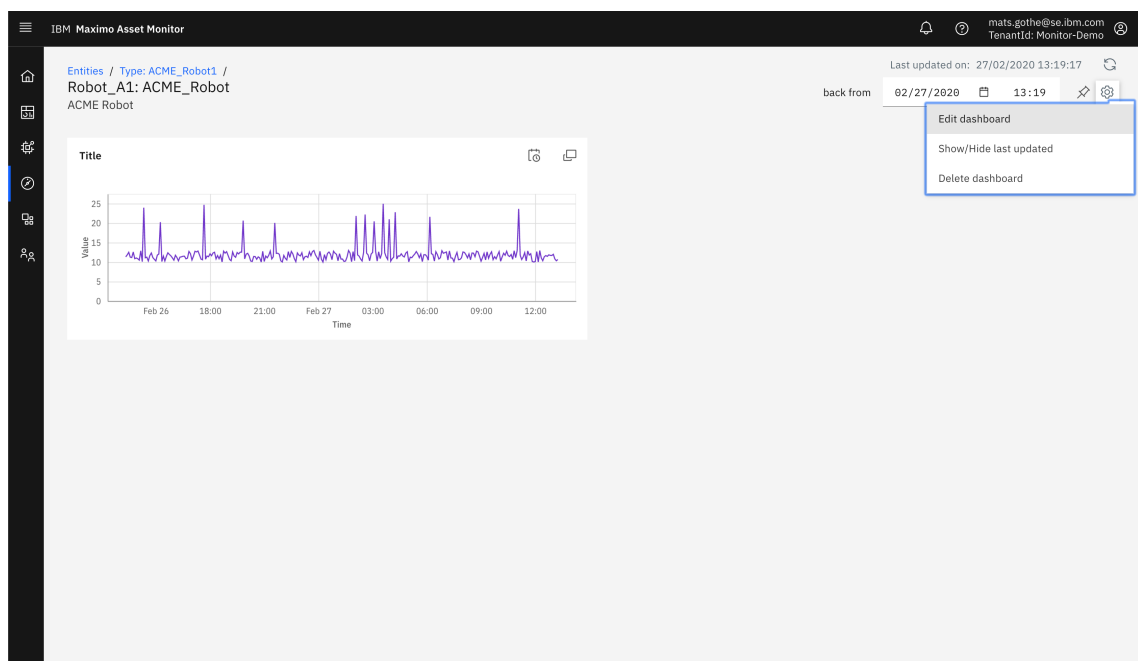


The robot instance dashboard, at this stage of the lab, only contains a single line graph card with torque values. We will first update the presentation of the graph card with a title and axes labels. Then proceed and add more cards to the dashboard.

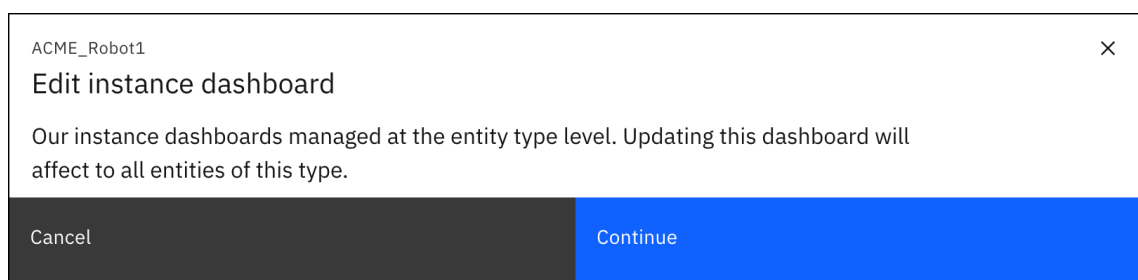
A dashboard is configured using a JSON file. The file contains all detailed card and layout configurations. The dashboard JSON file may be downloaded, modified and uploaded from the instance dashboard page.

3. To access the dashboard JSON file for the robot dashboard, click on the cogwheel icon in the upper right corner of the dashboard title bar.

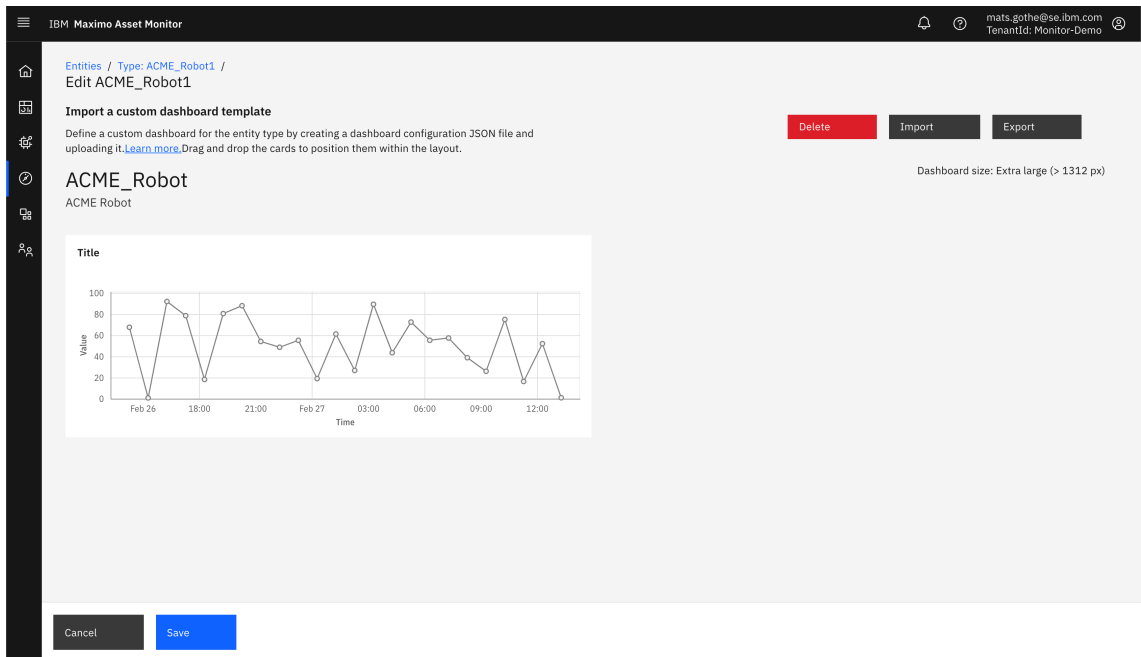
Choose the **Edit Dashboard** action



4. Click **Continue** on the **Edit Instance Dashboard** confirmation dialog.



- On the Dashboard editor page, click **Export** to download the dashboard JSON file.
Save the JSON file to your downloads folder.



- Open the Downloads folder in Windows File Explorer.
- Open and view the **ACME_Robot-dashboard.json** file in the notepad editor.

```
{
  "title": "ACME_Robot",
  "timeGrain": "hour",
  "description": "ACME Robot",
  "cards": [
    {
      "id": "card-torque-timeseries",
      "type": "TIMESERIES",
      "size": "MEDIUMWIDE",
      "title": "Title",
      "dataSource": {
        "timeGrain": "hour",
        "attributes": [
          {
            "attribute": "torque",
            "id": "torque"
          }
        ]
      },
      "range": {
        "count": -24,
        "interval": "hour"
      }
    },
    {
      "content": {
        "series": [
          {
            "dataSourceId": "torque",
            "label": "Value"
          }
        ]
      }
    }
  ]
}
```

```

    },
    "xLabel": "Time",
    "yLabel": "Value"
  }
}
],
"layouts": {}
}

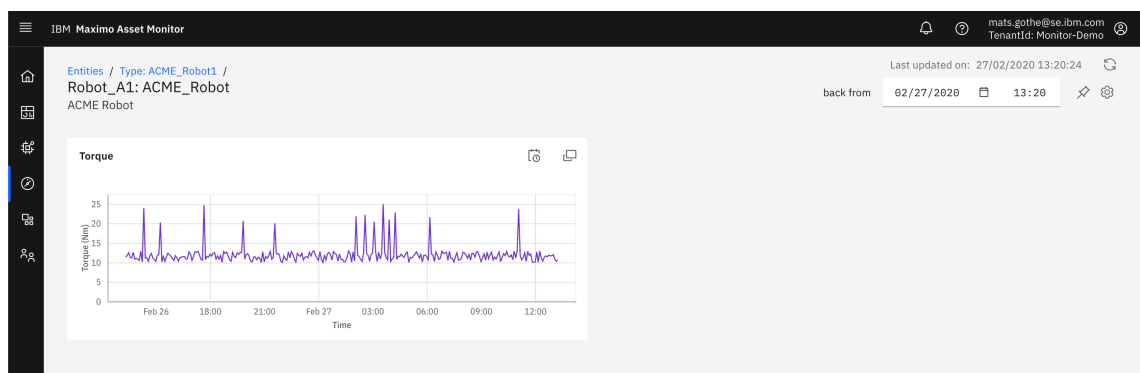
```

The dashboard JSON file has a structure with a few dashboard definition elements and after that a **"cards"** [] and a **"layouts": {}** section. In this lab we will add additional dashboard configurations in the cards section of the JSON file.

Note: The JSON file defines a single timeseries graph card. The data source of the card is bound to the "torque" metric we explored in the previous section of the lab.

To update the dashboard configuration, edit the ACME_Robot-dashboard.json file

1. Update the JSON file with the following changes
 - Update title of the card to "Torque".
 - Update the label of the graph to "Torque"
 - Update the y-axes of the card to "Troque (Nm)"
2. Save the file
3. Return to the Instance Dashboard editor page in Maximo Asset Monitor. Click **Import** and upload the updated ACME_Robot-dashboard.json file.
4. Click **Save** to apply the change in the uploaded file.
5. View your updates on the dashboard.



Note: The card title and Y-axes is updated with "Torque".

We have now applied some simple updates to the robot dashboard. We will proceed and add a new value card to the dashboard.

3.3 Adding a Value Card to the Robot Instance Dashboard

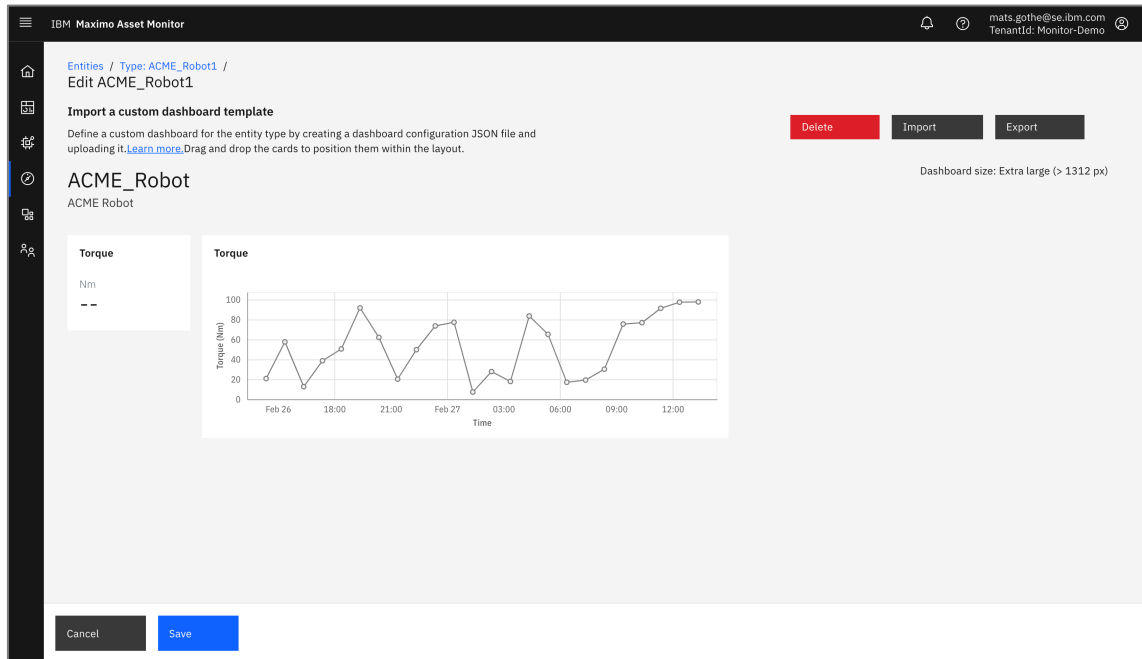
To add a new value card to the dashboard

1. Get the file **3.3.VALUE CARD.json** from the shared folder.
2. Return to the Notepad editor and add the following template code to the “cards”: [] section. Paste the code **before** the existing time-series card.

```
{
  "id": "card-torque-value",
  "size": "SMALL",
  "title": "Torque",
  "type": "VALUE",
  "dataSource": {
    "attributes": [
      {
        "attribute": "torque",
        "id": "torque"
      }
    ]
  },
  "content": {
    "attributes": [
      {
        "dataSourceId": "torque",
        "label": "Nm",
        "precision": 2
      }
    ]
  }
},
```

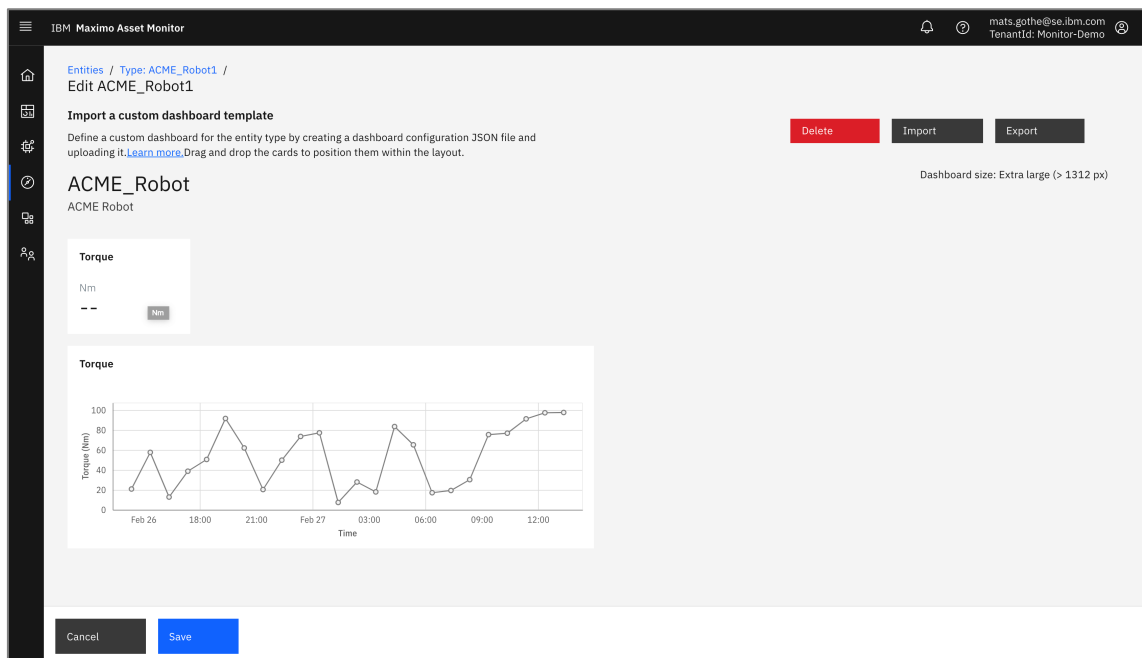
3. Save your changes to the JSON file.
4. Repeat the steps from previous section to
 - Open the instance dashboard editor
 - Click on Import to upload the updated JSON file
 - Save to apply the changes

5. View the updated robot dashboard.



Note: A new card has been added to the dashboard presenting the latest torque value for the robot.

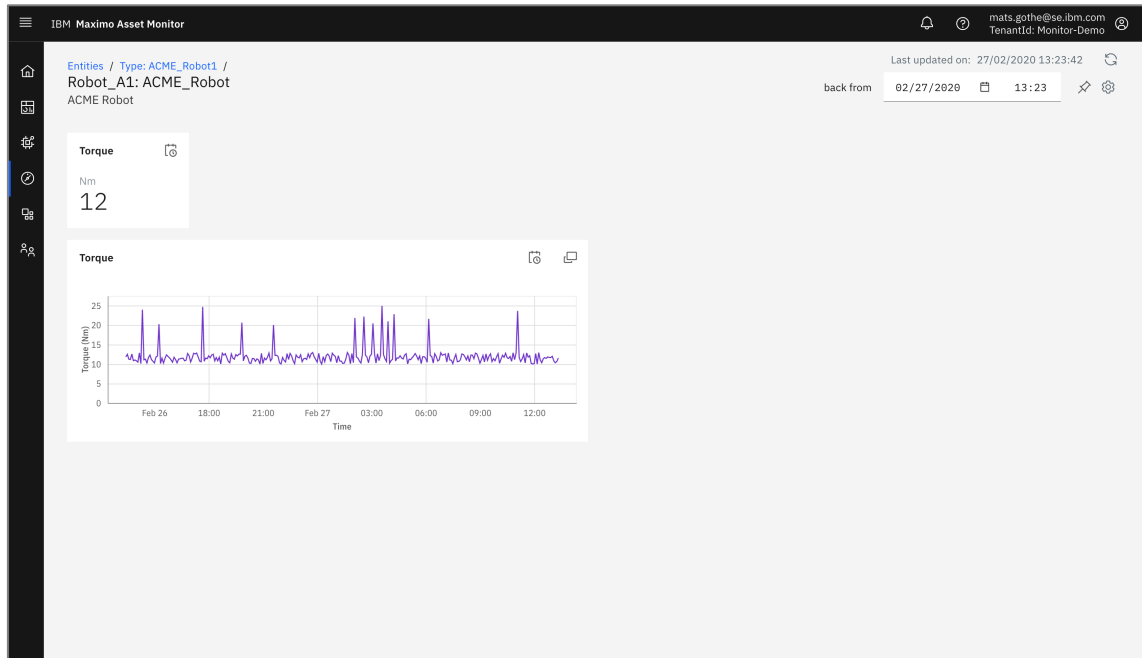
6. Change the dashboard layout by grabbing the value card, dragging it to the right of the line graph and dropping it into the location. Note: You may need to move the line graph to the right to fit both cards on a row.



7. Click **Export** to get a new JSON file with the updated layout.

Note: There is a good practice to make and validate the changes, then export the JSON file and work with the latest exported version for additional updates.

8. Click **Save** and view the updated dashboard layout. We now have a line graph card with a time-series of torque values, and a value card with the latest torque value from the robot.



3.4 Adding an Alert Card to the Robot Instance Dashboard

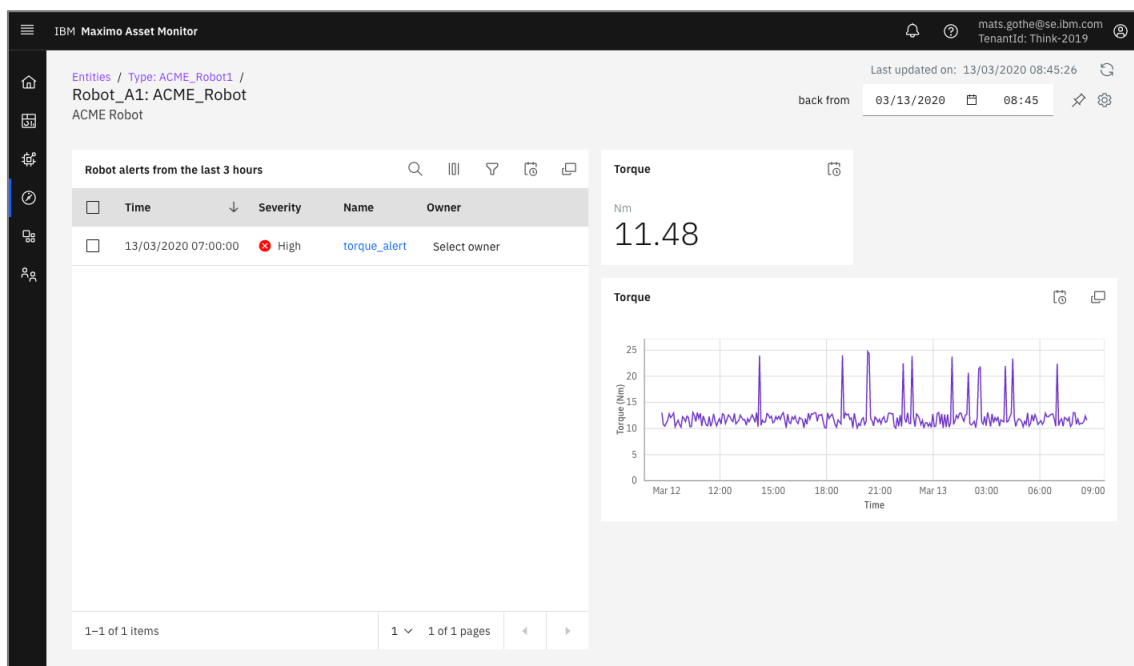
To add a new anomaly alert card to the dashboard

1. Get the file **3.4.ALERTS CARD.json** from the shared folder.
2. Return to the Notepad editor and add the following template code to the “cards”: [] section. Paste the code **before** the existing value and time-series cards.

```
{
  "id": "alerts",
  "size": "LARGE",
  "title": "Robot alerts from the last 3 hours",
  "type": "ALERT",
  "dataSource": {
    "range": {
      "count": -3,
      "interval": "hour"
    },
    "timeGrain": "input",
    "type": "alert"
  }
},
```

Note: The Alerts card do not take a data source. The card will show all alert metrics defied in the entity type.

3. Save and upload the changes to the JSON file.
4. View the updated robot dashboard.



Note: We now have an Alert table on the dashboard listing all torque anomaly alerts from the robot over the last 3 hours.

3.5 Adding Anomaly Alerts to the Torque Graph

Anomaly robot metric data can be shown in a tabular form, the Alert table card we just added in the previous section. Anomalies can also be shown graphically, as overlays on the data metric where the anomaly has been detected.

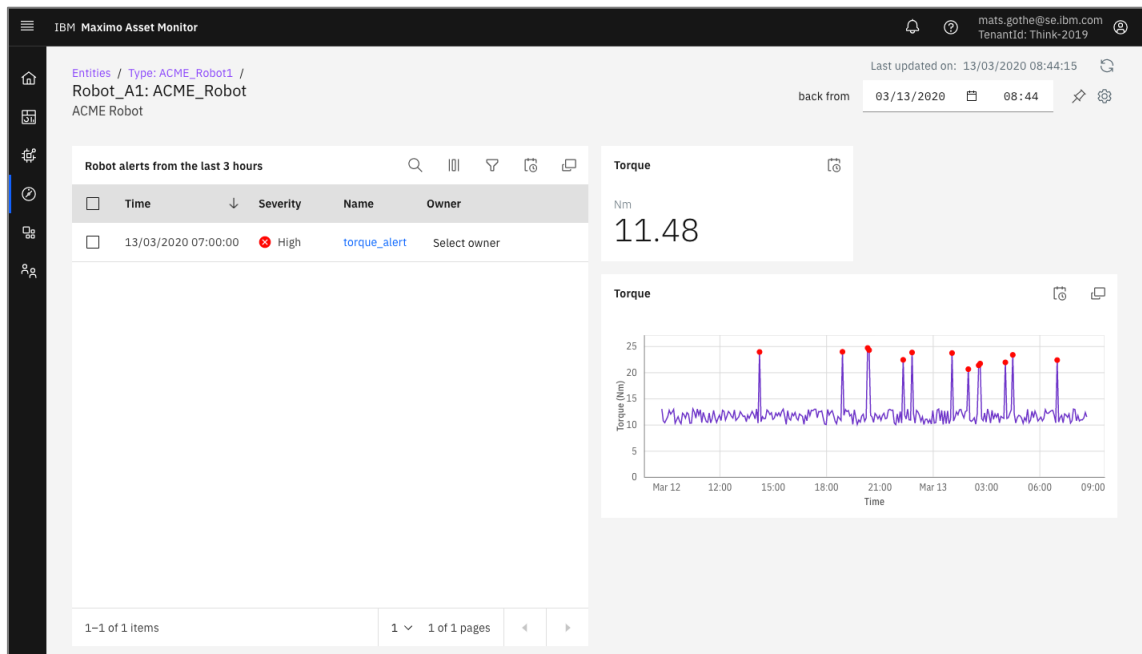
To add the torque anomaly alerts to the Torque line graph card on the dashboard

1. Get the file **3.5.ANOMALY ALERTS.json** from the shared folder.
2. Return to the Notepad editor and view the time-series card configuration. Paste the new red code into the time-series card configuration.

```
{
  "id": "card-torque-timeseries",
  "type": "TIMESERIES",
  "size": "LARGE",
  "title": "Torque",
  "dataSource": {
    "timeGrain": "hour",
    "attributes": [
      {
        "attribute": "torque",
        "id": "torque"
      }
    ]
  },
  "range": {
    "count": -24,
    "interval": "hour"
  },
  "additionalData": {
    "type": "alert",
    "dataFilter": {
      "name": "torque_alert"
    }
  },
  "content": {
    "series": [
      {
        "dataSourceId": "torque",
        "label": "Torque"
      }
    ],
    "xLabel": "Time",
    "yLabel": "Torque (Nm)"
  }
}
```

Note: The added code will add the anomaly metric data source to the graph.

3. Save and upload the changes to the JSON file.
4. View the updated robot dashboard.



Note: A new card has been added to the dashboard presenting the latest torque value for the robot.

3.6 Adding an Image Card

Visualizations always help the interpretation of data. Monitor dashboards provides image cards that can present an image of the asset, or a map with the asset location. Hot spots on the image can be used to present location or status information on the asset. We will now add a schematic image of the robot, and place three hot spots on the image with metrics.

To add an image card to the dashboard

1. Get the file **3.6.IMAGE CARD.json** from the shared folder.
2. Return to the Notepad editor and add the following template code to the “cards”: [] section. Paste the code **before** the existing cards.

```
{
  "content": {
    "image": "robo-arm",
    "alt": "Robot",
    "hideZoomControls": true,
    "hideMinimap": true,
    "hotspots": [
      {
        "color": "#999",
        "icon": "icon-checkmark-solid",
        "content": {
          "attributes": [
```



```

        {
            "dataSourceId": "torque",
            "label": "Torque"
        }
    ],
    },
    "locations": [
        {
            "x": 20,
            "y": 15
        }
    ],
    },
    {
        "color": "#999",
        "icon": "icon-checkmark-solid",
        "content": {
            "attributes": [
                {
                    "dataSourceId": "speed",
                    "label": "Speed"
                },
                {
                    "dataSourceId": "acc",
                    "label": "Acceleration"
                }
            ]
        },
        "locations": [
            {
                "x": 60,
                "y": 70
            }
        ],
        },
        {
            "color": "#999",
            "icon": "icon-checkmark-solid",
            "content": {
                "attributes": [
                    {
                        "dataSourceId": "load",
                        "label": "Load"
                    }
                ]
            },
            "locations": [
                {
                    "x": 80,
                    "y": 15
                }
            ]
        }
    ],
    },
    "dataSource": {
        "attributes": [
            {
                "attribute": "torque",
                "id": "torque"
            }
        ]
    }
}

```

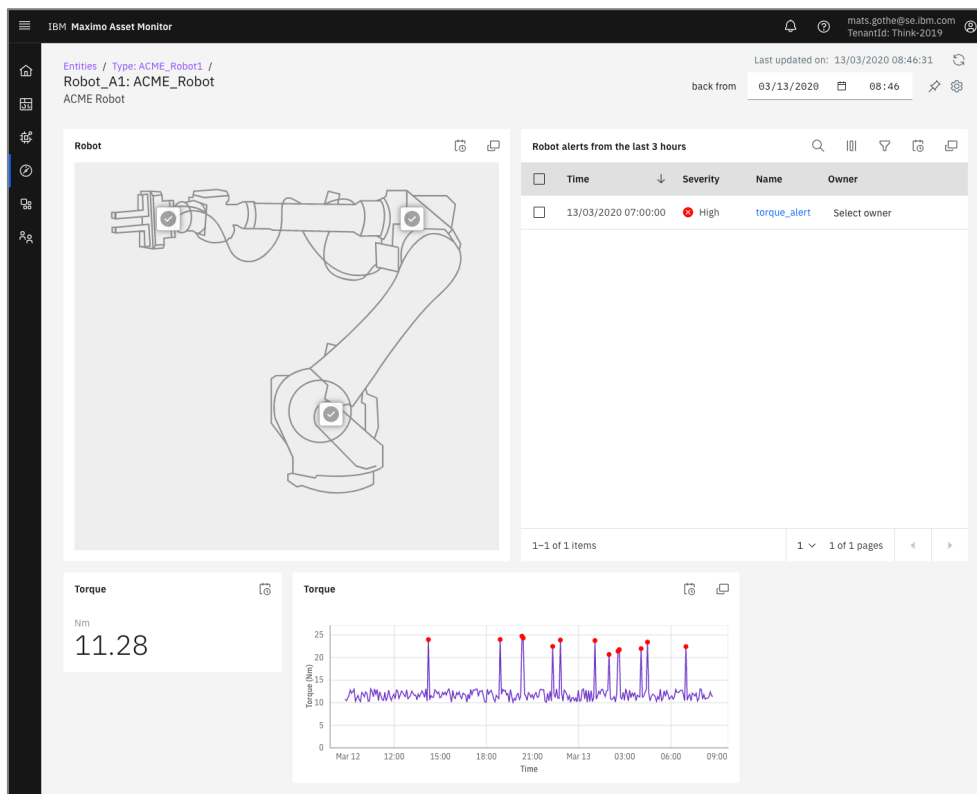
```

    },
    {
      "attribute": "load",
      "id": "load"
    },
    {
      "attribute": "speed",
      "id": "speed"
    },
    {
      "attribute": "acc",
      "id": "acc"
    }
  ],
  "range": {
    "count": -1,
    "interval": "hour"
  }
},
{
  "id": "robot-image",
  "size": "LARGE",
  "title": "Robot",
  "type": "IMAGE"
},
},

```

Note: The image card “robot-arm” image. It then declares three hot-spots on the image. Each hot spot is given a an icon, a color, the data metric to display and the location of the hot spot. The location is given by image pixel coordinates from the upper/left corner.

3. Save and upload the changes to the JSON file.
4. View the updated robot dashboard.

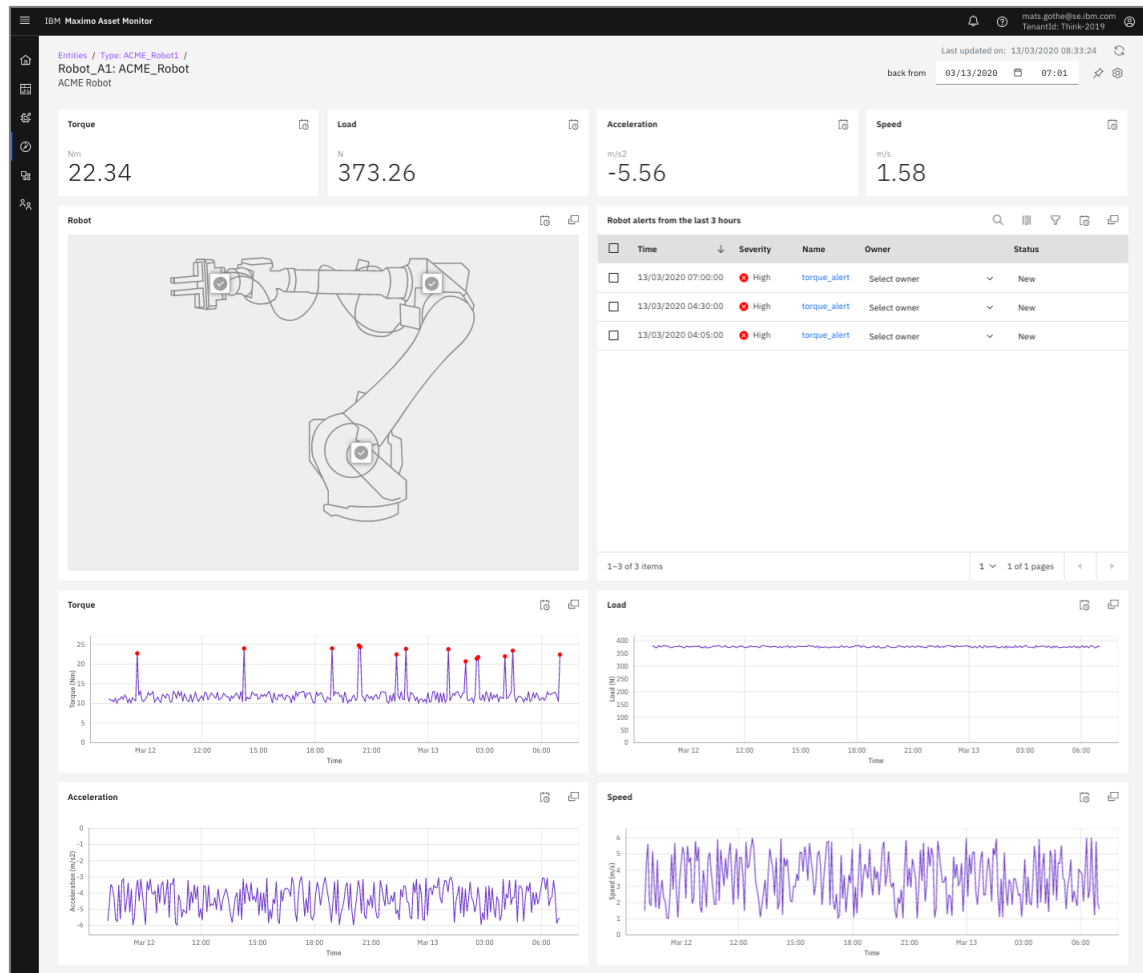


3.7 [Optional] Finalizing the dashboard

To create a fully functional and complete operational robot dashboard there are additional cards that should be added. The layout of the dashboard should also be finalized. This section of the lab is optional. You can perform the steps, or just review and import the final dashboard configuration.

The following additions has been made to finalize the robot dashboard

- Additional value cards have been added for Acceleration, Speed and Load metrics. In the configuration, copy / paste the Torque value card JSON and make any changes to bind it to the other 3 metrics. Note, you need to change the card id, the data source and content sections.
- An additional value card was added for Alert Count. Create a copy of the Torque value card JSON and bind it to the **torque_alert_ACME_Robot_count** metric.
- The layout of the dashboard was updated. Move the cards around to create a top-down organization of value cards, alert cards and line graph cards.



We have now completed the task to update the robot instance dashboard. In the next section we will explore Summary Dashboards in Maximo Asset Monitor.

4 Exploring a Robot Summary Dashboard

4.1 About Summary Dashboards

A summary dashboard is a presentation of performance KPI metrics in the context of a filtered set of entities, *i.e.* all robot in a manufacturing site or in a production line at site. The filter is defined by dimensions assigned to the entities. For example, Robot_A1 and Robot_B1 may be operating at the Alphaville site, while Robot_C1 and Robot D1 are operating at the Betacamp site. A summary dashboard provides a filter control to set the value of the dimensions and filter the entity scope. It will then compute the aggregations that apply to the filter and provide performance KPIs or statistical values of the metrics. For example, the Max, Min and Mean torque of all robots in the filtered scope. Or, the KPI of availability of the robots at a site by providing the percentage of an operational state metric.

A summary dashboard uses time grains when computing the aggregations. Metrics may be computed and presented by hour, day, week, month. It is recommended to present a common grain for the various cards on a dashboard.

A summary dashboard supports the same list of cards as an instance dashboard and the steps to configure a summary dashboard is similar to the steps we performed in the previous session of this lab.

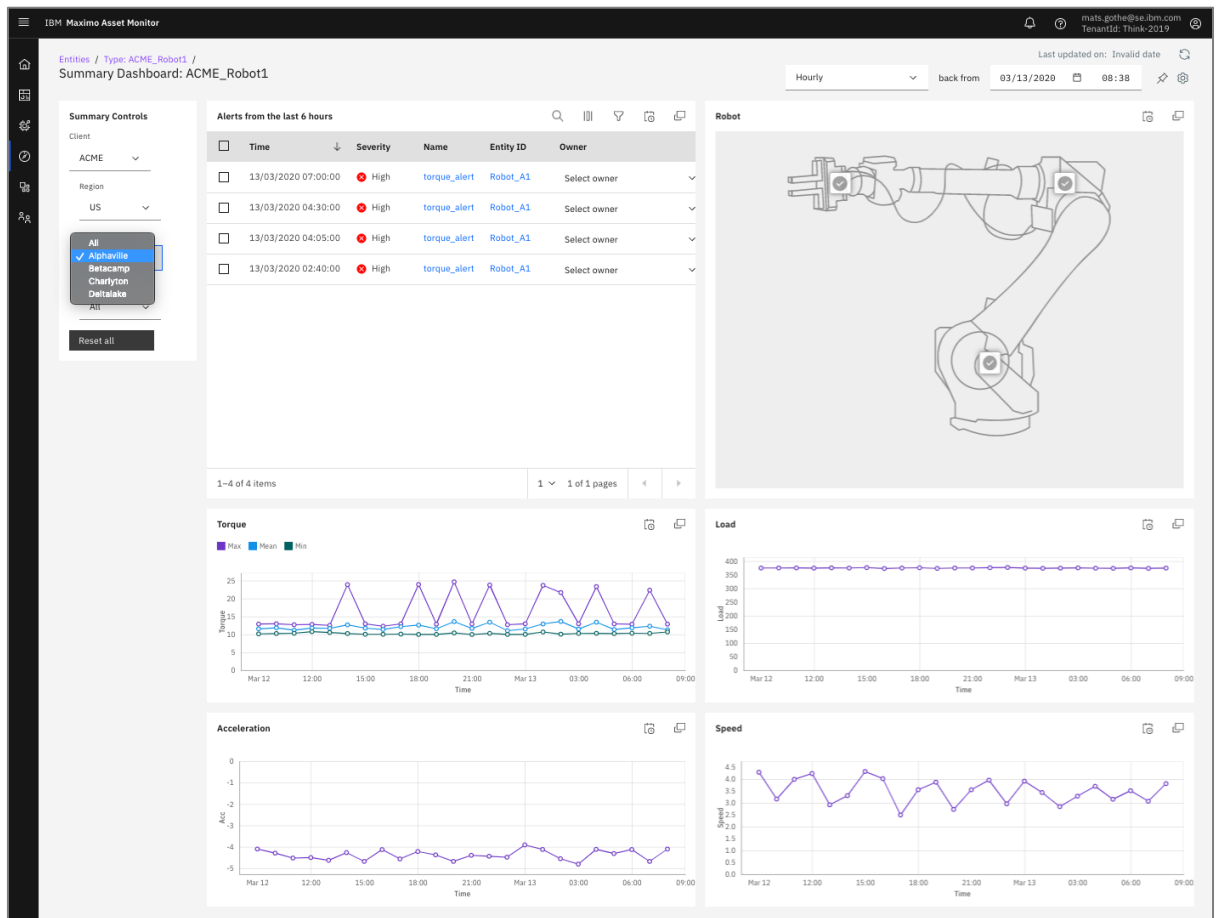
4.2 Explore the ACME Robot Summary Dashboards


To view the ACME_Robot summary dashboard

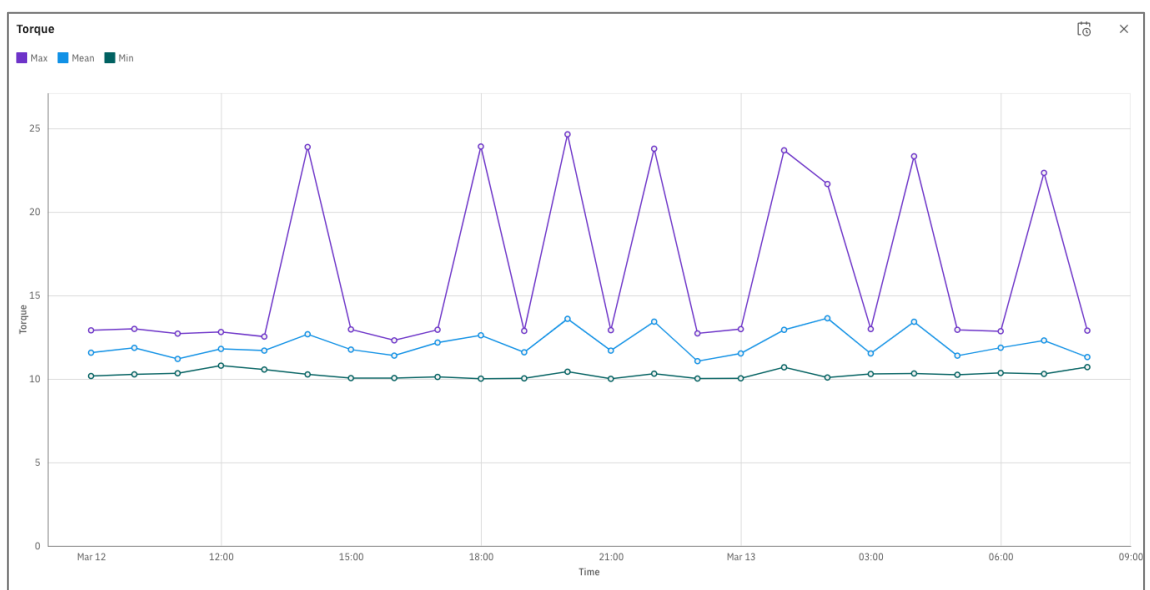
1. Make sure you have the **Type: ACME_Robot** entity type page open

ID	Site	Process	Client	Region	Rcv_timestamp_utc
Robot_A1	Alphaville	Assembly	ACME	US	2020-03-03T17:14:48.513+0000
Robot_B1	Betacamp	Assembly	ACME	US	2020-03-03T17:14:48.706+0000
Robot_C1	Charlyton	Assembly	ACME	US	2020-03-03T17:14:48.909+0000
Robot_D1	Deltalake	Assembly	ACME	US	2020-03-03T17:14:49.123+0000


- In the Summary Dashboard section, click on the ACME_Robot summary dashboard.' The summary dashboard opens.

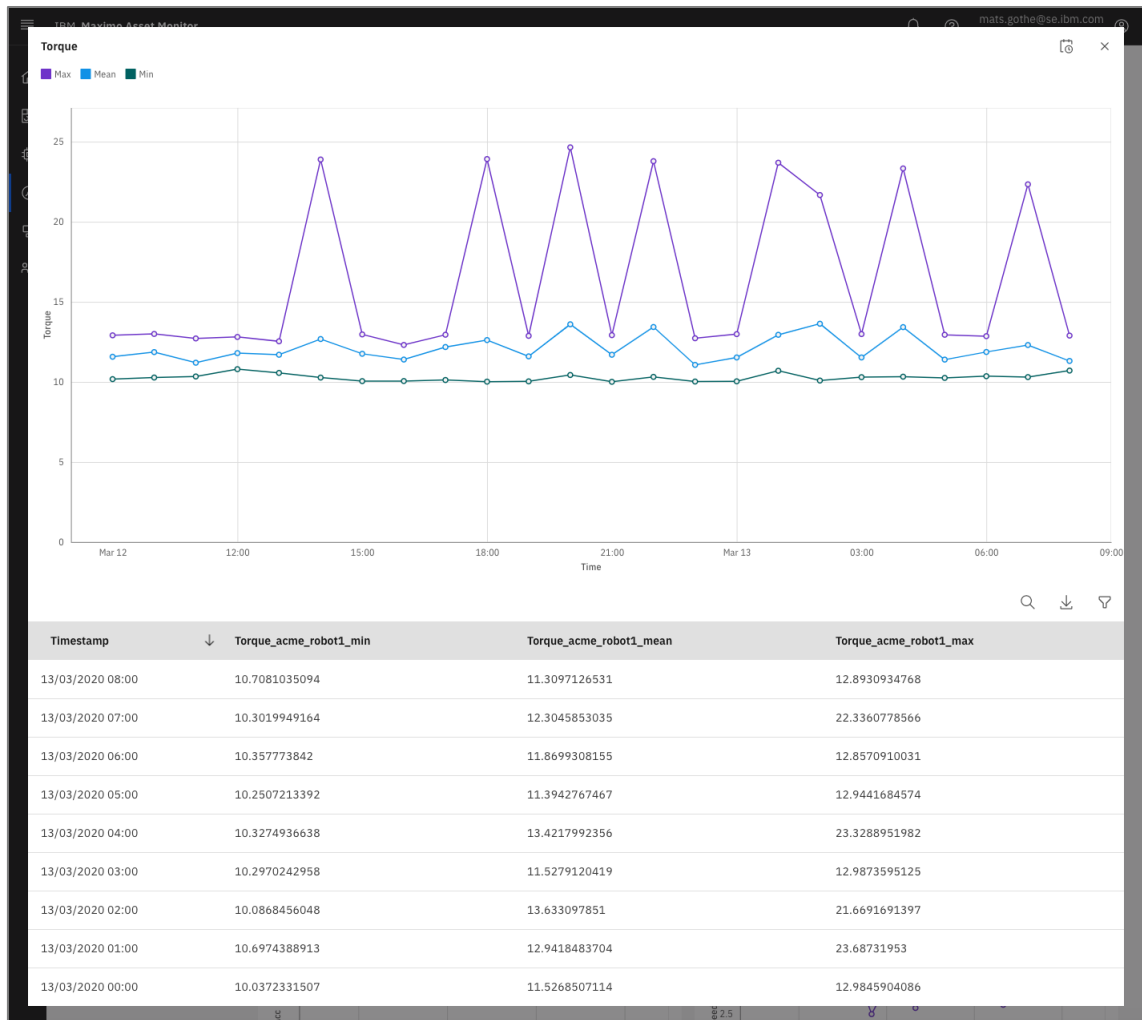


- Explore the cards on the summary dashboard.
- Click on the Full Size icon  on the Torque card to view the graph in full screen mode




5. Explore the Torque data graph

- Click on the legends to show / hide individual statistical metrics
- Hover over a data point to see its value
- Scroll down on the page to view the tabular data in the graph
- Click the download icon  to get a CSV-file with all data values

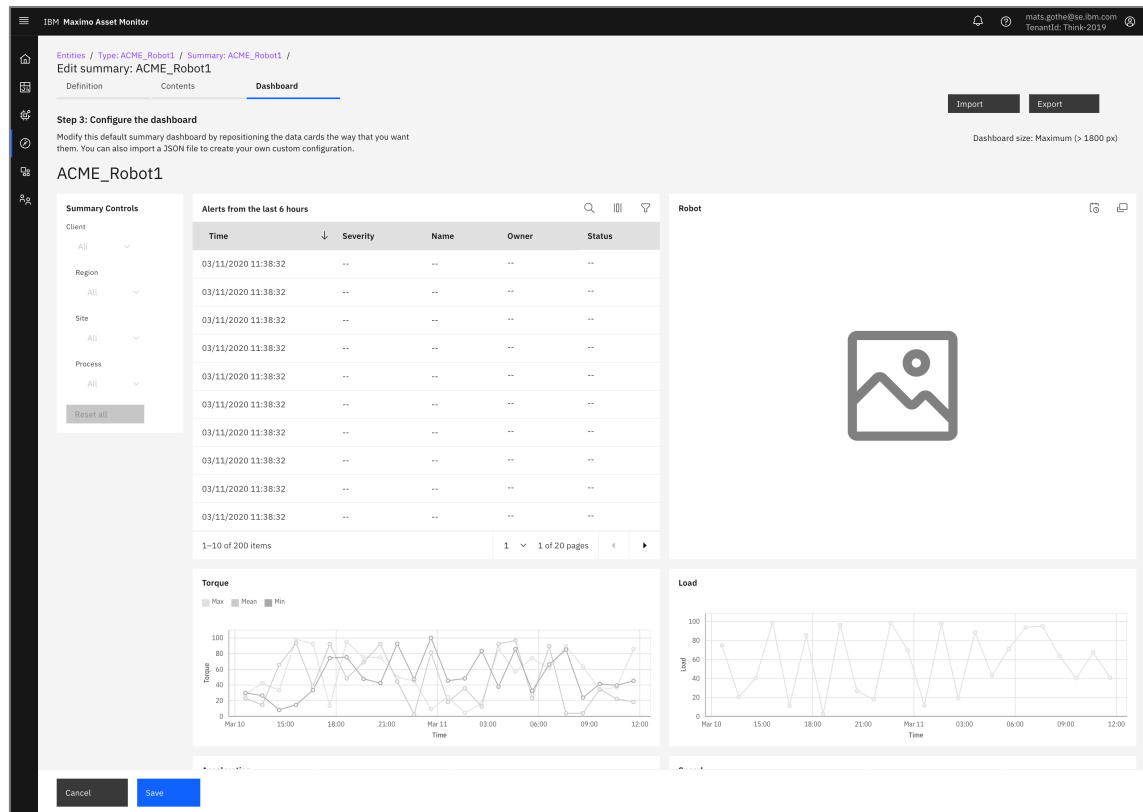


4.3 Explore the Summary Dashboard Editor

To open summary dashboard editor

1. Click on the cogwheel icon  and choose the **Edit dashboard** action

The editor opens.



Note: The summary dashboard editor is similar in usage to the Instance Dashboard editor, but adds Definition and Contents steps to the configuration.

2. Click on the **Definition** tab to view the summary dashboard definition.

The configuration page contains settings for the default grain of the dashboard and the hierarchy of dimensions used for filtering.

The screenshot shows the 'Definition' tab in the IBM Maximo Asset Monitor. The page title is 'Edit summary: ACME_Robot'. The 'Definition' tab is selected, showing 'Step 1: Define how to summarize your data'. The 'Summary name' is 'ACME_Robot'. The 'Time grains' are set to 'Hourly' and the 'Timestamp' is 'RCV_TIMESTAMP_UTC'. The 'Dimensions' table shows a hierarchy: CLIENT (None), PROCESS (SITE), REGION (CLIENT), and SITE (REGION). The 'Save' button is highlighted.

Dimension	Parent dimension
CLIENT	None
PROCESS	SITE
REGION	CLIENT
SITE	REGION

Note: The hierarch of dimensions is set to CLIENT > REGION > SITE > PROCESS. The summary dashboard will use this hierarchy when filtering the robots and computing performance KPIs.

3. Click on the **Contents** tab to view the summary dashboard definition.

The contents page contains settings for the summary data to be shown as line graphs on the dashboard. Each metric is presented in a separate graph with the selected aggregations.

The screenshot shows the 'Contents' tab in the IBM Maximo Asset Monitor. The page title is 'Edit summary: ACME_Robot'. The 'Contents' tab is selected, showing 'Step 2: Populate the summary with data'. The 'Available input data' table lists metrics: load, speed, torque, and torque_alert. The 'Methods' dropdown for 'torque' is open, showing options: count, first, last, max, and mean. The 'Save' button is highlighted.

Item	Type	Methods
load	Number	Methods
speed	Number	Methods
torque	Number	Methods
torque_alert	Boolean	Methods

4. Click on the **Dashboard** tab to view the summary dashboard definition.

The dashboard page provides the same capabilities as the Instance Dashboard editor to reorganize the layout and download / upload the JSON definition of the dashboard.

The screenshot shows the 'Dashboard' tab of the 'ACME_Robot1' summary dashboard in IBM Maximo Asset Monitor. The interface includes a left sidebar with navigation icons, a top header with user information, and a main workspace. The workspace contains a 'Summary Controls' panel on the left with filters for Client, Region, Site, and Process. The central area displays a table titled 'Alerts from the last 6 hours' with columns for Time, Severity, Name, Owner, and Status. The table shows 10 rows of data. Below the table is a 'Torque' section with a legend for Max, Mean, and Min. On the right side of the workspace, there is a 'Robot' card with a placeholder image icon and a 'Load' button. At the bottom of the workspace, there are 'Cancel' and 'Save' buttons. The top right corner has 'Import' and 'Export' buttons and a note about the dashboard size limit.

Time	Severity	Name	Owner	Status
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--
03/11/2020 11:38:32	--	--	--	--

Note: You can Export the JSON definition for the summary dashboard to explore the card configurations.

We have now completed the last step in this hands-on lab.

5 Conclusions from this Maximo Asset Monitor lab

We have now completed the last step in this hands-on lab.

During this lab you have:

- Gained hands-on experience with Maximo Asset Monitor.
- Explored entity types, entities, data metrics, anomalies and alerts.
- Deepened your understanding of configuring Instance Dashboards.
- Deepened your understanding of Summary Dashboards.

We hope that you have found this lab informative, educational, and fun.

5.1 Further reading

To learn more about the IBM Maximo Asset Monitor visit

- Maximo Asset Monitor on ibm.com
<https://www.ibm.com/products/ibm-maximo-asset-performance-management/asset-monitor>
- Maximo Asset Monitor knowledge center
https://www.ibm.com/support/knowledgecenter/SSQP8H/iot/kc_welcome.html

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