openMCT User's Guide

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Revision History

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- Initial published version.

Glossary

Telemetry Stream: A streaming real-time telemetry source configured in Open MCT within a Data Set.

Composable Object : Any type of object in Open MCT that can be created and edited by the user.

Composition: In Open MCT, the act of creating or editing an object, including the detemination of which objects are contained within a given object as well as configuration options for each.

Containment: In Open MCT, many objects are composed of other objects, and hence are said to "contain" them. Folders, Display Layouts, Plots, Tables and more all contain other objects.

Context Menu: A user interface element that provides a set of options as a menu, contextually tailored for a given object type. Often invoked by "right-clicking" or "ctrl-clicking" an object in Open MCT. See "Context Menus" on page 6.

CSV: Comma Separated Values, a common file export format for data in which each line represents a record, with commas separating field values. More on exporting data starting at "Exporting an Object's Historical Data" on page 6.

Data Set: A Open MCT object that collects a variety of data resource types via URLs into a single, accessible data object that exposes data collections as view objects to the rest of the application. See "Data Set and Data Views" on page 6 for more.

Data Views: Built-in views for the different data types exposed by a Data Set; includes Telemetry Telemetrys, EVR's, Dictionaries, and more. See "Data Set and Data Views" on page 6 for more.

Dialog: A common user interface element presented in Open MCT as an overlay to solicit input from the user or to provide a quick view of an element.

Dictionary: In Open MCT, a Data View of the deployment-configured mission dictionary. The Dictionary exposes meta-data and information about the missions's telemetry and enumerated Telemetrys as well as event records. More information starting with "Dictionaries" on page 6.

Display Layout: A type of composed view object that allows the placement and sizing of other views in a two-dimensional canvas area. For more, see "Display Layouts" on page 6.

Enumerated Telemetry: A telemetry Telemetry that encodes state-based information, such as "ON" and "OFF". Typically values are stored as numeric indices, with a dictionary lookup utilized to convert to a human-readable string.

Export: In Open MCT, the act of extracting data or content from the application for use outside it.

Filtering: In a Open MCT table view, filtering refers to only displaying rows of data in which one or more columns include data that match a user-entered value.

Historic Data: Data retrieved and displayed via a query against a datetime span with a discrete beginning and end.

Inspection Pane: In Open MCT, a user interface element that provides meta-data and configuration options for the currently in-view object. More info at "Inspection Pane" on page 6

Telemetry Table: In Open MCT, a type of composable tabular view that always displays available data for each of its constituent Telemetrys in alphanumeric format. "Telemetry Tables and Telemetry Table Sets" on page 6 has more information.

Link: In Open MCT, a Link is a shortcut to another object, similar to a symlink or alias in other computer systems. See "Original Objects and Links" on page 6.

Min-Max Query: A technique employed to optimize the performance of data queries associated with plot views. For example, in a time-based plot of a telemetry Telemetry in which there are 100 pixels available to display in the time axis, retrieving more than 100 data points is wasteful — no more than 100 points can be rendered in that space. A min-max query allows the dimensions of the rendering space to be included as part of the query, so that the server can optimize and return the sufficient number of data points, and no more, to accurately represent the data.

Object: In Open MCT, an object is the fundamental building block of the application. Both built-in (Telemetry Telemetry, Dictionary, EVR View, etc.) and created elements (Display Layouts, Telemetry Tables and more) are all considered objects. More at "Original Objects and Links" on page 6.

Pane: A portion of the main user interface of Open MCT, which is divided into three main panes: the Browsing Area with the Object Tree, View Area and the Inspector. See "Interface Overview" on page 6.

Plot (Overlay and Stacked): A strip chart visualization of data values over time for one or more telemetry Telemetrys. There are two types of plots available in Open MCT: overlay, in which Telemetrys share a common Y axis and overlay each other and stacked, in which each Telemetry maintains its own Y axis and hence stack on top of each other. More information at "Overlay and Stacked Plots Overview" on page 6.

Plot Line: A rendered line that connects data points in a plot. See "Edit an Overlay Plot, Plot Series Options" on page 6.

Plot Marker: The visual indicator of an actual data point in a plot. "Edit an Overlay Plot, Plot Series Options" on page 6.

Properties: In Open MCT, many objects have properties associated with them, such as their name, plot display options, fields to include, etc.

Real-time Data: Data retrieved and displayed in an ongoing basis as it becomes available to the server and application.

Session: An specific instance of an AMPCS down or uplink session, which are uniquely identified by a number and hostname. Open MCT uses sessions to detemine what data to display at any given time. More on configuring and using sessions in Open MCT at "Connecting to Data When Starting Open MCT" on page 6.

Status Bar: An area at the bottom of the Open MCT interface that displays the current status for a number of aspects of the application via Status Indicators. It also displays warning messages when necessary. See "Interface Overview" on page 6.

Status Indicator: A small iconic representation of a system or attribute of Open MCT that are displayed in the Status Bar area. Hovering over any of the indicators will expand them, providing more details and available actions. See "Status Area and Indicators" on page 6.

Telemetry Table: In Open MCT, a type of composable view object that displays data for one or more contained telemetry Telemetrys in a tabular view.

Time Conductor: An interface in Open MCT that allows control of the time context and bounds of data queries for many Open MCT view types. See "Time Conductor Overview" on

page 6.

Topic: A named container of one or more sessions provided by AMPCS. More information starting with "Connecting to an Active Venue" on page 6.

View: Any component which can be displayed to a user. Views may be a single indivisible item, or be composed of other view types.

View Object: A single instance of a view. Can be composed by the user, or built-in as part of a particular Open MCT deployment.
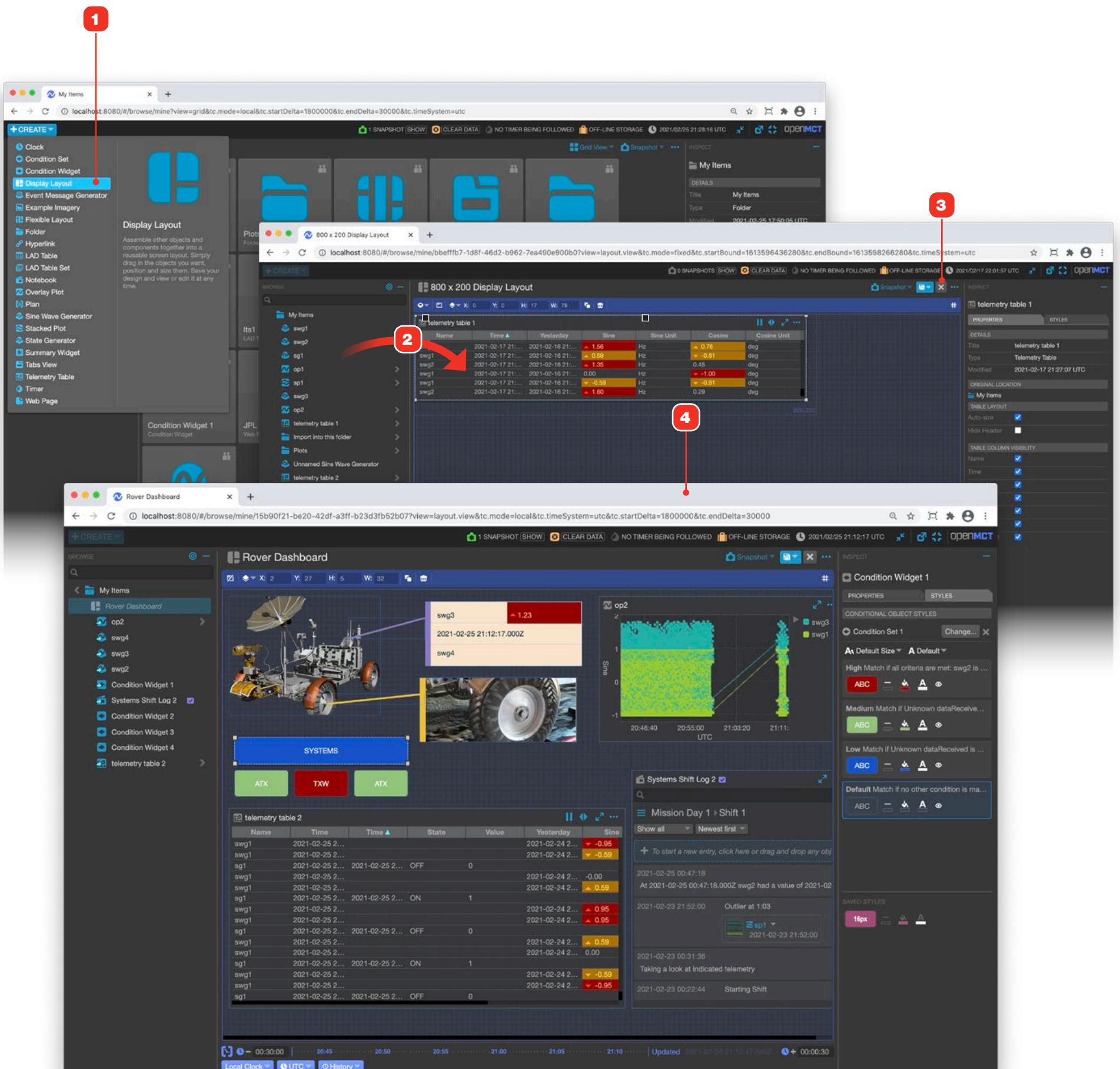
Create a Screen Display

Create a screen that includes multiple telemetry items together in one view.

1 Create a new Display Layout. See "Creating A New Object" on page 41 for more.

2 Find, drag in and position the elements you want.

3 Save your Layout.

4 The final result.

MORE DETAILS

- "Creating A New Object" on page 41
- "Editing An Object" on page 43
- "Display Layouts" on page 69
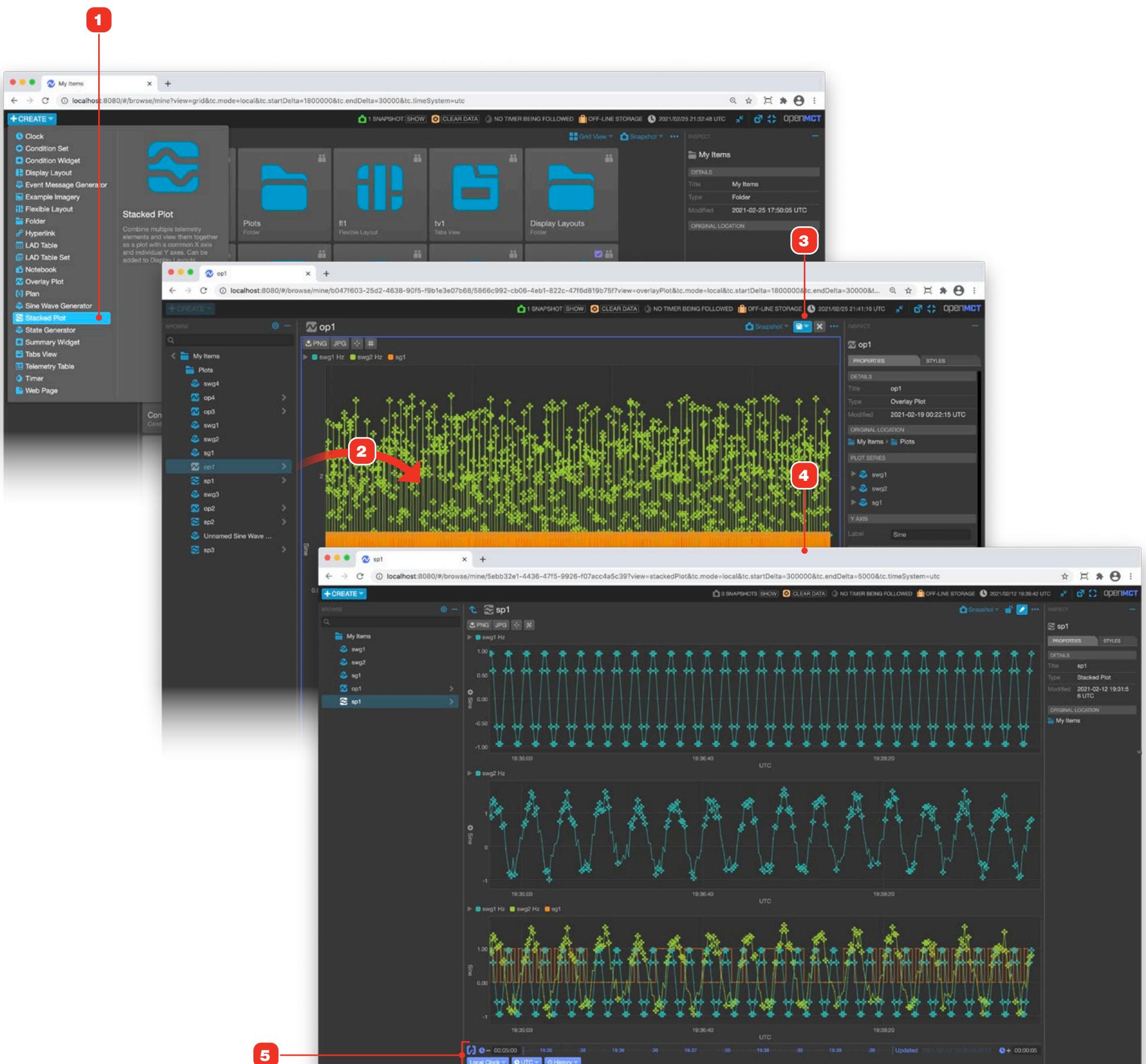
Create a Stacked Plot

Bring together multiple telemetry Telemetrys in a stacked plot view with a common X axis. If you want to include an Overlay Plot **5** as a stacked element, create and save your Overlay Plot first, then add it in step **2** below.

1 Create a new Stacked Plot.

2 Find and drag in the telemetry Telemetrys and Overlay Plots you want. You can drag in as many items as you like.

3 Save your work.

4 The final result. Pan, zoom and explore the view as needed within each plot and by using the Time Conductor.

MORE DETAILS

- ■ "Creating A New Object" on page 41
- ■ "Editing An Object" on page 43
- ■ "Overlay and Stacked Plots Overview" on page 52
- ■ "Edit a Stacked Plot" on page 57
- ■ "Edit an Overlay Plot" on page 53
- ■ "Time Conductor Overview" on page 22
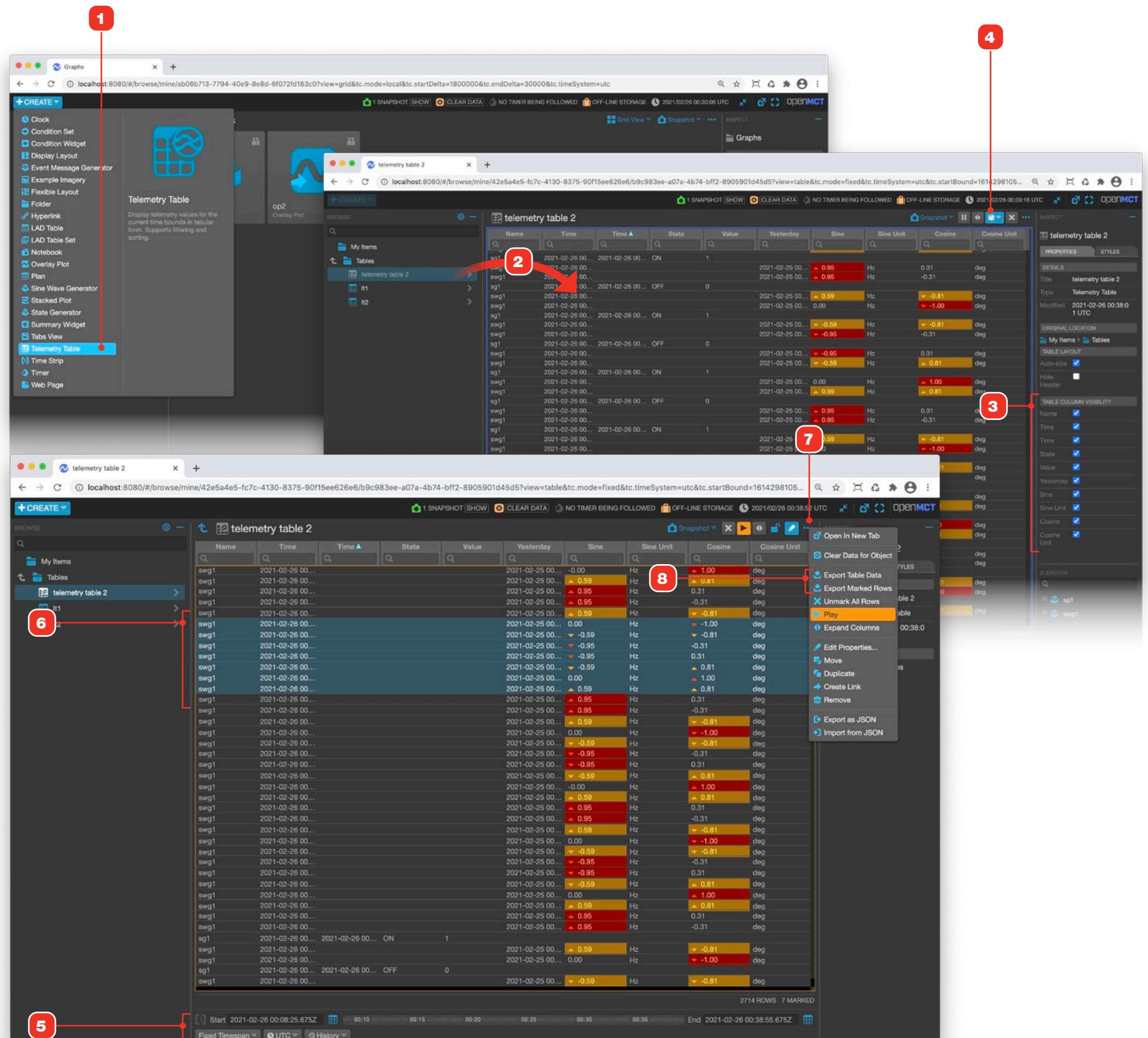
Collect And Export Historical Data for Multiple Telemetrys

Although you can export any Telemetry's historical data by context clicking it in the tree, exporting data for multiple Telemetrys in the same file requires a bit of setup. To do this, add multiple Telemetrys to a Telemetry Table, and then export that table's data. Here's how.

1   Create a new Telemetry Table.

2   Find and drag in the telemetry Telemetrys you want. You can drag in as many telemetry Telemetrys as you like.

3   Hide or show columns that you'd like to exclude or include respectively.

4   Save your changes and exit Edit mode.

5   In Fixed Timespan Mode, adjust the Time Conductor to set the datetime range that you are interested in.

6   You can export all the table's data, or optionally only selected rows.

7   Click the table's "More Options" button to display its menu.

8   To export all the table's data, select "Export Table Data". To export only selected rows, select "Export Marked Rows". If your browser is set to prompt you for a download location on your computer, you'll be able to name your exported file and select a save location in the subsequent system dialog box. Otherwise, the file will automatically be named "export. csv".

MORE DETAILS

- "Creating A New Object" on page 41
- "Editing An Object" on page 43
- "Telemetry Tables" on page 58
- "Time Conductor, Fixed Timespan Mode" on page 23

Imagery Metadata and Compass Rose Overview
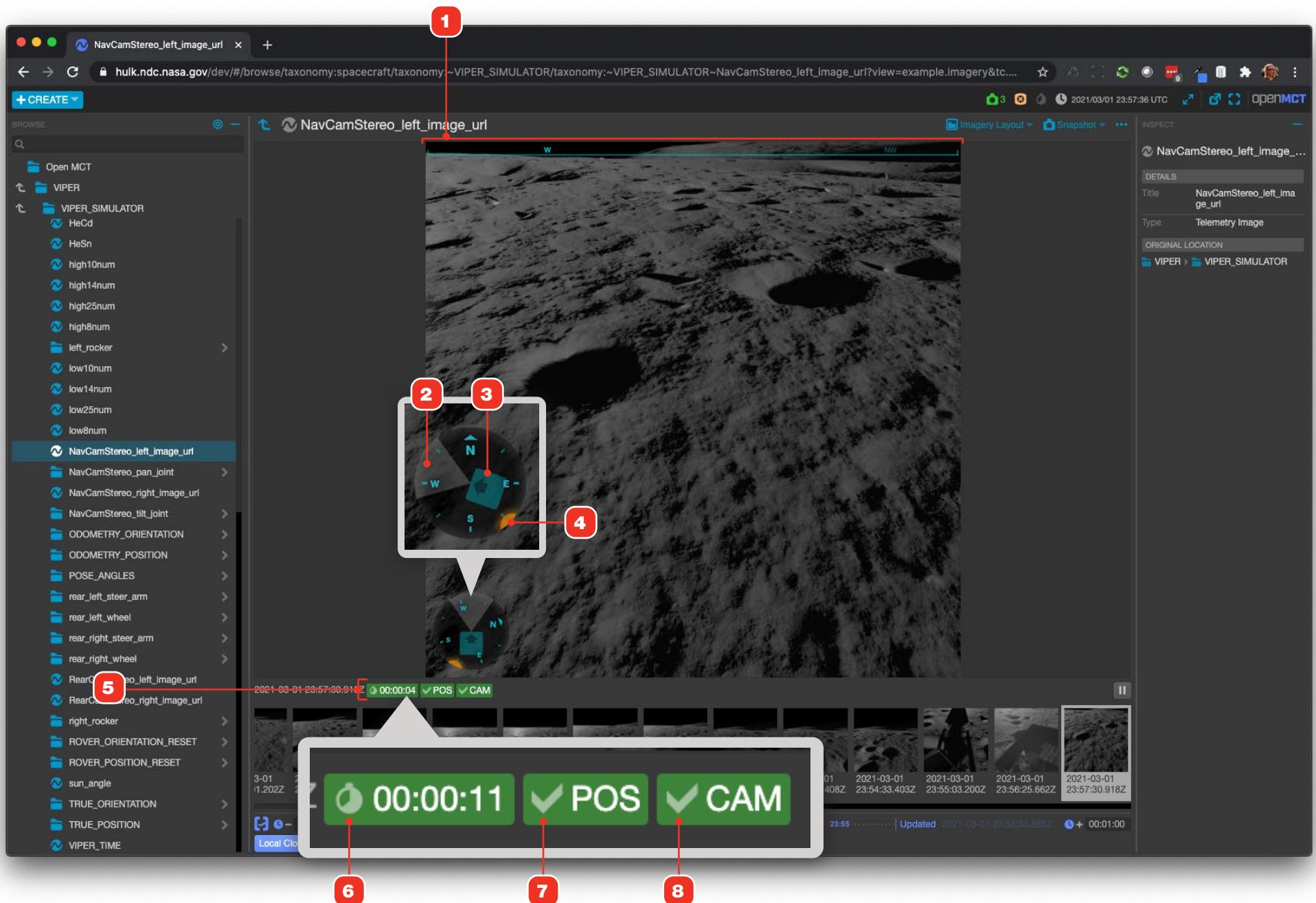
Imagery now uses available data (depending on your deployment) to display additional metadata about a given image.

1 Compass direction element displays the cardinal compass directions in view in a given image.

2 Camera angle relative to the rover body and camera.

3 Rover body attitude.

4 Sun angle relative to the cardinal compass directions.

IMAGERY INDICATORS

To provide better support for rover operations, imagery "freshness" indicators **5** indicate the relative age of the image, if the rover is still at the same position when the image was taken, and if the camera pan-tilt unit is still looking in the same direction as when the image was taken.

6 Age Freshness: will blink briefly for brand new images and will stay green for a period of time (2 to 5 minutes), depending on settings in your deployment.

7 Position Freshness: if the rover has not yet moved or turned its body from the position where an image was taken, this indicator will be displayed.

8 Camera Freshness: if the rover's nav cam has maintained its stance from when an image was taken, this indicator will be displayed.

Plans and Timestrips Views Overview

If your Open MCT configuration supports it, Open MCT supports viewing and working with activity plans. Plans are viewed as zoom-able, pan-able Gantt chart views and work in both fixed and real-time Time Conductor modes. Plans are defined in a JSON file format, and can be imported as static files or made available via your data source. Activities can colored as needed in the plan file itself.

For details on JSON formatting for plans, see the Open MCT code repository documentation. Plans served your datasource support live updating when they are changed, with a refresh time under one minute.

1 Plans made available from your datasource can simply be clicked on to view.

2 A plan can be added to a Timestrip object, which can also hold telemetry **3**.

Introduction

Open MCT (Open Mission Control Technologies) is a web-based, multi-mission telemetry monitoring and analysis tool suite that allows deep access to mission data coupled with powerful composability features. Users can rapidly view and explore data in a variety of visualizations, as well as create many different types of views that can be saved and shared with others. It runs in the browser with no software required to be installed, on both desktop and compatible mobile devices.

BROWSER CONSIDERATIONS

The application is a web-based application that runs in a browser, and as such may have some idiosyncrasies that those who are more familiar with standard desktop applications should be aware of.
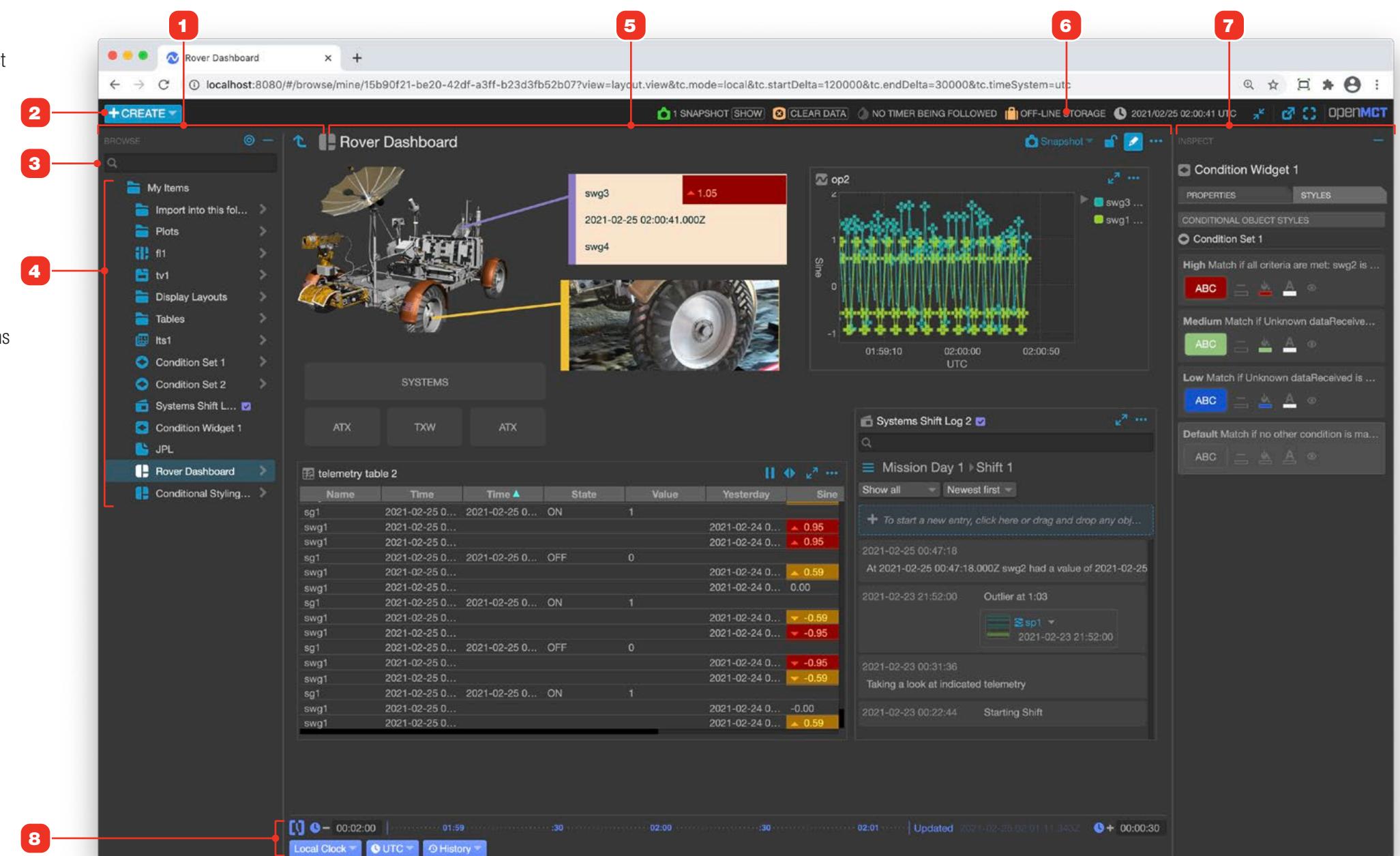
- **Supported Browsers:** While Open MCT should still work and perform well in most modern popular browsers such as recent versions of Firefox and Safari, the application has been developed and tested mainly in Google Chrome – it's highly recommended to use that browser. Internet Explorer is not recommended or supported.

- **Back and Forward Buttons:** Using the browser's Back and Forward buttons may present unpredictable results, and isn't recommended. Use the application's available buttons to navigate within the app.

- **Backspace Button:** Avoid use of your keyboard's Backspace button (except when editing text), which in most browsers is mapped to the action of browser Back.

Interface Overview

1 **Browsing Pane:** Includes the Create button to create new objects, Search and the Object Tree.

2 **Create Button:** All objects in the application (other than pre-existing data objects) are created via this button and its menu **8**. See "Creating A New Object" on page 41 for more.

3 **Search:** Search allows you filter the Object Tree. See "Searching" on page 17.

4 **Object Tree:** This contains all the objects you have access to, both telemetry objects and user-created objects. Single-click an item to select it and display its contents in the view area. If an item has an arrow to its right, click the arrow to drill into that item's contents in the tree view.

5 **View Area:** The view area shows the contents of a particular item. Different types of items provide different views of their contents. For example, you view the contents of a layout in the Object Tree as a list of items, but when seen in the View area, the Layout presents those items in its composed, "laid out" view.

6 **Status Area:** Shows several indicators showing the current status of the application, and provides some application-wide setting capabilities. For more, see "Status Area and Indicators" on page 21.

7 **Inspection Pane:** This pane shows useful information about the currently selected item. See "Inspection Pane" on page 18 for more.

8 **Time Conductor:** Controls the time context for all time-aware views in the application, setting the time scope for all data displayed. See "Time Conductor Overview" on page 22 for more.
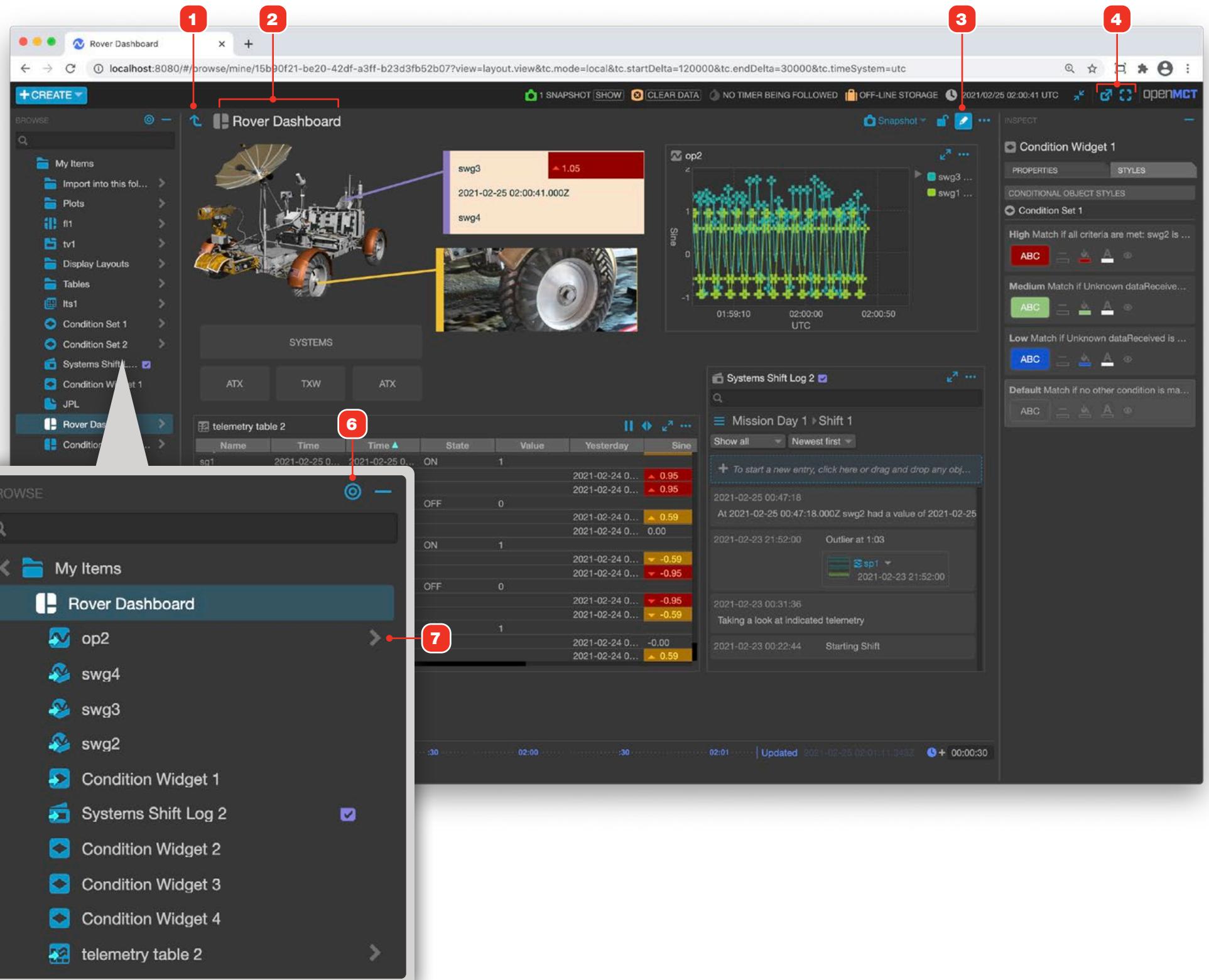
Viewing Objects

1 **Navigate Up:** Navigates the view "up" to the object that contains the current object. This is also known as its parent.

2 **Current Object Type and Name:** Title of the currently selected object being viewed.

3 **Edit Button:** Click to edit the current object. This only applies to "composable" objects (those that can be created via the Create menu) so this button may not always appear.

4 **View Buttons:** Some types of items have certain capabilities available to their view in the upper right of this area:

	View in New Browser Tab	Open the current object in a new browser tab.
	View fullscreen	Expand the current view to occupy the full area of the display.

5 **Tree Navigation "Up":** Navigates the tree view up to the parent of the item clicked.

6 **Sync Tree View:** Clicking this synchronizes the tree to bring the currently navigated object **2** into view in the tree.

7 **Tree Navigation "Down":** Navigates the tree view down into the item clicked. Items will only display this arrow if they have children elements.

Original Objects and Links
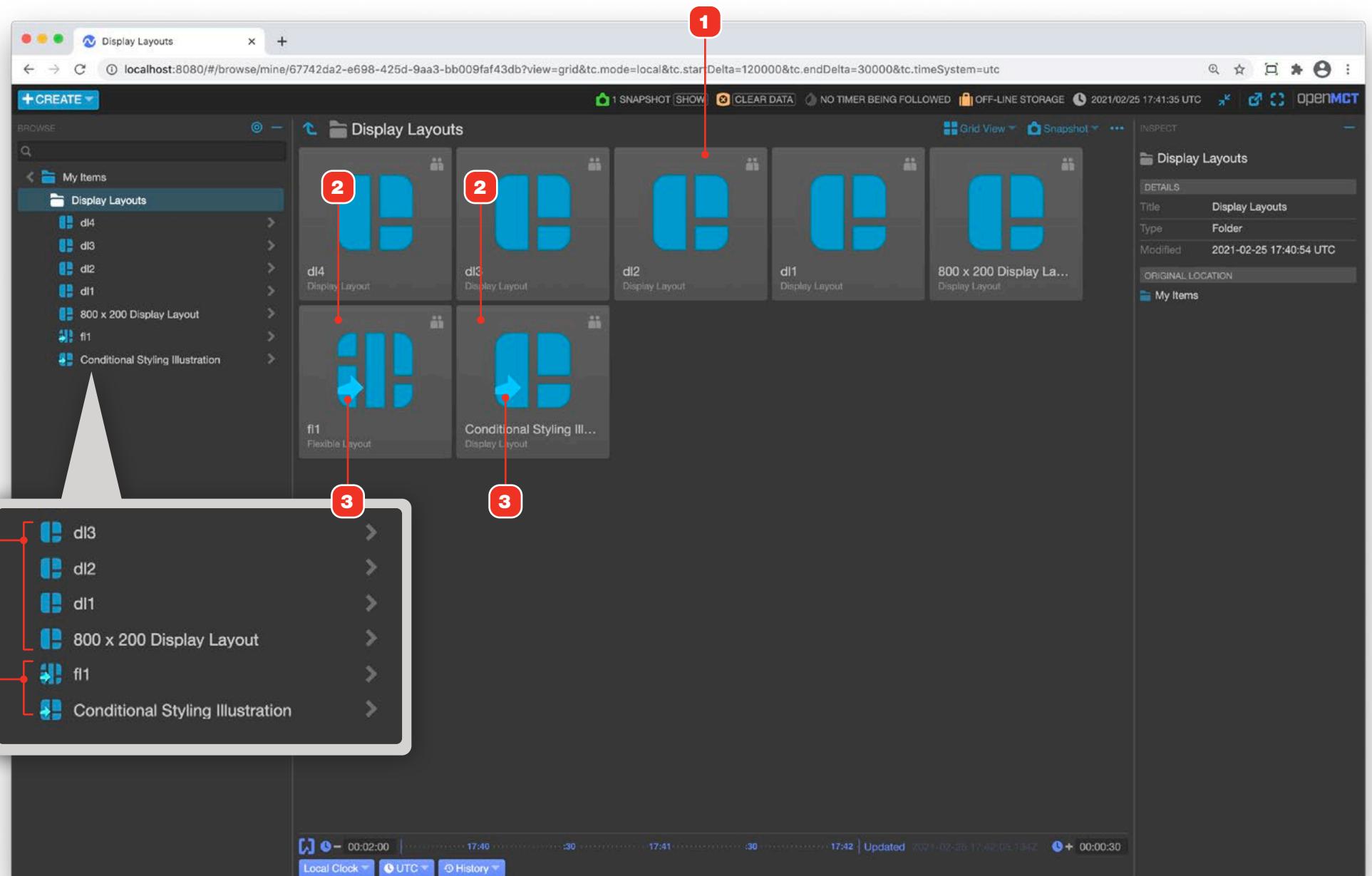
Objects in the application are either "original" objects **1** or Links **2** to original objects. Links are the same as symlinks in Unix, or aliases in the Mac OS.

When you first create an object, that object is considered an original. When that object is placed into another object, like a folder or a Display Layout, a Link is created to its original. Changing the original in one place automatically updates all Links to that original - editing a Link is actually editing the original object. You can create a Link to any original object and place it where you like.

Links are distinguished visually from originals via the inclusion of a small arrow symbol **3** in the lower left of their type icons.

1 Original objects.

2 Links to objects.
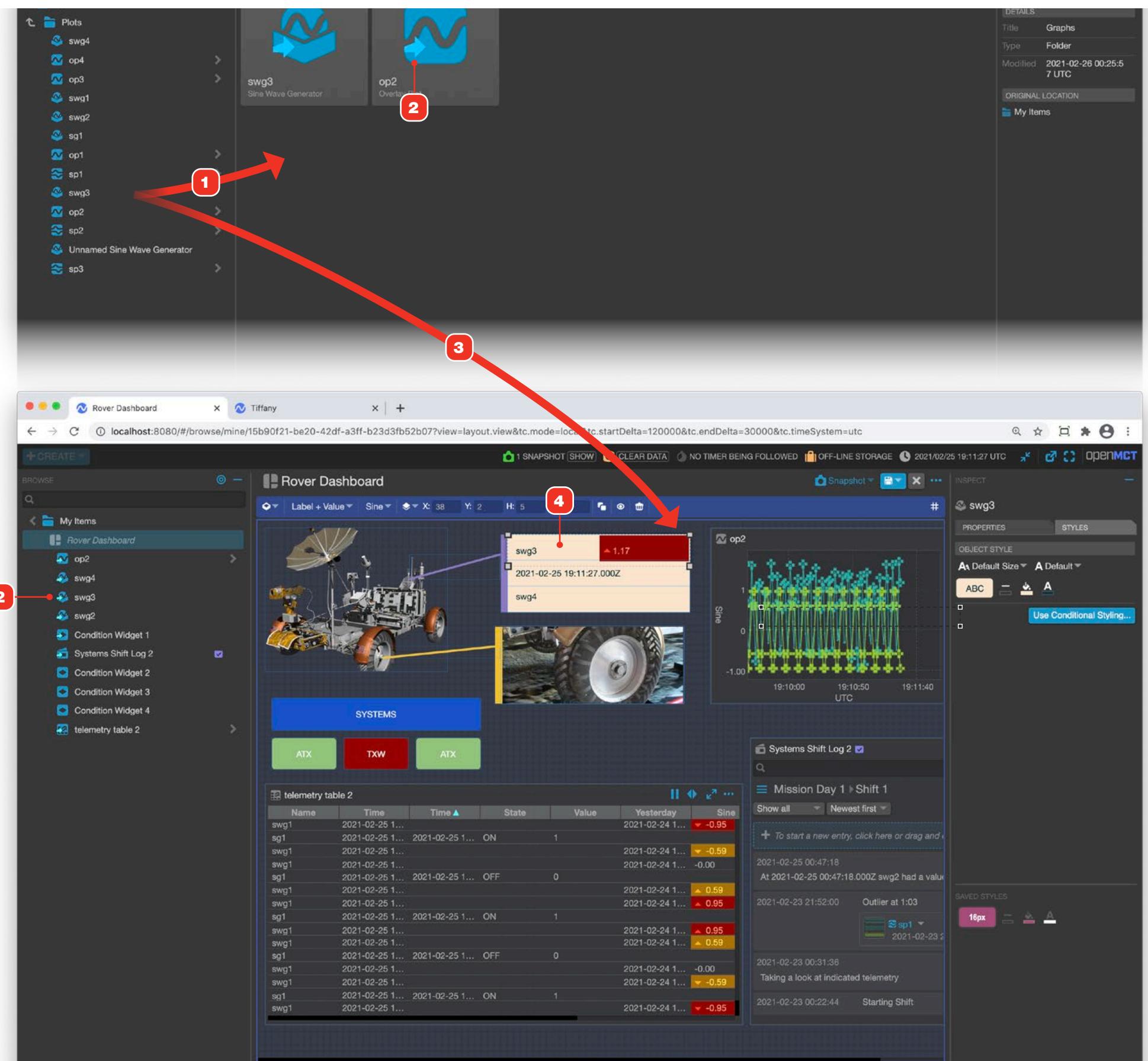
Dragging and Dropping Objects

The application supports drag and drop for many actions. The result depends on what you're dragging and where you're dropping it.

1 Dragging from the tree into a Folder will create a "link" **2** within that folder to the original. See "Original Objects and Links" on page 14 for more on Links.

3 Dragging from the tree into the main view of another object will also create a link to the original, but will also add that item to the destination object in a meaningful way. In this example, dragging a telemetry Telemetry onto a Display Layout adds that Telemetry as an alphanumeric display **4** to the layout's canvas. See "Editing An Object" on page 43 for more on this.
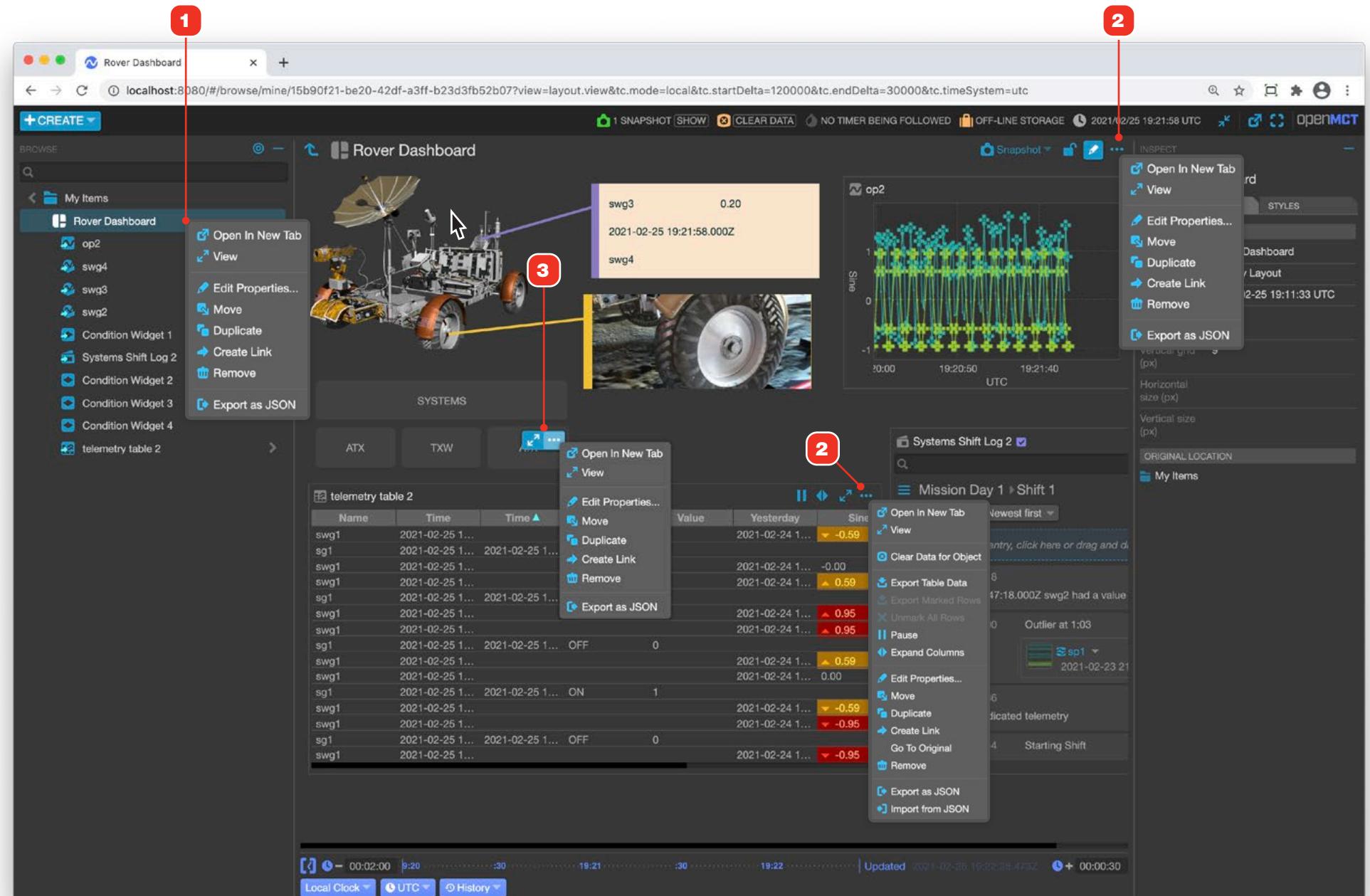
Context Menus

Context menus allow many operations to be performed on objects in the application. Available actions are dependent on the type of object and its current context. Here are some of the most common actions usually available. See content elsewhere in this document for details on capabilities each different type of view.

|	Menu Item	Description
	Open in New Tab	Creates a new browser tab, navigates to the object and displays with that object's default view.
	View	Displays the related element in a fullscreen overlay, allowing more detailed exploration of an item without navigating away from the current view.
	Go to Original	Only available for Links. Navigates to the Link's original object.
	Create Link	Only available to original objects. Create a link to the object.
	Edit Properties	Only available to objects that have editable properties. Displays the Edit Properties dialog for the object.
	Duplicate	Only available to objects that can be duplicated. Displays the Duplicate dialog for the object.
	Move	Only available to objects that can be moved. Displays the Move dialog for the object.
	Remove/Delete	Only available to objects that can be removed or deleted. If object is a Link, displays Remove; otherwise, displays Delete.
	Export as JSON	Exports the selected item's configuration. See "Exporting and Importing Object Configurations" on page 36.
	Import from JSON	Imports and exported configuration. See "Exporting and Importing Object Configurations" on page 36.
	Export Data	Allows the export of the data within the selected object.
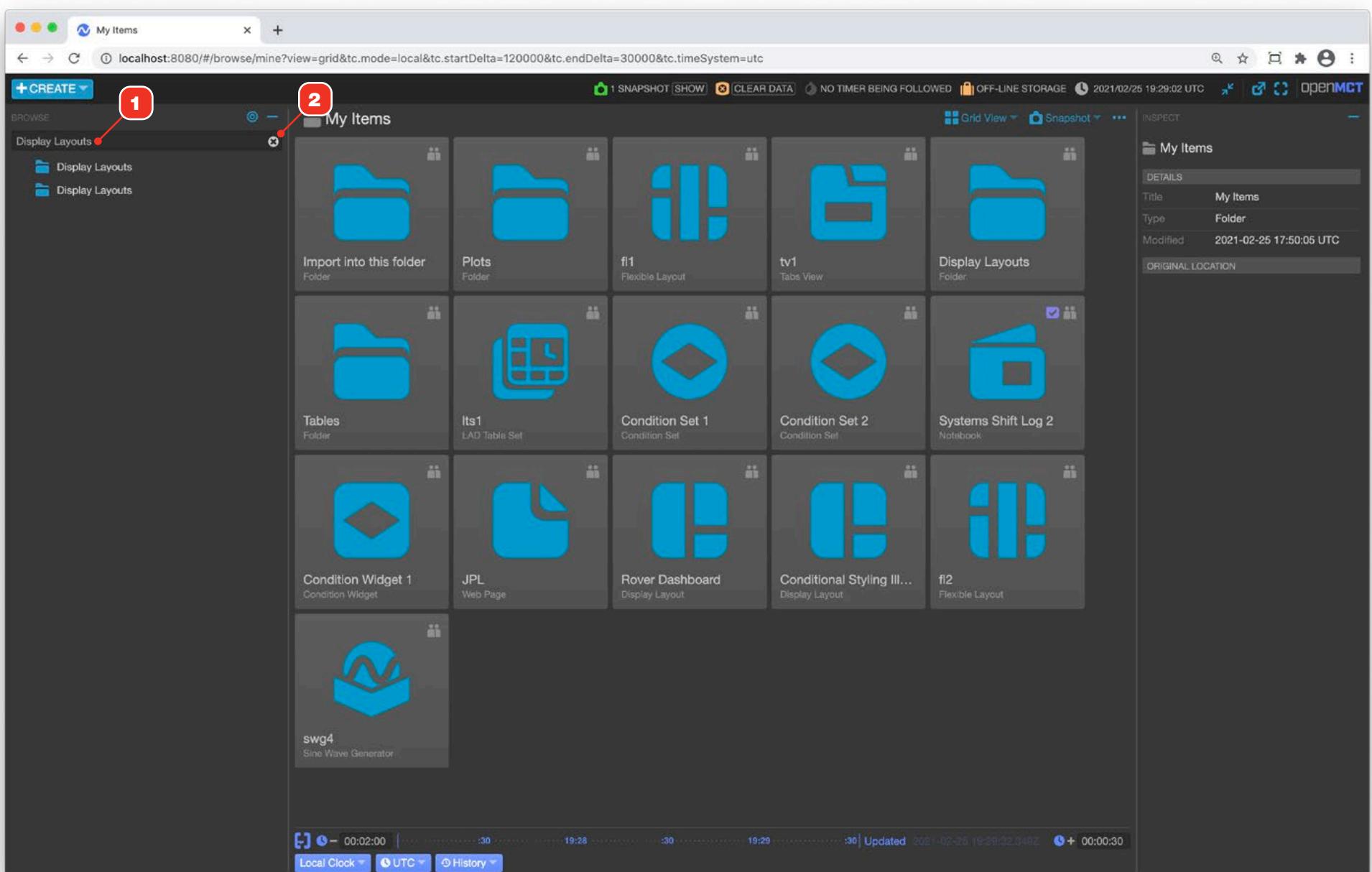
Context menus are accessed two different ways:

1 Context-click objects in the Object Tree to display their context menus. Context clicking gestures vary per operating system and hardware, but most commonly are available via right-mouse button click on an item.

2 Many objects in various views will display a "More Options" icon button ⋯. Clicking this button displays that object's context menu. In some views, the "More Options" button may be hidden until hovering over an item **3**.
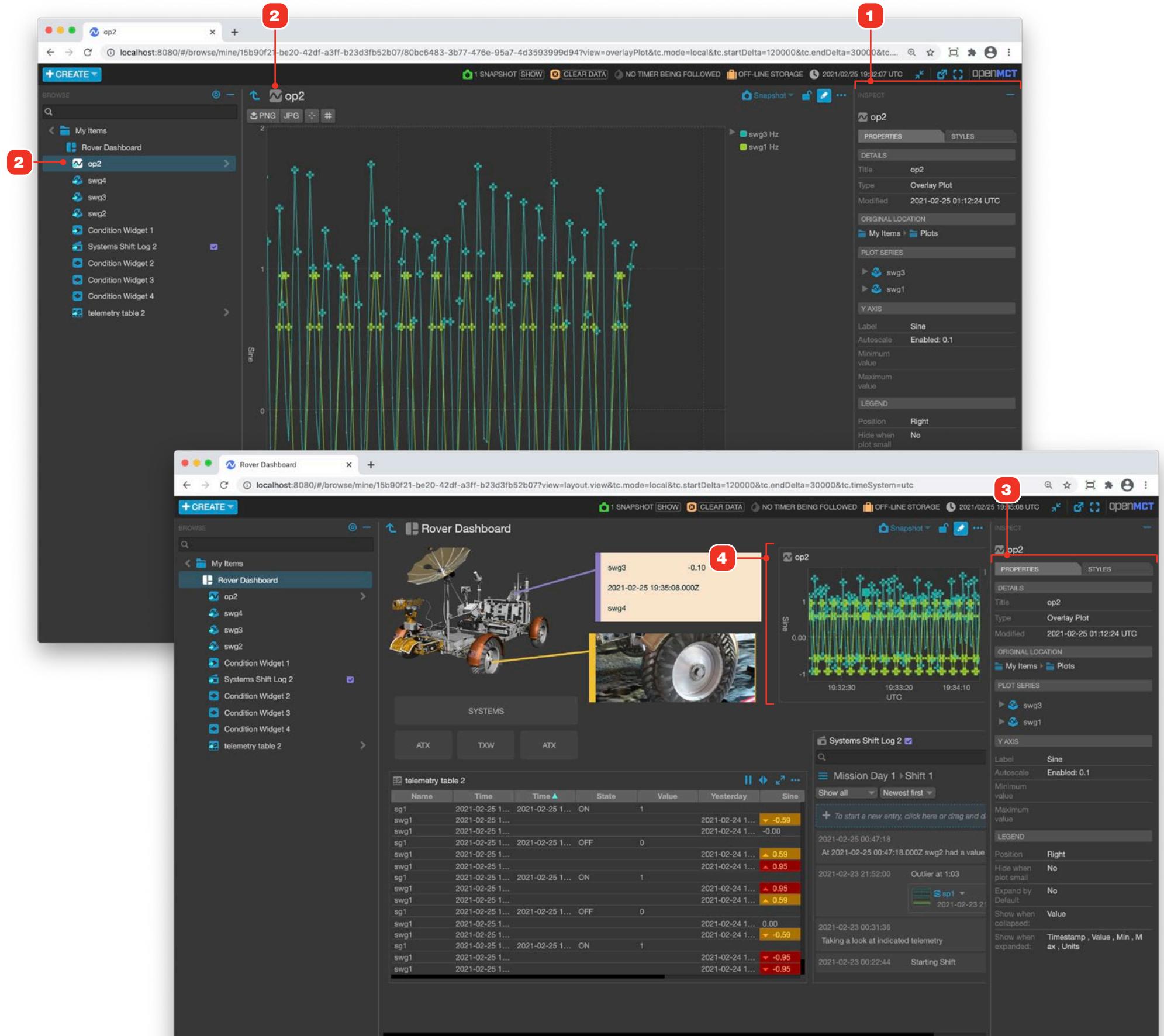
Searching

1 To search for an object, start typing the Search field. Matching results will begin to appear as you type.

2 To clear your search and go back to the Object Tree, click this button.

Inspection Pane

1 The Inspection pane gives you useful information on the currently navigated to object **2**.

3 When a component object of a Display or Flexible Layout is selected, the Inspection pane will provide information about that item **4**.
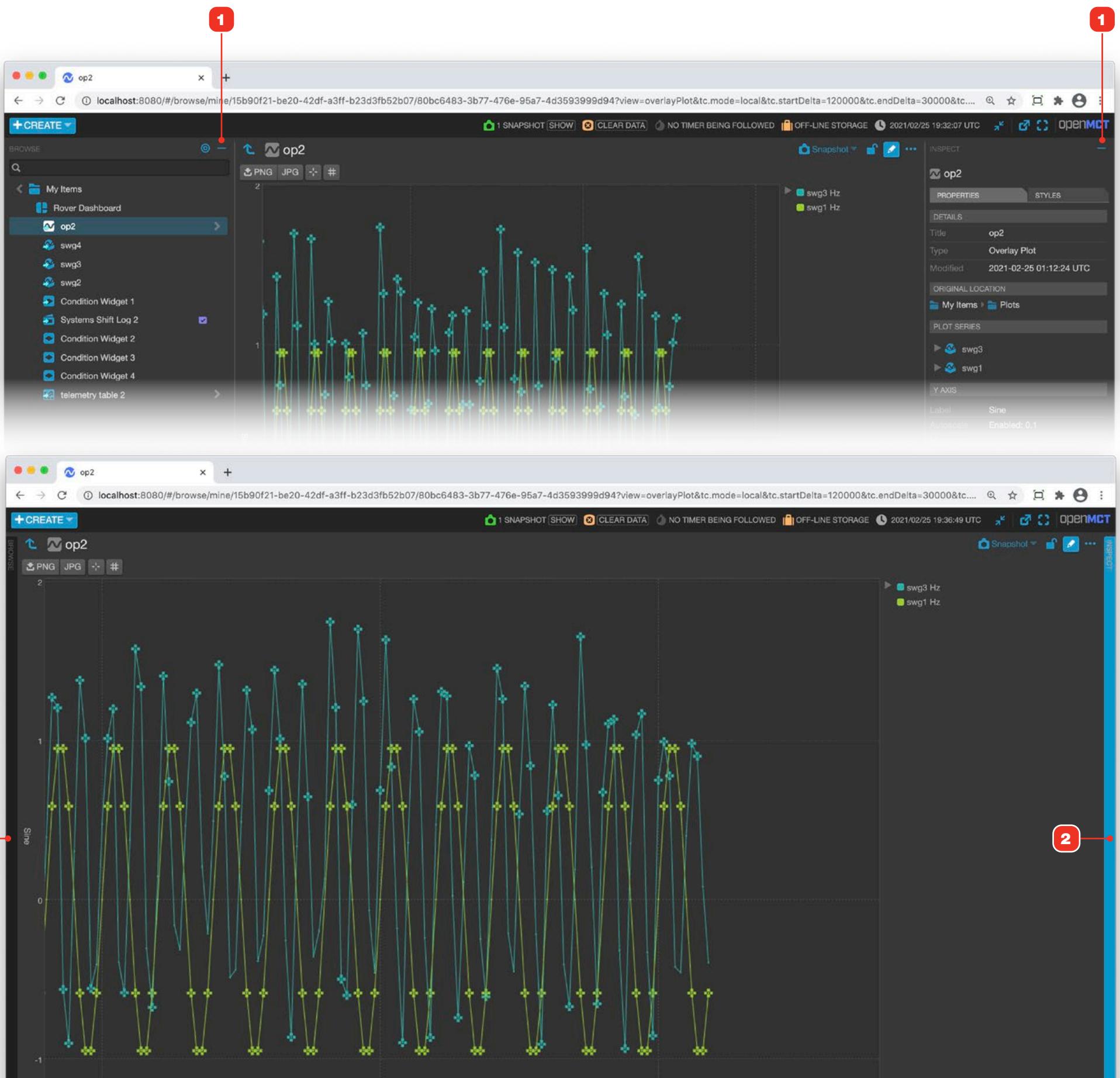
Expanding and Collapsing View Panes

You can expand the area available to the main view by collapsing both the Browse and Inspection panes.

1 To temporarily collapse a pane click the pane's "collapse" button.

2 To re-expand a collapsed pane, click anywhere in its collapsed area.

Fullscreen Mode

While in fullscreen mode, all browser window "chrome" - the window edges, address bar, bookmarks, etc. - is hidden, allowing the application to occupy every bit of the screen.

1 The application can be toggled into fullscreen mode by clicking the Fullscreen button.

2 While in fullscreen mode, click the Fullscreen button again to exit fullscreen mode.
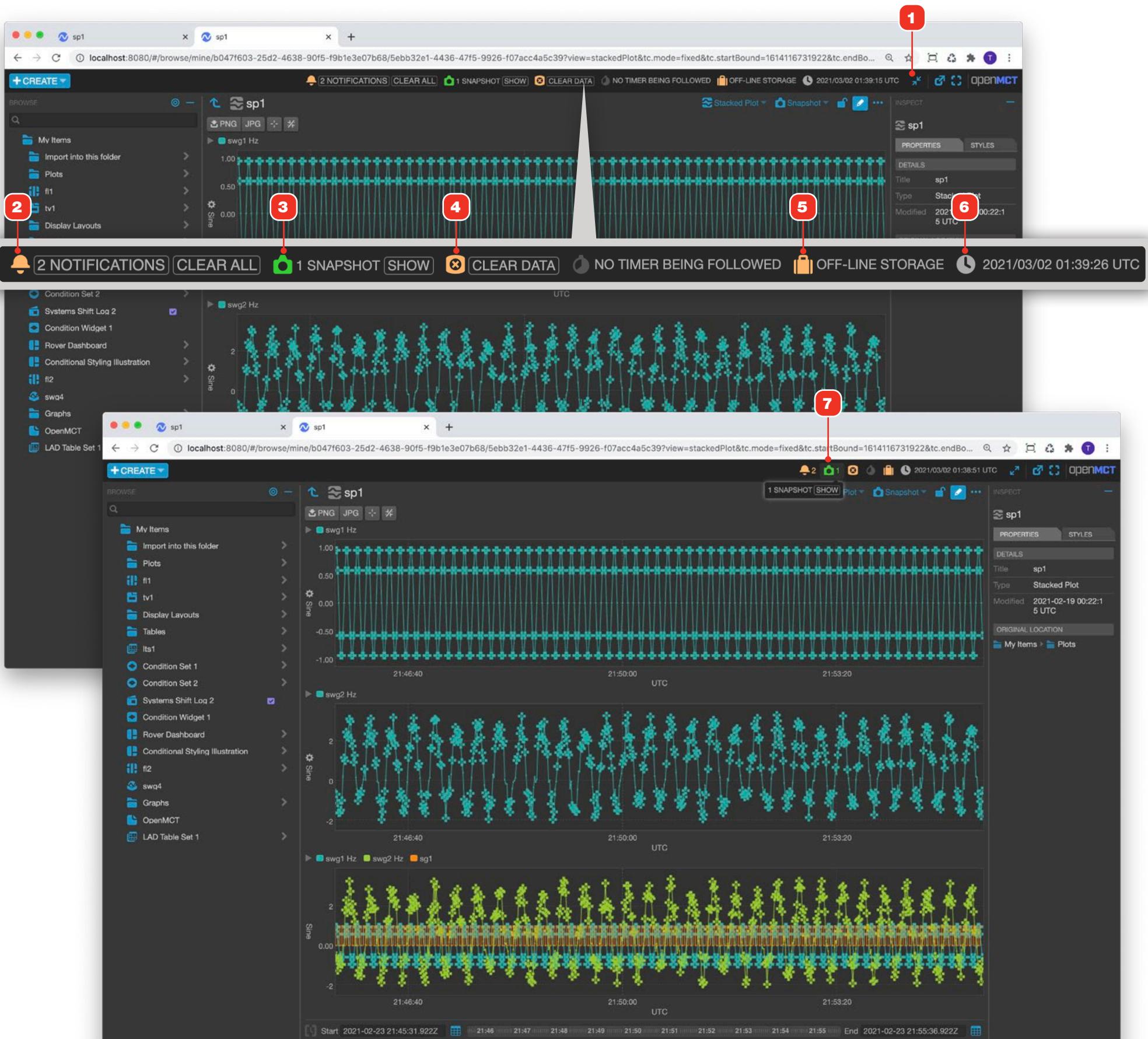
Status Area and Indicators

The Status area shows current status for a number of aspects of the application and provides application wide data connection capabilities. It also displays warning messages when necessary.

**1** By default, the Status area is displayed in it expanded view. To collapse the Status area, click this button. Clicking the button again when the area is collapsed will expand it again.

2 If there are any system notifications that should be brought to your attention, the Notifications indicator will display, with the number of notifications and a button giving you access to the Notifications dialog to view them.

3 The Snapshot feature allows you to capture screenshots of any view and quickly save them to a Notebook or the Snapshots holding area. The Snapshots holding area will indicate the number of snapshots saved and allow you to view all the snapshots that you have saved upon clicking the "Show" button

4 This control allows data to be temporarily cleared from the main view.

5 The Off-Line Storage feature is an indication of where changes are being saved and serve as a confirmation that changes are being saved correctly.

6 If real-time data is available and has been received by Open MCT, this indicator will display the last update datetime.

7 Hovering over any icon when the area is collapsed will display a bubble with the same details and controls for that item that appear in the expanded mode.

Time Conductor Overview

The Time Conductor **1** and **2** controls the time bounds of data queries for many Open MCT view types. Settings in the Time Conductor persist as you navigate between objects, allowing you to quickly explore data in any number of telemetry objects in a given timeframe. When multiple object types are placed in a Display Layout, the Time Conductor allows you to set their time bounds in a single action. The current Time Conductor settings are encoded in the URL, so you can bookmark and share specific timeframes.

TIME CONDUCTOR MODE TYPES
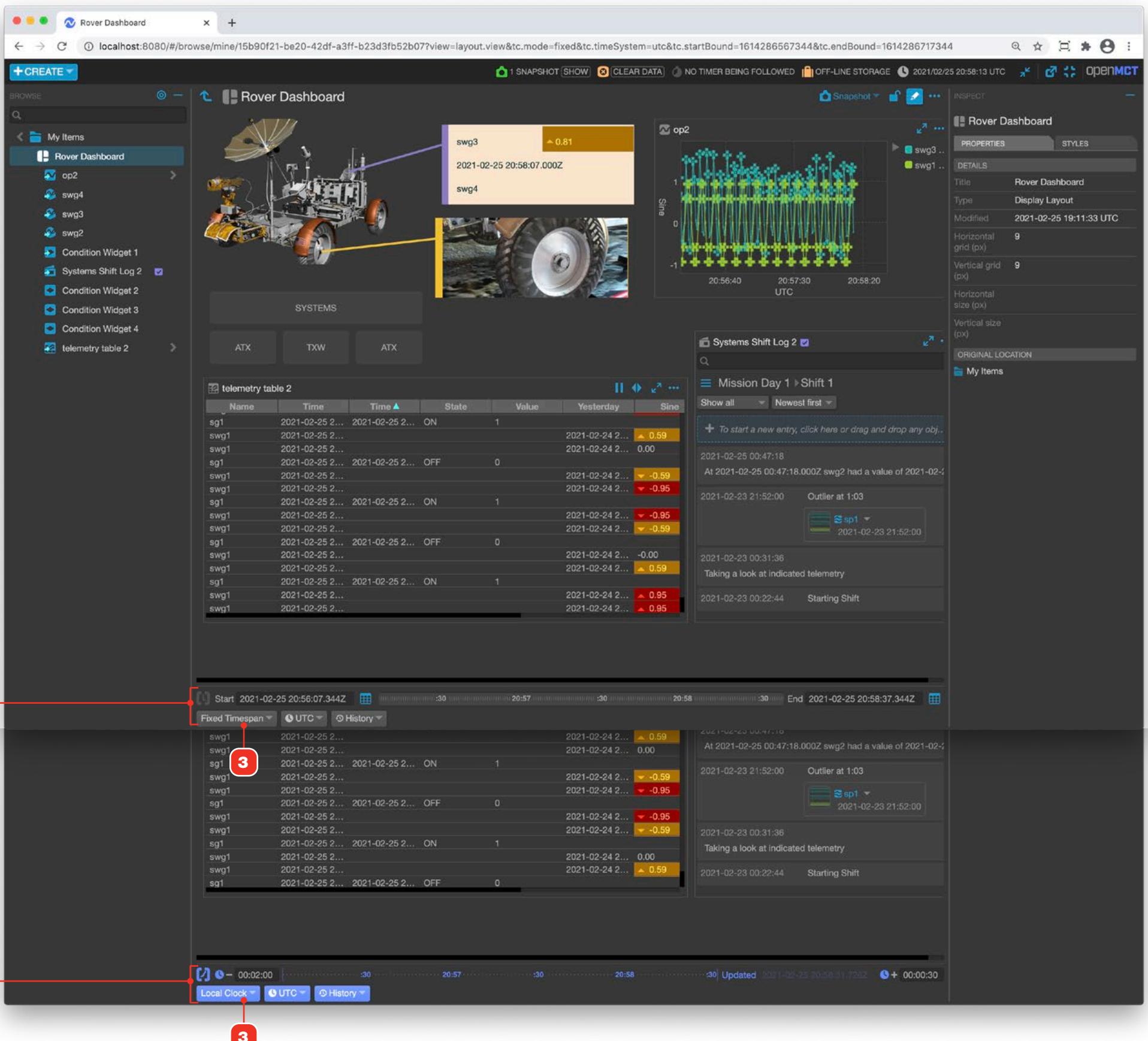
The Time Conductor has two basic mode types: fixed timespan and real-time.

1 **Fixed Timespan Mode:** Queries and makes data accessible to displays within a fixed timespan. Start and End bounds are discrete datetimes.

2 **Real-time Modes:** Connects to available real-time data and streams it continually to displays. The End bound is an offset from "now", and the Start is a negative time offset from the Start.

3 **Mode Selection Control:** Sets the mode for the Time Conductor:

Mode	Mode Type	Time Formats
Fixed Timespan Mode	Fixed Timespan	ERT, SCET, SCLK
Local UTC	Real-time	ERT, SCET
Latest SCET	Real-time	SCET
Latest ERT	Real-time	ERT
Latest SCLK	Real-time	SCLK

RELATED

- "Time Conductor, Fixed Timespan Mode" on page 23
- "Time Conductor, Real-time Modes" on page 24
- "How the Time Conductor Affects Object Types" on page 25

Time Conductor, Fixed Timespan Mode

The Time Conductor in Fixed Timespan Mode queries and makes data accessible to displays within a fixed timespan. Start and End bounds are discrete datetimes. Incoming real-time data will be displayed if the Start and End time bounds encompass "now", but the display will not automatically advance to keep new data in view.

1 **Time System:** Controls the current time system (ERT, SCET, SCLK, etc.) used by the Time Conductor and all displayed objects. Plots, table and other views will adjust their time indicators to use the selected format.

2 **Start and End Datetime Range Inputs:** Enter a valid datetime value to define a date range to query and display. The format of the datetime is based on the current setting in the Time Format control **1**. Note that you can enter partial values - for example, if the Time Format is SCET, entering "2015-300T" is the equivalent of 2015-300T00:00:00.000. The start must precede the end. If you enter an incorrect the value, the input will turn red indicating that you must correct your input. Input formats are as follows:
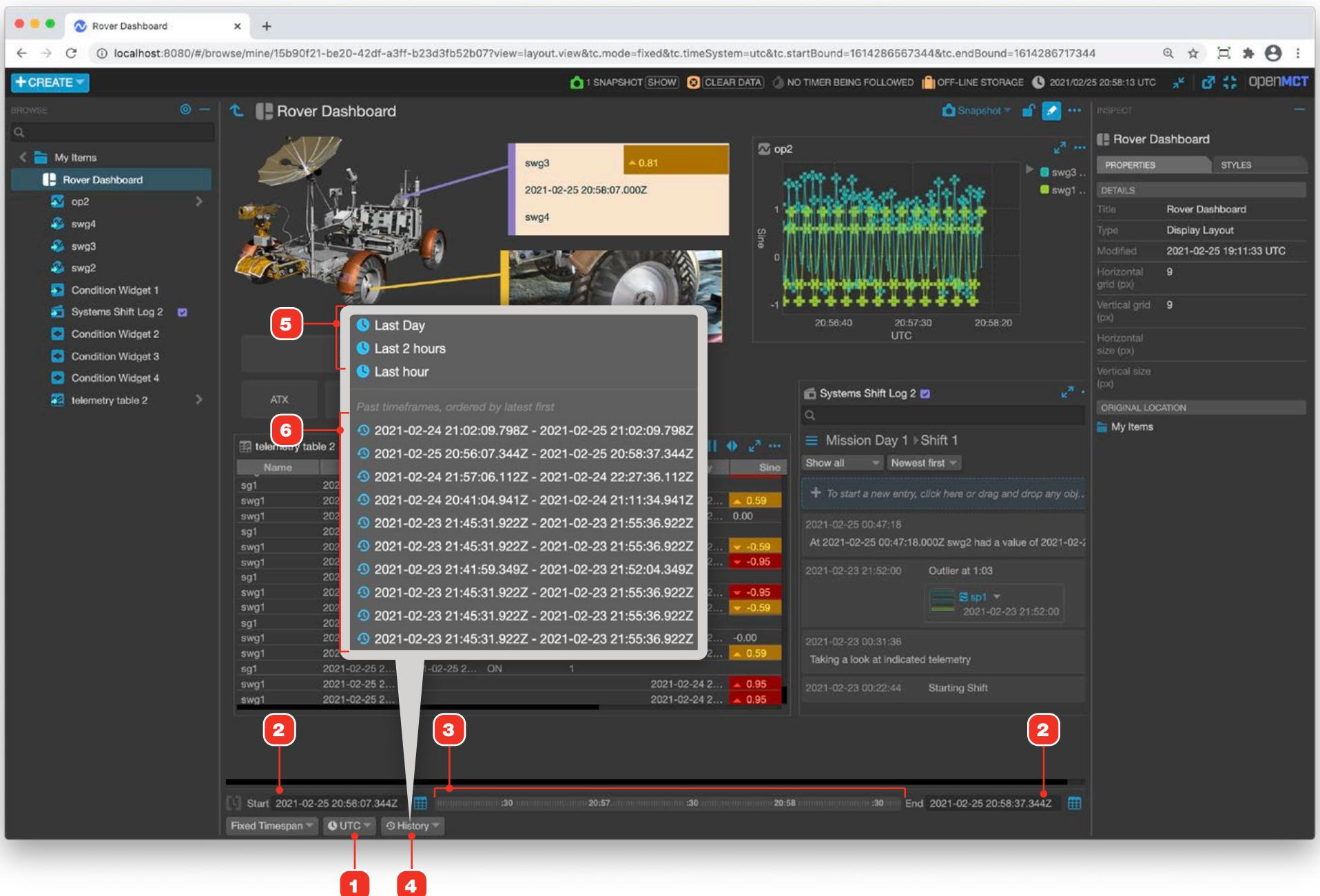
Format Set in **1**	Input Entry and Display Style
SCET, ERT	**2015-300T23:59:59.999** <4 digit year>-<3 digit day of year>T<2 digit hours, 00 to 23>: <2 digit minutes, 00 to 59>:<2 digit seconds, 00 to 59>. <3 digit milliseconds, 000 to 999>
SOL	**SOL-100M24:59:59.999** SOL-<SOL number>M<2 digit hours, 00 to 23>: <2 digit minutes, 00 to 59>:<2 digit seconds, 00 to 59>. <3 digit milliseconds, 000 to 999>
SCLK	**123456.789012** <Floating point decimal number>

3 **Tick Line:** In Fixed Timespan Mode, the Tick Line can be dragged left or right to pan the time window while preserving the current window duration. For example, dragging the Tick Line one minute to the left will subtract a minute from both the Start and End inputs and update the main view just as if the inputs were manipulated directly.

4 **History:** Click this button to display the History menu, which includes timespan presets **5** and past timeframes **6**.

5 **Useful Boundary Presets:** Your deployment configuration may include useful timespan presets similar to those shown here.

6 **Past Timeframes:** The History menu also tracks changes to the Time Conductor's bounds: every they are changed, the prior Start and End bounds settings are saved here. Saved entries can be clicked to restore the Time Conductor to those bounds. Entries are ordered newest to oldest, and the menu will track up to 10 boundary settings. After 10 entries, the oldest entry will be pushed out to make way for the newest.

Time Conductor, Real-time Modes

The Time Conductor in one of its real-time modes is primarily useful in monitoring real-time streaming data as it comes in. Rather than a fixed span of time as used in Fixed Timespan Mode, the real-time modes treat time like a "moving window" in which the right side **4** of the window is "now" and the left side **3** is a negative offset in time from the right side. As new data streams in, the Time Conductor and displays automatically advance and update to keep that data in view. Both the left and right sides of this "window" can be changed by entering different values.

1 **Time Format:** Controls the current time format used as inputs by the Time Conductor and all displayed objects. Plots and other views will adjust their time indicators to use the selected format.
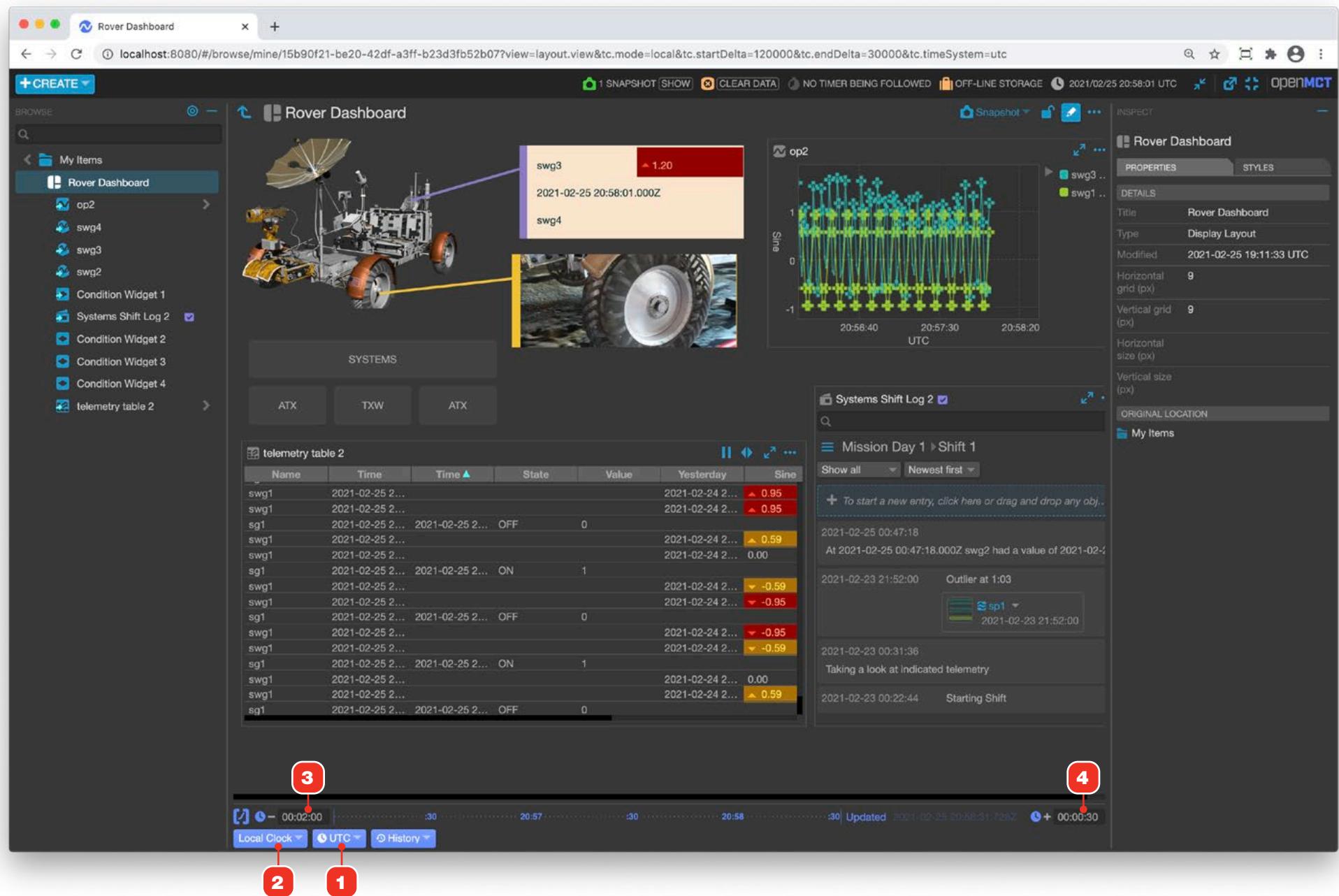
2 **Mode Selection Details:**

Mode	Details
Local UTC	The Time Conductor will automatically advance and displays will update themselves based on ticks from a UTC clock. ERT and SCET time formats are both available.
Latest SCET, ERT and SCLK	The Time Conductor and displays will only advance and update when data becomes available based on what type of latest tick (SCET, ERT and SCLK) has been selected.

3 **Left Side Time Range Input:** Enter a valid time value to define the amount of time offset from the right side **4**. The format of the datetime is based on the current setting in the Time Format control **1**. If you enter an incorrect the value, the input will turn red indicating that you must correct your input. Input formats are as follows:

Format Set in **1**	Input Entry Styled
SCET, ERT	**23:59:59** <2 digit hours, 00 to 23>:<2 digit minutes, 00 to 59>:<2 digit seconds, 00 to 59>
SCLK	**123456.789012** <Floating point decimal number>

4 **Right Side Time Range Input:** Controls the offset from now, and defaults to 00:00:00 so that "now" is at the right-most side of the Time Conductor and time-based X axis plots. Setting a value here other than 0 will add "padding" into the future, which could be useful if predictive data is being compared to incoming real-time data. Input format and behavior are as described in the Left Side Time Range Input **3**.
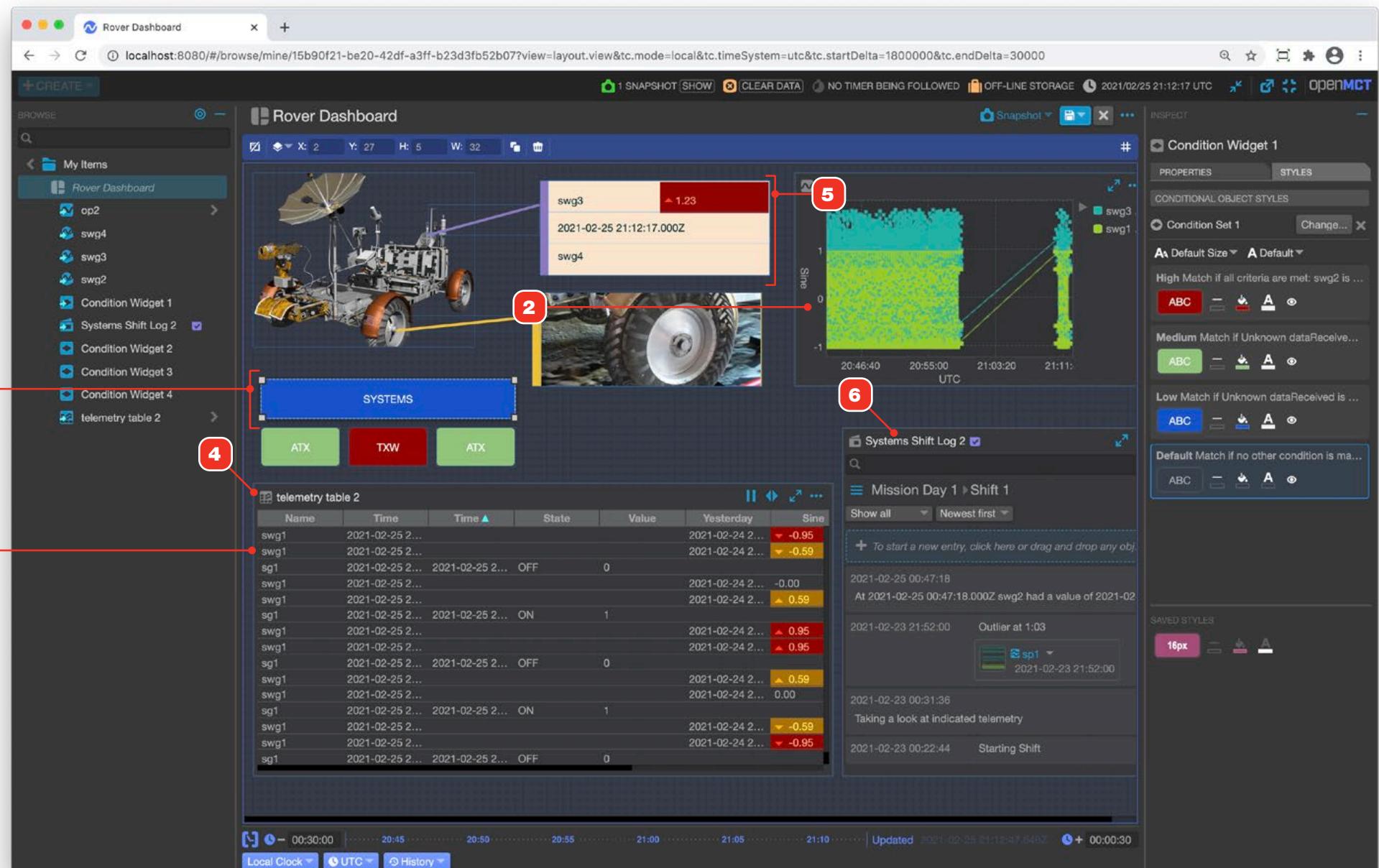
How the Time Conductor Affects Object Types

The table below illustrates how Open MCT objects are affected by the Time Conductor. Some objects will constrain the data they display to the Start and End bounds of the Time Conductor. Other object types like Telemetry Tables and Sets, Data Product views and others will ignore the Time Conductor and always display their latest data. Some view types don't display time-based data at all - those rows are shown grayed out.

Category		Object Type	Data Constrained to Conductor Bounds	Always Displays Latest Data
Data View		Telemetry Alarms	✔	
Data View		EVRs	✔	
Data View		Dictionaries		
Data View		Data Products	✔	
Data View		Packets	✔	
Data View		CommandEvents	✔	
Data View	4	Frame Events, Packet Summary Events		✔
Composable View		Folder		
Composable View	1	Condition Widgets		✔
Composable View	5	Alphanumerics		✔
Composable View	2	Overlay and Stacked Plot	✔	
Composable View	3	Telemetry Table	✔	
Composable View		Telemetry Table		✔
Composable View	6	Notebook		
Composable View		Web Page		
Composable View		Link		
Composable View		Data Set		
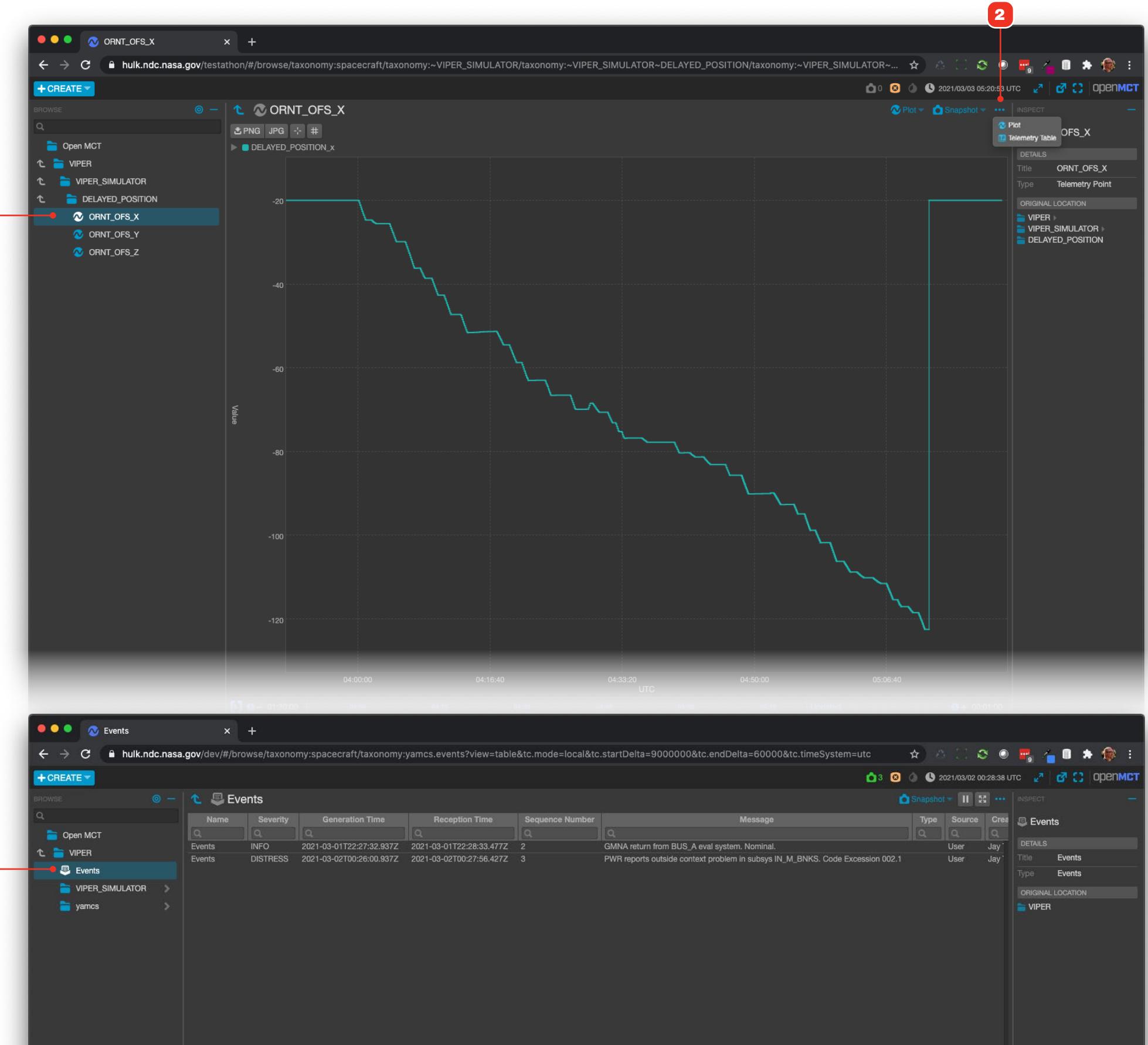
Viewing Server-based Data

When your Open MCT deployment is configured to include mission or other server-based data, those elements may be exposed as read-only nodes in the tree. The structure and location of items in the tree is dependent on your deployment, and may be different from screens depicted here.

1 Click a telemetry point to view its data. By default, alphanumeric data is displayed as a plot.

2 When telemetry can be viewed in more than one way, you can change the view type by clicking its view switcher button in its main view and selecting an alternate view from the menu.

3 Certain types of data may only have one type of view. In this example, event messages from a flight software system appear in a table format.

Using Plot View

PLOTTING HISTORIC DATA

When viewing historic data, all data will be plotted for the datetime range selected in the Time Conductor. Note that if there are more data points than there are available pixels, a min-max approach will be used to avoid pulling down more data than can be displayed. Zooming or panning the plot will automatically requery the data as needed, returning more detailed data if available.
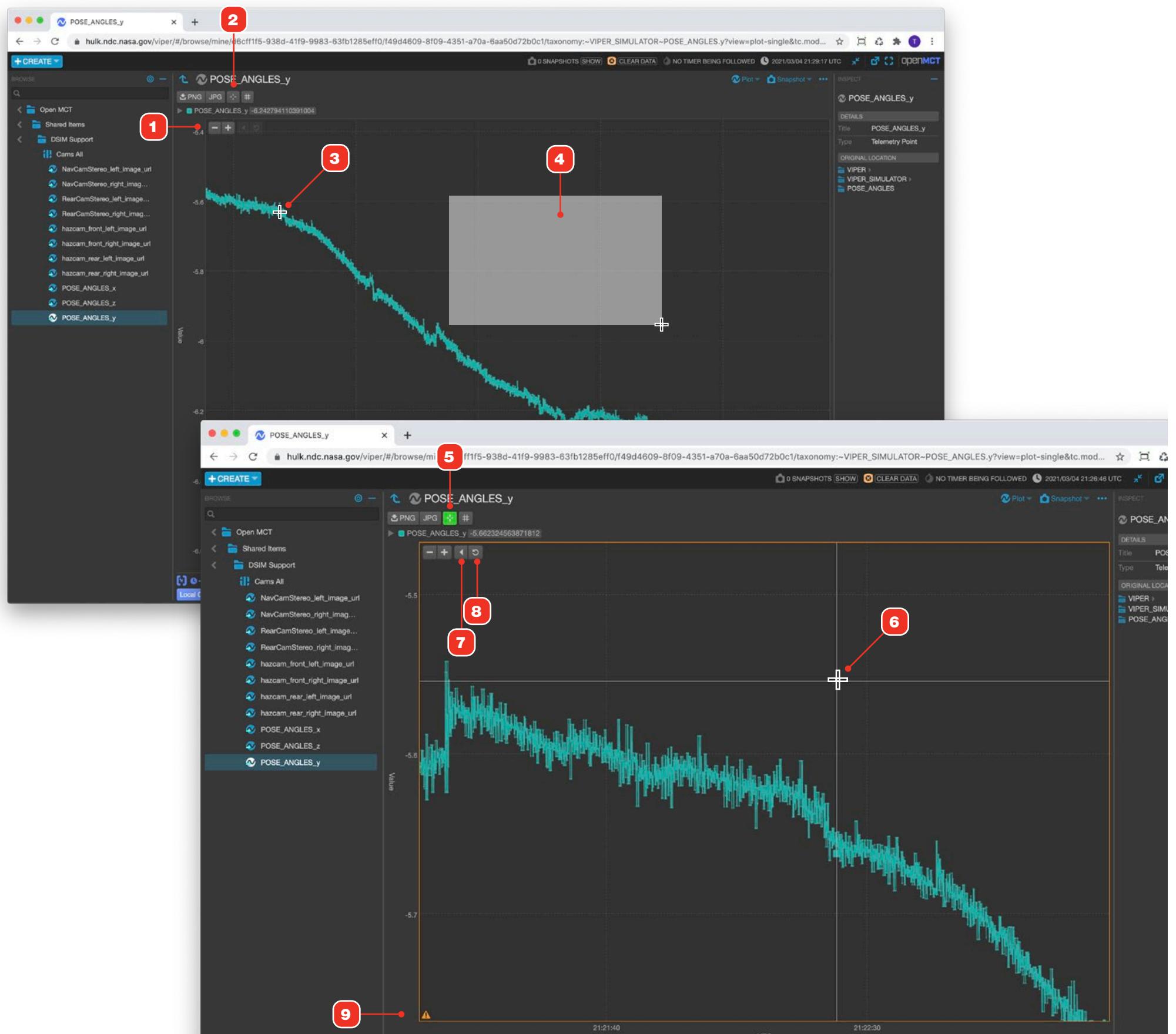
PLOTTING REAL-TIME DATA

When real-time data is connected to and the Time Conductor is in a "real-time" mode, plots will initially display in a time window in which "now" is on the right-hand edge of the plot with the left edge a trailing length of time into the past. As time progresses, the view automatically pans to the left to keep "now" at the right edge of the plot area.

ZOOMING AND PANNING

Zooming can be accomplished via the mouse wheel, a marquee, or zoom buttons. Once zoomed, the display area is frozen and will not scale or shift to accommodate new streaming real-time data, although data will continue to be loaded in the background. You can continue to zoom in or pan the view in this manner as much as you'd like.

1 Click these buttons to zoom in or out.

2 To pan the plot, hold the Option key (Mac) or Alt key (Windows) and drag anywhere within the plot area.

3 To zoom by drawing a marquee, click in a region of the plot and drag to draw a rectangular marquee area **4**. When the mouse button is released, the marqueed data of the plot will be expanded to fill the available view area, with both X and Y axes scaling accordingly. Additional data may be queried to provide greater detail.

5 Cursor guides can be toggled on or off by clicking this button.

6 Activated cursor guides.

7 To step back through successive zooms or pans that you've made (just like using the Back button in a browser), click this button. Once you've stepped back through your entire zoom history, this button will no longer appear until you zoom or pan again.

8 When the plot has been zoomed or panned, to view all available data and restore the streaming display of real-time data, click this button. Once you've reset the view, this button will no longer be available until you zoom or pan again.

9 When a plot view is zoomed or panned such that real-time data is no longer being displayed, an orange border and alert icon will be displayed indicating that you may not be seeing the most recent data. Resetting the plot using the reset control **8** will remove this indication.

Using Plot View, Plot Legend

Plot legends can be viewed in a space-saving "collapsed" view **1**, or an expanded tabular format **2** that offers more information. For overlay plots, legends can be configured per object to display on top, below, or to either side of the plot display area when collapsed. Legends always appear above or below an overlay plot's display area when expanded.
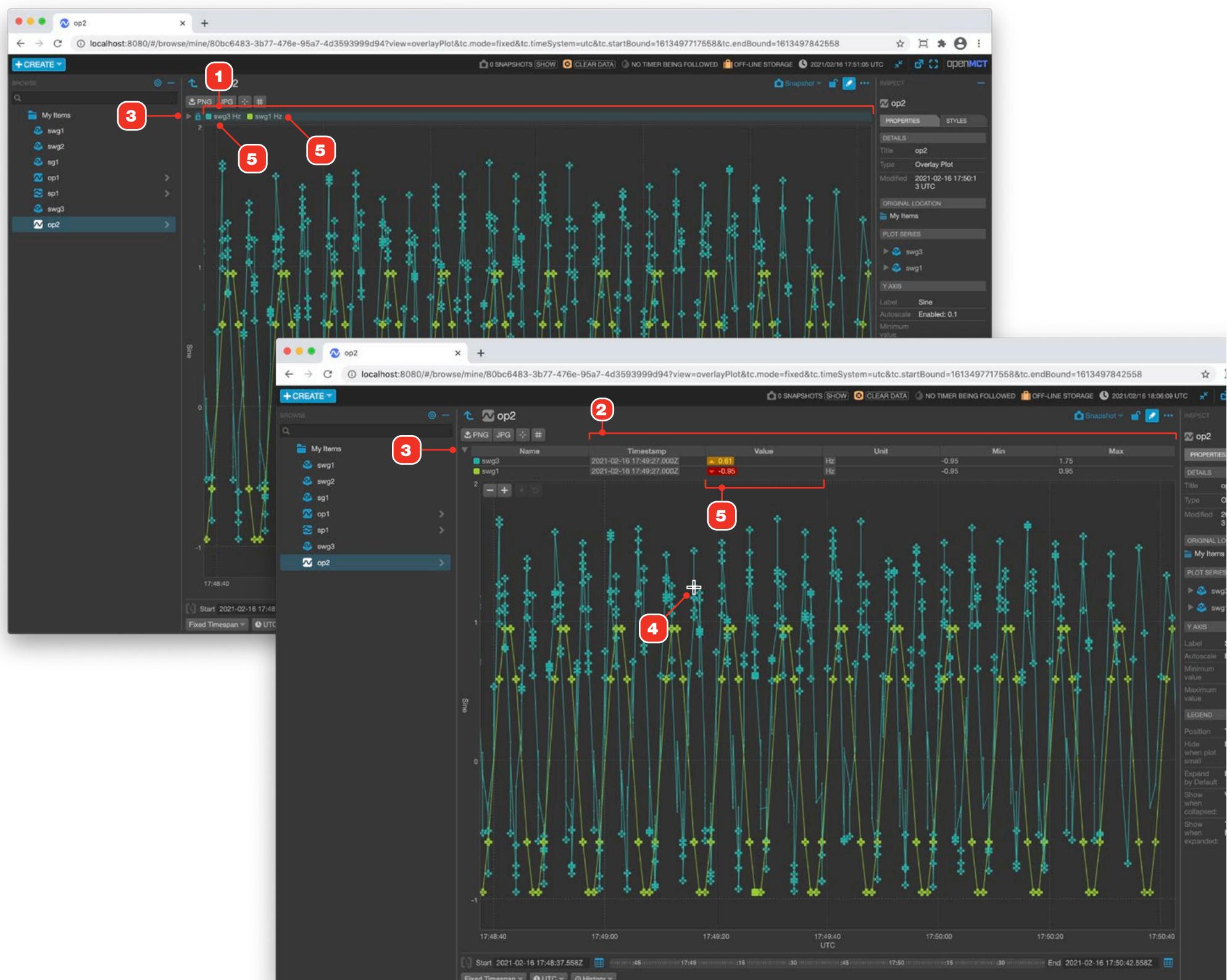
For more on configuring legends in plots, see "Edit an Overlay Plot, Y Axis and Legend Options" on page 54.

1 The collapsed legend displays a single of row of legend items, including color, name and (optionally) the value of a hilited point of each series while hovering. Note that not all of the legend items may display in the collapsed state - to see all legend items, expand the legend by clicking its view toggle arrow **3**.

2 The expanded legend displays more information about the plot data:

Timestamp	The timestamp of a hilited point while hovering.
Value	The value of a hilited point while hovering.
Min and Max	The minimum and maximum value for each series within the current data's timebounds as set by the Time Conductor. Note that these values are not affected by hovering or zooming.

3 To toggle the legend from collapsed to expanded or vice versa, click its expansion toggle arrow.

4 Hovering over the plot display area will display the values of the points nearest to the current X axis position of the cursor for all series in the plot. Depending on how the plot has been configured, hover-based values **5** appear in both collapsed and expanded legend modes.

Table Views

Table views are provided for a number of telemetry types, including Telemetrys, packets, frames, commands and more. Table views can additionally be created, giving you the ability to customize the content and display of the view. Data displayed in a Table object can be filtered and sorted as well as exported as a CSV file - see "Exporting a Table View's Data" on page 34 for more. Table views can be embedded in Display Layouts. Tables can display up to a maximum of 10,000 rows.

Table views display all the data available within the Start and End datetimes defined by the Time Conductor. If a real-time connection is enabled and the End datetime of the Time Conductor is in the future, the table will append incoming streaming real-time data as it is received. Note that this action doesn't involve a requery of the historic data provider.

When the Time Conductor is in a real-time mode (Local UTC) the table will show both historic and real-time data that fits within the Time Conductor's Start and End bounds. As new data comes in, it will continue to be added to the view, and as old data no longer fits within the Time Conductors bounds it is removed from the view.

1   Rows can be sorted by clicking a column header to cycle through sorting options. Only a single column at a time can used for sorting. When a column is controlling the sort, a marker indicator appears as shown - this example shows the view being sorted by ERT ascending. If no marker is displayed on any column, rows are displayed in the order they were received from the server.

No marker	The default; rows are displayed in the order received from the server. Not supported in all table views.
▲	Sort by this column in ascending order.
▼	Sort by this column in descending order.

2   When viewing real-time data and sorted by any time system ascending, scrolling to the bottom of the window will keep the scrollbar softly locked in that position so that new incoming data always appears in view at the bottom of the window.

3   The number of rows in the table's dataset is displayed here.

4   Currently visible data can be filtered by entering any full or partial word or numbers into a column's filter input. Filtering occurs as you type, and multiple columns may be used to filter. Note that when you are filtering, the number or rows indicator **3** will change to indicate how many rows are currently matching your filter settings.

Pausing and Marking Rows in Table Views

Rows in most scrolling table views can be marked, simply to visually identify a row as it's moving, or to select one or more rows to export their data.

PAUSE/PLAY

1 If the Time Conductor is in real-time mode, scrolling tables can be paused by clicking this button. Pausing a table will stop incoming real-time data from being appended to the table and halt scrolling.

2 When paused, an orange border is displayed around the table, and the Pause button toggles to Play. Clicking this button will remove marks from all rows and cause the view to requery for any new data that may have become available while the view was paused. Real-time data scrolling will resume if the Time Conductor is in that mode.

MARKING ROWS

3 Single rows can marked by clicking them. To mark multiple rows, click once, hold the shift key, and click again. All rows between the first and last clicks will be marked. When one or more rows are marked, the view is automatically paused. The number of marked rows will be **5** displayed next to the number of rows in the table.

4 To mark discontinuous rows, hold the Cmd key (Mac) or Ctrl key (Windows) and click rows. Use the same keyboard modifier to unmark an already marked row.

6 When one or more rows are marked, Export Marked Rows will export just the data associated with those rows. See "Exporting a Table View's Data" on page 34 for more.

7 Unmarking All Rows will remove marks from all rows and has the same effect as clicking the Play button **2**.

Viewing a Table Row's Data

It may be useful to see all the data for a row of a table, in cases where the information is not visible due to scrolling or hidden table columns.

1 To view all the data for a given row in a table, context click the row and select "View Full Datum" from the resulting menu.

2 All the row's data will be displayed in an overlay. Click the Close button 3 to dismiss the overlay and return to the table view.

Telemetry Points

Telemetry Points are individual telemetry elements. A telemetry point can alternately be viewed as a plot or as tabular data. In contrast to the Plot view, which will display only the number of data points needed to properly show a plot, table views will show as much data as possible, up to 10,000 data points. Data displayed is always based on the current datetime range and time system as specified in the Time Conductor. See "Time Conductor Overview" on page 22 for more.

The Telemetry's view can be switched from plot to table, here's how:

1   Click on a Telemetry to navigate to it. By default, the Telemetry will initially display in plot view.

2   Change the view selector from "Plot" to "Telemetry Table" **3**. Note that zooming or panning operations in the plot view will be lost, and won't apply to data displayed in the table.

4   The table view can be filtered and sorted **5**.

RELATED
- "Edit a Stacked Plot" on page 57
- "Time Conductor Overview" on page 22
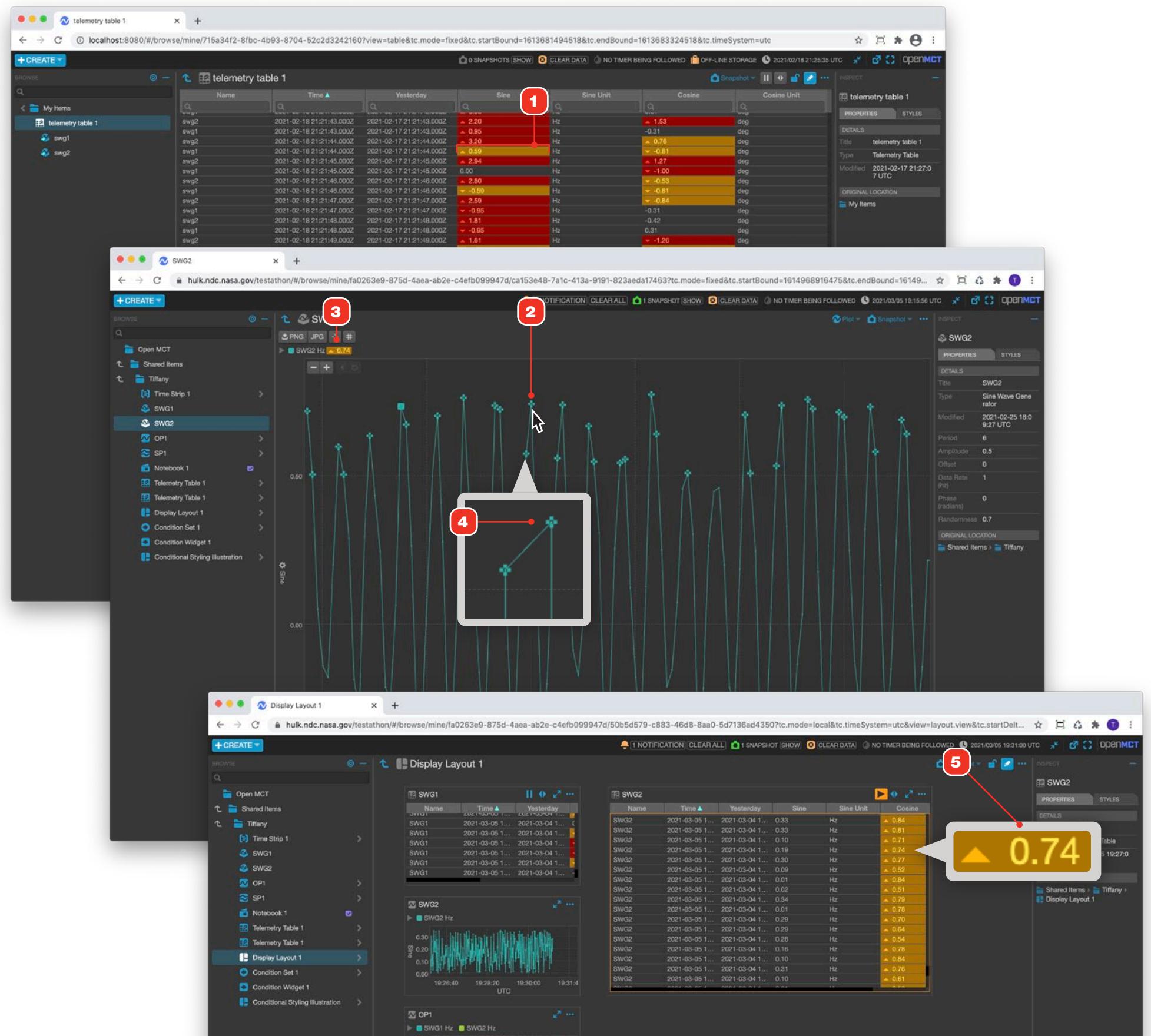
Telemetry Point Limits

The application displays telemetry limit violations in a variety of views. Limit violations display for the time in which telemetry has exceeded the limit - once a limit is no longer being violated, the limit violation indicator is not displayed.

Limits are included in the telemetry itself, and cannot currently be defined by the user. Currently, MCWS supports yellow and red limits. Note that examples included here are for illustrative purposes only.

1 Yellow and Red limit violations in a Tabular view.

2 When hovering over a point that is in violation, its value in the legend will also be rendered with violation indicators **3**.

4 In plot views, data points that are in violation are drawn in a distinct manner.

5 Yellow limit violation in a Display Layout.

Exporting a Table View's Data

Table views in Open MCT, either the table view available to many objects in Open MCT, or that of a Telemetry Table object, allow you to export all the data from their current view. This export method applies table filtering and sorting to its export.
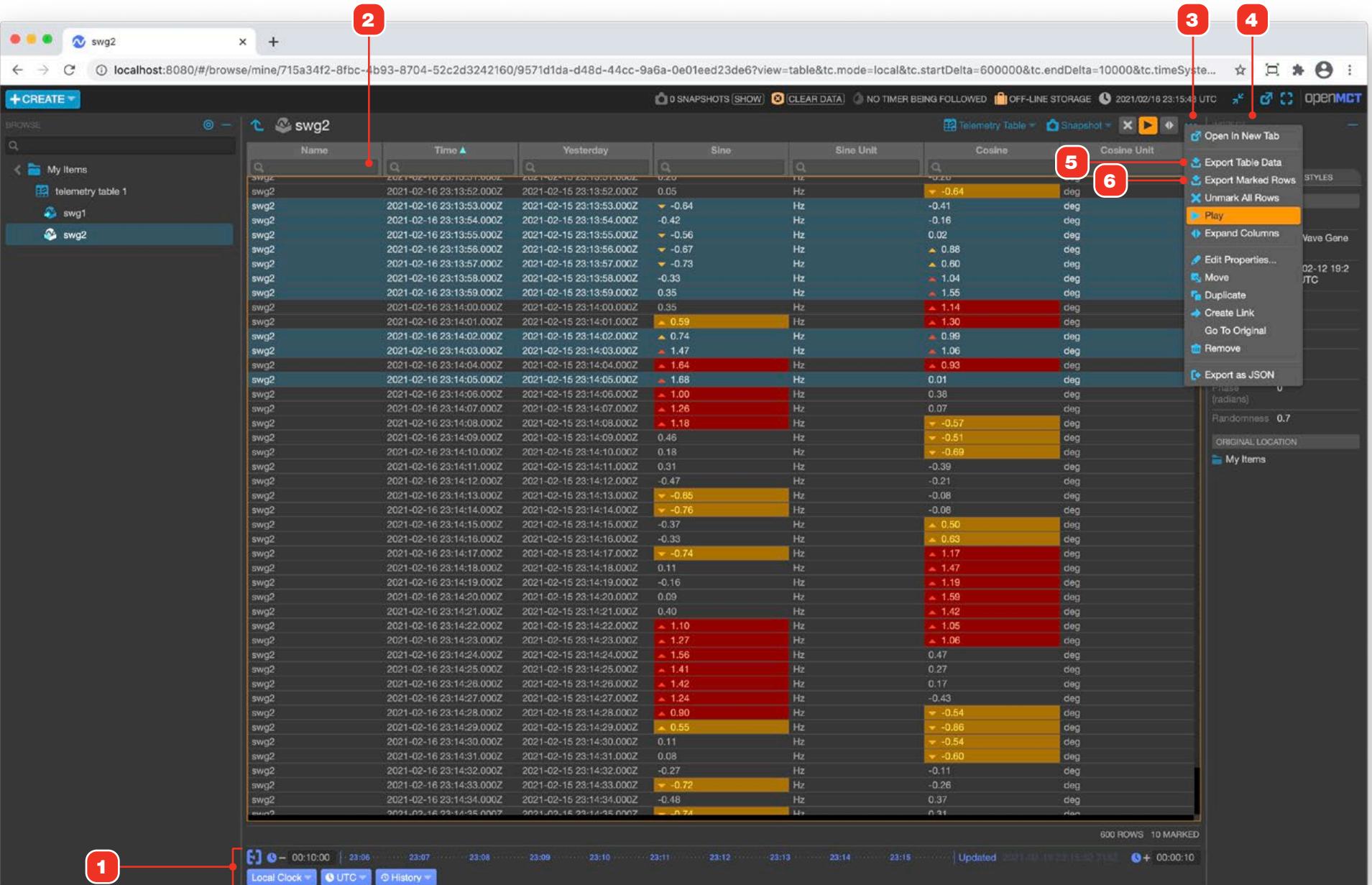
IMPORTANT NOTE: This method exports both historic and real-time data, but ONLY exports the data in the current view. Even if all filtering is removed, table views are limited to 10,000 rows.

STEPS

1 Set the Time Conductor to the mode and timesystem of your choosing.

2 Filter and sort the table as needed.

3 Click the view's "More Options" button to display the options menu **4**.

5 To export all the rows of a table's data, click "Export Table Data".

6 To export a selection of rows, select the rows you wish to export and click "Export Marked Rows". See "Pausing and Marking Rows in Table Views" on page 30 details on selecting rows in table views.

If your browser is set to ask you where to save your file, you'll be able to name the file. Otherwise, a file named "export.csv" will be created and saved.
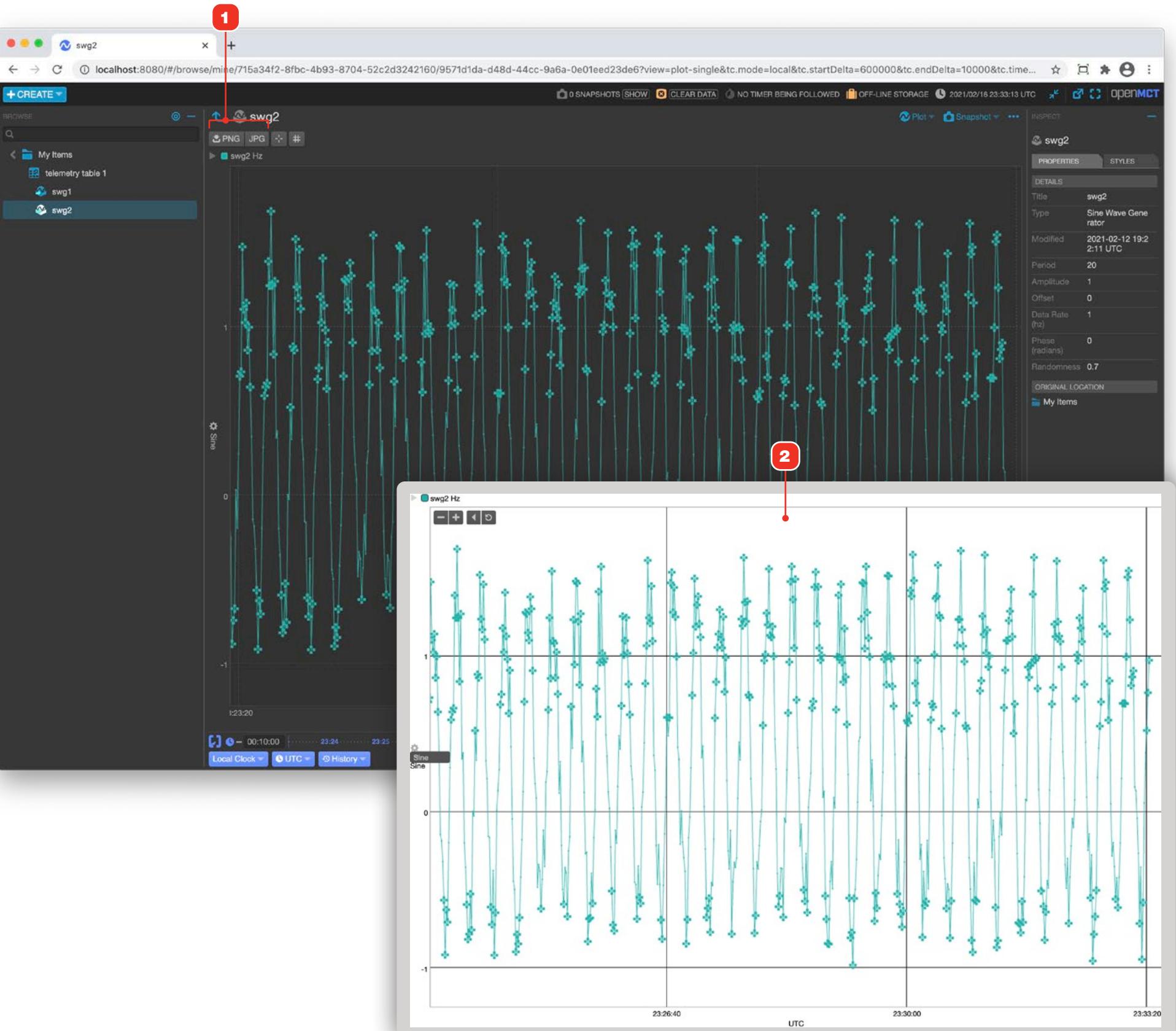
Exporting a Plot as an Image File

Plots can be exported as PNG or JPG files. The resulting file will include the plot, its axes, and legend. Any zoom or pan operations will be included - what you see at time of export is what you get. The legend will be as you see it when the Export action is invoked: if expanded it will appear in your exported image that way.

1 Click the either the PNG or JPG export button. If your browser is set to ask you where to save your file, you'll be able to name the file. Otherwise, a file named "plot_png.png" or "plot_jpg.jpg" will be created and saved.

2 An example of an exported plot.
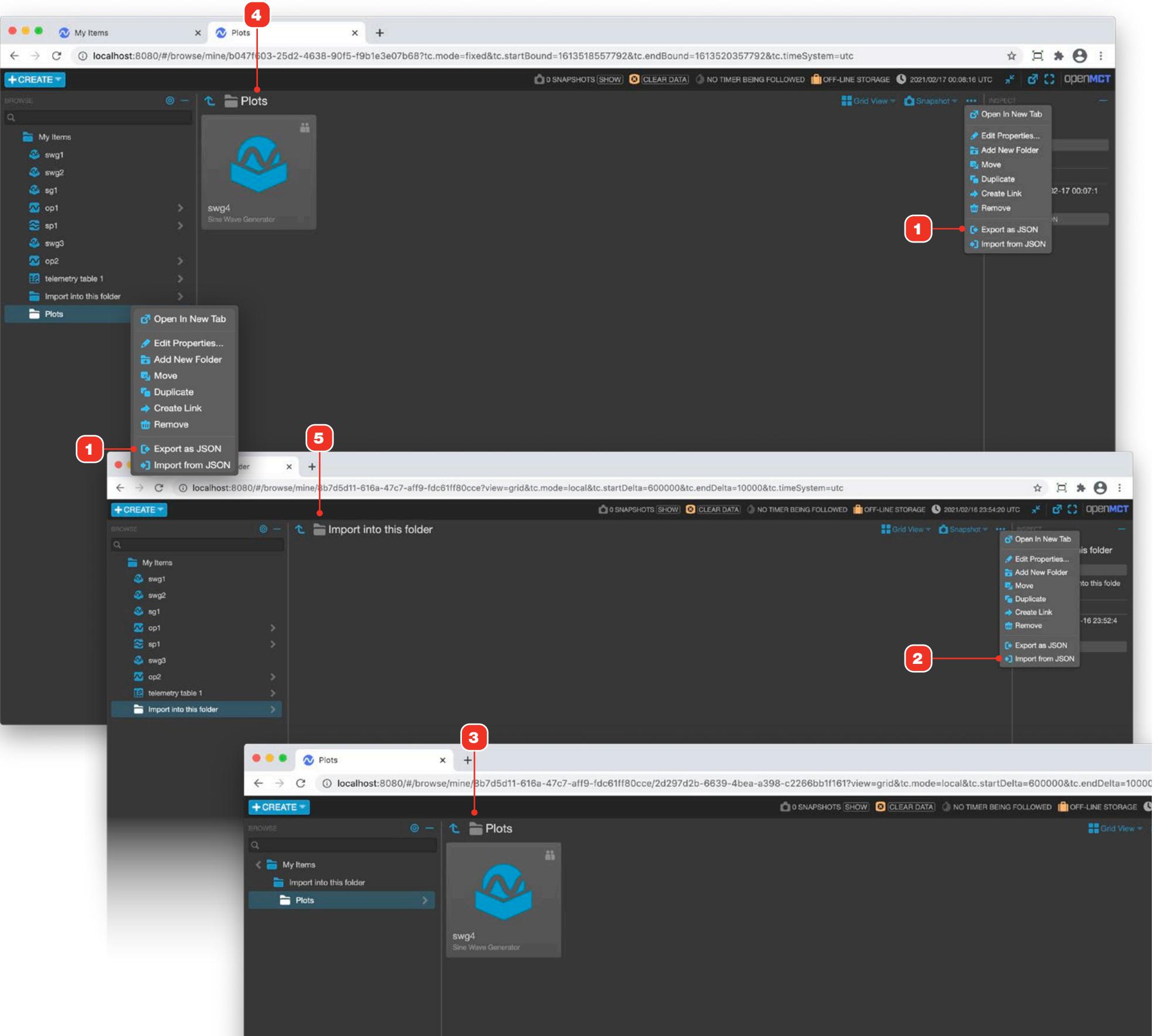
Exporting and Importing Object Configurations

Any creatable object can be exported as a text file, then re-imported into the application in another location, or even another deployment running the same version of Open MCT. The resulting export will include the selected object as well as all of its children, recursively.

This example shows exporting the folder "Plots" **4** and importing that file into a folder named "Import into this Folder" **5**.

STEPS

1 Context click any object in the tree, or access the currently navigated object's "More Options" menu and select "Export as JSON" from its menu. Your browser will prompt you to save a JSON file on your computer.

2 To import an exported object, select the new location in the tree and context click it, or navigate to the desired location and access its "More Options" menu. Choose "Import from JSON" from its context menu.

3 The result: the outermost container plus all of its children (and their children recursively) is imported into the selected location.

Imagery Overview
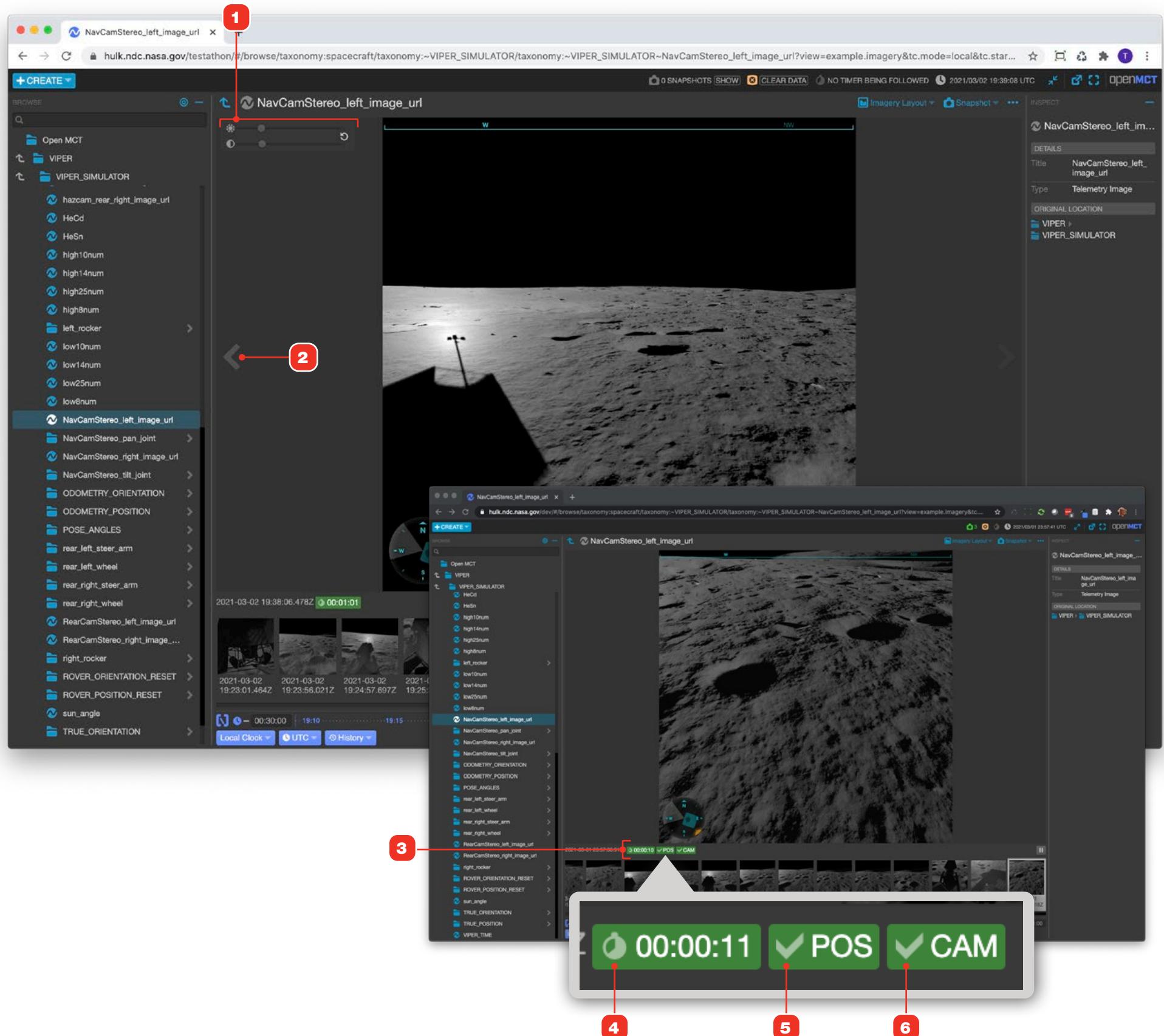
Imagery now uses available data (depending on your deployment) to display additional metadata about a given image.

1 The brightness and contrast slider bar allow users to temporarily make changes to any image that they are currently viewing. Clicking on the reset arrow will remove any changes made to the image and revert it back to its original brightness and contrast settings.

2 Users can click on the arrow to the left and right of the main image that they are viewing to view other images.

IMAGERY INDICATORS

To provide better support for rover operations, imagery "freshness" indicators **3** indicate the relative age of the image, if the rover is still at the same position when the image was taken, and if the camera pan-tilt unit is still looking in the same direction as when the image was taken.
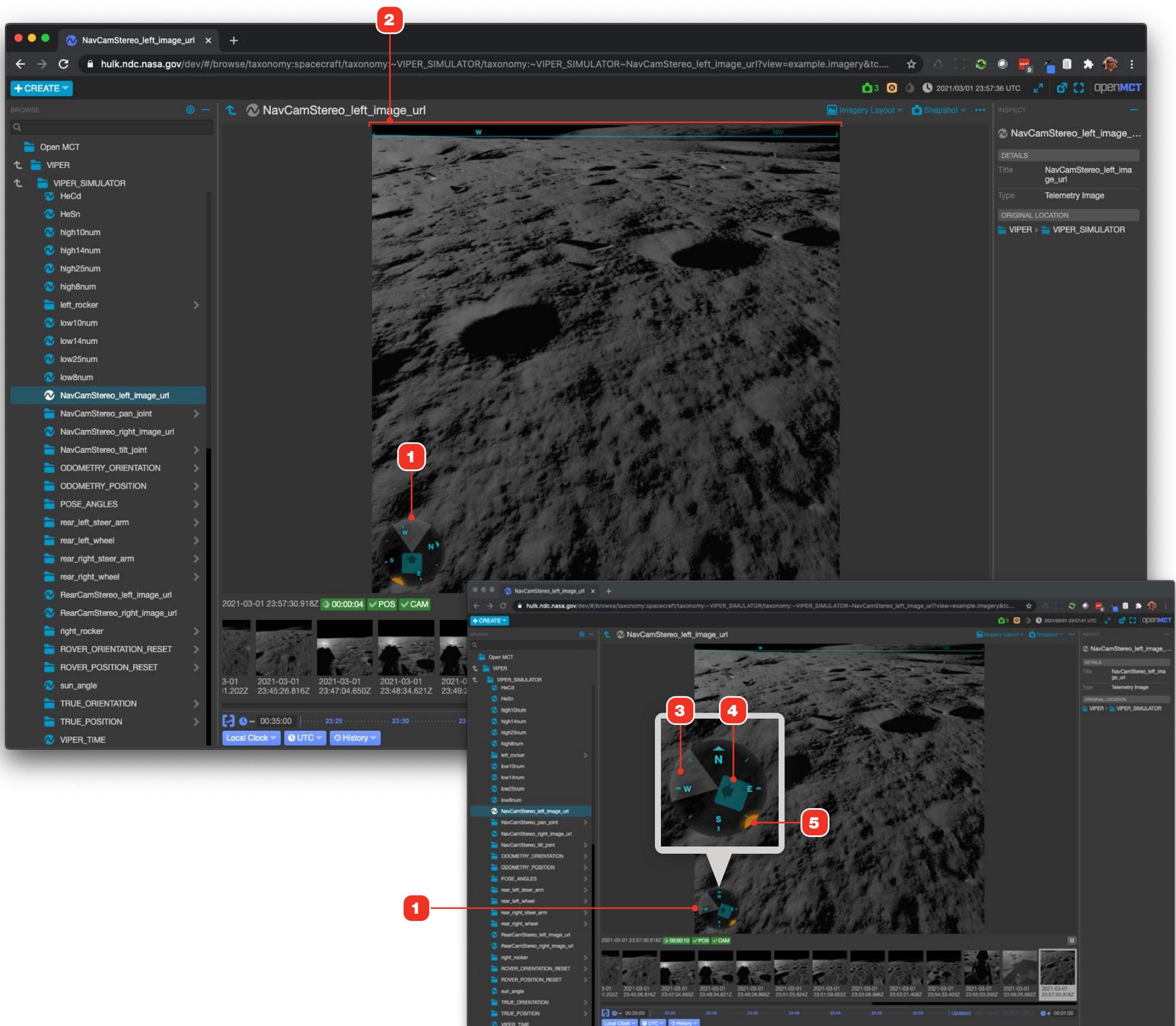
4 Age Freshness: will blink briefly for brand new images and will stay green for a period of time (2 to 5 minutes), depending on settings in your deployment.

5 Position Freshness: if the rover has not yet moved or turned its body from the position where an image was taken, this indicator will be displayed.

6 Camera Freshness: if the rover's nav cam has maintained its stance from when an image was taken, this indicator will be displayed.

Imagery Metadata and Compass Rose
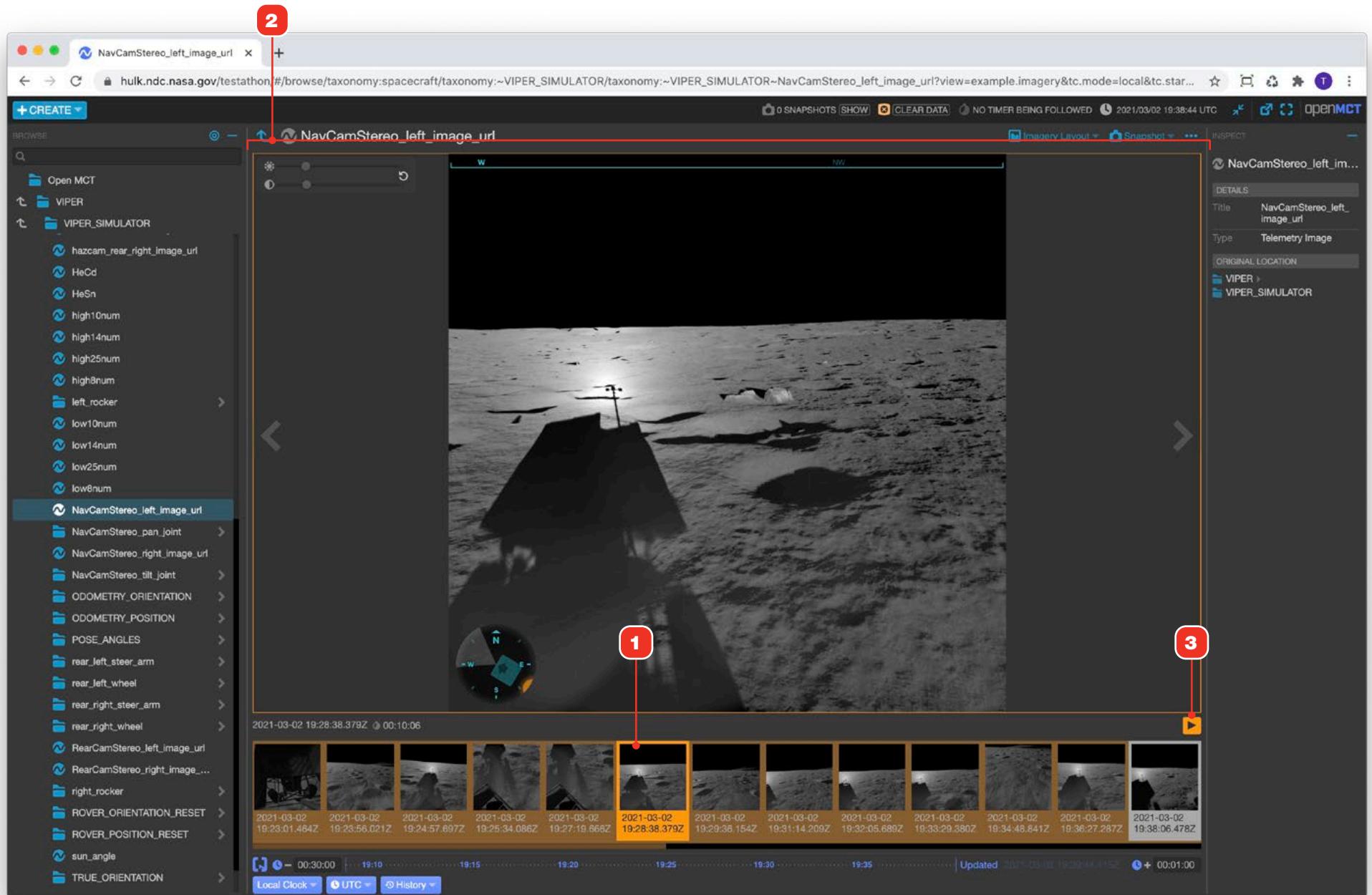
1 By default, the compass rose displays with north straight up. Click the rose to toggle it to "camera direction up" mode.

2 Compass direction element displays the cardinal compass directions in view in a given image.

3 Camera angle relative to the rover body and camera.

4 Rover body attitude.

5 Sun angle relative to the cardinal compass directions.

Interacting with Past Images

1 Users can view past images by clicking on any thumbnail image shown in the camera roll.

2 The orange border indicates that you are viewing an image from the past. When viewing past images while the time conductor is in real-time mode, any automatic refresh of new images will be paused.

3 The play button indicates that real-time image capture has been paused. To obtain the latest image, click on the play button to unpause the time conductor and resume local clock.
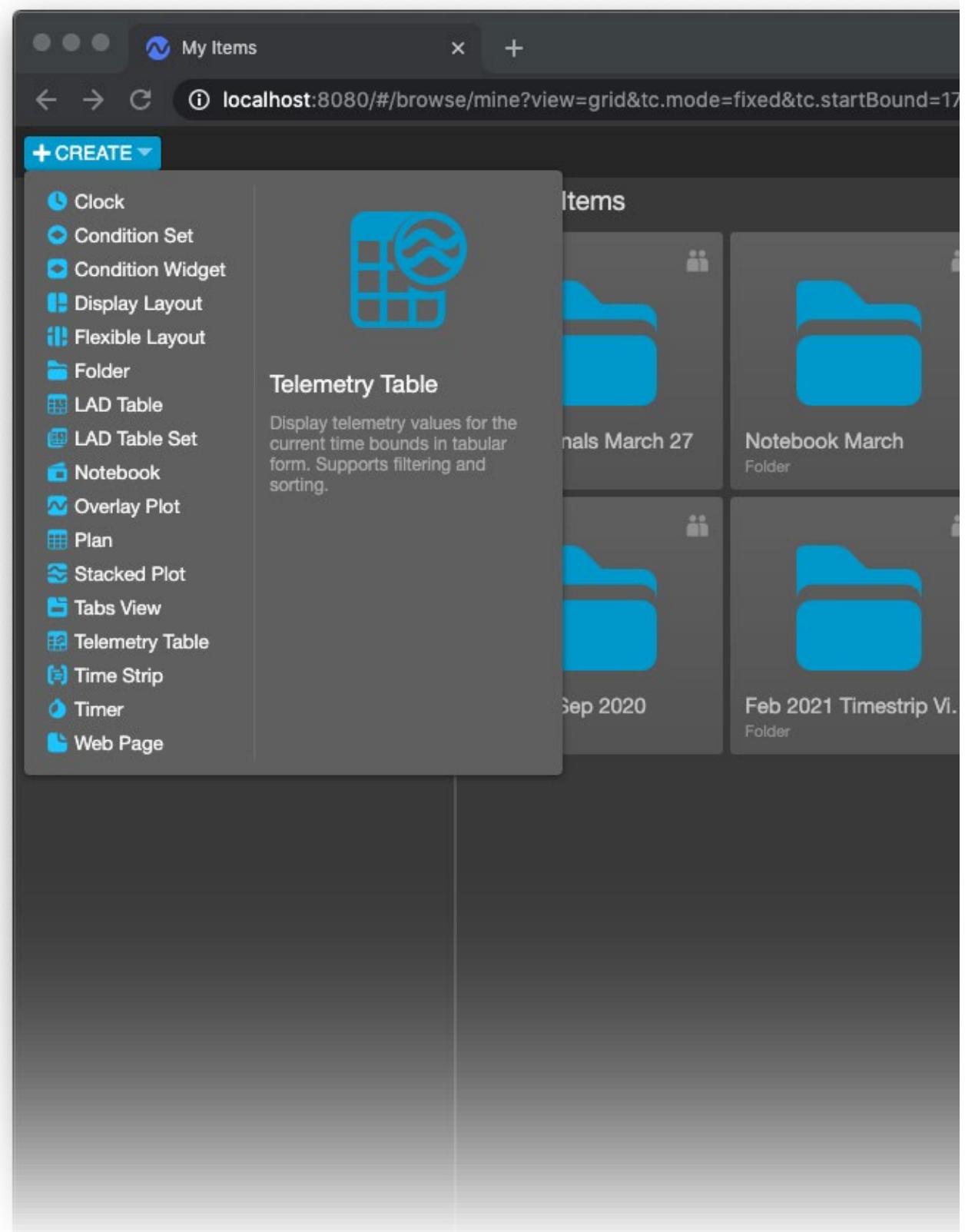
Overview of Creatable Object Types

A summary of all the object views that can be created via the Create menu.
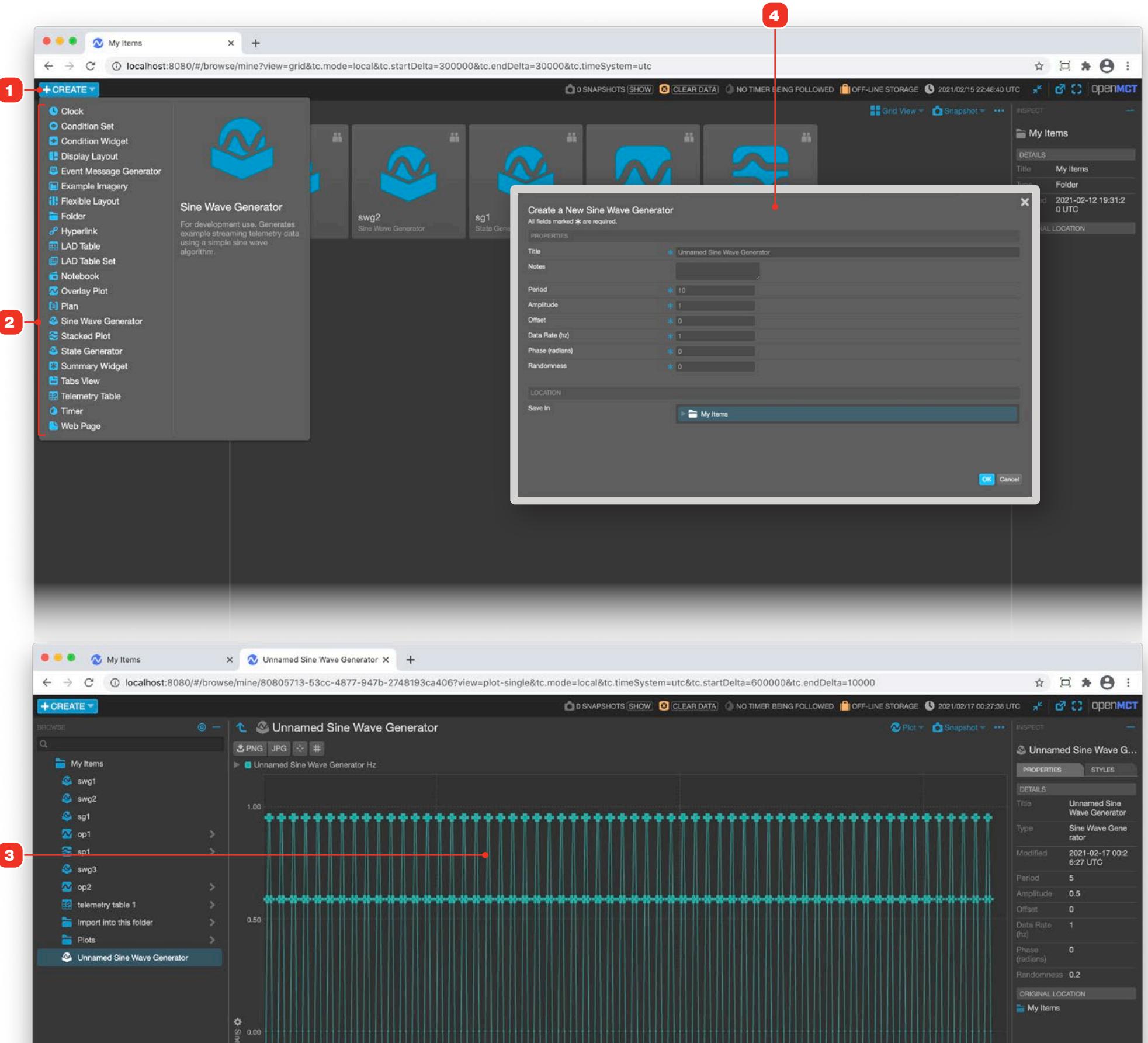
| View	Description	Page
Clock	A digital clock that can be configured for any timezone.	99
Condition Set	Create related conditions that monitor and evaluate telemetry values in real-time with a wide variety of criteria. Use to control the styling for a wide variety of other views, or use as its own telemetry output.	83
Condition Widget	A button element that can be styled using Condition Sets.	90
Display Layout	A Display Layout allows you to create, save and share screens that organize almost any other type of object that has a view.	69
Flexible Layout	Another way to organize and display multiple types of different views, Flexible Layouts use a fluid, dynamic sizing approach to displaying contained elements.	81
Folder	Store and access items in a categorized filesystem-like hierarchy.	50
LAD Table	A tabular view for telemetry channels. Each row of the table is a channel, columns are fields of the channel. Current values are displayed as alphanumerics.	60
LAD Table Set	Collect Channel Tables together in a single object view. Each table is sub-headed with it's name.	60
Notebook	A flexible way to save notes or create shift logs. Entries are automatically time-stamped and can include annotated screenshots of any view in the application.	92
Overlay Plot	Visualize one or more Telemetry Channels plotted together with a common Y axis.	52
Plan	Allows import of a time-based activity plan defined in JSON format, displayed as a Gantt-like chart in horizontal swimlanes.	64
Stacked Plot	A plot view that displays each channel with its own independent Y axis while maintaining synchronization of the X (time) axis.	52
Tabs View	Displays contained objects as clickable tabs, giving you the ability to collect together a group of objects and rapidly navigate between them.	51
Telemetry Table	A tabular view for telemetry channels. Each row of the table is a value for one or more channels, columns are fields of constituent channels.	58
Time Strip	Allows display of Plans along with alphanumeric telemetry displayed in horizontal swimlanes with a common time axis.	64
Timer	Create countdown or count-up timers targeted to a discrete datetime. Timers can be paused and restarted.	100
Web Page	A component that embeds a Web page via its URL, allowing web content to be added to Display or Flexible Layouts.	101

Creating A New Object

1   Click the Create button to display the Create Menu.

2   Select the type of object you'd like to Create.

3   Depending on the type of object you're making, you'll be taken either to a new blank workspace **3** for that object type, or a properties dialog screen **4** will be presented.
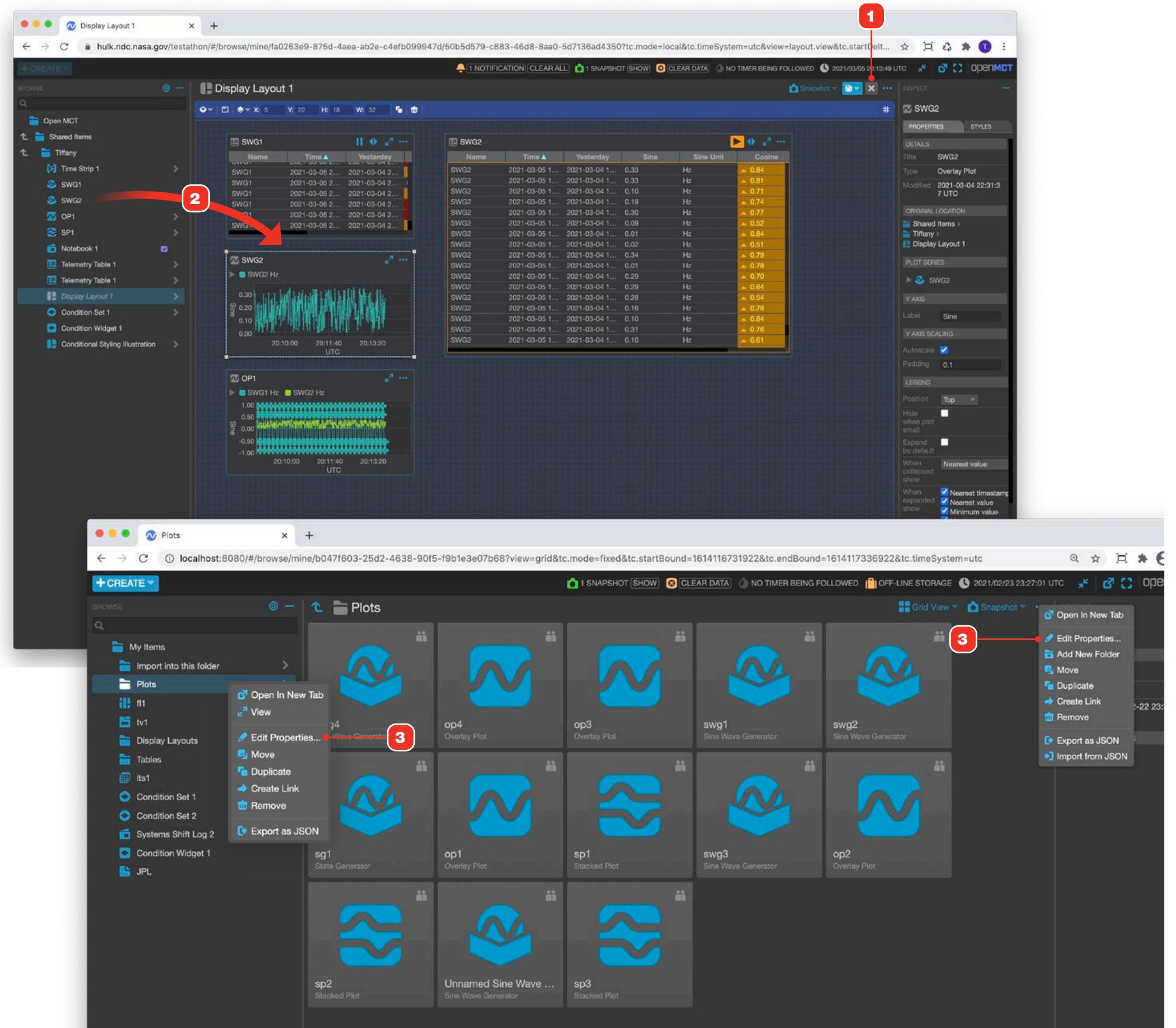
Starting To Edit

There are two ways to begin editing an object:

1 To start editing a navigated to object, click its Edit button.

2 Drag and drop objects from the Object Tree into its view. If the current object cannot contain the object you are dragging it won't allow the drop.

3 Some object types only have edtiable properties and don't have an edit interface in the UI, such as Folders. To edit this type of object's properties, clicks its disclosure arrow in the main view, or context-click it in the tree **4**. See "Editing Object Properties" on page 44 for more information.
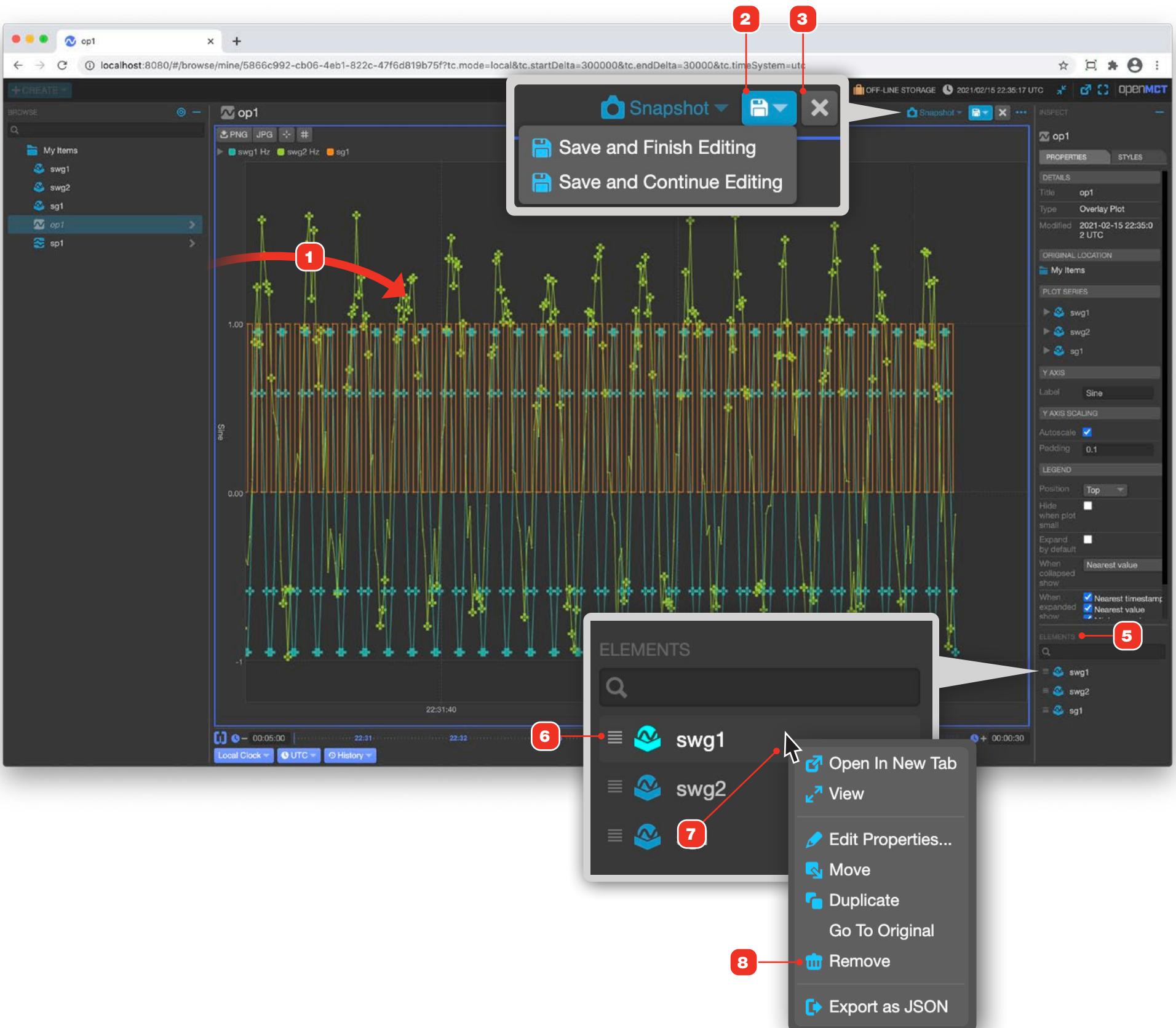
Editing An Object

Different types of objects have varied ways in which they can be edited, but adding and removing elements is the same.

1   **Adding Objects:** Objects are added to the workspace by dragging them from the Object Tree. Once an element is added, it appears in the Elements pool **5** and the main view area.

2   **Saving:** Clicking the Save button will present a dropdown menu of options. Clicking "Save and Finish Editing" will save all work and exit Edit mode, while choosing "Save and Continue Editing" will also save but allow you to keep working in Edit mode.

3   **Cancelling:** The "X" Cancel button will exit Edit mode without committing any changes.

4   **Inspector Tabs:** Many objects have both editable properites for their elements as well as styling options - click the appropriate tab here to access the desired interface. For more information on styling objects, start with "Styling an Object with Static Styles" on page 45.

5   **Elements Pool:** While editing, this area shows the items that have been added to the current object.

6   **Rearranging Order:** For a number of views such as Stacked Plots and Telemetry Tables, the order of elements in the main display is controlled by their order in the Elements pool **5**. To rearrange the order of elements in the view, drag an element by its handle up or down in the Elements pool to move it to a new position. The main display will update as soon as you make a change while editing.

7   **Removing Objects:** To remove an object, context-click it in the Elements pool and select "Remove" **8** from its context menu.
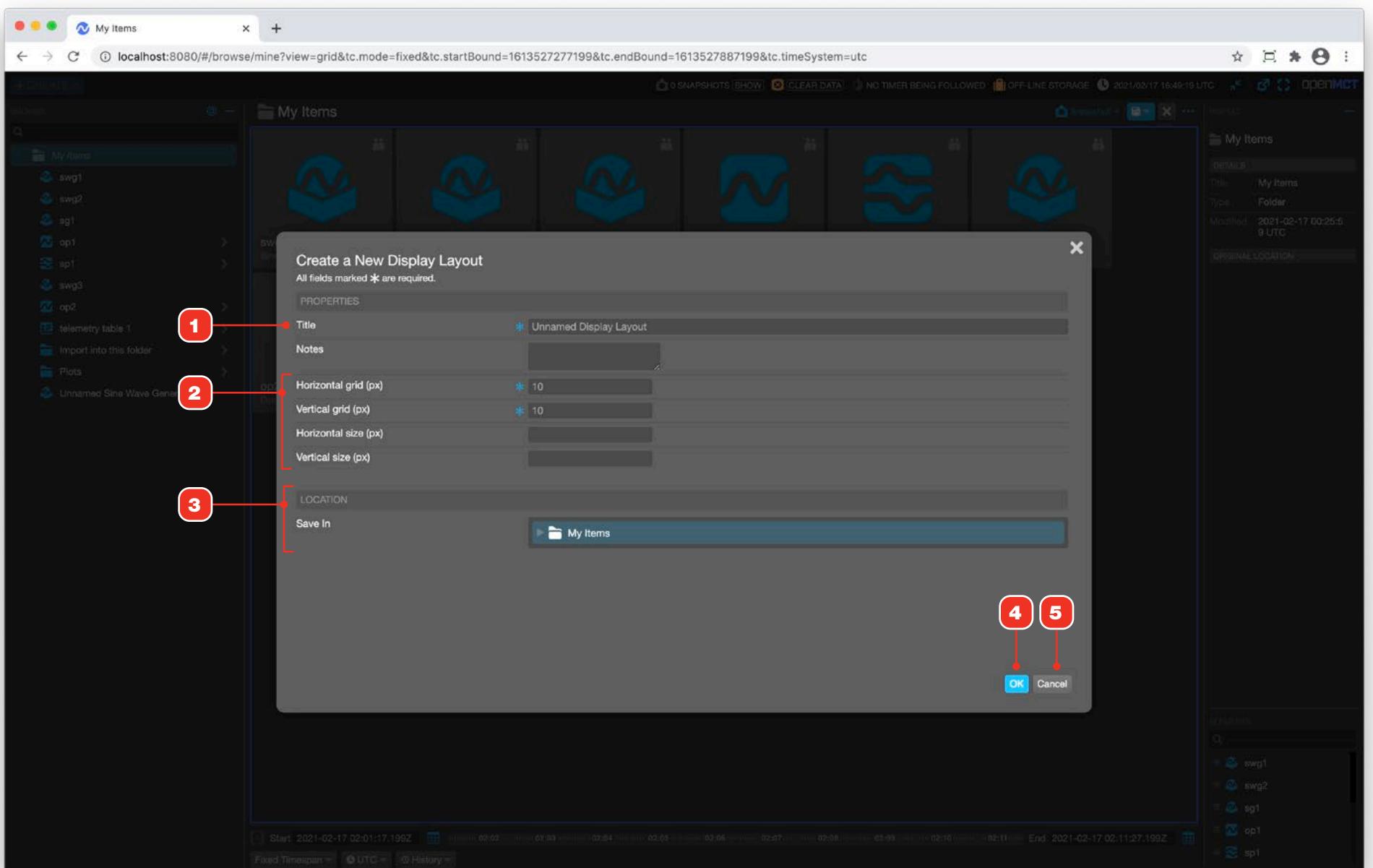
Editing Object Properties

When saving a newly created object for the first time, you'll be prompted to name it and decide where to save it. You also use this dialog when editing the object properties of an existing object.

1 Enter a title for the object you are creating. The object's title is easily edited later by editing that object's properties.

2 Some objects have optional properties that can be set and saved with the object.

3 Select the location to save your new object. All objects can be saved into a folder; some object types can be saved directly into objects other than folders, depending on the type that you're creating. You won't be able to select an invalid object type to save your new object into. Objects can be moved later by selecting the "Move" command from that object's context menu - see "Context Menus" on page 16.

4 Click "Ok" to save your object.

**5** "Cancel" will take you back to editing your new object.
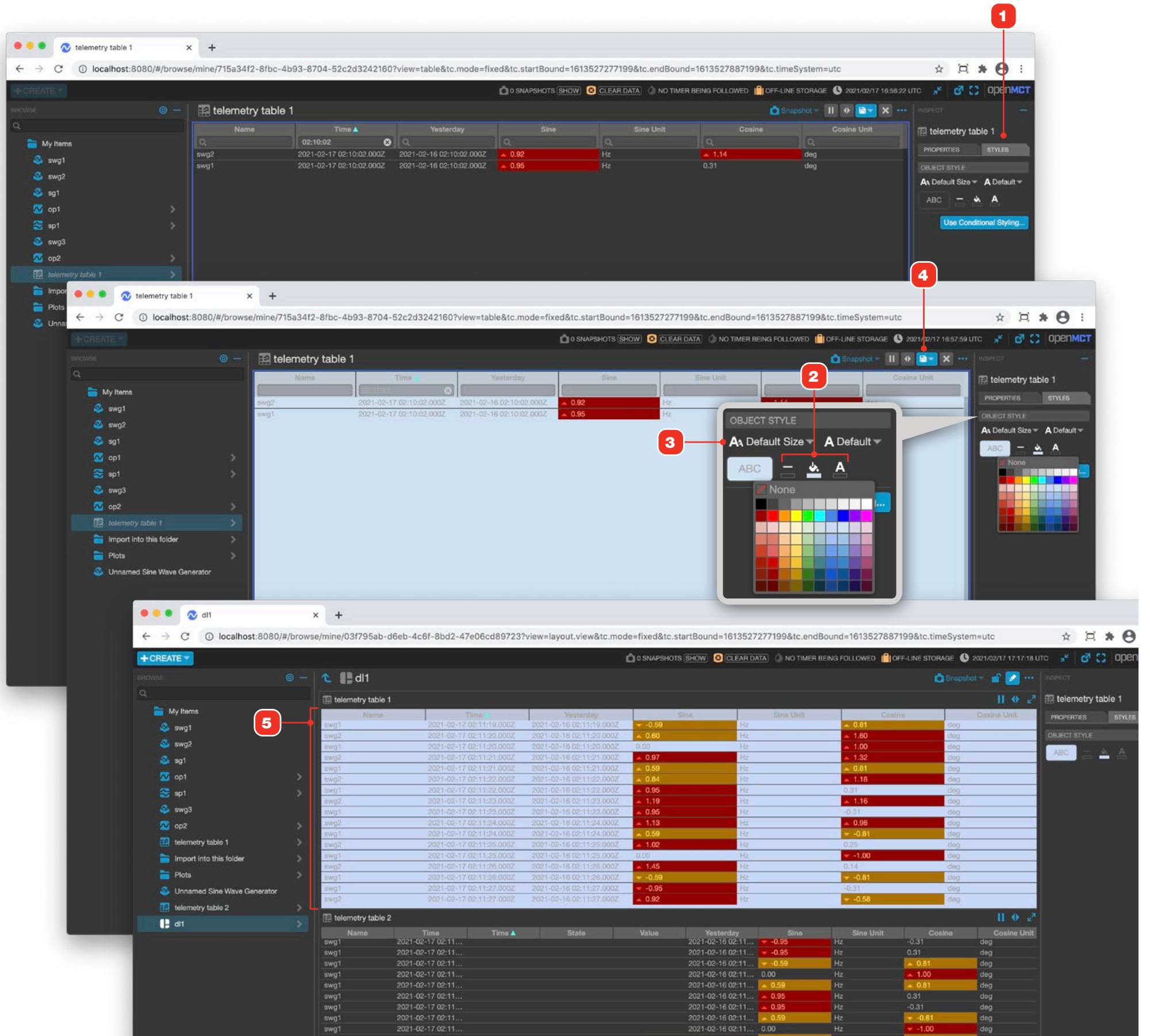
Styling an Object with Static Styles

Many objects in the application allow styling to be applied to them. Styles set in this way are saved with the object and appear wherever that object is used, such as within a Display Layout. Display Layouts have special considerations for styling, see "Editing Domain Objects From Within a Display Layout" on page 74.

You can apply and save static styles, or use Condition Sets to conditionally style an object based on real-time telemetry values . For more on this, see "Condition Sets Overview" on page 83 and "Styling An Object With Conditional Styling" on page 46.

1 To statically style an object while editing, click the Styles tab.

2 Choose border color, background color and text color options as desired. When "None" **3** is selected, the object uses the application's default colors.

4 Save your changes.

**5** Wherever your styled object appears, its styles are applied.
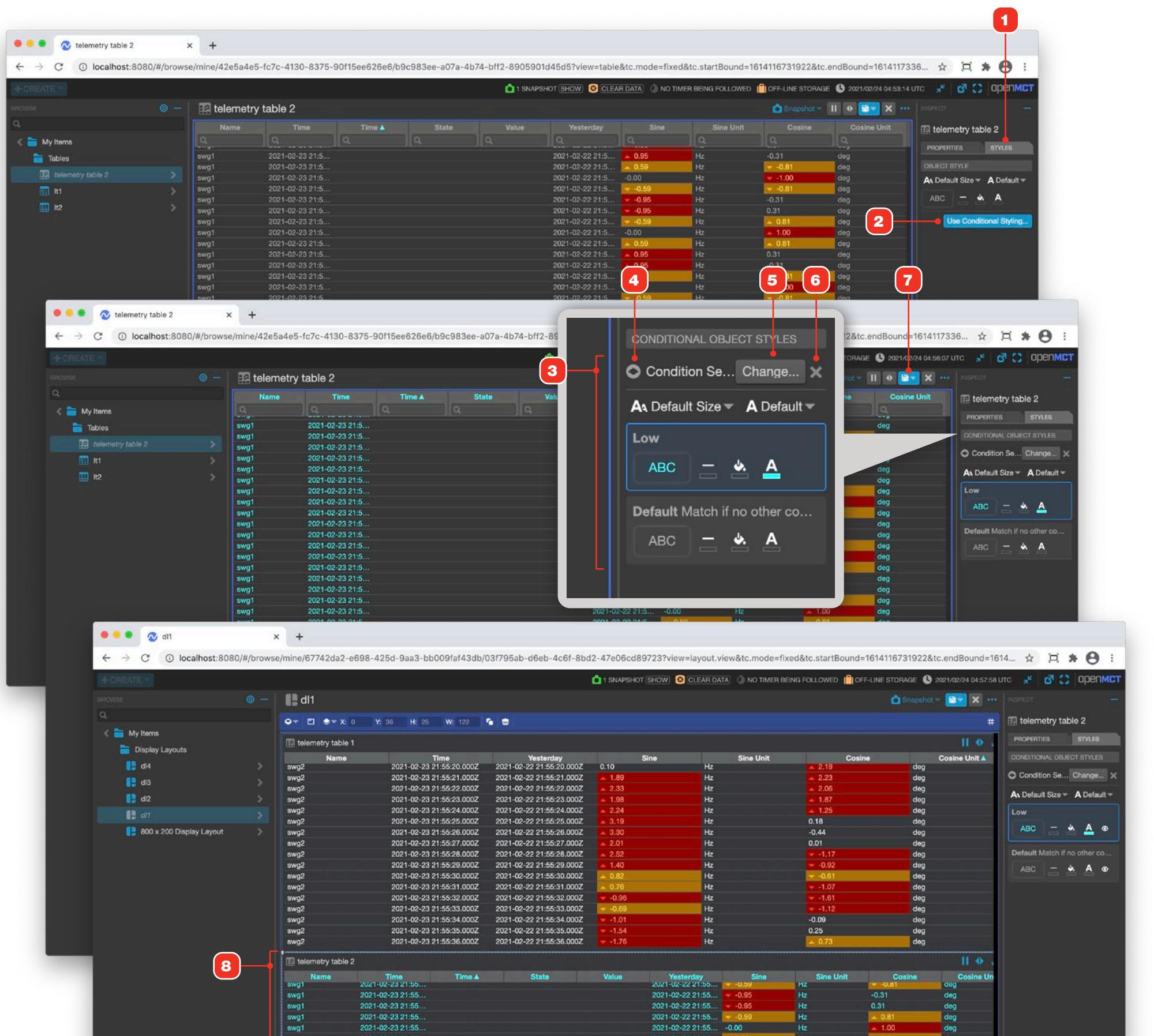
Styling An Object With Conditional Styling

Condition Sets give you a powerful way to dynamically style many objects in the application based on a real-time evaluation of telemetry values. For example, you could set the background color of an object like a plot, table or Condition Widget to a warning color when a value exceeds a limit or is within a range, or when a value is not defined.

For more on Condition Sets, see "Condition Sets Overview" on page 83.

1 To conditionally style an object while editing, click the Styles tab, then click "Use Conditional Styles..." **2**. A dialog will appear and prompt you to select a previously created Condition Set.

3 Styling options for each condition within the selected Condition Set allow you to set border color, background color and text color options that will be applied when that condition is matched.

4 The name of the currently selected Condition Set. Can be clicked during editing for a summary view of the set and its condition definitions.

5 Select another Condition Set.

6 Remove the currently selected Condition Set and revert to static styling.

7 Save your changes.

**8** Wherever your styled object appears, its styles are dynamically applied as telemetry is evaluated in real-time.
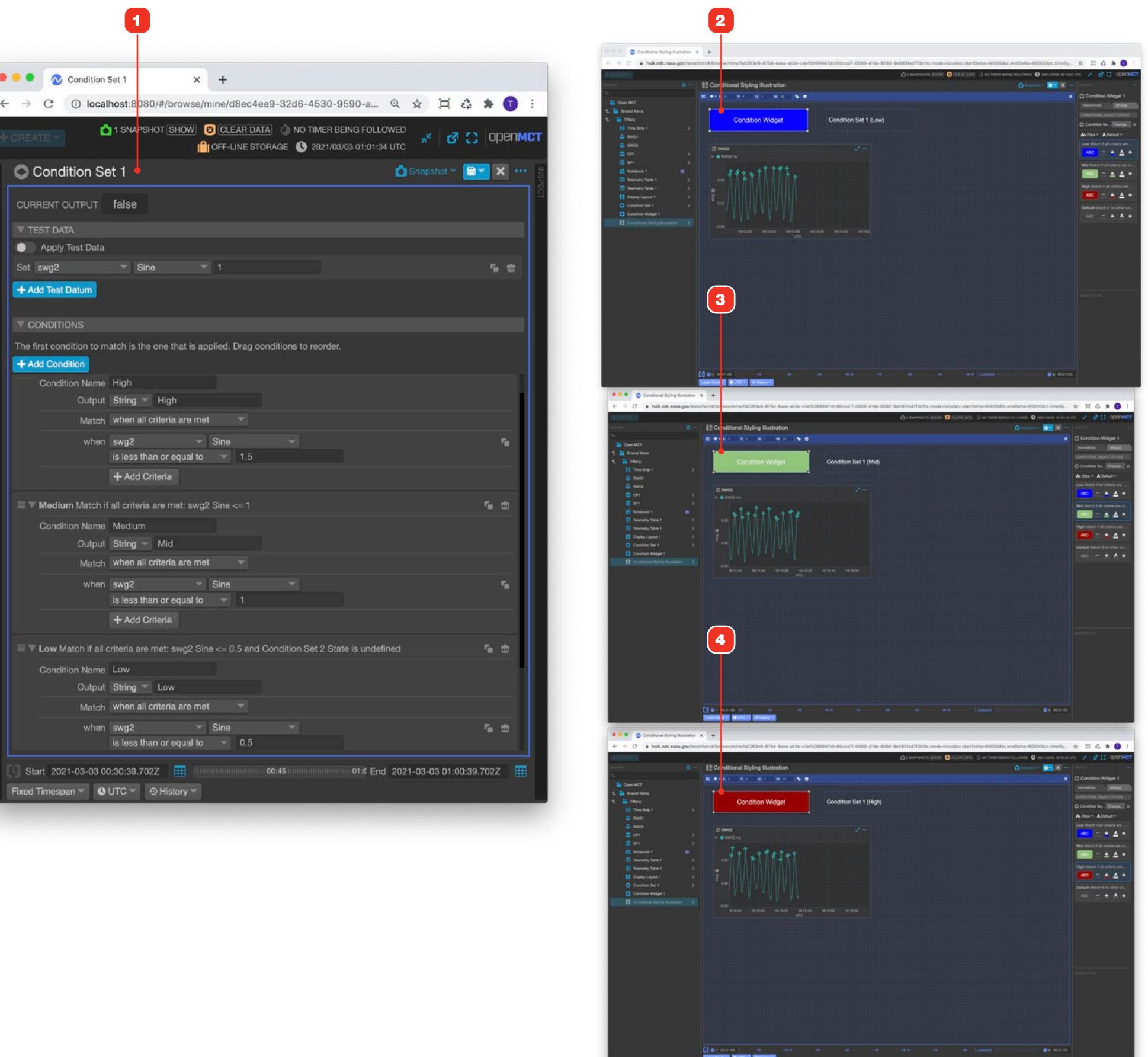
Conditional Styling Relationships

An illustration of the relationship between telemetry, a Condition Set that evaluates it, and a Condition Widget that uses that set for conditional styling. A Display Layout including all the elements is shown in three instances close in time as the value of the Telemetry is evaluated and subsequently drives the conditional styling of the Condition Widget.

1 The Condition Set uses three conditions that evaluate the sine value of SWG2. While not required, the defined conditions are collectively exhaustive and the Default condition is never matched.

- ■ "Low" captures all sine values less than or equal to 0.5
- ■ "Mid" captures all sine values less than or equal to 1
- ■ "High" captures all sine values less than or equal to 1.5

2 SWG2 has a sine value less than or equal to 0.5 and is matched by the "Low" condition, which applies a blue background to the Condition Widget.

3 SWG2 has a sine value less than or equal to 1 and is matched by the "Mid" condition, which applies a green background to the Condition Widget.

4 SWG2 has a sine value less than or equal to 1.5 and is matched by the "High" condition, which applies a red background to the Condition Widget.
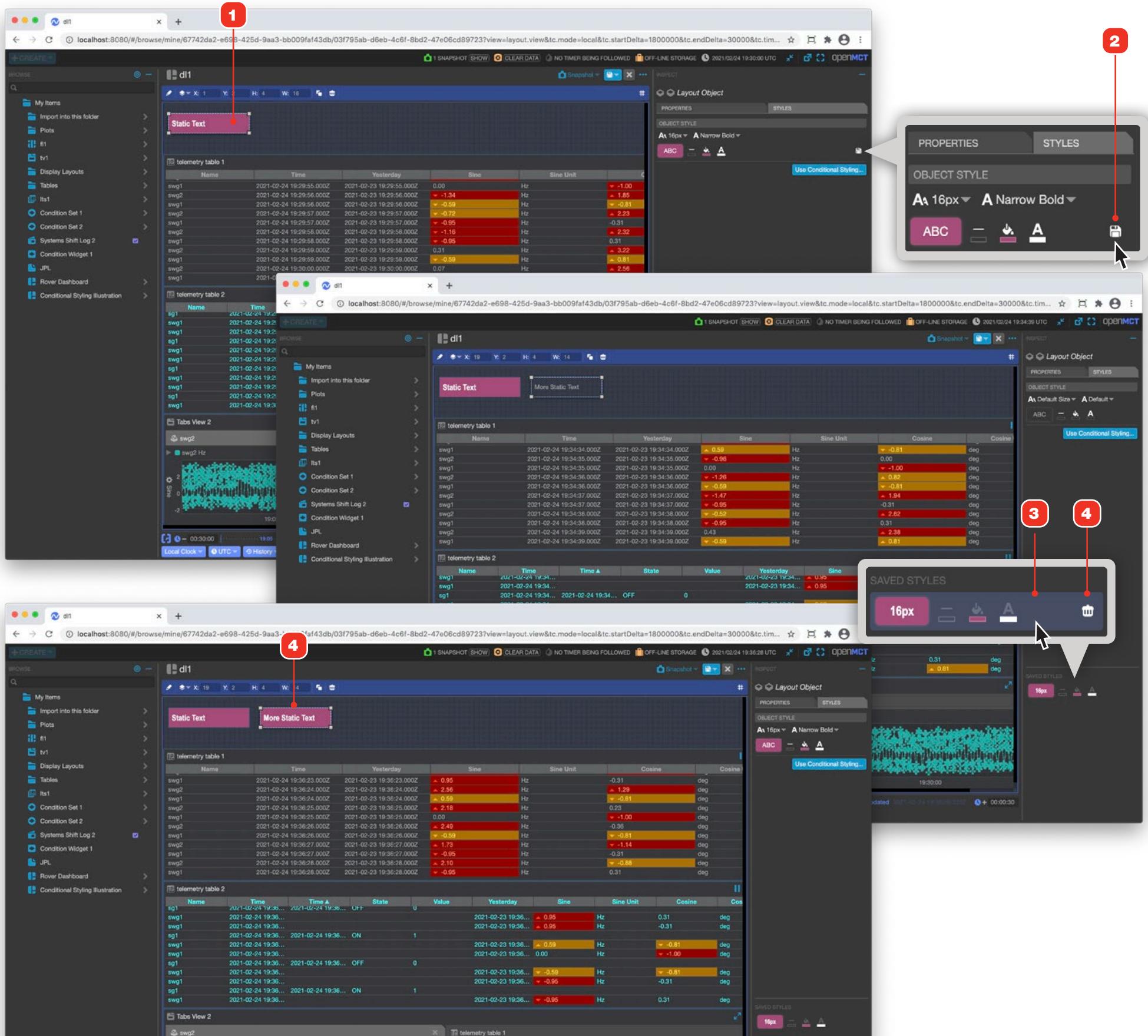
Saving and Applying Saved Styles

Styles can be saved and applied to other objects. Saved Styles created while styling any type of object can be reused and applied to any other object, and Saved Styles can be used for both static and Conditional styling. Here's how:

1 Select an object and style it as desired.

2 When mousing over the style controls, a "Save" icon will appear. Click this to save the style.

3 Saved styles appear in the "Saved Styles" section of the Inspector pane.

4 Saved styles can be deleted by mousing over the style and clicking the associated Delete icon. Note that deleting a saved style will have no affect on any elements that had that style applied to them.

5 Selecting an element and clicking a saved style will apply all applicable settings of that style to that element.

Locking Objects

Composed objects can be flagged as "locked" to indicate to other users they should not be edited. This feature will not prevent you or anyone else from editing an object; it is intended as a light-duty "think twice" action prior to being able to edit an object.
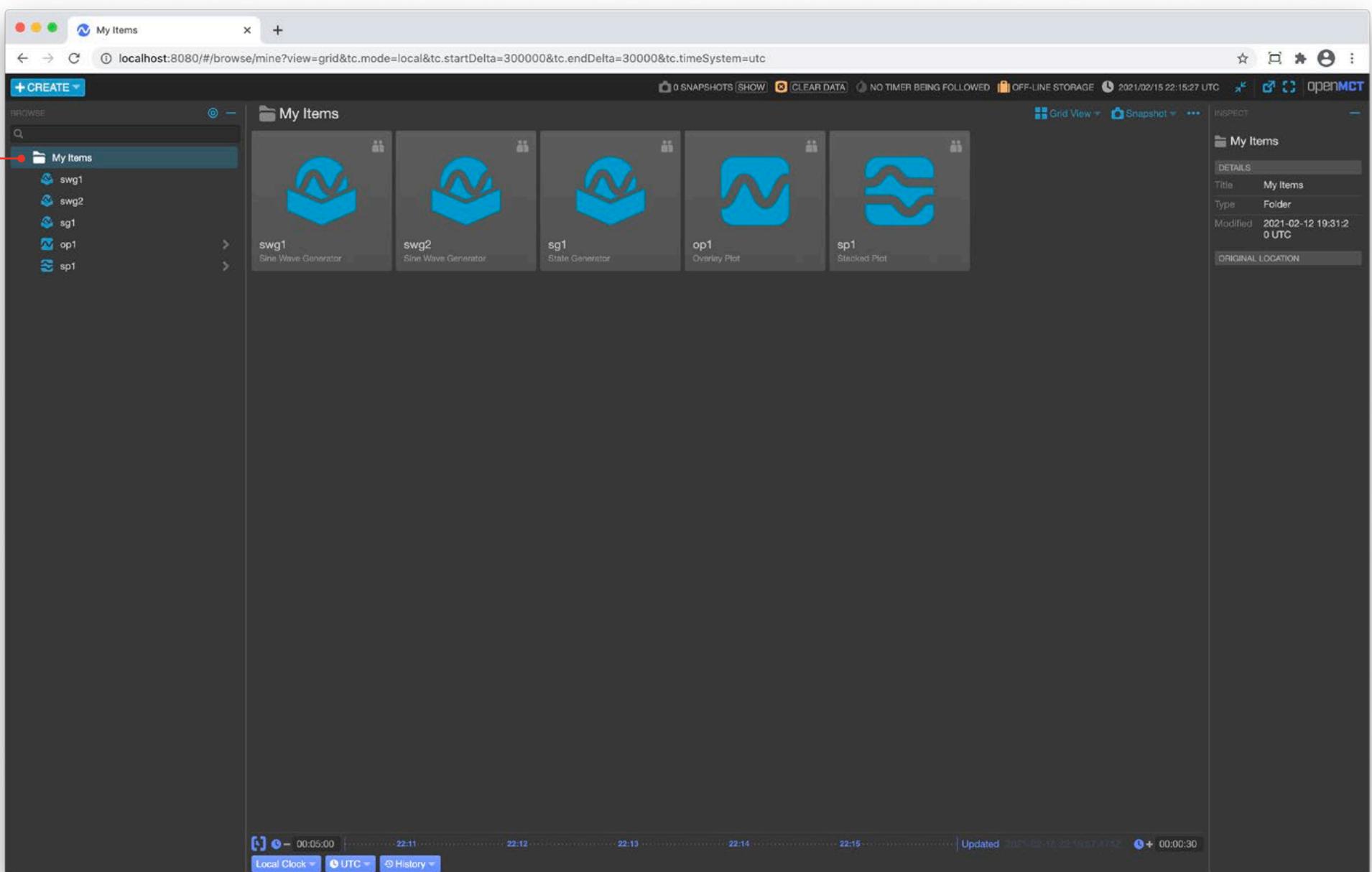
1 In Browse mode, click an object's Lock icon to lock the object.

2 When an object has been locked, the Edit button is not displayed, and the lock icon appears as illustrated. To unlock the object and enable editing, click the Lock icon again.

Folders

1 Very much like using a computer's desktop or filesystem explorer, folders allow you to store and access items in a categorized place.
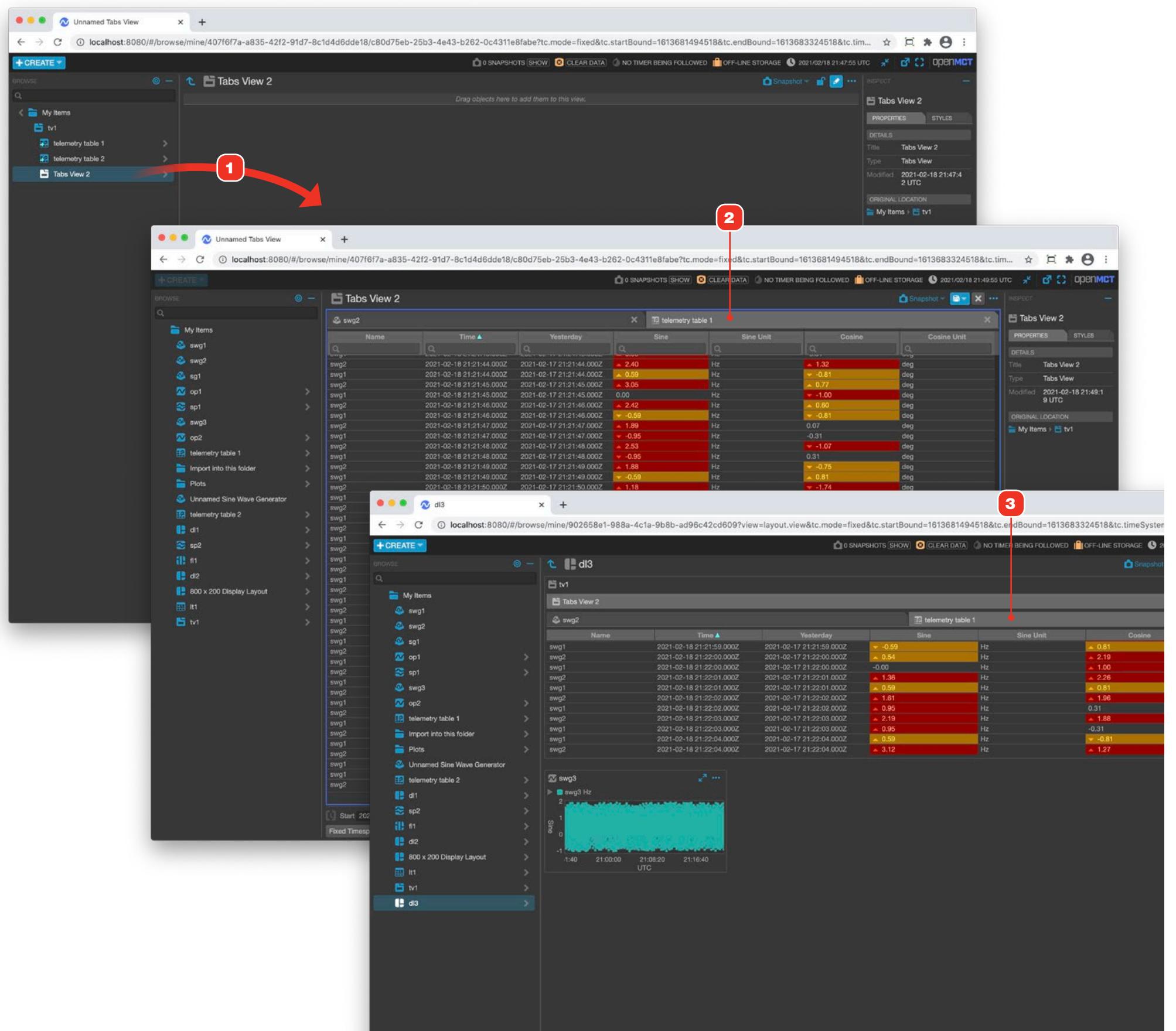
Tabs View

For information on editing objects in general, see "Creating A New Object" on page 41.

A Tabs View displays contained objects as clickable tabs, giving you the ability to collect together a group of objects and rapidly navigate between them.

1 Drag an object from the tree into the view area to add an object and its tab.

2 Click a tab to see its view.

3 A Tabs View can be added to a Display Layout.
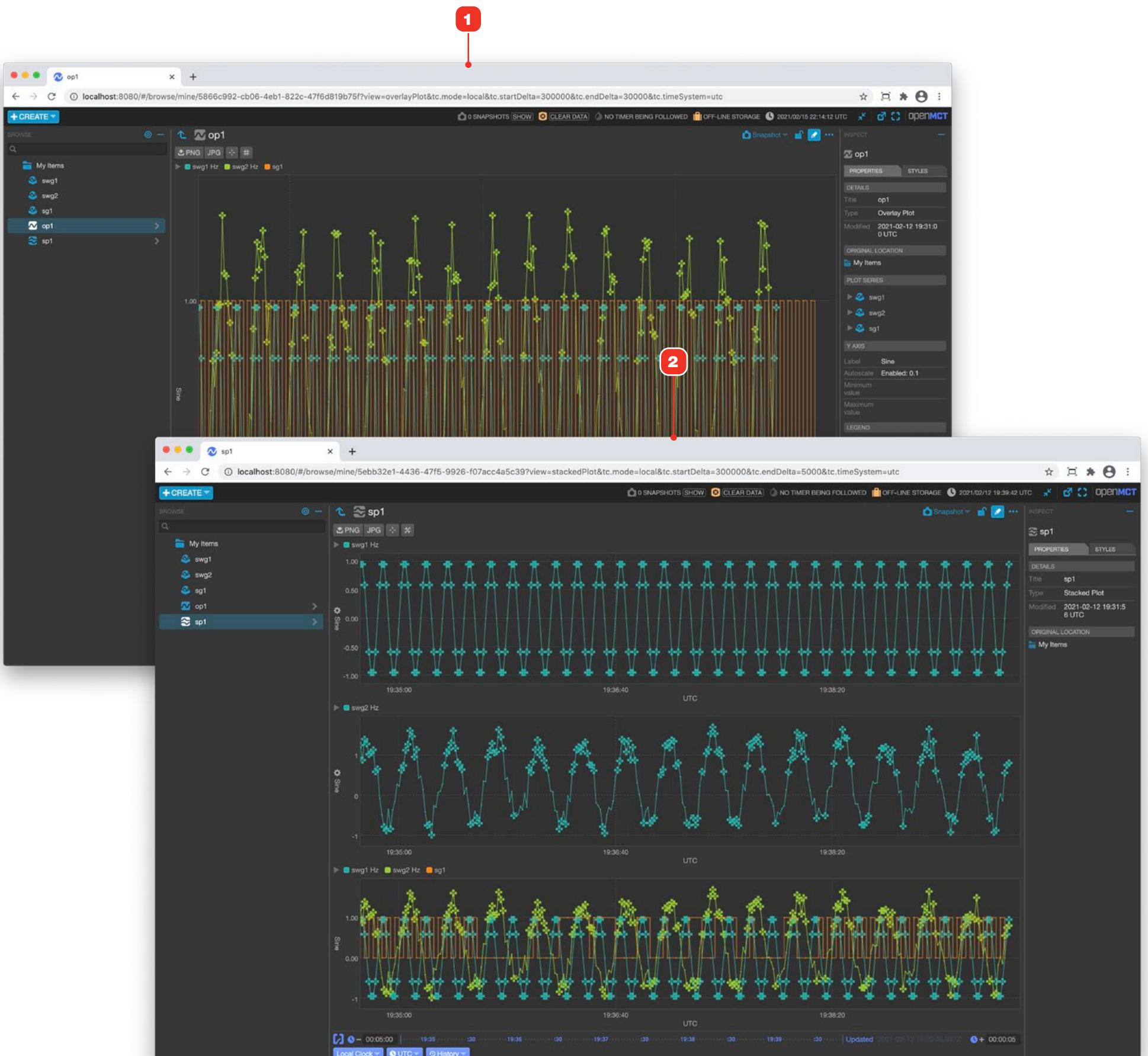
Overlay and Stacked Plots Overview

You can collect together, plot and save telemetry points by creating either a Overlay or Stacked plot object. Both types can be added to Display Layouts.
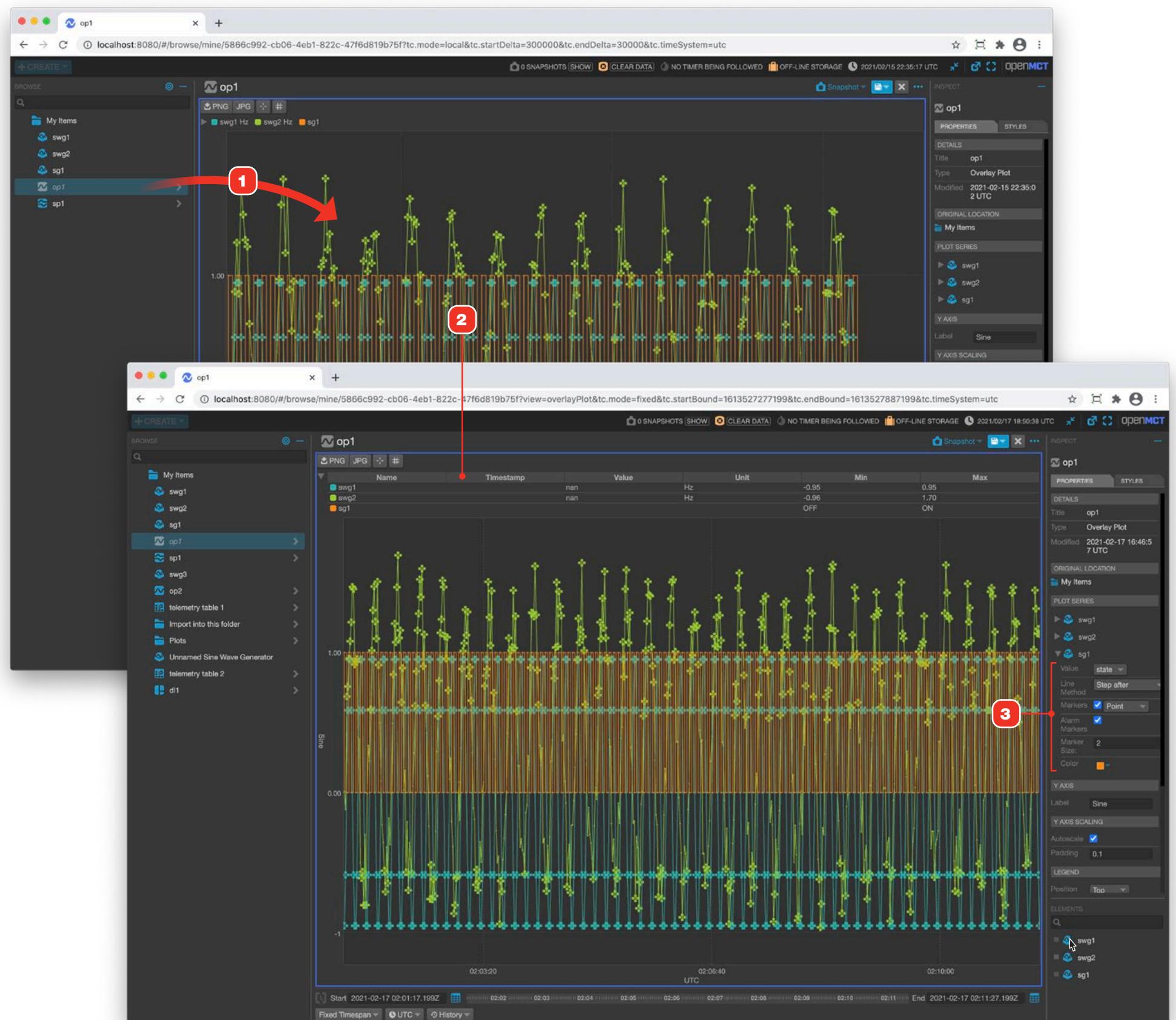
1 An Overlay Plot allows you to visualize one or more telemetry points overlaid together with a common Y axis.

2 A Stacked Plot displays each Telemetry with its own independent Y axis while maintaining synchronization of the X (time) axis.

Edit an Overlay Plot

For information on editing objects in general, see "Creating A New Object" on page 41.

1 Add objects to your plot by dragging from the Object Tree.

2 Telemetrys added to a Overlay Plot will add their legend. If data is available for the Telemetry, it will be plotted immediately and the Y scale of the plot will be adjusted to accommodate the new range of values.

3 Plot rendering style can be set and saved with this Overlay Plot. Follow instructions as noted in "Edit an Overlay Plot, Plot Series Options" on page 56.

Edit an Overlay Plot, Y Axis and Legend Options
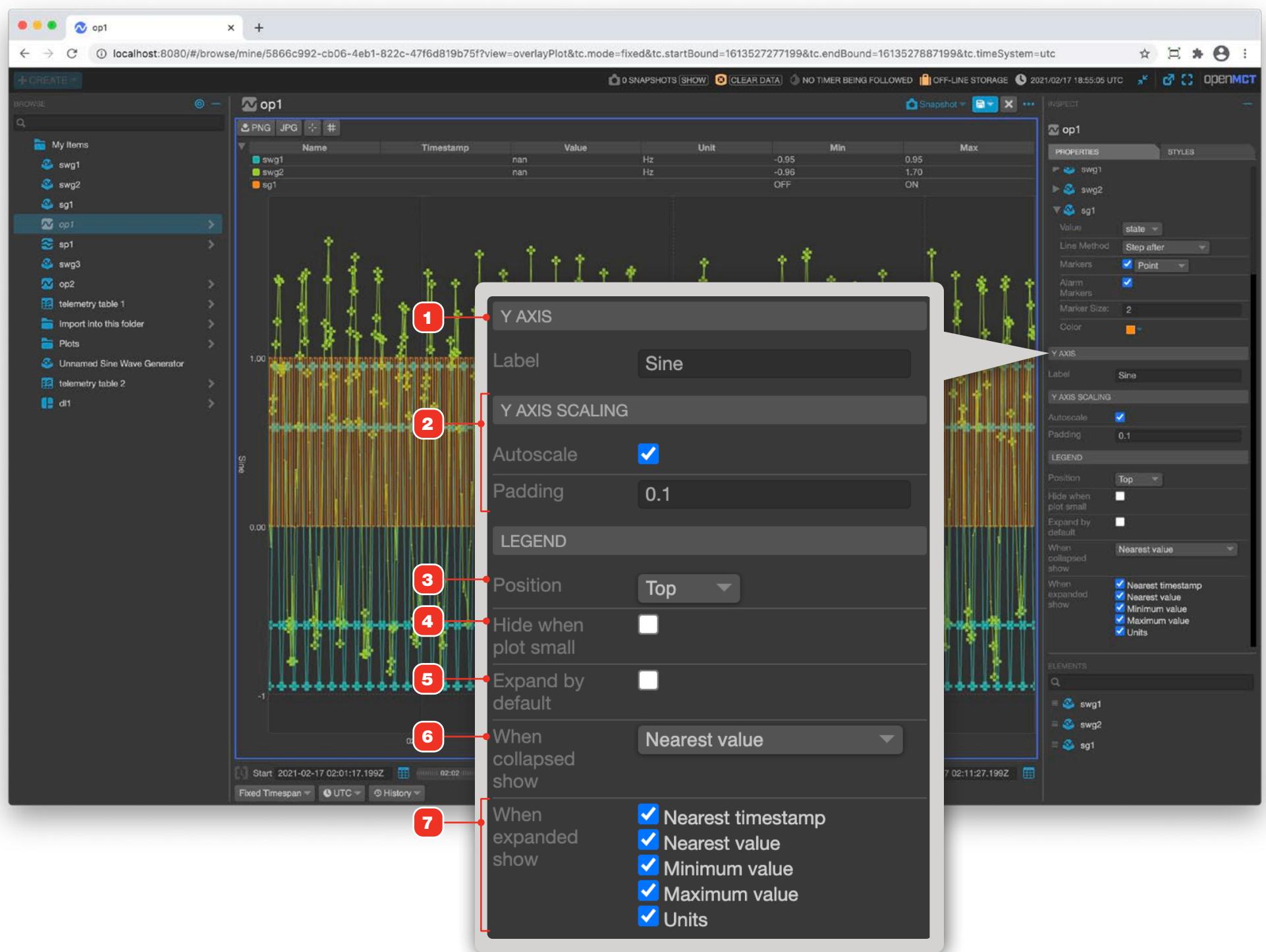
Y AXIS OPTIONS

To change the display options for an overlay plot, first make sure the Inspection pane is expanded. See "Inspection Pane" on page 18 for more.

1 You can manually entered a desired label for the Y axis in this input.

2 Checking "Autoscale" will automatically scale the Y axis based on the queried data, using the Padding value to automatically add a percentage of padding space to the upper and lower bounds of the plot. To manually control the minimum and maximum Y axis values, uncheck this box and enter values in the appropriate inputs.

LEGEND OPTIONS
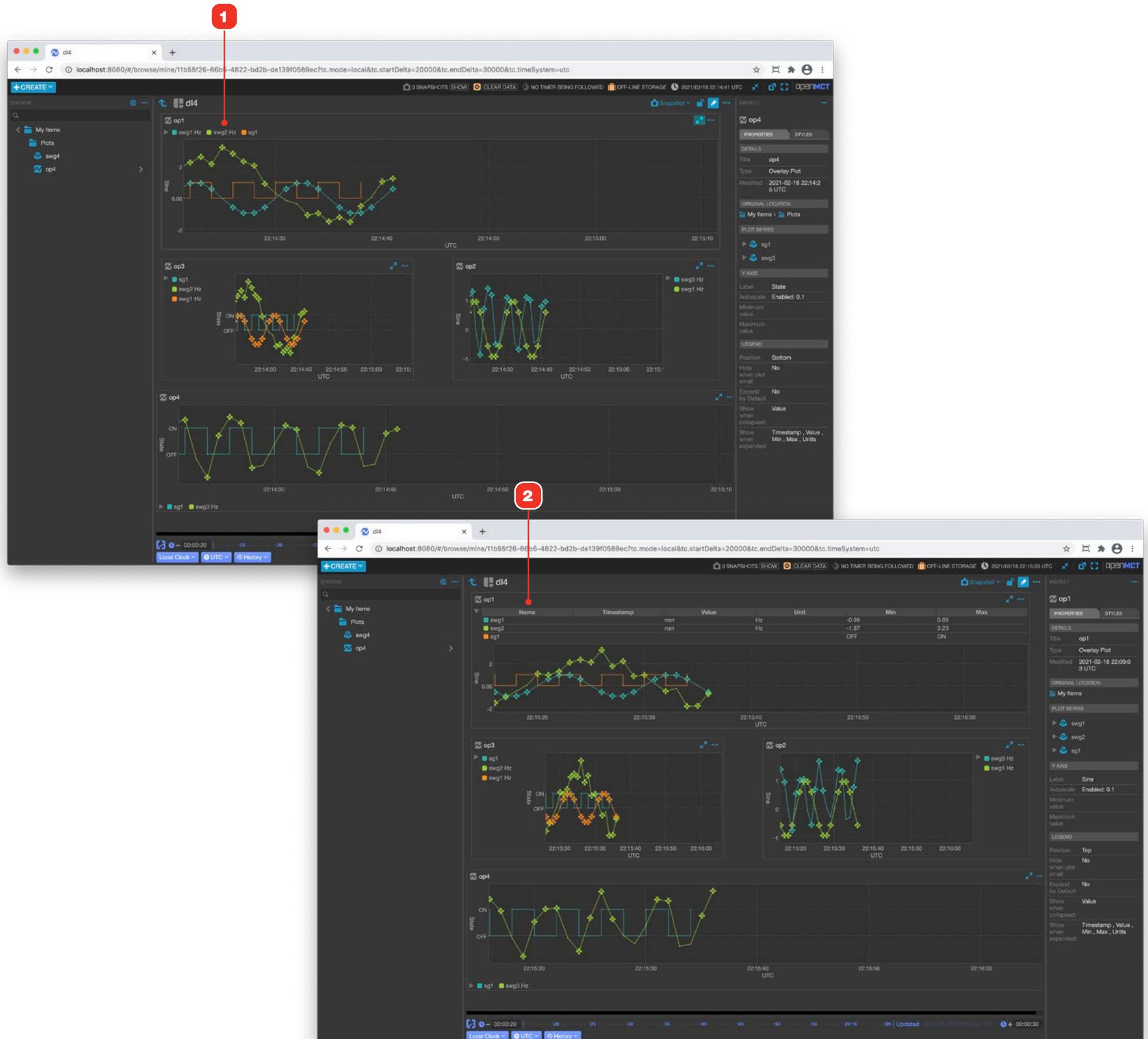
3 Selections here allow you to control the position of the collapsed plot legend relative to the plot display area. To hide the legend entirely, select "Hidden". See "Edit an Overlay Plot, Legend Placement Examples" on page 55 for more on the results of legend positioning.

4 Checking "Hide when plot small" will hide the legend when this plot is placed and sized small in a Display Layout. "Small" is under 600 x 600 pixels. The legend is always displayed in the main view and the "View Large" overlay regardless of this setting.

5 To always expand the legend for this object by default, check this box.

6 When the legend is collapsed, hovering the cursor over the plot can display a value, controlled by the selection made here. To not display any value when hovering, select "None".

7 When the legend is expanded, the columns to be displayed can be controlled here.

Edit an Overlay Plot, Legend Placement Examples

1 Plot legends can be placed above, below or to either side of the plot display area.

2 Expanding a plot's legend will shrink the plot data display area accordingly.

Edit an Overlay Plot, Plot Series Options

Each series in a plot view can be styled independently. To change the way that a series is rendered, first make sure the Inspection pane is expanded. See "Inspection Pane" on page 18 for more.
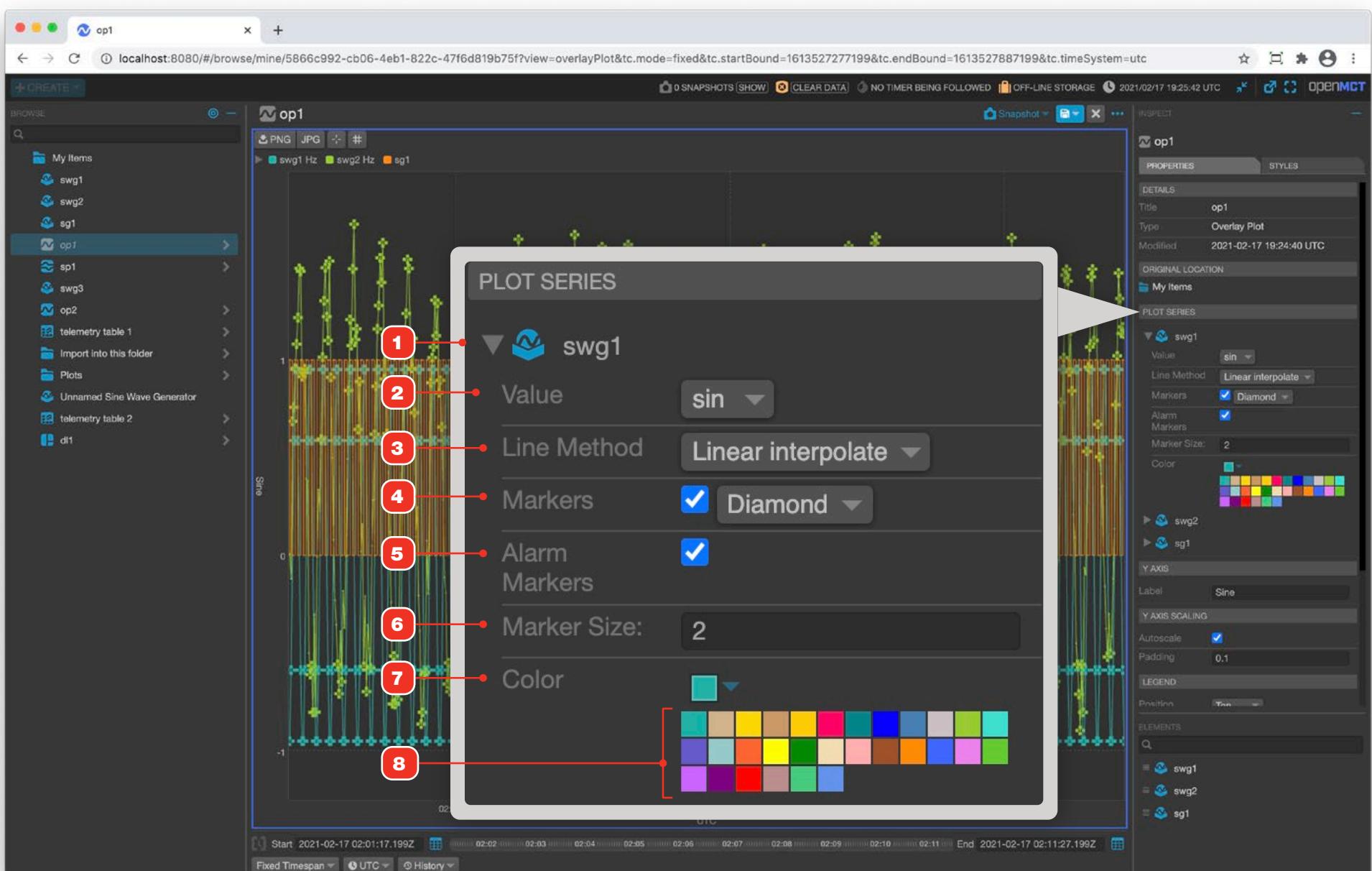
1 Expand a Telemetry series to view its options by clicking its expand toggle arrow.

2 "Value" for this series controls what field of this Telemetry will be plotted as the range.
⚠ IMPORTANT NOTE: **The setting for the first Telemetry in the plot series sets the range for the entire overlay plot.**

3 Line styles control how lines are interpolated and rendered:

No Line	No line will be drawn. Note that choosing this option and disabling "Show Markers" will cause that series to not be rendered.
Step Line	Discrete data points are connected with vertical and horizontal lines. When a data point is plotted, a horizontal line is continually drawn until a new data point is plotted, at which time a vertical line connects to the new point.
Linear Line	Direct lines are drawn between discrete data points.
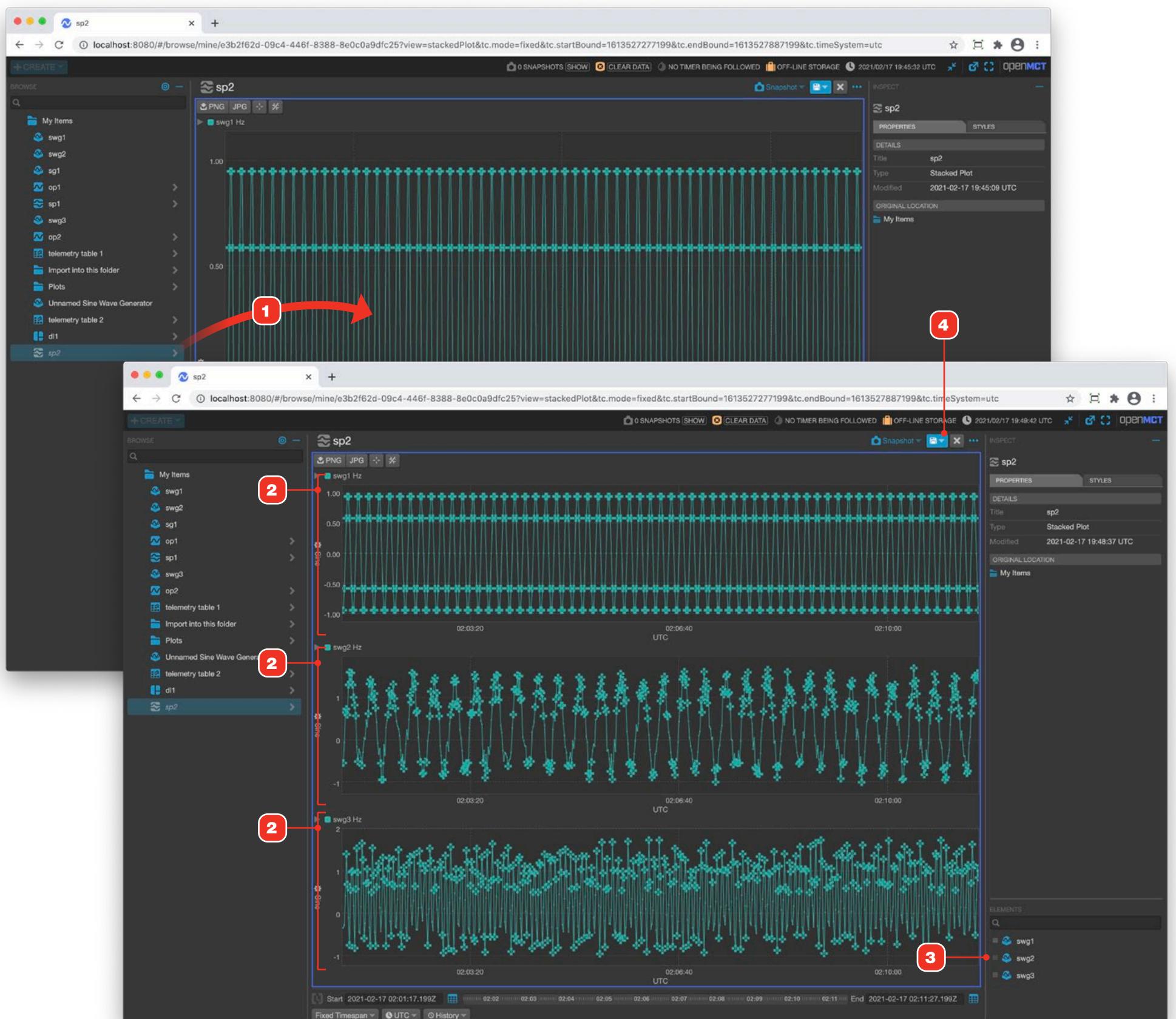
4 When "Markers" is checked, a marker will be drawn for each discrete data point available for that plot. You can select the shape of marker in the associated menu option.

5 Enabling "Show Alarm Markers" will render plot points in a visually distinct manner when a value for the selected series is in alarm.

6 The size of the marker can be set by entering a value here.

7 Color can be manually set for each element in the plot. Click the associated color swatch to display a palette of color choices **8**.

Edit a Stacked Plot

For information on editing objects in general, see "Creating A New Object" on page 41.

1 Add objects to your plot by dragging from the Object Tree. You add telemetry points and Overlay Plots to a Stacked Plot. To inlcude an Overlay Plot in your stacked plot, first create the Overlay Plot before building the Stacked Plot. See "Edit an Overlay Plot" on page 53 for more.

2 Each Telemetry or Overlay Plot added to a Stacked Plot will be added as a stack element. If data is available for the Telemetry, it will be plotted immediately. The height of the stack element is automatically set.

3 To rearrange the order of items in the stack, drag an element by its handle up or down in the Elements pool to move it to a new position. The main display will update as soon as you make a change while editing. To remove an element from your plot, context-click it in the Elements pool and choose "Remove" from the available context menu.

4 Choose a save option to retain your changes.
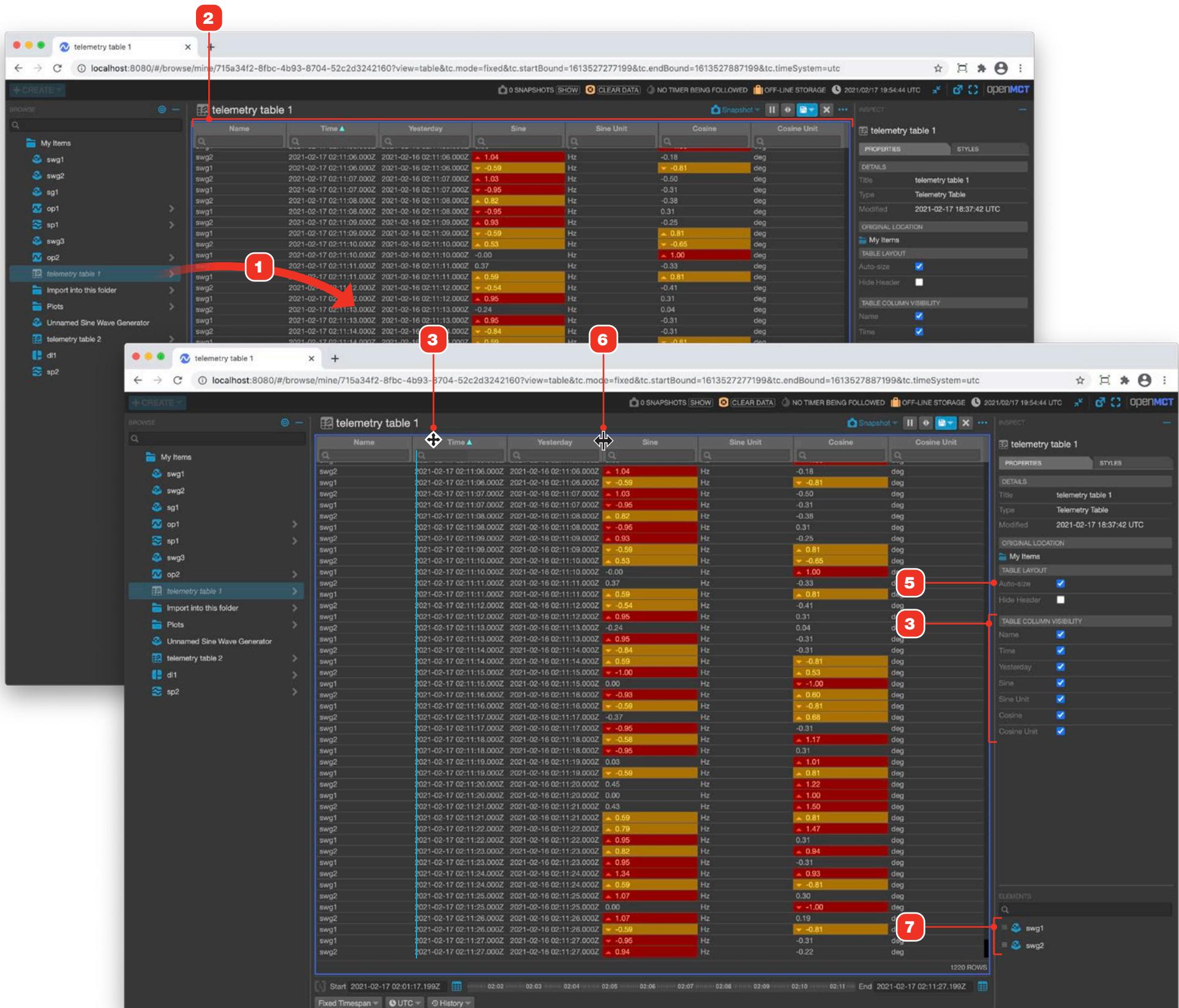
Telemetry Tables

For information on editing objects in general, see "Creating A New Object" on page 41.

1 Add objects to your Telemetry Table by dragging from the Object Tree. You may only add telemetry points to a Telemetry Table.

2 As you add Telemetrys, columns will be automatically added as necessary in the view area. To hide columns, see **3**.

3 Telemetry Tables allow you to include data that might have different fields, and handles that by displaying the superset of all fields by default. To hide a column, uncheck it here.

4 Columns can be re-ordered by clicking and dragging their headers to a new location in the table.

5 By default, tables use an "Auto-sizing" strategy: their total widths automatically expand or collapse to fill whatever view they're placed into. To disable this behavior and force a table view to always be a set fixed width, uncheck this control.

6 Column widths can modified by clicking and dragging on the edge of any table header cell. Modifying a table column's width will cause the table's "Auto-size" feature to be disabled and put the table into a fixed width display mode.

7 Remove added Telemetrys by right-clicking them in the Elements pool and selecting "Remove" from the context menu.

Telemetry Tables, Hiding Headers

You can hide the header labels and search inputs of Telemetry Tables to make them as compact as possible.

1 Edit the Telemetry Table, and check the "Hide Header" checkbox in the Properties tab.

2 The table's headers will be hidden.

3 Wherever that table is used (as shown here, in a Display Layout), it's headers will be hidden.

LAD Tables and LAD Table Sets

LAD Tables are a type of table display that allow you to quickly assemble a grid of telemetry points with their current values. LAD Tables and LAD Table Sets can be added to Display Layouts. LAD Tables and Sets are not controlled by the Time Conductor, and always display the latest available data for each Telemetry that comprises them.

1 A LAD Table is a collection of telemetry points. Each Telemetry is represented once in a row of the table, and always displays its latest available data. For more, see "Edit a LAD Table" on page 62.

2 A LAD Table Set is a collection of Telemetry Tables. Each Telemetry Table **3** in a set appears with its title as a sub-header. More info available at "Edit a LAD Table Set" on page 63.
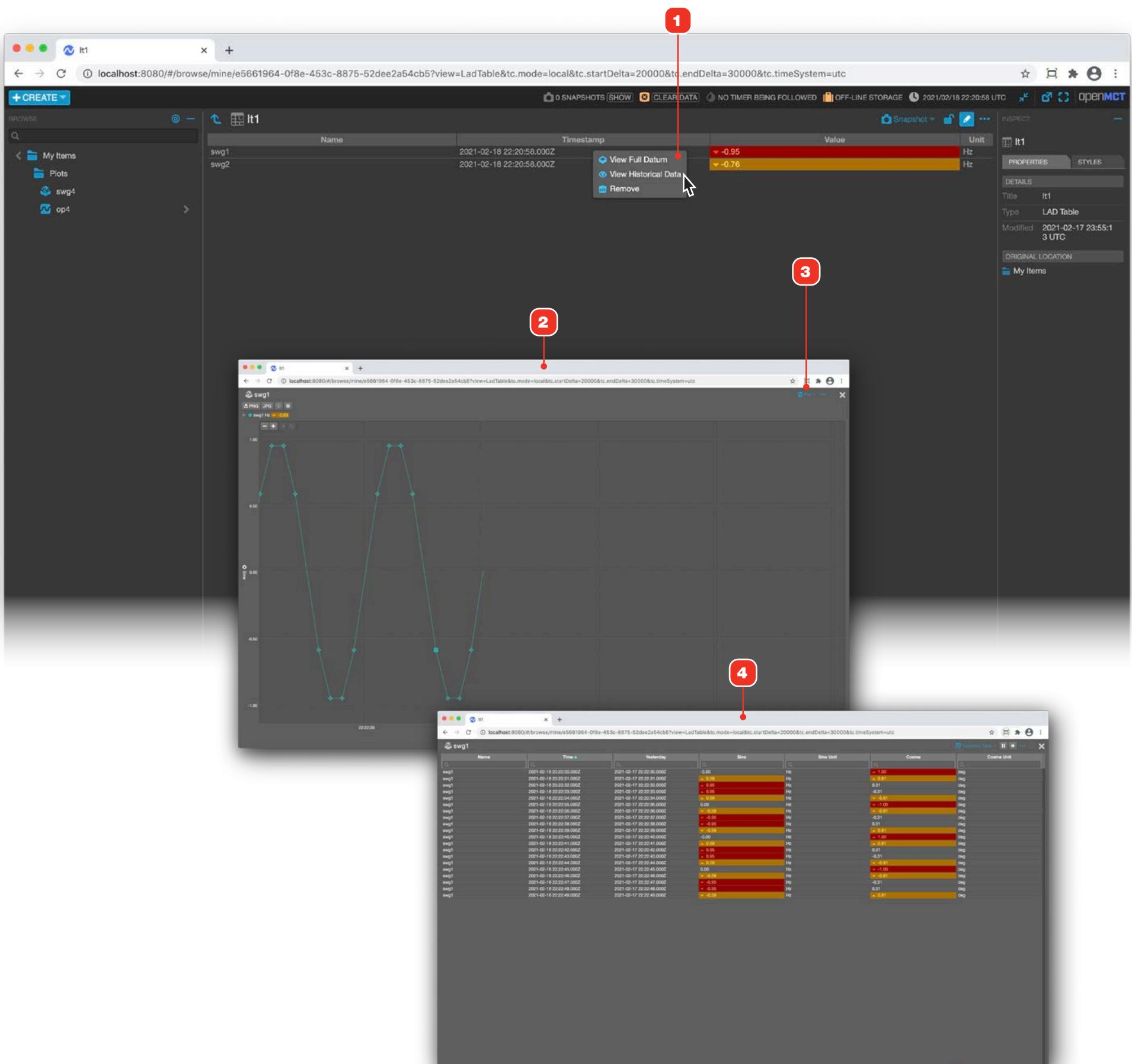
View Historic Data from a LAD Table

LAD Tables allow you to view the historic data for a selected field of a Telemetry in a LAD Table. Data is displayed in an overlay dialog, and the scope of the historic data will be based on the Time Conductor's current settings.

1 Context-click a value cell of a LAD Table to display its context menu item "View Historical Data".

2 By default, historic data for the selected field and Telemetry is displayed as a plot.

3 To switch to a tabular view **4**, select "Telemetry Table" from the view's switcher menu.
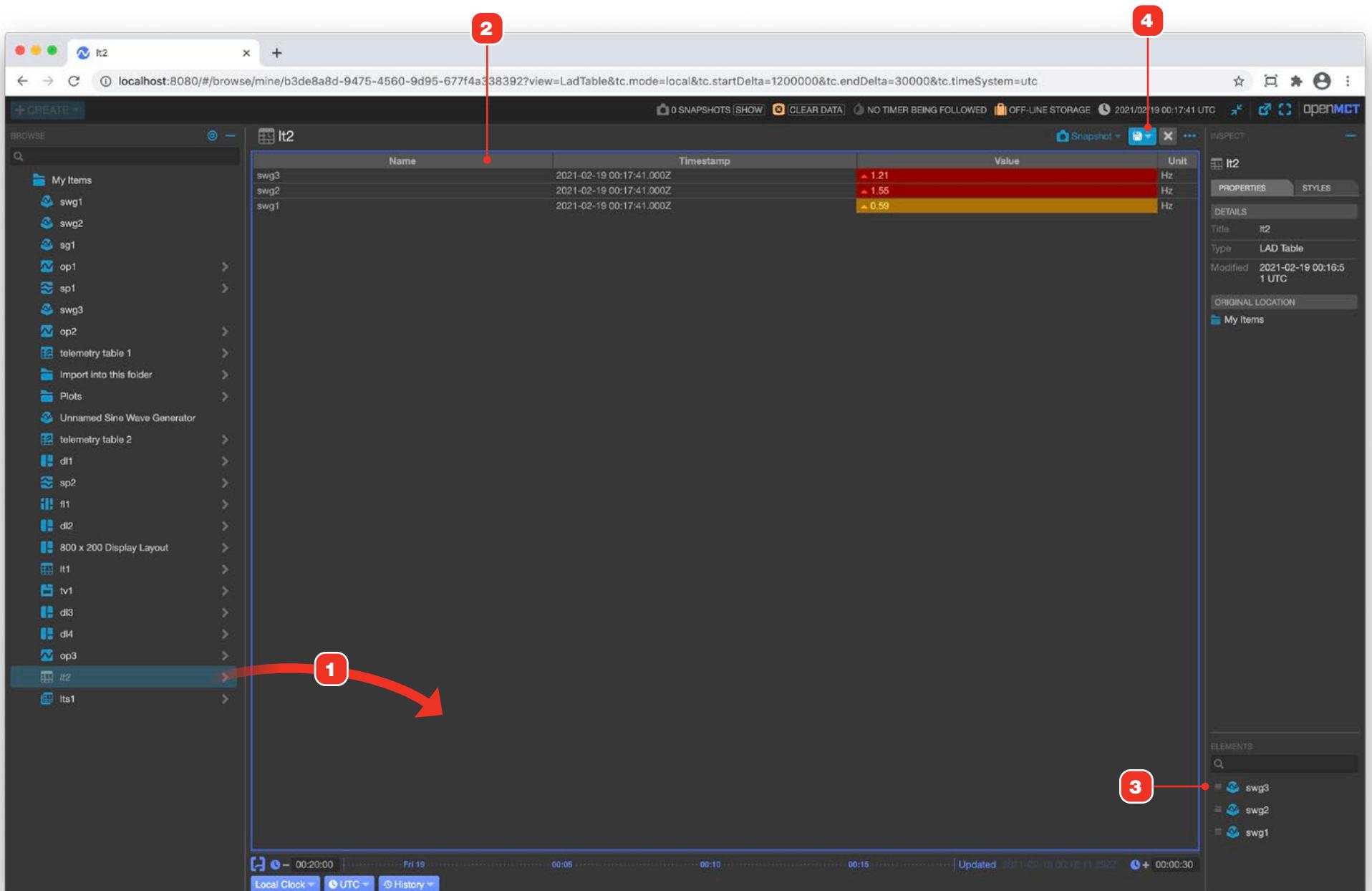
Edit a LAD Table

For information on editing objects in general, see "Creating A New Object" on page 41.

For column visibility, reordering and resizing, see "Telemetry Tables" on page 58.

1 Add objects to your LAD Table in the order you'd like them to appear by dragging from the Object Tree . You may only add telemetry points to a LAD Table.

2 Columns can be reorganized by clicking and dragging their headers, and resized by dragging the header edge. See "Telemetry Tables" on page 58 for more.

3 To rearrange the order of rows in the table, drag an element by its handle up or down in the Elements pool to move it to a new position. The main display will update as soon as you make a change while editing. See "Telemetry Tables" on page 58. Remove a Telemetry by context-clicking it in the Elements pool and selecting "Remove" from the context menu.

**4** Click "Save" when you're done editing.
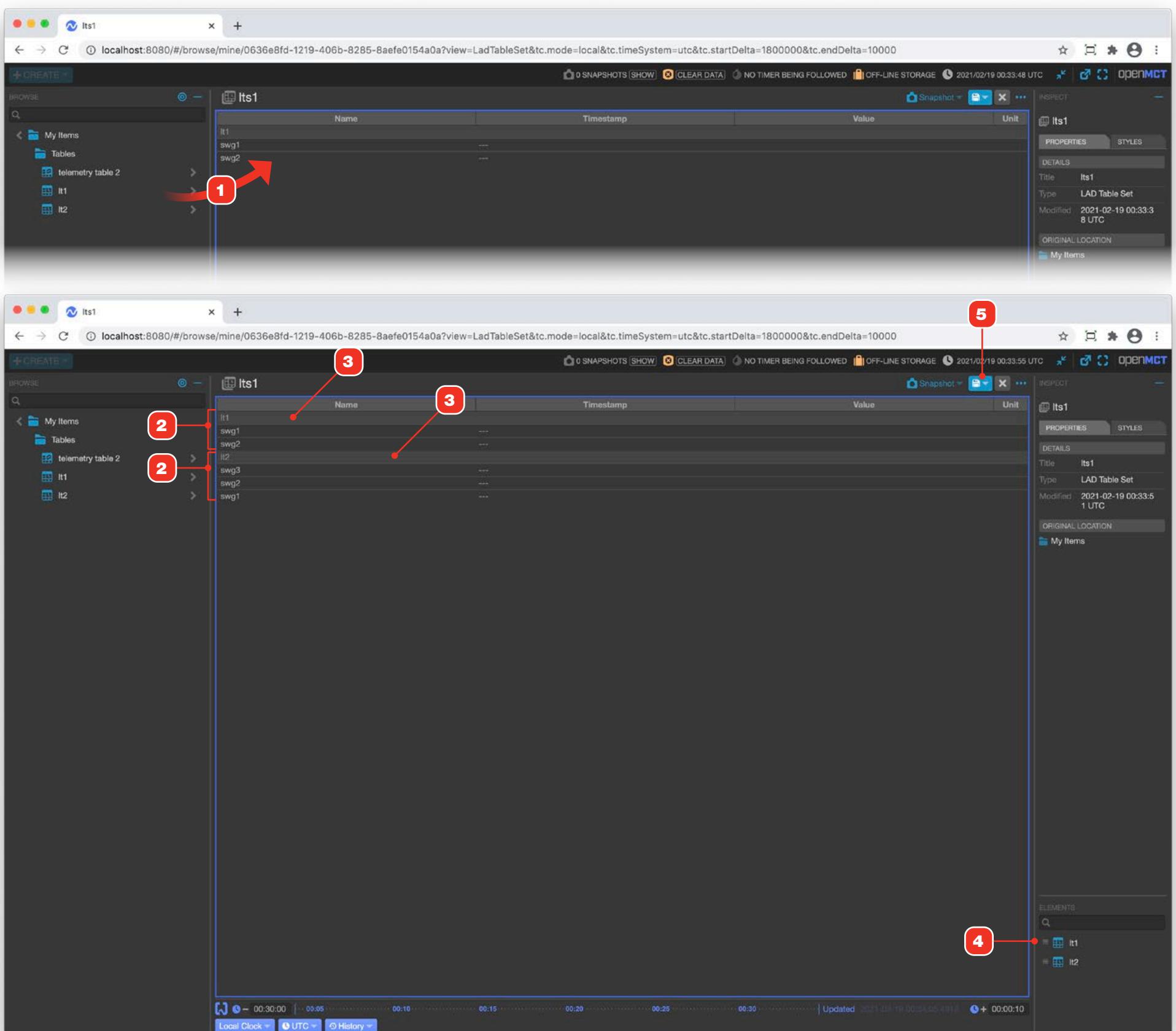
Edit a LAD Table Set

For information on editing objects in general, see "Creating A New Object" on page 41.

For more on creating LAD Tables, see "Edit a LAD Table" on page 62.

1 Add objects to your LAD Table Set by dragging from the Object Tree. You may only add LAD Tables to a LAD Table Set.

2 As you add LAD Tables, they are added to the set's view. Each table will appear with a sub-header **3** based on its title.

4 LAD Tables are arranged in the order that they were added. To rearrange their order, drag a LAD Table by its handle up or down in the Elements pool to move it to a new position. The main display will update as soon as you make a change while editing. Remove a LAD Table by context-clicking it in the Elements pool and selecting "Remove" from its context menu.

5 Click "Save" when you're done editing.

Plans and Timestrips Views Overview

If your Open MCT configuration supports it, Open MCT supports viewing and working with activity plans. Plans are viewed as zoom-able, pan-able Gantt chart views and work in both fixed and real-time Time Conductor modes. Plans are defined in a JSON file format, and can be imported as static files or made available via your data source. Activities can colored as needed in the plan file itself.

For details on JSON formatting for plans, see the Open MCT code repository documentation. Plans served your datasource support live updating when they are changed, with a refresh time under one minute.

1 Plans made available from your datasource can simply be clicked on to view.

2 A plan can be added to a Timestrip object, which can also hold telemetry **3**.

Time in Plan and Timestrip Views

Plans and Timestrips use the Time Conductor to determine the bounds of what data to display. Put another way, the Time Conductor must be set such that its start and end bounds encompass the datetimes used in a given plan. This applies whether the Time Conductor is set to Fixed Timespan or the Local UTC real-time mode. **For more on using the Time Conductor, see page "Time Conductor Overview" on page 22.**

The example shown here uses activities that occur in December 2023.

1 When the Time Conductor is set to a timeframe that doesn't encompass the datetimes of your activities, the activities won't be displayed. Here the Time Conductor is set to the afternoon of March 3, 2021 UTC.

2 Here the Time Conductor has been set to start at Dec 23, 2023 at 10:00:00 UTC and end Dec 24, 2023 at 01:00:00 UTC, causing activities to display.

**3** Plans display a UTC timescale.
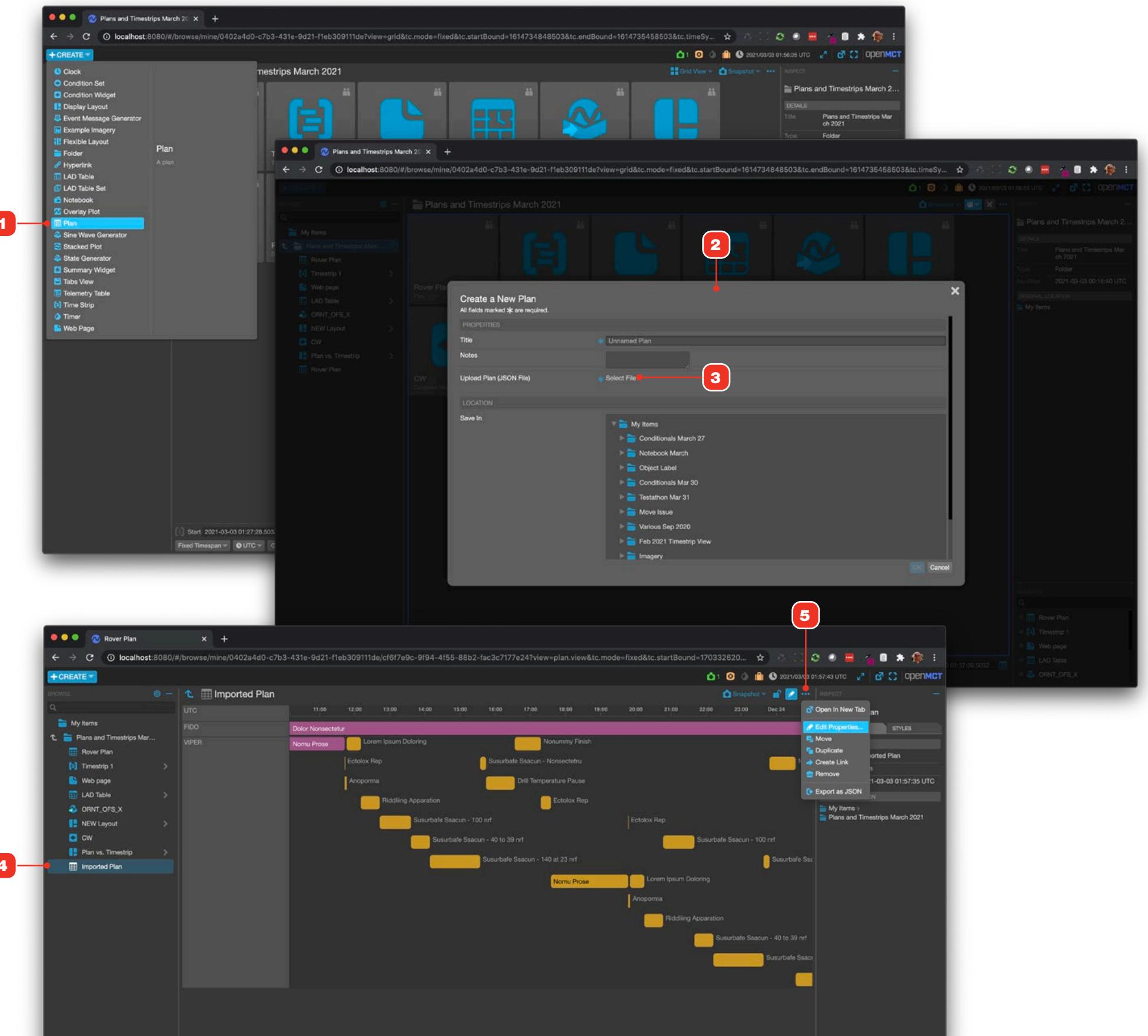
Creating a Plan View

Plans may also be imported from local JSON files on your computer, here's how.

1   Create a new Plan object from the Create menu.

2   In the resulting dialog, name your plan and click "Select File" **3** to browse to a properly formatted JSON file on your computer.

4   The resulting imported plan.

5   Once imported, the plan in Open MCT doesn't stay in sync with the file that was used as an import source. To update an existing plan, modify the JSON file and then choose "Edit Properties" from the Plan's more options menu. You'll then be able to select the modified JSON plan (or a completely new one) via the Select File button shown in **3**.
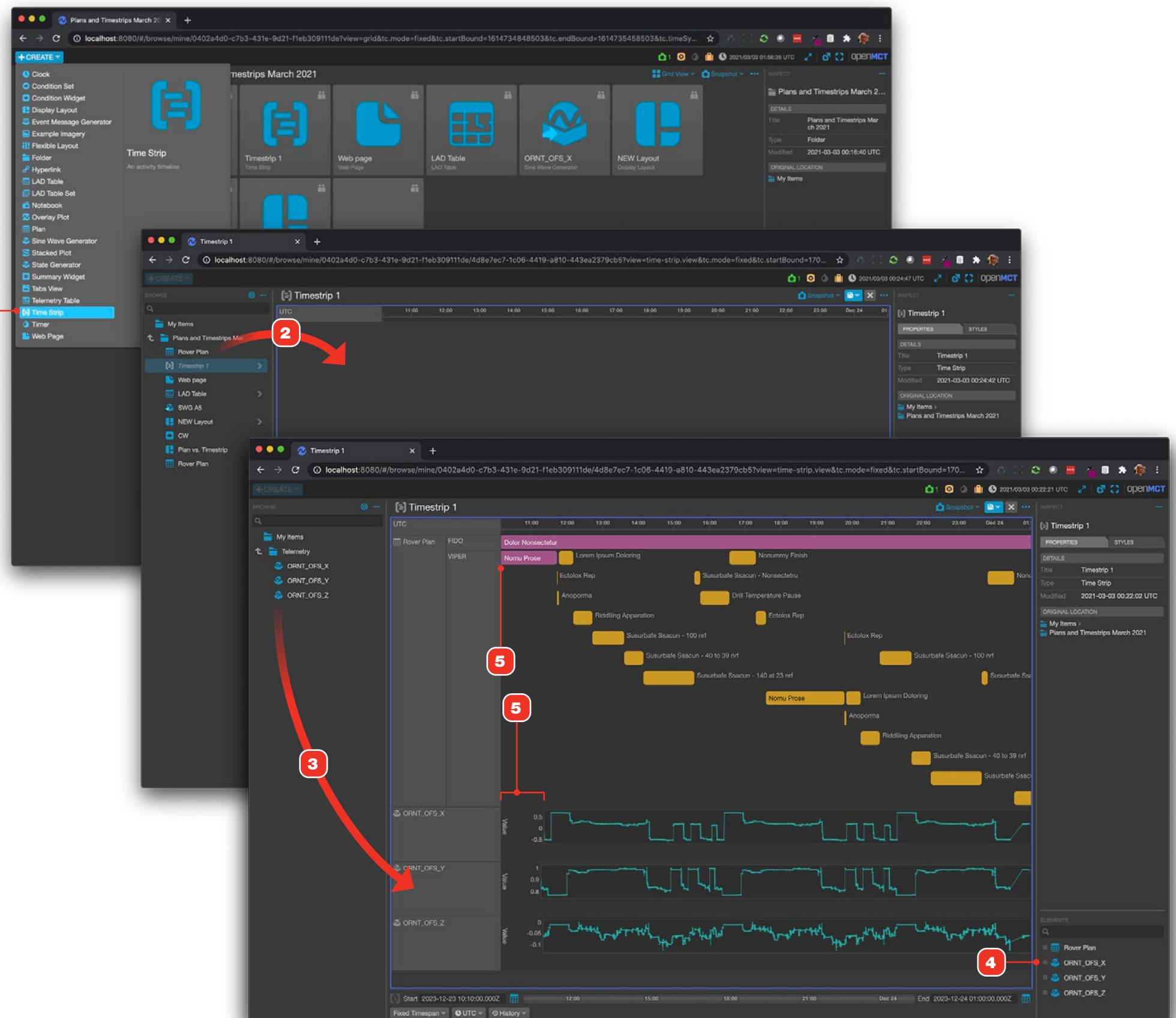
Creating a Timestrip View

For information on editing objects in general, see page "Editing An Object" on page 43.

Note that as of this release (1.6.2) telemetry plots and plan activities do not align properly along their left edges because the plan view isn't yet accounting for the space required by the plot's Y axis as shown in **5**. In subsequent releases, activities and telemetry will be exactly aligned to allow correlation between them.

1 Create a new Timestrip object from the Create menu.

2 Drag Plans from the tree at left into main edit area to add them.

3 Any alphanumeric telemetry may also be added by dragging from the tree.

4 To reorder elements in the view, drag them within the Elements pool.

Layouts Overview

In Open MCT, there are two types of layouts that allow you to compose and organize view objects: Display Layouts and Flexible Layouts. Here's a comparison of the two.

DISPLAY LAYOUTS

A Display Layout organizes and contains elements in a fixed two-dimensional canvas area. Items always retain their position and size despite how the layout itself is sized. Use a Display Layout when you want precise control of the dimensions and positions of contained elements.

For more, see "Display Layouts" on page 69.
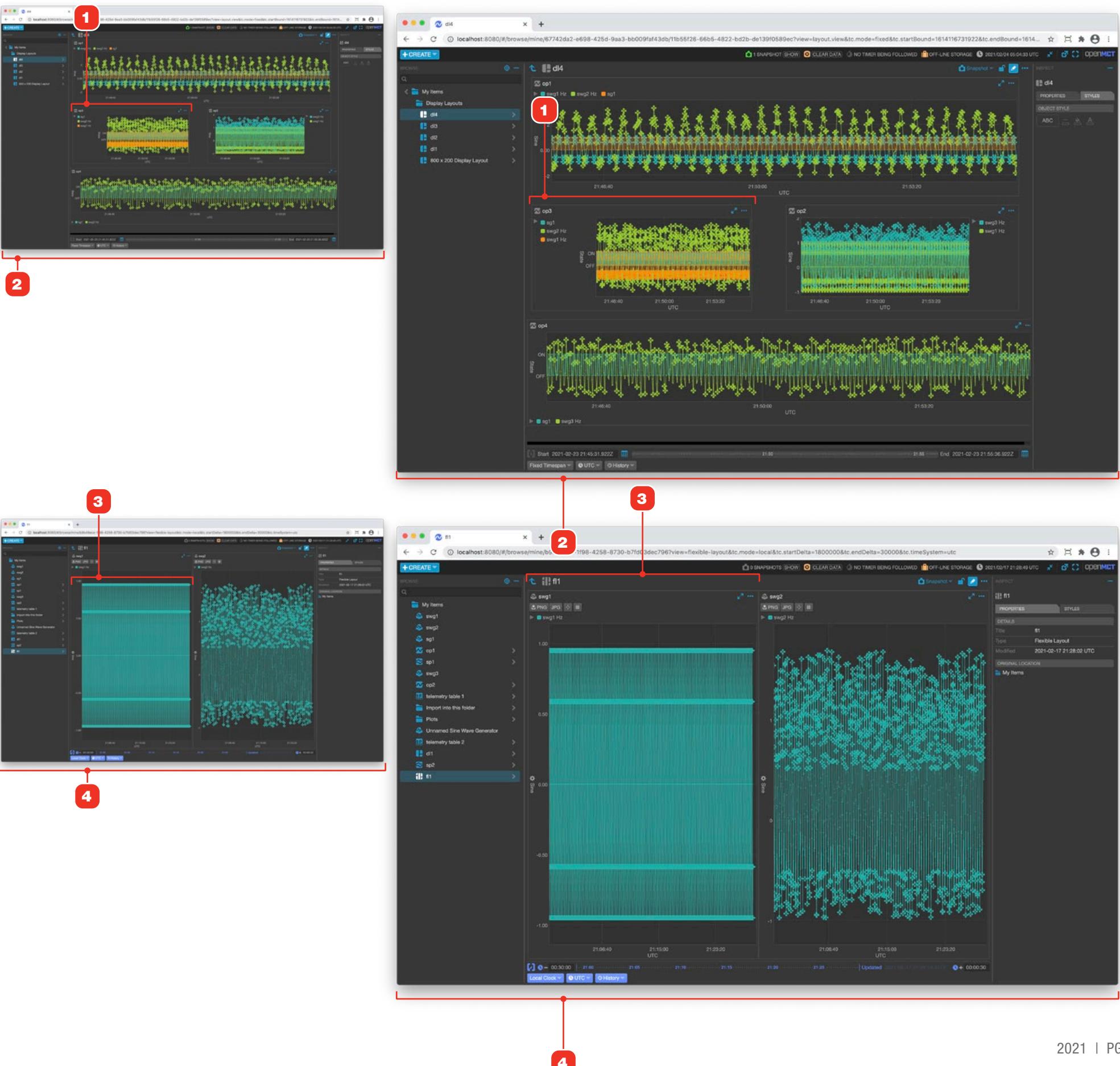
1 Elements in a Display Layout retain their position and size regardless of how the layout itself is sized **2**.

FLEXIBLE LAYOUTS

A Flexible Layout uses a fluid columns or rows approach to displaying contained elements. Items always resize dynamically as the layout itself resizes to fill all available display space. Flexible Layouts are ideal for displays that will be viewed in a variety of sizes, for example, in a desktop environment and mobile.

**For more, see "Flexible Layouts" on page 81.**
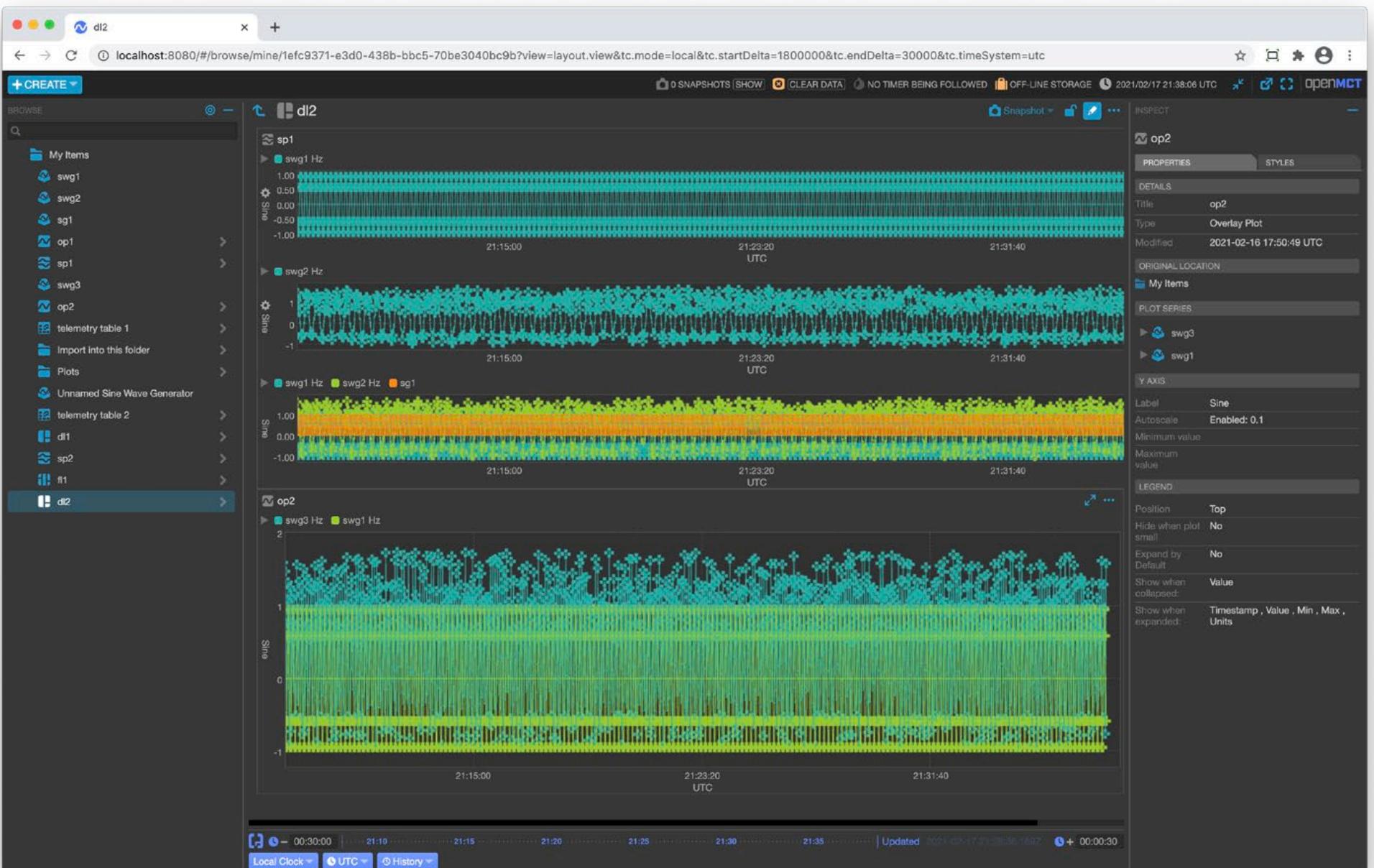
3 Elements in a Flexible Layout scale their size proportionally to how the layout itself is sized **4**.

Display Layouts

A Display Layout allows you to create, save and share screens that organize almost any other type of object that has a view. Other telemetry points, Plots, Tables and more can be positioned and resized in a two-dimensional space. All Time Conductor-aware objects in a Display Layout synchronize their display with the Time Conductor's settings. See "Time Conductor Overview" on page 22 for more.
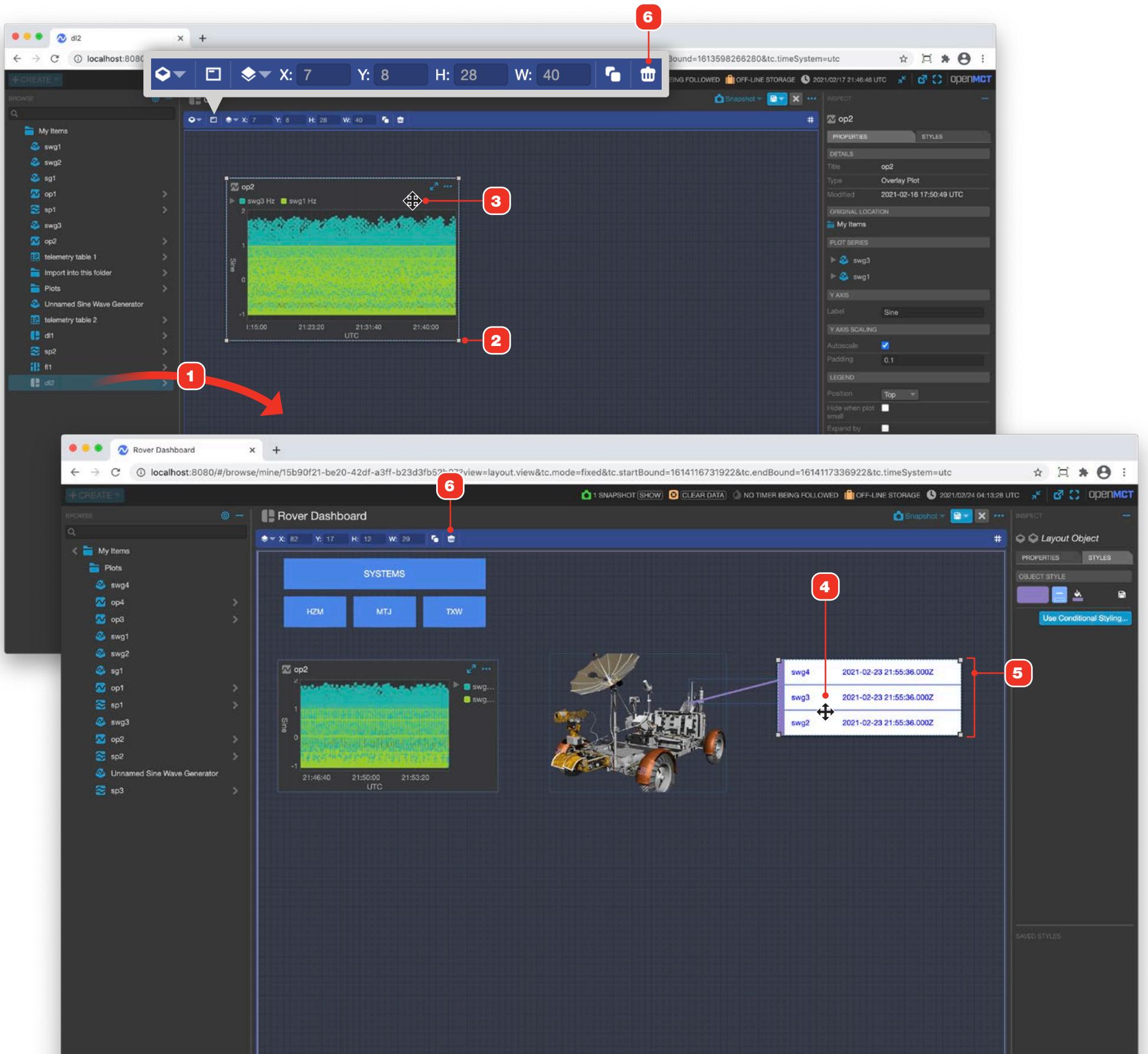
Edit a Display Layout

For information on editing objects in general, see "Creating A New Object" on page 41.

1 Add objects to a Layout by dragging from the Object Tree.

2 Selected objects are bounded by a dashed-border edit marquee. Click and drag any corner to resize the object.

3 To position a domain object (which typically contains complex content) hover over it until its move bar appears, then click and drag that.

4 Other object types like telemetry or drawing objects can be moved by clicking and dragging them anywhere.

5 Multiple objects can be selected, then moved, resized and formatted. To select multiple objects, hold the shift key while clicking. Shift-clicking a selected object will de-select it. Click and drag anywhere in the selected objects to move them.

6 Remove objects by clicking their "Remove" button in the toolbar.
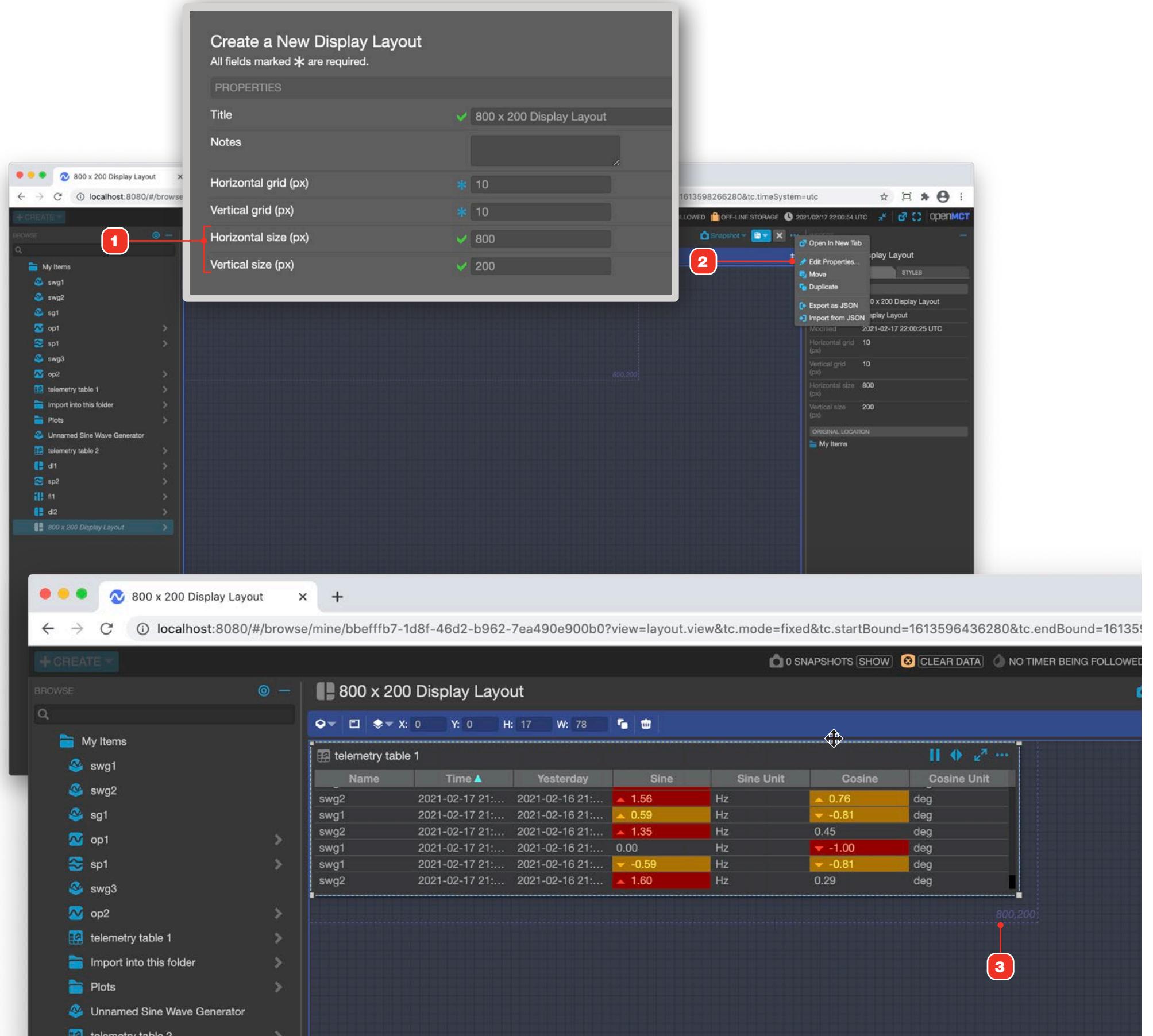
Display Layout Sizing

If you need a Display Layout to be an exact pixel size, you can use the layout's size property to display a visual aid within the layout's canvas area.

1 You can set the desired dimensions for a Display Layout either when creating it, or afterwards by editing its properties **2**.

3 If size dimensions have been set, a visual aid with the lines and the size dimensions settings appears in the layout's canvas area.
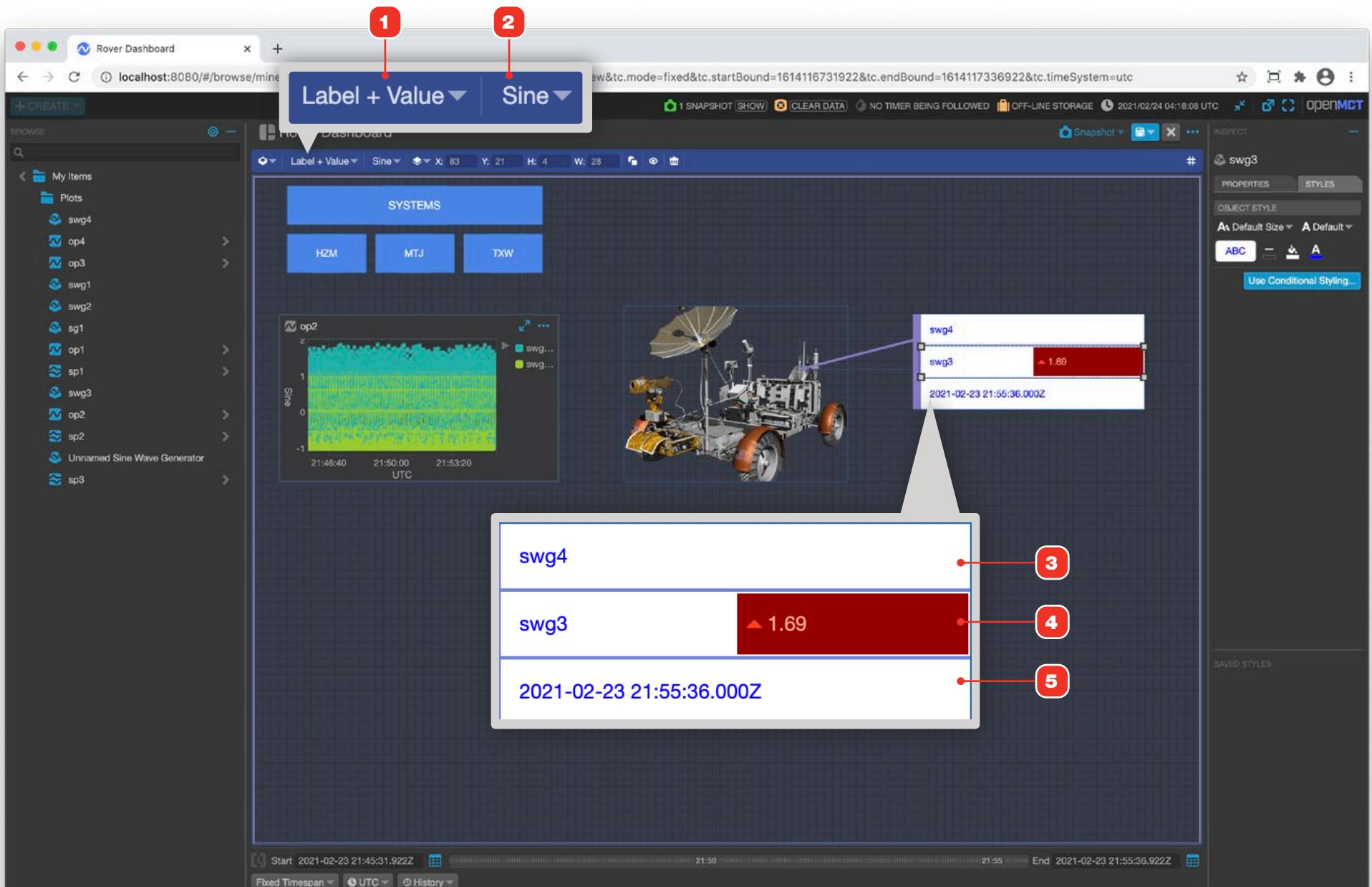
Telemetry Placed in a Display Layout as Alphanumerics

Placing telemetry in a Layout as an alphanumeric has configuration options. Property configurations or styles applied to these view types in a Layout are only applied and saved to their instances within a given Layout and don't affect the original object.

1 By default, telemetry elements display a label (their name) and a current value **3**. You can alternately choose to display only the label **4**, or only the value **5**.

2 Choose the field to display as the element's value via this menu. The menu here will automatically populate based on the valid fields available for the selected telemetry element.
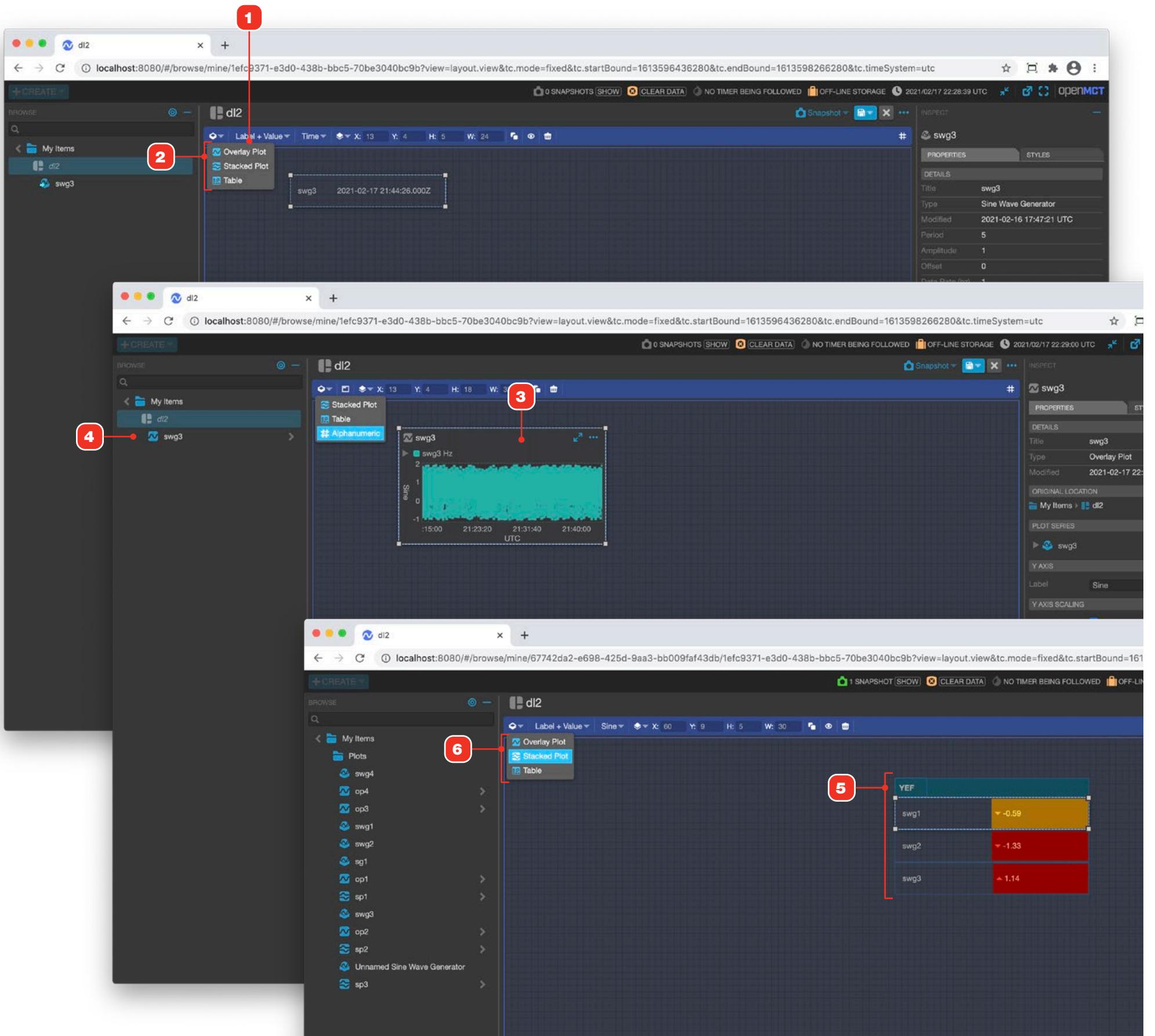
Changing the Display Format of Telemetry Placed in a Display Layout

By default, telemetry is placed in a Display Layout as an alphanumeric. However, you can easily change that to a plot or a table, or convert a plot or table back to an alphanumeric. Here's how.

1 With the alphanumeric selected, access the Object View selector menu from the toolbar.

2 From the menu, select the view type you'd like to convert to. This example converts the alphanumeric to an Overlay Plot.

3 The converted result. Note that this will actually create a new Overlay Plot view object **4** as a child of the current Display Layout. That plot can further be edited and reused in the same way as an Overlay Plot created from the Create menu.

5 Selecting multiple alphanumerics and converting them to any other view **6** will merge them together into a single instance of that view. In this example, the four selected alphanumerics would be brought together into a single new Stacked Plot view.
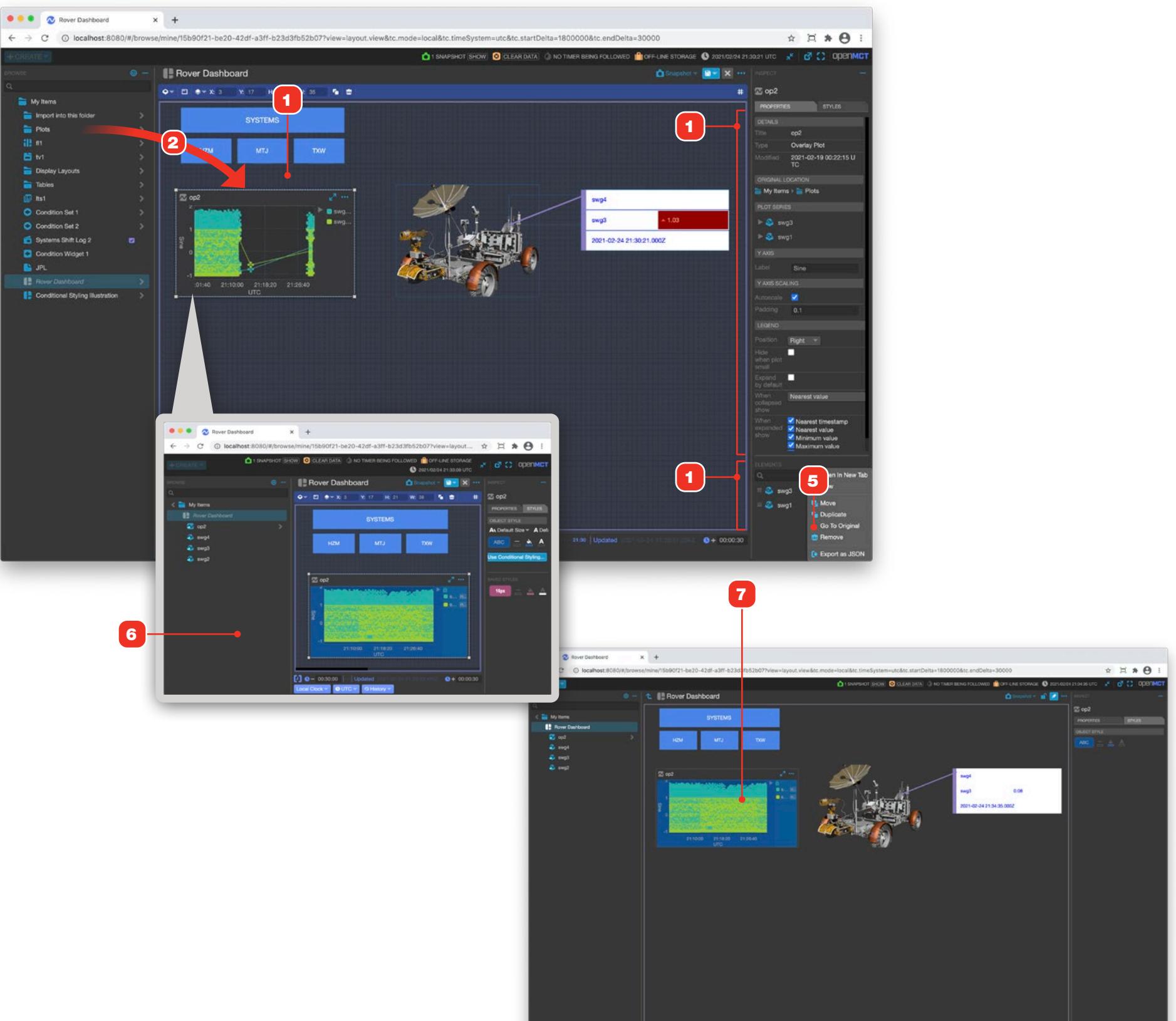
Editing Domain Objects From Within a Display Layout

You can edit and alter the properties of many editable objects like Overlay and Stacked Plots, other Layouts, Tables and more directly while working within a Display Layout. Editing this type of object in a Layout also edits its original version: editing the contents, configuring properties or applying styles also changes the original.
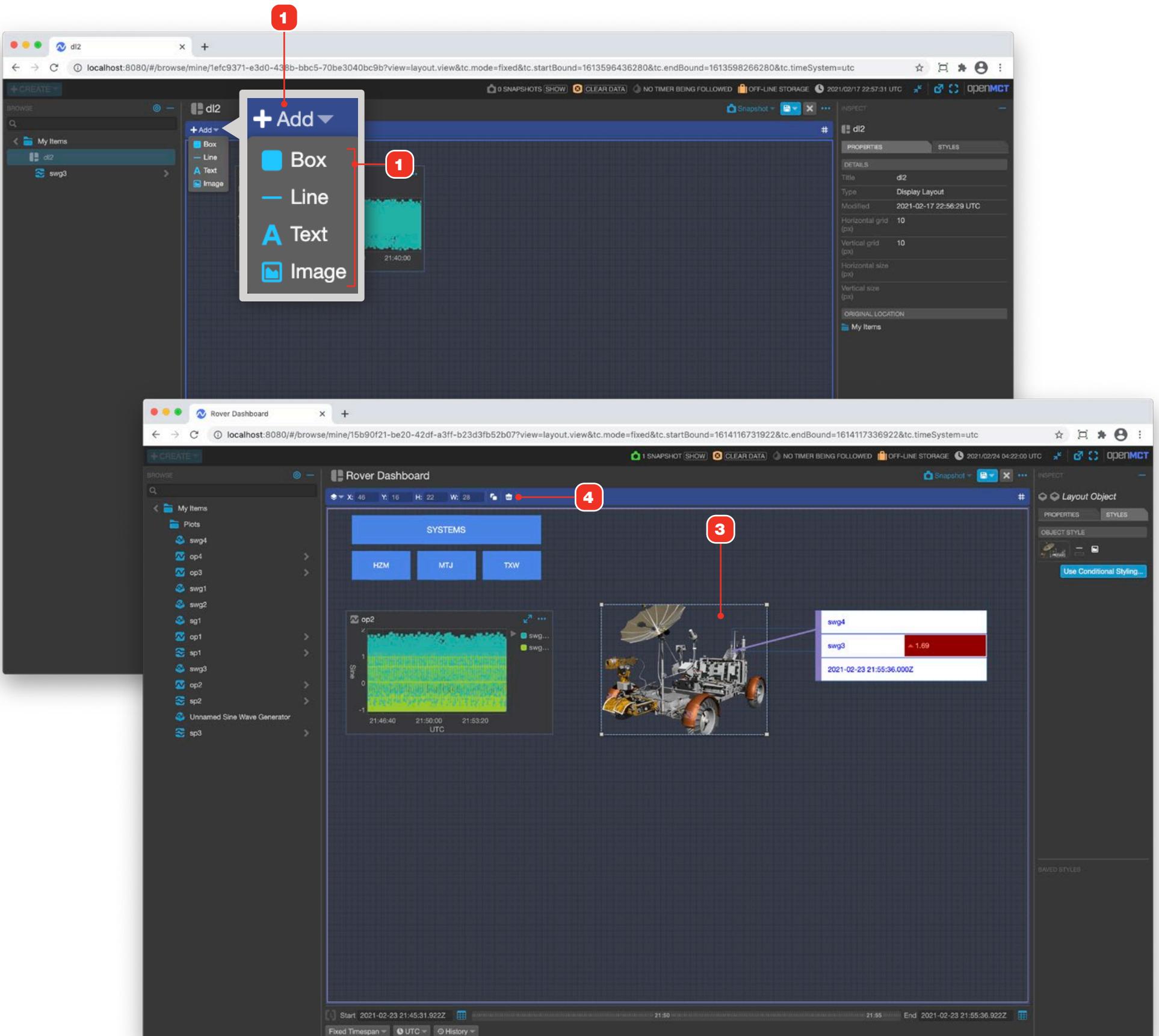
1   Select a single object.

2   The Inspector will the display the name, properties and style options **2** and the elements **3** of the item that you've selected.

4   You can add elements as you normally would by dragging and dropping them into the area of the selected item. For example, you could drag and add a telemetry point to the selected Overlay Plot view.

5   Items can be removed from selected objects by context clicking one of their elements in the Elements pool and choosing "Remove".

6   Apply styles to a composable domain object in a Layout also changes the original version of the object **7**, affecting it everywhere that it appears.

Adding Drawing Objects

1 To add boxes, lines, text or images to a Display Layout, click the "Add" button in the toolbar. Note that the button is only visible when no other objects are selected.

2 Select the type of drawing object from the menu.

3 Selected drawing objects can be formatted with their available buttons in the toolbar and Styles tab. See "Layout Editing and Styling Controls" on page 76.

4 To remove an a drawing object, click its "Remove" toolbar button.
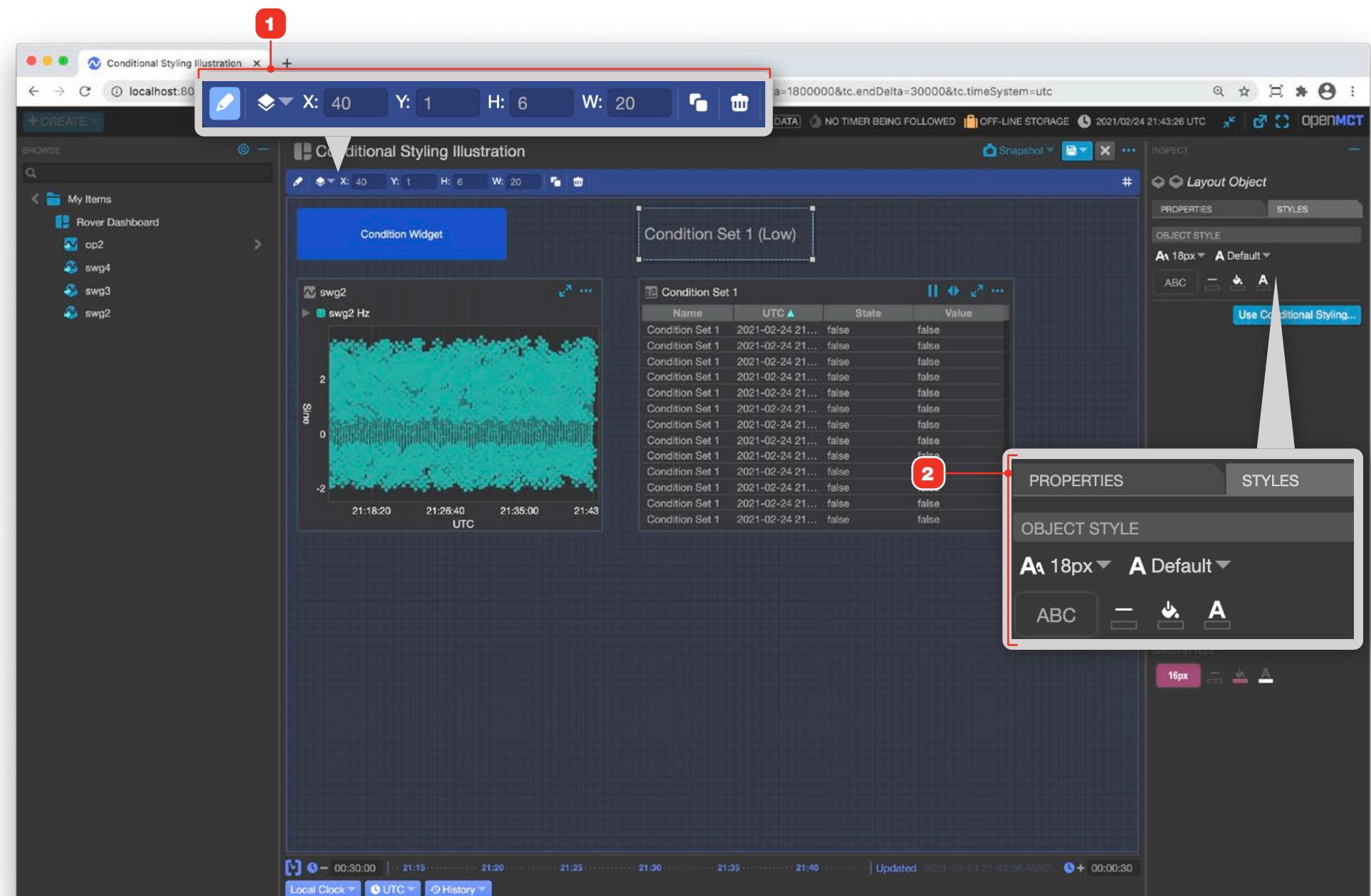
Layout Editing and Styling Controls

The toolbar and Styles Tab allow you to apply formatting, as well as position and remove objects in your Layout. The buttons displayed depend on which and how many objects are selected.

1 Toolbar

Control	Item	Description
	Convert View Type	Allows domain objects to be converted between display formats, such as alphanumeric to overlay plot, stacked plot and table, and back again.
	Show/hide Object Frame	Allow toggling of the display of a domain object's frame.
	Edit Text Content	Allows editing of a text object's content.
	Layer Order	Controls the "stacking order" of objects; move selected items above or beneath other items.
X: 7 Y: 8	Canvas coordinates	Directly enter position and dimension coordinates for selected items.
	Duplicate	Duplicates selected items. See "Duplicating Items in a Display Layout" on page 77.
	Delete button	Deletes or removes the selected item from the Display Layout.

2 Styles Tab
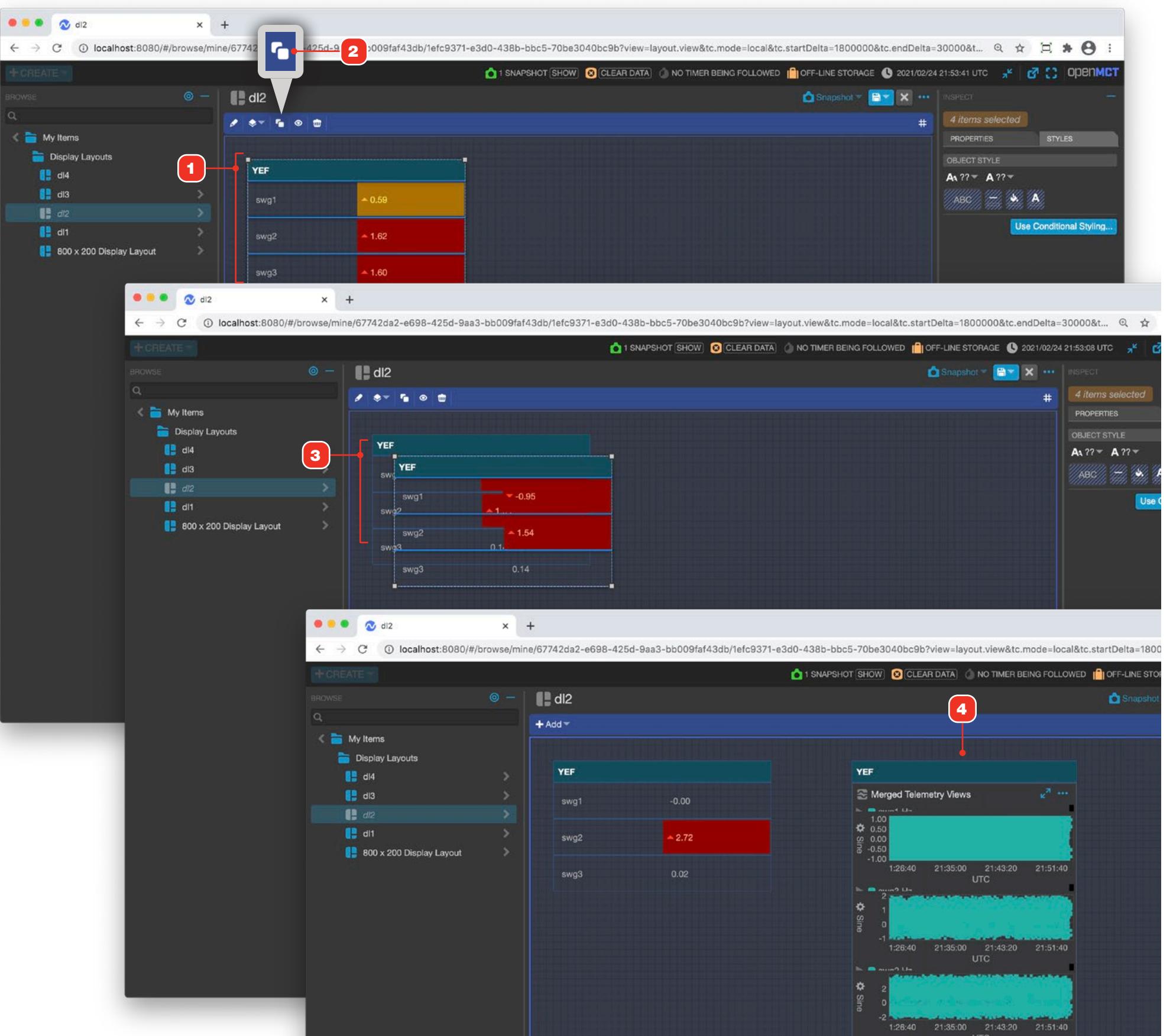
| Control	Item	Description
A₄ Default Size	Font Size	Controls the text size of domain objects, text objects and telemetry alphanumeric elements.
A Default	Font Style	Controls the font style of domain objects, text objects and telemetry alphanumeric elements.
ABC	Style preview	Displays a visual preview of the styles applied to selected items.
	Border / line color	Applies to telemetry points, domain objects, all drawing objects
	Fill color	Applies to telemetry points, domain objects, box, text and line drawing objects
A	Text color	Applies to telemetry points, domain objects, text drawing objects
	Visibility toggle	Only available when using conditional styling. Sets the visibility of any object when the designated condition is matched.

Duplicating Items in a Display Layout

Items in a Display Layout can be duplicated with one click. Duplicated items retain the style settings for their originals, making it easier to create Layouts with multiple items that utilize consist styles.

1 Select the items you want to duplicate.

2 Click the Duplicate button in the main toolbar.

3 Duplicated items will be offset from their originals.

4 Duplicated items can be further manipulated and edited. In this example, the four alphanumeric telemetry elements have been converted into a single Stacked Plot view.
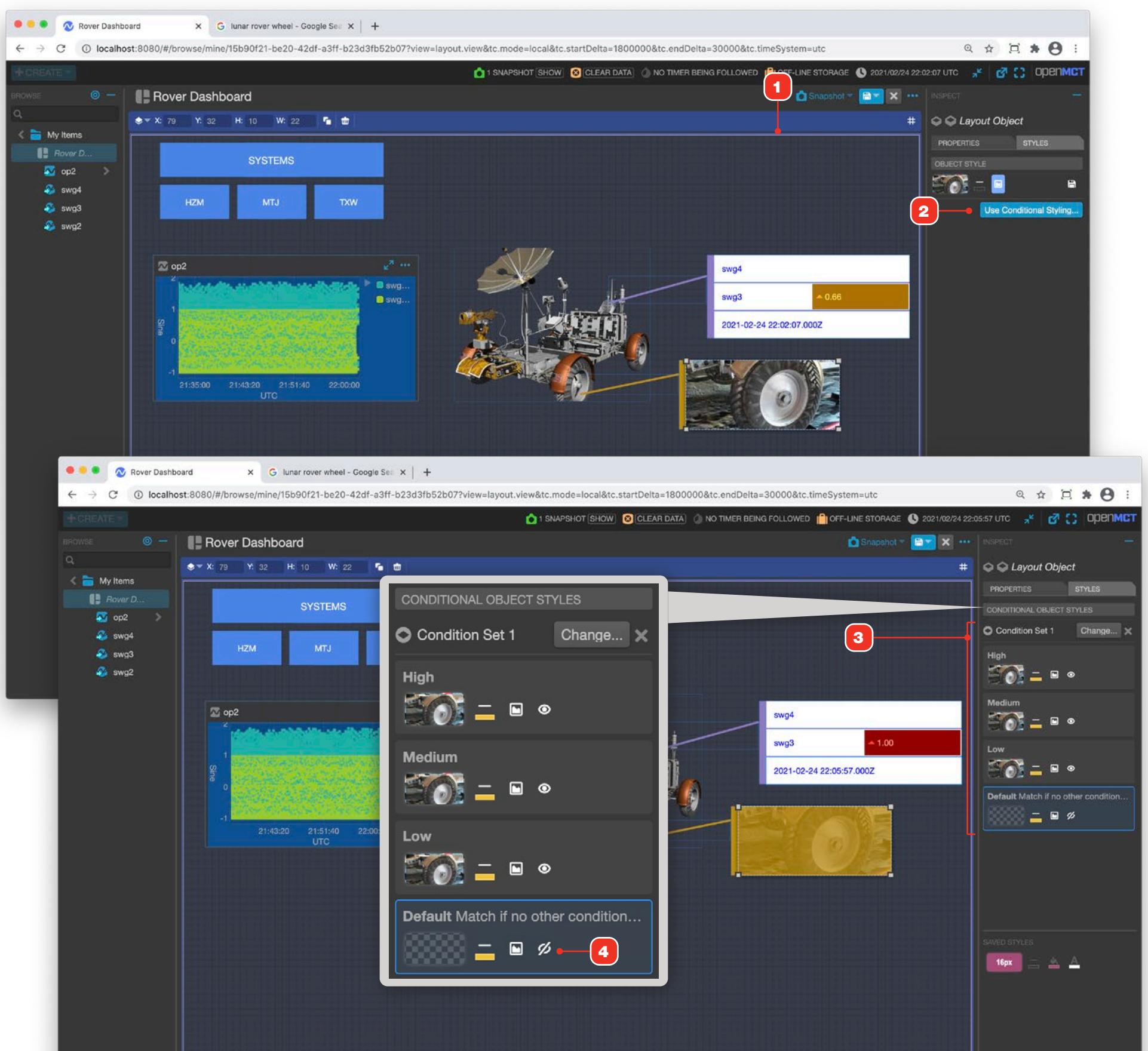
# Using Conditional Styling in a Display Layout

Using a Condition Set in a Display Layout to control styles for objects in the layout has features and considerations not present elsewhere.
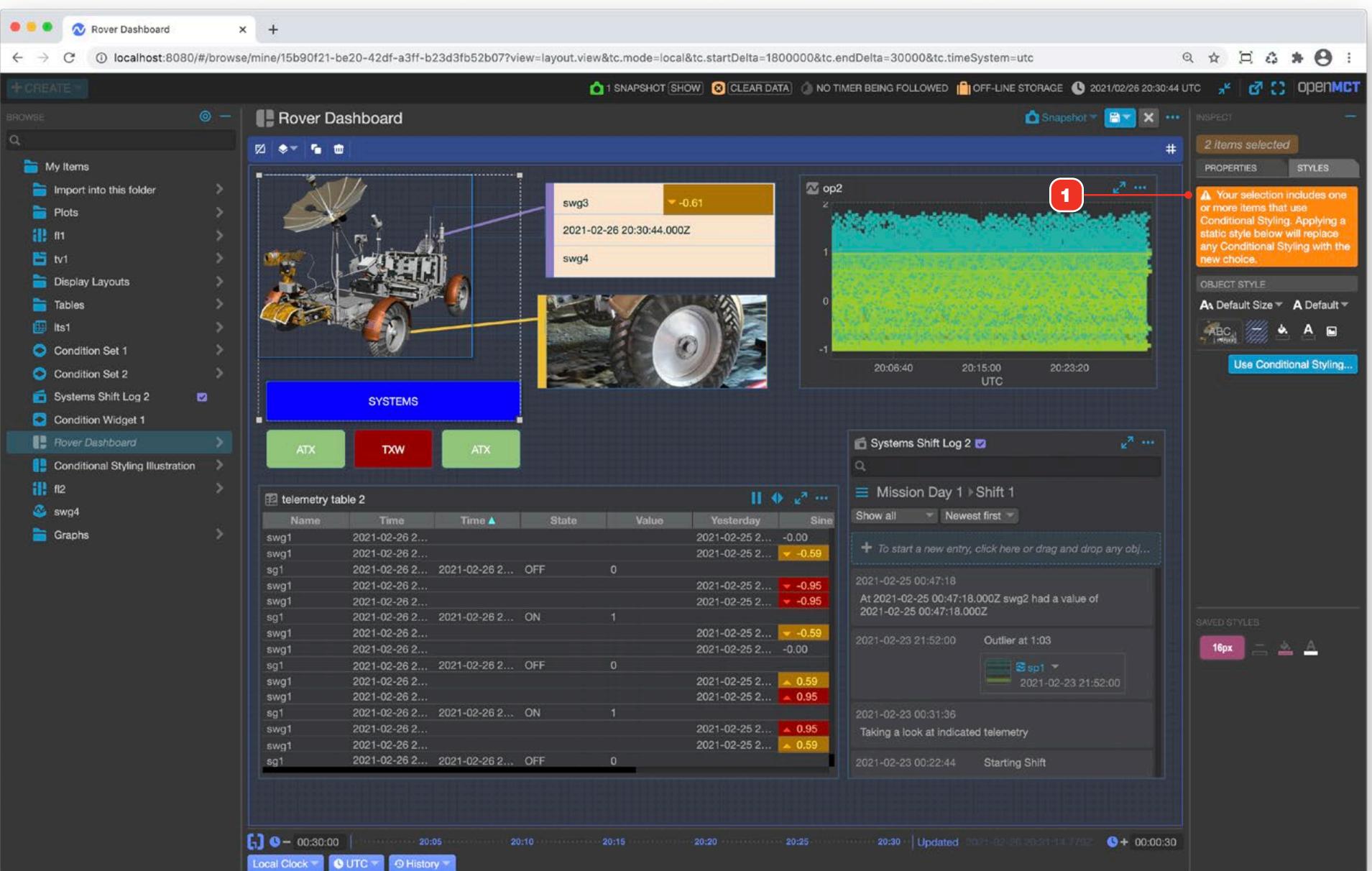
1 To use conditional styling, select the object you want to apply it to, then click the "Use Conditional Styling" button **2**. You'll be prompted to select a Condition Set via a dialog.

3 In addition to border color, image objects can dynamically assign a different image with each condition. This example shows three different images that will be displayed for the selected image, depending on which condition in the Condition Set is matched.

4 Visibility of any object in the layout - domain objects, telemetry and drawing objects - can be toggled on or off per condition. In this example, the image will be hidden if the Default condition is matched.

Mixed Styles and Conditional Styling in a Display Layout

1 If multiple objects are selected with a mix of static and/or conditional styling, this warning will display. Applying any style will remove all conditional styling currently applied to all objects in the selected set.
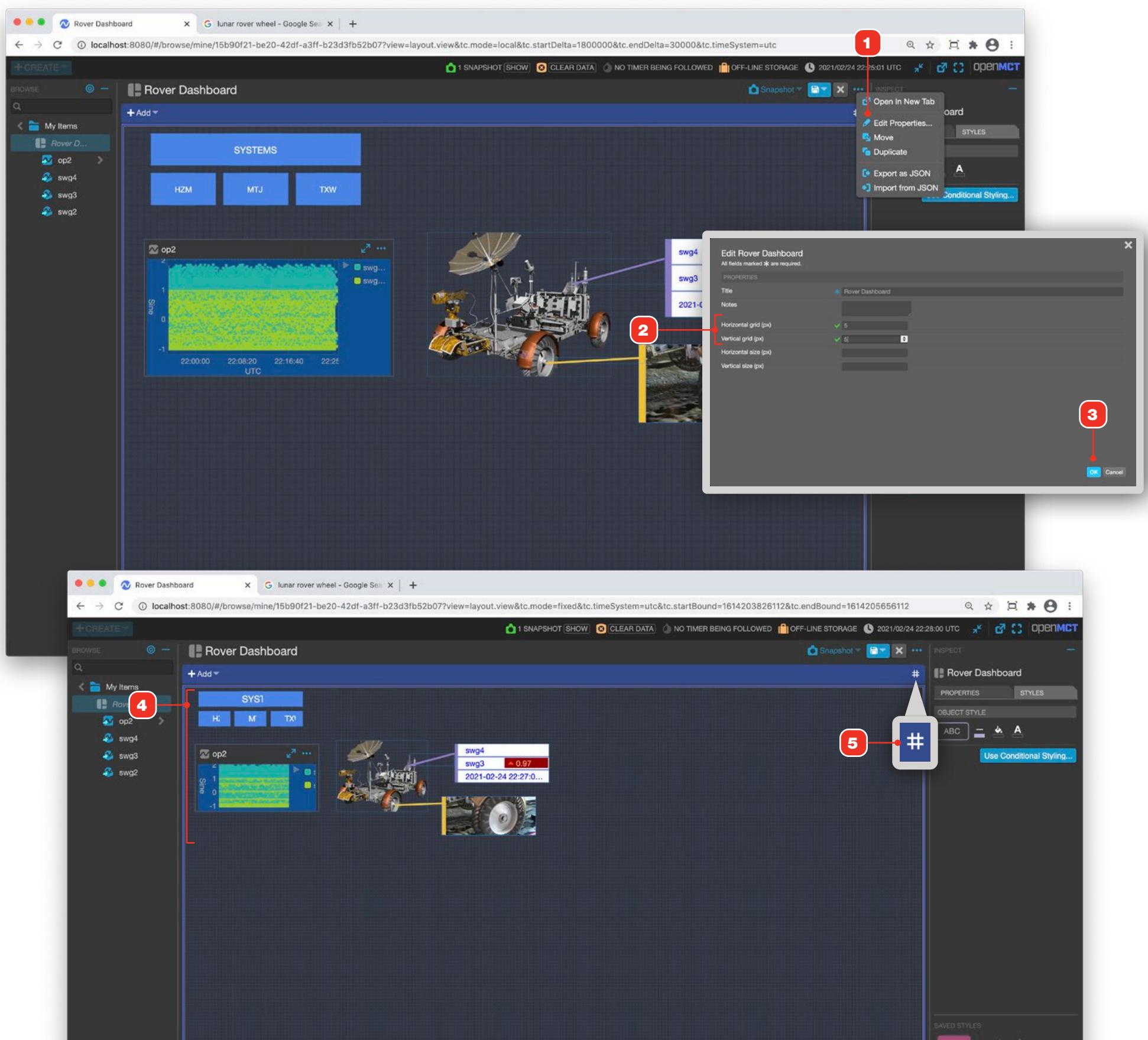
Using the Display Layout's Snapping Grid

Display Layouts use a grid that objects snap to when being repositioned and resized during editing. The grid is visible while editing, but is not displayed in browse mode. The default settings for this grid can be changed.

1 Right-click the Layout's context arrow and choose "Edit Properties..." from the context menu.

2 In the Layout Grid section of the Properties overlay, enter pixel values for the horizontal and vertical dimensions that you'd like.

3 Click "Ok" to save your settings.

4 Objects will maintain the same grid dimensions they had previously, but will scale up or down in size depending on how you changed the grid settings. In this example, a layout that was previously set to 10, 10 has now been changed to 5, 5, resulting in all objects scaling down.

5 You can toggle the display of the snapping grid by clicking this button. Note that snapping still functions even when the grid is hidden.
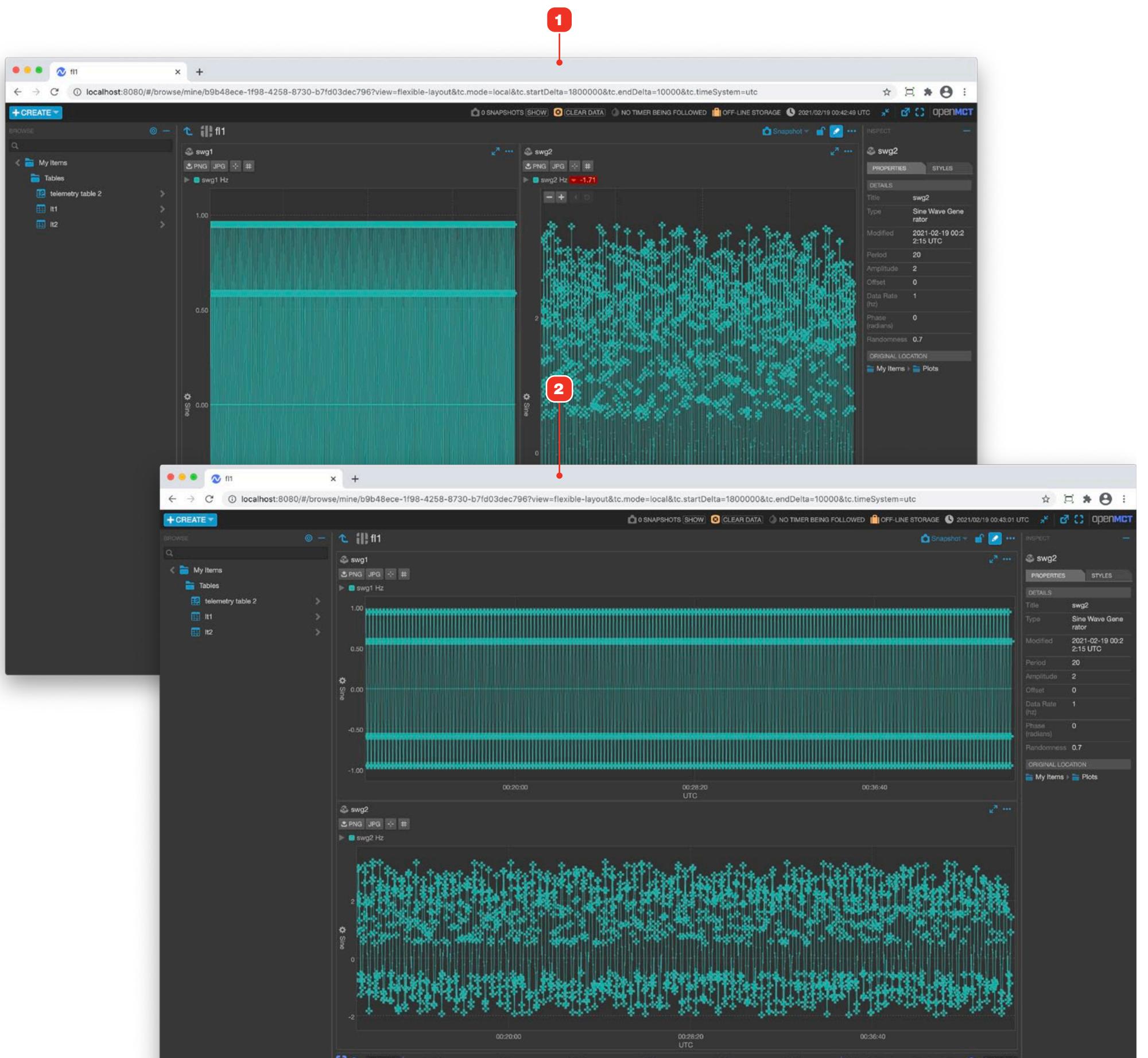
Flexible Layouts

A Flexible Layout uses a fluid sizing approach to displaying contained elements. Items placed in a Flexible Layout scale dynamically to fill the space available to them. Placed items are organized in either columns **1** or rows **2**. Flexible Layouts are ideal for displays that will be viewed in a variety of sizes, for example, in a desktop environment and mobile.

For more on Flexible Layouts versus Display Layouts, see "Layouts Overview" on page 68.
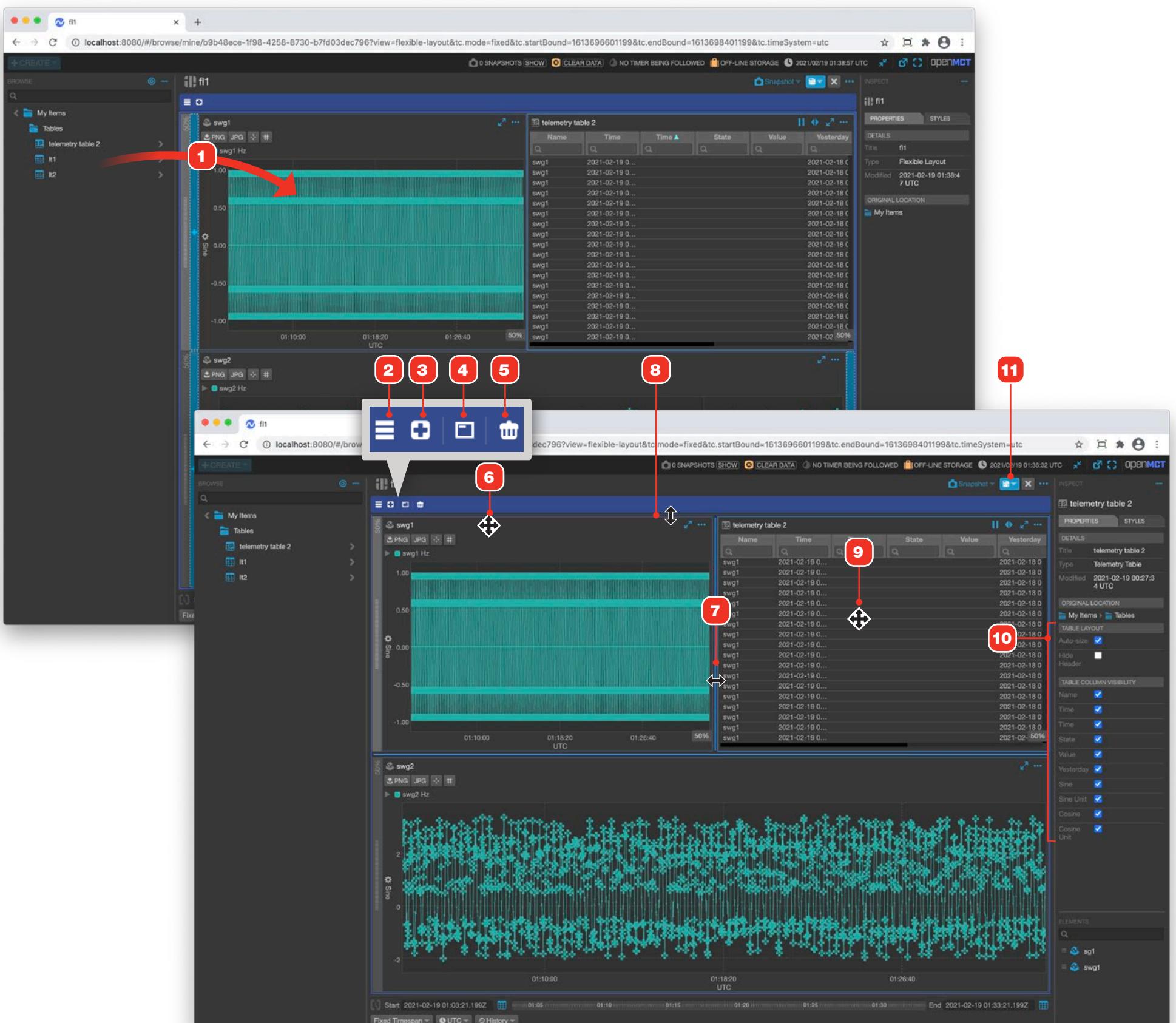
Edit a Flexible Layout

For information on editing objects in general, see "Creating A New Object" on page 41.

1 Add objects to a Flexible Layout by dragging from the Object Tree. When dragging an object, valid drop areas will highlight as shown in blue.

2 To toggle the layout from columns to rows, click this button.

3 To add a container, click this button.

4 To hide a selected item's frame, click this button. For more details on frame visibility, see "Layout Editing and Styling Controls" on page 76.

5 Delete a selected item or container by selecting it, then clicking this button.

6 To reorganize containers, click and drag its header.

7 The relative size of containers can be adjusted by dragging their resize handles.

8 The relative size of an object within a container can be adjusted by dragging its resize handle.

9 To move an object, click to select it, then drag it.

10 Properties of selected items can be edited in the Inspector panel.

**11** Click "Save" when you're done editing.

Condition Sets Overview
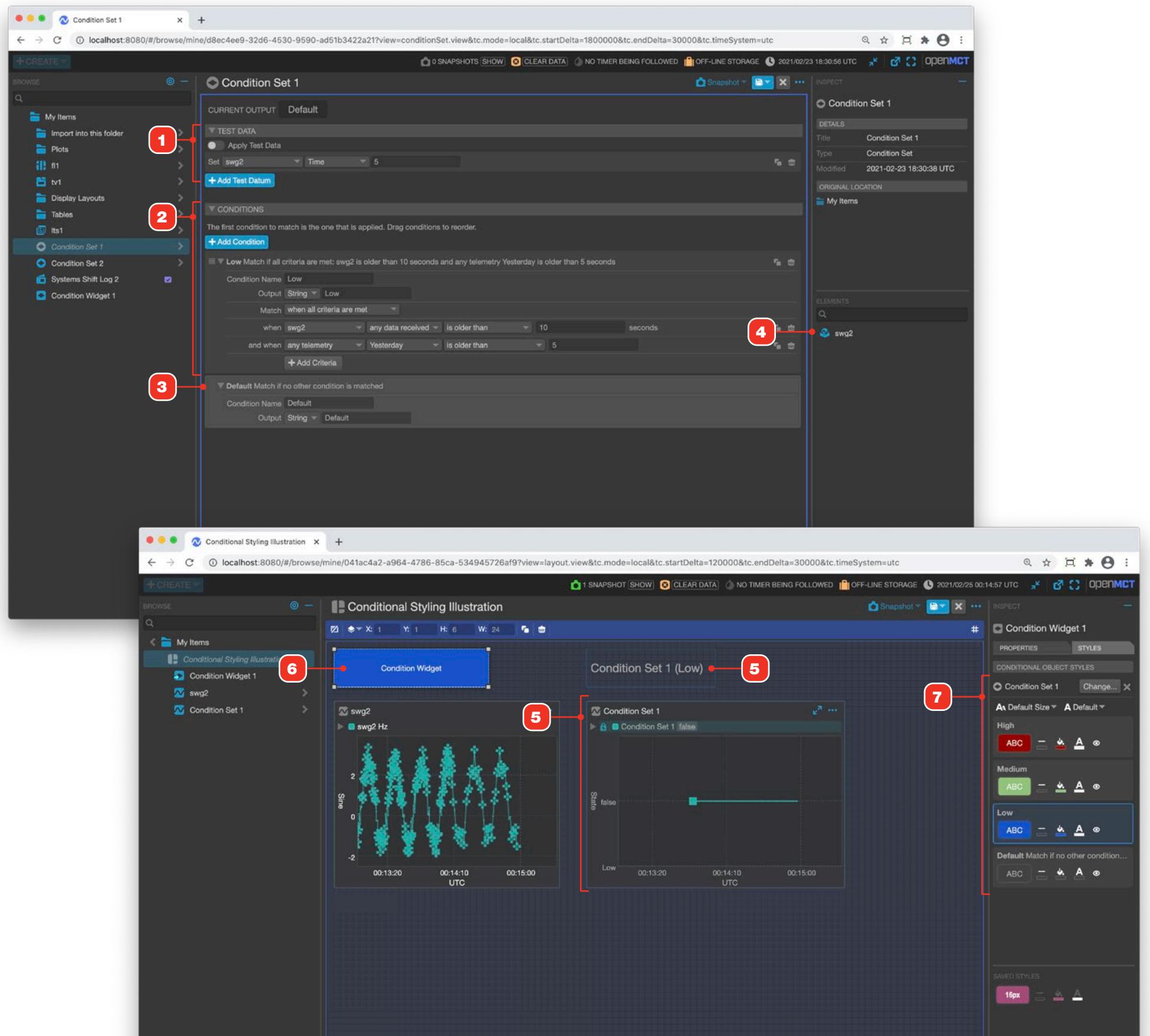
Condition Sets allow you to define one or more conditions that progressively evaluate contained telemetry points' current values in real-time, and output a result that can used in a variety of different ways, including dynamically styling a wide variety of objects and acting as a telemetry output point itself.

Examples include:

- Set the background color of an object like a plot, table or Condition Widget to a warning color when a value exceeds a limit or is within a range.
- Show a different image in a Display Layout based on the state of a telemetry element, like a switch being open or closed.
- User-created enumerated telemetry, such as evaluating a numeric telemetry element and outputting LOW, NORMAL and HIGH string values based on numeric criteria evaluations.

For more on conditional styling capabilities, see "Styling An Object With Conditional Styling" on page 46.

1 Test Data allows the manual forcing of telemetry data values to test condition evaluation logic.

2 A Condition Set includes one or more conditions that are evaluated from the top down - the first condition that matches "wins" and halts evaluation until new data is received. If no conditions match, then the bottom-most default condition **3** wins.

4 Condition Sets can evaluate one or more telemetry points. Evaluations occur every time new data is received for included Telemetrys.

5 Condition Sets output telemetry and their values can be visualzied as alphanumerics, plots and tables. Condition Sets can even be used as a telemetry input to another Condition Set.

6 Condition Sets can be used to dynamically style many different types of elements **7**. Each defined condition can apply unique fill, border, text color, image URL and even visibility to objects.
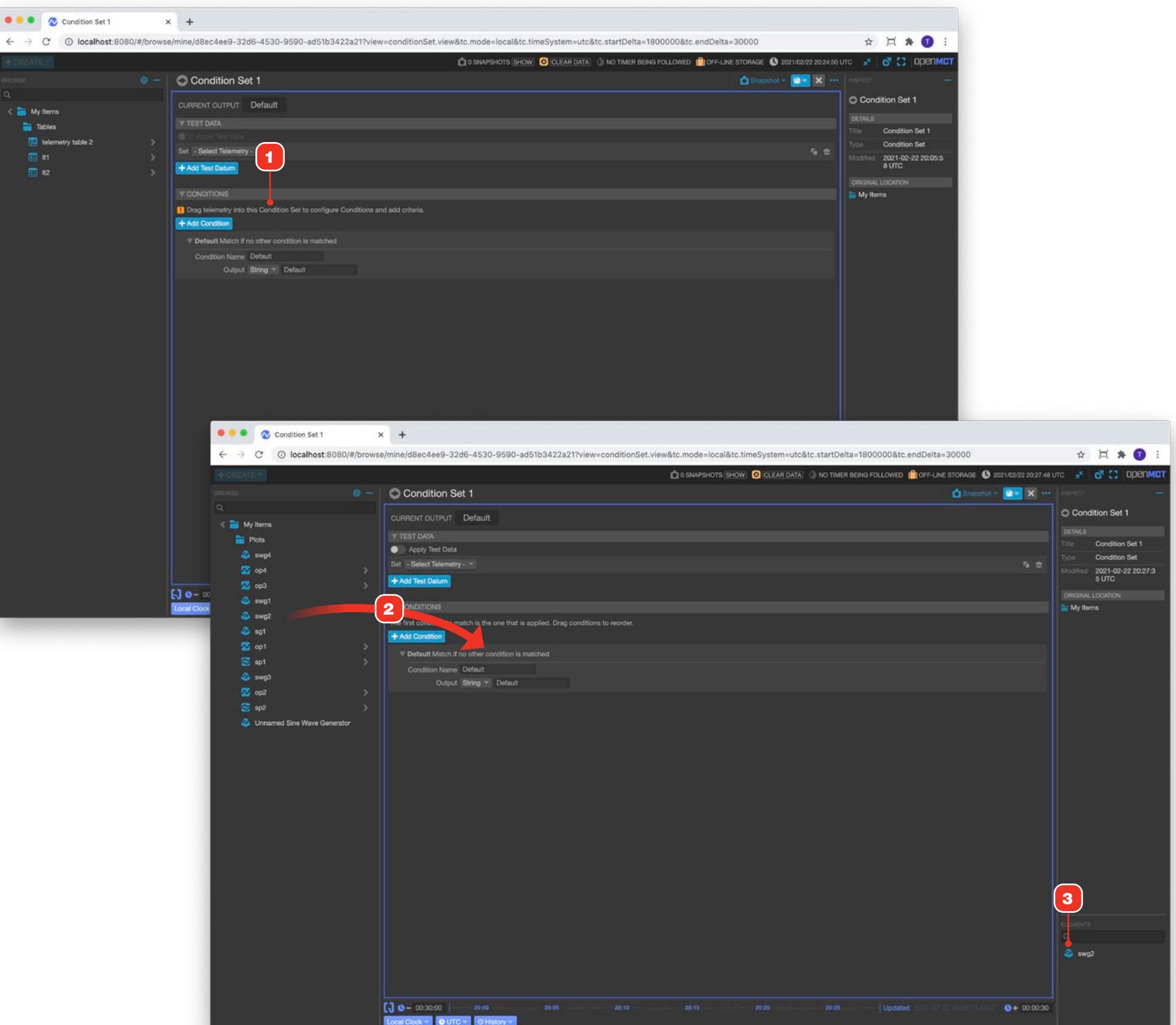
Creating a New Condition Set

For general information on editing objects, see "Creating A New Object" on page 41.

1 A Condition Set must have at least one telemetry point order to configure it.

2 Drag a telemetry point from the tree anywhere into the edit interface.

3 Once a telemetry point has been added, you can begin configuring the set. See "Conditions" on page 85.
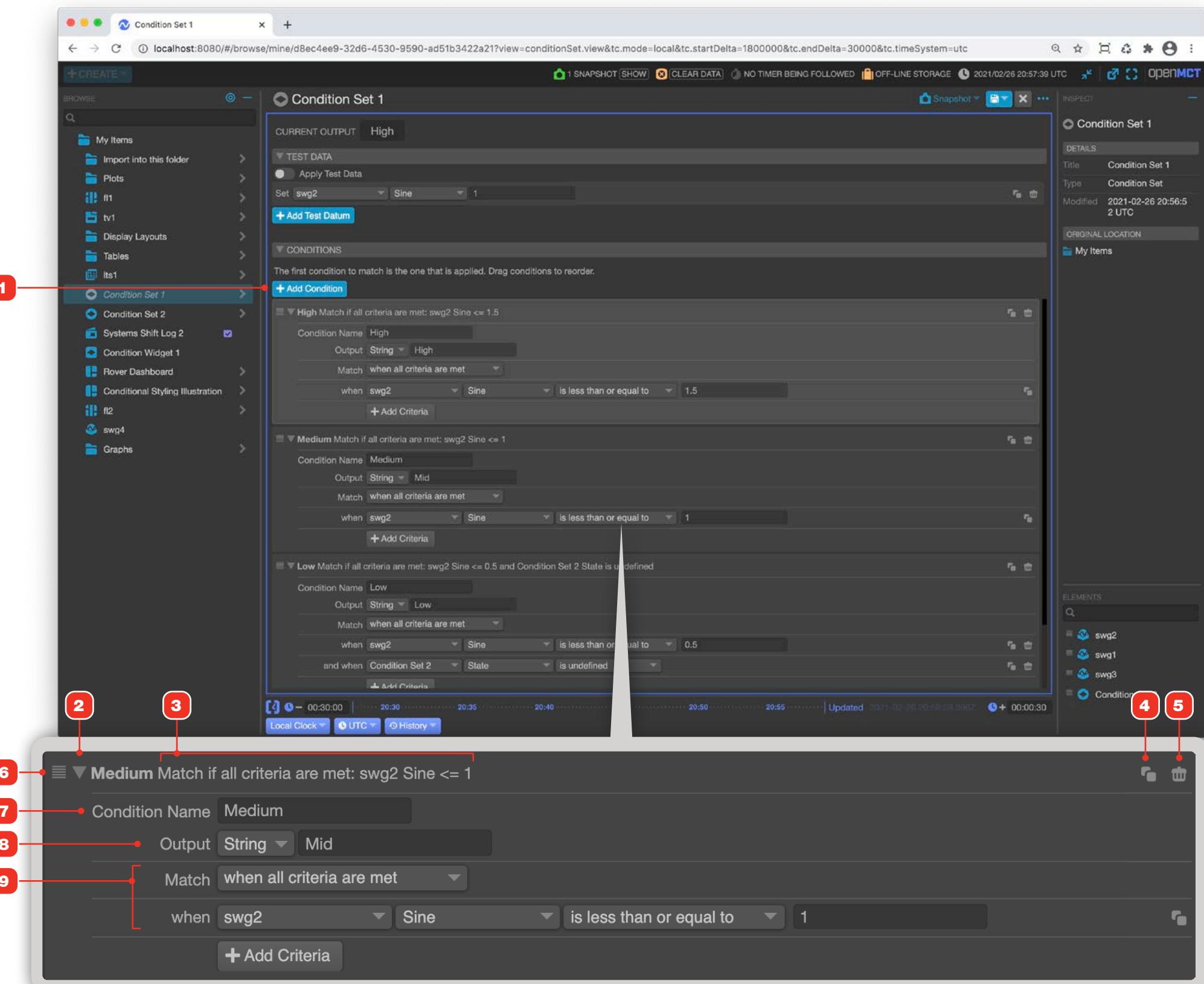
Conditions

Each condition in a Condition Set consists of matching criteria and an output. Conditions are evaluated from the top down; the first condition that matches "wins" and the set outputs that condition's value. If no conditions match, then the default condition **9** wins.

1 Click "Add Condition" to add and configure more conditions. Add as many conditions as needed to create unique outputs.

2 Expands and collapses the associated condition to allow space to be saved when needed.

3 Summary of the condition's criteria. Dynamically updates as criteria are edited.

4 Duplicates the associated condition.

5 Deletes the associated condition.

6 Click here to drag a condition to reorder it in the list of conditions. Note that the default condition **9** must always remain last, and conditions cannot be dragged beneath it.

7 The name of the condition.

8 The Condition Set's output value when a given condition is matched. Can be boolean (true or false) or a string.

9 One or more criteria within a given condition. See "Working With Condition Criteria" on page 86.

Working With Condition Criteria

Each condition has one or more criteria that you configure with a menu-based interface.

1 Adds a new criteria.

2 Duplicates the associated criteria.

3 Deletes the associated criteria.

4 **Criteria Relationship:** define the evaluation context for your criteria.

Setting	Effect
any criteria is met	Logical OR. Causes the condition to match as soon as any one criteria is met in this condition.
all criteria are met	Logical AND. All criteria must be met in this condition in order for it to match.
when no criteria are met	Logical NOT. The condition will match if none of the criteria are met; if a single criteria is met then the condition will not match.
when only one criteria is met	Logical XOR. Causes the condition to match when at least and only one of its criteria are met; if no criteria are met or more than one criteria is met, the condition will not match. When only one criteria is defined, this is functionally equivalent to "any criteria is met" and "all criteria are met".
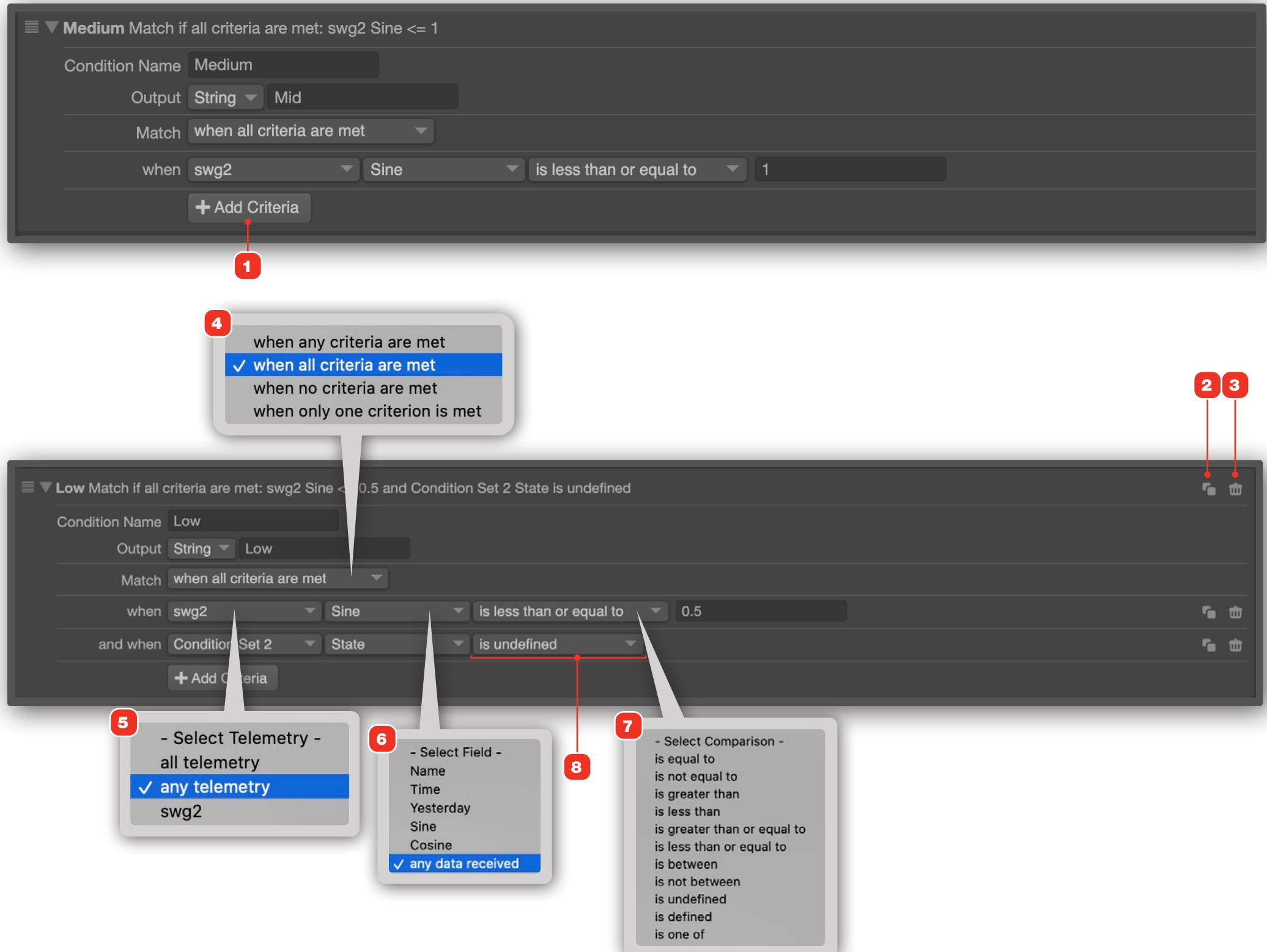
5 **Telemetry:** define which telemetry should be evaluated in the criterion.

Setting	Effect
all telemetry	Current values from *all* telemetry included in the Condition Set must meet the particular criterion.
any telemetry	Current values from *any one* of the telemetry included in the Condition Set must meet the particular criterion.
<specific telemetry point>	Current values from the specified telemetry must meet the particular criterion.

6 **Field:** allows selection of the field to evaluate, based on the choice in **2**. If multiple telemetry is included in the Condition Set, and those telemetry have different fields, the union of fields will be presented. You can also test if any data has been received in a timeframe for the selected Telemetry(s) from **5**.

7 **Comparison:** available comparisons based on the type of field chosen in **3**. Numeric, string and boolean field types all include different comparators and this menu will change accordingly.

8 **Comparison value fields:** inputs for matching criteria values based on the choice in **4**. Some comparisions, such as "is defined" do not require a value input; in that case fields will not be displayed here.
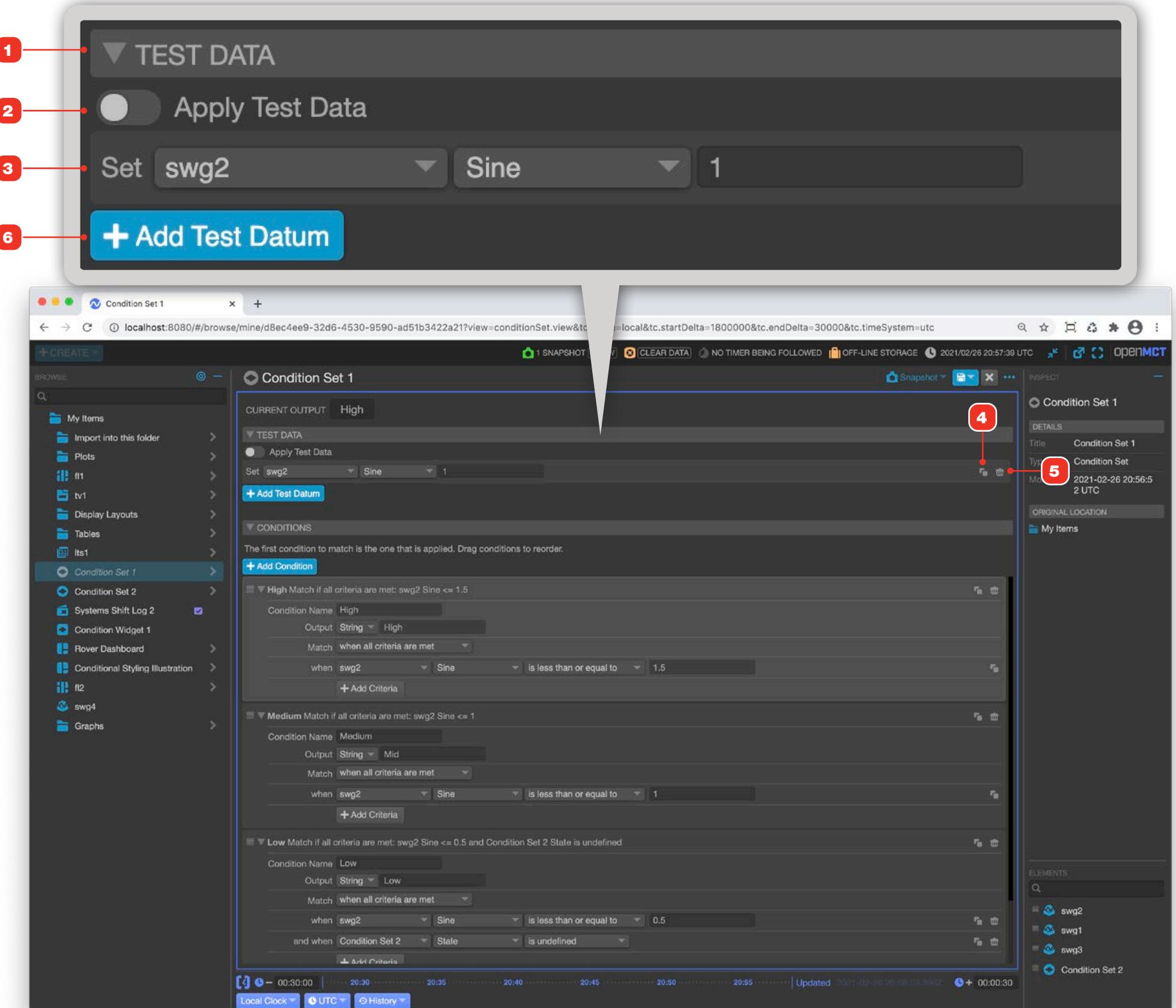
Using the Test Data Capability In a Condition Set

By default, a Condition Set uses the current values of included telemetry to evaluate its output. You can use Test Data to manually force a value for one or more included telemetry points in order to evaluate the configuration of your conditions. You can add multiple test datums to set values for one or more fields and telemetry points included in the Condition Set.

1 The current output of the set based on the currently matching condition.

2 When "Apply Test Data" is enabled the Condition Set ignores the real values of included telemetry and only uses values defined in the Test Data section. Test Data is only applied while editing a Condition Set when this control is enabled.

3 Sets the telemetry point, field and value to apply. The Condition Set will dynamically match against values as they are entered.

4 Duplicates the associated test datum.

5 Deletes the associated test datum.

6 Adds additional test datums.
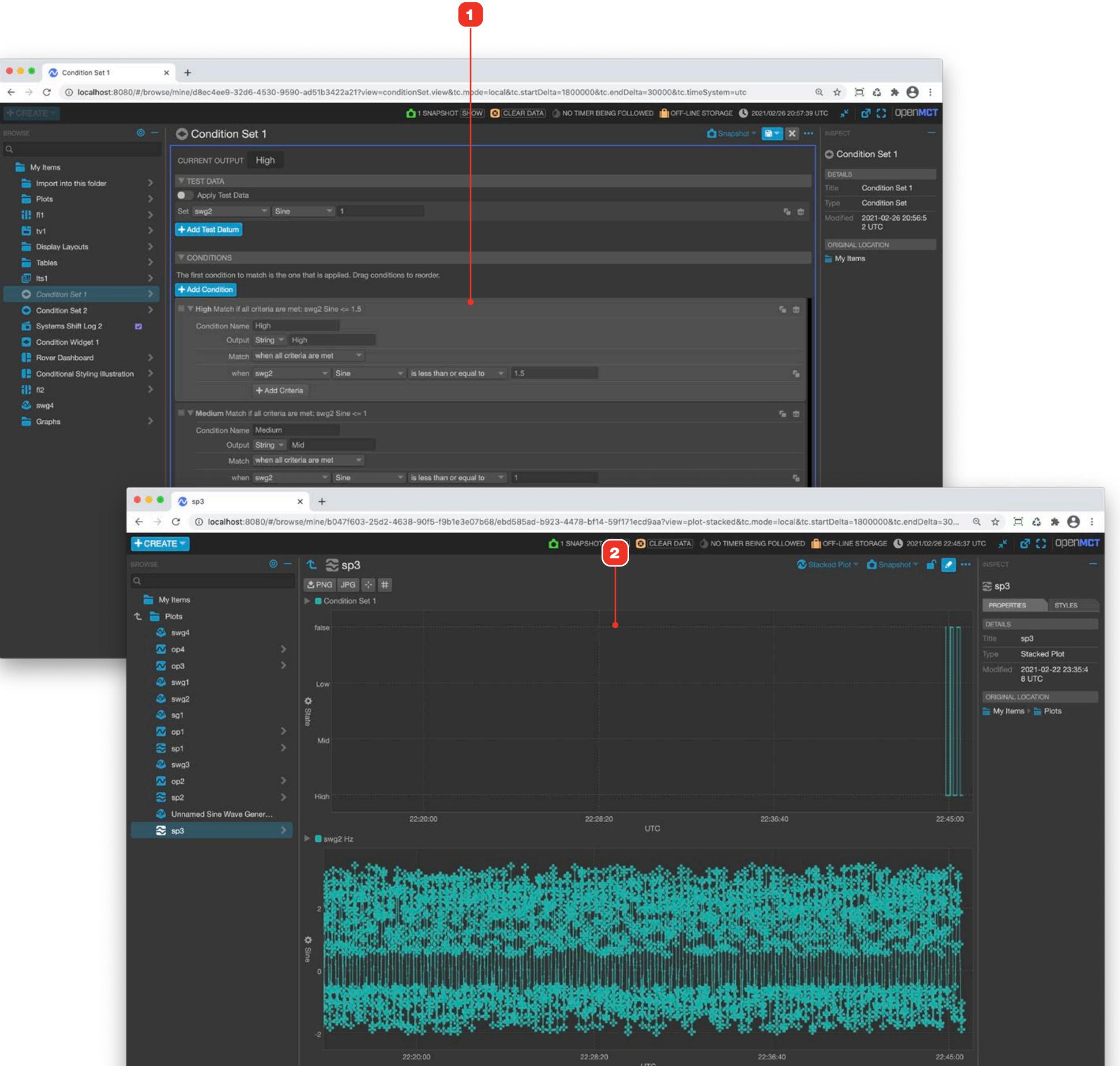
Using a Condition Set as Telemetry

A Condition Set outputs values as a result of its condition evaluation, and can be used in the same ways that telemetry points can. Setting evaluation criteria at the proper values would allow you to create your own enumerated telemetry.

1 This Condition Set has three conditions that output high, mid and low strings respectively based on numeric criteria applied to a telemetry point.

2 The Telemetry and the Condition Set plotted together in a Stacked Plot for comparison.
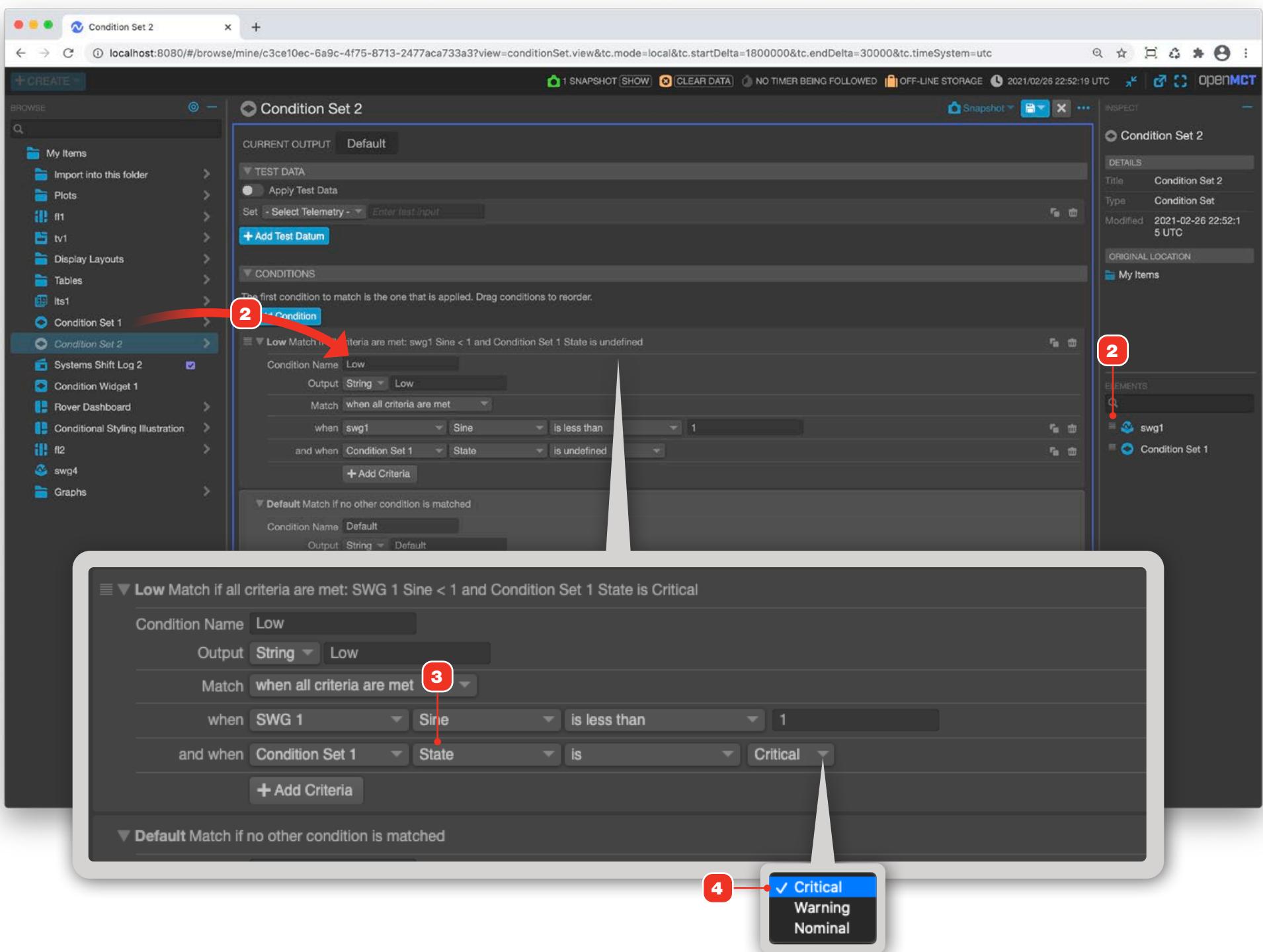
Using a Condition Set As An Input Within Another Condition Set

Because Condition Set outputs are treated as telemetry, one Condition Set can use one or more other Condition Sets as telemetry inputs in the same ways that telemetry points can be. Using them in this way, for example, might let you build chains of layered Condition Sets in order to do rollup assessments of hierarchical systems.
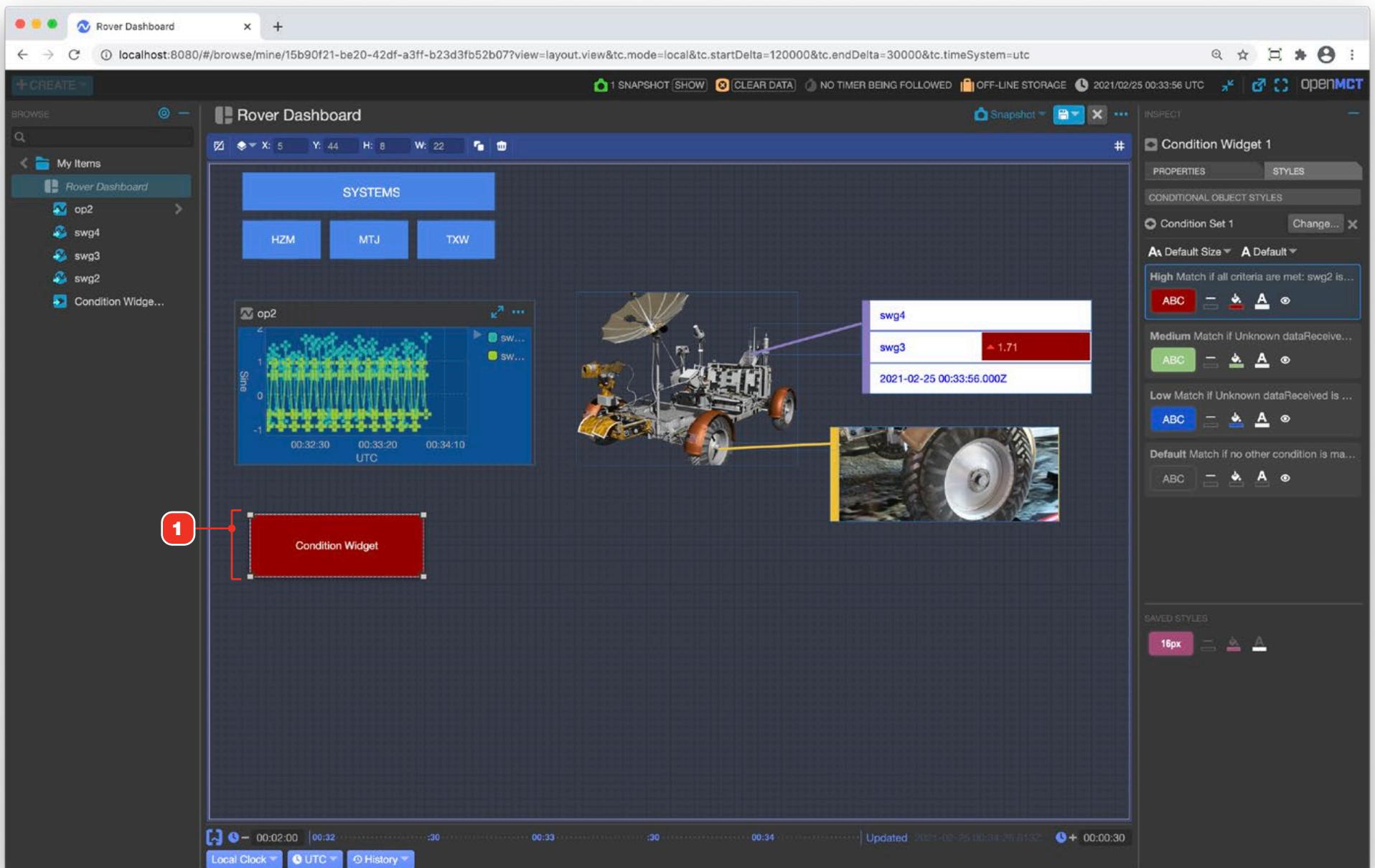
1 Drag a Condition Set into the edit area of the set that you're editing to add it as a telemetry input **2**.

3 Using the "State" field of the Condition Set allows you to see a list **4** of all available outputs for all included Condition Sets.

Condition Widgets

Condition Widgets **1** are designed to use Condition Sets and conditional styling to let you create dynamic status rollup indicators that visually change based on real-time evaluated Telemetry values. Condition Widgets can link to any URL including other Open MCT displays.
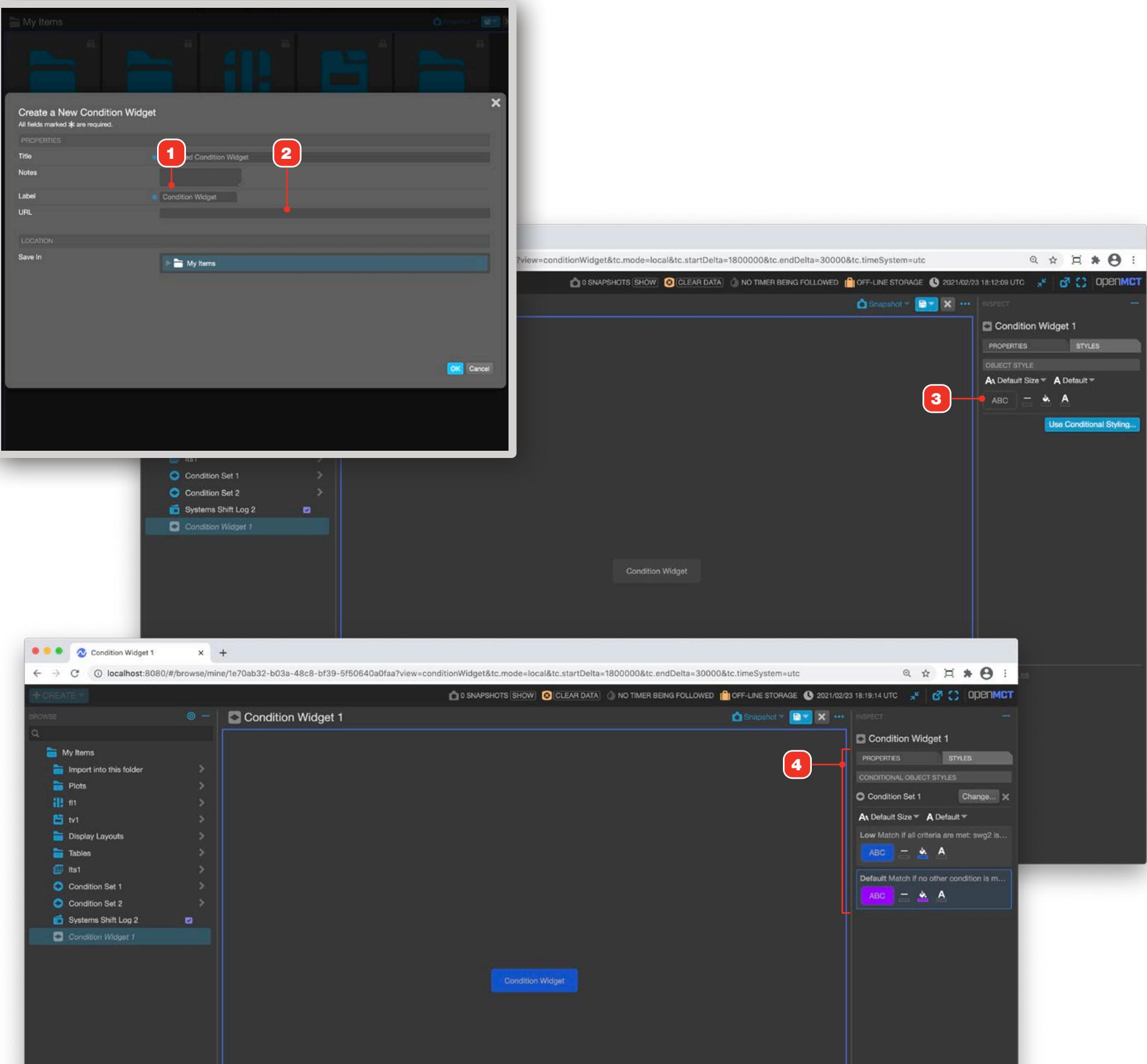
Creating a Condition Widget

For general information on editing objects, see "Creating A New Object" on page 41.

1 Controls what is displayed in the widget itself **2**.

2 To make the widget into a clickable button, enter any URL (including other displays within the application) here.

3 You can static style your widget here, or use a Condition Set to conditionally style **4** your widget. For more info, see "Condition Sets Overview" on page 83.
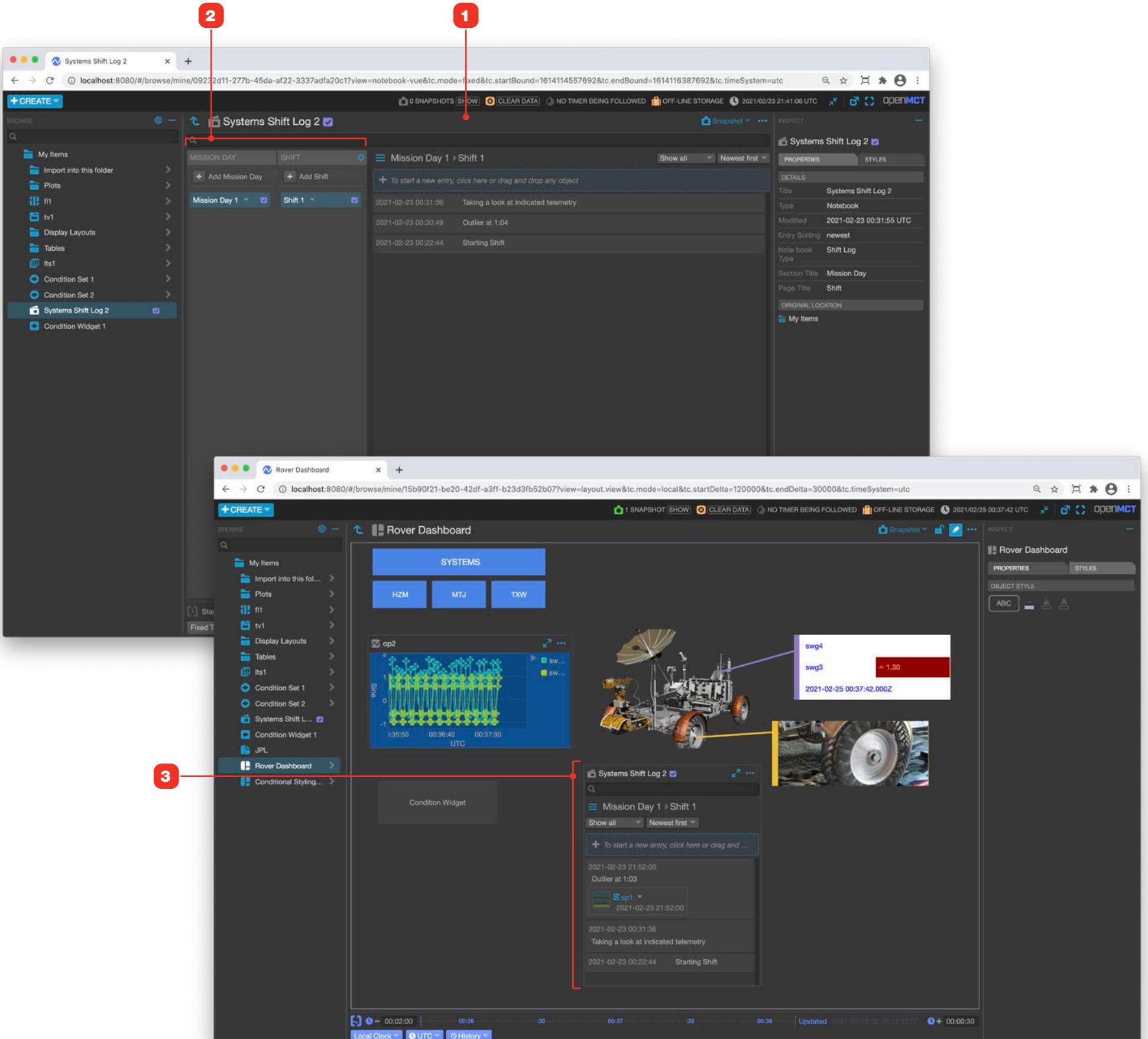
Notebook

The Notebook provides a flexible way for you to save notes or create a shift log. Entries are automatically time-stamped and can include annotated screenshot of any view in the application. Customizable sectioning and page names let structure the Notebook to your needs.

1 Notebook in the main view.

2 Notebooks include sections and pages. The names of sections and pages can be customized, shown here as "Mission Day" and "Shift" respectively. You can add as many sections as you like, and each section can have an unlimited number of pages.

3 Notebook placed in a Display Layout. The Notebook is fully functional in this context: you can add new entries, add Snapshots and navigate within it.
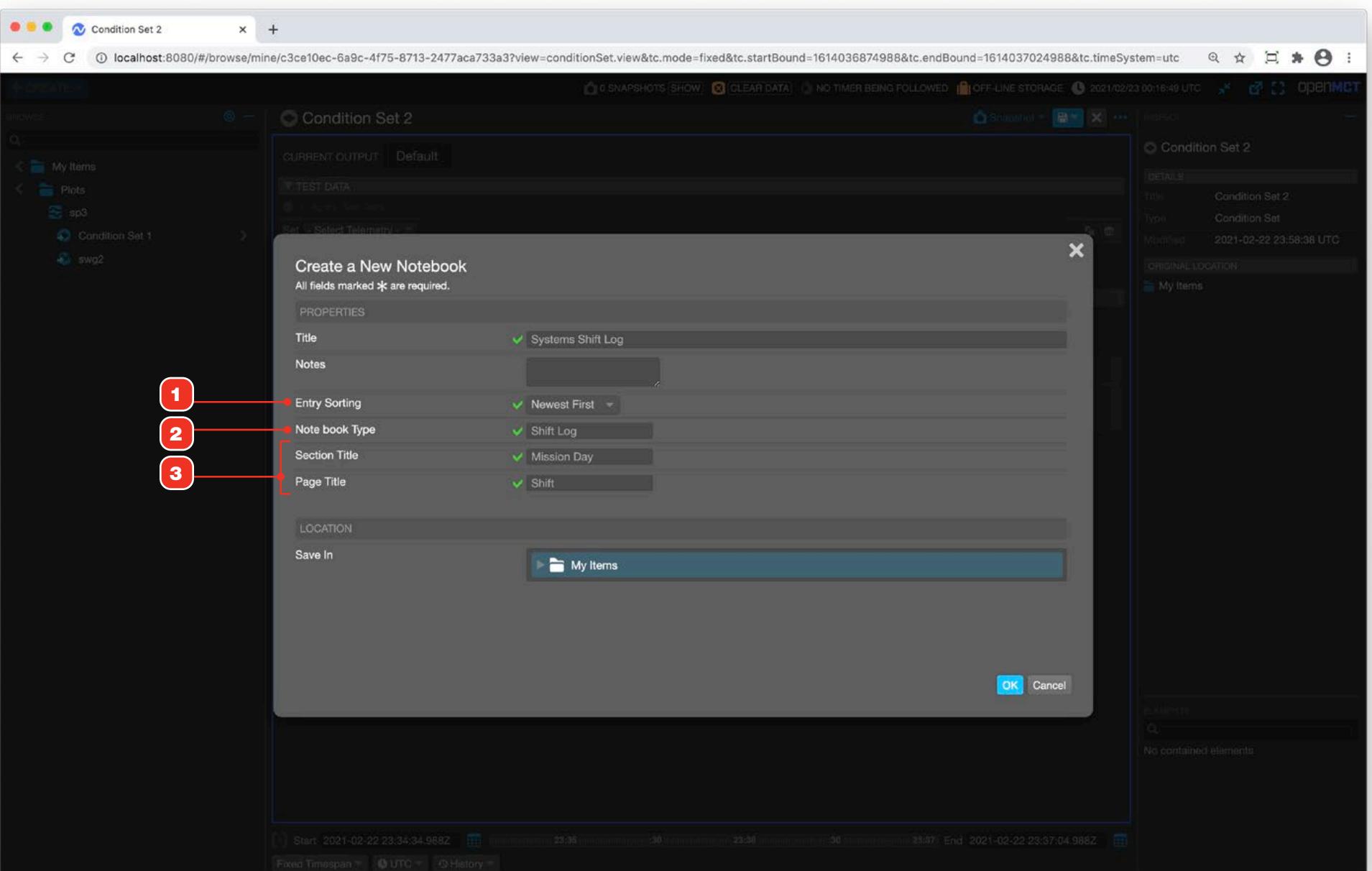
Creating a New Notebook

For general information on editing objects, see "Creating A New Object" on page 41.

There are a number of options available to customize your Notebook:
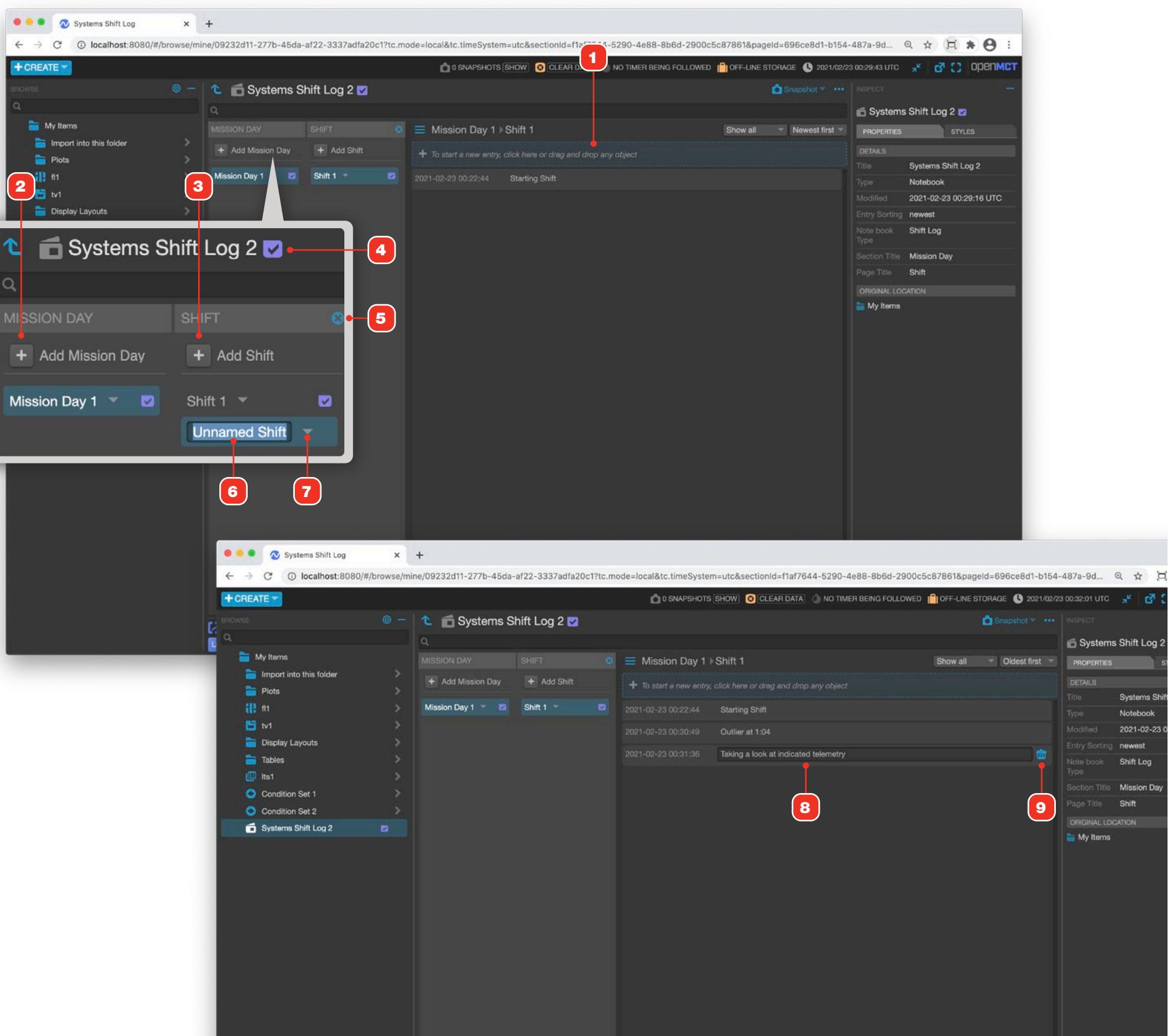
1   Set the default method by which entries are sorted for display.

2   Categorize Notebook. This information appears in metadata for the Notebook.

3   Customize the name of sections and pages to fully fit the Notebook to your particular usage.

Working with the Notebook

1 Click the new entry area to add a new entry to this Notebook.

2 Click to add a new section.

3 Click to add a new page.

4 The latest page and section to receive an entry automatically becomes the designated location for new Notebook Snapshots and is marked with this icon. See "Taking and Adding Snapshots to the Notebook" on page 95.

5 Click to toggle the display of the navigation pane.

6 To rename a page or section, select it, then click it again. The name will become editable - enter a new name, then tab or click away to save the change.

7 Pages and sections can be deleted by clicking the associated menu arrow and selecting the Delete option from the resulting menu. Deleting a section will also delete all its pages.

8 Enter text for an entry, then tab or click away to save the change.

9 Entries can be deleted by hovering over the entry and clicking its associated trash can.
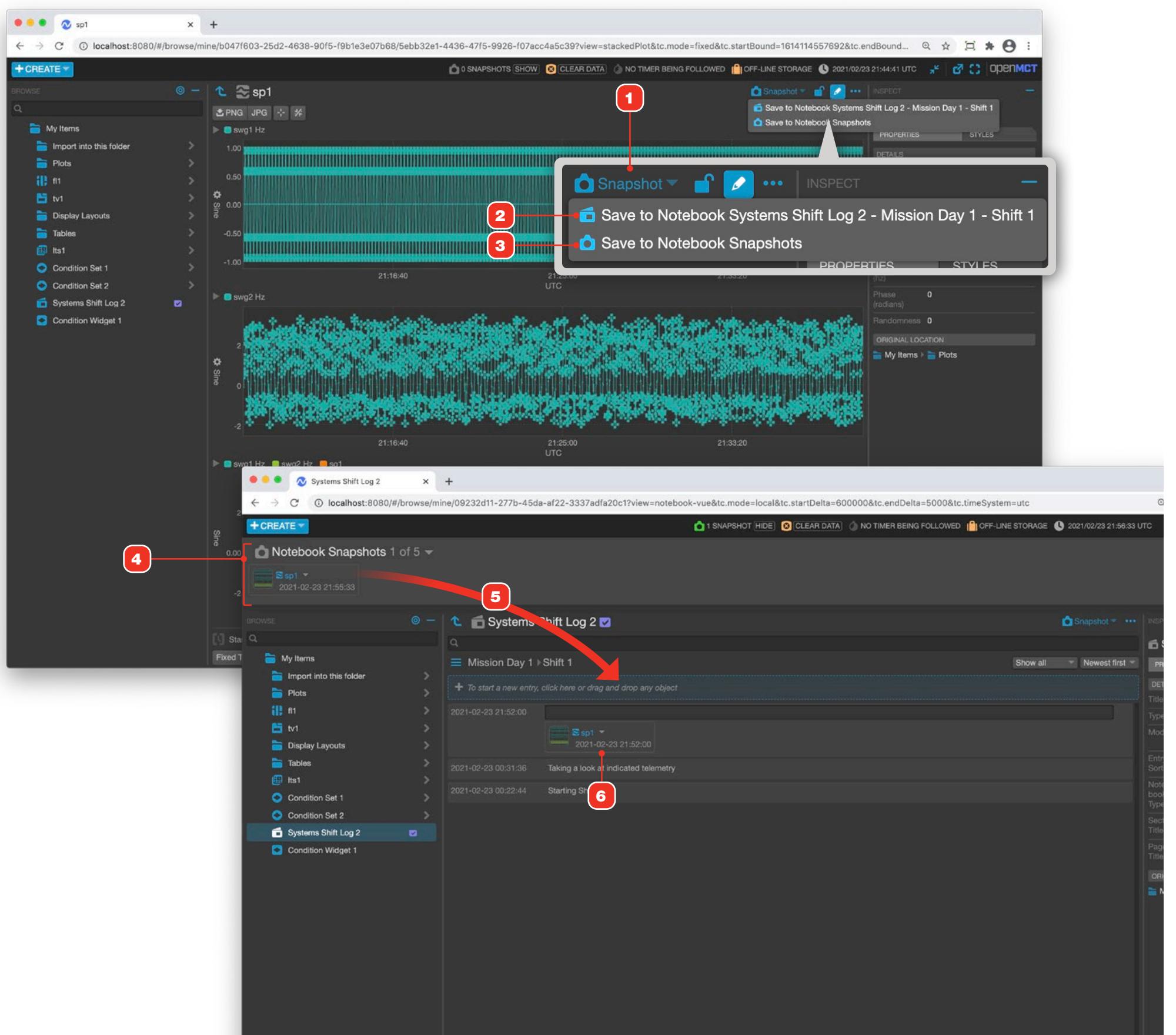
Taking and Adding Snapshots to the Notebook

The application's Snapshot feature allows you to capture screenshots of any view and quickly save them to a Notebook or the Snapshots holding area.
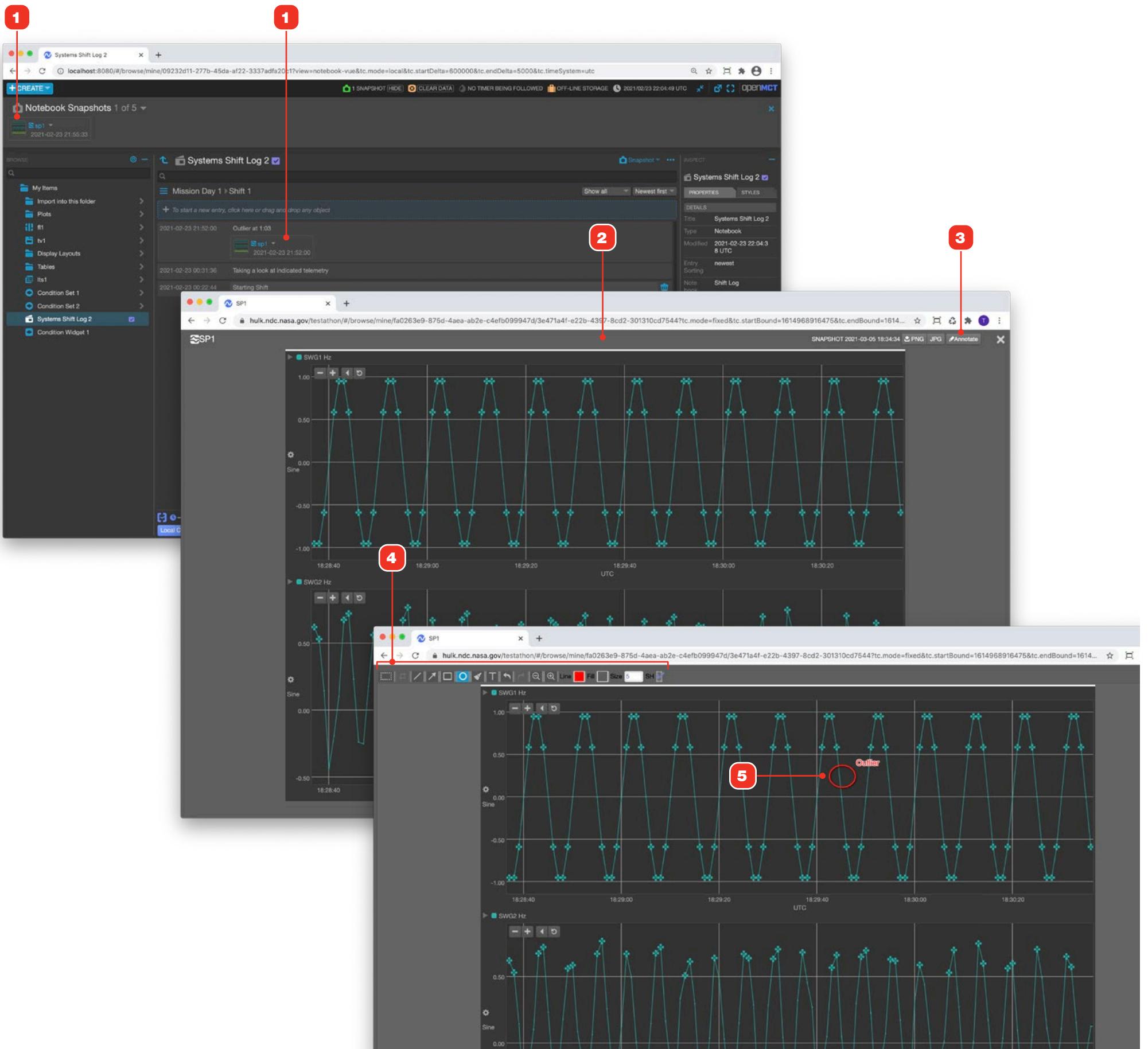
1 Click the view's Snapshot menu button to display the Snapshot menu.

2 The most recent Notebook's section and page that has had an entry made in it will be designated as the default location for new Snapshots and displayed here as an optional save location.

3 You can save a Snapshot to the Snapshots holder area **4**.

4 The Snapshots holder can hold up to five Snapshots.

5 Drag Snapshots onto a Notebook's new entry area, or any existing entry. Once a Snapshot is moved into a Notebook entry, it is removed from the Snapshot holder area.

6 Snapshots appear as embedded elements in Notebook entries. A Notebook entry can contain any number of embedded Snapshots.

Working with Notebook Snapshots

1   Click a Snapshot thumbnail to view it expanded **2**.

3   When viewing a Notebook Snapshot, you can annotate it by clicking the Annotate button.

4   Drawing tools let you add shapes and text to the Snapshot.

**5**   Annotations, once saved, are permanently added to the image.
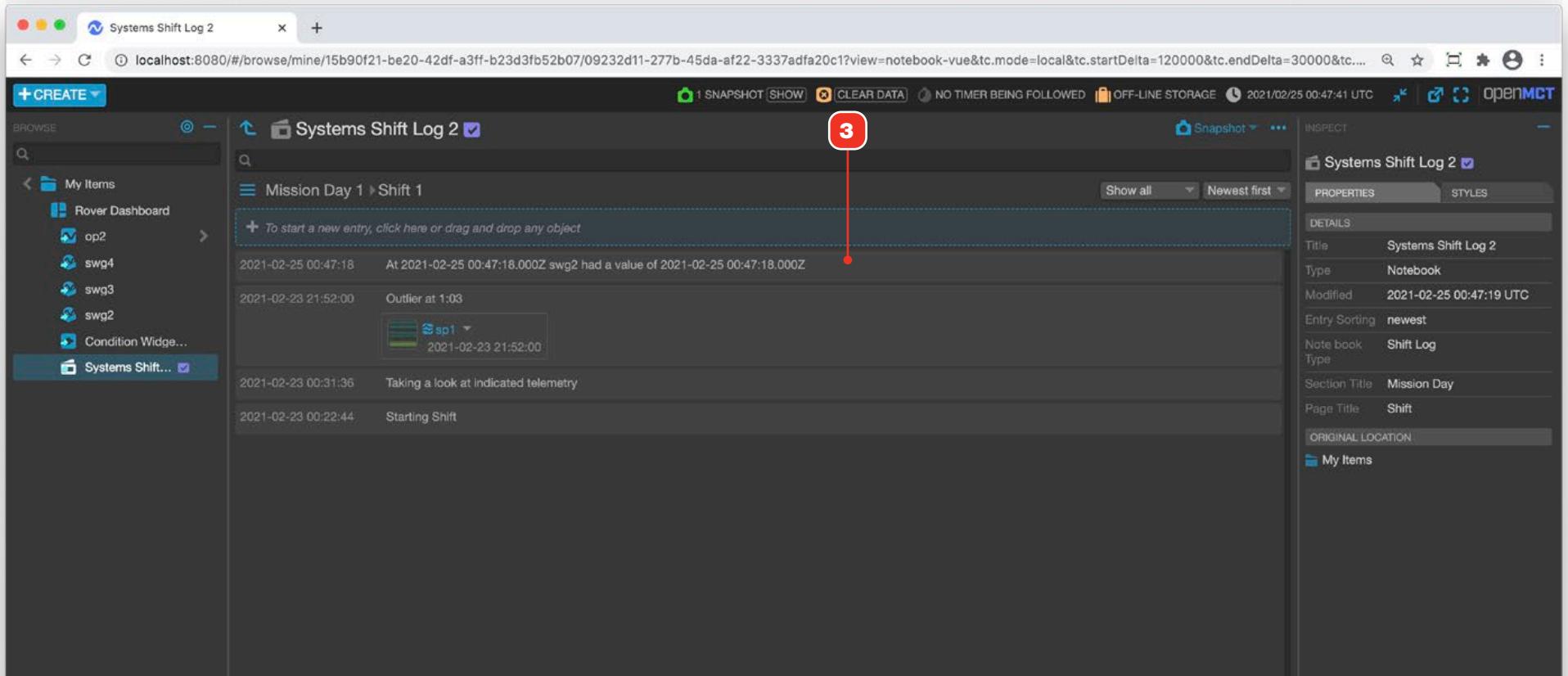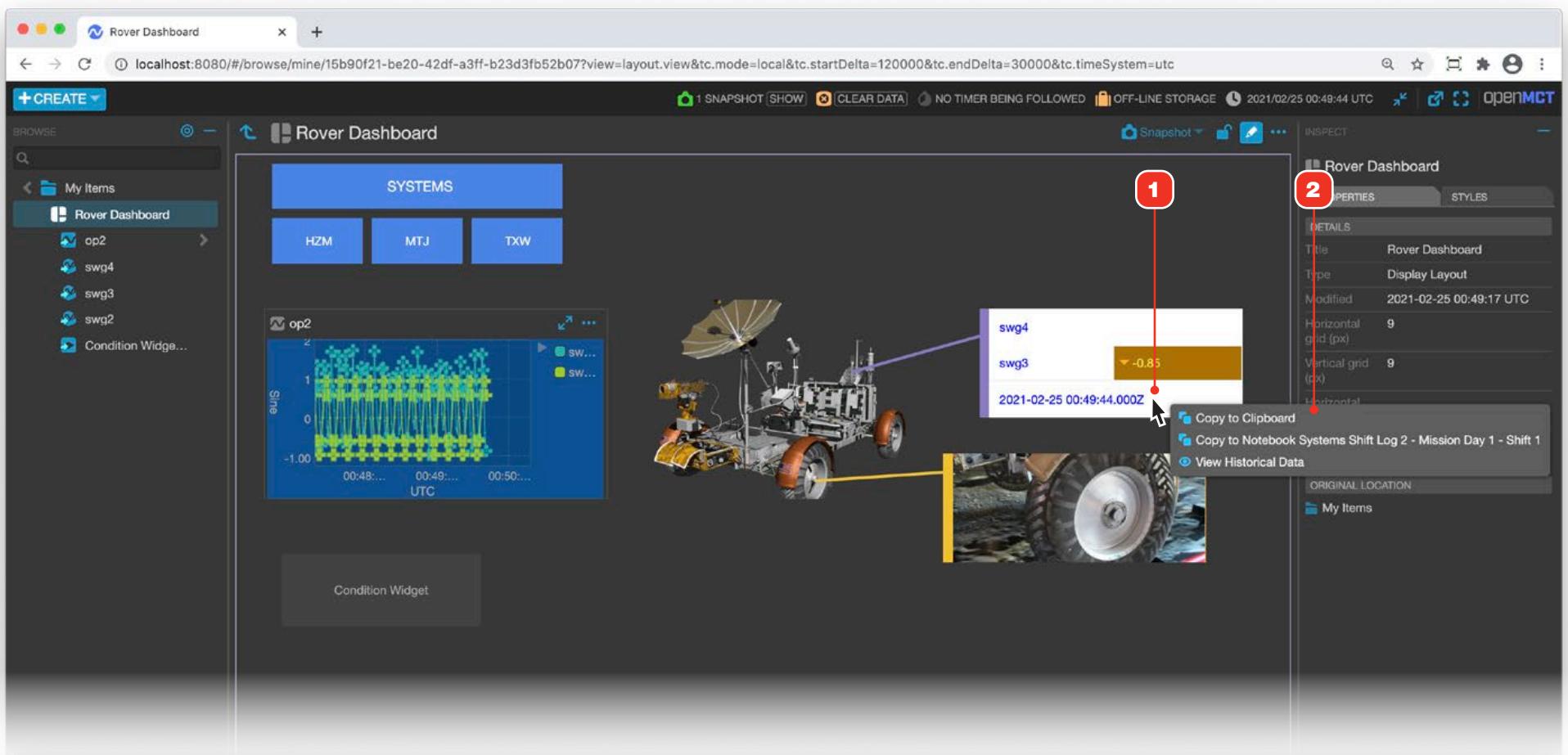
Capturing Data Into a Notebook Entry

You can directly capture current data from a Display Layout's alphanumeric displays directly into a Notebook entry.

1 Context-click any alphanumeric display in a Display Layout.

2 From the resulting menu, you can copy the current value to the clipboard, or to the default Notebook section and page as a new entry.

3 Captured values are added to the Notebook with a timestamp, Telemetry identifier, value and unit type (if available).
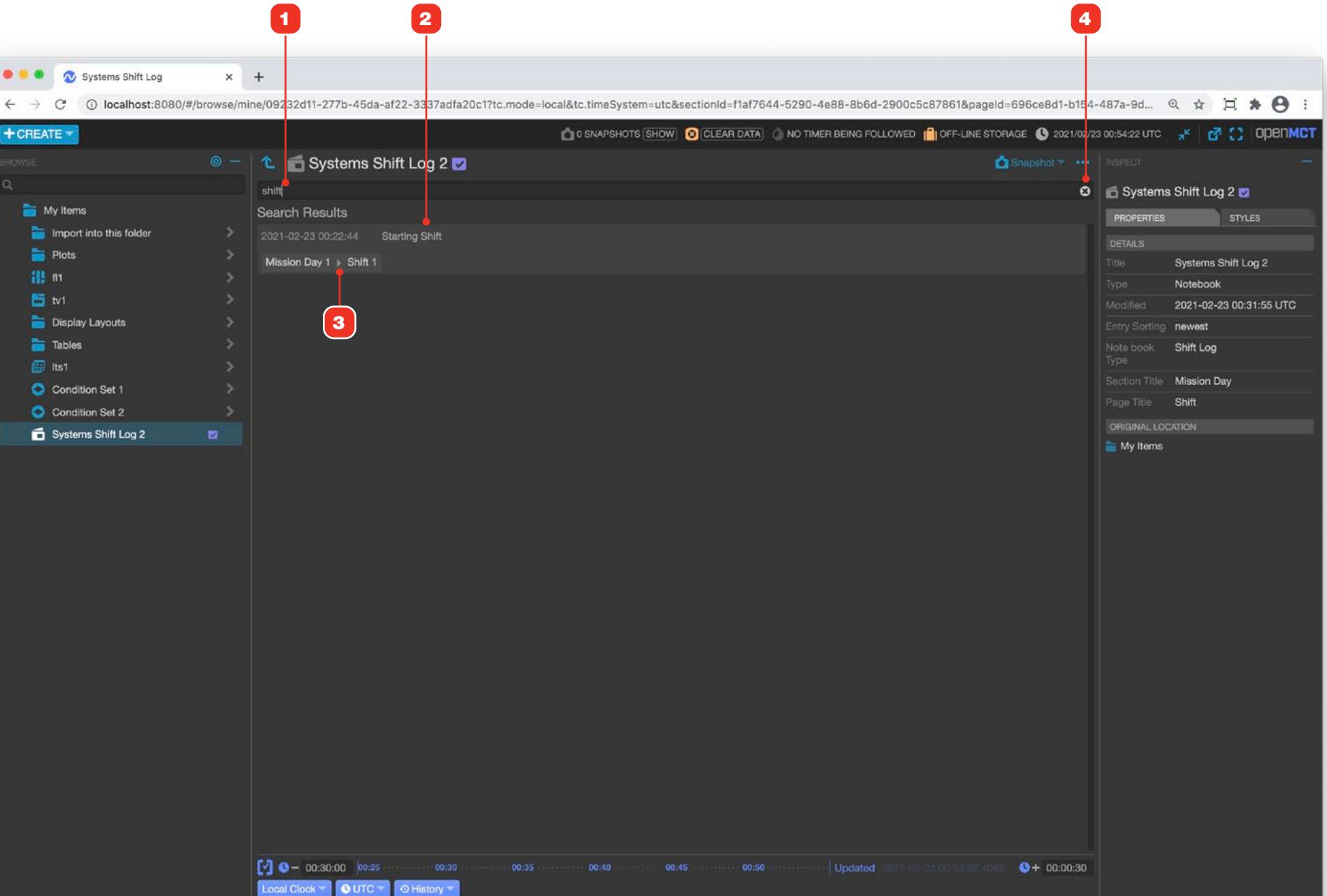
Searching within a Notebook

Notebooks provide the ability to search within a single Notebook.
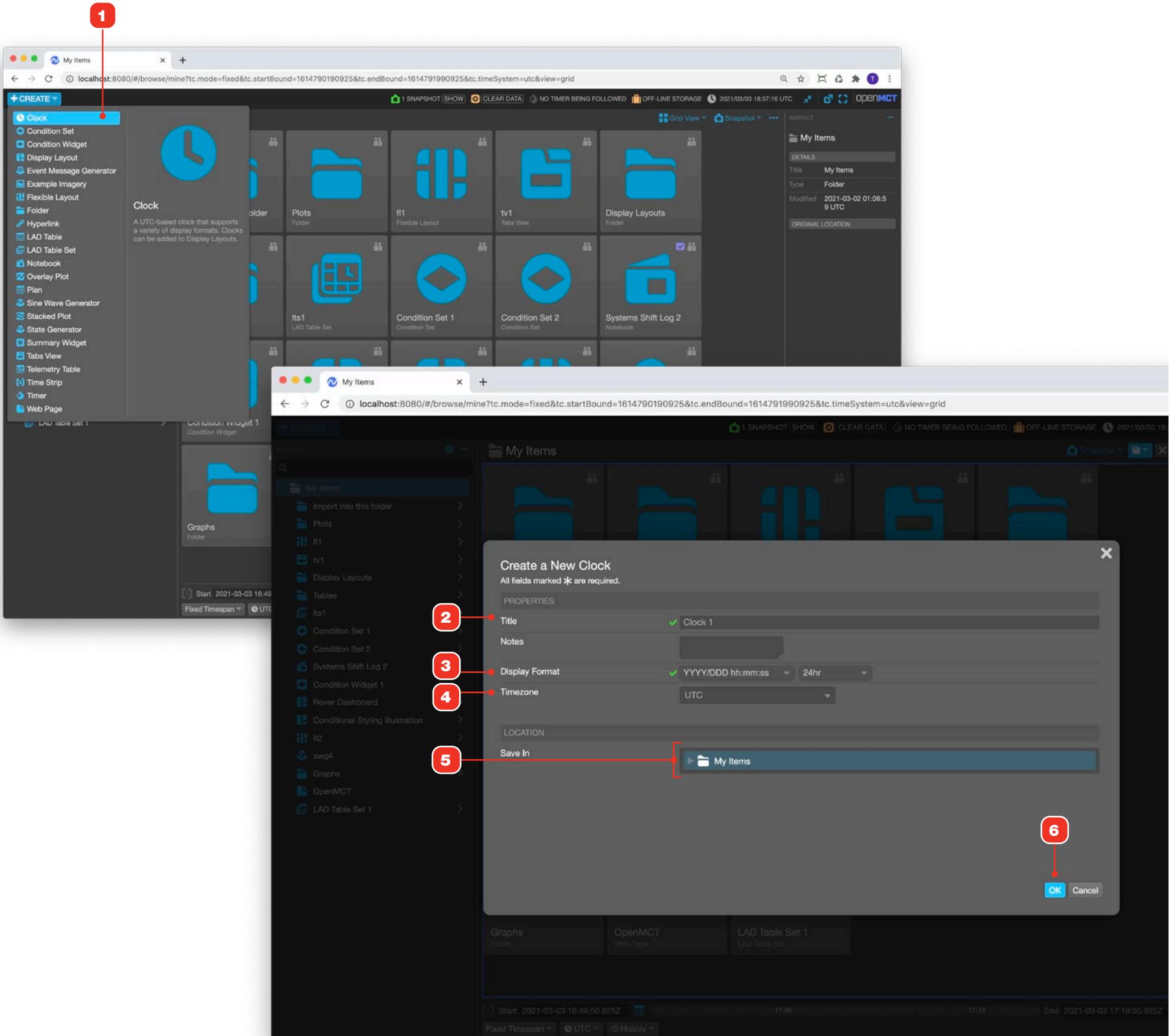
1 Enter a search term. Matching entries **2** will be displayed as you type.

3 The section and page that contain the entry will be displayed. Clicking the section or the page here will navigate to that part of the Notebook.

**4** To exit search, clear the entry field by clicking here.

Clocks
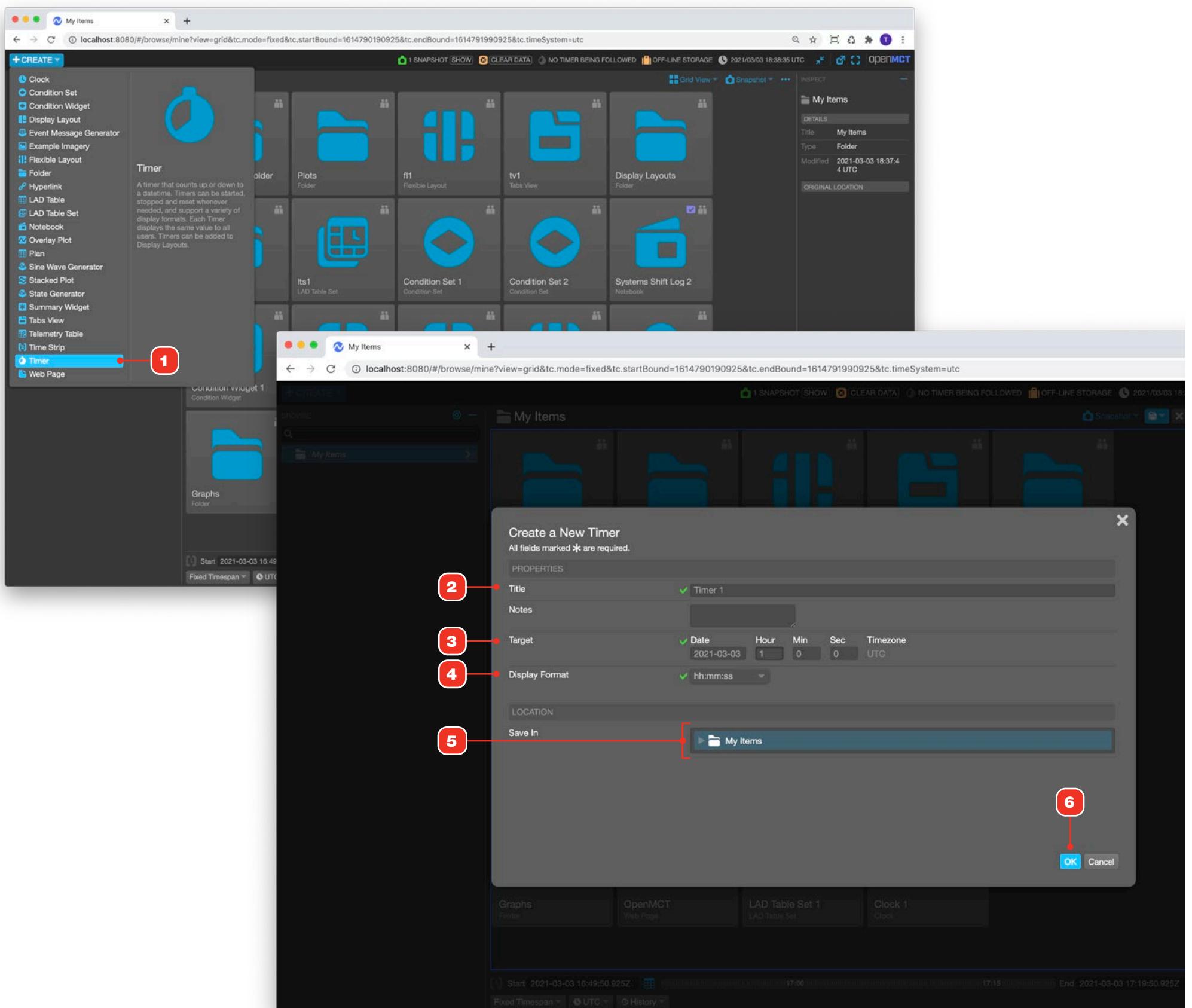
1 A Clock component can be added to Display Layouts and support a variety of display formats.

2 Create title for Clock object.

3 Select desired Display Format (YYYY/MM/DD hh:mm:ss, YYYY/DDD hh:mm:ss, or hh:mm:ss and choose between 12 hr or 24 hr clock format).

4 Select desired Timezone (Options include UTC, CET, CST6CDT, Etc/GMT, by Country/ Region, etc.).

5 Select a location to save Clock object.

6 Click "Ok" to save changes.
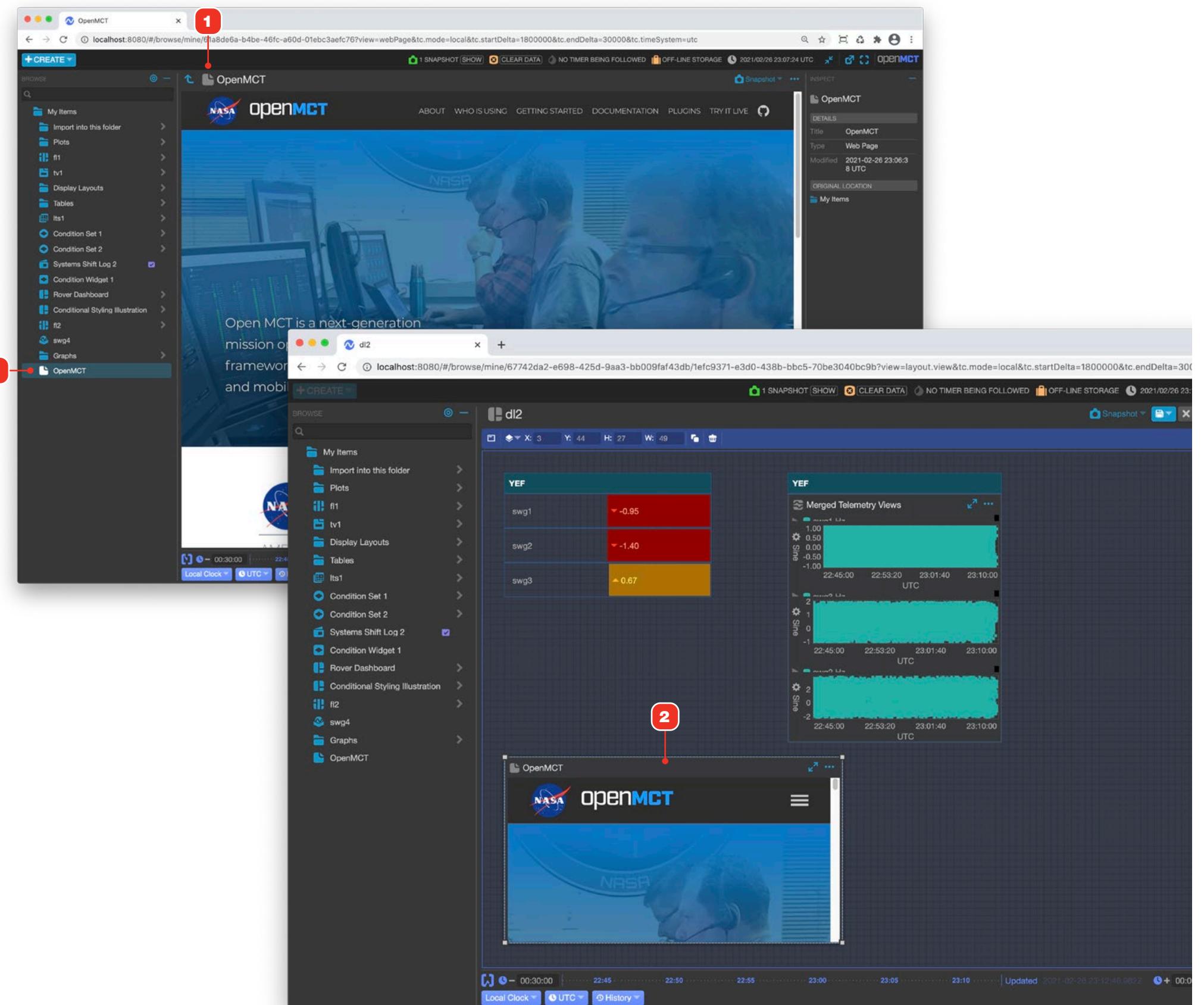
Timers

1 A Timer component allows you to create countdown or count-up timers targeted to a discrete datetime. Timers can be paused and restarted.

2 Create title for Timer object.

3 Select desired Dateframe.

4 Select Display Format (DDD hh:mm:ss or hh:mm:ss).

5 Choose location to save Timer object.

6 Click "Ok" to save changes.

Web Page

1 A Web Page component allows you to view and embed a Web page via its URL. Web Pages can be added as a positionable, resizable component **2** to a layout.

Edit a Web Page

For information on editing objects in general, see "Creating A New Object" on page 41.

1   Enter a title and full URL (including either http:// or https://) in the fields as shown.

2   Select a location to save your web page object.

3   Click "Ok" to save your changes.

IMPORTANT NOTE

The application displays web pages as objects using a technique known as "Iframe embedding" - some sites don't allow this. If you're sure you entered your URL correctly and your Web Page object displays a blank view, this may be why.