News since Qlik Sense 1.0 - Developers

Qlik Sense®
November 2022
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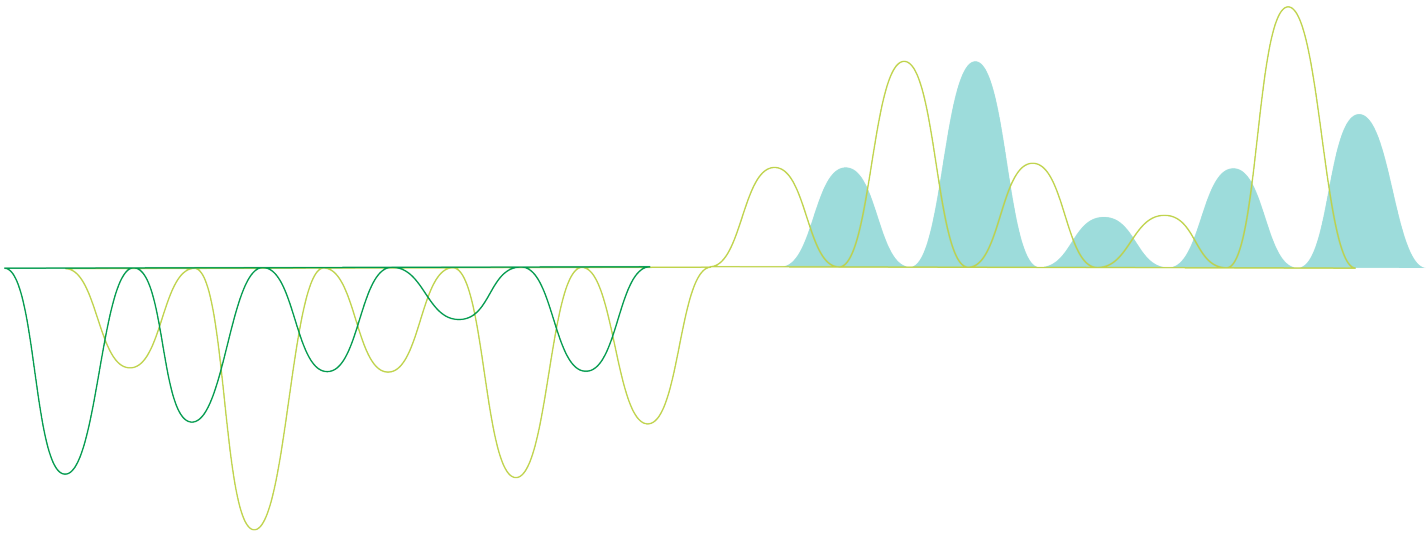

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1 What's new in Qlik Sense November 2022

This section provides Qlik Sense developers a summary of the features and improvements available in Qlik Sense Enterprise on Windows.

Business users, analytic creators, and data integrators should review the What's New section in the Qlik Sense Enterprise on Windows documentation set.

Qlik Sense administrators should review the What's New section in the Qlik Sense for Administrators documentation set.

There are no new features or changes in Qlik Sense developers help for this release.

2 What’s new in Qlik Sense August 2022

There are no new features or changes in Qlik Sense developers help for this release.

3 What's new in Qlik Sense May 2022

This section provides Qlik Sense developers a summary of the features and improvements available in Qlik Sense Enterprise on Windows.

Business users, analytic creators, and data integrators should review the What's New section in the Qlik Sense Enterprise on Windows documentation set.

Qlik Sense administrators should review the What's New section in the Qlik Sense for Administrators documentation set.

Custom theme settings include new styling for sheet title

Set the background color and gradient for sheet titles to help users tell the difference between public, private, and community sheets. By default, the background is transparent.

KPI background color and new icons

Users can now add background colors to KPI charts, giving them more flexibility when customizing visualizations. An extensive array of new icons has also been added to the existing icon set. You can now customize the properties for KPI objects in the following ways:

- Set the backgound color as a single color, a conditional color, and by expression.
- Use icons and conditional icons.

4 What's new in Qlik Sense February 2022

This section provides Qlik Sense developers a summary of the features and improvements available in Qlik Sense Enterprise on Windows.

Business users, analytic creators, and data integrators should review the What's New section in the Qlik Sense Enterprise on Windows documentation set.

Qlik Sense administrators should review the What's New section in the Qlik Sense for Administrators documentation set.

Nebula extensions for Qlik Sense

nebula.js is a collection of JavaScript libraries, visualizations, and CLIs that helps you build and integrate visualizations on top of the Qlik Associative Engine. With this update, as part of the recent release of the Nebula 2.0 library, you can generate a nebula visualization to use as an extension in Qlik Sense. This also allows you to generate a legacy extension to run in Qlik Sense before 2020.

5 What’s new in Qlik Sense November 2021

There are no new features or changes in Qlik Sense developers help for this release.

6 What’s new in Qlik Sense August 2021

6.1 Security updates

Updates to the underscore.js library

The underscore.js library that is exposed through the AMD module in the Qlik Sense client has been updated from version 1.5 to version 1.13. This change fixes a potential security issue with the underscore.js library, but it causes some breaking changes to extensions and mashups that use the library.

The following properties and methods are removed from the underscore.js library with version 1.13:

- `unzip` method is replaced by `_zip.apply(_,list)`.
- `_.escape` function no longer escapes `/`.
- `_.matches` function is replaced by `_.matcher`.

Underscore.js change log

7 What’s new in Qlik Sense May 2021

7.1 Conversational Analytics API

The API allows developers to build their own client for Insight Advisor Chat into both their apps and enterprise chat bot platforms, available where the chat add-on is included.

7.2 Combochart improvement API

Visualization properties have been added to the combochart to allow users to set different color settings for each measure.

`qMeasures>qDef>color`

8 What’s new in Qlik Sense February 2021

8.1 Insight Advisor Chat

In mashups: Chat can now be embedded in Qlik Sense mashups.

9 What’s new in Qlik Sense November 2020

9.1 Visual analytics and usability improvements

Images in custom tooltips

Users can now load custom images in tooltips for more styling options. They can feature an image from the media library or reference one by a URL. This offers further flexibility and enhanced options for app development, as images are a great way to provide additional context when hovering over an object. Custom tooltip properties have been updated for bar, line, pie, bullet, scatterplot, combo, and treemap charts.

Other chart improvements

- The ability to hide disclaimers in charts; a user can now decide whether the disclaimer for additional data points should be visible or not. The `showDisclaimer` property has been added to the bar, line, pie, scatter plot, treemap, distribution plot, and box plot chart properties.
- Extended functionality in table mini charts, including `others`, and `null`.

Usability look and feel

A new modern Qlik Sense theme for better-looking apps. It introduces a modern look and feel with clean styling options for color and font selections, ensuring apps have a fresh appeal by default and are consistent with the Qlik brand.

10 What’s new in Qlik Sense September 2020

10.1 Visual analytics improvements

Frequency counts in list box

You can show the frequency of each dimension value, which can be shown as an absolute number with Frequency count or as a percentage with Relative frequency (%). New property: **`qListObjectDef.frequencyEnabled`**

Hover icons toggle

You can turn off the hover menu for an object on a sheet so that it does not interfere with usage of the chart. This update applies to all chart types except button chart. New property: **`disableNavMenu`**

Border toggle for container object

You can control whether the borders of the objects inside a container will be shown or hidden. The setting applies to all charts inside the container. New property: **`borders`**

Improved reference lines

Bar and line charts now include dimension-based (vertical) reference lines with formatted labels, useful for enhancing charts with added detail along a time axis (such as start and end dates of important events) New property: **`dimRefLines`**

11 What’s new in Qlik Sense June 2020

11.1 Visualizations

Mini chart

In a straight table, you can now add a mini chart to a table cell. This mini chart is a small line chart that lets you measure across a second dimension.

New bullet chart

The new bullet chart is a custom-built gauge for displaying KPIs. The new bullet chart has extended customization and improved functionality. The new bullet chart replaces the bullet chart that was previously included as part of the visualization bundle.

Custom Tooltip enhancements

Improved custom tooltip options for the following chart types:

- barchart
- line chart
- pie chart
- map
- tree map
- combo chart
- scatter plot

11.2 Embedded analytics

Developer portal

Qlik Developer Portal is the new home for discovering, learning, and referencing APIs for the Qlik platform. In this initial release, the portal will include API reference documentation for the management of APIs in SaaS editions of Qlik Sense along with product tutorials available for public consumption. In addition, the Developer Portal includes reference and tutorials for Nebula.js and Enigma.js, Qlik's framework-agnostic libraries for integrating analytics.

Command Line Interface

Automate Qlik Sense into your DevOps processes with Qlik-CLI. Qlik-CLI enables IT administrators of Qlik SaaS editions and QSEoK to script administrative workflow into external batch processes, automate moving workloads to the cloud, and interact with application models to validate data all from a command line.

Nebula.js

Nebula.js 1.0 is a library for easily embedding Qlik into other web application and making custom visualizations. This release includes a command-line interface for making new visualizations compatible with all editions of Qlik Sense and access to an assortment of base-line visualizations from Qlik Sense through NPM to embed in projects.

12 What’s new in Qlik Sense April 2020

12.1 Normalization for bar chart, line chart, combo chart, and table

A normalization modifier has been added to the bar chart, line chart, combo chart, and straight table.

bar chart properties

line chart properties

combo chart properties

table properties

12.2 Sort by Y value in the pivot-table

The dimension values can now be sorted by the numeric value of the first measure. This sort order will affect all dimensions and have precedence before any other sort order defined under the dimensions.

pivot-table properties

12.3 Search in hyperlinks of straight table

You can now add a field containing the label and then add an expression containing the URL so that text in the label field can be searched instead of the URL.

table properties

13 What’s new in Qlik Sense February 2020

13.1 New action button

You can create a button that performs actions like applying a bookmark or locking a field. You can style the button background color and image, set a label and font size and color, as well as adjust border color, width, and radius.

button properties

13.2 Pivot table styling

Styling includes header font size and color, cell font size and color, text alignment and color of dimension values. Styling improves readability and gives users the power to create and customize the look and feel of Qlik Sense tables.

pivot-table properties

13.3 Table trend indicators

The straight table is being enhanced with graphical elements. The user can add conditional icons similar to the KPI object. Table indicators are useful for presenting trends and warning information and highlighting essential information.

table properties

13.4 Line chart styling

The line chart has been re-factored using our Picasso.js framework and, at the same time, we are exposing several highly desired features. The lines can be individually styled per measure or for the whole chart.

- Line thickness
- Line style: solid or dashed
- Line curve: smooth or straight
- Vertical presentation

linechart properties

13.5 Moving average and difference

Two new modifiers are added to the Bar, Line, Table, and Combo chart. The new modifiers support full moving average and difference in steps, for instance rolling 12 months average. The modifier concept provides a quick and easy way to add another level to any expression. The generated expressions are available for

inspection copy and edit.

barchart properties

linechart properties

table properties

combochart properties

13.6 Extended font family selection

The new theme setting allows developers to set the font family for text in Qlik Sense charts.

Creating themes with custom fonts

14 What’s new in Qlik Sense November 2019

Table styling

This feature gives the app developer more control over the style, look and feel when creating tables, including:

- Options to style the straight table
- Theme properties
- Header font size and color
- Cell font size and color
- Center align columns

Improved Accumulation in bar chart, line chart, combo chart, and table

- The Accumulation modifier in the Visualization API lets you accumulate values of your measures in a bar chart, line chart, combo chart and table.
- Accumulation can be made over the whole dimension or in a finite number of steps

enigma-go

The stability index of the open source library has changed from Experimental to Stable.

enigma-go library

Mekko chart

The Mekko chart has been added to the list of supported chart types.

Mekko chart properties

15 What’s new in Qlik Sense September 2019

15.1 Pie chart styling

This release features new styling options for the pie chart in the same fashion as the bar chart. These include the ability to tune the pie chart outline width, color, corner radius and inner radius, which gives the user a variety of options to improve the style, look, and feel of the chart. This helps customers moving from QlikView to Qlik Sense and reduces the need for mashup and extension development.

Qlik Sense pie chart styling

15.2 CSRF security

Cross-site request forgery (CSRF) is when someone attacks a user’s web application by taking advantage of that user’s authentication. To ensure that Qlik Cloud and Qlik Sense Enterprise on Kubernetes APIs are protected against CSRF security risks, Qlik has implemented token-based anti-CSRF security for its APIs.

16 What’s new in Qlik Sense June 2019?

16.1 Native container object

A new container object allows you to add Qlik Sense visualizations in a limited space by using tabs to switch between the visualizations.

Qlik Sense container properties

16.2 Improved bar chart styling

Qlik Sense now offers a greater degree of flexibility when it comes to bar chart styling such as stroke color and width, bar width, number of bars, scrollbar, labels, and more.

Qlik Sense bar chart properties

17 What's new in Qlik Sense April 2019?

17.1 APIs

Audit

The Qlik Sense audit service API is responsible for logging system events in a cloud environment.

Qlik Sense audit service API

Reload

The Qlik Sense reload service API enables the automation of tasks related to shared app reloads in a cloud environment.

Qlik Sense reload service API

17.2 Mashups

Mashups are now supported in a Qlik Sense Enterprise on Kubernetes environment.

Deploying your mashup to Qlik Sense Enterprise on Kubernetes

18 What’s new in Qlik Sense February 2019?

For a list of new features in Qlik Sense February 2019, see: What’s new in Qlik Sense February 2019?.

19 What’s new in Qlik Sense November 2018?

19.1 AngularJS version

AngularJS framework upgraded to version 1.7.2, which provides better stability and compatibility.

Using AngularJS in visualization extensions

20 What’s new in Qlik Sense September 2018?

20.1 AngularJS version

Open source front end framework upgraded to version 1.6.9, which provides better stability and compatibility.

Using AngularJS in visualization extensions

21 What’s new in Qlik Sense June 2018?

21.1 Webpack

Webpack is now used to bundle the client which will make it possible to improve future load times as well as modernizing the code base.

This may affect unsupported extensions and cause them not to render.

Extensions that use supported APIs will continue to work as before.

21.2 Export / Import an App with or without data

Updated endpoint

The query parameter "name" has been removed from the QRS API endpoint /qrs/app/{id}/unpublish?name={name}.

21.3 Support for promote/demote in QRS

New endpoints

Two new endpoints were added to approve and disapprove app objects: "/qrs/app/object/{id}/approve" and "/qrs/app/object/{id}/unapprove".

22 What’s new in Qlik Sense April 2018?

22.1 Picasso.js

The picasso.js charting library, which is streamlined for building custom, interactive, and powerful visualizations for the Qlik Sense Analytics platform, is now open source.

https://github.com/qlik-oss/picasso.js

22.2 Mashups in offline Qlik Sense Desktop configurations

Support for accessing web applications while being offline has now been added. The documentation includes best practices for creating and running web applications in an offline Qlik Sense Desktop configuration.

Mashups in offline Qlik Sense Desktop configurations

23 What’s new in Qlik Sense February 2018?

23.1 ODAG REST service API

API reference

The ODAG REST service enables on-demand creation of Qlik Sense apps. With this feature, Qlik Sense developers can build mashups (and other applications) that directly access the ODAG service API.

Qlik Sense ODAG service API

23.2 Widgets and extensions

Styling an app with custom themes

You can now create custom themes to style an app on a global or granular basis:

- Change colors.
- Add images and backgrounds.
- Specify fonts, font sizes, font weights and font styles.

Custom themes

24 What's new in Qlik Sense November 2017?

24.1 Engine API

New method: GetBaseBNFString

A new method has been added that gets the current Backus-Naur Form (BNF) grammar of the Qlik engine scripting language, as well as a string hash calculated from that grammar.

New method: GetFieldValues

A new method has been added that retrieves the values of a field.

New struct: BookmarkFieldPage

A new definition has been added that defines the range of the bookmark fields that are returned

24.2 Creating visualizations on the fly

New and updated examples

New and updated examples of how to create visualizations on the fly using the Visualization API and the qlik-visual web-component has been added to the documentation. The documentation now include examples for creating any supported visualization type on the fly.

Creating visualizations on the fly

New visualization type: listbox

A new visualization type has been made public, the list box, which is the most basic sheet object. It contains a list of all possible values of a specific field.

Visualization API: listbox properties

qlik-visual: listbox properties

Create visualizations on the fly: listboxes

24.3 Capability APIs

ODAG navigation bar updates for getObject method

The **`app.getObject`** method has been updated to support the On-demand App Generation (ODAG) navigation bar.

app.getObject method

getProductVersion method deprecated

The **`global.getProductVersion`** method has been deprecated. Use About API: System info: Get instead.

golbal.getProductVersion method

New struct: BookmarkFieldPage

A new definition has been added that defines the range of the bookmark fields that are returned

25 What's new in Qlik Sense September 2017?

25.1 Visualization API

New visualization type: Waterfall chart

You can now illustrate how an initial value is affected by intermediate positive and negative value with the new waterfall chart. For example, you can show the positive and negative contributions of different accounts in an income statement.

Waterfall chart properties

25.2 Engine API

Hierarchical data API

A new hierarchical data API enables a definition that more closely reflects the visual representation of data.

Benefits of the new API:

- Ensures little to no manipulation or transformation of data structure in the front end.
- Simplifies the creation of charts.
- Enables more powerful and dynamic charts.

GetHyperCubeTreeData method

26 What's new in Qlik Sense June 2017?

26.1 File type filtering

To improve security, APIs have been introduced that enable you to specify which file types and file extensions are permitted to be uploaded to a static content library.

- App content: Get file extension whitelist
- File extension: Add
- File extension: Delete
- File extension: Get
- File extension whitelist: Get
- File extension whitelist: Update

26.2 Analytic connections

New analytic connection APIs have been introduced to manage server-side extensions that extend the Qlik Sense expression library and support calls to third-party engines.

The QRS API includes the following new endpoints:

- Analytic connection: Create
- Analytic connection: Delete
- Analytic connection: Get
- Analytic connection: Update

26.3 Creating apps on the fly

New APIs have been introduced to create session apps:

- qlik.sessionApp method
- qlik.sessionAppFromApp method
- setScript method
- getScript method

Create apps on the fly

27 What's new in Qlik Sense 3.2?

27.1 Create custom themes as extensions

This feature is delivered as BETA in this release.

Themes are used to style your Qlik Sense apps and you can create your own custom themes based on your company standards.

When you have created a custom theme, you store it in Qlik Sense as an extension. The JSON file and any additional resources, such as CSS files, are zipped and imported as an extension in the Qlik Management Console (QMC). This enables governance in the QMC and security rules can be added for controlling which themes specific users have access to.

Widgets and extensions: Custom themes

27.2 Custom components

- Custom components are now officially supported.
- You must update custom components created and used in widgets before version 3.2.
- You can now have several versions of the same custom component in Qlik Sense.
- You must now define the dependency between widgets and the custom components they are using.

Custom components

27.3 enigma.js

This feature is delivered as EXPERIMENTAL in this release.

enigma.js is a client library that communicates with Qlik Sense backend services. It can be used in a browser or in a Node.js environment. You can use enigma.js as an SDK or do CRUD (that is create, read, update and delete) operations on apps and on app entities.

enigma.js is an open source library, developed on GitHub. The version of enigma.js used in Qlik Sense 3.2 is experimental. Visit GitHub for the latest version, or if you want to contribute to the library.

API reference: enigma.js

27.4 leonardo-ui

This feature is delivered as EXPERIMENTAL in this release.

leonardo-ui is an open source library which is used within Qlik Sense, providing a variety of graphical UI components. The markup of these components can be used in extensions, mashups, and widgets. The library is maintained and supported by Qlik.

In addition to the standard leonardo-ui components, Qlik Sense comes with some additional angular leonardo-ui components. These components are not included in the documentation found on GitHub.

The version of leonardo-ui used in Qlik Sense 3.2 is experimental. Visit GitHub for the latest version, or if you want to contribute to the library.

API reference: leonardo-ui

27.5 QlikView converter

The QlikView converter simplifies the work associated with converting elements from a QlikView document into master items in a Qlik Sense app. Visualizations, expressions, dimensions, and variables can be selected for conversion. The tool is available from the Dev Hub.

Using the QlikView converter to create a Qlik Sense app

28 What's new in Qlik Sense 3.1?

28.1 Custom components

Custom components are small, self-contained elements of code (JavaScript and CSS) that can be used and re-used when building widgets. Custom components make it easier for the widget designer to include sophisticated UI items such as sliders, date-pickers, and tabs because no JavaScript programming is required: the components are ready-made. The custom components are added to widgets in a declarative way.

This feature is published as BETA in this release.

28.2 Qlik Sense Repository Service API

New interpretation of SchemaEvent date properties

The interpretation of the `startDate` and `expirationDate` properties of the `SchemaEvent` entity has changed. Previously these properties represented a date and time stamp including offset. The time zone (in IANA/Olson format) is now stored in a separate property (called `timeZone`). In addition, the new property `daylightSavingTime` now indicates whether daylight savings is observed (valid values are "`ObserveDaylightSavingTime`", "`PermanentStandardTime`", "`PermanentDaylightSavingTime`"). The QRS API will continue to accept offsets, but we recommend that you update your code to use the new properties because the support of offsets will be removed in a future release.

28.3 Widget editor

New widget components in the properties panel builder

You can now use the Widget editor to add two more types of graphical interface components to your widgets: **Radio buttons** and **Switch**. These are included as available components in the properties panel builder under **Items**.

28.4 Qlik Explorer for developers

- Templates.

  It is now possible to create custom templates where you can define code snippets that suit your specific needs. This feature replaces the "Mode" feature that was available in the tree view in earlier releases.
  For more information about Templates, see Templates

- Actions have been removed from the tree view.

Actions are now listed in the Code tab along with other snippets, instead of being represented as separate nodes in the tree view.

- New design of Code tab.

  The Code tab and the use of Drag-and-Drop from the tree view has been redesigned to fit the new template concept. Drag-and-drop from the tree will always yield the ID of the node irrespective of the currently selected template. All other snippets are accessed from the Code tab where you can switch between snippets from different template.

29 What's new in Qlik Sense 3.0?

29.1 Dev Hub

Create and edit widgets with the Widget editor

Dev Hub contains a new tool: Widget editor. You use the Widget editor to create and edit widgets. Qlik Sense widgets are simple app objects created using HTML and CSS but no other programming knowledge.

Widgets, like other visualization extensions, are used to customize the behavior and appearance of sheets and visualizations. Because widgets do not require JavaScript programming, they are intended for creating objects that do not require advanced calculations or the use of external libraries, such as KPI objects, simple charts, and tables.

A widget must belong to a widget library. An example library is supplied Qlik Sense. Widget libraries are managed from the Widget editor. Widget libraries appear in the assets panel under custom objects alongside visualization extensions.

Introduction to widgets

29.2 Exporting and printing of visualization extensions

You can now export and print visualization extensions.

Enabling export of your visualization extension

To support this, the following properties have been added to the Extension API:

- export property
- exportData property

The following property has been updated:

- snapshot property

29.3 .NET SDK

Connect to Qlik Sense through a method instead of process ID

Support for setting up a Qlik Sense connection based on a process ID is now deprecated. A number of symbols have therefore been marked as deprecated and will be removed in future versions of the .NET SDK. Instead of using a process ID, you now connect to local engine instances using the method `Qlik.Engine.Location.FromUri` and explicitly specifying the relevant URI.

The following symbols have been marked as obsolete:

- Class `Qlik.Engine.UriResolver`
- Method `Qlik.Engine.UriResolver.QlikEngineUrl`
- Method `Qlik.Engine.UriResolver.GetEnginePids`

- Method `Qlik.Engine.Location.FromProcess(int processId)`
- Method `Qlik.Engine.Location.FromProcess(Process process)`

.NET SDK – API reference

New property to perform version checks

The class `Qlik.Engine.Location` now has a new property named `IsVersionCheckActive` that determines whether or not to perform version checks when connecting to a Qlik Sense instance. This means that it is possible to verify the version check setting for all connections to a specific `Location`object. You can still use the parameter `noVersionCheck` for connection methods such as `Qlik.Engine.LocationExtensions.HubAsync` to override the version check setting of the Location object.

.NET SDK – API reference

New mechanism for properties and layout caching

Generic objects have previously had a mechanism for caching properties and layouts so that engine calls to retrieve that data only would be made if the object is considered dirty. This mechanism has been generalized, and is now available for all classes that supports the properties/layout behavior. The following classes utilize this mechanism:

- GenericBookmark
- GenericDimension
- GenericMeasure
- GenericObject
- GenericVariable

.NET SDK – API reference

29.4 Qlik Engine JSON API

New structs

- CPUUsage
- MemoryUsage
- HealthcheckStatus
- Range
- SelectInfo
- NxContinuousRangeSelectInfo
- NxTickCell
- NxAxisTicks

- NxAxisData
- NxContinousDataOptions

Updated structs

- NxAttrExprDef

  New property: qLibraryId

- NxAttrExprInfo

  New properties: qMin and qMax

- NxPivotDimensionCell

  New property: qAttrExps

- NxDerivedFieldsData

  New property: qTags

- NxDimensionInfo

  New properties: qMin, qMax, qContinousAxes, qIsCyclic, qDerivedField

New methods

- GetListObjectContinuousData method
- SelectListObjectContinuousRange method
- SelectHyperCubeContinuousRange method

29.5 Single Integration API / Single configurator

New option parameter: noSelections

Added option for turning off selections but still being able to keep interactions enabled. Before this update, you had to disable all interactions in order to turn off selections.

29.6 Qlik Sense Proxy Service API

Personal API: Get user

Updated return values. This API now returns more detailed JSON values that specify whether a user is logged in, not logged in, or logged in anonymously.

29.7 Qlik Sense Repository Service API

App: Get hub information

New endpoint.

App: Get hub list

New endpoint.

App content quota: Get

New endpoint.

App content quota: Update

New endpoint.

Access type: Request access type

Removed endpoint.

Shared content: Delete content

New endpoint.

Shared content: Upload file

New endpoint.

New entities and properties for future use

The following entities and properties are for future use. Do not use these items.

- `CloudAppSyncStatus` entity
- `CloudCredentials` entity
- `CloudStreamSyncStatus` entity
- `DeleteProhibited` property of the `User` entity
- `timeZone` and `daylightSavingTime` properties of the `SchemaEvent` entity

29.8 Plugins

Improved connection handling

The Visual Studio plugin now also supports connecting to a Qlik Sense serverwith credentials other than the logged-on user or anonymous mode.

30 What’s new in Qlik Sense 2.2?

30.1 Dev Hub

Dev Hub accessible from the Hub

The Dev Hub can now be accessed from the Hub menu.

New UI for Engine API Explorer

The Engine API Explorer has a completely new UI for an enhanced user experience.

Deprecated links and their replacements

All the links to tools and pages that previously contained "workbench" now refer to "dev-hub". URLs containing "workbench" are deprecated. Use "dev-hub" in the URL instead, as shown in the following list:

- Start page:
  - Deprecated: *http[s]://<servername>:<port>/workbench*
  - Use instead: *http[s]://<servername>:<port>/dev-hub*
- Protocol tester (renamed to Engine API Explorer in 2.1.1):
  - Deprecated: *http[s]://<servername>:<port>/workbench/protocoltester.html*
  - Use instead: *http[s]://<servername>:<port>/dev-hub/engine-api-explorer*
- Extension editor:
  - Deprecated: *http[s]://<servername>:<port>/workbench*
  - Use instead: *http[s]://<servername>:<port>/dev-hub/extension-editor*
- Mashup editor:
  - Deprecated: *http[s]://<servername>:<port>/workbench*
  - Use instead: *http[s]://<servername>:<port>/dev-hub/mashup-editor*
- Single configurator:
  - Deprecated: *http[s]://<servername>:<port>/workbench/single*
  - Use instead: *http[s]://<servername>:<port>/dev-hub/single-configurator*

30.2 Mashups

Create visualizations on the fly

Qlik visual is a custom element that displays visualizations on, for example, a web page. You can display existing visualizations, or you can create and display new ones on the fly.

Creating visualizations on the fly means that the Qlik Sense app does not need to contain any visualizations and they can now be created programmatically in your web page code without having to be built in the Qlik Sense UI first.

Create extensions on the fly

The `registerExtension` method allows you to register a visualization extension in a mashup without installing it on the Qlik Sense server. After it has been registered, it is free to use within the mashup just as if it was installed on the server. This means that you can distribute mashups, including the extensions being used, as one package.

App Integration API

The App Integration API provides parameters that can be used to create an URL that returns a complete HTML page containing the embedded app. This URL can be embedded in a web page, for example by including it in an iframe.

It allows you to pass parameters to an app and to open an app with one or several selections applied.

Selection API

The Selection API allows developers to work with the selection state data returned from Qlik associative engine without having a deeper knowledge of internal constructs.

Non-clashing CSS frameworks

The new Qlik styles replaces the old qlikui and client styles and Qlik Sense now support styles included by a number of common CSS frameworks.

Improved qlik-styles.css

The qlik-styles-css has been optimized leading to faster loads of mashup based solutions.

30.3 .NET SDK

Asynchronous

Asynchronous behavior is improved, especially during the setup of connections to the engine.

Deserialization

A bug relating to deserialization of messages containing binary data from the engine has been fixed. Deserialization of such data could, in some cases, fail, causing the Qlik Sense Desktop to return the value null for the entire instance. An example of a data structure where this problem could occur is the class **`DocProperties`**, which has several binary data properties, including the property **`WallpaperPic`**.

Constraints on NuGet dependencies

You can now use more versions of the NuGet package, the following range of versions are supported:

- Newtonsoft.Json: 6.0.1 – 7.0.1
- Autofac: 3.5.0 – 3.5.2

Updates

The classes **`KpiProperties`** and **`KpiLayout`** (and the associated interfaces) no longer have a property named **`KpiLink`**. It has been replaced by a new property of type string called **`SheetLink`**.

30.4 Qlik Engine JSON API

Export data from pivot tables

You can export data from pivot tables.

Enhanced sorting in pivot tables

You can now sort by the values of a measure in a pivot or stacked pivot table.

Updated API for the search

New method: SearchResults.

30.5 Qlik Sense Repository Service API

Conflict handling

Added information on conflict handling when updating entities in the Qlik Sense Repository Service (QRS).

License rule audit: Get audit rules matrix

New endpoint.

Security rule audit: Get audit rules matrix

New endpoint.

Synchronization rule audit: Get audit rules matrix

New endpoint.

Data market: Add license bundle

New endpoint.

Data market: Get terms acceptance

New endpoint.

Printing service: Get local printing service

New endpoint.

Server node configuration: Get local

New endpoint.

App: Upload app

Removed the `{replace}` parameter.

App: Import app

Removed the `{replace}` parameter.

Access type: Request access type

Updated the `AccessTypeRequest` in the body.

Notification: Add change subscription

Added an example of how to use notifications.

Engine service: Get local engine service

Updated the return value.

Service registration: Add server node configuration

Removed endpoint.

Access type: Add User access type by selection

Removed endpoint.

30.6 Qlik Sense User Directory Connector API

Generic LDAP

Added information that the settings for generic LDAP are case-insensitive.

30.7 Plugins

Qlik Analytics plugin for Visual Studio

The Visual Studio plugin is a development toolbox created to simplify the process of integrating Qlik Sense functionality into other environments. Qlik Analytics for Visual Studio provides quick access to relevant information from your Qlik Sense environment, which for instance makes it easy to integrate Qlik Sense visualizations into an existing web site.

31 What’s new in Qlik Sense 2.1?

Here are some of the highlights of the new and updated features in the release of Qlik Sense 2.1:

Dev Hub replaces Qlik Sense Workbench	Dev Hub replaces Qlik Sense Workbench.
Various API updates	Capability APIs replace Mashup APIs. Navigation API and Table API introduced. Updates to Variable API.
Building server tools	Various updates to Qlik Sense Repository Service API.
Building clients	Qlik Engine JSON API: improved usability of variables.
Creating .NET applications	The Qlik Sense .NET SDK is now publicly available on NuGet. Collaborative code samples provided in Qlik branch.

31.1 Building visualization extensions and mashups

Dev Hub

Dev Hub replaces Qlik Sense Workbench

Dev Hub replaces Qlik Sense Workbench.

New UI layout for code editors

The Extension editor, the Mashup editor, the Single configurator have had their UIs updated. The Protocol tester has been renamed to Engine API explorer.

Building visualization extensions

New visualization tutorials

Two new tutorials have been added for building visualization extensions: Working with data (Hello-Data) and Using AngularJS in visualization extensions (Hello-AngularJS).

Loading resources

The topic about loading resources has been improved.

APIs

Capability APIs replace Mashup APIs

The term Capability API is introduced with Qlik Sense 2.1. Some of the Capability APIs were available before this version, published under the name Mashup API.

Navigation API

Navigation API for Qlik Sense. The Navigation API allows navigation within a Qlik Sense app and is meant to be used in visualization extensions and will not work in Mashup scenarios.

Table API

The Table API allows developers to work with tabular data returned from the Qlik associative engine without needing to have expert knowledge of internal constructs, such as a hypercube.

Variable API updates
The following methods have been added to the Variable API: createSessionVariable method, get method, getByName method, setNumValue method, and setStringValue method.

The following method has been deprecated: setContent method.

31.2 Building server tools

Qlik Sense Repository Service API

App content: Upload file
New endpoint.

App content: Delete content
New endpoint.

Content library: Upload file
The endpoint is no longer restricted to the central node in a Qlik Sense site.

Content library: Delete content
The endpoint is no longer restricted to the central node in a Qlik Sense site.

Connecting with Node.js
Updated code example.

31.3 Building clients

Qlik Engine JSON API

Create, edit and remove generic variables
Work on variables has been performed in order to make it more consistent with the other types of objects.

Content libraries
Content libraries can be retrieved from the Qlik Sense repository or from the disk, depending on the Qlik Sense installation.

New name for the protocol tester
The protocol tester is renamed engine API explorer.

31.4 Creating .NET applications

Qlik Sense .NET SDK

NuGet
The Qlik Sense .NET SDK is now publicly available on NuGet.

Collaborative code samples

Qlik branch is a collaborative portal where users can share code samples. They are provided on as is basis, without any guarantees that they will work in all system configurations or future software releases. An example of such sample code is the `QlikSenseScriptObfuscator`.

Qlik Sense .NET SDK code samples

The purpose of the sample code provided by Qlik is to demonstrate capabilities and use cases of the API. They are provided on an as-is basis, without any guarantees that they will work in all system configurations and future software releases.

- Abstract structure

  The purpose of this sample is to provide a feature that makes it possible for the user to state explicitly and dynamically how to interpret a JSON object in the form of a C# class.

- App traverser

  The purpose of this sample is to see what visualizations an app contains by traversing it.

The Qlik Sense .NET SDK now supports:

Variables

Signed DLL:s

The Qlik Sense .NET SDK DLL:s are signed from version 2.1

32 What’s new in Qlik Sense 2.0?

32.1 Building visualization extensions and mashups

Dev Hub

Search in Dev Hub
Users can now search visualization extensions and mashups for filtering purposes.

Support for multiple users
The Extension editor and the Mashup editor now support if multiple users are editing the same file.

Language support in Single configurator
You can now use the Single configurator to override the default language of Qlik Sense.

Embed code functionality in Single configurator
You can now use the Single configurator to embed auto-generated iframe HTML code.

APIs

Language support in Single Integration API
The Single Integration API can now be used to select the language, overriding the default language of Qlik Sense.

Pivot table support in Backend API
The Backend API now has added support for pivot tables.

Language support in Mashup API
The Mashup API can now be used to select the language, overriding the default language of Qlik Sense.

32.2 Building server tools

Qlik Sense Proxy Service API

Proxy settings
Information has been added on the proxy settings in the repository database, and on how to configure virtual proxies.

Qlik Sense Repository Service API

SAML: Metadata download (call 1 of 2)
New endpoint.

SAML: Metadata download (call 2 of 2)
New endpoint.

Select format when exporting certificates
Added the ExportFormat parameter.

Port added
Added port 4239.

Return attribute values from a specific selection set
Added the optional `{selection}` parameter.

License rule: Get associated rules
Endpoint deleted.

Security rule: Get associated rules
Endpoint deleted.

Synchronization rule: Get associated rules
Endpoint deleted.

Preview create privilege
New endpoint.

App object: Publish
New endpoint.

App object: Unpublish
New endpoint.

App: Migrate
New endpoint.

App: Get state
New endpoint.

Certificate installation: Install certificate
New endpoint.

Certificate installation: Setup ping
New endpoint.

Custom: Get custom
Endpoint deleted.

Synchronization: Create snapshot
New endpoint.

User: Synchronize user
New endpoint.

About API: Get all defaults
New endpoint.

About API: Get type
New endpoint.

About API: Get description
New endpoint.

About API: Get relations
New endpoint.

About API: Get enums
New endpoint.

Data market: Get license
New endpoint.

Data market: Add license
New endpoint.

Data market: Update license
New endpoint.

App content: Upload file
New endpoint.

App content: Delete content
New endpoint.

32.3 Building clients

Qlik Engine JSON API

App migration
Apps created in a previous version of Qlik Sense are now automatically migrated to the current version of Qlik Sense.

ProductVersion method
The ProductVersion method replaces the QvVersion method, which is now deprecated. Both methods belong to the global class.

Association analysis
The associations between the fields of two tables can be retrieved.

GetAppEntry method
The GetAppEntry method retrieves the meta data of an app.

Images can be embedded in a qvf file
Images can be embedded in qvf files. For example, you can add a thumbnail in a qvf file or embed an image in a generic object.

GetEffectiveProperties method
The GetEffectiveProperties method returns the identifier, the type and the properties of an object.

If the object contains some soft properties, the soft properties are returned.

If the object is linked to another object, the properties of the linking object are returned.

Adaptive grid
When a generic object with two measures and one dimension contains a lot of data, groups of points (i.e cells) can be rendered instead of points.

A zone of interest can be refined (for zooming in) up to a maximum refinement level or coarsened (for zoom out).

The grid of cells is adaptive (not static), meaning that it adapts to different length scales.

Session apps
Session apps can be created. The session apps are not persisted.

You can create an empty session app or create a session app from a source app.

Improved search
In the previous version of Qlik Sense, the searched selections always erased the current selections. Now, it is possible to keep the current selections and add the searched selections on top.

A search context has been added and the behavior of the search depends on this search context.

The *SoftLock* parameter of the *SelectAssociations* method is deprecated and should not be set.

DoReloadEx method
Reloads the script that is set in an app and returns the path to the script log file.

CustomConnector struct
New property *qMachineMode*.

HyperCube struct
New properties *IndentMode* and *LastExpandedPos*.

ImportAppEx method
Imports an app to the Qlik Sense repository. The connections in the app can be excluded from the import.

32.4 Creating .NET applications

Qlik Sense .NET SDK

The Qlik Sense .NET SDK now supports:

- Pivot tables
- Maps
- Data Storytelling

  The Qlik Sense .NET SDK now supports Data storytelling, including snapshots. You can now do the following: get, destroy, create, and update storytelling objects.

  SlideItem properties classes have been added for the following: text paragraph slide item, text title slide item, shape slide item, image slide item, and snapshot slide item .

- Calculation conditions

Code samples
The purpose of the sample code provided by Qlikis to demonstrate capabilities and use cases of the API. They are provided on an as-is basis, without any guarantees that they will work in all system configurations and future software releases.

- App preload

  The purpose of this sample is to show how the Qlik Sense .Net SDK can be used to achieve fast load times when large apps are opened in the client for the first time.

- Custom desktop

  The purpose of this sample is to show how the Qlik Sense .Net SDK can be used to create a custom desktop than launches Qlik Sense as a background process and provides a simple custom GUI for interacting with it.

Improved property access implementation in abstract structure

The Qlik Sense .NET SDK now comes with an improved property access implementation in abstract structure. Instead of casting a generic invalid type cast exception when accessing the same property as two different types, the SDK will try to use the abstract structure type cast operation, and if it fails, cast a custom exception type that points to the root cause of the failure.

Improved handling of paging in hypercube and list objects

The Qlik Sense .NET SDK now comes with an improved handling of paging in hypercube and list objects.

The following class is obsolete:

Qlik.Sense.Client.Visualizations.MapComponents.PolygonLayer

Replaced with:

Qlik.Sense.Client.Visualizations.MapComponents.Polygon3Layer

33 What’s new in Qlik Sense 1.1?

Here are some of the highlights of the new and updated features in the release of Qlik Sense 1.1:

- Dev Hub is now available in a Qlik Sense installation
- Snapshots can now be included in mashups.
- Qlik Sense .NET SDK: Support for multiple hyper cubes and list objects in generic objects

33.1 Building extensions with Dev Hub

Dev Hub

Available in a Qlik Sense installation

Dev Hub is now available in a Qlik Sense installation as well as in a Qlik Sense Desktop installation.

Mashup editor

Redesign of the Mashup workbench

Mashup workbench has been re-designed to make it easier to use the generated mashup as a start for more advanced mashups.

Simplified selection making

Making selections programatically in your mashup is simplified by an easier syntax for the Mashup API method selectValues.

Closing session, app connection and web socket

You can close and discard the Session objects created in your mashup. Use the destroySessionObject method in the Mashup API.

You can also close the app connection which also closes the web socket. Use the close method in the Mashup API.

Snapshot support in mashups and single configurator

Snapshots can now be included in your mashups.

- getSnapshot method added to Mashups API.
- Snapshots library added to the Assets panel in Mashup workbench.

Support for code completion

Code completion is now supported in the Mashup workbench.

Master objects in Single configurator

You can now use master objects in single configurator.

Upgrade consideration - new path to require.js

The path to *require.js* has changed. The new path is */resources/assets/external/requirejs/require.js*.

Upgrade consideration - qirby.css name change

The css file *qirby.css* has changed name to qlikui.css and the path is */resources/autogenerated/qlikui.css*.

33.2 Building server tools

Qlik Sense Proxy Service API

X-Qlik-User header changed

Both `<directory>` and `<userid>` must be URL-encoded representations of UTF-8 values.

Code example updated

The code example in the help topic *Connecting to the QPS API using certificates* has been updated.

Port added

Port 4248 has been added.

Qlik Sense Repository Service API

Extension: Create extension with schema

New endpoint.

Extension: Delete extension by name

New endpoint.

Extension: Create or update a file in an extension

New endpoint.

Extension: Delete a file from an extension

New endpoint.

Notification: Add change subscription

Previously referred to as "Notification: Add event listener".

Added new optional parameters: `{changeType}` and `{propertyName}`.

Updated the description of the `{filter}` optional parameter.

Notification: Remove change subscription

Previously referred to as "Notification: Delete event listener".

Security rule audit: Get accessible objects

Changed the return value from `List<IExternalRepositoryObject>` to `List<IRepositoryObject>`.

Ports overview

Added port 4248.

33.3 Building clients

Qlik Engine JSON API

Set dimension limits in pivot tables

Customize OtherTotalSpecProp in the definition of the pivot table to set some dimension limits.

Open an app without loading its data
New parameter *qNoData* to toggle the behavior of the engine when opening an app. If set to true, the app is opened without its data.

Check that a number is correct according to the locale
New CheckNumberOrExpression method.

Replace an object that is published
New methods: CreateDraft method, CommitDraft method and DestroyDraft method.

NxDimension struct
Some properties have changed.

RangeSelectHyperCubeValues method
Added *qColumnsToSelect* parameter to the method *RangeSelectHyperCubeValues* to indicate which dimensions to select.

NxAppLayout struct
The property *qLocaleInfo* has been added to return information about the locale.

GenericObjectLayout struct
The property *qHasSoftPatches* has been added to indicate whether or not the generic object contains some soft properties.

qPseudoDimPos property
The property *qHyperCubeDef/qPseudoDimPos* no longer exists. The position of a pseudo dimension is set in *qHyperCubeDef/qInterColumnSortOrder* instead.

AllowEditMode method
The *AllowEditMode* method has been removed since it was deprecated. This method belonged to the global class.

33.4 Creating custom connectors

QVX SDK

The current version of the QVX SDK is 2.1. It supports Qlik Sense 1.1.

Qlik Sense adaptation
A section has been added to describe how to adapt an existing (QVX SDK version 2.0) or new connector to work in Qlik Sense.

New method added to override generic commands
A new method, HandleJSONRequest, has been added to handle QVX generic commands that are not pre-defined in the QVX API.

33.5 Creating .NET applications

Qlik Sense .NET SDK

Hyper cubes and list objects in generic objects

Support for multiple hyper cubes and/or list objects in generic objects.

New flow added for handling of dynamic data

Introduced new flow for handling dynamic data which will make it possible to support more complex client side management (like type conversion) than allowed in the previous flow.

Deprecated methods

The following methods have been deprecated and marked as Obsolete.

- `Qlik.Engine.Location.Local`
  Instead use: `Qlik.Engine.Location.FromUri`
- `Qlik.Engine.Location.LocalServer`
  Instead use: `Qlik.Engine.Location.FromUri`
- `Qlik.Engine.Location.FromProcess`
  Instead use `Qlik.Engine.Location.FromUri`
- `Qlik.Engine.Location.AppWithName`
  Instead use `Qlik.Engine.Location.AppWithNameOrDefault`

Upgrade consideration - do not use the C# concept dynamic

It is no longer possible to use the C# concept dynamic to set dynamic properties on SDK objects. The new dynamic data handling provides the methods **Set** and **Get** to be used for this purpose.