Tech Brief

QlikView® November 2018: Skia Rendering Library

With the QlikView® November 2018 (v12.30) release, Qlik has changed the graphics library used for rendering visualizations from Microsoft GDI to Skia. This technical brief will give you an overview of the change and the potential impacts to your QlikView deployment.

What is Skia?

Skia (https://skia.org/), an open source graphics library, was implemented in the QlikView November 2018 release to render the visualizations used in QlikView applications. Skia replaces the Microsoft GDI library (https://docs.microsoft.com/en-us/windows/desktop/gdi/windows-gdi), which QlikView previously used.

The change resulted from multiple factors, but primarily due to Microsoft's deprecation of the GDI library. Additionally, the Skia graphics library delivers better performance as well as more granular control of rendering compared to GDI, especially with regards to fonts. Coupled with the Qlik Associative Engine, Skia's greater scalability accelerates application delivery for users.

What is the impact of the Skia graphics library?

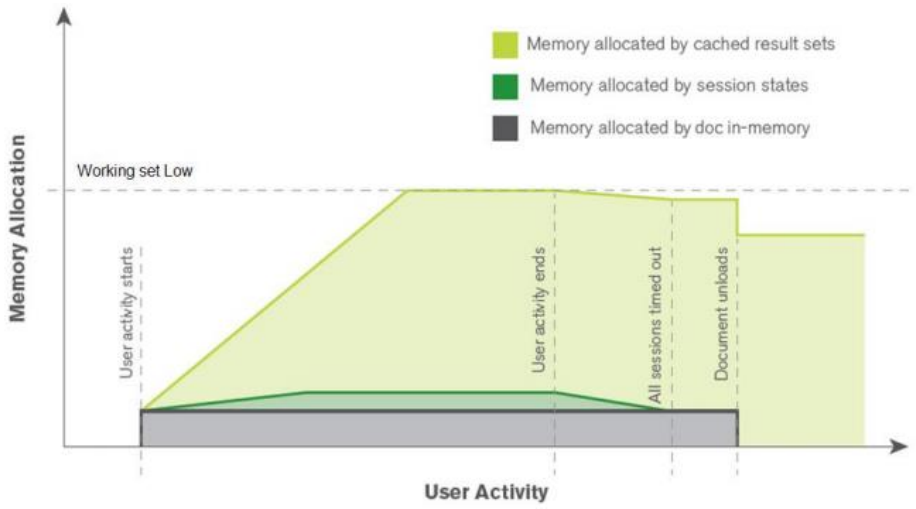
The move to Skia has resulted in performance and resource utilization implications you need to be aware of. However, before diving into details, it's important to understand how the Qlik Associative Engine uses resources.

The Qlik Associative Engine utilizes a cache that can be described in three parts: Document in-memory cache, session states, and cached result sets.

- Document in-memory cache: When an application is opened, the app is loaded from disk and expanded from a compressed state into memory. This cache is also known as document or base cache.
- Session states: Additionally, there is a small cache which stores session related information for each user's session, for example the selections made in an application.
- Cached result sets: As the user makes selections inside of an application, the Qlik Associative Engine calculates the result, then stores the value into cache.

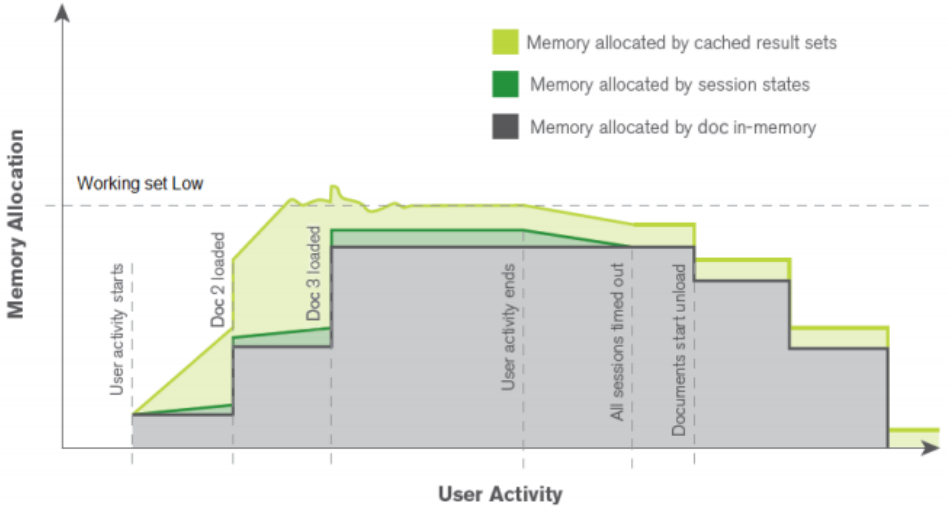
As Graph 1 illustrates, the aggregate memory usage by the Qlik Associative Engine is expected to grow until it reaches the configured ‘working set’ low threshold. With default settings, this means that the Qlik Associative Engine is expected to consume between 70% and 90% of the memory available on the server over time. When the ‘working set low’ threshold is exceeded, the Qlik Associative Engine will discard cache using a usage-based algorithm to stay at, or around, the ‘working set low’ threshold. (See Graph 2)

Graph 1



With the Skia graphics library, there is a fourth type of cache to add to the collection: Rendering cache. A consequence of this additional cache layer is that the same activity with the Skia library will consume more memory than it would using GDI while providing the output in a shorter timeframe.

Graph 2

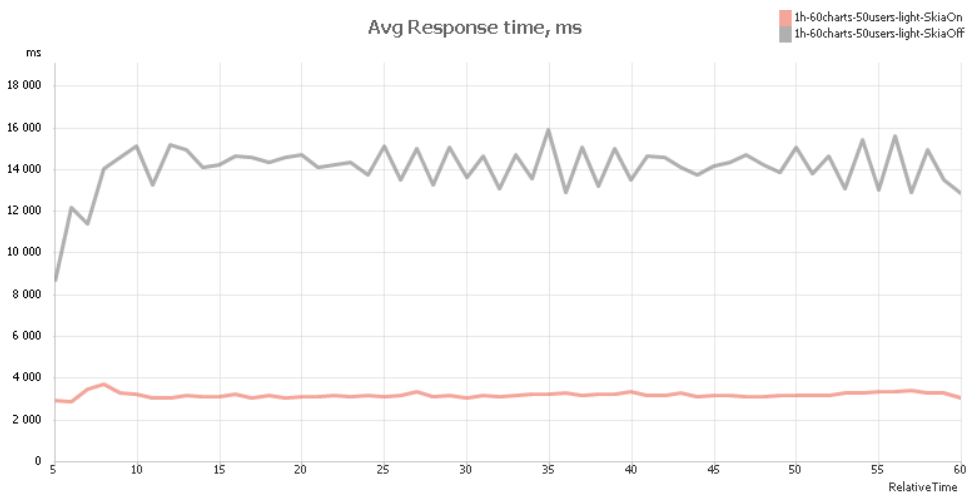


The values shown in this document may not necessarily be reproducible in other QlikView environments and should only be used as general guidance. It is important take into consideration other factors and variables within your own environment such as: machine specifications, size and number of charts, number of users, etc.

Scenario 1: Rendering cache

Graph 3

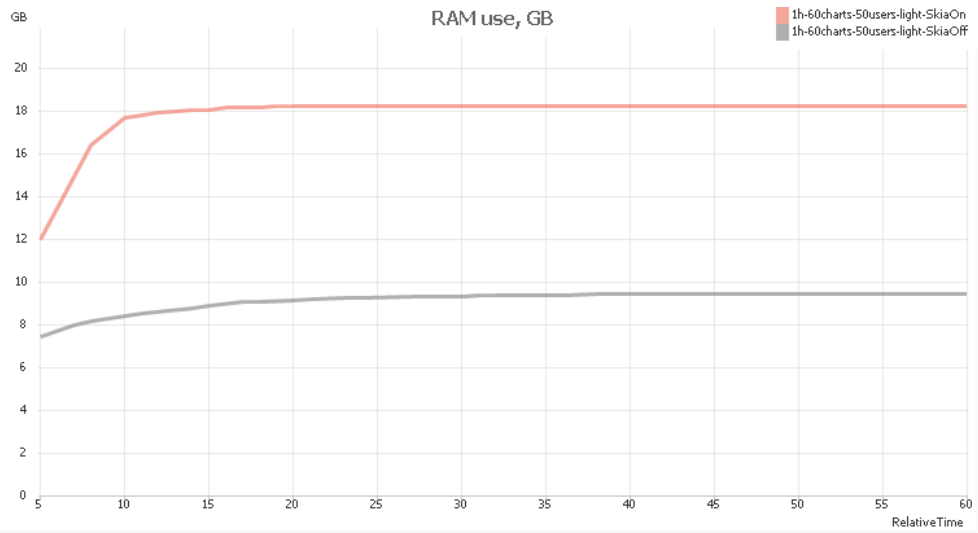
Graph 3 shows the average response times in a scenario where Skia and GDI rendered many charts:



As indicated by the graph, the response times for Skia were significantly shorter than for GDI.

Graph 4

Graph 4 shows the RAM use for the same scenario:



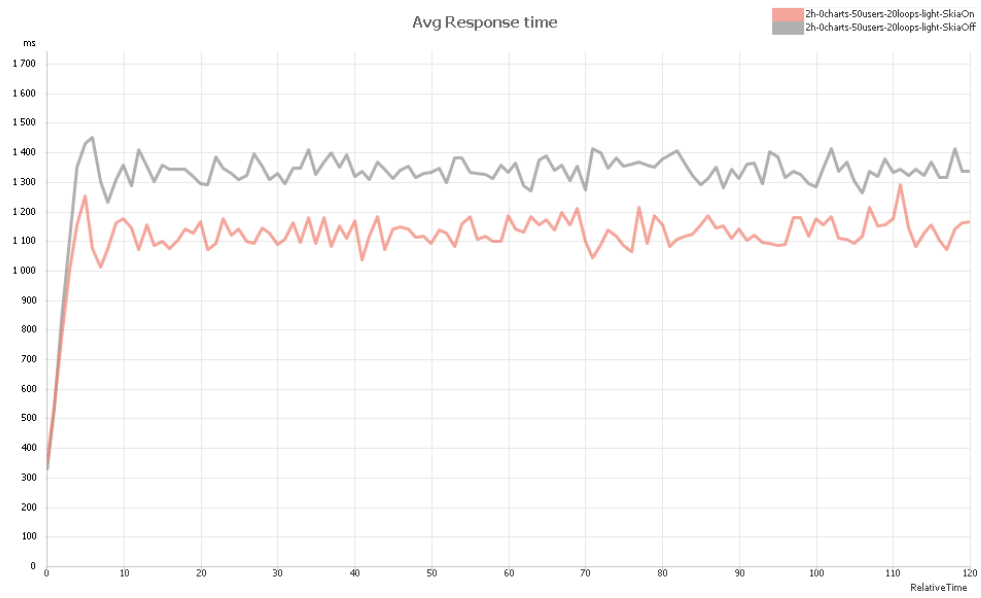
Neither Skia nor GDI reached Working Set Min, although Skia consumed more RAM than GDI due to the Rendering cache.

Scenario 2: Respecting the Working Set limits

As with the traditional three cache buckets when using GDI, the overall Qlik Associative Engine memory use with Skia is bound by Working Set Min and Max.

Graph 5

Graph 5 shows the average response times in a scenario where both Skia and GDI reached Working Set Min:

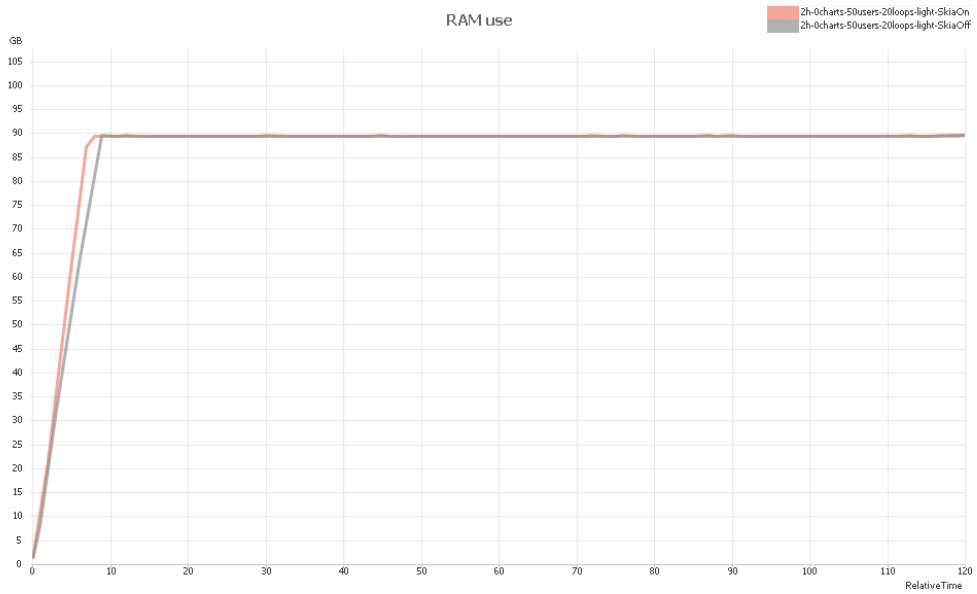


As indicated by the chart, the response times for Skia were shorter than for GDI.

Graph 6 shows the RAM use for the same scenario:

As indicated by the chart, Skia and GDI both respected the Working Set limits.

Graph 6



The Skia rendering library provides better scaling, measured by response time, to achieve the same delivery. In doing so, it will further unlock the existing investment in well-performing CPU chipsets.

What about hardware sizing?

An upgrade to QlikView November 2018 or later requires no hardware sizing adjustment. The improvements in response times and overall throughput offsets any additional work required of the QlikView server to manage additional RAM used for caching.

Qlik Associative Engine's Cache

Document in-memory cache:
Memory used to decompress the application from disk to memory

Session states:
Meta-data associated with the user's session inside of an application

Cached result sets:
The result of a user making selections in a visualization, for example: "Sum of Sales in 2015."

Rendering cache:
The cache used by the rendering engine (Skia) leveraged by QlikView to build visualizations.

How do I turn off Skia?

Like any software change, some updates may be delayed to provide sufficient time to make necessary accommodations.

Note: Qlik is providing a toggle to switch to GDI rendering and we expect to support this through the QlikView November 2019 release. The expected use of this toggle is as a short-term mechanism to allow for the activities needed to use Skia.

To turn Skia off:

- Stop the QlikView Server service on all nodes.
- For each of the nodes: open Notepad as Administrator.
- Backup the current the Settings.ini file (by default located at C:\ProgramData\QlikTech\QlikViewServer\Settings.ini). For example, copy and rename to Settings.ini.bak.
- Open the Settings.ini file and modify the file to fit this schema:
    - [Settings 7]
      PreviousEntries=Values
      ….
      GraphicsBackEnd=0
    - Note: there needs to be a blank line at the end of the file.
- Save the file.

After these changes have been made on all nodes, start the QlikView Server service on all nodes.

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About Qlik

Qlik is on a mission to create a data-literate world, where everyone can use data to solve their most challenging problems. Only Qlik's end-to-end data management and analytics platform brings together all of an organization's data from any source, enabling people at any skill level to use their curiosity to uncover new insights. Companies use Qlik products to see more deeply into customer behavior, reinvent business processes, discover new revenue streams, and balance risk and reward. Qlik does business in more than 100 countries and serves over 48,000 customers around the world.

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