Release guide

LuciadRIA 2023.0

6 June 2023

Contents

About this release

The 2023.0 release of LuciadRIA focuses on increased performance, visual quality and stability. With 2023.0, maps boot faster and point cloud visualization is more performant than ever, offering new options to tune visual quality. There is a new API to deal with WebGL context losses, and you can now use complex strokes on 3D shapes. Additionally, LuciadRIA now supports non-quad tree raster tile sets, including WMTS irregular tile matrices.

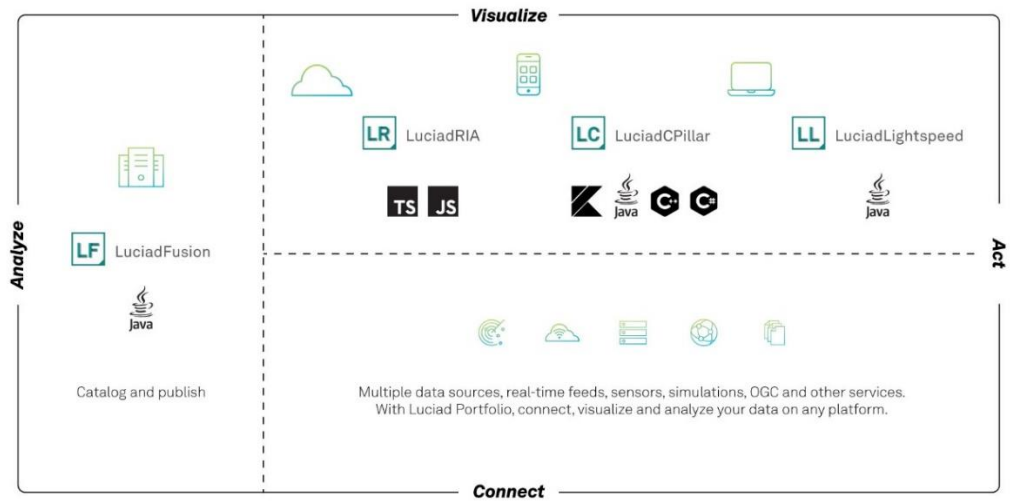

Figure 1: The Luciad portfolio

Benefits of new features

Point cloud rendering: Less is more

We made several improvements to LuciadRIA's point cloud visualization (see Figure 2). Performance has improved across the board. You now have an API to limit the number of points visualized, which can prevent performance degradation on lower-end devices. We also added an algorithm that dynamically adapts the point size based on the local density of the point. When applied, it increases the visual quality of the point cloud by reducing gaps between the points.

By applying these tools, you can make point clouds look better or gracefully degrade on lower-end hardware, in situations with reduced bandwidth, etc. Less is more, indeed.

Figure 2: This release offers a set of tools to fine-tune point cloud rendering.

Sample code/documentation to get you started

The article "Tuning performance and visual quality of point clouds" discusses the point count optimization option in a new section titled "Limiting the number of points in a point cloud layer." This is illustrated in Figure 3.

Tuning performance and visual quality of point clouds

The visual quality and performance of your point cloud display depends on various factors:

- The number of points loaded.
  - More points mean more detail. If there are more points, you can have smaller dot sizes.
  - More points can also lead to lower fluency and performance.
- The size of the dots on screen.
  - Smaller dots give you better detail if you have enough point density, but can result in a sparse point cloud if your density is low.
  - Larger dots give you a visually closed surface, but can cause an impression of lower detail and lower performance.
- Other visual effect settings.
  - The graphic effect settings on the map can have a major impact on visual presentation.
  - You have access to some point-cloud-specific effects too.

LuciadRIA does its best to find a good balance between these factors. It also offers various options to optimize visual quality and performance for your dataset, hardware, and use case.

Figure 1. An unclear, sparse point cloud

Figure 2. The point cloud displayed with high visual quality

Recommended settings

To get the best visualization out of your point clouds, you can configure various options

You can find detailed descriptions of all the settings further on. In this section, you can find our recommendation based on some usage profiles.

Type	Quality factor	Point count limit	Gap fill	Point shape	Point size	Usage
Low	0.75	5M	0	DISC	ADAPTIVE_WORLD_SIZE	Mobile devices
Medium	1.0	10M	0	DISC	ADAPTIVE_WORLD_SIZE	High-end phones & tablets, low-end laptops
High	1.5	20M	2	DISC	ADAPTIVE_WORLD_SIZE	Mid-range laptops
Ultra	2.0	unlimited	2	SPHERE	ADAPTIVE_WORLD_SIZE	Laptops with gaming hardware

*Program: Example of the recommended **high** settings.*

```
layer.qualityFactor = 1.5;
layer.performanceHints = {maxPointCount: 15000000};
layer.pointCloudStyle = {pointSize: {mode: ScalingMode.ADAPTIVE_WORLD_SIZE, worldScale: 1.0, minimumPixelSize: 1},
                         gapFill: 2,
                         pointShape: PointCloudPointShape.DISC};
```

Figure 3: The article "Tuning performance and visual quality of point clouds" is up to date and bundles all information for optimal point cloud visualization.

Apply complex strokes to 3D shapes

You can now use complex strokes on 3D shapes, as well as on draped (2D) shapes. For example, you can show a dashed line on a 3D box shape. Non-draped, pixel-sized 3D lines with complex strokes are oriented toward the viewer, as illustrated in Figure 4. This improvement also extends to world-sized lines and includes the application of OGC SLD/SE patterns on 3D lines. These OGC SLD/DE patterns can be defined either in pixel or world units of measurement.

This capability was added without any changes to the existing API. In previous releases, 3D lines with complex strokes were always draped. If you want to keep that behavior, specify “draped: true” in your ShapeStyle.

Figures 4 and 5: Complex strokes can now be applied to 3D shapes. The strokes are oriented toward the viewer.

Support for irregular raster tile sets

LuciadRIA now supports raster tile sets that do not have a quad-tree structure. These are tile sets in which the different levels don't have the same bounds, or the numbers of rows and columns are not a power of two with respect to the top level. This improvement includes support for non-quad tree WMTS TileMatrixSets, so different tile matrices can be defined.

Other improvements

- LuciadRIA now offers an API that allows you to handle WebGL context losses. These events occur when the browser needs to free up GPU resources. This can happen on a few occasions, for example:
    - When the system load is too high
    - When a driver crash occurs
    - When docking/undocking laptops
    - When putting a laptop in sleep mode

  The new API allows you to listen for these events and ask LuciadRIA to recreate its GPU resources, so your application can recover from a WebGL context loss event. The user no longer needs to restart the application. For more information and usage recommendations, see the article "Dealing with WebGL context losses," as illustrated in Figure 6.

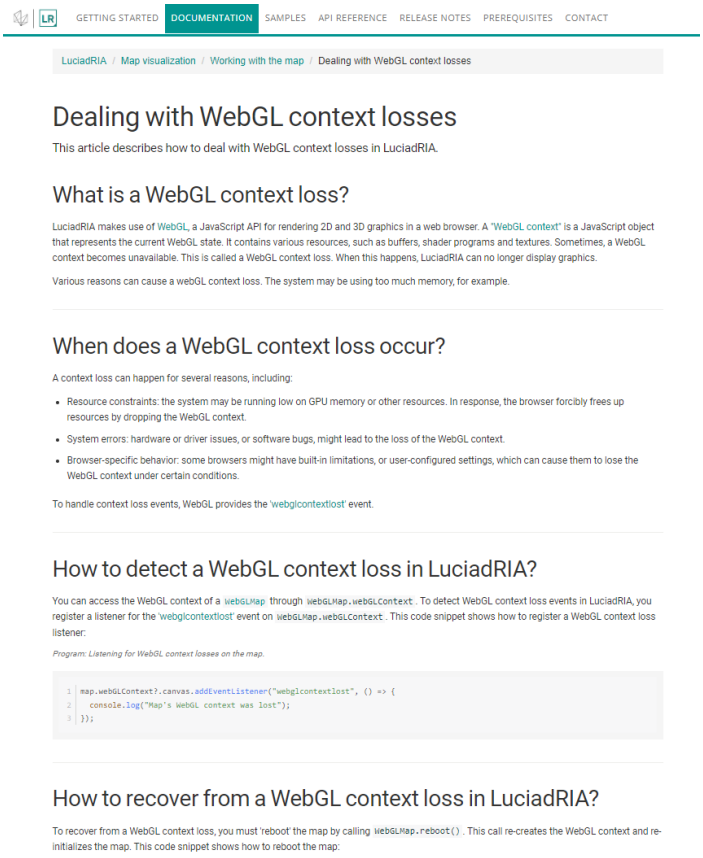

Figure 4: This new article explains how your application can recover from WebGL context losses.

- LuciadRIA now offers a set of pre-defined OGC SLD/SE custom functions, including Recode, Interpolate and Categorize. You can also define your own SE functions.

  The Symbology Encoding sample includes a custom function example that shows you how to give roads a specific width depending on the road type mentioned in the road name. For more information about defining and using those functions, see the article “SLD custom functions - Usage and examples.”

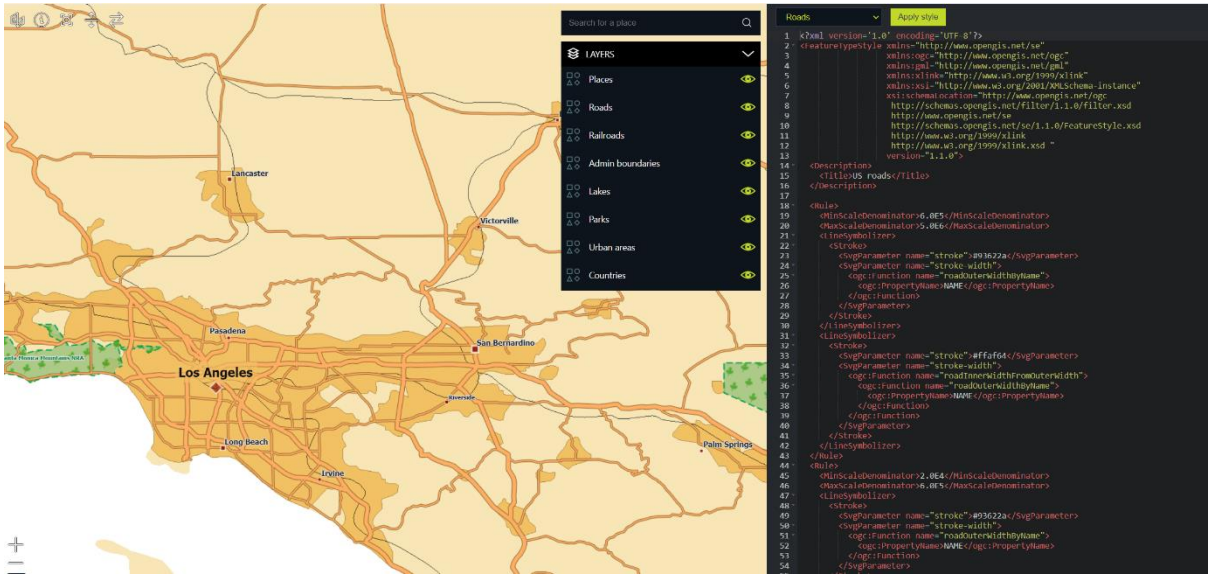

Figure 7: An OGC SLD/SE custom function for road styling

About Hexagon

Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector and mobility applications.

Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

Hexagon's Safety, Infrastructure & Geospatial division improves the resilience and sustainability of the world's critical services and infrastructure. Our solutions turn complex data about people, places and assets into meaningful information and capabilities for better, faster decision-making in public safety, utilities, defense, transportation and government.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 23,000 employees in 50 countries and net sales of approximately 4.3bn EUR. Learn more at hexagon.com and follow us @HexagonAB.

official English version. Additionally, some text, graphics, PDF documents and other accompanying material may not have been translated.

Links to third-party websites

This document may provide links to third-party websites for your convenience and information. Third-party websites will be governed by their own terms and conditions. Hexagon does not endorse companies or products to which it links.

Third-party websites are owned and operated by independent parties over which Hexagon has no control. Hexagon shall not have any liability resulting from your use of the third-party website. Any link you make to or from the third-party website will be at your own risk and any information you share with the third-party website will be subject to the terms of the third-party website, including those relating to confidentiality, data privacy and security.

Hexagon provides access to Hexagon international data and, therefore, may contain references or cross references to Hexagon products, programs and services that are not announced in your country. These references do not imply that Hexagon intends to announce such products, programs or services in your country.

Revisions

Hexagon reserves the right to revise these terms at any time. You are responsible for regularly reviewing these terms. Your continued use of this document after the effective date of such changes constitutes your acceptance of and agreement to such changes.

Questions

Contact us with any questions regarding these terms.