Release guide

LuciadFusion 2024.1

14 January 2025

Contents

About this release

LuciadFusion 2024.1 again strengthens the support for building information modeling (BIM) data. You can now stream Autodesk Navisworks data in addition to Industry Foundation Classes (IFC) and Autodesk Revit formats. You can also filter BIM data and specify an area of interest to stream only the data you're interested in.

This release also extends the support for 3D reality capture data. You can now stream packed HSPC point cloud data and panoramic image data contained in LGSx, a reality capture file format from Leica Geosystems.

There is better default support for vertical datums, which helps you increase vertical accuracy in your applications.

Finally, this release includes several enhancements to LuciadFusion's web services that provide convenient new capabilities and better performance for connecting applications.

This document lists the most noteworthy improvements. You can find the full list of changes in the release notes.
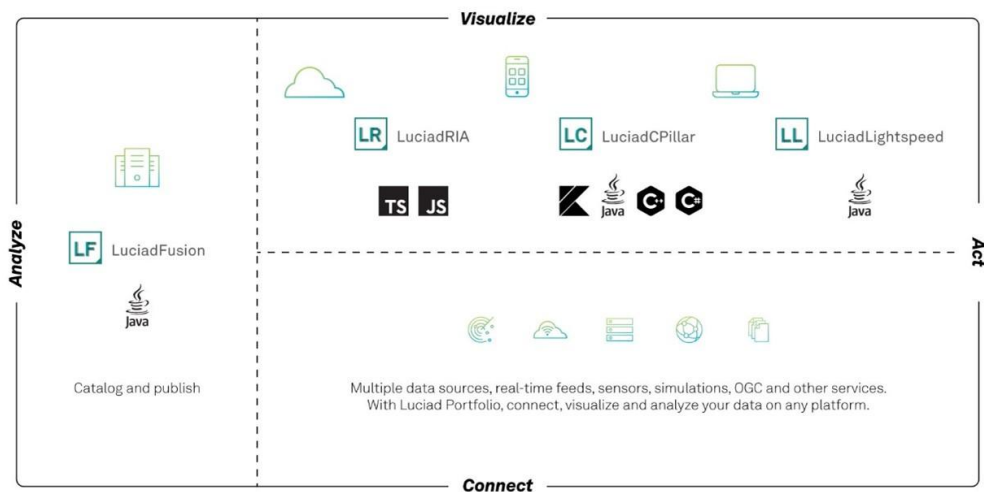

Figure 1 The Luciad portfolio
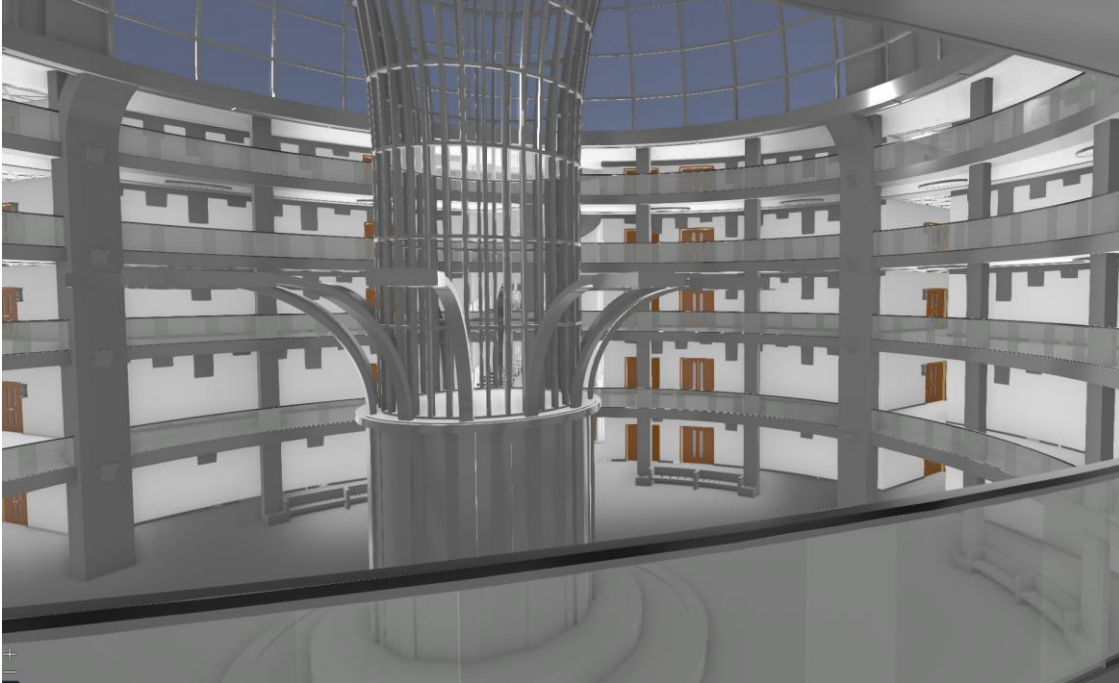
Benefits of new features

Figure 2 Visualization of a Navisworks file in LuciadRIA, served through LuciadFusion's OGC 3D Tiles service

Extended BIM support

In this release, the LuciadFusion support for BIM data has again been extended, strengthening GeoBIM capabilities. LuciadFusion now offers support for Autodesk Navisworks, in addition to support for BIM data in the Revit, IFC and Binz formats.

Navisworks support
Autodesk Navisworks is a BIM software tool for architects, engineers and construction professionals to combine and review 3D models created by other software packages, such as Autodesk Revit, AutoCAD and others.

It stores these 3D models in a proprietary NWD file format with the *.nwd* file extension.

These NWD files contain:

- A geometry model of a building or facility, including spatial elements, materials and shapes

- A so-called feature data model describing typical BIM properties of that data, such as layer, material and so on

LuciadFusion now decodes both the geometry and the attribute data, handling the two data types in a distinct way: the Navisworks data can be served by LuciadFusion using the OGC 3D Tiles protocol. The attributes can be served by LuciadFusion through a WFS service. Figure 2 illustrates the visualization of a Navisworks file in LuciadRIA, served through LuciadFusion's OGC 3D Tiles service.

Note that the support for Navisworks data is part of the Infrastructure standards option of LuciadFusion's Pro tier.

Filtering of BIM data at decoding time

Sometimes, a BIM dataset contains more elements than you're interested in.

Typically, this happens when a CAD model wrongly contains a copy of a building element that is located far away from the actual data, as illustrated in Figure 3. The element in question may be up to hundreds of kilometers away from the relevant model data.
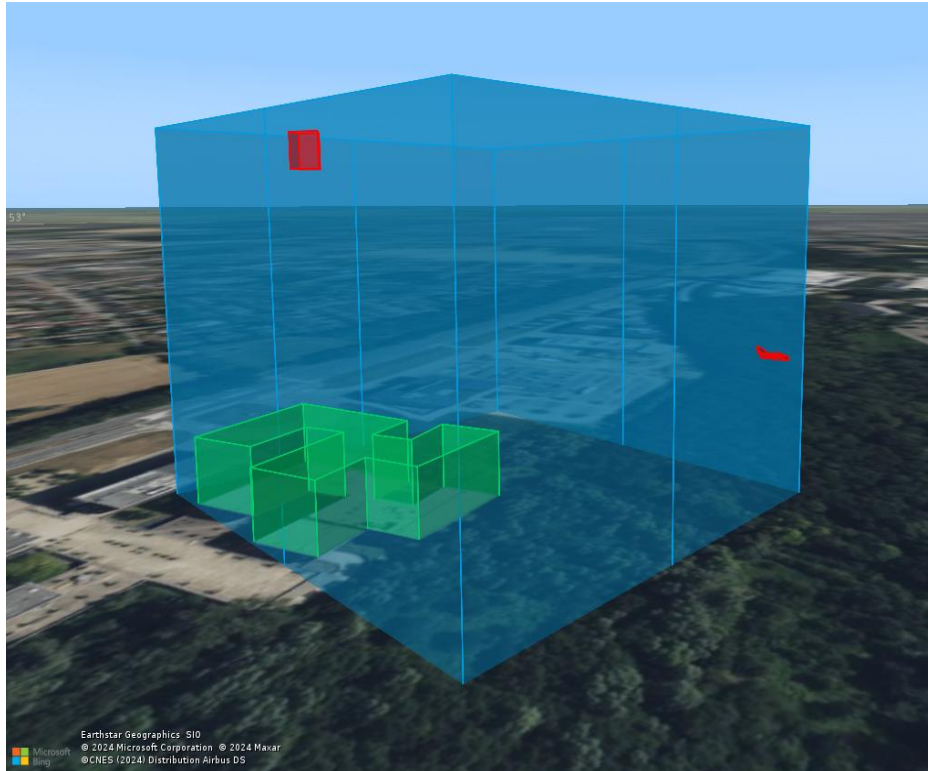

Figure 3 An illustration of the use case for filtering BIM data based on a bounding box

Although the relevant data is present in the dataset, the erroneous objects cause problems when you convert the geometry to an OGC 3D Tiles dataset: because the bounds of the dataset do not match the actual area of interest, it is impossible to automatically create a good tile structure. This impediment can result in poor data quality and unresponsive behavior of a client application that consumes the 3D Tiles.

If changing the source data is not possible, you can now create an XML file, containing an OGC filter that describes the area of interest as a BBOX element.

Sample code/documentation to get you started

The section "Data Formats: Autodesk Navisworks" was added to documentation. It bundles a collection of relevant articles. For specific guidance to get started with Navisworks data quickly, we refer to "Serving BIM data from LuciadFusion Studio."

The LuciadRIA IFC/Revit Viewer sample has been renamed and now also showcases Navisworks data, processed and served using LuciadFusion's OGC 3D Tiles service.

The article "Filtering BIM data" was added to guide you with filtering BIM data in case of outliers.

Extended support for reality capture data: LuciadFusion now supports LGSx

LGSx is a reality capture file format made available by Leica Geosystems. LGSx files archive a complete reality project in a single, highly compressed package, which makes it easy to share and view the project. An LGSx file may consist of point clouds, imagery, assets and metadata. The latest versions of Register 360, Cyclone 3DR and Pegasus Office can export data to the LGSx format.

LuciadFusion can handle the following data types inside LGSx files:

- Point cloud data, stored as packed HSPC data

- Panorama data

This means that you can publish the point cloud data in an LGSx file as an HSPC Service and the panoramics data in an LGSx file as a Panoramics Service. Both HSPC services and Panoramic services are existing capabilities within LuciadFusion. See Figure 4. This release extends their usage with new support for data in the LGSx format.
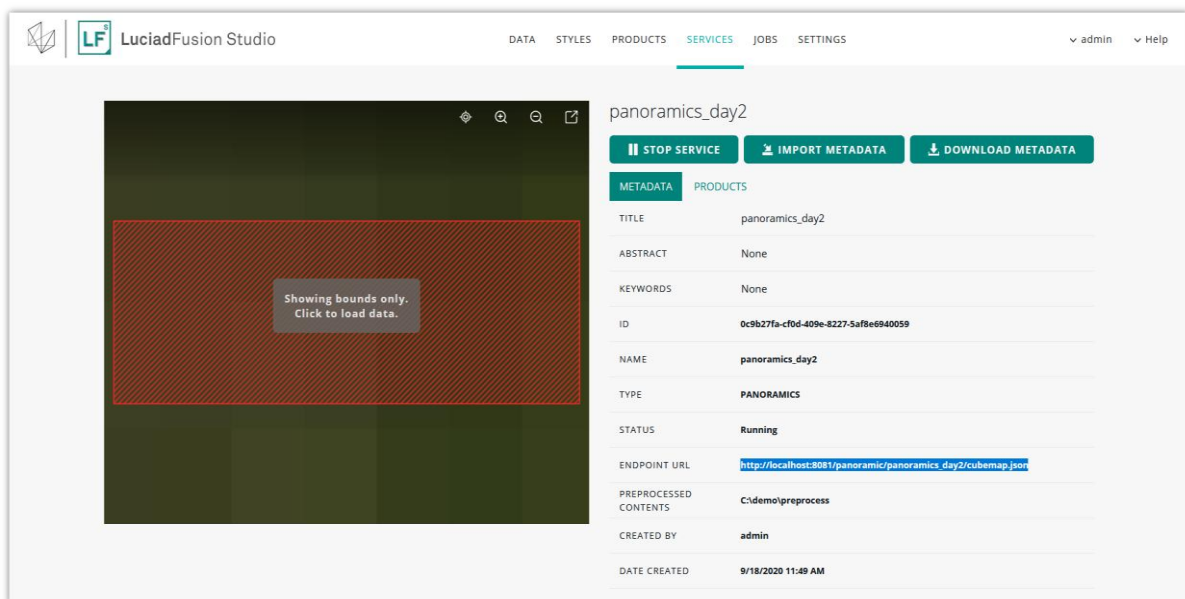

Figure 4 An example of a service of type "PANORAMICS" being set up in LuciadFusion Studio

The current implementation doesn't support any other data types stored in an LGSx file. If you have further questions about LGSx support in LuciadFusion, please contact the Luciad Product Management team at product.management.luciad.gsp@hexagon.com.

Note that the support for LGSx data containing point cloud data is part of LuciadFusion in all tiers, without the need for additional components. When your LGSx data packages contain panoramic imagery, these will only be extracted when you have LuciadFusion Advanced or Pro. There is no need for an optional component in this case, either.

Sample code/documentation to get you started

To guide you in using LGSx data, the article "Handling LGSx data" was added to LuciadFusion documentation.

Better default support for vertical datums

In the 2024.1 release, we continue the work that we started with the 2024.0 release on better default support for vertical datums. We learned this topic can lead to confusion because vertical references are missing, or provided in various formats. Sometimes, they are even incorrectly encoded within data sources. The 2024.1 release brings the possibility to approach almost every vertical datum using the base EGM2008 geoid.

Improve the behavior for unsupported vertical datums by approximating them with EGM2008

Vertical references that are unsupported and have a unit of measure expressed in meters can be approximated by using EGM2008 as base geoid. This behavior is active by default, but you can disable it.

If enabled, this feature adds support for dozens of additional EPSG codes, referring to references including a vertical datum, which is approximated by using EGM2008 as fallback vertical datum. The full list of additionally supported EPSG codes is available in the release notes.

The support for GeoTIFF tags, when embedded in either GeoTIFF or LAS files, has also been extended in a similar way. Where possible, unsupported vertical references are approximated by EGM2008.

Compound EPSG codes (related)

LuciadFusion now also supports model references from EPSG model reference source files containing compound CRSes.

Sample code/documentation to get you started

These improvements are default behavior, so no action is needed if you agree they are beneficial to your application. The release notes contain details for disabling this behavior, should you want to revert to the behavior of previous LuciadFusion versions.

Faster and more flexible OGC services

This release bundles various improvements to LuciadFusion's core capability: disseminating information via OGC services.

Out-of-the-box support for Transactional Web Feature Service (WFS-T) connections to a database back end

A WFS-T is a WFS service that allows features to be created, changed, replaced and deleted from the underlying data store.

LuciadFusion now offers out-of-the-box support for WFS-T for data stored in a database (*TLcdDatabaseModel*). This includes vector data decoded from Microsoft SQL Server, DB2

Spatial, Informix (Geodetic and Spatial), Oracle (Locator and Spatial), PostgreSQL PostGIS, SQLite SpatiaLite and GeoPackage.

To set up a WFS-T in LuciadFusion, you can enable transactions for your WFS service, either through the UI or through the REST API.

You can add support for other data formats by plugging in a WFS server model encoder factory.

The article "What data can you edit with a Transactional WFS (WFS-T) service?" provides an overview of all features offered.

Easy management of custom metadata properties

LuciadFusion includes support for customizable metadata properties to be associated with data resources. To ease the management of these properties, the REST and Java API have been extended with operations to create, update, delete and fetch a single custom property at a time.

WMS and WMTS GetLegendGraphic support

The WMS and WMTS services now come with improved *GetLegendGraphic* support for layers styled with OGC SLD:

- External SVG and bitmap icons defined in a *PointSymbolizer* are now included in a legend

- The optional WIDTH and HEIGHT parameters are now considered when generating legend icons

Furthermore, WMS services now support an optional LEGEND_OPTIONS parameter to control the visual appearance of a legend, such as font and background color. Refer to the sample class *samples.wms.server.SLDLegendOptions* for an illustration.

You can find the full implementation in sample code to ease customizations.

JPEG encoding

The libjpeg-turbo library is now used to encode images as JPEG. This significantly speeds up OGC WMS *GetMap* requests that specify JPEG as the desired map return format.

WFS composite model support

LuciadFusion now has improved support for composite models — an *ILcdModelContainer* — in WFS services. A WFS service maps a composite model to multiple WFS feature types. These feature types will be listed in the capabilities document and can be used in all other WFS operations that require a WFS feature type.

OGC compliance

LuciadFusion 2024.1 has been successfully tested for OGC compliance. This can be verified on the OGC website.

For Web Coverage Service (WCS), compliance is now confirmed for versions 1.0, 1.1 and 2.0.

Range requests

The following service types now support optimized data retrieval via single-part HTTP range requests:

- HSPC

- Panoramics

- OGC3DTiles

Other improvements

LuciadFusion 2024.1 also features a set of upgrades to existing format support.

Support for IFC 4.3
LuciadFusion now supports IFC files in the IFC 4.3 format.

Support for LASzip 1.4
LuciadFusion now supports LAS point cloud data in the LASzip 1.4 format. LASzip is an open-source library for the lossless compression of LAS point cloud files. The resulting LAZ files can be up to 93% smaller than original LAS files.

LASzip is considered the de facto standard for exchanging the ubiquitous LiDAR point cloud format and is supported by many applications. The LASzip compressor is much smaller and faster than generic compressors like bz2, gzip or andrar.

Support for S-52 4.0.4 presentation library
LuciadFusion now supports the S-52 4.0.4 presentation library for rendering ENC charts.

Support for overview levels in TIFF data
The GeoTIFF model decoder now supports loading TIFF data with overview levels from an external file (with extension *.ovr*).

Support for PostgreSQL 17
PostgreSQL 17 is now officially supported as a database for LuciadFusion Studio.

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Hexagon is the 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.

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