

Leapfrog Geo & Edge 2021.2

new release



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Leapfrog Geo & Edge Release Notes

1.1. Single Projects Tab – Phase 2



The second phase of this initiative makes connecting to Central smooth and effortless, particularly if you are working with multiple Central servers. The Central server list and associated features, “go to portal” and “publish”, are now located in a single location which, with a refreshed user interface, makes the Central integration from Leapfrog more intuitive, easier, and quicker to use. Other items that have been changed in this release are:

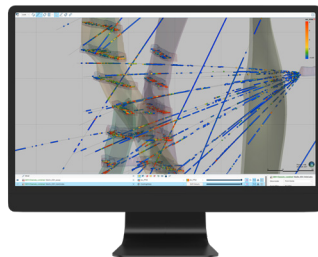
- Selecting a central project will connect to the server it comes from (auto-connect)
- Central Server selection menu relocated alongside user profile at top right corner
- Projects’ view – now includes the option of grid view
- Updated styling of the server list

1.2. Restricted Objects

You may notice some changes in the availability of objects created in a different Leapfrog product to the one you are working in now. These changes are part of longer-term work related to the delivery of Leapfrog functionality.

If you have any questions, please contact your regional representative.

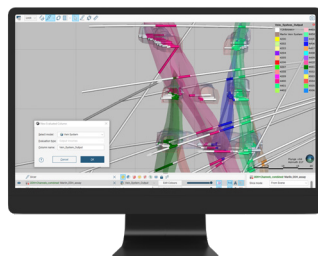
1.3. Drilling improvements



1.3.1. MERGED DRILLHOLE SETS

In the previous release (2021.1) a major new change was introduced to Leapfrog with the addition of multiple drillhole sets. This opened significant new workflow opportunities for using data of different types in geological models. However, there were still a few modelling situations where data from the additional drilling data sets could not be included, for example, the vein segments required to build a vein must all come from a single table as must the inputs to domained estimation.

In this release, we are pleased to bring you powerful new functionality to overcome these limitations, by allowing you to combine drillhole sets. This simple process is accessed via the New Combined Drillholes option. Any drillhole sets can be combined, with the user specifying which tables to combine, which value or category fields to map together and the priority order to use when combining.



1.3.2. EVALUATED COLUMNS ON INTERVAL TABLES

Evaluate GM categories directly onto interval tables as a new column then use this as a category in set level statistical analysis. A valuable alternative to the use of back-flagging, as it avoids the issue of small intervals that can be created in back-flagging.

This feature provides a valuable alternative to the use of back-flagged tables for analysis of statistics by category at the drillhole set level.

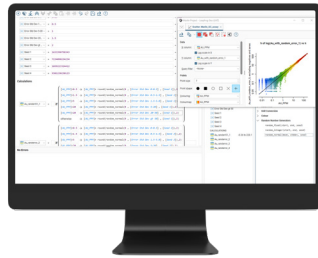
Currently, to break down an assay table by GM category requires the user to create a back-flag evaluation table and merge this with the assay table. Because GM surfaces are interpolated, there are normally small differences between the exact location of a GM boundary in the back-flagged table and the assay interval boundaries.

This can result in the creation of small intervals that break the original assay intervals and the splitting of originally discrete assay intervals between different categories. While the impact on length weighted statistics is usually minimal, it affects the 'count' and length and is the cause of frequent enquiries. By evaluating directly onto the mid-points of intervals, the issue of boundary splitting is eliminated.

1.3.3. ACQUIRE LINK AND SMART REFRESH PERFORMANCE

The acquire Link and Smart Refresh have been improved to allow for faster and more seamless reloading of data.

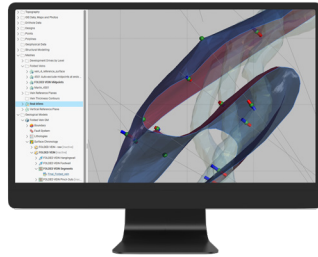
- It is now possible to add multiple assay tables during the set-up of an acquire drillhole selection, in the same way that multiple geology tables could be loaded.
- acquire Smart Refresh has been changed to enable you to bypass all the table importer dialogues if no changes are present in the mapping of column names and data types.
- A validation has been introduced that detects whether the individual interval values returned by acquire Smart Refresh contain any new data. If no new data is present, the table is not loaded to Leapfrog which means that no reprocessing related to that table needs to occur.



1.3.4. ADD TRIG AND RANDOM NUMBER GENERATOR TO CALCULATIONS

Standard Trig functions have been added to the calculation engine. These enable orientation data to be used in calculations – for example, planar structural data observations from drillholes or mapping, or the local evaluation of a variable orientation.

For Leapfrog users who want to incorporate trigonometric functions into calculations and incorporate pseudo-random numbers modelling and estimation workflows to simulate variability, validate results and produce synthetic data, without needing to export data to and from MS Excel, which breaks Leapfrog's dynamic workflows.



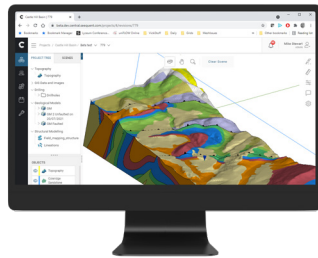
1.4. Vein Modelling improvements

The Leapfrog vein modelling tool provided a ground-breaking but somewhat inflexible workflow for rapid and repeatable modelling of thin, laterally continuous, gently curved structural geometries such as veins and faults.

A whole suite of changes has now been made, that build on the original design to bring an unprecedented new level of flexibility to this already powerful tool. This work has been ongoing over a couple of development cycles.

- Vein Organisation in the Project Tree - Mid-points have been made more discoverable by moving them out from under the Reference Surface tab and placing them at the same level as Vein Segments and Mid-points.
- Mesh From Vein Segment Mid-points - This enables you to create a reference plane with as much complexity as desired, using the advanced editing options available in the meshes folder:
 - Interpolant model type, drift options, sill, nugget and range
 - Trend directions and anisotropy
 - Direct editing with polylines or structural disks
 - Addition of existing points, values, structural data, polylines or GIS vector data
- Sharing Boundary Polylines Across Veins - Until now, vein boundary polylines had to be created separately for each vein. They could be exported but could not be imported. Much more flexibility has now been added to vein boundaries, by making vein boundary polylines shareable through the polylines folder.
- Improved pinch-out behaviour - Previously, if a drillhole did not contain valid logging it was ignored for pinch-out creation, meaning vein models passed straight through drillhole traces. An additional control is provided to the user to choose whether the vein should pinch out on an empty trace (a hole where no lithology has been logged) or continue through it.
- Export/Import of Bulk Vein Edits - it is common that manual editing of vein components is required to produce the vein model you want. Until now, vein edits were only accessible from within the vein model, which made it difficult to recreate a vein from scratch, or even keep a record of edits that had been made. It is now possible to export all user-made vein edits to file, using the Export Vein Edits option on the vein object. This dumps all user made vein edits for segments, midpoints and pinch-outs to a text file.

1.5. Central Improvements



1.5.1. PUBLISH OCTREE AND REGULAR SUB-BLOCK MODELS

Now that we have completed optimisation of the storage underlying our new block model formats, we also publish these models to Central. Both regular and octree block models, along with their evaluations, can now be published for collaboration purposes and web visualisation.

Note: Regular and octree block models will only be visible in Central Portal web visualisation and will not appear in the Central Browser desktop product as this is being phased out.

1.5.2. PUBLISH IMPORTED GM'S

Prior to this release GM's that were imported from Central into Leapfrog as static GM's could not be published back to Central. This partly limits Leapfrog <-> Central workflows - in particular the use of imported GM's to aggregate a final model from separate models that have been split and dispersed into separate 'working areas.'

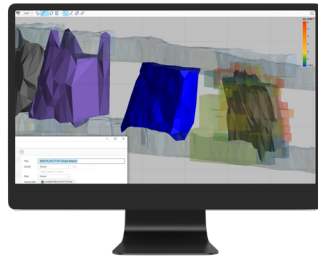
You can now publish imported GM's to Central, removing this limitation and making it possible to view aggregated GM's in Webviz and available for linked workflows that require the full aggregated GM.

1.5.3. PUBLISH SECTION LINE WORK

A key input to Geostudio slope stability models is 2D sectional representations of geology. Cross-sections of three-dimensional Leapfrog geological models can now be published to Central, opening the way for workflow connections into Geostudio slope stability analysis (in development).

1.5.4. PUBLISH ADDITIONAL META DATA

Volume attributed objects in Leapfrog (combined models, numeric models, indicator interpolants, distance functions, geological models and refined models and their static variants) now include those attributes when published in Central. This allows those volume attributes to be viewed in Central web visualisation and imported back into Leapfrog.

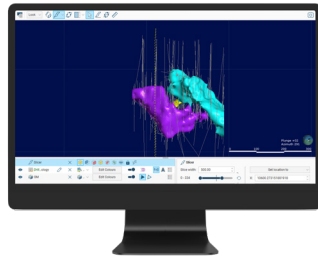


1.6. Proportion weighted resource reports (Edge)

A new feature has been implemented in Edge resource reports that calculates the proportion of blocks falling inside a reporting volume and uses this proportion to weight the reported tonnage and grade. This ensures that the block model volume reported from within a constraining volume will exactly match the volume of the geometry.

Two temporary columns are written to the block model, storing a category filter and the proportion falling inside the chosen volume. The 3D scene can be filtered by the category filter, displaying only the blocks that meet the filter conditions - providing a quick visual validation.

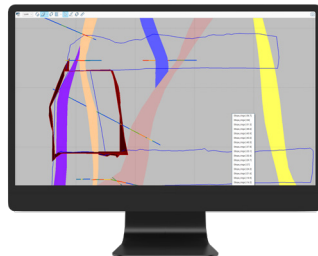
1.7. Slicer Sets



1.7.1. ASYMMETRIC THICK SLICE

Many modelling environments require an asymmetric slice through the objects in the 3D scene. For example, in an open-pit mining environment, the modeller will often want to see a certain distance above a bench or flitch height but a different distance below it.

Until now, the thick slice mode of the slicer has been symmetrical. Now, the user can slice asymmetrically, using a different distance back and front of the slice plane.

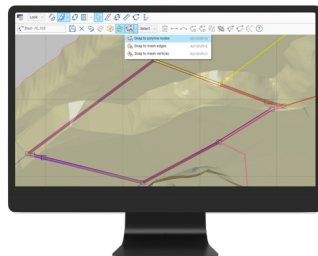


1.7.2. SLICER SETS

The original Leapfrog slicer revolutionised the navigation of 3D data sets, providing a quick and intuitive way of controlling the visualisation volume using a fluid slicing and sliding motion. Such freedom is invaluable, but in many modelling situations, such as landfills, site remediation or open-pit mining, activity is focussed on pre-defined sets of visualisation planes, which the user needs to be able to return to rapidly.

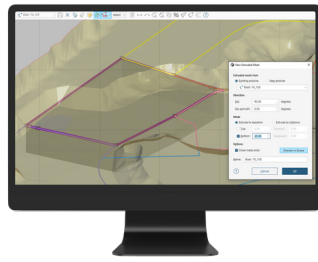
In this release, we are pleased to bring you a new feature - the 'slicer set' - that combine dynamic slicing with pre-defined sets of planes, enabling you quickly, precisely and repeatably locate yourself in space.

1.8. Polyline Improvements



1.8.1. GENERAL TOOL CHANGES

A new feature has been added to the polyline editor that allows you to 'snap' polyline nodes to existing polyline nodes, points, mesh edges or mesh vertices, providing an accurate and predictable way of placing a node. This polyline creation behaviour allows you to be more 'explicit' about polyline creation, which is particularly useful when needing to create polylines that interact with engineered structures, such as foundation designs or underground mine openings, or that need to dovetail against existing polylines, such as for creating dig-block outlines.

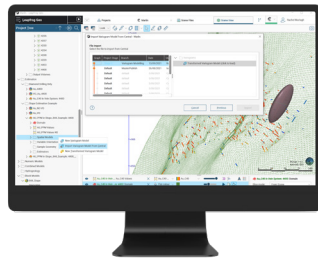


1.8.2. EXTRUDE MESH FROM CLOSED POLYLINE

Users have consistently asked for the ability to make simple geometric volumes by triangulation from polylines, without the necessity to create and isosurface an interpolant. Examples include, creating simple foundation geometries, developing 'cookie cutters' for clipping solids and the ability to create a dig-block volume from a polyline digitised on a bench surface.

In this release, we are pleased to introduce an easy to use, intuitive new tool allowing users to create mesh volumes by extrusion of polylines.

1.9. New Variogram Sharing workflows (Edge)



1.9.1. VARIOGRAM MODELS: PUBLISH TO/IMPORT FROM CENTRAL

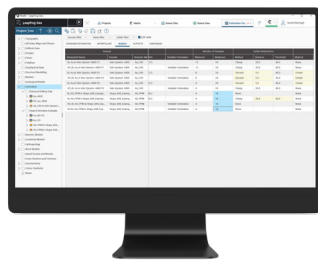
A regular or transformed variogram model can now be published as a versioned object in Central and can now also be imported back from Central into any domained estimation object.

Sharing via Central will enable new workflow possibilities such as the establishment of a 'master' variogram for production workflows, or the sharing of a variogram from a well-informed domain into minor domains. Variograms can be shared between branches of a project, or between projects.

1.9.2. EXPORT/IMPORT VARIOGRAM TO/FROM FILE

For Edge and CEx customers not using Central, variograms can now also be transferred between domained estimation objects via export to and import from a Seequent external file format. The file format is human-readable in a text editor, where it can be reviewed or edited. Version tracking is not supported.

1.10. Estimation Management – Edit parameter values (Edge)



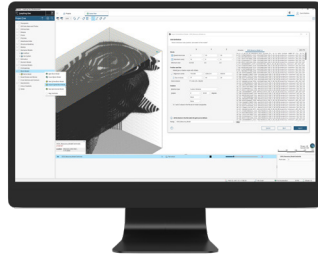
Resource estimates with multiple domains, variables and/or estimation methods can require very large numbers of estimators - projects with hundreds or even thousands of individual estimators are possible. In the previous release we provided you with a tabulated, filterable view of all estimation parameters that allowed rapid visual review and an easy path to open the dialogue of objects requiring edits, and that could be exported to Excel to record.

In this release, we are delighted to reveal our next iteration to model management – bringing you a powerful new ability to edit the inputs, outputs and parameters of estimators directly within the table. It is no longer necessary to open an individual estimation object in order to make changes to it - commonplace updates and edits can be made rapidly, in bulk and in a view that allows comparative visual validation. Editing behaviours are simple to learn and will feel familiar.

Table editing can be coupled with domain copying workflows to simplify and streamline the setting up and management of complex resource estimates.

And of course, you retain all the benefits of having resource estimates tightly and dynamically coupled to the underlying geological model, where changes to input data flow through to the output resource models.

1.11. Octree Model



1.11.1. ADD TRIG AND RANDOM NUMBER GENERATOR TO CALCULATIONS

For Leapfrog users who want to incorporate trigonometric functions into calculations and incorporate pseudo-random numbers modelling and estimation workflows to simulate variability, validate results and produce synthetic data, without needing to export data to and from MS Excel (which breaks Leapfrog's dynamic workflows).

1.11.2. MIGRATE REGULAR BLOCK MODELS TO N-TREE

In order to harness the performance, functionality and compression that the new octree format allows, regular block models have been converted in the Leapfrog backend to use the octree grid storage structure. The user will see no change to their workflows or data besides benefits from better performance and visualisation, as well as the ability to rotate regular models created in Leapfrog on all three axes which use of the octree structure makes possible.

1.11.3. STORAGE AND PERFORMANCE IMPROVEMENTS

We have further optimised the new octree block model format to make creating, visualising and processing octree block models faster as well as reducing Leapfrog project size and improving publishing speeds due to better block model compression.

1.11.4. ENHANCEMENT OF CSV SUB-BLOCK IMPORTER.

A whole raft of improvements has been made to the .csv importer for octree block models making interoperability with Leapfrog easier than ever. The new .csv block model improvements allow regularly sub-divided block models from virtually any external package to be imported, with market-leading ease of use tools such as in-scene visualisation of block centroids, auto-calculated metadata to help guide users, as well as informative messages. Moreover, even if the block model being imported doesn't perfectly fit a regularly divided octree style structure, it will still import correctly provided the dimensions of the blocks being imported fit within any combination of the minimum defined sub-block size.

- Up to 5x faster importer of large .csv files!
- New auto-parsing and filling in of fields for block models exported from Leapfrog.
- New auto-calculated metadata tab to help guide users on valid settings to enter if they are missing the block model header information.
- New options to define block model dimensions using number of blocks or extents.
- New powerful custom rotation settings allowing import of regularly divided block models from virtually any package as well as arbitrary block models if they closely approximate an octree style grid.
- Support for import of block models with offset rotation origins. Supports model vs. Project centroid space block models.
- New icons to help visually guide users on the meaning of new settings.
- Improved warning messages guiding users on which centroids will be imported / will not be imported / don't match grid definition but can still be imported.

1.12. Maintenance improvements

1.12.1. CHANGE ARCHIVER

Current Central (3.0.2, 3.1.1, 4.0) archiver uses Zpaq. The problem is that as files are compressed for storage in Central the process requires the system to have up to 2x the storage capacity of the original files. A more efficient alternative, namely ZSTD, will provide lossless compression. This HTTP compression can be built into web servers and web clients to improve transfer speed and bandwidth utilisation. Existing project data files in Central will not be unpacked during migration, therefore will continue to be Zpaq packed.

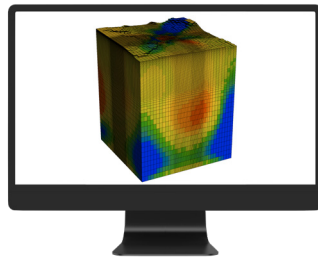
1.12.2. LEAPFROG STORAGE PERFORMANCE IMPROVEMENTS

Significant gains have been made in improving the storage performance of Leapfrog projects.

The biggest improvement comes from changes to the storage format of image files along with the compression of result arrays, while further optimisations have also been made in the storage of octree models.

Reduction in project size will vary a lot from project to project, depending on the types of data stored. Projects containing large or numerous images, or with large octree block models will benefit most - with testing showing 60-90% reductions in size on disk. Not only does this free up valuable disk space but backing up and publishing projects to Central is much faster.

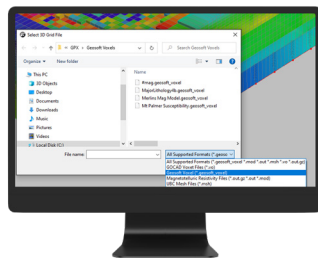
1.13. Geophysical Data handling



1.13.1. RATIONALISE 3D GEOPHYSICAL GRID STORAGE

The previous release of Leapfrog has supported geophysical grids in GoCAD, UBC and MT format. However, each was a separate implementation with different visualisation features and performance. Support for these geophysical formats has now been rationalised with consistent importation, evaluation, and visualisation.

All imported grids are now stored in an optimised internal storage with visualisation improvements in performance, transparency, filtering, subsetting and index slicing. The new grid storage paves the way for publishing of grids to Central for web visualisation. This was a step required to better support Oasis montaj Voxels, and for when we complete the publishing Geophysical Grids to Central.



1.13.2. IMPORT 3D GEOSOFT VOXELS FROM DATAROOM

To allow seamless consumption of Oasis Montaj voxels in Leapfrog, which would allow for the support of geophysical data inputs into geological modelling workflows, Leapfrog now can support the importation of Geosoft voxel grids (.geosoft_voxel file format).

1.14. Flow Modelling Improvements (Hydrogeology)

1.14.1. FEFLOW

FEFLOW grid creation has been streamlined with a new wizard that combines the 2D and 3D steps into one. In addition, all grid editing, evaluation and material properties tools have been relocated to a single dialogue on the parent.

Initial contaminant conditions in a FEFLOW model can now be set from numeric models or estimations, using simple workflows for evaluating contaminant concentrations per lithology onto grid centroids or nodes. Prior to this release, estimators couldn't be used as parameter inputs for initial conditions.

1.14.2. MODFLOW

When modelling several contaminants in a project, users want to apply the contaminants to MODFLOW and FEFLOW grids as initial conditions so that the contaminant concentration and location can be simulated through time. Prior to this release, estimators couldn't be used as parameter inputs for initial conditions.

Numeric models and estimators can now be used to create initial contaminant conditions with the following:

- Addition of material field to the Modflow and Feflow material parameter dialogues for Contaminants
- Per lithology - select a contaminant or numeric model or a constant value input.
- Export evaluations as initial conditions. Evaluate numeric models and estimators onto centroids and nodes.

1.15. Default behaviour changes

1.15.1. MULTIPLE DEVIATION DRILL PLANNER

A minor modification has been made to the multiple deviation drill hole planner. Previously, the collar position was not displayed until the first segment was created. Now the collar location is shown as soon as it is created. This immediately gives the user the direction the hole is going after each planned section leaving no guesswork or tedious side calculations.