

2021x Version News

Magic Software Architect

Released on: February 12, 2021

This release brings significant performance and scalability upgrades in key product areas: Merge, Teamwork Cloud project load, Teamwork Cloud project saving, table loading, Excel and CSV files import, and such common modeling tool operations as Copy/Paste, Find, Numbering, Element Selection, and Validation.

Version 2021x adds the ability to use layers in diagrams, automatically create legends, present diagrams or predefined sequences of diagrams in full screen to stakeholders, create compositions and aggregations in matrices, and use predefined element type filters when searching for the necessary model elements. Additionally, the Excel/CSV file import functionality has been reviewed and refreshed, and numerous improvements to Excel/CSV synchronization functionality in tables have been added.

Last but not least, project merge has been extended to give users the option to show only the changes in directly modified diagrams, hide Target and Equivalent Changes by default, and choose a specific ancestor calculation algorithm depending on merge scenario and expected outcome.

Client-side Performance Improvements

- Partial Data Loading in Tables
- Increased Excel and CSV files Import Speed
- Common Operations
 - Copy/Paste
 - Find
 - Numbering
 - Element Selection
 - Validation
- Profiling Changes in the UML 2.5.1 Metamodel

Teamwork Cloud-related Performance Improvements

- Project Merge
- TWC Project Load
- TWC Save to Local

System Requirements

Client-side Performance Improvements

Partial Data Loading in Tables

Experience enhanced table loading and scrolling performance! Thanks to the newly-introduced Load Partially mode, data is now loaded in only visible rows. There is no longer a need to wait until data is calculated in the entire table. Additionally, fast scrolling has improved; it is now considerably smoother.

Modeling and Infrastructure

- Layers Based on Legends
- Intelligent Legend Creation
- Presentation Mode
- Renewed Excel/CSV File Import
- Extended Excel and CSV Sync
- Composition and Aggregation Relationships in Dependency Matrix

Other Improvements

Discontinued Products

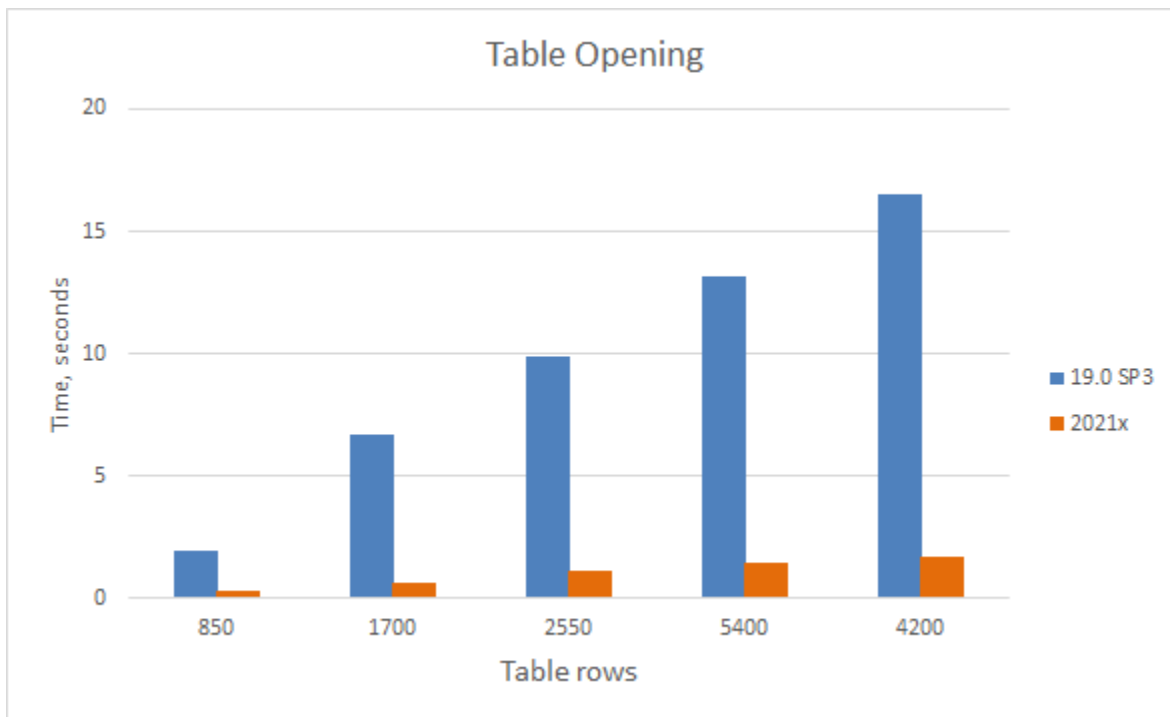
- From Teamwork Server to Teamwork Cloud
- From Cameo Collaborator for Alfresco to Cameo Collaborator for Teamwork Cloud

Collaboration

- Detecting Changes in Diagrams During Merge
- Further Merge Usability Improvements

Other Features

- Report Wizard

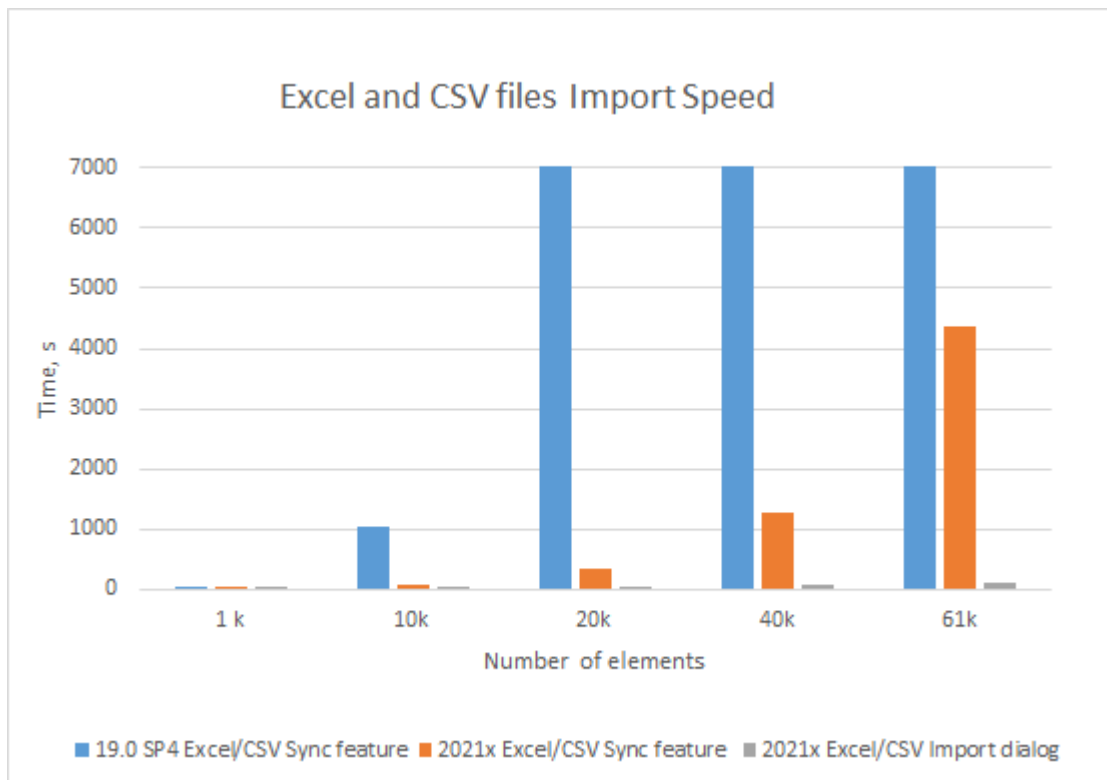


A chart comparing the opening time of Requirement Table having 7 standard columns with a different number of requirements.

[Learn more about partial loading in tables >>](#)

Increased Excel and CSV files Import Speed

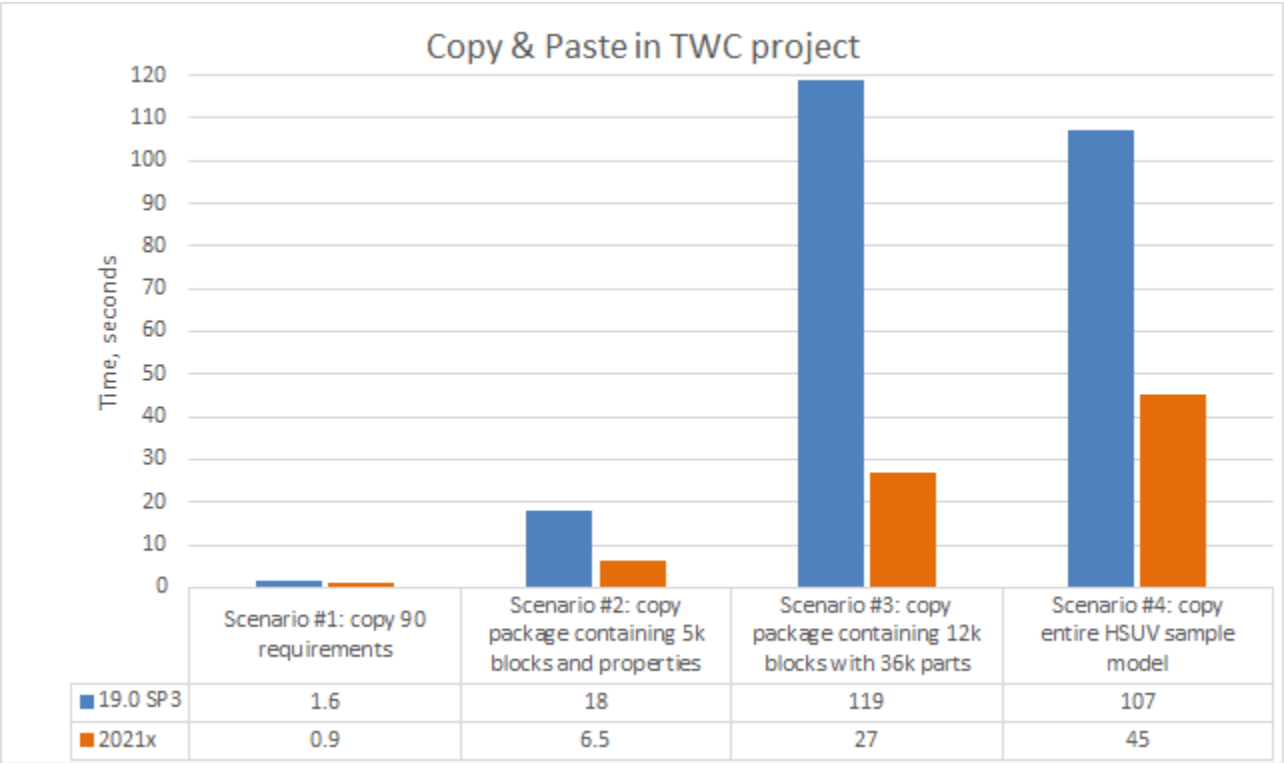
The import performance of data from an Excel or CSV file into the modeling tool adds a great experience while managing a large scope of data. The data import time using the table sync feature is significantly faster compared with the previous version (19.0 SP4). Also, the data import using the new Excel /CSV Import dialog is even better in comparison to Excel/CSV Sync feature. The import of 61k elements takes only 2 minutes (see the chart below).



A chart comparing data import from Excel and CSV files using the Excel/CSV Sync and Excel/CSV Import dialogs.

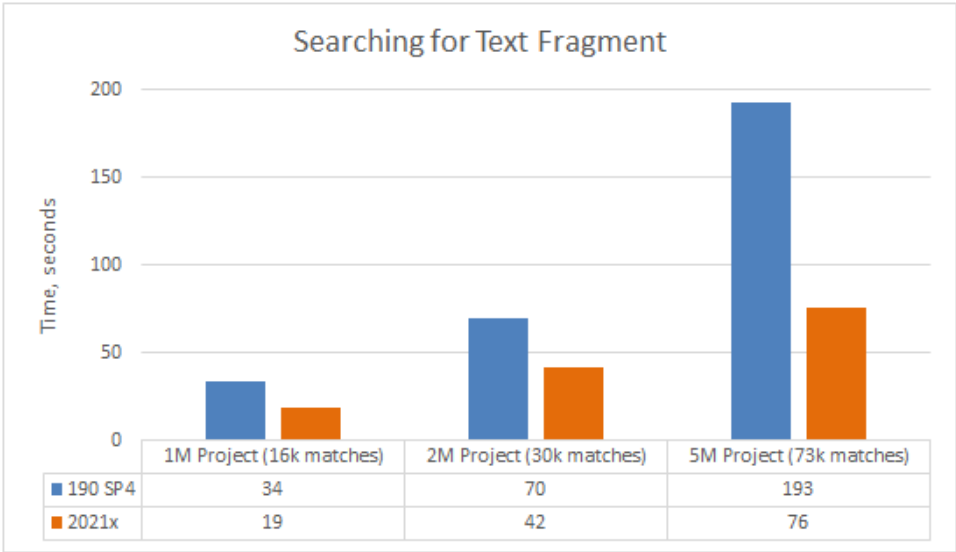
Common Operations

- **Copy/Paste.** Now you can copy and paste data 2-4 times faster depending on the specific scenario.



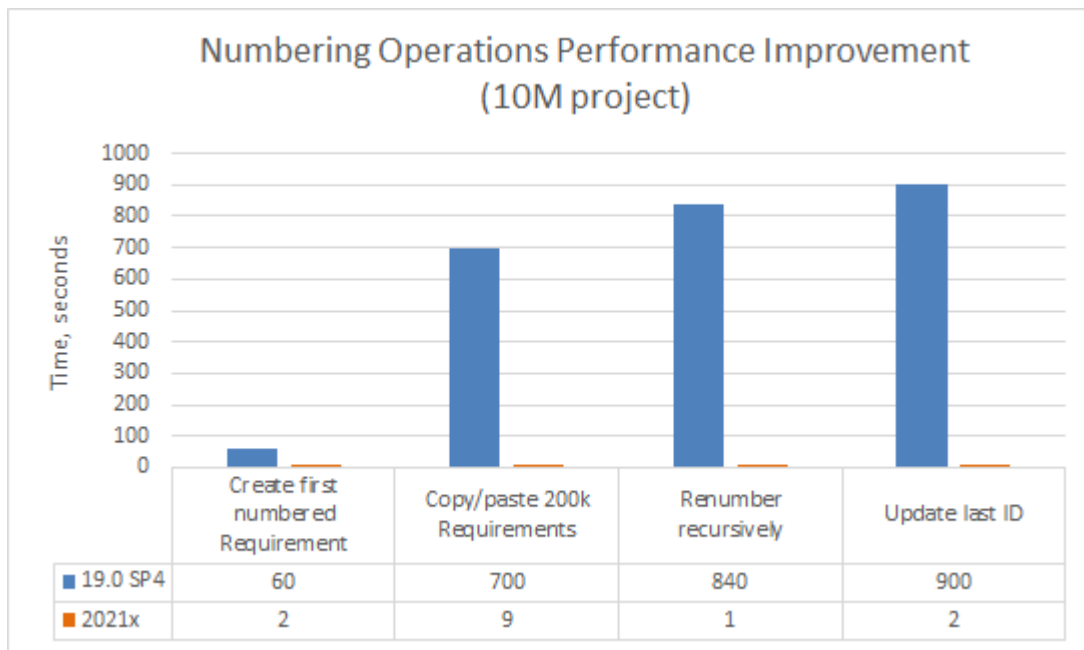
A chart comparing the copy&paste operation time in various scenarios.

- **Find.** The search speed in all texts has increased by 70-150% compared to 19.0 SP4.



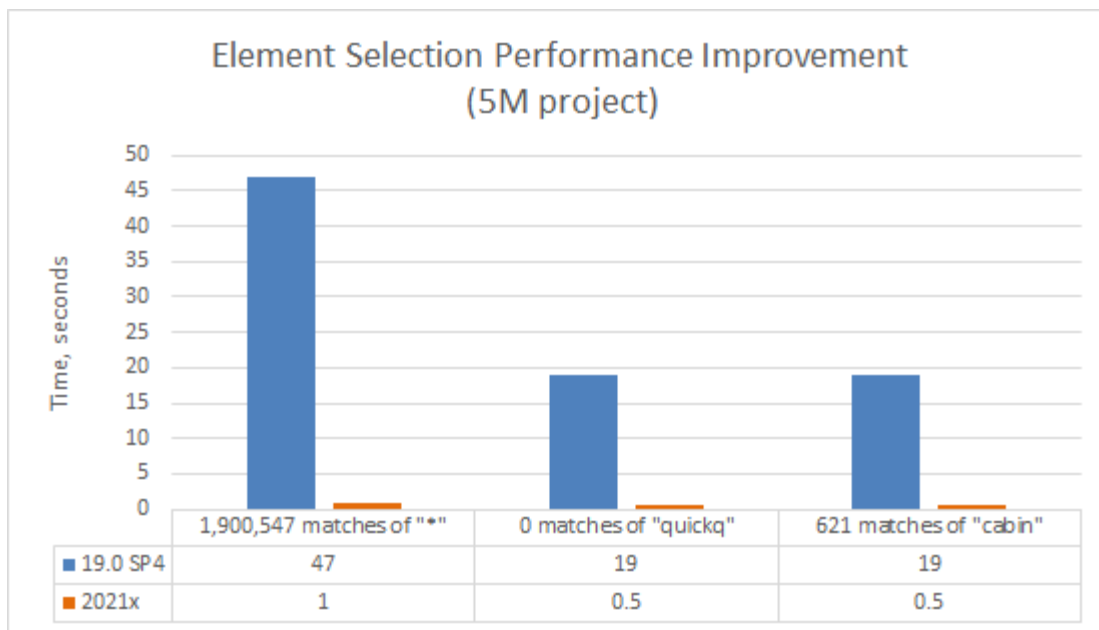
A chart comparing the Find operation speed in 19.0 SP4 and 2021x projects containing 1M, 2M, and 5M elements (including used projects).

- **Numbering.** Creating the first numbered element, copying/pasting numbered elements, renumbering elements recursively, and updating the last element ID is now 30-840 times faster.



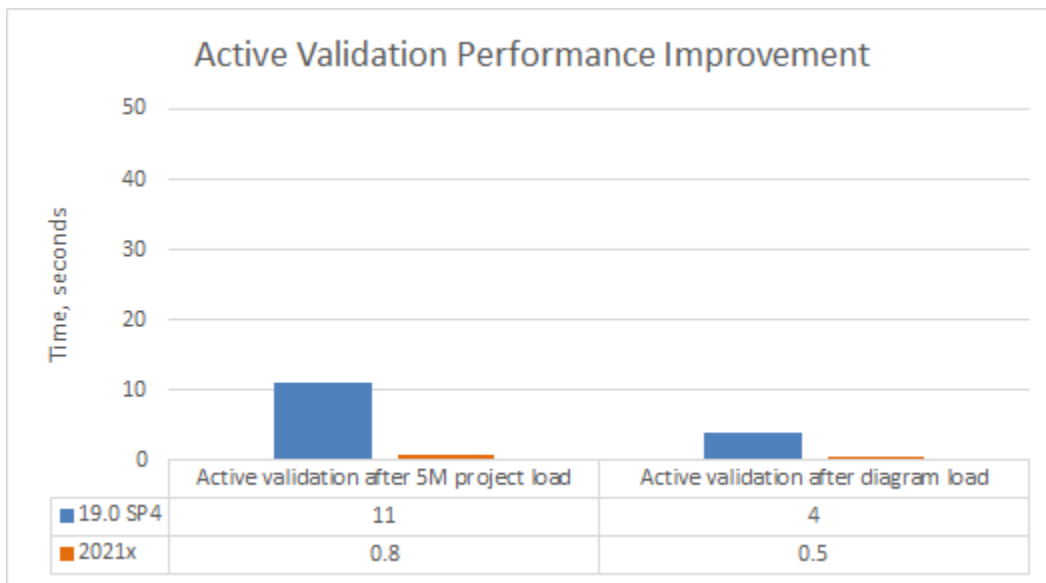
A chart comparing the Numbering operations speed in 19.0 SP4 and 2021x projects containing 10M elements (including used projects).

- **Element Selection.** Now you can search and select the needed elements (e.g., in the **Select Element** and **Quick Find** dialogs as well as drop-down lists) approximately 40-50 times faster.



A chart comparing the element selection speed in 19.0 SP4 and 2021x projects containing 5M elements (including used projects).

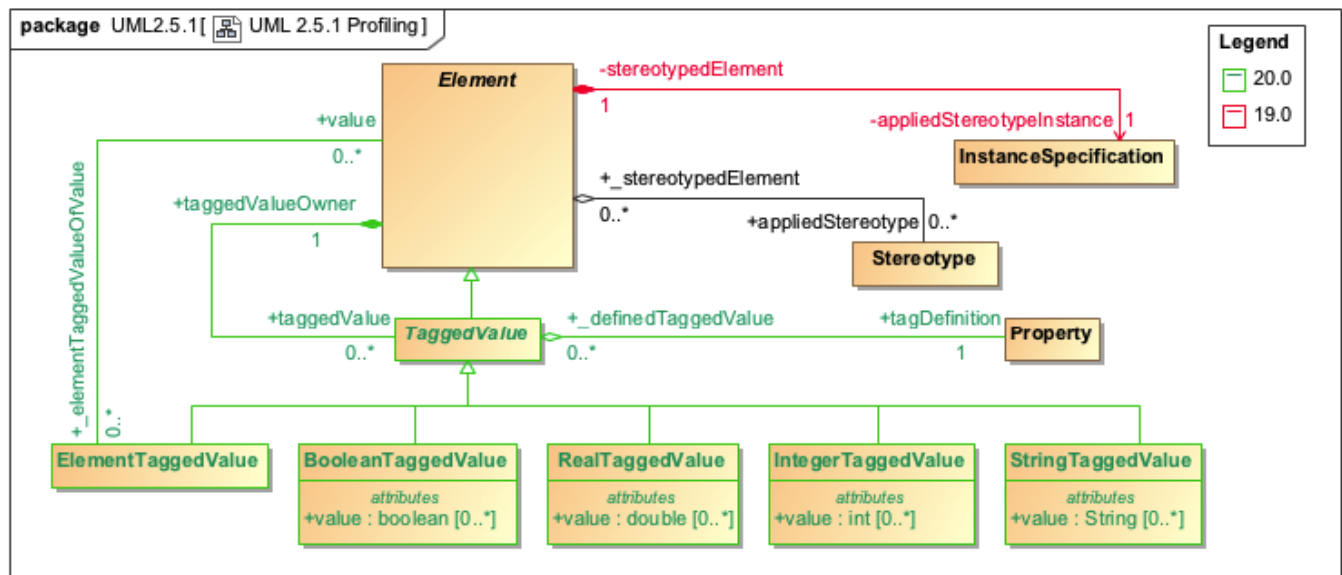
- **Validation.** The active validation of the model now takes less than a second (0.8s after 5M project load and 0.5s after diagram load).



A chart comparing the active validation speed after the project and diagram load in 19.0 SP4 and 2021x projects containing 5M elements (including used projects).

Profiling Changes in the UML 2.5.1 Metamodel

Significant changes have been implemented in the UML metamodel for improved performance. The InstanceSpecifications, Slots, and ValueSpecifications are no longer used to store profiling data. Instead, new model element types and properties are introduced, while some have been removed (see the diagram below).



Profiling changes in the UML metamodel.

As shown in the figure above, Element references the TaggedValue that is used to specify the Boolean, Integer, Real, String, or Element values of the applied stereotype properties. This approach uses fewer model elements to store profiling data, which leads to a decrease in the total number of elements in SysML and UAF projects by 40-80%.

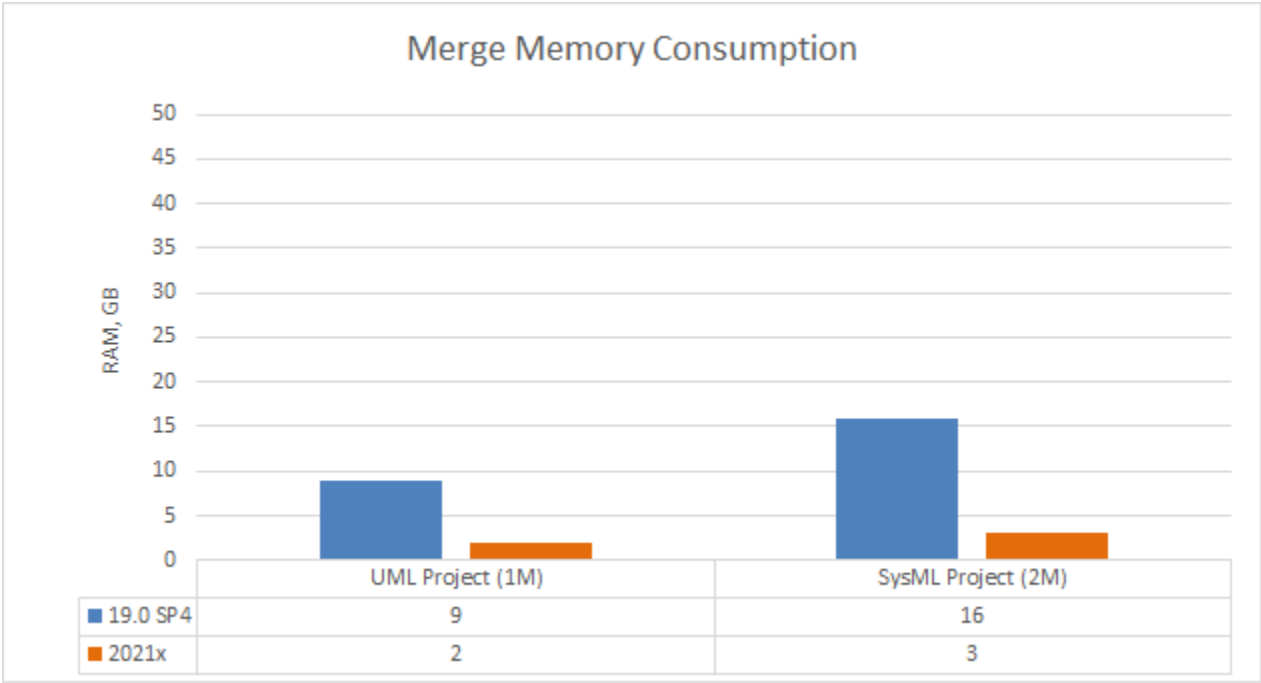
Note. Expressions based on the previously implemented profiling data storing metamodel no longer work, meaning that they have to be updated manually.

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Teamwork Cloud-related Performance Improvements

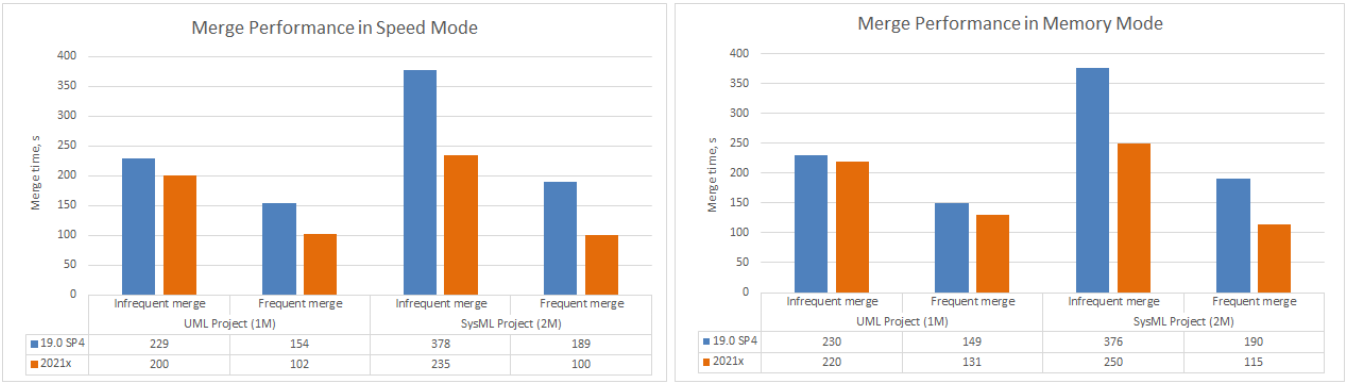
Project Merge

Project Merge has undergone considerable performance improvements. The modeling tool version 2021x requires approximately 4-5 times less memory to successfully merge two server project branches, compared to 19.0 SP4.



A chart comparing merge memory consumption in different modeling tool versions.

Furthermore, the merge operation speed has increased by 20-70% in 2021x compared to 19.0 SP4. Both frequent (between close project versions) and infrequent (between distant project versions) merges can now be performed much faster!

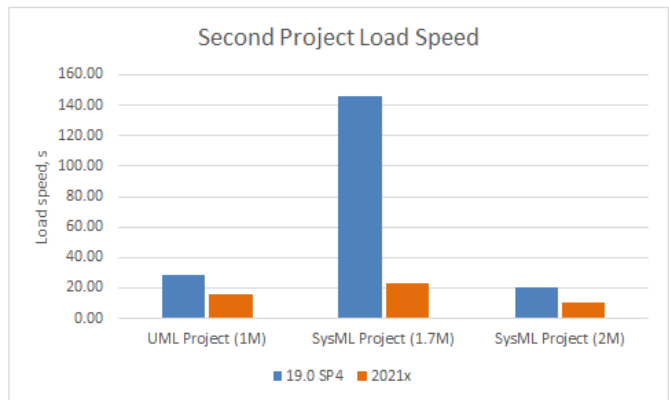
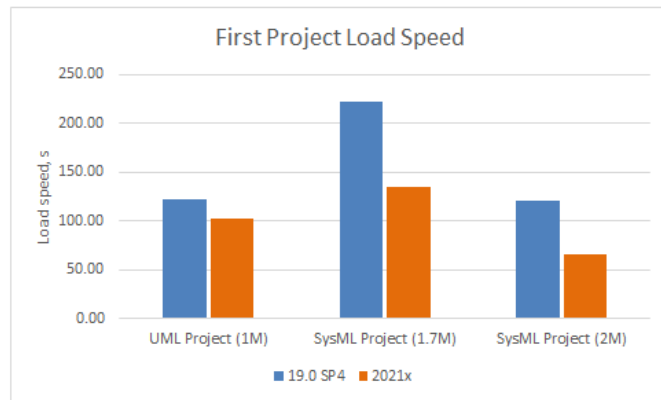
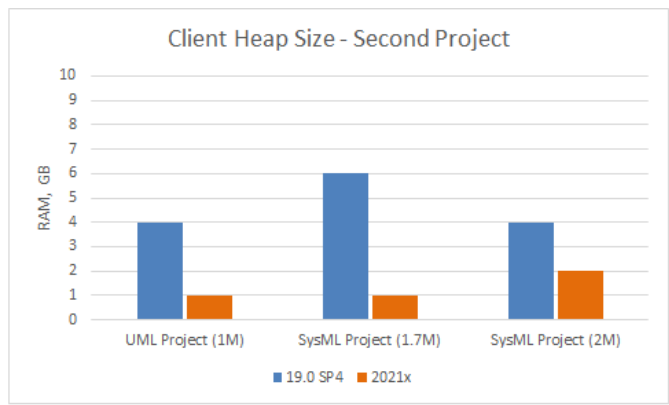
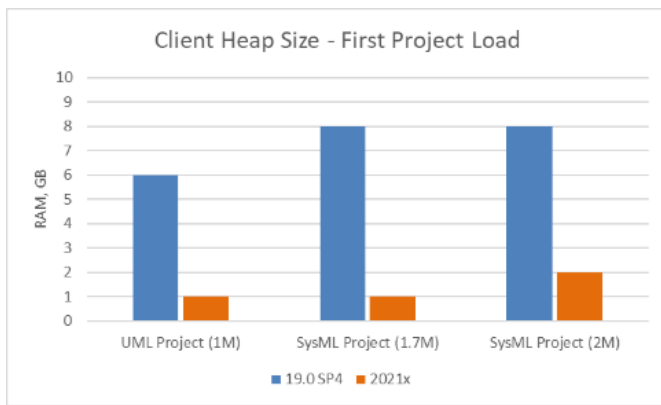


Charts comparing merge performance in Speed and Memory modes.

TWC Project Load

Project load memory and speed improvements have been implemented for Teamwork Cloud. The modeling tool now requires only 2GB of heap to load a 2M SysML project (first and second time) when working with TWC projects compared to 8GB in 19.0 SP4. Additionally, as a result of the UML metamodel changes, SysML projects are now opened 2-3 times faster.

Note. Received results cover the project load only, excluding validation, diagramming, and further modeling tool feature usage.

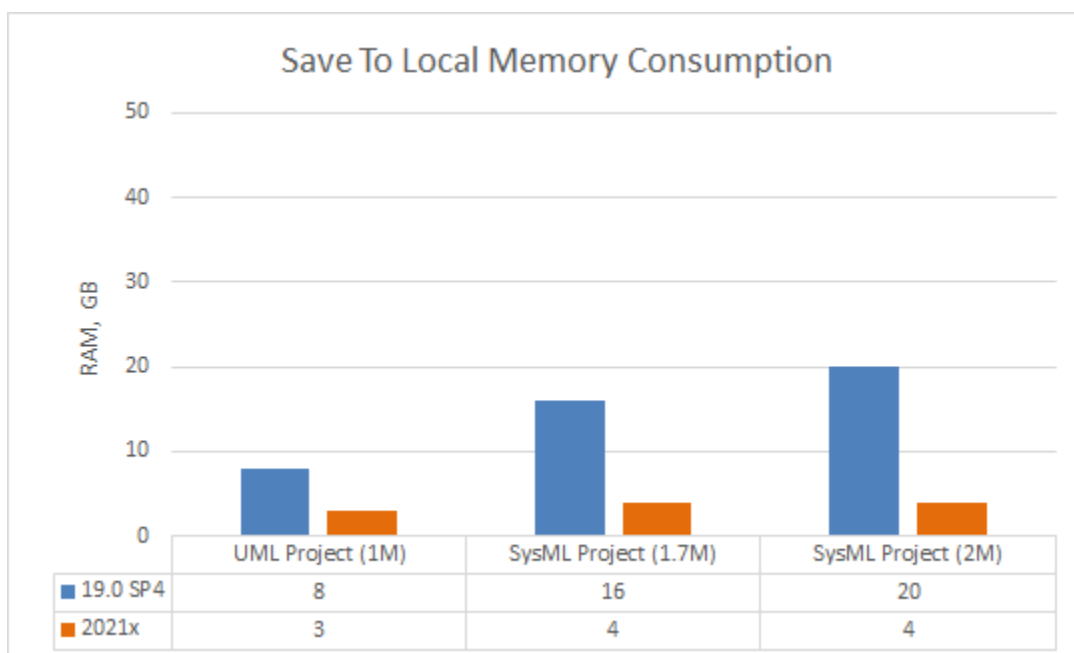


Charts comparing project load memory and speed improvements between different modeling tool versions.

- Three projects (sizes ranging from 1M to 2M) in 19.0 SP4 and the same projects in 2021x (sizes ranging from 750k to 1M) were used to run the tests.
- Migration time is excluded because projects that had already been migrated were used for testing.

TWC Save to Local

In 2021x, great attention is paid to the memory consumption and speed improvements. Saving a Teamwork Cloud project locally now requires less memory. For example, a 2M SysML project now consumes only 4GB of RAM, compared to 20GB in 19.0 SP4. What is more, the reduced project element count allows the save to local operation to be finished nearly two times faster.



A chart comparing memory consumption when saving a TWC project as a local one between different modeling tool versions.

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System Requirements

RAM and disk space requirements have been updated taking into consideration different sizes of large models. [Learn more about recommended system requirements >>](#)

Project Elements Count (including used projects)		Allocated Memory ²	Disk Space
Earlier versions	2021x and later ¹		
1.5 million	1 million	6GB	6GB
2.5 million	2 million	7GB	10GB
5 million	3.5 million	11GB	30GB

¹ the project elements count is different due to the profiling data storing metamodel optimized in 2021x.

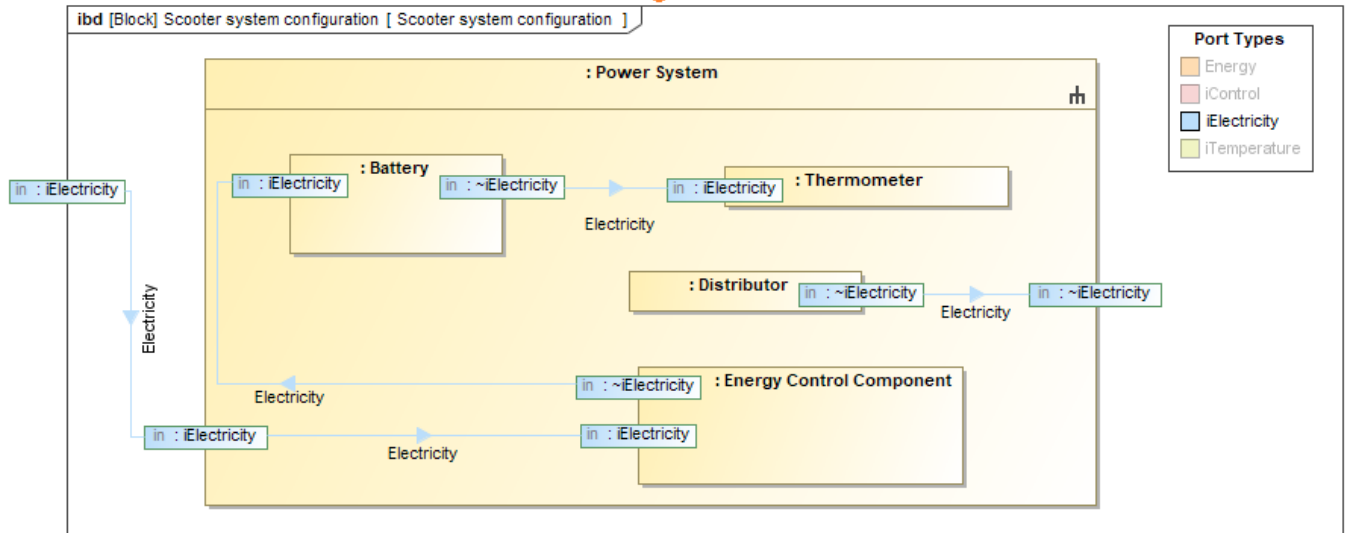
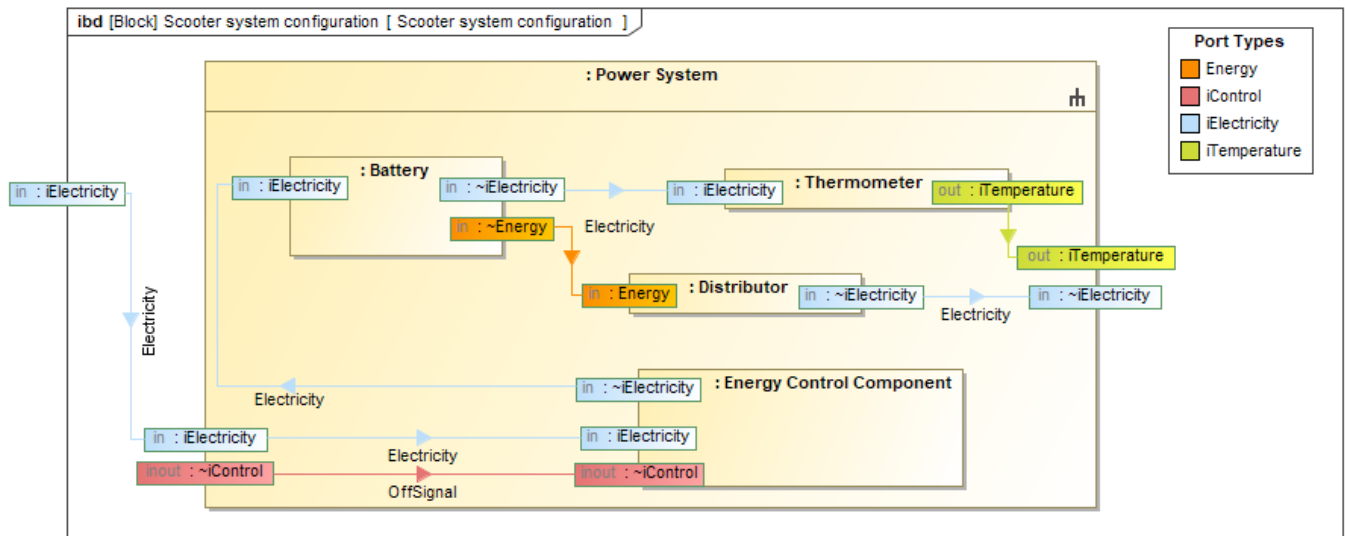
² these memory requirements are indicative and may vary by project specifics.

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Modeling and Infrastructure

Layers Based on Legends

Diagrams can get extremely crowded as a model evolves. For example, when highlighting a chosen piece of information, only one specific aspect of the system becomes a challenge. For your convenience, you can now filter diagrams by the selected Legend items to make only the necessary diagram layers stand out.

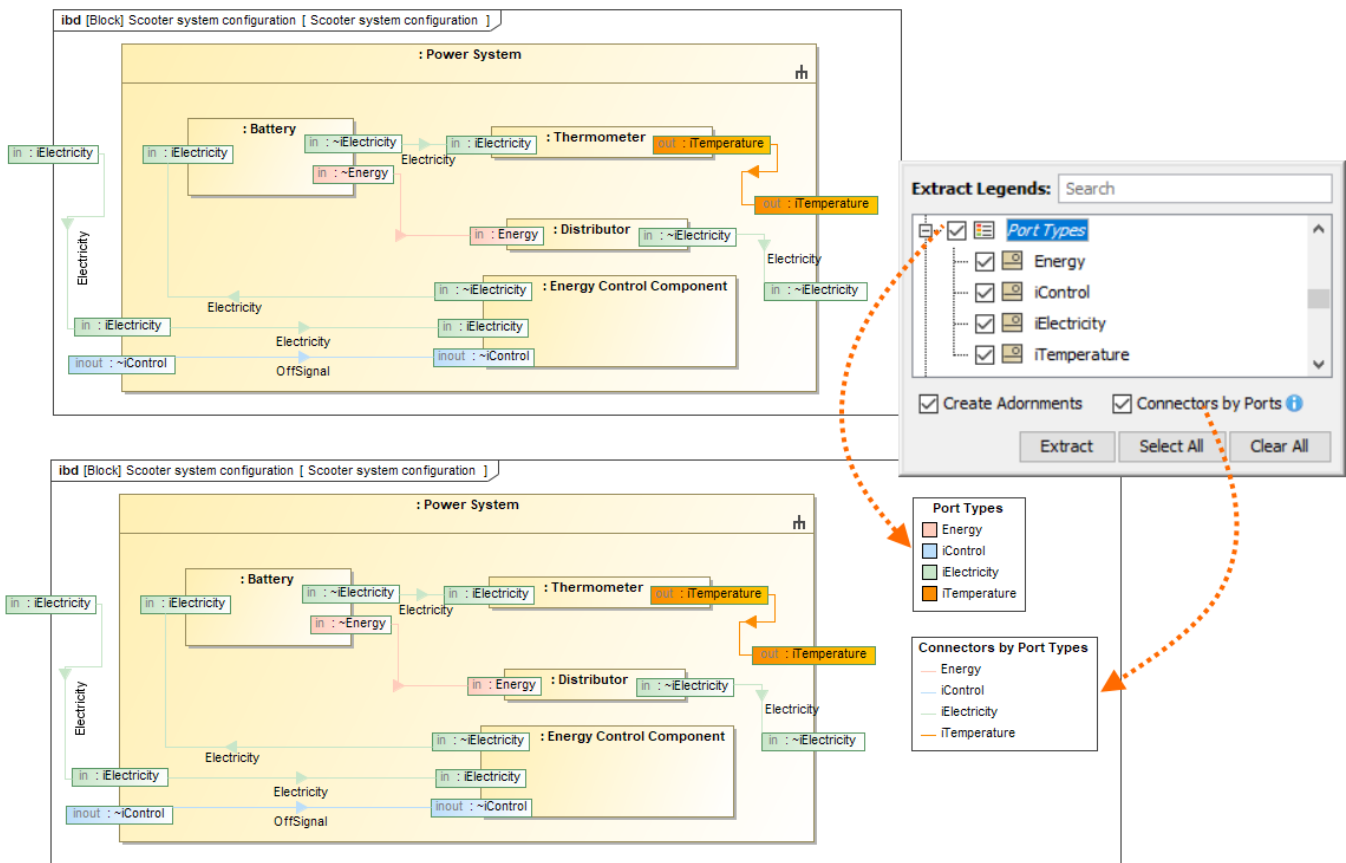


Filtering the diagram by the selected Legend item.

[Learn more about layers based on Legends >>](#)

Intelligent Legend Creation

Do you feel that Legend creation is a tiresome activity? Not at all! From now on, you can create Legends more easily than ever before: extract them automatically from the elements displayed on your diagram instead of relying on a manual creation. Additionally, you can now automatically extract Legend items for the existing Legends. Once the Legend items are created, you can customize their adornments representation. They can now be displayed as rectangular shapes or extended lines to represent paths and shapes in greater detail.



Extracting the Port Types legend according to the elements displayed on the diagram as symbols.

[Learn more about extracting Legends >>](#)

Presentation Mode

You can now present diagrams in full screen without showing user interface components, such as a model browser, diagram palette, status bar, and toolbars. That is not all! You can also define the sequence of diagrams to present one after another.

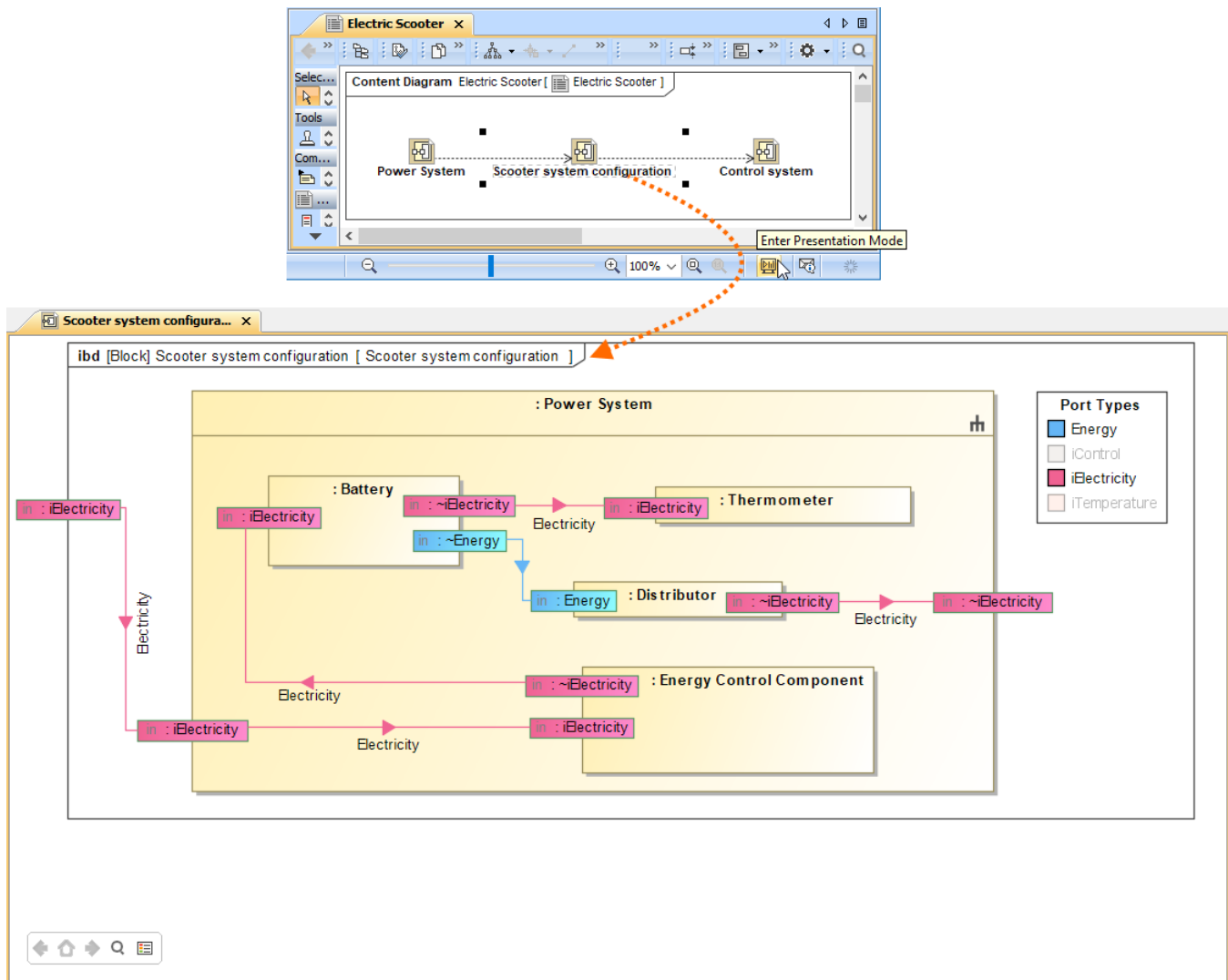
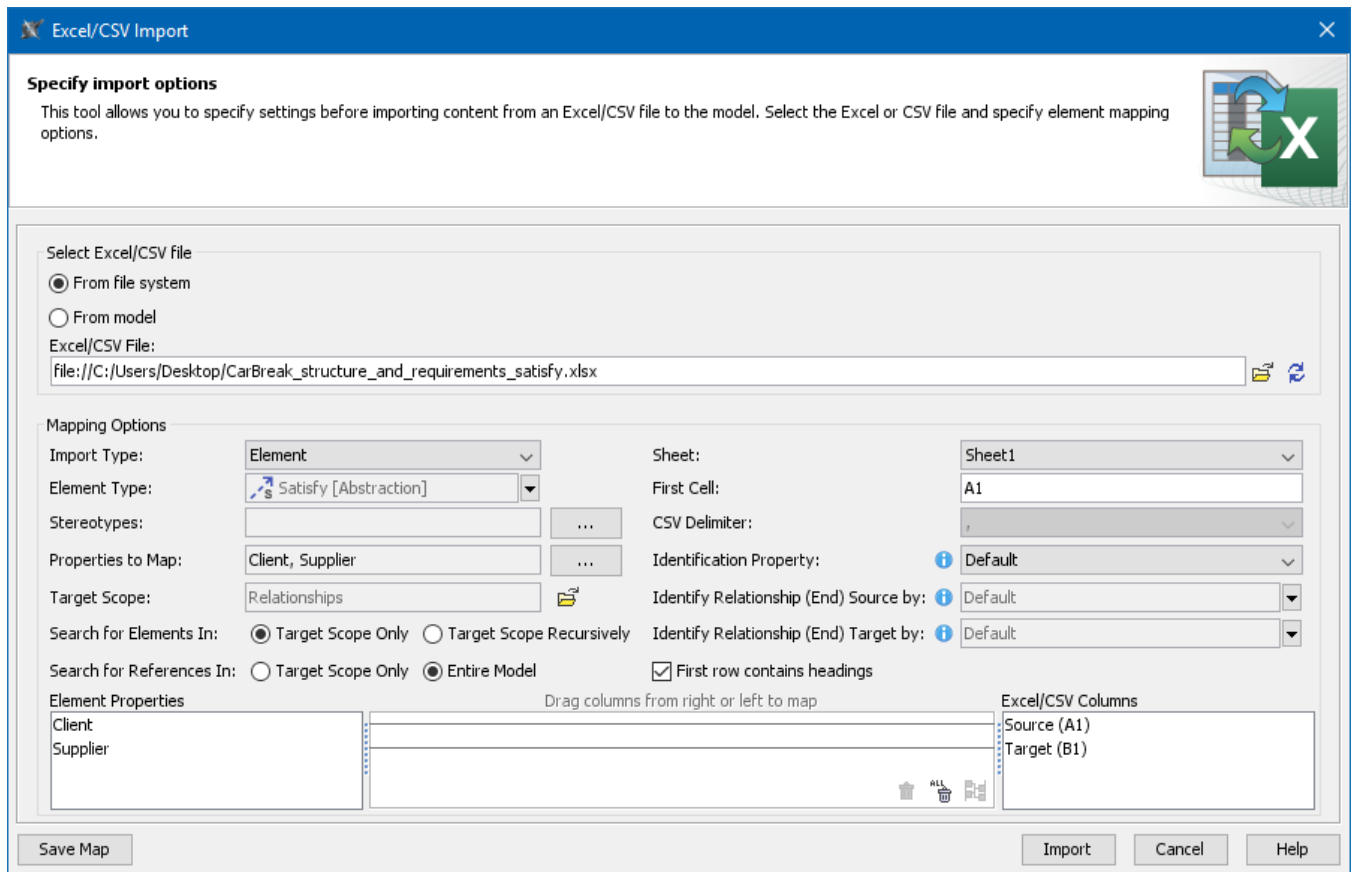


Diagram in the enabled Presentation Mode.

[Learn more about Presentation Mode >>](#)

Renewed Excel/CSV File Import

You can import data from an Excel/CSV file directly to the model without installing Excel and CSV Import Plugins (read more about [discontinued products](#)). From now on, the newly created Excel/CSV Import dialog brings an easy to use and clearly understandable graphical user interface. It allows you to import content with just a few clicks by selecting the Excel/CSV file and specifying element mapping options. Additionally, you can save your maps to reuse them, collect saved maps in groups, manage those groups, and use an entire group instead of a single map for data import.



Excel/CSV Import

Specify import options

This tool allows you to specify settings before importing content from an Excel/CSV file to the model. Select the Excel or CSV file and specify element mapping options.

Select Excel/CSV file

☒ From file system

☐ From model

Excel/CSV File:
file:///C:/Users/Desktop/CarBreak_structure_and_requirements_satisfy.xlsx

Mapping Options

Import Type: Element

Element Type: Satisfy [Abstraction]

Stereotypes:

Properties to Map: Client, Supplier

Target Scope: Relationships

Search for Elements In: ☒ Target Scope Only ☐ Target Scope Recursively

Search for References In: ☐ Target Scope Only ☒ Entire Model

Sheet: Sheet1

First Cell: A1

CSV Delimiter: ;

Identification Property: Default

Identify Relationship (End) Source by: Default

Identify Relationship (End) Target by: Default

☒ First row contains headings

Element Properties

Client

Supplier

Excel/CSV Columns

Source (A1)

Target (B1)

Save Map

Import

Cancel

Help

The Excel/CSV Import dialog with specified options for satisfy relationship import.

[Learn more about Excel/CSV file import >>](#)

Extended Excel and CSV Sync

Three improvements expanded the data synchronization between Excel or CSV files and a model:

- Unique elements. Elements to be synchronized can now be identified not only by their name, but also by element property or tag value.
- Direct relationships. From now on, you can import direct relationships between the source and target elements as easily as other elements.
- Relationship ends. When importing relationships between different elements, you can select a specific property or tag to identify the source and target end of the relationship.

Excel/CSV Sync Options

Set Excel/CSV sync options

This tool allows you to specify settings before syncing content between an Excel/CSV file and a table. Select the Excel or CSV file to sync with the table. To define syncing or mapping options, click the Details button.

Select Excel/CSV file

From file system

From model

Excel/CSV File:

file:///C:/Users/Desktop/CarBreak_structure_and_requirements_satisfy.xlsx

Sync Options

If rows in the file are deleted: Mark as obsolete

Mapping Options

Sheet: Sheet1

First Cell: A1

CSV Delimiter: ;

Identification Property: Default

Identify Relationship (End) Source by: Default

Identify Relationship (End) Target by: Default

First row contains headings

Table Columns

Name

Client

Supplier

Drag columns from right or left to map

Excel/CSV Columns

Source (A1)

Target (B1)

Details

OK

Cancel

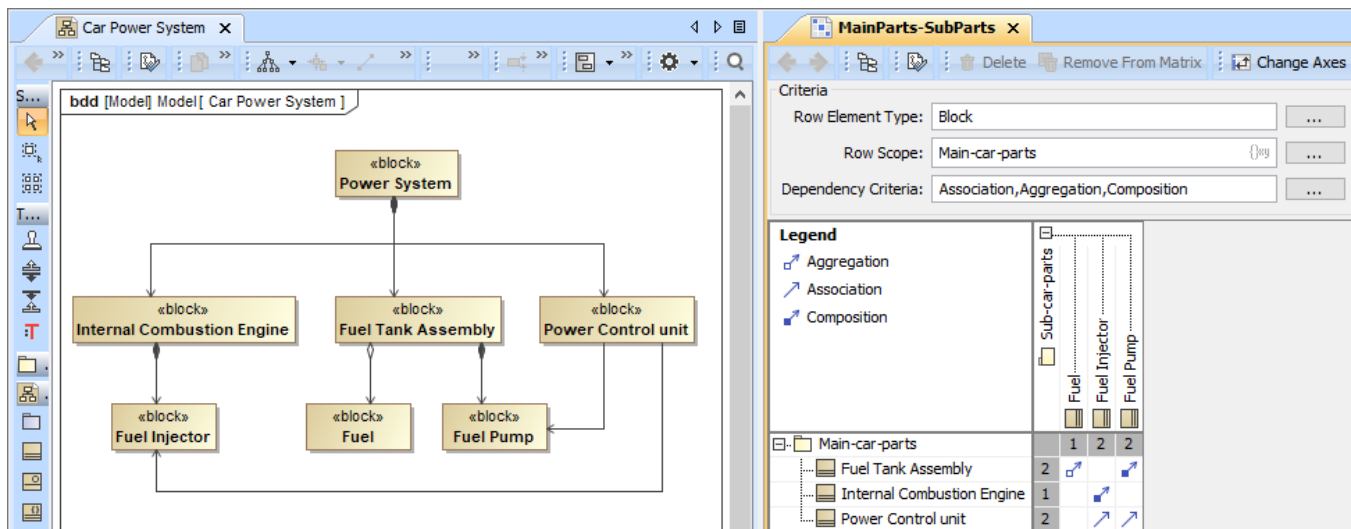
Help

New mapping options in the Excel/CSV Sync Options dialog: Identification Property, Identify Relationship (end) Source by, Identify Relationship (end) Target by.

[Learn more about Excel/CSV Sync in tables >>](#)

Composition and Aggregation Relationships in Dependency Matrix

You can now define relationships between the elements in your model more accurately! The latest release gives you the ability to create and display Composition and Aggregation relationships in a Dependency Matrix.



Creating and displaying Composition, Aggregation, and Association in a Dependency Matrix.

[Learn more about Composition and Aggregation creation >>](#)

Other Improvements

- Applying Legend items to the same element is more convenient since they are now grouped by Legend.
- A reference from the image shape to the attached image is now created when attached images are displayed as diagram shapes.
- The Diagram Tabs Limit is set to 20 to prevent high memory utilization. You can change this environment option at any time.
- The smart autocompletion command Ctrl + Space now works for the Change Event expression in a State Machine diagram.
- In the Select Element and Quick Find dialogs, elements can now be filtered by their types to narrow down search results.
- The Jython 2.7.2 version is now supported.
- The MARTE Profile version 1.2 is now supported.
- The Reader Edition is now available for all the 2021x version modeling tools. Contact your sales executive to request the license.

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Discontinued Products

- The development of the following plugins is discontinued:
 - Document Modeling Plugin (Model-based reports). For more effective model publishing and reviewing on the web, use [Cameo Collaborator](#).
 - To create Views and Viewpoints diagrams using the modeling tool with no plugins installed, use the Cameo Collaborator Publisher plugin or the SysML plugin instead.
 - The DockBook Library Profile is no longer available.
 - Methodology Wizard Plugin.
 - QVT Plugin.
 - Excel Import Plugin. We highly recommend using [Excel/CSV Sync](#) or [Excel/CSV Import](#) features instead.
 - CSV Import Plugin. We highly recommend using [Excel/CSV Sync](#) or [Excel/CSV Import](#) features instead.
 - LieberLieber Embedded Engineer plugin.
 - Project Element Counter plugin.
 - MBSE plugin.
- Web portal reports are no longer available. For more effective model publishing and reviewing on the web, use [Cameo Collaborator](#). You can also use Web Publisher (Simple HTML) or Web Publisher 2.0 ReportWizard templates to generate HTML reports.
- WSDL Code Engineering and WSDL diagrams are no longer available.
- C# Code Engineering and C# Professional Edition are no longer available.
- CIL and CIL Disassembler Code Engineering are no longer available.
- The News Reader (RSS) is no longer available. The notification at the right bottom corner of the modeling tool will inform you about the new version release instead.
- The *no_install_mac.zip* and 32-bit installation files are no longer offered for download.
- The Project Usage Map Profile is no longer available.
- The JavaScript Nashorn is deprecated with the intention of removing it. We highly recommend using JavaScript Rhino instead.
- The following 3rd party plugins are discontinued:
 - Cameo Workbench
 - Cameo Inter-Op
 - ParaMagic Lite
- The following no cost plugins are no longer available in modeling tools:
 - FAS. From now on, download it here: <https://sourceforge.net/projects/fas4md/>.
 - SYSMOD. From now on, download it here: <https://sourceforge.net/projects/sysmod4md/>.

From Teamwork Server to Teamwork Cloud

Teamwork Server is no longer supported in the latest release. Teamwork Cloud should be used as a product for collaborative modeling and model version control. Customers still using Teamwork Server must migrate their server projects to TWC 19.0 series first and then upgrade to TWC 2021x.

[Learn how to migrate from Teamwork Server to Teamwork Cloud >>](#)

From Cameo Collaborator for Alfresco to Cameo Collaborator for Teamwork Cloud

From version 2021x, Cameo Collaborator for Alfresco is no longer supported. We recommend using Cameo Collaborator for Teamwork Cloud instead.

[Learn the benefits of Cameo Collaborator for Teamwork Cloud compared to Cameo Collaborator for Alfresco >>](#)

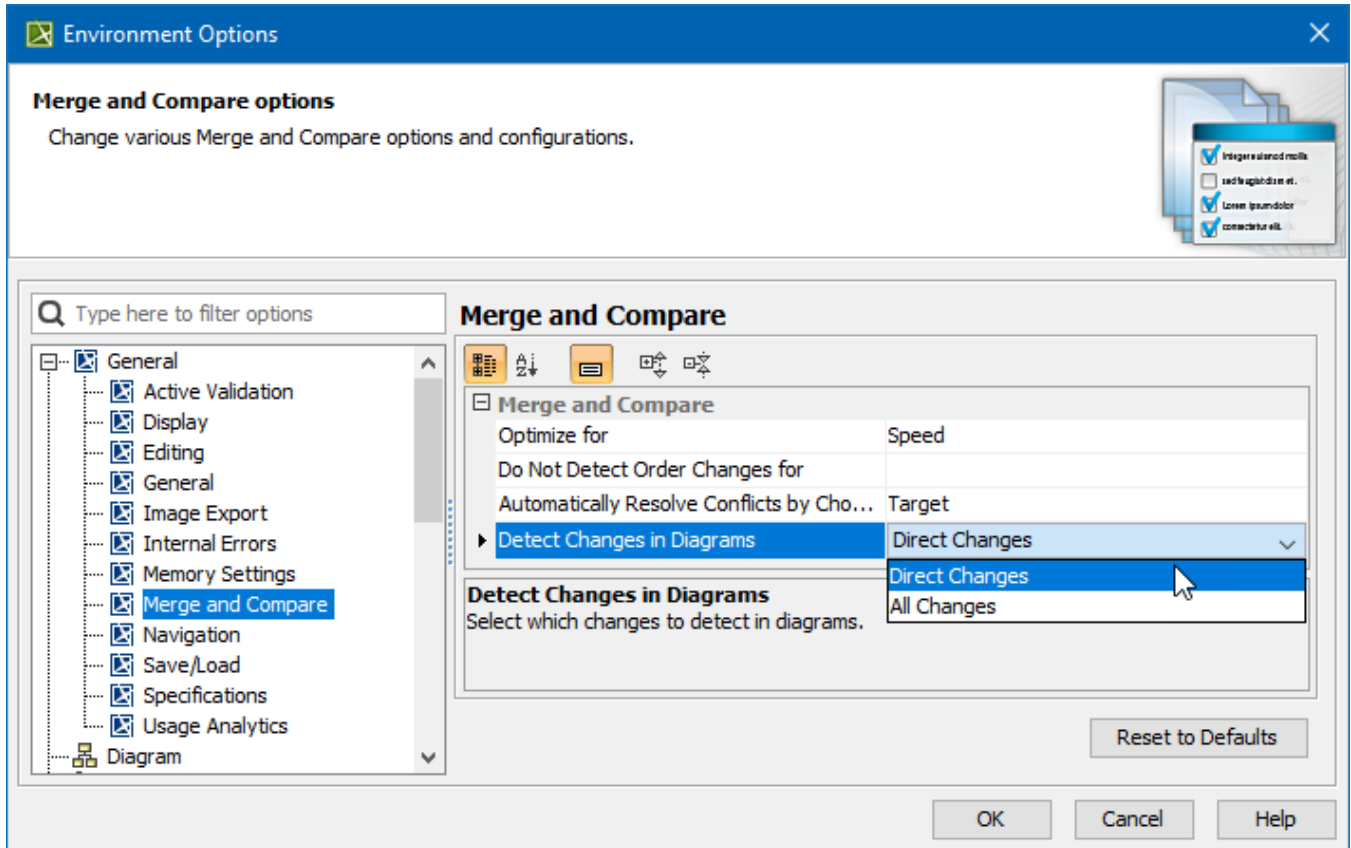
[Learn how to migrate your documents and comments from the Alfresco server to Teamwork Cloud >>](#)

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Collaboration

Detecting Changes in Diagrams During Merge

You can now specify in the **Environment Options** dialog whether to compare only the direct or all the changes in diagrams during the Project Merge and Project Comparison operations. By default, only the changes made by the user in loaded (open) diagrams are analyzed, leaving out unintentional diagram changes that occurred due to indirect changes in the model. This feature not only eases both merge and project comparison processes for the user, since the number of diagrams with changes is considerably reduced, but also optimizes modeling tool performance.



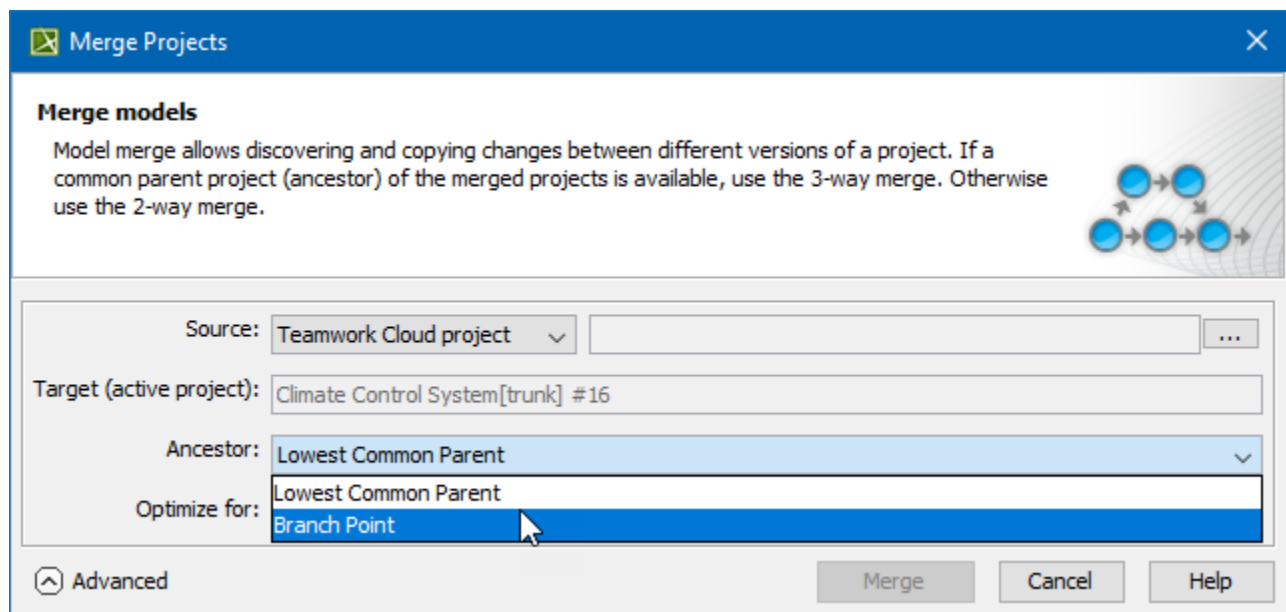
An Environment option to specify the changes to detect in diagrams.

Learn more about diagram changes in [model merge](#) and [project comparison](#) >>

Further Merge Usability Improvements

The model merge has undergone further usability improvements. From now on, changes from the Target and Equivalent Changes are automatically hidden by default; only the Source changes are shown. As a result, fewer changes need to be reviewed by the user.

Additionally, the model merge has been extended by adding a capability to select which ancestor calculation algorithm to use. You now have the freedom to choose a Branch Point as an ancestor for your merges. This is especially useful when merge results become too complex to understand and analyze due to previously rejected changes. By default, the Lowest Common Parent ancestor calculation algorithm is used.



Selecting the ancestor for future merges in the Merge Project dialog.

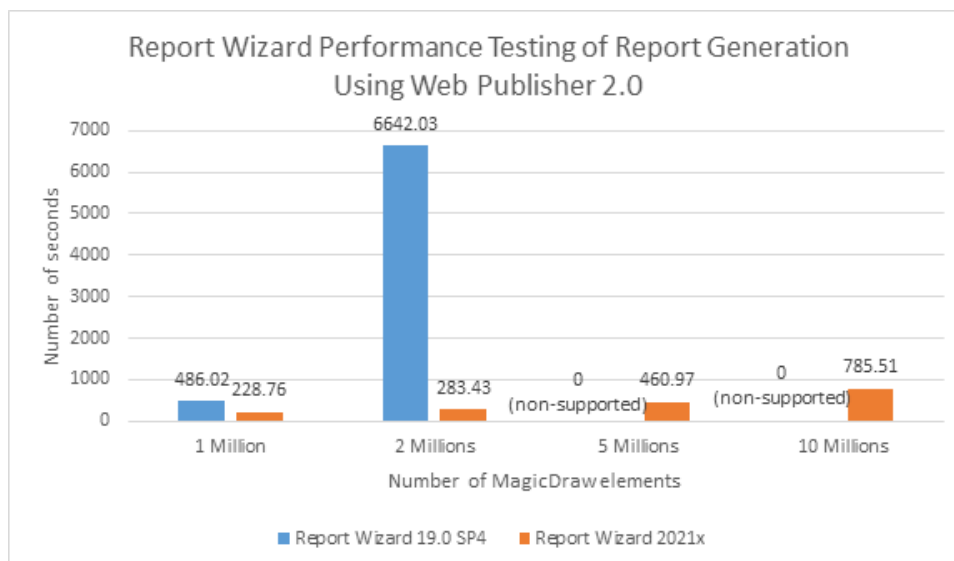
[Learn more about merge types in Teamwork Cloud >>](#)

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Other Features

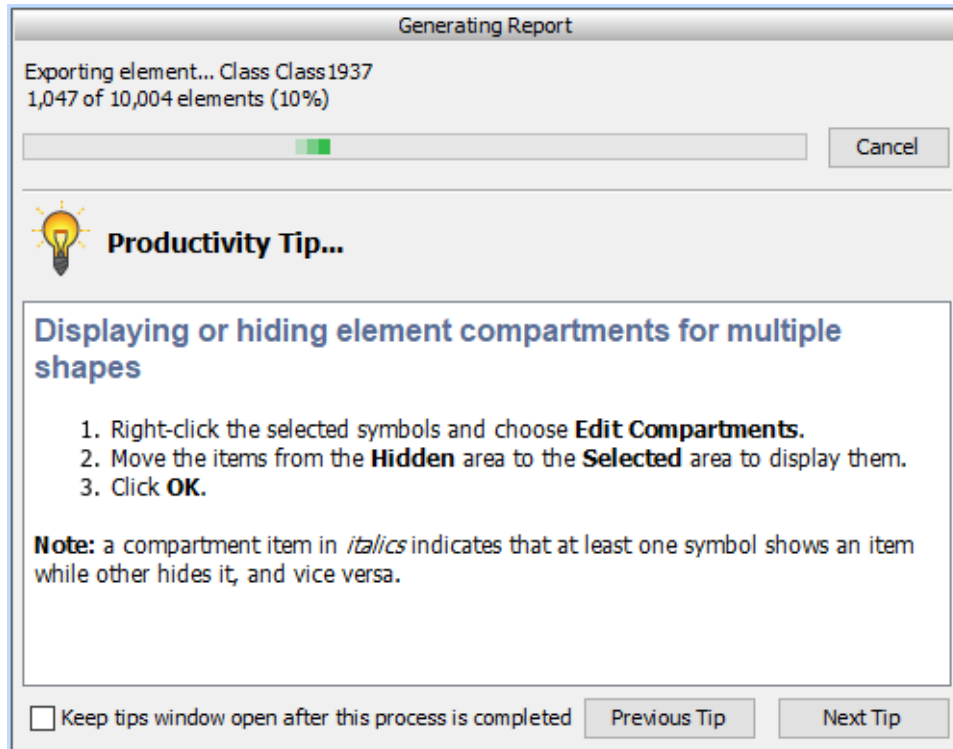
Report Wizard

- With a significant improvement in report generations for large-scale projects, Report Wizard 2021x has now been equipped to more efficiently generate reports using Web Publisher 2.0 templates of projects, with less time required and supporting more elements than earlier versions of the product.



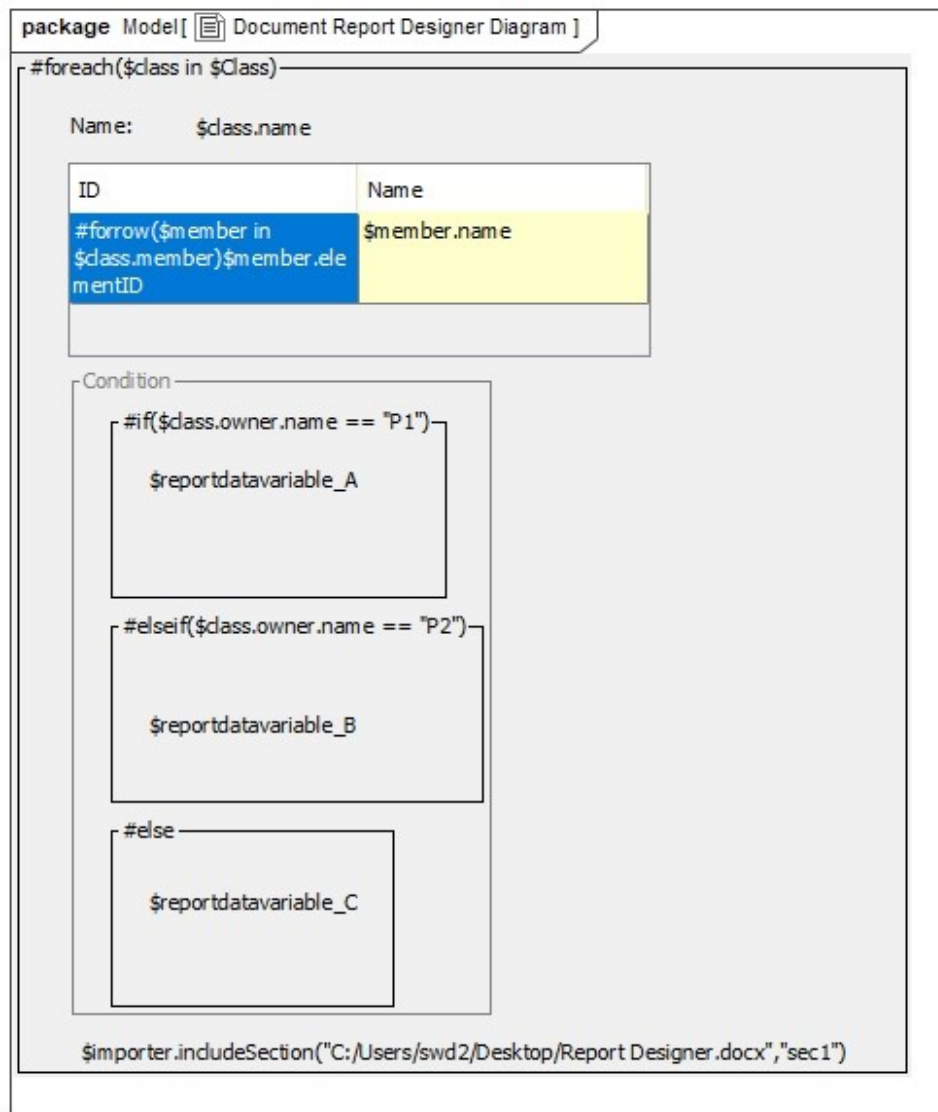
A bar chart displaying the performance testing of report generation from Report Wizard 19.0 SP4 and 2021x using Web Publisher 2.0.

- You can view the overall progress of generating reports deploying Web Publisher 2.0 through the progress bar and its displayed success percentage.




The progress bar with the success percentage shown above when generating reports using Web Publisher 2.0.

- A more effective tool of the Document Report Designer diagram is now available for conveniently drafting and designing new extensive templates of the Microsoft Word Document (DOCX) format. [Discover more about Document Report Designer >>](#)



Document Report Designer for drafting and designing new templates of the Microsoft Word Document (DOCX) format.

- With the Spreadsheet Report Designer provided in Report Wizard 2021x, you are now capable of effectively designing and generating Microsoft Excel Spreadsheet (XLSX) format. [Find out how to use Spreadsheet Report Designer >>](#)

package Model[
 Spreadsheet Report Designer
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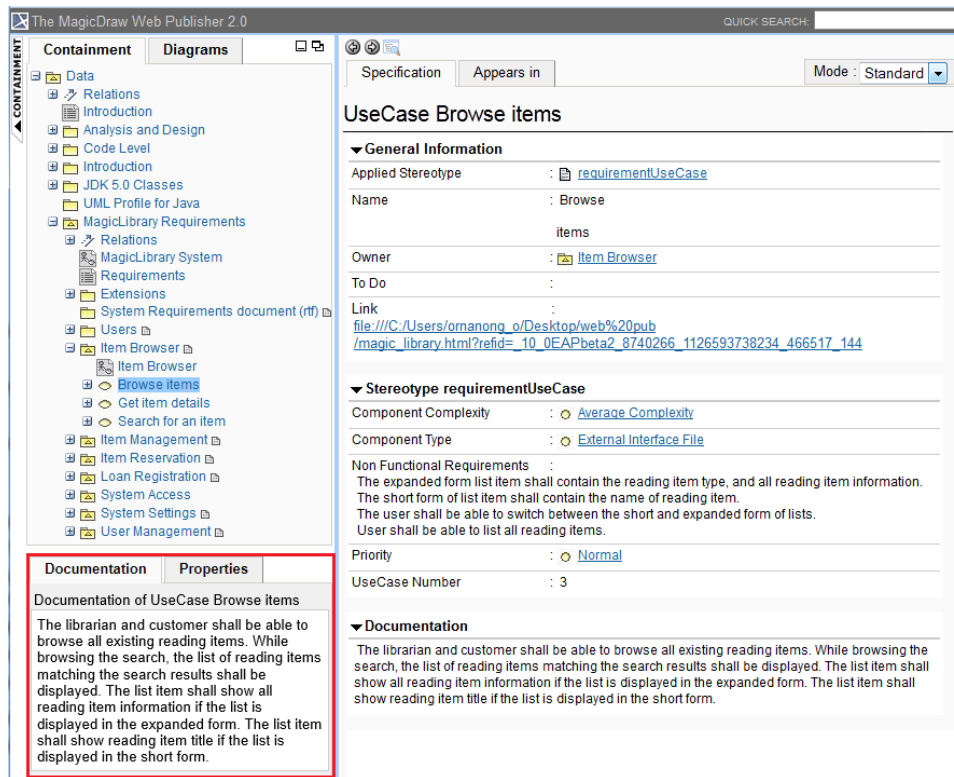
Name	Attribute	Documentation
#forrow(\$class in \$Class)\$class.name	\$class.attribute	\$class.documentation#endrow

Interface Name	Documentation
#forrow(\$interface in \$Interface)\$interface.name	\$interface.documentation#endrow

#forpage(\$signal in \$Signal)	
\$signal.name	\$signal.toDo
#endpage	

Spreadsheet Report Designer for designing and generating the Microsoft Excel Spreadsheet (XLSX) format.

- Web Publisher 2.0 now has the **Quick properties** panel, at the lower left (similar to MagicDraw), to show the documentation settings in the **Documentation** tab and properties in the **Properties** tab of elements selected in the diagram and from the Containment tree. [Learn more about the new Quick properties panel >>](#)



The Quick properties panel: Documentation and Properties tabs.

- The capability of **\$report.isEmpty(obj)** has been specially improved to check HTML String whether it is empty or not. [Learn more about using this report tool >>](#)
- The multi-field sorter is now available as a function for sorting a collection of elements in ascending or descending order by deploying multiple sorting properties, rather than merely a single property as in previous versions. [Find out more about the multi-field sorter >>](#)
- You can now sort elements by using a tag in applied stereotypes, regardless of being customized. [Learn more about this capability of the sorter tool >>](#)
- You can utilize a new sorter function for sorting elements as they appear in the Containment tree. [Discover how to use this sorter tool >>](#)
- With a new option reducing XML meta-data file name length, the error of Web Publisher 2.0 files with lengthy names has been fixed. [Know more about this report variable in Web Publisher 2.0 >>](#)
- Single or double quotes can now be interchangeably used in both of the **#includeSection** and **#sectionBegin** directives and **\$import**. **includeSection(templateName, sectionName)** of the Import Tool.
- You can now access and list property objects (including DSL) classified in the PropertyGroup of customized stereotypes. [See how the report tool works this way >>](#)
- Reference bookmarks and their links can be created for DOCX numbered items. [Learn about using these bookmark tools >>](#)
- Functions for displaying lists of properties in property groups for given elements and stereotypes are ready to use. [Learn how to use this group of report tools >>](#)

Other

- The automatic UAF, SysML, and BPMN project migration has been enhanced. The projects are migrated silently and now no additional confirmation is required.

Key Issues Fixed

The following key issues have been fixed with this version:

- The modeling tool no longer freezes when a tooltip with a special character is displayed.
- Multiple values are now pasted correctly from the Excel file to the table cell in the modeling tool.
- Part properties are now shown with dot notation after merge.
- The containment tree can now be maximized without any problems.
- Actions can now be inserted into the body of a nested conditional node as part of the body.
- Messages referenced by the formal gates are no longer lost after the update.
- The Show Suspicious action no longer triggers the calculation of Smart Packages that fall into the tracking scope.
- The non-ending search problem when performing another operation while search was running no longer occurs.
- Cyclical usages are no longer created during package export to a new server project.
- The association relationship direction now has a correct direction after the creation of a Part property.
- The filter now finds elements in tree-view tables when table nodes are collapsed.
- The offline project name is now automatically updated.
- An error no longer appears when using a valid URL as a hyperlink.
- The MBPLE activity branch existence preview is now displayed correctly.
- The MBPLE variant preview is now much faster.

- Diagram info is now shown for a newly created diagram.
- Recovered elements no longer appear in the model after changing the used project version.
- Requirements are no longer displayed in tables when they are removed from the table scope.
- The usage of recovered elements is now detected correctly.
- The Metachain Navigation results are now refreshed when a new step is inserted.
- A correct direction flow is shown when applying ItemFlow to Connector between Ports of nested parts of the same type.
- Deadlocks no longer occur when opening diagrams.
- Dragging multiple selected parts in Internal Block Diagram now works properly.
- The table filter no longer finds text in the wrong columns.
- Element history retrieval is now much faster.
- Changing the user role is now correctly reflected in an offline project.
- Teamwork Cloud projects can now be successfully exported into .mdzip.
- A project can now be added to Teamwork Cloud with default getESI settings without any problems.

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Magic Software Architect Documentation

- [Magic Software Architect 19.0 LTR SP4](#)
- [Magic Software Architect 19.0 LTR SP3](#)
- [Magic Software Architect 19.0 LTR SP2](#)