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CUSTOMER RESOURCE OPTIONS

Supporting users throughout their entire journey of learning model-based systems engineering (MBSE) is central to Vitech's mission. For users looking for additional resources outside of this document, please refer to the links below. Alternatively, all links may be found at www.vitechcorp.com/online-resources/.



Webinars

Immense, on-demand library of webinar recordings, including systems engineering industry and tool-specific content.



Screencasts

Short videos to guide users through installation and usage of GENESYS.



A Primer for Model-Based Systems Engineering

Our free eBook and our most popular resource for new and experienced practitioners alike.



Help Files

Searchable online access to GENESYS help files.



Technical Papers

Library of technical and white papers for download, authored by Vitech systems engineers.



Technical Support

Frequently Asked Questions (FAQ), support-ticket web form, and information regarding email, phone, and chat support options.



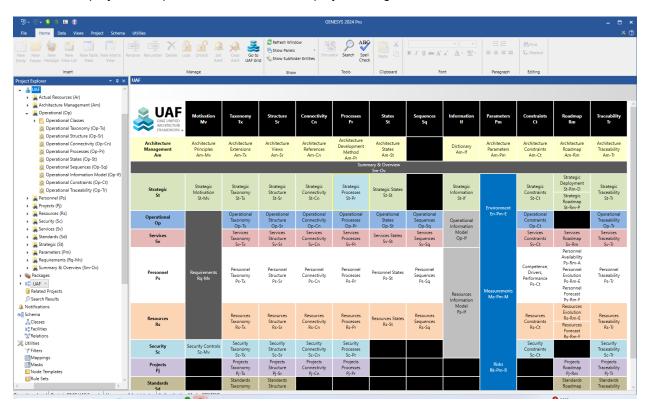
GENESYS 2024, released on December 24, 2024, is the latest and most robust version of Vitech's flagship MBSE platform. Many new capabilities and changes are introduced in this release to facilitate project and model management, improve usability, and help engineers do their jobs more effectively.

GENESYS ARCHITECTURE / INSTALLATION IMPROVEMENTS

With the release of GENESYS 2024, the dependency on Microsoft® SQL Server® Express for the local repository has been removed. An in-process database has been implemented and replaces SQL Server Express. The result is that installation is faster with fewer prompts. Additionally, the removal of the dependency means that this and future releases of GENESYS will function on Windows computers using ARM-based processors as well as virtual machines on current Apple hardware. Note that GENESYS Server still requires Microsoft® SQL Server®.

SUPPORT FOR UNIFIED ARCHITECTURE FRAMEWORK® (UAF®) 1.2

A common framework used in defense as well as commercial organizations, GENESYS 2024 now supports the creation of projects using the UAF 1.2 specification¹. Upon creation of a new project using the UAF schema, the project will open in GENESYS and display a UAF grid as shown below:

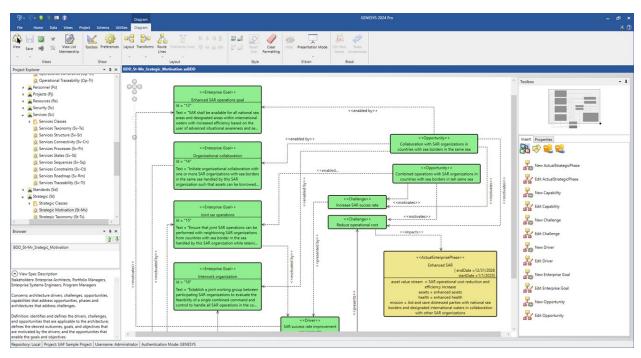


The UAF 1.2 implementation in GENESYS includes all UAF 1.2 *model kinds*, *domains*, and *viewpoints*. The UAF Project Explorer layout is organized for easy navigation with top-level folders representing domains and subfolders for all owned classes and viewpoints. Each *viewpoint* supports the UAF 1.2-defined visualizations as well as table views. In-tool descriptions of each UAF viewpoint are available on the diagram pallet.

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¹ Note: UAF is only available with GENESYS Pro edition.



UAF Viewpoint Visualization and Description

PROJECT ORGANIZATION

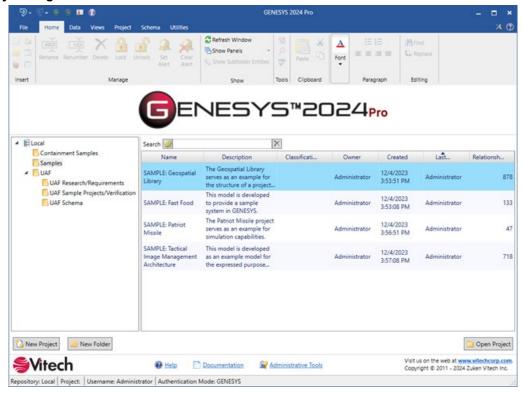
GENESYS 2024 features a redesigned project window, providing many new features and capabilities to allow the organization of your projects by folder, subfolder, and metadata, along with the ability to search through your existing projects.

Old Project Organization





New Project Organization



With this updated approach, organizations will be able to more effectively organize, browse, and search for projects. The same structure is implemented in administrative tools and file import/export operations, making for a consistent experience throughout GENESYS.

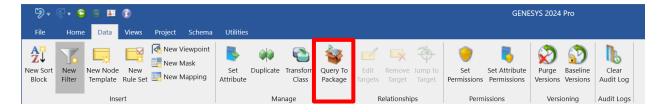
PROJECT OWNER

GENESYS 2024 now includes a Project Owner field. This is used to indicate the contact person with organizational project ownership responsibilities. This is not necessarily the GENESYS administrator of the project. The Project Owner can be set in the property sheet of the project.

QUERY TO PACKAGE

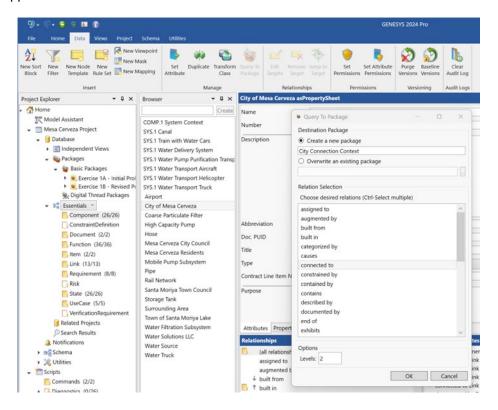
Automating the organization of model entities is critical to ensuring large models are easy to navigate and explore. GENESYS 2024 introduces a new capability called Query To Package, which allows a user to select an entity or entities and the associated relationships you want to query. The selected entities, relationships, and target entities will then be placed in either a new basic package or an existing package, depending on the selection in the query.

Query To Package (QTP) is located on the Data menu. It is visible when model entities are selected.

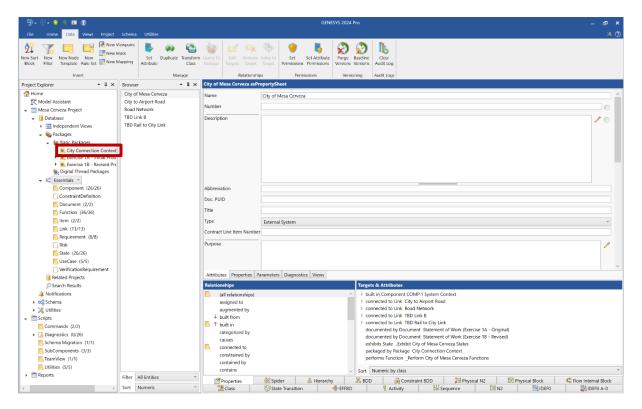




After selecting the desired entities on which to perform the function and clicking the QTP icon, the following screen will appear:



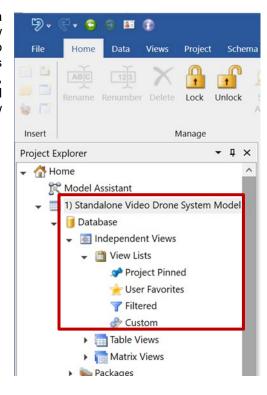
A new package will be created with all target entities with the "connected to" relationship from City of Mesa Cerveza. The results are shown below.





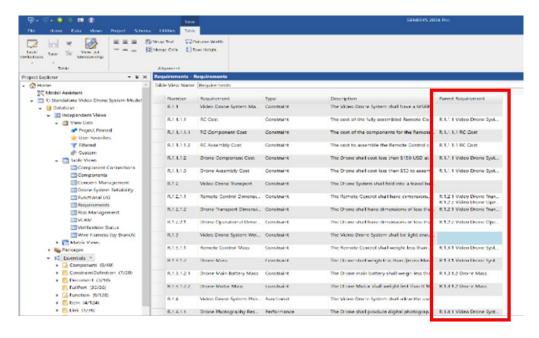
INDEPENDENT VIEWS

The Independent Views container, which provides a comprehensive approach to organizing and managing View Lists, Table Views, and Matrix Views, has been moved up to the top of the Project Explorer. The effect of this change is that common views used across the project (Project Pinned), views that a user frequently uses (User Favorites), and dynamic lists will be easier to locate and access for both new and existing users.



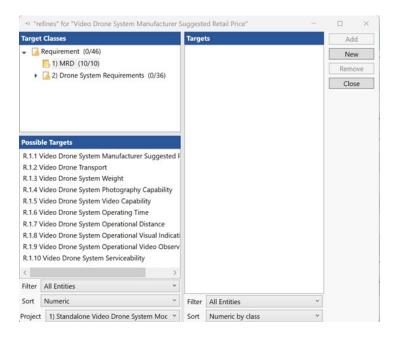
Relationship Editing in Table Views

Table Views in GENESYS are not only used for presenting model data in a tabular view. They can be used to create and modify model data. With GENESYS 2024, the ability to add or edit relationship targets directly in an active table view is now available. For example, in the table below, the parent requirement is a target class, shown in the red rectangle.



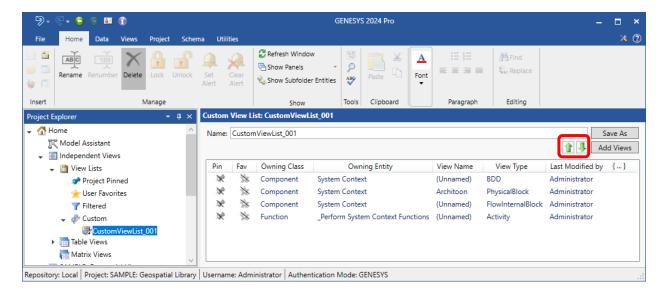


To use this, double-click on a cell with a possible relationship target (for example, any of the cells in the red, highlighted column above). Once this is done, the standard target selection dialog will appear. Notice the title bar of the dialog box where it displays the "refines" relationship, indicating that the requirement entity on this row of the table refines the selected parent requirement. This capability extends the usefulness of Table Views for editing model data.



Manually Ordering Views in a View List

View Lists help organize views that may be spread out across folders and entities in the model into cohesive, purpose-driven lists that facilitate locating and accessing important model data and visualizations. In addition to ascending and descending sorts by selected column, you can now manually order the views in the list using the move up/down arrows. This functionality is supported in all view lists except for Filtered Lists.





UI/UX IMPROVEMENTS

Matrix View Improvements

Matrix View load times have been significantly improved. The table below shows a comparison between GENESYS 2023R2 and GENESYS 2024 performing different operations on a 1000 component by 1000 function matrix.

	Load Entire Matrix	Update Single Relationship
GENESYS 2023R2	1m 23s	1m 23s
GENESYS 2024	17s	<1s

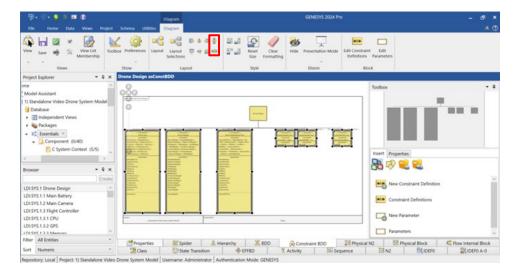
Grab and Pan

All Diagram types in GENESYS now can be panned by simply pressing and holding the wheel or middle mouse button. When the mouse cursor changes to a hand icon, the user can then grab and pan the diagram, moving the diagram to the desired location.

Distribute Nodes

The Distribute Nodes function allows you to select nodes (a minimum of 3) using shift-select in a diagram. Once all the nodes are selected, you can select distribute nodes horizontally as well as vertically, depending on the selected command. If you choose to distribute horizontally, GENESYS will take the space between the left-most and right-most edges of the selected nodes, and divide the space evenly based on the number of selected nodes such that the space between the nodes will be evenly distributed. If you choose to distribute vertically, the same function is performed based on the top-most and bottom-most edges.

In the screenshot below, you can see uneven horizontal spacing between the constraint blocks. Instead of manually adjusting the spacing, you can shift-select all the blocks and click on the Distribute Horizontally command, which is the bottom icon inside the red rectangle (the top icon is the Distribute Vertically command). Note that these icons are greyed out until the nodes you wish to distribute are selected.





After executing the command, the nodes will be distributed evenly and appear as below.

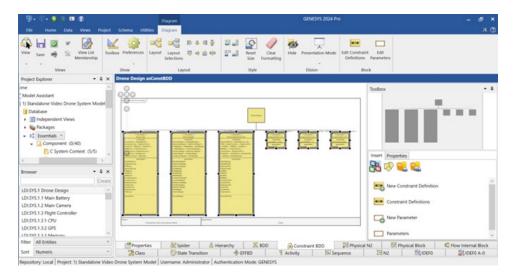


Diagram Load Improvements

Large Spider diagrams now load 20-30% quicker than in previous releases. This is particularly noticeable in spider and hierarchy diagrams. The degree of impact depends on whether you are accessing the project from a local or remote repository. Additionally, project complexity and size are key factors. The most significant impacts are seen with remote repositories, where the reduction in load time is typically in the 50-70% range in all the test scenarios that were conducted.

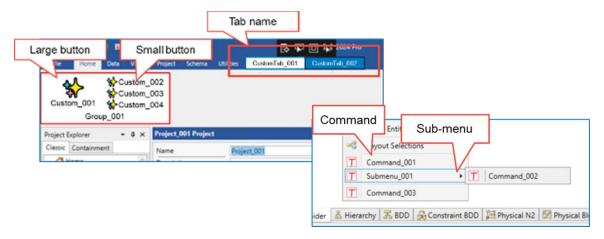
Other Minor Improvements

- Aligning ports on different components You can now select a port on one component and a port
 on another component (and possibly more beyond that) and use the align features in the ribbon to
 align the ports. This is useful for being able to quickly lay out diagrams such that link lines are
 perfectly straight.
- Resizing diagram frame proxy ports You can now resize a proxy port residing on the diagram frame in the same way a component proxy port can be resized.
- Project export date stamp When exporting a project using the File|Export command, the default filename for the project backup will append the current date. For example, if the project is called "System Project" and the export is created on 12/19/2024, then the default filename will be "System Project_12192024".

ADD-IN FRAMEWORK

GENESYS 2024 includes an Add-In Framework, giving advanced users and third-party developers the ability to develop custom GENESYS software extensions that directly integrate into the GENESYS user interface. As part of the software extension, developers can add items to the ribbon bar or context menus. The screens below show the types of items that can be added through this framework.

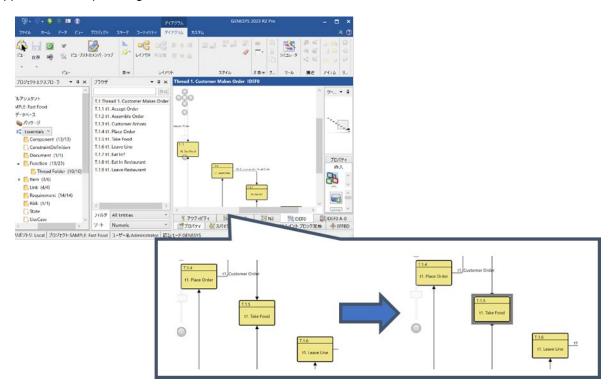




For assistance in developing an Add-In for GENESYS, please contact Vitech Customer Support at support@vitechcorp.com or +1 540 951 3999.

CROSS PROBING VIA API

An API for selecting entities and relationships in GENESYS diagrams has been added. This allows applications to open diagrams and select entities in GENESYS.



With the addition of this API, the following operations can be performed via applications:

- Select a specified entity in the browser.
- Activate a specified diagram or saved view.
- Select any combination of nodes/edges in a diagram.
- Adjust and center display of the selected area in the diagram.

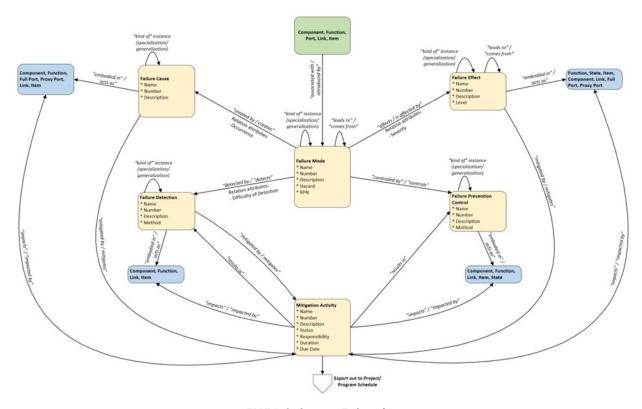


FMEA EXTENSION

The new Failure Mode & Effects Analysis (FMEA) Schema extension for GENESYS 2024 was developed to support failure mode analysis of system design models. It is a replacement to and supersedes the previous GENESYS FMEA extension.

The basic FMEA process examines design entities and evaluates the system architecture to identify ways in which the system fails to meet designed performance, objectives, or other "–ilities" (reliability, safety, and quality) criteria. System failures can occur because of the failure of components in the physical architecture, failure of functions to properly execute, failure of an interface and/or link, or failure to meet a requirement. Accordingly, a failure mode can be associated with than one entity in an architecture and the failure can be created by one or more causes.

The updated FMEA schema extension takes these needs into account and provides a comprehensive set of updated classes and attributes that can be used to generate physical (bottom-up) or functional (top-down) FMEAs.



FMEA Schema Extension

Failure Causes, Failure Detections, Failure Effects, and Failure Prevention Controls can be embodied in their associated MBSE system architecture entities (Components, Functions, Links, Items, etc.), providing a reusable and object-oriented means of conducting an FMEA in an integrated and consistent manner with the system architecture.

Once causes and effects are identified, mitigations can be developed to do one or more of the following:

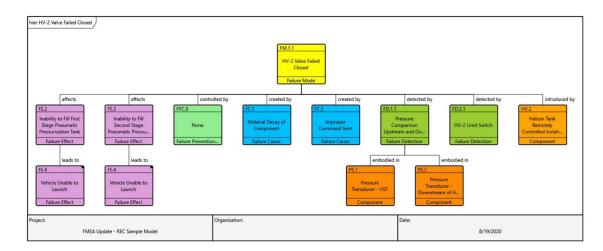
- Decrease the probability of occurrence (or design it out)
- Decrease the impact of the effect
- Increase the probability of detection (so that a responsive action can take place as quickly as possible).



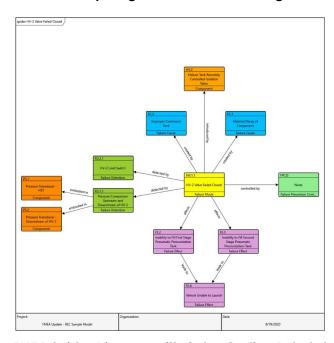
In addition to the added CSDL classes and relationships, the FMEA schema extension also includes:

- **FMEA Facility** that includes all FMEA classes, Failure Mode generating or impacted classes, and related classes.
- **New FMEA Hierarchy Definitions** that can be used on Hierarchy Diagrams or Spider Diagrams to visualize the FMEA information in the model.
- New FMEA Rule Sets for color coding of applicable entities on Hierarchy Diagrams or Spider Diagrams.
- New FMEA Table Definitions for displaying FMEA information in a traditional tabular format.

No.	Component Name	FM.	Fall	ur Hode	U N	Failure Cause *		17		Sev	0	FO No "	Failure Detection	difficultyOfDetectic *	FP.	Failure Preventic *	nes -
HV.3	First Stage Holium Fill Valve	FM12	HV-3Valv	e Falled Clo		Improper Command Sent Maneral Decay of Component	4 - Stight 5 - Lov	FE.2	Inability to FIEFESS Stage Pneumatic Pressurcation Tank	5 - Mode	rate I	FD 1.2	HV-3 Line Systch Pressure Comparison Upotream and Downstream of HV-3	2 - Very High 5 - Moderate	FPC.0	None	50
		FM22	HV-3Valu	e Falled Opv		Excessive Pressure in Upstream Element Improper Command Sent Manerial Decay of Component	4 - Stight 4 - Stight 7 - Moderanski High	FE.1	Durat of Tube Danage to downstream-components	3 - Serios 8 - Entrer	~	FD.12	HV-3 Link Switch Preciure Comparison Upsteam and Dovretteam of HV-3	2 - Very High 6 - Low	FPC.0	None	126
HV.2	Heisum Tank Remotely Controlled Isolaton Valve	FM.11	HV-2Valv	e Falled Clo	red FC.3	Ingroper Command Sent Manerial Decay of Component	4-Style 6-Hedum	FC	habity to Fill First Stage Pneumatic Pressurcation Tank habity to Fill Second Stage Pneumatic Pressultation Tank	5 - Mode 5 - Mode			HV-21 and Swech Pressure Comparison Upstream and Downstream of HV-2	5 - Moderate		None	60
		FM21	HV-2 Valu	e Falled Ope	FC.3	Excessive Pressure in Upstream Element Improper Command Serv Material Decay of Component		FE S	Damage to downstream components Inability to FIE First Stage Procumatic Procount ation Tank	9 - Serio 8 - Extrer 5 - Mode 5 - Mode	rishe f	FD.11	HV-2 Link Switch Pressure Comparison Updream and Covernee an of HV-2	2-Veryhigh 6-Low	FPC.0	None	90



FMEA Hierarchy Diagram with Color-Coding Rule Set



FMEA Spider Diagram with Color-Coding Rule Set



SCHEMA UPDATES

Numerous schema enhancements are being introduced with GENESYS 2024. The following is a summary of the changes to both the base schema as well as the capability schema:

New Class: Review

The Review class was added to support the upcoming release of the Sidekick™ Model Review and Collaboration Tool. The Review class will be used to capture the results and decisions of each review so that there is an artifact in the GENESYS project for convenience.

- Attributes:
 - actualClosingDate(Actual Closing Date): This attribute contains the actual closing date for the review
 - Type: Date Time
 - createdBy(Created By): The Created By String contains the User ID of the creating user.
 - Type: String
 - o description(Description): Description is the written statement of this entity.
 - Type: Text
 - Guidance(Guidance): The guidance statement for the Review entity
 - Type: Text
 - leadUser(Lead User): The Lead User is a collection of the Lead User ID Strings.
 Collection entries are User ID Strings.
 - Type: Collection(String)
 - mode(Mode): The enumerated Mode of the Review. Value can be "Static" or "Dynamic".
 Default value is set to "Dynamic"
 - Type: Enumeration(String)
 - name(Name): the name of the entity
 - Type: String
 - o number(Number): Number is the (ordinal) number, expressed in cells and using periods as separators, used to identify this entity's place in a hierarchy.
 - Type: Hierarchical Number
 - plannedClosingDate(Planned Closing Date): This attribute contains the planned closing date for the Review.
 - Type: Date Time
 - publishedDate(Published Date): This attribute contains the date when the Review was published.
 - Type: Date Time
 - o purpose(Purpose): The purpose statement of the Review entity.
 - Type: Text
 - reviewID(Review ID): This attribute contains the Review ID as provided by Sidekick.
 - Type: String
 - sidekickReviewLink(Sidekick Review Link): This attribute contains the hyper link to the



Review in Sidekick.

- Type: Reference Spec
- o startDate(Start Date): This attribute contains the start date for the Review.
 - Type: Date Time.
- Relationship added:
 - "generates" Note
 - o "has comments" Note

Requirement Class Changes

- Attributes:
 - o type(Type): Type is the nature of the requirement.
 - Removed:
 - Incentive Award Fee Criterion
 - Test
 - Added:
 - Environmental
 - Interface
 - Operational

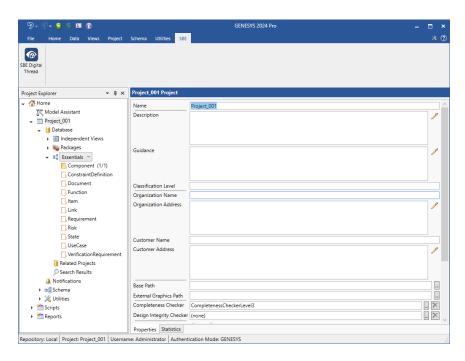
Verification Requirement Class Changes

- Attributes added:
 - environment(Environment): A description of the environment where the verification requirement is to be verified.
 - Type: Text
 - successCriteria(Success Criteria): Defines the necessary criteria to successfully verify a requirement.
 - Type: Text
- Relationship Added
 - o "assigned to" Organization

SBE VISION CONNECTOR

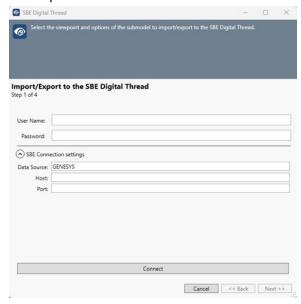
The GENESYS – SBE Vision Digital Thread Platform Connector has been updated to utilize the new GENESYS Add-In Framework. As an Add-In, the connector can now be installed in the GENESYS client on an as-needed basis for designated users.





The latest connector has been updated to be compatible with version 7.x of the SBE Vision Platform. This includes several changes to the GENESYS adapter, including:

- **Subscriptions**: previously users could create "authoritative" subscriptions from GENESYS. Now, authoritative subscriptions are default/empty within the GENESYS Digital Thread wizard and must be populated manually due to updates made in the SBE Vision SDK.
- UI update on Import/Export Settings Screen: previously the Data Source field was queried, and
 a selection of valid options were presented to the user from which they could select. This must now
 be manually entered due to updates made in the SBE Vision SDK.



"Digital Thread Data Store" File: Previously, GENESYS stored all SBE commit information for
each entity in the SBE Digital Thread Item Locator attribute made available to all entities through
the SBE Vision schema extension. Now, SBE manages this information via a local data store
file, which is persisted on the user's machine. GENESYS places this file in the Program Directory
folder for Vitech along with the versioned GENESYS log files.



GENESYS 2024 RESOLVED ISSUES

The table below contains a list of issues that were resolved in GENESYS 2024. They are grouped by area and provide a description of the main observed behavior or symptom resolved in this release.

Reference	Description / Resolution Notes
Diagrams	
Deleting an entity in the project explorer when there is a diagram tab open for the entity being deleted produces the error "Object reference not set to instance of object." (22360)	The delete operation now succeeds without error.
	The background specified in the view is now retained in the exported image. This fix also applies to report and TeamView outputs. The selection operation now succeeds without error.
construct with seven or more branches produces the error "Object reference not set to an instance of object." (3376)	
	The color of the selected data/trigger nodes are now updated to reflect the correct state after the operation. New triggers will change to green, and new data stores will change to grey.
Flow IBD – When proxy ports are on the diagram frame, frame continuously widens after any user action. (3289)	The frame will no longer continuously widen. The frame will now anchor at the outermost proxy port label.
Flow IBD – Executing the Remove command on a line connecting a port to a proxy port (external) may produce error "Object reference not set to an instance of an object." (3256)	The operation now succeeds without error.
Flow IBD – Proxy ports do not always attach to the frame boundary. (3308)	Under certain conditions, proxy ports (nodes representing external connections) did not always attach to the frame boundary. For example, this could occur when new external connections were added to a node already containing multiple external connections. The new proxy ports will now always attach to the frame.
requested would have violated their positioning constraints" if the objects are already aligned. (22622)	The message is no longer displayed if the objects are already aligned.
IBD/PBD – Executing the Distribute Lines command with a node selected containing a line that connects to itself produces error "An item with the same key already exists." (3177)	The operation now succeeds without error.
General	
, , , , , , , , , , , , , , , , , , ,	Long running operations can cause a SQL timeout error ignoring the DataProvider.BulkCommandTimeout setting in the application configuration file. The following operations have been refactored to properly honor this setting: - Turn versioning on in a project via project properties - Baseline Versions command



Reference	Description / Resolution Notes
The mouse operations are too sensitive resulting in undesired drag-drop and context menu popups. (6152)	The mouse drag-drop sensitivity has been adjusted and will now result in less accidental occurrences.
Globalization	
When creating new entities and other objects, pressing the Enter key to confirm Japanese characters in the name field will prematurely create the new entity with an incomplete name. (6152)	When conversion candidates are displayed, pressing Enter will now accept the selected conversion candidate and prevent completion of the name prompt prematurely.
Inheritance	
Opening a project with deep levels of inheritance causes the application to terminate. (4402)	The algorithm used to resolve inherited entity values has been reimplemented. The projects can now be opened without error.
Selecting an entity folder containing inheritance relationships across projects where the target projects are not resolvable causes the application to terminate. (3493)	The folder can now be selected without error, and entities are displayed.
Licensing	
After launching and successfully activating the application for the first time, the application produces Repository Connection Error "The GENESYS service on 'localhost' did not respond to the startup request" (6945)	The GENESYS service would sometimes fail to start due to a licensing error resulting in this message. The error has been resolved and the application starts seamlessly after activation now.
Matrix Views	
The matrix view legend displays the class Name instead of Alias if an Alias is specified in the schema. (21766)	The Alias will now be shown if specified in the schema.
The scroll position changes when relationships are updated in the matrix view. (6038)	The scroll position will now be maintained when double-clicking the matrix view to create/delete relationships. There has also been significant improvement in performance during this operation.
Parameters	
An integer value in a field of type float is displayed with eight zeros after the decimal point. (21767)	Integer values are now displayed with one zero after the decimal point.
Search	
Matrix does not exist in the View Type options list when executing a Search command. (22237)	Matrix is now an available option. This allows the user to search for matrix views by name.
Table Views	
Edits to merged cells do not persist. (20621)	Merged cells can now be edited and changes persist.
TeamView	
CR/LF characters in entity names will cause the TeamView output to be empty. (3285)	TeamView will now properly output entities with these characters in the name.
Utilities	
Hierarchy Definitions – The hierarchy definition editor prompts to save changes when nothing is changed. (6895)	When opening a spider or hierarchy diagram via the ribbon or context menu command, selecting a different hierarchy definition in the editor would cause a prompt to save changes to the definition. The prompt will no longer occur if the user only changes the selected definition and makes no changes to the definition itself.



Reference	Description / Resolution Notes
Node Templates – Clearing the Number of Lines field in the node template editor reverts the field to the original value. (6373)	Any operation that resulted in the field being temporarily empty would change the field back to the original value making it difficult for the user to use the delete or backspace key to enter a new value. This has been resolved and the value can be cleared without it being reset.
Rule Sets – Clearing the Name field in the rule set editor results in endless, recursive error message. (3377)	The user is now able to enter a new name to resolve the condition.
View Lists	
may contain duplicate classes if the view list is	The Classes drop down no longer shows duplicate classes. Classes from different projects which have the same unique ID are now consolidated.





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