



Thank you for using Simio. We expect that you will be pleased with its power, flexibility, and ease of use.

We are pleased to bring you the latest update to **Simio Release 9**. Simio's patented processes provide ease of use while also allowing unprecedented flexibility without requiring any coding. And Simio leads the industry in data representation and analysis. Simio is unique in our ability to do design, planning, scheduling, and schedule risk-analysis in one application.

Many of our customers have cited Simio's flexibility, ease-of-use, and great support among the reasons why they have adopted Simio -- often switching so they can do things that are difficult or impossible with other products. But we are not resting on that success -- we are continuing to make Simio easier to use and more flexible, while adding leading the industry with more technology breakthroughs.

This document describes the wealth of new features that have been recently added. Simio is ready to take on your most demanding modeling tasks.

The desire to teach using the latest innovations, combined with Simio's comprehensive academic package are moving Simio towards becoming the most widely taught simulation package with over 800 leading academic institutions worldwide already adopting Simio.

We are anxious to hear about your experiences. Please post your feedback in the forums mentioned below or send it directly to me. Thanks again for choosing Simio.

Dave Sturrock
Vice President – Operations, dsturrock@simio.com

Simio Release Notes



Support


The best way to get support is to use the **Simio User's Forum** found at www.simio.com/forums, or contact us at support@simio.com using one of the links on the Support Ribbon. Sign up on the user's forum as a **Simio Insider** to get full access to find product information, a place to post problems and questions, and the opportunity to engage in discussions with other users and the Simio team.

You can also find Simio User's Groups on:

LinkedIn (<https://www.linkedin.com/groups/55167>) and

Facebook (www.facebook.com/groups/13863832711).

Please visit our simulation community resources web page (www.simio.com/resources.html) for additional information.

The **Support Ribbon** (the Support tab) of the Simio software contains shortcuts to the above, plus much more. Don't miss the links to our on-line documentation, training, videos, downloads, and other helpful resources. While Simio includes comprehensive on-line help available at the touch of "F1" or  in the product, the numerous books and free video training courses provide a great way to get started using Simio.

Unfortunately, we cannot provide support to students. We encourage students to work through their instructors, or to reach out to the broader user community using the Simio Insiders User Forum.

What is a Sprint?

We are following an agile methodology in which we develop in three week cycles called sprints. At the end of each sprint we have tested, documented, distributable software including new functionality. The following pages describe the enhancements added during each sprint. It is not **necessary** that you download and install every Sprint unless you are interested in a particular feature. But we encourage you to do so when convenient so that you are always working with the best software, documentation and examples we can deliver. Most sprints are posted to the Simio Insiders download area. The public releases (discussed below) are updated approximately quarterly.

Where to Find New Releases

The latest public software releases can be found at: www.simio.com/download. Your activation will continue to work with new releases as long as your maintenance is current. Newer releases are often available on the [Simio Insiders forum](#).

Simio Release 9 – Sprint 163 – October 20, 2017

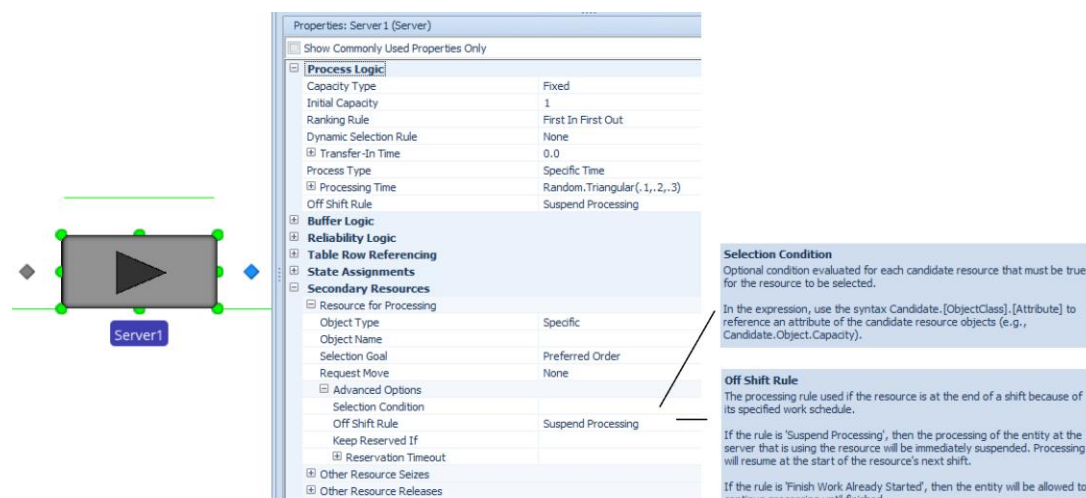
In this sprint, we have many user-requested enhancements to Simio. First, a new *Off Shift Rule* is now available for secondary resources, as well as task-related resources. Resources that go off shift can either suspend processing or finish the work already started. Additionally, many resource reservation functions have been added, in addition to a *Task Ready* add on process for task processing. Interactive Gantt charts are now available within the Enterprise edition in the Results tab area. And finally, the auto-create capability has been added to table columns for object references to allow objects within the Facility window to be created by table data. Look for more enhancements for this capability in the next sprint as well! Exciting stuff!

New *Off Shift Rule* for Secondary Resources

We have enhanced the Server, Combiner, Separator, Filler and Emptier objects in the Standard and Flow Libraries to include an *Off Shift Rule* property for the secondary resources used for processing within the object.

If an entity's processing requires the Secondary Resources -> Resource for Processing or if an entity's processing is a task sequence, and resource requirements are specified for any task, the *Off Shift Rule* property allows a user to easily indicate whether to 'Suspend Processing' or 'Finish Work Already Started' if the seized resource is at the end of a shift because of a specified work schedule.

The below diagram shows the *Off Shift Rule* used for Secondary Resources for processing.



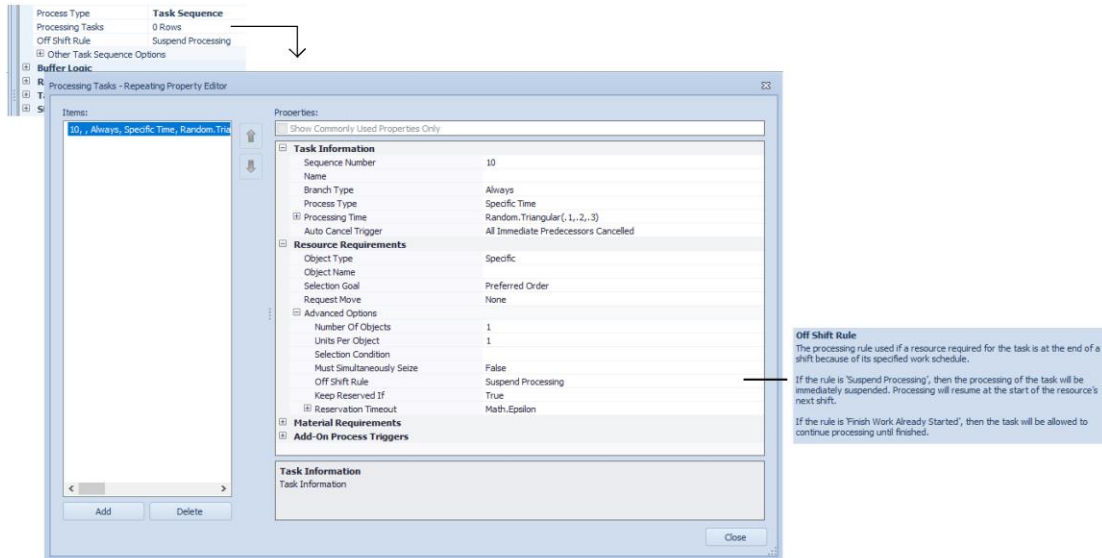
The screenshot shows the Properties window for 'Server 1 (Server)'. The 'Secondary Resources' section is expanded, showing the 'Resource for Processing' table with the following values:

Property	Value
Object Type	Specific
Object Name	
Selection Goal	Preferred Order
Request Move	None
Off Shift Rule	Suspend Processing

Two callout boxes provide additional information:

- Selection Condition:** Optional condition evaluated for each candidate resource that must be true for the resource to be selected. In the expression, use the syntax Candidate.[ObjectClass].[Attribute] to reference an attribute of the candidate resource objects (e.g., Candidate.Object.Capacity).
- Off Shift Rule:** The processing rule used if the resource is at the end of a shift because of its specified work schedule. If the rule is 'Suspend Processing', then the processing of the entity at the server that is using the resource will be immediately suspended. Processing will resume at the start of the resource's next shift. If the rule is 'Finish Work Already Started', then the entity will be allowed to continue processing until finished.

The below diagram shows the *Off Shift Rule* for resources used for processing tasks.



Resources, Workers and/or Vehicles can be used as secondary resources. If seized as a secondary resource for one or more processing task(s) at a Server, Combiner, Separator, Filler, or Emptier, and at the end of a shift because of a specified work schedule, the resource's ResourceState will be assigned to 'OffShift' if all related processing is suspended. Otherwise, the ResourceState will be assigned to 'OffShiftBusy'.

New Resource Functions – Reserved Resources

ReservationOwners - Provides functions for accessing the objects that currently have reservations for capacity units of this resource.

ReservationOwners.NumberItems - Returns the number of objects that currently have reservations for capacity units of this resource.

ReservationOwners.FirstItem - Returns a reference to the first object in the list of objects that currently have reservations for capacity units of this resource.

ReservationOwners.LastItem - Returns a reference to the last object in the list of objects that currently have reservations for capacity units of this resource.

ReservationOwners.ItemAtIndex(index) - Returns a reference to the object at a specified index position in the list of objects that currently have reservations for capacity units of this resource.

ReservationOwners.IndexOfItem(owner) - Returns the one-based index of the first occurrence of a specified object in the list of objects that currently have reservations for capacity units of this resource. If the object has not reserved, the resource then the value 0 is returned.

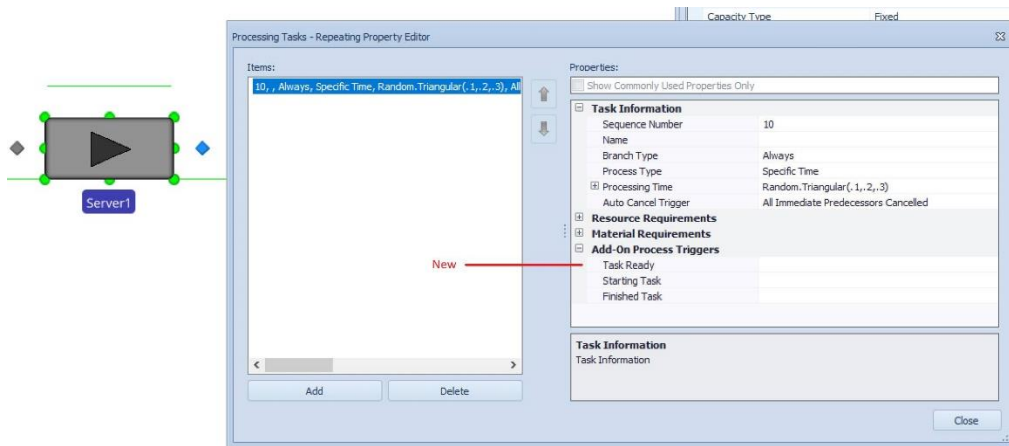
ReservationOwners.Contains (owner) - Returns True (1) if the objects that currently have reservations for capacity units of this resource include the specified object. Otherwise, the value False (0) is returned.

New Object Function – SeizedResources

SeizedResources.RequestedDestinationNodeFor(resource) - Returns a reference to the requested destination node for a specified resource in the list of resources currently seized by this object. If the resource is not found or was not requested to move when seized then the Nothing keyword is returned.

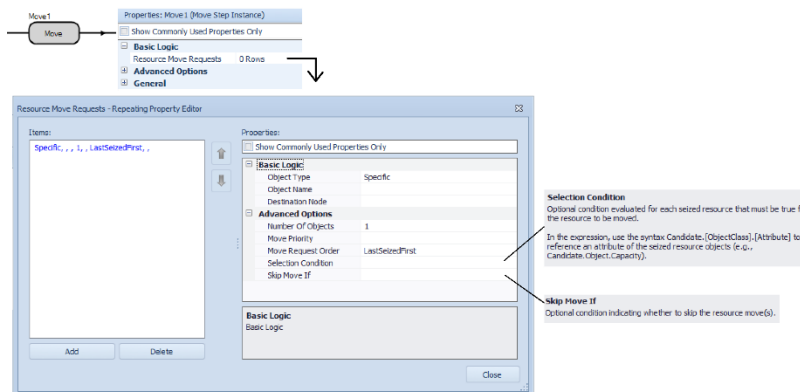
Task Sequences - New *Task Ready* Add-On Process Trigger

We have added a new *Task Ready* add-on process trigger to the Processing Tasks repeating property editor for Task Sequences. This was added per customer request to provide an add-on process before the attempt to seize or consume a task's resource and material requirements. This process will be executed when all the task's predecessor dependencies have been satisfied.



Move Step - New *Skip Move If* Property

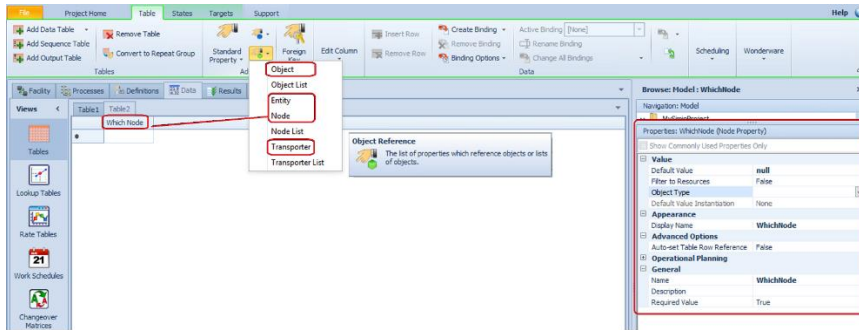
We have added a *Skip Move If* property for the Move step which is an optional condition that will be evaluated for each resource that has a move request. If the expression evaluates to false, the move will not take place. Also within the Move step, we have changed the name of the property *Move Request Condition* to be *Selection Condition* for consistency among steps.



Data Tables Enhancement – Auto-Create for Object Reference Columns

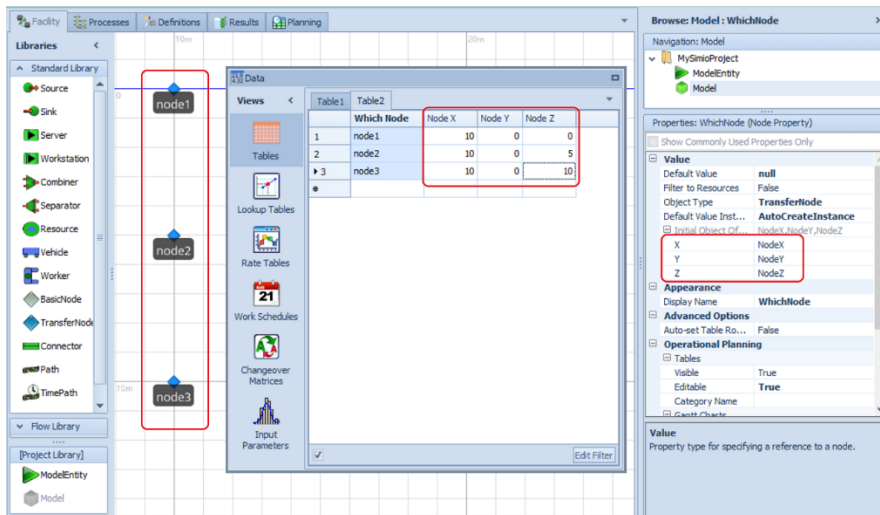
We have added the capability to auto-create objects by using the Object Reference column type within a data table or sequence table. When a column is of type Object Reference (i.e., Object, Entity, Node or Transporter), there are additional properties, including *Object Type*, *Default Value Instantiation* and

Initial Object Offset values that can be used to automatically create specific objects within the Facility window.



When the *Object Type* property of the Object reference column is specified as an object, such as 'TransferNode' for a Node reference or 'Worker' for a Transporter reference, then the *Default Value Instantiation* property becomes editable. When *Default Value Instantiation* is set to 'AutoCreateInstance' (instead of 'None' which is the default value), then all objects specified within the Object reference column of the table will be automatically created.

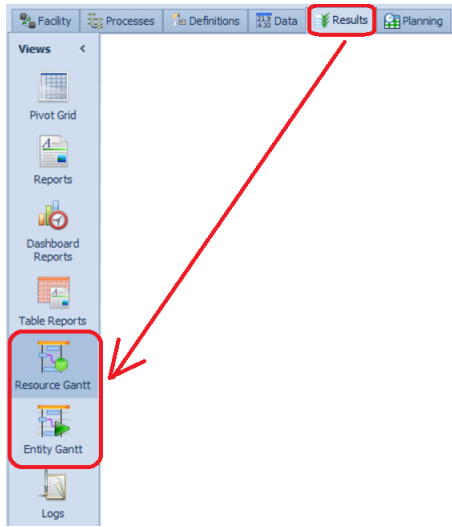
The *Initial Object Offset* values for X, Y, Z locations in the Facility window can be specified as the default of 0,0,0 or a real/integer value. These location values can also reference a real/integer column within the same table, where the objects have different location values and are placed accordingly within the Facility window, as shown below.



*Note: This is the first in several enhancements for easier data driven model building. *

Gantt Views in Interactive Mode – Enterprise Edition

We have enhanced the Results tab views to include the Resource Gantt and Entity Gantt charts. This will enable users to view the Gantt charts in interactive mode, including all randomness and failures incorporated in the interactive model. These Gantt charts are then based on the logs generated for the interactive run. *Remember that within the Gantt charts in the Planning tab, all randomness and failures are disabled.



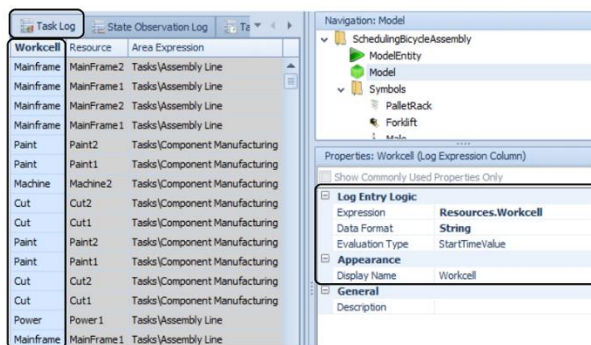
Simio Release 9 – Sprint 162 – September 21, 2017

In this sprint, we have added much functionality for categorizing and displaying tasks within the Gantt charts within Simio Enterprise edition. Additionally, many new functions have been added to both processes and tokens in preparation allowing secondary/task-related resources to have an *Off-Shift Rule*, which will be available in the next sprint.

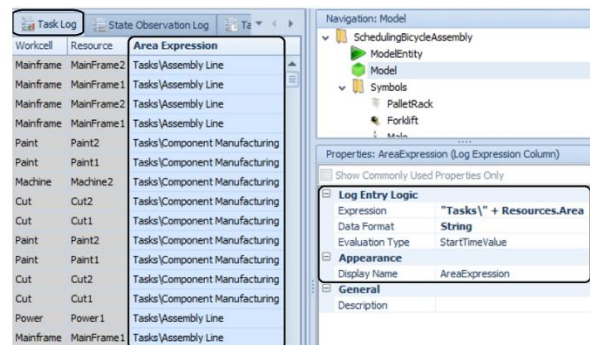
Simio Enterprise Edition – Task

When Processing Tasks type processing is used within many of the Standard Library objects, the user has the ability to specify multiple tasks, as well as required resources and/or materials within the Processing Tasks repeating property for an object (Server, Combiner, Separator, for example). Information about the task starting/ending times, as well as other related information is stored in the Task Log. In the previous sprint, we added a unique Task Id for each task which allows then Resource Usage, Material Usage, Transporter Usage and Constraint logs to have associated 'tasks'.

Within each Task Log (as with the Resource Usage Log), additional columns may be added to the log to provide additional information for Gantt charts. Below, the Workcell column was added to a Task Log to display information from the Resources table, Workcell column that is associated with the task. Also, the Area Expression column was added to provide a different 'category' for grouping tasks into sections within the Gantt. These and additional examples are also discussed in the Entity Workflow Gantt help.



Used for the Task Row property

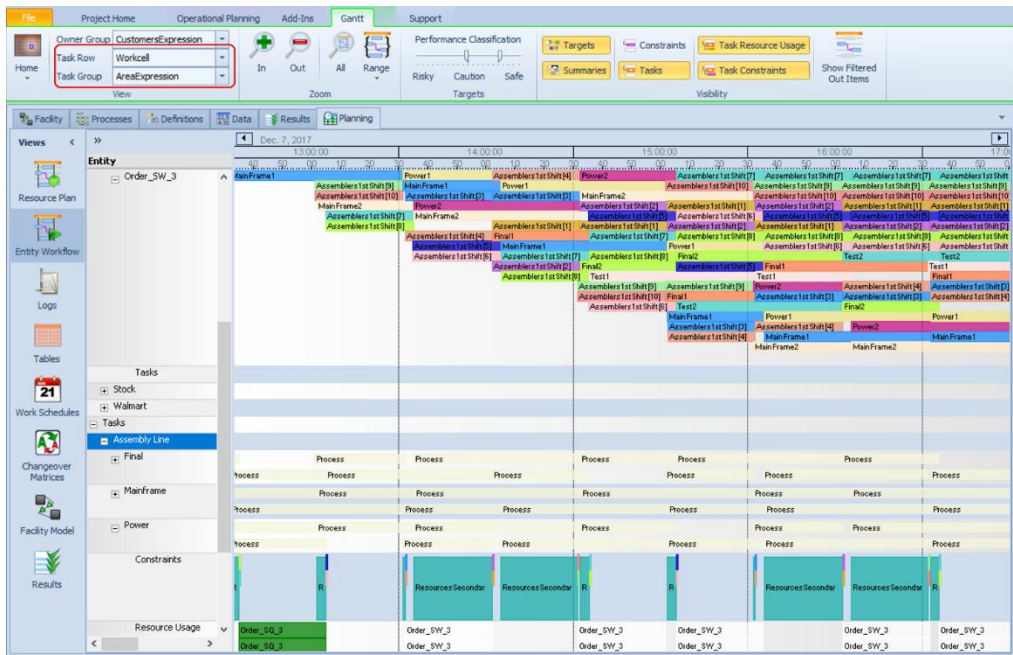


Used for the Task Group property

With Simio Sprint 162, we have enhanced both the Entity Workflow Gantt and Resource Plan Gantt ribbons to allow tasks to be displayed in different ways. See below Task Row and Task Group, circled in red, on the Gantt ribbon.

If only the Task Row references a Task Log column, the tasks are grouped by that column but still displayed directly under the entity that incurred the task (this property itself was added in Sprint 161). When a Task Group is specified (as below AreaExpression), all tasks are then *moved* from previously under each specific entity to more general Tasks area to allow for categorization of tasks. Tasks can then be shown by a location or area within a manufacturing facility (or any other custom expression specified). We have also enhanced the visibility of the Gantt items to include the Task Resource Usage and Task Constraints so that these may be turned on/off.

These new Gantt features will allow large assembly type operations with many tasks, like this example SchedulingBicycleAssembly, to be more clearly shown and customized on both the Resource Plan and Entity Workflow Gantt.

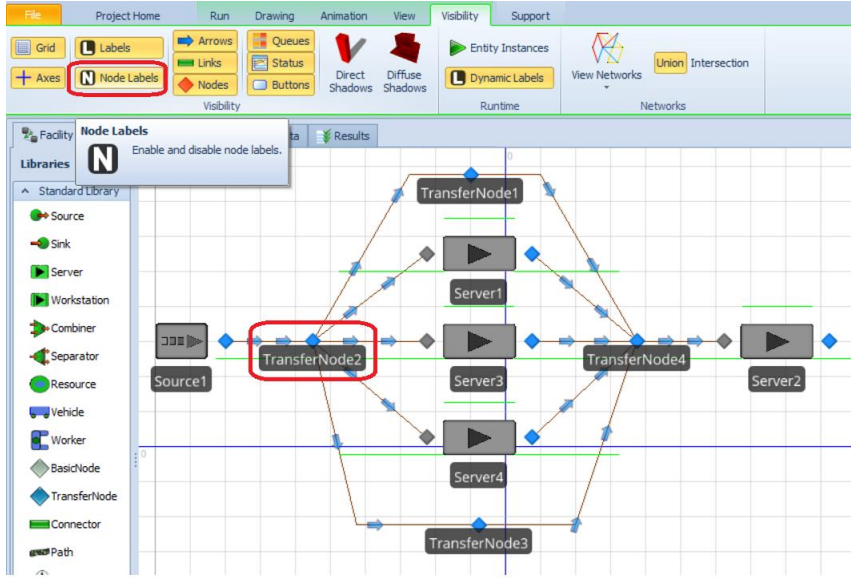


Using the Task Group option for categorizing tasks actually takes the Tasks out from under the particular order number (or entity) and puts them in a Tasks section. This allows the tasks for all orders (entities) to be seen in the same area.

If the Task Row is designated, the tasks will be categorized for each Task Group.

Node Name Visibility – Stand Alone Nodes

We have changed the software so that node object labels may now behave like other object labels in terms of visibility. Specifically, for “un-tethered” nodes (those not part of another object), we now show the name labels (previously labels would appear only when nodes were selected). This can be turned off within the Visibility ribbon.



New Process Functions

We have added a series of tokens in process-related functions. Note that these then provide access to the token reference that can then be used within the new token / task functions listed in the next section.

TokensInProcess.NumberItems - Returns the number of tokens that are currently executing the process.

TokensInProcess.FirstItem - Returns a reference to the first token in the list of tokens that are currently executing the process.

TokensInProcess.LastItem - Returns a reference to the last token in the list of tokens that are currently executing the process.

TokensInProcess.IndexOfItem(token) - Returns the one-based index of a specified token in the list of tokens that are currently executing the process. If the token is not found then the value 0 is returned.

TokensInProcess.ItemAtIndex(index) - Returns a reference to the token at a specified index position in the list of tokens that are currently executing the process.

TokensInProcess.Contains(token) - Returns True (1) if the list of tokens that are currently executing the process contains the specified token. Otherwise, the value False (0) is returned.

New Token.Task Functions

We have replaced the previous TaskInfo.* functions with Task.* functions and have added a number of new token/task related functions as well. These provide information related to a token within a task of the Task Sequences functionality. Thus, they are referenced as Token.Task, Token.Task.AssociatedObject, etc.

Task - Returns a reference to the active task associated with the token, if the token's execution is part of a task sequence.

Task.AssociatedObject - Returns the associated object reference for the task.

Task.SequenceNumber - Returns a string representing the sequence number used to determine the task's precedence constraints.

Task.IDNumber - Returns the integer number used to identify the task in the Immediate Predecessors or Immediate Successors field of another task.

Task.Name - Returns the name for the task.

Task.ExecutionID - Returns the unique integer identifier number automatically assigned to the task when the StartTasks step was executed.

Task.TimeStarted - Returns the simulation time (in hours) that the task was started.

Task.TimeInProgress - Returns the elapsed time duration (in hours) since the task was started.

Task.SeizedResources.NumberItems - Returns the number of resources currently seized by the task's associated object, filtered to only include the resource seizes that occurred specifically due to the task's execution.

Task.SeizedResources.FirstItem - Returns a reference to the first resource in the list of resources currently seized by the task's associated object, filtered to only include the resource seizes that occurred specifically due to the task's execution.

Task.SeizedResources.LastItem - Returns a reference to the last resource in the list of resources currently seized by the task's associated object, filtered to only include the resource seizes that occurred specifically due to the task's execution.

Task.SeizedResources.IndexOfItem(resource) - Returns the one-based index of the first occurrence of a specified resource in the list of resources currently seized by the task's associated object, filtered to only

include the resource seizes that occurred specifically due to the task's execution. If the resource is not found then the value 0 is returned.

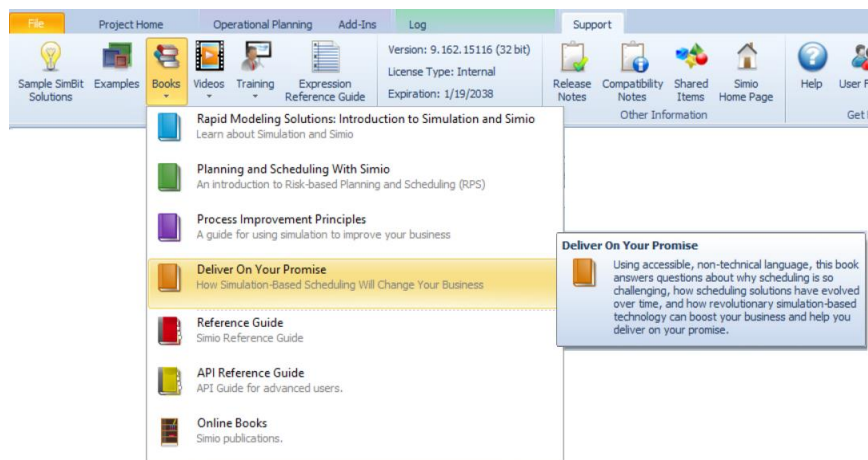
Task.SeizedResources.ItemAtIndex(index) - Returns a reference to the resource at a specified index position in the list of resources currently seized by the task's associated object, filtered to only include the resource seizes that occurred specifically due to the task's execution.

Task.SeizedResources.Contains(resource) - Returns True (1) if the specified resource is in the list of resources currently seized by the task's associated object, filtered to only include the resource seizes that occurred specifically due to the task's execution. Otherwise, the value False (0) is returned.

Task.SeizedResources.CapacitySeizedOf(resource) - Returns the total number of capacity units of a specified resource that are currently seized by the task's associated object, filtered to only include the resource seizes that occurred specifically due to the task's execution.

Support Ribbon - Books

We have added a link to a new e-book, *Deliver on Your Promise*, written by Simio CEO, C. Dennis Pegden, PhD. This book discusses why scheduling is so challenging, how scheduling solutions have evolved and how simulation-based technology can boost your business.



Simio Update to .NET 4.6.2

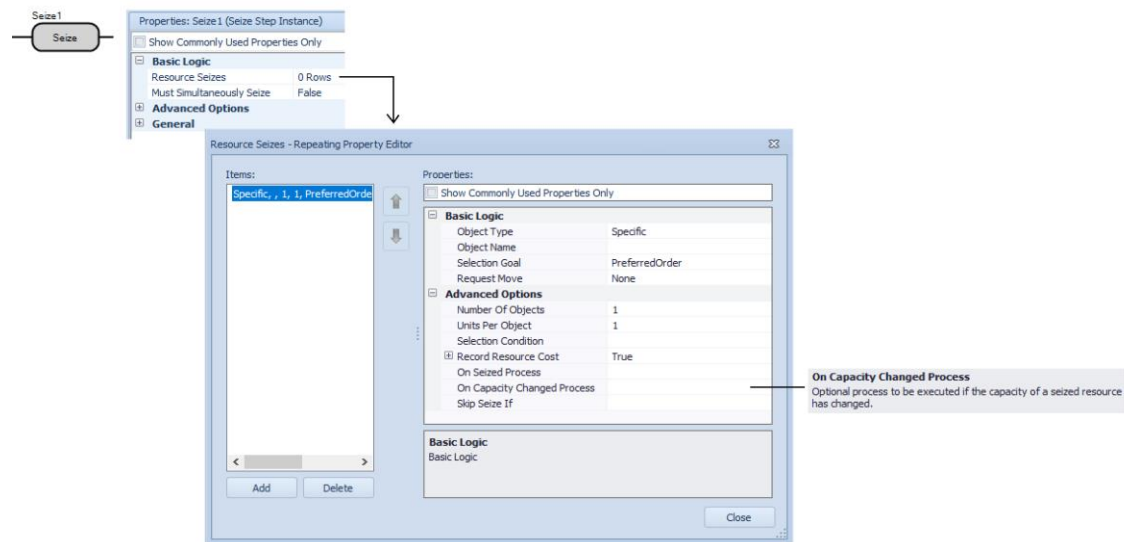
Simio requires the *.NET Framework Version 4.6.2*. If the framework is not already installed on your computer and you want to perform a manual install, you can download it from the *.NET Framework Downloads* page: (<http://msdn2.microsoft.com/en-us/netframework/aa569263.aspx>). It may also be installed by doing a Windows Update, depending upon your particular system configuration.

Simio Release 9 – Sprint 160/161 – September 2, 2017

In this sprint, we have made several changes in conjunction with some more major enhancements to come in the next several sprints. First, the Seize step has been enhanced to allow an additional process when the capacity of the seized object changes. Second, a unique Task Id field has been added to the Logs within the Planning tab (Simio Enterprise) that will allow for more customized Gantt viewing in the future.

Seize Step Enhancement – On Capacity Changed Process

We have enhanced the Seize step to include an On Capacity Changed Process property to optionally specify a process to execute if the seized resource capacity changes.



When a seized resource object's capacity has changed, the *On Capacity Changed Process* for each of the resource's owners (if any were specified at the Seize step(s)) will be first executed in seize order. Then last the resource object's *OnCapacityChanged* process.

When a new token is created to execute the *On Capacity Changed Process* that was specified at a Seize step:

- The token's associated object reference will be the resource.
- The token's context object reference will be the resource owner.
- The token will have a reference to the same active Task (if applicable) as the token that executed the Seize step.
- The token will have the same table references as the token that executed the Seize step.

Suspend and Resume Step Enhancements

We have enhanced both the Suspend and Resume steps to include *Token Match Condition* and *Skip Suspend If* properties. The *Token Match Condition* properties are available when the *Suspend Type* or *Resume Type* are 'Process'. These are optional match conditions used to filter the tokens executing the process. Only tokens currently in process that satisfy this condition will be suspended. The *Skip Suspend If* property is located within the Advanced Properties section of the repeatable property editor for both

the Suspend and Resume steps. This optional condition indicates whether to skip the suspend or resume action.

New Resource Object Function

ResourceOwners.AllProcessingSuspended - Returns True (1) if each owner of the resource has at least one associated process token currently suspended. Otherwise, the value False (0) is returned.

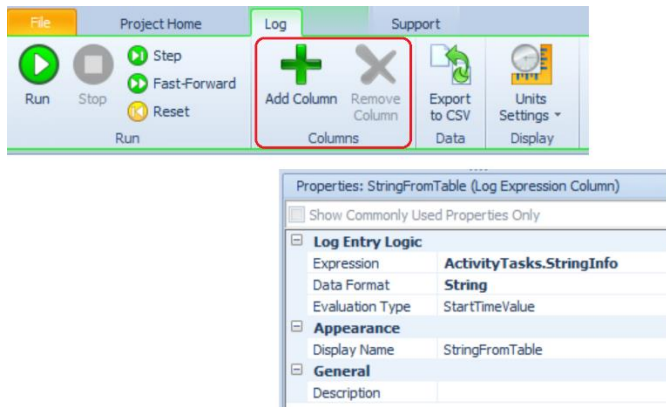
Simio Enterprise Edition – Task Id in Logs, Add Column Expressions within Task Log

We have enhanced many of the logs within Simio Enterprise Edition so that users may customize the Gantt charts.

Within the Task Log, there is a new Task Id column which includes a unique identifier for each task that was incurred. The Task Id may not always be sequentially listed, as the task is assigned a unique Task Id before the task is performed. If for some reason the task is not completed, you will not see it in the log.

Then, within many of the other usage and constraint logs, the Task Id is displayed. Within the Resource Usage Log, Material Usage Log, Transporter Usage Log and Constraint Log, the Task Id associated with the resource, material, transporter, or general constraint will be displayed.

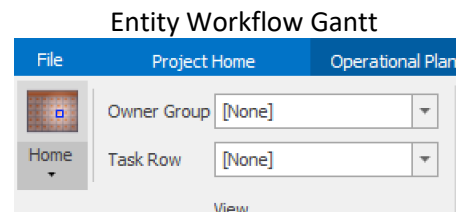
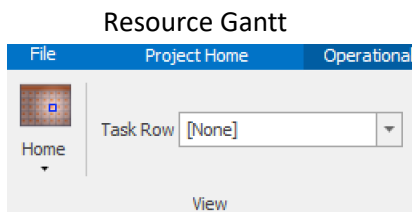
In addition to the Task Id available in the Task Log, we have added the ability to add/remove an expression type column(s) to the Task Log. The Log ribbon includes both the Add Column and Remove Column buttons (similar to adding new expression columns to the Resource Usage Log).



Note that the token used to evaluate the expression is the one created to run the process associated with the task, so whatever expression you would use in the model to get information, you would use here as well (e.g., Entity.** for the associated object that was indicated for StartTask, Token.TaskInfo.** for info about the task itself, TableName.ColumnName for table info associated with the running task).

Simio Enterprise Edition – Resource Plan and Entity Workflow Gantt - Task Row combo box selection

We have added a Task Row selection box to both the Resource Plan and Entity Workflow Gantt, where you can specify which custom expression on the Task Log is used to indicate what row a task item goes in. If nothing is specified, then the tasks continue to go into the “Tasks” row under the corresponding resource/owner. If a task row is specified, then the tasks go in a row of that name ***under*** the existing “Tasks” row (expanded with the +). Note that the original Grouping Expression for the Entity Workflow Gantt is now named Owner Group.



Task Id	Entity Id	Entity	Facility Location	Station	Task Sequence	Task	Start Time	End Time	Duration (Hours)	Location
1044	MFGOrder.696	Order_SG_1	MainFrame2	Processing	ProcessingTaskSequence	Process	12/1/2015 8:00:06 AM	12/1/2015 8:06:25 AM	0.105438	MainFrame2
1047	MFGOrder.696	Order_SG_1	MainFrame1	Processing	ProcessingTaskSequence	Process	12/1/2015 8:00:06 AM	12/1/2015 8:06:26 AM	0.105519	MainFrame1
1049	MFGOrder.696	Order_SG_1	Power2	Processing	ProcessingTaskSequence	Process	12/1/2015 8:06:28 AM	12/1/2015 8:13:42 AM	0.120513	Power2
1050	MFGOrder.695	Order_SG_1	Power1	Processing	ProcessingTaskSequence	Process	12/1/2015 8:06:29 AM	12/1/2015 8:13:44 AM	0.120723	Power1
1052	MFGOrder.697	Order_SG_1	MainFrame2	Processing	ProcessingTaskSequence	Process	12/1/2015 8:06:29 AM	12/1/2015 8:12:33 AM	0.101046	MainFrame2
1055	MFGOrder.698	Order_SG_1	MainFrame1	Processing	ProcessingTaskSequence	Process	12/1/2015 8:06:30 AM	12/1/2015 8:12:50 AM	0.105519	MainFrame1
1058	MFGOrder.699	Order_SG_1	MainFrame2	Processing	ProcessingTaskSequence	Process	12/1/2015 8:12:37 AM	12/1/2015 8:18:41 AM	0.101133	MainFrame2

Navigation: Model

- SchedulingBicycleAssembly
 - ModeEntity
 - Model

Properties: Location (Log Expression Column)

Show Commonly Used Properties Only

Log Entry Logic

Expression: **Entity.Location.Parent**

Data Format: **String**

Evaluation Type: **StartTimeValue**

Appearance

Display Name: **Location**

General

Project Home | Operational Planning | Add-Ins | Gantt | Support

Owner Group: Customer

Task Row: **Location**

View: In | Out | All | Range

Performance Classification: Risky | Caution | Safe

Targets | Constraints | Summaries | Tasks | Show Filtered Out Items

Views: Entity

- Tasks
 - Final1
 - Final2
 - MainFrame1
 - MainFrame2
 - Power1
 - Power2
 - Test1
 - Test2

Entity Workflow

Logs

Dec. 4, 2015

09:00:00

Process | Process | Process | Process

10 | 10 | 10 | 10

10 | 10 | 10 | 10

10 | 10 | 10 | 10

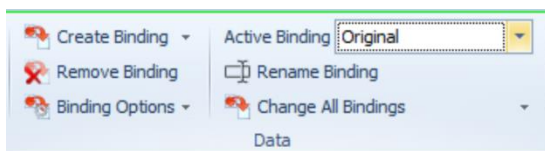
Process

Simio Release 9 – Sprint 159 – July 24, 2017

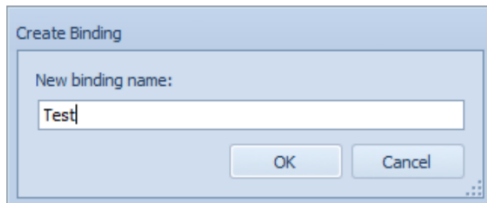
In this sprint, we have made many enhancements to the Data Binding capabilities within data tables. This includes having multiple bindings per table, changing between bindings for multiple tables easily and experiment scenario based data binding. Additionally, we have added the ability to remove rows from an output table and have included 2 SimBits demonstrating lists in tables.

Data Table Binding Enhancements

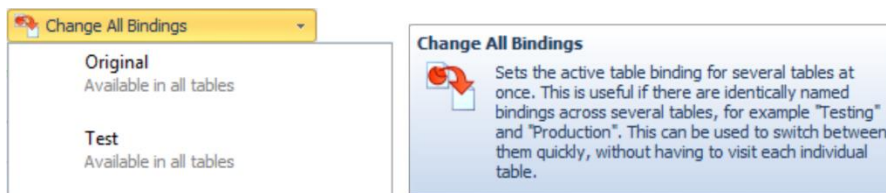
We have enhanced the data binding capabilities for data tables, including adding an *Active Binding* selection to allow for multiple bindings per data table. The original binding for a data table is considered the 'Default' binding (*Active Binding* is 'Default'). The *Rename Binding* option allows users to change the 'Default' name to another name (such as 'Original' as shown below).



When adding a new binding, use the *Create Binding* option. If the table already has an associated binding, the Create Binding dialog will appear asking for the new binding name. This binding name can be the same across multiple tables.



Each table then has its own 'group' of bindings. The *Change All Bindings* option then allows the user to set the Active Binding for several tables at one time. If there are multiple tables with the same binding name, they will be displayed in the *Change All Bindings* pull down list.



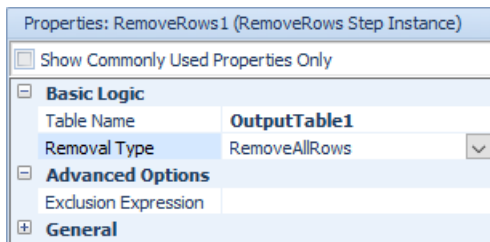
Experimentation – Scenario Based Data Binding

We have a new set of columns in the Design view of Experiments. Each column corresponds to every table with two (2) or more data bindings. The headers of the columns are the table names. The cell values are a drop down of the named bindings for that table. The default value of the cell for a new scenario is the currently 'active' data binding for that table. Then, for a particular scenario, the user can set the various bindings desired per table. OptQuest scenarios will keep data bindings as the 'active' data binding for the table.

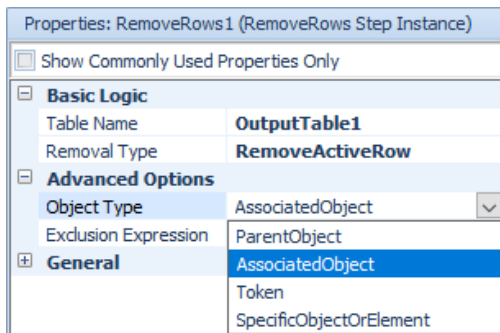
Design Response Results Pivot Grid Reports Input Analysis											
Scenario			Replications		Controls		Table Bindings		Responses		
<input checked="" type="checkbox"/>	Name	Status	Required	Completed	NumberOfDoctors	NumberOfNurses	PatientPriority	Initialization	Cost Of Staff	Average Length Of Stay	
<input checked="" type="checkbox"/>	001	Idle	5	5 of 5	3	3	Original	Original	31247.5	34.976	
<input checked="" type="checkbox"/>	002	Idle	10	10 of 10	3	3	Test	Original	31273.8	34.3466	
<input checked="" type="checkbox"/>	Scen...	Idle	10	10 of 10	3	3	Original	Test	31394.1	27.3299	
<input checked="" type="checkbox"/>	Scen...	Idle	10	10 of 10	3	3	Test	Test	31394.1	27.3299	

RemoveRows Step Enhancement

The RemoveRows step now can remove a single row from an output table. A new *Removal Type* property defaults to the step's existing behavior:



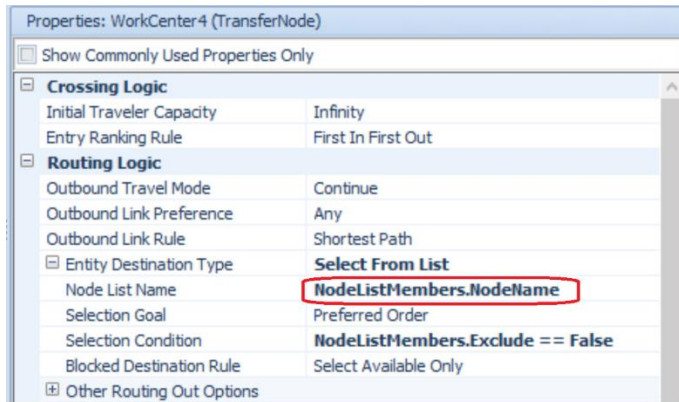
Setting the *Removal Type* to 'RemoveActiveRow' allows users to specify which object or element has a reference to the row to be removed:



This means that to remove a row from an output table, you use a SetRow step followed by a RemoveRows step. Once a row has been removed, any object or element that had a reference to the removed row now has an *invalid* reference, and it must be reset to a valid row before attempting to use it.

List Members in Tables – Enhancement to Destination Node List Name

We have added functionality so that users can now specify the *Node List Name* for a TransferNode (or *Destination Node List Name* for a Routing Group element) as a column in a data table.



New SimBits

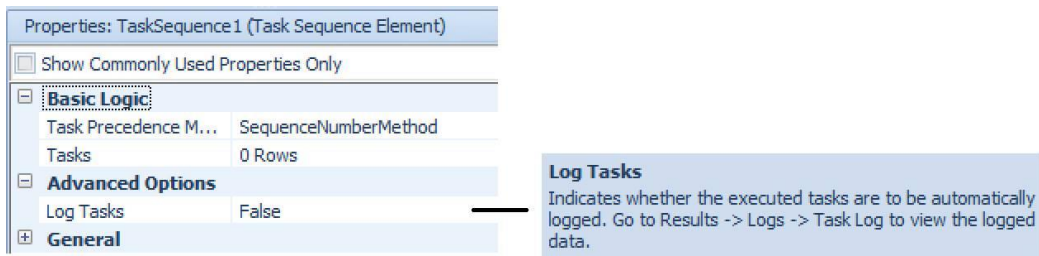
We have added a two new SimBits to demonstrate the use of tables for defining lists of objects.

UsingRelationalTablesToDefineNodeLists – In this model, entities are processed with different routings based on type, and each job step in a routing is performed at a work center that consists of two or more identical servers. All product mix, job routing, lists of possible server input nodes for each job entering a work center, and operation data is defined in a set of relational data tables.

UsingRelationalTablesToDefineResourceTaskLists – This model includes a server where the entity processing is a task sequence, and where all operation data is defined in a set of relational data tables including lists of possible resources that can perform specific tasks.

Task Logging

The TaskSequence element now provides a new *Log Tasks* Boolean property in Advanced Options.



And now for the Server, Combiner, or Separator objects in the Standard Library, the *Log Resource Usage* property provided in Advanced Options of each of those objects is now mapped down to the *Log Tasks* property of its child 'ProcessingTasks' TaskSequence element.

Simio Release 9 – Sprint 157/158 – June 30, 2017

In this sprint, we have expanded the type of characters that may be used within identifier names of objects and elements. Additionally, we have enhanced the route selection algorithm for the RoutingGroup element to better support common scheduling scenarios.

New Identifier Rules - Expanded

Identifiers, such as names of objects within the Facility window and elements within the Definitions window, can now start with a number and/or use expanded character set. For example, '123abc' is now a valid object/element name. We also have greatly expanded the available characters that are valid, so all Unicode uppercase and lowercase letter categories and well as others are supported. (As an example, here is a listing of the Unicode lower case letter category <http://www.fileformat.info/info/unicode/category/Ll/list.htm>)

Simio doesn't allow identifiers that evaluate to numbers so '123' is not valid, but '3f4' is valid. '3e4' is not valid because that is exponential notation for 3×10^4 .

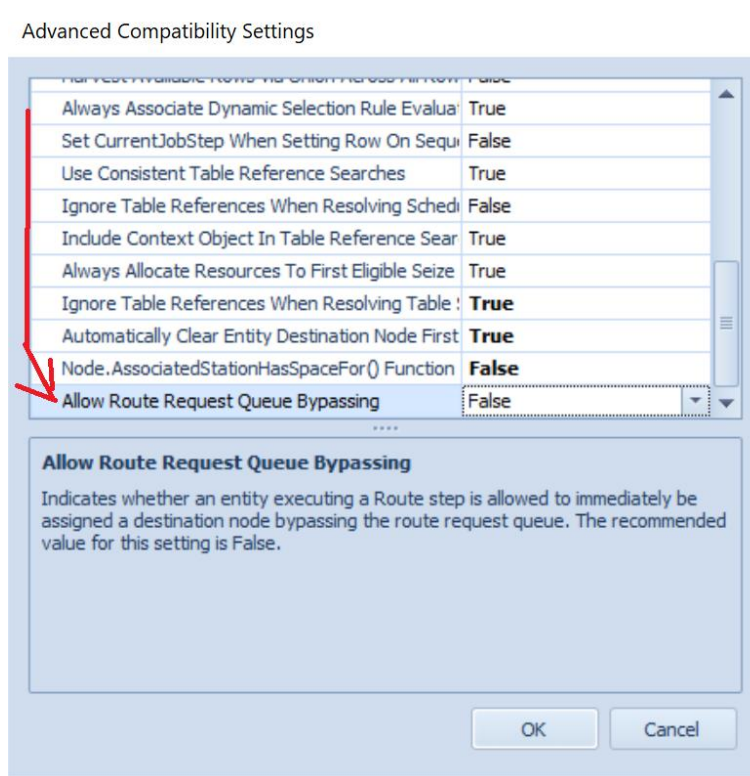
Routing Group – Route Selection Algorithm Enhancements

The RoutingGroup element has been enhanced so that the route selection algorithm prevents a lower priority entity from bypassing a route request queue that potentially contains higher priority entities. Additionally, if multiple destination candidates available in the list of possible destination nodes, the route selection algorithm consistently applies the destination selection goal specified on the Route step or TransferNode.

More specifically, there are two changes that have been made to the route selection algorithm in sprint 157.

- 1) When a Route step is executed, the arriving entity will no longer try to immediately select a destination. Instead, the entity will always be placed into the route request queue. The event types that trigger a routing group to schedule a late priority current event to try to select entities from its route request queue will now include any new entity arrival. See RoutingGroup element help for more information on current/new selection algorithms.

In the Run tab of the Ribbon, in Advanced Compatibility Settings, there will be a new Allow Route Request Queue Bypassing setting. The default value for this setting will be True for old models and False for new models.



2) When checking its route request queue, the new selection algorithm used by the routing group will be as follows:

If no dynamic selection rule is being used (static queue ranking rule only)

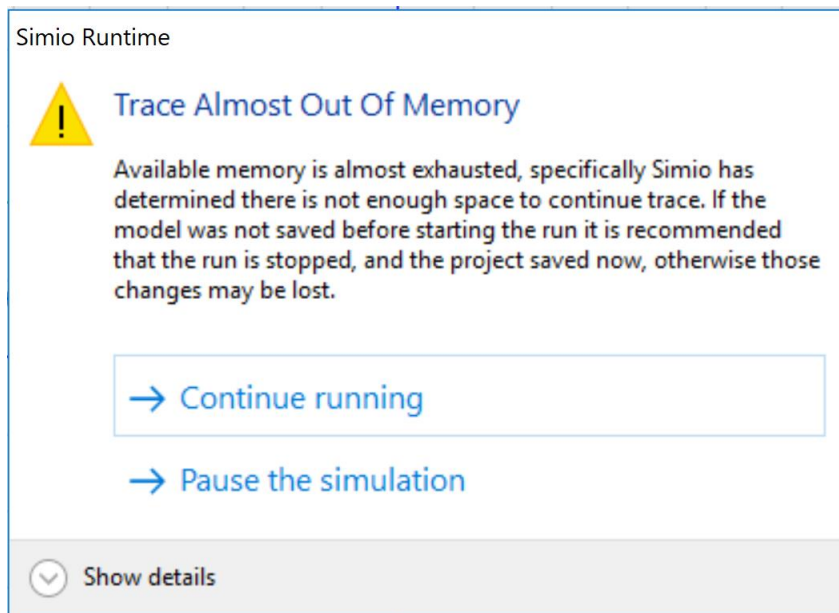
- Use the route request queue's static ranking rule to select a queue item.
- If there are multiple possible destination nodes available for the selected queue item, then use the entity's destination selection goal to select one of those nodes.

If dynamic selection rule is being used

- Find the best route request queue item for each possible destination node using the specified dynamic selection rule.
- Use the route request queue's static ranking rule to select a queue item from the best queue items found.

Memory Check for Trace

If trace is on, and Simio detects during trace that there is less than 50 MB of memory left, it now stops tracing and give you a warning, allowing for a model save:



Command Line Option for *Start in Scheduling Mode*

We have added a new command line option for Simio Enterprise users who may be giving a demonstration to production schedulers. The new "-start-in-scheduling-mode" command line option will simplify the interface and focus on the Gantt, Dashboards and Reports. For example, a shortcut for opening one of the scheduling examples would be:

```
"C:\Program Files (x86)\Simio\Simio.exe"
```

```
"C:\Users\Public\Documents\Simio\Examples\SchedulingDiscretePartProduction.spfx" -start-in-scheduling-mode
```

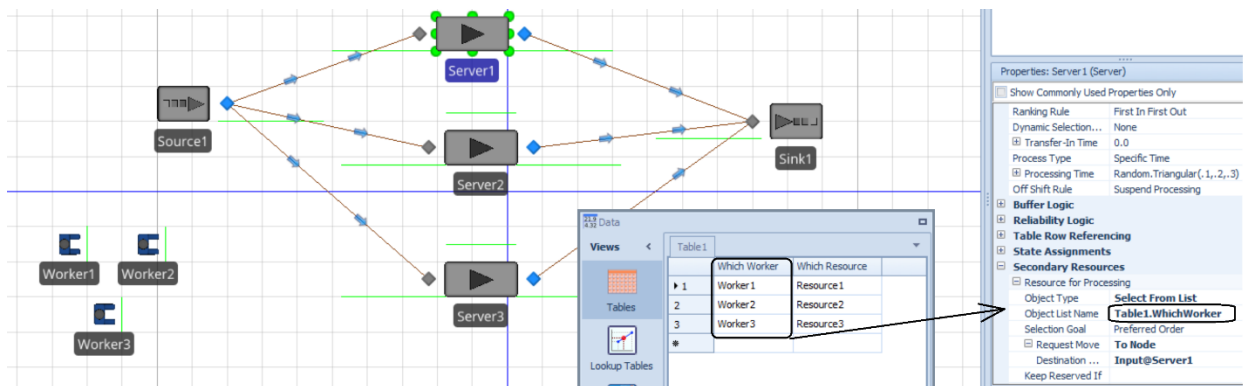
Simio Release 9 – Sprint 156 – June 2, 2017

In this sprint, we have added the capability to specify and reference certain object lists from tables, as well as enhanced our Gantt support zooming. We now also save the xml files for each object definition and table separately when saving *.simproj files to allow for easier concurrent modeling of projects.

List Members in Tables – Enhancement to Seize/Move/Release

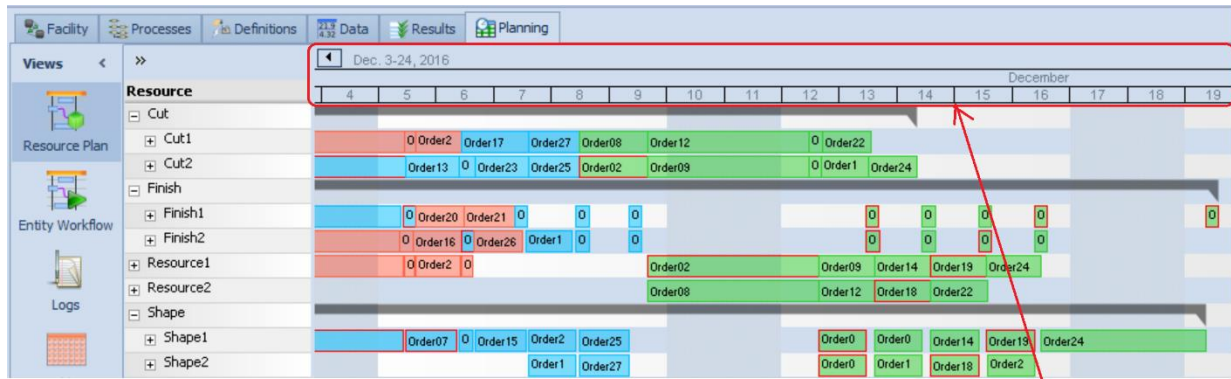
We have added the capability within several steps to allow for list members to also be specified within tables (in addition to Lists). The Seize, Move and Release steps now all allow for the TableName.ColumnName reference to be used as the *Object List Name* property value. Note that this table reference does not currently appear on the pull-down list for that property. Given that the Standard Library objects use the Seize/Release steps for allocating secondary resources, these table references are also available within the Secondary Resources section of objects (as shown below), as well as the Resource Requirements section within Task Sequence type processing.

Please note that this also includes the use of table state columns (Enterprise edition) for the list which, combined with the Output tables and the RemoveRows step, allows for dynamic runtime building of Seize lists.



Gantt Scroll Wheel Support – Enterprise Edition

We have enhanced the Simio Enterprise Edition Gantt charts so that the scroll wheel can be used to zoom in/out. Within either the Resource Gantt or Entity Flow Gantt charts, the cursor should be placed within the time scaler area to enable the scroll wheel for zooming. This now functions similarly to the Simio Portal edition for the Gantt charts.



Place cursor in the time scaler area and use scroll wheel to zoom in and out

New SimBit

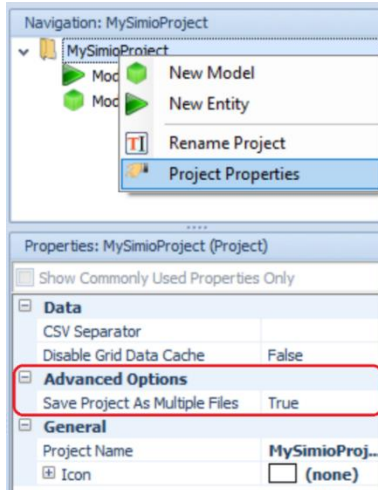
We have added a new renegeing type SimBit to our Sample SimBit Solutions.

RenegingCombiner – this model illustrates a palletizer or similar machine (Combiner object) that batches a standard number of parts together. After the parent (pallet) entity has waited for a given amount of time for the individual parts to arrive, it will renege, reset the batch size to the number of member parts currently waiting and then re-enter the combiner to continue with a smaller batch size.

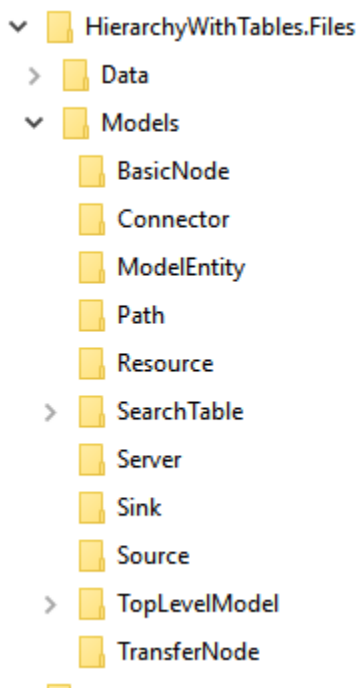
Enhancement to Allow for Easier Concurrent Modeling

Simio Team and Simio Enterprise licenses no longer check for an overall signature on the entire file. This will enable merges in various source control scenarios to generate still readable files by the user modelers. Note that Simio added an additional signature on the “document info” section of the file which must be present for the file to load if the signature of the entire file is missing or incorrect. Thus, if a user does wish to use this functionality, they will need at least one save in the new version of Simio to generate this document info signature.

For multi-file save targets (simproj and the internals of the zip archive of the sfx), Simio will save each Object Definition to its own file and each Table to its own file ***IF*** the project level property setting of *Save Project As Multiple Files* property is set to ‘True’ (which is the default for new projects). If it’s set to ‘False’ (the setting for all existing projects), we will continue saving the way we currently do (thus keeping existing simproj files “looking” the same when they are saved with new software).



To make use of the multi-file feature, the user should save the project as a .simproj. When the model is saved with this target, each object in the model will have its information stored in a folder by the same name located in the Model.Files\Models folder. For example, the HierarchyWithTables SimBit would look as follows:



Each folder will contain an XML file with information pertaining to that object type. If multiple modelers are working on the same project, but different objects, the updated object folder can be copied over the existing object folder. In the above example, if a modeler wanted to make changes only to the SearchTable object, the modeler can make the edits in a separate copy of the model, save the model as a *.simproj and then replace the old SearchTable folder with the updated folder.

Academic Licensing

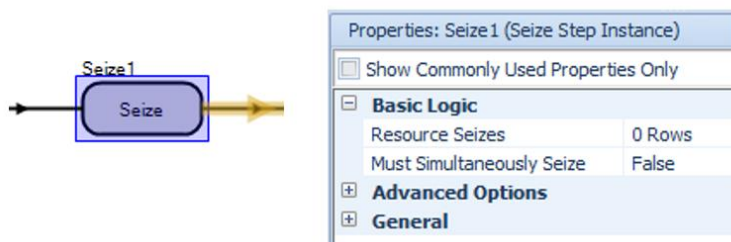
Please Note: In this and future Simio versions, projects saved with an academic license will no longer have their contents written in human-readable XML.

Simio Release 9 – Sprint 155 – May 1, 2017

In this sprint, we have enhanced the Seize step (and corresponding seize operations within the Standard and Flow Library objects) to allow users to **simultaneously seize** multiple resources. We have also enhanced the Seize trace to provide more information when seizing resources.

Seize Step – Simultaneous Seizing Enhancement

We have enhanced the Seize step such that if multiple resources are required, there is an option that indicates whether all must be available before any can be seized. If *Must Simultaneously Seize* is set to 'True', all resources must be available before they are seized. For more information, refer to the Seize step Help page within Simio.



Seize Step – Enhanced Trace

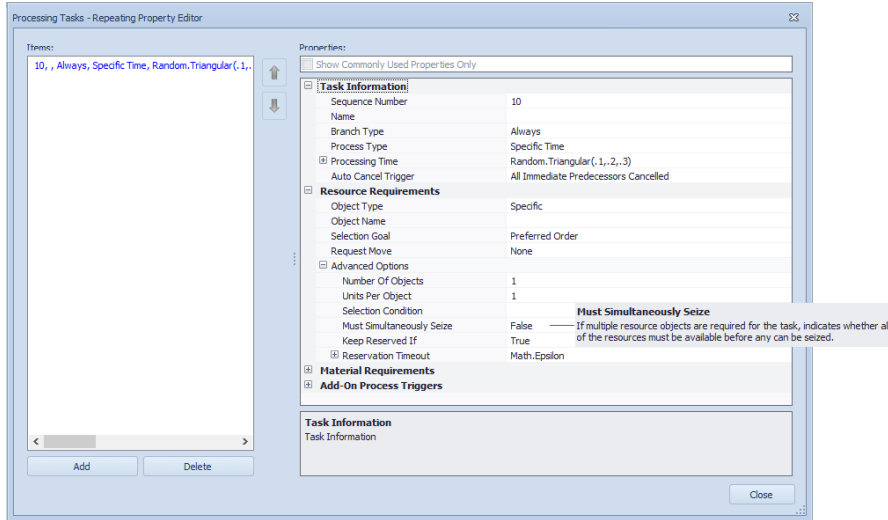
In addition to the above Seize step changes, we have also enhanced the Simio 'trace' for the step so that users may more easily view why a resource or group of resources is seized or not seized. In the below screenshot, for example, the entity requires both Tool3 and Worker1. While Tool3 is available for seizing at the time, Worker1 is currently not available. Therefore, the trace indicates that 'Insufficient resources available to satisfy the Must Simultaneously Seize requirement'. The entity will wait for both those to be available at the same time before seizing both.

Stopped at breakpoint on Process 1.Seize2	
[Seize] Seize2	Object 'DefaultEntity.34' checking availability to seize '1' resource(s) of resource type '[Specific] Tool3'.
	Object 'DefaultEntity.34' found '1' currently available resource(s) of resource type '[Specific] Tool3'.
	Object 'DefaultEntity.34' checking availability to seize '1' resource(s) of resource type '[Specific] Worker1'.
	Object 'DefaultEntity.34' unable to seize '1' capacity unit(s) of resource 'Worker1[1]'. Insufficient capacity available.
	Object 'DefaultEntity.34' found '0' currently available resource(s) of resource type '[Specific] Worker1'.
	Object 'DefaultEntity.34' unable to seize resources. Insufficient resources available to satisfy Must Simultaneously Seize requirement.
	Object 'DefaultEntity.34' waiting to seize '1' resource(s) of resource type '[Specific] Tool3'.
	Object 'DefaultEntity.34' waiting to seize '1' resource(s) of resource type '[Specific] Worker1'.

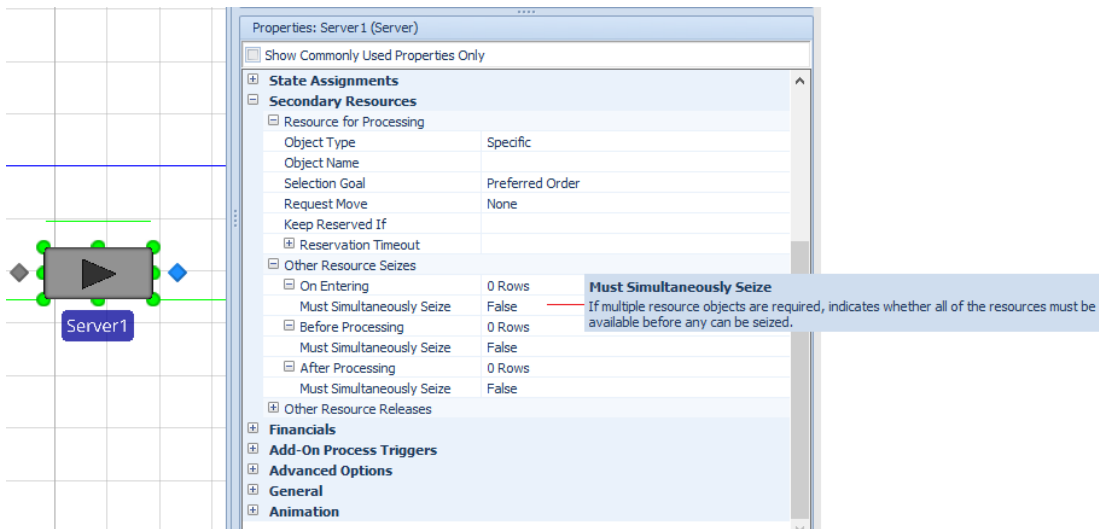
Standard and Flow Library Enhancements – Server, Combiner, Separator, Filler, Emptier

Based on the above enhancement to the Seize step, we have incorporated that same feature into our library object where multiple task resources or secondary resources may be utilized.

For task sequence type processing, processing tasks, the *Must Simultaneously Seize* is specified within the Processing Tasks repeating property. If the resources are specified and referenced within a table or if multiple objects are required as specified by the Number of Objects and/or Units per Object, this new field will be used.



For secondary resources within processing of the various objects, the 'Other Resource Seizes' sections of properties each have the option for *Must Simultaneously Seize*.

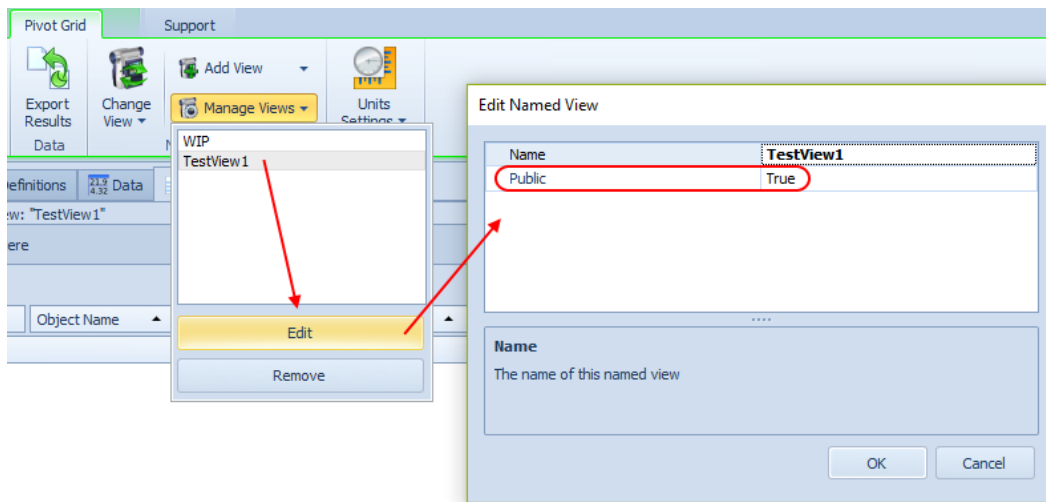


Simio Release 9 – Sprint 154 – April 10, 2017

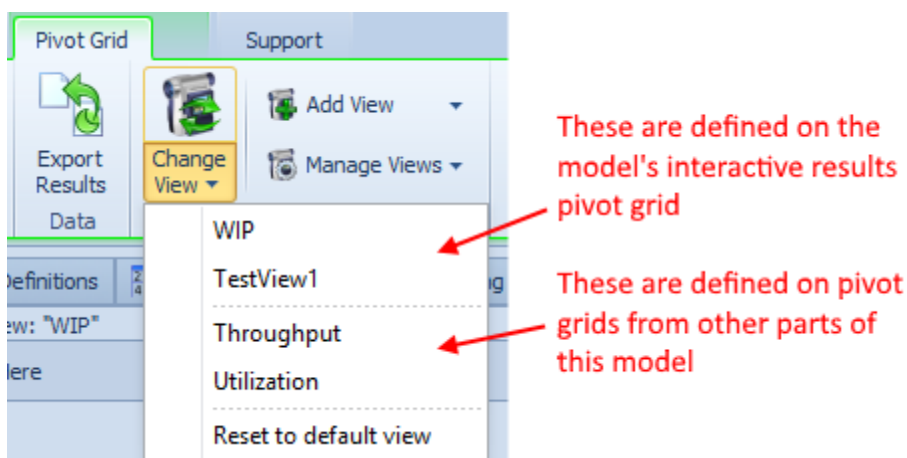
In this sprint, we have added the much-requested feature of *public* views for the pivot grids in different areas of the product. This allows users to customize pivot grid reports in a particular window (i.e., interactive results window), specify them as 'Public' and then view those same customized views in other windows, such as experiment pivot grid or planning results detailed results pivot grid.

Pivot Grid – Public Views

Named views in our various pivot grids are now "Public" by default, allowing them to be used by any other pivot grid in the model or any of its experiments:



When using named views in a pivot grid, you'll now see public ones from the other pivot grids associated with the same model. For example, when viewing the Results pivot grid for a model, you'll see its own named views, followed by public named views from other pivot grids (including those defined by the model's Experiments, as well as Planning results in Enterprise edition).

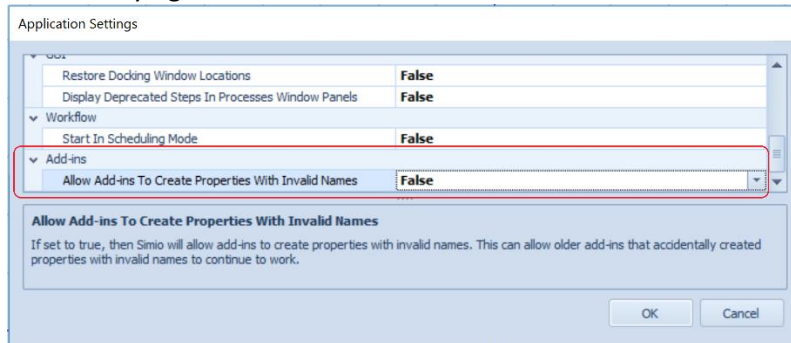


When applying a named view to a pivot grid, we will automatically hide or show certain columns as appropriate to the pivot grid. Specifically, the Minimum, Maximum, Half Width, and Std. Dev. columns will be hidden when applying an experiment's named pivot view to a model's pivot grid, while the

Minimum, Maximum, and Half Width columns will automatically be shown when applying a named pivot view from a model's pivot grid to an experiment's pivot grid.

New Application Setting - Allow Add-ins To Create Properties With Invalid Names

There is a new application setting that lets users turn off the validity checking of names of properties created by the API. The reason this has been added is that we did not used to check for validity, and there are old add-ins that create improper property names (e.g., with spaces) which will now cause models relying on those add-ins to not load in some circumstances.



Poisson Distribution

Please note that with the Poisson distribution for means ≥ 40 , the distribution will be calculated using the Normal distribution.

Simio Release 9 – Sprint 153 – March 21, 2017

In this sprint, we have added some new work schedule related functions, as well as enhanced our table importing capabilities. Several user-requested features have also been added, including a Sequence Destination property type for changing a data table to a sequence table and an Entity Activity List report for Simio Enterprise users.

New Schedule Functions

The below schedule based functions have been added to allow users more flexibility accessing schedule based information. These functions can be accessed using ScheduleName.*, SchedulePropertyName.Schedule.* (e.g., ResourceObjectName.WorkSchedule.Schedule.* if the resource is following a work schedule) or TableName.SchedulePropertyName.Schedule.*

AverageValue(fromDateTime, toDateTime) – Returns the average value over a specified time range.

MinimumValue(fromDateTime, toDateTime) – Returns the minimum value over a specified time range.

MaximumValue(fromDateTime, toDateTime) – Returns the maximum value over a specified time range.

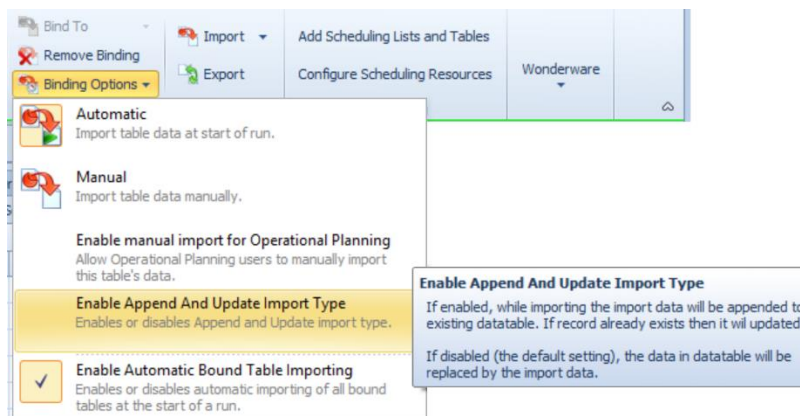
New SimBit

We have added a new SimBit to our large selection of small simulation modeling examples.

VehicleDoingSimultaneousLoading – this model illustrates three entity types waiting to be picked up by a vehicle at the same time. Each entity type has a different load time and the vehicle departs after the last entity finishes loading. The logic in this model could be used to customize the Vehicle object.

Table Importing Enhancement

The Binding Options within Data tab / Tables now includes the option to append and update data when importing. If this option is enabled and data is imported into a table with existing data, any new data will be appended to the existing table. If a record already exists (based on a value in the key column of that table), the data will be updated. * Note: This feature is available within sprint 152, but was not documented until sprint 153.



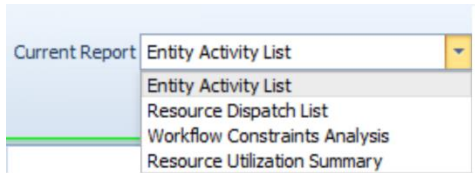
Tables - Sequence Destination Property

A standard Data Table can now be changed into a Sequence Table by using the new 'Sequence Destination' property type. This can be done by adding a new column of that type or changing an

existing column to that type. This is useful if the user has already defined multiple columns in a standard Data Table and realizes it should be a Sequence Table OR if the sequence destination column of a Sequence Table has been accidentally deleted.

New Entity Activity List – Simio Enterprise

Within the Planning tab, Results panel for Simio Enterprise edition, we have added an additional report named Entity Activity List. This report is an entity based listing of all resources / activities that have been allocated over time. The *Entity Name*, as well as *Start Date* and *End Date* are specified. As with the other reports in this section, the 'Show Detail' option provides more details on a resource by resource basis.



A screenshot of the Simio Enterprise Results panel. The 'Entity Activity List' report is displayed. The interface includes a left sidebar with navigation options like 'Resource Plan', 'Entity Workflow', and 'Logs'. The main area shows the report parameters and a table of activity data.

Entity Activity List
Generated On: 3/21/2017 8:12:24 AM
Date Range: 12/1/2016 8:00:00 AM - 12/22/2016 8:00:00 AM [Show Detail](#)
Owner: Order01

Resource	Start Time	EndTime	Duration (Hours)
Weld1	12/1/2016 8:00:17 AM	12/1/2016 11:42:17 AM	3.7000
Resource1	12/1/2016 8:00:17 AM	12/1/2016 11:42:17 AM	3.7000
Shape1	12/1/2016 11:42:30 AM	12/2/2016 8:30:30 AM	20.8000
Finish1	12/2/2016 8:30:41 AM	12/2/2016 1:54:41 PM	5.4000

Where the 2nd page is shown in graphical form (when Show Graphics is set to 'Yes')

Date Range: 12/1/2016 8:00:00 AM - 12/22/2016 8:00:00 AM [Show Detail](#)
Owner: Order01

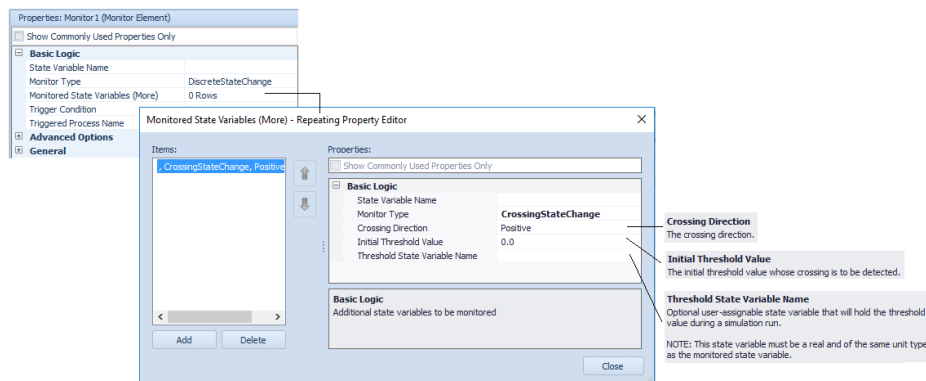
Simio Release 9 – Sprint 152 – February 24, 2017

In this sprint, we have updated the Monitor element to allow for multiple state variable triggers. A SimBit project has been added to demonstrate this feature in comparison with the new Scan step functionality that was added in Sprint 151. We have also added several user requested features needed for simulation projects.

Monitor Element Enhancement

We have enhanced the Monitor element to be able to monitor more than one state variable, which will simplify the event-driven waiting approach (Wait step). The enhancement will make it easier to model a single 'Status Changed' event that pertains to some logical grouping of state variables in the system, such as a set of variables that relate to the status of an area, a processing location, etc.

For example, suppose a single Monitor element named PackingAreaStatusChanged is defined that is monitoring discrete changes in the state variables Packer1.AllocationQueue, Packer1.ResourceState, Packer2.AllocationQueue, or Packer2.ResourceState. Somewhere in the modeled process logic, perhaps a Wait step is then used to hold a process token until event name PackingAreaStatusChanged occurs and event condition Packer1.ResourceState==0 && Packer2.ResourceState==0 is true.



New SimBit

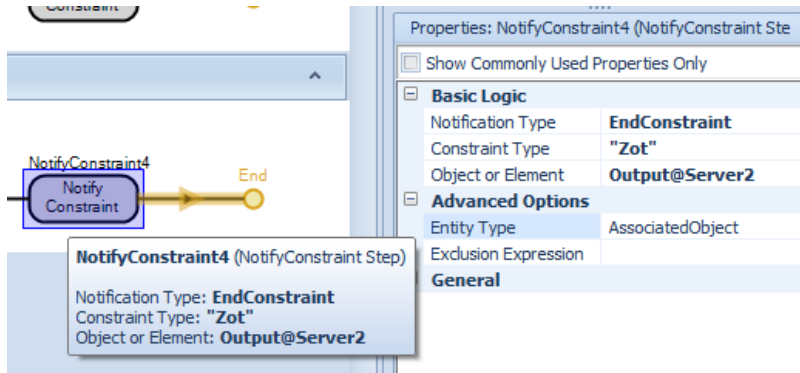
We have added a new SimBit project (BatchingProcessUsingScanOrWaitStepToControlBatchSize.spx) that includes two models which display the polled waiting (Scan step) approach and event driven (Wait step) approach.

BatchingProcessUsingScanStepApproach - Batching process at a server where the batch size control is modeled using a Scan step approach (polled waiting).

BatchingProcessUsingWaitStepApproach - Batching process at a server where the batch size control is modeled using a Wait step approach (event-driven waiting).

New NotifyConstraint Step

The new NotifyConstraint step allow users to add custom (i.e. user-defined) constraint entries into the Constraint Log (and by extension the Entity Gantt chart).



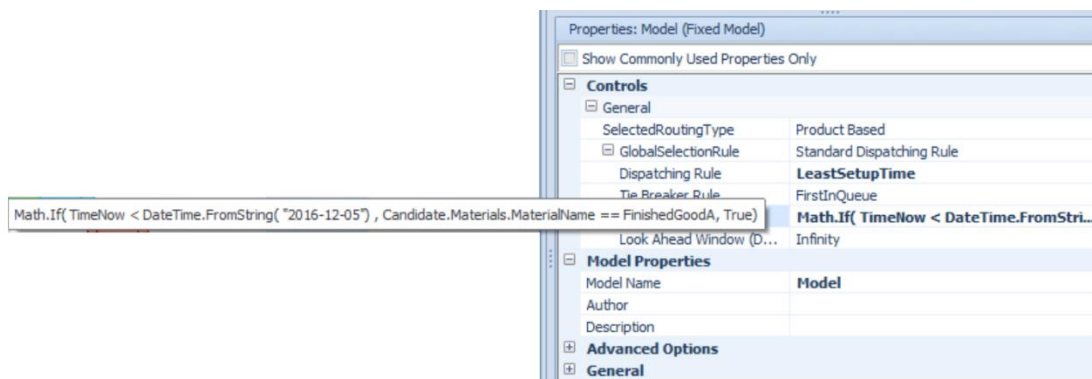
Entries in the Constraint log show up like this (the first two rows are existing automatic ones, the next two are custom ones):

Entity Id	Entity	Facility Location	Station	Constraint Type	Constraint Item Id	Constraint Item	Constraint Description	Start Time	End Time
DefaultEntity.33	DefaultEntity.33	Server1	InputBuffer	Resource Availability	Server1	Server1	Server	2/13/2017 12:04:33 AM	2/13/2017 9:03:39 AM
DefaultEntity.34	DefaultEntity.34	Server1	InputBuffer	Resource Availability	Server1	Server1	Server	2/13/2017 12:04:48 AM	2/13/2017 9:33:51 AM
DefaultEntity.16	DefaultEntity.16	Server1	InputBuffer	Sproing	Input@Server1	Input@Server1	BasicNode	2/13/2017 12:30:15 AM	2/13/2017 1:00:15 AM
DefaultEntity.15	DefaultEntity.15	Server2	Processing	Zot	Output@Server2	Output@Server2	TransferNode	2/13/2017 12:30:30 AM	2/13/2017 1:00:30 AM

When the user executes one of these steps with *Notification Type* set to 'StartConstraint', we create a new entry in the Constraint Log, setting the *Start Time* column to TimeNow. Then later, when the user executes one of these steps with *Notification Type* set to 'EndConstraint', with matching values for the other properties, we "close" that entry in the log by setting the *End Time* column to the current TimeNow.

New Dynamic Selection Rule Property – Filter Expression

The Dynamic Selection Rule grouping of properties has been enhanced to include a *Filter Expression*. This allows a user to optionally filter out any candidate entities that don't satisfy a specified logical condition. It is like the *Filter Expression* property provided by the 'Smallest Value First' and 'Largest Value First' rules.

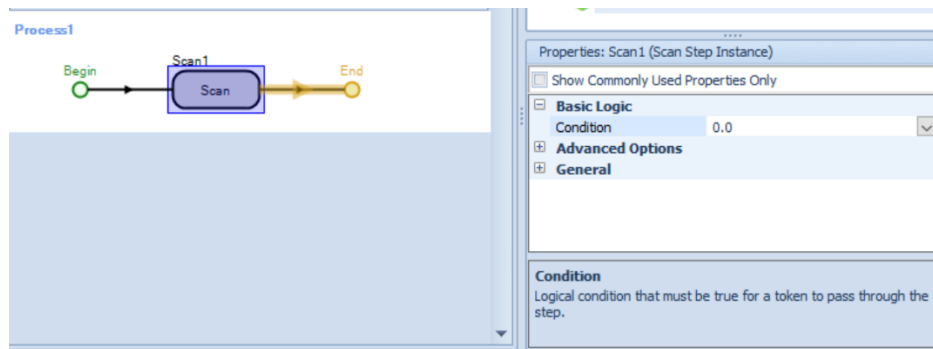


Simio Release 9 – Sprint 151 – February 7, 2017

In this sprint, we have added a new polled waiting approach for modeling with the Scan step. Additionally, we have enhanced our data binding options such that 'bound' data tables can be temporarily disabled for model distribution and testing.

New Scan Step

We have added a Scan step which provides a new polled waiting approach that allows a modeler to hold a process token until a specified condition is true, where the logical condition may be specified as any arbitrary expression.



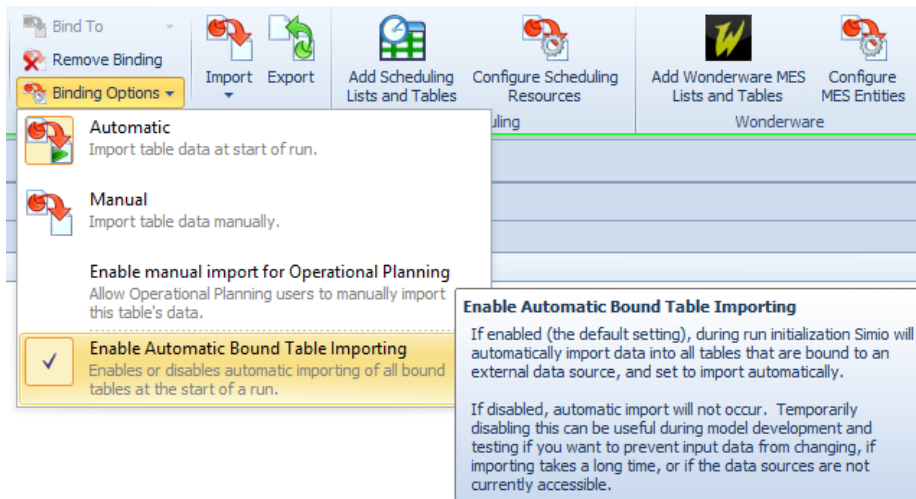
See more details in the Simio help for specifics of how this step works.

Enhancement to Resource Plan Gantt - Selecting a row(s) displays the property grid for the selection. (Enterprise Edition)

We have enhanced the Resource Plan Gantt so that when a user clicks on a resource name in the Resource Plan, the Resource related tables are displayed in the property view. This is useful, for example, if there is a column in the Resources table than allows the user to specify the work schedule. The enhancement allows the work schedule to be changed for a Resource from the Planning tab.

Option to Toggle Data Table Bindings

There is a new menu item on the Data tab under Binding Options that lets users to NOT do the automatic importing it would normally do for data bound tables. This is a model-level setting that is saved to the project file.



Note that this does not “temporarily *remove* table bindings” but will bypass the automatic import at start of run. When a model is in this state, bound tables that are set to automatically import show the following in red:

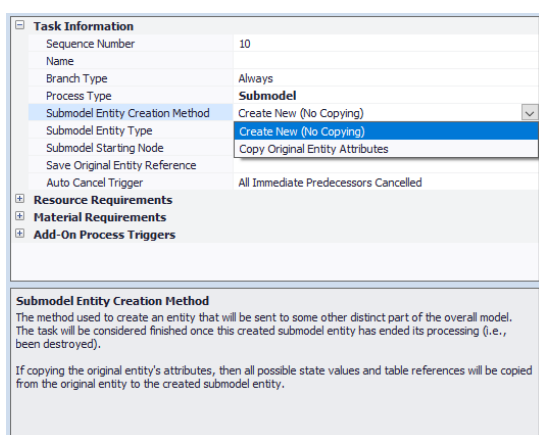
Table1	
Bound to Excel: C:\SimioModels\SAMPLE_DATA_FOR_BINDING_TO_TABLE.xlsx, Worksheet: Sheet1	
<i>Automatic importing of bound tables is currently disabled.</i>	
Name	Value

Simio Release 9 – Sprint 150 – January 24, 2017

In this sprint, we have made several user-requested features including enhancements related to task sequences and functions. The Snap to Grid feature has also been changed to allow easier placing of objects within the initial Facility window configuration.

Server / Combiner / Separator – Task Sequences Enhancement

If using the 'Task Sequence' for processing in Server, Combiner, or Separator, and a task's *Process Type* is specified as 'Submodel', the user now has an option to copy over the attributes of the original entity to the created submodel entity (e.g., state values and table references). Previously only the 'Create New (No Copying)' behavior was supported. This new feature allows for greater flexibility for submodel type processing with the task sequences.



Task Information	
Sequence Number	10
Name	
Branch Type	Always
Process Type	Submodel
Submodel Entity Creation Method	Create New (No Copying)
Submodel Entity Type	Create New (No Copying)
Submodel Starting Node	Copy Original Entity Attributes
Save Original Entity Reference	
Auto Cancel Trigger	All Immediate Predecessors Cancelled

Submodel Entity Creation Method
The method used to create an entity that will be sent to some other distinct part of the overall model. The task will be considered finished once this created submodel entity has ended its processing (i.e., been destroyed).
If copying the original entity's attributes, then all possible state values and table references will be copied from the original entity to the created submodel entity.

New Token Functions

We have un-deprecated the `Token.ContextObject` function (as requested by a customer) and for completeness, have added `Token.TaskInfo.IDNumber` function.

Token.TaskInfo.IDNumber - Returns the unique integer identifier number of the task assigned to the token. It is valid when using task sequences and the Task Precedence Method of either 'Immediate Predecessors Method' or 'Immediate Successors Method' where the task *ID Number* is specified.

New String Function

We have added a new string function that will compare sequence number strings.

String.CompareSequenceNumbers(sequenceNumber1, sequenceNumber2) - Compares two specified sequence number strings and returns 0 if the two sequence numbers have no implied dependency relationship, -1 if an item assigned the first sequence number must come before an item assigned the second sequence number, or 1 if an item assigned the first sequence number must come after an item assigned the second sequence number.

Each sequence number argument may be expressed as a string that contains either an integer or a dot-delimited sequence of integers (e.g., 10.2.3.1). Or, in a data table, you may add a property (column) of type 'Sequence Number' and the arguments of this function may be references to row values in such table columns.

Examples:

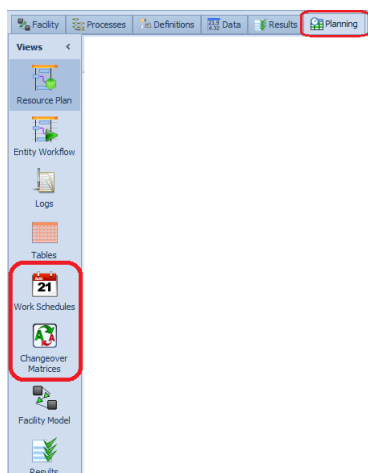
String.CompareSequenceNumbers("10", "10") will return 0.
String.CompareSequenceNumbers("10", "20") will return -1.
String.CompareSequenceNumbers("20", "10") will return 1.
String.CompareSequenceNumbers("10.1", "10.2") will return 0.
String.CompareSequenceNumbers("10.1", "20.1") will return -1.
String.CompareSequenceNumbers("20.1", "10.1") will return 1.

User Interface – Snap to Grid

The Snap to Grid has been updated slightly to snap to a quarter of a grid line in the default Facility window upon opening a model. This provides more flexibility in placing objects while maintaining the snap to grid feature 'on' setting at the start of the model building process.

Simio Enterprise – Planning Tab Enhancement

Within the Planning tab of Simio Enterprise Edition, we have added the Work Schedules and Changeover Matrices panel buttons to allow easy access to creating/modifying either resource work schedules or changeover matrices times. These are also available in 'Scheduler mode'.



Updated Visual Studio Templates

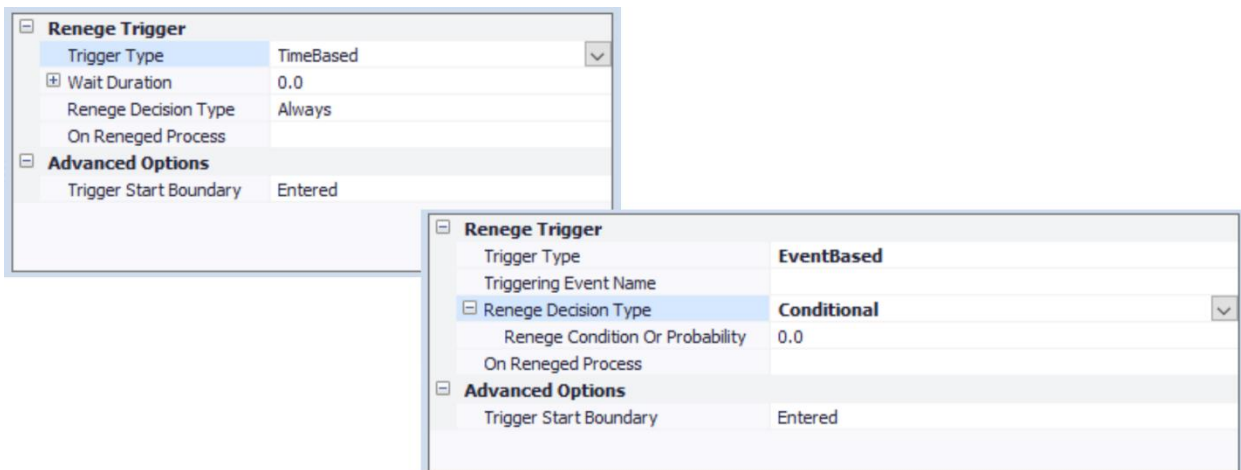
We have updated our C# Visual Studio Templates to support Visual Studio 2012, 2013 and 2015, and have added corresponding templates for VB.NET.

Simio Release 9 – Sprint 149 – December 13, 2016

In this sprint, we have enhanced the buffer logic on Standard and Flow Library objects to include renegeing, or abandoning waiting in a queue or station. Models illustrating various types of balking and renegeing have also been added to our extensive SimBit library.

Station Element - Renegeing

The Station element has been enhanced to include renegeing, when an entity decides to abandon waiting in a queue or station. Within the Advanced Options properties, a Renege Triggers repeating property editor allows users to define multiple triggers for renegeing. Triggers can be Time or Event based, and once the trigger has occurred, the renegeing can happen always or based on a probability or condition of the system.



There is also a new function, **NumberReneged**, that returns the total number of entities that have abandoned waiting in the station.

Buffer Logic – Renegeing Options

In sprint 146, we added balking options to the input and/or output buffers many objects. We have continued that effort and now provide renegeing options for the buffer(s) within the Source, Server, Combiner, Separator and Workstation within the Standard Library, as well as the Filler, Emptier, ItemToFlowConverter and FlowToItemConverter within the Flow Library.

For each input buffer and output buffer, the Balking & Renegeing Options includes the balking properties as well as a Renege Triggers repeating property editor to specify one or more methods to trigger renegeing within a buffer.

Properties: Server1 (Server)

Show Commonly Used Properties Only

Process Logic

Capacity Type	Fixed
Initial Capacity	1
Ranking Rule	First In First Out
Dynamic Selection Rule	None
<input checked="" type="checkbox"/> Transfer-In Time	0.0
Process Type	Specific Time
<input checked="" type="checkbox"/> Processing Time	Random.Triangular(.1,.2,.3)
Off Shift Rule	Suspend Processing

Buffer Logic

Input Buffer

Capacity	Infinity
Balking & Reneging Options	
Balk Decision Type	None
Reneges Triggers	0 Rows

Output Buffer

Capacity	Infinity
Balking & Reneging Options	

Reliability Logic

Table Row Referencing

Reneges Triggers
Optional waiting time or event-driven triggers that can cause entities to renege from the buffer.

Within the Reneges Triggers repeating property editor, there is a *Trigger Type* property to allow for either 'Time Based' or 'Event Based' triggering. For Time Based triggering, a *Wait Duration* expression is specified, while for Event Based triggering, the *Triggering Event Name* property is displayed.

If reneging is triggered, the action can happen either always (no conditions), or based on a probability or condition of the system. This allows for logic such as an entity evaluating the buffer size after a wait duration to determine whether to remain in the queue. The reneged entity can either be destroyed or sent to a different node for alternative processing.

See the associated SimBits or the Simio Help page for Balking and Reneging Options for more examples.

Simio also includes statistics on the total number of renege entities for a buffer in the automatically reported results.

Drop Filter Fields Here

Average

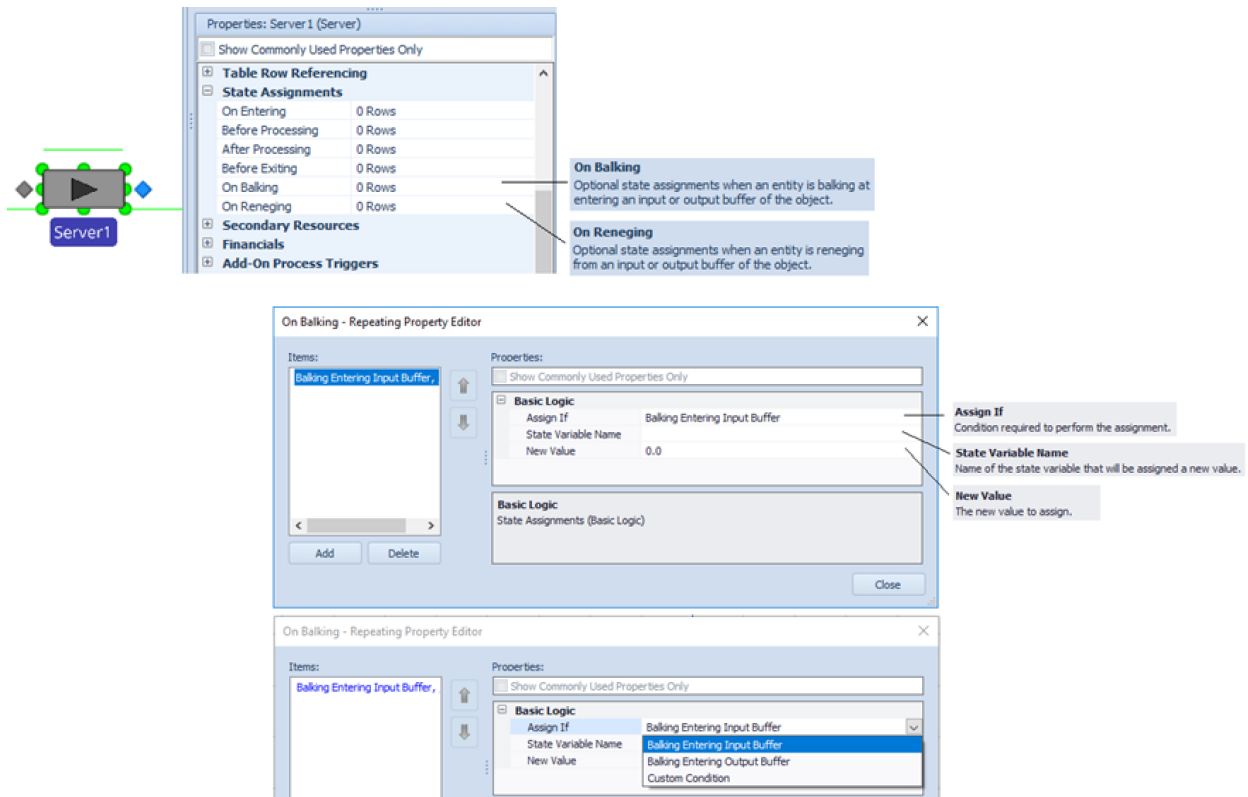
Object Type	Object Name	Data Source	Category	Data Item	Statistic	Average Total
Server	Server 1	InputBuffer	Content	NumberInStation	Average	0.1169
					Maximum	4.0000
			HoldingTime	TimeInStation	Average (Hours)	0.0010
					Maximum (Hours)	0.0132
					Minimum (Hours)	0.0000
			Throughput	NumberBalked	Total	2,843.0000
				NumberEntered	Total	2,847.0000
				NumberExited	Total	2,847.0000
				NumberReneged	Total	12.0000

Drop Column Fields Here

Server1.InputBuffer.NumberReneged

State Assignments - On Balking and On Renegeing

We have enhanced the Properties window of selected Standard or Flow Library objects to allow optional state assignments whenever an entity is balking at entering a buffer or renegeing from a buffer. Options are available for making assignments under different conditions.



Failed and Repaired Events

The 'Failed' & 'Repaired' events for Standard and Flow Library objects that have resource capabilities and failures are now accessible. These events may now be used in Renege Triggers as event based triggers, thus minimizing or eliminating any excess process logic. For example, the SimBit ChangingQueuesWhenServerFails now accesses the Server object Failed / Repaired events to trigger reneging to the alternative Server, thus eliminating the Decide/Search/Remove/Assign step approach previously used.

New SimBits – Balking and Reneging

We've added 3 new SimBits to demonstrate the Balking and Reneging functionality. Additionally, the existing SimBit ChangingQueuesWhenServerFails.spfx was changed to reflect the new balking and reneging logic of the Standard Library Objects.

SourceWithBalkingIfBlocked.spfx – This model shows the balking of entity arrivals at a source if there is no immediate space at the downstream server.

ServerQueueWithBalkingAndReneging.spfx – This model includes a single server queue with balking and reneging (impatient customers). Customers will balk from the queue if it's above a certain length. Then, once customers enter the queue, they have a waiting time after which they evaluate their place in the line to determine whether or not to renege.

MultiServerSystemWithJockeying.spfx – This model is service system that consists of a group of parallel servers, where each server has its own waiting line. Customers switch between lines if they think they will get served faster.

Entity 'Queueing' Functions

To make it easier for a modeler to check in a conditional expression whether an entity is currently waiting for a specific type of constraint, the following new functions will be provided for an entity object:

Queueing.IsWaitingResourceAllocationQueue - Returns True (1) if the entity is currently waiting in the AllocationQueue of a resource. Otherwise, the value False (0) is returned.

Queueing.IsWaitingMaterialAllocationQueue - Returns True (1) if the entity is currently waiting in the AllocationQueue of a material. Otherwise, the value False (0) is returned.

Queueing.IsWaitingStationEntryQueue - Returns True (1) if the entity is currently waiting in the EntryQueue of a station. Otherwise, the value False (0) is returned.

Queueing.IsWaitingLinkEntryQueue - Returns True (1) if the entity is currently waiting in the EntryQueue of a link. Otherwise, the value False (0) is returned.

Queueing.IsWaitingNodeEntryQueue - Returns True (1) if the entity is currently waiting in the EntryQueue of a node. Otherwise, the value False (0) is returned.

Queueing.IsWaitingRidePickupQueue - Returns True (1) if the entity is currently waiting in the RidePickupQueue of a node to be picked up by a transporter. Otherwise, the value False (0) is returned.

Queueing.IsWaitingRouteRequestQueue - Returns True (1) if the entity is currently waiting in the RouteRequestQueue of a routing group element to be assigned a destination. Otherwise, the value False (0) is returned.

Queueing.IsWaitingBatchLogicParentQueue - Returns True (1) if the entity is currently waiting in the ParentQueue of a batch logic element to collect a batch of other entities. Otherwise, the value False (0) is returned.

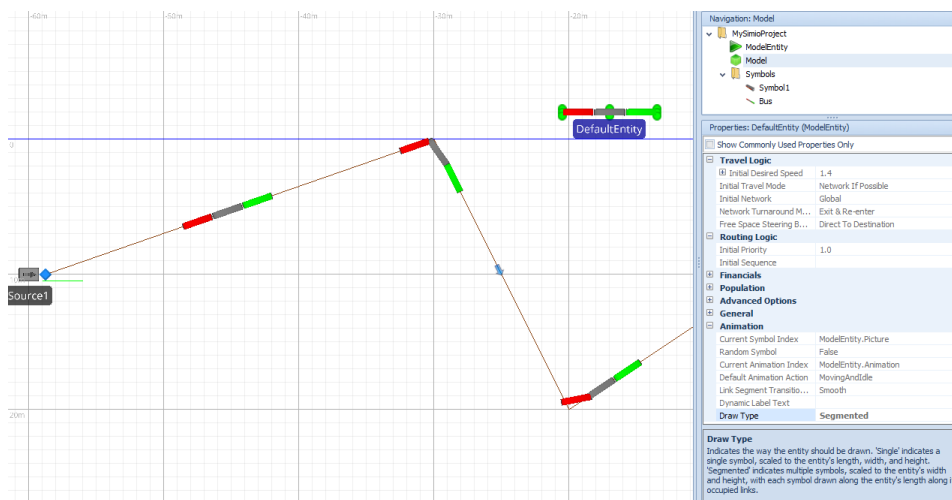
Queueing.IsWaitingBatchLogicMemberQueue - Returns True (1) if the entity is currently waiting in the MemberQueue of a batch logic element to be added as a member to a batch. Otherwise, the value False (0) is returned.

Simio Release 9 – Sprint 147 – October 28, 2016

In this sprint, we have added several new features, from new state assignments and table referencing within our Server type objects to segmented entity movement for smoother animations of certain symbols. Our Support ribbon options for Videos and Training have also been updated to provide users quick access to many resources for learning Simio and viewing examples.

Entity Animation - Display entities as segmented along links

Entities now have a *Draw Type* property (Animation) that allows the entity to be 'Single' or 'Segmented'. To have the entity actually move segmented, both the new *Draw Type* property should be set at 'Segmented' and the entity symbol itself must be able to be segmented. For example, to animate a train, the user would go to the Project Home ribbon, click New Symbol -> Create New Symbol, and place a number of individual cars and engines into the symbol. Then the new symbol can be applied to the ModelEntity placed in the Facility window.



State Assignments in Library Objects

The State Assignments section of properties in the Server, Combiner, Separator, Filler and Emptier objects has been enhanced to include a repeating property editor for optionally making assignments *Before Processing* and/or *After Processing* at the object.

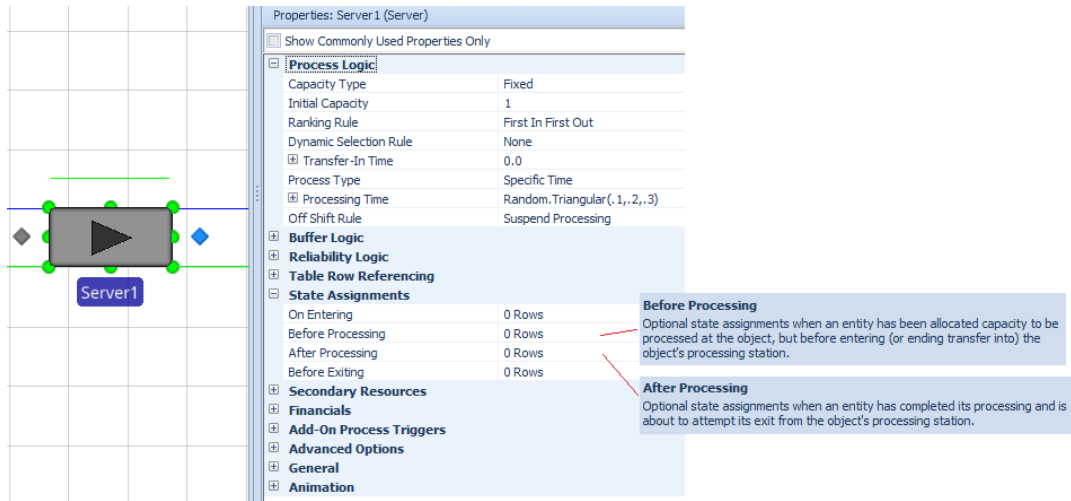
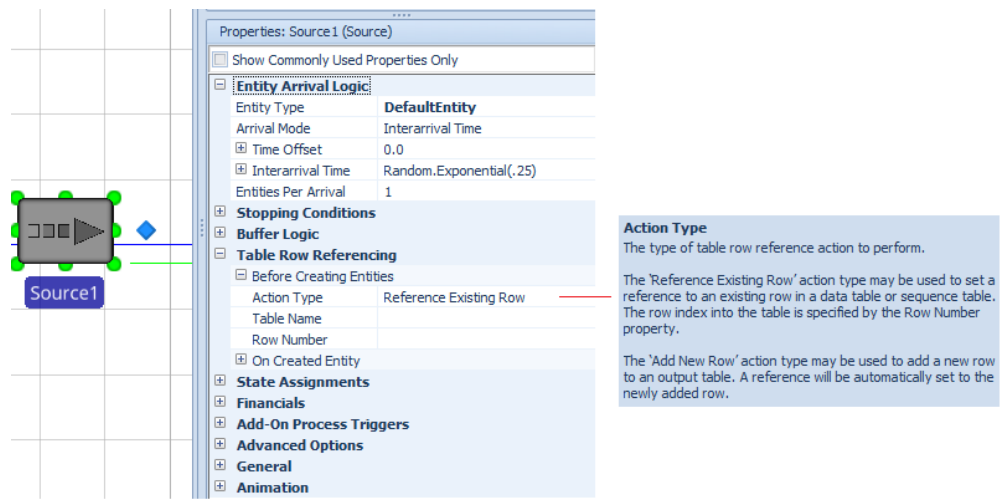
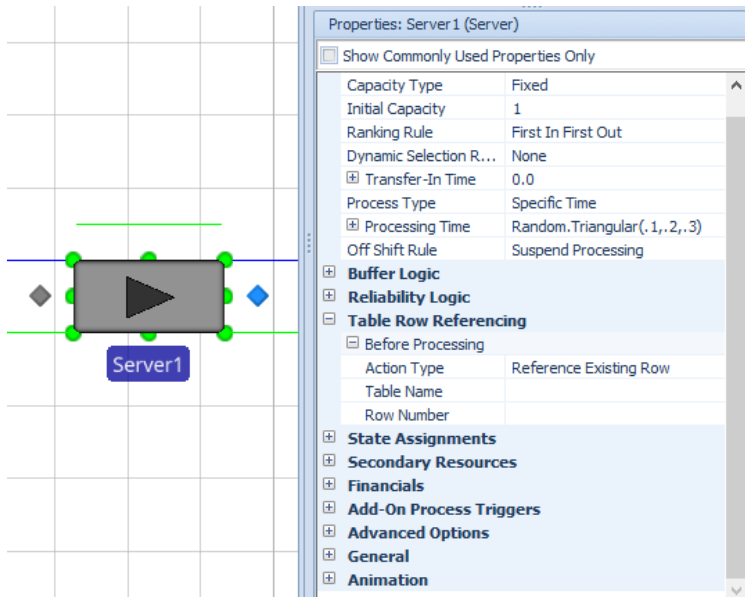


Table Row Referencing in Library Objects

The Table Reference Assignments section of properties in the Source has been renamed to Table Row Referencing. Additionally, an *Action Type* property has been added to allow users not only to 'Reference Existing Row' in a table before or on creating entities, but also to allow for alternatively to 'Add New Row' to an output table.



In conjunction with this change, the Server-oriented objects including the Server, Combiner, Separator, Filler and Emptier objects, have been enhanced to include the ability to reference table rows before the entity starts processing (prior to before processing state assignments). Each of these objects now allow for either referencing an existing row in a data or sequence table, or adding a new row to an output table.

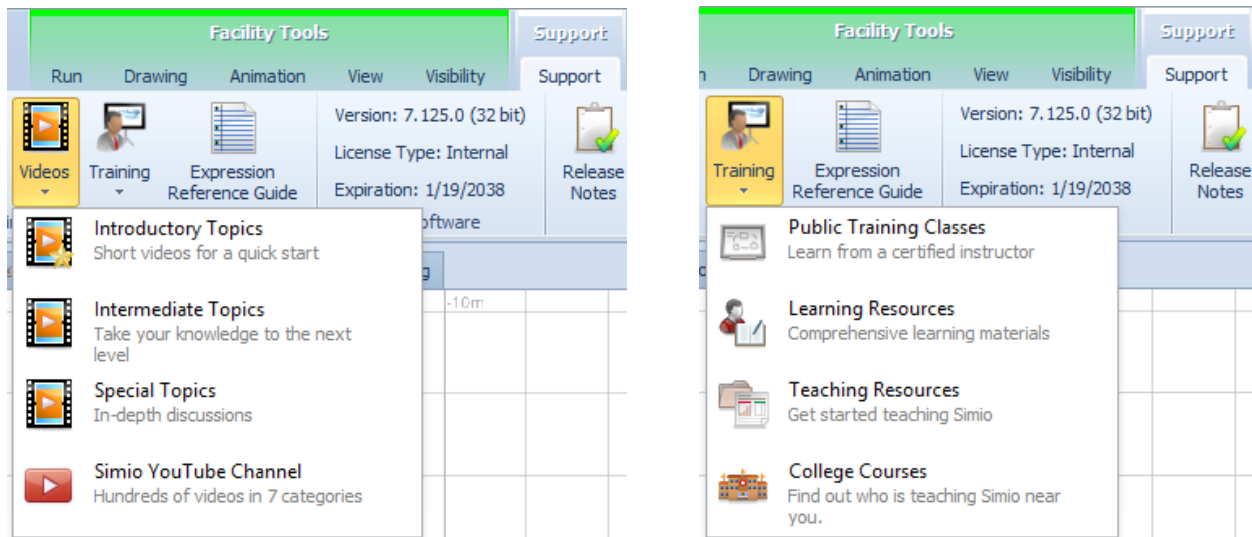


SetRow and AddRow Step Enhancements

The SetRow step (available in all Simio editions) and the AddRow step (available in Simio Enterprise edition) have both been enhanced to include a new conditional expression property. If a condition is specified, then it must evaluate to 'True' to perform the set row or add row action.

Support Ribbon Updates

We have updated both the Videos and Training buttons on the Support ribbon to provide a more organized and up to date look at the various levels for learning more about Simio, as well as resources for training. All options take you to links on our Simio website.



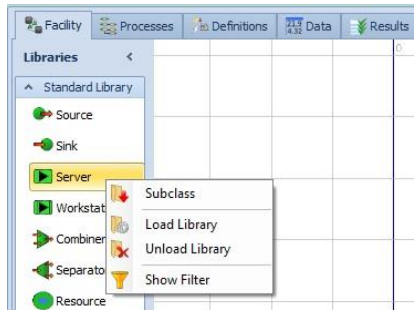
Remove Step Enhancements

We have changed the Remove step to include the ability to remove an entity from material allocation queues, as well as from network visit request queues (Global.VisitRequestQueue, for example). Entities either waiting for material or transporter (Worker/Vehicle) allocation can now be easily removed from

those queues if desired. This additional functionality has been added as we continue to enhance our balking / reneging capabilities.

Right Click on Library Panel Change

In addition to using the Load Library button from the Project Home ribbon to load a library into the project, users can now also right click on the library area itself to access the Load Library functionality. This right click area now allows both loading and unloading of library files.



Performance Enhancements with Status Label Creation

We've changed the way status labels are created - specifically, this addresses some performance issues with many status labels attached to many, many dynamic objects (entities). The enhancements are most notable when many status labels have the same exact size, color, and content, as we now share the same generated label between all those instead of creating a new one for each of them.

New Functions

LocationAt.Geographic - converts a latitude and longitude to an X, Y, Z location in the model, relative to the current latitude and longitude of the model's origin. The result of the function is a Location, with Z and X components that correspond to the latitude and longitude, respectively. Note that the range of valid values for latitude is -90.0 to +90.0, and for longitude is -180.0 to +180.0. If either value is out of range, the result is a Location consisting of all NaN values.

DateTime.SystemNow - returns the current DateTime from the computer (actual time, not simulation time), expressed in the computer's current timezone.

DateTime.SystemNowUtc - returns the current DateTime from the computer (actual time, not simulation time), expressed as Coordinated Universal Time (UTC).

Important Notice – Windows Vista

Please note that this sprint Simio 9.147 is the last release that we'll support running on Windows Vista, since Microsoft's extended support for Vista ends in April 2017.

Where's the Rest?

In case you are a history buff who would like to see a sprint by sprint account of how we got to this point, you can find that here:

<http://www.simio.com/downloads/public/documents/SimioHistoricalReleaseNotes.pdf>. This contains records from the first 146 sprints (0-146) covering the generation of Simio major releases 1 - 8.