

This course is intended for previous Users of ProModel & MedModel who have completed Essentials Training but may not have used the software for a while.

Our hope is that this training will help these Users “brush up” on their skills so they can again use the software to benefit their business.

We have updated this material to show PM 2018 features & screen shots!!

ProModel 2018 Basic Refresher Training Webinar



Instructor Info:
Rebecca Santos
rdossantos@promodel.com

1/2021 Version 10.5
PM 2021 Refresher Training Webinar
For Software Version: 10.5
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705 E Timpanogos Pkwy
Orem, UT 84097
801-223-4600

Course Objectives

1. Review the basic features of ProModel
2. Provide demonstrations of how to use ProModel
3. Show model examples
4. Answer Attendees' questions (*as time allows*)

Poll #1

Agenda

Sections

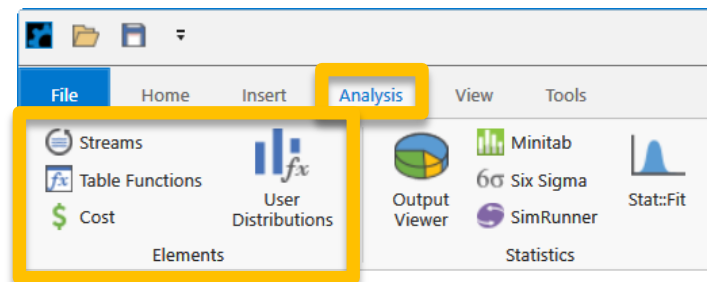
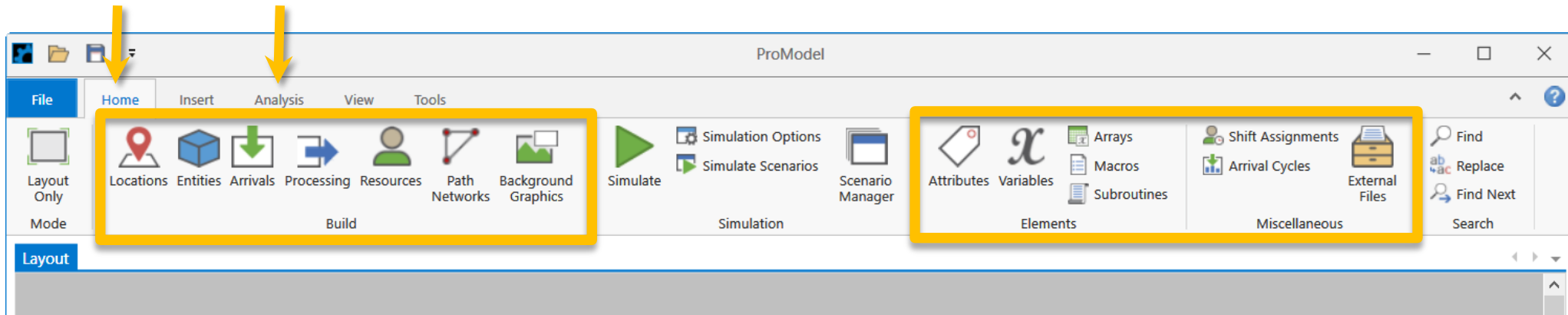
1. How to use ProModel
2. Locations, Entities, Arrivals & Processing
3. Resources & how to use them
4. Path Networks
5. User-Defined Expressions
6. Output Viewer
7. Scenarios
8. Wrap Up

1. How to Use ProModel

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About the PM Interface

- PM is essentially driven by tables with records built directly by the User or built automatically in the background as the User works.



About the PM Interface

- Go to a model element table by using either the ribbon button or a keyboard shortcut.

Example: Locations

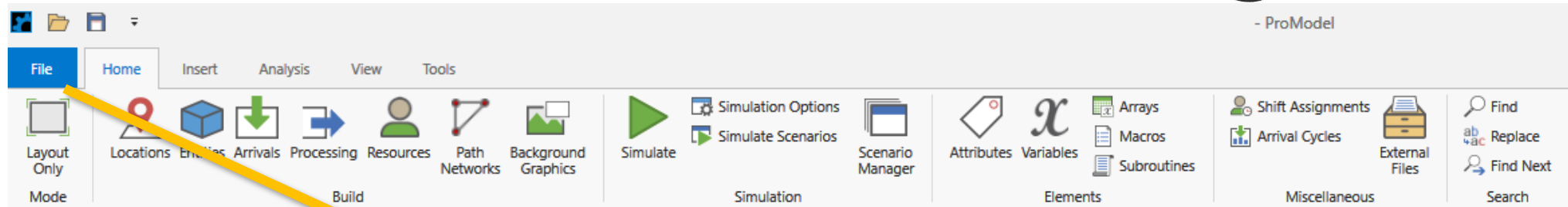
The screenshot illustrates the ProModel interface. The ribbon at the top includes tabs for File, Home, Insert, Analysis, View, and Tools. The Home tab is active, showing buttons for Layout Only, Mode, Locations, Entities, Arrivals, Processing, Resources, Path Networks, and Background Graphics. The Locations button is highlighted with a yellow box. A yellow arrow points from this button to a tooltip that reads: "Locations (Ctrl+Shift+L) Locations are places in the model where activities happen. This includes such things as machines where materials are processed, shelves where inventory is held, receiving docks at which materials arrive, conveyors that transport items, and so forth. Press F1 for more help". Another yellow box highlights the Locations button in the ribbon. A third yellow box highlights the Locations button in the ribbon. Below the ribbon, the Locations table is displayed, showing a list of locations with columns for Icon, Name, Cap., Units, DTs..., Stats, Rules..., and Notes....

Locations (Ctrl+Shift+L)
Locations are places in the model where activities happen.
This includes such things as machines where materials are processed, shelves where inventory is held, receiving docks at which materials arrive, conveyors that transport items, and so forth.
Press F1 for more help

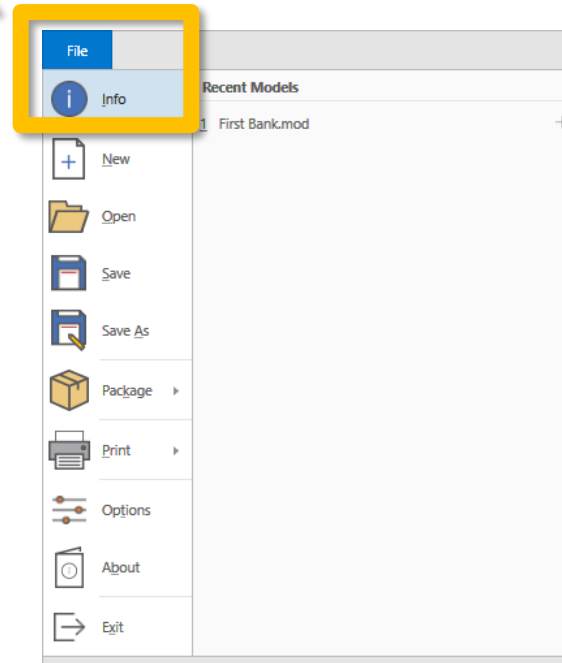
Locations

Icon	Name	Cap.	Units	DTs...	Stats	Rules...	Notes...
	Loc1	inf	1	None	Time Series	Oldest	
	Loc2	1	1	None	Time Series	Oldest	
	Loc3	1	1	None	Time Series	Oldest	

PM Home Ribbon – Getting Started



Select Info
from the
File menu



General Information

1. Give the model a title
2. Define the default model units
3. Define the graphics library
4. Hit "OK"
5. Go to "File ... Save As" name, & save the model!

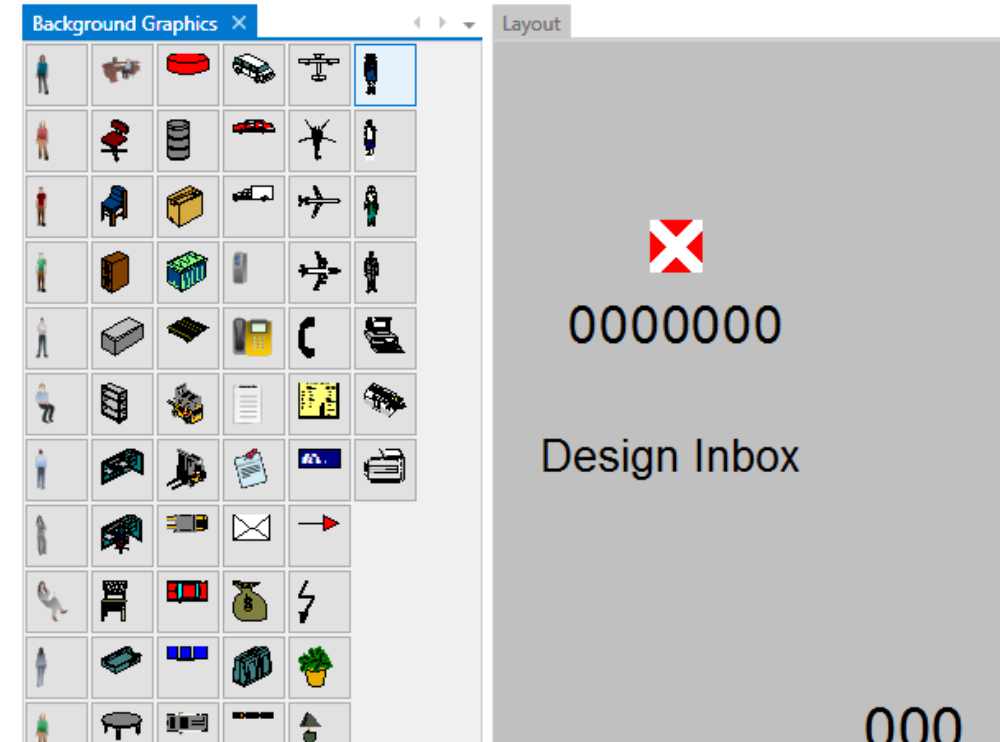
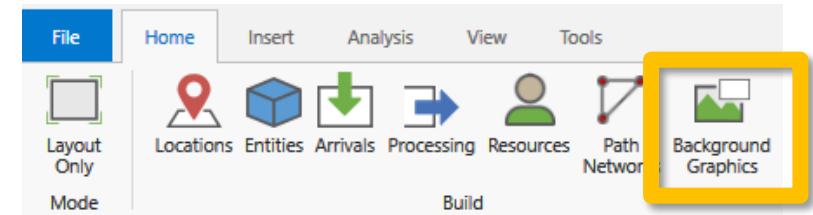
The screenshot shows the 'General Information' dialog box with the following fields and options:

- Title:** Fantastic Dan's Barbershop
- Graphic Library:** ESSENTIALS.GLB
- Model Instructions:** (empty field)
- Units:**
 - Time:** Seconds, Minutes (selected), Hours, Days
 - Distance:** Feet (selected), Meters
- Logic:** Initialization Logic..., Termination Logic...
- ☐ **Use SharePoint**
- Server:** (empty field)
- Buttons:** OK, Cancel, Help, Model Notes, Browse (for Graphic Library and Model Instructions), Test Connection

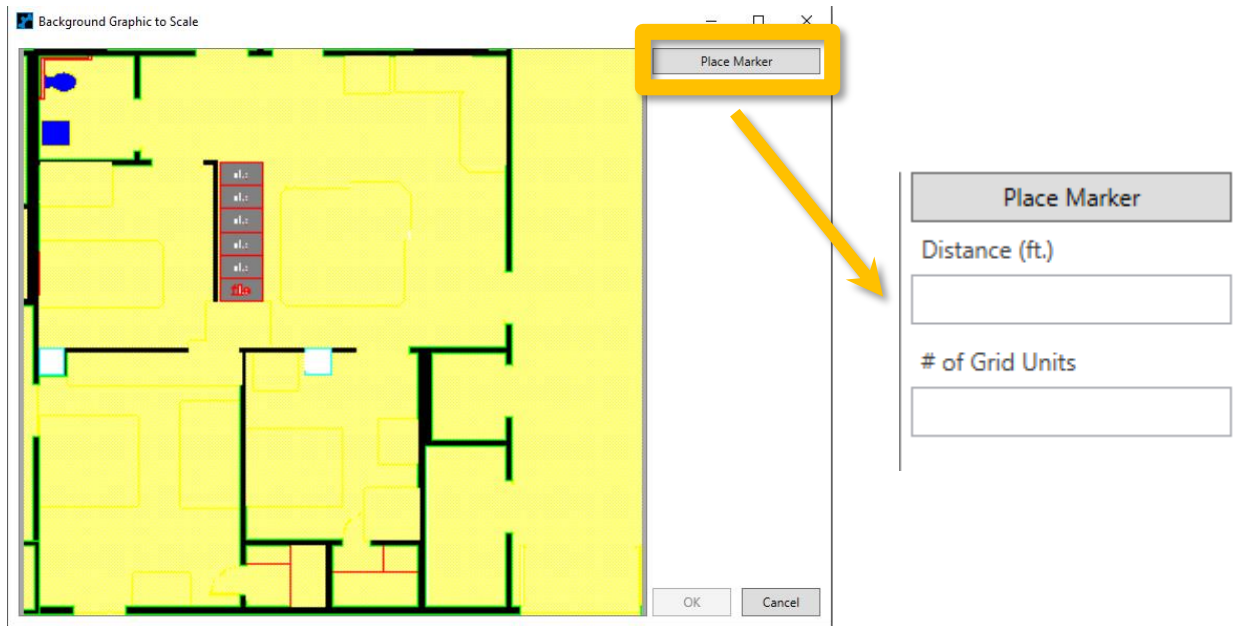
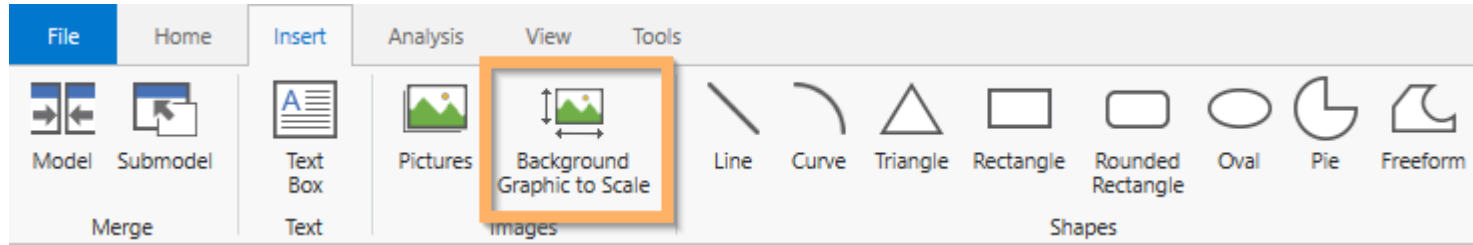
Note: Model will still work without a Title but you MUST have a file name!

Adding Background Graphics

- Select "Background Graphics"
- This opens the graphic library with images that can be used as background graphics



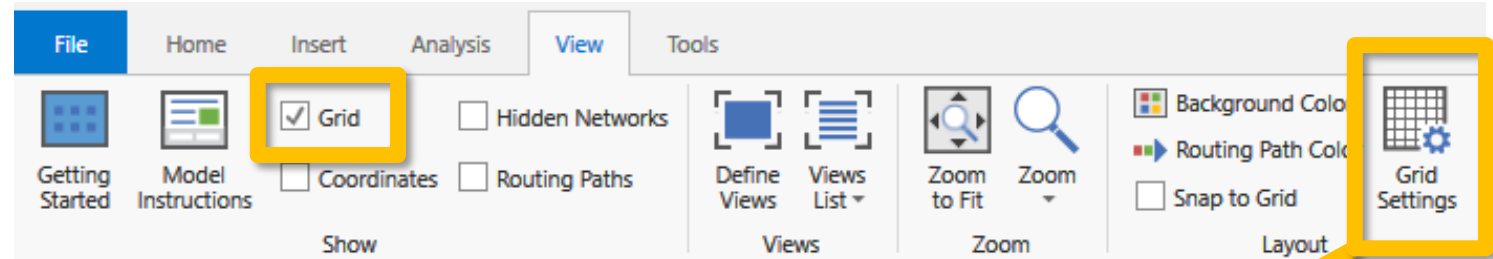
Scaling a background



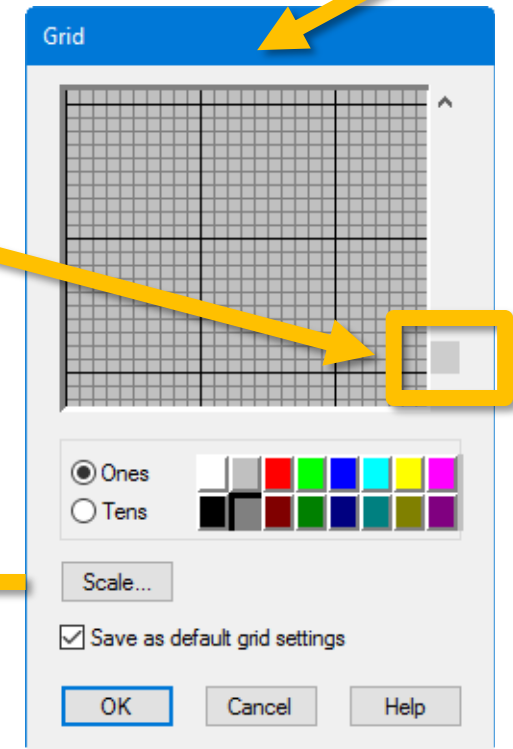
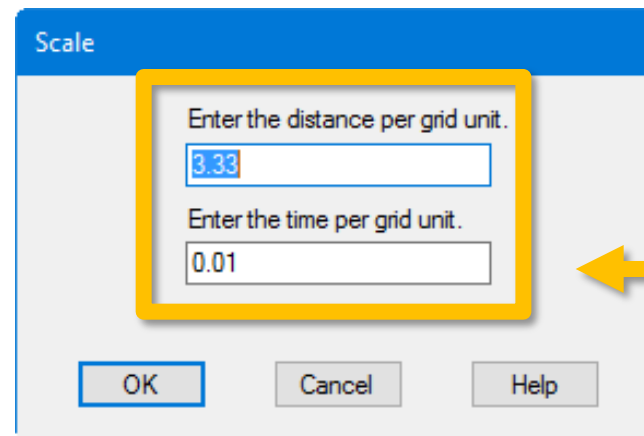
1. Click on Background Graphic to Scale
2. Click on Place Marker
3. Enter Distance and Number of Grid Units

Scaling the Grid

- ▶ From the View ribbon, click on the Grid checkbox then select Grid Settings.
- ▶ You may adjust the size of grid units if needed and then select the Scale button.
- ▶ Enter the distance or time per grid unit.
- ▶ $\text{Distance} / \text{Grid Units} = \text{Distance per Grid Unit}$

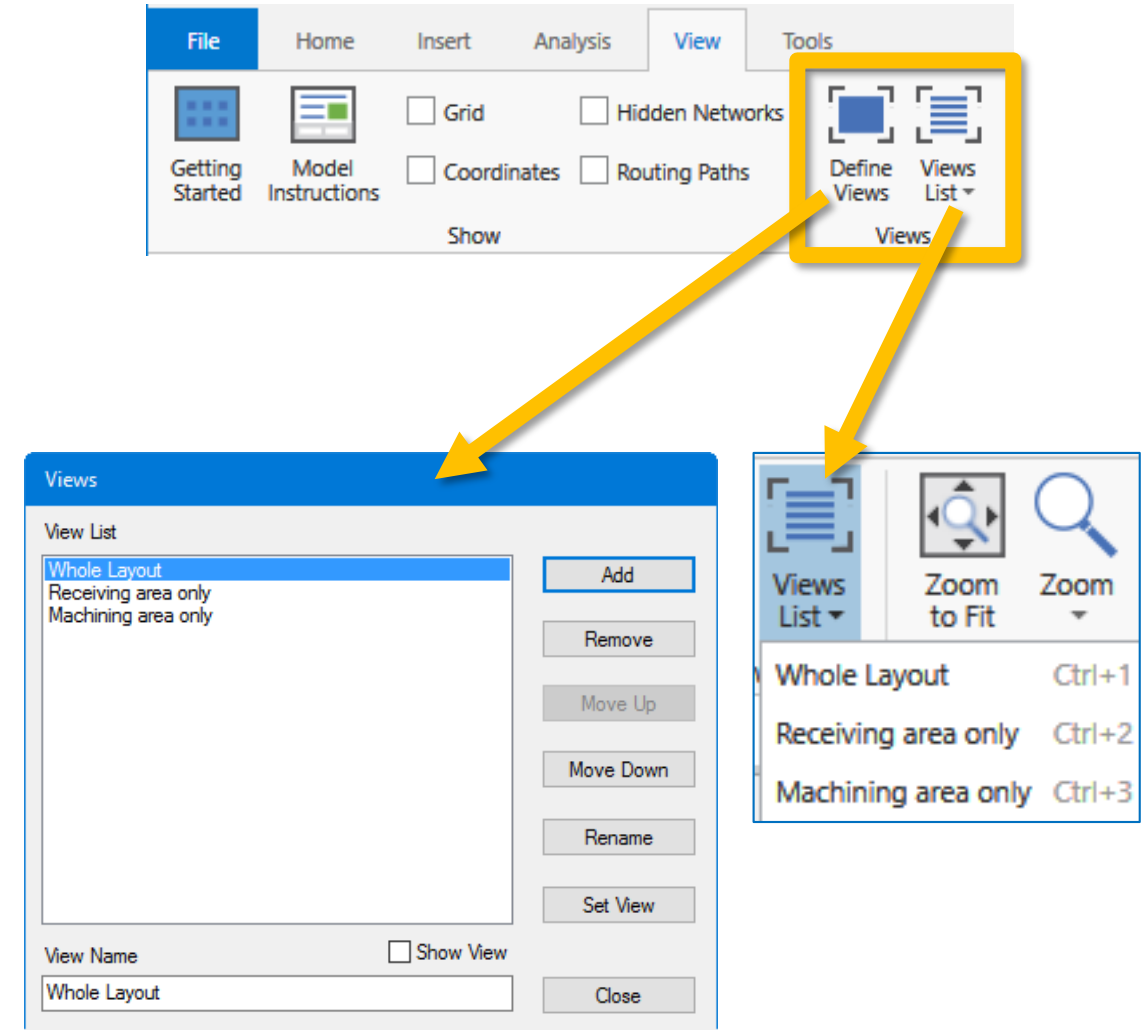


Slide to
adjust Grid
unit size

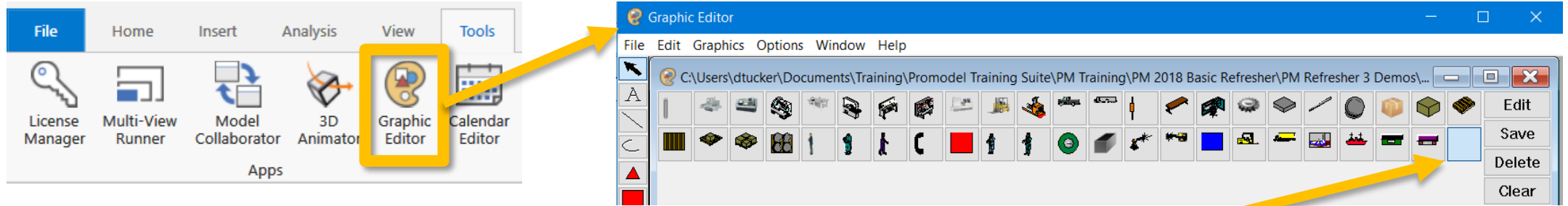


Saved Model Views

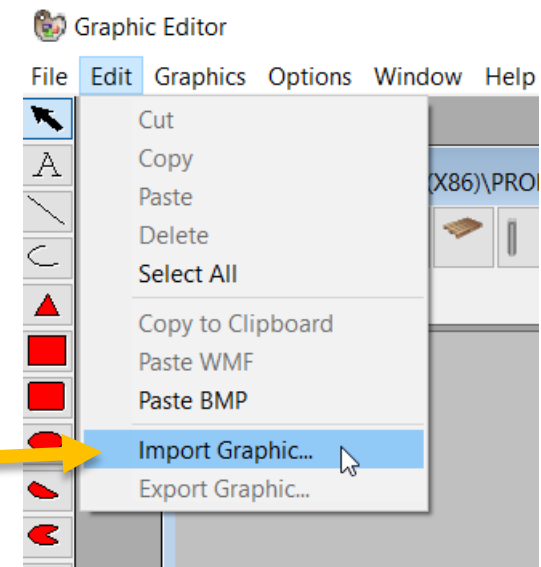
- Saved layout views can be created to help with screen navigation.
- From the View ribbon, select Define Views to Add to a list.
- The Views List shows all Views created.



Creating New Graphics



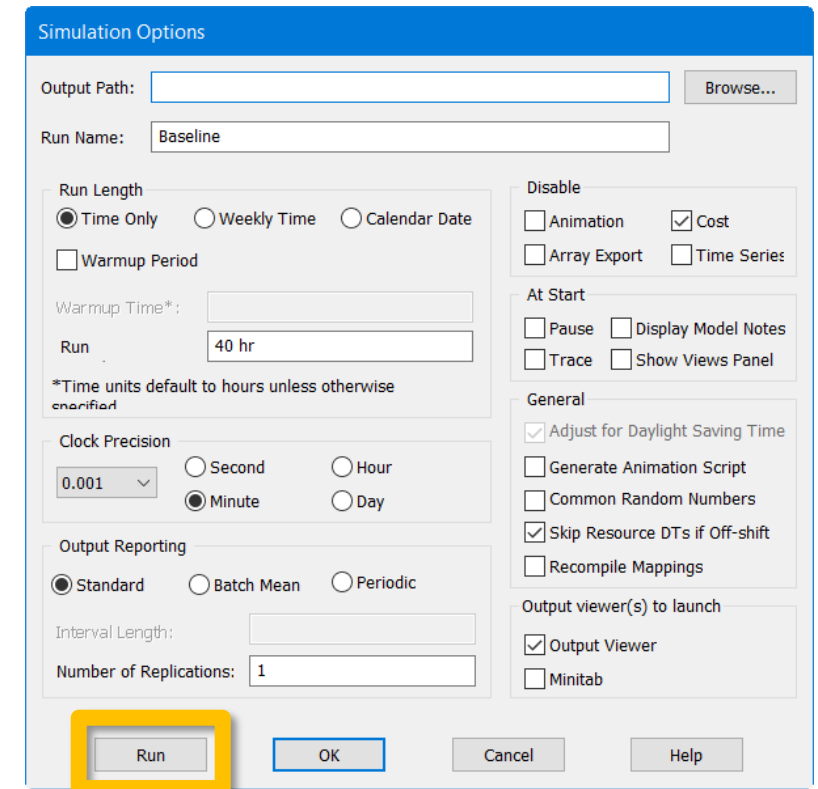
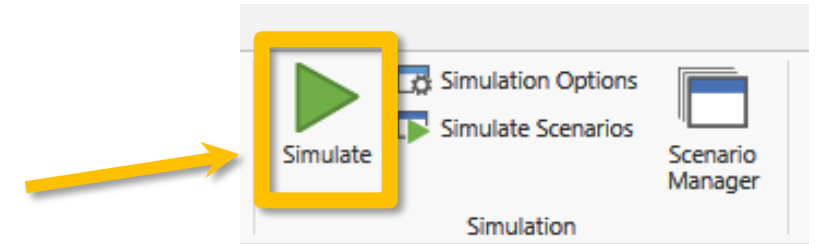
1. From the "Tools" menu, choose the "Graphics Editor" ribbon button.
2. To create a new graphic select the blank box and use the custom tools to design the new graphic.
3. If you have the graphic saved to the clipboard simply select "Paste BMP" or "Paste WMF."
4. To import a graphic click on the "edit" button in the top ribbon and select "Import Graphic..." to choose an image from your computer.



Note: Graphic images MUST be in a model's Graphic Library file if you want to use them as Entities, Resources, & Locations.

Run the Simulation

- To start the simulation
 - Click the Play button on the ribbon
 - Select Run in Simulation Options
 - Or use F10 key or (Fn + F10) keys



Runtime Control

The screenshot displays the ProModel software interface for a simulation titled "PM_Refresher_Demo_1.mod - [Baseline] - ProModel". The interface is divided into several sections:

- Simulation Panel:** Contains icons for Variables, Arrays, Locations, One Location, Zoom to Fit, Zoom, Views Panel, Views List, Create Plot, Plot Configuration, User Pause by Time, User Pause by Date, and Trace.
- Layout Panel:** Contains a slider bar for Animation Speed (labeled "Animation Speed (slider bar)" with an arrow) and a status bar showing Simulation Time as "HR:05 MIN:06" (labeled "Simulation Time" with an arrow).
- Simulation Area:** Displays a layout with three locations: Loc1 (labeled "1"), Loc2, and Loc3. Each location contains an "ENTITY" icon. A "TRUCK" icon is shown moving between Loc1 and Loc2. A person icon is shown near Loc3. Arrows point to the "Play/Pause/Stop" buttons (labeled "Play/Pause/Stop") and the "Animation On/Off" button (labeled "Animation On/Off") in the Simulation Panel.

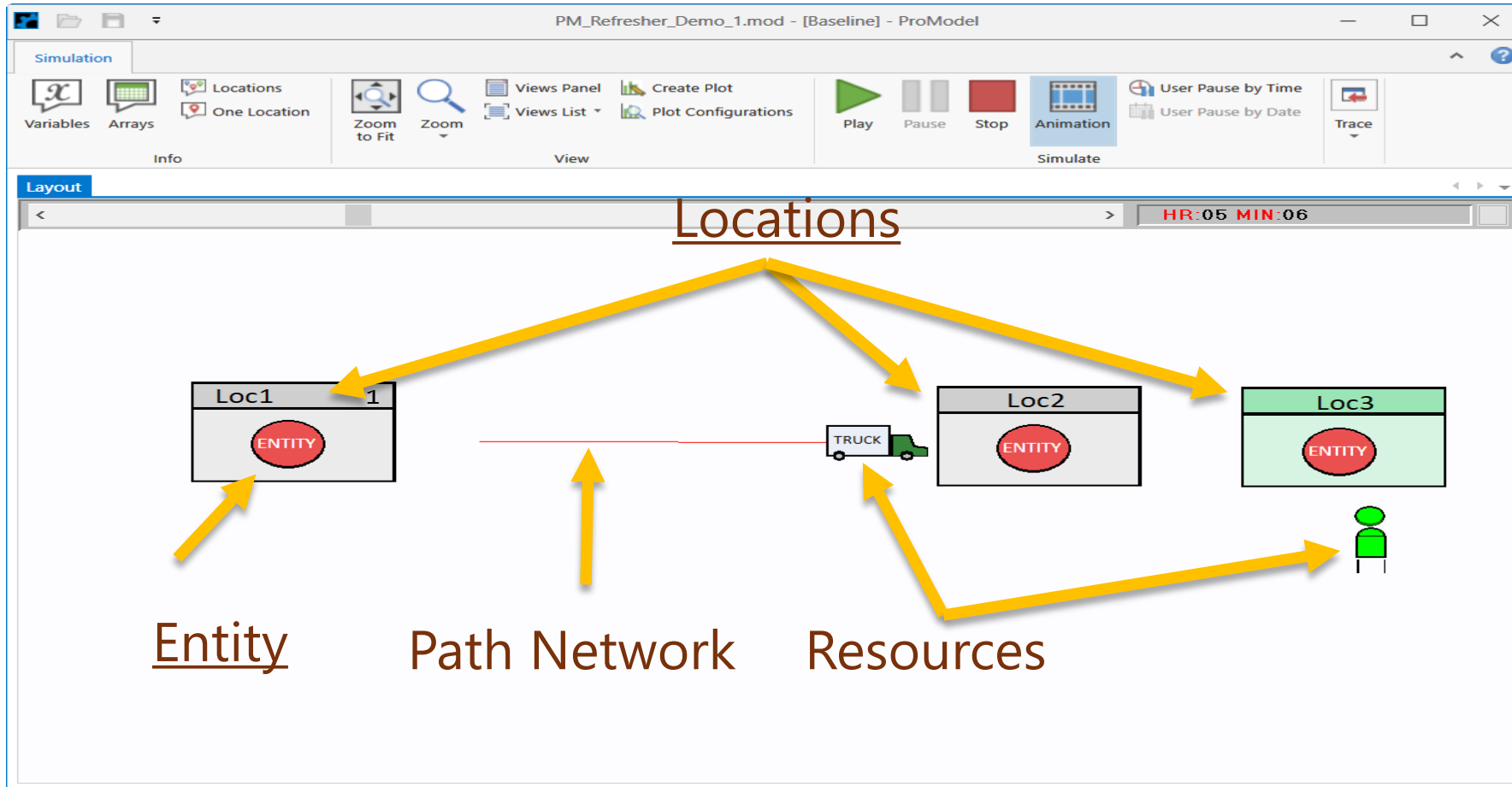
Resource Colors:

- Normal = Idle
- Green = Busy
- Red = Unavailable

2. Locations, Entities, Arrivals & Processing (L.E.A.P.)

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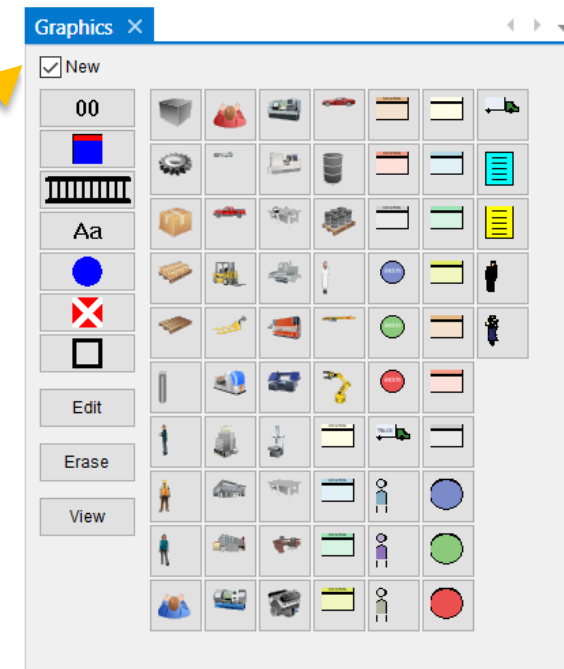
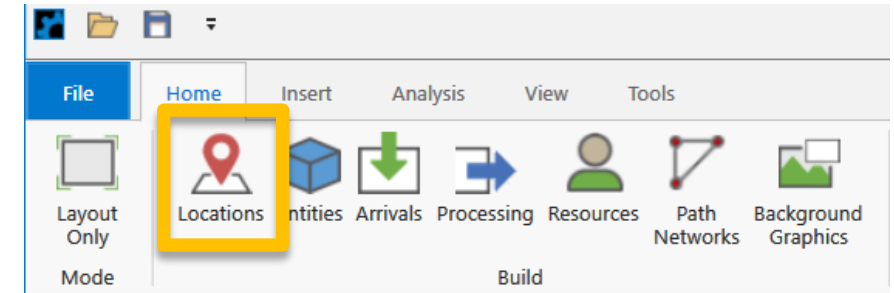
Basic Modeling Elements



Note: Arrivals are not visible here!
Processing may be shown or hidden.

Create Location (Process Steps)

- Select "Locations" from the Home menu ribbon.
- Click your chosen graphic and click on the layout to add the graphic to your workspace.



Tip: Remember to uncheck the New box if editing an existing Location record

Location Record & Parameters

Add the Location Name

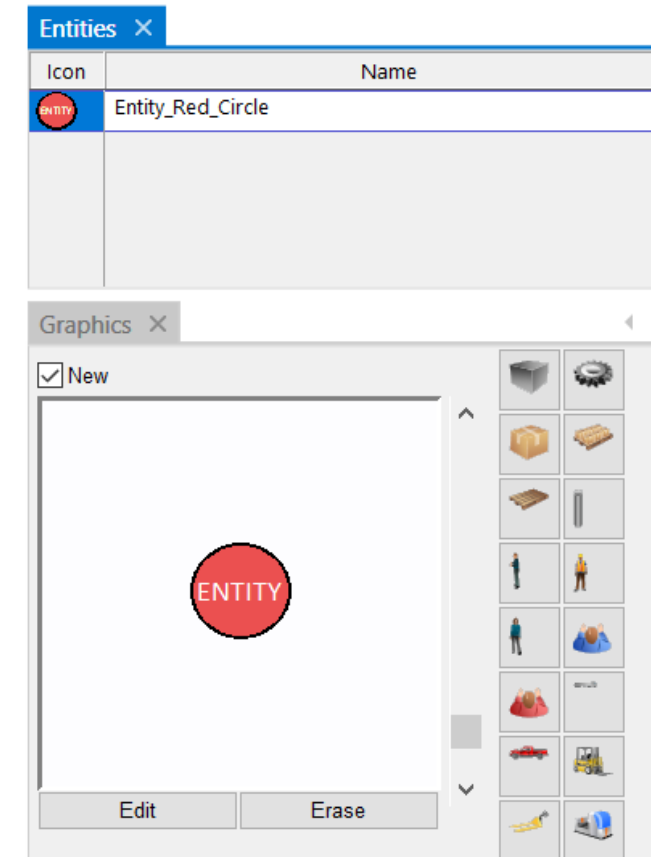
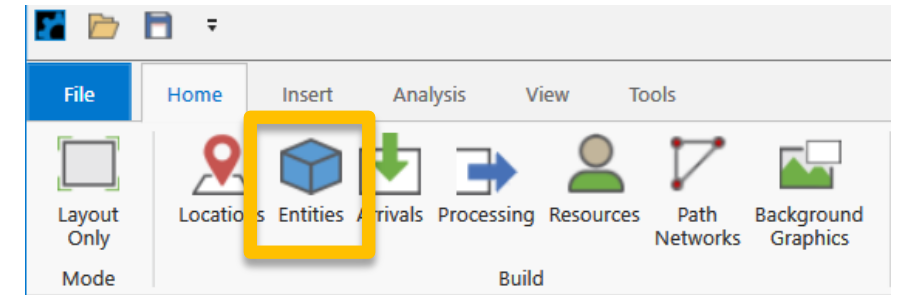
Icon	Name	Cap.	Units
	Loc1	inf	1
	Loc2	1	1
	Loc3	1	1

Location graphic

Set the Location Capacity (999, "inf" and "infinite" all work for unlimited capacity.

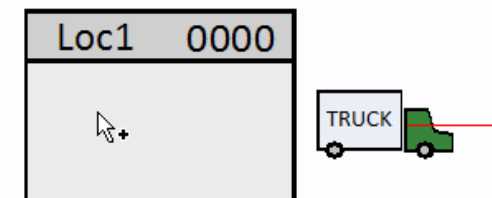
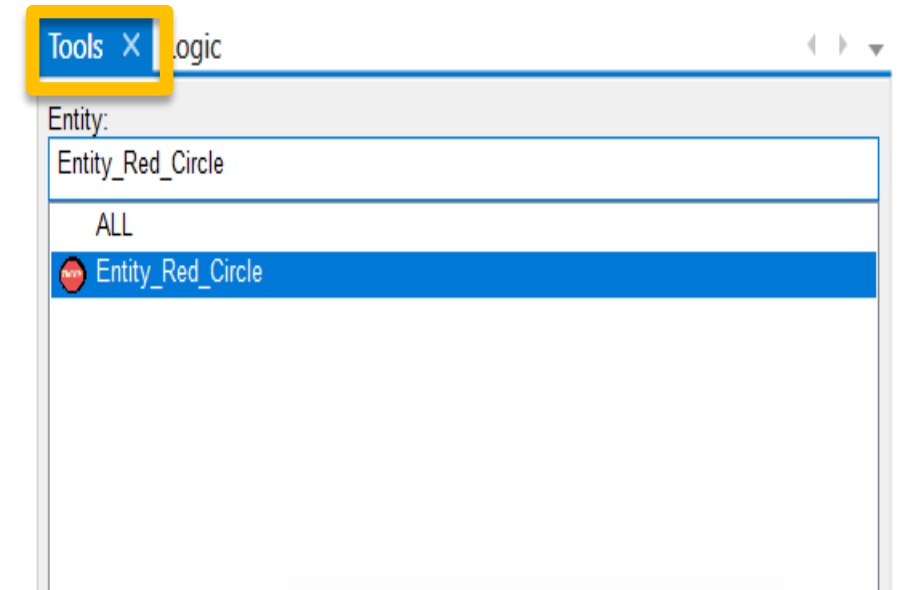
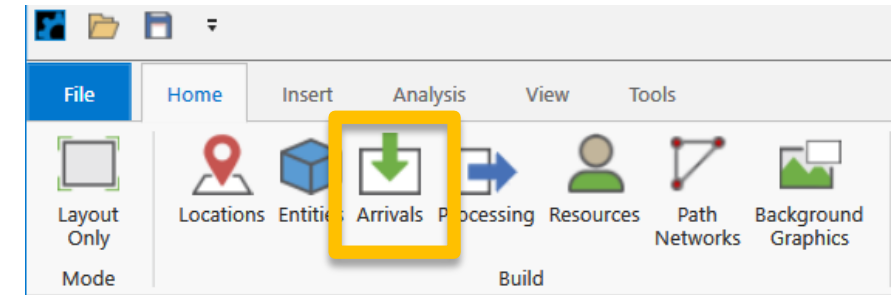
Create Entity

- Select "Entity" from your Home menu ribbon.
- Left-click an Entity graphic to add it to your model.
- Select the Entity's Record to adjust its parameters.



Arrivals

- To Create an Arrival:
- Select "Arrivals" from your Home menu ribbon.
- Use the "Tools" feature to create the Arrival automatically by left-clicking on the chosen location.



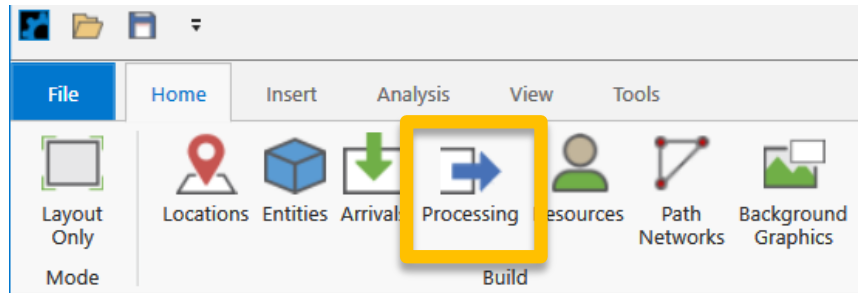
Arrival Parameters

- In the Arrival Record manually adjust how the entities enter your model.

Arrivals ×							
Entity...	Location...	Qty Each...	First Time...	Occurrences	Frequency	Logic...	Disable
Entity_Red_Circle	Loc1	1	0	INF	45 min		No

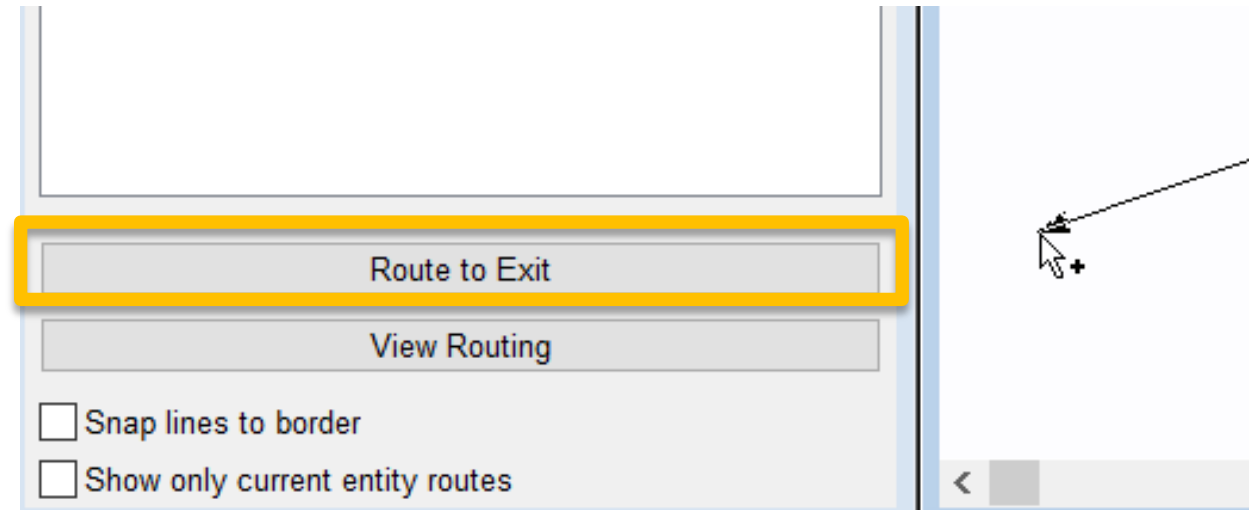
Processing

- Processing defines the process flow for entities from location to location, and to “Exit” (where the entity leaves the system).



Processing

- To Create Processing:
- Select "Processing" from your Home menu ribbon.
- Use the "Tools" feature to create the process automatically by left-clicking on your first location and then left-clicking again on your second location (etc).
- Finish by clicking from your last location to the "Route to exit" button.



Process Record Information

- The “Process” window specifies what happens to an entity at a given location.
- You can specify a process time with a WAIT statement in the Operation logic window.
- You can also create complex logic to execute processes at each location.

The screenshot displays the ProModel software interface with three main windows open: Process, Routing, and Move Logic. The Process window is highlighted with a yellow border and contains a table with the following data:

Entity...	Location...	Operation...
Entity_Red_Circle	Loc1	Wait 10 min
Entity_Red_Circle	Loc2	wait 20 min
Entity_Red_Circle	Loc3	use worker for 30 min

Below the table, the 'Tools' section shows a list of operations, with '1 Wait 10 min' highlighted. A yellow box and arrow point from this operation to the 'Wait 10 min' entry in the Process window table. Below the tools, the text 'Process AT Location: - WAIT' is displayed.

The Routing window shows a table with the following data:

Blk	Output...	Destination...	Rule...	Move Logic...
1	Entity_Red_Circle	Loc2	FIRST 1	Move With Truck Then

The Move Logic window shows a list of logic operations, with '1 Move With Truck Then free' highlighted.

Process Routing Information

- The “Routing” window specifies how an entity moves from one location to another.
- When an entity moves between locations you can specify the amount of time it takes for that transportation using Move logic.
- You can also create complex logic or assign resources to the movement.

The screenshot displays the ProModel software interface. On the left, the 'Process' window shows a table of operations:

Entity...	Location...	Operation...
Entity_Red_Circle	Loc1	Wait 10 min
Entity_Red_Circle	Loc2	wait 20 min
Entity_Red_Circle	Loc3	use worker for 30 min

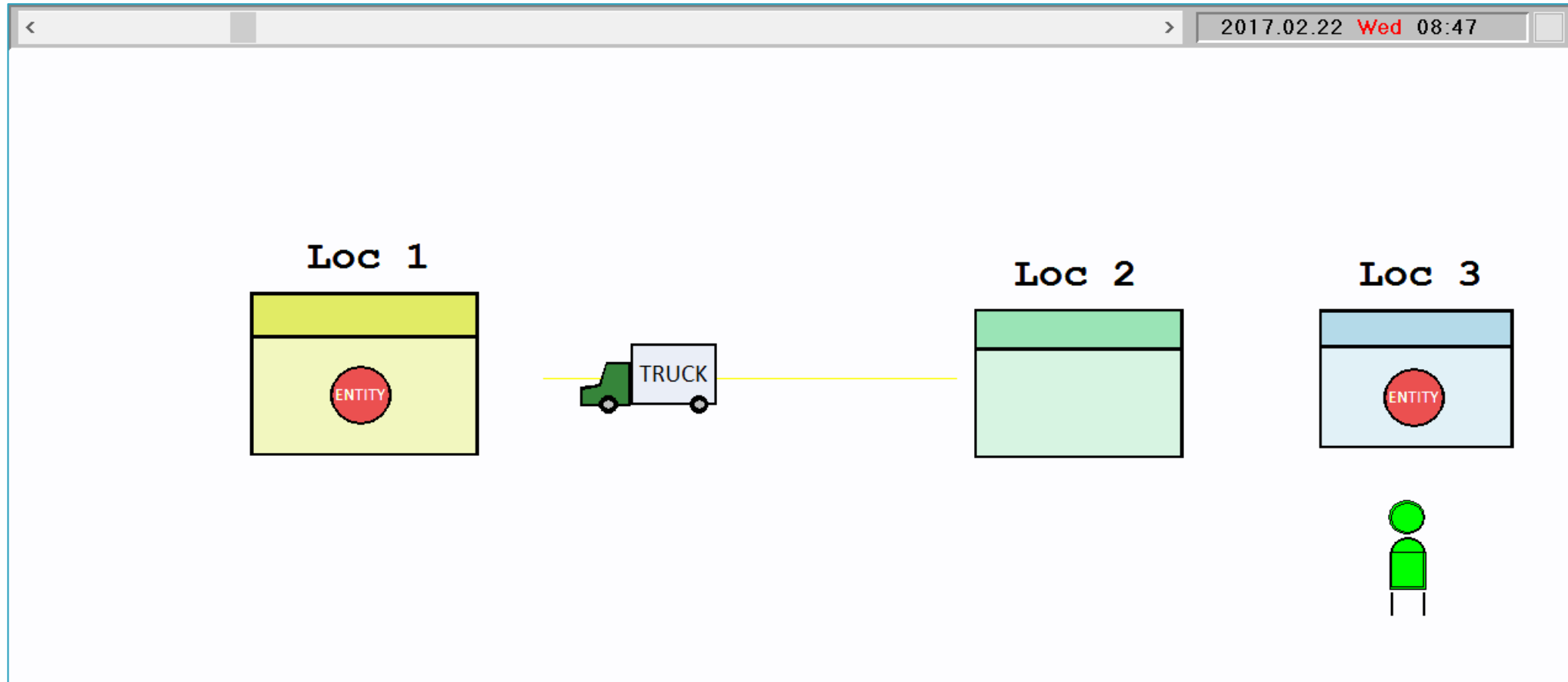
Below the Process window is the 'Tools' bar and the 'Operation' window, which shows '1 Wait 10 min'.

On the right, the 'Routing' window is highlighted with a yellow border. It contains a table of routing information:

Blk	Output...	Destination...	Rule...	Move Logic...
1	Entity_Red_Circle	Loc2	FIRST 1	Move With Truck Then free

An arrow points from the 'Move Logic...' button to the logic text 'Move With Truck Then free'. Below the Routing window, the text 'Process BETWEEN Locations: - MOVE' is displayed.

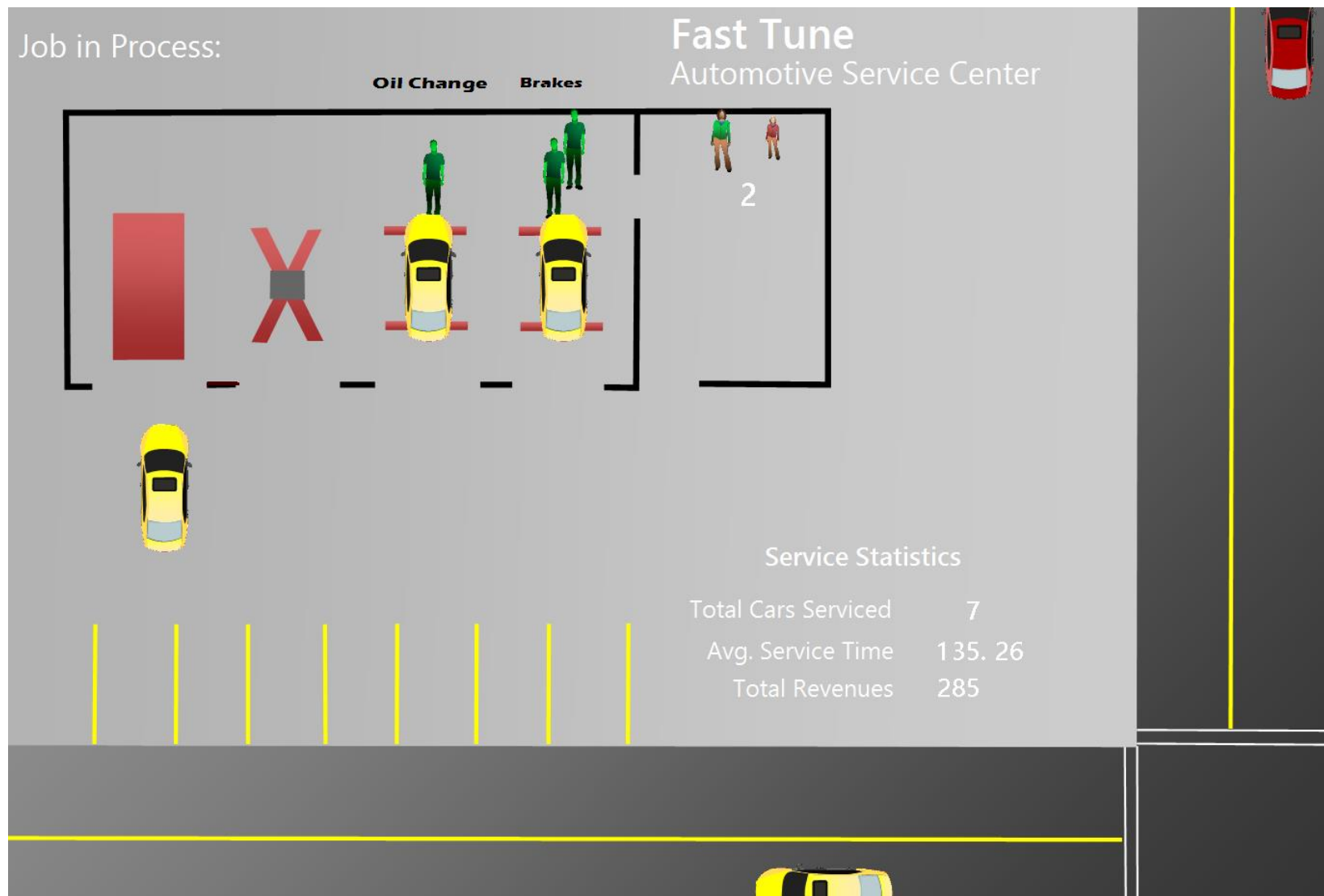
Demo 1: Build a Model Live



Poll #3

Demo 2: Model with LEAP

PM Demo:
Automotive
Service
Center

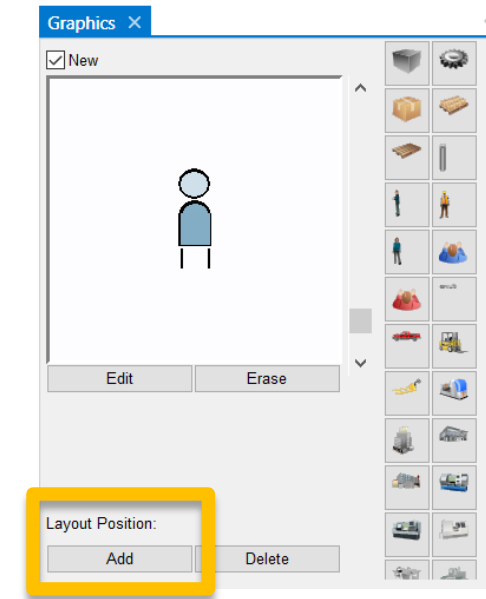
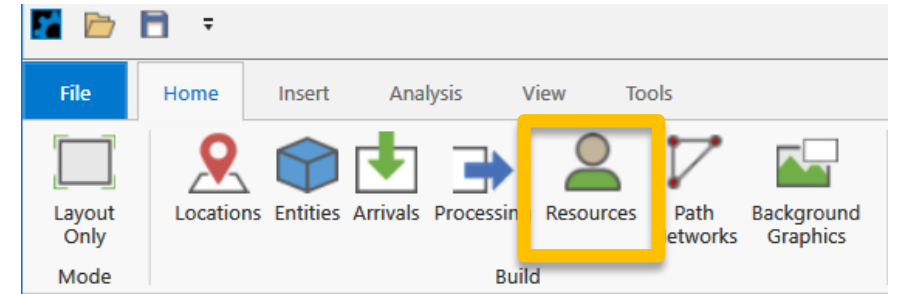




3. Resources & How to Use Them

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Resources

- Select “Resources” from the Home menu ribbon.
- Choose your graphic
- If the Resource is to remain in one spot (a static resource) then click the “Add” button to place it on the model layout



Resources X									
Icon	Name	Units	DTs...	Stats	Specs...	Search...	Logic...	Pts...	Notes...
	Worker	2	None	By Unit, Time Series	No Network	None	0	1	
	Truck	1	None	By Unit, Time Series	Network_Truck, n_H	None	2	1	

Controlling Resources

- Sometimes a worker or a piece of equipment must be available for a process to continue. There are several ways of requesting resources.
- Additionally, the same resource is often required for multiple steps of a process. ProModel has the functionality to precisely control when we *capture* and *release* Resources:
 - **Use** (in Logic)
 - **Get** (in Logic)
 - **Free** (in Logic)

Use Statement

- The Use statement is a method to capture a Resource in the logic, retain the resource for the defined process time, then release the Resource. The Use statement works the same as Get, Wait, & Free.
- Syntax: **Use** <Resource Name> **For** <duration> <units>

The screenshot displays two windows from the ProModel software. The top window, titled 'Process', contains a table with three columns: 'Entity...', 'Location...', and 'Operation...'. It lists three operations for 'Entity_Red_Circle' at different locations. The bottom window, titled 'Tools' and 'Operation', shows a single operation: '1 use worker for 30 min'.

Entity...	Location...	Operation...
Entity_Red_Circle	Loc1	Wait 10 min
Entity_Red_Circle	Loc2	wait 20 min
Entity_Red_Circle	Loc3	use worker for 30 min

Tools Operation X

1 use worker for 30 min

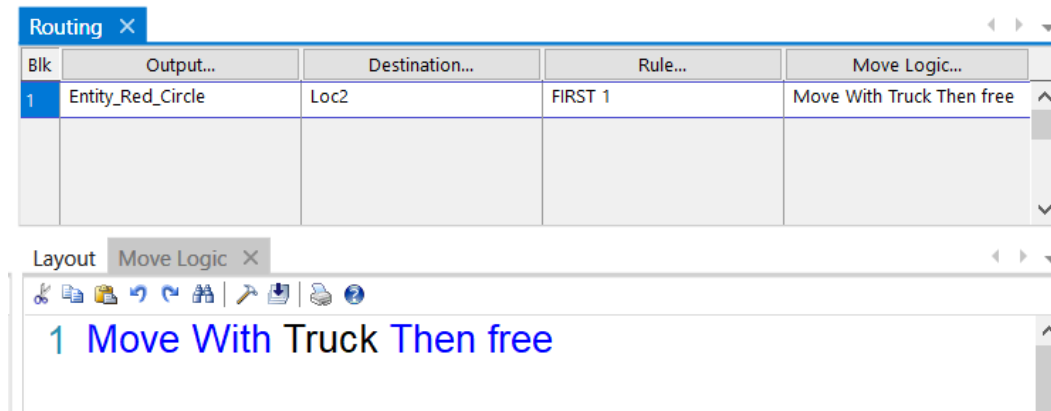
Get and Free Statements

- If we need more precise control over when we capture and release Resources, we can use the Get and Free statements.
- **Get** issues a request to capture the Resource. Once the Get statement is satisfied (the Resource is captured), the Entity will proceed to the next line of logic.
- **Free** will immediately free the listed Resource
- For example:

```
Wait 1 min  
Get Worker 1  
Wait 1 min  
Get Worker 2  
Wait 3 min  
Free ALL
```

Move With

- If a resource has not been freed it will automatically move to the next location with the entity.
- To use a resource to move an entity to the next location (using the resources speed) create a **Move With** statement in the routing logic.
- Syntax: **Move With** <Resource Name> **Then Free** (optional)



The screenshot displays the ProModel software interface. At the top, a 'Routing' window is open, showing a table with the following data:

Blk	Output...	Destination...	Rule...	Move Logic...
1	Entity_Red_Circle	Loc2	FIRST 1	Move With Truck Then free

Below the Routing window, the 'Move Logic' editor is open, showing a single logic statement: '1 Move With Truck Then free'.

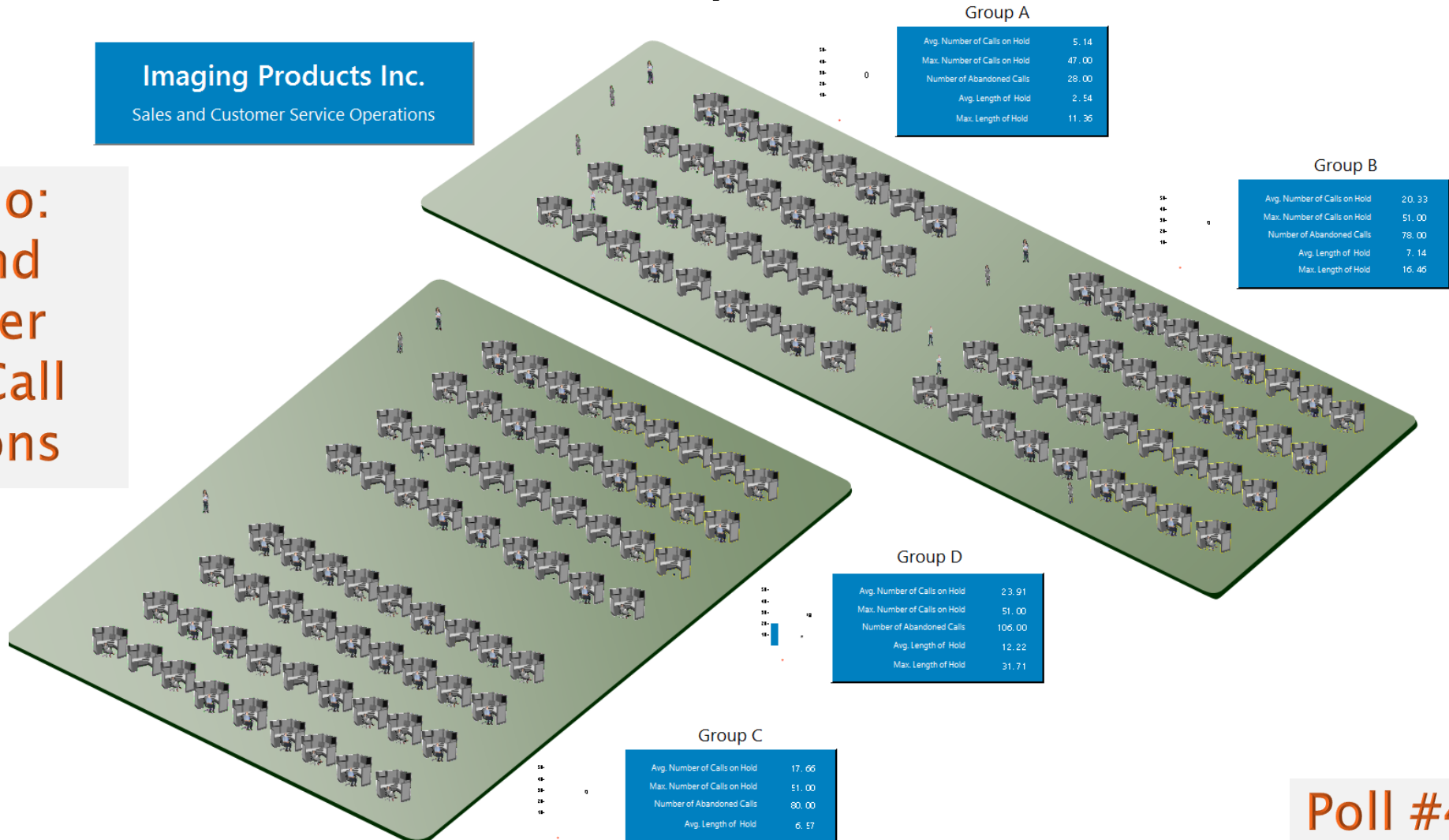
Note: Other Entity Move statements include:
Move On (a Path Network) & Move For (a set time)

Demo 3: Model with Multiple Resources

Imaging Products Inc.

Sales and Customer Service Operations

PM Demo:
Sales and
Customer
Service Call
Operations



Poll #4

10 Minute Break

Webinar will resume at 2:20 pm ET

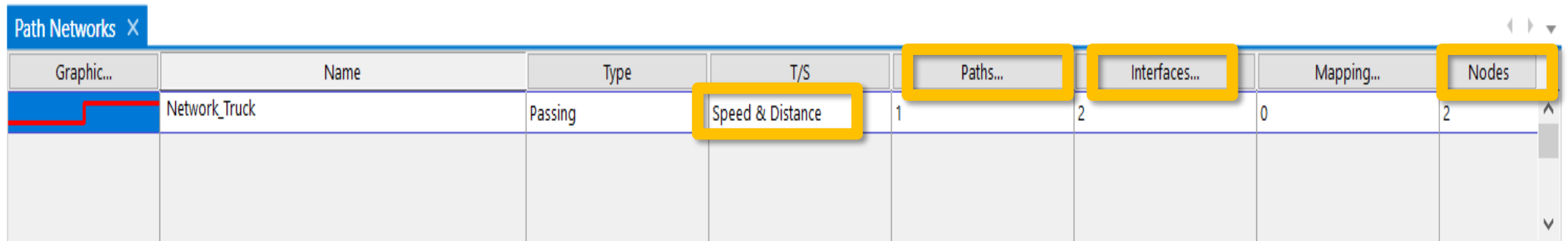



4. Path Networks

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Path Networks

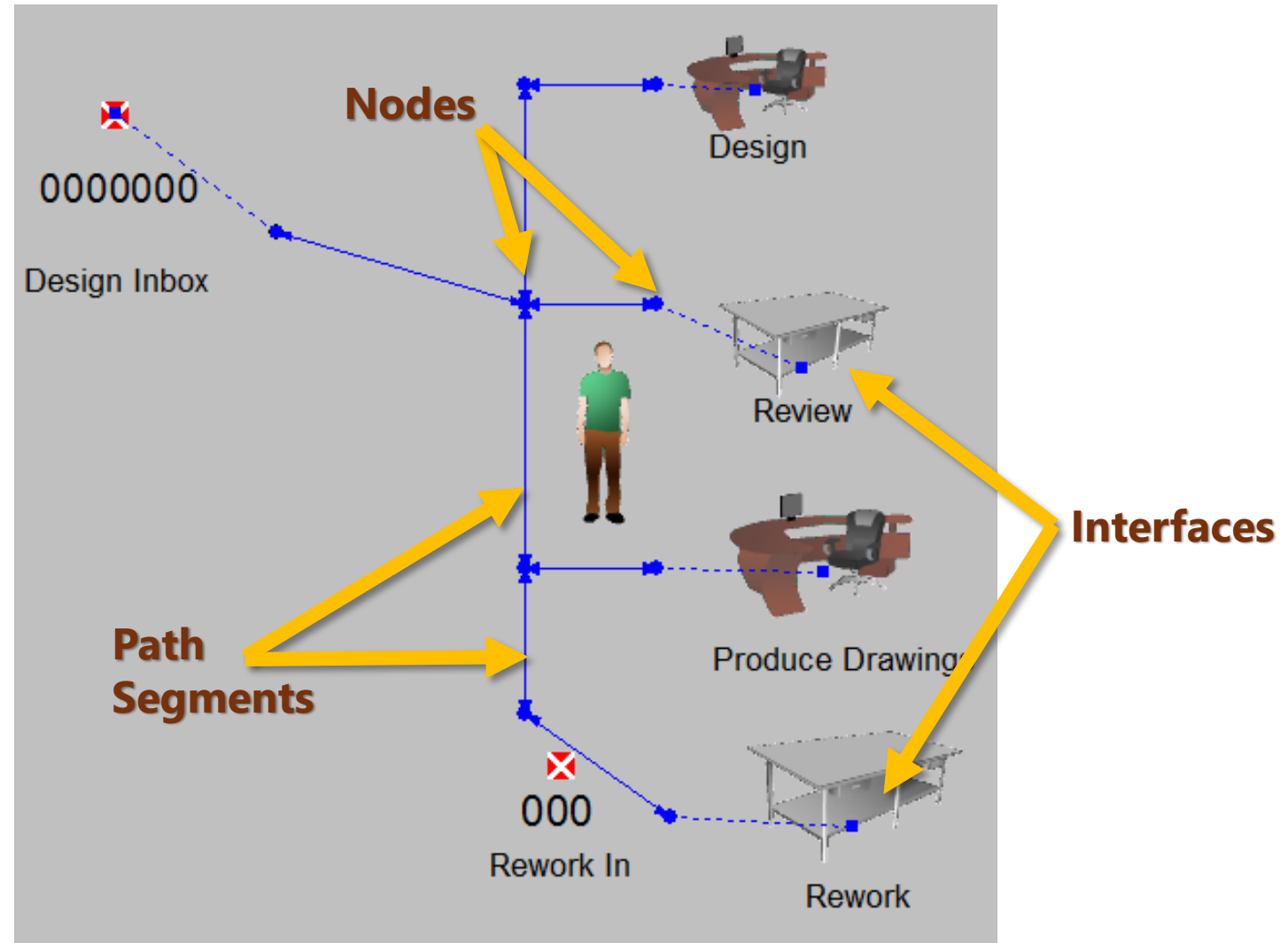
- Path Networks allow resources to move around the model
- Give you the ability to define the course of travel for Resources
- Selecting the *header* for: "**Paths...**" "**Interfaces...**" or "**Nodes**" takes you to other edit tables for these required elements.



Graphic...	Name	Type	T/S	Paths...	Interfaces...	Mapping...	Nodes
	Network_Truck	Passing	Speed & Distance	1	2	0	2

Path Network Terminology

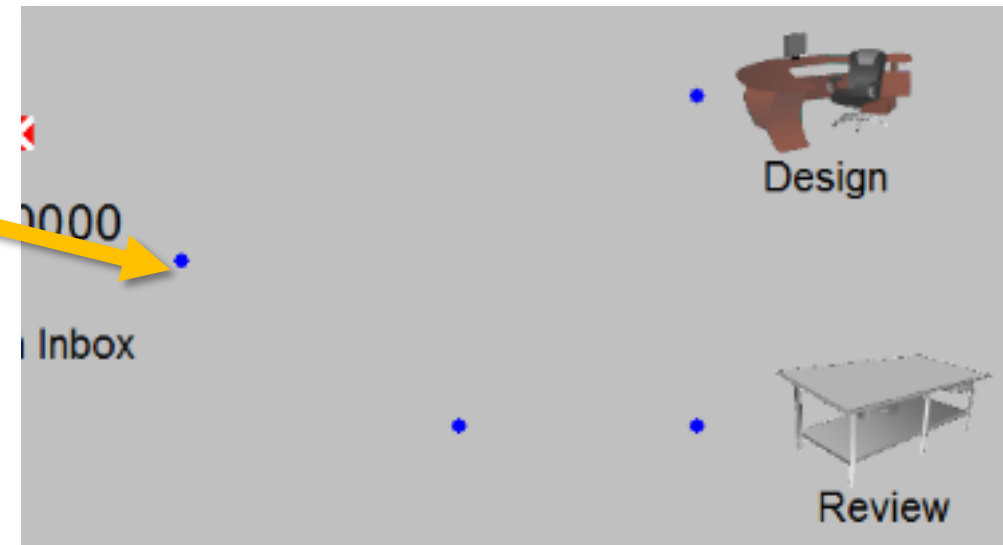
- Nodes
- Path Segments
- Interfaces



Nodes

- Nodes are used as decision points and interface points
- Create a node at each point the Resource might need to make a decision or interface with a location

Nodes x	
Node	Limit
NInbox	
N2	
NDesign	
N4	
NReview	
NProduce	
N7	
NRework	
N9	
N1	
N3	



Path Segments

- Path segments are the lines of travel between nodes
- Each segment can have its own time or distance properties defined, or Uni-directional or Bi-directional settings

Paths ×			
From	To	BI	Distance
NInbox	N2	Bi	17.72
NDesign	N4	Bi	9.00
N2	N4	Bi	15.00
NReview	N2	Bi	9.00
NProduce	N7	Bi	9.00
NRework	N9	Bi	12.20
N7	N9	Bi	10.00
N7	N2	Bi	18.00

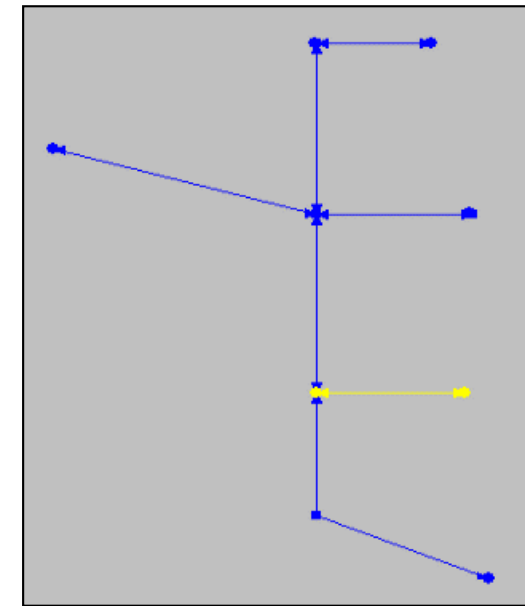
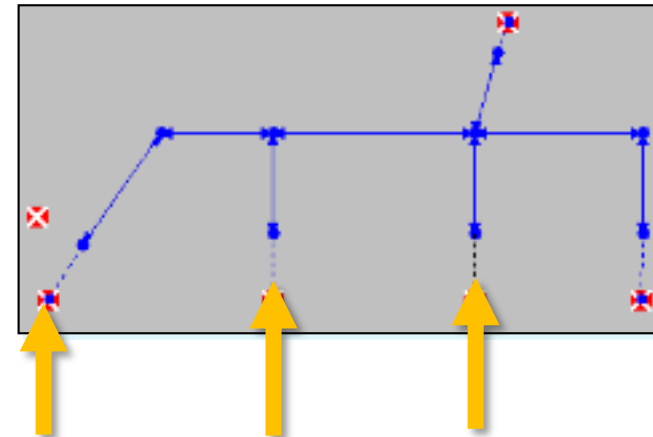


Figure 1

- If a Resource is told to work at a given location, the Resource will travel to the node associated with that location


Note: A location can have only one interface. However, a single Node could interface with more than one location.

Node	Location
NDesign	Design
NInbox	Design_Inbox
NReview	Review
NProduce	Produce_Drawings
NRework	Rework



Interfaces show the relationship between path nodes and locations.

Dynamic Resources

Resources									
Icon	Name	Units	DTs...	Stats	Specs...	Search...	Logic...	Pts...	Notes...
	Production_Bob	2	None	By Unit	Office_Net	None	0	1	

Select the Path Network name under “Specs” if you want a Resource to be dynamic and move between locations.

Specifications

Path Network: Office_Net

Nodes

Home: N7 Off Shift: (none)

☐ Return Home If Idle Break: (none)

Resource Search

☐ Closest Resource

☒ Least Utilized

☐ Longest Idle

☐ First Available

Entity Search

☒ Longest Waiting

☐ Closest Entity

☐ Min Attribute

☐ Max Attribute

Motion

Speed (Empty): 150 fpm

Speed (Full): 150 fpm

Accelerate: fpss

Decelerate: fpss

Pick-up Time: Seconds

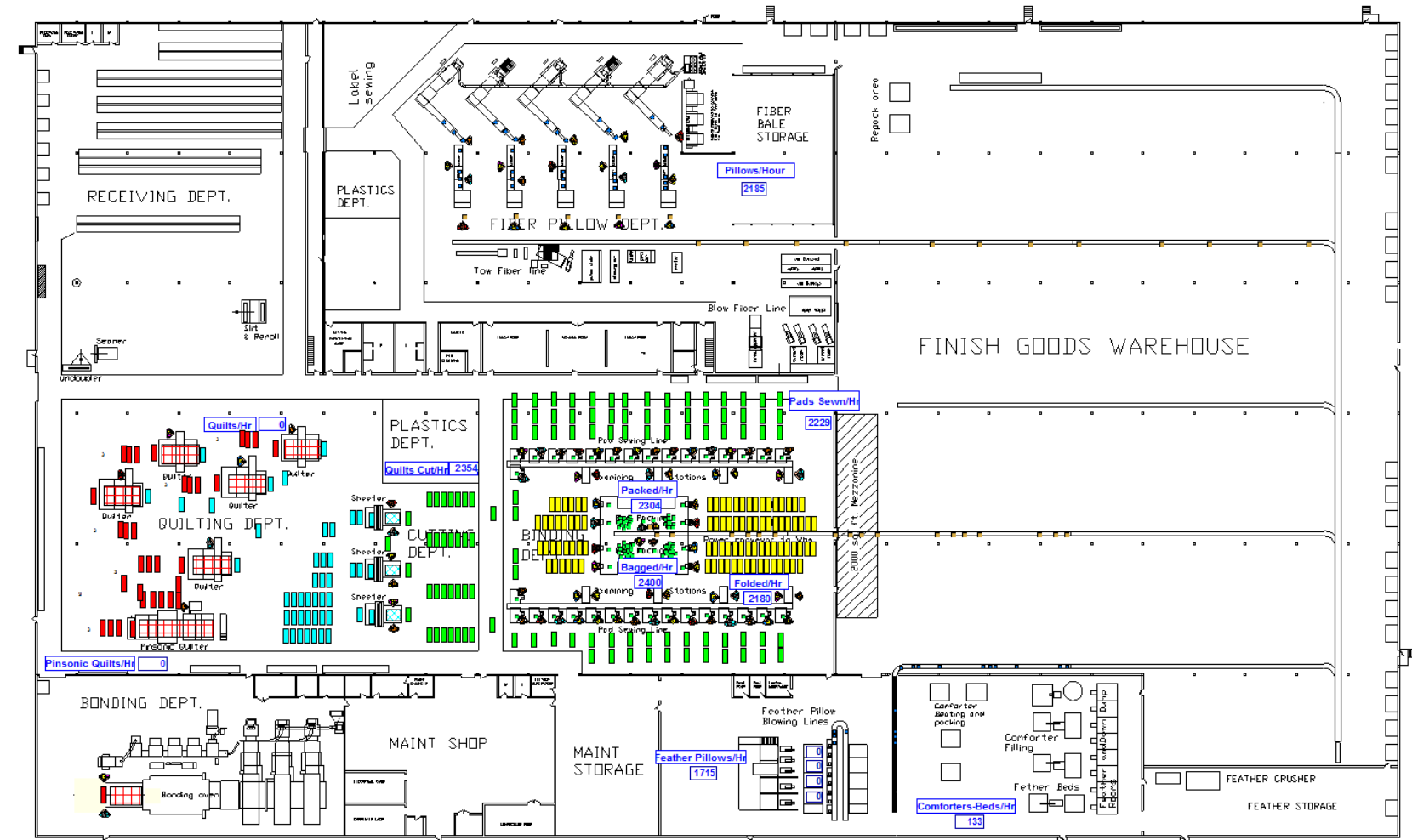
Deposit Time: Seconds

OK Cancel Help

Demo 4: Model with Path Networks

Mattress Pad Factory Before

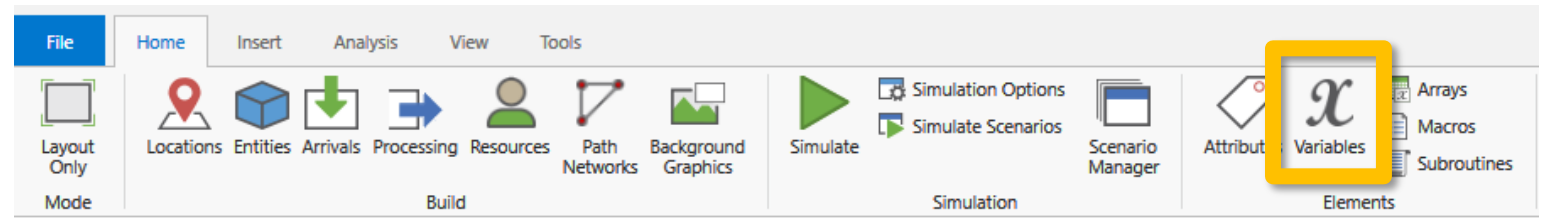
PM Demo:
Plant
Consolidation
and
Optimization



5. User-Defined Expressions

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Variables



- Hold Real or Integer value
- Gather statistical information
- Perform calculations
- Provide more advanced logic control
- Display on-screen counters or system statistics

Variables ×					
Icon	ID	Type	Initial value	Stats	Notes...

Variables

- Displaying on-screen counters or system statistics: Click in the icon column. Then click on the Layout area.

Variables ×	
COL	ID
No	vCompleted
No	vReworked

Variables ×	
Icon	ID
Yes	vCompleted
No	vReworked

Layout

00000000

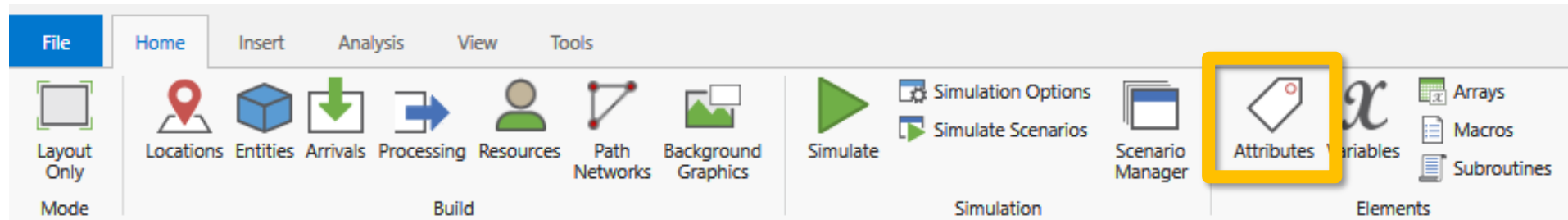
Attributes

- Used for identifying entities during processing or for tracking certain statistics.
- Not global—value is held by each entity independently.
- Initial value assigned to all entities as they enter the system.
- May be Real or Integer.



Attributes

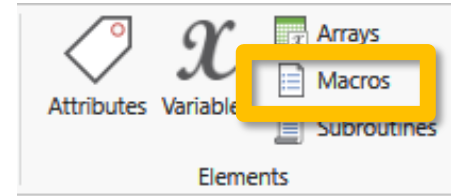
- Access Attributes from the Home ribbon



- Attributes edit table

Attributes X			
ID	Type	Classification	Notes...
aReworked	Integer	Ent	

Macros



- A Macro is an expression which can represent a number, a distribution, text, or a section of code that might be used repetitively throughout your model.
- Macros can also be used as parameters in the Scenario Manager for scenario analysis.
- Select “Macros” from the Home ribbon under Elements.
- Define the Macro (in the Macros table) and then enter the Macro in Location Properties or logic, for example.
- When you want to change a Macro value, do so in the Macros table or, if it’s a temporary change, you can modify it in the Scenario Manager.

Macros

- Macro Name
- Text (or Logic)
- Macro Options

Macros X			
ID	Text...		Options
mBobUnits	1		Scenario
mDesignCapacity	1		Scenario

Which Expression to Use?

Expression	Definition	Use When	Notes
Attribute	Integer or Real number	<ul style="list-style-type: none">Entity characteristic determines action or routeNeeded along with a Variable to track items	<ul style="list-style-type: none">Not Global; they are independent to each EntityNo Output Viewer Stats!Exist only during model run
Macro	Number, Distribution, or Text	<ul style="list-style-type: none">Value is repeated multiple places in modelNeeded for Scenario parameterWant a single table to edit many expressions used in logic	<ul style="list-style-type: none">Global to entire modelNo Output Viewer Stats!Exist only during model runValue cannot be changed after model run begins!
Variable	Integer or Real number	<ul style="list-style-type: none">Counting itemsNeeded to trigger actionValue needs to change during model run	<ul style="list-style-type: none">Global to entire modelYes, Output Viewer Stats!Can be displayed onscreen

Demo 5: Model with User Defined Expressions

MM Demo: Emergency Dept with Scenarios



Poll #6

6. Output Viewer

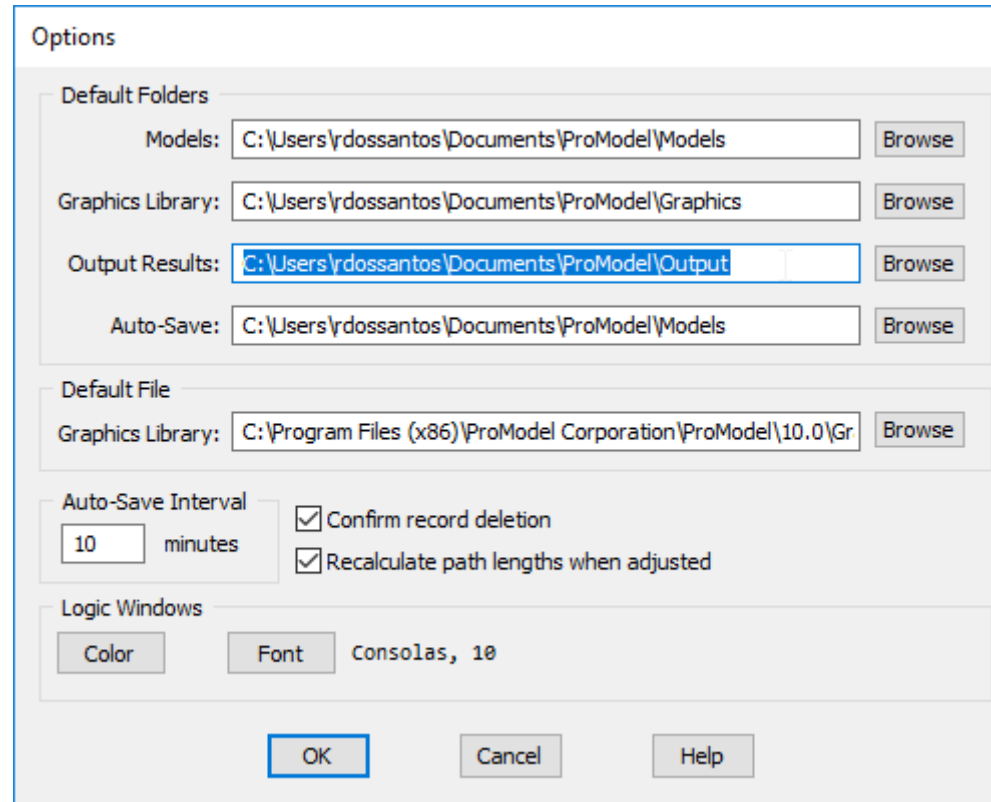
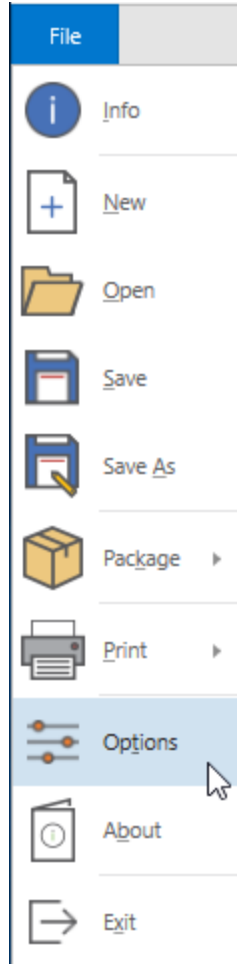
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About the Output Viewer

- A data file is generated every time a model runs
- The OV links to that file allowing data mining
- Use the OV to view different slices of data and examine the process model in detail
- Custom charts & tables can be built and saved so they populate with new data after each run
- TIP: Always determine some key process metrics early in a model project so you can compare output results later from different Scenarios



About the Output Viewer

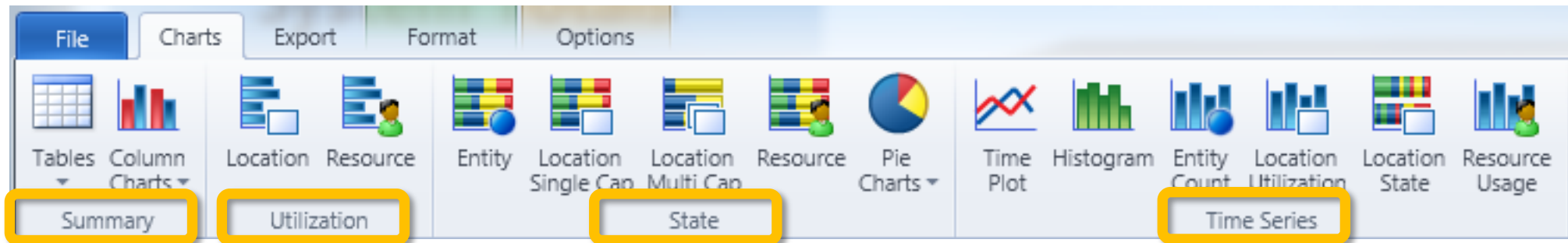


Results – Default View



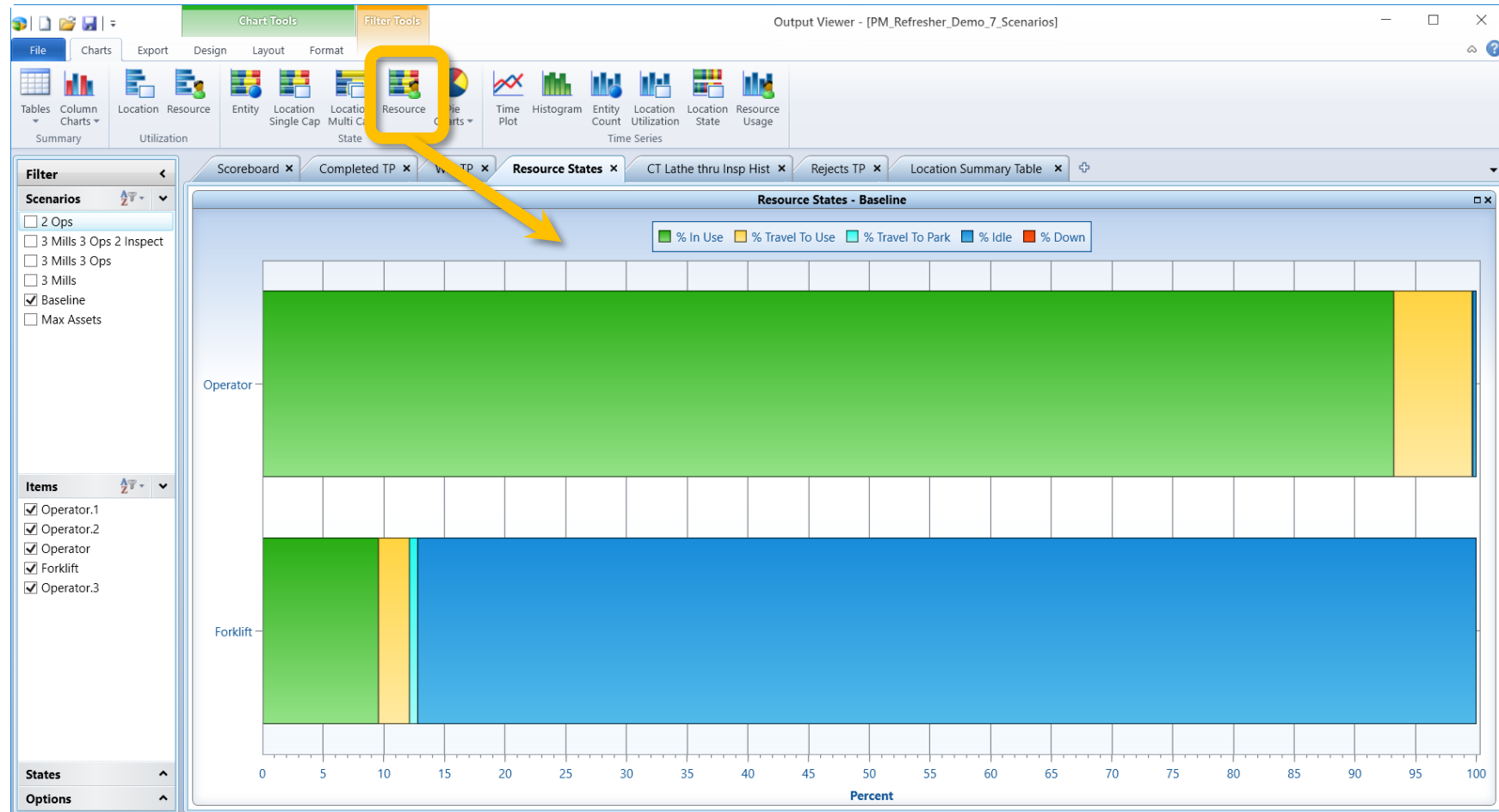
OV Chart Menu

- Summary – Tables & Column Charts
- Utilization – Locations & Resources
- State – Entities, Locations, & Resources
- Time Series – Data over the model run

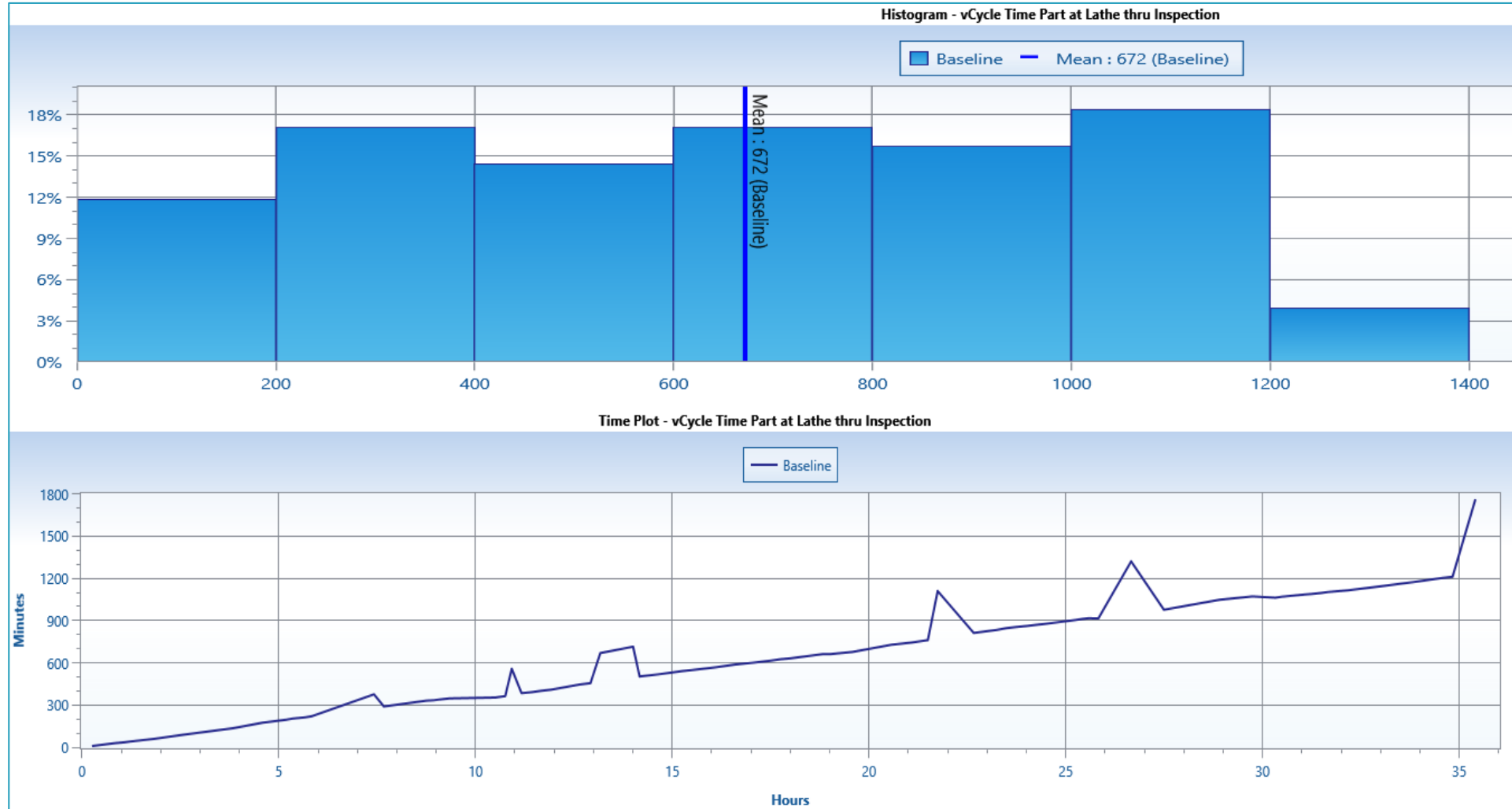


Create a Chart

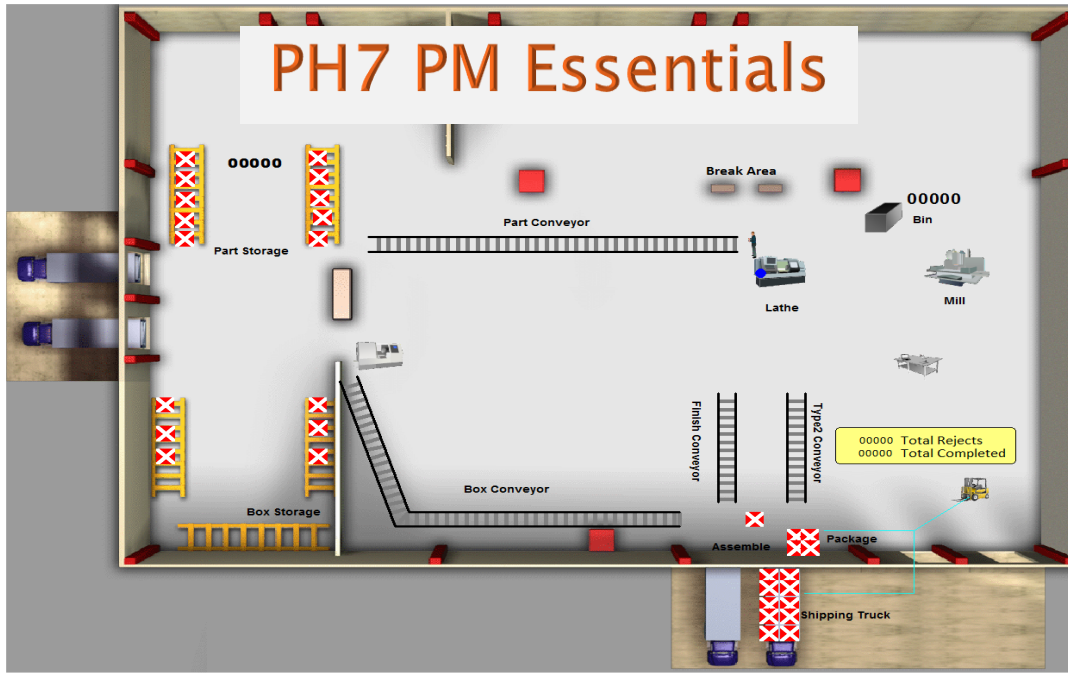
- Click on a button to create a new chart



Output Views—User-Defined



Demo 6: Model Results in Output Viewer



*Key Output Results you should Always analyze include:

- Throughput (i.e., Entity Exits)
- Cycle/Lead Time (process beginning to end)
- Work in Process (WIP)
- Location & Resource Utilization

Name	Scheduled Time (Hr)	Capacity	Total Entries	Average Time Per Entry (Min)	Average Contents	Location Summary		
						Maximum Contents	Current Contents	% Utilization
Part Storage	36.00	999,999.00	540.00	322.44	80.61	195.00	190.00	0.01
Bin	36.00	999,999.00	316.00	635.84	93.02	188.00	187.00	0.01
Part Conveyor	36.00	999,999.00	350.00	277.91	45.03	50.00	50.00	90.06
Box Conveyor	36.00	999,999.00	210.00	437.58	42.54	45.00	45.00	94.54
Box Storage	36.00	999,999.00	42.00	654.44	12.73	28.00	27.00	0.00
Shipping Truck	36.00	16.00	164.00	94.04	7.14	16.00	4.00	44.62
Package	36.00	4.00	164.00	24.17	1.84	4.00	0.00	45.89
Lathe	36.00	1.00	300.00	5.66	0.79	1.00	1.00	78.56
Mill	36.00	1.00	130.00	9.36	0.56	1.00	1.00	56.31
Finish Conveyor	36.00	999,999.00	58.00	1.03	0.03	1.00	0.00	0.15
Type2 Conveyor	36.00	999,999.00	106.00	0.44	0.02	1.00	0.00	0.24
Inspect	36.00	1.00	76.00	7.34	0.26	1.00	0.00	25.84
Box Maker	36.00	1.00	15.00	128.79	0.89	1.00	1.00	89.44
Assemble	36.00	1.00	165.00	12.87	0.98	1.00	1.00	98.35

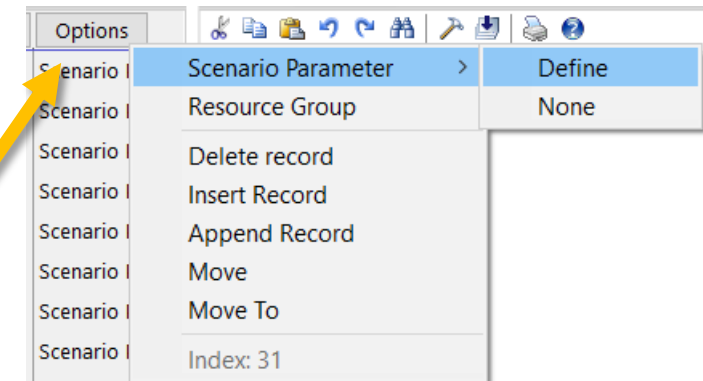
Name	Units	Scheduled Time (Hr)	Work Time (Min)	Number Times Used	Average Time Per Usage (Min)	Resource Summary	
						Average Time Travel To Use (Min)	% Utilization
Operator	1.00	34.00	2,032.90	700.00	2.72	0.19	99.65
Forklift	1.00	36.00	261.54	164.00	1.26	0.34	12.11

7. Scenarios

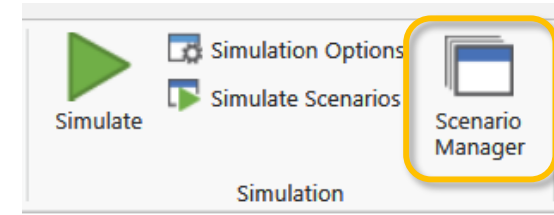
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Macro as Scenario Parameter

- You can't run a scenario if you don't have some element of your model to experiment with.
- You can ONLY run Scenarios in PM using Macros!
- Select the "Options" button located at the far right corner of the Macro table and select "Define."
- Edit the Macro's scenario parameters.

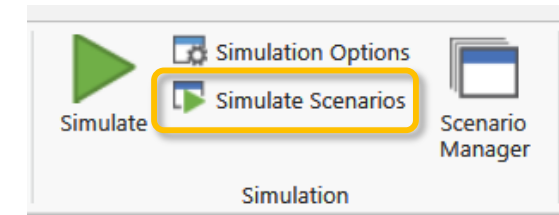
A screenshot of the 'Parameter definition for mPL2_Inventory_Tech' dialog box. The 'Parameter Name' is 'mInventory_Tech'. The 'Prompt' field is empty. The 'Numeric Range' radio button is selected, with 'From' set to 0 and 'To' set to 20. The 'OK', 'Cancel', and 'Help' buttons are at the bottom. A yellow arrow points from the 'Edit the Macro's scenario parameters' text to this dialog box.

Scenario Manager



- Scenario Manager allows you to adjust the “levels” of the macros you defined for each run of the model.
- Click the “Plus” button next to the baseline scenario to create a new scenario.
- Choose a descriptive name for your scenario and edit the macro values.
- Note: It’s best to change only one macro per scenario initially. Later you can combine significant factors by changing more than one macro as needed in additional scenarios.

Simulate Scenarios



- You can enable or disable each scenario for comparison by clicking on the checkbox under the Scenario title.
- Run the enabled Scenarios by clicking the Run Scenarios button

Scenario Manager								
#	Parameters	Baseline	2 Bob 1 Design	2 Bob 2 Design	2 Bob 3 Design	1 Bob 2 Design	1 Bob 3 Design	3 Bob 3 Design
	Simulate Scenario?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Last Simulation Run							
*	mBobUnits	1	2	2	2	1	1	3
*	mDesignCapacity	1	1	2	3	2	3	3

Scenario Analysis - Tables

Output Viewer - [PM_Refresh_Demo_7_Scenarios]

File Charts Export Format Options

Tables Column Charts Location Resource Entity Location Single Cap Location Multi Cap Resource Pie Charts Time Plot Histogram Entity Count Location Utilization Location State Resource Usage Summary Utilization State Time Series

Filter

Scenarios

- ☒ 2 Ops
- ☒ 3 Mills 3 Ops 2 Inspect
- ☒ 3 Mills 3 Ops
- ☒ 3 Mills
- ☒ Baseline
- ☒ Max Assets

Items

- ☒ Part
- ☐ Box

Columns Statistics Options

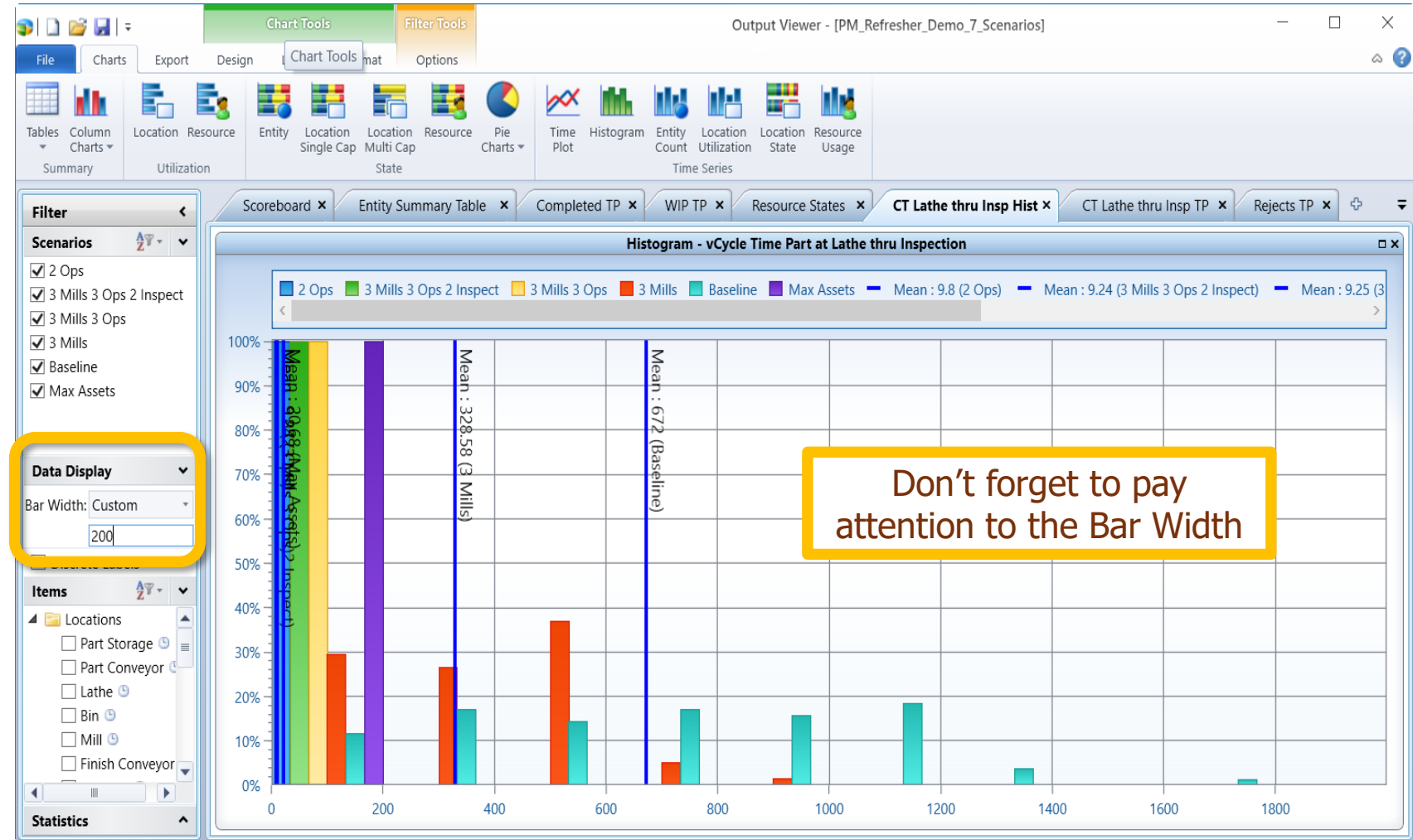
Scoreboard Completed TP Entity Summary Table WIP TP Resource States CT Lathe thru Insp Hist Rejects TP

Entity Summary

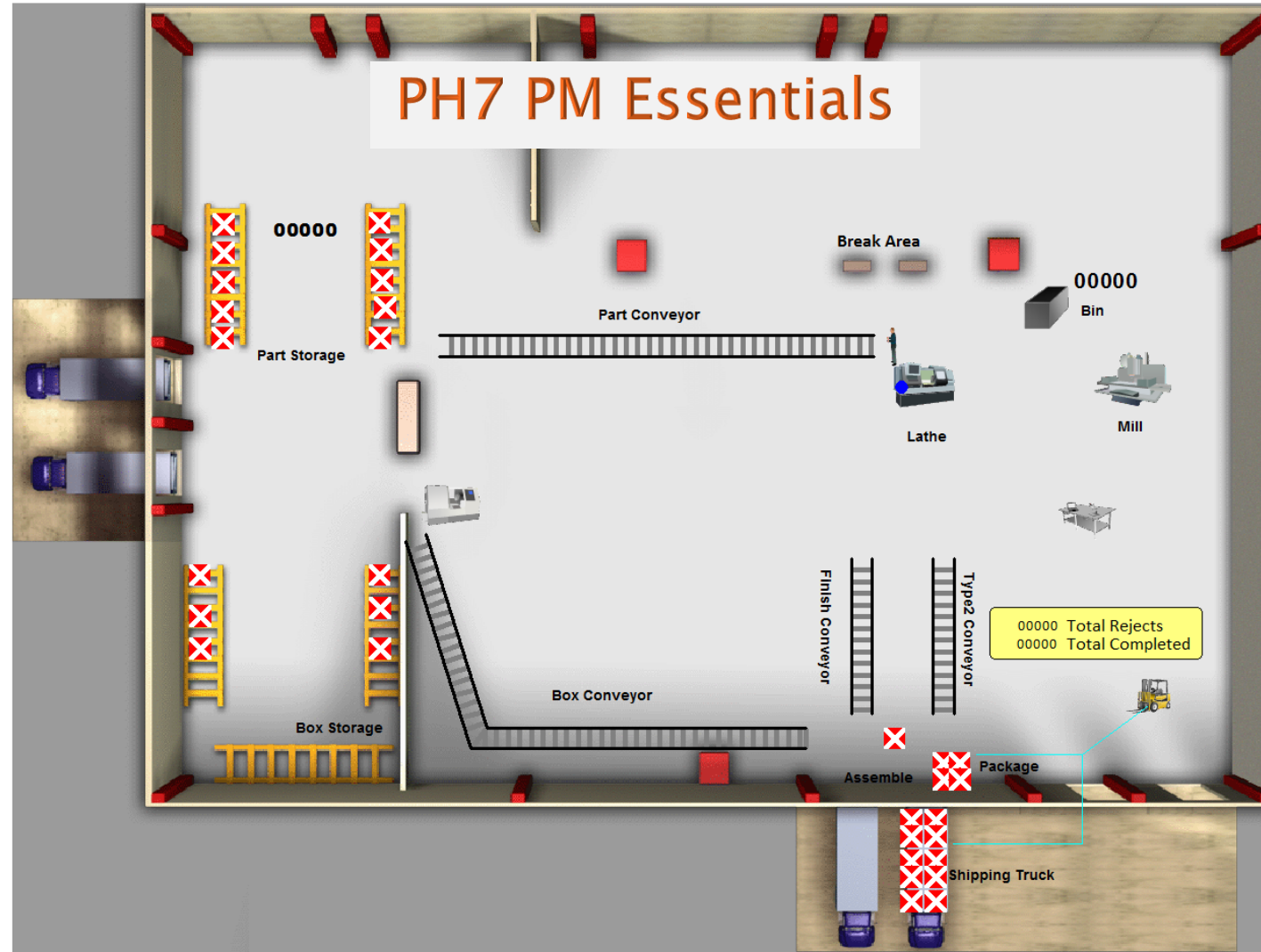
Scenario	Name	Total Exits	Current Quantity In Sy...	Average Time In System (Min)	Average Time In Move Logic (Min)	Average Time Waiting (Min)	Average Time In Operation (Min)	Average Time Blocked (Min)	
3 Mills 3 Ops 2 Inspect	Part	477.00	208.00	447.89	4.04	0.22	268.97	174.67	
3 Mills 3 Ops	Part	477.00	208.00	447.90	4.04	0.21	268.97	174.67	
2 Ops	Part	466.00	210.00	457.21	4.12	0.19	269.65	183.24	
Max Assets	Part	398.00	265.00	578.55	15.88	0.10	320.06	242.51	
3 Mills	Part	302.00	336.00	698.52	21.16	0.09	284.07	393.19	
Baseline	Part	164.00	430.00	878.35	19.53	0.09	201.42	657.32	

Scenario Analysis - Charts

- Histograms (Cycle Time)



Demo 7: Model with Multiple Scenarios



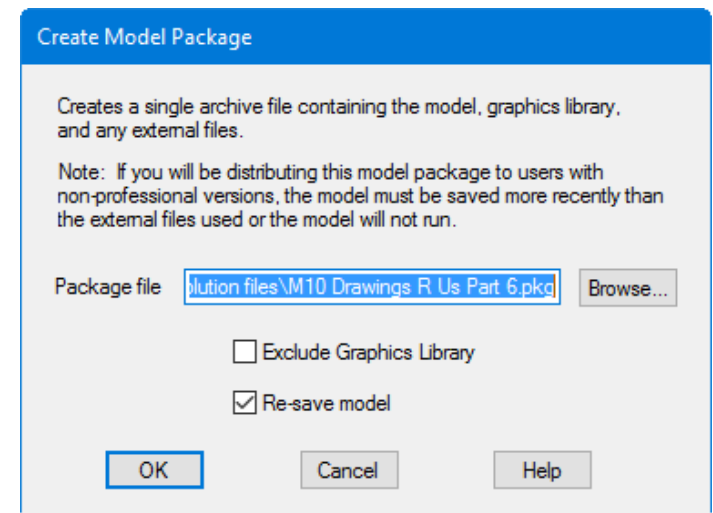
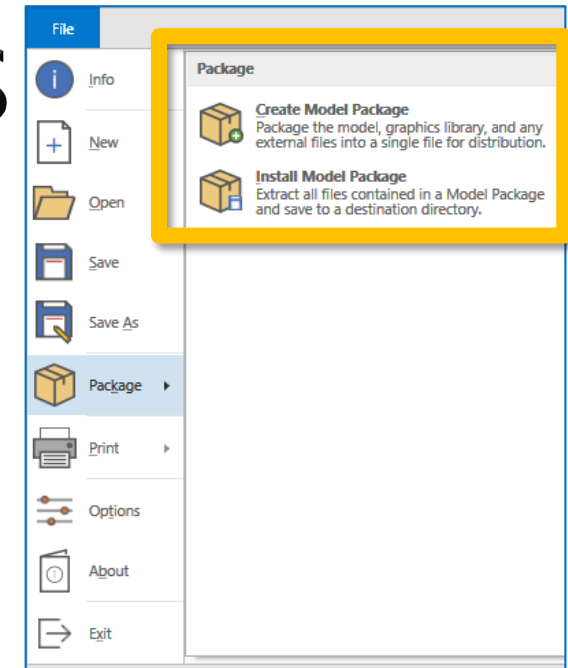
Poll #8

Wrap Up

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Creating Model Packages

- Sharing or archiving models is easy.
- Click on the File menu, select Package, and then "Create Model Package."
- This prompts you for a name for your model "Package."
- A model package is saved with a .pkg extension and combines: the .mod file, .glb file, and any other referenced files (such as calendar files, excel spreadsheets, or associated docs).
- This .pkg file can then be copied or emailed to others. They can run the model by selecting "Install Model Package."



Arrays

- An array is a matrix of values
- Each cell works like a variable
- A reference to a cell in an array can be used anywhere a variable can be used
- Refer to a specific array value by using the Array name followed by the specific value's row & column cell address. For example, the value 18 located in row 2 and column 3 has a cell address of [2,3] so it would be referred to as Array1[2,3].

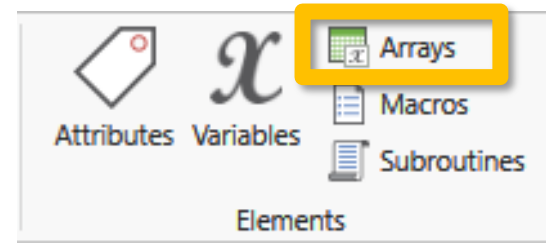
Array1:

	1	2	3	4
1	10	15	15	20
2	12	15	18	25
3	15	15	10	10

Array1 Cell Addresses:

Cell [1,1]	Cell [1,2]	Cell [1,3]	Cell [1,4]
Cell [2,1]	Cell [2,2]	Cell [2,3]	Cell [2,4]
Cell [3,1]	Cell [3,2]	Cell [3,3]	Cell [3,4]

Arrays

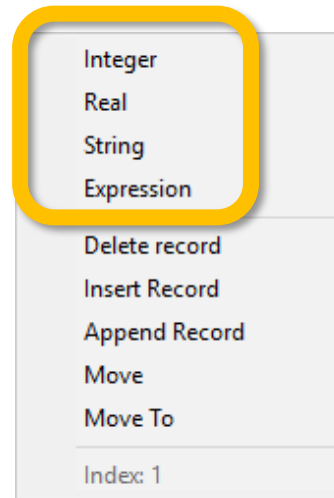


Arrays							
ID	Dimensions	Type	Import File...	Export File...	Disable	Persist	Notes...

↑
Name of the Array

↑
Row and Column Dimensions

↑
Array Type



↑
Re-import (clear) or keep data between replications

Note: Arrays can be created by importing directly from Excel files! Arrays can also be exported to Excel files!

Queues vs Conveyors

- Although both Queues & Conveyors are created using the same Location Icon, they do have a number of differences.

Queue



Conveyor



Capacity	Speed	Entity Exits	Op Logic	Move
Set in Location Table	Set in Entity Table	Can exit in any order	Executes upon Entry of Entity	Can use “Move for” in Op Logic
Entity size or Loc Table (lower of two)	Set in Conv Option	FIFO only	Can execute before and/or after Move	Can use “Move” in Op Logic

Poll #10

FINISHED

- Thanks for attending this PM 2018 Basic Refresher training course! We hope it was helpful.
- For more information on the PM 2018 Essentials or Advanced training courses, please contact the ProModel Sales Director that works with your company.
- Remember, help is only an email or phone call away.
- Good luck and happy modeling!

Technical Support
888-776-6633
support@promodel.com
6 am - 6 pm M-F, Mountain Time