PlantPAx System Design and Estimation Tools

PSE v5.0
September 2020

LISTEN. THINK. SOLVE.®

Allen-Bradley • Rockwell Software

Rockwell Automation

Important User Information

This documentation, whether, illustrative, printed, "online" or electronic (hereinafter "Documentation") is intended for use only as a learning aid when using Rockwell Automation approved demonstration hardware, software and firmware. The Documentation should only be used as a learning tool by qualified professionals.

The variety of uses for the hardware, software and firmware (hereinafter "Products") described in this Documentation, mandates that those responsible for the application and use of those Products must satisfy themselves that all necessary steps have been taken to ensure that each application and actual use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards in addition to any applicable technical documents.

In no event will Rockwell Automation, Inc., or any of its affiliate or subsidiary companies (hereinafter "Rockwell Automation") be responsible or liable for any indirect or consequential damages resulting from the use or application of the Products described in this Documentation. Rockwell Automation does not assume responsibility or liability for damages of any kind based on the alleged use of, or reliance on, this Documentation.

No patent liability is assumed by Rockwell Automation with respect to use of information, circuits, equipment, or software described in the Documentation.

Except as specifically agreed in writing as part of a maintenance or support contract, equipment users are responsible for:

- properly using, calibrating, operating, monitoring and maintaining all Products consistent with all Rockwell Automation or third-party provided instructions, warnings, recommendations and documentation;
- ensuring that only properly trained personnel use, operate and maintain the Products at all times;
- staying informed of all Product updates and alerts and implementing all updates and fixes; and
- all other factors affecting the Products that are outside of the direct control of Rockwell Automation.

Reproduction of the contents of the Documentation, in whole or in part, without written permission of Rockwell Automation is prohibited.

Throughout this manual we use the following notes to make you aware of safety considerations:

WARNING

Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

ATTENTION

Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you:

- identify a hazard
- avoid a hazard
- recognize the consequence

SHOCK HAZARD

Labels may be located on or inside the drive to alert people that dangerous voltage may be present.

BURN HAZARD

Labels may be located on or inside the drive to alert people that surfaces may be dangerous temperatures.

Contents

About This Lab

The PlantPAx System Estimator (PSE) wizard of Integrated Architecture Builder (IAB) is designed to help you develop budgetary quotes for distributed control systems. The PSE works from basic information typically available when a process control system is being designed, and also allows for precise configuration if desired.

Using the PSE defaults, all you need to create a budgetary quote is:

- Number of operator workstations
- I/O type and count by location

The PSE takes information you enter and applies architectural structure and system recommendations from the PlantPAx Distributed Control System guidelines. Using these guidelines, the PSE helps you determine the number of controllers needed in a subsystem based on I/O count and type; assuming typical process control strategies. The PSE also gives you flexibility to adjust the relative complexity and execution speed of the proposed control strategies. This flexibility allows you to adjust estimates based on evolving customer specifications.

NOTE: ***The PlantPAx System Estimator is continuously updated and improved with new features. For best results with the lab, please use the recommended version of IAB identified in the Lab Materials section. Any other versions of IAB may differ from the procedure outlined in this document.***

What You Will Accomplish

As you complete the exercises in this hands-on session, you will:

- Become familiar with the PSE user interface
- Learn best practices for achieving optimal performance from your PlantPAx system
- Configure a Process System from user-supplied information using PSE defaults
- Learn how to set preferences
- Learn how to build a configuration of servers, controllers, I/O locations, and workstations
- Learn how to configure I/O using point counts or control strategies
- Assign I/O points to hardware

Lab Materials

For this hands-on lab, you need the following:

- **Hardware –** None
- **Software –** Integrated Architecture Builder 9.7.9.7 (See Note in *About this Lab*)
- **Documentation –** None

Document Conventions

Throughout this lab manual, we have used the following conventions to help guide you through the lab materials.

This style or symbol:	Indicates:
Words shown in bold italics (e.g., ***Studio 5000*** or ***OK***)	An item or button that you must click on, or a menu name from which you must choose an option or command. This will be an actual name of an item that you see on your screen or in an example.
Words shown in italics, enclosed in single quotes (e.g., **'Controller1'**)	An item that you must type in the specified field. This is information that you must supply based on your application (e.g., a variable). **Note:** When you type the text in the field, remember that you do not need to type the quotes; simply type the words that are contained within them (e.g., Controller1).
Text in a gray box.	Text that appears in a gray box is supplemental information. Although it is not required in order to complete the lab exercises, it may help you understand better how IAB works or how to use IAB more efficiently.

Note: If the mouse button is not specified in the text, you should click on the left mouse button.

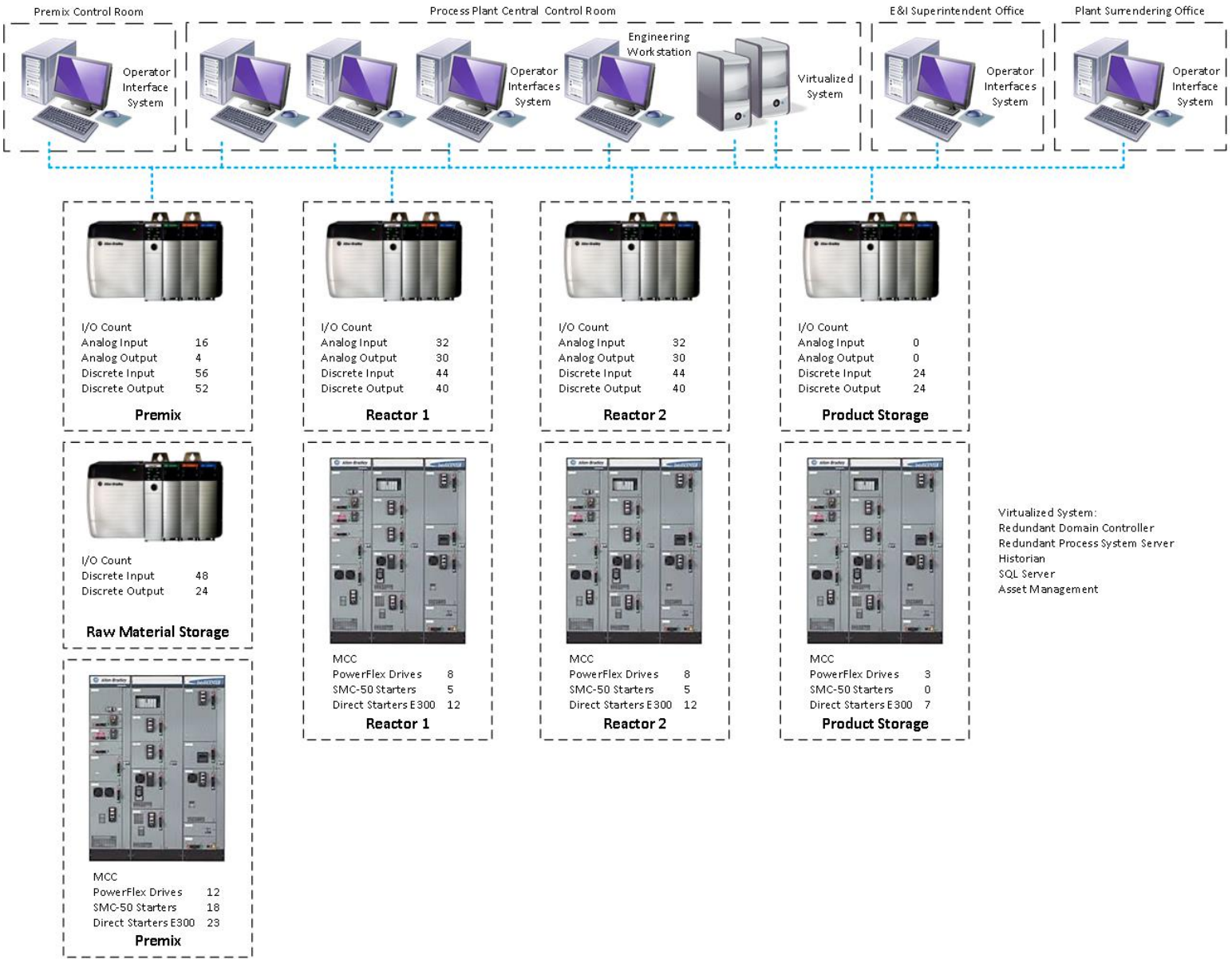
Before You Begin

Please close all open applications before starting this lab exercise.

1: Create a Process IAB Project Using Defaults

The PSE wizard comes with default settings applied that make it possible for you to easily configure a process system based on basic information that you can gather from a customer. In this section of the lab, you'll create a new project in IAB and use the PSE wizard to configure a process application based on customer-supplied information. You'll create the controllers, I/O and MCC locations, servers, and workstations shown in the diagram and add the I/O points in terms of I/O types and counts.

A customer-supplied process control system diagram is provided on the following page.

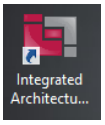


Note: For PowerFlex Drivers in this lab we can use PF755.

Follow the steps below to configure this project in IAB.

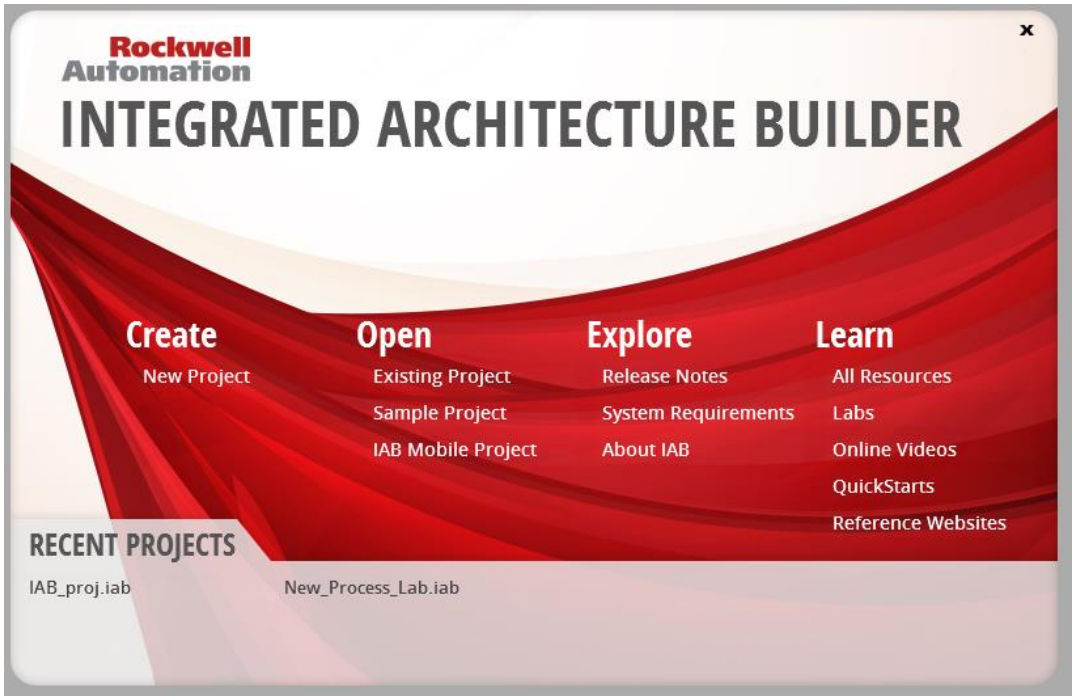
1. If IAB is already running, skip to step 3.

   If IAB is not already running, double click on the ***Integrated Architecture Builder*** icon on the computer Desktop to launch IAB.



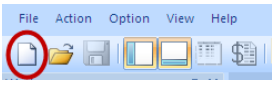
   If IAB asks if you would like to establish an Internet connection, click ***No***.

   The IAB start page appears, with the ***IAB Project Options*** displayed.



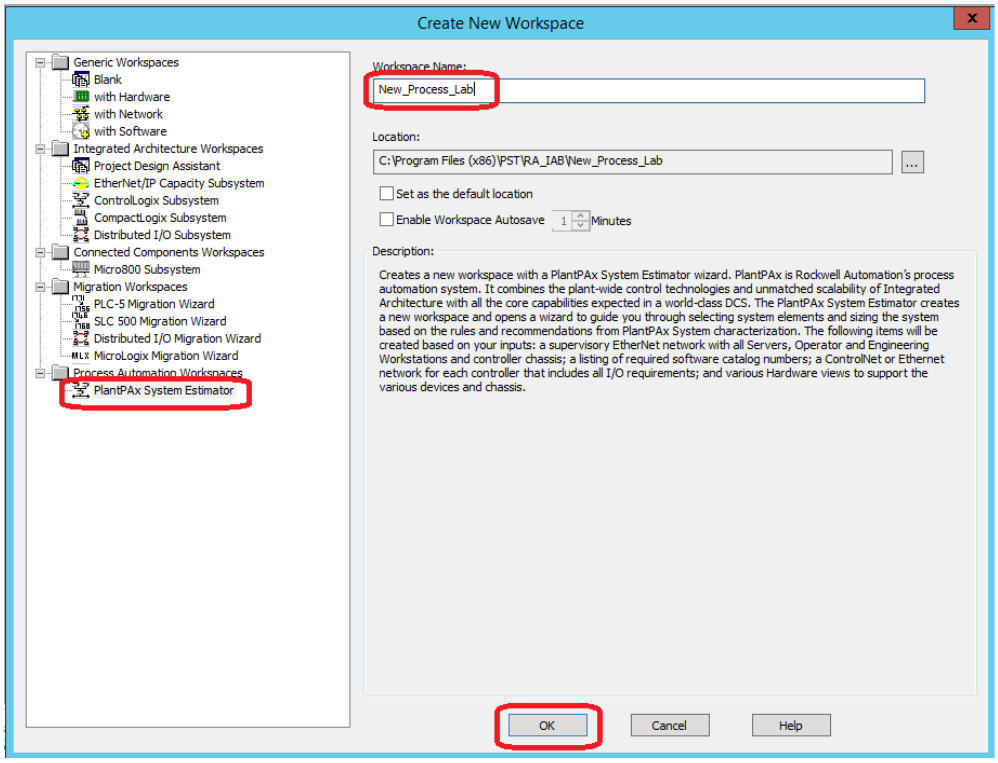
2. Click ***New Project*** and skip to step 4.

3. If IAB is already running, save any currently open project, then click the ***New*** button.

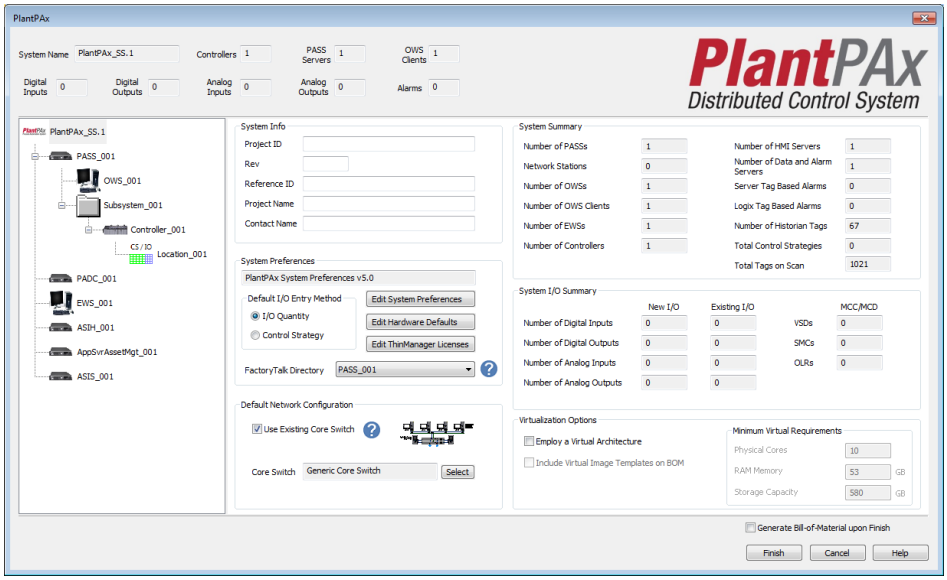


The Create a New Workspace dialog appears.

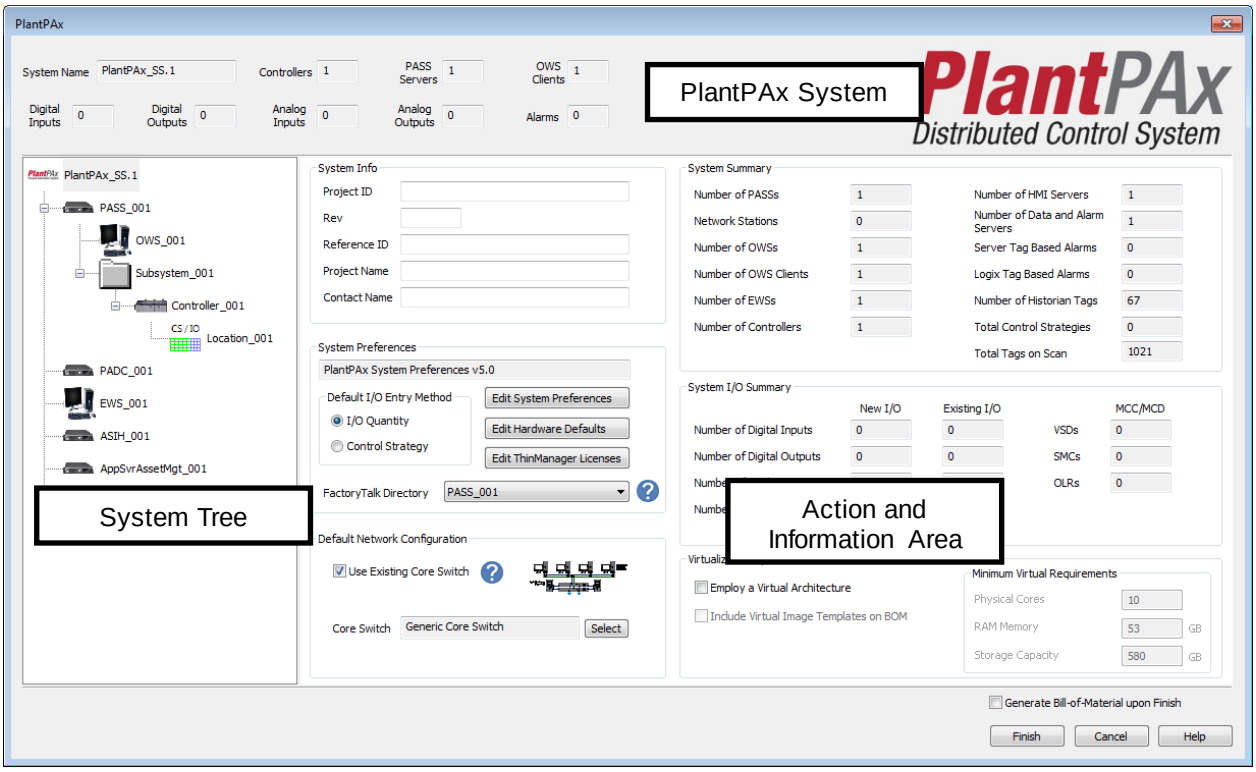
4. In the Create **a New Workspace** dialog, select ***Process Automation Workspaces > PlantPAx System Estimator*** and type in the Workspace Name *'New_Process_Lab'*, Click ***OK***.



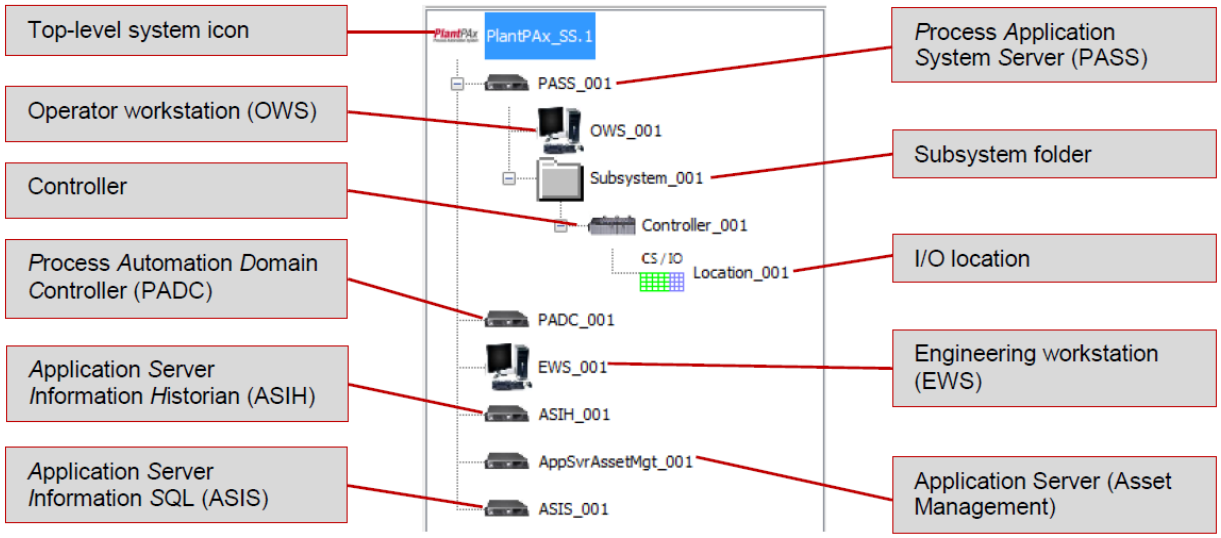
IAB Launches the PlantPAx wizard.



5. Look at the PlantPAx wizard window. Notice that there are three areas:



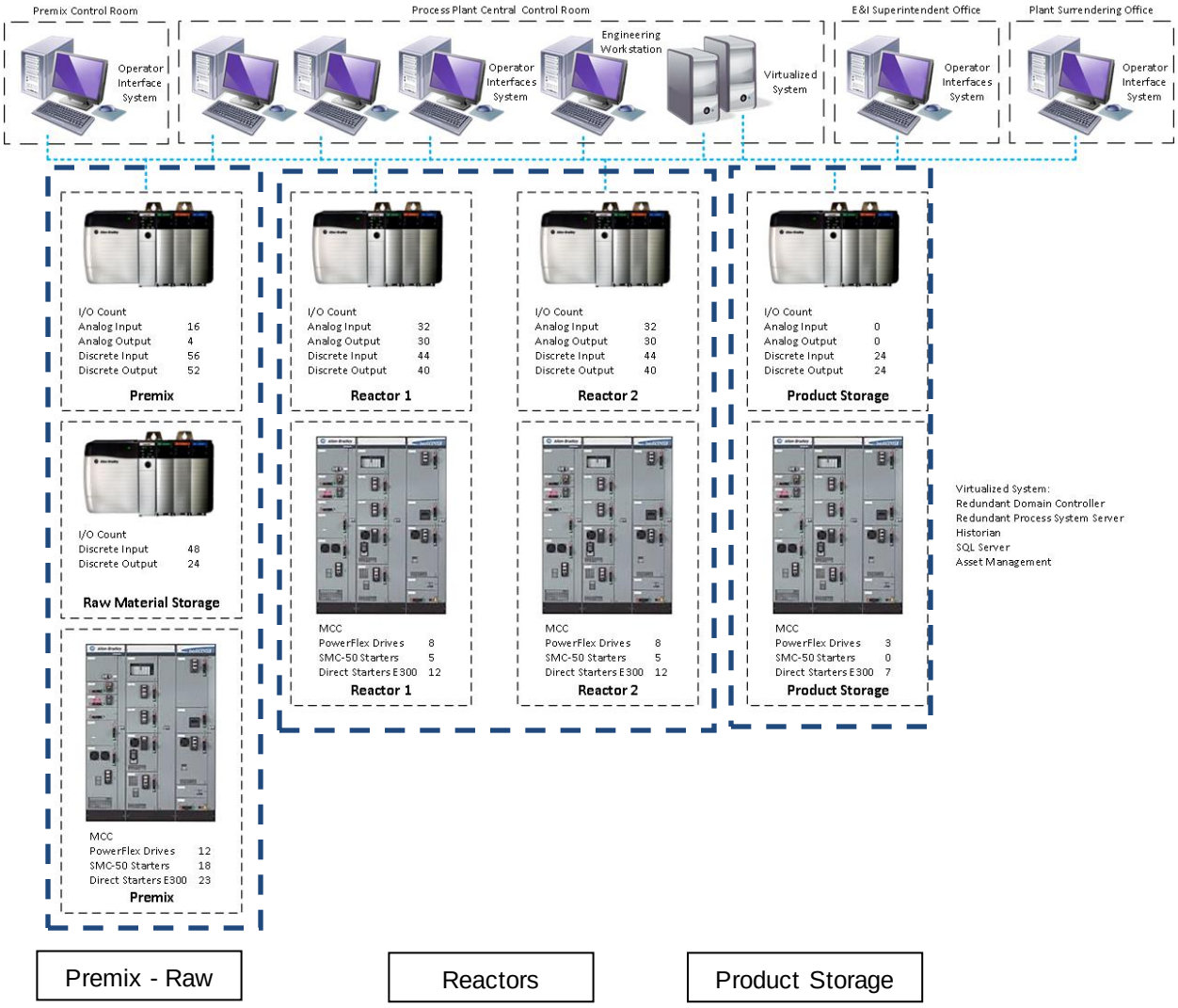
6. Notice that each new system automatically includes:



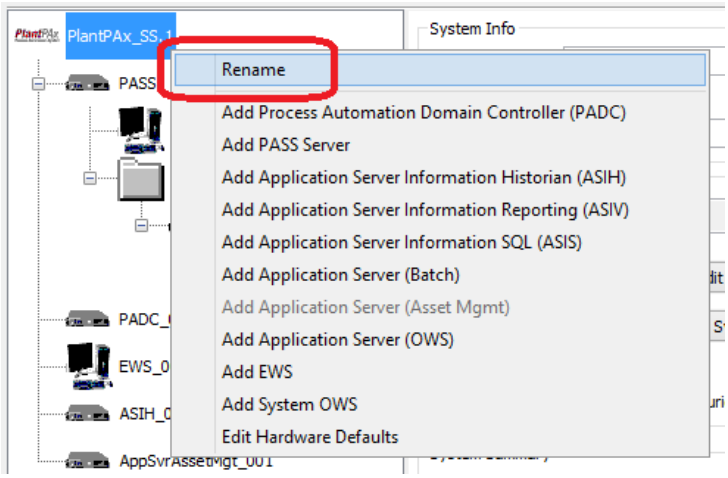
Click on each icon to see that the action and information area on the right changes depending on the item selected on the left.

7. Looking at the customer's process control system diagram, we see that the application has a supervisory network with six operator workstations and one engineering workstation. Under the supervisory network are several controllers. This application is organized into three subsystems.

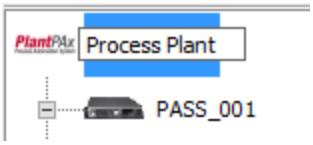
   - **Premix - Raw –** Has one controller that controls I/O and MCC in two physical locations (Premix and Raw Material Storage)
   - **Reactors –** Has two locations, each of which has a controller with I/O and MCC (Reactor 1 and Reactor 2)
   - **Product Storage –** Has one controller with I/O and MCC in one location (Product Storage)



8. Right click on the ***PlantPAx_SS.1*** item in the system tree and select ***Rename***. (Slow double click also works.)

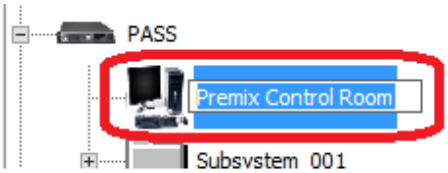


Type in the name ***Process Plant*** and hit ***Enter***.

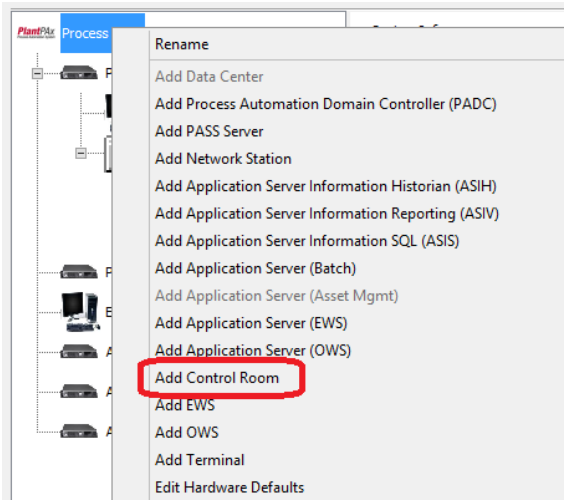


9. Rename PASS_001 to **PASS**

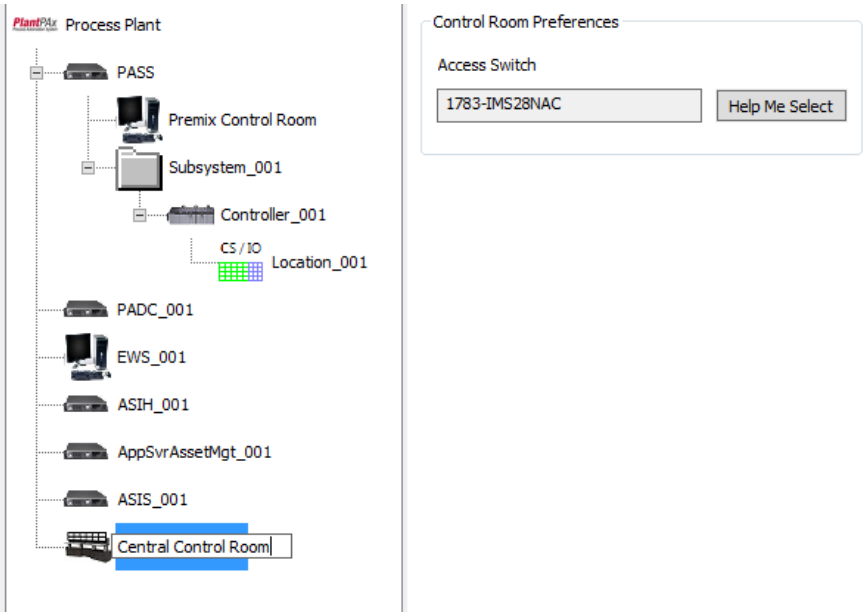
10. Rename OWS_001 to ***Premix Control Room***.



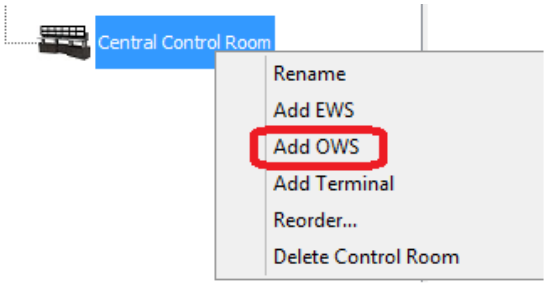
11. Add a control room that will be used to logically organize the operator workstations in the central control room. **Right click** on the Process Plant item and then click **Add Control Room**.



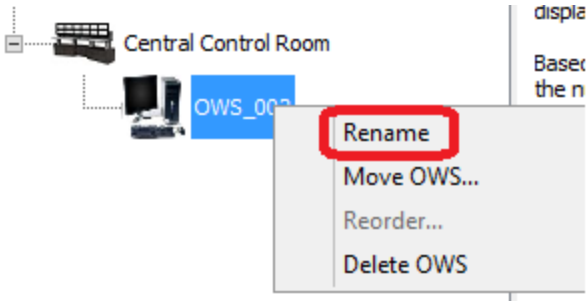
12. **Rename** ControlRoom_001 to '*Central Control Room*'.



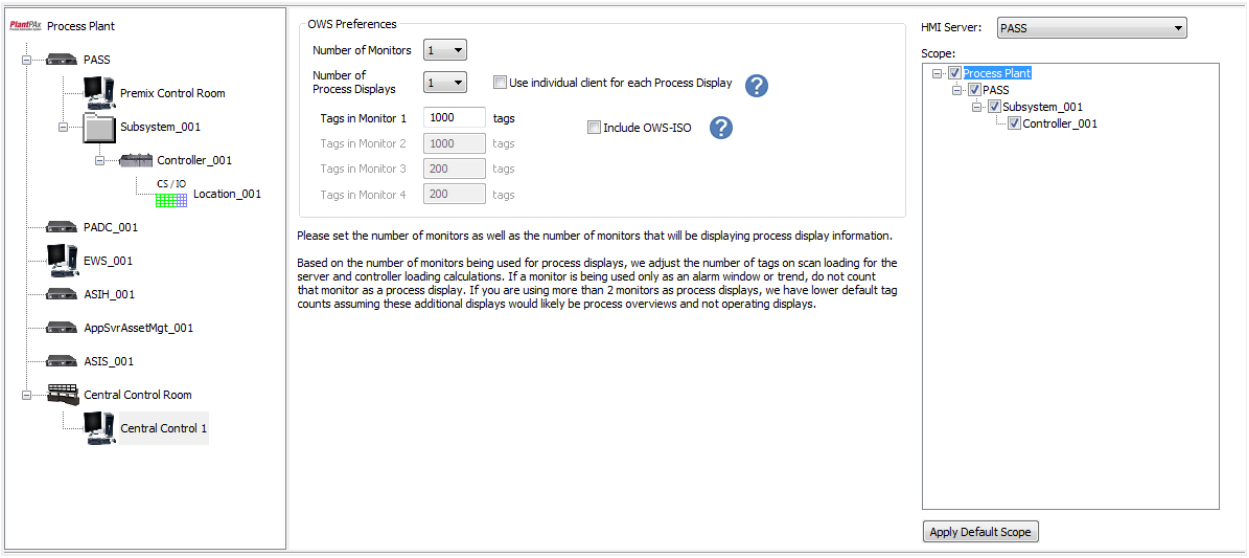
13. Add an operator workstation to the central control room. **Right click** on the Central Control Room item. Select ***Add OWS***.



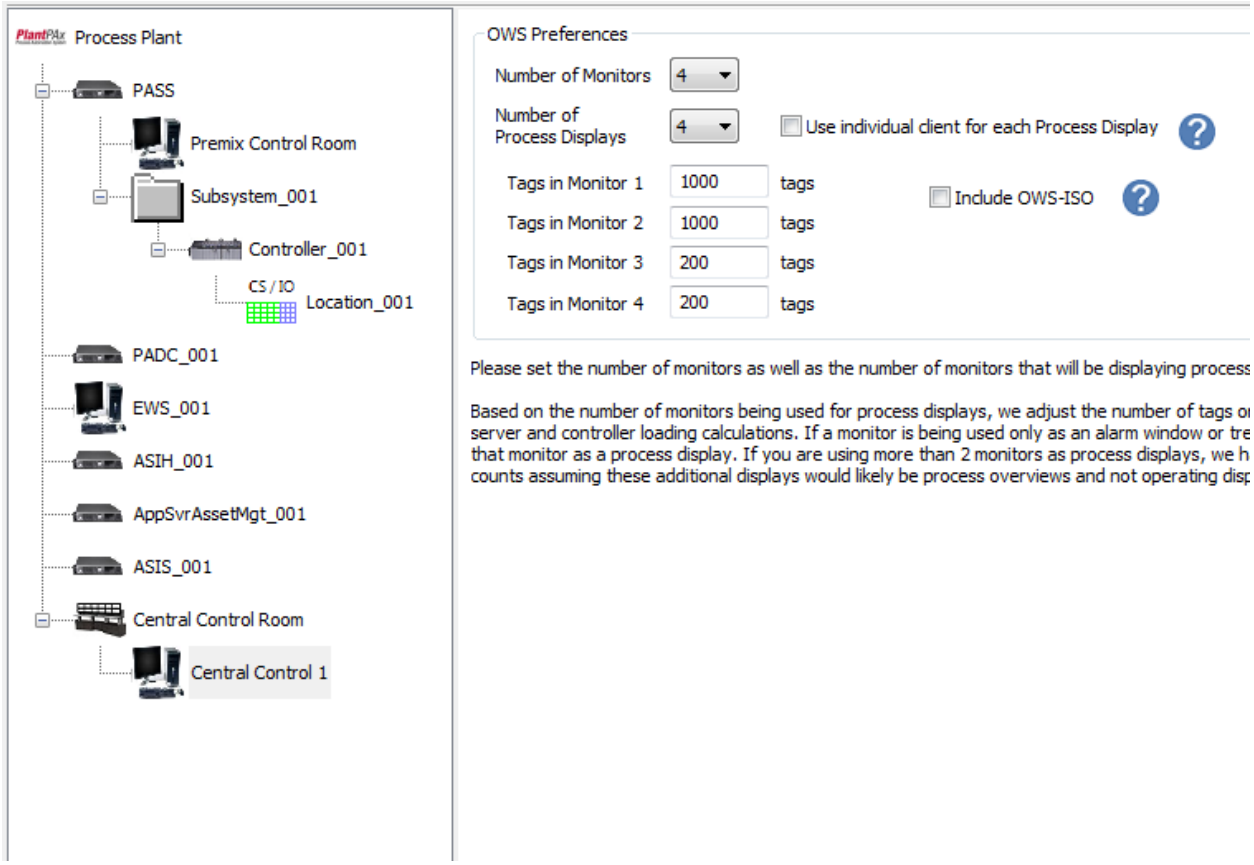
14. Rename the new workstation *Central Control 1*



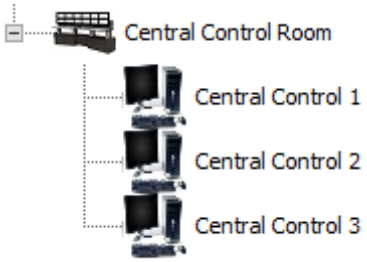
15. Click on **Central Control 1** to view the OWS Preferences. In the OWS Preferences pane, you can configure the number of monitors, the number of process displays, and the number of tags per monitor. You can also configure the scope for the OWS, which gives you the ability to limit the OWS to specific controllers.



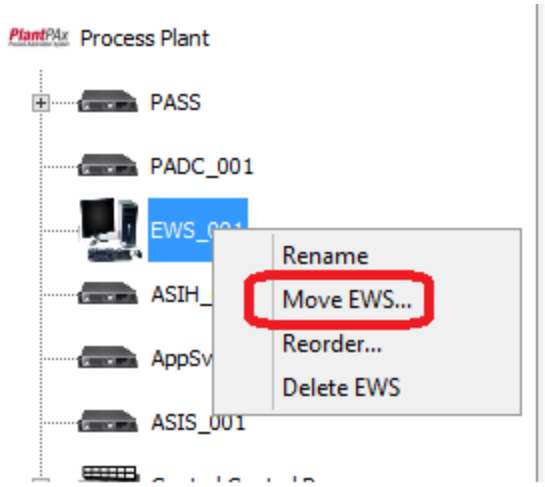
16. Configure this OWS to use a multi-monitor configuration. Select **4** from the Number of Monitors drop down and **4** from the Number of Process Displays drop down. You also have the ability to configure the number of tags on each monitor. Leave the tags at the default values for the lab.



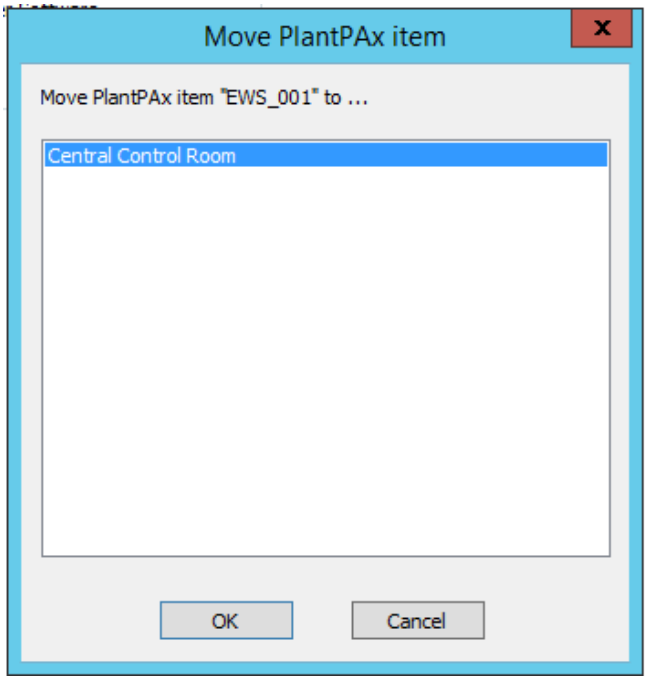
17. Repeat steps 13 and 14 to add two more workstations to the central control room named *Central Control 2* and *Central Control 3.*



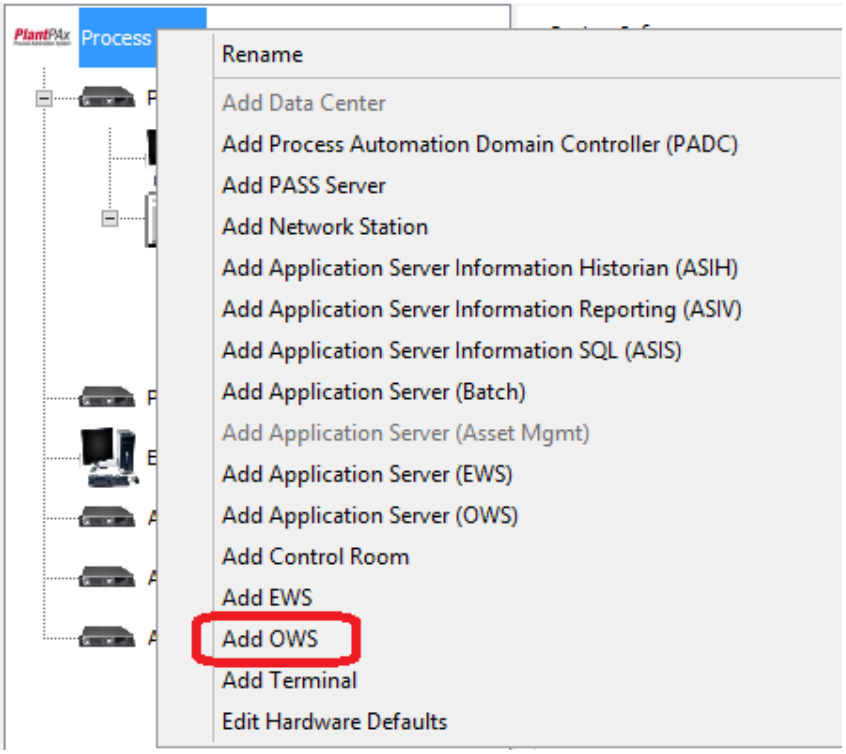
18. We can move existing components into the central control room as well. Let's move the engineering workstation to the central control room. **Right click** on **EWS_001** in the system tree and select **Move EWS…**



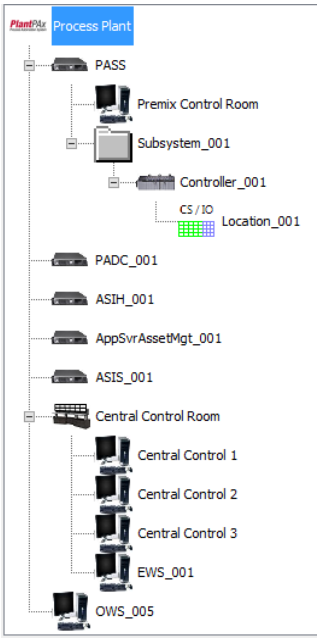
19. Select **Central Control Room**. Click **OK**.



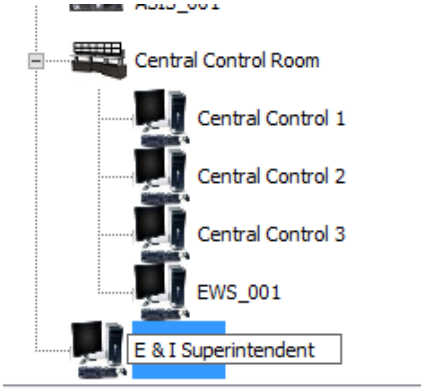
20. The following steps will describe how to add the other operator workstations at the system level. **Right click** on the Process Plant item. Notice that you can add more servers, engineering workstations, operator workstations, and terminals at the system level. Select ***Add OWS***.



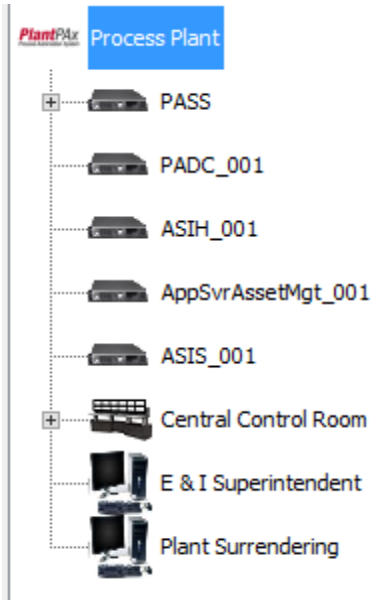
PSE adds a new operator workstation to the tree at the system level.



21. Rename the new workstation *E & I Superintendent*.



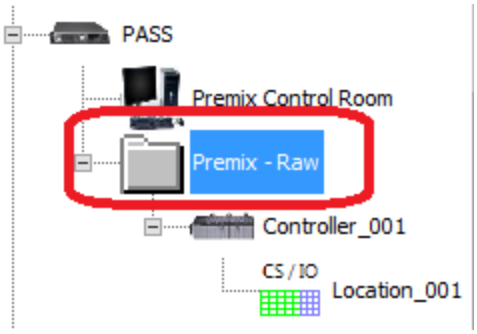
22. Repeat steps 20 and 21 to add one more operator workstation named *Plant Surrendering*.



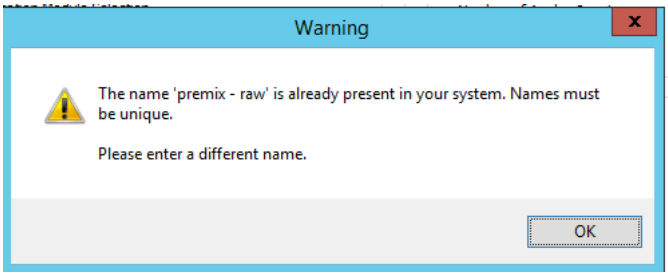
23. From the drawing, we see that the Premix - Raw area has **one controller** that controls I/O in two locations (Premix and Raw Material Storage) and a MCC.

You can use the default subsystem, controller, and I/O location that IAB has created to begin adding these items to the configuration.

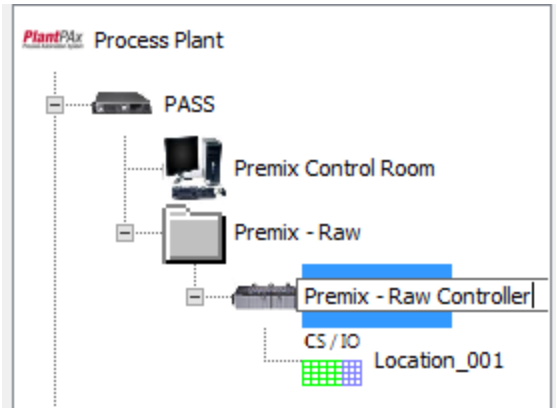
The subsystem folder is a container for the controllers and I/O locations associated with a particular process area. IAB has added a default subsystem folder to the tree under the PASS. Right click on the folder, select ***Rename***, and type in the name ***Premix - Raw***.



24. Right click on the controller that IAB has added in the Premix - Raw subsystem and try to rename it ***Premix - Raw*** as well. You will get the following error:

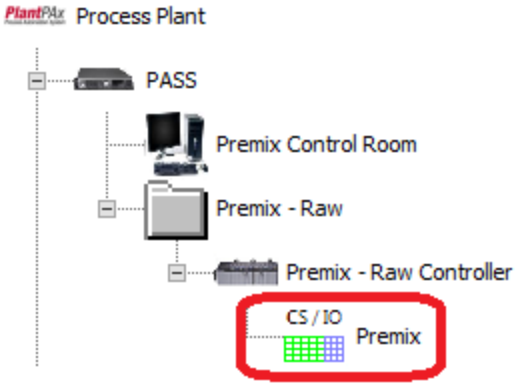


Unlike in previous versions of IAB, you cannot have duplicate names for Process Plant items even if they are completely different components. Click OK. Right-click on the controller and instead rename it to ***'Premix – Raw Controller'***:

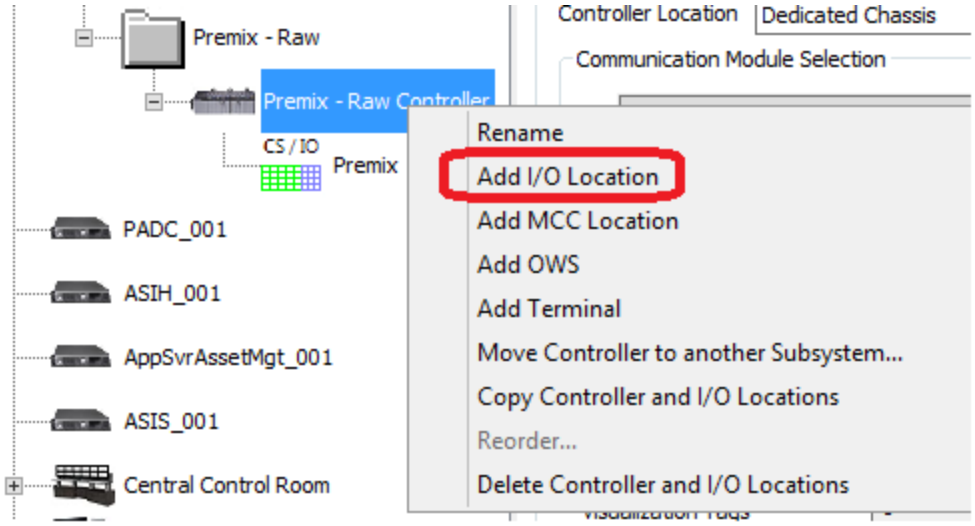


25. Right click the I/O location that IAB has added by default under the Premix - Raw controller and rename it ***Premix***.

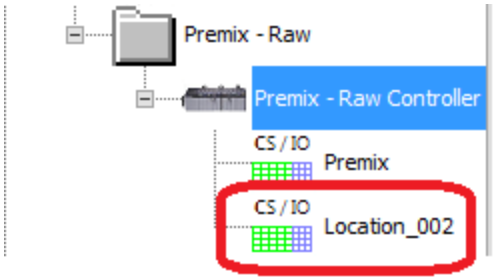
The tree should now look like this:



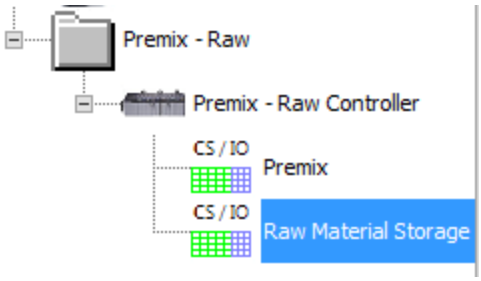
26. The Premix - Raw area has one more I/O location. Right click the Premix - Raw Controller and select ***Add I/O Location***.



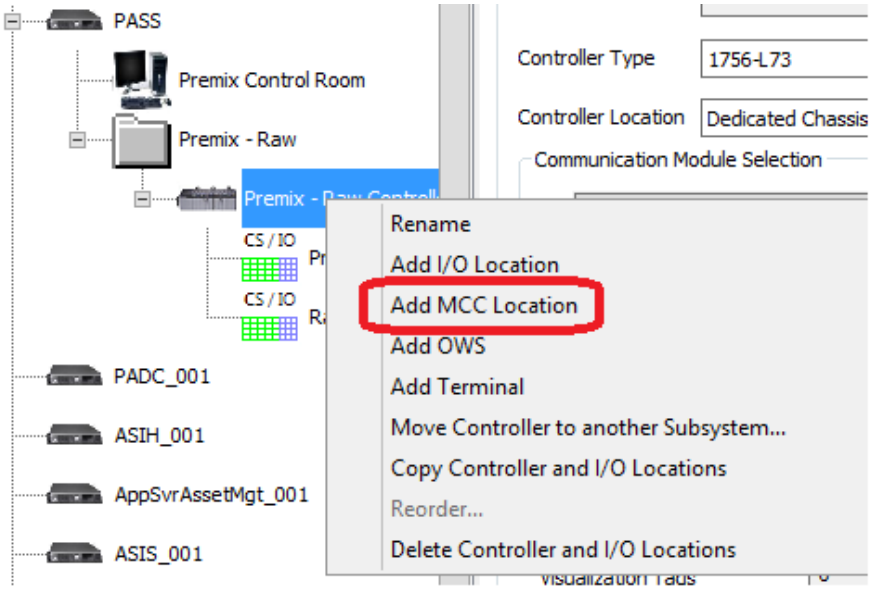
IAB adds a new I/O location under the Premix - Raw controller.



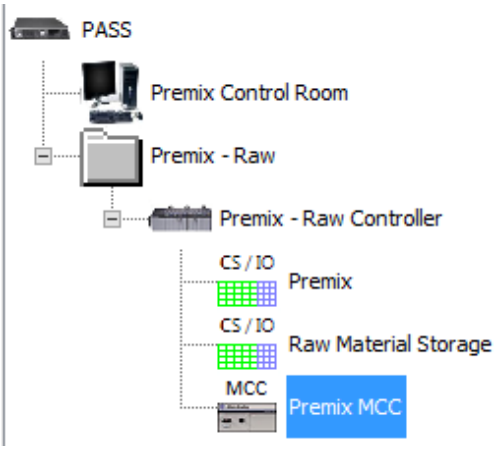
27. Right click the new I/O location and rename it ***Raw Material Storage***.



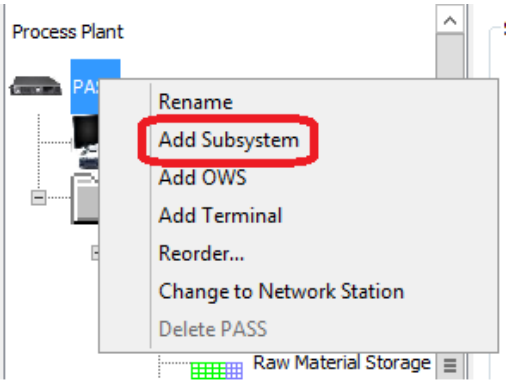
28. The Premix - Raw area has a MCC location. Right click the Premix - Raw Controller and select ***Add MCC Location***



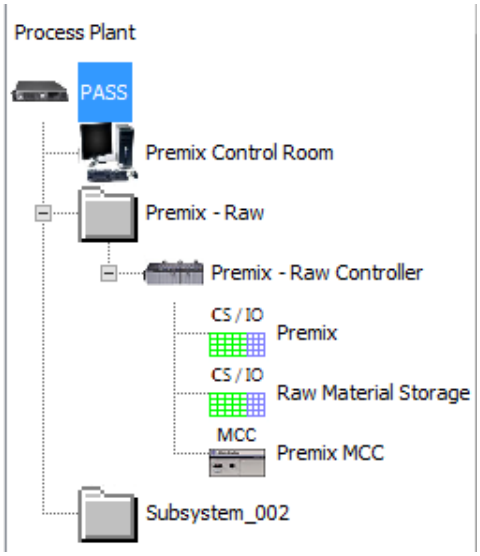
Right click the new MCC location and rename it ***Premix MCC***



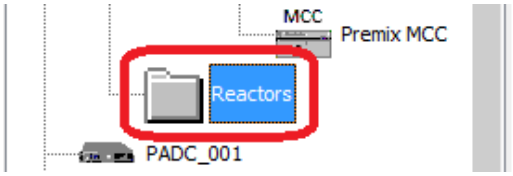
29. Now add the other subsystems. Right click on the PASS and select ***Add Subsystem***.



IAB adds a new subsystem folder under the PASS.

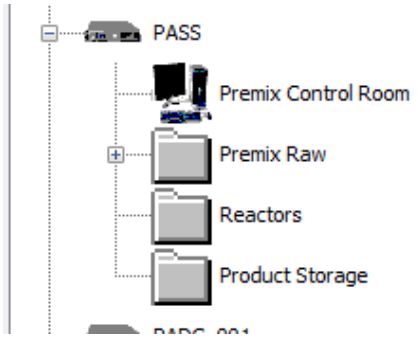


30. Rename this new folder ***Reactors***.

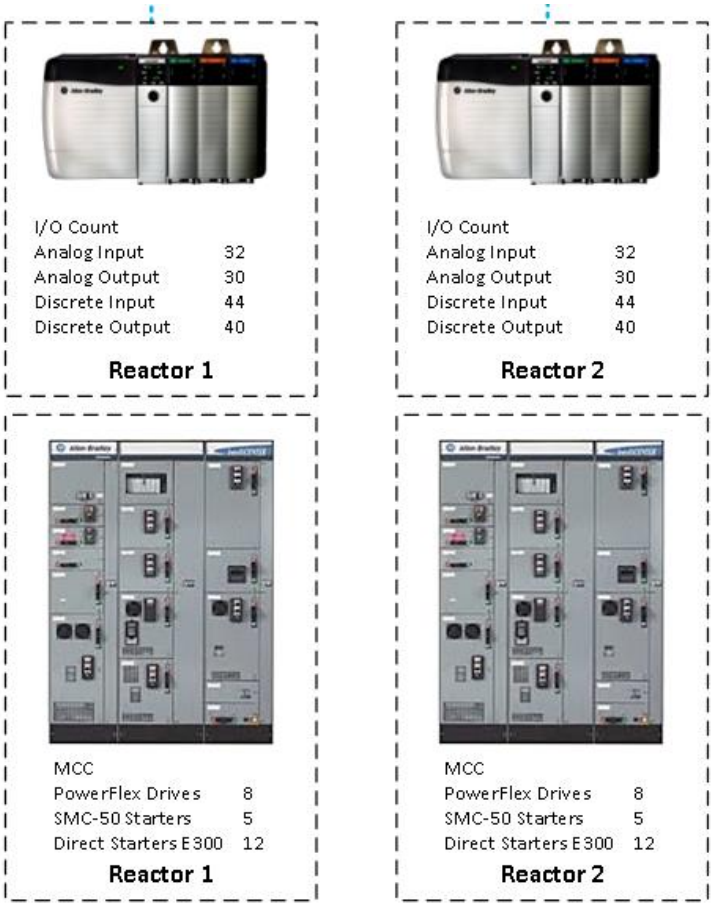


31. Repeat step 29 to add a new **subsystem** and rename it **Product Storage**.

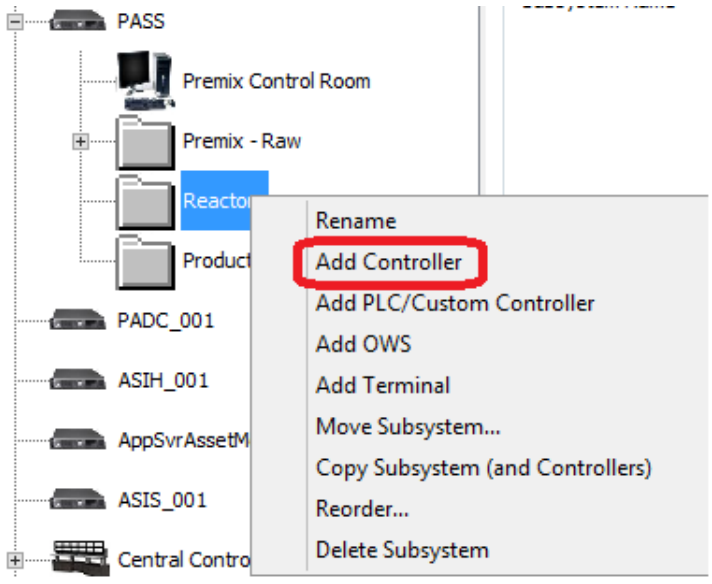
With the Premix - Raw subsystem folder collapsed, the tree should now look like this:



32. From the drawing, you can see that the Reactors area has **two controllers**, each with a single I/O and MCC location.

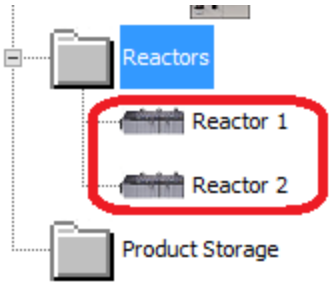


In the tree, right click on the ***Reactors*** subsystem folder and select ***Add Controller***.

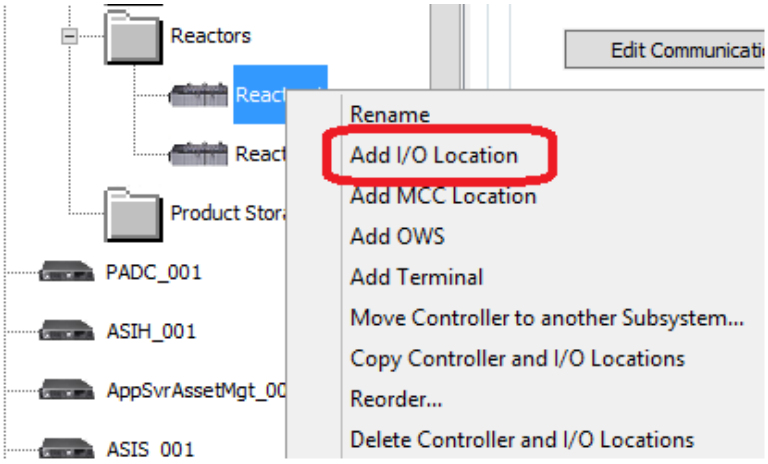


IAB adds a controller under the Reactors folder. Rename the new controller ***Reactor 1***.

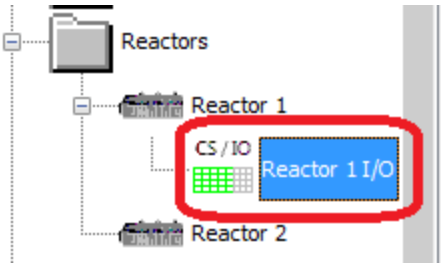
Repeat to add another controller and rename this one ***Reactor 2***.



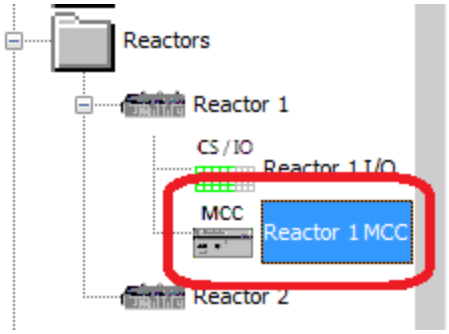
33. Right click on ***Reactor 1*** and select ***Add I/O Location***.



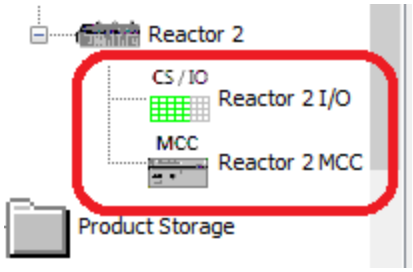
IAB adds a new I/O location under the Reactor 1 controller. Rename it ***Reactor 1 I/O***.



34. Right click on the ***Reactor 1*** controller and select ***Add MCC Location***, and rename it ***Reactor 1 MCC***.

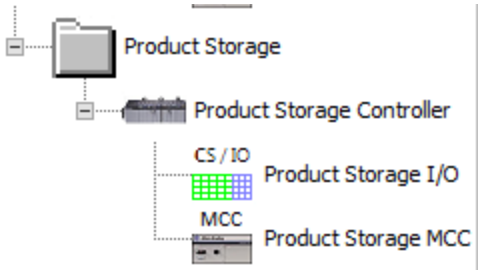


35. Repeat Steps 33 and 34 to add an I/O location and an MCC location under the Reactor 2 controller. Rename the new I/O location **Reactor 2 I/O,** and the new MCC location **Reactor 2 MCC**.

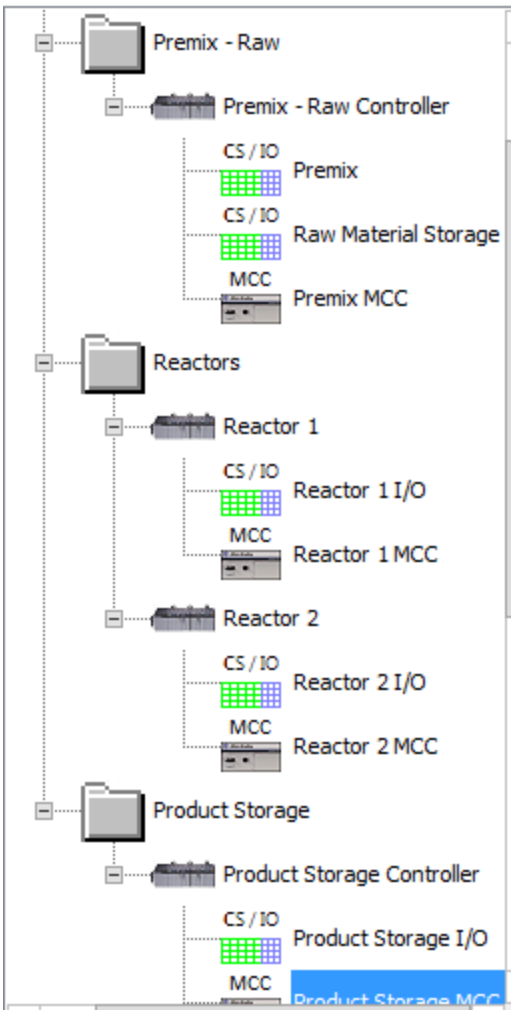


36. Check the drawing to see that the Product Storage area has **one controller** and **one I/O location**.

Right click the Product Storage subsystem folder and select **Add Controller**. IAB adds a new controller. Rename the controller **Product Storage Controller**. Add an **I/O location** to the Product Storage controller and rename it **Product Storage I/O**. Add an **MCC location** to the Product Storage controller and rename it **Product Storage MCC**.

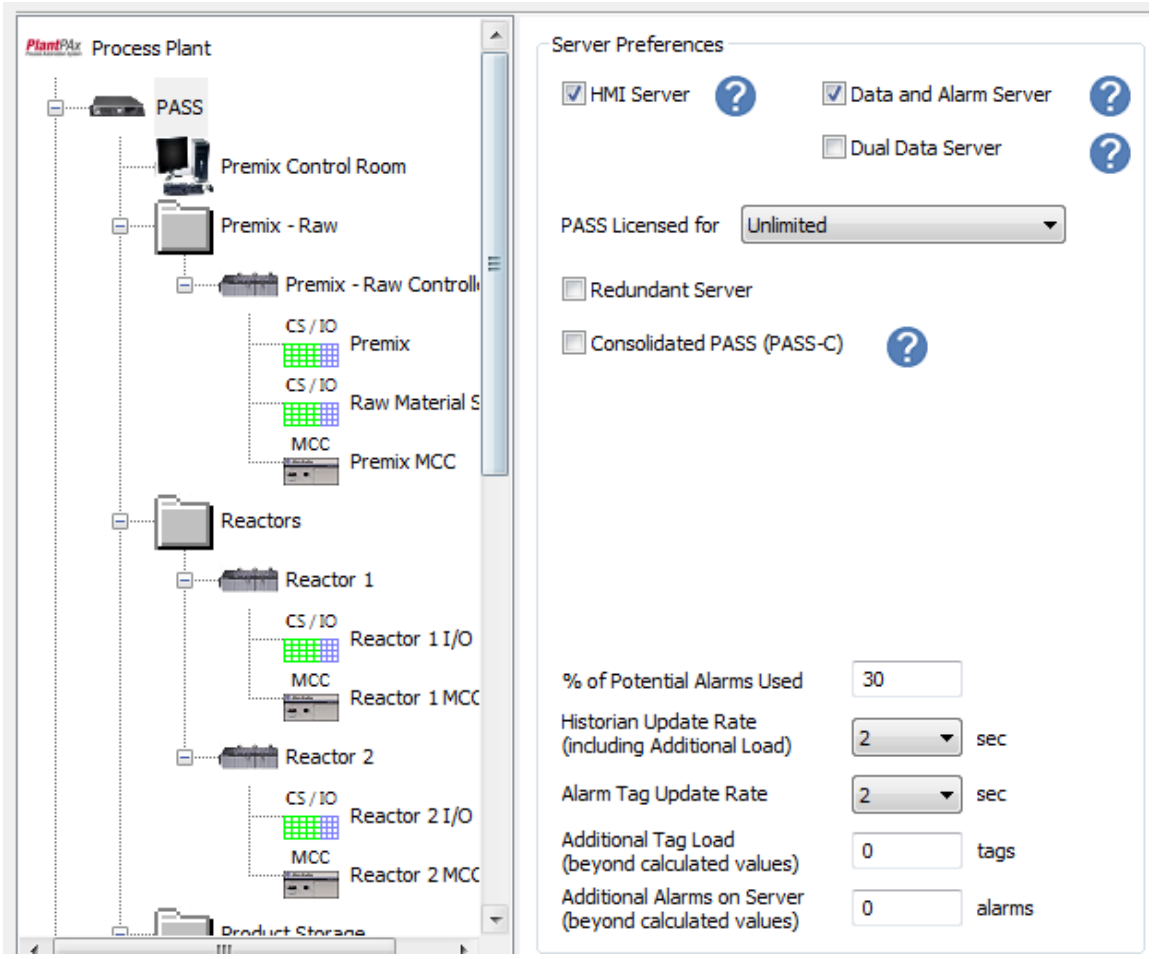


37. You have now created the tree for the process application, including areas (subsystems), controllers, and I/O locations as well as operator workstations.



Next you will set preferences for each of the items you created.

38. Click on the **PASS** in the tree. Notice the server preferences that appear.

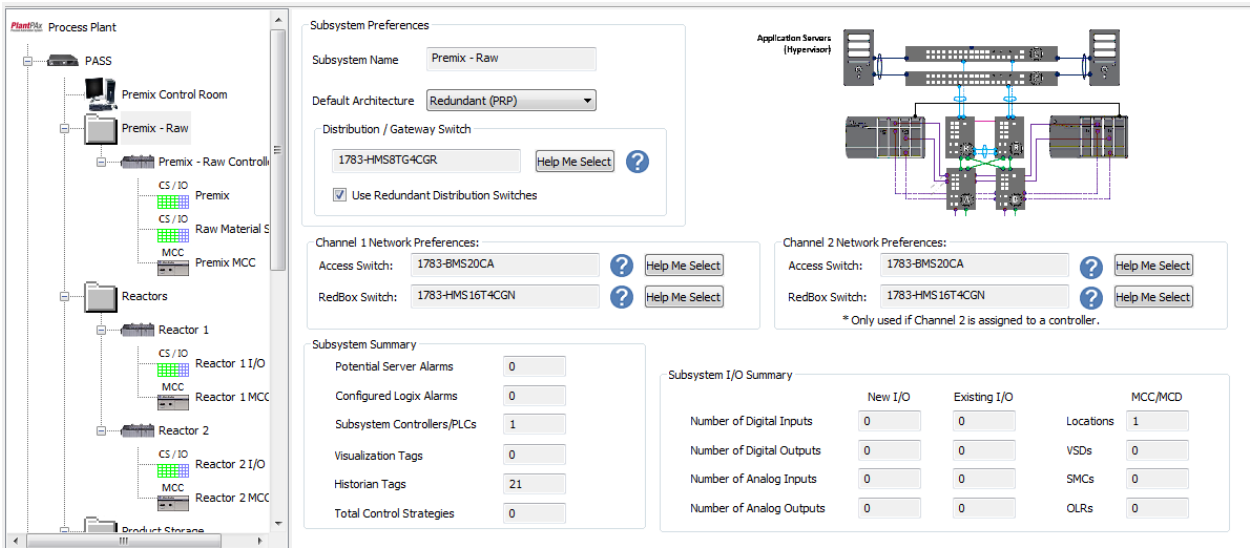


For the server, you can specify the following:

- Servers: The PASS can be specified to include an HMI Server and a Data/Alarm Server. The PASS can also support a second data server by selecting the Dual Data Server option. This doubles the data processing capacity of the PASS server.
- License type: The PASS can be licensed for a number of displays or you can specify a combo license which will allow for unlimited displays and up to 25 OWS clients.
- Redundant or Non-Redundant Server configurations
- Additional information for tags, alarms, and update rates.

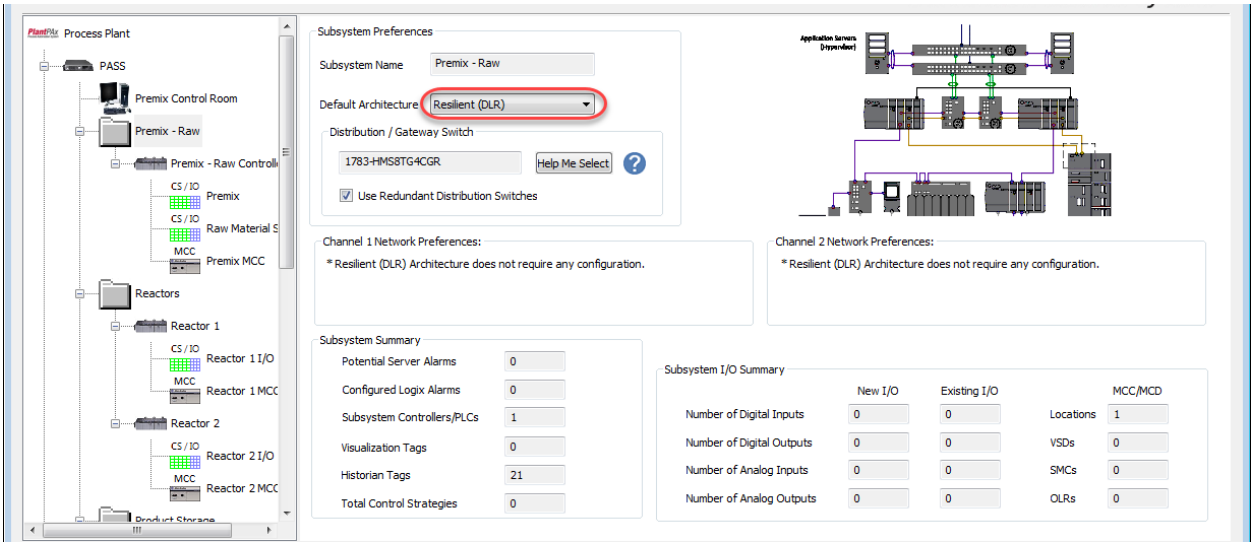
Notice that IAB has selected default values for all the parameters. For now leave all these preferences at their default values.

39. Click on the **Premix - Raw** subsystem folder. Subsystem preferences are displayed.

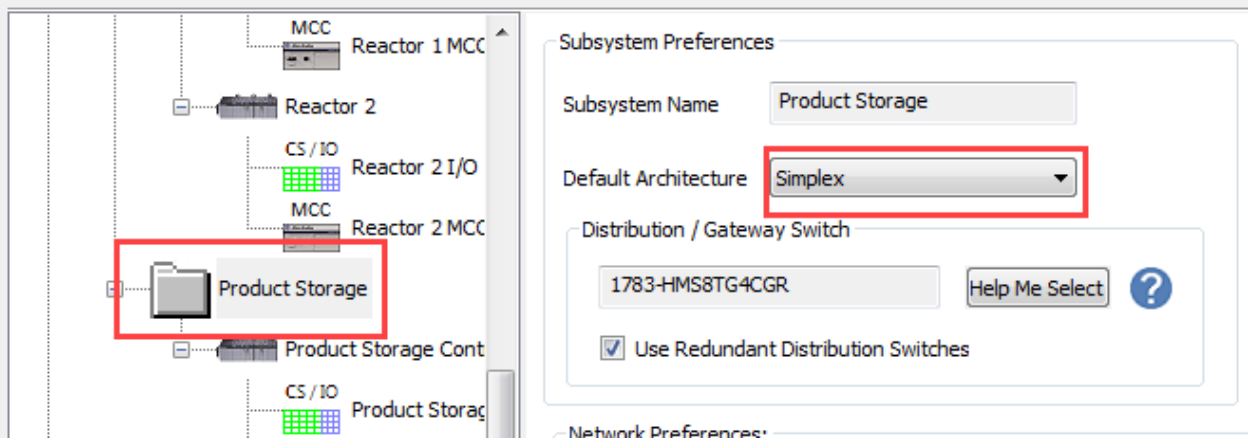


The preferences pane allows you to select a default architecture type. There are 3 options: Redundant (PRP), Resilient (DLR), and Simplex.

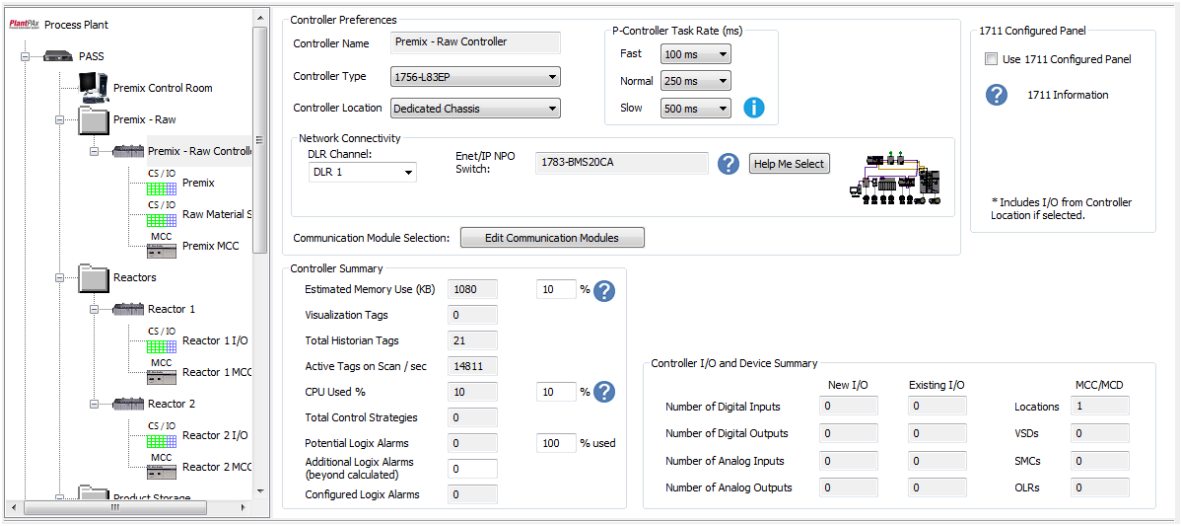
Select Resilient (DLR) for the Premix – Raw subsystem.



40. Click on the **Product Storage** subsystem folder. **Select Simplex for the subsystem.**



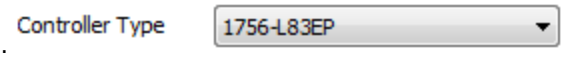
41. Click on the **Premix - Raw Controller**. Controller preferences for the selected controller are displayed.



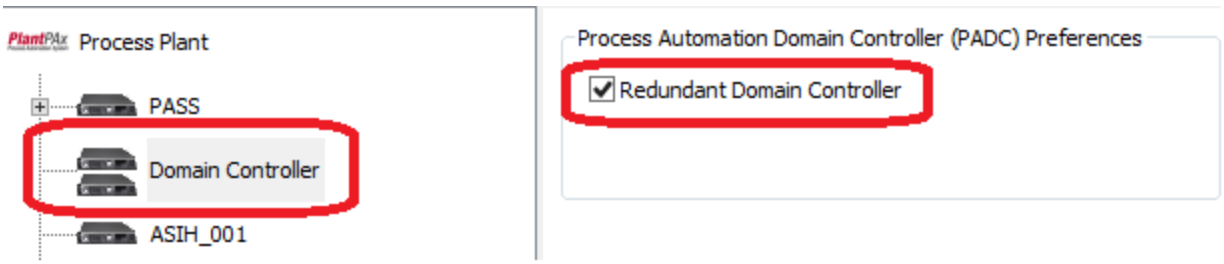
In the Controller Preferences pane, you can specify controller type, controller location, network connectivity, and edit communication modules under the selected controller. Additionally, you can specify the task rates for Fast, Normal, and Slow. These tasks are based on the PlantPAx tasking model for controller applications.

In the Controller Summary pane, you can reserve a percentage of extra memory and CPU for additional application code. It is recommended that you reserve at least 10% of your controller memory and CPU for additional application code. In some cases, such as batch, you may need to reserve more.

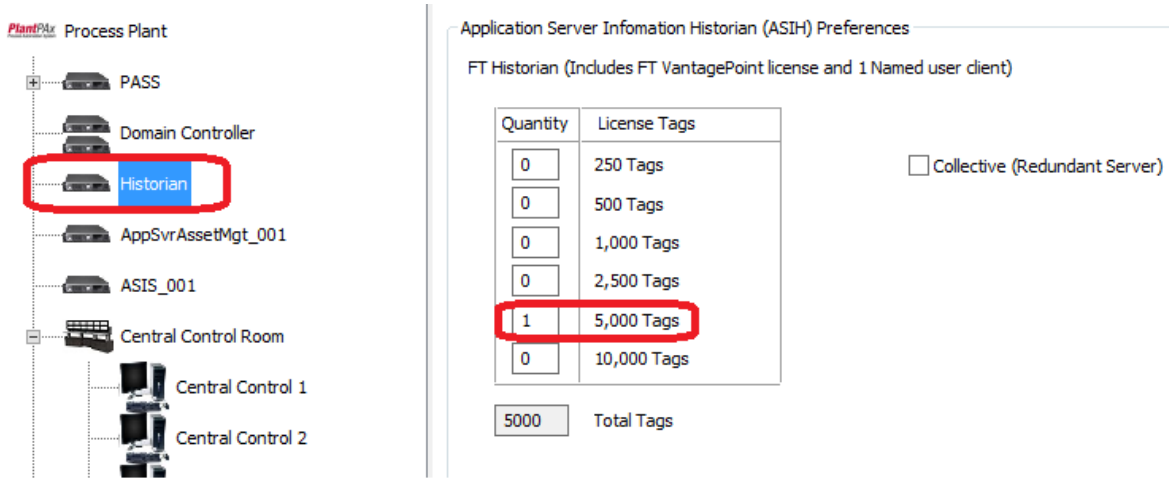
42. Click on the **Controller Type dropdown** to display a list of the controllers you can select. Notice that the way to specify a redundant controller is to select one of the items labeled Redundant in the controller dropdown. Leave the default 1756-L83EP selected.



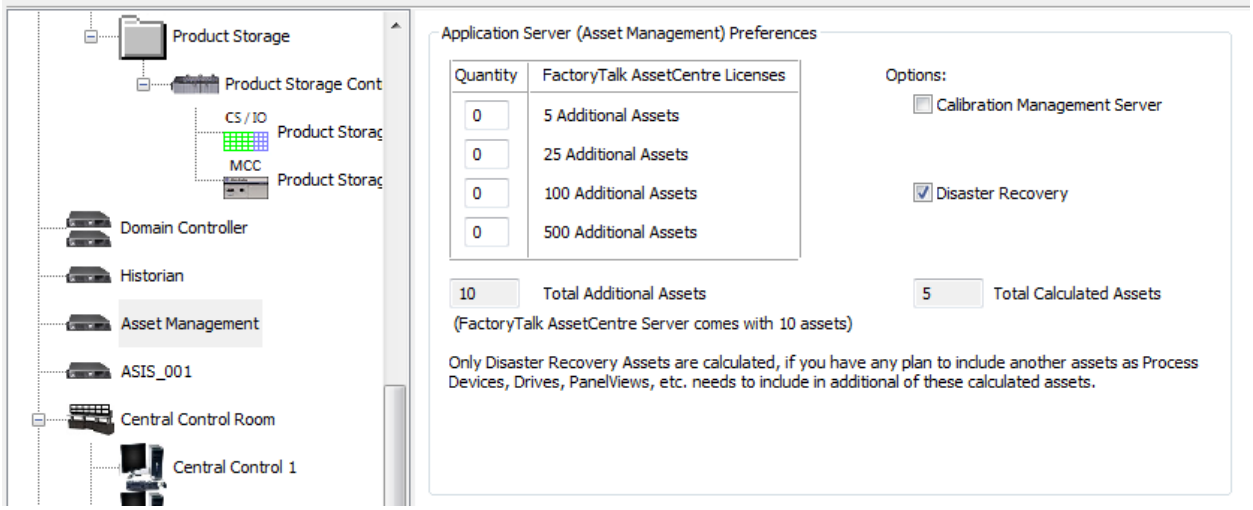
43. Right click on the ***PADC_001*** icon in the tree. Rename to **Domain Controller**, and then select the **Redundant Domain Controller** checkbox.



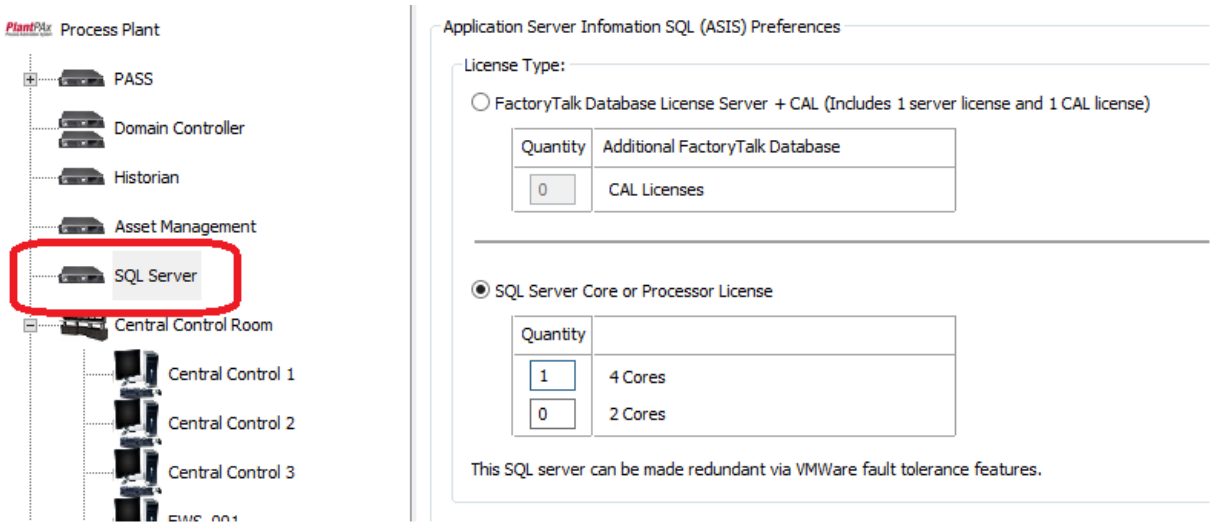
44. Right click on the **ASIH_001** icon in the tree and rename to ***Historian***. Configure the number of tags that will be licensed for the historian server. Enter a quantity of '***1***' for 5,000 license tags. Note the system will notify you if the selection is lower than the number of tags estimated by the tool.



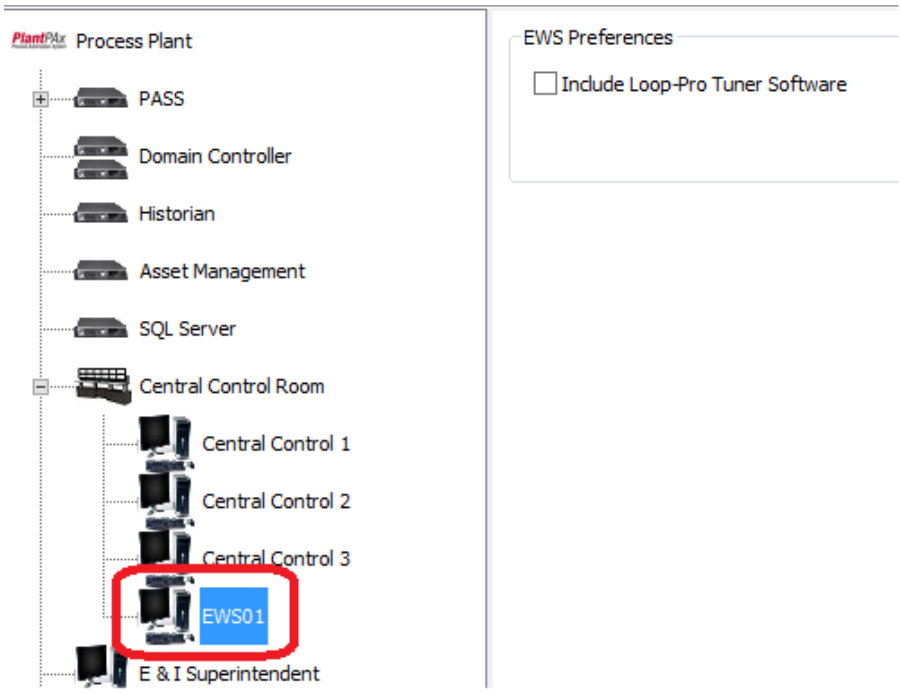
45. Click on the **AppSvrAssetMgt_001** icon in the tree and rename to **Asset Management.** The preferences pane allows you to configure additional assets and options for calibration management and disaster recovery.



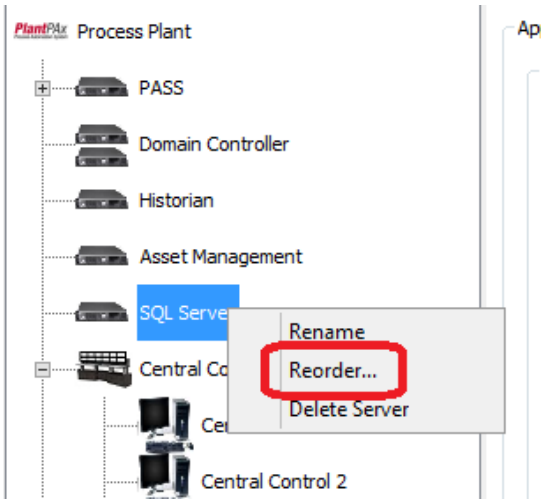
46. Right click on the **ASIS_001** icon in the tree and rename to **SQL Server**. In the server preferences pane, you can configure the license type for the SQL server.

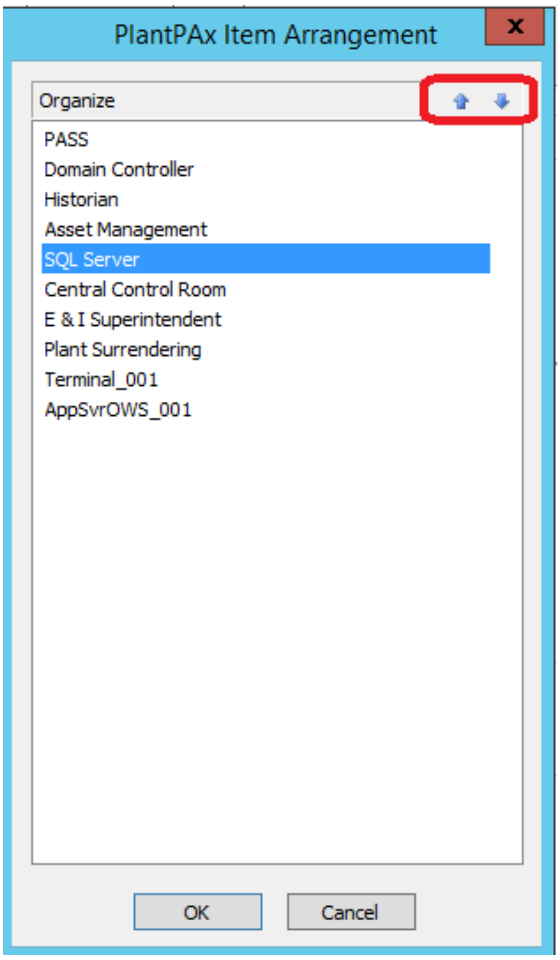


47. Expand the Central Control Room and Click on the **EWS_001** icon in the tree. Rename EWS_001 to **EWS01**. As an option we can include the Loop-Pro Tuner Software in the Engineering Workstation. Loop-Pro Tuner is award-winning technology that easily connects to your process data for modeling and tuning.

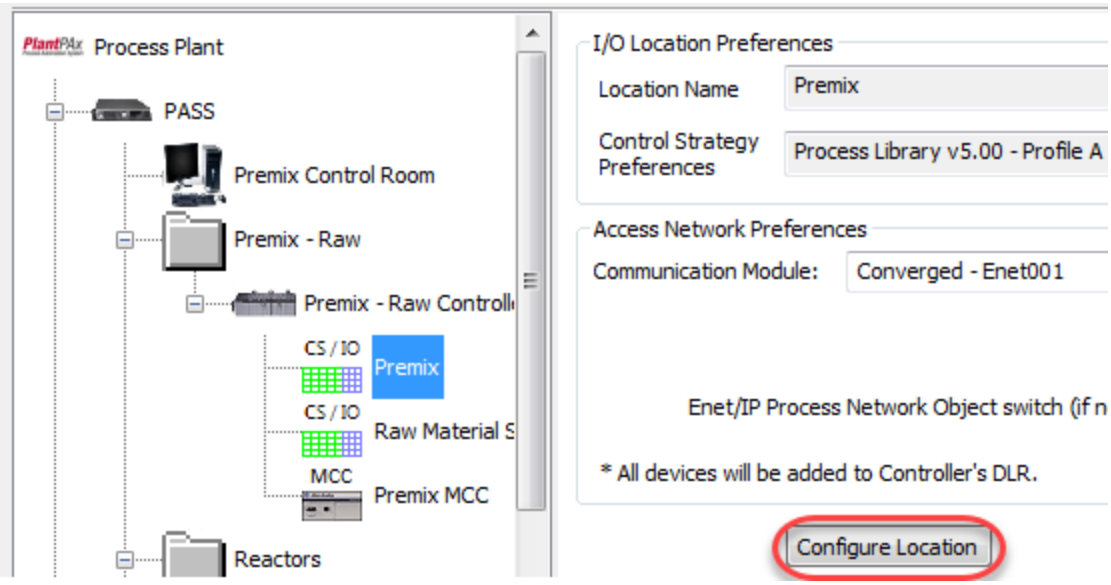


48. Select any computer, and then right-click and select ***Reorder..***, selecting the up/down buttons it is possible to create a different organization.

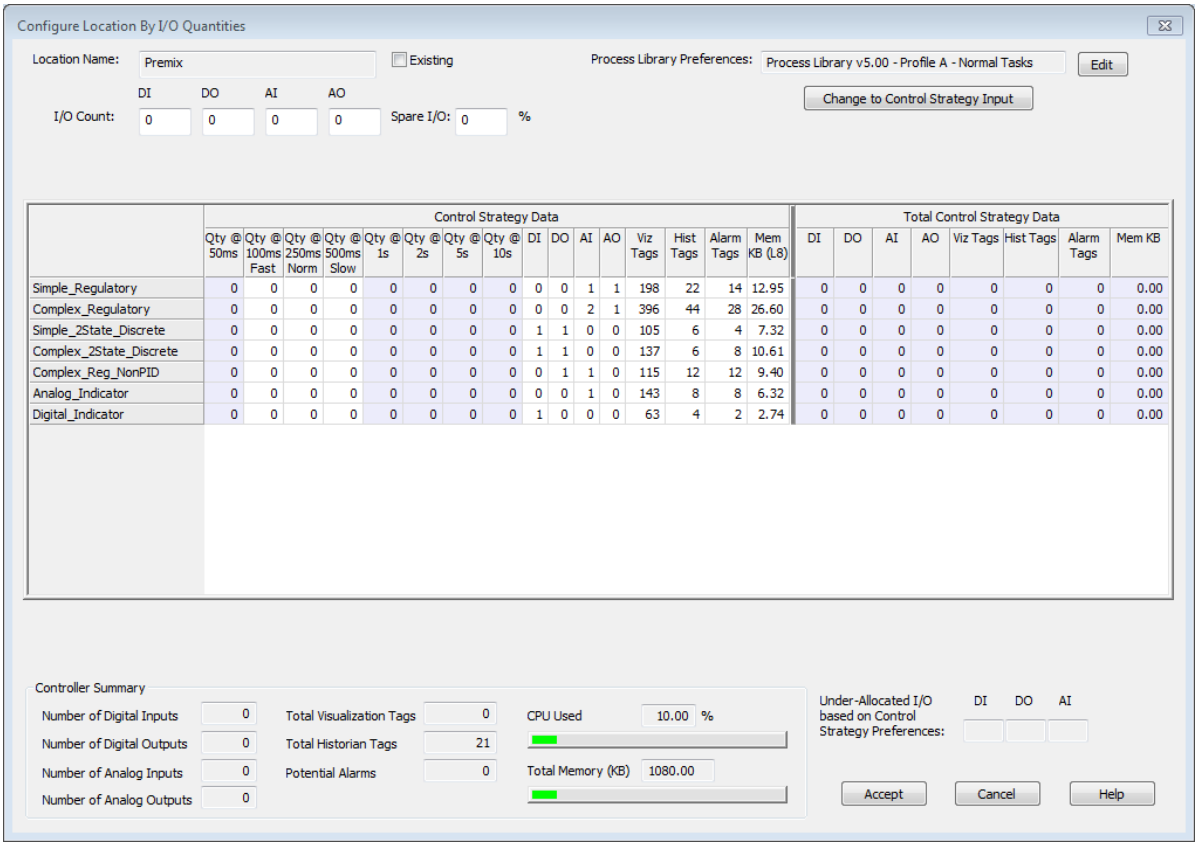




49. Returning to the Premix – Raw subsystem, click on the ***Premix*** I/O location. Notice that none of the I/O Location Preferences can be entered on this screen. Also notice the Configure Location button. When you want to specify the I/O that is contained in the selected I/O location, you would click this button.

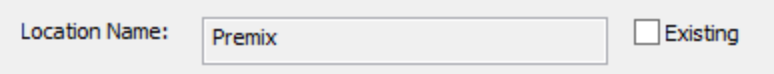


50. Click the **Configure Location** button now. IAB displays the I/O configuration (load estimation tool) window for this I/O location.

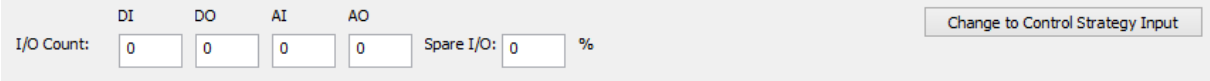


There is a lot going on in this window, so let's take a few minutes to look at the different parts of it.

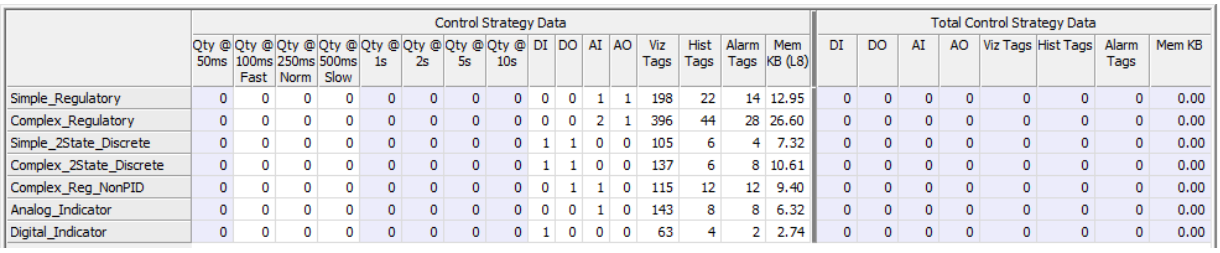
51. In the upper left corner is the name of the I/O location. If this location is part of the customer's existing plant, you would check the Existing checkbox.



52. Under the Location Name are boxes for entering I/O Count. We will be using these for the current project. If you would rather specify numbers of control strategies instead of numbers of I/O points, you would click the Change to Control Strategy Input button. For this project, we are going to use I/O Count. There is also a box to enter the percentage of spare I/O points to be included.



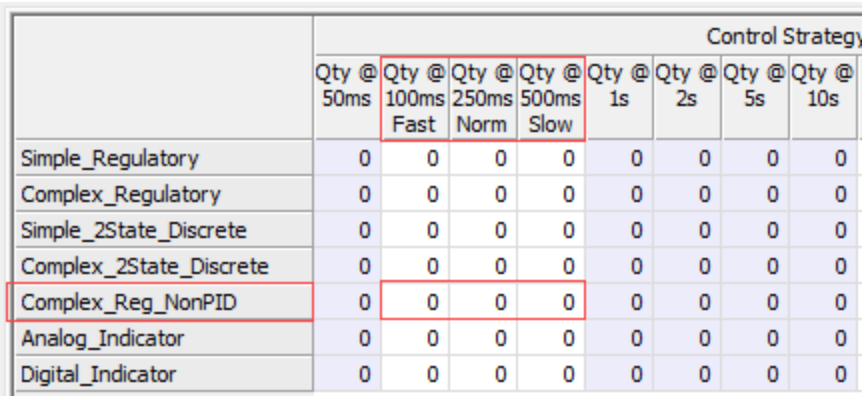
53. The large table in the center of the window shows information about control strategies.



	Control Strategy Data																Total Control Strategy Data							
	Qty @ 50ms	Qty @ 100ms Fast	Qty @ 250ms Norm	Qty @ 500ms Slow	Qty @ 1s	Qty @ 2s	Qty @ 5s	Qty @ 10s	DI	DO	AI	AO	Viz Tags	Hist Tags	Alarm Tags	Mem KB (L8)	DI	DO	AI	AO	Viz Tags	Hist Tags	Alarm Tags	Mem KB
Simple_Regulatory	0	0	0	0	0	0	0	0	0	0	1	1	198	22	14	12.95	0	0	0	0	0	0	0	0.00
Complex_Regulatory	0	0	0	0	0	0	0	0	0	0	2	1	396	44	28	26.60	0	0	0	0	0	0	0	0.00
Simple_2State_Discrete	0	0	0	0	0	0	0	0	1	1	0	0	105	6	4	7.32	0	0	0	0	0	0	0	0.00
Complex_2State_Discrete	0	0	0	0	0	0	0	0	1	1	0	0	137	6	8	10.61	0	0	0	0	0	0	0	0.00
Complex_Reg_NonPID	0	0	0	0	0	0	0	0	0	1	1	0	115	12	12	9.40	0	0	0	0	0	0	0	0.00
Analog_Indicator	0	0	0	0	0	0	0	0	0	0	1	0	143	8	8	6.32	0	0	0	0	0	0	0	0.00
Digital_Indicator	0	0	0	0	0	0	0	0	1	0	0	0	63	4	2	2.74	0	0	0	0	0	0	0	0.00

For each control strategy type listed on the left of the table, the following information is displayed:

- Number of control strategies at different execution times. For example, the highlighted cells below shows the number of Complex Regulatory Non-PID control strategies defined for the Fast, Normal, and Slow tasks:



	Control Strategy							
	Qty @ 50ms	Qty @ 100ms Fast	Qty @ 250ms Norm	Qty @ 500ms Slow	Qty @ 1s	Qty @ 2s	Qty @ 5s	Qty @ 10s
Simple_Regulatory	0	0	0	0	0	0	0	0
Complex_Regulatory	0	0	0	0	0	0	0	0
Simple_2State_Discrete	0	0	0	0	0	0	0	0
Complex_2State_Discrete	0	0	0	0	0	0	0	0
Complex_Reg_NonPID	0	0	0	0	0	0	0	0
Analog_Indicator	0	0	0	0	0	0	0	0
Digital_Indicator	0	0	0	0	0	0	0	0

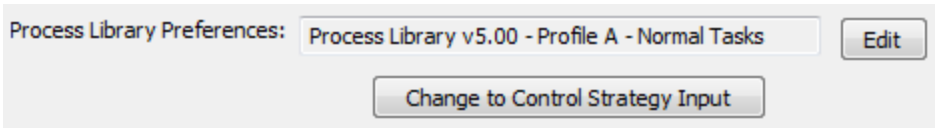
- Number of I/O points, tags, and memory allocated for the control strategy. For example, each Complex_Reg_NonPID control strategy uses 1 Digital Input and 1 Analog Input. It also has 115 visualization tags, 12 historian tags, and 12 alarm tags allocated. Finally, 9.40KB of controller memory is allocated for each Complex_Reg_NonPID control strategy.

	Control Strategy Data															
	Qty @ 50ms	Qty @ 100ms Fast	Qty @ 250ms Norm	Qty @ 500ms Slow	Qty @ 1s	Qty @ 2s	Qty @ 5s	Qty @ 10s	DI	DO	AI	AO	Viz Tags	Hist Tags	Alarm Tags	Mem KB (L8)
Simple_Regulatory	0	0	0	0	0	0	0	0	0	0	1	1	198	22	14	12.95
Complex_Regulatory	0	0	0	0	0	0	0	0	0	0	2	1	396	44	28	26.60
Simple_2State_Discrete	0	0	0	0	0	0	0	0	1	1	0	0	105	6	4	7.32
Complex_2State_Discrete	0	0	0	0	0	0	0	0	1	1	0	0	137	6	8	10.61
Complex_Reg_NonPID	0	0	0	0	0	0	0	0	0	1	1	0	115	12	12	9.40
Analog_Indicator	0	0	0	0	0	0	0	0	0	0	1	0	143	8	8	6.32
Digital_Indicator	0	0	0	0	0	0	0	0	1	0	0	0	63	4	2	2.74

- The total I/O points, tags, and memory for each type of control strategies. This is the shaded area of the table.

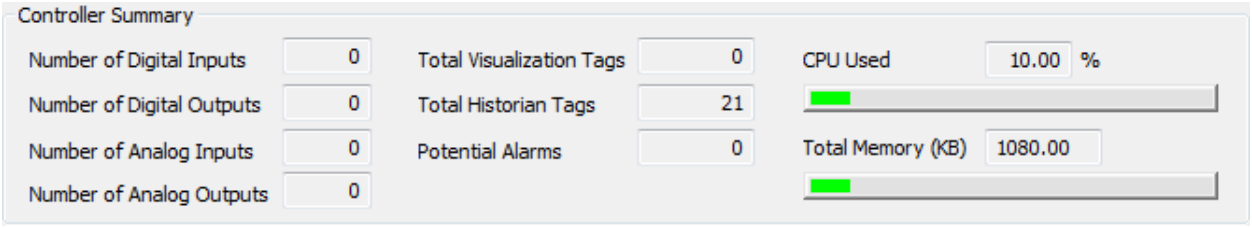
Total Control Strategy Data							
DI	DO	AI	AO	Viz Tags	Hist Tags	Alarm Tags	Mem KB
0	0	0	0	0	0	0	0.00
0	0	0	0	0	0	0	0.00
0	0	0	0	0	0	0	0.00
0	0	0	0	0	0	0	0.00
0	0	0	0	0	0	0	0.00
0	0	0	0	0	0	0	0.00
0	0	0	0	0	0	0	0.00

54. The upper right corner of the window displays the used preference version, selecting ***Edit*** will let you choose the source of the I/O point, tag, and memory allocations that are used for the control strategies.



Feel free to review the different library options. For this exercise we will use ***Process Library v5.00 - Profile A – Normal Tasks*** in the dropdown.

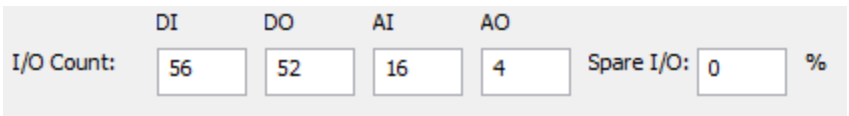
55. At the bottom left of the table is a summary of the I/O points, tags, alarms, and memory for the controller that controls this I/O location, along with an indication of controller loading. This data is totaled from all the I/O locations controlled by the same controller and gives you an easy to read indication of controller loading.



56. Finally, the lower right corner provides data to show if additional I/O points must be specified to meet the requirements of the IAB-selected control strategies when using I/O counts to configure I/O. We will see how these work shortly.

57. Now that you've taken a brief tour of the I/O configuration window, you can start entering I/O counts. Look at the customer drawing and notice the I/O counts for the Premix location:

Enter the values from the drawing in the I/O Count Fields. Click out of the I/O Count Fields when finished entering values.



58. Notice what has happened in the Control Strategy table.

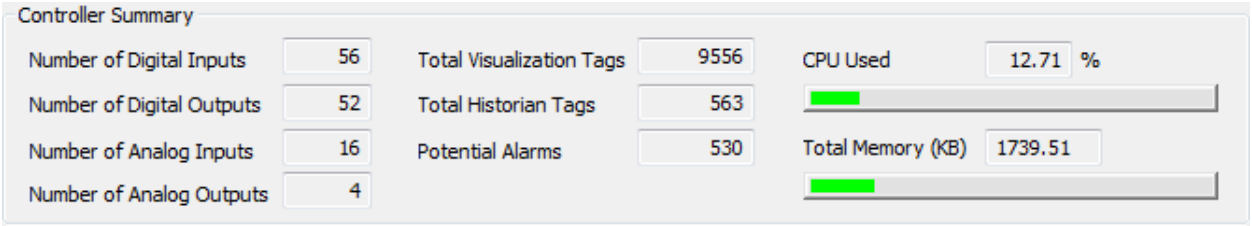
- Control strategies have been allocated:

	Control Strategy Data															
	Qty @ 50ms	Qty @ 100ms Fast	Qty @ 250ms Norm	Qty @ 500ms Slow	Qty @ 1s	Qty @ 2s	Qty @ 5s	Qty @ 10s	DI	DO	AI	AO	Viz Tags	Hist Tags	Alarm Tags	Mem KB (L8)
Simple_Regulatory	0	0	4	0	0	0	0	0	0	0	1	1	198	22	14	12.95
Complex_Regulatory	0	0	1	0	0	0	0	0	0	0	2	1	396	44	28	26.60
Simple_2State_Discrete	0	0	16	0	0	0	0	0	1	1	0	0	105	6	4	7.32
Complex_2State_Discrete	0	0	37	0	0	0	0	0	1	1	0	0	137	6	8	10.61
Complex_Reg_NonPID	0	0	0	0	0	0	0	0	0	1	1	0	115	12	12	9.40
Analog_Indicator	0	0	10	0	0	0	0	0	0	0	1	0	143	8	8	6.32
Digital_Indicator	0	0	3	0	0	0	0	0	1	0	0	0	63	4	2	2.74

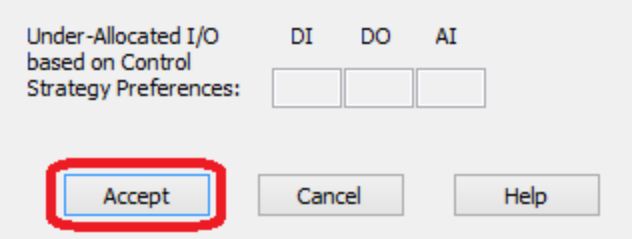
- I/O points, tags, and memory have been totaled for each control strategy:

Total Control Strategy Data							
DI	DO	AI	AO	Viz Tags	Hist Tags	Alarm Tags	Mem KB
0	0	4	4	792	88	56	51.80
0	0	2	1	396	44	28	26.60
16	16	0	0	1680	96	64	117.12
37	37	0	0	5069	222	296	392.57
0	0	0	0	0	0	0	0.00
0	0	10	0	1430	80	80	63.20
3	0	0	0	189	12	6	8.22

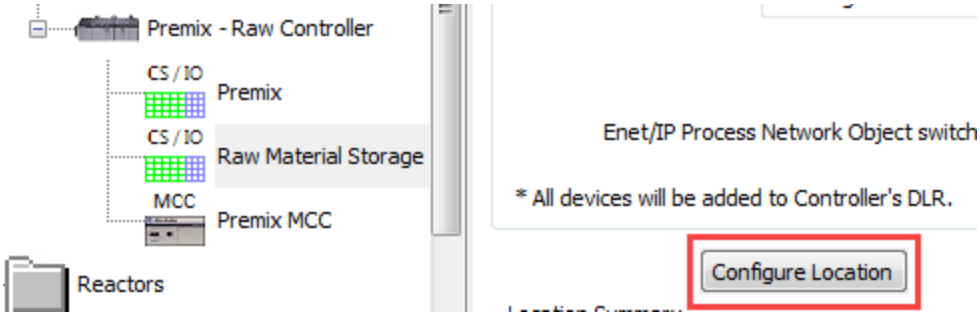
- The controller summary has been updated: about 13 % of controller capacity has been used.
  NOTE: This 13 % includes the 10 % reserve of user defined application code as defined in the controller summary.



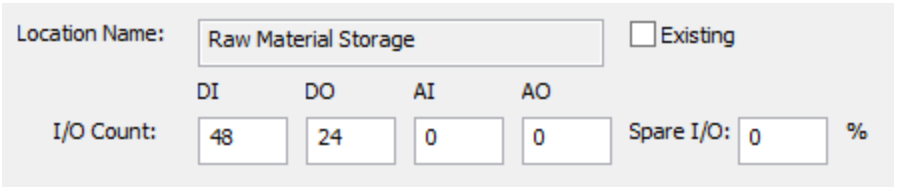
59. No under-allocated I/O has been reported, so click the ***Accept*** button.



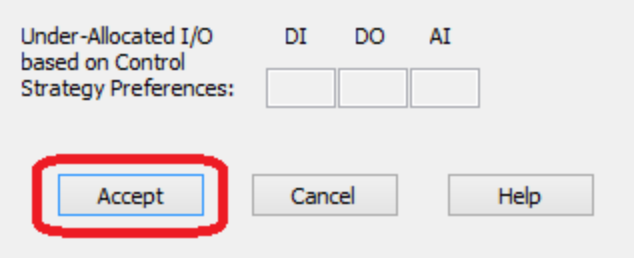
60. Click the ***Raw Material Storage*** I/O location in the tree and click the ***Configure Location*** button for this location.



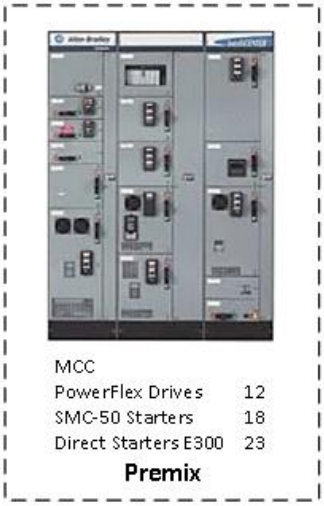
61. Enter the I/O counts for the Raw Material Storage location:



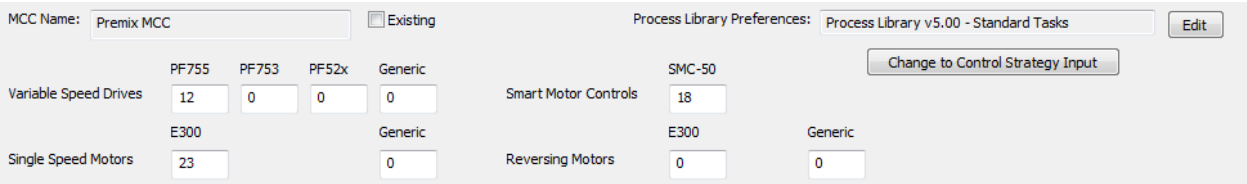
62. Click **Accept**.



63. Enter the MCC devices for the Premix location:

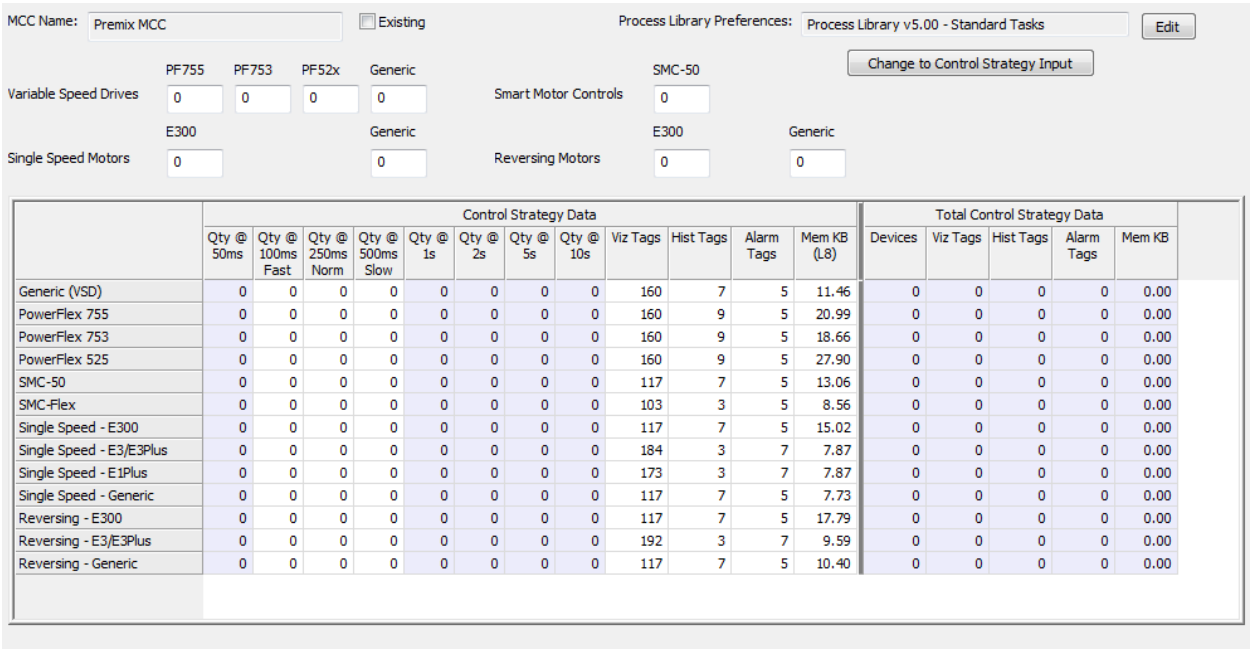


64. Select Premix MCC Location, and then click ***Configure MCC***, enter the MCC devices.



For each motor type listed on the left of the table, the following information is displayed:

- Number of control strategies at different execution times.
- Number of tags and memory allocated for the control strategy.
- The total tags and memory for each type of control strategies.

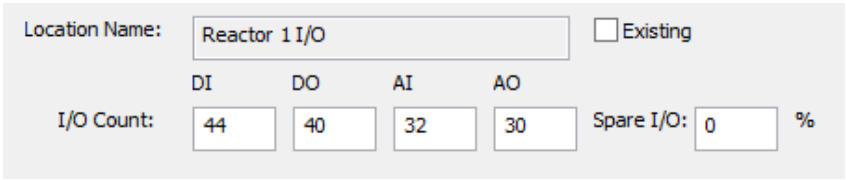


	Control Strategy Data												Total Control Strategy Data				
	Qty @ 50ms	Qty @ 100ms Fast	Qty @ 250ms Norm	Qty @ 500ms Slow	Qty @ 1s	Qty @ 2s	Qty @ 5s	Qty @ 10s	Viz Tags	Hist Tags	Alarm Tags	Mem KB (L8)	Devices	Viz Tags	Hist Tags	Alarm Tags	Mem KB
Generic (VSD)	0	0	0	0	0	0	0	0	160	7	5	11.46	0	0	0	0	0.00
PowerFlex 755	0	0	0	0	0	0	0	0	160	9	5	20.99	0	0	0	0	0.00
PowerFlex 753	0	0	0	0	0	0	0	0	160	9	5	18.66	0	0	0	0	0.00
PowerFlex 525	0	0	0	0	0	0	0	0	160	9	5	27.90	0	0	0	0	0.00
SMC-50	0	0	0	0	0	0	0	0	117	7	5	13.06	0	0	0	0	0.00
SMC-Flex	0	0	0	0	0	0	0	0	103	3	5	8.56	0	0	0	0	0.00
Single Speed - E300	0	0	0	0	0	0	0	0	117	7	5	15.02	0	0	0	0	0.00
Single Speed - E3/E3Plus	0	0	0	0	0	0	0	0	184	3	7	7.87	0	0	0	0	0.00
Single Speed - E1Plus	0	0	0	0	0	0	0	0	173	3	7	7.87	0	0	0	0	0.00
Single Speed - Generic	0	0	0	0	0	0	0	0	117	7	5	7.73	0	0	0	0	0.00
Reversing - E300	0	0	0	0	0	0	0	0	117	7	5	17.79	0	0	0	0	0.00
Reversing - E3/E3Plus	0	0	0	0	0	0	0	0	192	3	7	9.59	0	0	0	0	0.00
Reversing - Generic	0	0	0	0	0	0	0	0	117	7	5	10.40	0	0	0	0	0.00

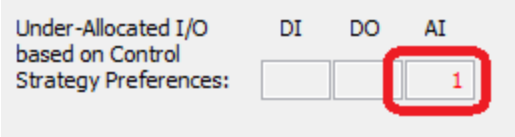
65. The upper right corner of the window displays the version of the library that is used for calculating the control strategy data. Selecting ***Edit*** will let you choose a different source. Continue to use the Process Library v5.00 Standard Tasks template. Click **OK** and **Accept**.

66. Click the ***Reactor 1 I/O*** location in the tree and click ***Configure Location***. Enter the I/O counts for the Reactor 1 location.

.

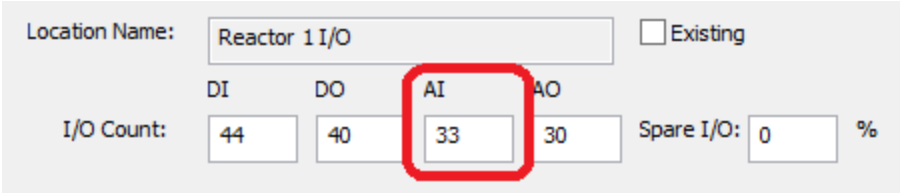


Notice that the Under-Allocated I/O display shows the number 1 in the AI field, after Accept.



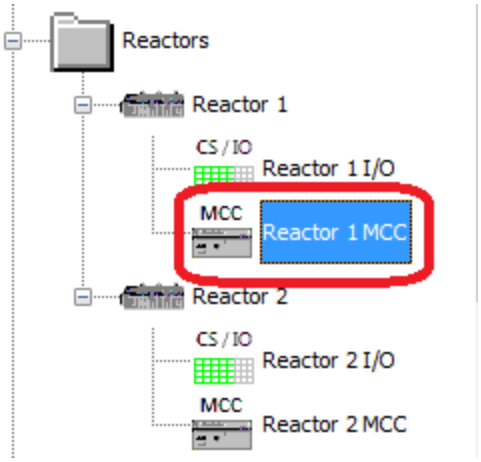
The number 1 indicates that one more AI count is required to fulfill the I/O requirements of the allocated control strategies. In this example we will change the I/O Requirements to match the control strategies count.

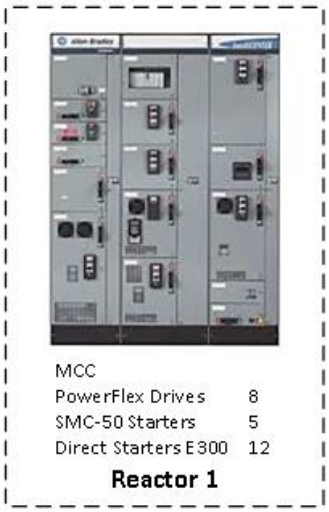
Increase the AI I/O count by one, to *33*. Click out of the field after entering the new value.

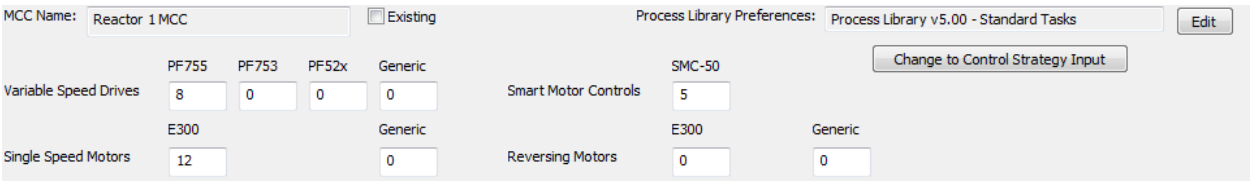


Now the Under-Allocated I/O fields are clear, so click ***Accept***.

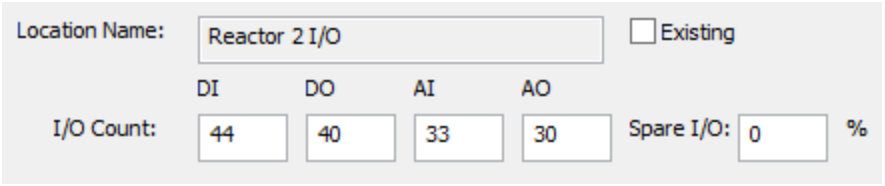
67. Select Reactor 1 MCC location, and then enter the MCC devices data.

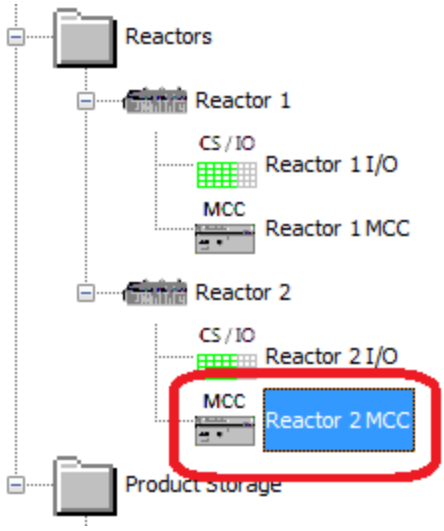


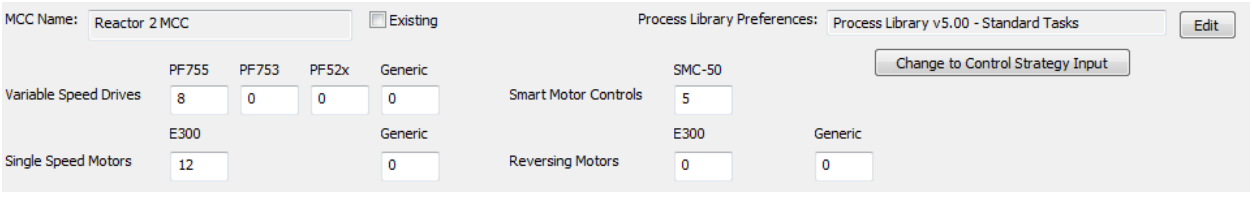




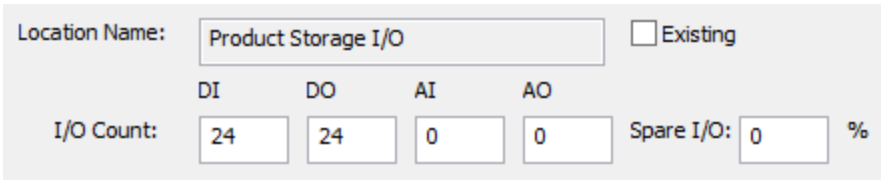
68. Repeat previous steps for the Reactor 2 I/O and MCC location (same values).



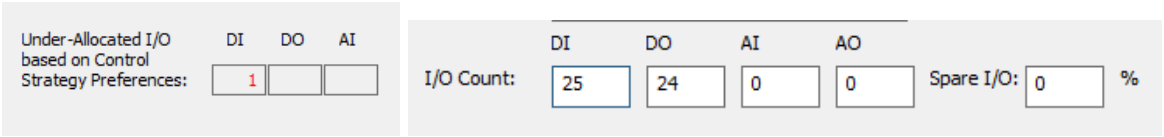




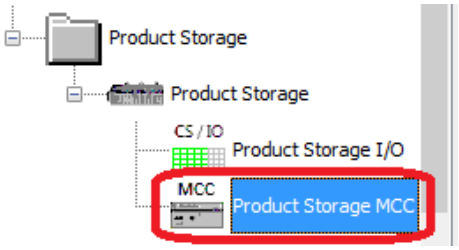
69. In the tree, select the ***Product Storage I/O*** location and click the ***Configure Location*** button. Enter the I/O values in the I/O Count Fields as follows.

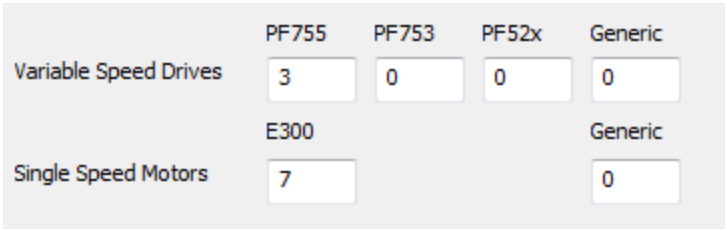


For the Product Storage location, the Under-Allocated I/O display shows one more DI is needed. Increase the DI count to 25, then click ***Accept***.



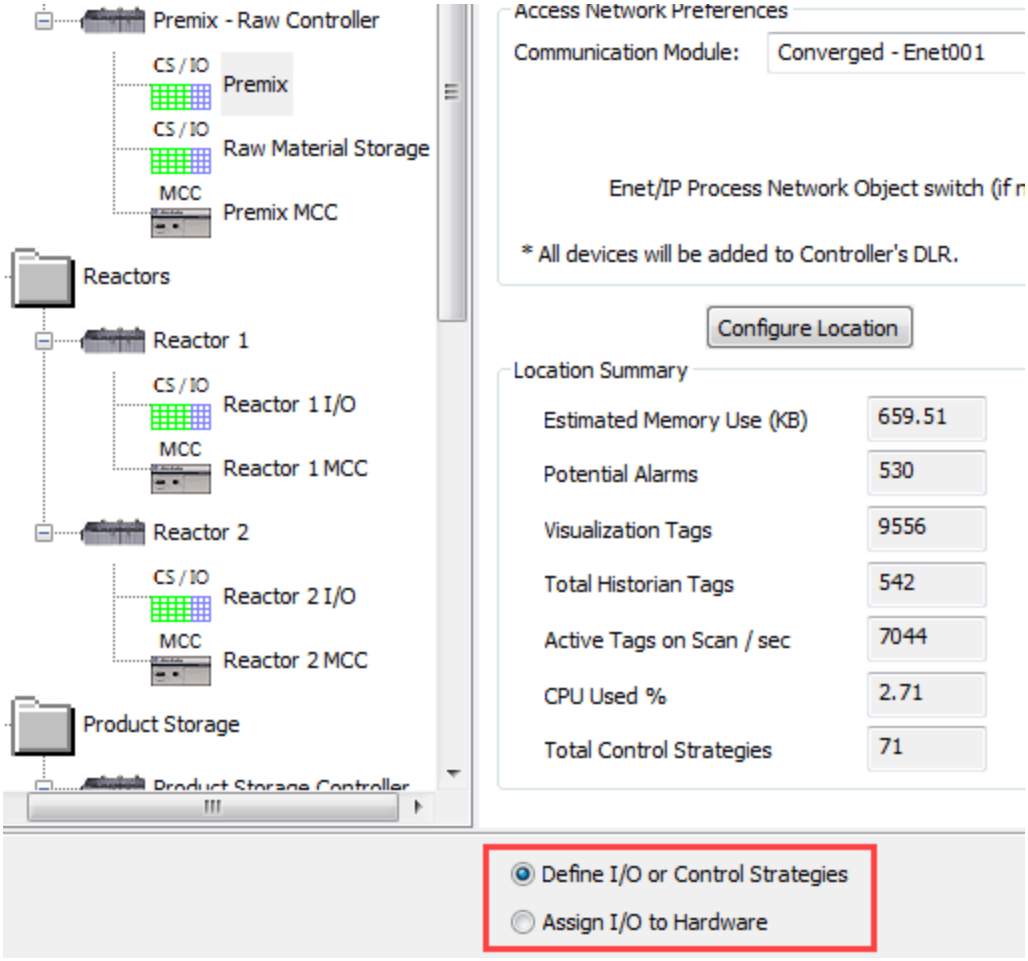
70. Enter the Product Storage MCC data.



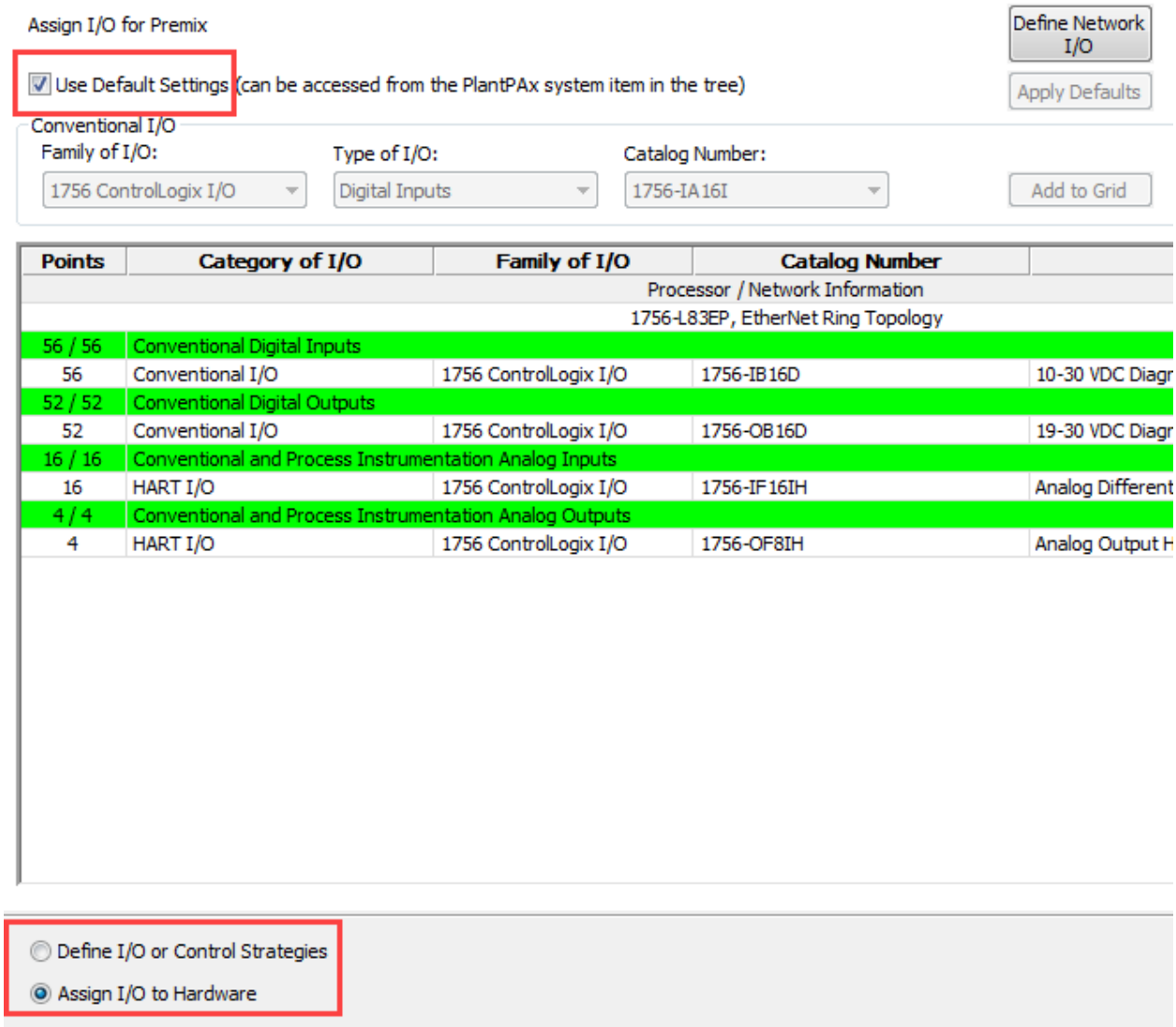


71. Click on each item in the tree and notice how the summary information for each item has been updated per your I/O entries.

72. With the I/O data entered, you are now ready to assign specific I/O modules. Click on the ***Premix*** I/O location in the tree. Notice the radio buttons at the bottom of the window.



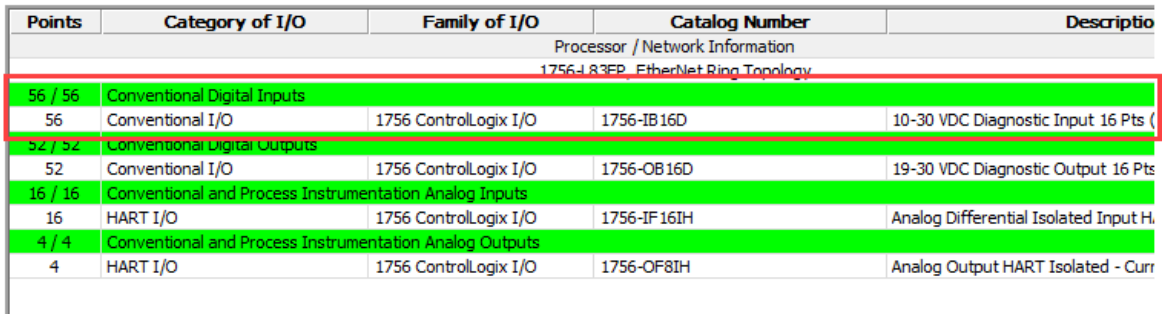
73. Click the ***Assign I/O to Hardware*** radio button. IAB displays a table of I/O types and quantities with specific modules assigned to each. Notice that the ***Use Default Settings*** checkbox is checked by default.



IAB has selected ControlLogix I/O modules by default. Later in the lab, you'll see how you can:

- Change the assigned I/O module for each type
- Select different I/O platforms
- Add additional lines in the table and divide the total I/O quantity for a type among two or more I/O modules

74. Examine the section of the table for Conventional Digital Inputs.

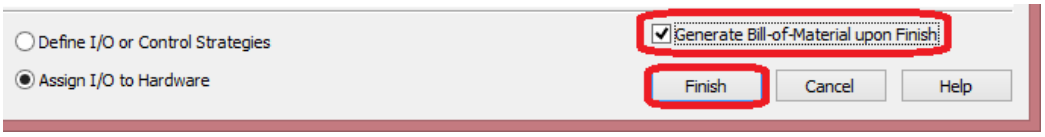


Points	Category of I/O	Family of I/O	Catalog Number	Descriptio
		Processor / Network Information		
		1756-L83EP, EtherNet Ring Topology		
56 / 56	Conventional Digital Inputs			
56	Conventional I/O	1756 ControlLogix I/O	1756-IB16D	10-30 VDC Diagnostic Input 16 Pts (
52 / 52	Conventional Digital Outputs			
52	Conventional I/O	1756 ControlLogix I/O	1756-OB16D	19-30 VDC Diagnostic Output 16 Pts
16 / 16	Conventional and Process Instrumentation Analog Inputs			
16	HART I/O	1756 ControlLogix I/O	1756-IF16IH	Analog Differential Isolated Input H
4 / 4	Conventional and Process Instrumentation Analog Outputs			
4	HART I/O	1756 ControlLogix I/O	1756-OF8IH	Analog Output HART Isolated - Curr

- The green color indicates that all I/O of the stated type has been assigned to modules.
- The colored bar indicates the I/O type, in this case Conventional Digital Inputs.
- The numbers in the green bar show I/O points assigned / total I/O points. For example, in this case 56 points out of a total of 56 have been assigned to a module.
- The white table rows below the colored row show the specific modules to which I/O points have been assigned.

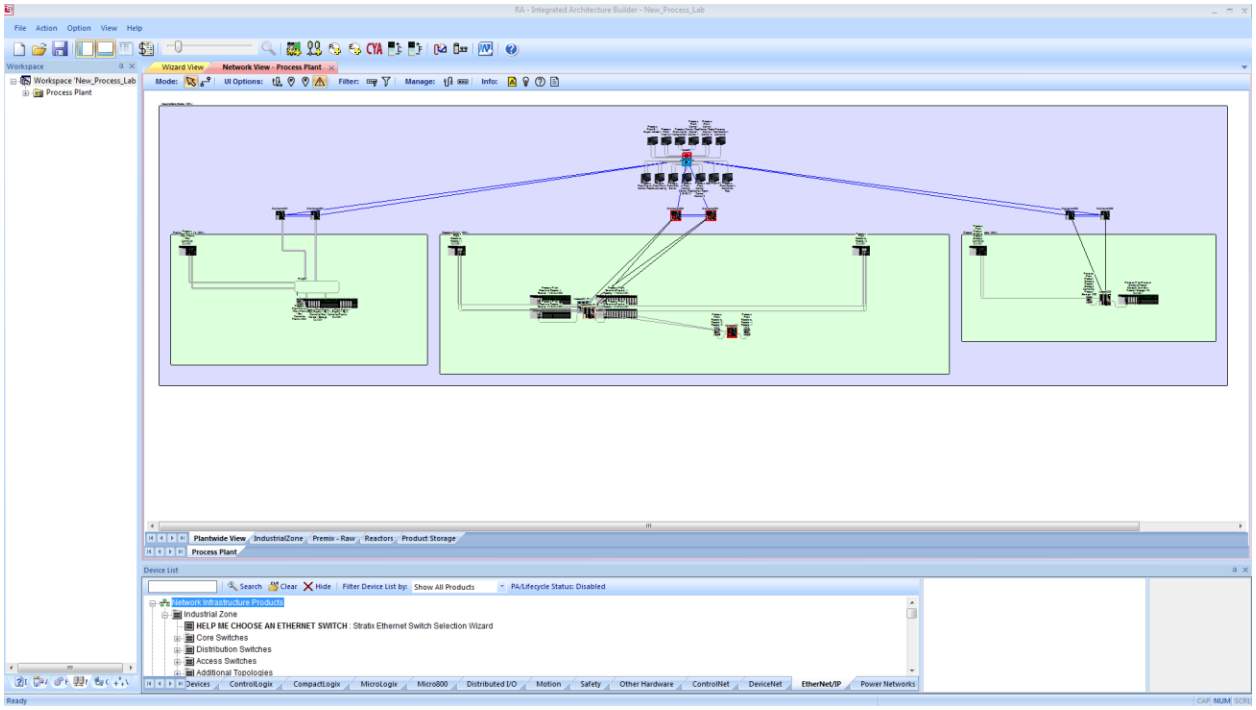
For now we'll accept the **defaults**. Click on each I/O location to see how the I/O has been assigned.

75. Check the ***Generate Bill-of-Material upon Finish*** checkbox and click ***Finish***.



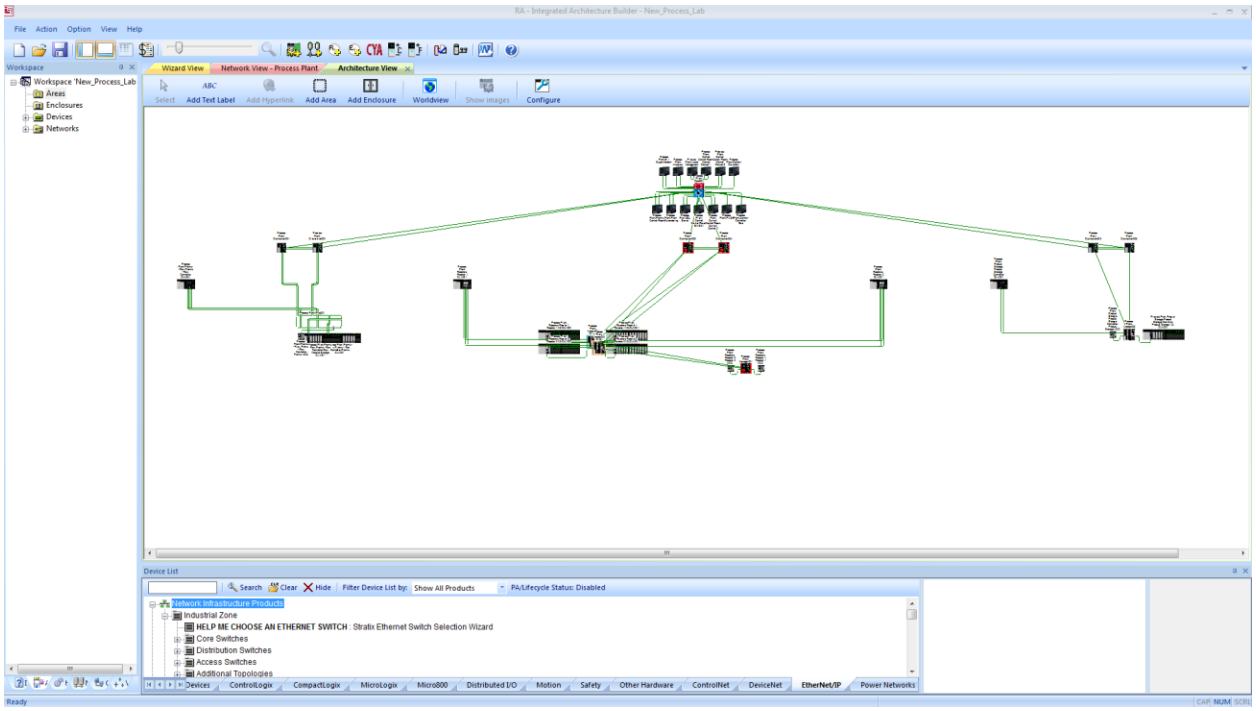
IAB generates the hardware for the specified process application.

76. Click the ***Network*** tab. The Network tab is a tree view which enumerates the networks in the project, along with the devices connected to the networks. You can move the components around and zoom in and out with the slider to better see the architecture.

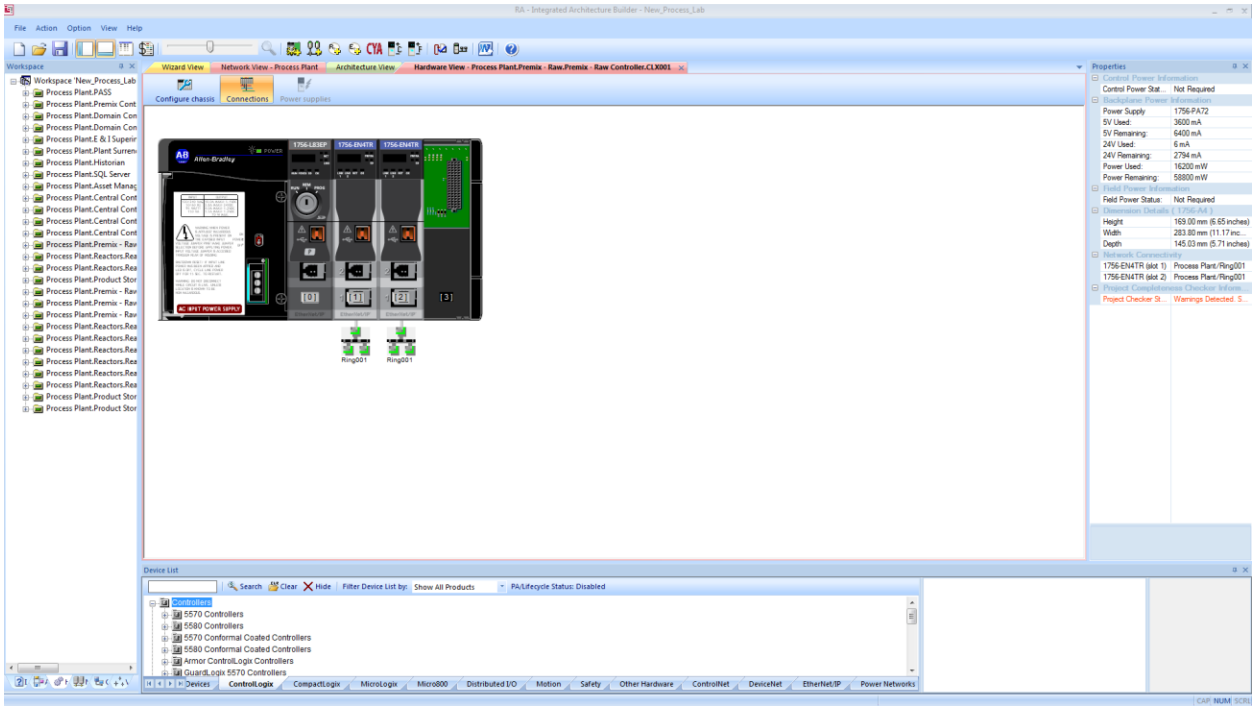


.

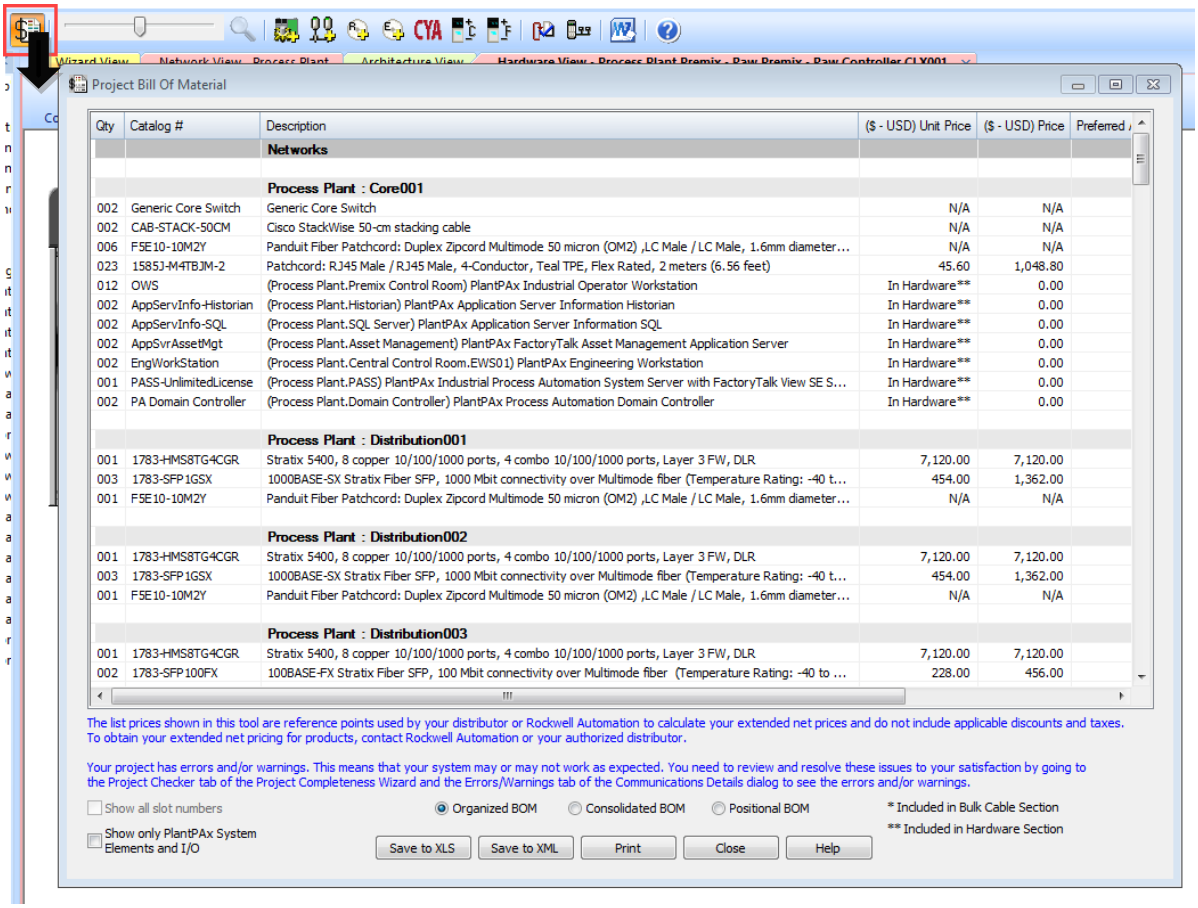
77. Click on the ***Architecture*** tab. The Architecture tab is a tree view which enumerates the devices, networks, areas, and enclosures in the Architecture View.



78. Click on the **Hardware** tab and check the hardware views of the created chassis to see the way the controllers and I/O have been configured.



79. Click the ***Project BOM*** button and check the project BOM and confirm to save changes. Click No if prompted to connect to the Internet.



You have now seen how to quickly configure a simple process application using the PSE and its default selections. Next, you'll learn how to configure an application in more detail. Close the BOM.

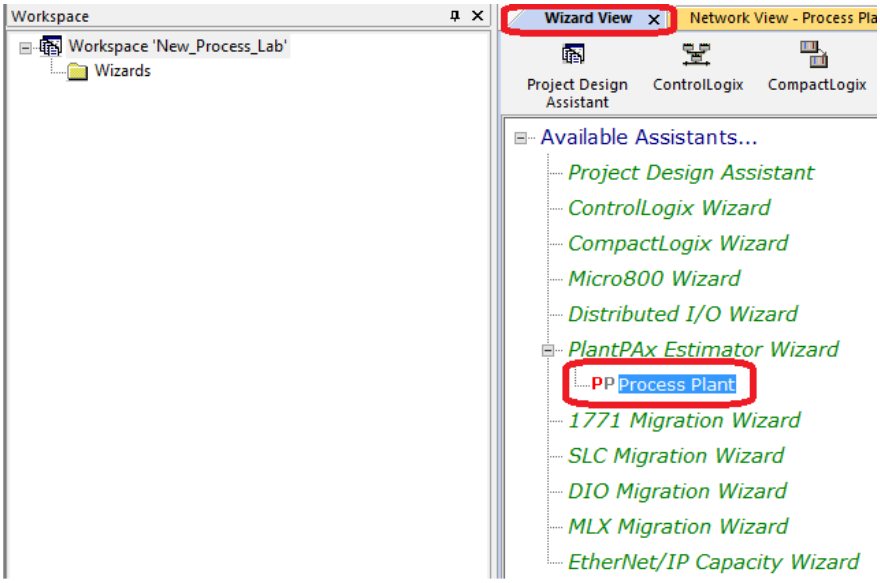
2: Modify a Process Configuration

Using system defaults to quickly configure a process application can be useful for budgetary purposes, but most process applications will require more detailed configuration later if not sooner. In this lab section, you will modify the configuration you created in the previous section and learn about the detailed configuration features of the PSE.

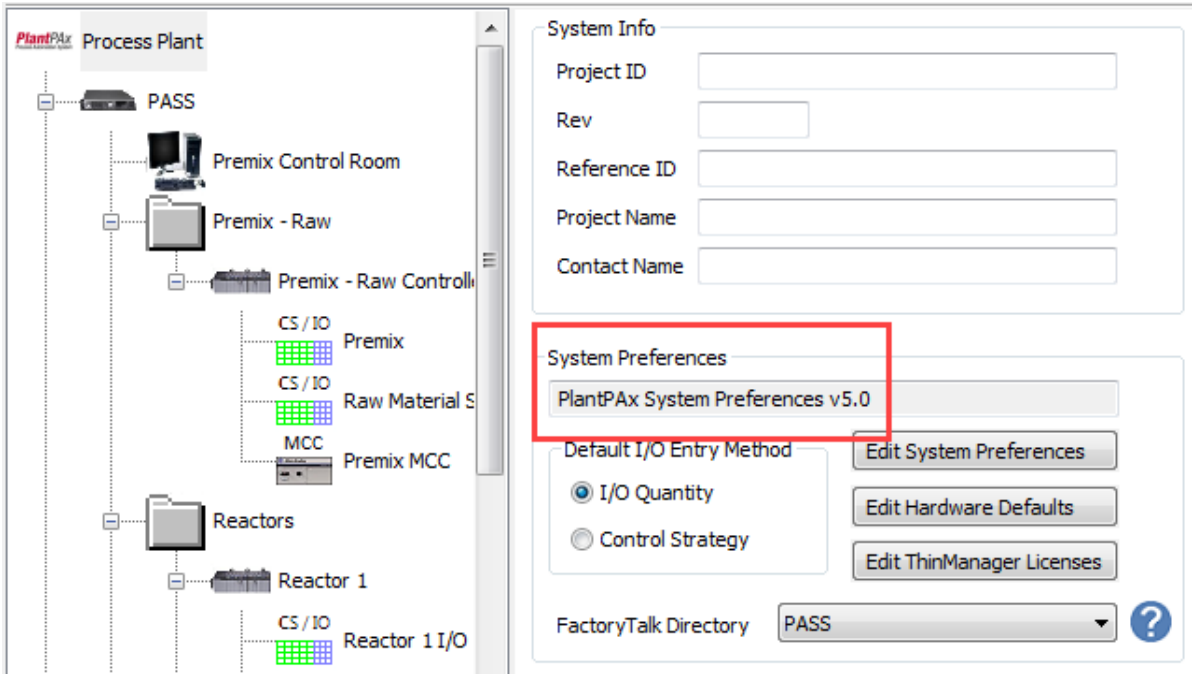
Suppose your customer has reviewed the initial configuration and has provided you with some additional details and requirements:

- Use redundant power supplies on all ControlLogix chassis
- Use a DLR ring for the MCC in the Premix subsystem
- Use redundant controllers in the reactor subsystem
- Use 8 channel analog input modules (1756-IF8) throughout instead of the 16 point versions quoted
- Add 5 AI and 2 AO Foundation Fieldbus devices to both Reactor 1 and Reactor 2
- Add 15 HART inputs to Product Storage
- Use FLEX I/O for the Product Storage I/O

1. Go to the **Wizard View**. Double click on the ***Process Plant*** item to reopen the PSE.

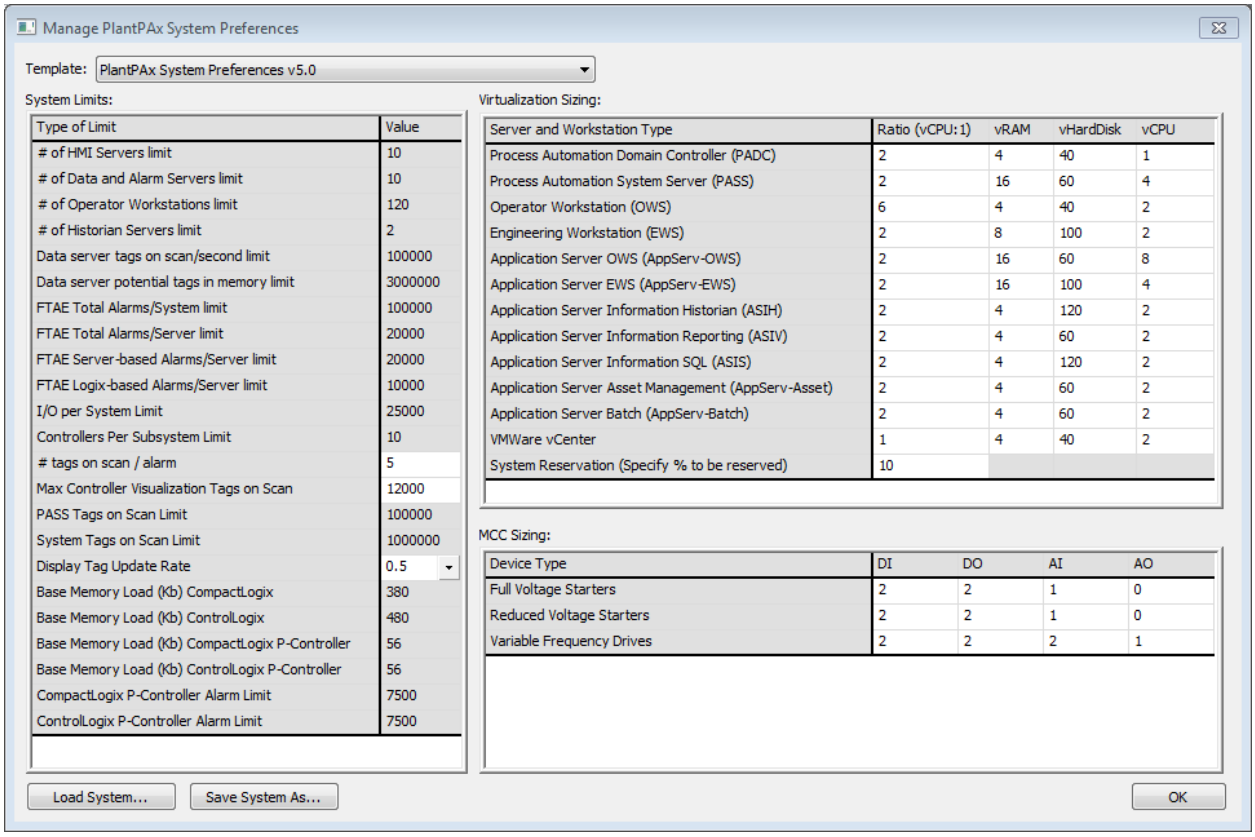


2. Use redundant power supplies on all ControlLogix chassis. In the PlantPAx System Estimator, system preferences are stored in a PlantPAxSystem_v5.0.PAxSys file. You can open to edit the system preferences. Click on the ***Process Plant*** icon at the top of the tree. Notice that System Preferences are being supplied by ***PlantPAx System Preferences v5.0***.



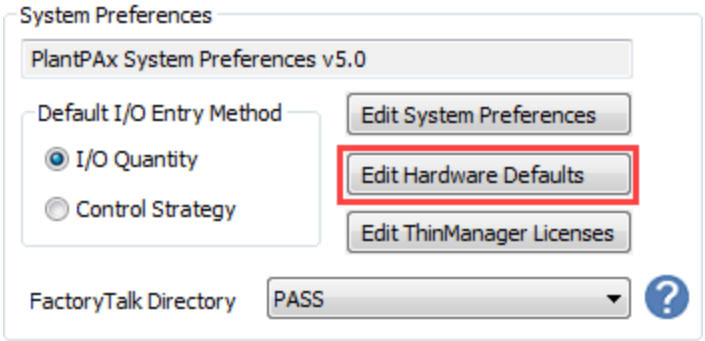
3. Click the **Edit System Preferences** button.

   IAB opens the system preferences

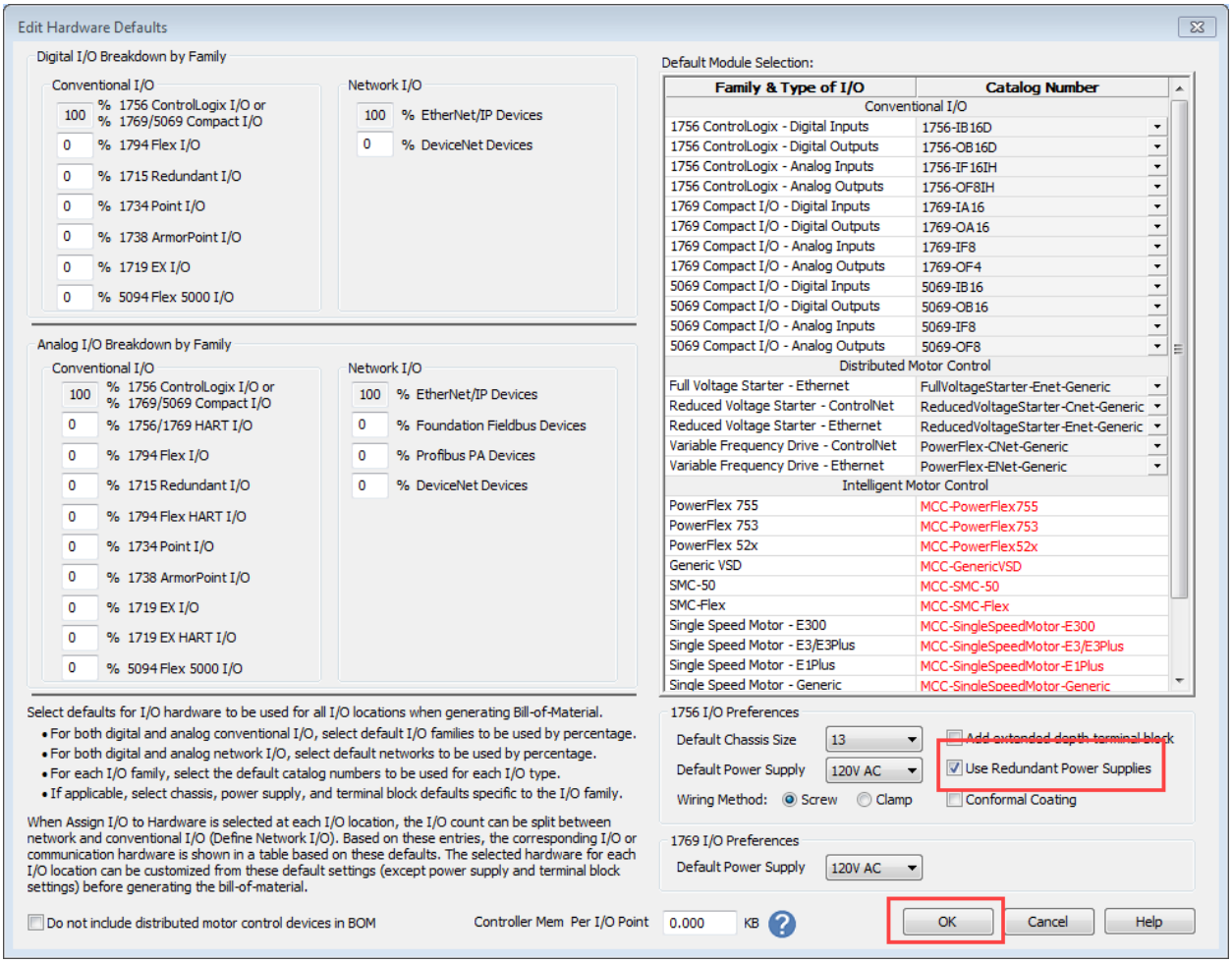


   Close the Manage PlantPAx System Preferences, selecting **OK**.

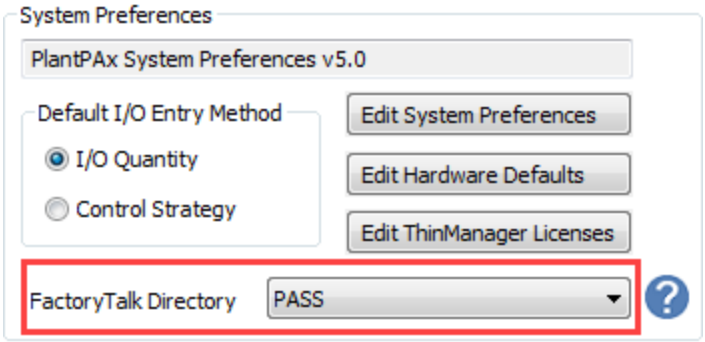
4. Click the ***Edit Hardware Defaults*** button



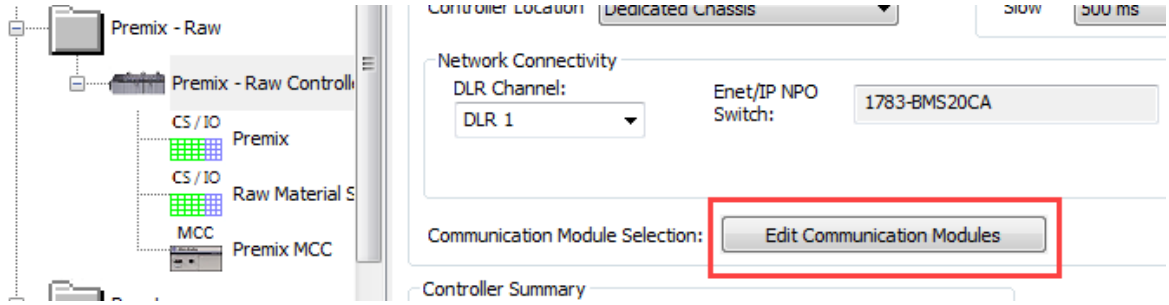
5. Select the checkbox for ***Use Redundant Power Supplies***. Click the **OK** button.



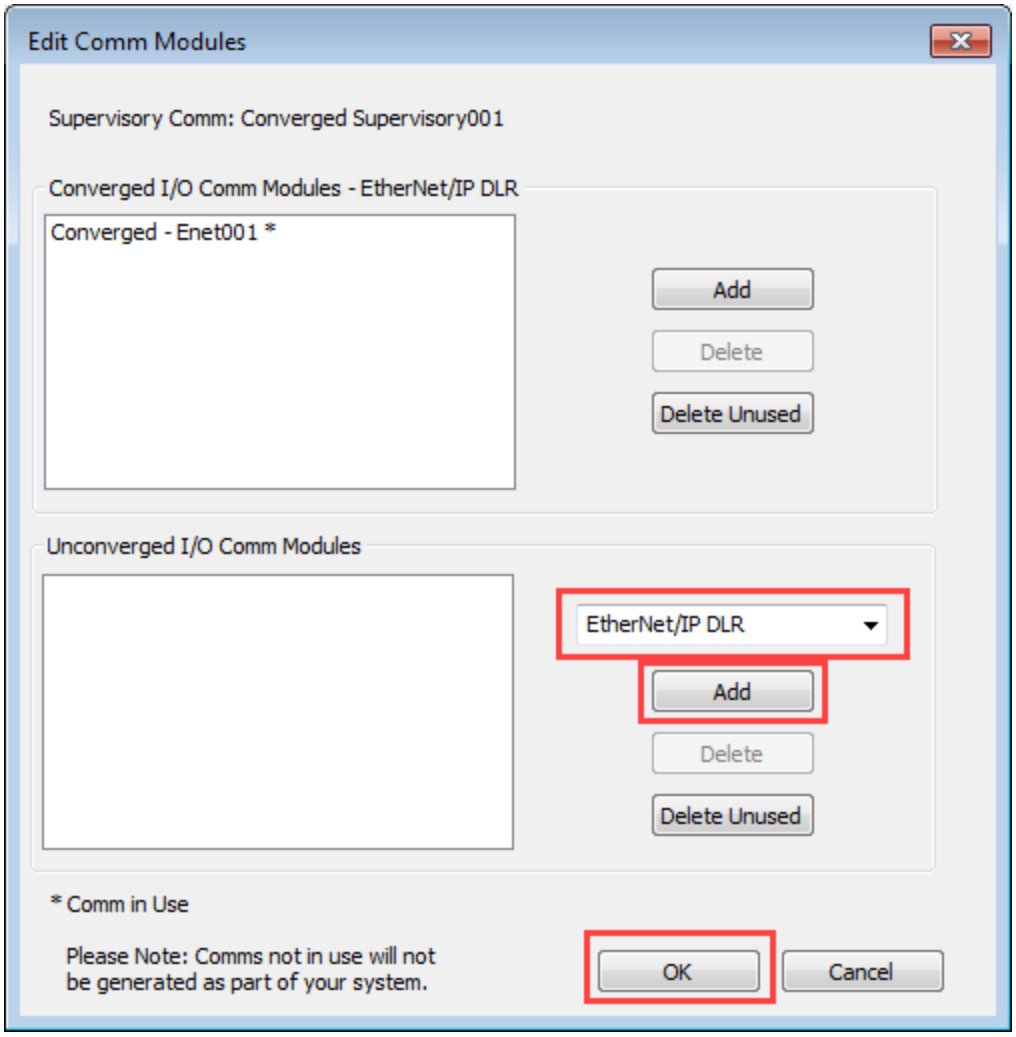
6. Note that the FactoryTalk Directory is defined in the drop-down box. This box will be populated with all PASS servers defined in the system. A PlantPAx system only requires one PASS server to be defined as the FactoryTalk Directory.



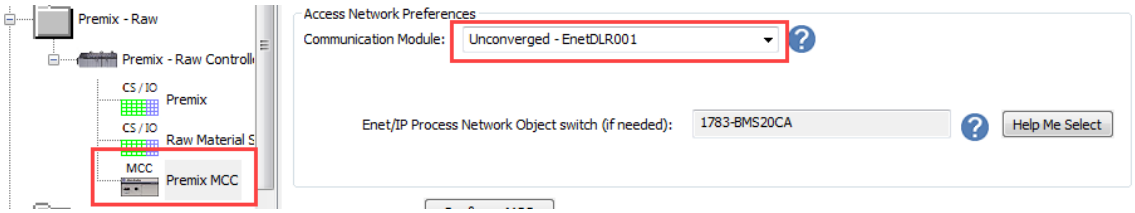
7. The PSE allows for different network types to be added for controllers. Click on the ***Premix - Raw Controller*** in the tree. In the Controller Preferences area, select **Edit Communication Modules**.



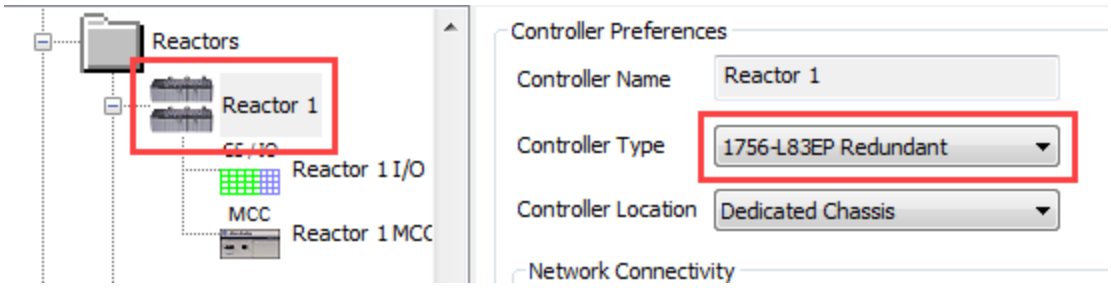
8. Add an un-converged DLR ring for an MCC. Un-converged modules will be isolated to the controller chassis. Converged modules will be included in the default architecture defined for the subsystem. Select **EtherNet/IP DLR** from the dropdown menu. Click **Add**. Click **OK**.



9. Click the **Premix MCC** location. Select the **UNCONVERGED - ENETDLR001** module from the dropdown in local network preferences.

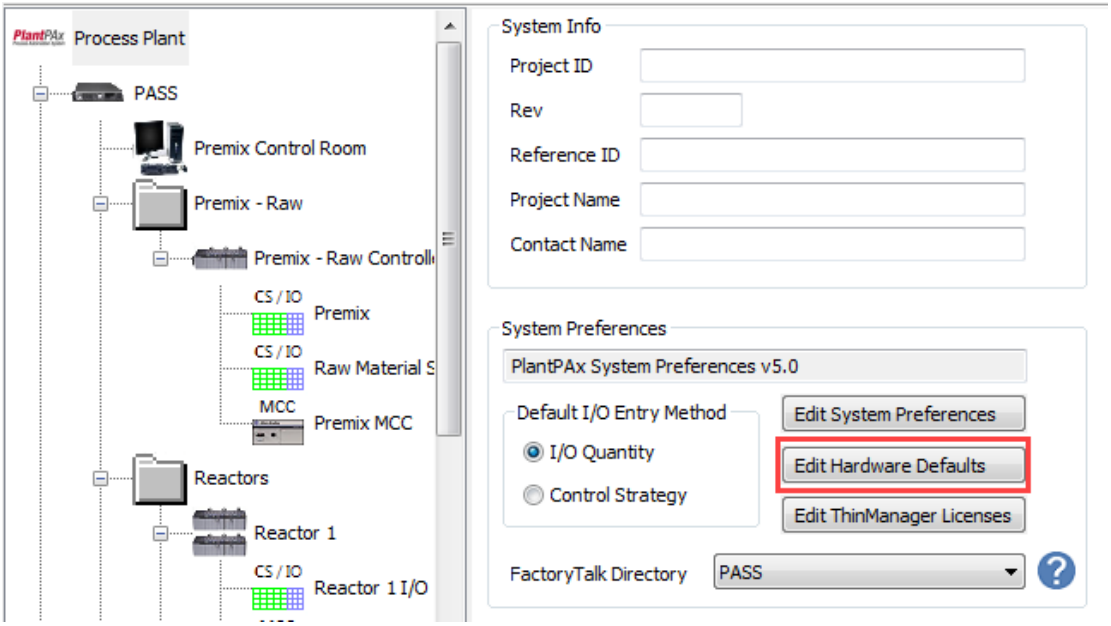


10. Use redundant controllers in the Reactors subsystem. Click the **Reactor 1 controller** in the tree. In the Controller dropdown, select ***1756-L83EP Redundant*** to specify a redundant controller. This selection will generate a pair of redundant chassis with duplicate controllers, redundancy modules, and communication modules and will add the necessary cables to the BOM as well.

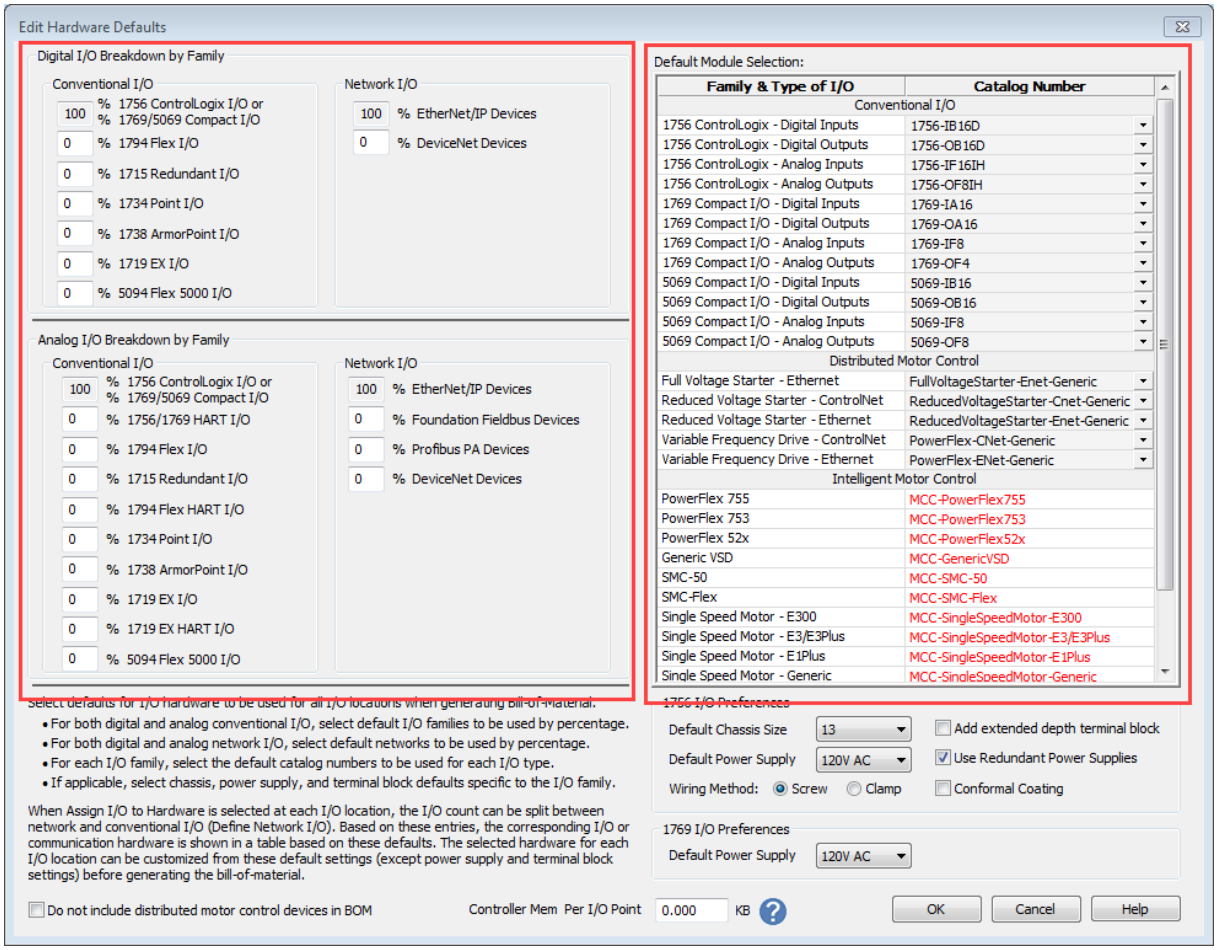


Repeat for Reactor 2 controller. Notice how the CPU Used % increases when redundant controllers are selected.

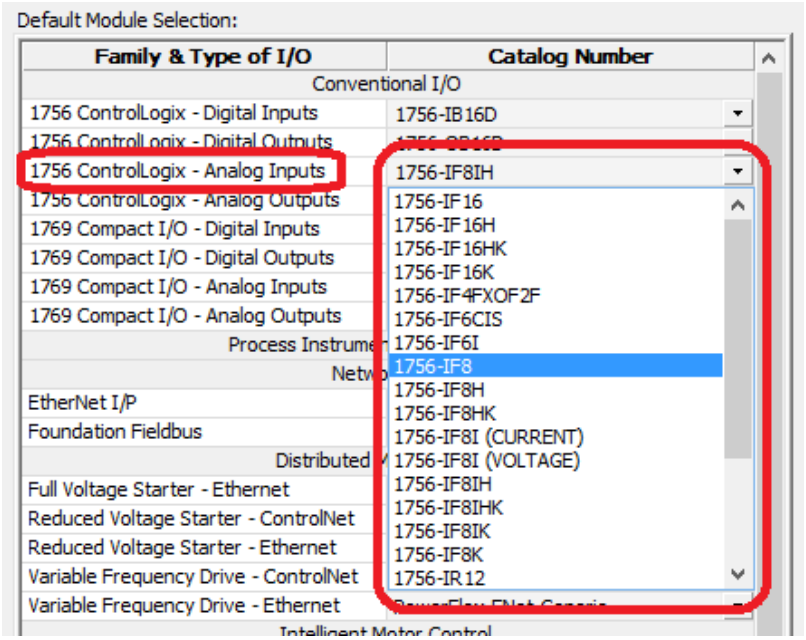
11. Use 8 channel analog input modules (1756-IF8). Since this change is to be applied throughout the project, you should make the change in the Hardware Defaults. Click the **Process Plant** (system) at the top of the tree and click the **Edit Hardware Defaults** button.



IAB displays the Edit Hardware Defaults dialog. The Edit Hardware Defaults dialog lets you select the I/O modules that will be used in the wizard by default. There are two sections: I/O Breakdown by Family, and Default Module Selection.

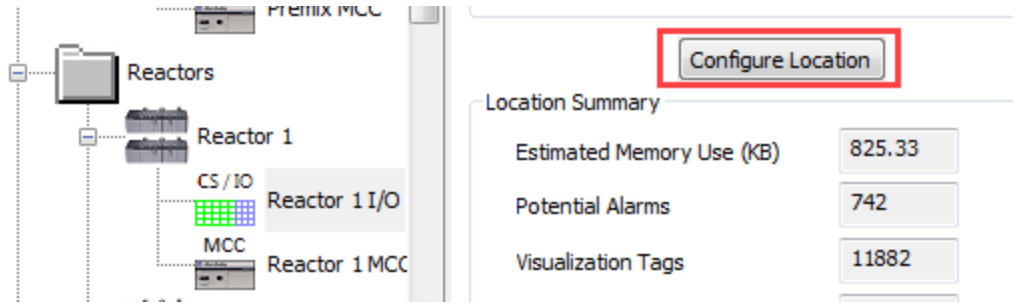


12. For our application, we will not change the I/O Breakdown by Family. That is, we will use 100% ControlLogix I/O as the default for both digital and analog I/O. We want to have the PSE use 1756-IF8 modules for all analog inputs. In the Default Module Selection section of the dialog, find the line for ***1756 ControlLogix – Analog Inputs***, and use the dropdown to select the ***1756-IF8*** module.



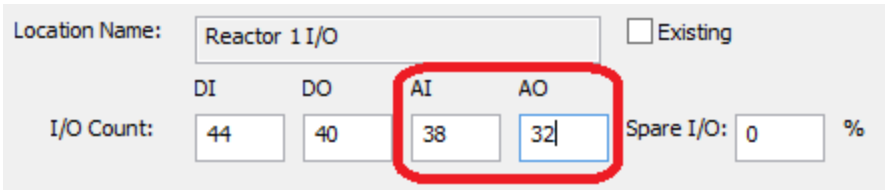
Click ***OK*** to accept the changes.

13. Add 5 AI and 2 AO Foundation Fieldbus devices to both Reactor 1 and Reactor 2. To add I/O points like this is a multi-step operation. First, you must increase the total I/O quantity for each location. Second, you must specify that 5 AI and 2 AO points are to be for Foundation Fieldbus devices. To get started, click the **Reactor 1 I/O** location in the tree and click the **Configure Location** button.

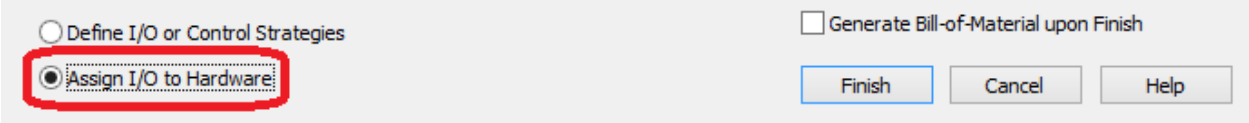


IAB opens the I/O Configuration dialog.

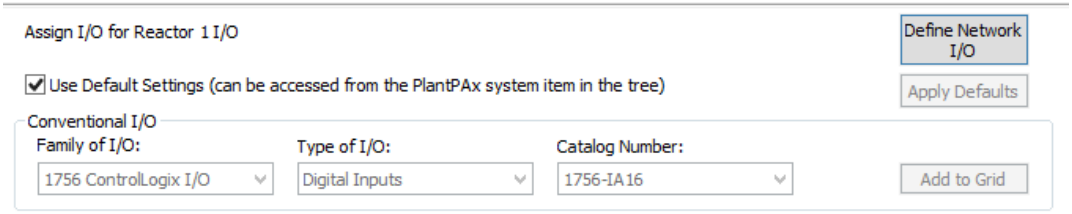
14. Increase the AI quantity by 5, to 38, and increase the AO quantity by 2, to 32. Click out of the I/O count fields. This will account for the new I/O points in the totals. Click ***Accept*** to ok the changes.



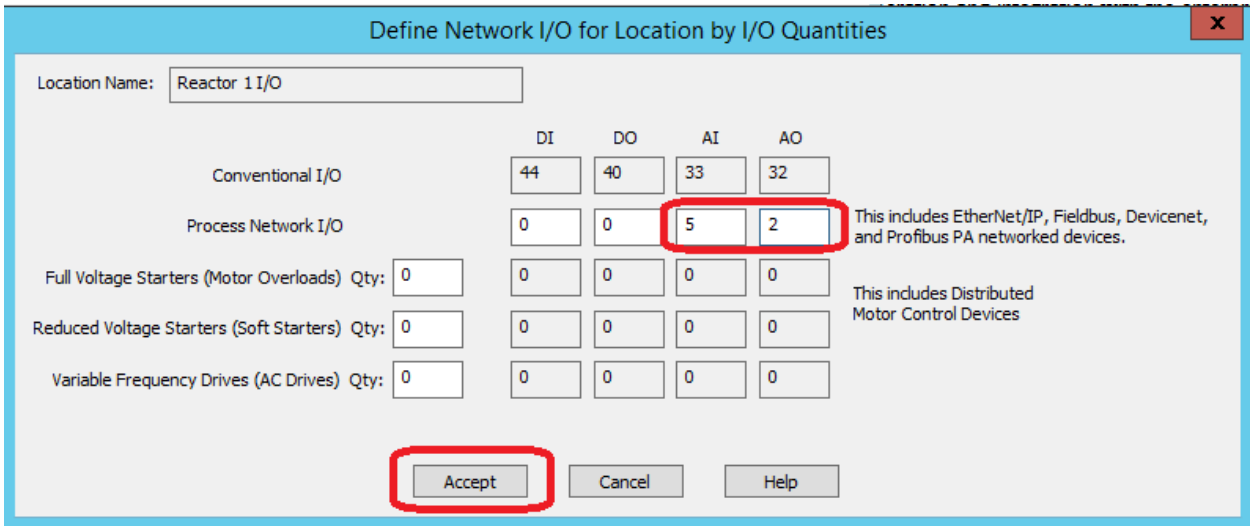
15. Now click the Assign I/O to Hardware radio button.



16. Click the ***Define Network I/O*** button in the upper right corner of the display.



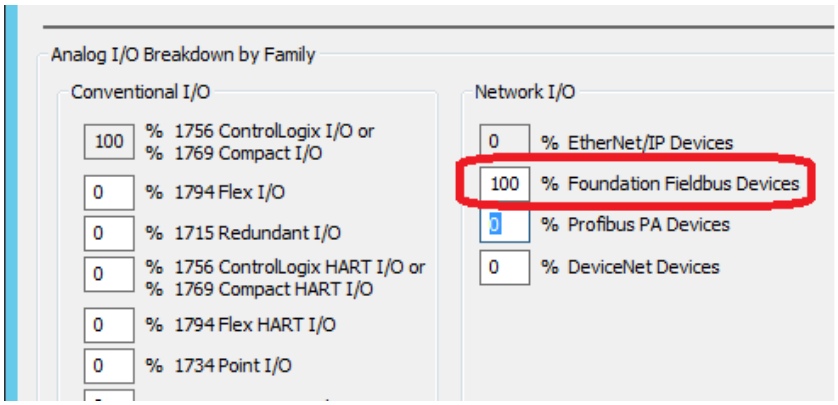
This launches a dialog in which you can specify the number of IO points for Process Networks. Enter '**5'** in the **AI** box for **Process Network I/O** and enter '**2'** in the **AO** box and click out of the field. Notice that when you do this, the Conventional I/O totals are adjusted so that the total AI and AO are the same as entered in the Location Define I/O dialog. Click ***Accept***.



17. The I/O assignment table now shows a new area titled **Process Network I/O**. Notice that it contains seven points assigned to EtherNet/IP. Per our customer's request, we want to have all the Process I/O assigned to Foundation Fieldbus.

44 / 44	Conventional Digital Inputs			
44	Conventional I/O	1756 ControlLogix I/O	1756-IB16D	10-30 VDC Diagnostic Input 16 Pts (...
40 / 40	Conventional Digital Outputs			
40	Conventional I/O	1756 ControlLogix I/O	1756-OB16D	19-30 VDC Diagnostic Output 16 Pts ...
33 / 33	Conventional and Process Instrumentation Analog Inputs			
33	Conventional I/O	1756 ControlLogix I/O	1756-IF8	Analog Input - Current/Voltage 8 Pts...
30 / 30	Conventional and Process Instrumentation Analog Outputs			
30	HART I/O	1756 ControlLogix I/O	1756-OF8IH	Analog Output HART Isolated - Curr...
7 / 7	Process Network I/O			
7	EtherNet/IP	Communication Interfaces	1756-EN2T	EtherNet 10-100M Bridge Module
0	Foundation Fieldbus	Communication Interfaces	1788-CN2FFR	ControlNet To Foundation FieldBus Li...
0	Profibus PA	Communication Interfaces	1788-CN2PAR	ControlNet to Profibus-PA Linking De...
0	DeviceNet	Communication Interfaces	1756-DNB	DeviceNet Bridge/Scanner Module. ...

18. Click the **Process Plant** item in the tree, click the **Edit Hardware Defaults** button, and in the dialog that appears set the **% Foundation Fieldbus Devices** box to '**100**'. Click ***OK*** to accept the changes.

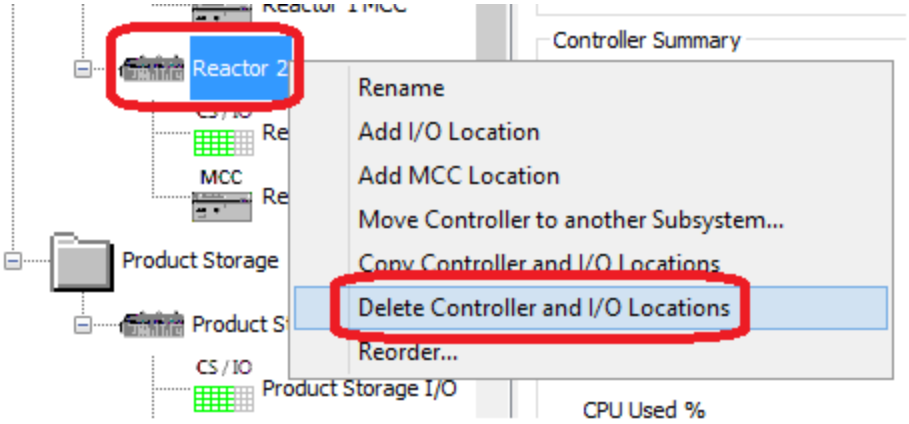


19. Click back on **Reactor 1 I/O**, and the I/O assignment table shows all 7 Process Network I/O points assigned to Foundation Fieldbus.

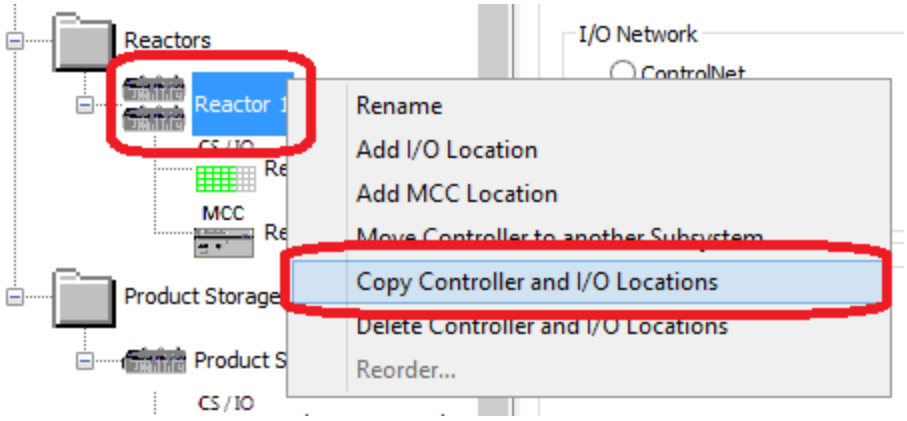
30	HART I/O	1756 ControlLogix I/O	1756-OF8IH	Analog Output HART Isolated - Curr...
7 / 7	Process Network I/O			
0	EtherNet/IP	Communication Interfaces	1756-EN2T	EtherNet 10-100M Bridge Module
7	Foundation Fieldbus	Communication Interfaces	1788-EN2FFR	EtherNet To Foundation FieldBus Lin...
0	Profibus PA	Communication Interfaces	1788-EN2PAR	EtherNet/IP to Profibus-PA Linking D...
0	DeviceNet	Communication Interfaces	1756-DNB	DeviceNet Bridge/Scanner Module. ...

20. You could repeat the previous steps for the Reactor 2 I/O location. But since Reactor 2 is the same as Reactor 1, you can also delete the Reactor 2 controller and its I/O location and duplicate Reactor 1 to accomplish the same end.

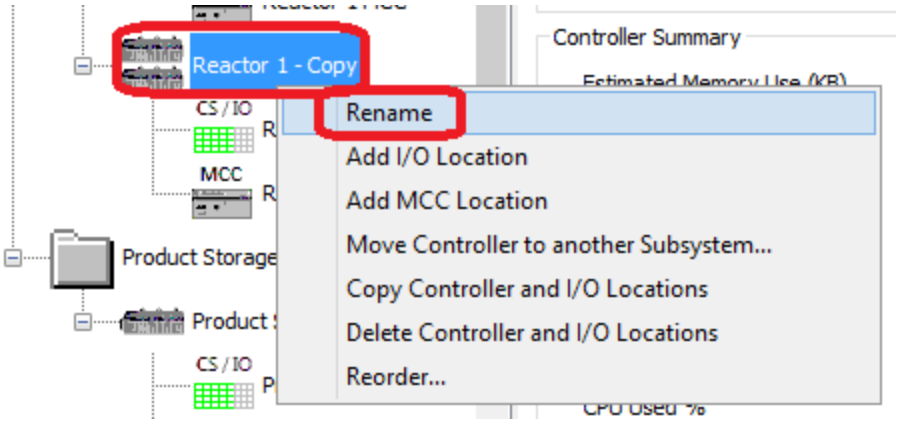
    Right click the ***Reactor 2*** controller and select ***Delete Controller and I/O Locations***. IAB deletes the location and its associated I/O location.



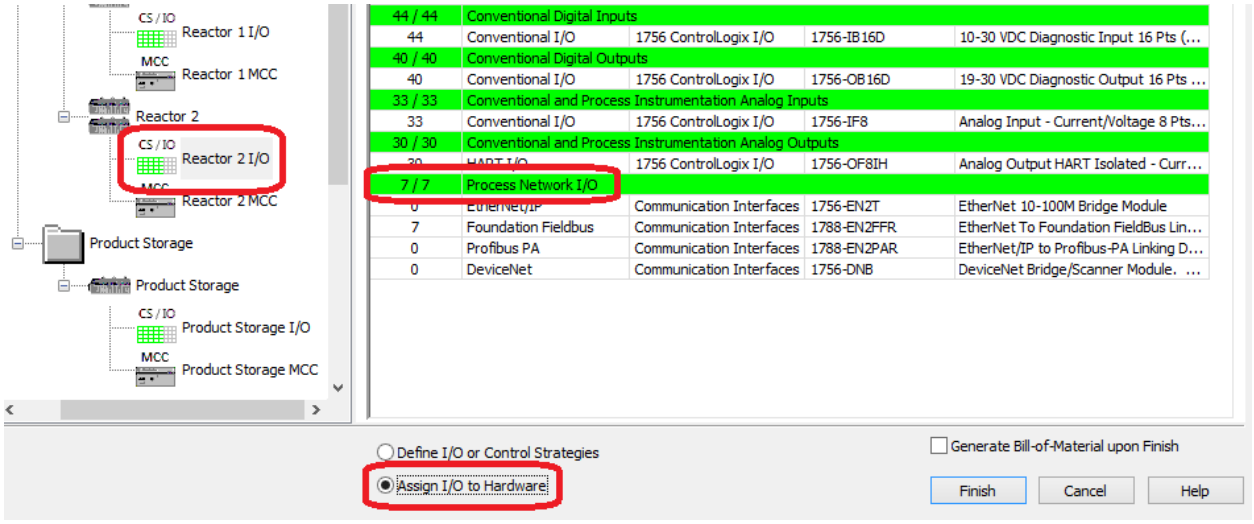
21. Right click the ***Reactor 1*** controller and select ***Copy Controller and I/O Locations***.



IAB creates a new controller named Reactor 1 - Copy and an I/O location named Reactor 1 I/O - Copy. Rename the new controller and I/O location ***Reactor 2, Reactor 2 I/O***, and ***Reactor 2 MCC*** respectively.

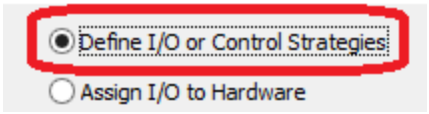


22. Check the I/O assignments for Reactor 2 I/O and verify that the seven process network I/O points are there.

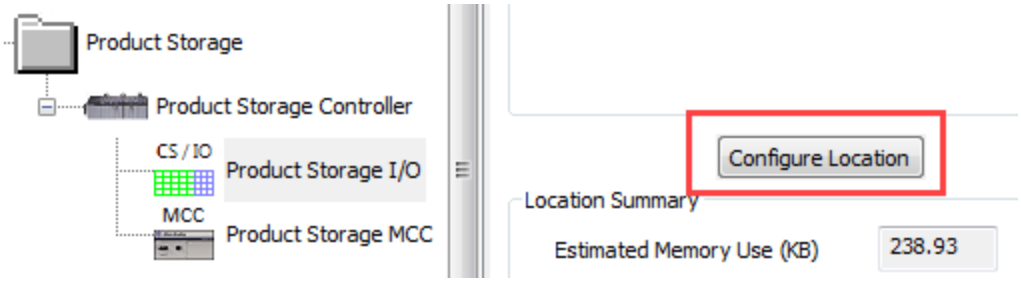


23. Add 15 HART inputs to Product Storage. This again is a two-step process – first, add 15 Analog Inputs to the I/O totals in the Define I/O table, and second, allocate those 15 analog inputs to HART I/O modules.

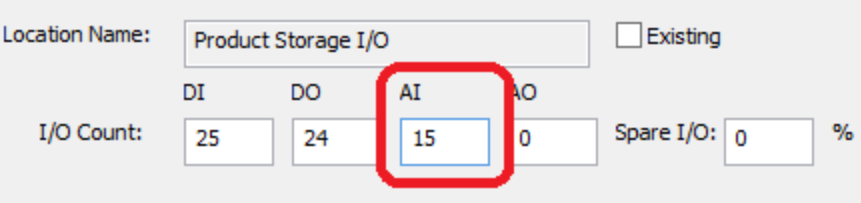
Click the ***Define I/O or Control Strategies*** radio button.



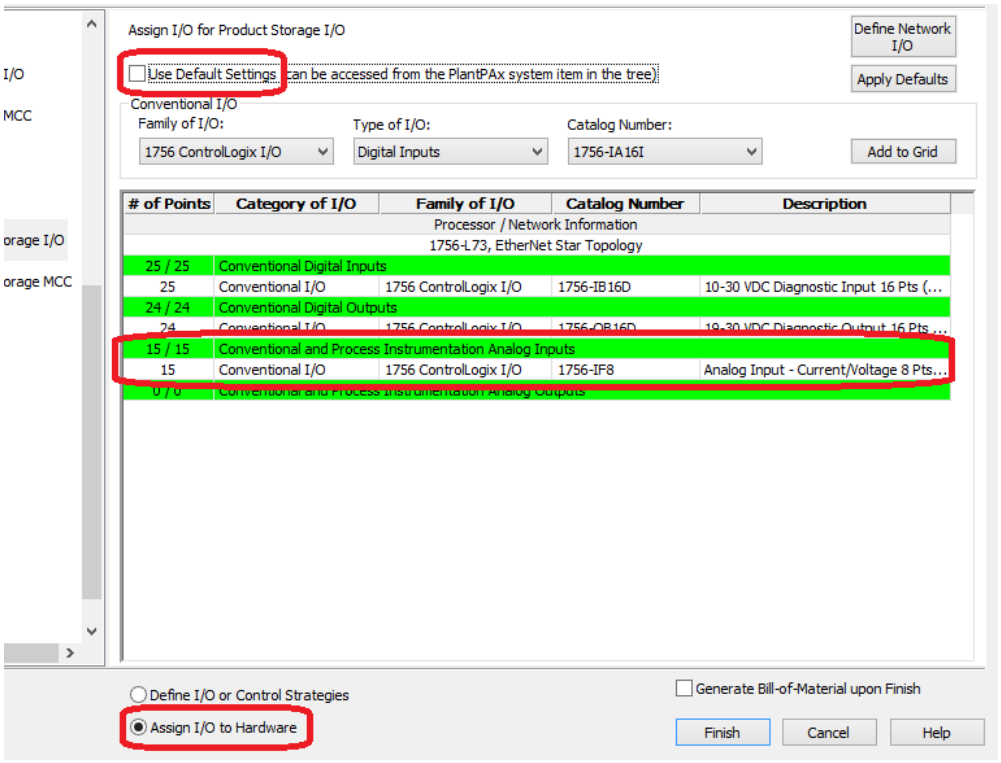
Click on the ***Product Storage I/O*** location and click the ***Configure Location*** button.



24. In the I/O Configuration dialog, enter *15* in the ***AI*** box and click out of the field. Click ***Accept*** to ok the changes.



25. Click the ***Assign I/O to Hardware*** radio button. The I/O grid shows the 15 analog inputs you entered assigned to a 1756-IF8 I/O module. You want to change this assignment to a HART module. You'll be departing from the defaults, so **uncheck** the ***Use Default Settings*** checkbox.

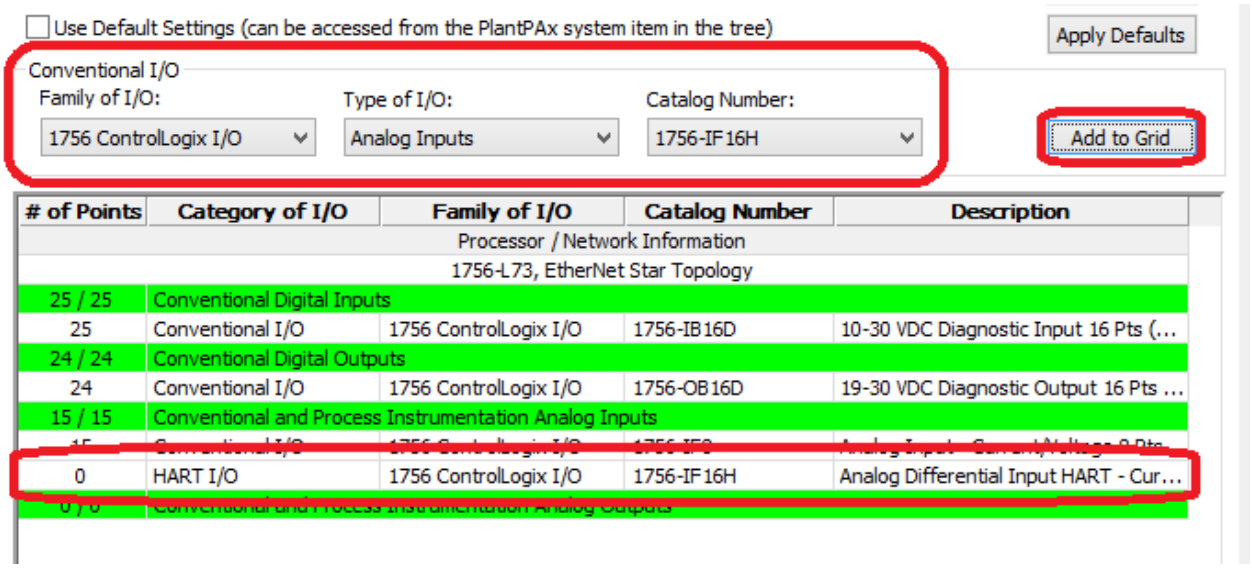


26. You don't want to reset the system-wide defaults to change the module assignment because that would apply to all I/O locations, and you want to change only the Product Storage I/O location. You can add a new line to the I/O grid for a HART Input module, then assign the 15 analog inputs to that module.

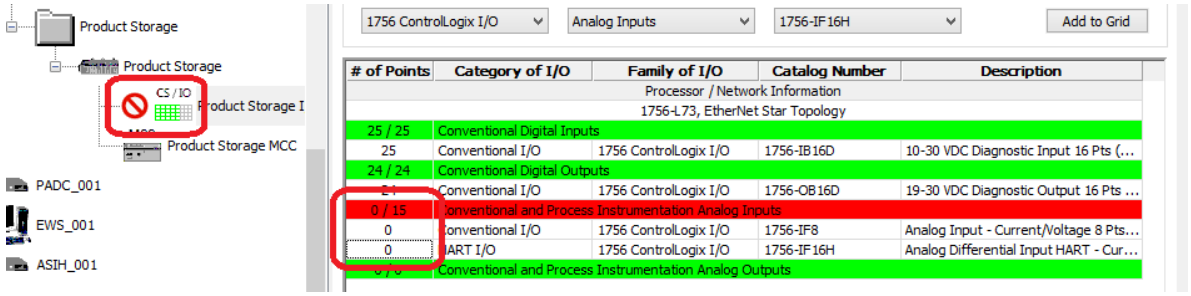
    Use the dropdowns in the Conventional I/O section of the display to make the following choices:

    - **Family of I/O** – 1756 ControlLogix I/O
    - **Type of I/O** – Analog Inputs
    - **Catalog Number** – 1756-IF16H

    Click the ***Add to Grid*** button. IAB adds a new line to the Analog Inputs section of the grid for the HART module. Zero I/O points are assigned to the HART module.



27. Change the number of analog inputs assigned to the 1756-IF8 module to zero and click out of the field. IAB changes the Analog I/O section heading to red and puts an error icon next to the I/O location in the tree. These indicators warn you that there is unallocated I/O.



28. Enter 15 for the number of points assigned to HART I/O and click out of the field. The indicators are now green, and you have accomplished adding 15 HART I/O points to the Product Storage I/O location.

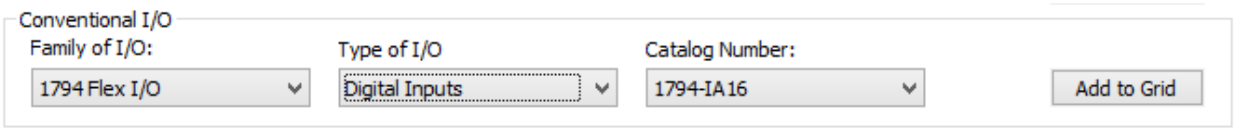
# of Points	Category of I/O	Family of I/O	Catalog Number	Description
Processor / Network Information				
1756-L73, EtherNet Star Topology				
25 / 25	Conventional Digital Inputs			
25	Conventional I/O	1756 ControlLogix I/O	1756-IB16D	10-30 VDC Diagnostic Input 16 Pts (...
24 / 24	Conventional Digital Outputs			
24	Conventional I/O	1756 ControlLogix I/O	1756-OB16D	19-30 VDC Diagnostic Output 16 Pts ...
15 / 15	Conventional and Process Instrumentation Analog Inputs			
0	Conventional I/O	1756 ControlLogix I/O	1756-IF8	Analog Input - Current/Voltage 8 Pts...
15	HART I/O	1756 ControlLogix I/O	1756-IF16H	Analog Differential Input HART - Cur...
0 / 0	Conventional and Process Instrumentation Analog Outputs			

29. **Use FLEX I/O for the Product Storage I/O**. Since this is a requirement for only one location, this is a job to do in the I/O Assignment grid. (If you wanted to specify FLEX I/O for the entire project, you would do so in the Edit Hardware Defaults dialog, accessed from the system level.)

    To assign the I/O in the Product Storage location to FLEX I/O modules, you need to add a new line to the I/O grid for each I/O type.

    In the conventional I/O section of the display, use the dropdowns to add three new lines to the grid:

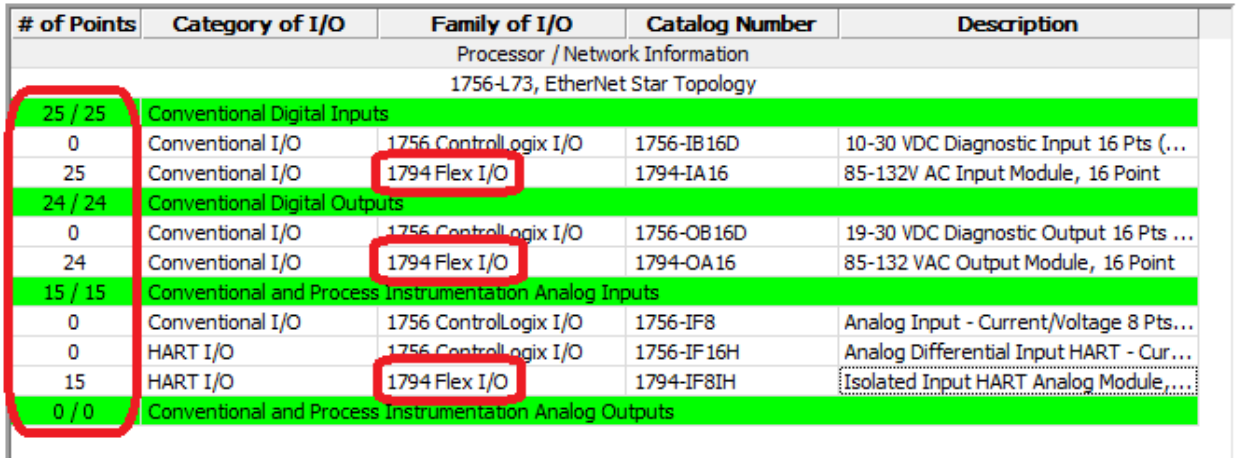
    - 1794 FLEX I/O, Digital Inputs, 1794-IA16



    - 1794 FLEX I/O, Digital Outputs, 1794-OA16

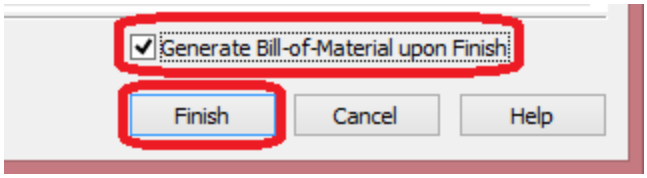
    - 1794 FLEX I/O, Analog Inputs, 1794-IF8IH

30. In the I/O grid, transfer all the I/O from the ControlLogix modules to the FLEX I/O modules by adjusting the No. of Points fields.



# of Points	Category of I/O	Family of I/O	Catalog Number	Description
Processor / Network Information				
1756-L73, EtherNet Star Topology				
25 / 25	Conventional Digital Inputs			
0	Conventional I/O	1756 ControlLogix I/O	1756-IB16D	10-30 VDC Diagnostic Input 16 Pts (...
25	Conventional I/O	1794 Flex I/O	1794-IA16	85-132V AC Input Module, 16 Point
24 / 24	Conventional Digital Outputs			
0	Conventional I/O	1756 ControlLogix I/O	1756-OB16D	19-30 VDC Diagnostic Output 16 Pts ...
24	Conventional I/O	1794 Flex I/O	1794-OA16	85-132 VAC Output Module, 16 Point
15 / 15	Conventional and Process Instrumentation Analog Inputs			
0	Conventional I/O	1756 ControlLogix I/O	1756-IF8	Analog Input - Current/Voltage 8 Pts...
0	HART I/O	1756 ControlLogix I/O	1756-IF16H	Analog Differential Input HART - Cur...
15	HART I/O	1794 Flex I/O	1794-IF8IH	Isolated Input HART Analog Module,...
0 / 0	Conventional and Process Instrumentation Analog Outputs			

31. Check the box for ***Generate Bill-of-Material upon Finish*** and click the ***Finish*** button. Accept any prompts from IAB to regenerate the system.



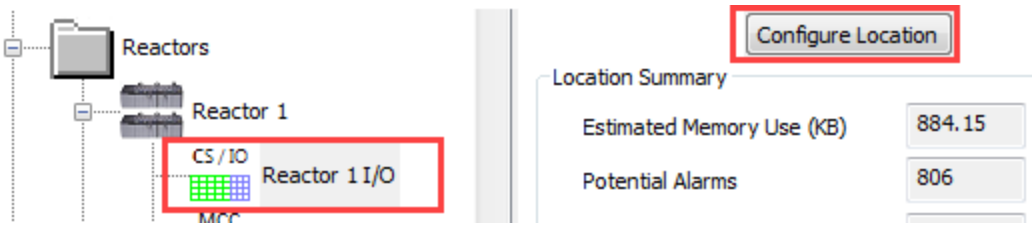
Check the hardware and network views to verify that:

- Redundant power supplies are used on ControlLogix chassis
- The Reactor 1 and Reactor 2 controllers have redundant controller chassis
- 8 channel analog input modules (1756-IF8) are used (check the consolidated BOM)
- Foundation Fieldbus linking devices have been added where needed
- Product Storage I/O is FLEX I/O and includes HART modules

3: Correct Problems in a PSE Configuration

The PlantPAx System Estimator keeps track of controller loading and server loading and lets you know when your configuration is over established limits. The following steps will show how this works.

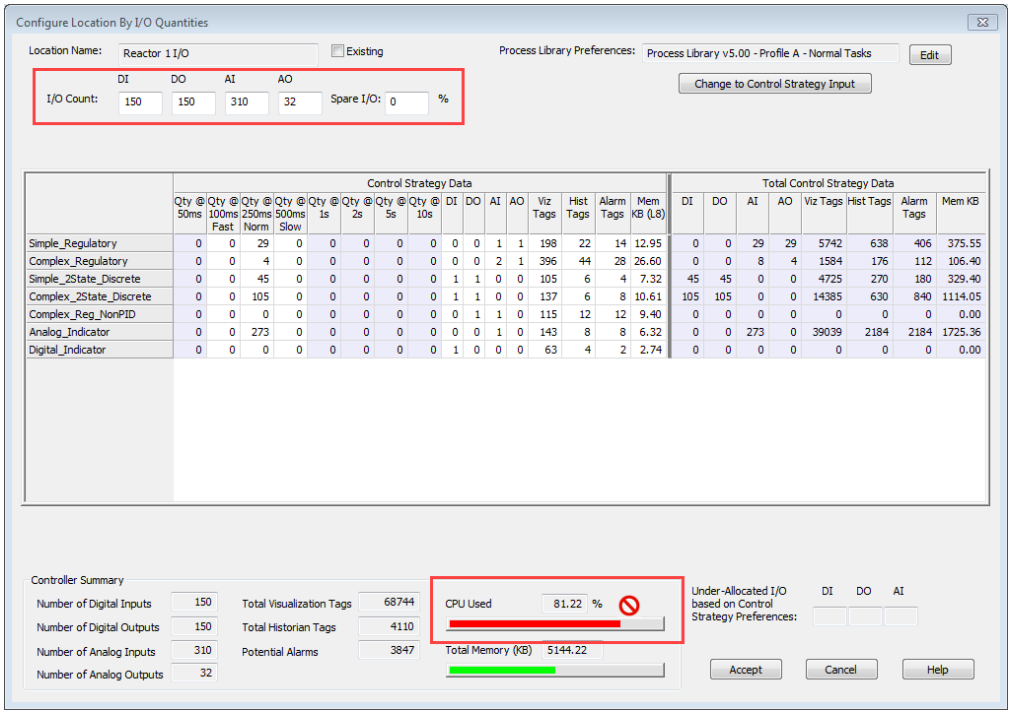
1. Open the ***Process Plant*** wizard instance, select the ***Reactor 1 I/O*** location and open its ***Configure Location*** dialog.



2. In the I/O Configuration dialog, change the following I/O quantities:

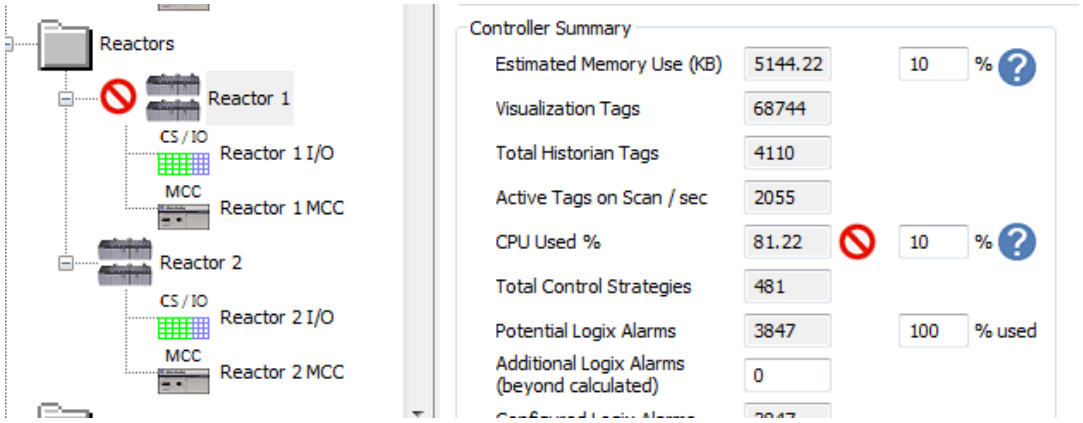
   DI – 150 DO – 150 AI – 310

   When you click out of the last I/O field you changed, the CPU Used field is colored red, indicating a controller overload.

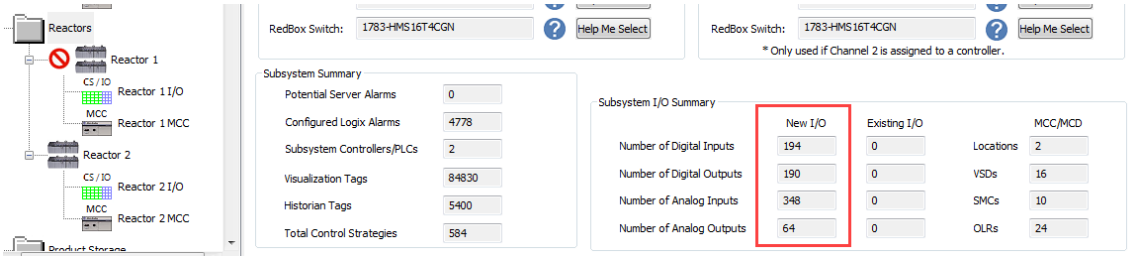


To begin corrective action, click ***Accept*** to accept the changes in I/O configuration.

The I/O location summary and the tree indicate the overload with red circles.

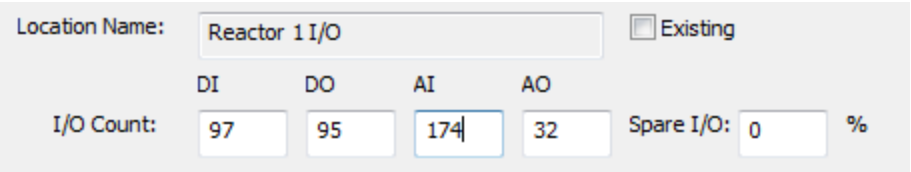


3. Click the ***Reactors*** subsystem folder and check the total I/O for the subsystem.

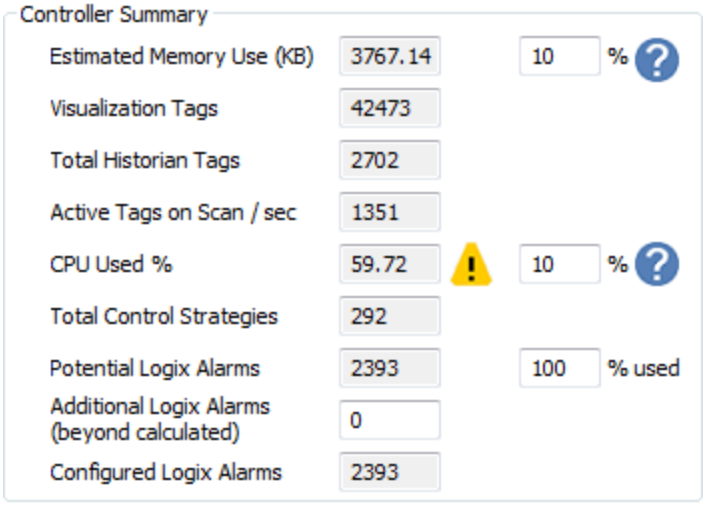


4. We will make a simplifying assumption that you can split this total I/O between the two controllers (Reactor 1 and Reactor 2). Open the ***Configure Location*** dialog for ***Reactor 1 I/O*** again and adjust the I/O quantities as follows:

DI – 97 DO – 95 AI – 174



Accept the changes and click the **Reactor 1** controller. Notice that a yellow triangle remains for the CPU usage in the controller summary.



A yellow triangle is a warning to show that the usage is close to the limit but not exceeding the limit. No action is required to correct the warning.

Repeat previous steps for **Reactor 2**.

This adjustment distributes I/O so there are no controller overloads.

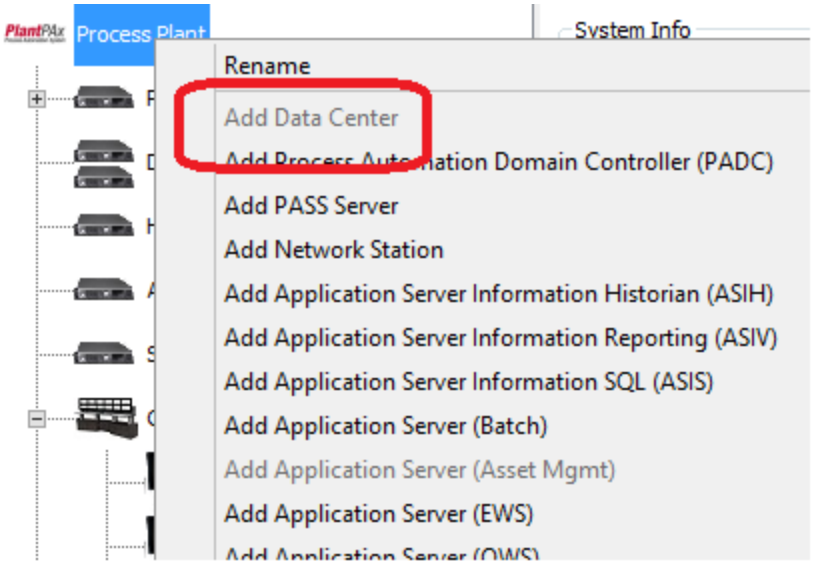
You might also have added a third controller to the Reactors subsystem and added the extra I/O to that controller. The actions you take will depend on application requirements.

> You may notice that even after you make changes to eliminate an overload condition, the tree still shows the error indicator next to a server, controller, or I/O location. To check the true status, click on the item that has the indicator. If the indicator goes away, the error is corrected. Status is updated only when you click on the item.

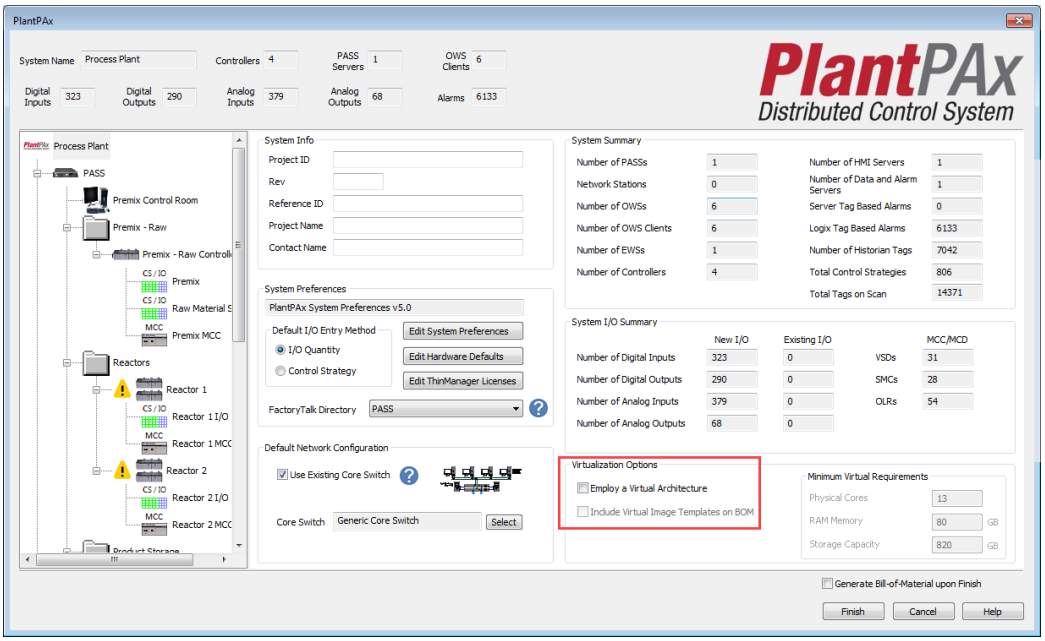
4. Virtual Data Server

You can add a Data Center which acts as a Server to host virtual appliances for your system elements.

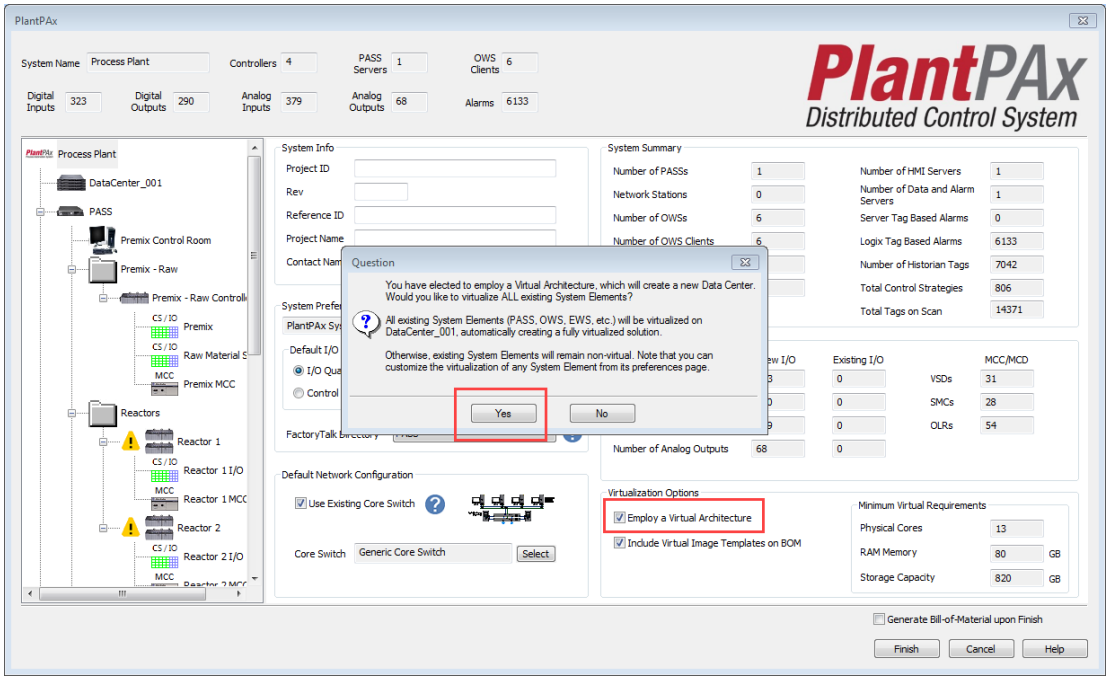
1. Right click on **Process Plant** in the system tree and you will see that the option to add a Data Center is currently greyed out. A virtual architecture must be employed prior to adding a data center.



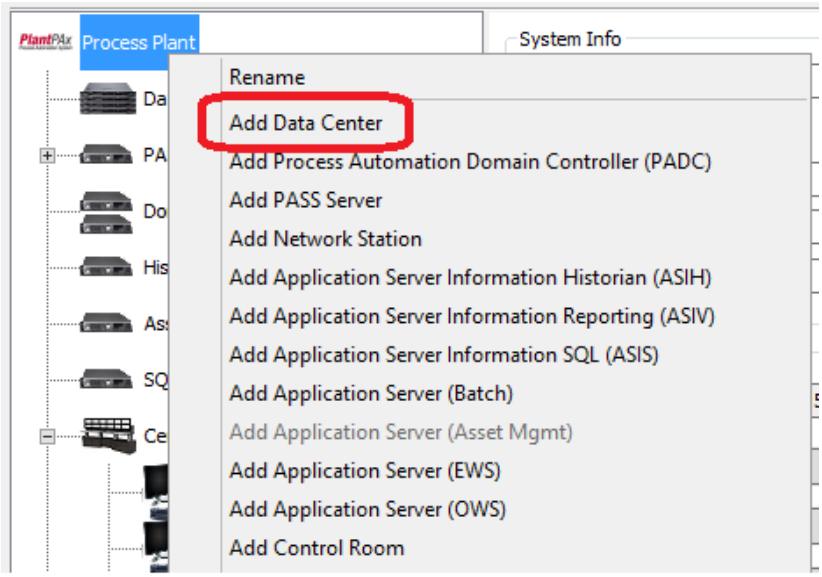
2. Select **Process Plant**, the Virtualization Options will be available at the bottom right.



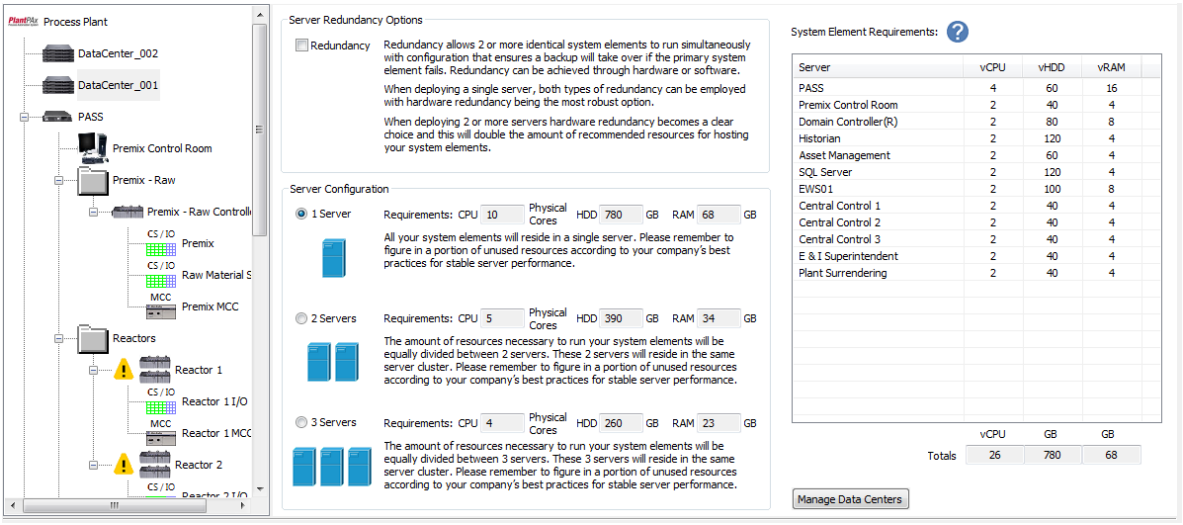
3. Select to **Employ a Virtual Architecture**. Click **Yes** to virtualize all existing system elements.



4. A Data Center (DataCenter_001) was automatically added when the virtual architecture was employed. You can add an additional data center by right clicking of Process Plant and selecting **Add Data Center**. DataCenter_002 is added to the system.



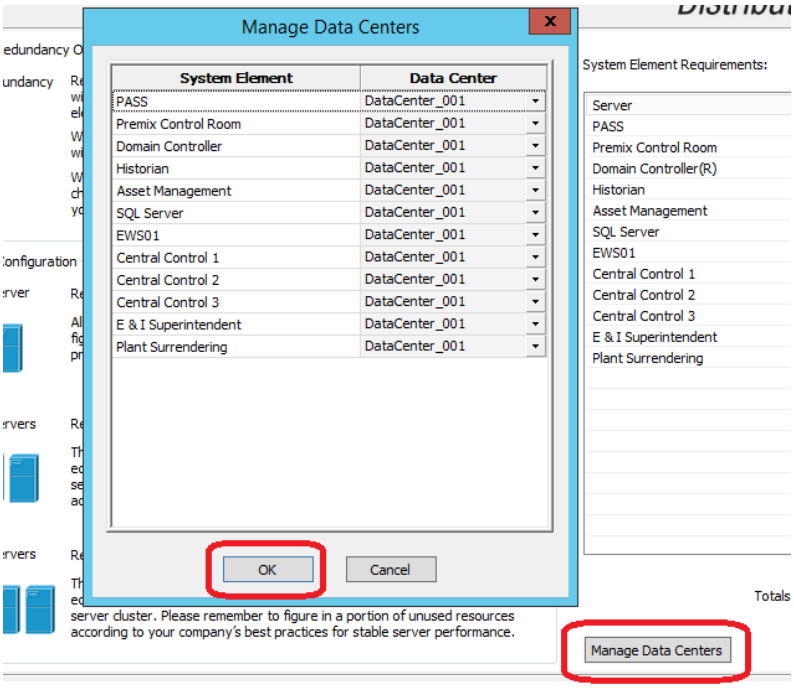
5. Select **DataCenter_001** in the system tree to view the configuration options for the data center.



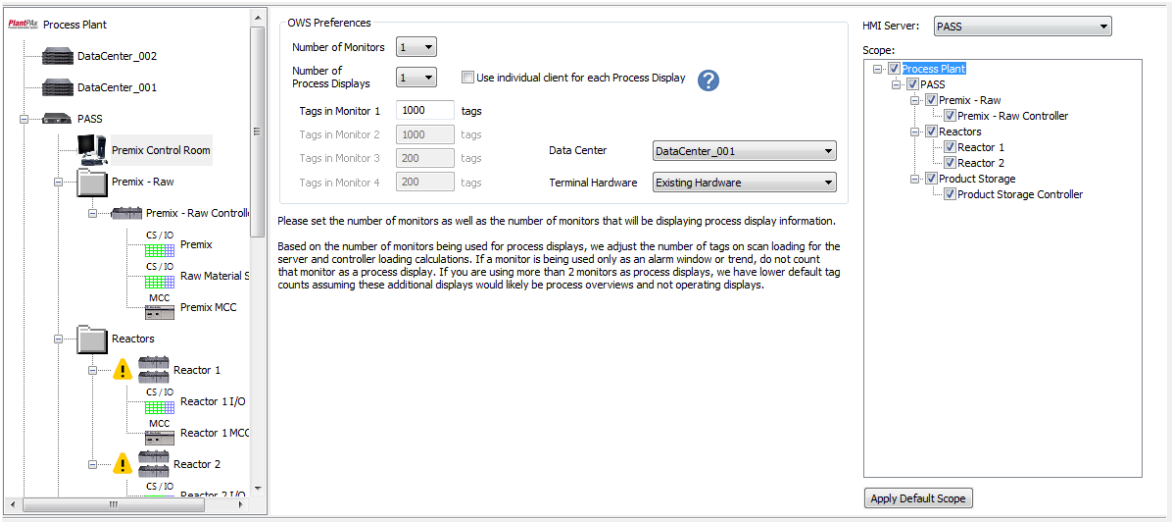
You can configure server redundancy options and the number of servers in your system.

The system element requirements indicate the number of virtual CPUs, GBs of hard disk, and GBs of RAM required for your virtual system. Note: When virtualizing, you will need licenses for your hypervisor (host server OS) and virtualization management software. These licenses will not be included in your BOM as there are many options available.

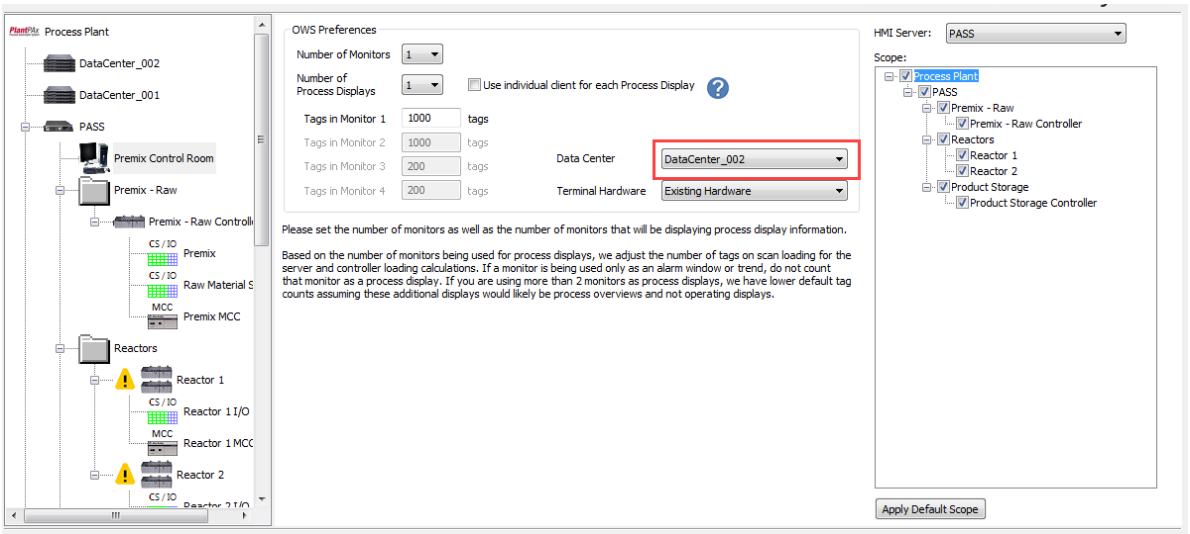
6. Click **Manage Data Centers.** From here you can reference each system element to a specific data center or choose not to virtualize that element. Click **OK**.



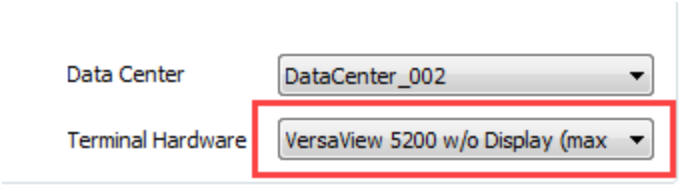
7. Click on **Premix Control Room** in the system tree.



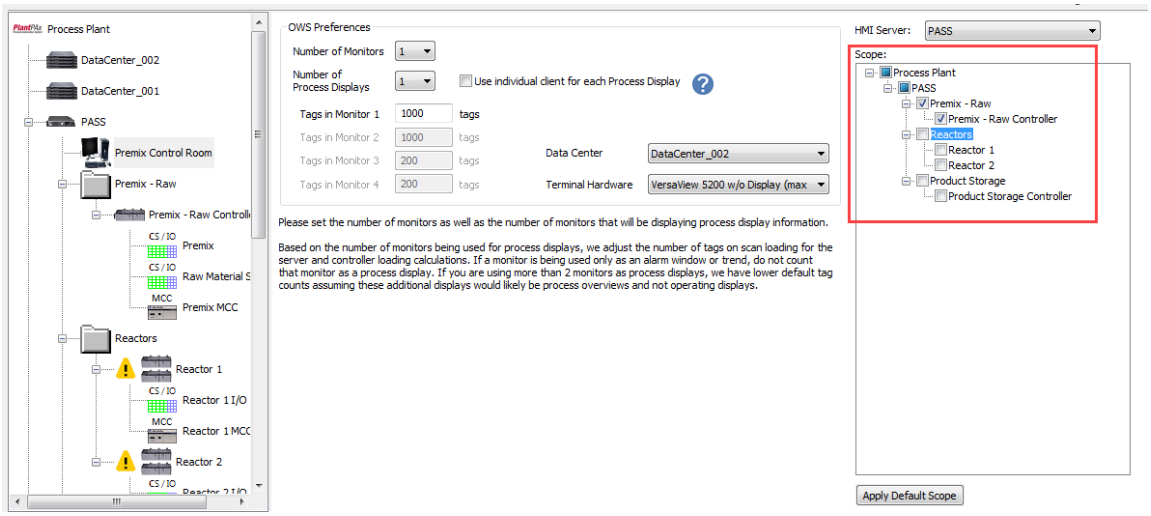
8. Select **DataCenter_002** from the Data Center drop down in the OWS preferences pane.



9. Select **VersaView 5200 w/o Display (max 2 monitors)** from the Terminal Hardware drop down in the preferences window.

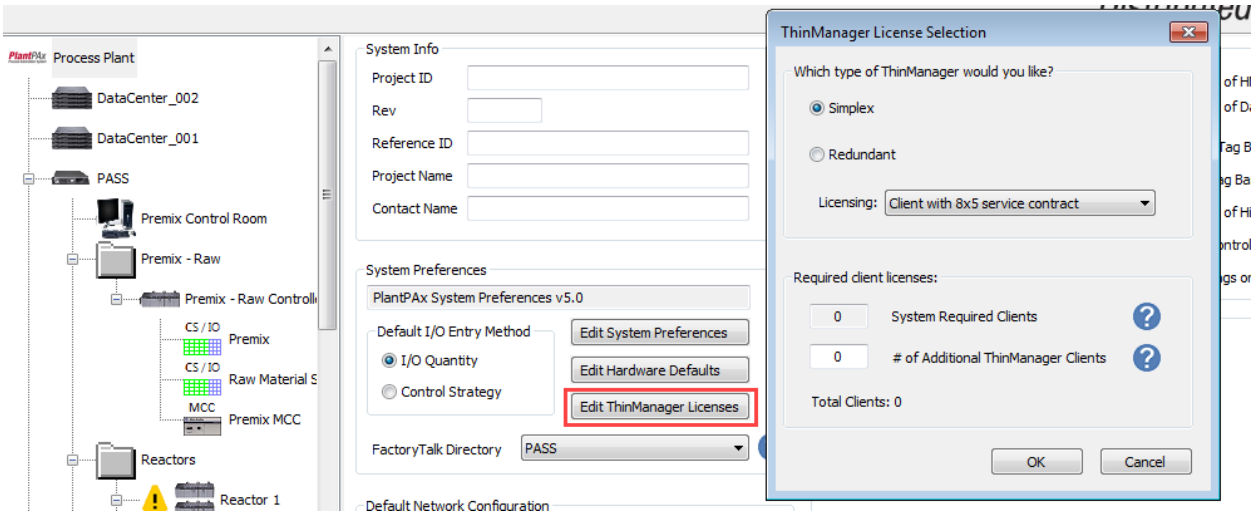


10. You can limit the scope of this terminal to only the Premix – Raw Controller. **Deselect** the **Reactors and Product Storage** subsystems from the scope.



5. ThinManager

1. Click the **ProcessPlant** icon in the system tree. Click the button to **Edit ThinManager Licenses**



In the ThinManager License selection window, you have the ability to configure the following:

- ThinManager type:
    1. Simplex allows the use of a single ThinManager server.
    2. Redundant uses a full redundant pair of ThinManager servers.
- Licensing Type: Either 8x5 or 24x7 support
- Required Client Licenses to support the number of terminals added to the project or additional clients to support non-PlantPAx system elements, such as mobile devices.
- Number of client licenses to be purchased.

2. We will not add any ThinManager clients to our project at this time. Click **Cancel**.

3. Check the **Generate Bill-of-Material upon Finish box** and click **Finish.** Accept any prompts to regenerate the project.

4. **Save your project.**

This completes the PSE Lab exercise.