M.A.C. SOLUTIONS

PROCESSVUE

Configuration of the Output Reconstructor, Data Message Routing and Duplicate Message Handling

Abstract

The following documentation is to help guide you through the process of setting up message routing, output Reconstructor and message duplication across multiple Data Collectors.

Contents

1. Overview and Objectives 3
2. Setup and Configuration 4
3. Setting the number of Data Collectors in the Archiver 4
4. Local Data Collector (Collector 1) 5
5. Remote Data Collectors (Collectors 3 and 4) 10
5.1 Collector 3 10
5.2 Collector 4 11
6. Archiver Configuration 14
6.1 Overview 14
6.2 Output Reconstructor 14
6.3 Message Duplication 26
6.4 Message Routing 30
6.5 Message Parsing 39

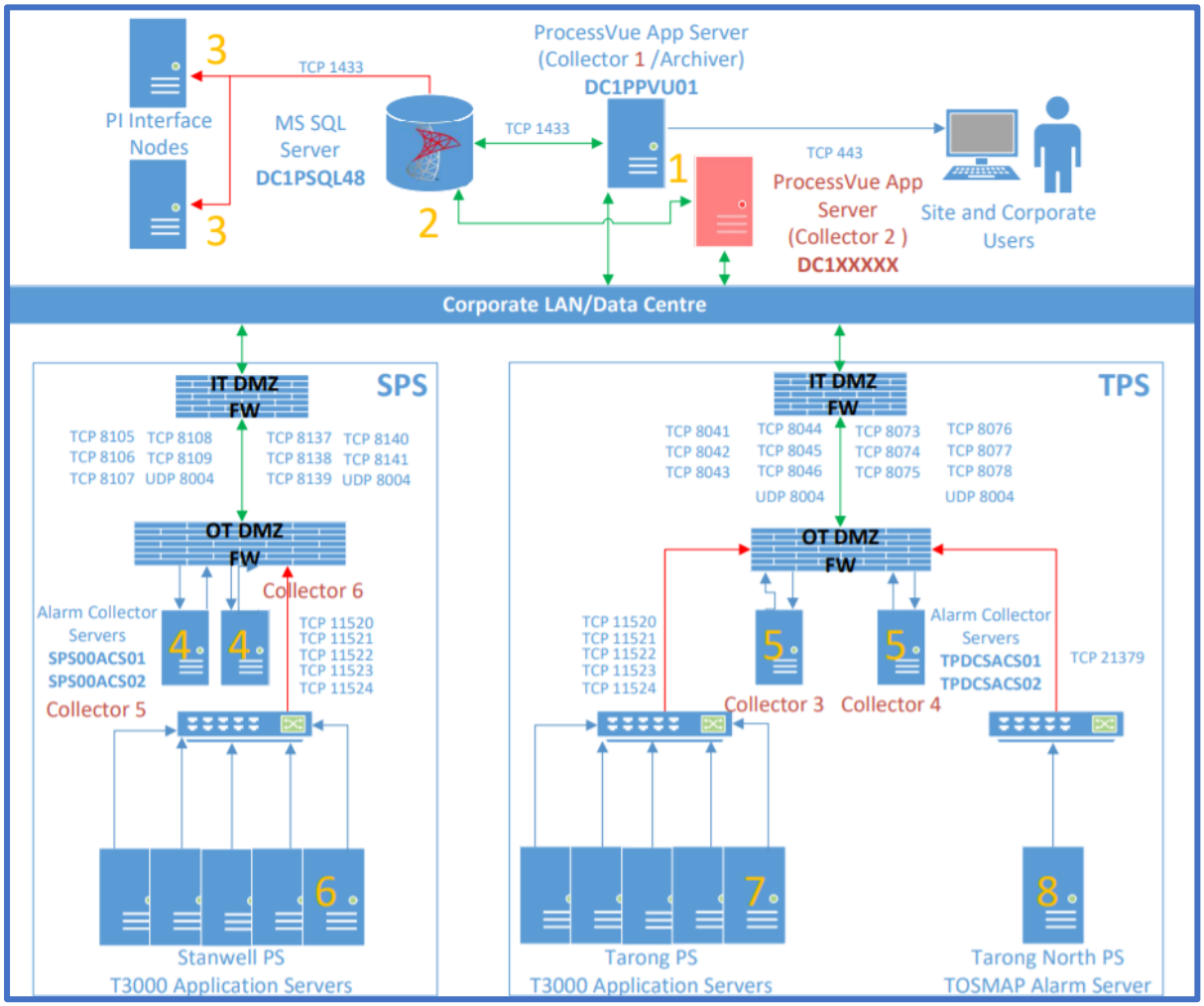
1. Overview and Objectives

The objective of this document is to provide an insight and instruction into setting up the TPS system in reference to the Architecture diagram. Following this guide will allow you to establish a connection for both of the Alarm Collector Services and use the ProcessVue functionality to only display messages from one of the Alarm Collector Services.

These functions include:

- **Output Reconstructor** – Rebuilds messages from fields in the MasterEventLog tables to output to an Ethernet Port. Once this rule is setup it will allow for Data to be read between different Data Collectors when aligned with the Message Routing.
- **Message Routing** – Allows you to route specific message data to another Connector Table. When configuring the Message Routing, selecting the Output Reconstructor option will allow for cross Collector routing.
- **Message Duplication** – Detects duplicate messages in the data. Duplicate Data can be checked across multiple Connectors.

Once you have implemented this on the TPS side of the system, you will be able to use this as guidance to setup the SPS side of the system and any additional expansion down the line.

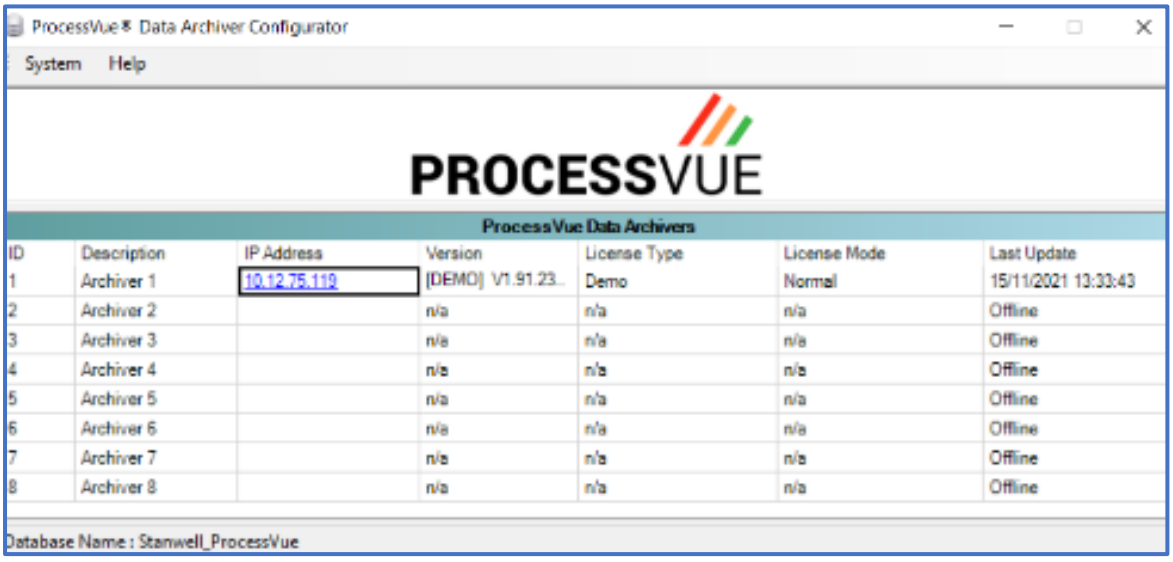


2. Setup and Configuration

1. The first thing that needs to be carried out is the installation of the Data Collector Service and Data Collector Configurator on each of the machines required. Following the installation guide for ProcessVue will allow you to successfully achieve this. This installation will be on machines ProcessVue App Server (Collector 1) and Machine 5 (Collectors3 and 4) in accordance with your TPS portion of the System Architecture.
2. Then, on the ProcessVue App Server machine where Collector 1 is located, you will need to install the ProcessVue Data Archiver Service and the Data Archiver Configurator. Following the installation guide will allow you to achieve this.

NOTE – This document assumes that you have the ProcessVue Software installed (Collectors, Archiver, Analyser).

1. Once you have installed the Software components and started the Services, open the Archiver Configurator.



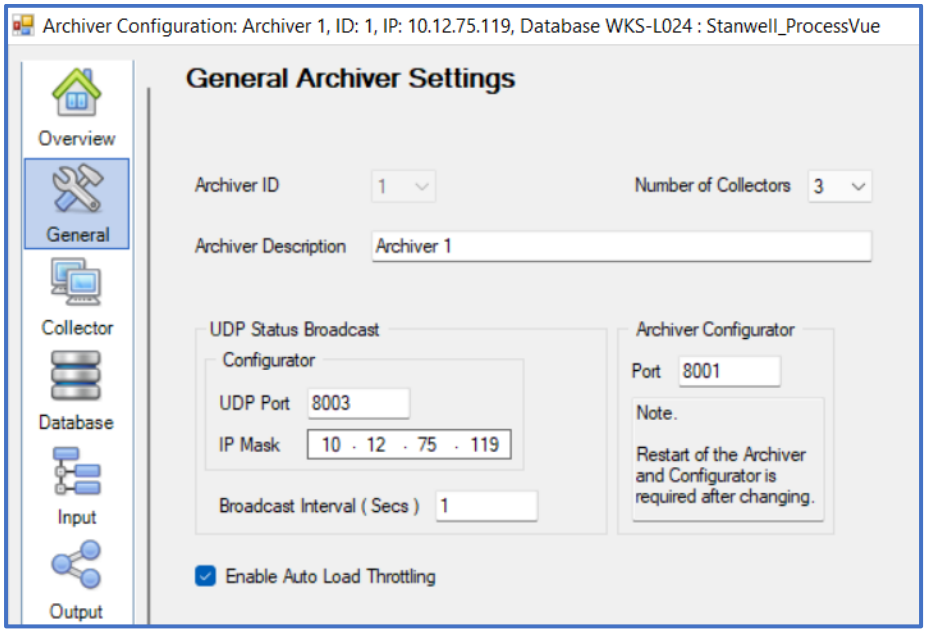
2. Click on the IP Address to login
   a. Default Username – **Admin**
   b. Default Password – **admin**

When you have logged in you will see the Data Archiver Overview screen. On this screen you see will the configured Collectors, the Connectors, the IP Addresses, and the assigned Ports. These will be displayed in either Red or Green. Green meaning there is an established connection between the Archiver and the Collector, Red meaning there is not a connection.

3. Setting the number of Data Collectors in the Archiver

1. On the menu bar on the left-hand side of the screen, select the General menu option.

2. Towards the right, there will be a dropdown menu for the **Number of Collectors,** select the dropdown menu and click on the required number of Collectors. *In this example it will be 3.* ***1x Collector on the Local Machine (Collector 1) and 2x Remote Data Collectors (Collector 3 and 4).*** *(You will need to increase this value when you are configuring additional sites (SPS)).*

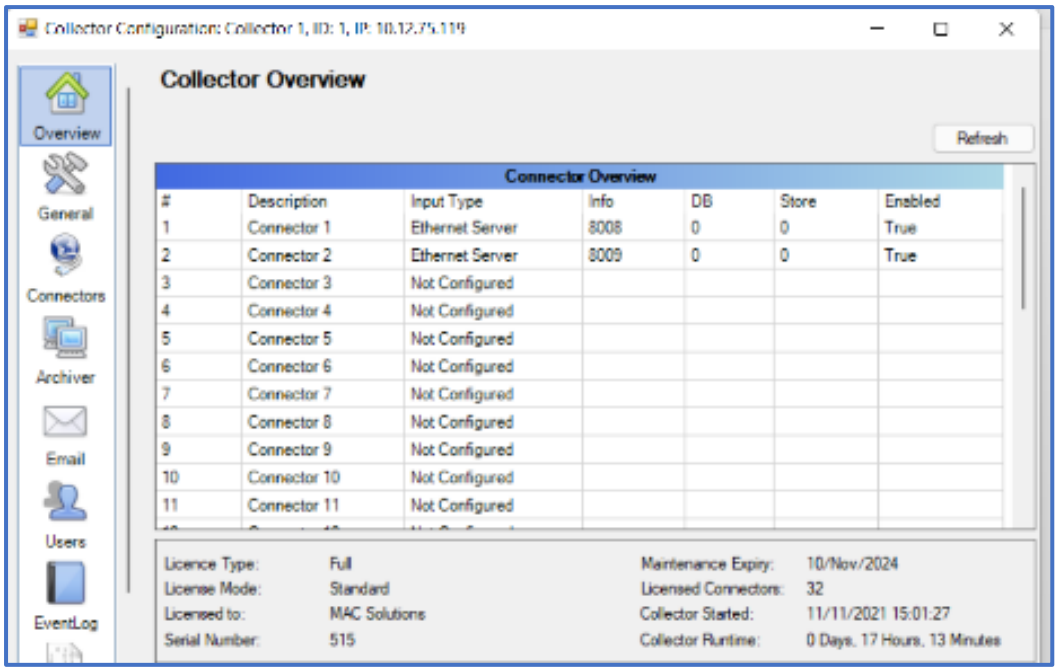


3. Click Apply.
4. For now, the Archiver Configurator can be closed or minimised.

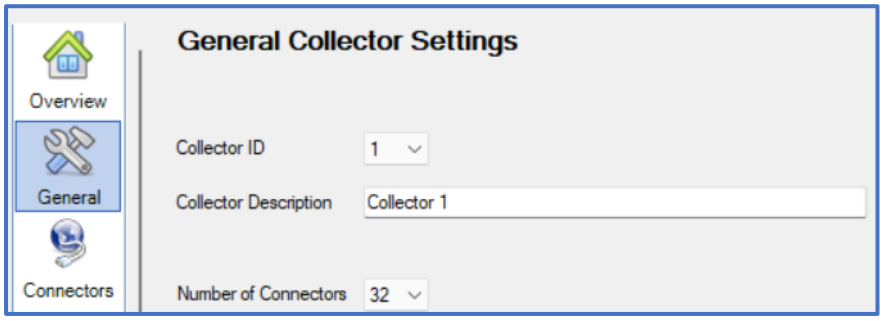
4. Local Data Collector (Collector 1)

1. Open the Data Collector Configurator on the machine it is sharing the Data Archiver on.
2. Click the IP Address to login entering the Username and Password.
   a. Username Default – **Admin**
   b. Password Default – **admin**
3. When you have logged into the Data Collector Configurator you will see the Collector **Overview screen.**

The Collector Overview screen will allow you to see your configured Inputs and the relevant Input type and Information associated.



4. Select the General menu option from the menu bar on the left-hand side.
5. On the **General Collector Settings** screen, you will be able to set the Collector ID, give the Collector a description and set the number of Connectors associated.



   a. Set the **Collector ID** to **1.** *This is the local Data Collector, therefore setting this Collector to ID 1 allows the system to be in-line with the architecture.*
   b. Change the **Collector Description** to Collector 1.
   c. **Number of Connectors** can range between 1 and 32, we will set this to 6 as there are 6 inputs for the system.
6. Click Apply to save the configuration.
7. From the menu on the left-hand side, select the Archiver tab.

In the Archiver tab on the Collector Configurator, this is where the Port Map is set in reference to the Collector ID which has been set in the General tab. To keep the different Data Collectors uniformed, having Collector ID 1 assigned and Collector ID 1 Port Map assigned with it ensures the Collectors are numbered in Chronological order.

The recommended Port Map is as follows:

Recommended Port Maps

8041 – 8072 Collector ID 1 *** Default

8073 – 8104 Collector ID 2

8105 – 8136 Collector ID 3

8137 – 8168 Collector ID 4

8169 – 8200 Collector ID 5

8201 – 8232 Collector ID 6

8233 – 8264 Collector ID 7

8265 – 8298 Collector ID 8

In relation to the remote Data Collectors (3 and 4), the following the Port Maps will be used:

Collector	**Port Map**
Collector 1	8041-8072
Collector 3	8105-8136
Collector 4	8137-8168

On the local Data Collector, 6 Ethernet inputs needing configuring to allow for the Outputted Data to be sent to the local Data Collector. With 6 different inputs being used you will need to set up 6 different Ethernet inputs and keeping the default Ports assigned. The default Ports for each Connector are:

Connectors	**Port Number**
Connector 1	8008
Connector 2	8009
Connector 3	8010
Connector 4	8011
Connector 5	8012
Connector 6	8013

NOTE – When you are creating the rules for the Output Reconstructor later in the document, you will see how the Output rules are setup for the local Ethernet Ports.

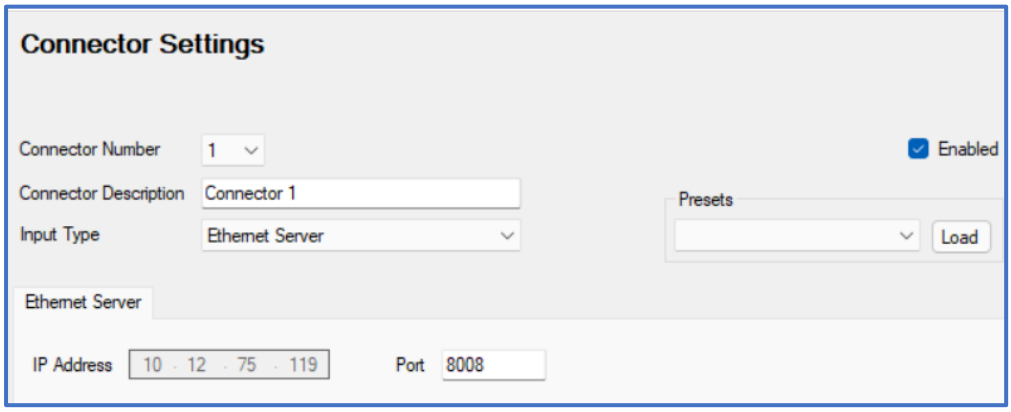
To achieve this, you must:

8. On the local Data Collector (Collector 1), select the Connectors menu option

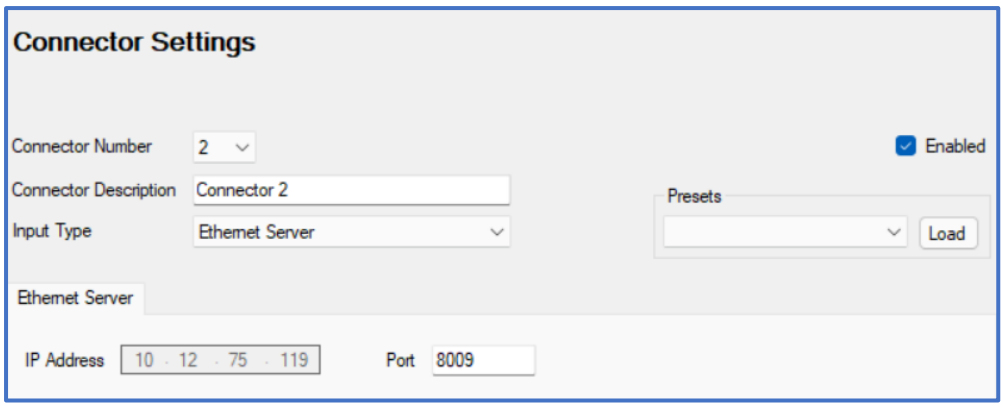
On the Connector Settings screen, you will first need to:

9. Set the Connector Number to 1
10. Set the Input Type to Ethernet
11. Click the enabled button
12. Click Apply to save the configuration.

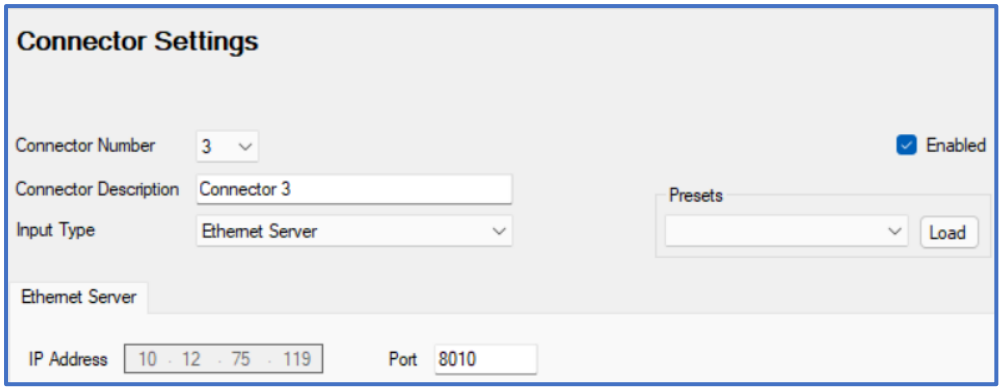
By default, the Port for Connector 1 will be set to 8008 as shown in the table above.



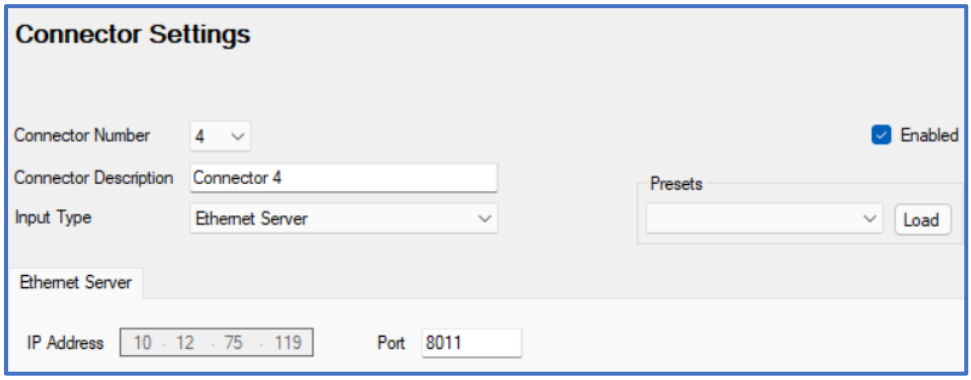
13. Follow the steps to setup Connector 1 for Connectors 2-6.
14. For Connector 2, set the Connector number to 2 and the Input Type to Ethernet.
15. Click the Enabled button and then Apply.



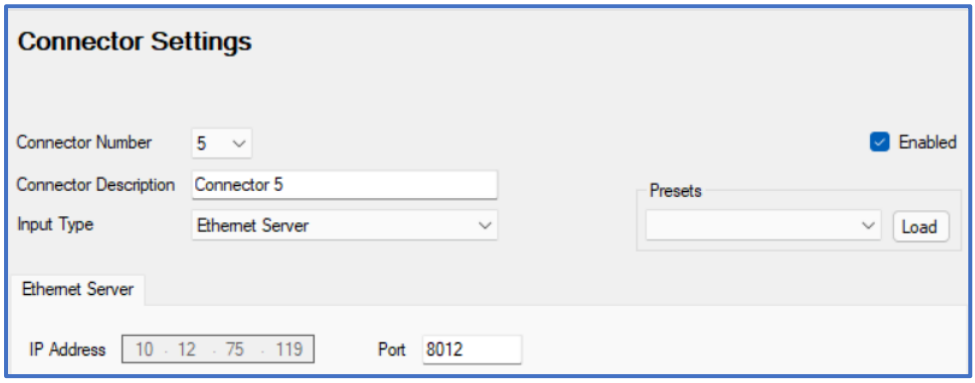
16. Follow the previous steps and apply this to Connector 3.



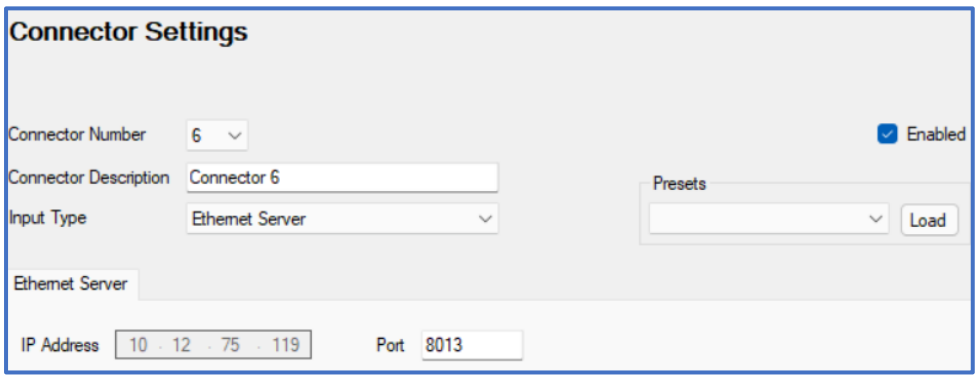
17. Select Connector 4 and configure the settings the same as the previous Connectors.



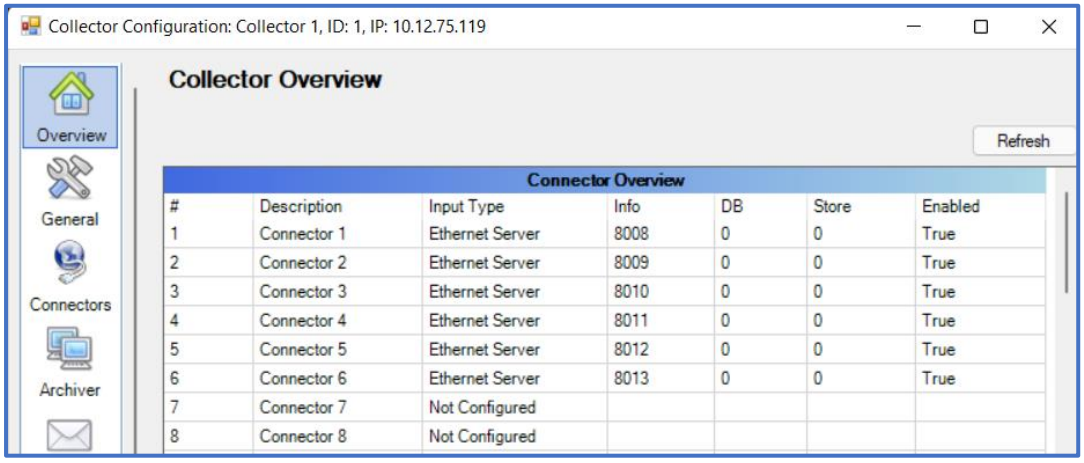
18. Select Connector 5 and configure the settings the same as the previous Connectors.



19. Select Connector 6 and configure the settings the same as the previous Connectors.



After configuring the inputs on Collector 1, you will be able to see them configured in the Overview screen.



5. Remote Data Collectors (Collectors 3 and 4)

The remote Data Collectors will need configuring to be able to communicate with the Data Archiver and allow for data to be received.

5.1 Collector 3

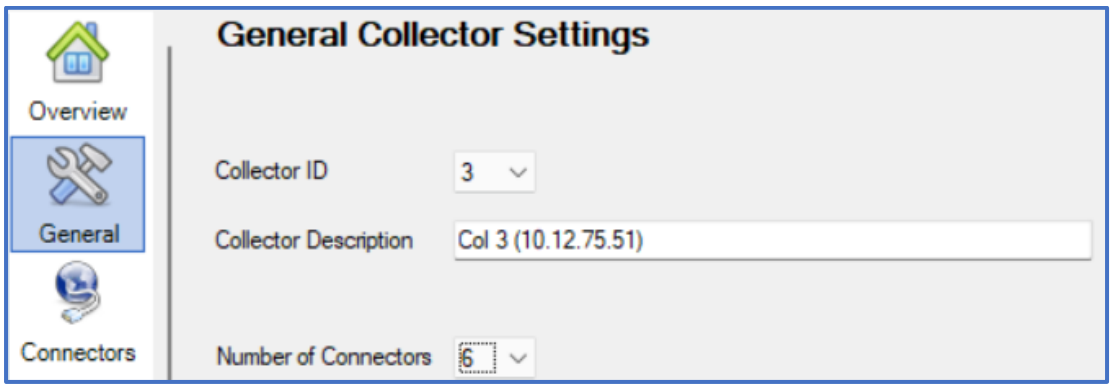
1. Login to the Data Collector Configurator on the machine where Collector 3 is installed.

2. Select the General Tab.

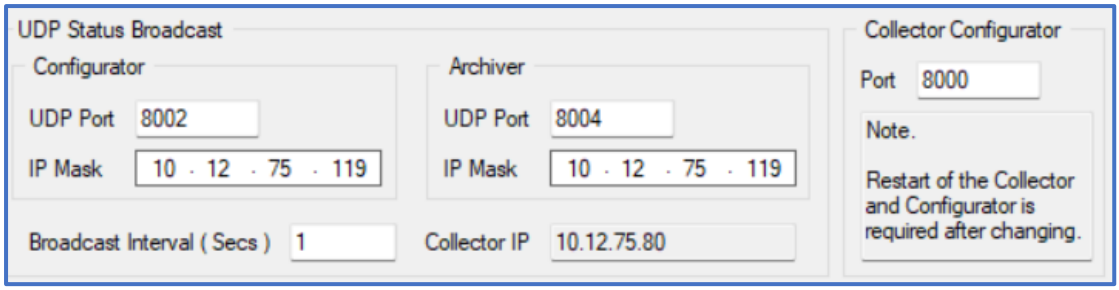
3. Set the Collector ID to 3.

4. Give the Collector Description a name of 'Collector 3'

5. Set the number of Connectors to 6.

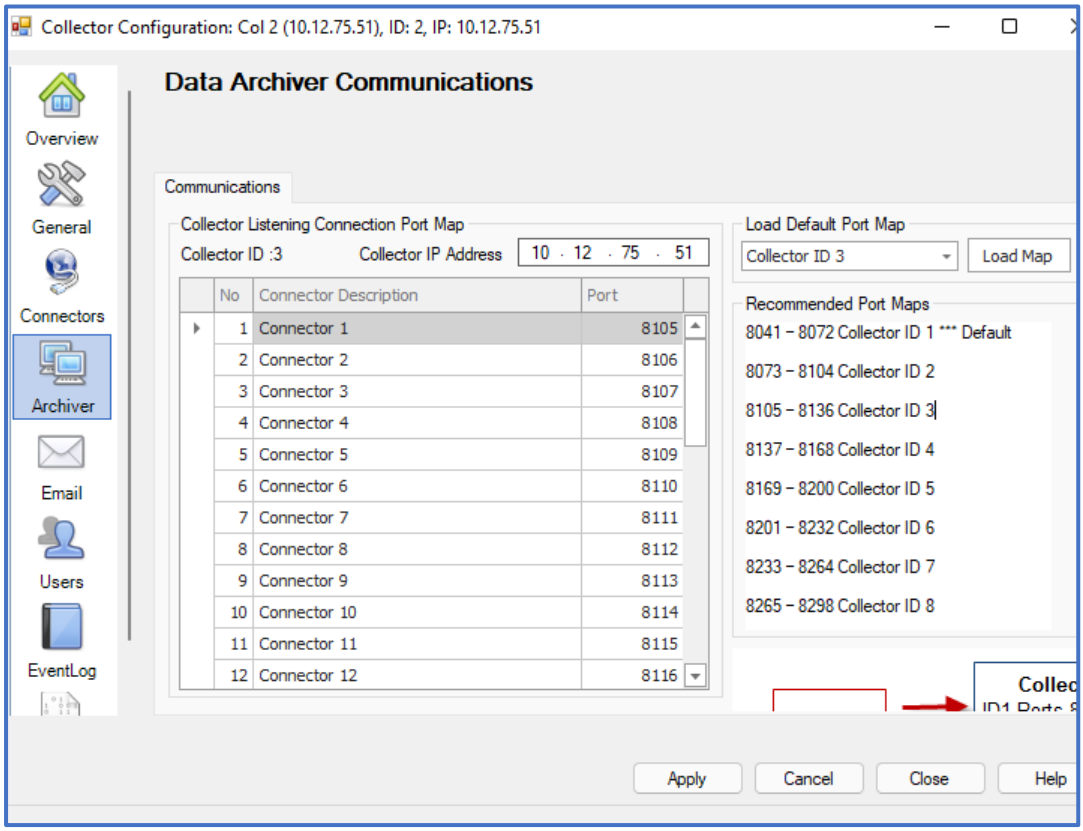


6. Under the UDP Status Broadcast, set the Archiver IP Mask to the IP Address of the Data Archiver.



7. Click Apply to save the settings.
8. Click the Archiver Menu Option

9. For Collector 3, load the Default Port Map for Collector ID 3 from the dropdown menu



10. Click Apply.

5.2 Collector 4

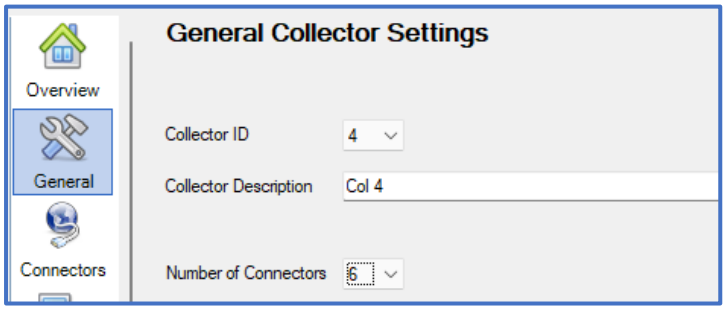
1. Login to the Data Collector Configurator on the machine where Collector 4 is installed.

2. Select the General Tab.

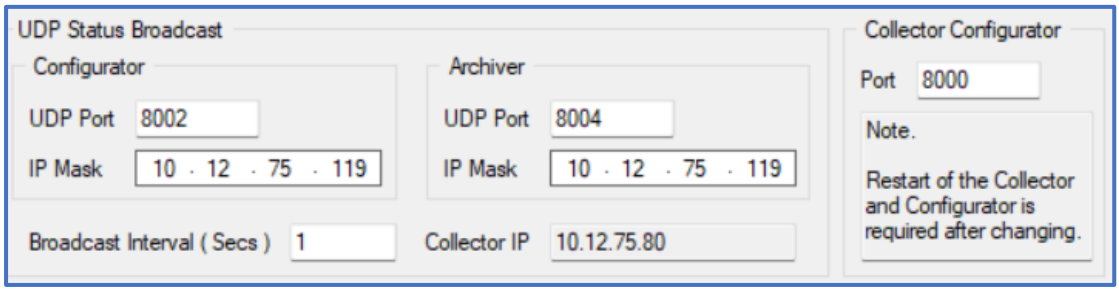
3. Set the Collector ID to 4.

4. Give the Collector Description a name of 'Collector 4'

5. Set the number of Connectors to 6.

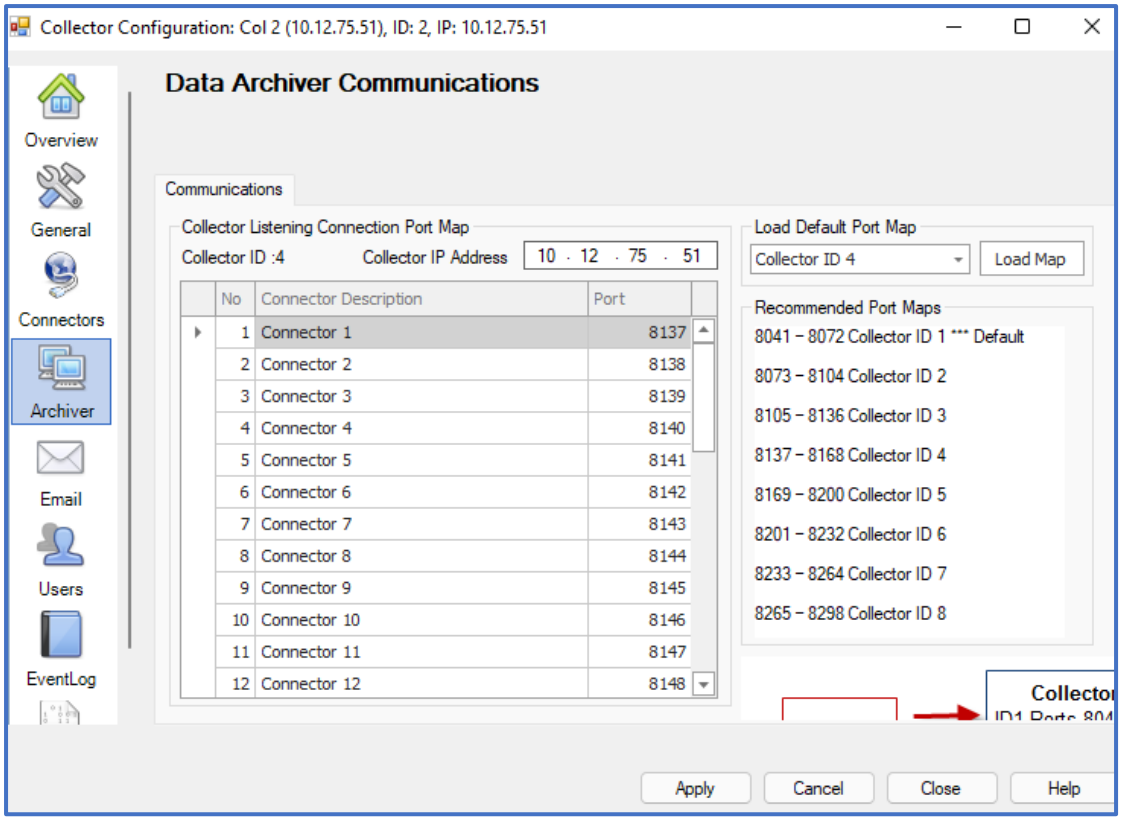


1. Under the UDP Status Broadcast, set the Archiver IP Mask to the IP Address of the Data Archiver.



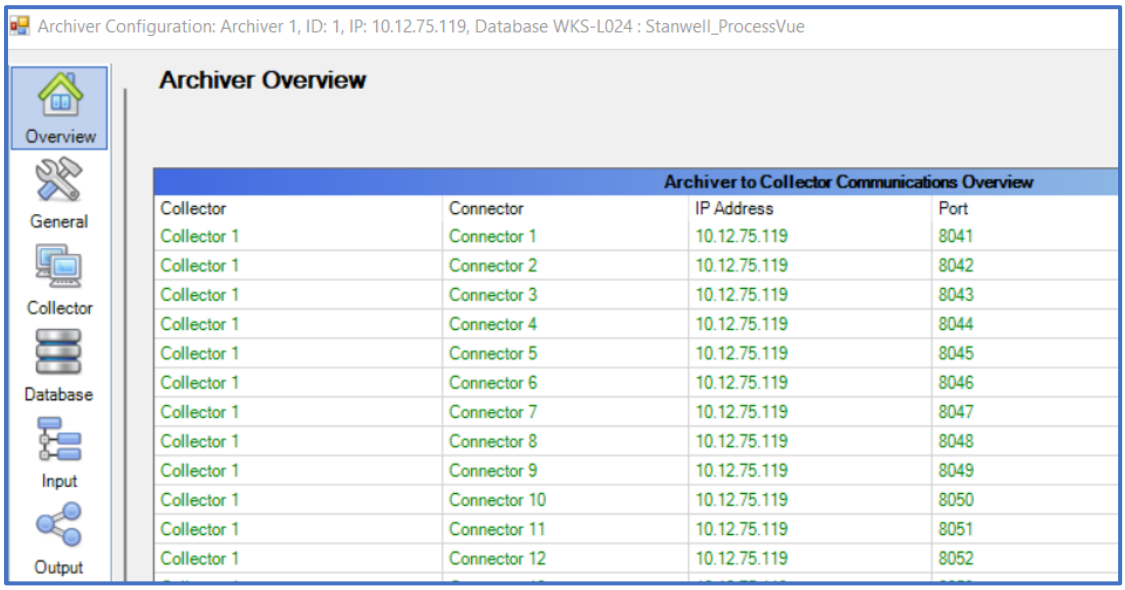
2. Click Apply to save the settings.
3. Click the Archiver Menu Option

4. For Collector 4, load the Default Port Map for Collector ID 4 from the dropdown menu



5. Click Apply.

After setting up the remote Data Collector communications to communicate with the Data Archiver, you will be able to see a list of all the Archiver to Collector Communications Overview in the Data Archiver.



6. Archiver Configuration

The Output Reconstructor is used to setup rules to allow for data to be routed between Data Collectors. With the remote Data Collectors collecting data from source and being received by the Data Archiver, the Output Reconstructor will then push the data back out to the configured Port on the Local Data Collector to be received and stored by the Data Archiver/SQL DB.

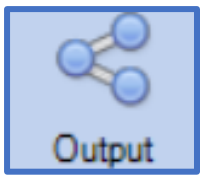
6.1 Overview

To successfully set up a configuration which uses the Output Reconstructor and route the messages between Data Collectors and filter out duplicate messages here is an overview of the actions to be carried out:

1. Setup the Pool for the Output Reconstructor rules for 6 inputs on the 2 Remote Data Collectors.
    a. 6 separate pools will need configuring with the IP Address for the Local Data Collector and different Ports for each of the configured Ethernet Inputs.
    b. Configuration in the Field Merge Setup tab. *This will determine what data fields are identified to be passed through as part of the Output Reconstructor.*
2. Configure the Message Routing with the Output Reconstructor rules created for each of the 6 inputs on both remote Data Collectors.
    a. Both Remote Data Collector will need the Output Reconstructor Rule in the Message Routing to be setup.
    b. Connector 1 Inputs will need the same Output Reconstructor rule applying. The same will apply for all the other inputs on each remote Data Collector.
3. On the Duplicate Filter, a rule will need creating in the Pool setup which will also need creating 5 more times so there is a rule for all 6 inputs. *The Duplicate Message Handler will need the following:*
    a. Stack Size – 5000
    b. Deadband (Secs) – 60
    c. Duplicate Window Size – 500
    d. Mode – Delete
    e. On the Connector Setup tab, you need to select the Local Data Collector and Connector 1 and select the first Pool setup rule.
        i. Repeat Step 5 by selecting Connector 2 and the second rule from the Pool Setup and repeat again through to Connector 6.
4. Save the existing configuration out to CCI file and then load the CCI files for the Parsing rules so that they are set for each input on the Local and the Remote Data Collectors.

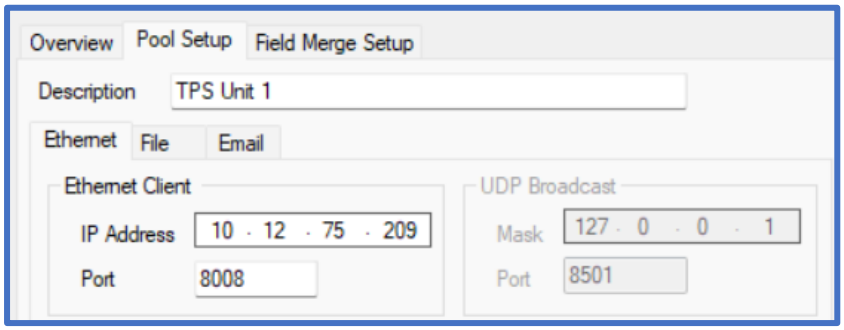
6.2 Output Reconstructor

1. Open the Archiver Configurator and select the Output menu option

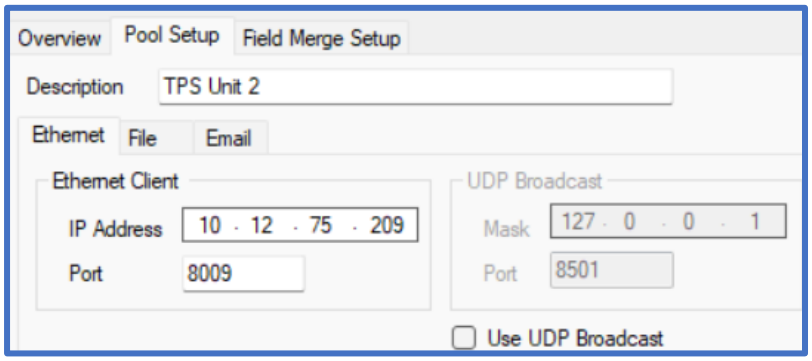


2. Select the Pool Setup tab
3. Towards the right-hand side, right-click Output Reconstructor and click Add

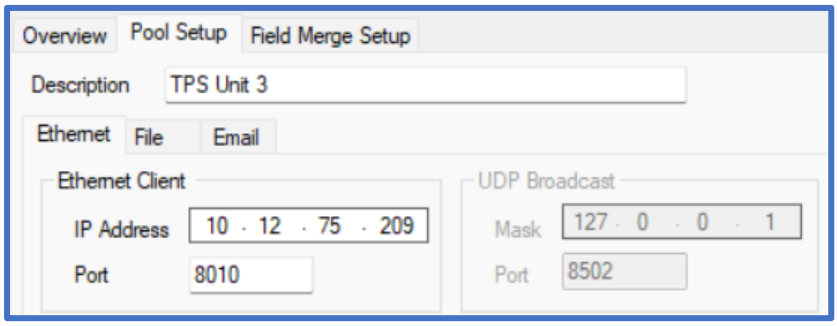
4. Enter the IP Address of the Local Data Collector (Collector 1) and the Port number for the Connector 1 Ethernet Port which has been setup during the configuration of the Local Data Collector earlier in the document. *(Default Connector 1 Ethernet Port is 8008 and the Port Number increments by 1 when the next Connector is selected).*



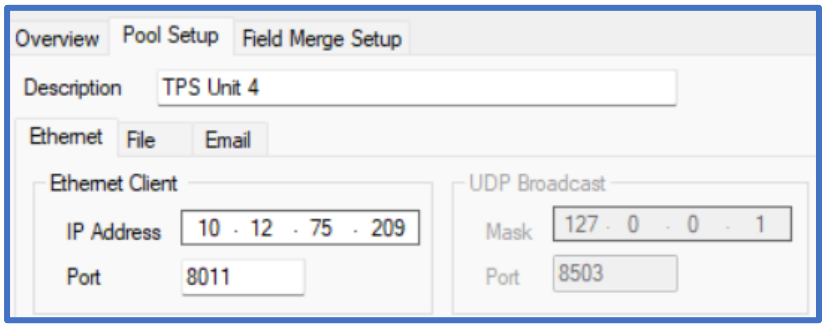
5. Give the rule a Description to align with Connector 1 and Save the settings.
6. Repeat the steps to create 5 more rules for the remaining inputs, right clicking the Output Reconstructor each time and adding a new rule:
7. TPS Unit 2 – Enter the IP Address of the Local Data Collector, assign Port Number 8009 and save the configuration.



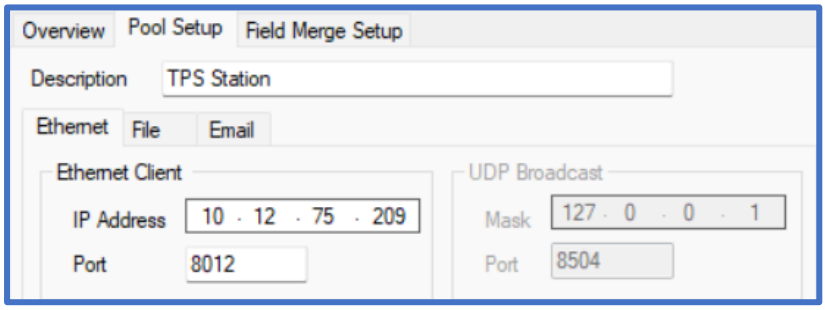
8. TPS Unit 3 – Enter the IP Address of the Local Data Collector, assign Port Number 8010 and save the configuration.



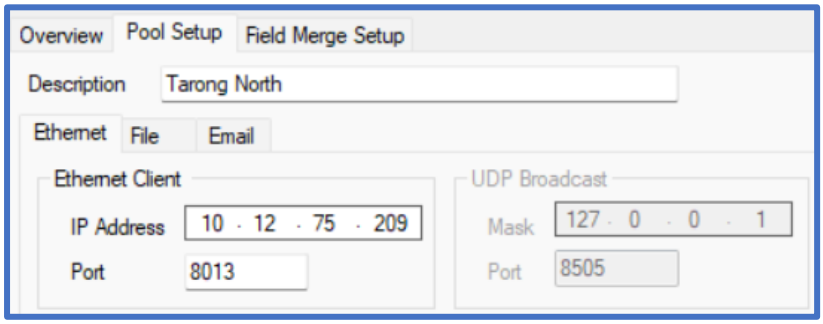
9. TPS Unit 4 – Enter the IP Address of the Local Data Collector, assign Port Number 8011 and save the configuration.



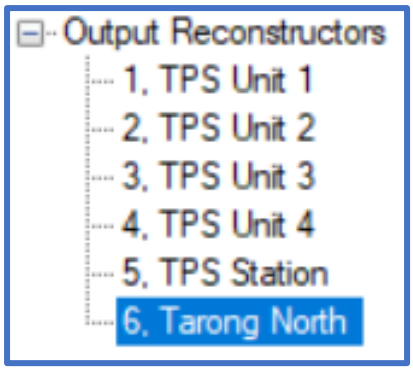
10. TPS Station – Enter the IP Address of the Local Data Collector, assign Port Number 8012 and save the configuration.



11. Tarong North – Enter the IP Address of the Local Data Collector, assign Port Number 8013 and save the configuration.

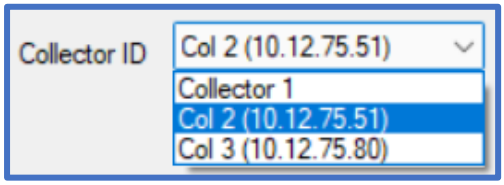


12. Once you have added the new rules, they will be listed in the right-hand pane.

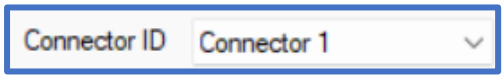


13. After the Pool Setup configuration has been complete, select the Field Merge Setup tab

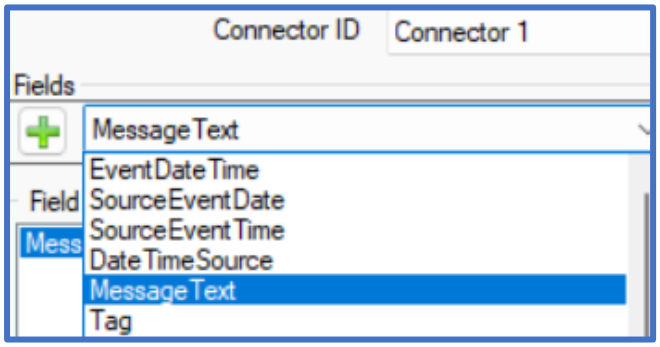
14. Select a Remote Collector from the Dropdown menu



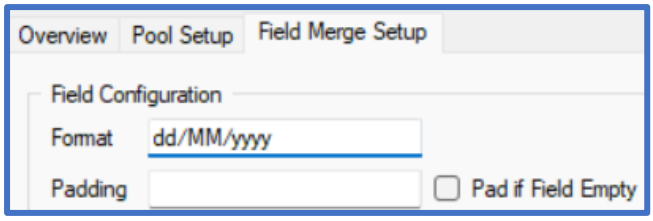
15. Select Connector 1 from the Connector ID dropdown menu



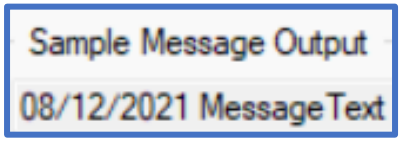
16. Select Message Text from the dropdown list under Fields and click Add.



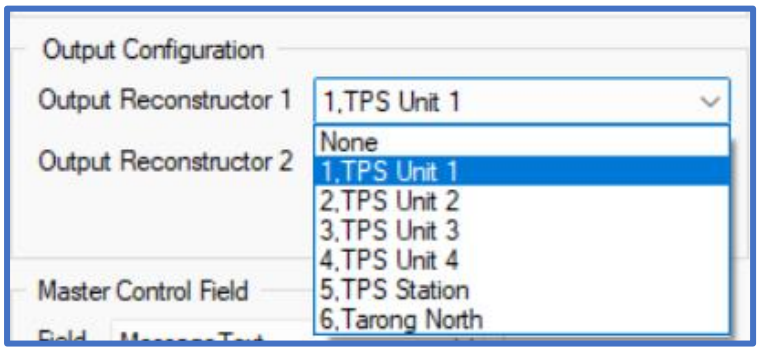
17. Under Field Configuration on the left-hand side, the Format field will only be applicable if the EventDateTime field has been selected. Here you will have to enter the format of your EventDateTime: E.g., dd/MM/yyyy



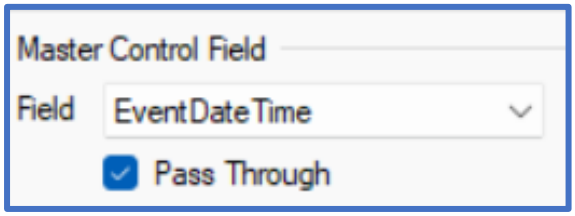
NOTE – A Sample Message Output will be constructed at the bottom of the page when Fields are added.



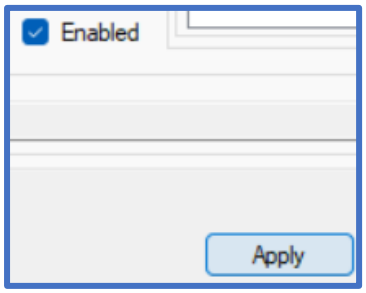
18. Under Output Configuration, select TPS Unit 1 for the Dropdown list for Connector 1.



19. The Master Control Field will allow you to select a Field to automatically Output the data if no data can be found in any of the Fields you have selected.

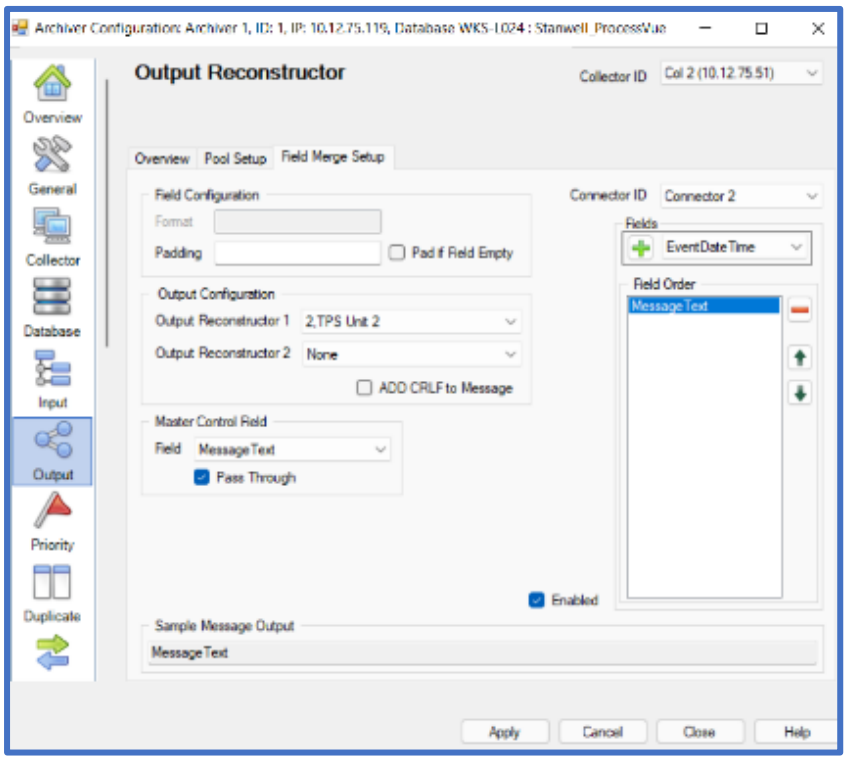


20. Click the Enabled button and then Apply to save the configuration.

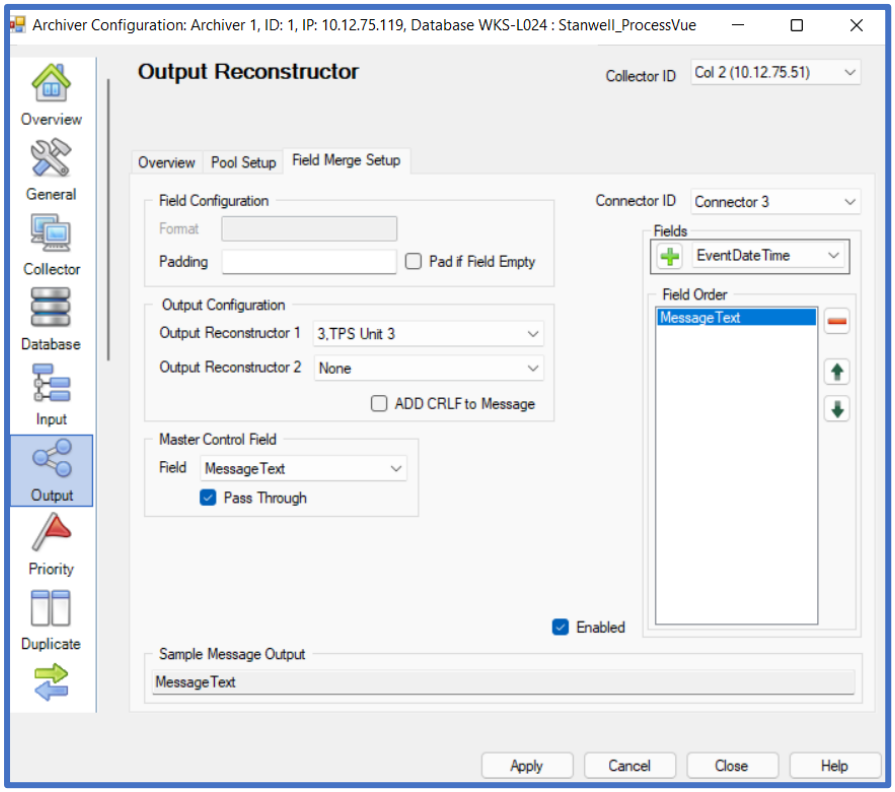


For Connectors 2-6, you will need to repeat the steps above, but ensure you select the next Connector from the Connector ID Dropdown list and place assign the Output Rule which matches the selected Connector.

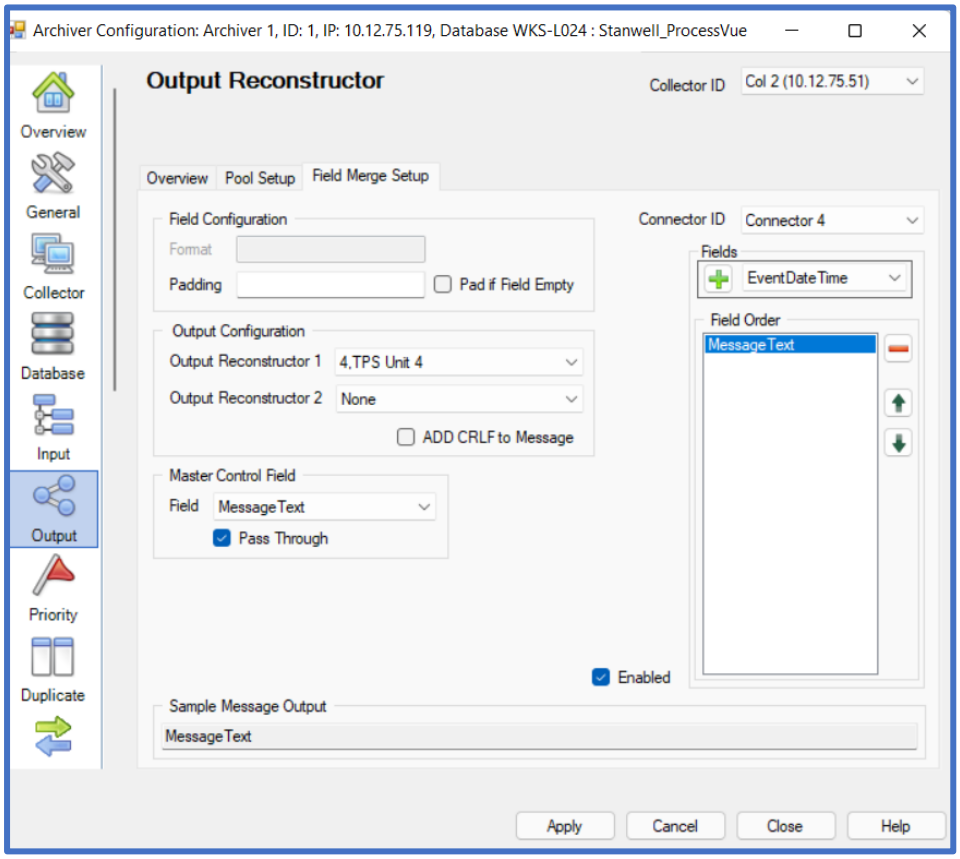
21. For Connector 2, make sure that Connector 2 is selected from the dropdown list, you enter the Fields, select TPS Unit 2 from the Output Configuration, enable the rule and Apply it.



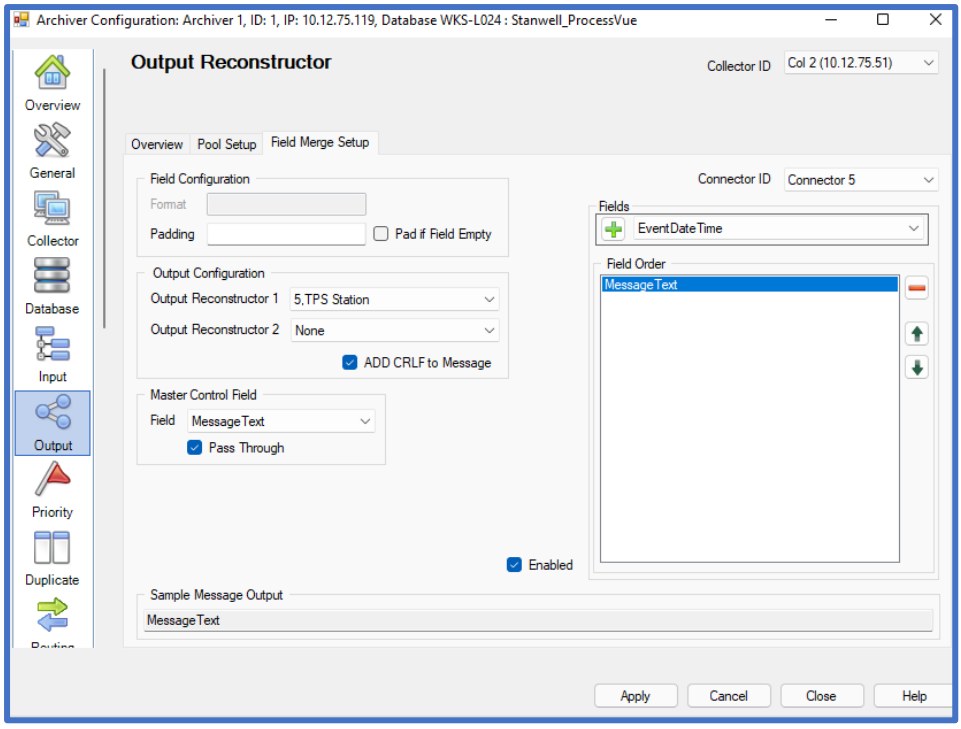
22. For Connector 3, make sure that Connector 3 is selected from the dropdown list, you enter the Fields, select TPS Unit 3 from the Output Configuration, enable the rule and Apply it.



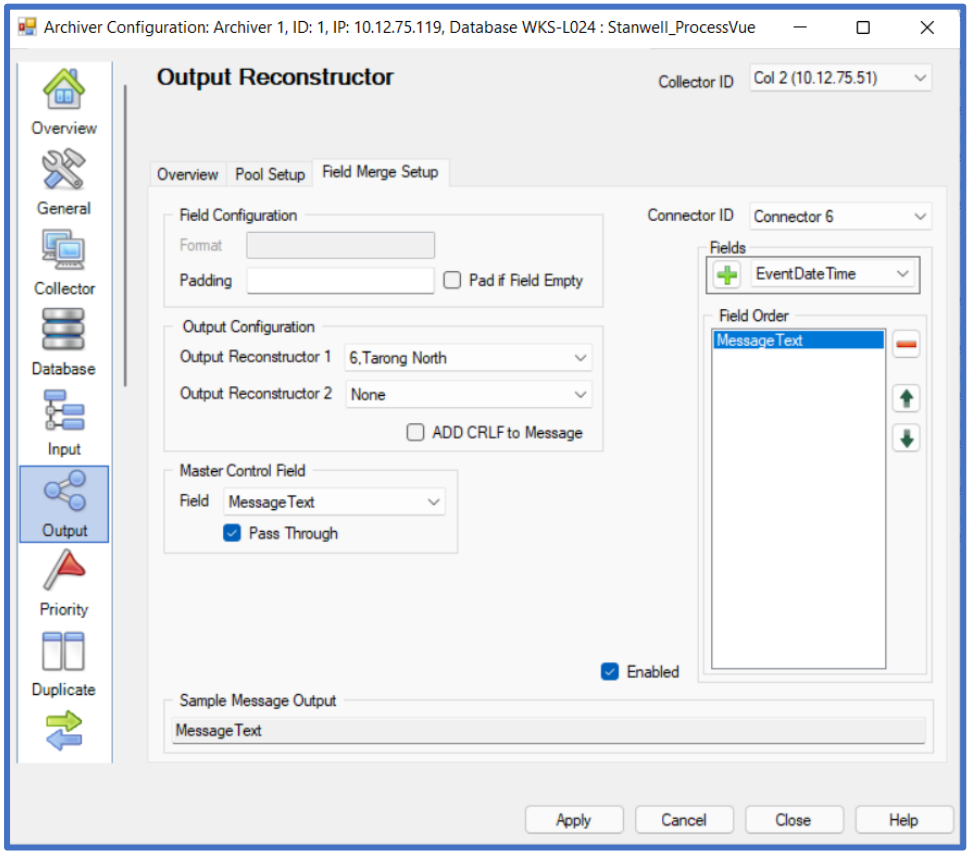
23. For Connector 4, make sure that Connector 4 is selected from the dropdown list, you enter the Fields, select TPS Unit 4 from the Output Configuration, enable the rule and Apply it.



24. For Connector 5, make sure that Connector 5 is selected from the dropdown list, you enter the Fields, select TPS Station from the Output Configuration, enable the rule and Apply it.

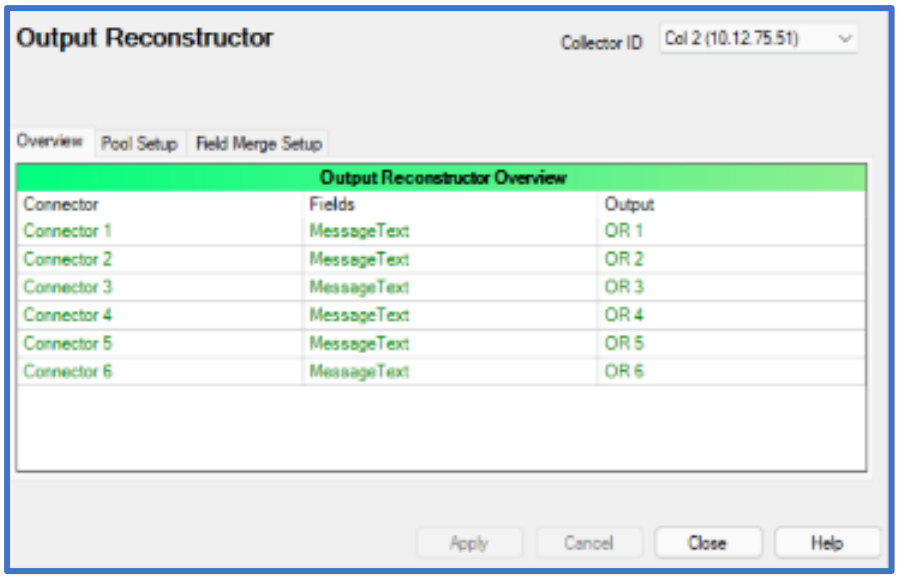


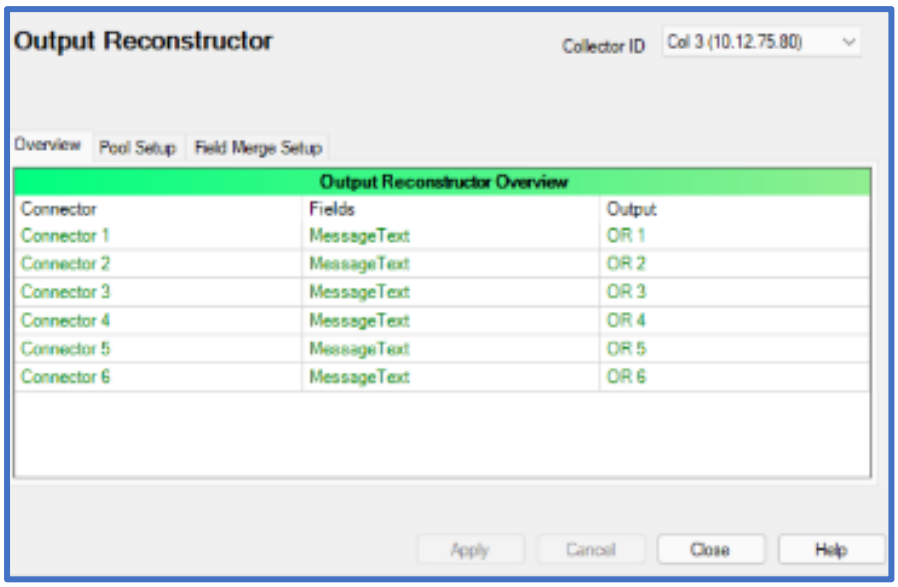
25. For Connector 6, make sure that Connector 6 is selected from the dropdown list, you enter the Fields, select Tarong North from the Output Configuration, enable the rule, and Apply it.



26. After setting up the Field Merge Setup for the first remote Data Collector (Collector 3), the **exact** same rules will need implementing on the second remote Data Collector (Collector 4) for Connectors 1-6.

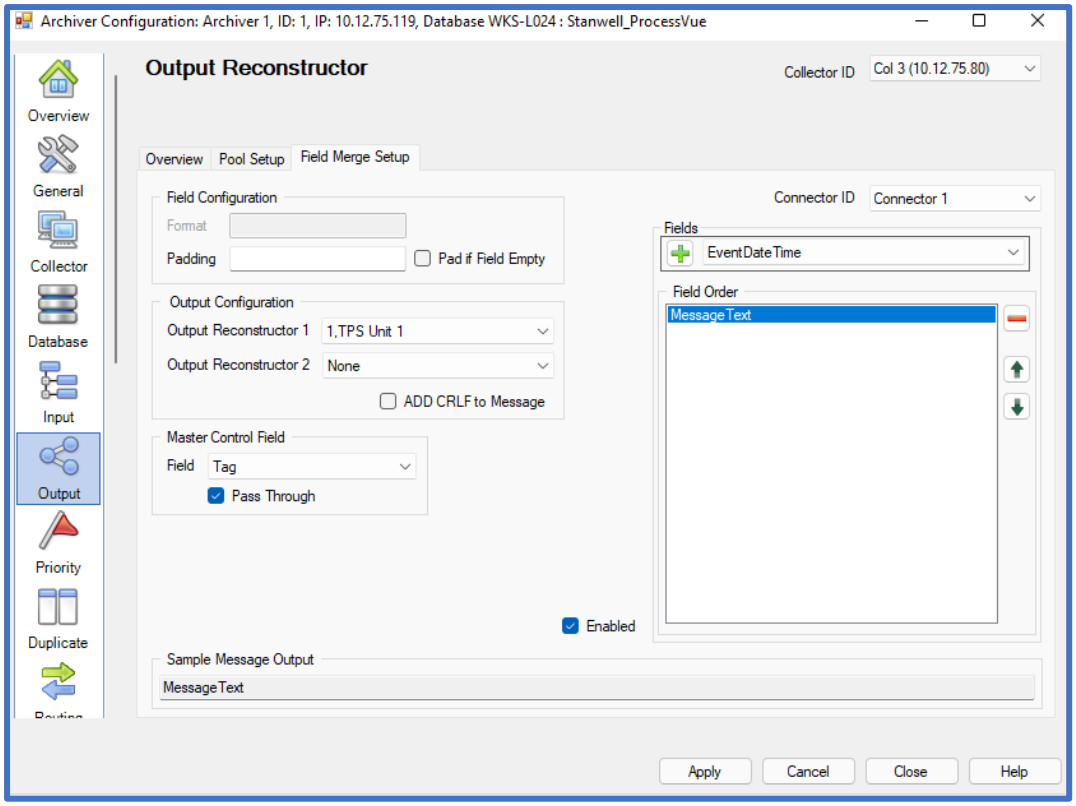
    Creating the rules for Collector 4 means the data will be outputted to the same input on Collector 1 to allow for the duplicate rule to remove any duplicate messages. The rules for the Output Reconstructor do not need assigning to the Local Data Collector (Collector 1). Once the rules have been put in place for both Remote Data Collectors, selecting the Overview screen will give you an indication of the rules in place for the Connectors on a Data Collector.



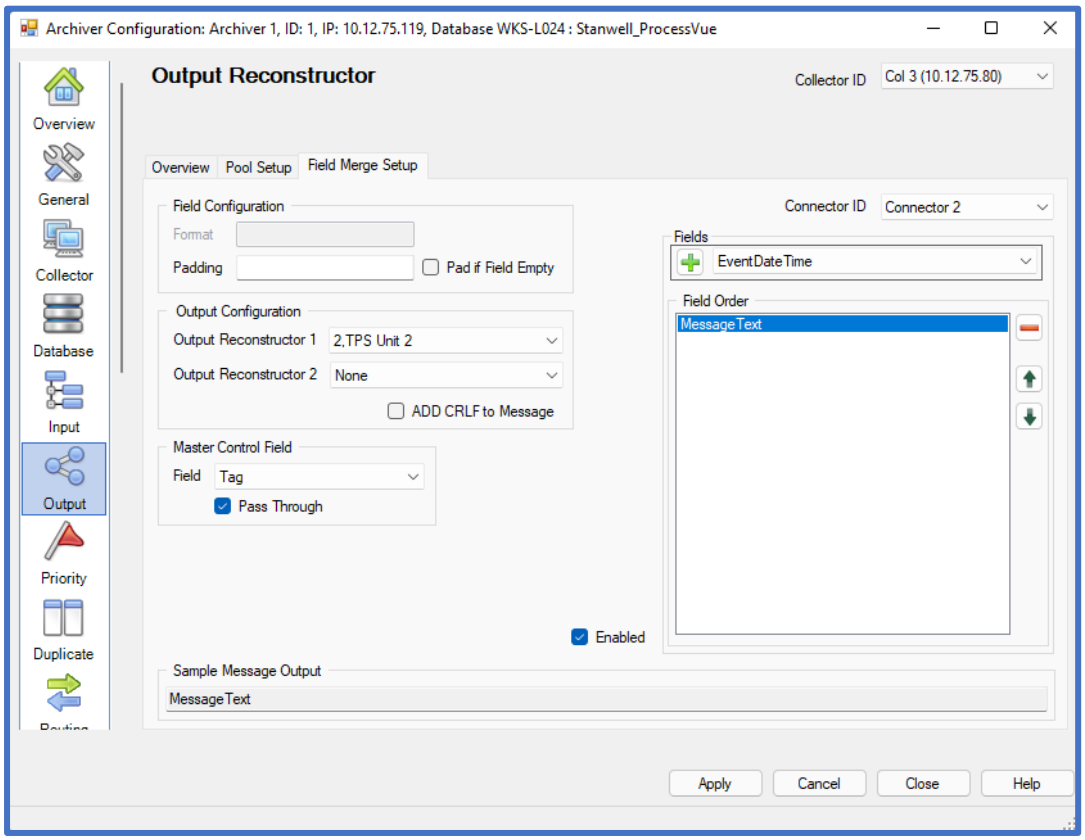


Collector 4 Output Reconstructor Field Merge Setup:

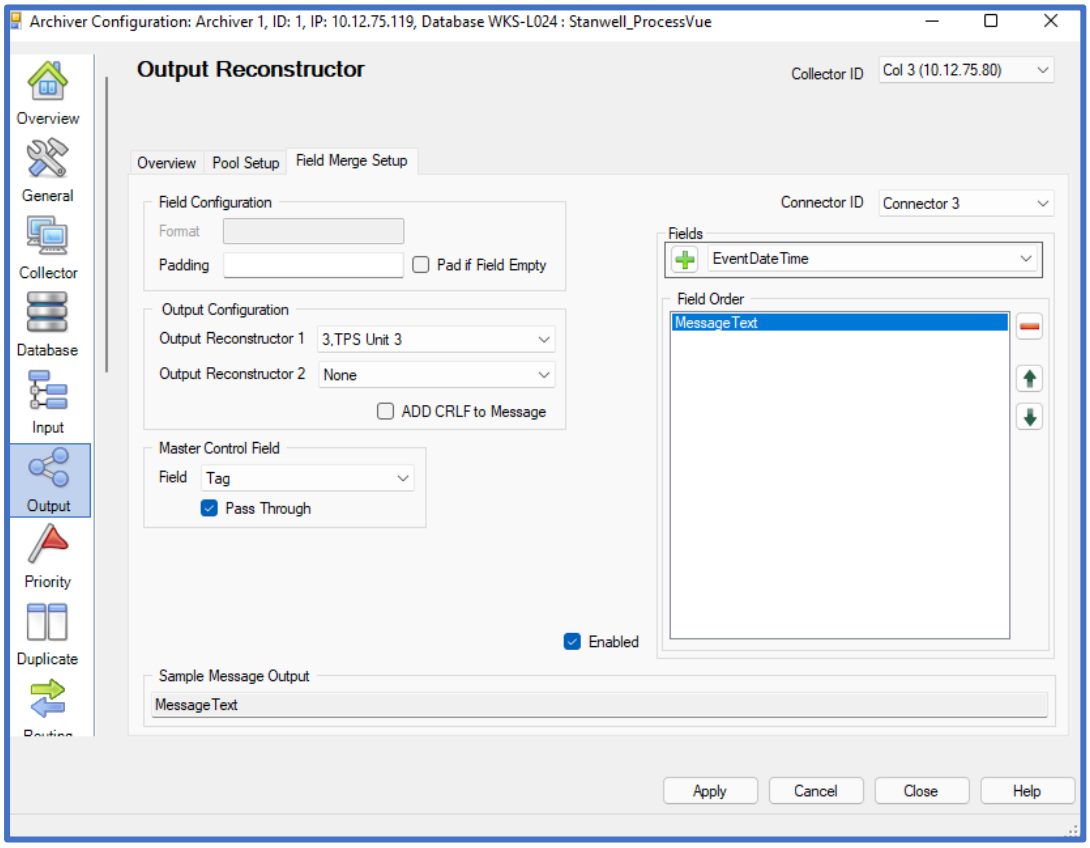
1. For Connector 1, make sure that Connector 1 is selected from the dropdown list, you enter the Fields, select TPS Unit 1 from the Output Configuration, enable the rule, and Apply it.



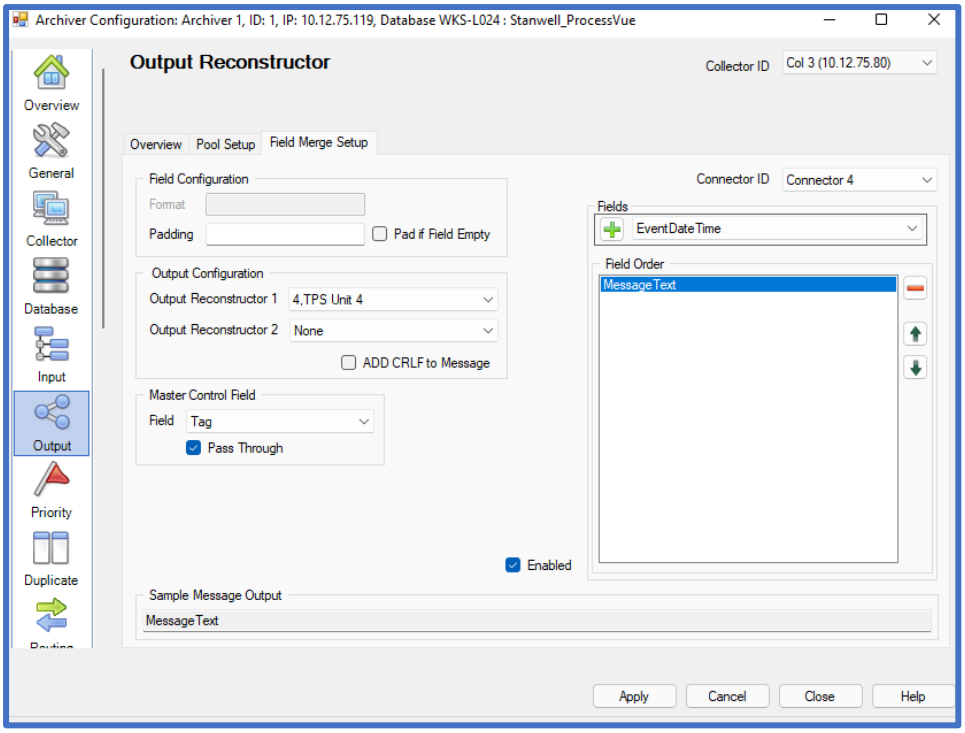
2. For Connector 2, make sure that Connector 2 is selected from the dropdown list, you enter the Fields, select TPS Unit 2 from the Output Configuration, enable the rule, and Apply it.



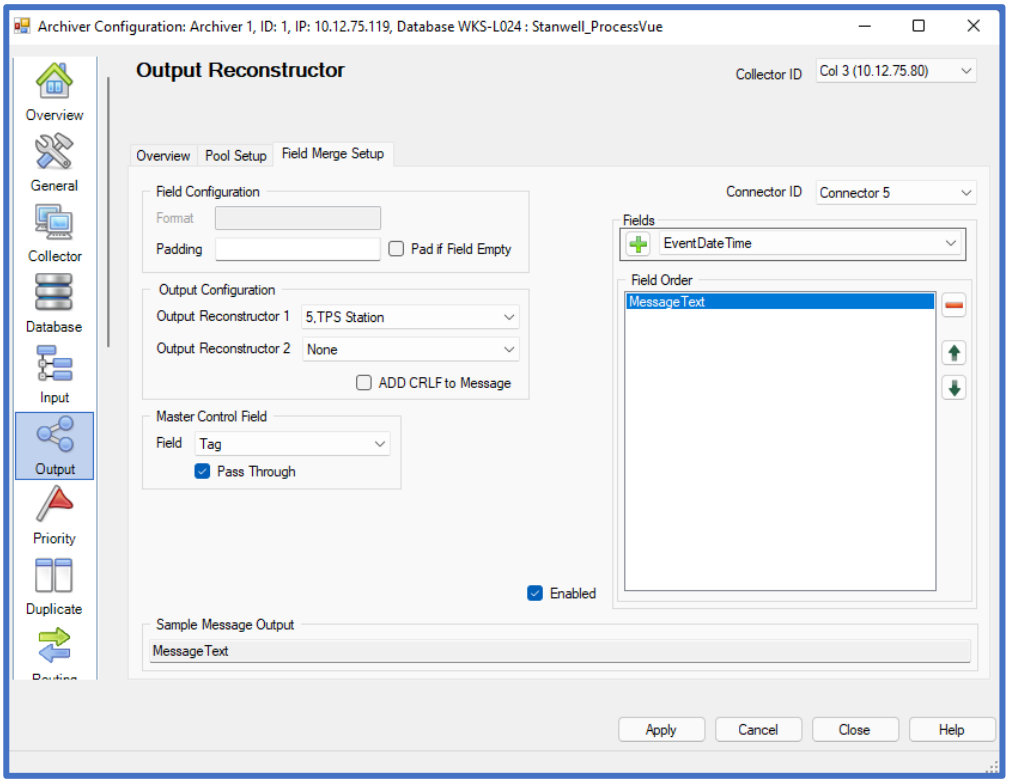
3. For Connector 3, make sure that Connector 3 is selected from the dropdown list, you enter the Fields, select TPS Unit 3 from the Output Configuration, enable the rule, and Apply it.



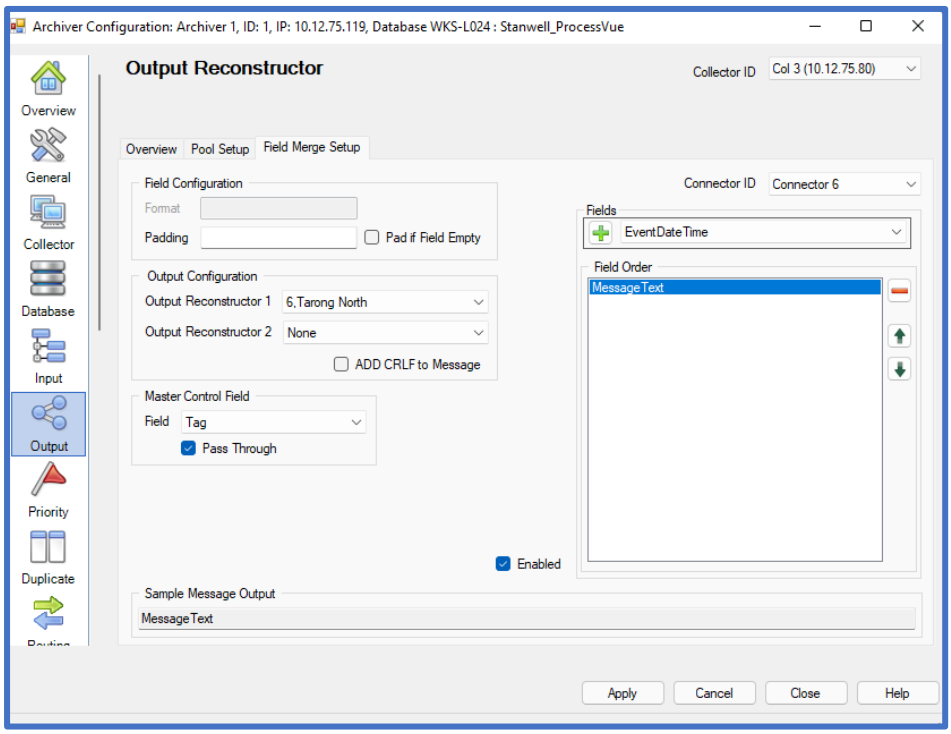
4. For Connector 4, make sure that Connector 4 is selected from the dropdown list, you enter the Fields, select TPS Unit 4 from the Output Configuration, enable the rule, and Apply it.



5. For Connector 5, make sure that Connector 5 is selected from the dropdown list, you enter the Fields, select TPS Station from the Output Configuration, enable the rule, and Apply it.



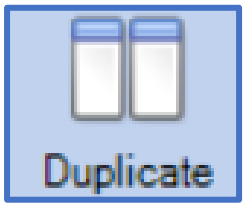
6. For Connector 6, make sure that Connector 6 is selected from the dropdown list, you enter the Fields, select Tarong North from the Output Configuration, enable the rule, and Apply it.



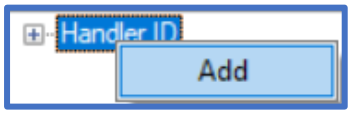
6.3 Message Duplication

The Duplicate message module detects duplicate messages within the data. When duplicate data is detected, it is either masked or deleted depending on the mode you select. If the data is masked then ProcessVue will ignore this data, if you select delete, it will be deleted.

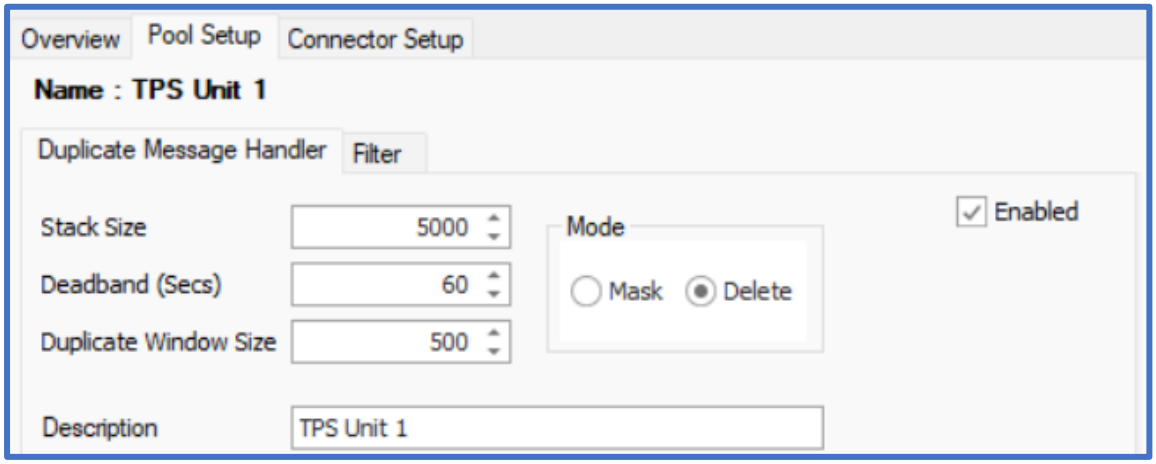
1. Select the Duplicate menu item from the bar on the left-hand side



2. The Overview tab will give you a view of the Duplicate rules which have been configured so far. If there are no rules configured it will show None under the Linked column.
3. Select the Pool Setup tab.
4. Towards the right-hand side, under Handler, right-click on the Handler ID and click Add.

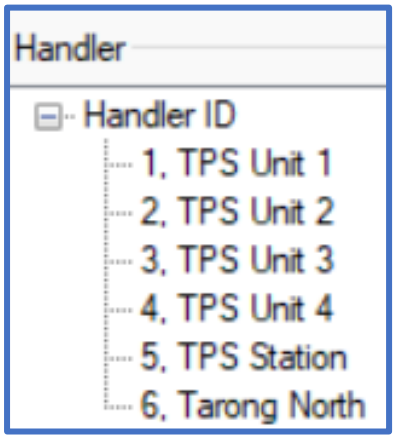


5. Under the Duplicate Message Handler tab that appears, enter the following into the fields:

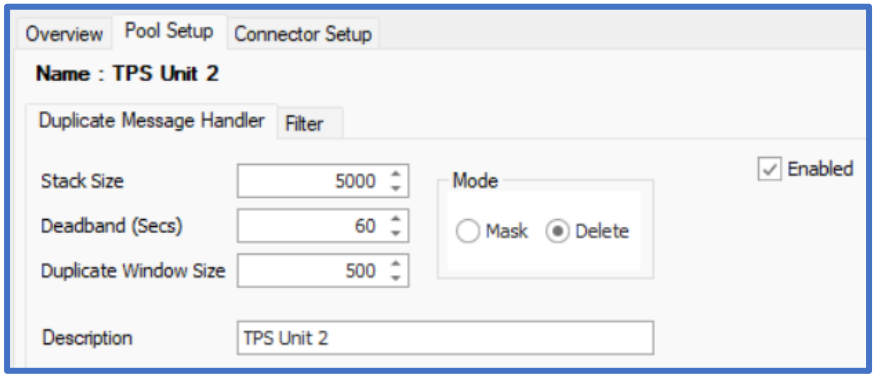


NOTE - This configuration was internally tested for when the Archiver machine is down for updates/patching. This allows for messages which are built up in the Collector buffers to be archived and remove the duplicates at the same time.

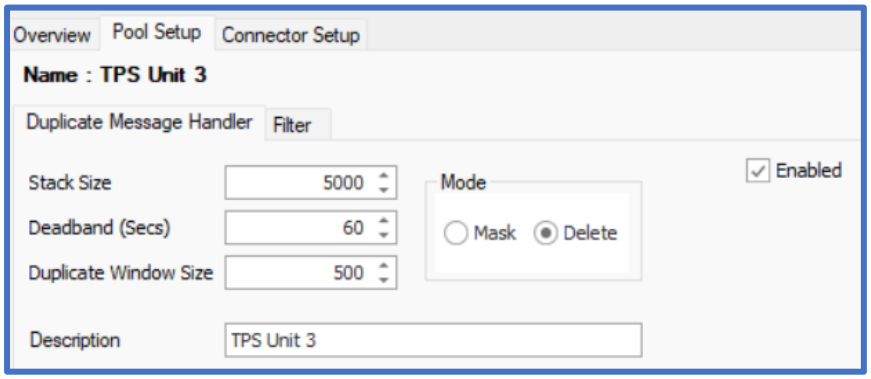
6. Give the Pool Setup a description, Rule 1 – TPS Unit 1, Rule 2 – TPS Unit 2 etc…
7. Click the Enabled box and then Apply to save the setup.
8. Repeat the Steps so you have a Pool Setup for all 6 inputs by right clicking the Handler ID and clicking Add.



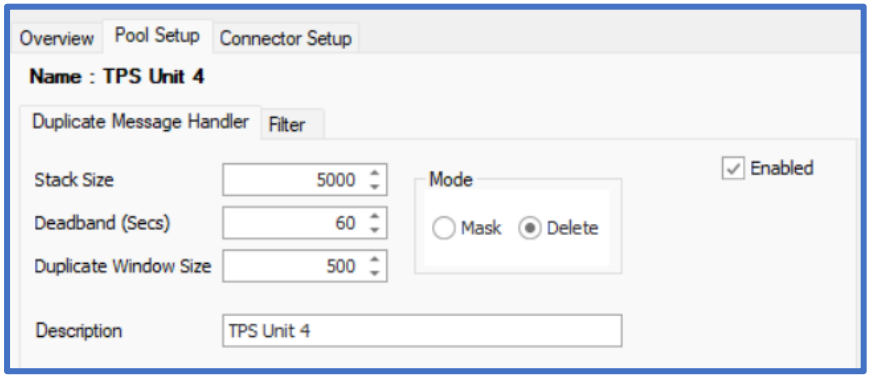
9. Setup for TPS Unit 2 configured the same as TPS Unit 1.



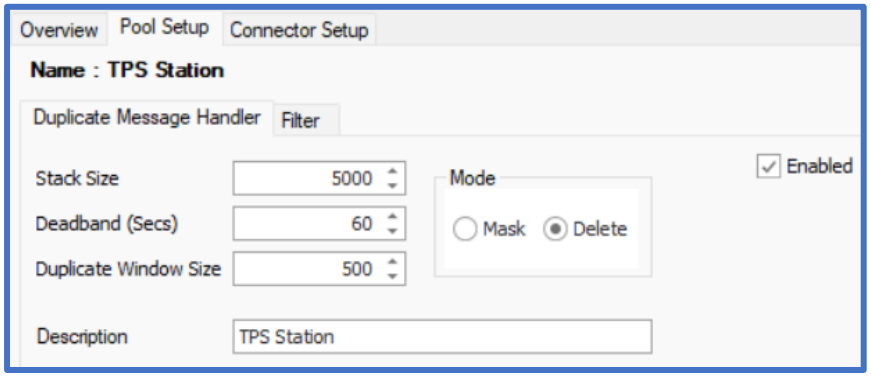
10. Setup and configuration for TPS Unit 3 in line with the previous Setups.



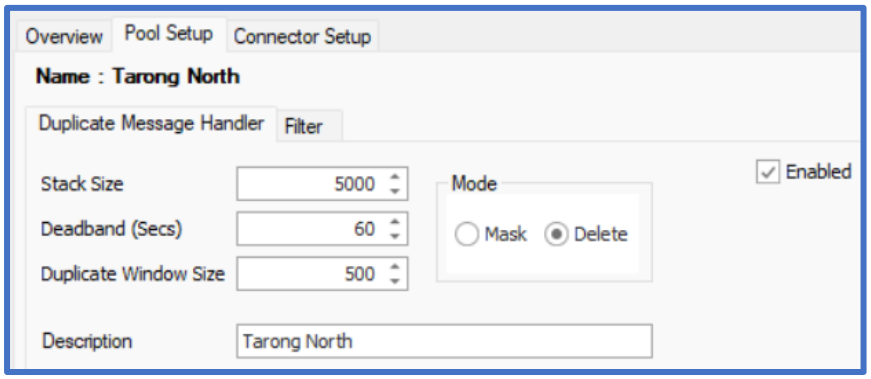
11. TPS Unit 4 setup the same as previous Pool Setups



12. TPS Station Pool setup the same as previous Connectors

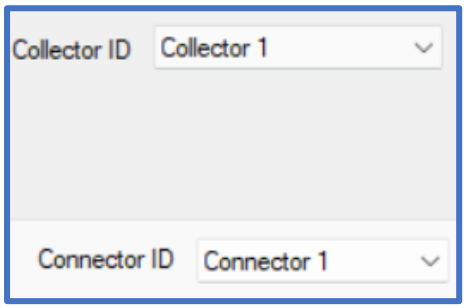


13. Tarong North Pool Setup the same as previous Connectors.

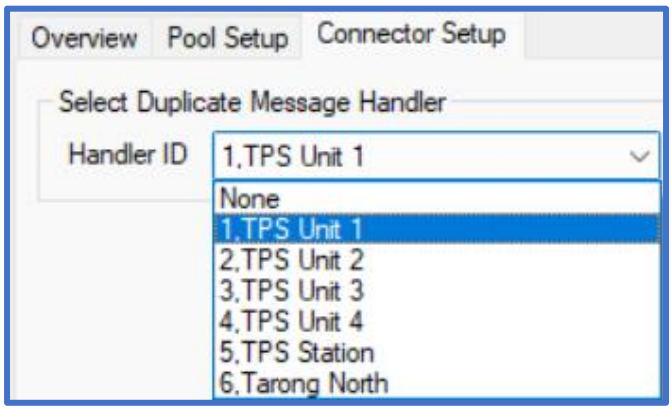


14. After the Pool Setup has been complete for all 6 inputs (TPS Unit 1 – Tarong North) select the Connector Setup tab.

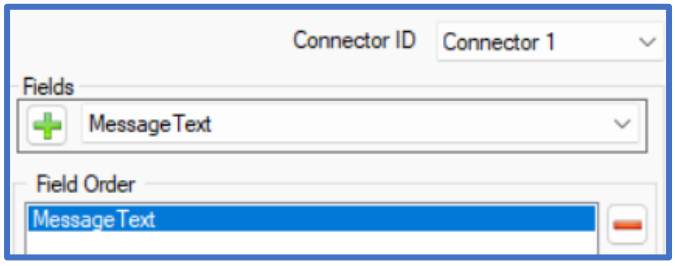
15. The Duplicate function works on the local Data Collector (Collector 1) therefore you will need to ensure the Collector ID is set to Collector 1.
16. When you have selected Collector 1, select Connector 1 from the Connector ID Dropdown menu



17. On the left-hand side of the screen, under Select Duplicate Message Handler, select the first Handler ID created in the Pool Setup from the dropdown menu for Connector 1 (TPS Unit 1).

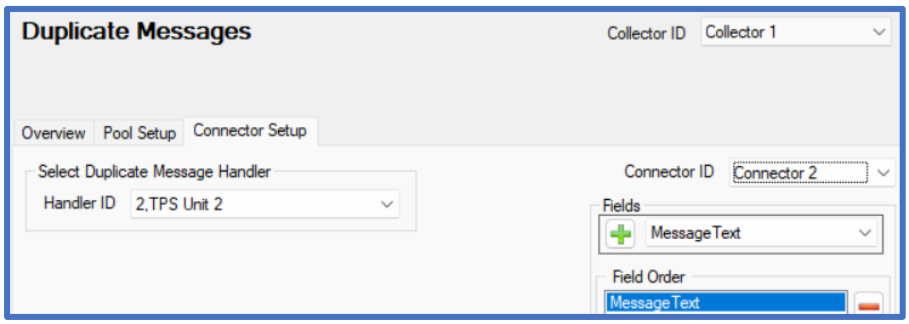


18. Under Fields, select what fields to identify for duplicate messages.



19. Click Apply to save the settings.
20. Repeat steps for Connectors 2-6 on Collector 1 to apply a duplicate message handler to all the local Connectors receiving data.

21. Select Connector 2 from the Connector ID dropdown menu, assign TPS Unit 2 from the Handler ID and add the required fields. After configuration, click Apply to save the settings.



22. Select Connector 3 from the Connector ID dropdown menu, assign TPS Unit 3 from the Handler ID and add the required fields. After configuration, click Apply to save the settings.

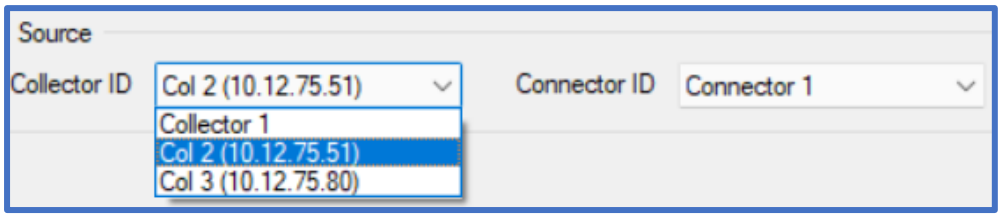
6.4 Message Routing

The Message Routing is where the Output Reconstructor is set to route messages across the different Data Collectors. In this case it will be Outputting messages from the two remote Data Collectors to one centralised local Data Collector.

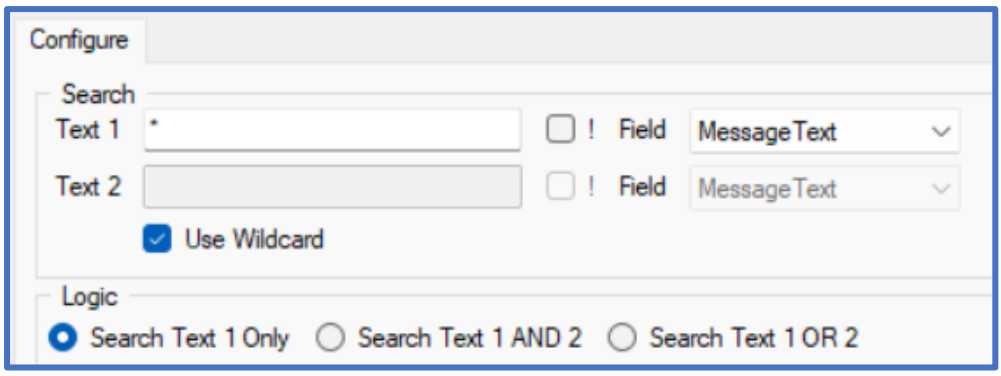
These rules will need to be applied on the Connectors for **both** remote Data Collectors and the assigned inputs on these Collectors (Collector 3 and Collector 4).

1. To access the Message Routing functionality, use the menu bar scroll to find Routing in the Archiver Configurator.

2. Under Source at the top of the screen, select the first remote Data Collector (Collector 3 with your system architecture) from the dropdown menu and select Connector 1.



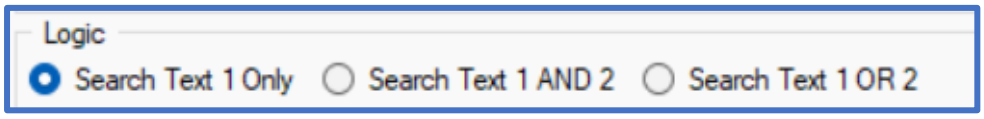
3. Under Source, you will see a section called Search. This is where you can define the Text to search for and the Field to look in. *This example will use * in the **Message Text** field.*



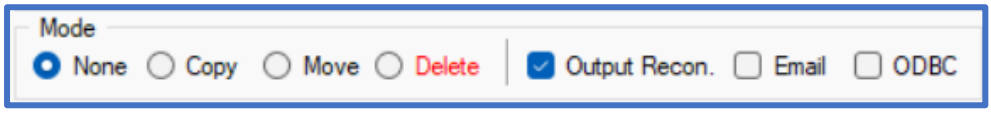
4. Ticking the Use Wildcard button will, by default, the Search will find any string that is contained in the input message. This is acceptable when looking for a fixed string, but Wildcard allows in addition the use of Wildcard Characters such as * ? !.
    a. * - Any Text String
    b. ? – Any single Character

*Using the * in the Text to Search will find any text string within the Message Text field.*

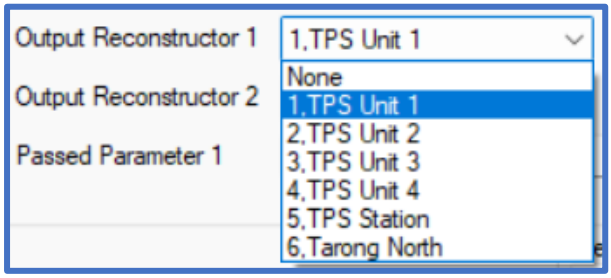
5. In the Logic section you will select Search Text 1 Only.



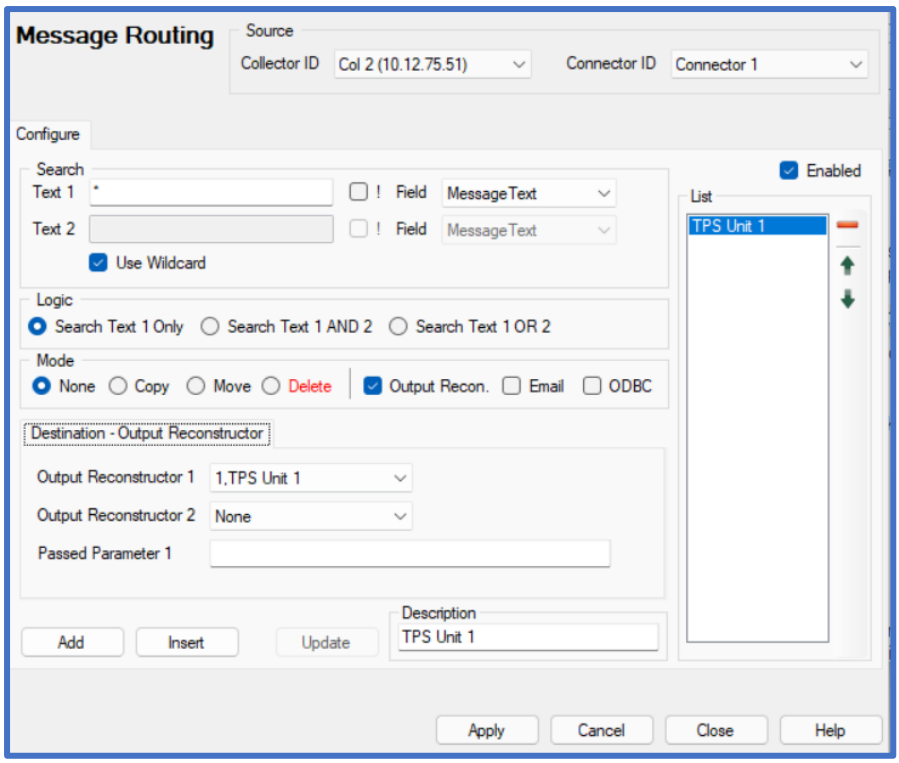
6. Under the Mode section, this is where you can select to Copy, Move, Delete, Output Reconstruct, Email, ODBC or take no action. In this instance you will want to select **Output Recon.** And keep the mode on **None.**



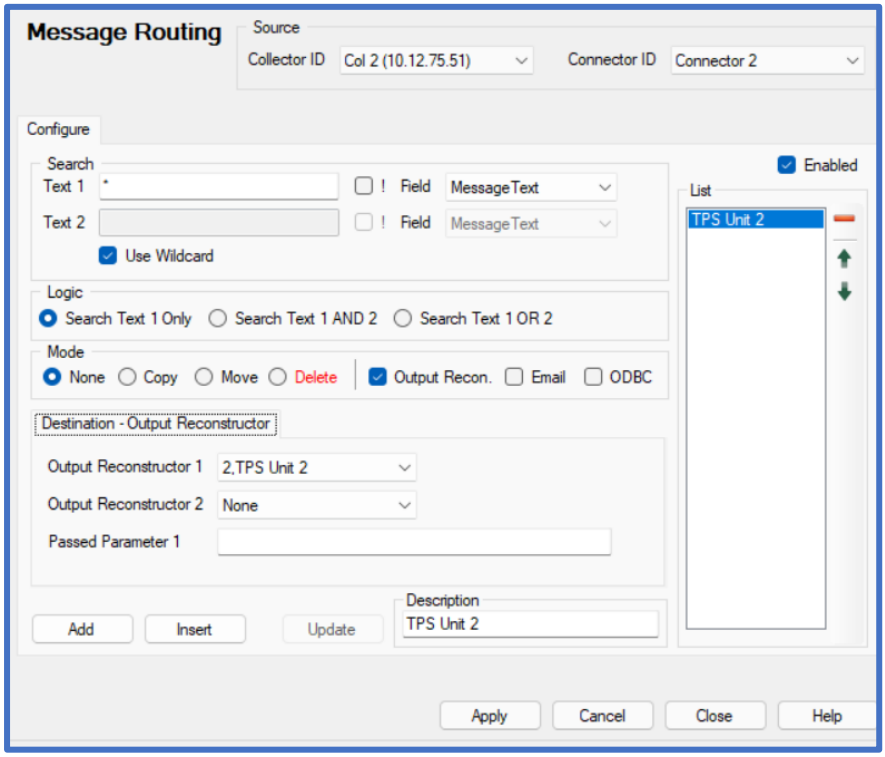
7. When you have selected Output Recon, a new field will be displayed at the bottom of the screen – **Destination – Output Reconstructor.** Here you will assign the Output Reconstructor rule you have created earlier in the document.
8. Under Output Reconstructor 1, select TPS Unit 1 from the dropdown menu.



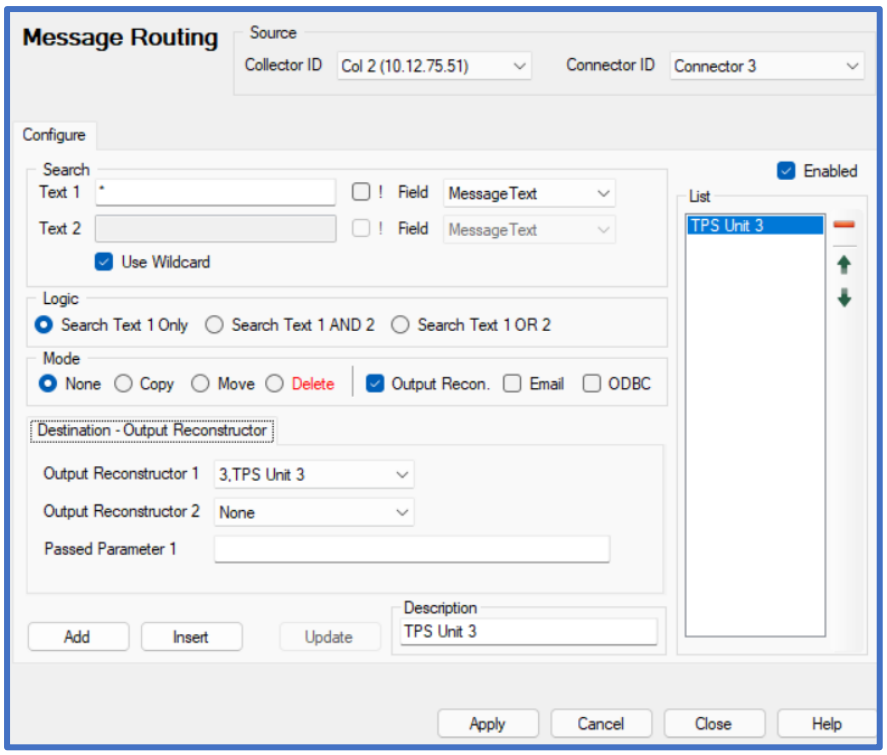
9. Give the configuration a description and click Add.



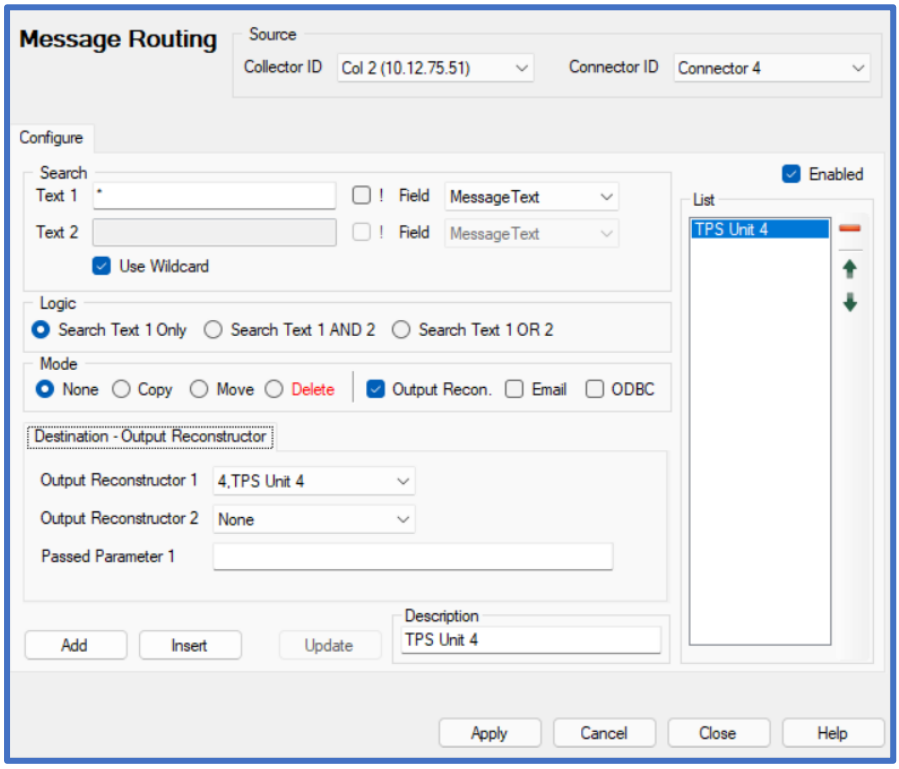
10. Click Apply to save the configuration.
11. You will then need to follow these steps for Connector 2-6 on Collector 3, then select Collector 4 and configure the rules for all 6 Connectors.
12. Setup Collector 3 Connector 2 as follows:



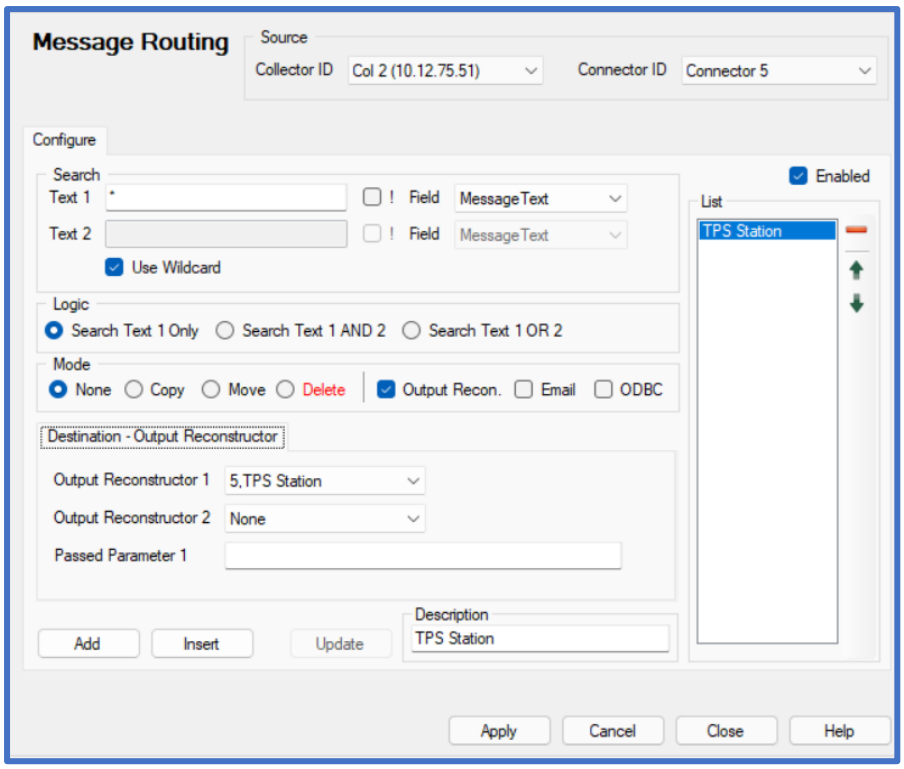
13. Setup Collector 3 Connector 3 as follows:



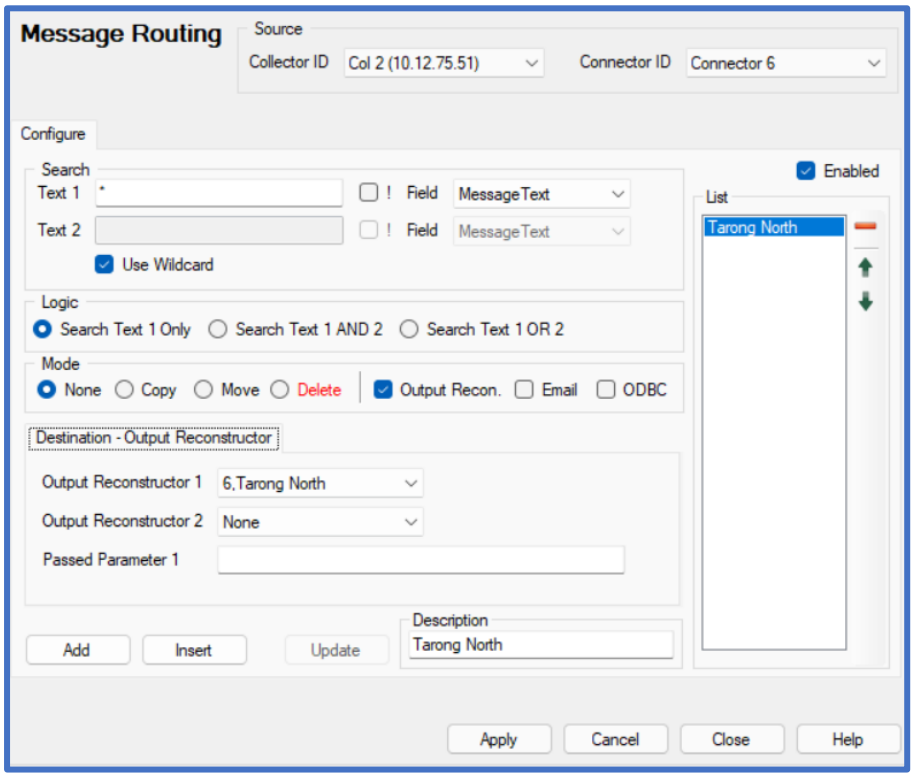
14. Setup Collector 3 Connector 4 as follows:



15. Setup Collector 3 Connector 5 as follows:

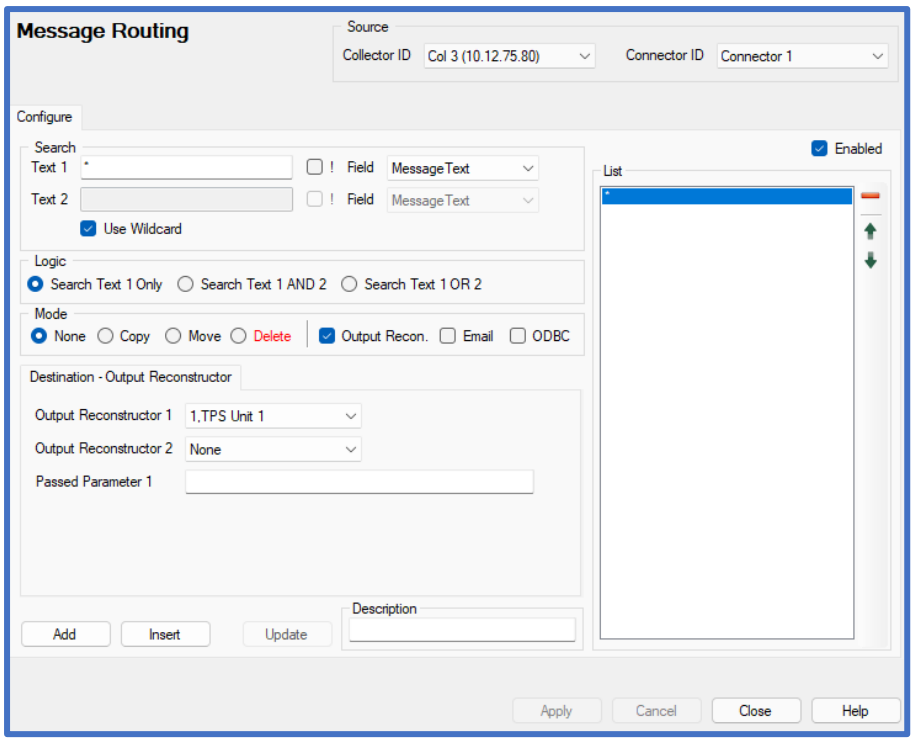


16. Setup Collector 3 Connector 6 as follows:

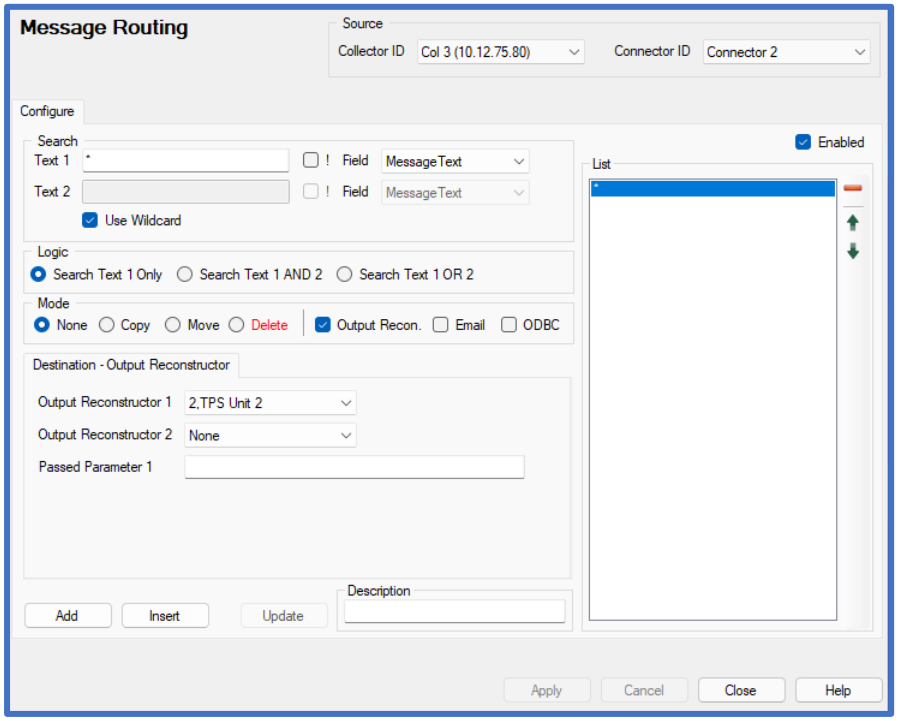


Collector 4:

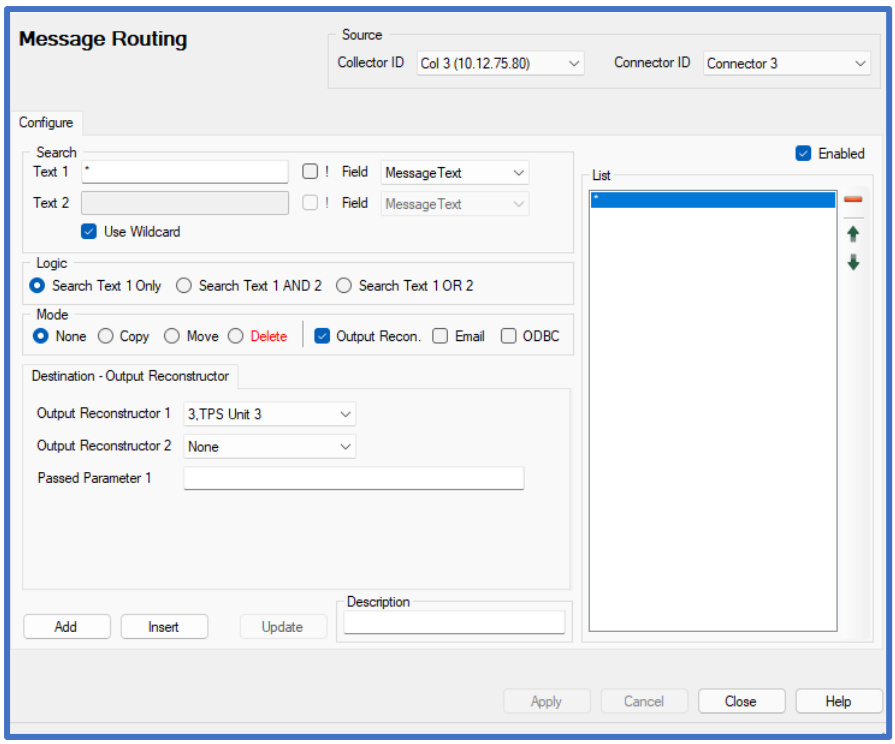
17. Setup Collector 4 Connector 1 as follows:



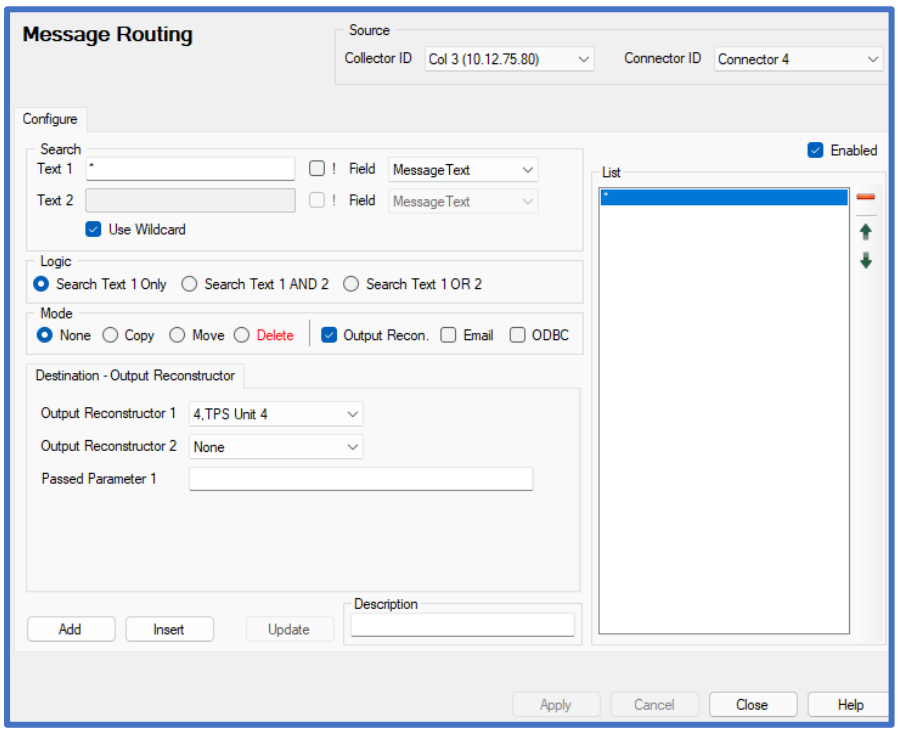
18. Setup Collector 4 Connector 2 as follows:



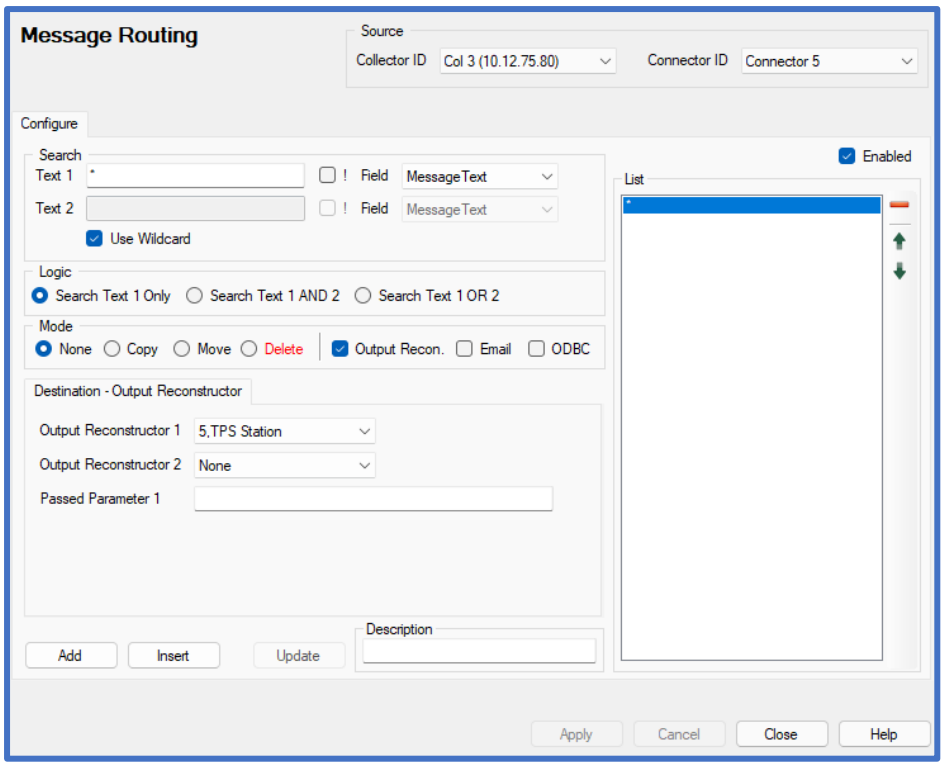
19. Setup Collector 4 Connector 3 as follows:



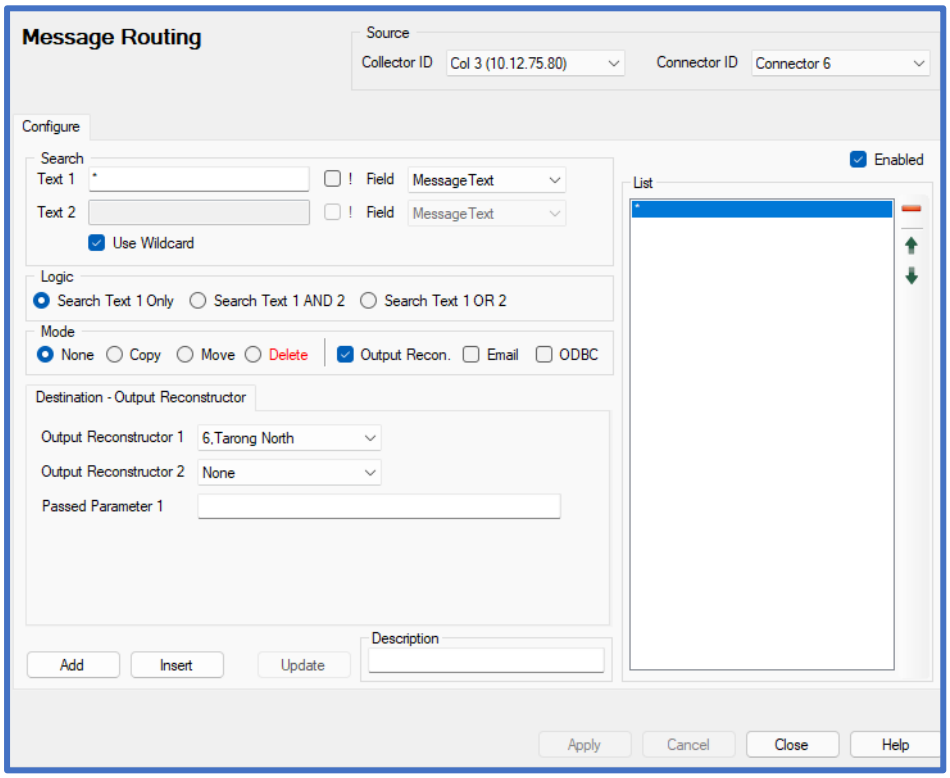
20. Setup Collector 4 Connector 4 as follows:



21. Setup Collector 4 Connector 5 as follows:



22. Setup Collector 4 Connector 6 as follows:



Once these rules have been put into place on all 6 inputs for Collectors 3 and 4 and you start receiving data, the Output Reconstructor rules will take place and route the data from Collectors 3 and 4 to the centralised local Collector 1. When the duplicate function takes

place, it will ensure no duplicate data is stored in the SQL DB and will only store one of the messages.

When a Data Collector is down for patching the Data Collector that is still running will have the collected data Output Reconstructed to the centralised Data Collector. The Duplicate rule will still be in place but since the data is still being received from one Data Collector, there will be no messages removed because of the absent Data Collector. When the absent Data Collector is back online, the Duplicate function will carry on looking for Duplicate data from the moment the second Data Collector is back online.

Once your data has been received on one centralised Data Collector, you can then configure the internal routing rules in line with the existing system and proposed architecture.

The image below shows an example of the end result with the centralised Data Collector (Collector 1). The first 6 inputs displaying a message string from either of the two remote Collectors (Collectors 3 & 4) and then setting up rules that you have on the existing system to route the Alarms and Events on the remaining inputs.

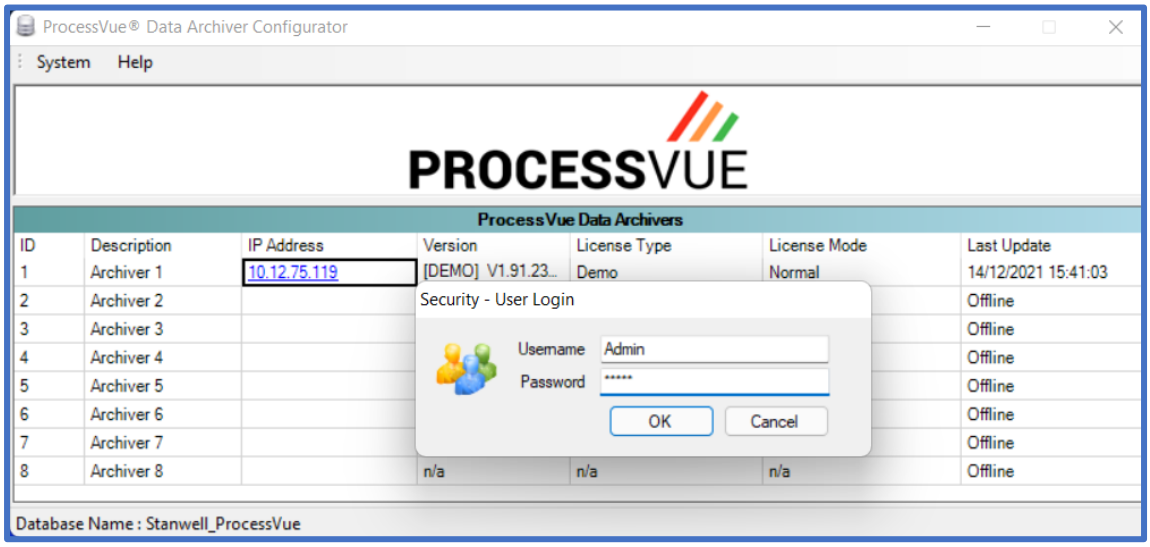
Collector 1 (VM)	Port Map
TPS Unit 1 Col 3 & 4	8041
TPS Unit 2 Col 3 & 4	8042
TPS Unit 3 Col 3 & 4	8043
TPS Unit 4 Col 3 & 4	8044
TPS Station Col 3 & 4	8045
Tarong North Col 3 & 4	8046
Spare	
Spare	
Spare	
U1 P1,P2,P3 Alarms	NA (Routed)
U1 I&C Alarms	NA (Routed)
U1 Other Alarms	NA (Routed)
Spare	
TN L1,L2,L3 Alarms	NA (Routed)
U2 P1,P2,P3 Alarms	NA (Routed)
U2 I&C Alarms	NA (Routed)
U2 Other Alarms	NA (Routed)
Spare	
Spare	
U3 P1,P2,P3 Alarms	NA (Routed)
U3 I&C Alarms	NA (Routed)
U3 Other Alarms	NA (Routed)
Spare	
Spare	
U4 P1,P2,P3 Alarms	NA (Routed)
U4 I&C Alarms	NA (Routed)
U4 Other Alarms	NA (Routed)
Spare	
Spare	
Station P1,P2,P3 Alarms	NA (Routed)
Station I&C Alarms	NA (Routed)
Station Other Alarms	NA (Routed)

6.5 Message Parsing

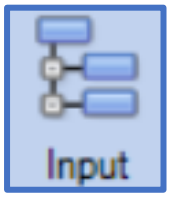
Message Parsing is responsible for taking the Raw Data from the Pre-processor and Parsing it into different fields. Once Parsing rules have been created, they can be saved to the machine/disk as CCI files and loaded back onto inputs on different Collectors. Parsing rules can be copied between different Connectors on the same Collector if the message string format is consistent throughout.

To achieve this, you will need to:

1. Login to the Archiver Configurator

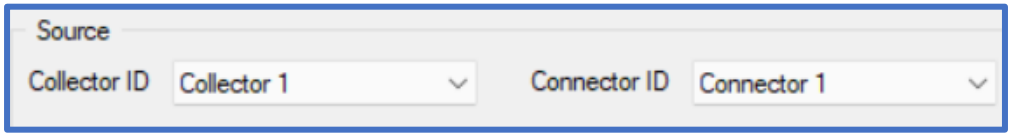


2. Select the Input menu option

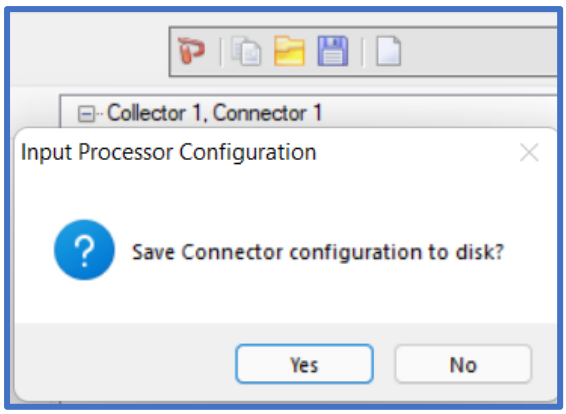


3. Select the Parser tab

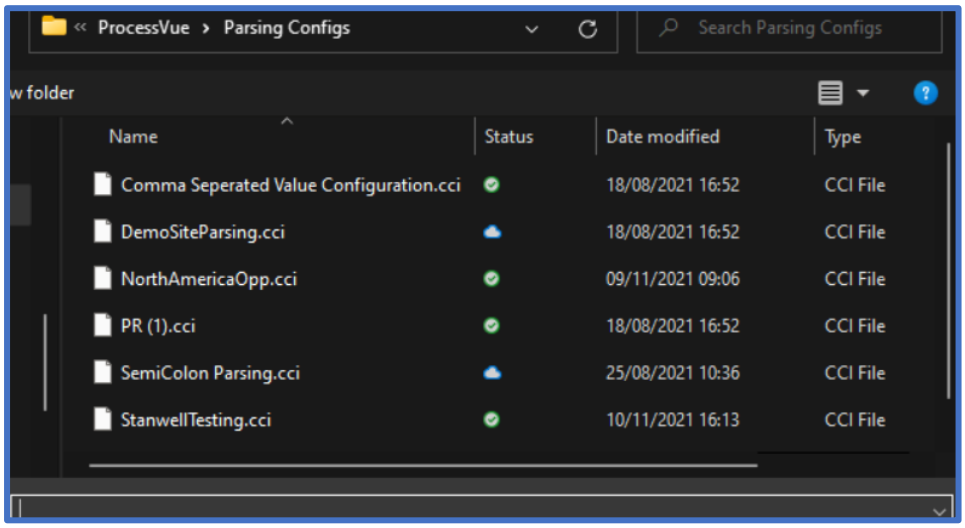
4. Select the Collector and a Connector/s which have the existing Parsing rules in place.



5. Click the save button and click Yes



6. Save the CCI file to a location where you seem suitable.



7. Select the additional Collector/s which do not have any parsing rules.
8. Load the CCI file from disk for all the unconfigured Connectors.
9. Click Apply to save any configurations.

As always, if you have any questions, please follow up with an email and we will be happy to assist you.