



Adroit Enterprise OEE

Technical Description

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Adroit Enterprise OEE

Overview

1. Introduction

OEE is a metric that identifies the percentage of planned production time that a Factory, a Single Machine or Production Line consisting of a cluster of Machines is productive. So for any given piece of machinery, Factory or group of machines, one might measure how many products were manufactured correctly the first time and compare that amount to the number the machine should have produced in a given amount of time. This led to the discovery of known and unknown problems in production by the accurate logging of all the standing times, slow running periods, machine breakdowns, material issues, etc. These standing times are enforced by interlocking the machine when standing on a fault condition till the fault is logged to ensure accurate feedback to the OEE.

OEE is built on 3 pillars.



- The first is the Availability of equipment.
- The second is the Performance of the Machine or Operating Personnel
- The last is the Quality that is produced

OEE can be used on one machine or single equipment as well as on multiple equipment lines as well as the entire factory with multiple equipment.

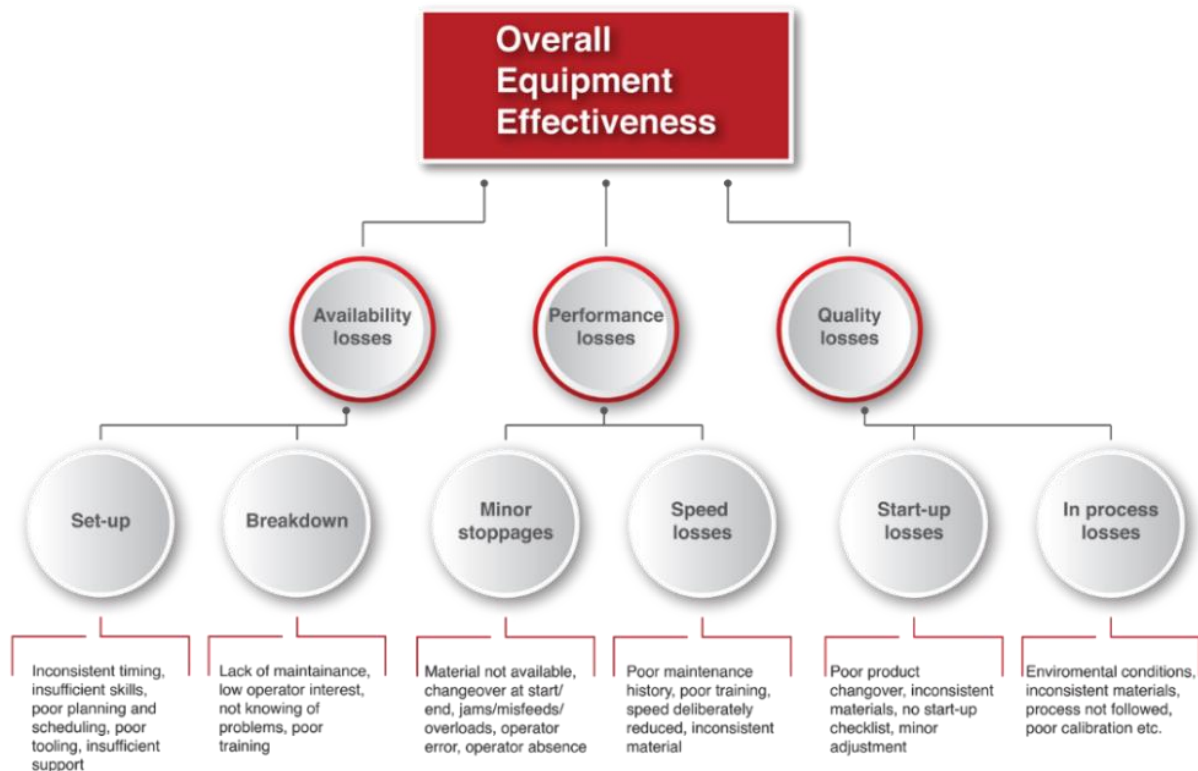
It is suitable for all types of manufacturing processes including discrete, continuous or batch.

Adroit Enterprise OEE has built-in management and real-time performance reporting and early detection of problems means less downtime and production losses.

With Adroit Enterprise OEE, companies can anticipate events that represent efficiency and savings – allowing focus on preventative maintenance, machine failure root cause etc.

Live data provided by the Adroit Enterprise OEE solutions can provide insights and knowledge to reduce unplanned downtime, increase throughput speed and quality whilst identifying unplanned stoppages that ultimately lead to greater profitability.

This document will serve to guide the user through the standard setup procedures and will describe all related information on the various components of the Adroit Enterprise OEE system.



2. Software Requirements

The following software packages are required:-

- Mitsubishi GX Works 3 (PLC Programming)
- Adroit 10 SCADA
- Windows 10 for all IPC's
- Windows Server Operating Systems for both the SQL and Adroit Servers
- MS Office 32 Bit with Outlook for Adroit Server (Emailing reports etc)
- Microsoft SQL Server 2017 (Standard or Enterprise)
- SSMS SQL server Management Studio (FREE)
- SSRS SQL Server Reporting Services (FREE)
 - SQL Server Information Tools (FREE)
- Visual Studio Community Version (FREE)
 - Microsoft Server Data Tools (FREE)

3. Hardware Requirements

Adroit Enterprise OEE

- Factory Equipment Requirements:

- Data Controller (FX5U)
- IPC (Industrial PC)
- 4 Port Industrial Switch
- Small UPS (700Va) (Data Controller and Switch Only)
- 4-way Stack lights
- General switch in Factory with Fibre connection
- 24 Volt Power supply
- 8 x Relays and Relay Basis
- 15 Amp Power sockets x 5

Hardware Factory

OEE Signals Needed

- Inputs

- Running signal from Equipment
- Production pulse (Counter)
- Safeties
 - E-Stop
 - Cage door
 - Trip wire
- Additional (If needed)

- Outputs

- Machine Interlock Signal
- Stack lights
 - Red
 - Orange
 - Green
 - Blue

Hardware Server Room

- Server Room Requirements

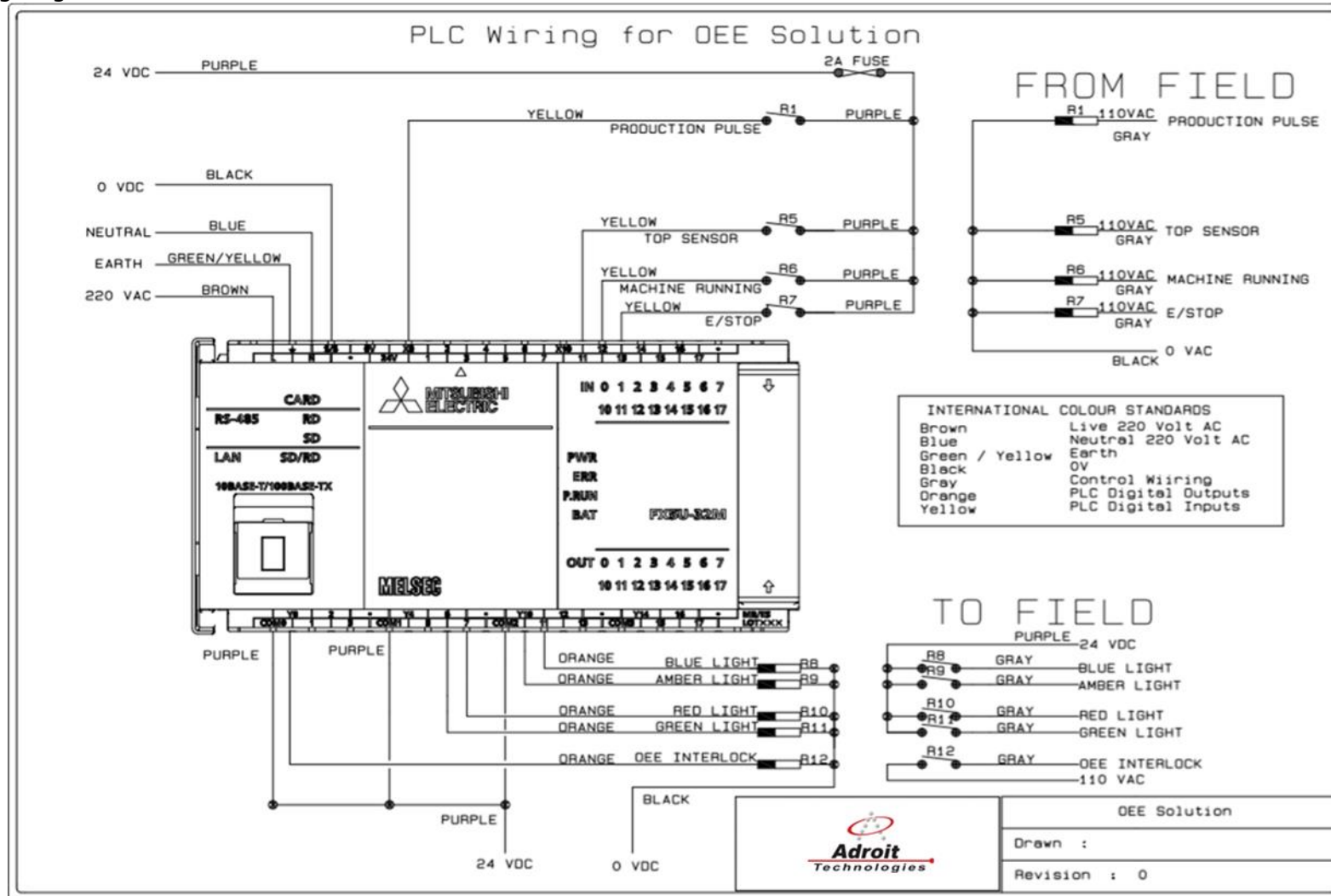
- SQL Server
- Adroit Server with OEE
- General switch in Server Room with Fibre connection
- Server Room UPS

Confidential

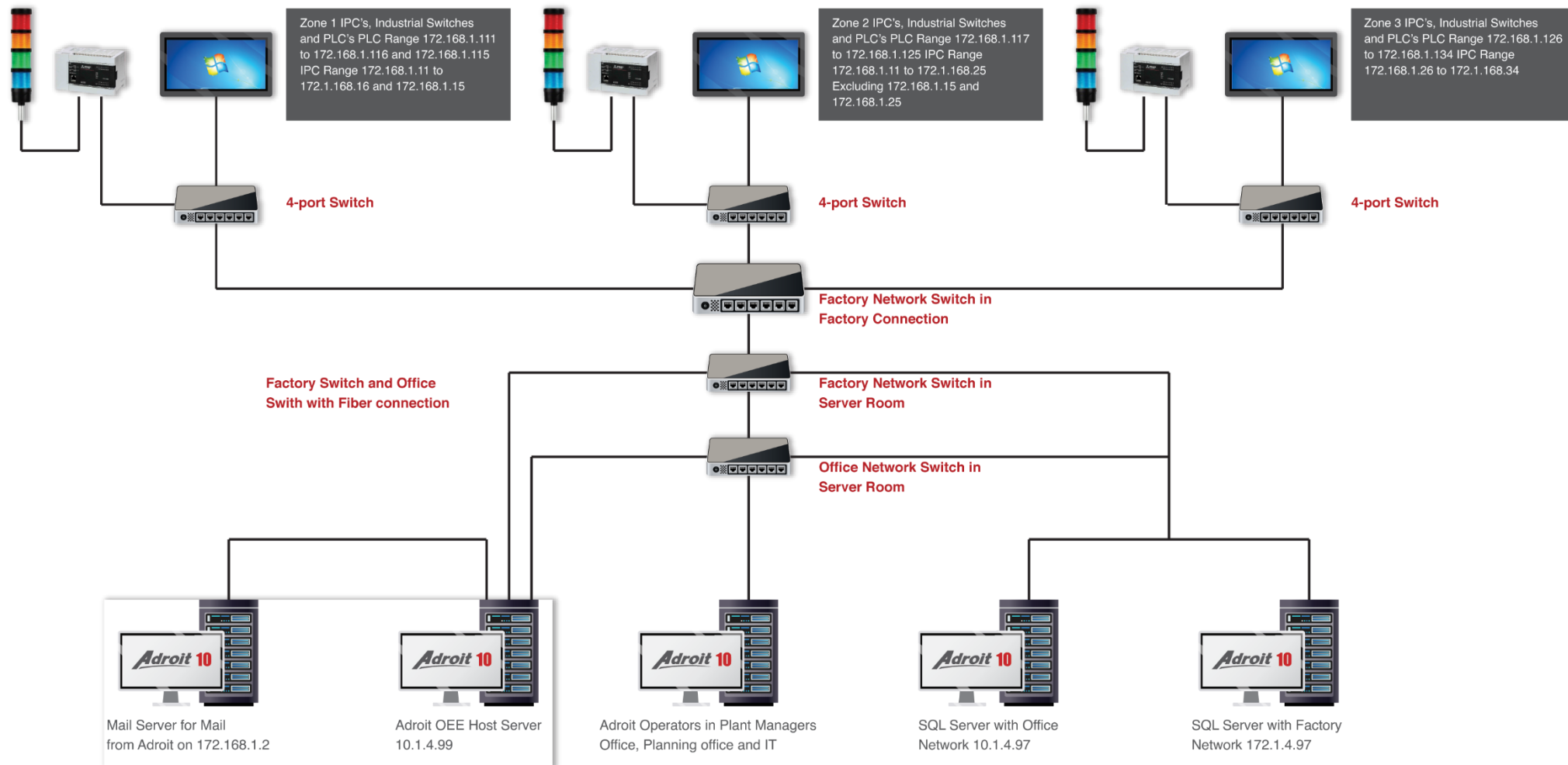
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4. PLC Wiring Diagram

The wiring diagram for the Mitsubishi FX5U PLC:-



5. Network Sample Diagram



Adroit Enterprise OEE

Site Deployment

1. Introduction

The purpose of this document is to assist in deploying the Adroit OEE system on a new machine on site. A machine name 'PRESS01' will be used as an example in this document. This name should be replaced by the relevant machine name being used on site.

2. Server Machine Configuration

2.1. SQL Server Installation

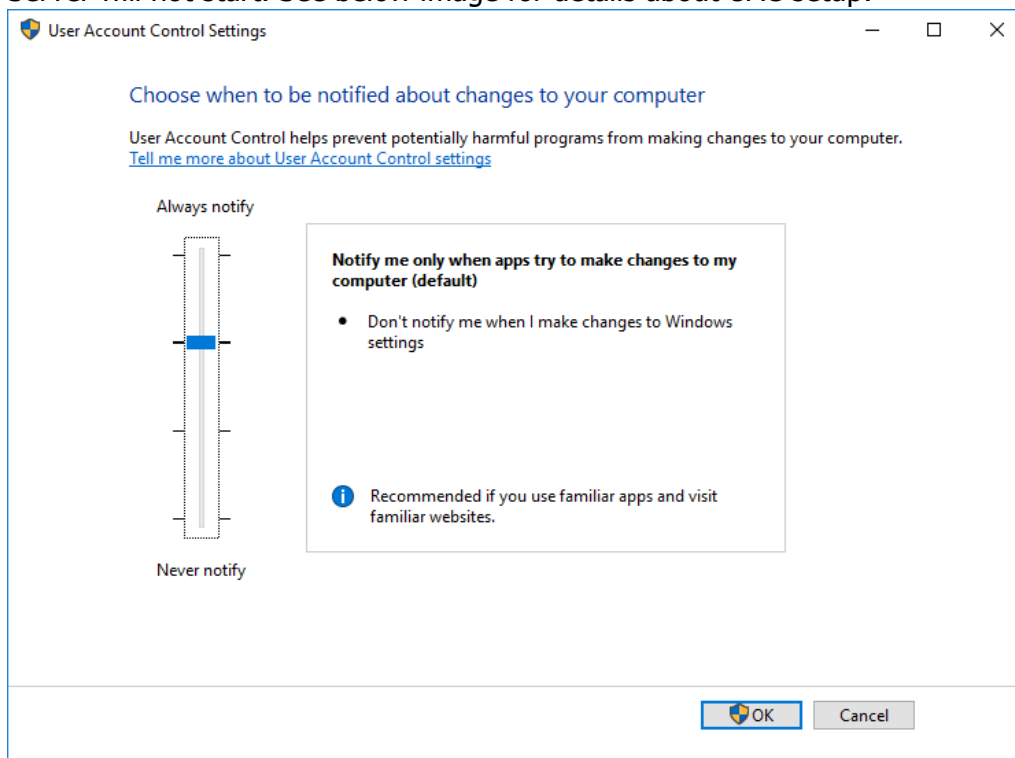
Once the server is ready for all necessary installations, it is very important to know that SQL Server along with SSRS should be installed on a separate Server computer. Refer to the chapter on the **SSRS** for the installation of SSRS after SQL Server has been installed.

Please note that when installing SQL, ensure that the following databases are added:

- Adroit
- AdroitReports

2.2. Adroit Installation

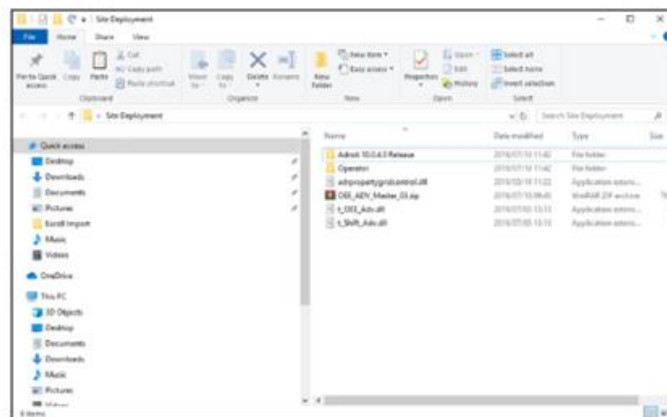
It is important to note that UAC (User account control) should be enabled and set to at least the second highest setting i.e. "Notify me only when apps try to make changes to my computer (default)". If UAC is disabled, the Adroit installation will not run. If UAC is disabled after installation, the Agent Server will not start. See below image for details about UAC setup:



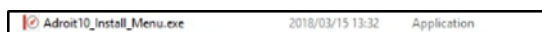
The following images in this section is a step by step guide in installing the typical install for Adroit version 10.0.4.0.

It is ideal to keep all Adroit installation, back up, .dll files in one folder on the server desktop. To use as an example for this document, a folder called Site Deployment is used. See images below:

1. Open the Site Deployment folder and open the folder Adroit 10.0.4.0 Release



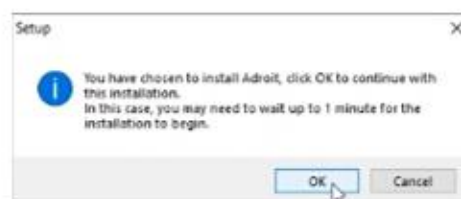
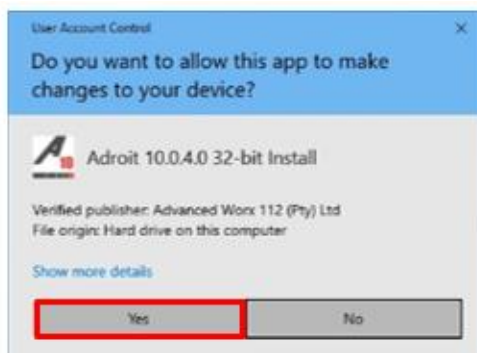
2. Double click on the **Adroit 10_Install_Menu.exe** file and the installation menu will be opened



3. In the installation menu, navigate to **SCADA Install** and select **Install Adroit 10 SCADA**.

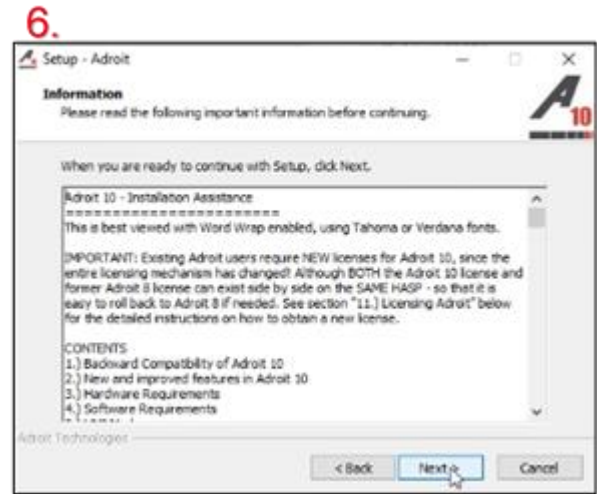


4. A User Account Control and Setup screen should pop up, select **Yes** and **OK**.

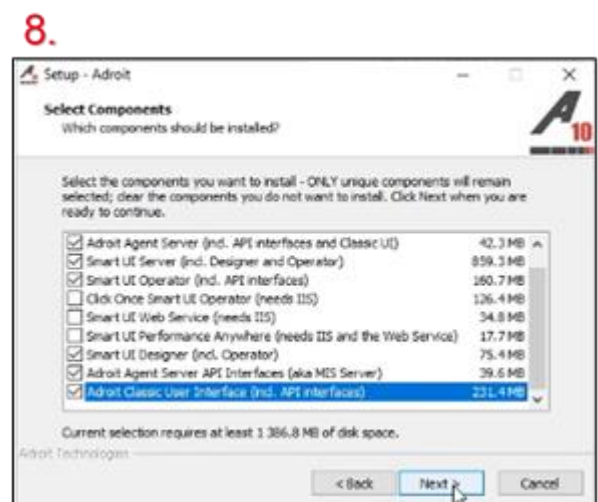
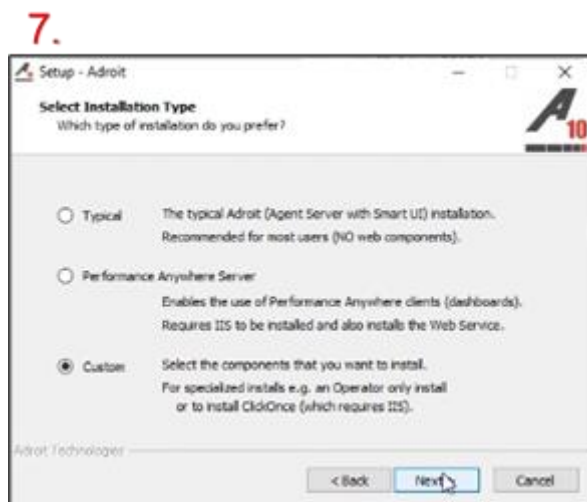


5. A License Agreement screen will appear, accept the agreement and select **Next**.

6. An Information screen appears thereafter, read through the information provided if needed, select Next

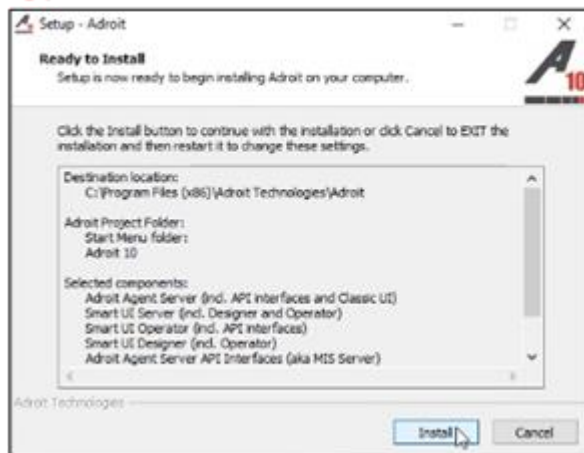


7. The page to select the installation type will appear. Select the **Custom** install type and then select **Next**
8. The page to select the different Adroit components to install will appear, see image 8 and replicate the image by selecting all the components selected in the image

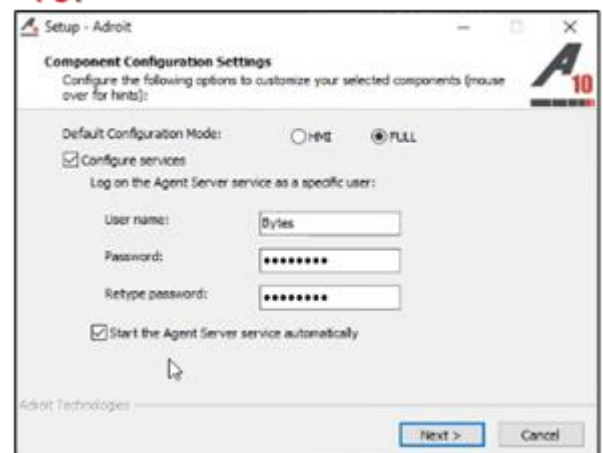


9. A confirmation page will appear, select **Install**
10. After installation has been completed, the Component Configuration Settings page will appear. For Default Configuration Mode, select **FULL**. Ensure that the Configure services checkbox is ticked. Enter a relevant username and password. Finally, ensure the check box to start the agent server automatically is ticked.

9.



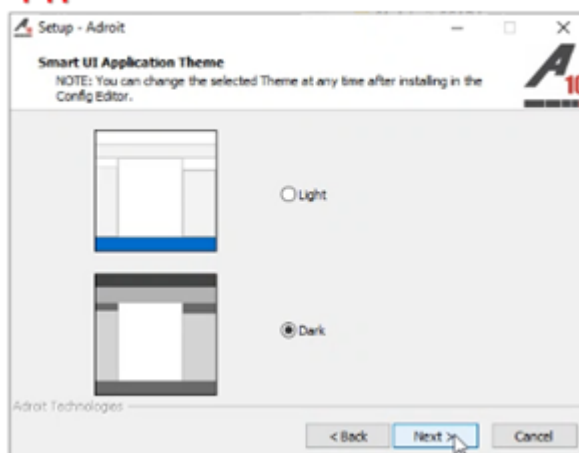
10.



11. Select any preferable Application theme, select **Next**.

12. The installation is now complete, select yes to restart the computer option and then select **Finish**

11.



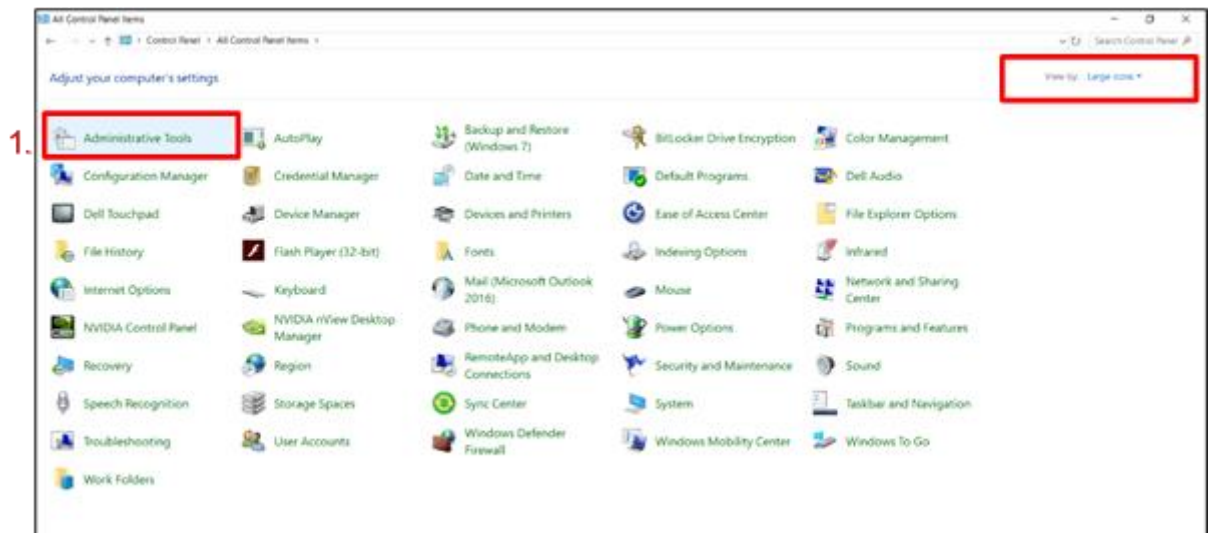
12.



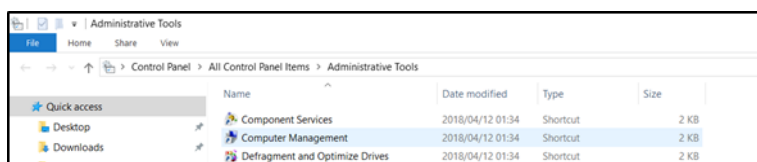
2.3. Users and Groups

For Adroit to recognize Users, they must first be created on the Windows's Active Directory. The user information will be automatically detected on the Adroit system. Users can be anyone within an organization that will be involved with the OEE system. They will thereafter be assigned under certain groups which is explained in the next section. This section will describe the method in creating the relevant users for the Adroit OEE system.

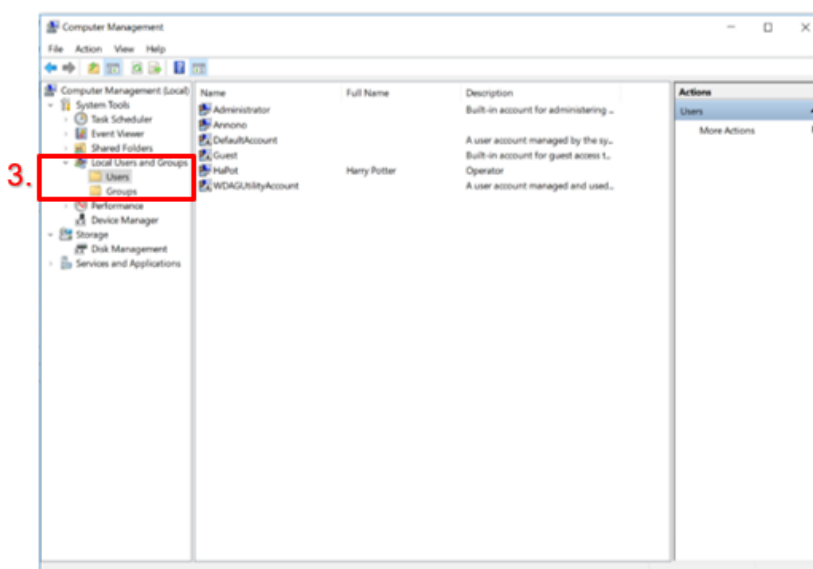
1. Navigate to Administrative Tools within the Control Panel (ensure 'View by' option is set on Large icons)



2. Double click on Computer Management



3. On the left side of the screen, navigate to **Local Users and Groups**
4. You can now view all existing or create new users and groups to the Active Directory

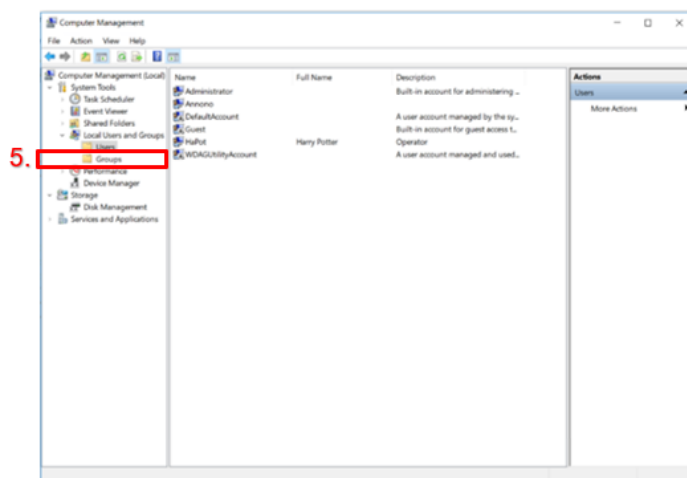


For Adroit to recognize Groups, they must first be created on the window's Active Directory. The user group information will be automatically detected on the Adroit system. Users that have been created already will fall under different categories (Groups) within the system. This is to monitor different security access for the different functionalities of the system. It is important to note that for the OEE system, the following Groups should ideally be created:

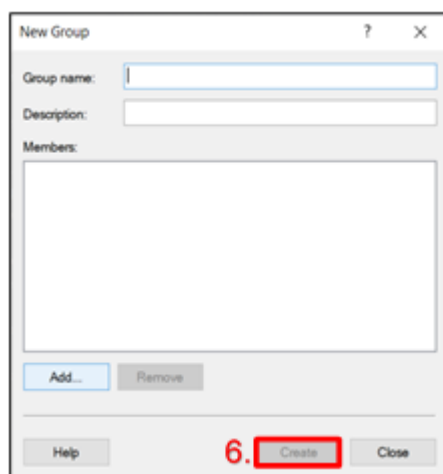
- Maintenance
- Tool setters
- Quality
- Planners
- Supervisors
- Managers
- IT
- Developers
- Operators

The following steps can be followed to create groups on the machine server:

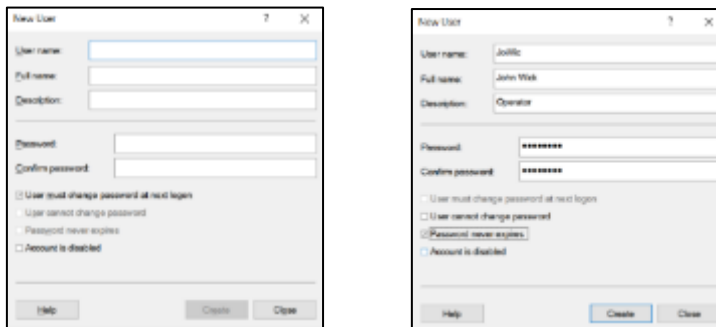
5. From the Computer Management screen, select **Groups**. You can now view all the different available groups. To add groups, right click on Groups and select New Group.



6. Enter the relevant group names and descriptions accordingly. Click on **Create**



7. The next step is to assign users to belong to certain groups. Right click on **Users** and select **New User**
8. Enter the required details for a user as shown in the image.

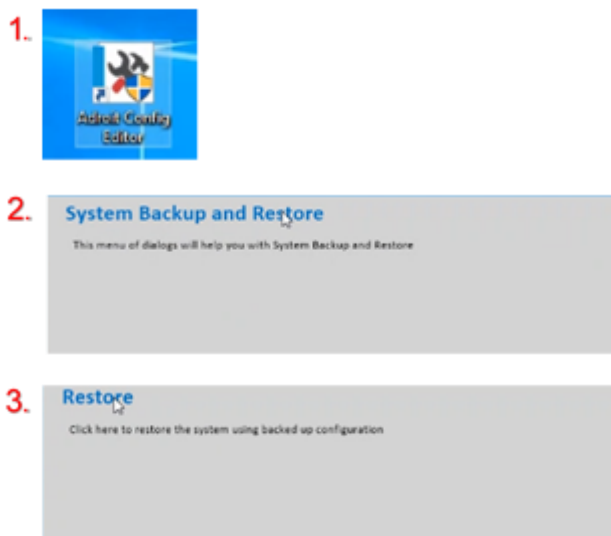


The user has now been added onto the local server; the Adroit database will now recognize all users that have been added in the active directory. Create relevant users and add them to the groups. Remember that a user can only belong to a single Adroit Group at a time or security for that user will not work in the Adroit SCADA environment. For instance, the user can belong to both Administrators and Developers, if only one of those groups are being used in Adroit SCADA.

2.4. Adroit Setup Configuration

Once Adroit has been successfully installed, a few Adroit shortcut files should have been added to the desktop. The next step is to configure all the different setups to start running the software as required. The first step will be to restore a backup that has been created of the entire OEE SCADA system during the development and design phase and is now ready for site implementation.

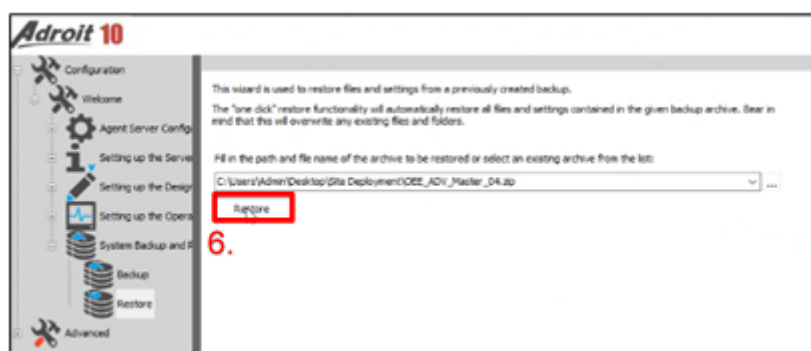
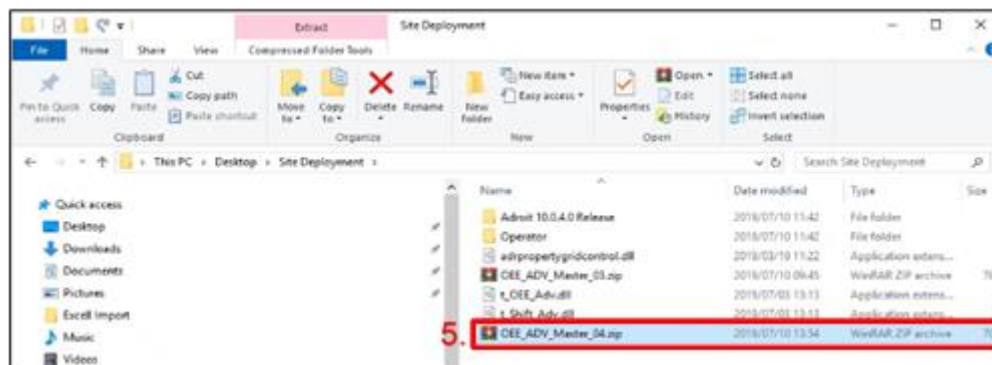
1. On the desktop look for and open the shortcut named Adroit Config Editor
2. On the configuration home page, navigate to **System Backup and Restore**
3. Select **Restore**



4. A wizard will appear requesting the file path of the backup file to be restored



5. Navigate to the correct location of the Adroit OEE back up file that is being restored. In this document the example used of where the location is found is in the image that follows and is found in the Site Deployment folder on the Desktop.
6. Click on **Restore**



2.5. Security Settings

The security setup is crucial with regards to granting access to the system as a whole or to only certain aspects of the system to different users and groups that will be using the system. The image that follows should be duplicated as follows:

1. Ensure 21 CFR Part 11 is not enabled
2. Auditing to an external database should be disabled
3. When selecting the domain, ensure that the name of the server is being used i.e. SERVER01
4. Select the appropriate Group to obtain full global access to the system
5. Select the appropriate Users to obtain full global access to the system
6. Select the Group allowed to perform every service within the server
7. Select **Finish**

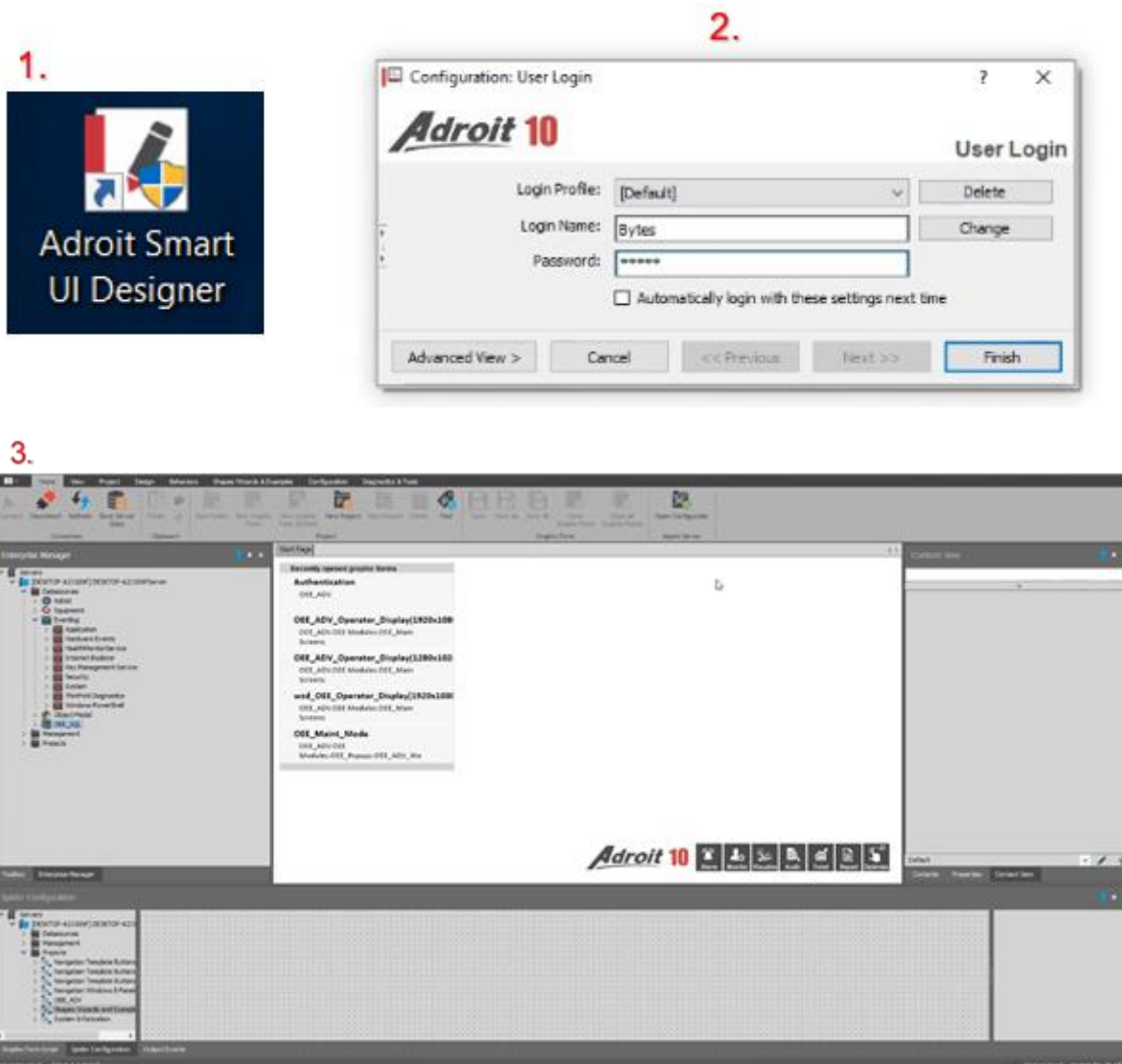


3. Adroit SmartUI Designer

3.1. Login

After Adroit has been successfully installed and configured, the Adroit SmartUI Designer can now be opened for setting up different functionalities of the project which is displayed for the operator. It is important to note that not all user groups (as noted in section 2.3) will have access to the designer. Only the users in the Administrators Group will have access. The following process is followed when logging onto the designer:

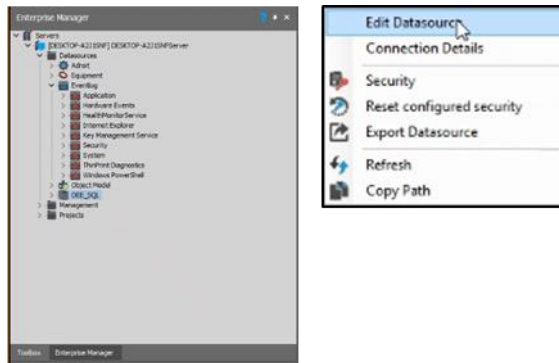
1. Locate and double click the shortcut called Adroit SmartUI Designer on the Desktop
2. Enter the correct login name and password of a user that belongs to the Administrators group
3. The designer is now open as seen in this image



3.2. SQL Connection

Before any projects can be loaded, a connection needs to be established to the Adroit database in SQL. The process to ensure this is achieved as follows:

1. On the home page of the Adroit designer, locate the Enterprise Manager pane on the left of the screen. Follow the following path: Servers → 'Server Name' → Datasources → OEE_SQL. Right click on **OEE_SQL** and select **Edit Datasource**



2. Ensure that the correct SQL string name is used that connects to the Adroit database in SQL Server

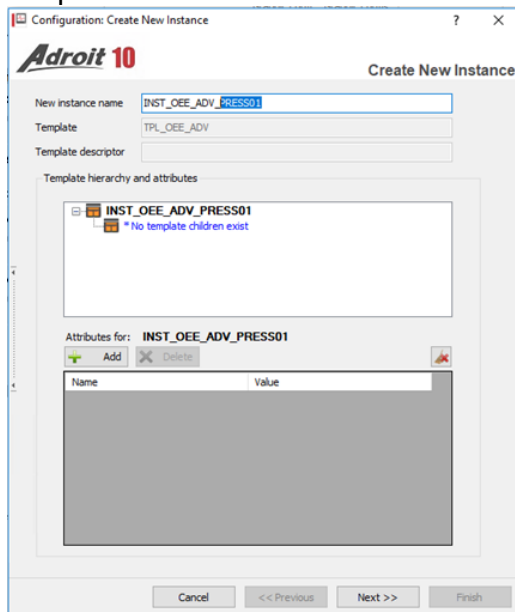


4. Adroit OEE Object Model

4.1. Deployment of Object Model

Before this process can begin, ensure to run SUI server and Agent Server and start up the Designer on the server machine (make sure the security dongle (HASP) is licensed and plugged in). It is also important to check that the SQL Datasource has a healthy connection (see section 3.2).

On the left hand side of the designer in the Enterprise manager section, navigate to the following path Datasources\Object Model\Templates\User and right click on the TPL_OEE_ADV Object model template and select "Create new instance of this template". The following popup screen will appear:



Here we will add the machine name to the end of the Instance name. For example, INST_OEE_ADV_ **PRESS01**. Click next.

The SCADA configuration page will now pop up, the following process flow should be followed:

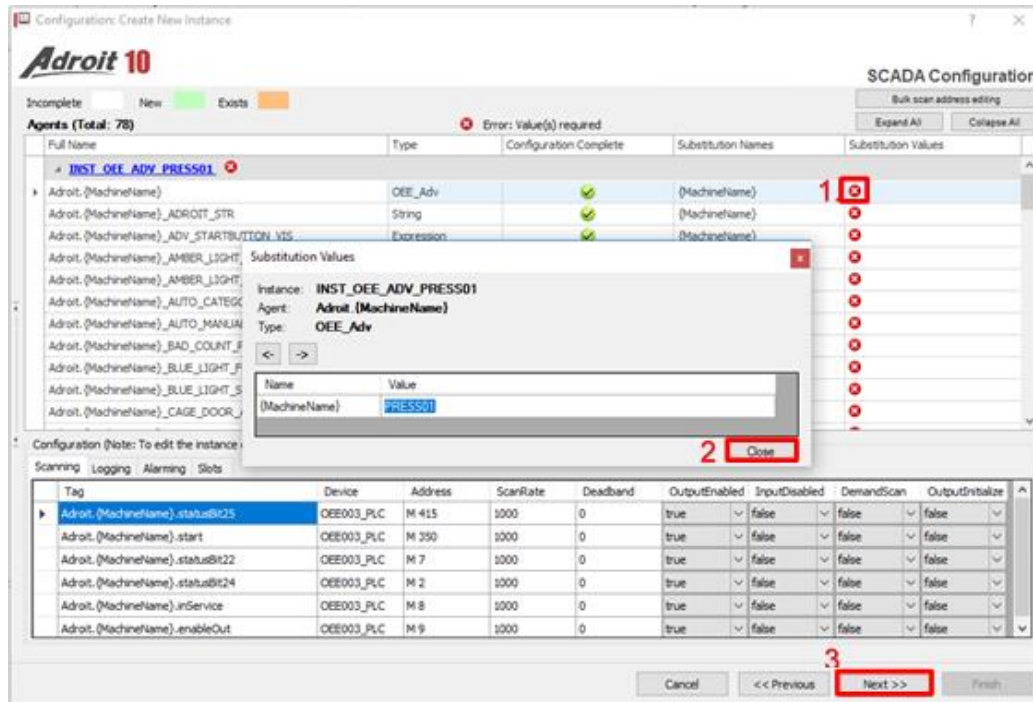
1. Click on one of the red crosses in the Substitution Values column
2. Enter the new machine's name. Close the dialog.

Note that all the tags in the Full Name column will now be substituted with the new machine name. They will also turn green to indicate that these agents are new and do not yet exist in the WGP file. When adding multiple machines to a single Agent Server, some tags are universal to the system and will already exist. These will be marked in Orange.

The tag slots may be pre-populated at this point in case you would like to add the OEE_ADV Agent's connection string, etc., but this is not necessary as it can still be done manually via the Agent configurator once the Instance has been deployed.

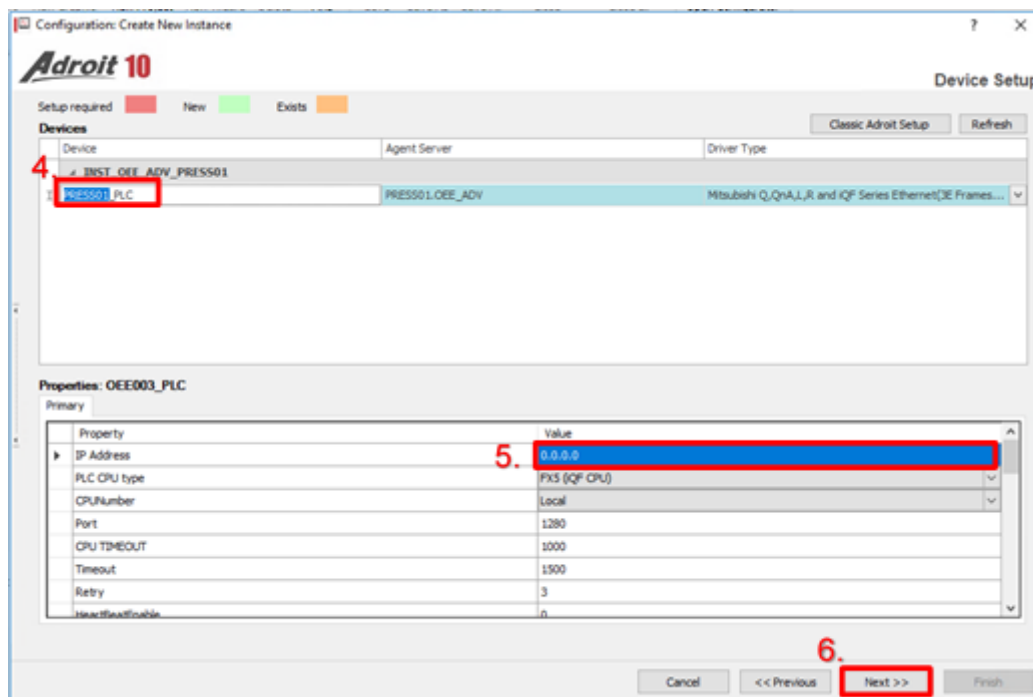
PLC Scan addresses can also be edited here by selecting the relevant tag from the Full Name column and editing its scanning configuration in the Scanning tab at the bottom of the page. Again, this is not strictly necessary as scanning may be changed at a later stage via the Agent configurator. Bulk scan address editing is also available from a button in the top right corner of this page.

3. Click Next.



The Device Setup page will now appear.

4. Edit the Device name in the Device column to represent the new machine.
5. The IP address can also be edited here or at a later stage via SUI config editor.
6. Click Next.



The DBLogs page will appear.

7. Enter the connection string that is pointing to the Adroit database, running on the local SQL server with windows authentication. If this has changed, then the connection string can either be edited here, or at a later stage via the Agent configurator.
8. Click Next

Configuration: Create New Instance

Adroit 10

DBLogs

New Existing

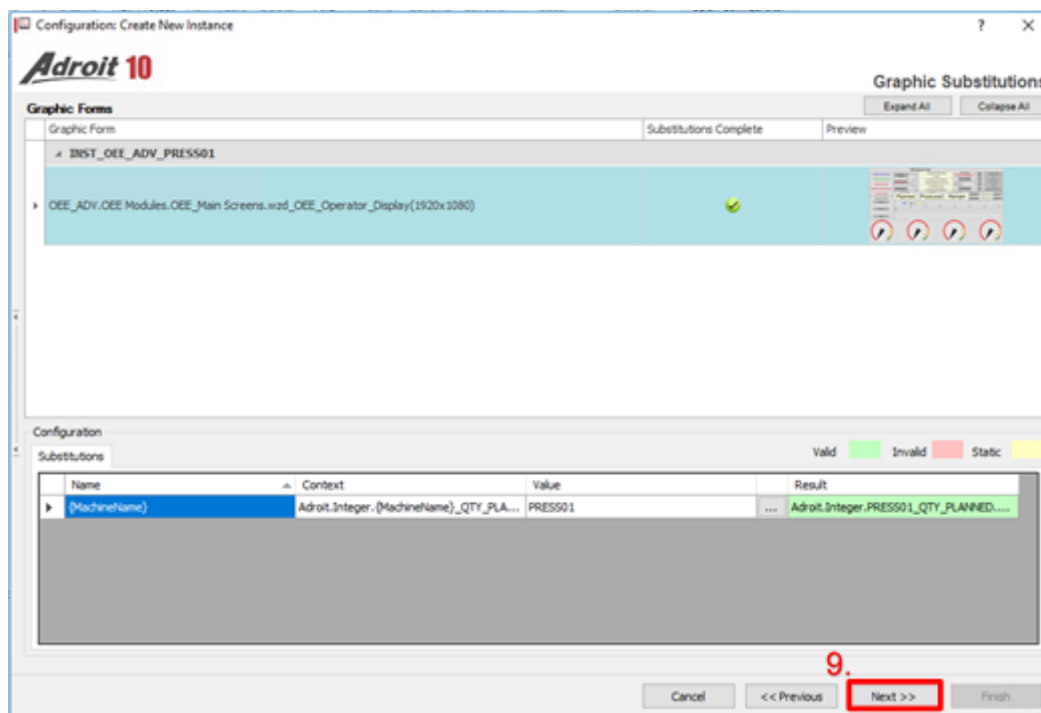
Name	Log As Str...	Interval	Housekee...	Connection	Disable ...	Method	Enable	Houseke...	Table	Trigger
INST_OEE_ADM_PRESS01										
PRESS01_STA...	False	60	7	Provider=SQLNCLI10.1;Integrated Security=SSPI;	false		1 true		0 Adr_DBLog	

Tags

Name	DBLogAgent	Deadband
Adroit.PRESS01_AMBER_LIGHT_FLICK.value	Adroit.PRESS01_STACKLIGHTS	0
Adroit.PRESS01_AMBER_LIGHT_SOLID.value	Adroit.PRESS01_STACKLIGHTS	0
Adroit.PRESS01_BLUE_LIGHT_FLICK.value	Adroit.PRESS01_STACKLIGHTS	0
Adroit.PRESS01_BLUE_LIGHT_SOLID.value	Adroit.PRESS01_STACKLIGHTS	0
Adroit.PRESS01_GREEN_LIGHT_FLICK.value	Adroit.PRESS01_STACKLIGHTS	0
Adroit.PRESS01_GREEN_LIGHT_SOLID.value	Adroit.PRESS01_STACKLIGHTS	0
Adroit.PRESS01_RED_LIGHT_FLICK.value	Adroit.PRESS01_STACKLIGHTS	0
Adroit.PRESS01_RED_LIGHT_SOLID.value	Adroit.PRESS01_STACKLIGHTS	0

Cancel << Previous **Next >>** Finish

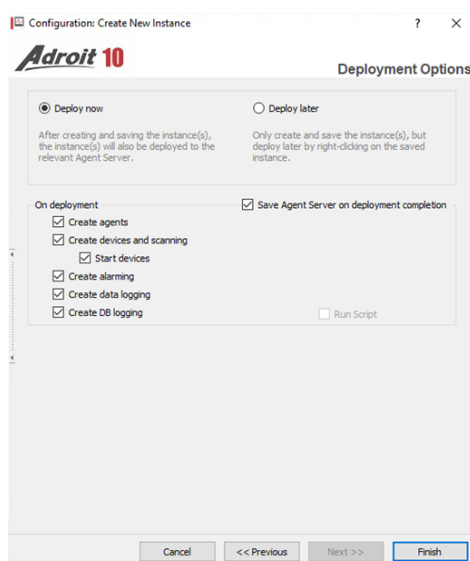
9. On the Graphic Substitutions page, select Next



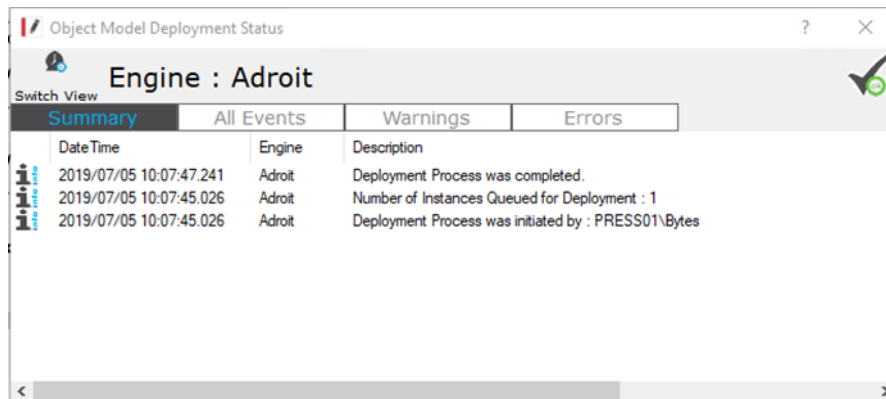
The Deployment Options page will appear. The Deploy Now option will create the Instance and then write the Agents to the Agent server database, add the scanning etc, and build the project. Deploy later will only create the instance, from where the deployment can be activated at a later stage. This is useful when creating the Instance off site and moving it to site to minimize time spent on site. For this example, we will assume that we are on site and deploy now.

Note that, if the device does not have a valid IP, which connects to a physical device, which is turned on, the deployment will FAIL if the instance is deployed with the device in the started state. In other words, if the device does not physically exist in the field, switch OFF the "Start devices" radio button on the deployment screen before deploying.

Click Finish.



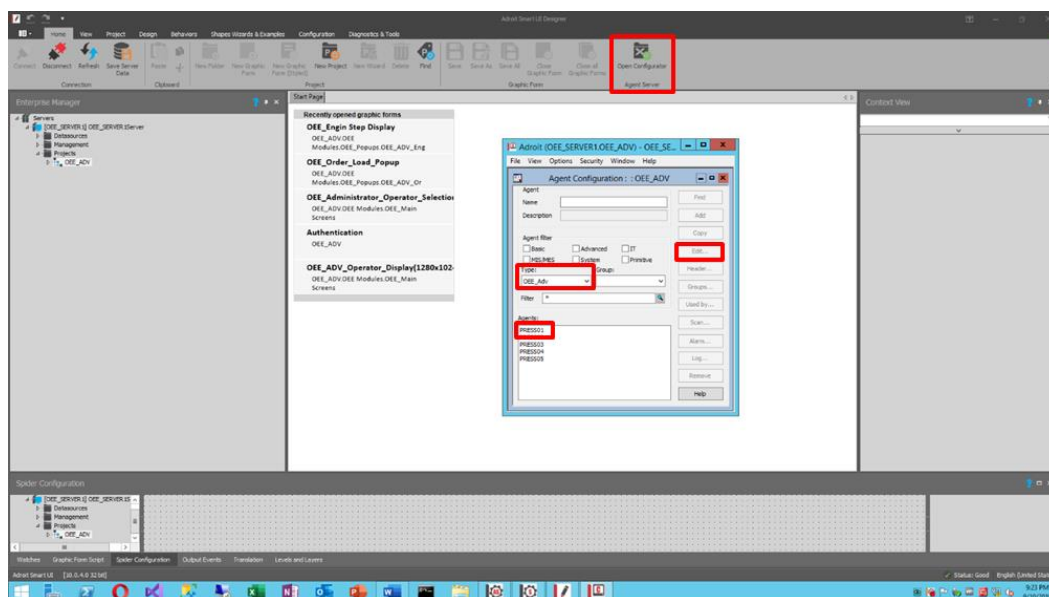
Deployment status screen will appear, this screen will step through the process of deploying the Instance and notifies the user of any Errors during the process. Warnings should be looked at but can mostly be ignored. Errors will mostly result in non-deployment and should be investigated. Once the process is completed, the window can be closed.



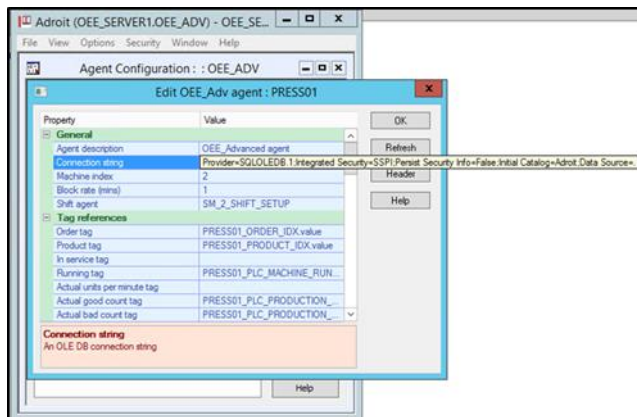
4.2. Post Deployment Configuration

Once a machine has been deployed (process in section 4.1 followed and completed), the following post configuration process is to be followed in the SmartUI Designer.

1. Open the Agent Configurator and edit the OEE_ADV agent of the machine being deployed.



- Browse in the connection string to the Adroit database and make sure that the Machine IDX is set to 0 so that it will automatically have an IDX assigned. Click finish.



- Create the shift agent for this OEE and connect it to the Adroit database. Add this shift agent to the OEE agent mentioned above.
- In SQL, open the OEE_Adv_Users table and find the idx for the user that will be logging onto the Operator. (Adroit Test is an example user with an idx number of 29)

	idx	UserName
1	1	Admin
2	2	Administrator
3	29	Adroit Test
4	3	anhoq
5	28	anrem
6	1030	bytes
7	1031	Dick
8	1033	dumkh

- Edit the OEE_Machine_User_Bridge table and insert the user idx into the correct column.

	idx	machine_idx	user_idx
1	1	2	29
2	2	3	29
3	3	4	29
4	4	5	29
5	5	6	29
6	6	7	29
7	7	8	29

- Open the OEE_MachineSetup table and find the idx for the new machine. Add this idx to the relevant column in the OEE_Machine_User_Bridge table and press enter.

	idx	MachineName	MachineDescription	Factory	Areald	Line	RunRateMax	RunFactor	RunRateActual	RunRatePeriod	ActiveStatus
1	2	Press01	Press01	Zone01	3	Press01	1	10	10	60	0
2	3	Press02	Press02	Zone01	4	Press02	1	10	10	60	0
3	4	Press03	Press03	Zone01	6	Press03	1	10	10	60	0
4	5	Press04	Press04	Zone01	7	Press04	1	10	10	60	0
5	6	Press05	Press05	Zone01	8	Press05	1	10	10	60	0

	idx	machine_idx	user_idx
1	1	2	29
2	2	3	29
3	3	4	29
4	4	5	29
5	5	6	29
6	6	7	29
7	7	8	29

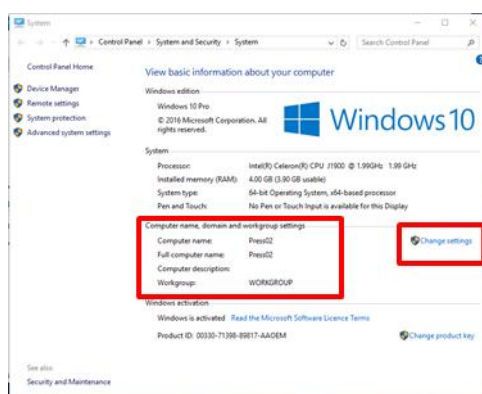
The security for that Operator station is now set up and the user will be able to log in as soon as the Operator itself is set up. Once a single user has been added here, it is possible to change security settings from a graphic form in the Operator.

7. In the Adroit Datasource, browse the relevant OEE Agent InService tag and add security to it. (by selecting the "Audit Writes" and "Requires Authorization" checkboxes)
 - a. Add security on the following
 - i. Right click on Adroit and add all the users
 - ii. Right click on Equipment and add all the users
 - iii. Right click on Eventlog and add all the users
 - iv. Right click on Objectmodel and add all the users
 - v. Right click on OEE_SQL and add all the users
 - vi. Right click on OEE_ADV under project and add all the users
 - vii. Click Refresh
 - b. In the Adroit Data source, browse the relevant OEE agents 'Inservice' tag and add security to it. ("Audit Writes" and "Requires Authorization")
8. Other: The HASP needs to be licensed for OEE_ADV- one per machine to be added. The HASP also needs to contain one additional remote Operator license per machine.
9. Open Operator and do the initial Setups

4.3. Operator Machine Configuration

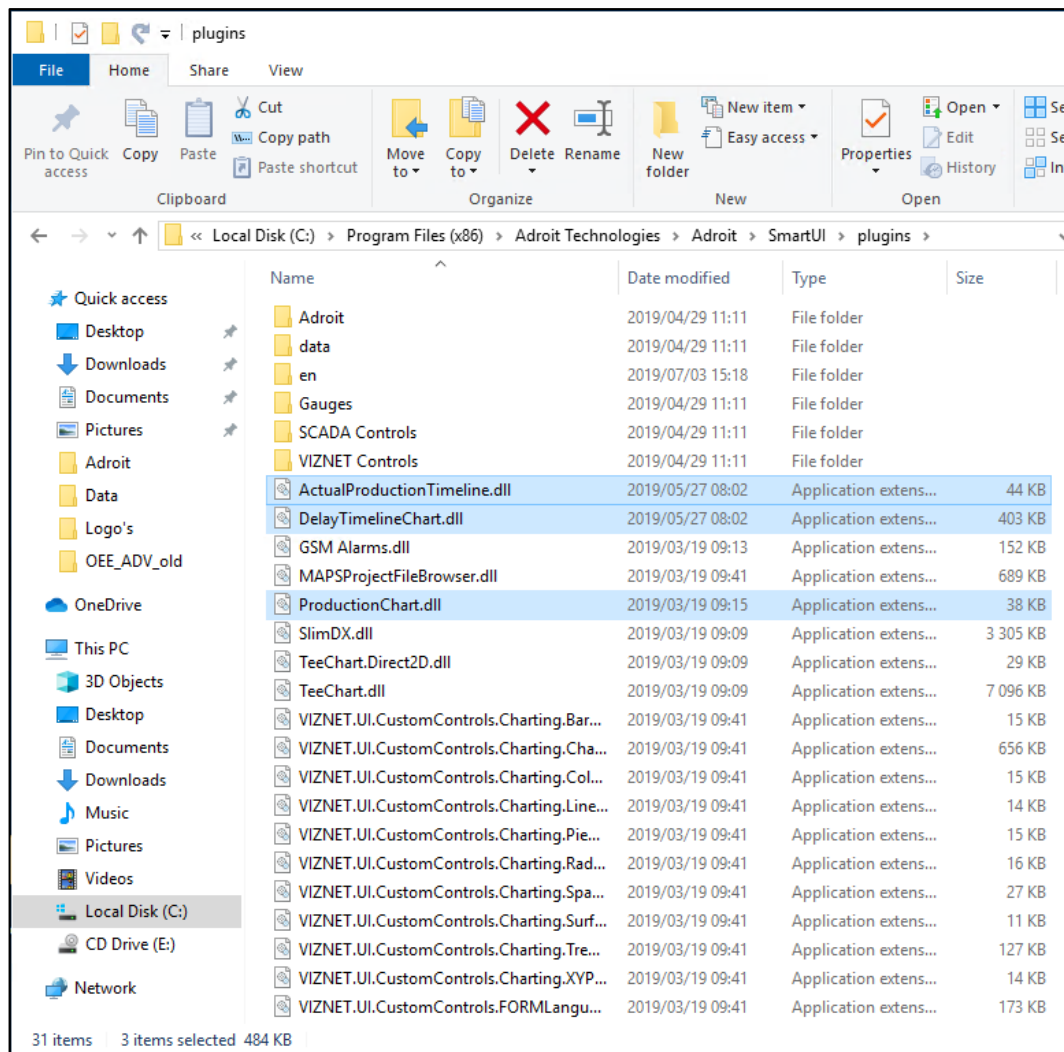
Once the Industrial PC (IPC) has been installed at an appropriate area close to the machine, the following configurations should be completed

1. Change the machine name to reflect the physical machine. An easy path to follow in doing this is by right clicking on 'This PC' in windows file browser and then selecting properties. Select **Change Settings** and change the PC name accordingly.

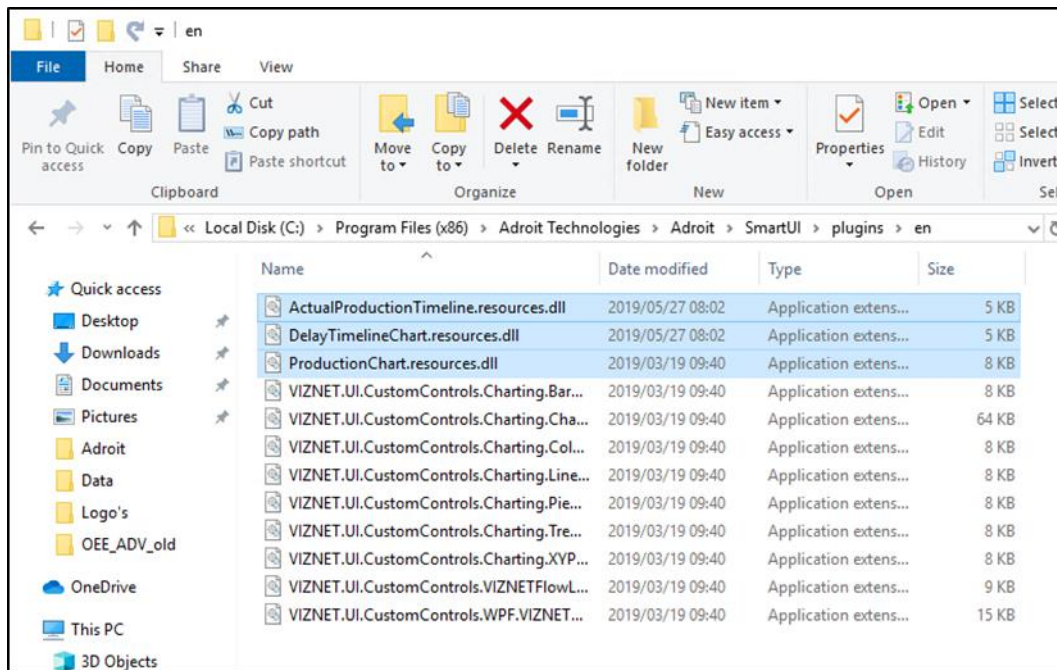


2. Install SUI Operator from the 10.0.4.0 Install disc. Ensure to only select the SUI Operator to be installed.
3. Create a Group on the machine representing the machine i.e. Press01
4. Create the Users allowed to work on this machine and add them to this group.
5. If necessary, create the groups for the Maintenance, Toolsetters, etc that will be allowed to log onto this machine.

6. NB: PC name should match whatever the OEE Agent is named. This will be referred to throughout the project in templates as MachineName i.e if the machine is called Press01 then the PC name needs to be Press01 and the OEE_ADV name needs to be Press01 (all substitution in the object model referring to {MachineName}).
7. SUI - The following .dll files need to be copied manually onto each operator into the 'C:\Programfiles(x86)\Adroit Technologies\Adroit\SmartUI\Plugins' directory:
 - a. ActualProductionTimeline.dll
 - b. DelayTimelinChart.dll
 - c. ProductionChart.dll



8. SUI - The following .resources.dll files need to be copied manually onto each operator into the "C:\Programfiles(x86)\Adroit Technologies\Adroit\SmartUI\Plugins\en" directory)
 - a. ActualProductionTimeline.resources.dll
 - b. DelayTimelineChart.resources.dll
 - c. ProductionChart.resources.dll

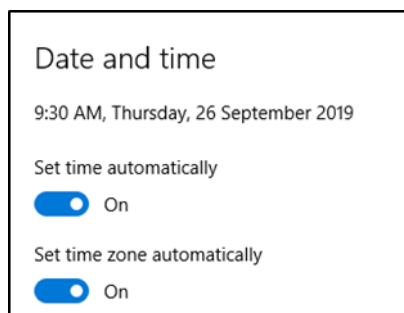


The operator can now be opened on the machine. Only relevant users with access to the specific press may log in.

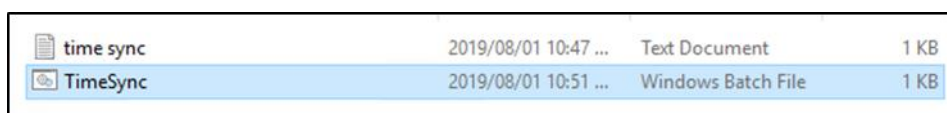
4.4. Time Synchronization

Often the IPC will not have an internet connection and will not be able to display the correct date and time. Therefore, the date and time on the IPC needs to sync to the date and time of the main server machine. The following procedure should be followed to complete this task:

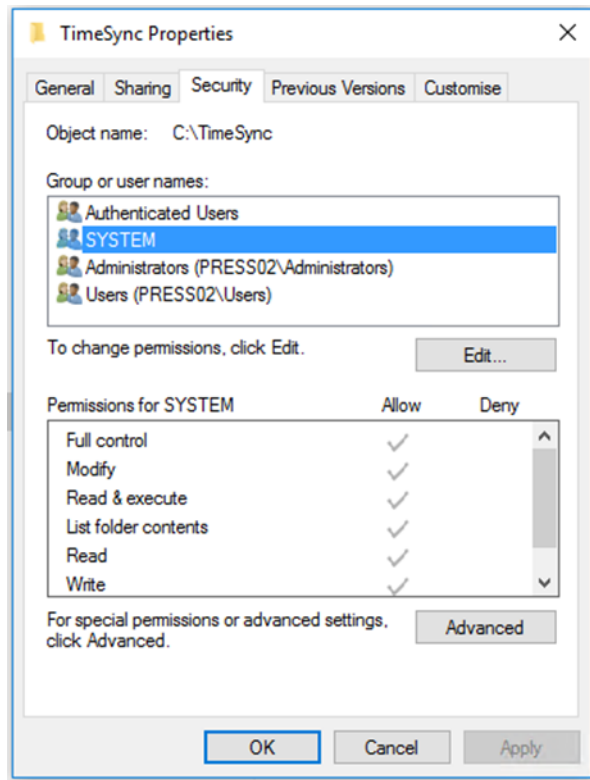
1. The first step is to ensure that Date and Time settings are set as follows



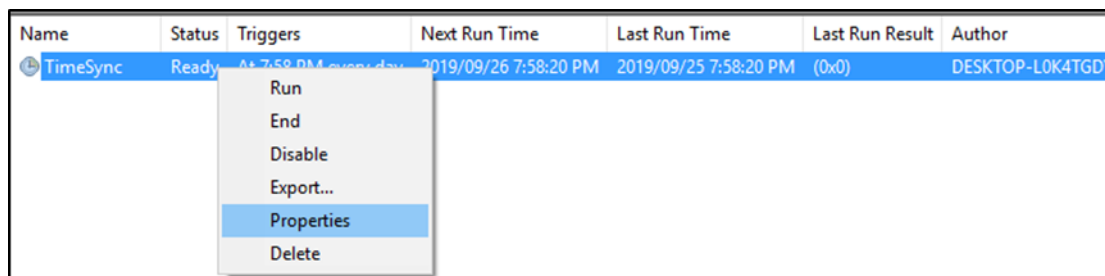
2. Navigate to the TimeSync folder (C:\TimeSync) on the machine and ensure the following files are saved in the folder



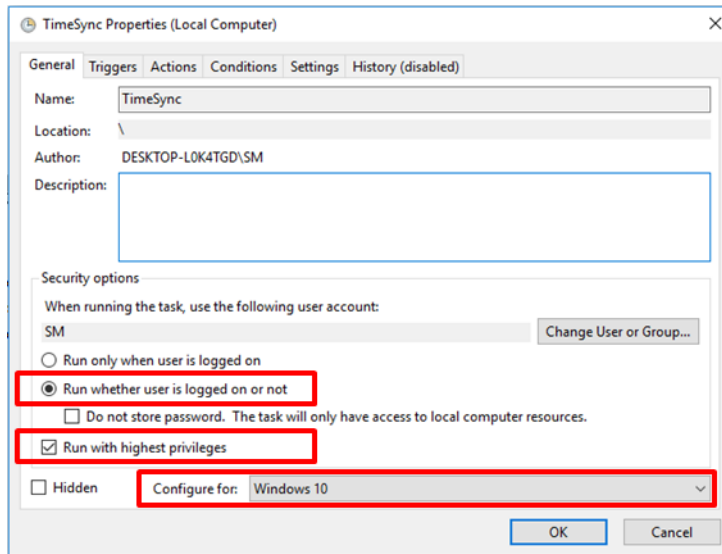
3. Right click on the TimeSync .bat file and select properties. Navigate to the Securities tab. Ensure that both 'SYSTEM' and 'Administrators (PRESS02\Administrators)' have full control for permissions



4. Open the windows 'Task Scheduler' and add a new task called TimeSync
5. Right click on the newly added TimeSync task and select properties



6. Select 'Run whether user is logged on or not', 'Run with highest privileges' and configure for Windows 10 as in the image that follows and then press OK



7. Right click on the 'TimeSync' task again and select run. The time on the IPC should be the correct date and time as is on the main server.

Name	Status	Triggers	Next Run Time	Last Run Time	Last Run Result	Author	Created
TimeSync	Ready	At 7:58 PM every day	2019/09/26 7:58:20 PM	2019/09/25 7:58:20 PM	(0x0)	DESKTOP-L0K4TGD\SM	2019/08/02 7:5

Run

End

Disable

Export...

Properties

Delete

Adroit Enterprise OEE

Controls Configuration

1. Introduction

The purpose of this document is to give step by step instructions on how to set up the control's configuration on Adroit Enterprise OEE. The document will comprise of the Actual Production Timeline as well as the Delay Timeline Chart Controls.

2. OEE Controls Configuration

2.1. Actual Production Timeline

The purpose of the Actual Production Timeline is to give an indication of whether the production being worked is reaching its target or not. In other words, there will always be a planned quantity of products that needs to be produced which is the target.

Current Quantity Made:

Current Qty Made = Actual Good count (slot in OEE Adv Agent) + Actual Bad count (slot in OEE Adv Agent)

Target Value:

If Production is started the ProductionStatus will be S (started), then the Target Marker will be set as to the actual target value (qtyPlanned (in OEE_Adv_WorkOrders table)) + 20%

Projected Value:

Projected = Current Qty Made + (Current Rate x Time Left (slot in OEE Adv Agent))

Current Rate = Current Qty Made / (DateTime.Now - ActualStartTime (in OEE_Adv_WorksOrders table))

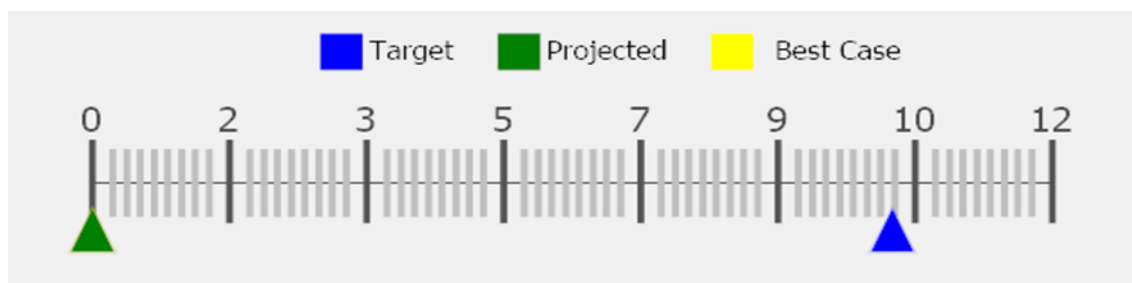
Best Case Value:

Best Case = Current Qty Made + (Best Rate x Time Left (slot in OEE Adv Agent))

Best Rate = Maximum Rate of Line (100%) x Product Line Factor

For Maximum Rate of Line, use the RunRateActual in OEE_Adv_MachineSetup table.

For Product Line Factor, use the RunFactor in the OEE_Adv_ProductList table.



In order to construct the graph on Adroit, the following setup configurations need to be followed (see image that follows):

- Server - Set the SmartUI Server that is being connected to
- Adroit DataSource - Set the name of the Adroit Datasource that is being connected to

- OEE Advanced Agent Name - Set the name to the OEE Advanced Agent in Adroit that is being used
- OLEDB DataSource - Set the OLEDB DataSource to the database from which data is being retrieved from
- Poll Interval - Set the required interval (in milliseconds) at which the OEE Adv database recalculates marker values as well as update the gauge and markers
- Minor Tick Count – Sets the number of minor tick marks on the scale between adjacent major tick marks
- Major Tick Count – Sets the total number of major tick marks displayed on the scale
- Scale Start Point - Sets the starting point of the scale
- Scale End Point - Sets the ending point of the scale
- Scale Auto Rescaling - Sets whether the scale's range of values is automatically expanded when the scale's current Value reaches either the MinValue or MaxValue
- Gauge Bounds - Sets the gauge's bounds
- Gauge AutoSize - Sets a value indicating whether the size of a Gauge control should be determined automatically. When this option is enabled, the ProportionalStretch property is ignored
- Gauge Proportional Stretch - Decides whether the gauge is proportionally zoomed when resizing
- Target Marker Color - Sets the colour of the Target Marker
- Projected Marker Color - Sets the colour of the Projected Marker
- Best Case Marker Color - Sets the colour of the Best-Case Marker
- Actual Unit Bar Color - Sets the colour of the Actual Units Bar

ActualProductionTimeline Tasks	
DataSource Settings	
Server	Default Server
Adroit DataSource	Adroit
OEE Advanced Agent Name	OEE_AGENT_SETUP
OLEDB DataSource	OEE_SQL
Poll Interval	10000
Gauge Settings	
Minor Tick Count	4
Major Tick Count	8
Scale Start Point	62.5, 250
Scale End Point	62.5, -20
☒ Scale Auto Rescaling	
Gauge Bounds	6, 6, 629, 180
Gauge AutoSize	True
☒ Gauge Proportional Stretch	
OEE Settings	
Target Marker Color	Blue
Projected Marker Color	Green
Best Case Marker Color	Yellow
Actual Units Bar Color	225, 255, 0, 0
Wizards	
Configuration	
Behaviors	
New Behavior	

The following hidden properties of the ActualProductionTimeline control need to be driven from the following corresponding OEE Advanced Agent tag slots:

- OrderIdx – driven by orderIdx slot - Adroit.OEE_ADV.OEE003.orderIdx
- MachineId – driven by machineIdx slot - Adroit.OEE_ADV.OEE003.machineIdx
- ProductIdx - driven by productIdx slot - Adroit.OEE_ADV.OEE003.ProductIdx
- ActualBadCount – driven by actualBadCount slot –

Adroit.OEE_ADV.OEE003.actualBadCount

- ActualGoodCount - driven by actualGoodCount slot –

Adroit.OEE_ADV.OEE003.actualGoodCount

- ActualUnitsPerMin - driven by actualUnitsPerMin slot –

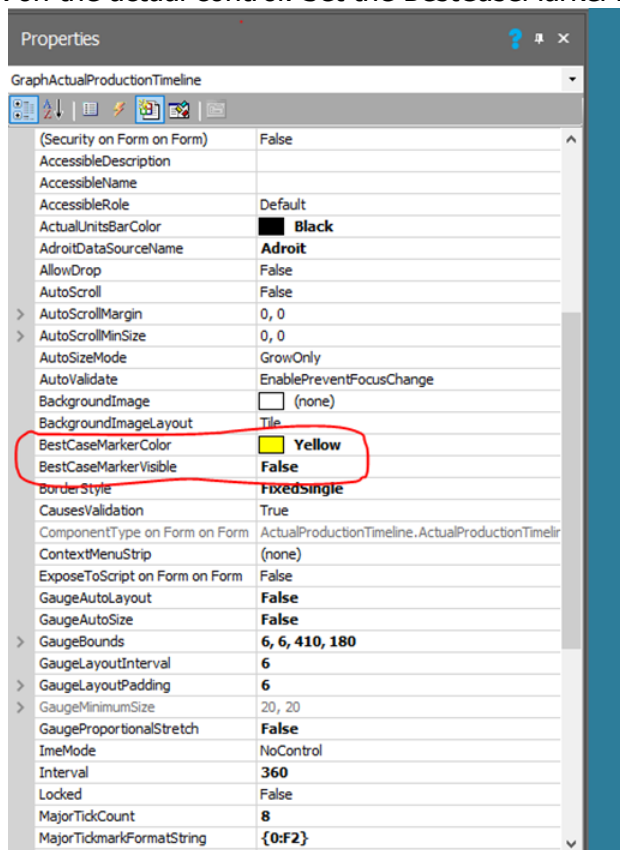
Adroit.OEE_ADV.OEE003.actualUnitsPerMin

- TimeLeft - driven by timeLeft slot – Adroit.OEE_ADV.OEE003.timeLeft
- TimeStarted - driven by timeStart slot - Adroit.OEE_ADV.OEE003.timeStart
- Start – set to true from any source to start updating the gauge and markers –

Adroit.Integer.OEE003.StopAdroit

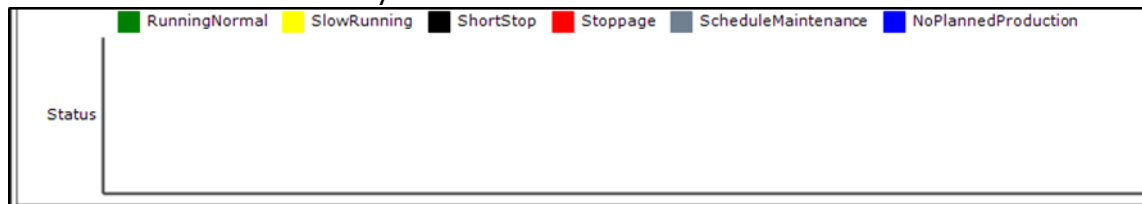
- Stop – set to true from any source to stop updating the gauge and markers and reset the gauge - Adroit.OEE_ADV.OEE003.Start_Button.Value

The Visibility of the Best-Case indicator can be toggled between Visible and Not visible. This can be achieved by setting the BestCaseMarkerVisibility in the Properties of the Adroit Designer when you click on the actual control. Set the BestCaseMarkerVisibility to False.



2.2. Delay Timeline Chart

The purpose for the delay timeline chart is for a quick overview for anyone that walks past to OEE operator screen to see the history of the current works order.



The following settings can be configured for the DelayTimelineChart control:

- Server - Set the SmartUI Server that is being connected to
- Adroit DataSource - Set the name of the Adroit data source that is being connected to
- OEE Advanced Agent Name - Set the name to the OEE Advanced Agent in Adroit that is being used
- OLEDB DataSource - Set the OLEDB DataSource to the database from which data is being retrieved from
- Poll Interval – Sets the interval (in milliseconds) in which the colour for the different statuses is determined and updated as a point in the timeline chart
- Bottom Axis Increment - Sets the Chart Bottom Axis increment value, 0 is auto
- Running Normal Status Color- The status colour for the machine running normal to be displayed on the chart
- Slow Running Status Color- The status colour for the machine when slow running to be displayed on the chart
- Stoppage Status Color- The status colour for the machine when experiencing stoppages to be displayed on the chart
- Scheduled Maintenance Status Color- The status colour for the machine for scheduled maintenance to be displayed on the chart
- No Planned Production Status Color- The status colour for the machine for no planned production to be displayed on the chart

DelayTimelineChart Tasks	
DataSource Settings	
Server	Default Server
Adroit DataSource	Adroit
OEE Advanced Agent Name	OEE_AGENT_SETUP
OLED8 DataSource	OEE_SQL
Poll Interval	10000
Chart Settings	
Bottom Axis Increment	0.0006944444444444447
OEE Settings	
Running Normal Status Color	Green
Slow Running Status Color	Yellow
Stoppage Status Color	Red
Scheduled Maintenance Status Color	Black
No Planned Production Status Color	Blue
Wizards	
Chart Editor	
Configuration	
Behaviors	
New Behavior	

The following hidden properties of the Delay Timeline Chart control need to be driven from the following corresponding OEE Advanced Agent tag slots:

- OrderIdx – driven by orderIdx slot - Adroit.OEE_ADV.OEE003.orderIdx
- MachineId – driven by machineIdx slot - Adroit.OEE_ADV.OEE003.machineIdx
- ProductIdx – driven by productIdx slot - Adroit.OEE_ADV.OEE003.machineIdx
- Available – driven by available slot - Adroit.OEE_ADV.OEE003.Availability
- Running – driven by running slot - Adroit.OEE_ADV.OEE003.Running
- SlowRunning – driven by slowrun slot - Adroit.OEE_ADV.OEE003.SlowRun
- Start - set to true from any source to start plotting the chart with status colors - Adroit.OEE_ADV.OEE003.InProduction
- Stop - Stop – set to true from any source to stop plotting the chart with status colors and reset/clear the chart - Adroit.OEE_ADV.OEE003.Start_Button.Value

Adroit Enterprise OEE

Email Driver

1. Overview

This driver is designed to provide an interface for sending alarms or any other email information including attachments from Adroit.

The driver currently only supports RAWBYTES slots, of which only the Notifier Agent currently provides a suitable rawbytes slot.

The Notifier Agent allows for manual email sending, and it also exposes the various sub items such as TO, CC, FROM, SUBJECT and so forth as individual VARSTRING slots so an email interface could easily be crafted onto a mimic.

The subject line and body may contain text macros that are parsed to allow for rich detailed information to be sent if required and not just a simple alarm text field.

2. Email Configuration



2.1. Outgoing Mail Settings

Mailbox resource– Is not editable and is automatically created when the configuration dialogue is closed (OK), with the last known resource remembered so that additional devices will reference that id by default. Future new devices resources can quickly be associated when configuring a new device. A prompt will appear if non resource constituents are changed and user intervention is requested to direct the driver to ignore or allow the change to affect an existing resource because other devices may be using that resource, for the EMAIL driver this only applies to the password which can be changed from time to time.

From – The fully qualified email address.

Login Password– The account email domain password

SMTP Server – The SMTP server machine name, e.g. "MAIL.adroit.co.za"

SMTP Mail Port – (default 25) Port required on the mail server for SMTP.

3. Usage: Macros

<ALM> will insert the alarm string received from the Notifier Agent.

<agent.slot> will insert the result of a string query to the agent slot, for example an analog.value slot will result in the engineering value being inserted.

{The corner brackets are not included.}

Manual mails send the macro undecoded, for verification. The macros will only be expanded through the traditional alarming mechanism.

Macros can be placed anywhere in the text fields of SUBJECT or BODY, duplicates are allowed.

The attachment line may only send 1 file at a time, any file may be sent.

Example: This can be inserted into the BODY.

"Hello Fred

An alarm for your attention : (<ALM>) ,

The dam level is at <DAM_LVL.VALUE> meters.

The pump is <RUN_STATE.TEXT>.

Goodbye from Adroit"

4. Supported Addresses

4.1. Outgoing Email Rawbytes Slots

The driver address is "EMAIL.x" where { x = 0, x <= 250 }

must be output enabled

must be scan inhibited

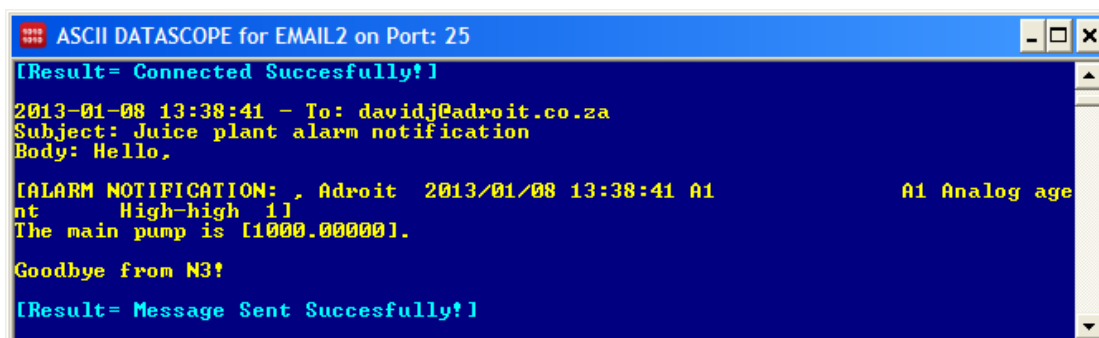
must be scanned to a notifier's EMAILRawValue slot.

The other notifier email slots are internal and should not be directly scanned to any driver.

Noting that the FROM field is defined once in the device setup, a system may require more, this can be achieved by adding as many more "devices" as needed.

If the FROM field is not significant, up to 250 notifier slots may be scanned to one device by incrementing the index.

5. Datascope Example



```

ASCII DATASCOPE for EMAIL2 on Port: 25
[Result= Connected Successfully!]
2013-01-08 13:38:41 - To: davidj@adroit.co.za
Subject: Juice plant alarm notification
Body: Hello,

[ALARM NOTIFICATION: , Adroit 2013/01/08 13:38:41 A1          A1 Analog age
nt      High-high 11
The main pump is [1000.00000].

Goodbye from N3!

[Result= Message Sent Successfully!]
  
```


Adroit Enterprise OEE

SSRS

1. Introduction

The purpose of this document is to give step by step instructions on how to firstly install SQL Server Reporting Services (SSRS). Secondly a detailed explanation is given on how to use different report building platforms to share reports onto SSRS.

2. SQL Reporting Services

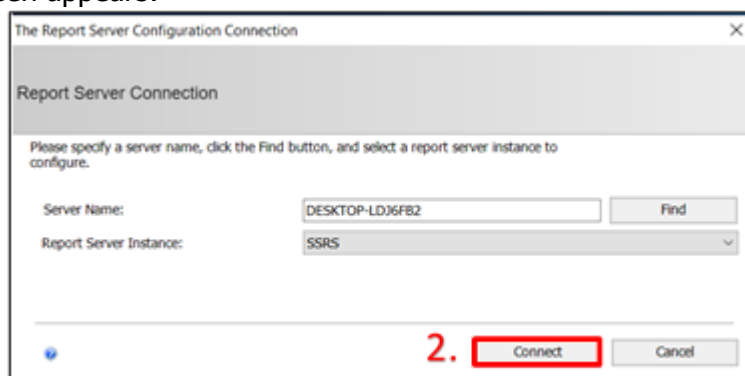
2.1. Setting Up SSRS

The following images gives a step by step guideline on how to install and set up SSRS on your machine. The SSRS installation file can be found online at <https://www.microsoft.com/en-us/download/details.aspx?id=55252>.

1. Once the installation has been successfully completed, the **Report Server Configuration Manager** program is installed under the folder **Microsoft SQL Server Reporting Services**. The image that follows is an illustration of what the configuration manager looks like.



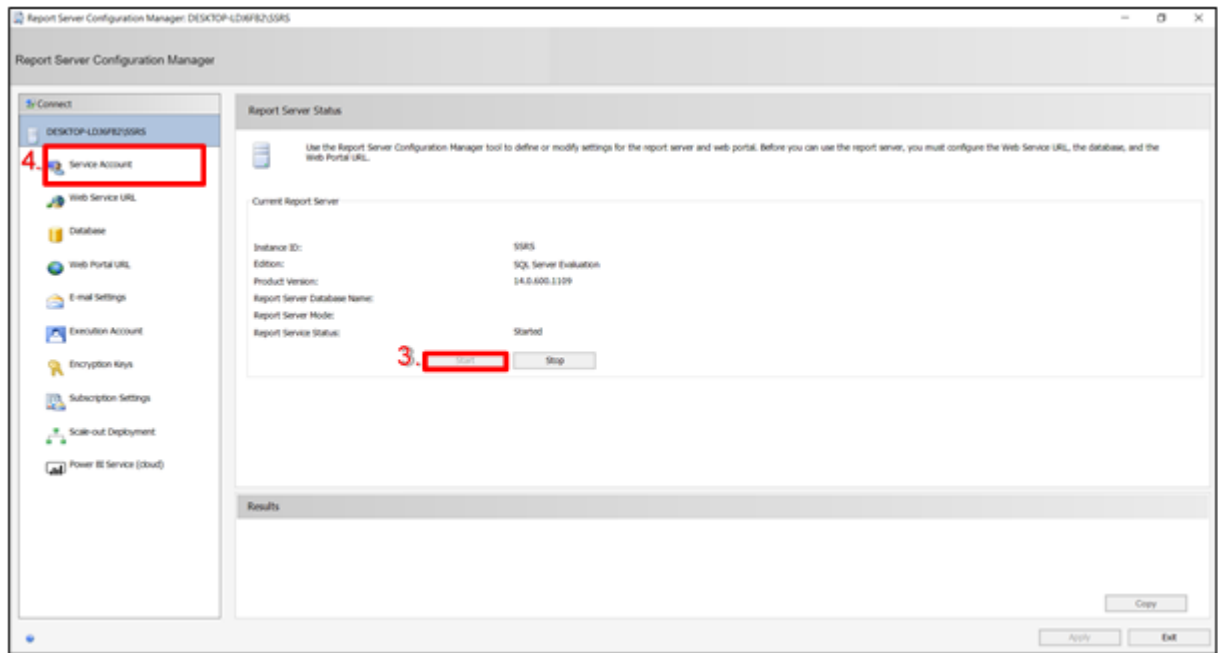
Select and run the configuration manager to begin the SSRS set up process. Once open the following screen appears:



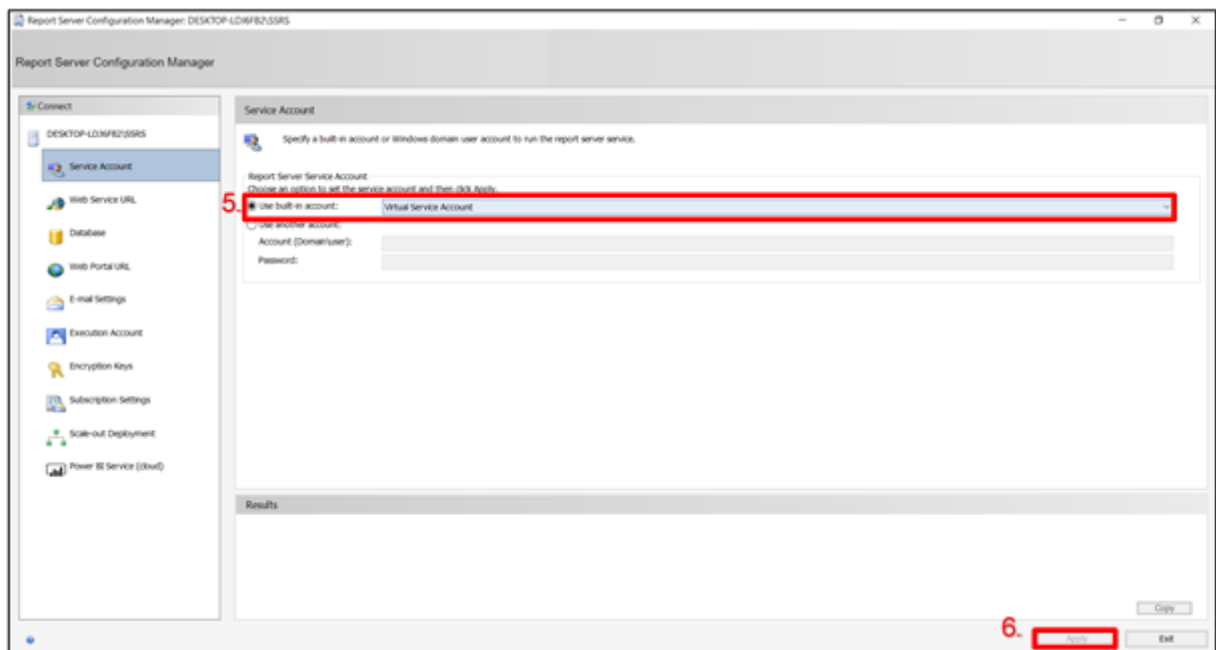
2. Keep the Server Name at the default name (or any other relevant server name) and select Connect

Once you are connected to the server, the Report Server Configuration Manager will open.

3. In order to start the reporting services, select **Start** on the Report Server Status page as seen on the image that follows.
4. Once the report server has started, proceed to the **Service Accounts** page.

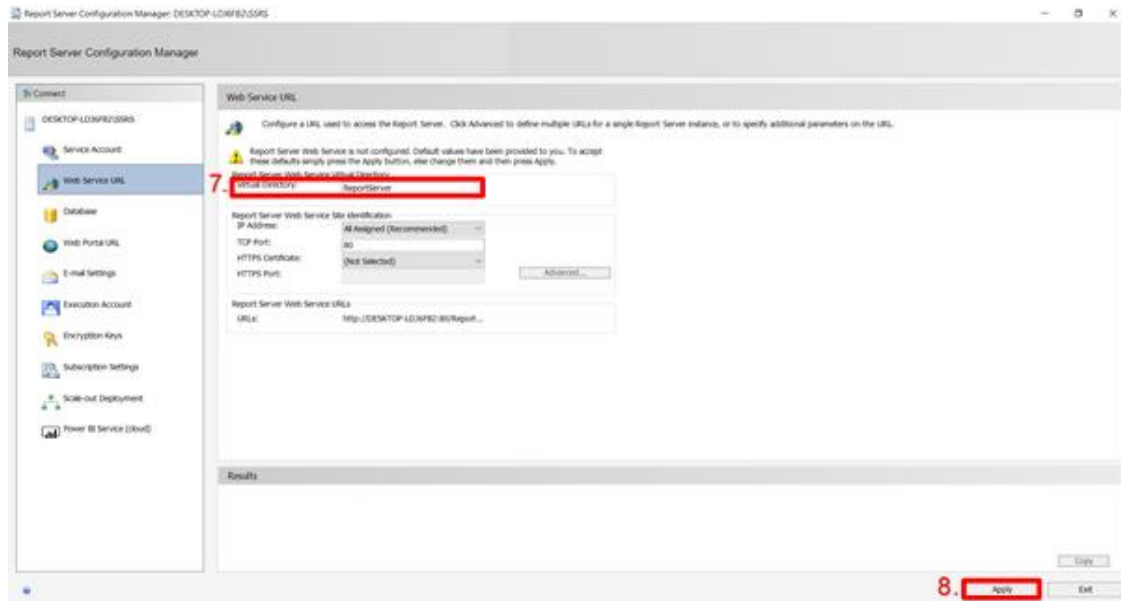


5. At the Use built-in account option, select **Virtual Service Account**
6. Select **Apply** and proceed to the **Web Service URL** page



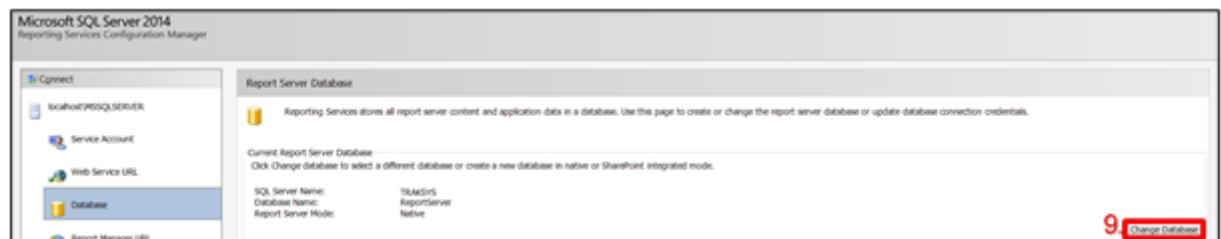
The Web Service URL page is to set up a URL to view reports to be stored on reporting services. Once the Web Service URL page, the name of the server on which the reports can be viewed is set up.

7. Enter a name for the server (e.g. AdroitOEE_ReportServer) or it can just be left on the default name given.
8. Select **Apply** and proceed to the Database page.

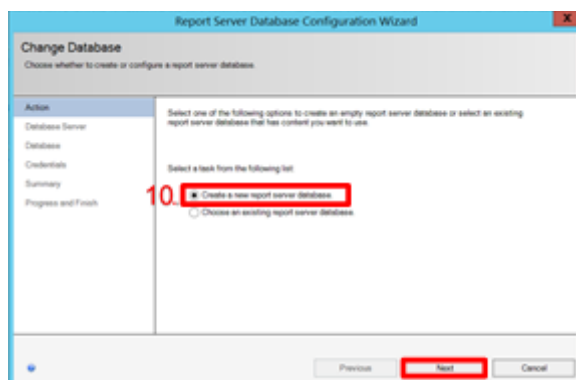


The database page is meant to connect SSRS to either an existing or new database.

9. Select Change Database

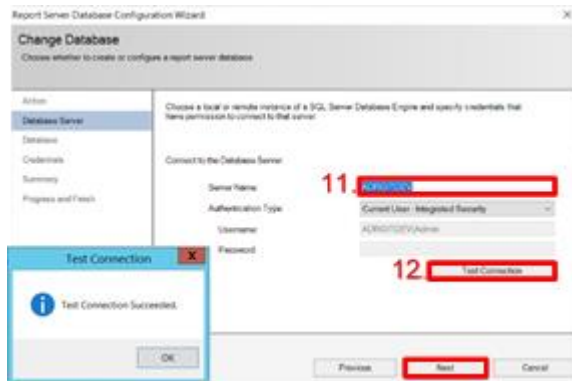


10. Select Create a new report server database and then Next.

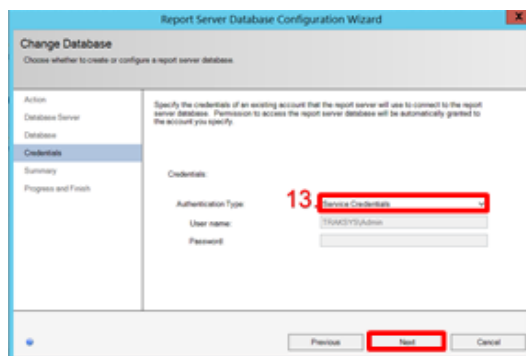


11. Enter the server name the SSRS must connect to

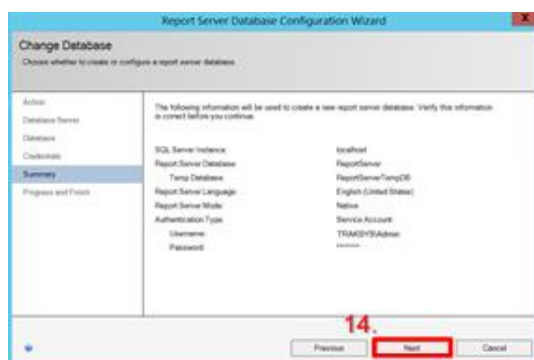
12. Select **Test Connection** to ensure that SSRS connects to the database server successfully



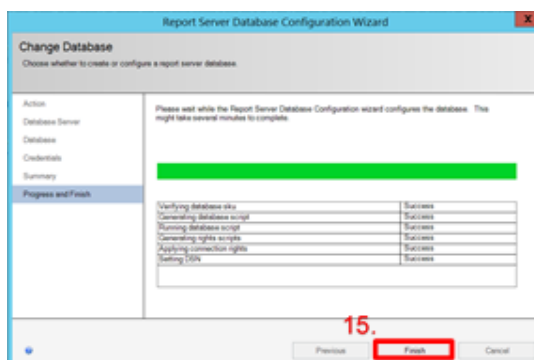
13. For the authentication type, select the **Service Credentials** option and select **Next**.



14. Verify the summary of all the information entered and select **Next**.



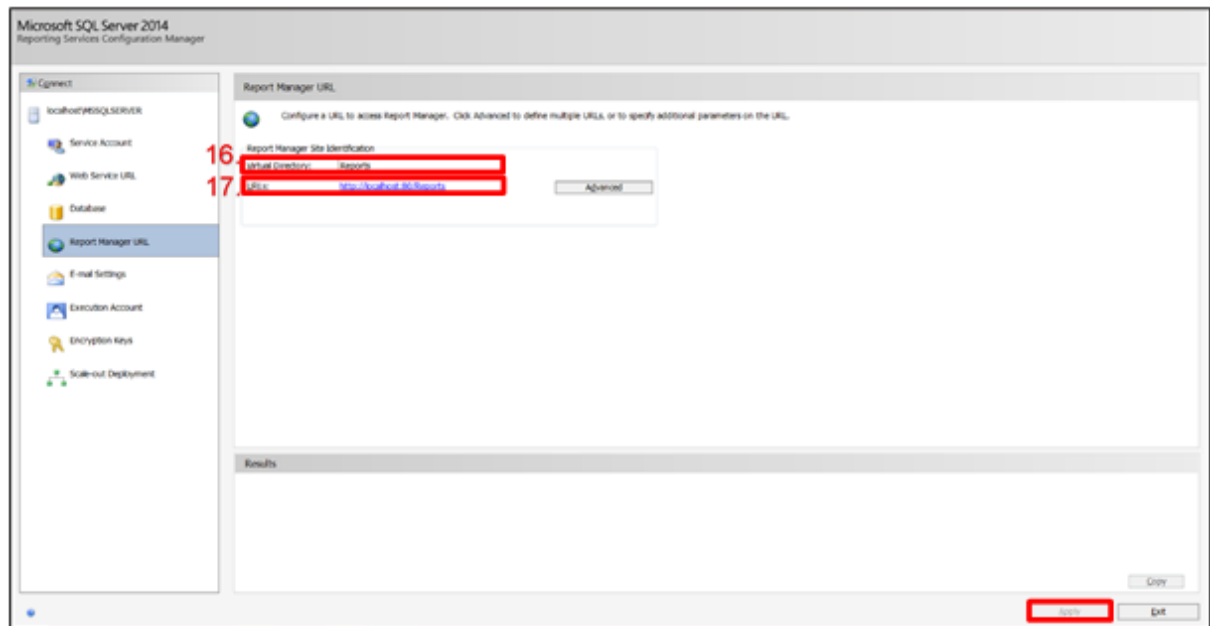
15. Wait for the database connection to be configured successfully and select **Finish**.



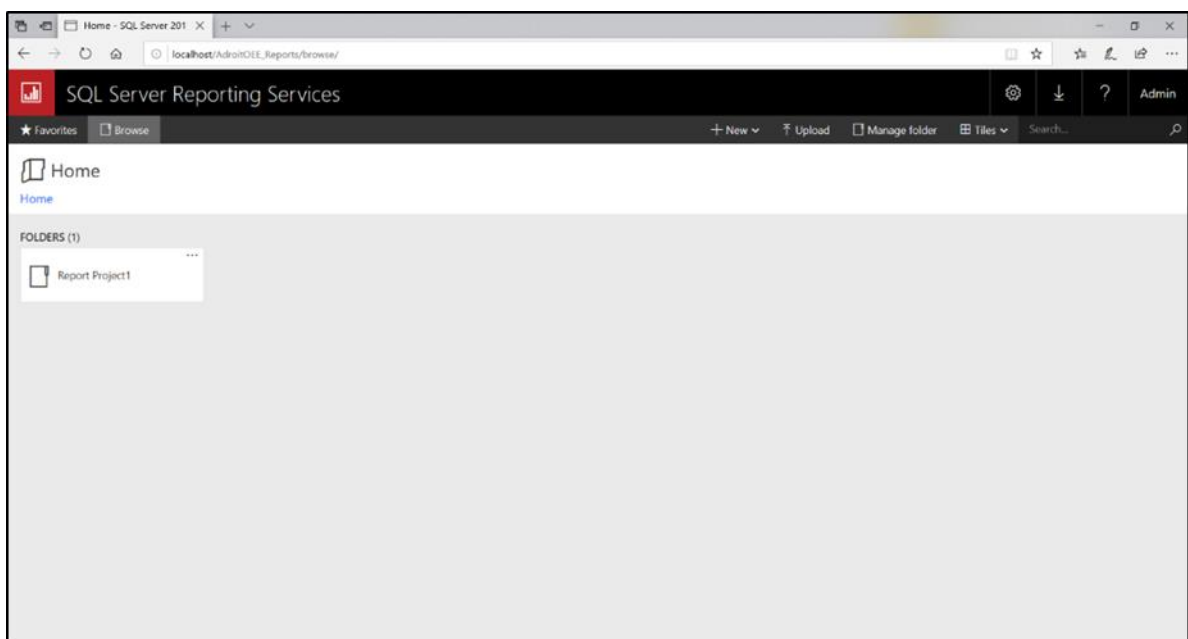
Once the database has been configured, proceed to the **Web Portal URL** page. This URL creates a SSRS reports manager directory where all reports are stored and can be managed efficiently.

16. Enter a virtual directory name (e.g. AdroitOEE_Reports) and select **Apply**.

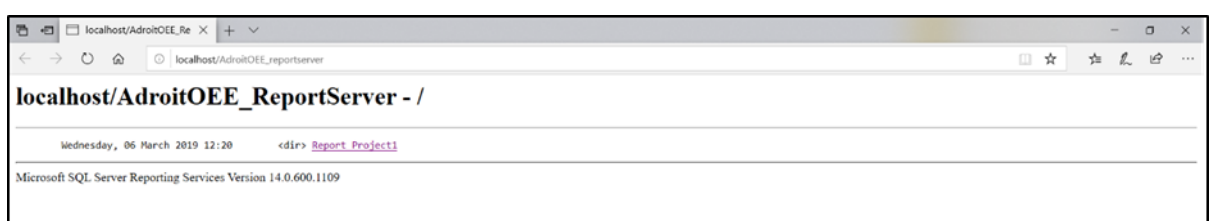
17. Click on the URL to view the SSRS reports manager page



The image that follows displays what the SSRS report manager looks like. This report manager is connected to the selected database and will store reports created on report building platforms i.e. Microsoft SQL Server Report Builder or Visual Studio.



The report server URL is also a platform where the reports are stored, but it isn't used as such for managing of reports. But more for just viewing. The following image is an illustration of the SSRS report server and can be viewed by opening the URL that is found on the **Web Service URL** page (see step no. 8). Microsoft SQL Server Reporting services is now successfully set up.

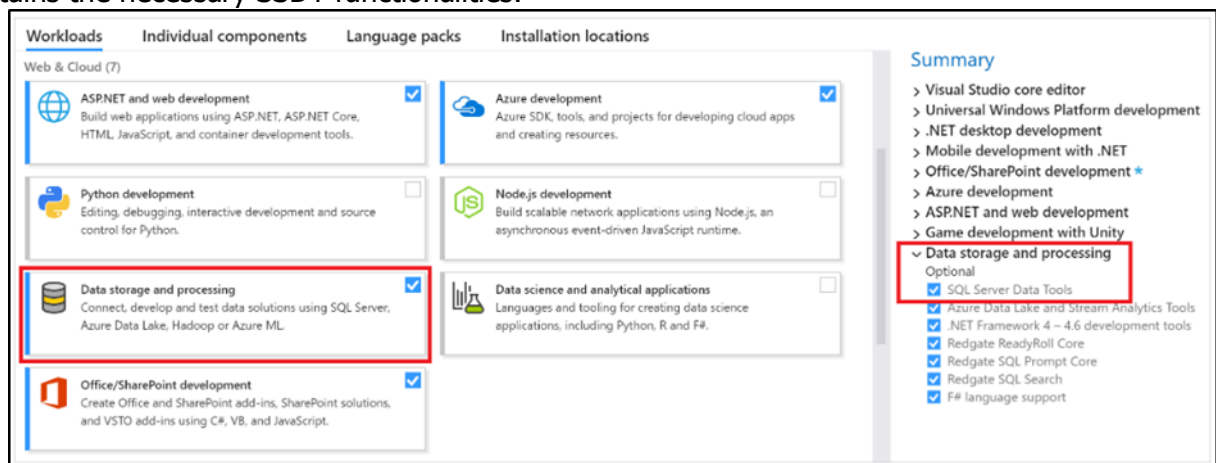


3. Report Building Platforms

3.1. Microsoft Visual Studio

3.1.1. SSDT Setup

Visual Studio allows you to create a report server project as well as a report definition (.rdl) file using SQL Server Data Tools (SSDT). In order to enable the functionalities to create and edit reports, SSDT needs to be installed when installing Visual Studio. The following image gives an indication of where to include SSDT during the Visual Studio installation. Microsoft Visual Studio needs to be installed first and the image that is displayed illustrates a step during the installation. Select all the relevant options to your specific needs, however it is crucial that that **Data storage and processing** is selected as it contains the necessary SSDT functionalities.

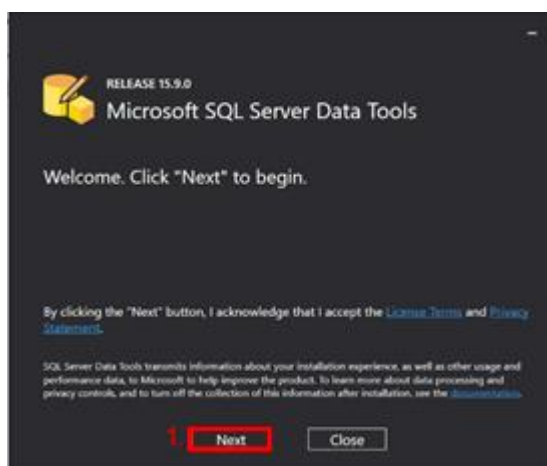


Once Visual Studio is successfully installed, a separate SSDT stand-alone installation is required to enable Visual Studio to run .rdl files. The installation file can be found on the following link: <https://docs.microsoft.com/en-us/sql/ssdt/download-sql-server-data-tools-ssdt?view=sql-server-2017>. The following image displays the installation/setup file for SSDT.

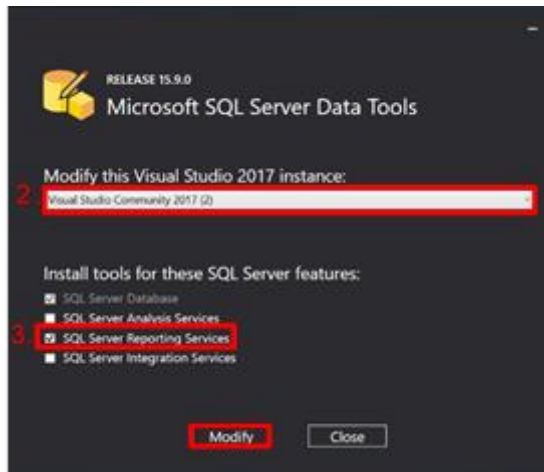
SSDT-Setup-ENU.exe	2019/02/27 06:43	Application	1 588 KB
--------------------	------------------	-------------	----------

Run the file and the image that follows will be displayed. Follow the indicated steps:

1. Select **Next**



2. This option usually depends on the version of Visual Studio that was installed. Generally Visual Studio Community is used hence select the **Visual Studio Community 2017** option
3. It is crucial that **SQL Server Reporting Services** is selected for reporting services. The other options may be selected for other purposes such as building SQL Server relational databases, Azure SQL databases, Analysis Services (AS) data models, Integration Services (IS) packages. Select **Modify/Install**.

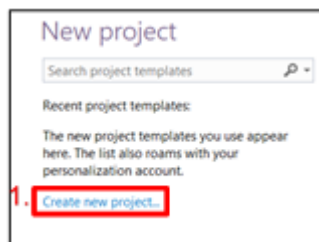


Once SSDT has finally been installed you can now load or create *.rdl* report files onto Microsoft Visual Studio.

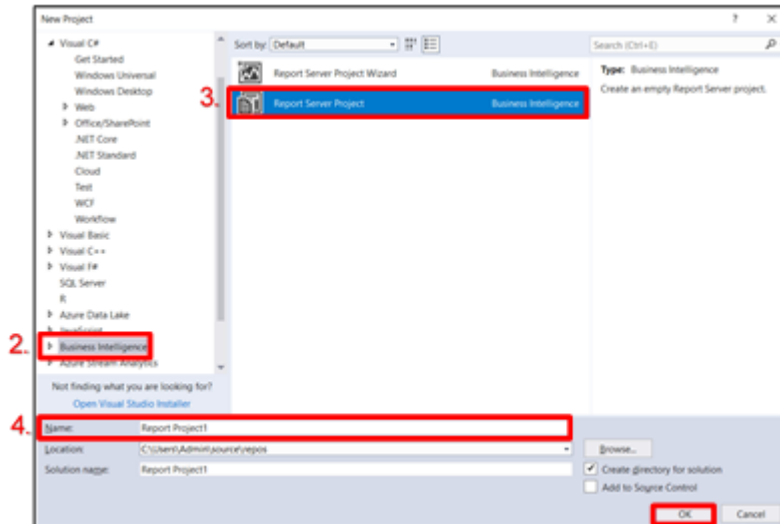
3.1.2. Loading Existing Reports on Visual Studio

In a situation where there are *.rdl* reports that have already been created, a user can create a new project profile on Visual Studio to load these reports. The user can thereafter make any necessary adjustments and then deploy the reports onto SSRS. The following steps describe the process of loading the reports onto Visual Studio.

1. Open Microsoft Visual Studio and select **Create new project**

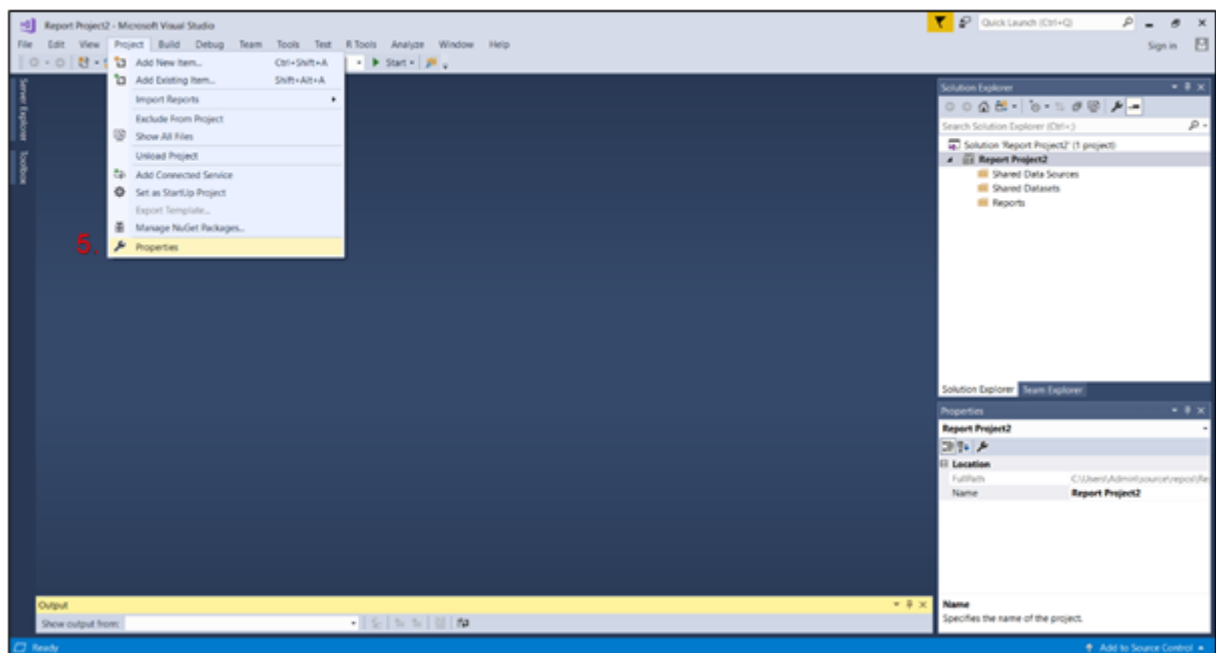


2. On the left-hand side of the screen, navigate to the **Business Intelligence** project type option and select it.
3. Select Report Server Project
4. Enter an appropriate project name (e.g. AdroitOEE_Reports) and select **Ok** to proceed.

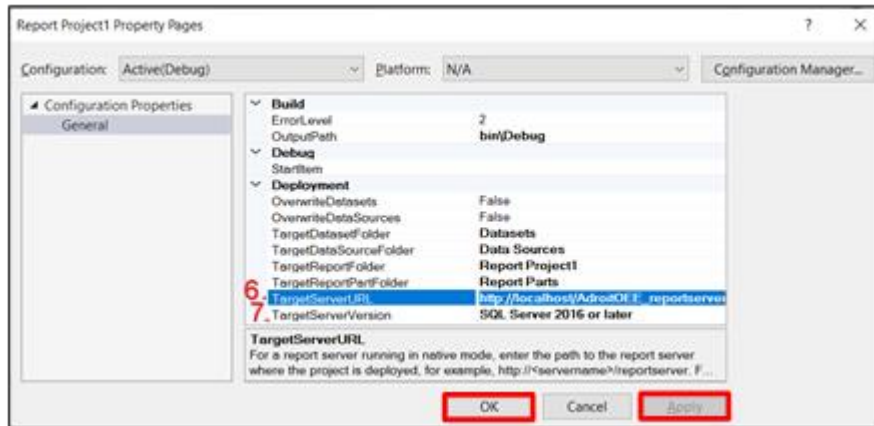


A new project is now created. It should be noted that the aim is to connect this project to the SSRS server. Before loading any reports ensure that the newly created project is linked to the SSRS report server. Execute the following steps:

5. Navigate to **Project** and then select **Properties**

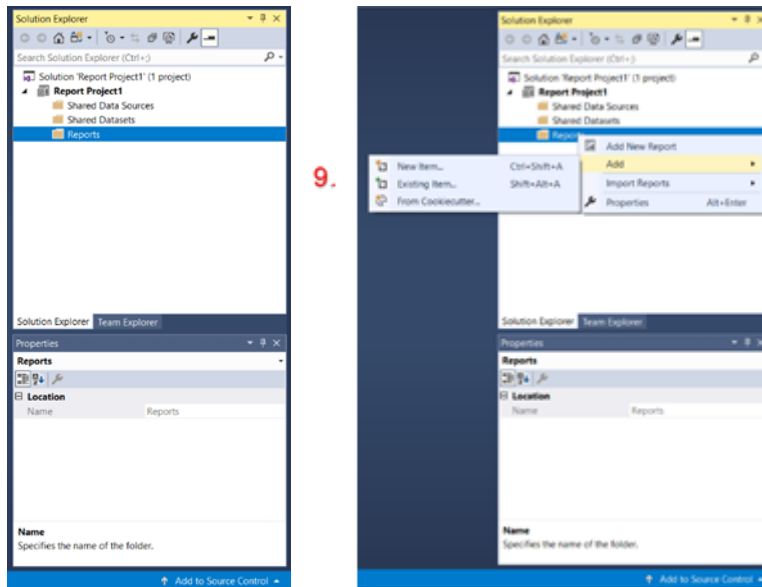


6. Ensure that the **Target Server URL** is the same URL for the SSRS report server URL. See the URL found on the **Web Service URL** page for step 8 in the Setting Up SSRS section.
7. Ensure that the Target Server Version is of the relevant version of SQL Server in use
8. Select **Apply** and **OK**

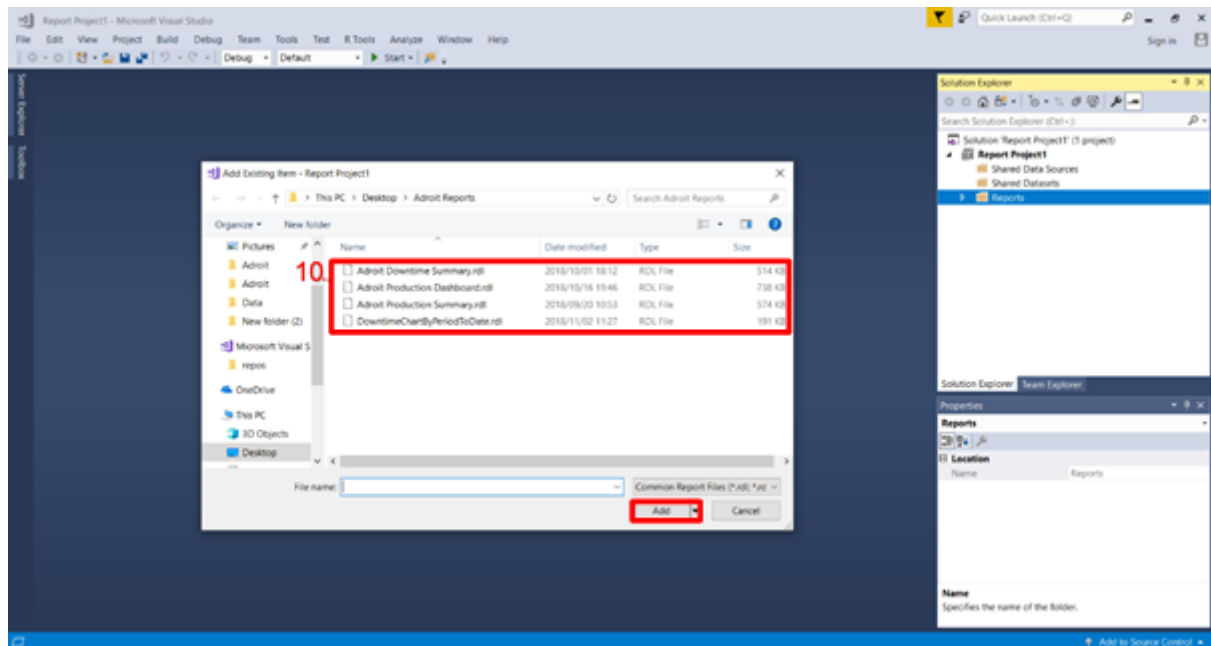


The connection to the SSRS Server has been made. Now any reporting that is done can be deployed onto SSRS. The next step is to load existing *.rdl* reports.

9. On the main page of the project, navigate to **Reports** on the right-hand pane and right click, navigate the mouse to the **Add** option and select **Existing Item**

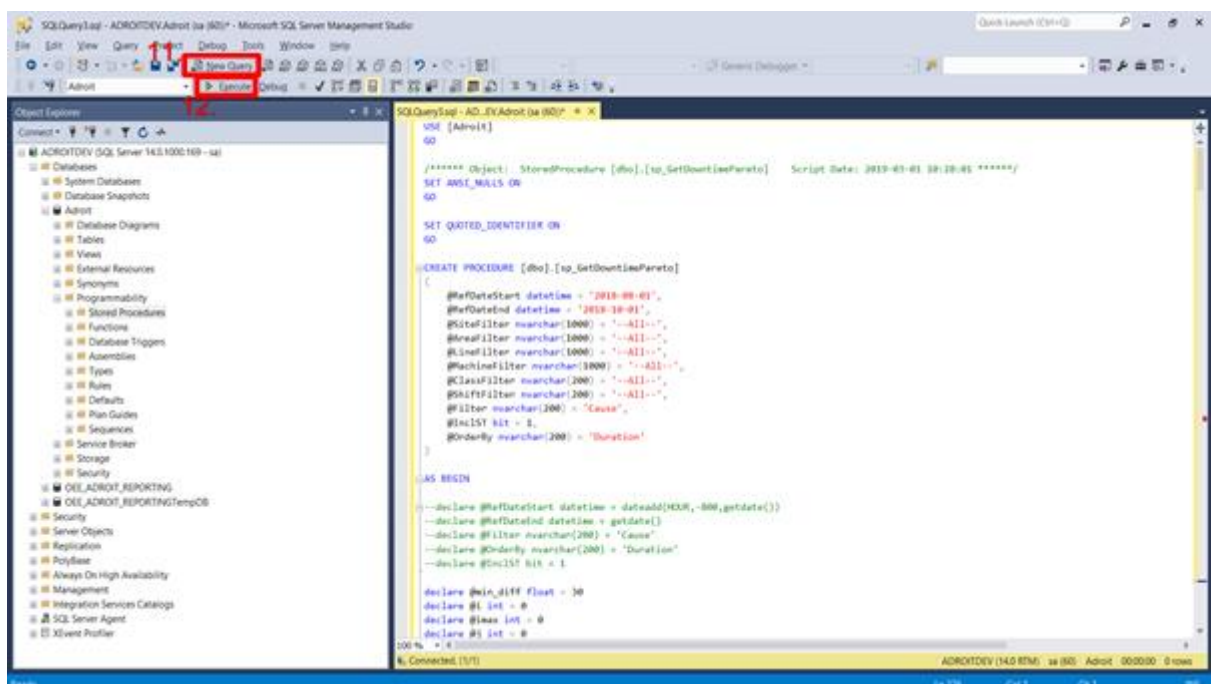


10. Select existing *.rdl* report files that you wish to load onto the project and click on **Add**

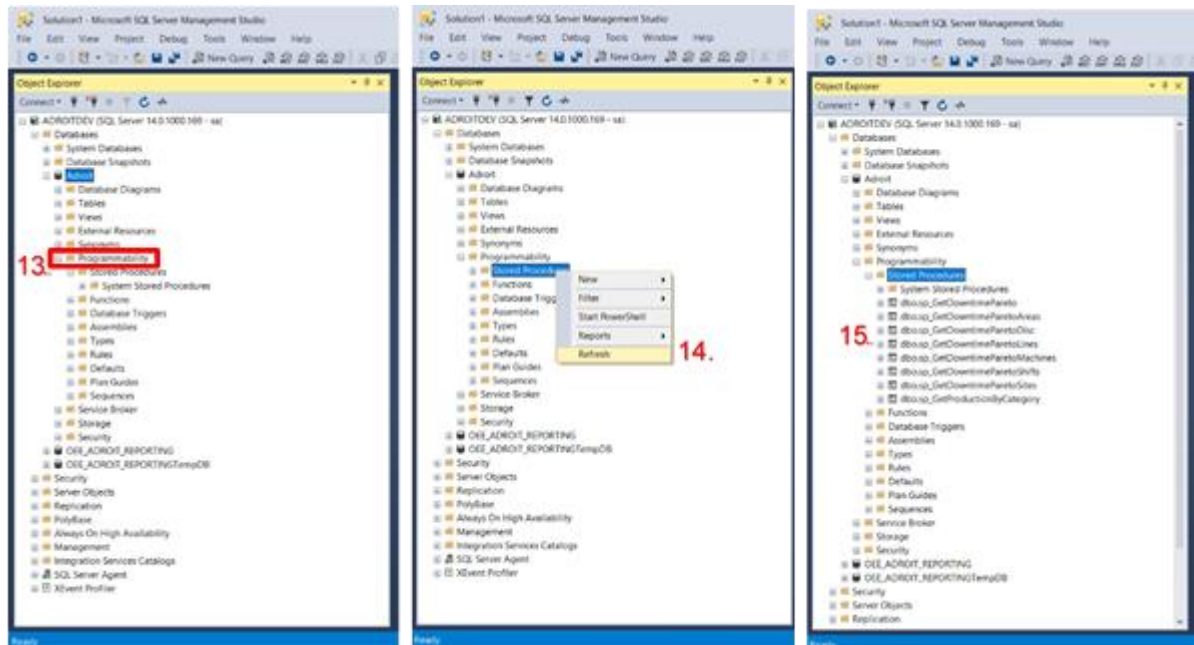


The reports are now all successfully loaded onto Visual Studio. At this point the reports still need to retrieve data from an existing database. The next step is to open **Microsoft SQL Management Studio**. This is to acknowledge the database that will be used for the reports. Stored procedures need to be created or loaded (if already created) onto SQL Management studio and then linked to its respective reports. Open SQL Management Studio, connect to the relevant server and execute the following steps:

11. Select **New Query** to either create the store procedure or paste an existing store procedure
12. **Execute** the query to ensure that it runs successfully. Repeat step 11 and 12 if there are more store procedures needed

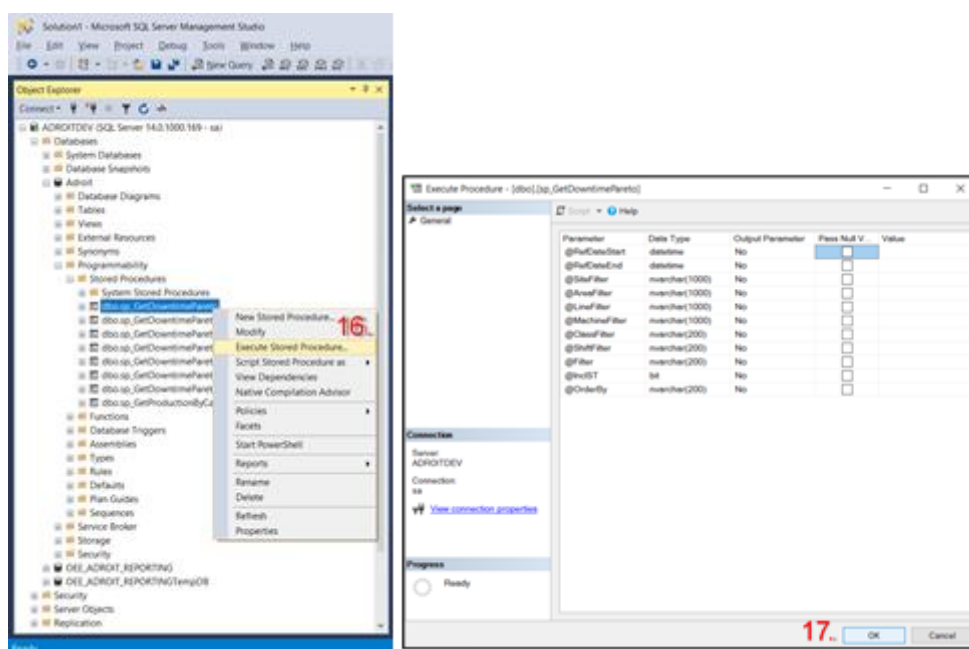


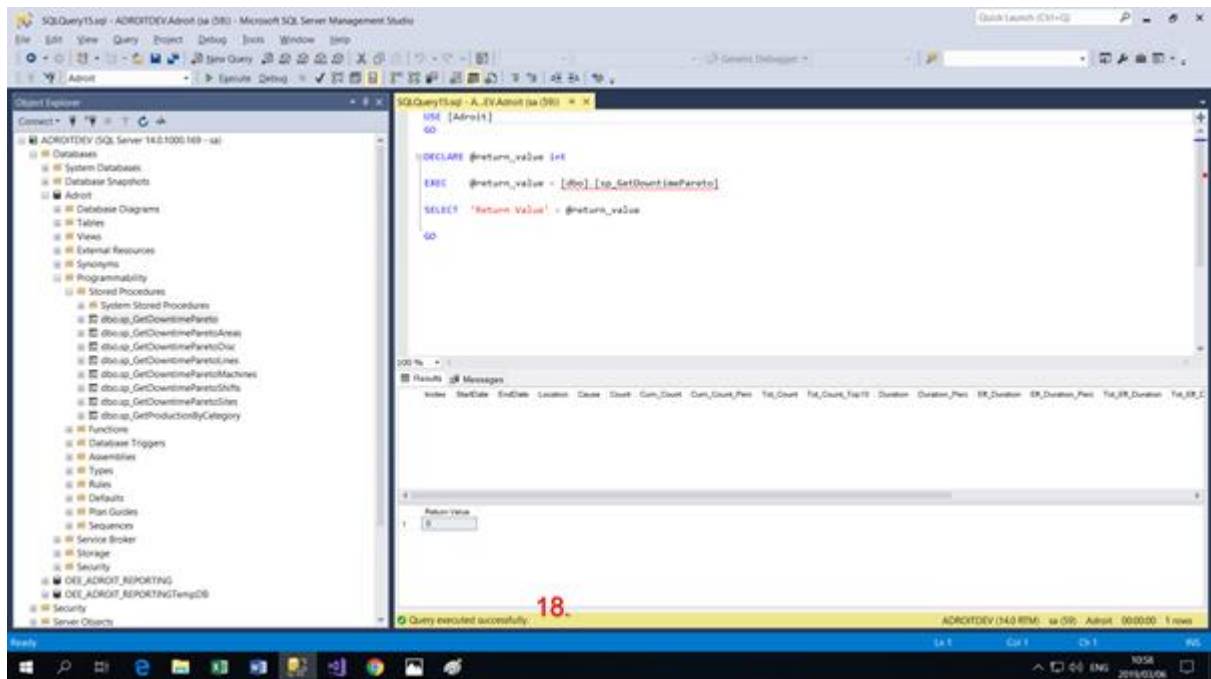
13. After running the query successfully, navigate to the existing database (i.e. **Adroit**), select **Programmability**
14. Right click on **Stored Procedures** and select **Refresh**
15. The store procedure that was executed in step 12 will now be loaded onto the stored procedures



Before linking the stored procedures, they need to be tested to ensure that that no errors exist within the stored procedure.

16. Right click on a stored procedure and select **Execute Stored Procedure**
17. Verify the parameters and select **OK**
18. Verify that the query was executed successfully. Repeat steps 16-18 for all stored procedures that needs to be used for the respective reports. Note that the image for this step displays no data as the database does not contain any data for this example.

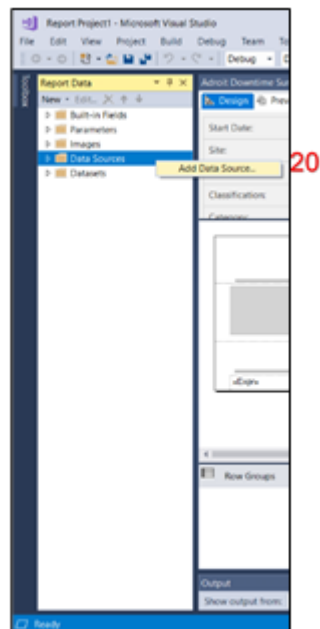
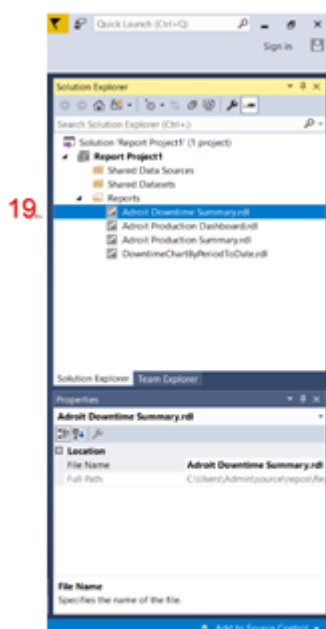




Once all the stored procedures have been verified and executed successfully, go back to Visual Studio. A data source and data set need to be defined for the project on Visual Studio.

19. Select and open any report.

20. Once a report is opened, a pane on the left-hand side of the page called **Report Data** appears with the report that opens. Right click on **Data Sources** and select **Add Data Source**

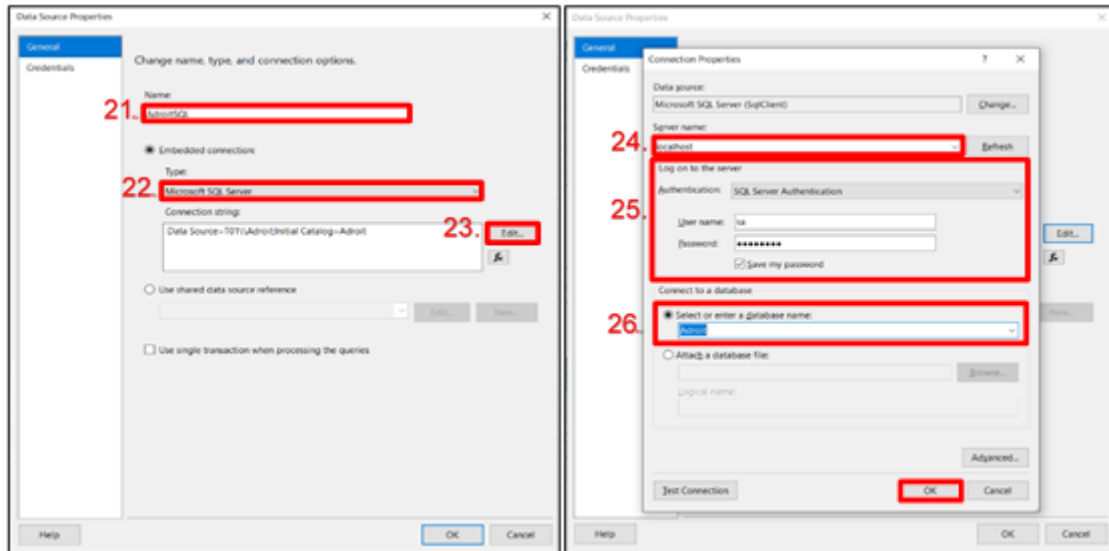


21. A **Data Source Properties** page will pop up, enter a relevant name for the data source (e.g. **AdroitSQL**)

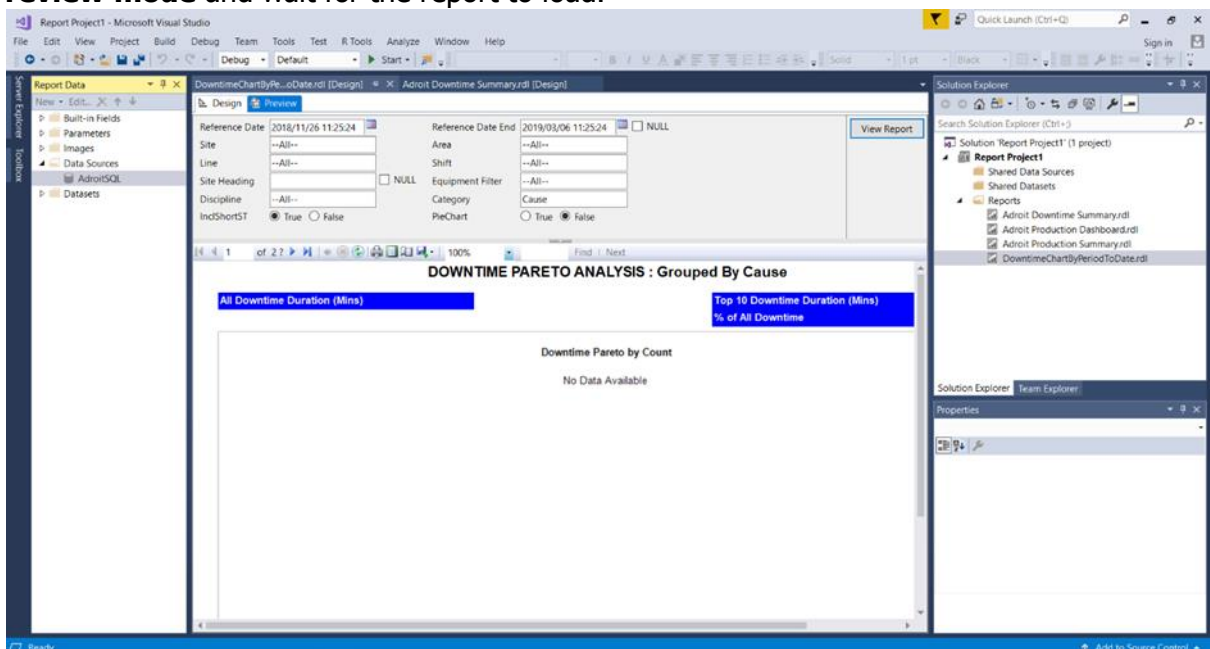
22. Select **Microsoft SQL Server** for the **Type** of connection.

23. At Connection String select Edit

24. A **Connection Properties** page will pop up, enter a relevant **Server name**
25. Enter a method of logging on to the server. Can either be **Windows Authentication** or **SQL Server Authentication** (where a username and password are required, select checkbox for **Save my password**)
26. Select the relevant database to be connected to (or type it out) and press **OK**



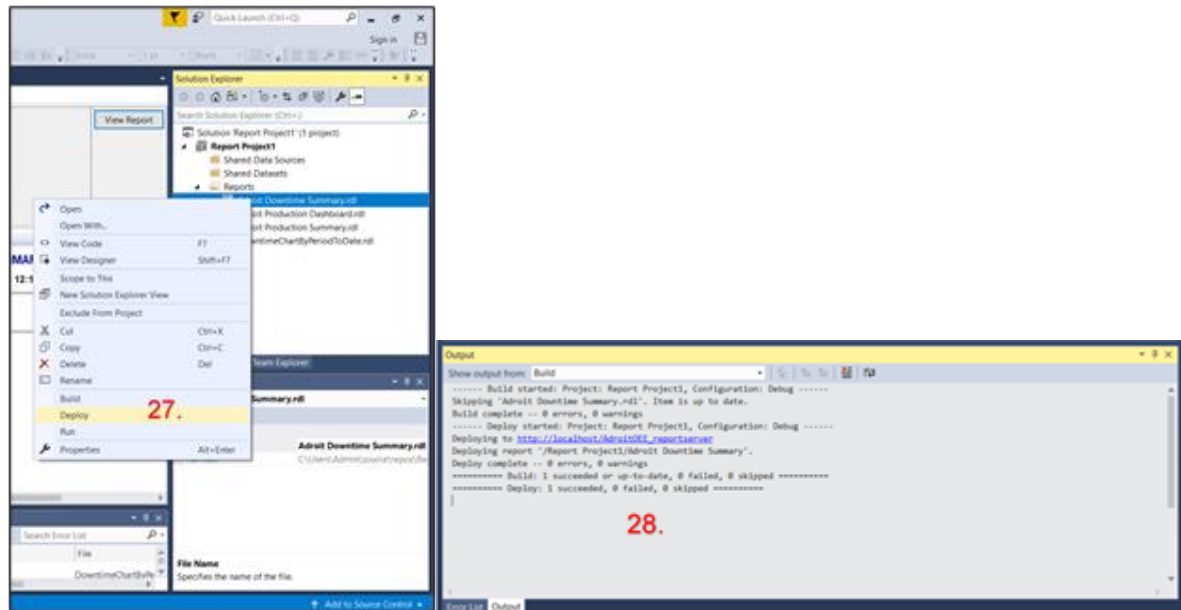
The data source has now successfully been loaded onto the project. The final steps are to verify whether the reports extract the data correctly and that there are no errors that exist. The report that is already open should be in **Design** mode, to verify whether the report is running correctly, switch to **Preview mode** and wait for the report to load.



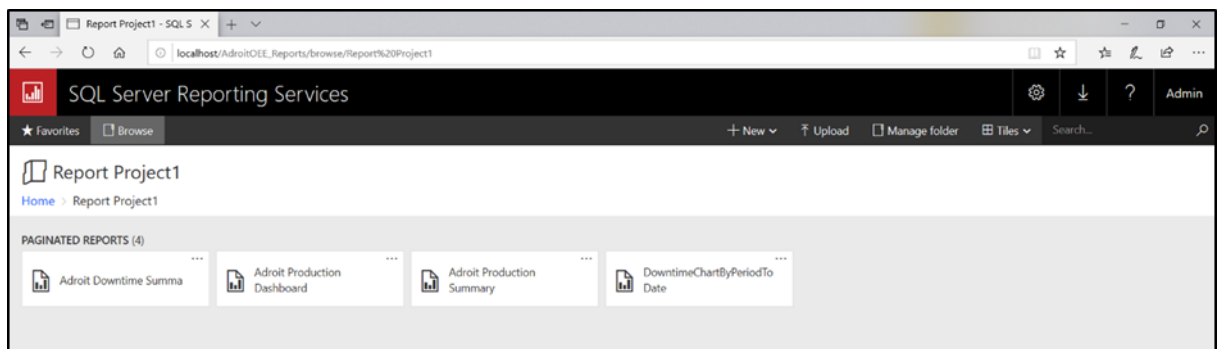
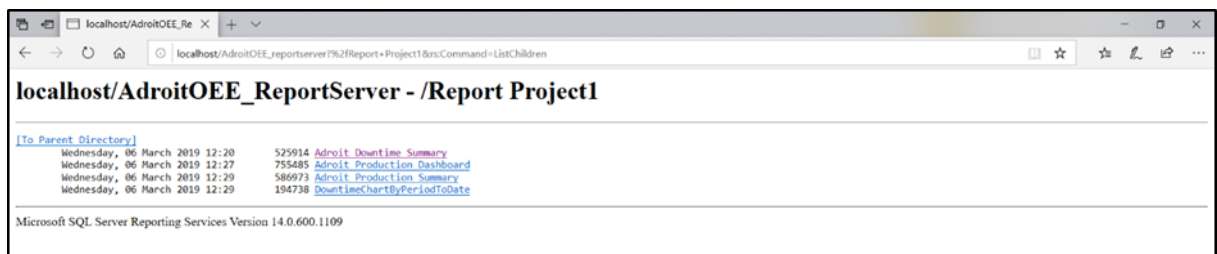
The report will open up and if no errors are displayed then the report is extracting data from the database correctly and the report is running smoothly. Do this for all available reports. Note that in the example above, it says 'No Data Available', this is because in the example used the database is empty.

The final step is to deploy the reports onto SSRS. The following images illustrates how to do so:

27. Navigate to a report, right click and select **Deploy**
28. Wait for confirmation that the report has been successfully deployed. Repeat steps 27-28 for the remaining reports



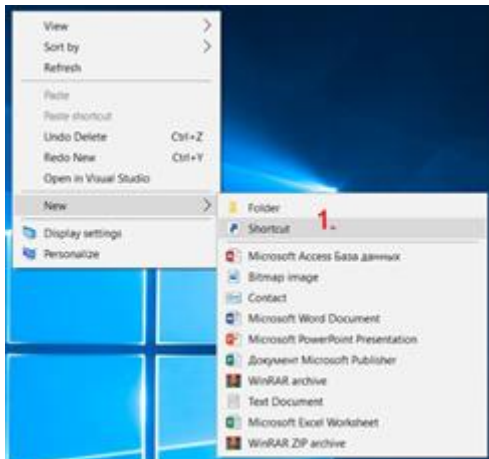
Once the reports have successfully been deployed, it can now be displayed on the SSRS Reports Server and Reports Manager URLs. The following images is an example of what the reports look like on SSRS.



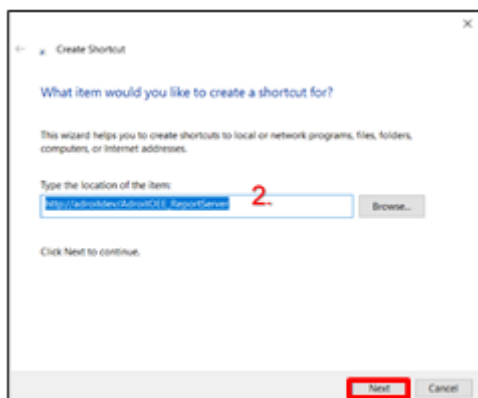
4. Desktop Shortcut

The user may feel the need to have a shortcut to the report server URL for the client or even a shortcut to the reports URL instead of having to look for the URL elsewhere. The following steps describe the process in creating the URL shortcut on a Windows 10 desktop:

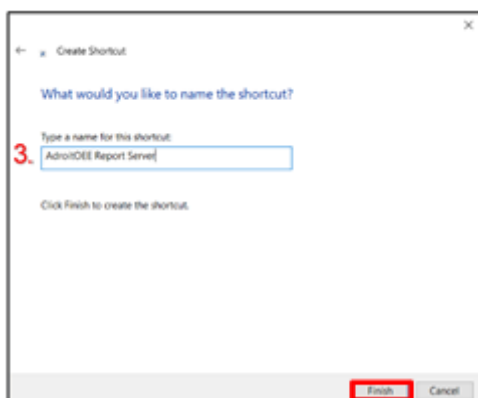
1. Right click the mouse on the Desktop, navigate the mouse to **New** and select **Shortcut**



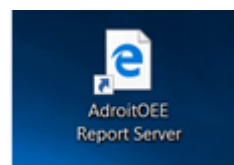
2. In the **Type the location of the item** section, enter the relevant URL for the shortcut that you want to create and select **Next**. The example in the image below is the URL for the AdroitOEE report server for clients to view the reports.



3. Type a relevant name for the shortcut being created, select **Finish**.
4. The icon has now been created on the desktop and the Report Server can now be accessed much quicker



4.



Adroit Enterprise OEE

Reports

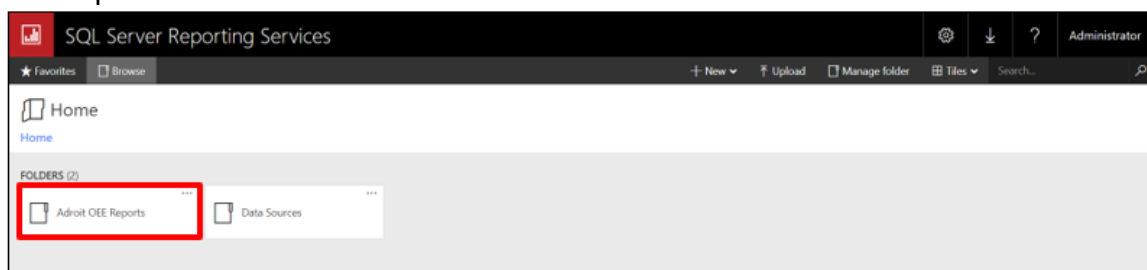
1. Introduction

The purpose of this document is to provide a detailed overview of the Adroit OEE reports that have been developed using SQL Server Reporting Services (SSRS). The reports have been made available for management to have an overview of the factory's performance as well as other KPIs.

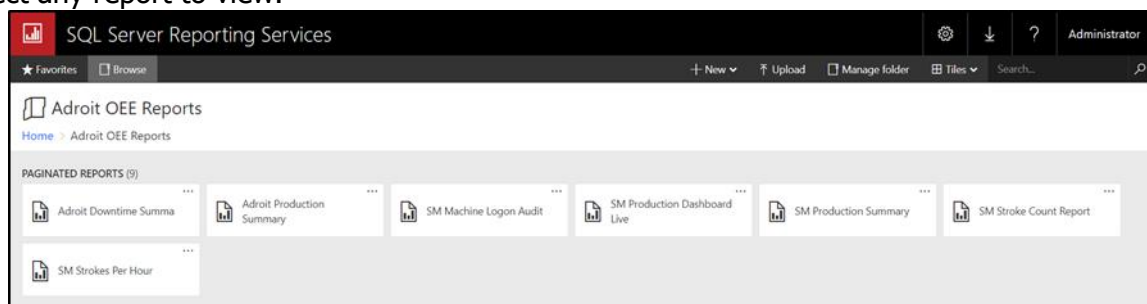
2. Adroit OEE Reports

After the SSRS has been setup, a link is provided to be able to view the reports. See the chapter on **SSRS** for the procedure on how to setup SSRS and get the link to view the reports.

The image below show the main overview pages for the SSRS. Select 'Adroit OEE Reports' to view all available reports.



Select any report to view.



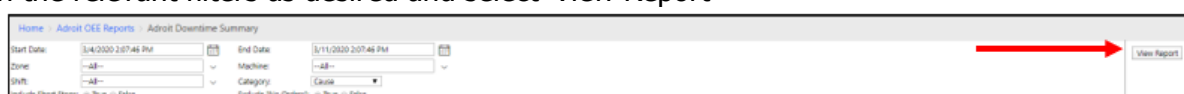
2.1. Adroit Downtime Summary

There are four different types of reports included here to give an overview of the factory's downtime. The four reports are as follows:

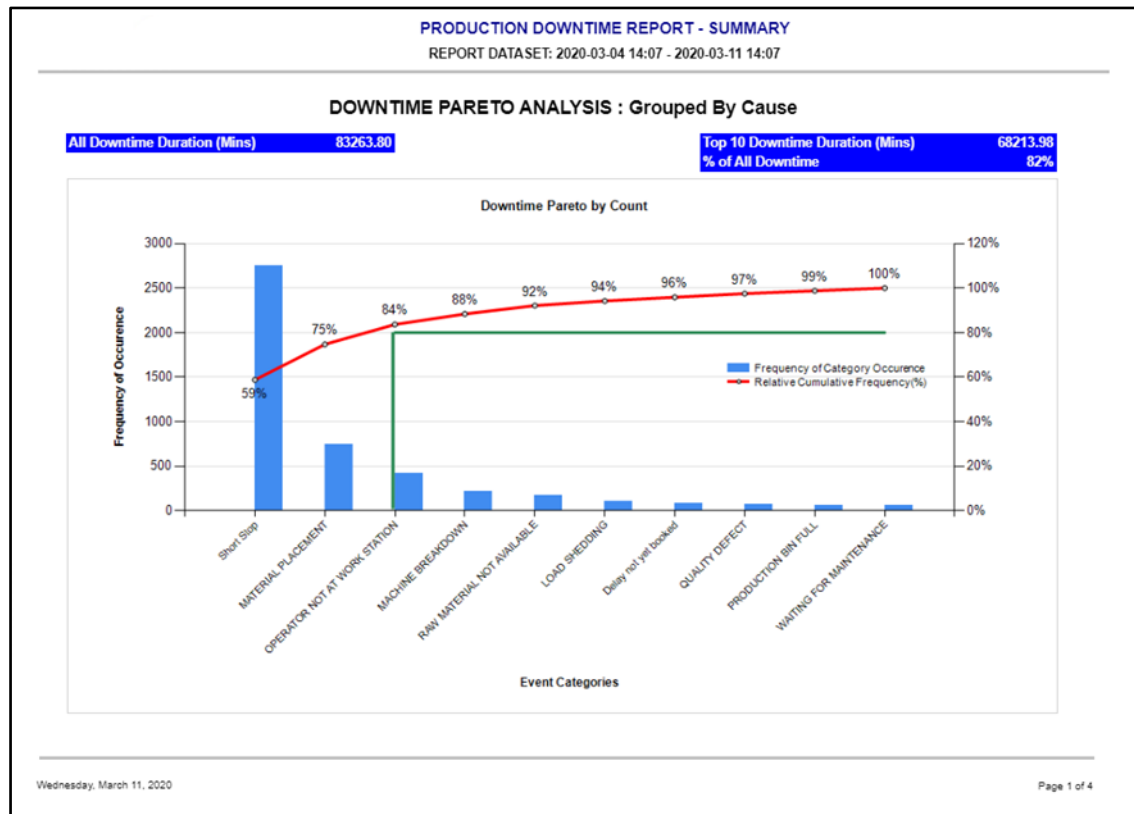
Downtime Pareto Analysis by Count

The Pareto analysis is generally known as the 80/20 rule because it is based on the idea that 80 percent of a factory's results can come from doing 20 percent of the work. Conversely, 80 percent of a situation's problems can be traced to 20 percent of the causes. The pareto chart can also be described as a quality tool to help analyse and prioritise causes of delays.

Fill in the relevant filters as desired and select 'View Report'



The report will now be loaded



The bars represent the cause of delays (event categories) and is presented in descending order (from tallest to shortest). The more frequent cause of delay can be seen more appropriately. The line on the graph represents the relative cumulative frequency of the of the causes (in %). The fourth report describes best where the information of this graph is calculated. To describe the graph in more detail, it can be seen that Short Stops occur the most and occur 59% of the time. There after Material Placement occurs 16% of the time ($59 + 16 = 75\%$) and so forth.

The default report is always loaded is a pareto analysis of the downtime of all machines based on downtime causes. Filters can be adjusted to see downtime for only one machine or as many as required based on what is available. The user can also filter to see results for specific zones or shifts. Different categories can also be selected to see a pareto downtime for not only based on downtime causes.

Machine: --All--

Category: Machine ▼

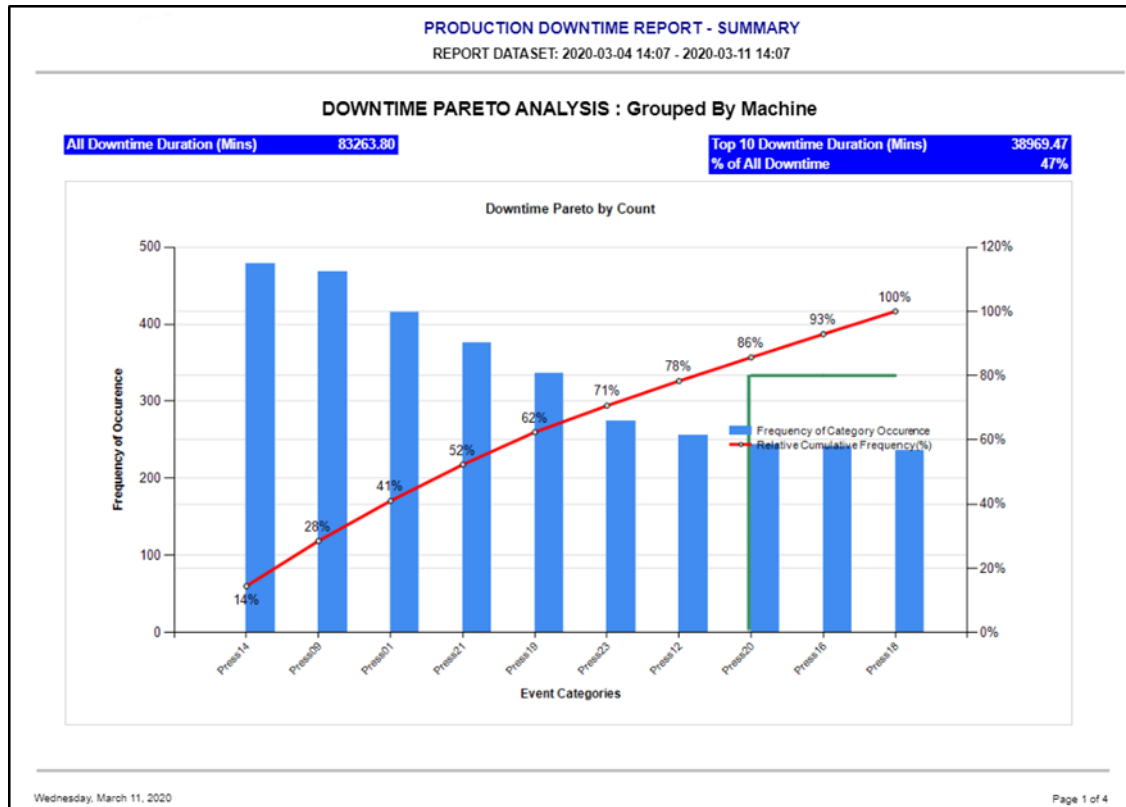
Exclude "No Orders": Cause
Discipline
Machine
Line
Area
Site
Shift
Operation

← 100%

PRODUCTION D >R

REPORT DATASE - 20

Note that the filters will apply to all four reports. Just an indication of a Pareto analysis based on machines downtime.



The total amount of downtime is also calculated and is given at the top of the report. This is calculated based on the dates provided in the filters.

Downtime Pareto Analysis by Duration

This report is almost identical to the previous report; however the downtime duration is used to create the graph instead of downtime occurrences (count).

Fill in the relevant filters as desired and select 'View Report'

Home > Adroit OEE Reports > Adroit Downtime Summary

Start Date: 3/4/2020 2:57:46 PM End Date: 3/11/2020 2:57:46 PM

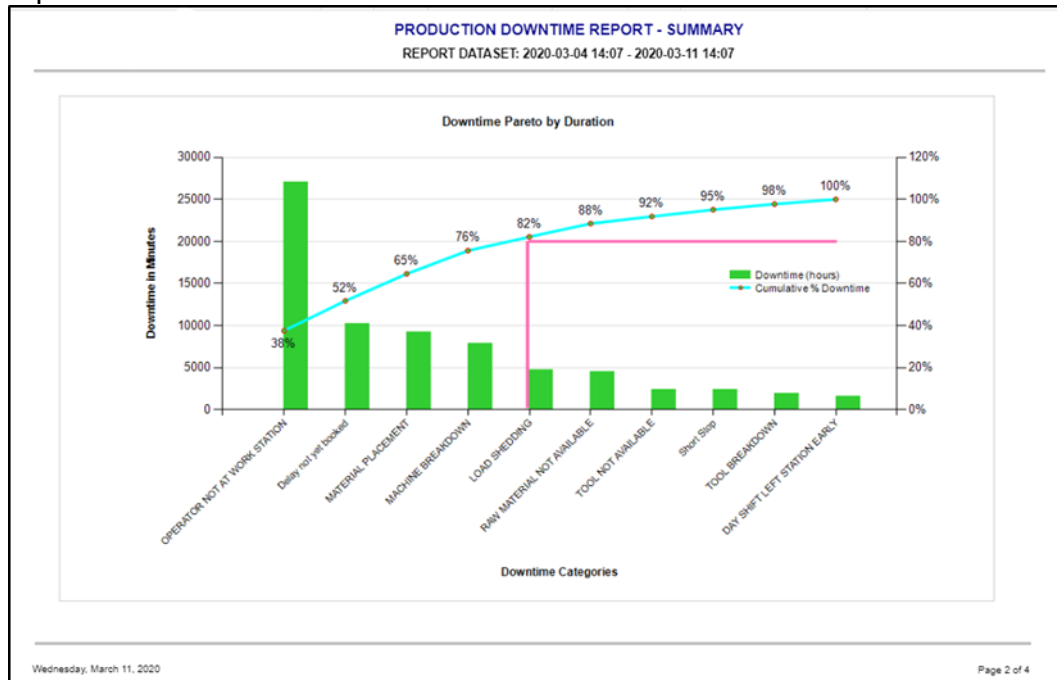
Zone: -- All -- Machine: -- All --

Shift: -- All -- Category: Cause

Include Short Stops: ☒ True ☐ False Exclude Top Orders: ☒ True ☐ False

[View Report](#)

The report will now be loaded

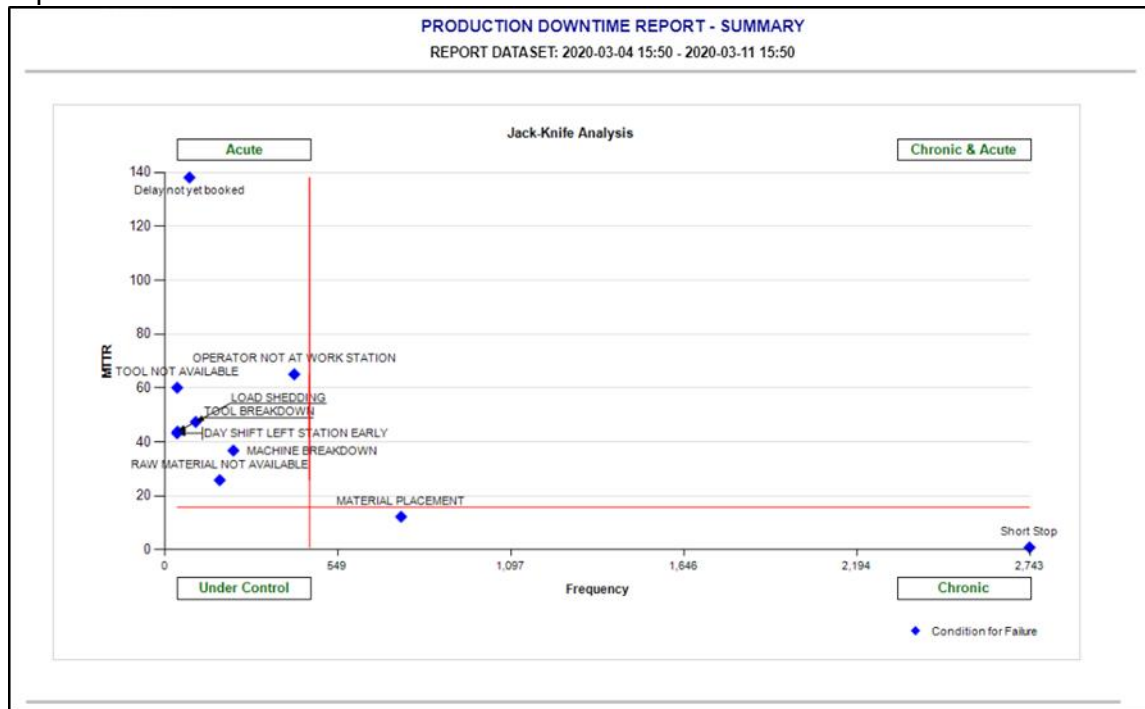


Jack-Knife Analysis

The Jack-Knife report has been constructed to display all the Mean Time to Repair (MTTR) values for all the causes.

Fill in the relevant filters as desired and select 'View Report'

The report will now be loaded



Jack-Knife Tabular Analysis

The Jack-Knife graph as described in the previous report receives its data from the table displayed in this report.

Fill in the relevant filters as desired and select 'View Report'

The report will now be loaded

PRODUCTION DOWNTIME REPORT - SUMMARY											
REPORT DATASET: 2020-03-04 15:50 - 2020-03-11 15:50											
Jack-Knife Tabular Analysis											
Code Number	System Name	Downtime (Minutes)	% Time	% Cumulative Time	Number of Breakdowns	MTTR	Frequency	MTTR	Action Plan	Who	When
1	OPERATOR NOT AT WORK STATION	26,753.5	36.97%	36.97%	411	65.09	Under Control	Acute			
2	Delay not yet booked	10,911.4	15.08%	52.05%	79	138.12	Under Control	Acute			
3	MATERIAL PLACEMENT	9,188.6	12.70%	64.75%	750	12.25	Chronic	Under Control			
4	MACHINE BREAKDOWN	8,023.2	11.09%	75.84%	218	36.80	Under Control	Acute			
5	LOAD SHEDDING	4,695.3	6.40%	82.33%	99	47.43	Under Control	Acute			
6	RAW MATERIAL NOT AVAILABLE	4,526.4	6.26%	88.58%	175	25.87	Under Control	Acute			
7	TOOL NOT AVAILABLE	2,404.9	3.32%	91.91%	40	60.12	Under Control	Acute			
8	Short Stop	2,328.8	3.22%	95.13%	2,742	0.85	Chronic	Under Control			
9	TOOL BREAKDOWN	1,797.6	2.48%	97.61%	41	43.84	Under Control	Acute			
10	DAY SHIFT LEFT STATION EARLY	1,728.6	2.39%	100.00%	40	43.22	Under Control	Acute			

Wednesday, March 11, 2020

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The data in this table is also used to construct the pareto charts in the first two reports. The first six columns are used in the first two reports and sixth column (MTTR) is used for the Jack-Knife chart.

- **System Name** – The causes/reasons for downtime
- **Downtime (minutes)** – The downtime duration of each cause in the given dates chosen in the filters
- **% Time** – This is % downtime for each cause. Hence take each causes Downtime (minutes) and divide it by the total of the Downtime (minutes) column. For the first cause; $26753,5 / 72356,3 = 36,97\%$.
- **% Cumulative Time** – This is the cumulative time percentages of all the causes. The first cumulative percentage will always remain the same as the first percentage time (i.e. 36,97%). The second cumulative percentage is the sum of the first cumulative percentage and the second % Time (i.e. $36,97 + 15,08 = 52,05\%$). Hence third cumulative percentage is the sum second cumulative percentage and the third percentage time (i.e. $52,05 + 12,7 = 64,75\%$).
- **Number of Breakdowns** – This calculates every single downtime occurrence. The first cause experienced downtime/breakdowns 411 times.
- **MTTR** – This is calculated by taking total downtime divided by the number of breakdowns. Giving you an average time to 'repair'.

2.2. Adroit Production Summary

There is only one report to be displayed in this section. An overview of production (total good and bad parts produced) as well as OEE values based on the dates selected in the filters. See the chapter on the **OEE User SOP** (the OEE Calculation and Production graphs section) for a detailed description of the OEE formulas.

Fill in the filters as required.

Start Date: 3/10/2020 4:41:23 PM End Date: 3/11/2020 4:41:23 PM
 Zone: --AB-- Machine: --AB--
 Category: Zone View Report

Note that by default, the report will be filtered per zone. This can obviously be adjusted.

PRODUCTION REPORT SUMMARY - Grouped By Zone
 REPORT DATASET: 2020-03-10 16:41 - 2020-03-11 16:41

Zone	Start Time	End Time	Target	Total Good	Total Bad	Availability	Performance	Quality	OEE
Zone01	20/03/10 21:48	20/03/11 13:06	9100	6517	0	60.49%	78.43%	100.00%	47.44%
Zone02	20/03/11 07:56	20/03/11 13:06	4192	264	0	44.71%	33.56%	100.00%	15.00%
Zone03	20/03/10 21:28	20/03/11 13:06	14691	8163	0	74.84%	59.08%	100.00%	44.22%
			27983	14944	0	60.01%	57.02%	100.00%	35.55%

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2.3. Machine Logon Audit

This report has been made available to have an audit trail on who has been logging on the operator system. The aim is to ensure that the correct people are accessing the system at their respective times.

Fill in the filters as desired. Note that the report is displayed per machine. Any other machine may be selected.

Home > Adroit OEE Reports > SM Machine Logon Audit

Start Date: 3/10/2020 5:22:18 PM End Date: 3/11/2020 5:22:18 PM
 Machine: Press01

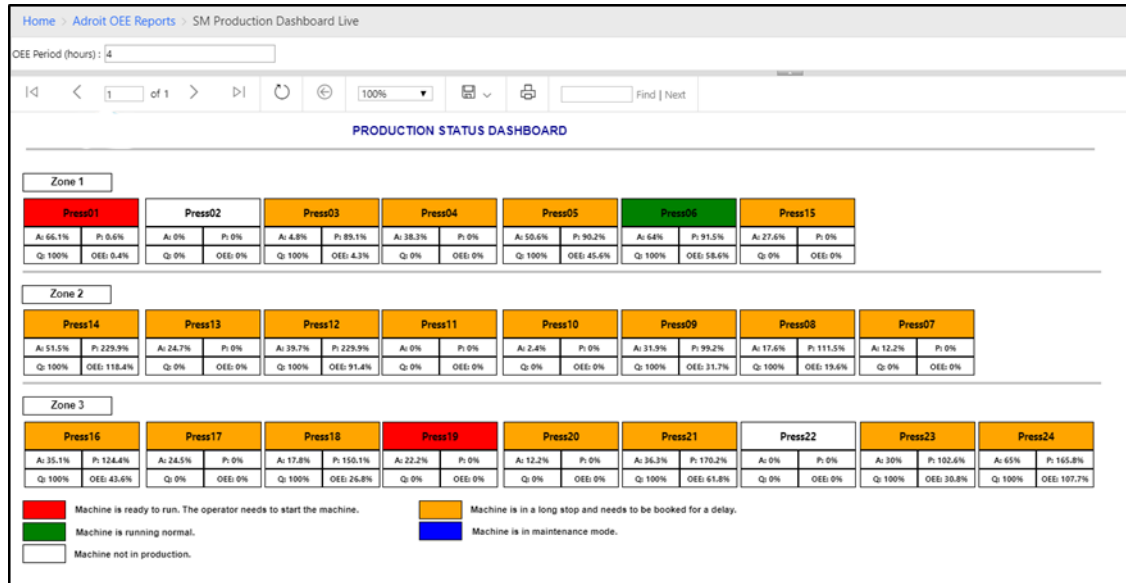
Machine Logon Audit - Press01
 REPORT DATASET: 2020-03-10 17:22 - 2020-03-11 17:22

Event Datetime	Machine	Machine IP	Source	User ID	Full Name	User Description	Action	Time-in-State (Mins)
20/03/11 16:58	Press01	172.168.1.11	SecurityManager	MAJOE	MAMPURU JOEL	Supervisors	Successful logoff	24
20/03/11 13:06	Press01	172.168.1.11	SecurityManager	MAJOE	MAMPURU JOEL	Supervisors	Successful login	232
20/03/11 11:07	Press01	172.168.1.11	SecurityManager	MAJOE	MAMPURU JOEL	Supervisors	Successful logoff	119
20/03/11 06:33	Press01	172.168.1.11	SecurityManager	MAJOE	MAMPURU JOEL	Supervisors	Successful login	274
20/03/11 06:31	Press01	172.168.1.11	SecurityManager	MAPET	MATLALA PETER	Supervisors	Successful logoff	2
20/03/11 06:31	Press01	172.168.1.11	SecurityManager	MAPET	MATLALA PETER	Supervisors	Successful login	0
20/03/10 21:15	Press01	172.168.1.11	SecurityManager	MAPET	MATLALA PETER	Supervisors	Successful login	556

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2.4. Production Dashboard Live

This report has been made available for anyone outside of the production floor to have an overview of the live/current status of production of the entire plant. Each machines OEE values can be seen as well as different statuses of the machines in coded in different colours. See the legend of the different colours.



2.5. Production Summary

This report has been made available to provide a more detailed overview of production within the factory. OEE values and production counts will be based on works orders produced within the date and times selected in the filter. Other information regarding the order is provided in the report for viewing.

PRODUCTION REPORT SUMMARY

REPORT DATASET: 2020-03-04 17:40 - 2020-03-11 17:40

Zone	Machine	Customer Part Number	ERP Part Number	Operation Description	Works Order	Work Order Quantity	Planned Start Date	Actual Start Date	Actual End Date	Total Planned Time (mins)	Total Actual Time (mins)	Total Good	Total Bad	Strike Rate Per Minute	Availability	Performance	Quality	OEE
Zone01	Press01	AB39-2101605-DD	SFD16038	Draw	20022788ER1	1000	2003/10	2003/10 21 52	2003/11 13 06	1000	914.1	396	0	0.4	83.64%	42.02%	100.00%	22.49%
Zone01	Press06	AB39-2102892/3	SFD16007 / 12	RESTRIKE	20022909-2	2000	2003/10	2003/11 08 21	2003/11 13 06	667	264.3	507	0	1.6	87.36%	44.97%	100.00%	35.28%
Zone01	Press09	AB39-26113408/9	SFD16043/44	3 XTRIM	20022913AF	1500	2003/10	2003/10 21 59	2003/11 13 06	500	906.3	1473	0	1.6	86.80%	20.07%	100.00%	13.23%
Zone02	Press07	AB39-2101605-AD18DCDDO	SFD16017 / 42 / 26 / 38	Flange	20022925A1	1000	2003/11	2003/11 08 26	2003/11 13 06	283	280	11	0	0.0	1.83%	22.56%	100.00%	0.42%
Zone02	Press08	46212-090	STY05023	4XFORM	20022954-3	1596	2003/10	2003/11 08 15	2003/11 13 06	452	290.6	231	0	0.8	32.35%	33.94%	100.00%	10.94%
Zone03	Press18	91366-2570A	1N07003	TRIM	20022875ab	600	2003/10	2003/10 21 28	2003/11 13 06	227	937.4	574	0	0.6	12.30%	16.78%	100.00%	2.05%
Zone03	Press21	AB39-2102962-3	SFD16007/12	FROM	20022908A1	1500	2003/11	2003/11 10 20	2003/11 13 06	500	165.9	238	0	1.4	100.00%	44.35%	100.00%	44.35%
Zone03	Press23	AB39-2102892/3	SFD16007 / 12	Trim	20022908A3	2000	2003/11	2003/11 08 44	2003/11 13 06	667	262.3	413	0	1.6	100.00%	49.77%	100.00%	49.77%
Zone03	Press24	AB39-2111K345-AA	SFD15012 / 13	3 X TRIM & PIERCE	20022900B	1000	2003/10	2003/11 08 00	2003/11 13 06	333	306.2	506	0	1.7	83.78%	67.46%	100.00%	56.52%
Zone03	Press16	AB39-2111B12	SFD15024	BLANK	20022947-4	3391	2003/10	2003/11 07 36	2003/11 13 06	2035	329.4	432	0	1.3	89.60%	78.30%	100.00%	70.16%
Zone03	Press21	AB39-2102962-3	SFD16007/12	FROM	20022942	2000	2003/10	2003/10 21 36	2003/11 10 09	667	752.0	2000	0	2.7	73.11%	42.84%	100.00%	31.32%
Zone01	Press03	EB38-2102220-AA	SFD02220	4X FORM T&P CAM PFLANGE	20022945-2	600	2003/10	2003/11 02 54	2003/11 09 52	200	417.9	600	0	1.4	89.19%	32.48%	100.00%	19.23%
Zone01	Press05	AB39-26101301-BA	SFD16049 / 52	TRIM & PIERCE	2002229HYU	1000	2003/10	2003/11 04 58	2003/11 09 38	417	280.3	539	0	1.9	47.20%	229.01%	100.00%	108.21%
Zone03	Press23	AB39-2102892/3	SFD16007 / 12	Trim	20022909-9	2000	2003/10	2003/10 21 56	2003/11 08 41	667	644.8	2000	0	3.1	88.41%	83.03%	100.00%	71.75%
Zone01	Press06	AB39-2102892/3	SFD16007 / 12	RESTRIKE	20022909-1	2000	2003/10	2003/10 21 49	2003/11 08 11	567	621.9	2000	0	3.2	84.72%	2.19%	100.00%	1.88%
Zone02	Press08	46212-090	STY05023	4XFORM	20022954-2	1596	2003/10	2003/11 07 56	2003/11 08 10	452	14.1	22	0	1.6	100.00%	44.16%	100.00%	44.16%
Zone03	Press24	AB39-2610130-BA	SFD16049 / 52	Restrike	20022927	1000	2003/10	2003/10 21 40	2003/11 07 40	417	600	1000	0	1.7	88.68%	73.35%	100.00%	43.02%
Zone03	Press19	D639-2110620-AA	SFD02003	Trim	20022929J	1000	2003/10	2003/11 02 54	2003/11 07 36	283	262.8	1000	0	3.5	89.80%	79.50%	100.00%	52.96%
Zone01	Press05	AB39-26101301-BA	SFD16049 / 52	TRIM & PIERCE	20022927A2	1000	2003/10	2003/10 21 48	2003/11 04 51	417	423.6	1000	0	2.4	35.86%	178.24%	100.00%	46.46%
Zone03	Press16	AB39-2111B12	SFD15024	BLANK	20022947-1	3391	2003/10	2003/10 19 52	2003/10 21 26	2035	334.3	0	0	0.0	3.38%	27.41%	100.00%	0.52%
Zone02	Press08	AB39-26101301-BA	SFD16049 / 52	Trim & Pierce	20022894a8	1500	2003/10	2003/10 13 19	2003/10 21 14	650	474.5	12	0	0.0	1.46%	18.75%	100.00%	0.27%

2.6. Stroke Count Report

This report has been made available in order to give an overview of how many times the machine has been pressed vs the planned amount. The report will display results based on the time chosen in the filters, and the total stroke counts appear. The total per zone, machine or shift can be viewed.

Home > Adroit OEE Reports > SM Stroke Count Report

Start Date: 3/10/2020 5:59:34 PM End Date: 3/11/2020 5:59:34 PM

Zone: --All-- Machine Filter: --All--

Shift: --All-- Category: Zone

1 of 1 100% Find | Next

Total Strokes Report - Grouped By Zone

REPORT DATASET: 2020-03-10 17:59 - 2020-03-11 17:59

Zone	Planned Strokes	Total Strokes
Zone01	7897	8802
Zone02	2429	3650
Zone03	11542	13690
	21868	26142

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2.7. Strokes Per Hour

This report has been made available to display the total strokes that a machine was or is producing per hour, based on the dates selected. This report only shows results per machine and the product that was being produced on the machine.

Home > Adroit OEE Reports > SM Strokes Per Hour

Start Date: 2/2/2020 6:03:19 PM End Date: 3/11/2020 6:03:19 PM

Machine: Press03 Product Code: EB3B-2102221-AA - 4X FORM,T&P,CAM P,FLANGE

1 of 1 100% Find | Next

Strokes Per Hour

REPORT DATASET: 2020-02-02 18:03 - 2020-03-11 18:03

Machine	Product Code	Product Description	Total Parts Per Hour
Press03	EB3B-2102221-AA	4X FORM,T&P,CAM P,FLANGE	100.9
			100.9

Wednesday, March 11, 2020 Page 1 of 1

Adroit Enterprise OEE

PLC IP Change

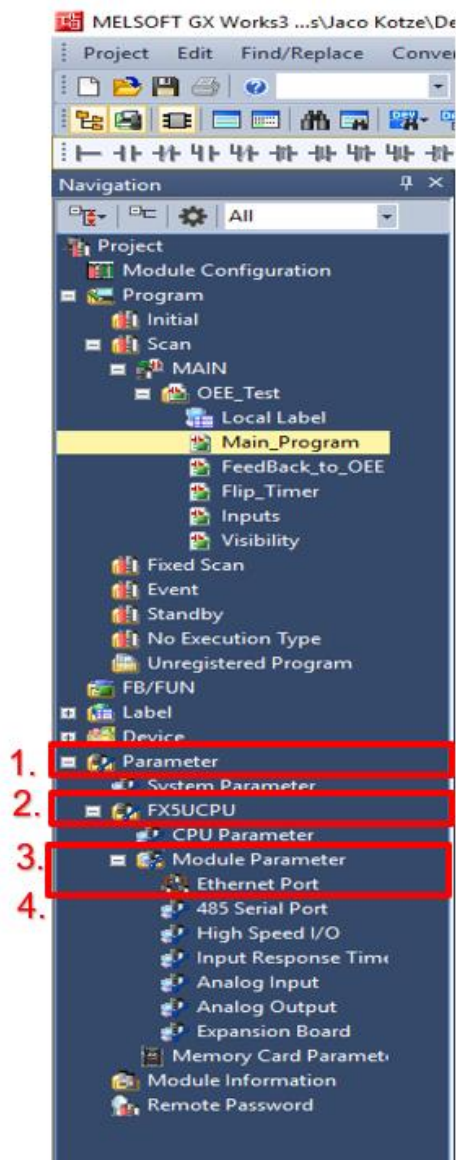
1. Introduction

The purpose of this document is to give step by step instructions on how to change the IP Address for a Mitsubishi FX5U 32M PLC CPU. The process is described when using the MELSOFT GX Works 3 software.

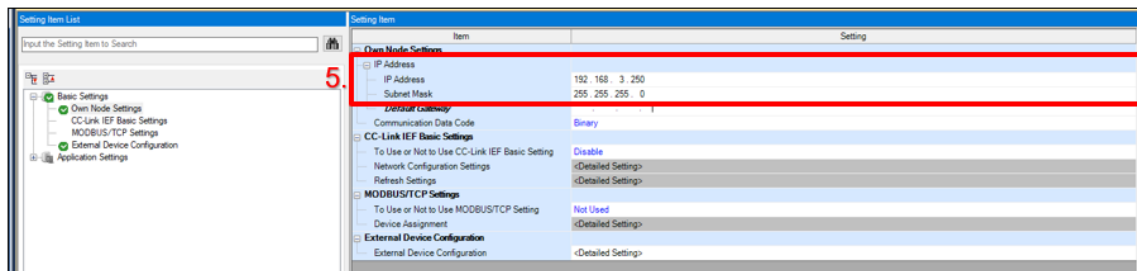
2. Process Flow

When wanting to change the IP address on the GX Works PLC software, the following step by step process needs to be followed:

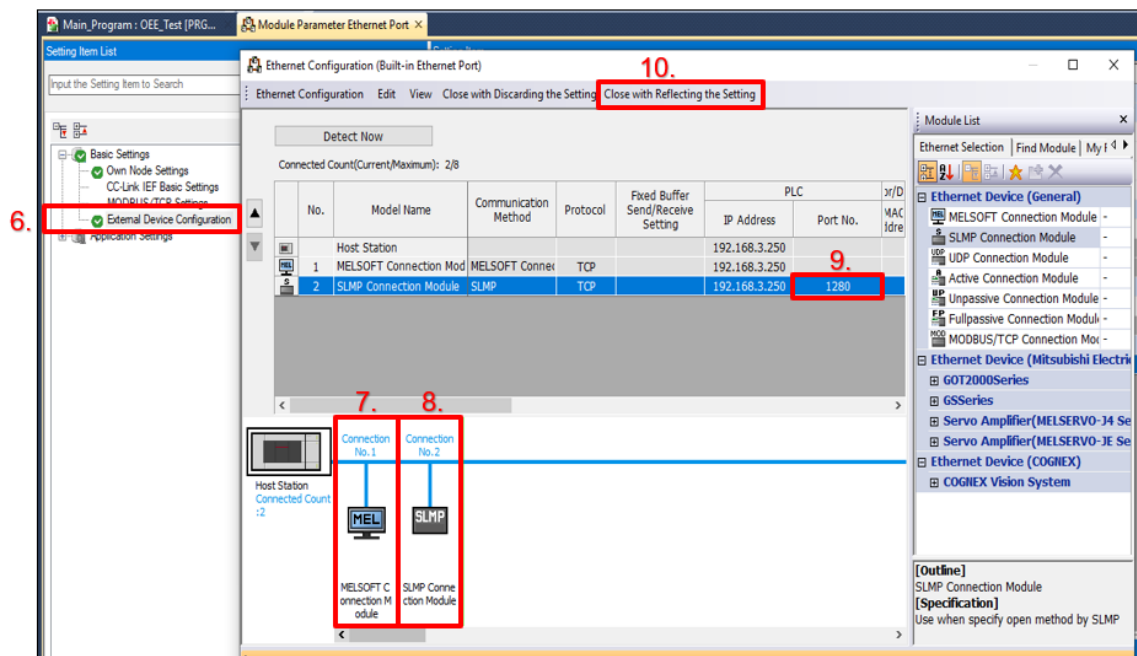
1. In the Navigation pane on the left of the screen, navigate to and open **Parameter**
2. Navigate to and open **FX5UCPU**
3. Navigate to and open **Module Parameter**
4. Double click on **Ethernet Port**



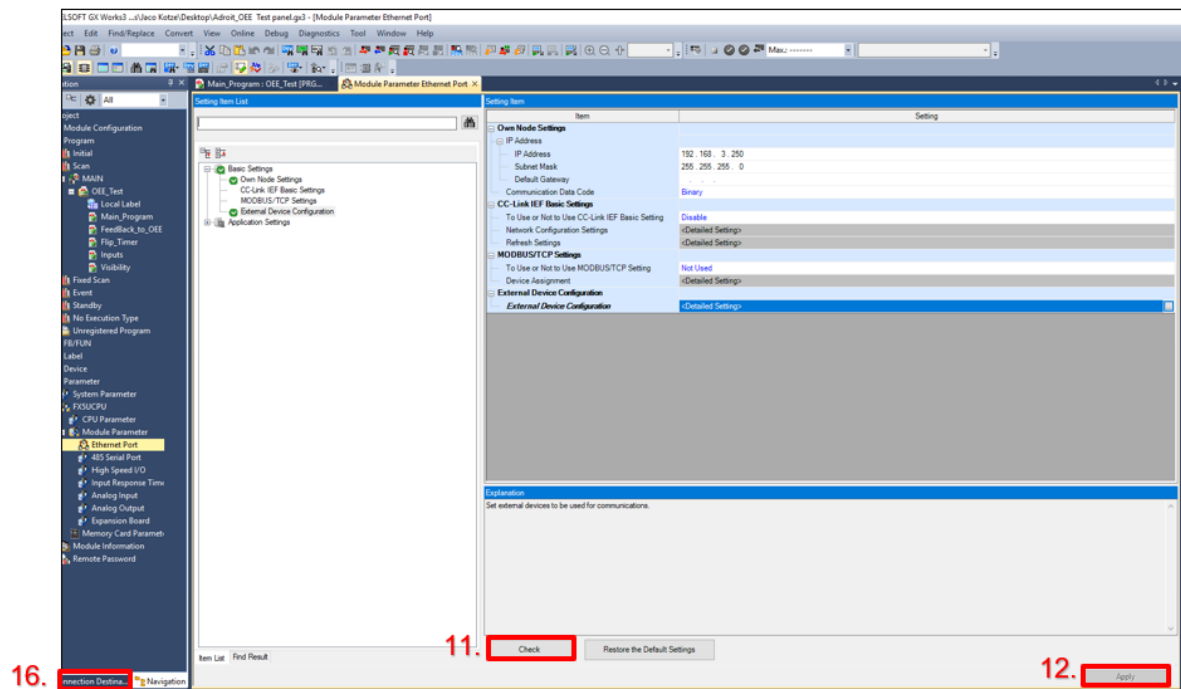
- Change the IP Address and Subnet Mask to what is desired



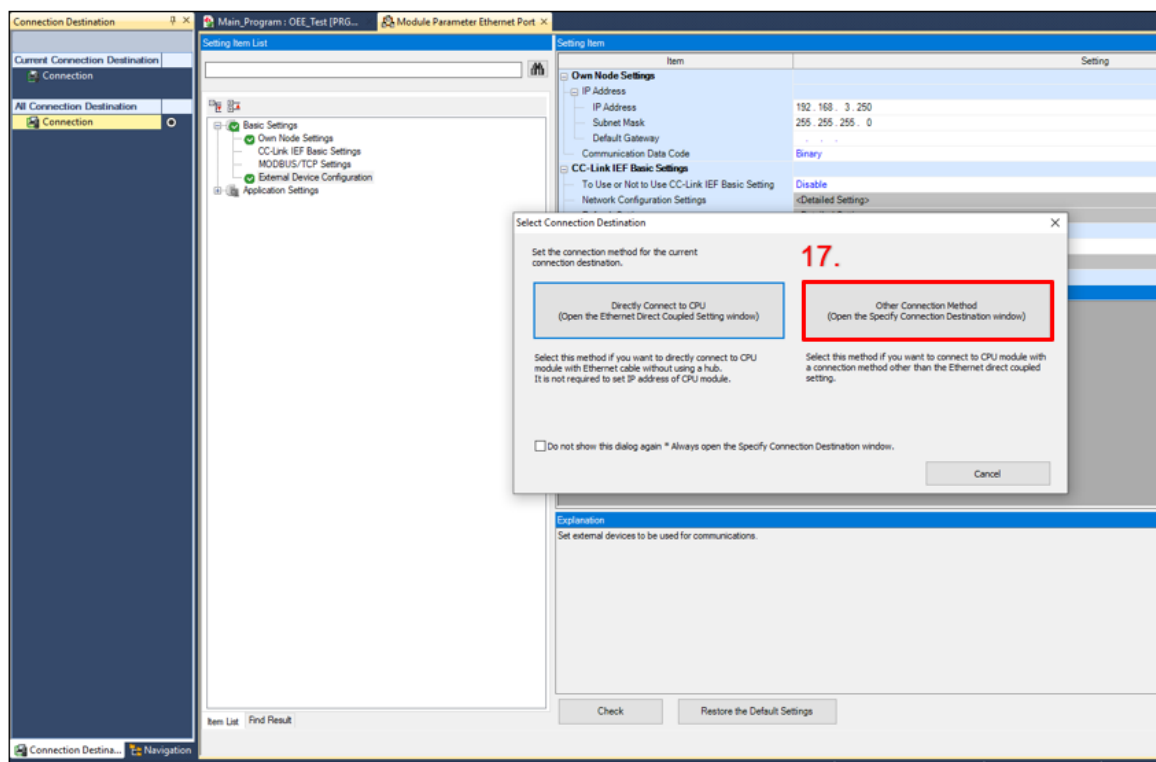
- Double click on External Device Configuration
- Drag the **MELSOFT Connection Module** to the Host station
- Drag the **SLMP Module** to the Host station as well
- On PLC section, enter the port number **1280** for the SLMP Connection Module
- Click on Close with Reflecting the Setting



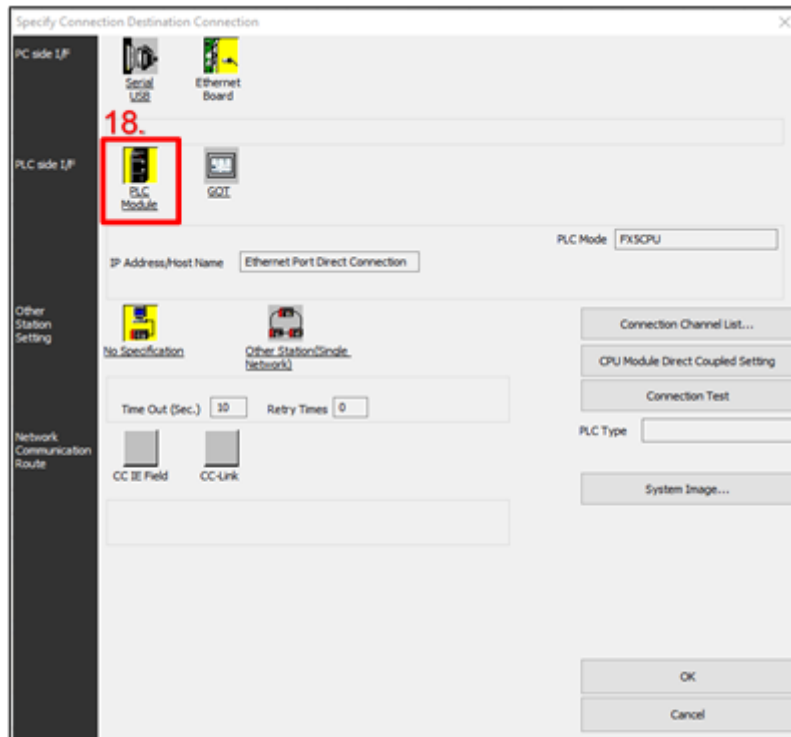
- Click on **Check**
- Click on **Apply**
- Click on the **F4** button on the keyboard to convert the program
- Select the Write Program to PLC option
- Change your PC's IP Address to the same range as the PLC
- Click on **Connection Destination** on the bottom left of the screen



17. Select Other Connection Method



18. Double click on **PLC Module**



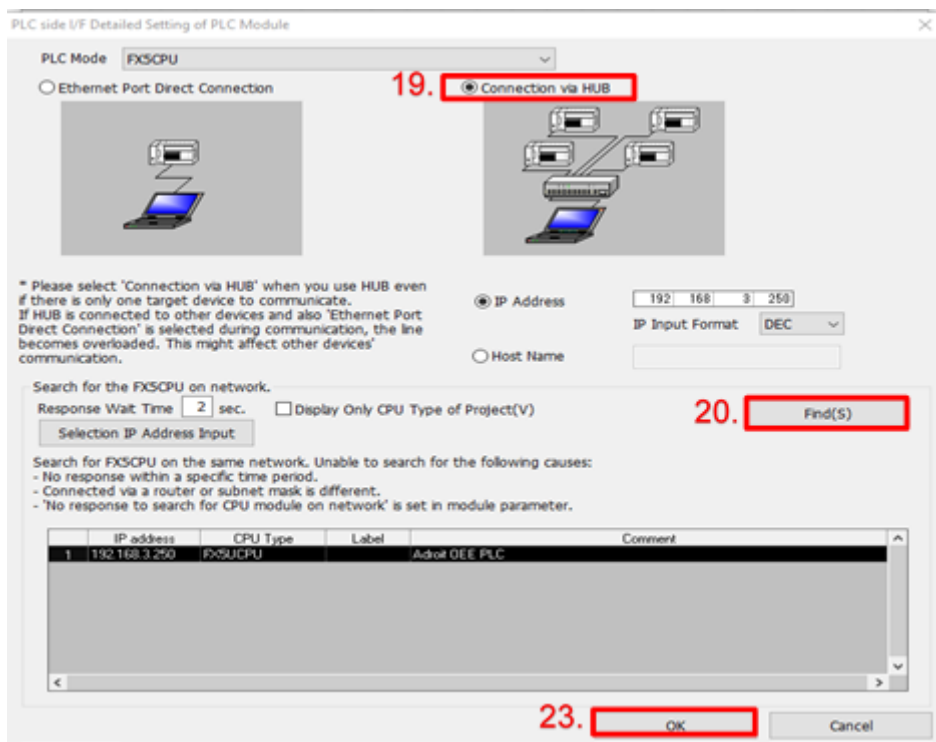
19. Select the Connection via Hub option

20. Select **Find(S)**

21. Select the correct adapter and press **OK**

22. Select the PLC in the window

23. Press **OK**



Adroit Enterprise OEE

PLC SD Card Setup

1. Introduction

The following document is a guide to assist in setting up SD Cards for a Mitsubishi FX5U PLC. This is helpful in scenarios where for any reason the PLC experiences problems and can't be used anymore. The entire PLC program will be backed up on the SD card and can simply be inserted and loaded onto a new PLC.

2. SD Card Setup

This section provides information regarding the procedure that must be followed to load the PLC program onto the SD Card. Note that the following must be available for the procedure to be carried out:

- A computer (PC) with an SD card slot
- An SD Card with enough memory



- The latest GX Works3 PLC software must be installed on the PC (which ever version is relevant for the project)
- The PLC program/project to be backed up needs to be loaded on the software
- Mitsubishi FX5U PLC being used for the project (or any other related PLCs that work on the GX Works3 software)



The following subsections are to be followed in sequence.

2.1. Format SD Card

The first step of the procedure is to ensure that the SD card is formatted. The following steps should be followed:

1. Insert the SD Card into the SD slot on the PLC



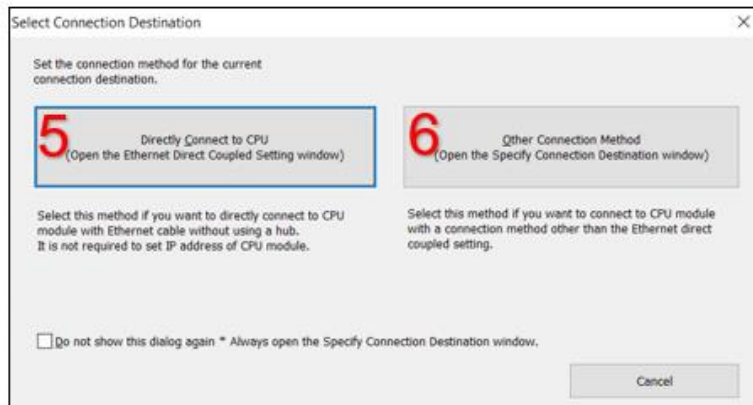
2. Ensure that the PLC is in a stop state by pushing the rest button down.
3. Ensure that a connection exists between the PLC and GX Works3 software. Note that the PLC and the PC which the software with the PLC program is loaded on are connected to the same network. Alternatively, the PLC can be directly connected to the PC via an ethernet cable.

Open the GX Works3 software on the PC. On the left of the screen, select the 'Connection Destination' tab at the bottom of the page

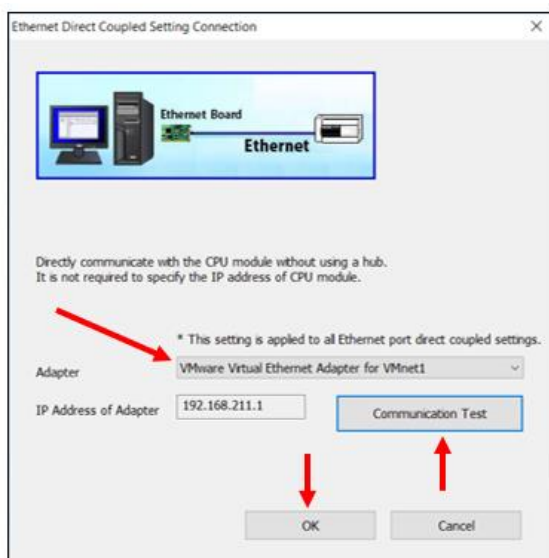
4. Double click on 'Connection' to select a connection to be established.



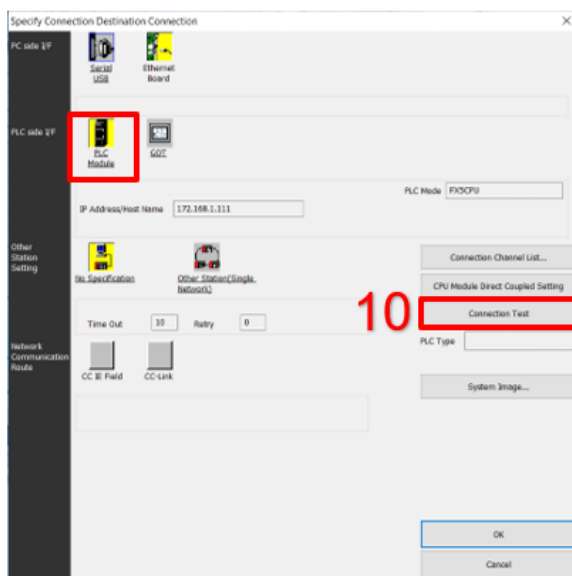
5. The 'Select Connection Destination' page will pop up. If the PLC is connected directly to the PC via an ethernet connection, then select the 'Directly Connect to CPU' button.
6. If PLC is connected to the PC via an established office network, then select 'Other Connection Method'.



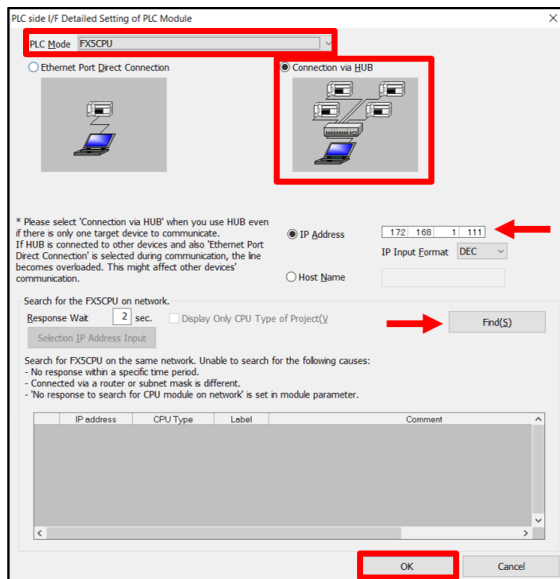
7. If process step 5 is selected, ensure that the ethernet cable is connected between the PLC and PC. Ensure that the correct adaptor is selected, select 'Communication Test' to confirm that a connection is established between the PC and PLC. If the connection is successful, click on 'OK' and continue with step 9.



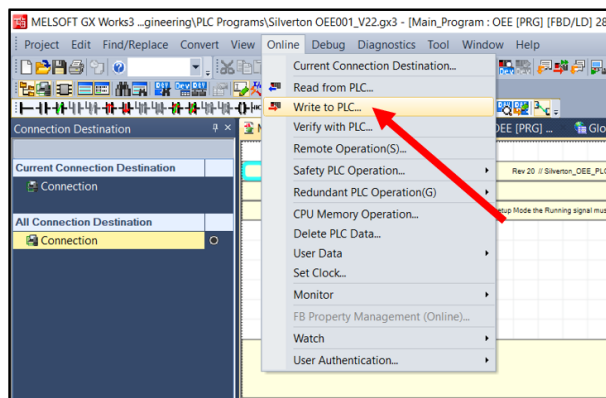
8. If process step 6 is selected, ensure both the PC and PLC is connected to the office network. Double click on the PLC Module button



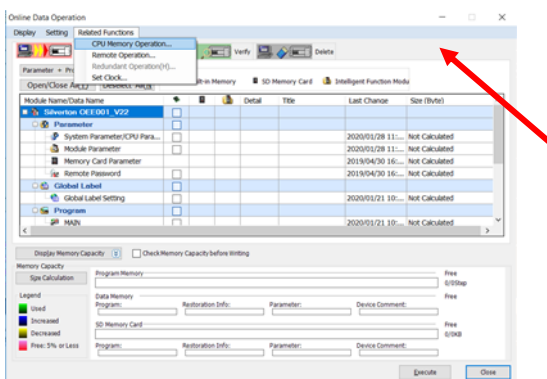
9. In this page ensure that the correct PLC mode is selected. Then ensure that the 'Connection via HUB' option is selected. Enter the correct IP address of the PLC. Thereafter select the 'Find(S)'. If the correct PLC IP is found and is seen in the list, then select 'OK'



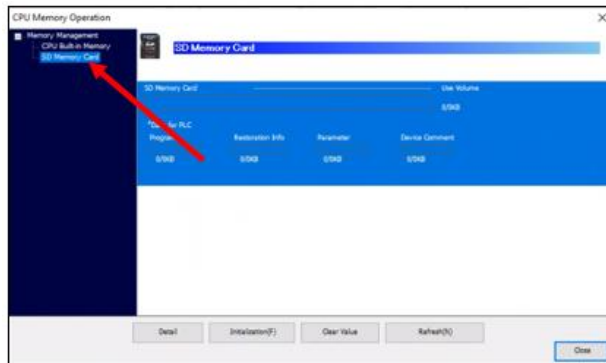
10. Now the page on step 8 will reappear. Select the 'Connection Test' button to see if a connection has successfully been established.
11. A connection has now been established. We can proceed to format the SD Card. Remember to ensure that the SD card has been inserted into the PLC and that the PLC is in a stop state (see steps 1 and 2). Select the 'Online' option on the top toolbar on the GX works3 software and select 'Write to PLC'.



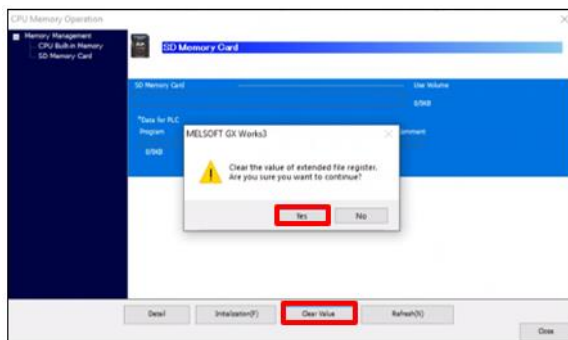
12. The Online Data Operation page will open. Navigate to the 'Related Functions' tab and select 'CPU Memory Operations'.



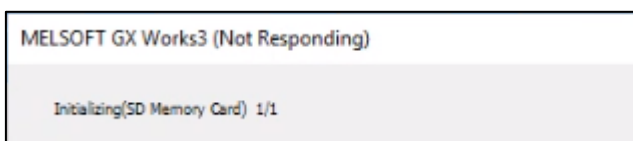
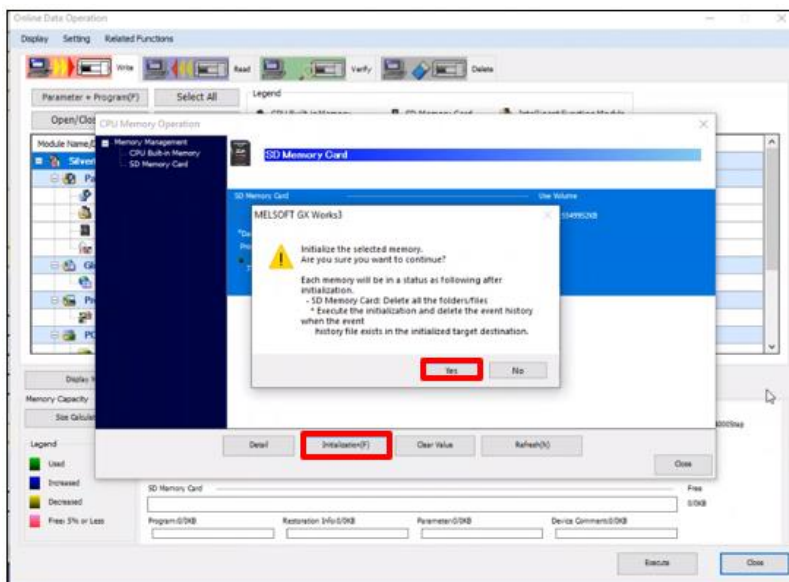
13. Select 'SD Memory Card'



14. Select 'Clear Value', this option is to format the SD Card. A confirmation message will popup, select 'Yes'.



15. The SD Card has now been cleared. Select 'Initialization(F)', a confirmation message will popup, select 'Yes'.



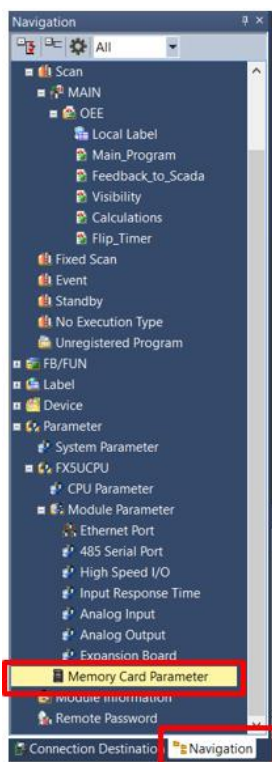
16. The SD Card is now formatted. It is important to note that before removing the card, just below the slot there is a button. Press the button (1) until the SD Card light goes off (2), the SD Card can now safely be removed.
17. Also put PLC into Stop Mode.



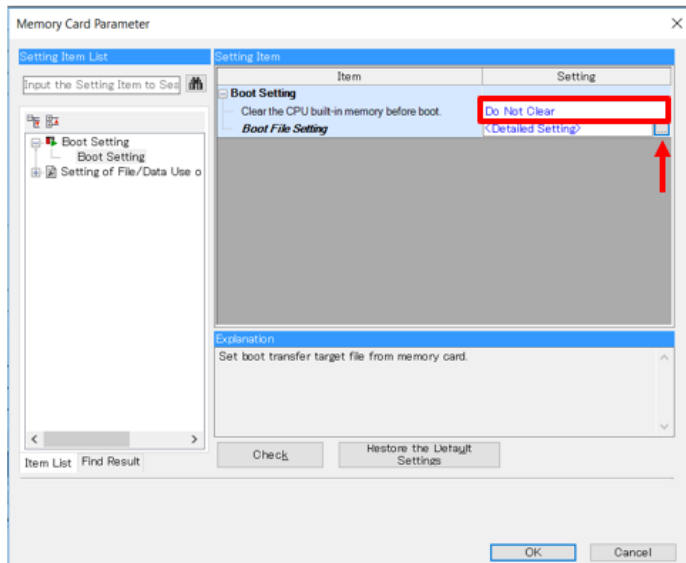
2.2. Loading Program onto SD Card

The SD Card is now formatted and is ready for the PLC program to be loaded and backed up onto the Card. For this sub-section it is important to have a PC with a SD Card slot. Once PC is powered up, open the GX Works3 software with the PLC program loaded on the software as well.

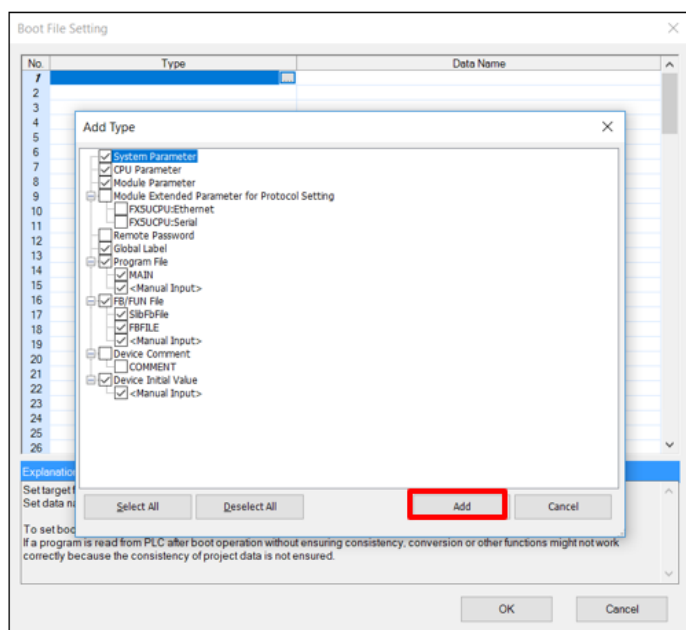
1. Insert the SD Card into the PC
2. Click on 'Navigation' on the bottom left of the screen. Then navigate to the following: Parameter, FX5UCPU, Module Parameter and then double click on Memory Card Parameter.



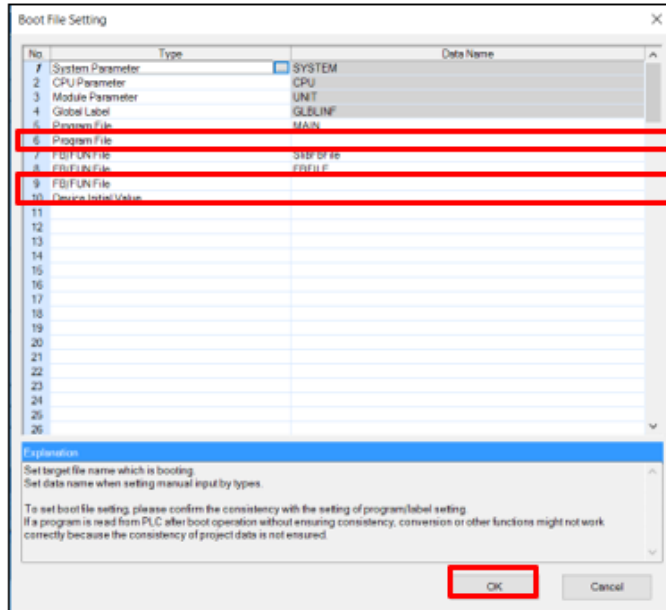
3. Ensure that Boot Setting is open. Select 'Do Not Clear' for the first option. Thereafter for Boot File Setting, open up the settings to select the different options available



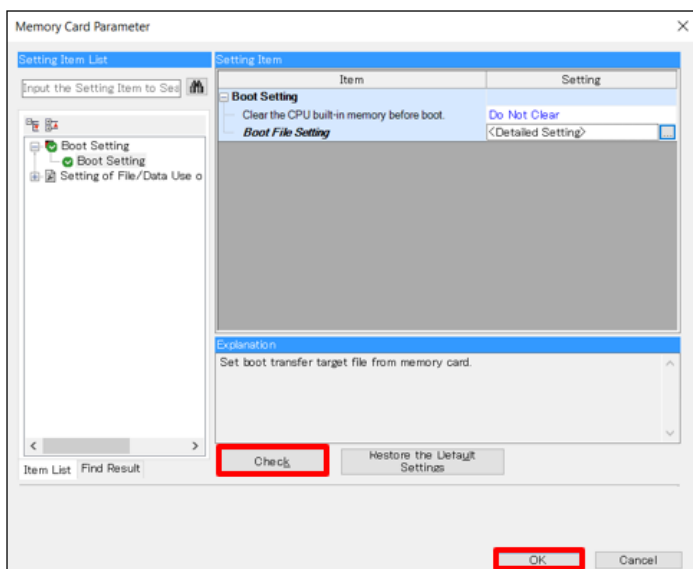
- Now select all the files to be loaded onto the SD Card, see the image that follows for all the necessary files. The options to be selected will sometimes differ depending on the program. After selecting all the correct files, select 'Add'.



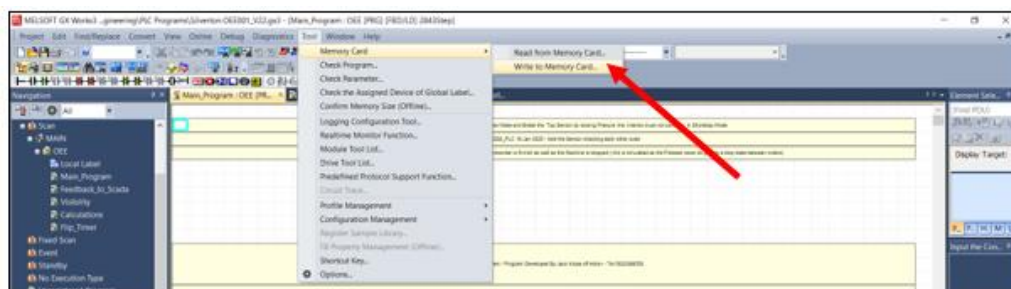
- There will be file types that duplicate and have empty values in the Data Name columns. Be sure to delete these files.



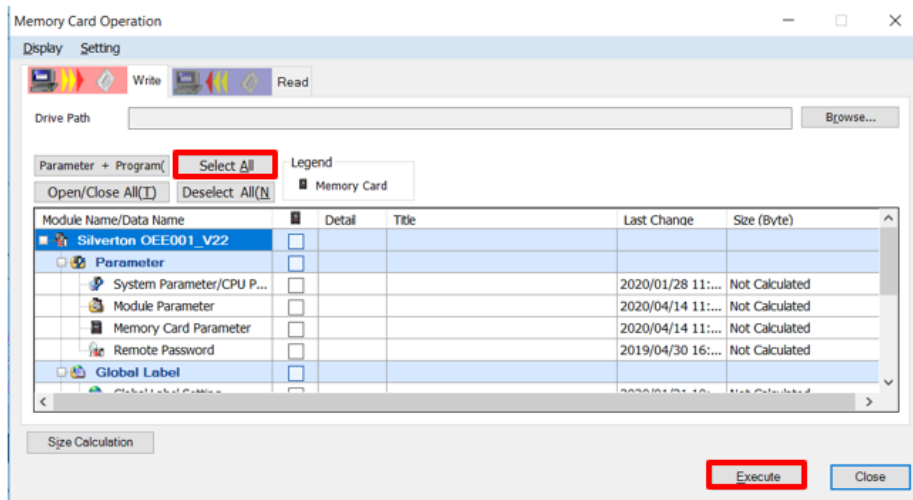
- Now the files have been loaded. Click on 'Check' to confirm that there are no errors. If there were no errors found, select 'OK'.



- Now navigate to Tool, Memory Card and the select Write to Memory Card on the top toolbar of the page.



- Select the drive path of the memory card. This is usually the F drive after the card has been inserted into the PC.
- Now click on 'Select All' and 'Execute'. The program has now been successfully loaded onto the card and can be inserted and loaded onto a new PLC.



2.3. Loading of PLC Program onto new PLC via the SD Card

This sub-section is executed when a PLC program has been backed up onto an SD card and now needs to be loaded onto a new PLC. Note that this step is usually needed if a problem occurs with an existing PLC and is replaced with a new one. The SD card contains the program and can easily be loaded to the new PLC, ensure that the PLC is correctly wired.

1. Ensure that the power of the PLC is switched off.
2. Ensure that the reset button of the PLC is in a stop state (see step 2 under [sub-section 2.1](#))
3. Now insert the SD Card into the SD Card slot (see step 1 under [sub-section 2.1](#))
4. Switch on the power of the PLC
5. After the PLC has been switched on, push the reset button up to reset the PLC. Give the PLC some time to read the SD Card and thereafter the program will be loaded onto the PLC.



6. After the PLC has successfully read the PLC, the SD Card can be removed from the PLC (see step 16 under [sub-section 2.1](#)).

Adroit Enterprise OEE

OEE User Standard Operating Procedure (SOP)

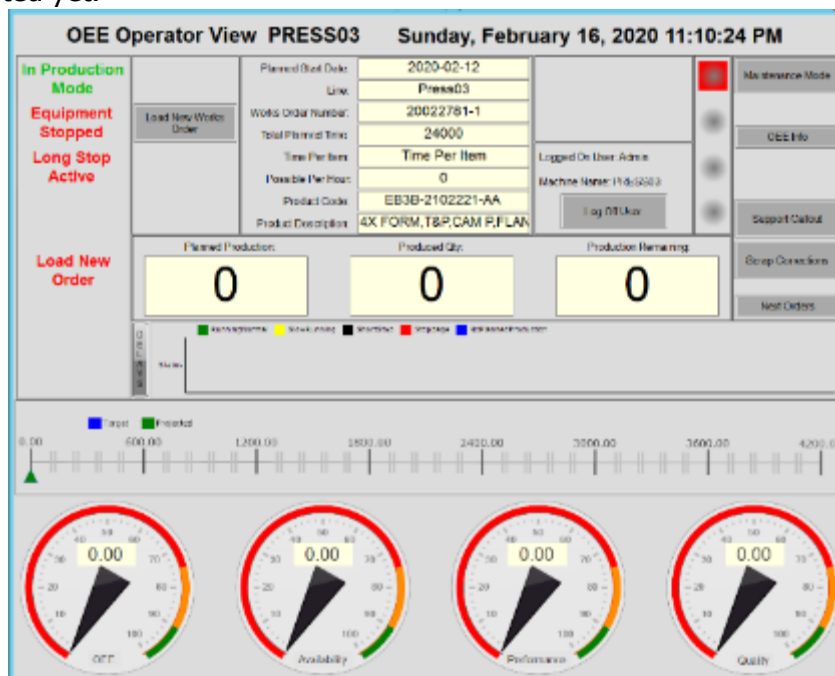
1. Introduction

The purpose of this document is to give step by step instructions on how all relevant users of a factory are to use the different Adroit OEE operator functionalities. This manual is set up to describe each component of the operator view. The operator view has been created on Adroit for users to perform various functions such as load works orders, start the machines, book any delays that a machine encounter and so forth.

2. Generic Operator Screen

The image that follows illustrates the screen on which the operator will be having access to and will be working on. The subsections that follow will give explanations of the different functionalities that is available on the OEE Operator View.

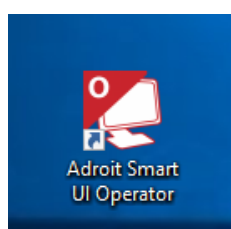
Note that the current state of the machine as seen on the screen is that it is ready to run but has not started yet.



2.1. Log in

Every machine is meant to have a separate remote computer/HMI specific to that machine. Hence, not all users will have access to all the machines. The first step is to log in, on the desktop on the computer, a shortcut named **Adroit SmartUI Operator** will be available. The following images that follow represent the steps that the operator must follow to successfully login to a machine:

1. The responsible operator must click on the shortcut available on the desktop and he will be directed to a login page



2. The operator is now required to enter his assigned **Login Name** and **Password**



2.2. Equipment Status

This section is available to give the user different statuses of the OEE for awareness. At different stages of production, the alarms that are displayed here can be the following (see example in the image that is displayed):

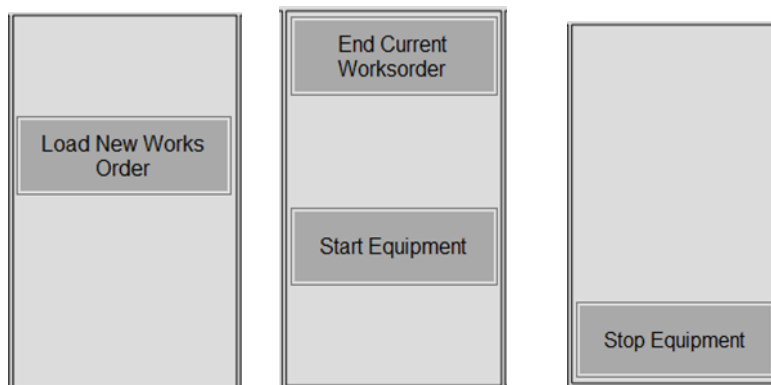
- Equipment Stopped
- Equipment Running
- Slow Running
- Long Stop Active
- Short Stop Active
- In Production Mode
- In Maintenance Mode
- No Open Orders
- Load New Order
- Tool Setup Mode
- Shift Break



2.3. Production Controls

This section is available to give the operator the options of the following:

- Loading a works order that has been preloaded
- Starting and stopping production
- Ending a works order for the purpose of loading the next one after the production of the previous works order has been completed. The orders can also be stopped prematurely if the supervisor wishes to complete the order. Note: the order that were prematurely ended will disappear and if the supervisor do want to continue that order, the order need to be reloaded by the Production Planner with a different works order number



Works orders are preloaded onto the Adroit system by the production planner. Before the machine can be started, an order must be loaded to begin the production. Refer to the Supervisor Training Manual section in the most recent version of the **Adroit Enterprise OEE Training Manual** document on the process of loading and starting orders.

2.4. Active Order Details

This section is available to give detailed information of the works order that has been loaded. The following information can be seen:

- The planned start date of the production for the specific works order
- Line – The machine name that's going to be used for production
- The unique works order number for identification and reference purposes relating to the works order
- The total time that is planned for production for the specific works order
- Time per item is the time for one complete cycle of the machine
- Possible per hour is the production target in an hour
- The unique product code assigned to the specific product that is being produced
- Product Description – The name of the product being produced

Planned Start Date:	2020-02-12
Line:	Press03
Works Order Number:	20022781-1
Total Planned Time:	24000
Time Per Item:	Time Per Item
Possible Per Hour:	0
Product Code:	EB3B-2102221-AA
Product Description:	4X FORM,T&P,CAM P,FLAN

2.5. Current Production Figures

This section is available for the operators, supervisors and about anyone walking past the machine to view the planned vs actual production figures.

Planned Production:	Produced Qty:	Production Remaining:
0	0	0

2.6. Delay Capture

This section is available to give an alarm to notify the user that there is a reason for delay in production that needs to be booked.

In every production process there will always be some sort of delays that slow down the process or prevent the process from reaching planned targets. An OEE system helps to keep track of delays to measure the performance of the process more effectively. It is ideal to generally consider two types of delays, namely short stops and long stops. When there is a short delay that for a predefined amount of time the system will then go into a short stop state. The short stop period is considered a delay however during this time the operator can still resume production. . However, once the time limit for a short stop has been reached, the machine is now in a long stop state and in this state the machine will not be able to run until a reason for the delay has been booked.

See the Supervisor Training Manual section in the most recent version of the **Adroit Enterprise OEE Training Manual** document to see how to book a delay and how to restart production after the delay is booked.

Delay Capture	Delay Capture
	OEE ACTIVE DELAY
	Book Delay

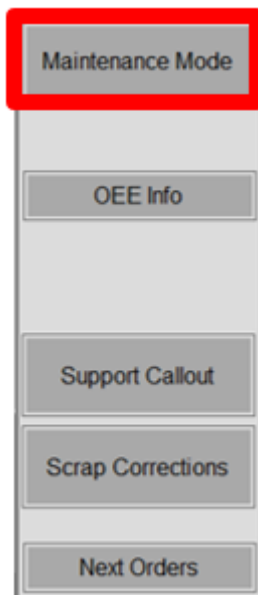
2.7. User Info

This section is available to view the user that logged into the machine as well as the name of the machine. Note that when the machine is running, the operator does not have the option to log off from the OEE system (see image on the left). When the machine is not running and production is stopped, then the operator has the option to log off from the OEE system (see image on the right).

User Info	User Info
Logged On User: Pirei Machine Name: OEE001	Logged On User: Pirei Machine Name: OEE001
	Log Off User

2.8. Maintenance Mode

This section has been made available for the user to change the OEE system from production mode to maintenance mode and vice versa by selecting the Maintenance Mode button.

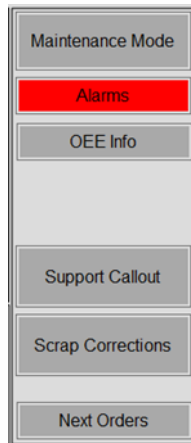


This mode has been made available on the OEE for an instance where the operator notices an issue with the machine during production. At this moment the machine will either stop automatically or the operator will have to stop the machine. Note that the red stack light will be flashing in this instance. When the operator stops the machine for investigation, the OEE will be temporarily in a **Short Stop** state, the operator now needs to investigate the problem with the machine. Note that if the operator takes longer than the defined short stop period to investigate the problem, the OEE will be changed into a **Long Stop** state.

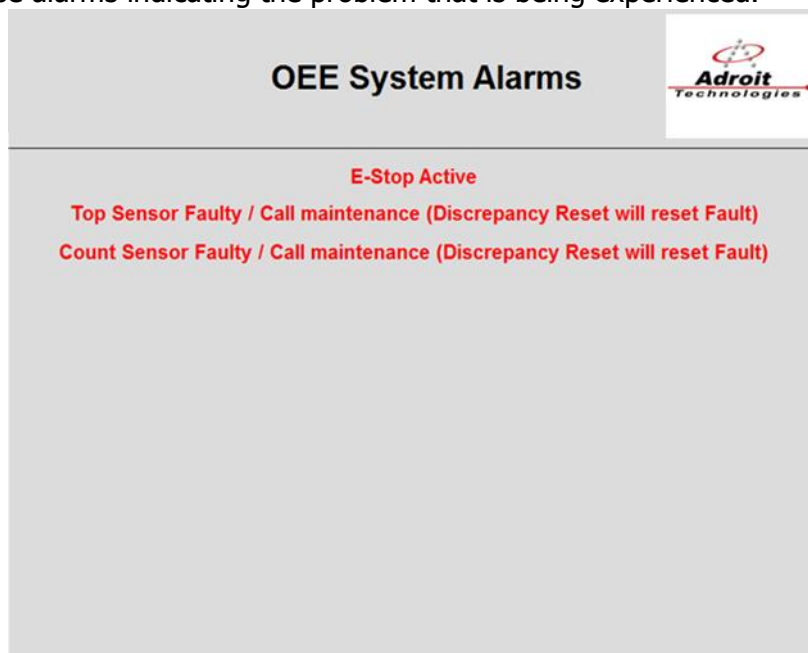
In an instance where the operator is unable to fix the problem himself, the available technical officials will be expected to intervene. These officials are generally the maintenance, tool setters and quality officials. It is important to note that when a long stop is active, the system will have to be changed from production to maintenance mode. Only maintenance, tool setters and quality officials are authorised to make the change on the system. See the Maintenance Training Manual section in the latest version of the **Adroit Enterprise OEE Training Manual** document to see a step by step guide in changing from production to maintenance mode and back.

2.9. Alarms

The Alarm button only appears if the machine has been switched off (E-Stop is active) and if there is an issue with the Top Limit and Counter sensors. In this instance, no equipment can be started through the OEE and no orders can be loaded until the machine is either switched back on or the sensor errors are resolved.



When clicking on the 'Alarms' button that is flashing red, the following screen pops up with one of these alarms indicating the problem that is being experienced.



The sensor faulty alarms will only be activated by the following conditions:

- Top limit sensor pulse occurs 5 or more times than the count sensor pulse
- Count sensor pulse occurs 5 or more times than the top limit sensor pulse

If any of these conditions occur, the machine will interlock, and the Alarm will appear. This is to help indicate that there is a sensor problem and maintenance (probably an electrician) needs to try fix the sensor issue, reset the discrepancy in maintenance mode and continue production.

Maintenance Mode Selection



Please Note: When in Maintenance Mode the OEE Agent do not count the Production Good Quantity. The Maintenance Break is however logged against the Availability of the Relevant Equipment. When put in Production mode the Production Quantity will be active again.

Plant Status: Production Mode

Maintenance Mode

Please Note: When in Maintenance Mode the Maintenance will be able to operate the machine for the present amount of strokes. When the Available Stroke Counter reach 0 the Machine will be interlocked and become inoperable. To Reset, Log out and log in again.

Available Strokes:

Discrepancy Reset
 Top Sensor Counter
QTY

Exit
 Production Sensor Counter
QTY

2.10. OEE Info

The OEE Info page has been setup to show different statuses for different functionalities of the OEE system. Its purpose is to be used for fault finding. It is mainly for the technical system administrators of the system to identify the different states of different tags to better understand a problem and identify a fault.

OEE_Engine Steps



OEE Field Info


 E Stop
Normal


 Count Limit
Switch


 Top Limit
Switch


 Interlock


 Equipment
Started

OEE Engine Info

Engine Step	4	In Service	1
Short Stop	0	Machine Running	0
Long Stop	1	Slow Running	0
In Production	0	Start	0
Enable Method	2	Enable Out	0
Licenced	1	No Active Order	0
Delayed Step	1	Order IDX	112
Machineldx	2	Product IDX	569
Connected	1	Toolsetting Bit	0
		Shift Bit	0
Shif agent	SM_2_SHIFT_SETUP		

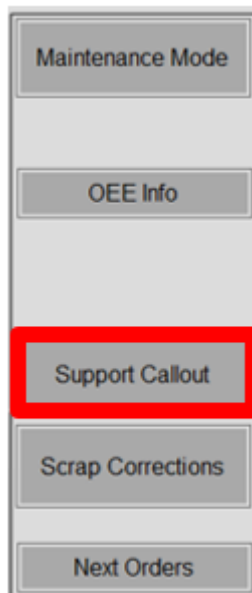
PLC Communication
Exit

It is also possible to view the states of all the PLCs within the plant by selecting the 'PLC Communication' button.

Manufacturing OEE PLC Comms			
PLC Comms Press01 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press07 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press13 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press19 PLC Communication: ● PLC Started: ● PLC Healthy: ●
PLC Comms Press02 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press08 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press14 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press20 PLC Communication: ● PLC Started: ● PLC Healthy: ●
PLC Comms Press03 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press09 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press15 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press21 PLC Communication: ● PLC Started: ● PLC Healthy: ●
PLC Comms Press04 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press10 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press16 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press22 PLC Communication: ● PLC Started: ● PLC Healthy: ●
PLC Comms Press05 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press11 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press17 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press23 PLC Communication: ● PLC Started: ● PLC Healthy: ●
PLC Comms Press06 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press12 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press18 PLC Communication: ● PLC Started: ● PLC Healthy: ●	PLC Comms Press24 PLC Communication: ● PLC Started: ● PLC Healthy: ●

2.11. Support Callout

This section is available for the operator to call either a maintenance, tool setter or quality official when experiencing a problem with the machine during production.



An authorisation page will pop up, the supervisor is now expected to login.



Authentication Popup Supervisor

Authentication

Please enter Username and Password to Open the Required Popup

Username:

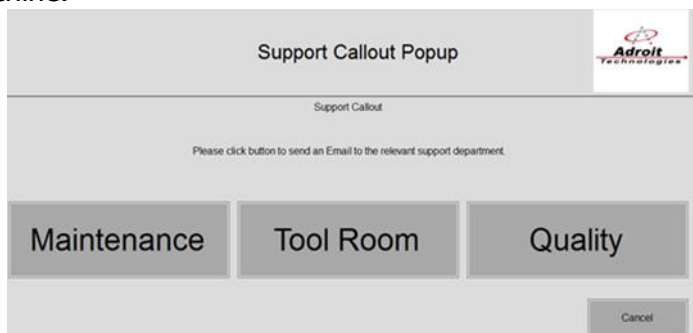
Password:

LOG ON

Cancel

OEI_ADV OEE Modules OEE_Popups OEE_Support OEE_Callout OEE_Support_Callout_Popup

The support callout page will open, select any of the three options depending on the problem of the machine.



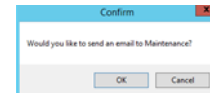
Support Callout Popup

Support Callout

Please click button to send an Email to the relevant support department.

Maintenance Tool Room Quality

Cancel



Confirm

Would you like to send an email to Maintenance?

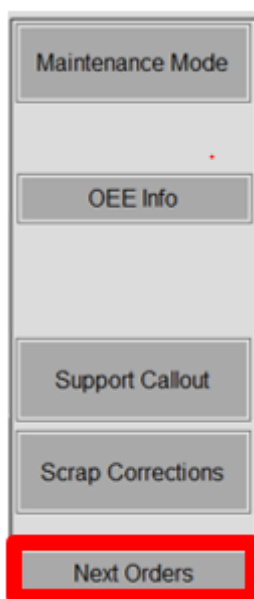
OK Cancel

2.12. Scrap Input and Corrections

This section is available after production for the quality officials to indicate the quantity of products that were scrapped and the quantity of products that were reworked. There are two sections for scrap input. One is straight after a works order has completed and another at any point where the quality official felt that there was a mistake made and correction needs to be made. See the Quality Training Manual section the in the latest version of the **Adroit Enterprise OEE Training Manual** document to view the steps taken for the quality officials for scrap input and corrections.

2.13. Viewing the Next Orders

This functionality allows the user to simply see what the forecasted planned orders are. When selecting the 'Next Orders' button, a screen appears displaying the next 5 orders that are planned.



Maintenance Mode

OEE Info

Support Callout

Scrap Corrections

Next Orders

Next 5 orders to produce



WorksOrderNumber	ProductCode	ProductDescription	QtyPlanned	PlannedStartDate	TimePerItem	TotalPlannedProduction	PlannedPriority
20022766-1	EB3B-41111K36-BC	DRAW	1100	2020-02-11	41	45100	3
20022766-2	EB3B-41111K36-BC	DRAW	1100	2020-02-11	18	19800	4
20022766-3	EB3B-41111K36-BC	DRAW	1600	2020-02-12	18	28800	5

Exit

2.14. Stack Lights

This section is available for the purpose of giving an indication of different statuses of the OEE or stages of production.



2.14.1. Red Light

The red light on the stack lights has got two indications. The first indication is a solid red light. When the solid red light is on, it is an indication that the machine is ready to run. The action that needs to be taken when the red light is on by the operator is to start the machine.

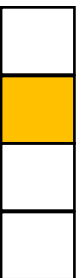
The second indication is a flashing red light, which means that the machine is experiencing some sort of a fault e.g. estop is pressed.



2.14.2. Orange Light

The orange light indicates that the operator has an outstanding reason that needs to be booked, the fault that needs to be booked was caused by a machine stoppage that lasted for a longer time than that of a short stop period. A **short stop period** is a period that is automatically booked by the system and doesn't contain a reason. Short stop period time is being set in the OEE_ADV Agent and is determined by the factory operation planning.

Example of a short stop is when an operator must load a machine. A **long stop period** is any period bigger than a short stop. With a long stop, a reason must be booked by the operator and the orange light will be on.



2.14.3. Green Light

The green light on the stack lights has got two indications. When the stack light is on solid green, it means that the machine is running normal. Flashing green means machine is slow running in other words producing less than the target. Slow running is setup in the OEE_ADV Agent under rate loss limit per min.



2.14.4. Blue Light

The blue light on the stack lights has got two indications. Solid blue light indicates that the OEE was put into maintenance mode to ensure that the maintenance/quality/tool setter can work on the machine without the OEE counters being active and counting. Flashing blue indicates that the system is in a tool setup mode. In this mode, the tool setter will change the tool on a machine and must do so in a prescribed time before the system goes into a long stop and interlocks the machine.

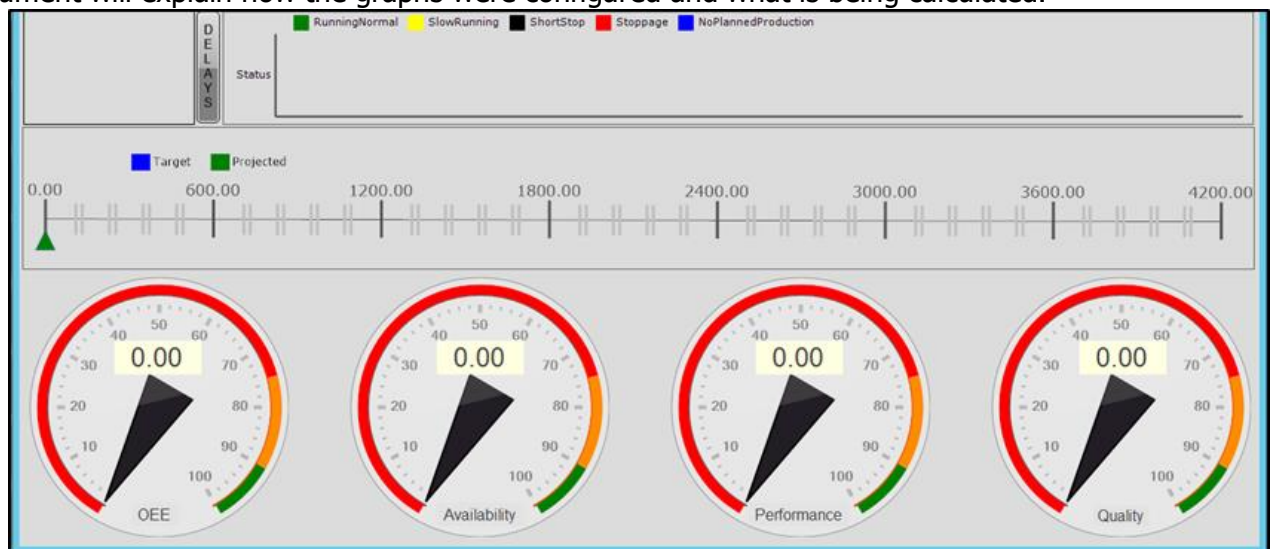


2.15. OEE Calculation and Production graphs

This section is available for the operator to view the results from the different OEE calculations and is displayed on the dials. It is important to note that the calculations are made based on a predefined block period. The different dials represent the following:

- **Availability** - Availability rate (percentage of time the machine is ready to produce, working properly, and not in the midst of changeovers or adjustments) = $\text{Run Time} \div \text{Available time (Delay Time + Run Time)}$.
- **Performance** - Performance rate (ratio of output produced compared to a standard) = $\text{Actual output (Total count)} \div \text{Standard output (Target Count)}$.
- **Quality** - Quality rate (ratio of good output compared to actual output) = $\text{Right-first-time output (Good parts)} \div \text{Actual output (Total Parts)}$.
- **OEE** - $\text{OEE (\%)} = \text{Availability rate} \times \text{Performance rate} \times \text{Quality rate}$

As for the production graphs, refer to the chapter on the **Controls Configurations** document. The document will explain how the graphs were configured and what is being calculated.



The purpose of the 'DELAYS' button seen to the left of the first graph is for the user to be able to view the last 15 delays that were booked. The following table will appear on the screen once the button is clicked.

Delay Reasons					
	Startdt	Enddt	Duration	Category2	Notes
▶	2/14/2020 9:30 PM	2/15/2020	9000	LEFT EARLY FOR SHIFT...	
	2/14/2020 6:10 PM	2/14/2020 9:00 PM	10200	SCRAP BIN NOT AVAILA...	
	2/14/2020 3:10 PM	2/14/2020 5:00 PM	6599	LATE FROM SHIFT BRE...	
	2/14/2020 12:30 PM	2/14/2020 3:00 PM	9000	PRODUCTION BIN FULL	
	2/14/2020 10:53 AM	2/14/2020 12:00 PM	3965	EMPTY PRODUCTION B...	
	2/14/2020 10:53 AM	2/14/2020 10:53 AM	31	Short Stop	Short stop
	2/14/2020 1:42 AM	2/14/2020 1:43 AM	61	MATERIAL PLACEMENT	
	2/14/2020 1:20 AM	2/14/2020 1:32 AM	723	MATERIAL PLACEMENT	
	2/14/2020 1:14 AM	2/14/2020 1:14 AM	32	Short Stop	Short stop
	2/14/2020 12:56 AM	2/14/2020 12:56 AM	16	Short Stop	Short stop
	2/14/2020 12:37 AM	2/14/2020 12:44 AM	424	SCRAP BIN FULL	
	2/14/2020 12:29 AM	2/14/2020 12:31 AM	130	MATERIAL PLACEMENT	
	2/14/2020 12:20 AM	2/14/2020 12:21 AM	12	Short Stop	Short stop
	2/14/2020 12:19 AM	2/14/2020 12:20 AM	43	Short Stop	Short stop
	2/14/2020 12:10 AM	2/14/2020 12:18 AM	531	MATERIAL PLACEMENT	

3. User Setup Configurations

Different stakeholders within the organization will have access to different functionalities of the entire OEE system. For instance, when a supervisor logs into the SmartUI Operator, he will view the main OEE production operator view. When the planner logs in, the works order setup will open as the planner only has access to that. The following sections describe a few setups that different users will have access to and what these setups are meant for.

3.1. Area Setups

This section is mainly for setting up the different areas of production within the plant on the OEE system. The user can easily create new area by typing a press name under 'Description' and to which zone the machine should belong to under 'Parent'.

If the user wants to make any changes to the information already currently available, then select any of the areas, edit the Description or Parent and select 'Update Area'.

If the user wants to delete and area, simply select the area and select 'Delete Area'.

Area Setup

Silverton manufacturing

- Zone01
 - Press01
 - Press02
 - Press03
 - Press04
 - Press05
 - Press06
 - Press15
- Zone02
 - Press07
 - Press08
 - Press09
 - Press10
 - Press11
 - Press12
 - Press13

Update Area Details

Description: Press09

Parent: Zone02

Update Area

Add Area
Delete Area
Unselect
Exit

3.2. Category Setup

The Category Setup allows for the relevant user to add, remove or edit reasons for various types of production delays. When adding a new reason, select the addition symbol and fill in all the empty fields with the relevant data.



OOE Category Setup

Category Details

Category: RAW MATERIAL NOT AVAILABLE

Group Selection: Select Group

OEE Type: Performance

Delete Selected Record: ☐

Exit

Id	Category	OEE Type
86	RAW MATERIAL NOT AVAILABLE	Performance
87	MATERIAL PLACEMENT	Performance
88	OPERATOR NOT AT WORK STATION	Performance
89	SCRAP BIN FULL	Performance
90	SCRAP BIN NOT AVAILABLE	Performance
91	EMPTY PRODUCTION BIN NOT AVAILABLE	Performance
92	PRODUCTION BIN FULL	Performance
93	LATE FROM SHIFT BREAK	Performance

Note in this setup, you do not categorise where the delay reason should appear. This will be done in the next section. 'Category' is where the delay reason is typed out. 'Group Selection' is simply to identify the reason under the available types of delay reason (e.g. CAM BROKEN would be grouped under a mechanical delay reason).

OEE Category Setup



Category Details

Category:

Group Selection:

OEEType:

Delete Selected Record: ☐

Idx	Category	OEE Type
175	GANGED TOOL BALANCING PROBLEM	Availability
176	TOOL CLAMPED WRONG	Availability
177	TOOL SHIMMING PROBLEM	Availability
178	CAM BROKEN	Availability
179	CUSHION PRESSURE INCORRECTLY	Availability
180	DEVIATION TO PRODUCE/REWORK APPROVED	Availability
181		

The OEE Type is simply to identify what OEE factor does the delay reason affect.

OEE Category Setup



Category Details

Category:

Group Selection:

OEEType:

Delete Selected Record: ☐

Idx	Category	OEE Type
175	GANGED TOOL BALANCING PROBLEM	Availability
176	TOOL CLAMPED WRONG	Availability
177	TOOL SHIMMING PROBLEM	Availability
178	CAM BROKEN	Availability
179	CUSHION PRESSURE INCORRECTLY	Availability
180	DEVIATION TO PRODUCE/REWORK APPROVED	Availability
181		

After filling on all the fields, the user needs to click on the save button to add into the database.



The user also has the option to edit the current information available. Simply click on an existing record, and correct the relevant fields and the click save.

The user may also delete a record if needed by simply selecting the record that needs to be removed, tick the 'Delete Selected Record' check box and then thereafter click the save button.

Delete Selected Record: ☒

3.3. Delay Category

This section allows the user to group the OEE delay reason that was added in the Category Setup to a machine (and area) as well as user group. User group consists of Operator, Maintenance, Quality and Tool Room. When wanting to add a new record, select the addition symbol and fill all the empty fields.

MachineId	DelayTypeHeader	OEEType	UserGroup
1	RAW MATERIAL NOT AVAILABLE	Performance	Operator
1	MATERIAL PLACEMENT	Performance	Operator
1	OPERATOR NOT AT WORK STATION	Performance	Operator
1	SCRAP BIN FULL	Performance	Operator
1	SCRAP BIN NOT AVAILABLE	Performance	Operator
1	EMPTY PRODUCTION BIN NOT AVAILABLE	Performance	Operator
1	PRODUCTION BIN FULL	Performance	Operator
1	LATE FROM SHIFT BREAK	Performance	Operator
1	LEFT EARLY FOR SHIFT BREAK	Performance	Operator
1	DAY SHIFT LEFT STATION EARLY	Performance	Operator

Select the machine name and area description (generally the same).

MachineId	DelayTypeHeader	OEEType	UserGroup
1	RAW MATERIAL NOT AVAILABLE	Performance	Operator
1	MATERIAL PLACEMENT	Performance	Operator
1	OPERATOR NOT AT WORK STATION	Performance	Operator
1	SCRAP BIN FULL	Performance	Operator
1	SCRAP BIN NOT AVAILABLE	Performance	Operator
1	EMPTY PRODUCTION BIN NOT AVAILABLE	Performance	Operator
1	PRODUCTION BIN FULL	Performance	Operator
1	LATE FROM SHIFT BREAK	Performance	Operator
1	LEFT EARLY FOR SHIFT BREAK	Performance	Operator
1	DAY SHIFT LEFT STATION EARLY	Performance	Operator

The 'Delay Type Header' are the reasons added in the Category Setup (see section 3.2).

OEE Delay Category Setup (Manual)

Delay Category Details

Machine Number:

Area Description:

Delay Type Header:

User Group:

Delete Selected Record: ☐

MachineId	DelayTypeHeader	OEEType
1	RAW MATERIAL NOT AVAILABLE	Performance
1	MATERIAL PLACEMENT	Performance
1	OPERATOR NOT AT WORK STATION	Performance
1	SCRAP BIN FULL	Performance
1	SCRAP BIN NOT AVAILABLE	Performance
1	EMPTY PRODUCTION BIN NOT AVAILABLE	Performance
1	PRODUCTION BIN FULL	Performance
1	LATE FROM SHIFT BREAK	Performance
1	LEFT EARLY FOR SHIFT BREAK	Performance
1	DAY SHIFT LEFT STATION EARLY	Performance

The 'User Group' is where the user classifies the reason as either a production delay (Operator), a maintenance, toolroom or quality delay.

OEE Delay Category Setup (Manual)

Delay Category Details

Machine Number:

Area Description:

Delay Type Header:

User Group:

Delete Selected Record: ☒

MachineId	DelayTypeHeader	OEEType	User Group
1	RAW MATERIAL NOT AVAILABLE	Performance	Operator
1	MATERIAL PLACEMENT	Performance	Operator
1	OPERATOR NOT AT WORK STATION	Performance	Operator
1	SCRAP BIN FULL	Performance	Operator
1	SCRAP BIN NOT AVAILABLE	Performance	Operator
1	EMPTY PRODUCTION BIN NOT AVAILABLE	Performance	Operator
1	PRODUCTION BIN FULL	Performance	Operator
1	LATE FROM SHIFT BREAK	Performance	Operator
1	LEFT EARLY FOR SHIFT BREAK	Performance	Operator

Once entering all the fields, then click save the save button.



The user also has the option to edit the current information available. Simply click on an existing record, and correct the relevant fields and the click save.

The user may also delete a record if needed by simply selecting the record that needs to be removed, tick the 'Delete Selected Record' check box and then thereafter click the save button.

Delete Selected Record: ☒

3.4. Classification Setups

The Classification Configuration setup is made available to assign a colour to the different delay type categories, mainly for graphs on the OEE system and reporting. The method of adding, removing and editing data is the same as the previous two sections (see section 3.2 and 3.3).

OEE Classification Configuration



Classification Details

Classification Description:

Classification Color:

Exit

Delete Selected Record: ☐

	Description	Color
▶	Unavailable	Black
	Electrical	Red
	Mechanical	Blue
	Toolroom	Purple
	Quality	Gray
	Production	Yellow
•		

3.5. Machine Setup

The machine setup is made available to the user to assign specific parameters to the machines already created in the Area Setup. The parameters are as follows:

- Machine Name – Type out the machine number
- Machine Description – Any description suitable for the machine number
- Factory – Select the correct zone
- Line – select the machine number
- Run Rate Max – Maximum number of items per period
- Run factor – derating factor, from 0-1 (DVW – What is this factor??)
- Run Rate Period (In Seconds) - Period (in secs) for which Run Rate applies

The method of adding, removing and editing data is the same as the previous two sections (see section 3.2 and 3.3)



OEE Machine Setup

Machine Details

Machine Name:

Machine Description:

Factory:

Line:

Run Rate Max:

Run Factor:

Run Rate Period (In Seconds):

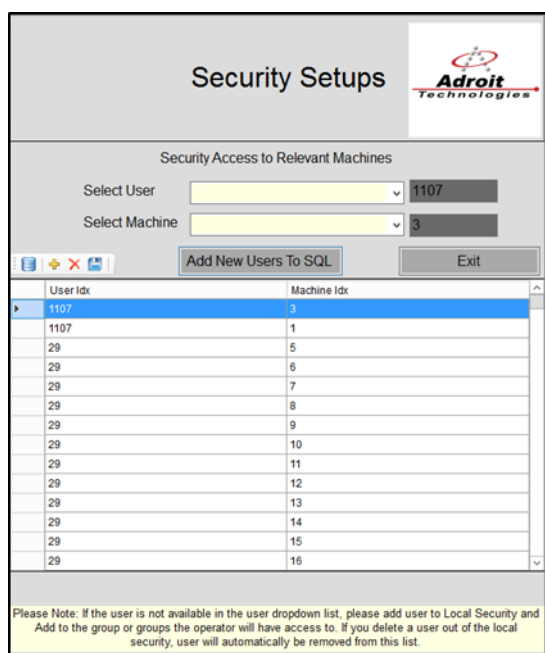
Delete Selected Record: ☐

Machine Name	Machine Description	Factory	Line	Run Rate Max	Run Factor	Run Rate Period	Run Rate Actual
Press01	Press01	Zone01	Press01	1	10	60	10
Press02	Press02	Zone01	Press02	1	10	60	10
Press03	Press03	Zone01	Press03	1	10	60	10
Press04	Press04	Zone01	Press04	1	10	60	10
Press05	Press05	Zone01	Press05	1	10	60	10
Press06	Press06	Zone01	Press06	1	10	60	10
Press07	Press07	Zone02	Press07	1	10	60	10
Press08	Press08	Zone02	Press08	1	10	60	10
Press09	Press09	Zone01	Press09	1	10	60	10
Press10	Press10	Zone02	Press10	1	10	60	10

3.6. Security Setup

This section is typically for IT and System Administrators or any other relevant users responsible for setting up all the Windows Active Directory users and groups within an organization. For Adroit to recognize users, they must first be created on the Window's Active Directory. The user information will be automatically detected on the Adroit system. Users can be anyone within an organization that will be involved with the OEE system. See section **2.3 Users and Groups** in the chapter on **Site Deployment**.

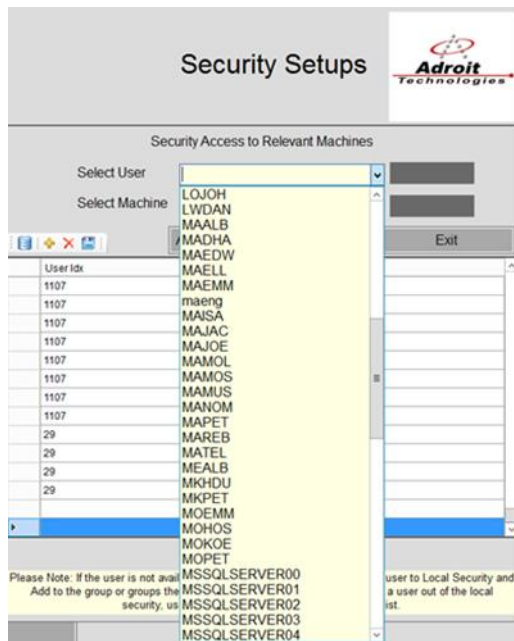
Once the users and groups have been created on windows, they have to be configured in adroit to specific machines and other areas/setups of the OEE system. The method of adding and editing records is the same as described in section 3.2 and 3.3. The only thing different for Deleting a record is by selecting the cross in between the addition and save buttons.



User Idx	Machine Idx
1107	3
1107	1
29	5
29	6
29	7
29	8
29	9
29	10
29	11
29	12
29	13
29	14
29	15
29	16

Please Note: If the user is not available in the user dropdown list, please add user to Local Security and Add to the group or groups the operator will have access to. If you delete a user out of the local security, user will automatically be removed from this list.

The 'Select User' drop down list includes all the users added in the Windows Active Directory. Select a user to give access to a specific machine.



Security Setup

Security Access to Relevant Machines

Select User: [Dropdown]

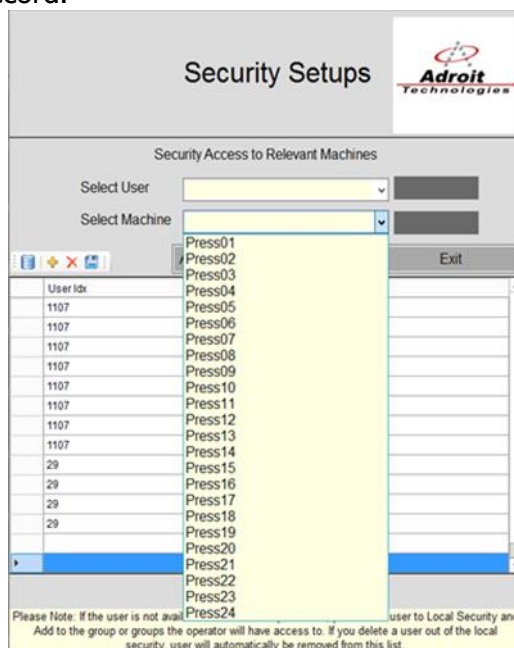
Select Machine: [Dropdown]

Exit

User Idx	Machine
1107	LOJOH
1107	LWDAN
1107	MAALB
1107	MADHA
1107	MAEDW
1107	MAELL
1107	MAEMM
1107	maeng
1107	MAISA
1107	MAJAC
1107	MAJOE
1107	MAMOL
1107	MAMOS
1107	MAMUS
1107	MANOM
1107	MAPET
29	MAREB
29	MATEL
29	MEALB
29	MKHDU
29	MKPET
29	MOEMM
29	MOHOS
29	MOKOE
29	MOPET
29	MSSQLSERVER00
29	MSSQLSERVER01
29	MSSQLSERVER02
29	MSSQLSERVER03
29	MSSQLSERVER04

Please Note: If the user is not available, Add to the group or groups the security, user will automatically be removed from this list.

Select the machine number that the user should have access to. If the user should have access to more than one machine, then keep adding a new record and selecting the same user but selecting the different machines. Remember to always select the save button after adding, removing or editing a record.



Security Setup

Security Access to Relevant Machines

Select User: [Dropdown]

Select Machine: [Dropdown]

Exit

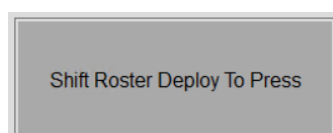
User Idx	Machine
1107	Press01
1107	Press02
1107	Press03
1107	Press04
1107	Press05
1107	Press06
1107	Press07
1107	Press08
1107	Press09
1107	Press10
1107	Press11
1107	Press12
1107	Press13
1107	Press14
29	Press15
29	Press16
29	Press17
29	Press18
29	Press19
29	Press20
29	Press21
29	Press22
29	Press23
29	Press24

Please Note: If the user is not available, Add to the group or groups the operator will have access to. If you delete a user out of the local security, user will automatically be removed from this list.

3.7. Changing between different Shift Setup

This section is for users with access to change the shift setup. If for any reason the current shift setup is compromised, different shift setups have been configured to cater for the change in the current shift.

When the user is logged in, select the 'Shift Roster Deploy To Press' button.



All the presses with the current shift setup is viewed in the first column. The column to the right of each row is made available for the user to select a different shift setup if needed per machine. Once selection is complete, select the 'Exit' button at the bottom of the page and the shift setup for the specific machine will be updated.

Manufacturing Shift Roster	
Current Shift Selection	New Shift Selection
Press 01 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 02 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 03 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 04 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 05 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 06 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 07 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 08 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 09 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 10 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 11 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 12 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 13 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 14 SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP

3.8. Loading SD Card onto New PLC

The entire PLC program will be backed up on an SD card and can simply be inserted and loaded onto a new PLC. This will only be needed if there are any issues with the current PLCs and new PLCs replace the existing ones. The SD card contains the program and can easily be loaded to the new PLC, ensure that the PLC is correctly wired.

1. Ensure that the power of the PLC is switched off.
2. Ensure that the PLC is in a stop state by pushing the reset button down, and keeping it down
3. Now insert the SD Card into the SD Card slot



4. Switch on the power of the PLC
5. After the PLC has been switched on, push the reset button up to Start the PLC. Give the PLC some time to read the SD Card and thereafter the program will be loaded onto the PLC.



6. After the PLC has successfully read the SD Card, the card can be removed. It is important to note that before removing the card, just below the slot there is a button. Press the button (1) until the SD Card light goes off (2), the SD Card can now safely be removed.



Adroit Enterprise OEE

Workorder Setup

1. Introduction

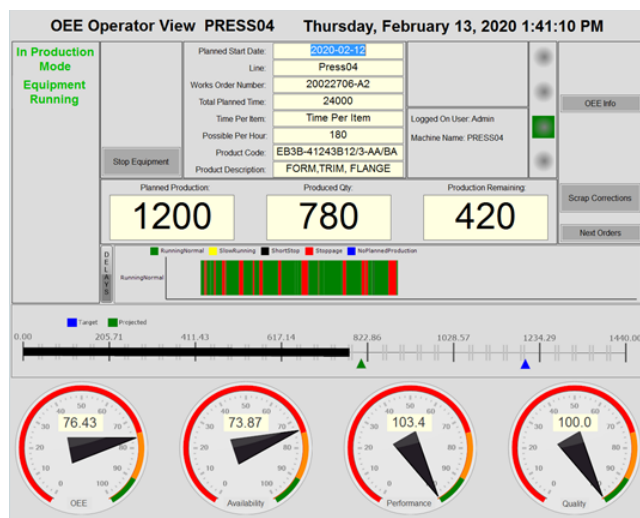
The purpose of this document is to provide a clear guideline for the production planner on how to load production orders as well as Tool setup orders.

2. Production Planning

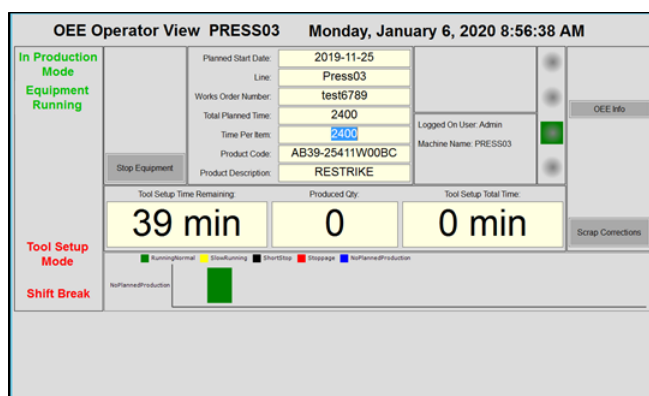
2.1. Loading Orders

There are two types of orders that the production planner is supposed to load onto the OEE system, that the operators load on the plant floor. The two are:

- Works orders – These are normal production order that is planned over a certain period based on customer orders. When a works order is loaded, and the machines are running in production then the OEE operator screen will look like the image that follows.



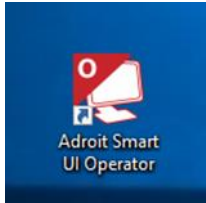
- Tool Setup – A tool setup is loaded the exact same way. The purpose of the tool setup is to give the tool setter certain time that is allocated for changing the tool. The image below depicts what a tool setup looks like on the operator screen. To use the image as an example, 'Time Per Item' of 2400 seconds (40min) is the total time that the tool setter has for changing the tool. Thereafter, a delay occurs which works the same way as the production delay. A reason has to be booked. The tool setter will then have four more opportunities to carry on setting the tool. Each opportunity will be a fourth of the total Time per item ($2400/4 = 600$ seconds for each opportunity) with a delay to book after each opportunity.



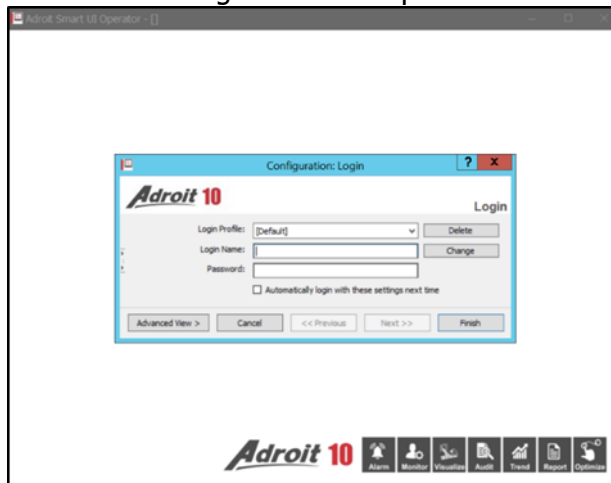
The following steps should be followed by a production planner, or any other relevant user in order to load orders:

2.1.1. Logging in

Locate and double click the 'Adroit SmartUI Operator' icon on the desktop if the login page is not already opened

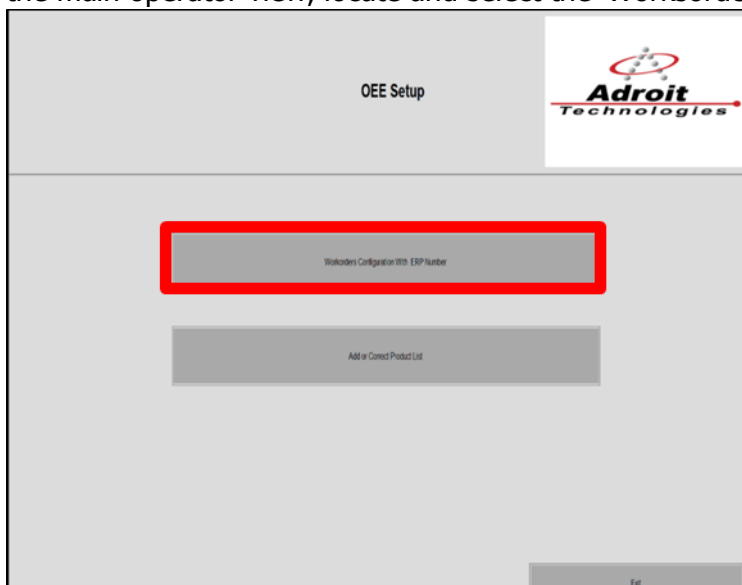


Enter the relevant login name and password and select 'Finish'



2.1.2. Loading orders or tool setups onto database

From the main operator view, locate and select the 'Workorder Setup ERP Number Only' button



The works order setup page is now open, see the image that follows.

OEE Works Order Capture (ERP)

Works Order Load

Started Orders List

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

Machine Name:

ERP Number:

Product Code:

Product Description:

Qty Planned:

Tool Setup:

Works Order Number	Qty Planned	Line	Planned Priority	Planned Start Date	Tool Setup	Product Code	Product Description	Time Per Item	Total Planned ProductionTime	Production Status
TestWO003	5	Press02	4	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestWO004	5	Press02	5	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestTS002	1	Press02	6	2019-10-30	☒	AB39-26101301-AE	TRIM & PIERCE	2400	2400	P
TestWO005	5	Press02	7	2019-10-30	☐	AB39-26101301-BA	TRIM & PIERCE	25	125	P
TestWO006	5	Press02	8	2019-10-30	☐	EB38-4110744-DA	3 STAGE TRIM, PIERCE &	20	100	P

Refresh the page by selecting the refresh button. Thereafter select the '+' button to add a new line to enter a new works order



See from the image below that a new line has been added.

OEE Works Order Capture (ERP)

Works Order Load

Started Orders List

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

Machine Name:

ERP Number:

Product Code:

Product Description:

Qty Planned:

Tool Setup:

Works Order Number	Qty Planned	Line	Planned Priority	Planned Start Date	Tool Setup	Product Code	Product Description	Time Per Item	Total Planned ProductionTime	Production Status
TestWO003	5	Press02	4	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestWO004	5	Press02	5	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestTS002	1	Press02	6	2019-10-30	☒	AB39-26101301-AE	TRIM & PIERCE	2400	2400	P
TestWO005	5	Press02	7	2019-10-30	☐	AB39-26101301-BA	TRIM & PIERCE	25	125	P
TestWO006	5	Press02	8	2019-10-30	☐	EB38-4110744-DA	3 STAGE TRIM, PIERCE &	20	100	P
					☐					

Start off by entering a relevant works order number in the field provided as long as the planned date for the order. Thereafter enter the production status:

P – Planned
X – Delete

OOE Works Order Capture (ERP)

Works Order Load

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

Machine Name:

ERP Number:

Product Code:

Product Description:

Qty Planned:

Tool Setup:

Select a priority number for the works order as they will appear on the operator view in ascending order.

OOE Works Order Capture (ERP)

Works Order Load

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

Machine Name:

ERP Number:

Product Code:

Product Description:

Qty Planned:

Tool Setup:

#	Planned Priority	Planned Start Date	Product Description
1	4	2019-10-31	2101605-CD DRAW
2	5	2019-10-31	2101605-CD DRAW
3	6	2019-10-31	26101301-AE TRM & PERCE
4	7	2019-10-31	26101301-BA TRM & PERCE
5	8	2019-10-31	4110744-DA 3 STAGE TRM & PERCE

Works Order Number	Qty Planned	Line	Planned Priority	Planned Start Date	Tool Setup
TestWO003	5	Press02	4	2019-10-30	☐
TestWO004	5	Press02	5	2019-10-30	☐
TestWO002	1	Press02	6	2019-10-30	☒
TestWO005	5	Press02	7	2019-10-30	☐
TestWO006	5	Press02	8	2019-10-30	☐

Select the machine to where the works order is to be produced.

OOE Works Order Capture (ERP)

Works Order Load

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

Machine Name:

ERP Number:

Product Code:

Product Description:

Qty Planned:

Tool Setup:

Planned	Line	Planned Priority	Planned Start Date	Product Description
Press02	4	2019-10-31	2101605-CD	DRAW
Press02	5	2019-10-31	2101605-CD	DRAW
Press02	6	2019-10-31	26101301-AE	TRM & PERCE
Press02	7	2019-10-31	26101301-BA	TRM & PERCE
Press02	8	2019-10-31	4110744-DA	3 STAGE TRM & PERCE

Once a machine is selected, a query is being executed in the background to only filter out specific ERP numbers and product codes relating to only the machine that was selected. Select the relevant ERP number.

OEE Works Order Capture (ERP)

Works Order Load

Works Order Number: TestWO007

Planned Start Date: 10/31/2019

Production Status: P

Planned Priority: 9

Machine Name: Press01

ERP Number: AB39-21111K34/S (selected)

ProductCode: SFD16049 / 52

Product Description: 1FD26411

Qty Planned: 1FD21411

Tool Setup: 1FD25411

5FD23013

5FD16017

5FD16042

5FD16026

5FD16038

Select the product code

OEE Works Order Capture (ERP)

Works Order Load

Works Order Number: TestWO007

Planned Start Date: 10/31/2019

Production Status: P

Planned Priority: 9

Machine Name: Press01

ERP Number: SFD16049 / 52

ProductCode: AB39-2610130/1-BA (selected)

Product Description: AB39-2610130/1-BA

Qty Planned:

Tool Setup:

Select a product description of the part that is to be produced

OEE Works Order Capture (ERP)

Works Order Load

Works Order Number: TestWO007

Planned Start Date: 10/31/2019

Production Status: P

Planned Priority: 9

Machine Name: Press01

ERP Number: SFD16049 / 52

ProductCode: AB39-2610130/1-BA

Product Description: Draw

Qty Planned:

Tool Setup:

Before entering the next two fields, it is important to understand a Tool Setup:

- True – A tool change needs to occur. Qty planned should be 1.
- False – No tool change needed, a normal works order is being loaded and Qty planned should be entered as normal.

Enter the quantity of products that is planned to be produced along with whether the order is a tool setup or not.

Qty Planned:

Tool Setup:

Planned Priority: Product Code:

Qty Planned:

Tool Setup:

Planned Priority: Product Code:

All fields have now been filled, make sure to click on the save button to make sure that a record of the new works order/tool setup is loaded onto the database.



OEE Works Order Capture (ERP)

Works Order Load

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

Machine Name:

ERP Number:

Product Code:

Product Description:

Qty Planned:

Tool Setup:

Works Order Number	Qty Planned	Line	Planned Priority	Planned Start Date	Tool Setup	Product Code	Product Description	Time Per Item	Total Planned ProductionTime	Production Status
TestWO003	5	Press02	4	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestWO004	5	Press02	5	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestTS002	1	Press02	6	2019-10-30	☒	AB39-2610130/1-4E	TRIM & PIERCE	2400	2400	P
TestWO005	5	Press02	7	2019-10-30	☐	AB39-2610130/1-BA	TRIM & PIERCE	25	125	P
TestWO006	5	Press02	8	2019-10-30	☐	EB3B-4110744-DA	3 STAGE TRIM, PIERCE &	20	100	P
TestWO007	1	Press01	9	10/31/2019	☒	AB39-2610130/1-BA	Draw	2400		P

2.1.3. Editing Order

In a situation where there was a mistake made by the planner after having loaded an order, or for any other reason a change needs to be made to an order, the following steps should be followed.

OEE Works Order Capture (ERP)

Works Order Load

Started Orders List

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

Machine Name:

ERP Number:

Product Code:

Product Description:

Qty Planned:

Tool Setup:

Works Order Number	Qty Planned	Line	Planned Priority	Planned Start Date	Tool Setup	Product Code	Product Description	Time Per Item	Total Planned ProductionTime	Production Status
TestWO003	5	Press02	4	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestWO004	5	Press02	5	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestTS002	1	Press02	6	2019-10-30	☒	AB39-2610130/1-4E	TRIM & PIERCE	2400	2400	P
TestWO005	5	Press02	7	2019-10-30	☐	AB39-2610130/1-BA	TRIM & PIERCE	25	125	P
TestWO006	5	Press02	8	2019-10-30	☐	EB3B-4110744-DA	3 STAGE TRIM, PIERCE &	20	100	P
TestWO007	1	Press01	9	10/31/2019	☒	AB39-2610130/1-BA	Draw	2400		P

Once open select the specific works order/tool setup to be changed by selecting the first cell which always remains empty which then selects the entire row.

Works Order Number	Qty Planned	Line	Planned Priority	Planned Start Date	Tool Setup	Product Code	Product Description	Time Per Item	Total Planned ProductionTime	Production Status
TestWO003	5	Press02	4	2019-10-30	☐	AB39-2101605-CD	DRAW	30	150	P
TestWO004	5	Press02	5	2019-10-30	☐	AB39-2101605-DD	DRAW	30	150	P
TestTS002	1	Press02	6	2019-10-30	☒	AB39-2610130/1-AE	TRIM & PIERCE	2400	2400	P
TestWO005	5	Press02	7	2019-10-30	☐	AB39-2610130/1-BA	TRIM & PIERCE	25	125	P
TestWO006	5	Press02	8	2019-10-30	☐	EB3B-4110744-DA	3 STAGE TRIM, PIERCE &	20	100	P
TestWO007	1	Press01	9	10/31/2019	☒	AB39-2610130/1-BA	Draw	2400		P

The fields below will then update according to the selected row. At this point any fields can be selected and edited. Once satisfied click on the save button and the record will be updated.

OEE Works Order Capture (ERP)

Works Order Load

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

Machine Name:

ERP Number:

Product Code:

Product Description:

Qty Planned:

Tool Setup:

2.1.4. Deleting a Record

Select the record that needs to be removed. See section 3 on how to select to edit a record. It is important to note that when a record is deleted, it is removed only from the front-end interface. The record is always saved in the SQL database and cannot be deleted; however the production status is saved as 'X'.

Change production status from 'P' to 'X'.

OEE Works Order Capture (ERP)

Works Order Load

Works Order Number:

Planned Start Date:

Production Status:

Planned Priority:

2.1.5. View current running orders

The planner can view the orders that are currently running on the plant floor. Select the 'Started Orders List' button

OEE Works Order Capture (ERP)

Started Orders List

Works Order Number:
 Planned Start Date:
 Production Status:
 Planned Priority:
 Machine Name:
 ERP Number:
 ProductCode:
 Product Description:
 Qty Planned:
 Tool Setup:

Works Order Number	Qty Planned	Line	Planned Priority	Planned Start Date	Tool Setup	Product Code	Product Description	Time Per Item	Total Planned Pro
2002274H	1000	Press 10 1	1	2020-02-13	☒	HM501211	Blank	7	7000
20022749-5	1000	Press 15 1	1	2020-02-13	☐	EB3B-2503410-AA	RESTRICK	36	36000
20022794	2000	Press 24 1	1	2020-02-13	☐	AB39-2102892/3	Form	20	40000
20022775A	800	Press 23 1	1	2020-02-13	☐	AB39-21111K345-AA	3 X TRIM & PIERCE	20	16000
20022763-6	1200	Press 18 2	2	2020-02-10	☐	74411-02090	TRIM	14	16800
20022688-6D	400	Press 13 2	2	2020-02-11	☐	AB39-2101605-AD/BD/CD/DO	Trim & Pierce	22	8800
20022768	1	Press 15 2	2	2020-02-11	☒	EB3B-4110744-CA	Draw	2400	2400
20022742F	1000	Press 10 2	2	2020-02-13	☐	HM501211	Blank	7	7000
20022733A22	1500	Press 12 2	2	2020-02-13	☐	AB39-2102892/3-AC/AB	PIERCE,HANG UP	20	30000
20022794-1	2000	Press 24 2	2	2020-02-13	☐	AB39-2102892/3	Form	20	40000
20022745o	1000	Press 09 2	2	2020-02-13	☐	AB39-25411W00-BC	TRIM	41	41000

If the Production Status is 'S', it indicates that the order has started. The Loaded Order List page will open up for the planner to view the current status of the orders that are in production in the plant.

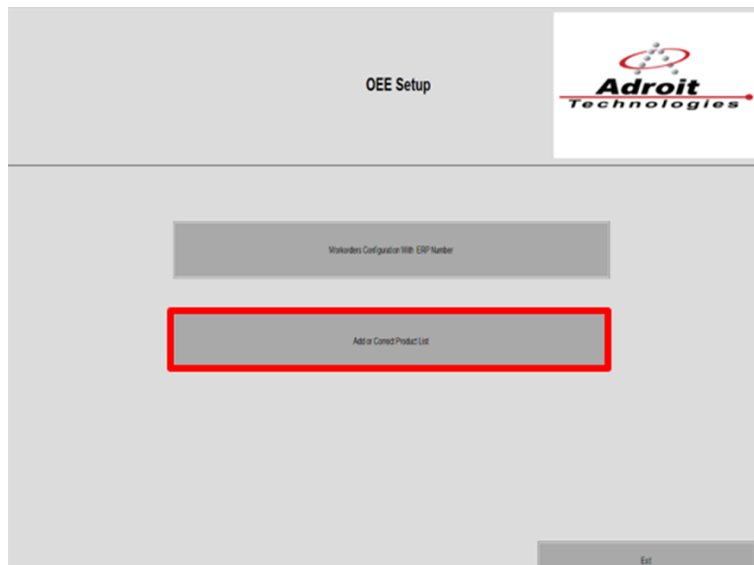
Loaded Order List

Production Status:

Line	ERPNumber	WorksOrderNum	ProductCode	TotalPlannedPro	ProductDescripti	ProductionStatus	PlannedStartDate	ActualStartDate	ActualStopDate	ActualStartTime
Press01	1FD26411	20022745-B	AB39-26411W	12150	FORM	S	2020-02-10	2020-02-13		13:06:08.0000...
Press03	5FD02221	20022781-1	EB3B-210222...	24000	4X FORM,T&P...	S	2020-02-12	2020-02-12		18:44:42.0000...
Press04	5FD23009 / 10	20022706-A3	EB3B-41243B...	24000	FORM,TRIM, F...	S	2020-02-12	2020-02-13		16:53:24.0000...
Press05	5FD16049 / 52	20022705-AB	AB39-2610130...	41000	TRIM & PIERCE	S	2020-02-12	2020-02-13		14:27:43.0000...
Press06	Trans Panels ...	59417-4	Trans Panels ...	12000	Form	S	2020-02-13	2020-02-13		14:34:50.0000...
Press07	5FD16017 / 42...	20022747-SA	AB39-2101605...	17600	Flange	S	2020-02-12	2020-02-13		01:15:08.0000...
Press08	5FD17996	20022791-1	JB3B-17V996...	9499	PROGRESSION	S	2020-02-13	2020-02-13		15:37:12.0000...
Press09	1FD26411	20022745H	AB39-26411W...	41000	TRIM	S	2020-02-11	2020-02-13		09:46:33.0000...
Press11	1FD26411	2002290-6	AB39-26411W...	49200	Restrike	S	2020-02-03	2020-02-04	2020-02-04	09:23:16.0000...
Press13	5FD16017 / 42...	20022688-6C	AB39-2101605...	22000	Trim & Pierce	S	2020-02-11	2020-02-12		20:27:41.0000...
Press15	5FD14004	20022656-A9	EB3B-260341...	36000	RESTRICK	S	2020-02-12	2020-02-12		10:54:24.0000...
Press17	5FD14006	20022710-6	AB39-2150844...	70000	3X Form	S	2020-02-05	2020-02-05	2020-02-05	07:40:13.0000...
Press17	5TY20005	20022763-2	74411-02090	43200	FORM	S	2020-02-10	2020-02-13		07:22:33.0000...
Press19	5TY05026	20022756-A3	46231-0K060	19600	Pierce	S	2020-02-13	2020-02-13		13:48:48.0000...
Press20	5FD16007/12	20022772-4B	AB39-2102892/	21000	RESTRICK	S	2020-02-12	2020-02-13		18:32:16.0000...
Press21	5FD16007/12	20022772-4I	AB39-2102892...	30000	TRIM	S	2020-02-12	2020-02-13		12:40:02.0000...
Press22	5FD15012 / 13	20022774-A3	AB39-21111K3...	24000	Draw	S	2020-02-12	2020-02-13		14:36:28.0000...
Press23	5FD15012 / 13	20022744F4	AB39-21111K3...	20000	3 X TRIM & PIE...	S	2020-02-12	2020-02-13		11:12:12.0000...
Press24	5FD16007 / 12	20022772-3	AB39-2102892	29900	Form	S	2020-02-11	2020-02-13		07:50:22.0000...

2.2. Adjustments to Product Codes

This section is to assist the planner in making changes to crucial information relating to any product that is listed in the product list table or add a new product. Select the 'Add or Correct Product List' button



In this screen you can filter by the Machine Name and then simply select the product that you want to adjust, edit the information that needs to be updated and then select save. When adding a new product, select the plus button and all the fields will be empty, populate all the fields with the relevant information relating to the new product. Once completed, select the save button and the new product has been added for the selected machine.

Product Code Setup

ERP Number:

Product Code:

Machine Name:

Product Description:

Qty Operators Required:

Delete Record ☐

Tool Setup Time:

Time Per Item:

Run Factor:

Rate Loss Limit:

Packing Multiplier:

ERPNumber	ProductCode	ProductDescription	MachineName	QtyOperatorsRequ	ActualProductionT	ToolSetupTime	TimePerItem	RunFactor	RateLossLimit	PackingMultiplier
5FD16049 / 52	AB39-2610130/...	Draw	Press01	2	41	2400	41	1	1	150
1FD26411	AB39-26411W0...	FORM	Press01	4	30	2400	30	1	1	150
1FD21411	AB39-21411W0...	FORM	Press01	4	30	2400	30	1	1	150
1FD25411	AB39-25411W0...	FORM	Press01	4	30	2400	30	1	1	150
5FD23013	EB3B-4111K36...	Draw	Press01	2	45	2400	45	1	1	150
5FD16017	AB39-2101605...	Draw	Press01	4	60	2400	60	1	1	150
5FD16042	AB39-2101605...	Draw	Press01	4	60	2400	60	1	1	150
5FD16026	AB39-2101605...	Draw	Press01	4	60	2400	60	1	1	150
5FD16038	AB39-2101605...	Draw	Press01	4	60	2400	60	1	1	150
5FD23006	EB3B-4110744...	3 STAGE TRIM...	Press02	4	14	2400	14	1	1	150
5FD23007	EB3B-4110744...	3 STAGE TRIM...	Press02	3	20	2400	20	1	1	150
5FD23020	EB3B-4111K36...	DRAW	Press02	2	18	2400	18	1	1	150
5FD16049 / 52	AB39-2610130/...	TRIM & PIERCE	Press02	2	25	2400	25	1	1	150
5FD16007 / 12	AB39-2102892...	FORM,TRIM, RE...	Press02	3	20	2400	20	1	1	150
5FD16017	AB39-2101605...	DRAW	Press02	4	30	2400	30	1	1	150
5FD16042	AB39-2101605...	DRAW	Press02	4	30	2400	30	1	1	150
5FD16026	AB39-2101605...	DRAW	Press02	4	30	2400	30	1	1	150

Adroit Enterprise OEE

SQL Database

1 Introduction

The purpose of this document is to provide a clear understanding of each table that exists within the Adroit OEE SQL database.

2 SQL Database Table Requirements

The user needs to create a database called Adroit (or any other relevant name). When the user installs the first OEE_Adv agent in Adroit, the underneath tables will be automatically created in the Adroit database.

The Adroit OEE has been setup to automatically capture various data and calculations on the software onto an Adroit database that is created on Microsoft SQL Server. The tables that are created on the Adroit SQL Server database on which the data is stored are as follows:

- OEE_Adv_Areas
- OEE_Adv_GroupInfo
- OEE_Adv_CategoryInfo
- OEE_Adv_DelayCategory
- OEE_Adv_MachineSetup
- OEE_Adv_ProductList
- OEE_Adv_WorksOrders
- OEE_Adv_ShiftHistory
- OEE_Adv_Events
- OEE_Adv_DelayEvents
- OEE_Adv_DelayHistory
- OEE_Adv_ShiftAdvance
- OEE_Adv_Machine_User_Bridge
- OEE_Adv_Users

2.1 Areas

The Areas table with the naming convention `dbo.OEE_Adv_Areas` is defined as a **setup** table and is used to store the names of the different areas of a factory. The data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to each entry within the Area table. It is an auto increment index number.	Int	No
ParentIdx	The ParentIdx describes the relationship between the different location IDs	Int	Yes
Description	The description describes the relevant area	varchar(80)	Yes
ActiveStatus	Either one of the following numbers/results can appear in this column: 0 – end user can see the data (active data) 1 – end user cannot see the data (data seems deleted, but still available in database for reporting purposes)	Bit	Yes

*Idx is a primary key

2.2 GroupInfo

The GroupInfo table with the naming convention `dbo.OEE_Adv_GroupInfo` is used to store the groupings of the different fault reasons that should be logged by the operator. The data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to a group of fault reasons. It is an auto increment index number	Int	No
Description	Name of the different reason groups	varchar(80)	Yes
Color	Unique color assigned to identify the group	Varchar(20)	Yes
ActiveStatus	Either one of the following numbers/results can appear in this column: 0 – end user can see the data (active data) 1 – end user cannot see the data (data seems deleted, but still available in database for reporting purposes)	Bit	Yes

*Idx is a primary key

2.3 CategoryInfo

The CategoryInfo table with the naming convention dbo.OEE_Adv_CategoryInfo is used to store the actual reasons under each grouping found in the GroupInfo table that the operator selects. The data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to a fault reason. It is an auto increment index number	Int	No
GroupID	Index or unique ID number from the GroupInfo idx column that a reason falls under	Int	No
Category	The actual reason for the fault	Varchar(80)	Yes
OEEType	Type of OEE factor that is affected by the fault i.e. Availability	Varchar(80)	Yes
ActiveStatus	Either one of the following numbers/results can appear in this column: 0 – end user can see the data (active data) 1 – end user cannot see the data (data seems deleted, but still available in database for reporting purposes)	Bit	Yes

*Idx is a primary key

2.4 DelayCategory

The DelayCategory table with the naming convention dbo.OEE_Adv_DelayCategory stores data that is setup for the operator to make auto selections of the faults on the operator front end screen. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to faults that are auto selected. It is an auto increment index number	Int	No
MachineIdx	Machine no. on which the fault code is applicable	Int	Yes
UserGroup	The group to which the user that recorded the delay reasons belongs to	Varchar(80)	Yes
CategoryInfoIdx	Index or unique ID number from the idx column in the CategoryInfo table that a fault falls under	Int	Yes
AreaIdx	Index or unique ID number from the Idx column in the Area table of which area that the fault of the machine belongs to	Int	Yes
Tag	When using auto reasoning, this column gives the tags from Adroit that is applicable	Varchar(80)	Yes
TagDescription	Gives a description of the Tag	Varchar(80)	Yes
TagValueTestType	Value of the tag indicating the fault code from the field. A method of numbering the tag	Varchar(80)	Yes
DelayTypeHeader	Manual reasons that the user will select	Varchar(80)	Yes
OEEType	Type of OEE factor that is affected by the fault of the machine i.e. Availability	Varchar(80)	Yes
ActiveStatus	Either one of the following numbers/results can appear in this column: 0 – end user can see the data (active data) 1 – end user cannot see the data (data seems deleted, but still available in database for reporting purposes)	Bit	Yes

*Idx is a primary key

2.5 Machine Setup

The machine setups will be automatically created by the OEE_Adv agents. The user needs to update the missing information in this table. Under no circumstance can a machine setup row be deleted e.g. if machine 10 is created with a machineidx 1 in the machine setup table, it cannot be changed to a different idx. The reason being that the links is being established from this table to various other tables. The MachineSetup table with the naming convention dbo.OEE_Adv_MachineSetup stores data that concerning the machine capabilities and performances that is setup. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to a machine. It is an auto increment index number	Int	No
MachineName	The actual name of a machine	Varchar(80)	Yes
MachineDescription	More detailed name of the machine	Varchar(80)	Yes
Factory	The name of the factory to which the machine belongs to	Varchar(80)	Yes
AreaId	Index or unique ID number from the Idx column in the Area table of which area that the fault of the machine belongs to	Int	No
Line	The name of the line where a product is produced on the specified machine	Varchar(80)	Yes
RunRateMax	The maximum number of products that the specified machine can produce in a specified time (in seconds)	Float	Yes
RunFactor	This is a de-rating factor that is given to the machine if the machine is not running at its maximum capacity. If the run factor is 1, then machine running at 100% capacity If the run factor is at 0.5, then the machine is running at 50% capacity	Float	Yes
RunRateActual	This gives the actual products produced after run factor is considered. MaxRunRate X RunFactor	*Computed column specification: ([RunRateMax]*[RunFactor])	Yes
RunRatePeriod	The specified time (in seconds) for the RunRateMax	Float	Yes
ActiveStatus	Either one of the following numbers/results can appear in this column: 0 – end user can see the data (active data) 1 – end user cannot see the data (data seems deleted, but still available in database for reporting purposes)	Bit	Yes

*Idx is a primary key

2.6 ProductList

The ProductList table with the naming convention dbo.OEE_Adv_ProductList stores data regarding all the products that can be produced on all the machines. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to a specific product that is produced. It is an auto increment index number	Int	No
ProductCode	Unique code assigned to products produced	Varchar(80)	Yes
ERPNumber	Unique code assigned to products produced that is generated in an ERP system	Varchar(80)	Yes
ProductDescription	Gives a description of the actions executed for each of the products produced	Varchar(80)	Yes
MachineName	The name of the machine that is producing the selected product	Varchar(80)	Yes
TimePerItem	The predetermined or expected time to produce one item	Int	Yes
RunFactor	This is a de-rating factor that is given to the product if any reason exists that more time is needed to produce a product. If the run factor is 1, then 100% chance of product being produced on time If the run factor is at 0.5, then 50% chance of product being produced on time	Float	Yes
RateLossLimit	The number of products to be lost within a period to indicate slow running	Float	Yes
PackingMultiplier	Number of products being packed onto a crate/pallet	Float	Yes
QtyOperatorsRequired	The number of operators that will be working on a machine for a specific worksorder	Int	Yes
ActualProductionTime	Actual time that is taken to produce one product after taking into account the RunFactor	*Computed column specification: (((TimePerItem]-[TimePerItem]*[RunFactor])) +[TimePerItem])	Yes
ActiveStatus	Either one of the following numbers/results can appear in this column: 0 – end user can see the data (active data) 1 – end user cannot see the data (data seems deleted, but still available in database for reporting purposes)	Bit	Yes
ToolSetupTime	The time needed to setup a tool on a machine for a specific product	Int	Yes

*Idx is a primary key

2.7 Works Orders

The Works Orders table with the naming convention `dbo.OEE_Adv_WorksOrders` stores data pertaining to all works orders. This table takes on two functions. It can be described as both a history and setup file. A setup file takes in new works orders loaded and shows the history of events with regard to the order. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to a specific works order that is loaded. It is an auto increment index number	Int	No
MachineIdx	Index or unique ID number from the Idx column in the MachineSetup table of which machine the worksorder will be produced on	Int	Yes
WorksOrderNumber	The actual works order number (customers works order numbers)	Varchar(24)	Yes
ProductIdx	Index or unique ID number from the idx column in the ProductList table of which product is being produced for a specific works order	Int	Yes
ProductCode	Unique code assigned to products produced from the ProductList table	Varchar(80)	Yes
ProductDescription	Gives a description of the products produced	Varchar(80)	Yes
ERPNumber	Unique ERP number assigned to products produced from the ProductList table	Varchar(80)	Yes
QtyPlanned	The quantity of products that are planned to be produced for a specified works order	Float	Yes
QtyReworked	The number of products that is reworked during and after production	Float	Yes
QtyScrapped	The number of products that was rejected during and after being reworked	Float	Yes
QtyProduced	The total number of products produced, including reworked products	Float	Yes
PlannedStartDate	The date on which production is planned to start for a specified works order, entered by production planner	Date	Yes
ActualStartDate	Actual date of when production of a specified works order starts, entered automatically from system	Date	Yes
ActualStopDate	Actual date of when production of a specified works order ends, entered automatically from system	Date	Yes
ActualStartTime	Actual time of when production of a specified works order starts, entered automatically from system	Time(7)	Yes
ActualStopTime	Actual time of when production of a specified works order ends, entered automatically from system	Time(7)	Yes

Operator	The login name of the operator logged onto the OEE system	Varchar(20)	Yes
ShiftNumber	The shift in which the operator was working on the specified works order, obtained from ShiftSetup table	Int	Yes
TimePerItem	The predetermined or expected time to produce one item as from ProductList table	Float	Yes
TotalPlannedProductionTime	TimePerItem X QtyPlanned	*Computed column specification: ([QtyPlanned]*[TimePerItem])	Yes
QtyOperatorsPresent	The number of operators that will be working on a machine for a specific worksorder	Int	Yes
Quality	OEE component calculated and given as a percentage	Float	Yes
Performance	OEE component calculated and given as a percentage	Float	Yes
Availability	OEE component calculated and given as a percentage	Float	Yes
OEE	Quality X Performance X Availability = OEE	Float	Yes
Line	The name of the line where production occurred	Varchar(80)	Yes
PlannedPriority	The order in which worksorders are prioritized and produced	Int	Yes
ToolSetup	This is to indicate if an order is a normal works order (production job/order) or a tool setup order (tool change): 0 – Normal works order 1 – Tool setup order	Bit	Yes
ProductionStatus	Different letters are used to identify different stages of production: P – Planned (Input by production planner) X – Deleted (Input by production planner) S – Started (Input automatically by system) C – Completed (Input automatically by system)	Varchar(1)	Yes
ToolSetupTime	The allocated time for the tool setup before a delay occurs	Int	Yes

*Idx is a primary key

2.8 Shift_Setup

The ShiftAdvanceSetup table with the naming convention dbo.OEE_Adv_ShiftAdvanceSetup stores data regarding all the different available shifts that are created. There can be more than one shift created depending on the shift schedule of the factory. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to a specific shift. It is an auto increment index number	Int	No
DayOfWeek	Different numbers are used for the different days of the week: 0 – All days of the week 1-7 represents Sunday till Saturday respectively	Int	Yes
ShiftNumber	The shift number in a day	Int	Yes
Description	Gives a description of the shift	Varchar(80)	Yes
Date	This is a date whereby the shift expires, for housekeeping purposes	Date	Yes
TimeStart	The time of when the shift starts	Time(0)	Yes
TimeEnd	The time of when the shift ends	Time(0)	Yes
Busy	Indicates the reasons for no productions, some examples are tea time, lunch, planned stoppages, meetings etc.	Int	Yes

*Idx is a primary key

2.9 Shift History

The Shift History table with the naming convention `dbo.OEE_Adv_ShiftHistory` stores data regarding all the different shifts that were previously used. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
ShiftHistoryIdx	Index or unique ID number assigned to a specific shift record. It is an auto increment index number	Int	No
MachineIdx	From idx column in the MachineSetup table of the machine that is used to produce the works order	Int	No
ShiftNumber	The shift number for the current record	Int	No
ShiftDescription	Gives a description of the shift for the current record	Varchar(80)	Yes
Date	This is the date of the current record entered	Date	No
StartTime	The time of when the shift started for the current record	Time(0)	No
EndTime	The time of when the shift ended for the current record	Time(0)	No
Busy	0 – This shift entry is used in OEE calculations 1 – This shift entry is not used in OEE calculations	Int	No

*MachineIdx, ShiftNumber, Date, StartTime and EndTime are all primary keys

2.10 Events

The Events table with the naming convention dbo.OEE_Adv_Events stores data regarding all the events that occurred from start to finish of a works order. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to an event that occurs. It is an auto increment index no.	Int	No
MachineIdx	Index or unique ID number from the idx column in the MachineSetup table	Int	Yes
Startdt	Block period start date time. 5 to 10-min blocks.	DateTime	Yes
Enddt	Block period end date time	DateTime	Yes
ProductIdx	Index or unique ID number from the idx column in the ProductList table	Int	Yes
OrderIdx	Index or unique ID number from the idx column in the Worksorders table	Int	Yes
ShiftHistoryIdx	Index or unique ID number from the idx column in the ShiftHistory table	Int	Yes
TheoreticalUnitsPerMinute	Theoretical Units Per Minute for block period (free format)	Float	Yes
TargetPerMinute	Target Per Minute for block period (free format)	Float	Yes
ActualUnitsPerMinute	Actual Units Per Min for block period, from a tag	Float	Yes
ActualGood	Actual good for block period, if available from a ActualGood tag	Float	Yes
ActualBad	Actual bad for block period, if available from a ActualBad tag	Float	Yes
ReworkGood	Actual rework good units, if available from a ReworkGood tag	Float	Yes
ReworkBad	Actual rework bad units, if available from a ReworkBad tag	Float	Yes
Scheduledtime	Actual schedule time, calculated from 3rd party query, in seconds	Int	Yes
Runtime	Actual run time, end-start time, in seconds	Int	Yes
Availability	Availability loss for block period, calculated from 3rd party query, in seconds	Float	Yes
Performance	Performance loss for block period, calculated from 3rd party query, in seconds	Float	Yes
Quality	Quality loss for block period, calculated from 3rd party query, in seconds	Float	Yes
SystemNotScheduledLoss	Machine not scheduled for block period, calculated from 3rd party query, in seconds	Float	Yes
UpstreamDownstreamLoss	Upstream (1), downstream (2) loss, default 0	Float	Yes
SlowRun	A value of 1 denotes production rate was less than the rate loss limit value	Bit	Yes

*Idx is a primary key

2.11 DelayEvents

The Delay Events table with the naming convention dbo.OEE_Adv_DelayEvents stores data regarding all delays that occur in the machine. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Index or unique ID number assigned to an event that occurs. It is an auto increment index number	Int	No
MachineIdx	Index or unique ID number from the idx column in the MachineSetup table	Int	Yes
Startdt	Start time of delay	DateTime	Yes
Enddt	End time of delay. Can be a NULL.	DateTime	Yes
Duration	Delay duration in seconds	Int	Yes
ProductIdx	Index or unique ID number from the idx column in the ProductList table	Int	Yes
OrderIdx	Index or unique ID number from the idx column in the Worksorders table	Int	Yes
ShiftHistoryIdx	Index or unique ID number from the idx column in the ShiftHistory table	Int	Yes
Category1	Delay category 1 (auto category as detected by tag value)	Varchar(80)	Yes
Category2	Delay category 2 (selected by operator)	Varchar(80)	Yes
Notes	User notes	Text	Yes
OEEType	OEE type loss – Entered by operator as Availability (1), performance (2), quality (3) or machine not scheduled (4). Default value 0	Varchar(80)	Yes
OperatorLogon	Name of operator	Varchar(20)	Yes

*Idx is a primary key

2.12 DelayHistory

The Delay History table with the naming convention `dbo.OEE_Adv_DelayHistory` stores data regarding the history of the all delays that occur in the machine. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Auto increment index number	Int	No
MachineIdx	Index or unique ID number from the idx column in the MachineSetup table	Int	Yes
Startdt	Delay start date time	DateTime	Yes
Enddt	Delay end date time	DateTime	Yes
Duration	Duration of delay	Int	Yes
Processed	Record is processed	Int	Yes

*Idx is a primary key

2.13 Users

The Users table with the naming convention `dbo.OEE_Adv_Users` stores data regarding all the users of the OEE system. The information of these users is automatically retrieved from the local machine users after the OEE_Adv agent has been loaded. This is updated regularly to remove users that were deleted from the local users in windows. It will also add new users regularly. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Auto increment index number	Int	No
UserName	Login name of the users	Varchar(50)	Yes

*Idx is a primary key

2.14 Machine User Bridge

The machine user bridge table with the naming convention `dbo.OEE_Adv_Machine_User_Bridge` stores data regarding all the machines that users have access to. This table assists with the security permissions on the OEE per machine. Data that is stored in the different columns of this table are described as follows:

Column Name	Description	Data Type	Allow Nulls
Idx	Auto increment index number	Int	No
Machine_idx	The machine that a user has permission to log on to. This information is taken out of the idx column in the MachineSetup table.	Int	Yes
User_idx	The user that has permission to operate on the relevant machine. This information is taken out of the idx column in the Users table	Int	Yes

*Idx is a primary key

Adroit Enterprise OEE

OEE ADV Agent Design Specifications

1 Introduction

This document will not outline the theory but will simply concentrate on the design of the OEE_ADV agent and the underlying tables.

2 SHIFT_ADV Agent

The OEE_ADV Agent requires a new Shift Agent called SHIFT_ADV. Unlike the legacy SHIFT Agent, this Agent will keep its configuration in SQL as opposed to the WGP file.

2.1 Table Requirements

Each SHIFT_ADV Agent will have its own configuration table. The table name will be the same name as the Shift Agent prefixed by SHIFT_ADV_. The table looks as follows:

Column name	Column type	Description
Idx	Int	Auto increment index number
DayOfWeek	Int	a number for 1 to 7 (Mon to Sun)
ShiftNumber	Int	the shift number being described for a particular day
Description	Text	a suitable description for this entry
Date	Date	optional date entry
TimeStart	Datetime	the start time of the period
TimeEnd	Datetime	the end time of the period
Busy	Boolean	Work period i.e. not a free period

A sample of a shift configuration is as follows:

DayOfWeek	ShiftNumber	Description	Date	TimeStart	TimeEnd	Busy
1	1	Mid-morning shift		06:00	09:00	X
1	1	Morning tea		09:00	09:15	
1	1	Late morning shift		09:15	12h00	X
1	1	Lunch		12h00	12h30	
1	1	Early afternoon shift		12h30	14h00	X
1	2	Mid-afternoon shift		14:00	17:00	X
1	2	Afternoon tea		17:00	17:15	
1	2	Late afternoon shift		17:15	20h00	X
1	2	Dinner		20h00	20h30	
1	2	Early evening shift		20h30	22h00	X
1	3	Late evening shift		22h00	01:00	X
1	3	Early morning tea		01:00	01:15	
1	3	Early morning shift		01:15	03h00	X
1	3	Early afternoon shift		03h30	06h00	X
	1	Company meeting	2017/01/17	13h00	13h30	

Typically, shifts will not have a date specified and such records are generic and will apply throughout the year according to the current day of week value. However, exceptions need to be catered for and this is where the date column is used as shown in record idx 16 above. This is called an **exclusion record**.

- **Exclusion records** may have their busy field checked if it makes sense to do so.
- **Exclusion records** are expected to contain the correct shift number

The shift agent will always first check for a matching **exclusion record** before attempting to find a matching day of week entry.

2.2 Shift Agent Slots

The shift agent will contain two output slots

1. ShiftIndex – Index of the record (current record) found to match the current day of week and time of day
2. ShiftNumber – Shift number of the current record
3. ShiftBusy – Denotes whether the current record is a work period (1) or a free period (0)

The following slots are available in the shift agent:

Slot name	Slot type	Slot description
connection	Varstring	An OLE DB connection string for storage of shift period information i.e. SHIFT_ADV_* tables
lastError	VarString	Last SQL transaction error
lastErrorQuery	VarString	Last SQL transaction causing error
operation	RawBytes	for internal use
records	List	A representation of the records found in the SQL table
shiftBusy	Boolean	Denotes whether the current shift period record is a work period (1) or a free period (0)
shiftDescription	String	Current shift description
shiftEnd	Time	End time of currently active shift period
shiftIndex	Int	The index of the matching shift period record
shiftInfo	String	Current shift information string (in the format "2010/03/17 Shift 2, 08:00 hours from 10:00 to 18:00")
shiftNumber	Integer	The current shift number
shiftRecord	RawBytes	A copy of the matching table entry for the current shift
shiftStartTime	Time	Start time of currently active shift period

2.3 Shift Agent status slots

Status name	Status description
connected	Pulsed at the end of every shift to allow interested parties to perform shift end operations
connectionerror	OleDb connection string is invalid OR OleDb datasource is non-existent
Transactionerror	OleDb connection string is invalid OR OleDb datasource is non-existent
Shiftendpulse	Pulsed at the end of every shift to allow interested parties to perform shift end operations
shiftinvalid	Shift period for current time not found

3 OEE_ADV Operation

An OEE_ADV Agent instance will represent a machine within the process.

3.1 Table Requirements

The new OEE_ADV Agent requires a number of tables for operation. Certain of these tables are required by the Agent for read/write operations, but the Agent is also responsible for creating all tables that are required by the solution as a whole. All tables are listed hereunder.

3.1.1 Delay Category Table

The delay structure is defined for each system and it is based on optional parent/child relation. The table describes each field for the delay category (OEE_Adv_DelayCategory) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
MachineIdx	Int	Machine index – cross referenced from a Machine ID table
UserGroup	Int	User group for filtered views of record entries
CategoryInfoIdx	Int	Category Info ID
AreaIdx	Int	Area ID
Tag	VarChar(80)	Tag whose value will start/end a delay
TagDescription	VarChar(80)	Tag Description
TagValueTestType	VarChar(80)	The value to be tested for that will demote a delay is in effect, typically 0 or 1 or any numerical value. It is possible that we may extend this in the future to allow a more complex test e.g. =1, =0, >1, <1 etc
DelayTypeHeader	VarChar(80)	The name that needs to be displayed for the category in any grid or delay edit screens
OEEType	Int	OEE loss type index – Availability (1), performance (2), quality (3) or machine not scheduled (4)
ActiveStatus	bit	Entry is active

3.1.2 Shift History Table

For every shift change, a new shift record will be added to this table, containing the shift configuration as recorded in the shift table. The unique ShiftHistoryIdx field of the newly added record is the ShiftHistoryIdx to be used in all other tables that refer to ShiftHistoryIdx.

The table describes each field for the Shift History table (OEE_Adv_ShiftHistory):

Column name	Column type	Description
ShiftHistoryIdx	Int	Auto increment index number
MachineIdx	Int	Machine index – cross referenced from a Machine ID table
ShiftNumber	Int	the shift number being completed
ShiftDescription	Varchar(80)	the description of the shift being completed
Date	date	the date on which the shift commenced
StartTime	time(0)	the start time of the shift
EndTime	time(0)	the end time of the shift
Busy	Int	Shift is not available for production

3.1.3 Delay Event Table

The table describes each field for the delay event data (OEE_Adv_DelayEvents) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
MachineIdx	Int	Machine index – cross referenced from a Machine ID table
Startdt	Datetime	Start time of delay
Enddt	Datetime	End time of delay. Can be a NULL.
Duration	Int	Delay duration in seconds
ProductIdx	Int	Product produced on the machine if available from OEE_ADV agent
OrderIdx	Int	Order on the current machine if available from OEE_ADV agent
ShiftHistoryIdx	Int	As available from OEE_ADV agent
Category1	Int	Delay category 1 (auto category as detected by tag value)
Category2	Int	Delay category 2 (selected by operator)
Notes	Text	User notes
OEEType	VarChar(80)	OEE type loss – Entered by operator as Availability (1), performance (2), quality (3) or machine not scheduled (4). Default value 0
OperatorLogon	VarChar(20)	Operator name

Each time a delay occurs in the machine, whether tag driven or manually created, a new record will be inserted without an end date. After the delay has ended, the machine will update the end date. The user can then classify the record as required.

Each time a delay is modified a delay event audit log will be saved – This is presumed to be under the control of the client NOT the agent because the client is editing the record.

The following will stop the current delay and start a new one if a delay is active:

- New shift
- Order change
- Delay category change

The event data can be edited afterwards and may have an impact on the OEE calculation. This depends on the OEE type for the selected delay. If a delay is less than a predefined value (shortStopDelay) for the machine, it will be marked as short delay.

Short delays will also be captured in the same structure but will be marked as a short delay, depending on the configuration data. These delays can be edited if required. This delay time will form part of the configuration of the machine in the delay event table.

Delays caused from upstream or downstream, must have no influence on the calculated OEE. This will be an input into the KPI Agent. This will only influence the available time for production.

3.1.4 Delay History Table

For any history changes on the delay data (typically OEEType) the machine requires to modify the history data on the OEE side. Therefore each time a delay record is edited, a record will be inserted into the Delay History table. A 3rd party SQL job will then process these records to fix up the event data in the time period.

The table describes each field for the Delay history table (OEE_Adv_DelayHistory):

Column name	Column type	Description
Idx	Int	Auto increment index number
MachineIdx	Int	Machine index – cross referenced from a Machine ID table
Startdt	datetime	Delay start date time
Enddt	datetime	Delay end date time
Duration	Int	Duration of delay
Processed	Boolean	Record is processed

3.1.5 OEE Events Table

Event OEE data block can be from 1 to 60 minutes. A data block will always end at the end of a minute synchronised to the hour. In other words if we are recording 10 minute data blocks and a delay ends at 14h07:33, a new OEE data block will be created at 14h07:33 and will end at 14h10:00

Each time a new shift starts, or a new delay begins, the machine will end the previous event OEE data block and start a new one.

The table describes each field for the OEE event data (OEE_Adv_Events) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
MachineIdx	Int	Machine index – cross referenced from a Machine ID table
Startdt	Datetime	Block start date time. 5 to 10-minute blocks. Too long and we cannot draw nice graphs.
Enddt	Datetime	Block end date time
ProductIdx	Int	Product produced on the machine if available from OEE_ADV agent
OrderIdx	Int	Order on the current machine if available from OEE_ADV agent
ShiftHistoryIdx	Int	As available from OEE_ADV agent
TheoreticalUnitsPerMinute	Float	Theoretical Units Per Minute for block period (free format)
TargetPerMinute	Float	Target Per Minute for block period (free format)
ActualUnitsPerMinute	Float	Actual Units Per Minute for block period, from a tag
ActualGood	Float	Actual good for block period, if available from a ActualGood tag
ActualBad	Float	Actual bad for block period, if available from a ActualBad tag
ReworkGood	Float	Actual rework good units, if available from a ReworkGood tag
ReworkBad	Float	Actual rework bad units, if available from a ReworkBad tag
Scheduledtime	Int	Actual schedule time, calculated from 3rd party query, in seconds
Runtime	Int	Actual run time, end-start time, in seconds; calculated automatically as (datediff(second,[startdt],[enddt]))
Availability	Float	Availability loss for block period, calculated from 3rd party query, in seconds
Performance	Float	Performance loss for block period, calculated from 3rd party query, in seconds
Quality	Float	Quality loss for block period, calculated from 3rd party query, in seconds
SystemNotScheduledLoss	Float	Machine not scheduled for block period, calculated from 3rd party query, in seconds
UpstreamDownstreamLoss	Float	Upstream (1), downstream (2) loss, default 0
SlowRun	Int	A value of 1 denotes production rate was less than the rate loss limit value

3.1.6 Machine Setup Table

The table describes each field required for defining a machine (OEE_Adv_MachineSetup):

Column name	Column type	Description
Idx	Int	Auto increment index number
MachineName	VarChar(80)	Machine name
MachineDescription	VarChar(80)	Machine description
Factory	VarChar(80)	Factory to which machine belongs
AreaId	Int	Tag whose value will start/end a delay
Line	VarChar(80)	Name of line
RunRateMax	Float	Maximum number of items per period
RunRatePeriod	Float	Period (in secs) for which RunRate rate applies
RunFactor	Float	Factor to be applied to maximum run rate (0-1)
RunRateActual	Float	RunRateMax * RunFactor calculated automatically as ([RunRateMax]*[RunFactor])
ActiveStatus	bit	Entry is active

3.1.7 Product List Table

The table describes each field for the product list (OEE_Adv_ProductList) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
ProductCode	VarChar(80)	Machine index – cross referenced from a Machine ID table
ERPNumber	VarChar(80)	ERP number related to product
ProductDescription	VarChar(80)	Category Info ID
MachineName	VarChar(80)	Area ID
TimePerItem	Int	Time to produce one item in seconds - default 1000
RunFactor	Float	Default 1
RateLossLimit	Float	Default 0
PackingMultiplier	Float	
QtyOperatorsRequired	Int	Default 1
ActualProductionTime	Int	([TimePerItem]-([TimePerItem]*[RunFactor])+[TimePerItem])
ActiveStatus	bit	Entry is active

3.1.8 Users Table

The table describes each field for the users (OEE_Adv_Users) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
UserName	VarChar(50)	User name
FullName	VarChar(100)	Full name of user
Description	VarChar(100)	Description of user

3.1.9 Machine/User Bridge User

The table describes each field for the delay machine/user bridge (OEE_Adv_Machine_User_Bridge) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
Machine_Idx	Int	Machine index – cross referenced from a Machine ID table
User_Idx	Int	From user table

3.1.10 Group Info Table

The table describes each field for the group information (OEE_Adv_GroupInfo) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
Description	Varchar(80)	Gropu description
Color	Varchar(20)	Color assigned to group
ActiveStatus	Bit	Entry is active – default 0

3.1.11 Category Info Table

The table describes each field for the category information (OEE_Adv_CategoryInfo) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
GroupId	Int	From group info table
Category	VarChar(80)	Category description
OEEType	VarChar(80)	
ActiveStatus	Bit	Entry is active – default 0

3.1.12 Areas Table

The table describes each field for the areas (OEE_Adv_Areas) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
ParentIdx	Int	Parent area index
Description	Int	Description of area
ActiveStatus	bit	Entry is active – default 0

3.1.13 Works Orders Table

The table describes each field for the work orders (OEE_Adv_WorkOrders) table:

Column name	Column type	Description
Idx	Int	Auto increment index number
MachineIdx	Int	Machine index for which order applies
WorksOrderNumber	VarChar(24)	Works order name
ProductIdx	Int	From product list table
ProductCode	VarChar(80)	From product list table
ProductDescription	VarChar(80)	From product list table
ERPNumber	VarChar(80)	ERP number that applies
QtyPlanned	Float	No of items to produce
QtyReworked	Float	No of items reworked
QtyScrapped	Float	No of items scrapped – from Adroit
QtyProduced	Float	No of items produced – from Adroit
PlannedStartDate	Date	Planned start date – from Adroit
ActualStartDate	Date	Actual start date – from Adroit
ActualStopDate	Date	Actual stop date – from Adroit
ActualStartTime	Time(7)	Actual start time – from Adroit
ActualStopTime	Time(7)	Actual stop time – from Adroit
Operator	VarChar(20)	Operator – from Adroit
ShiftNumber	Int	Shift number – from Adroit
TimePerItem	Float	From machine setup table
TotalPlannedProductionTime	Float	[QtyPlanned] * [TimePerItem] calculated as ([QtyPlanned]*[TimePerItem])
QtyOperatorsPresent	Int	Number of operators required for order
Quality	Float	From Adroit
Performance	Float	From Adroit
Availability	Float	From Adroit

OEE	Float	From Adroit
Line	VarChar(80)	From machine setup table
PlannedPriority	Int	Priority of order
ToolSetup	Bit	Order assigned for tool setup
ProductionStatus	VarChar(1)	P=Planned, S=Started, C=Completed, X=Cancelled

3.2 OEE_ADV Agent Operation

The OEE_ADV Agent is designed to record OEE blocks of data and delays to the database.

The size of the data blocks is governed by the value (in minutes) of the blockRate slot and blocks will always end (and start) at the beginning of a new minute. The end of the first block is always synchronised to the top of the hour which means that a 10 minute block sample will always end at the next 10 minute interval past the hour. In other words if a line becomes available at 10h12:33, the block will commence at 10h12:33 and will end at 10h20:00.

The following applies:

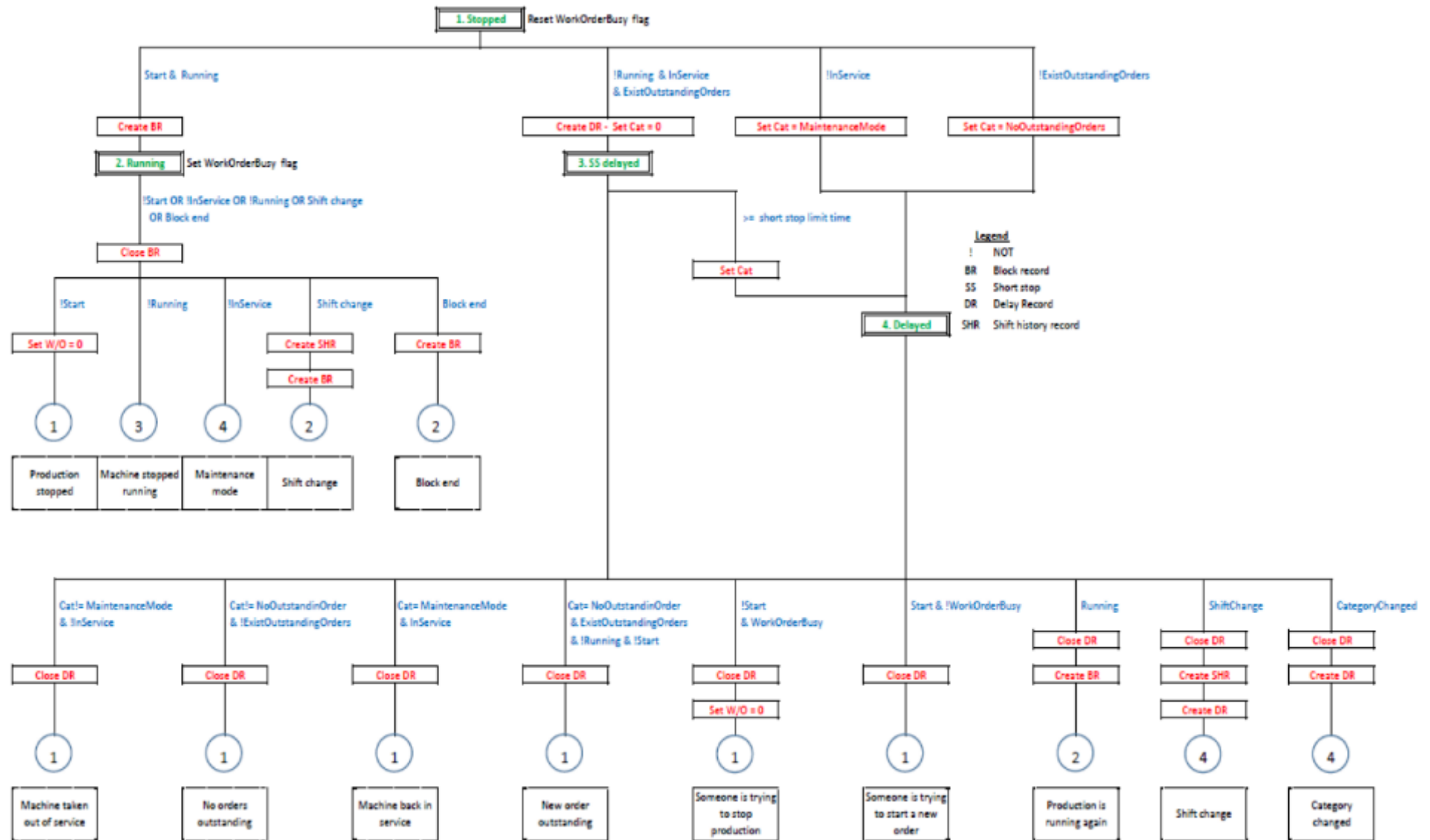
1. Once the start slot is TRUE (should only be made TRUE if the enable method is not equal to 'On batch end' OR there are no reasons outstanding in the delay events table) the OEE agent will begin creating block records or delay records, depending on the state of the Running slot respectively. If the running slots is TRUE, the agent will commence record block record events otherwise it will record delay events beginning with a short stop delay
2. When the line starts running, the Agent adds a block record to the table. This is known as the **current block record**. The Startdt field will contain the current time and the machine, product, order and ShiftNumber fields will be appropriately populated from the respective Agent slots
3. When the block ends, the **current block record** will be closed. In other words the **current block record** will have its Enddt field updated with the current time, and the actual and rework count fields will be calculated from the Agent slots and the **current block record** will be updated. A new **current block record** will be immediately created with its Startdt field equal to the current time.
4. Should there be a shift number or order change, the **current block record** will be closed, and a new **current block record** will be created.
5. Should the running signal become FALSE, a block will be immediately ended, and a new **current delay event record** will be created as short stop delay. The category ID for this new delay will be set to 1 which denotes a short stop delay. The Agent's The Startdt field will contain the current time and the machine, product, order and ShiftNumber fields will be appropriately populated from the respective agent slots
6. Should the short stop delay exceed the short stop limit time the delay category ID will change to 0 denoting an "unconfigured" delay category. Any changes to the Agent's delayCategory slot value thereafter will be used as the delay category for this delay.
7. Any subsequent changes to the Agent's delayCategory slot value will cause a new **current delay event record** to be created
8. When the running signal becomes TRUE again, the **current delay event** will be closed. In other words the **current delay event** will have its Enddt field updated with the current time, the duration field will be calculated. Depending on the enable method:
 - a. 'Always' or 'On batch end' - A new **current block record** will be created with its Startdt field equal to the current time.
 - b. 'Immediate' – Only if there are no reasons outstanding in the delay events table will a new **current block record** will be created with its Startdt field equal to the current time.

9. Should the available signal become FALSE, any **current block record** or **current delay event** will be closed, and nothing will happen until the available signal comes on again.
10. At midnight a current block record will be closed and a new one created automatically as long as event block rate is divisible into 60 i.e 1, 2, 3, 4, 5, 6, 10, 12, 15, 20 or 30 minutes

A **current block record** and a **current delay event** will never coexist. The record that does exist will depend only on the value of the running signal.

The above engine flow is shown in the flow diagram overleaf:

OEE Engine Flow Chart



3.2.1 Block Record OEE Calculations

Every block record will have the OEE recorded for the block. These are calculated as

Performance = the sum of ActualGood, ActualBad, ReworkGood and ReworkBad / Practical Machine Rate

Availability = 100% because block records are all about being available.

Quality = the sum of ActualGood and ReworkGood / the sum of ActualGood and ActualBad

3.2.2 OEE_ADV Agent Slots

The following slots are available in the OEE_ADV agent:

Slot name	Slot type	Slot description
actualBadCount	Integer	The actual bad count
actualBadCountTag	Tagname	Optional tag denoting the count of bad products leaving the line
actualGoodCount	Integer	The actual good count – must be scanned or value read from actualGoodCountTag
actualGoodCountTag	Tagname	Tag denoting the count of good products leaving the line
actualUnitsPerMin	Integer	The actual units per minute count – will be calculated internally if actualUnitsPerMinTag not used
actualUnitsPerMinTag	Tagname	Optional tag denoting the actual units per minute count
availability	Real	Availability factor for current order
inService	Boolean	Machine is available for production
inServiceTag	Tagname	Optional tag denoting machine is available for production
blockRate	Int	The number of minutes per OEE event block
Connection	Varstring	An OLE DB connection string for storage of OEE events, delay events and delay history
delayCategory	Integer	Delay category ID
delayCategoryTag	Tagname	Delay category ID
enableMethod	Int	Method for enabling further production 0=Always, 1=End of batch, 2=Immediate
enableOut	Boolean	Production is enabled
engineStep	Int	OEE engine step position 1=idle, 2=running, 3=SS delay, 4=Delay
lastError	VarString	Last SQL transaction error
lastErrorQuery	VarString	Last SQL transaction causing error
machineIdx	Integer	Machine ID
operator	String	Name of operator (set by UI)
orderIdx	Integer	Index of the order number record
orderTag	Tagname	Optional tag denoting the order number being executed on the line
performance	Real	Performance factor for current order
pPerformance	Real	Practical performance value – never equal to 0, otherwise forced to 1
productIdx	Integer	Index of the product record
productTag	Tagname	Optional tag denoting the product on the line

quality	Real	Quality factor for current order
rateLossLimit	Real	Rate loss limit (defines low production rate)
reworkGoodCount	Integer	The count of good reworked products leaving the line
reworkGoodCountTag	Tagname	Optional tag denoting the count of good reworked products leaving the line
reworkBadCount	Integer	The count of bad reworked products leaving the line
reworkBadCountTag	Tagname	Optional tag denoting the count of bad reworked products leaving the line
running	Boolean	Line is running
runningTag	Tagname	Optional tag denoting that line is running
shiftAgent	Tagname	The shift agent that defines the shift pattern for this line
shortStopLimit	Real	Short stop limit time in minutes (default=3)
timeEnd	Time	Projected end time for current order
start	Boolean	Agent/production is started
timeEnd	Real	Projected end time for current order (mins)
timeLeft	Real	Time left for current order (mins)
timeStart	Time	Start time of current order
tPerformance	Real	Theoretical performance value – never equal to 0, otherwise forced to 1
oee	Real	Overall OEE for current order
timeElapsed	Real	Elapsed time for current order (mins)
Epos	Integer	OEE code engine position - for debugging purposes only
inServiceCS	Boolean	In Service cold start value
updateUsers	Boolean	Update users table now
shiftBusy	Boolean	Shift is currently busy (on a break)
toolSetup	Boolean	Currently in tool setup phase as defined by current work order

3.2.3 OEE_ADV Agent Status Slots

Status name	Status description
blockend	Pulsed at the end of every OEE block to allow interested parties to perform block end operations
connected	Pulsed at the end of every shift to allow interested parties to perform shift end operations
connectionerror	OleDb connection string is invalid OR OleDb datasource is non-existent
delayedstep	Machine is delayed
inProduction	In production
Invalid	Machine or product or order
Licensed	Agent licensed to run
noOrders	No orders in work orders found
runningstep	Machine is running
shiftend	Pulsed at the end of every shift to allow interested parties to perform shift end operations
shortstopstep	Machine is in a short stop delay
slowrun	Machine is running slowly
transacterror	OleDb query string is invalid

Adroit Enterprise OEE

Shift Setup

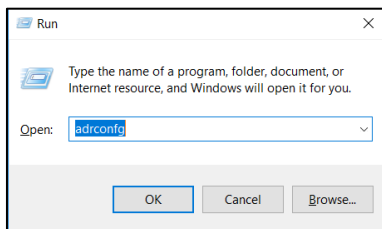
1 Introduction

The purpose of this document is to give step by step instructions on how to create new shifts on Adroit. A shift agent in adroit allows the user to create different shifts that are being used in the business.

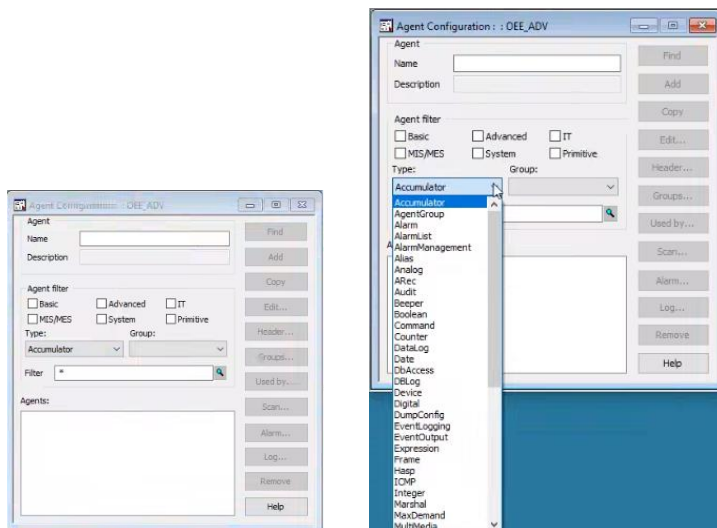
2 Shift Setup

2.1. Creating New Shifts

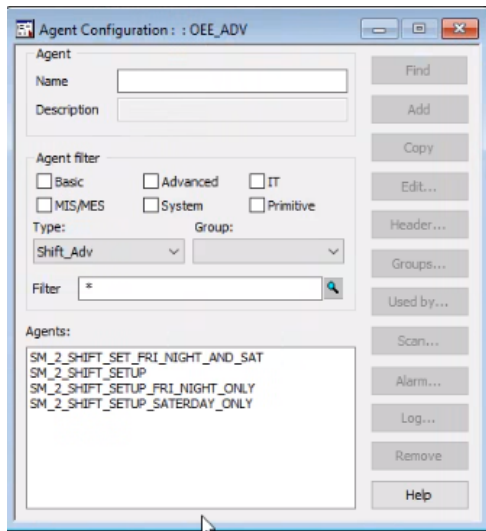
The first step is to open the Adroit configurator. The configurator can be opened via the Adroit designer or a quicker way can be followed by the following path; type 'Run' on windows on the run app type 'adrconfg'.



The agent configurator will now be opened. Click on the 'Type' dropdown and select the 'Shift_Adv' agent type to view and edit existing shift agents or to create a new one.



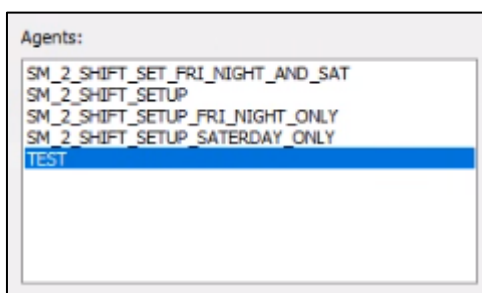
The agents block as seen below displays all the shift agents that have been created already.



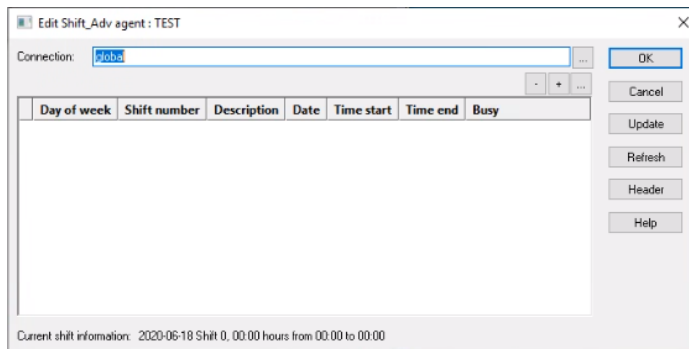
To create a new agent, simply clear the name and description fields, enter a relevant shift name and select 'Add'.



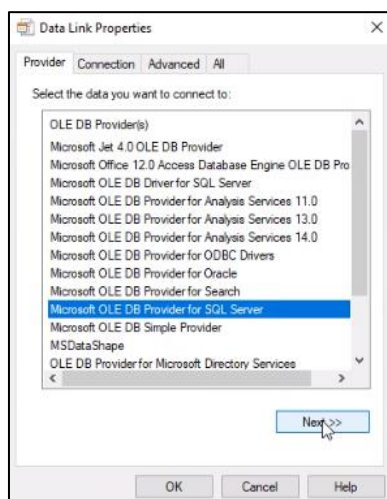
The new 'Test' agent has now been added



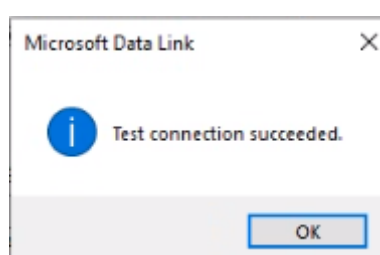
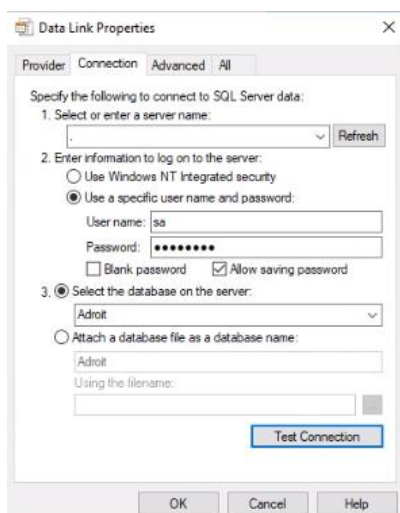
Double click on Test agent in the agents block to edit the shift agent. The edit page will open. Before adding the actual shift, a connection needs to be established. Select the options button for 'Connection'.



Select 'Microsoft OLE DB Provider for SQL Server' then select Next.

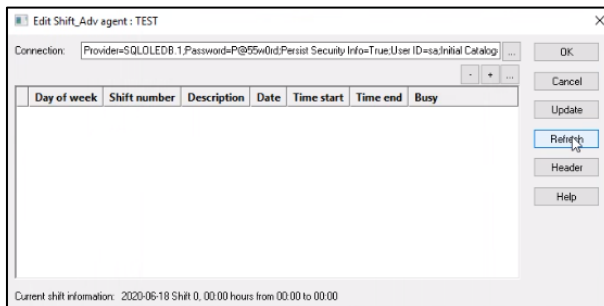


Enter the relevant server name, note that in the example below a dot '.' was used for localhost as the server. In a real case here the actual server where SQL Database belongs to needs to be added. Select the relevant login option, if the security for the database on the SQL server is windows authentication then select the first option. Otherwise select the second option and enter the relevant username and password. If the correct server was entered, all the database options will appear. Select the relevant database and then select 'Test Connection'.



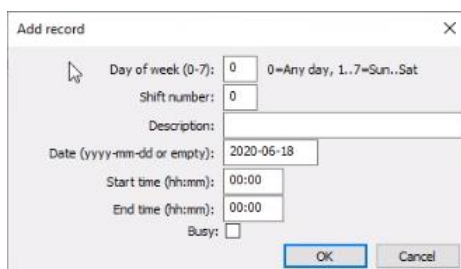
If the test connection has been succeeded, then the connection has been added.

The edit agent page will be opened again. Then select Update then Refresh. Now the shifts can be added. Select the plus button as seen in the image.

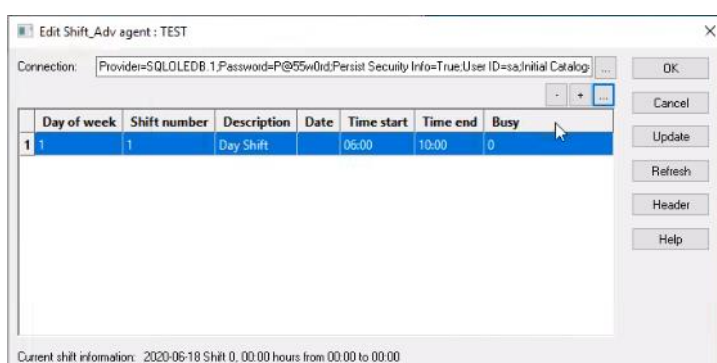


The 'Add record' page will open. The following fields in this section are described as follows:

- Day of the week
 - 0 - any day of the week.
 - 1 - Sunday, 2 – Monday, 3 – Tuesday, 4 – Wednesday, 5 – Thursday, 6 – Friday, 7 - Saturday
- Shift number – a number to assign to the shift e.g. shift 1, shift 2 etc
- Description – A description for the shift e.g. Day Shift, Night Shift or Tea/Lunch Break
- Date – If a date is entered then this shift will only work on the date entered and no other date. For this shift to be recurring then this field should be kept empty.
- Start time – Time when the shift starts
- End time – Time when the shift ends
- Busy – this indicates a shift break, if selected then OEE will not be calculated



Fill in all the fields required for the shift. The minus button is to delete shifts. The plus button is to add a new shift and the edit button is to change/edit the existing shift.



Note that a new shift period is being created for the same day. Note this shift being added is only a 15minute Tea break. The Busy option was selected, so this won't affect the OEE calculation. In this same way, shifts for the remainder of the day must be created.

Add record

Day of week (0-7): 1 0=Any day, 1..7=Sun..Sat

Shift number: 1

Description: Day Shift (Tea Time)

Date (yyyy-mm-dd or empty):

Start time (hh:mm): 10:00

End time (hh:mm): 10:15

Busy: ☒

OK Cancel

2.2. Creating Public Holiday Shifts

Public holidays are obviously a disruption to any production schedule. Hence to avoid incorrect OEE calculations due to unplanned days like public holidays, unique shifts need to be created for these days. These shifts that are created are assigned a date to ensure that they are only valid for the specific date entered. All the hours that are included in the shift of the public holiday must be entered. An example would be if Tuesday is the public holiday and assuming Monday's shift ends Tuesday morning at 06:00, and the next shift to resume production would be Wednesday morning at 07:00, the following hours must be entered for as the public holiday shift:

- Tuesday from 06:00 to 00:00
- Wednesday 00:00 to 07:00

Add record

Day of week (0-7): 2 0=Any day, 1..7=Sun..Sat

Shift number: 1

Description: Public Holiday

Date (yyyy-mm-dd or empty): 2020-06-16

Start time (hh:mm): 06:00

End time (hh:mm): 00:00

Busy: ☒

OK Cancel

Note that these hours can be split up into the different shifts if required (e.g shift 1, 2 and 3 as the image below), but the most important aspect to remember is to tick the Busy checkbox and to enter the correct dates.

Edit Shifts agent: TEST

Connection: Provider=SQLOLEDB;1;Password=P@55w0rd;Persist Security Info=True;User ID=sa;Initial Catalog=...

Day of week	Shift number	Description	Date	Time start	Time end	Busy
2	1	Public Holiday	2020-06-16	06:00	00:00	1
3	1	Public Holiday	2020-06-16	06:00	00:00	1
4	2	Public Holiday	2020-06-16	06:00	00:00	1
5	3	Public Holiday	2020-06-16	06:00	00:00	1
6	1	Public Holiday	2020-06-17	00:00	07:00	1
7	2	Public Holiday	2020-06-17	00:00	07:00	1
8	3	Public Holiday	2020-06-17	00:00	07:00	1

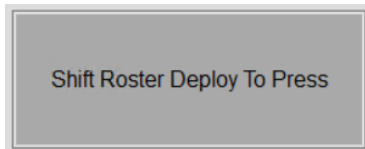
Current shift information: 2020-06-18 Shift 0, 00:00 hours from 00:00 to 00:00

OK Cancel Update Refresh Header Help

The shifts are now added, and the agent can be selected as per required.

2.3. Changing Between Different Shift Setup

This section is for users with access to change the shift setup. If for any reason the current shift setup is compromised, different shift setups have been configured to cater for the change in the current shift. When the user is logged in, select the 'Shift Roster Deploy To Press' button.



All the presses with the current shift setup is viewed in the first column. The column to the right of each row is made available for the user to select a different shift setup if needed per machine. Once selection is complete, select the 'Exit' button at the bottom of the page and the shift setup for the specific machine will be updated.

Manufacturing Shift Roster		
	Current Shift Selection	New Shift Selection
Press 01	SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP
Press 02	SM_2_SHIFT_SETUP	SM_2_SHIFT_SETUP SM_2_SHIFT_SETUP_SATERDAY_ONLY SM_2_SHIFT_SETUP_FRI_NIGHT_ONLY SM_2_SHIFT_SET_FRI_NIGHT_AND_SAT
Press 03	SM_2_SHIFT_SETUP	
Press 04	SM_2_SHIFT_SETUP	
Press 05	SM_2_SHIFT_SETUP	
Press 06	SM_2_SHIFT_SETUP	
Press 07	SM_2_SHIFT_SETUP	
Press 08	SM_2_SHIFT_SETUP	
Press 09	SM_2_SHIFT_SETUP	
Press 10	SM_2_SHIFT_SETUP	
Press 11	SM_2_SHIFT_SETUP	
Press 12	SM_2_SHIFT_SETUP	
Press 13	SM_2_SHIFT_SETUP	
Press 14	SM_2_SHIFT_SETUP	