

LYNQ

# LYNQ 2020 Training Guide

LYNQ 2020 TRAINING GUIDE

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## How to use this guide

### Self-Paced Learning

Review the materials at your own pace.

### About LYNQ

A single, configurable, plug-and-play solution to digitalise and drive factory performance through the effective management of resources.

The aim of this guide is to provide customers and partners with the confidence to use, support, demonstrate or sell LYNQ. If you are partner, this guide supports the knowledge required for partner certification at the silver level and gold level and should be referred to after certification has been acquired at the bronze level.

Certification at the bronze level, ensures you are already aware of:

- The value proposition
- The core solution features as per the Product Brochure

Certifications are currently only applicable to partners. Certifications for end users are currently not offered at this time.

This guide is intended to be used as a learning aid, regardless of the Enterprise Resource Planning application LYNQ is deployed with. When learning using this training guide, you should refer to the glossary. The glossary explains the mapping between the terms used in the training guide and the terms used for your Enterprise Resource Planning application. This allows the training guide to be written in a common language, that supports all LYNQ customers and partners. The glossary can be found from the LYNQ help menu.

This training guide provides a practical step-by-step walk through of LYNQ 2020 to improve your understanding of how the product is typically used within a manufacturing environment. You must have access to the internet whilst using this training guide.

Throughout this training guide and LYNQ you will see references to the IEC 62264 international standard. The standard provides a model for defining the activities of manufacturing operations management. Customers adopting this model in their process design, benefit from:

- Good practices of manufacturing operations
- Automation of the manufacturing processes
- Improvements to existing manufacturing processes
- Reduced manufacturing and automation costs
- Faster operational processes
- Increased productivity and output

This guide is best utilised in conjunction with the demo dataset provided by LYNQ, which should be installed on your own dedicated environment. Allowing you to complete exercises consistently without any other users making changes to the environment.

### Exploring Analytics

Select any range within the month of **January** to demonstrate out of the box factory performance analytics

### Demo Environment

If you plan to share your demonstration environment with other users in your organisation consider installing LYNQ on a cloud environment such as an Azure virtual servers. Please refer to [System Requirements](#)

The demonstration data is an extended version of the standard Enterprise Resource Planning Demo dataset that you should already be familiar with. Specifically, it includes transactional data required to demonstrate the factory performance analytics provided by LYNQ to its fullest potential.

This transactional data to support the presentation of analytics can be found by selecting records within the month of **January** in the Dashboard and Reports screens.

Your training environment should also have the Microsoft Office application installed.

### Portal Registration

Select the option to request access from the [Portal](#).

This training guide is for LYNQ 2020. Before starting to learn using this training guide, check that all core components of LYNQ 2020 are installed and ready to use in accordance with the Installation Guide.

You must have installed:

- LYNQ mom
- LYNQ aps
- LYNQ api

Note: To properly follow this training guide, LYNQ api must be configured to integrate with your Enterprise Resource Planning application. Details on how to configure LYNQ api is found under guides and whitepapers when clicking on the LYNQ help menu.

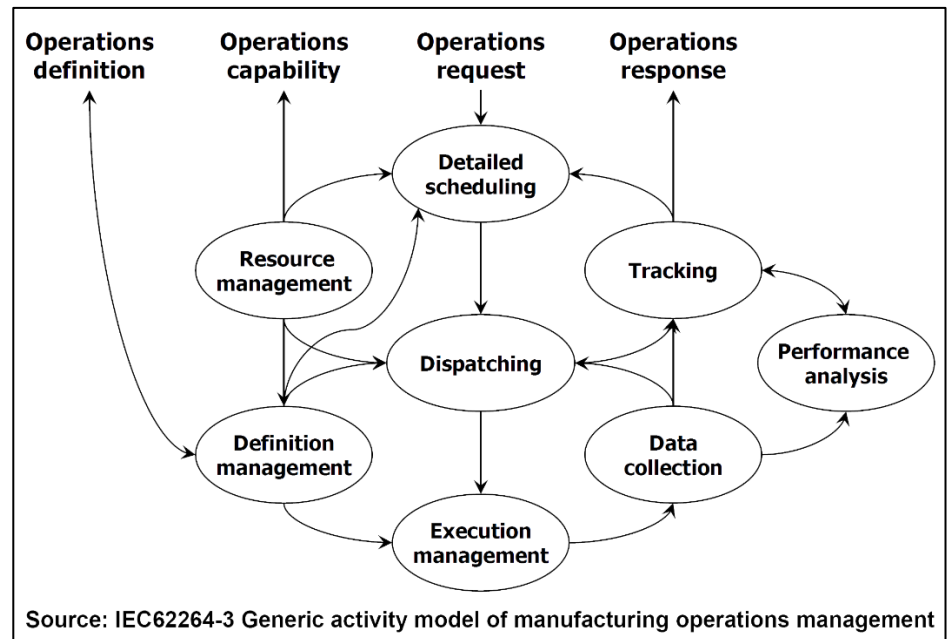
## Data Flow Model

### Guide Purpose

This guide concentrates on the operational activities between LYNQ and Enterprise Resource Planning.

Manufacturing operations management has various data flows, as illustrated by the IEC62264 generic activity model diagram. The connected arrows indicate the important data flows between the main activities completed in LYNQ and the integrated Enterprise Resource Planning application.

IEC62264 Generic Activity Diagram



Not only does LYNQ provide data flow between Enterprise Resource Planning and Manufacturing Operations Management but it provides seamless data flow between all the various activities within Manufacturing Operations Management to provide one fully cohesive Manufacturing Execution System (MES).

Unlike other solutions, whereby scheduling activities are completed independently from data collection activities with no real relationship between the two systems. LYNQ is designed, developed, deployed and adopted with this competitive advantage in mind.

With LYNQ being closely coupled to Enterprise Resource Planning, it is quick to deploy, and out of the box supports a number of different Enterprise Resource Planning applications. There is no time wasted setting up complex integration data flow mappings and business rules, LYNQ have done all the hard work for you. Giving you an integrated solution within minutes with the support of the Enterprise Resource Planning Application Programming Interface (API).

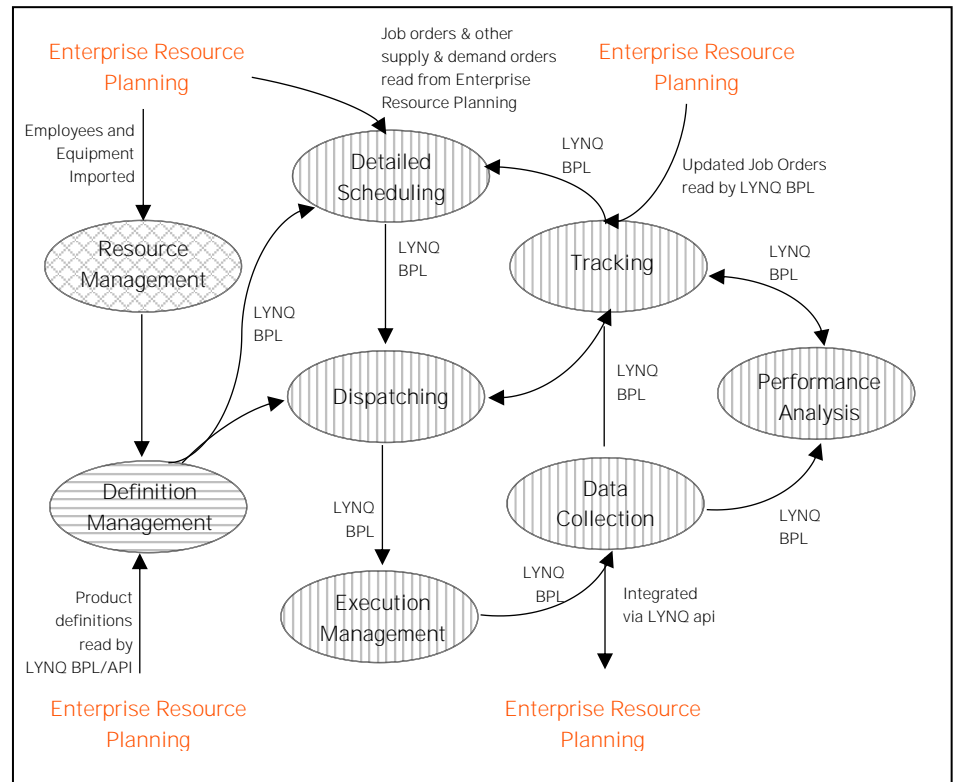
## Integration Flow Model

### Integration White Paper

The integration white paper for your Enterprise Resource Planning application is found under guides and whitepapers when clicking on the LYNQ help menu.

The Integration Flow Model illustrates how data flows between LYNQ and Enterprise Resource Planning. Note the different touchpoints with Enterprise Resource Planning. LYNQ must be in permanent communication with Enterprise Resource Planning to function.

Integration Flow Model Diagram



### Key

-  Activity performed in LYNQ
-  Activity performed in Enterprise Resource Planning
-  Activity performed in LYNQ & Enterprise Resource Planning

SQL views generated at the point of installation are created in:

- Enterprise Resource Planning Database
- LYNQ Databases

All SQL views are prefixed with the word 'Lynq' and collectively referred to as the LYNQ Business Process Layer (BPL).



# Get Started

**LYNQ mom license**

Pay particular attention to recommended reading articles that are listed in a table at the start of each chapter. Recommended articles will give you a head start, increasing your learning experience and will help you to perform exercises provided in this training guide.

After completing all exercises in this training guide, you will be sufficiently skilled to operate LYNQ as a user, to provide support to your own internal users, to demonstrate and sell LYNQ as a Silver Partner or to demonstrate, sell and support LYNQ as a Gold Partner.

This guide will follow the order of the IEC62264 Data Flow Model

- Resource Management
- Definition Management
- Detailed Scheduling
- Dispatching
- Execution Management
- Data Collection
- Tracking
- Performance Analysis
- Continuous Improvement

Throughout this training guide, you will see a key, which references the application(s) where activity is completed. You will learn the concepts of LYNQ faster, if you are able to remember these keys.

Key



Activity performed in LYNQ



Activity performed in Enterprise Resource Planning



Activity performed in LYNQ & Enterprise Resource Planning

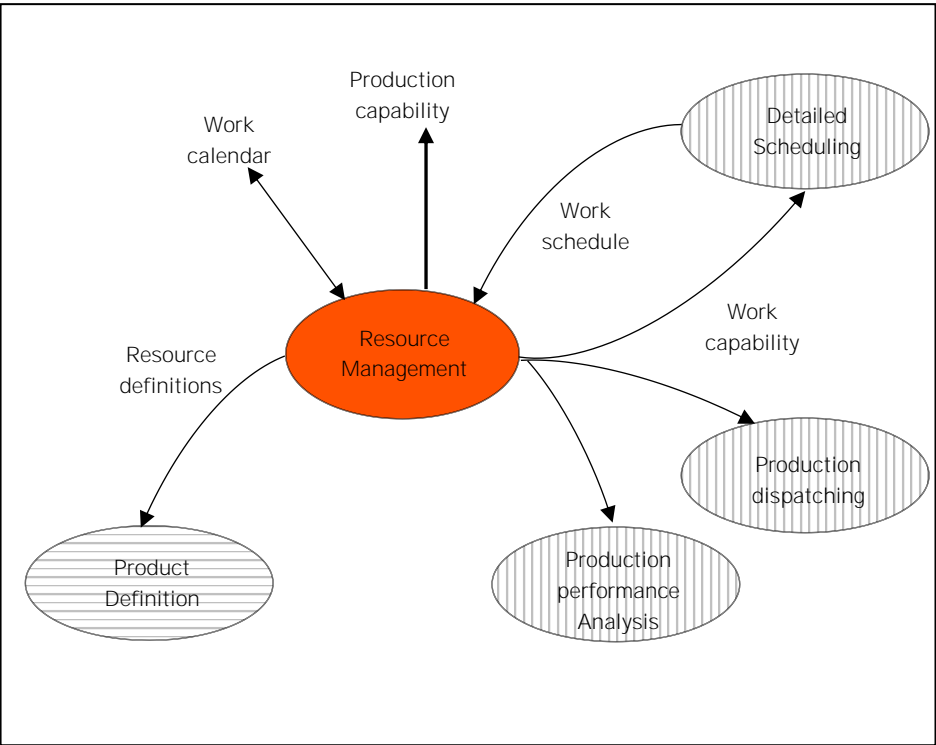
Within each chapter, you will be asked to read an article relating to the subject, which will teach you the necessary knowledge to operate LYNQ. For in-depth setup and configuration guidance, please refer to the advanced user guide, which is found under guides and downloads when clicking on the LYNQ help menu.

# Resource Management

**Source of Resources**  
Resource Management takes place in both LYNQ and Enterprise Resource Planning. Routines in LYNQ all resource management data to be imported.

Resource management deals with the resources required to manufacture e.g. machines, tools, labour and materials. Work units, tools, employee and bill of material records. Resource Management is performed in Enterprise Resource Planning and extended further within LYNQ to support operations management.

Resource Management data flow diagram:



Key

Activity performed in LYNQ

Activity performed in Enterprise Resource Planning

Activity performed in LYNQ & Enterprise Resource Planning

Recommended Reading Articles

Order	Article Name	Article Number
1	Navigating LYNQ	KA-01587
2	Opening a Company in Visual APS	KA-01594
3	Navigating Visual APS	KA-01587

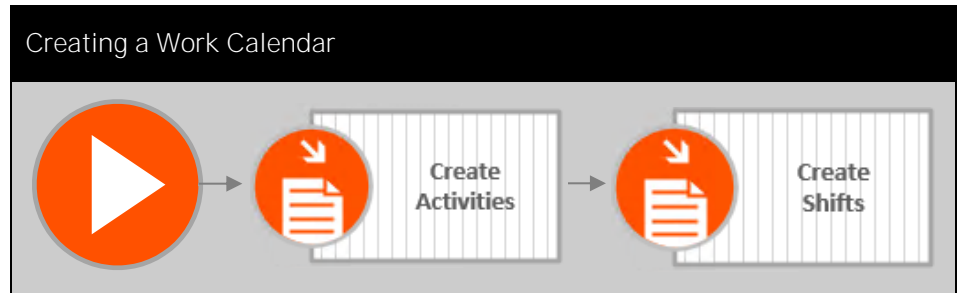
## Work Calendar

### Resource Shift

Shifts are associated to a resource. Resource management will be discussed on the next page.

The work calendar represents the working hours, holiday calendar, breaks, plant shutdowns and shift schedules. Before you can use LYNQ for detailed scheduling, you must define a work calendar. Work calendars are configured within Visual APS and are setup independently of Enterprise Resource Planning.

Click on each task to create the Work Calendar



## Resource Definition

### Primary and Secondary

LYNQ considers primary resources as employees and work units and secondary resources as Tools. However, secondary resources such as skillsets are not imported from Enterprise Resource Planning.

### Activate

Employees that are not activated will not be able to perform data collection. Work Units (equipment) which is not activated will not be enabled for reporting of downtime to support overall equipment effectiveness (OEE) calculations.

### Licenses

Manual seat licenses are required to activate employees or equipment. Automated device licenses are required for automated devices. Secondary resources do not require licensing.

### Supported?

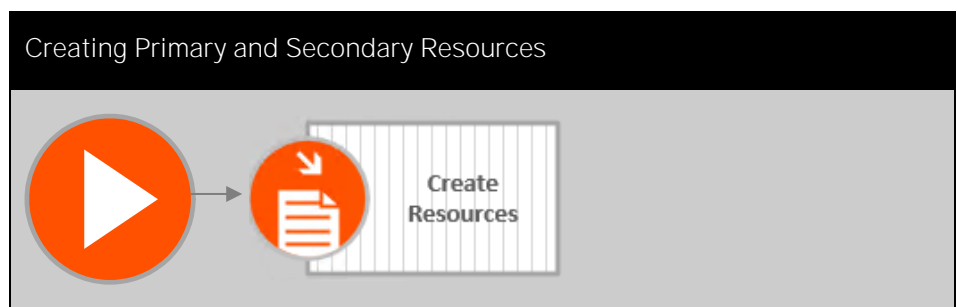
Check the glossary in the LYNQ help menu to check whether secondary constraints (tools) are supported in your Enterprise Resource Planning application.

Resources are defined as personnel, equipment and/or materials. Resources such as employees and work units are associated to shifts and help define the production capacity. Resources are typically imported from Enterprise Resource Planning and their settings can be extended further in LYNQ. Before resources are available for scheduling, they must be associated to a shift. A default shift can be selected during import of the resource from Enterprise Resource Planning

Primary and secondary resources are imported:

Order	Data Type	Imported To	Imported From
1	Work Units	LYNQ aps	Enterprise Resource
2	Tools	LYNQ aps	Enterprise Resource
3	Employees	LYNQ mom	Enterprise Resource
4	Work Units	LYNQ mom	LYNQ aps
5	Tools	LYNQ mom	LYNQ aps

Click on the task to learn how to create resources



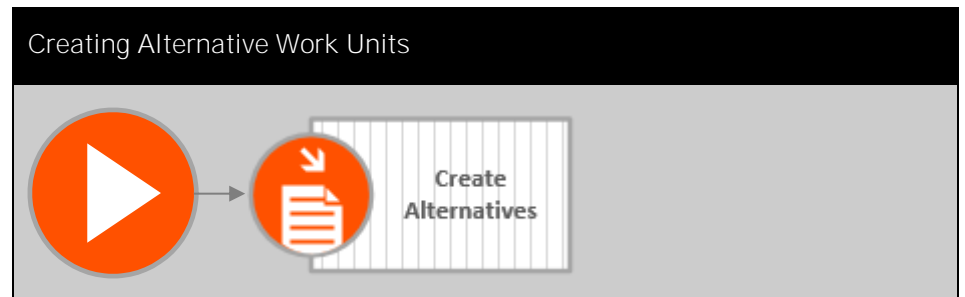
## Alternative Work Units

### Limited Capacity

Visual APS can still schedule a job order/operation automatically if there is spare capacity within other compatible work units. This is done with alternative work units.

When a specific work unit has no available capacity in the current planning interval, Visual APS can still schedule a job order/operation automatically if there is spare capacity within other compatible work units. This is achieved through the use of alternative work units.

Click on the task to learn how to create alternative work units



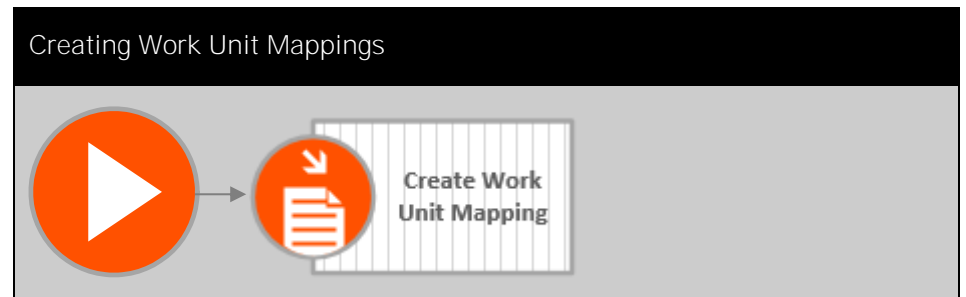
## Work Unit Mapping

### Flexibility

Work unit mappings can be useful when it may be difficult to reorganize work units and work centres in Enterprise Resource Planning

In the majority of cases work unit mappings do not require any reconfiguration from their default settings after the work unit has been imported. However, there may be situations where the company wishes to maintain a different organisational structure of work centres/work units within Visual APS to those in Enterprise Resource Planning.

Click on the task to learn how to create work unit mappings



## Constraints

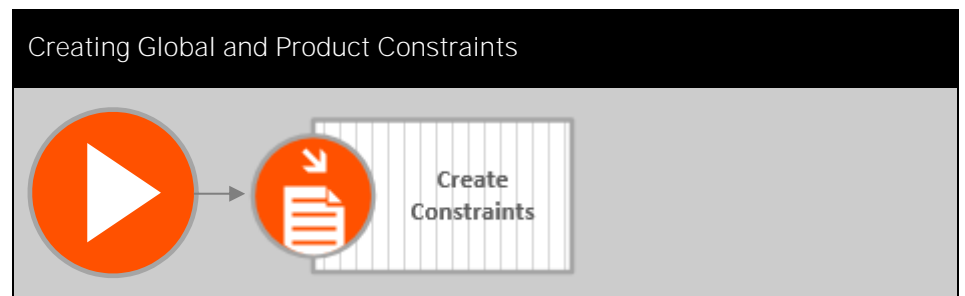
### Constraints Editor

By default, constraints are enabled for employees and equipment. The constraints editor allows additional constraints to be setup.

Global and product constraints can apply to work units to define the different resource quantities and different time factors for different types of resources.

Constraints may be utilised under many different scenarios but may be considered when a work unit runs at different rates than the primary work unit specified in the routing. To accommodate the difference when using alternative work centres, use constraints to adjust the operation time.

Click on the task to learn how to create constraints



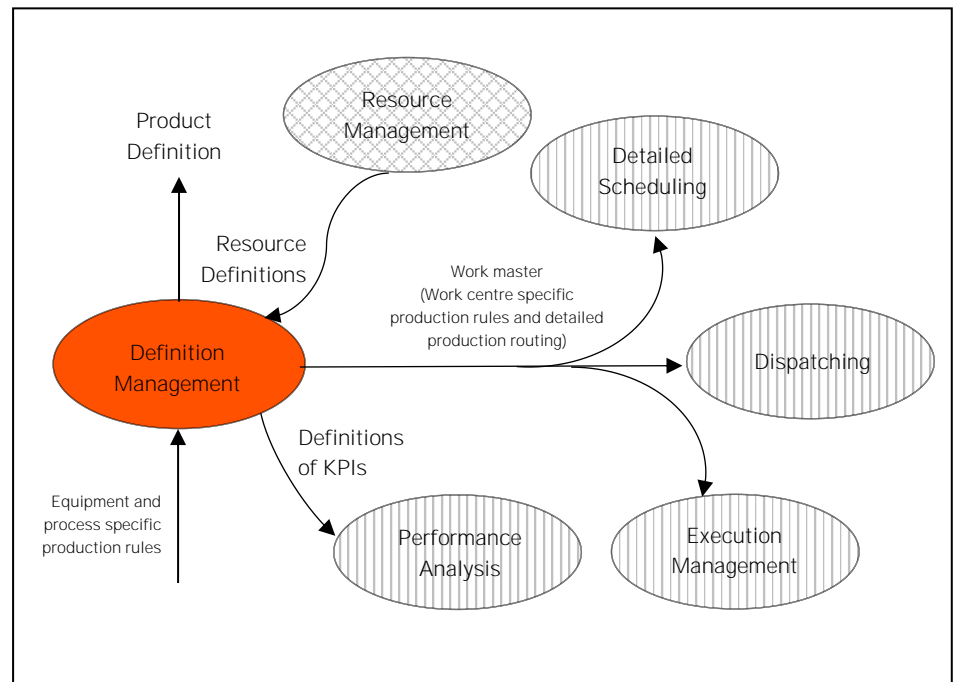
## Definition Management

### Critical Data

LYNQ relies entirely on production definition data to accurately schedule, dispatch and perform data collection activities.

Definition management deals with the rules to produce a product. In the Data Flow diagram below notice how Definition Management flows into detailed scheduling, dispatching, performance analysis and execution management.

Definition Management Data Flow Diagram



The product definition is associated to the job order. The job order will show all the tasks, materials, and equipment that will be used in the manufacture of the product. If the material is made from many separate items, a bill of materials will ascertain what items will be needed during the manufacturing process.

The job order will also show the steps that need to be achieved to manufacture a finished product. The routing shows the flow of required work that needs to be achieved, which can be one or more facilities and could include work being sent to an external vendor for specialised tasks. The routing determines what work is to be performed and where and how it will be done.

The routing decides the path and sequence of operations to be performed on the job order from one machine to another. The purpose of routing is to establish the optimum sequence of operations so that the manufacture of the finished product is performed at the lowest cost and the fastest time.



### Critical Data

LYNQ relies entirely on production definition data to accurately schedule, dispatch and perform data collection activities.

In further detail the routing will define:

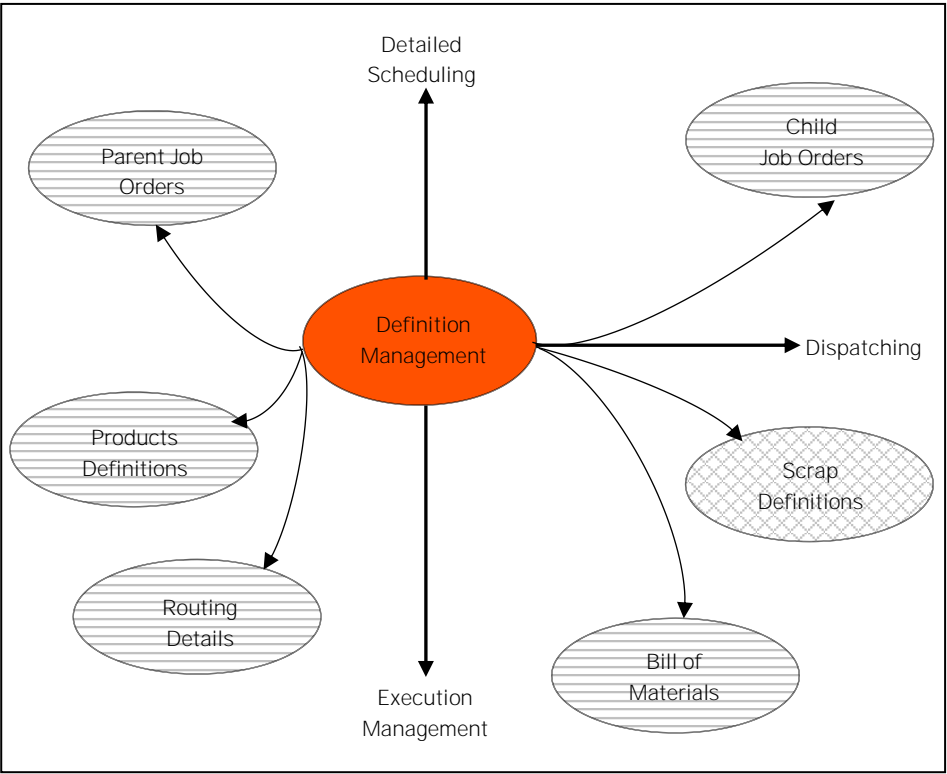
Component	Description
Operation	A list of operations that must be performed at a particular time. It requires a resource to be used to perform an operation. The resource could be a piece of equipment such as a drill or a lathe, or it could be a manual resource that would perform a task such as checking quality or performing a measurement. The operation would be allocated a certain amount of time for the task to be performed before the operation is finished and passed on to the next operation. The routing has to have these operations in the correct order for the manufacturing process to be completed correctly.
Bill of Materials	The exact format for a BOM will vary depending on the nature of the product being manufactured, but it is typical for two distinctly different types of BOM to be associated with each product—one used for the engineering phase when a product is first being developed, and another type of BOM used when the product rolls out to mass production for shipping to customers.
Work Unit	The work unit is another term for the piece of equipment that is to be used in the operation or the manual resource that is being used to perform a specific task. If the work unit is a machine or a piece of equipment, the system will need to know information about that work unit, such as the capacity of the item. The information about setup and breakdown times need to be established for each work unit, so the correct time is allocated to the overall estimated duration for the job order.
Scrap	As part of an operation, the process may produce a certain amount of scrap material. For example, if an operation changes the shape of a component, by either a lathe or saw, there may be a quantity of scrap material that is generated. If the same quantity of scrap is always produced at a certain operation, then this can be identified in the routing.
Outside Processing	In the manufacture of some products, there may be a need to either send the semi-finished product out for a process to be carried out or for an outside vendor to come into a company's facility to perform the work. This specialised work could be as simple as certifying that an item passes certain quality tests or if an item requires a special coating for a certain customer.

Definitions in LYNQ

To integrate scrap in data collection to Resource Enterprise Planning, scrap reasons must be configured in LYNQ. The scrap definitions in LYNQ should match the scrap definitions in Enterprise Resource Planning. Check the Glossary from the LYNQ help menu to check whether scrap is integrated with your Enterprise Resource Planning application.

Production definition management is predominantly maintained in Enterprise Resource Planning. Routing details may be referred to as either master recipe, SOP, SOC, routing or assembly steps depending on the production strategy used.

Definition Management Activities Diagram



Key

	Activity performed in LYNQ
	Activity performed in Enterprise Resource Planning
	Activity performed in LYNQ & Enterprise Resource Planning

### User Defined Fields

Please send User  
Defined Field mapping  
requests to  
[support@lynqmes.com](mailto:support@lynqmes.com)

LYNQ integrates with a number of different Enterprise Resource Planning applications. The integration design will determine the data requirements required by LYNQ for your specific Enterprise Resource Planning application. Considering each Enterprise Resource Planning application will differ in functionality, the exact data fields used by LYNQ are excluded from this training guide. You should refer to the Integration Whitepaper document, found in guides & white papers from the LYNQ help menu, to fully understand the key fields required for detailed scheduling.

Non supported data fields may be mapped as User Defined Fields in the LYNQ Business Process Layer.

## Job Orders

### User Settings

Visual APS settings are stored in the Windows local User Profile. If the profile is of type roaming, the same settings apply when the user logs into Visual APS from multiple locations.

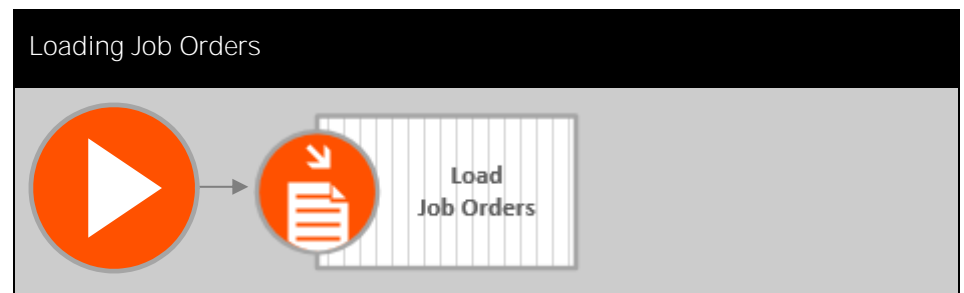
Detailed scheduling reads job orders from Enterprise Resource Planning. Once created, job orders are displayed in the Visual APS Task Panel and will appear ready for scheduling. Before progressing to the detailed scheduling chapter of this training guide, **let's take a few** minutes to create a new job order in Enterprise Resource Planning to see how this can be loaded into Visual APS.

Refer to the Enterprise Resource Planning user guide if you need guidance on creating job orders with the Production Definition below.

Create a Job Order with the Product Definition:

- Manufactured Product
- Routing with 3 operational steps
- Single Level Bill of Materials with 3 purchased component items
- Associate the Job Order with a Customer Order
- Quantity to Manufacture 10
- Delivery Date +1 month from today
- Job Order should be released/confirmed for scheduling

Click on the task to learn how to load the Job Order into Visual APS



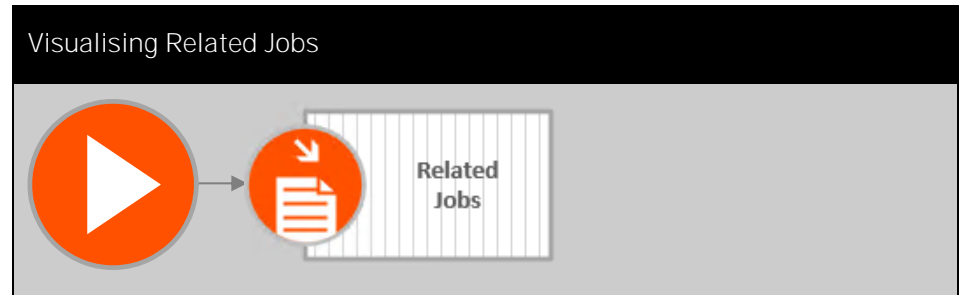
## Parent/Child Jobs

### Supported?

Check the Glossary from the LYNQ help menu to confirm that LYNQ supports Child Job Orders with your Enterprise Resource Planning application.

Jobs orders that contain a multi-level bill of materials, also referred to as an indented bill of material, have a hierarchical structure of assemblies and their related parts and components. Within LYNQ, you will see this hierarchy referred to as parent and child orders. The related jobs tab in the Visual APS task panel, displays the hierarchy of parent and child orders.

Click on the task to learn how to visualise related jobs



# Attaching Documentation

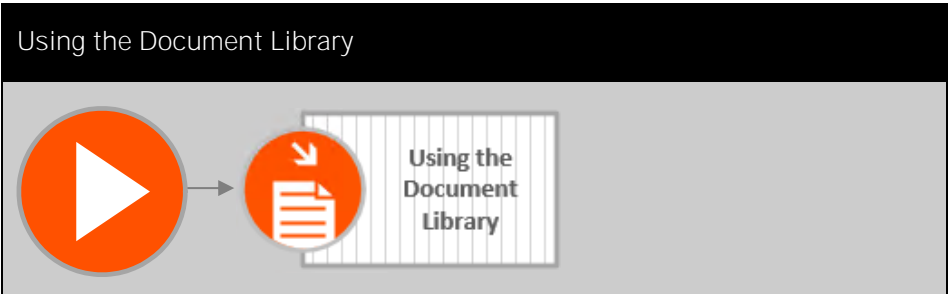
SharePoint

LYNQ provides the ability to integrate the document library with other document management solutions such as Microsoft SharePoint.

Documents such as manufacturing instructions, recipes, product structure diagrams, CAD drawings and test definitions required for the manufacturing process can be attached or associated to different definitions using the Document Library. Records saved in the Document Library are visible from the workbench and several other reporting screens in LYNQ, by clicking on the paperclip icon.

Component	Description
LYNQ aps	<p>Documents attached in Visual APS are only visible within detailed scheduling activities and limited to physical file formats. Documents can be stored against definitions:</p> <ul style="list-style-type: none"><li>• Job Order</li><li>• Operation</li><li>• Product</li></ul>
LYNQ mom	<p>Documents attached in LYNQ MES are managed by the document library and visible within dispatching, execution management, tracking, data collection and performance analysis. Attachments are not restricted to physical file formats. The document library supports different formats such as file, form, URL. Documents can be stored against definitions:</p> <ul style="list-style-type: none"><li>• Job Order</li><li>• Operation</li><li>• Product</li><li>• Work Centre</li></ul>

Click on the task to learn how to use the document library



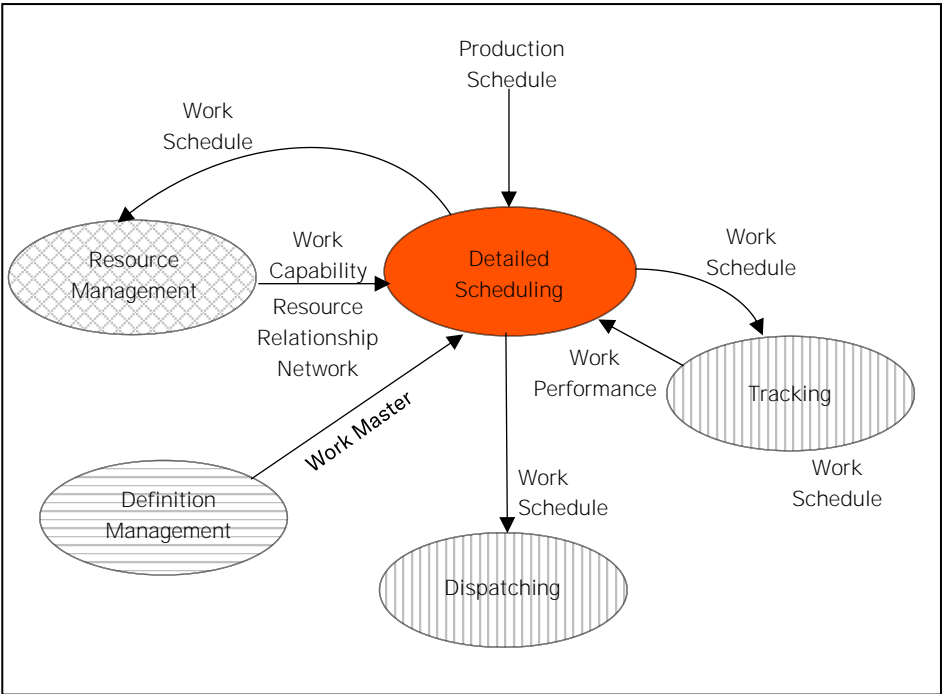
Detailed Scheduling

Visual APS

Visual APS is the component of LYNQ that provides detailed scheduling functionality to the planners. Visual APS is installed as a Desktop Client install and can be run directly from the desktop shortcut or from the LYNQ website.

Detailed production scheduling optimises the use of resources to meet production schedule requirements, taking into consideration resource and material availability. The objective of detailed scheduling is to create and maintain a production plan and work schedules. Plan and prioritise operations to ensure maximum performance with minimal delay. Compare actual production to planned production. Reschedule the production plan and where schedules where work performance is not as expected, ensure delivery dates are not affected, where possible. Manage resource capacity. Simulate what-if scenarios to calculate production lead times. Provide effective management of bottleneck resources.

Detailed Scheduling Data Flow Diagram



Key

Activity performed in LYNQ

Activity performed in Enterprise Resource Planning

Activity performed in LYNQ & Enterprise Resource Planning

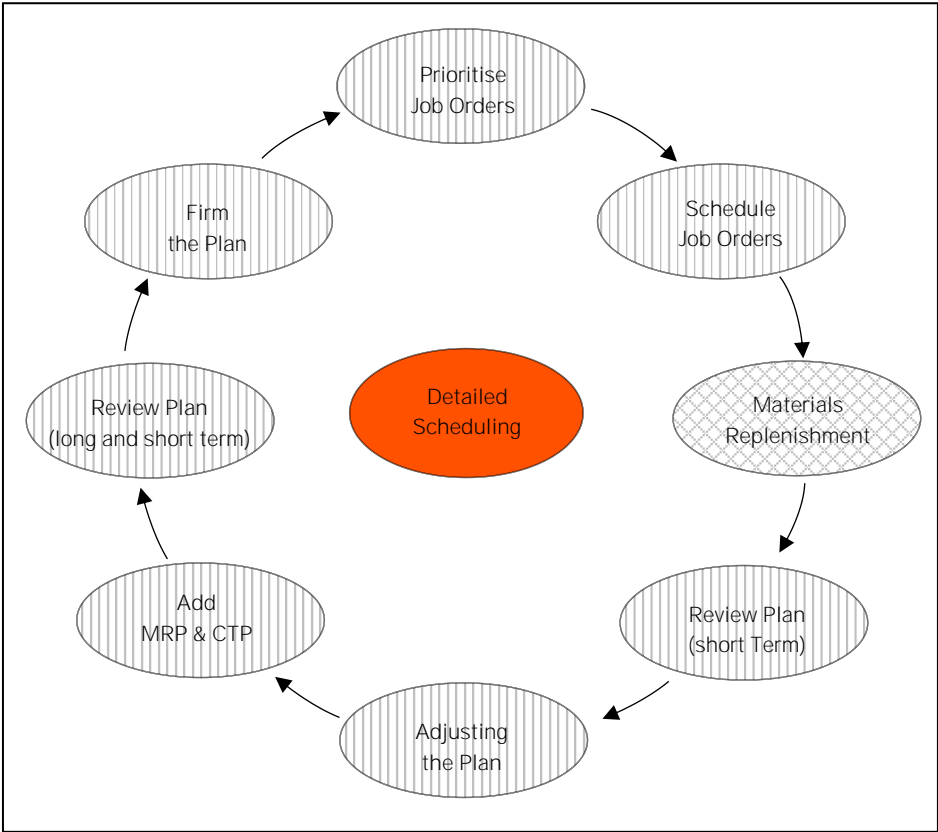
# Detailed Scheduling

Visual APS

Visual APS is the component of LYNQ that provides detailed scheduling functionality to the planners. Visual APS is installed as a Desktop Client install and can be run directly from the desktop shortcut or from the LYNQ website.

You will learn in this chapter how to perform basic activities of detailed scheduling, as illustrated in the detailed scheduling activities diagram. Upon completing the flow of activities, you will have created a production plan, for production dispatching.

Detailed Scheduling Activities Diagram



Key	
	Activity performed in LYNQ
	Activity performed in Enterprise Resource Planning
	Activity performed in LYNQ & Enterprise Resource Planning



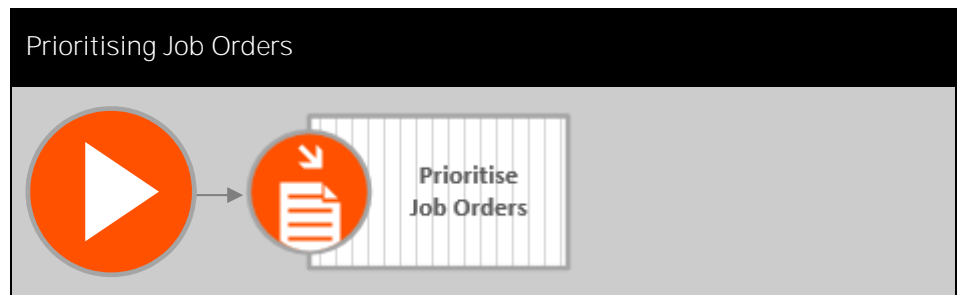
## Prioritising Job Orders

### Prioritisation Features

Visual APS includes several different features to prioritise Job Orders with useful features such as Markers, Workflow Menus, Column Filters and Groups. These features will refine which job orders display in the Task Panel for scheduling.

Understanding how production should be prioritised is an important consideration for any manufacturer. All manufacturers have at least job orders, some of which are urgent, others of which are less so. Hence the need to prioritise how job orders are scheduled. The priorities that are set, will ultimately drive the schedule and is a main factor for how scheduled dates are calculated..

Click on the task to learn how to prioritise Job Orders



## Scheduling Job Orders

### Planner Required

Visual APS cannot schedule either manually or automatically without a planner operating the software. LYNQ does not support fully automated scheduling.

### Valid for Scheduling

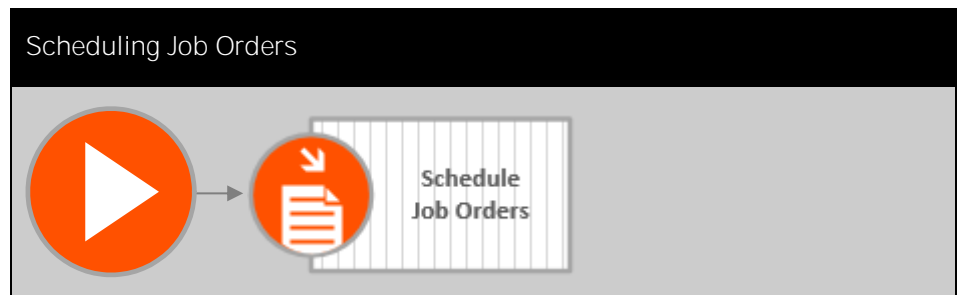
Before operations can manually or automatically schedule, Visual APS must recognise the operations as being valid for scheduling. The valid for scheduling indicator must be green, for Visual APS to schedule it. The indicator displays in the task panel at the job order level and at the operation level. Review the product definition if job orders are not valid for scheduling.

The planning interval in Visual APS defines a period where scheduling can occur. Scheduling cannot occur outside the planning interval. Use the settings area in Visual APS to change the default planning interval settings or manually adjust the planning interval from the schedule menu.

LYNQ supports forward and backward scheduling. With forward scheduling enabled, Visual APS will schedule the job order to be completed one day before the due date without overloading any work unit. With backward scheduling enabled, Visual APS will schedule the job order from the specified date and time (current or order), without overloading any work unit. LYNQ schedules job orders to be completed within the planning interval. If all operations for a Job Order cannot be scheduled within the planning interval the Job Order will not schedule. In this instance, the planning interval should be extended.

For the purpose of understanding and clarity, scheduling will be based on capacity only at this stage. Materials planning will be covered later in this training guide.

Click on the task to learn how to schedule job orders



## Replenishing Materials

### What is MRP?

Material requirements planning is the process where through the creation of purchase orders (for raw materials) and or job orders (for manufactured intermediates or sub-assemblies), materials are replenished.

Up until now a schedule has been created based on available capacity without considering material availability. While LYNQ provides visibility of material availability, it is not and does not replace Materials Requirements Planning within Enterprise Resource Planning.

Material replenishment is the process whereby materials are replenished through the creation of purchase orders (for raw materials) and or job orders (for manufactured intermediates or sub-assemblies) based on material requirements having been established.

Material requirements are established based on the bill of material and knowing when they can be manufactured based on true available capacity which is provided by LYNQ. Replenishment can be automated (using Materials Requirements Planning) or handled manually using reports within LYNQ.

Managing material requirements in Visual APS, will differ depending on where Material Requirements Planning is executed.

If materials requirements planning is executed within Enterprise Resource Planning, the typical process would be to save and publish the production plan, run materials planning in Enterprise Resource Planning to create purchase and job orders based on the job orders new scheduled start and end dates, refresh the data in Visual APS, recalculate material requirements and then to finally review the material indicators which in theory should be green, if Material Requirements Planning has functioned correctly.

If material requirements planning is not executed within Enterprise Resource Planning, LYNQ provides an MRP Overview report to help purchasing and planning teams, manually generate purchase orders and job orders.

Click on the task to learn how to use the MRP Overview



## Reviewing the Short Term Plan

### What are Workflows?

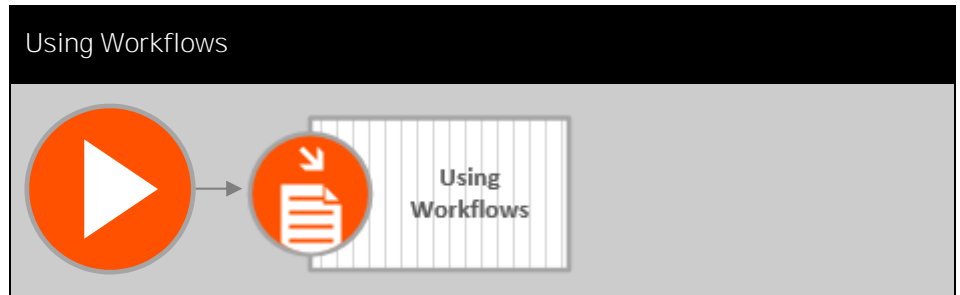
Workflows appear as saved filters of the task panel on the Workflow menu. Global workflows are available to all users of Visual APS. Users can create new user or global workflows.

### Groups after APS restart

After a restart of Visual APS, task panel groups are lost.

The short term schedule should be reviewed from both a capacity and materials perspective. A short term plan will focus on the next few weeks and not the entire planning interval. The task panel can be filtered to show only short term scheduled job orders by using the built in workflows in Visual APS. The short term workflow filters the task panel to the next four (4) weeks.

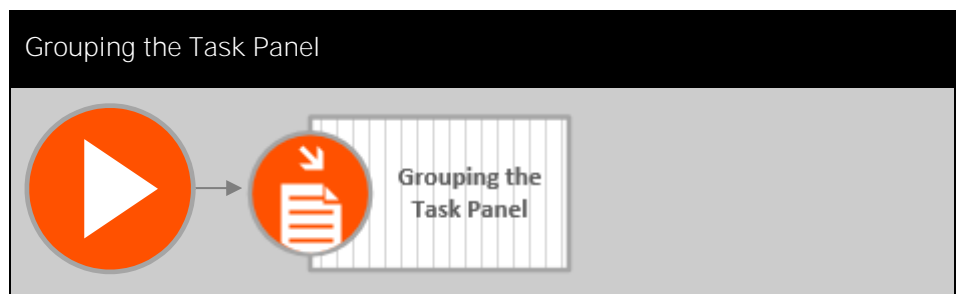
Click on the task to learn how to use Workflows



If materials planning is not executed in Enterprise Resource Planning, the MRP Overview should be run by week and filtered to show where the shortage quantity is greater than zero. The report can be exported and sent to the purchasing and planning teams to generate purchase orders and job orders based on these requirements.

Once the purchasing and planning teams have generated sufficient orders to satisfy the requirements, Visual APS should be refreshed and Material Calculations re-run. Grouping the Task Panel by the Material indicator column will quickly help identify which materials are still reporting shortages. Continue to review short materials with the purchasing and planning teams until all shortages have been rectified.

Click on the task to learn how to group the task panel



## Reviewing the Short Term Plan

### Capacity Chart Export

The capacity chart will export to Microsoft Excel for further analysis.

Capacity for the short term can be reviewed from the capacity chart. All work units should be selected and the date range set to four (4) weeks and sorted by week. The capacity chart is a visual representation of your loading for each week. Remember that Visual APS is a finite capacity planning application. Level loading has automatically occurred and none of the work units are over loaded as a result.

Click on the task to learn how to use the capacity chart



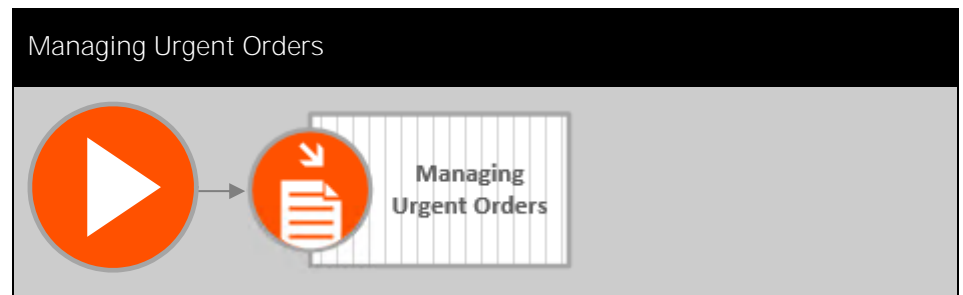
## Adjusting the Plan

### Using Autoshift

Auto shift is a manual technique on the schedule tab that allows an operation to be inserted where something is already scheduled. Autoshift works in either replace, shift or move ASAP mode. Learn how autoshift works by clicking on the associated article links on each task.

Despite every best effort to produce the perfect production plan, unforeseen events happen that result in plans needing to change at short notice. For example, if a new job order is received that needs to be rushed out. The equipment breaks down which must be repaired, causing delays in the plan. A job order runs slower than expected causing a knock on effect to other planned job orders. All these scenarios can be managed within Visual APS

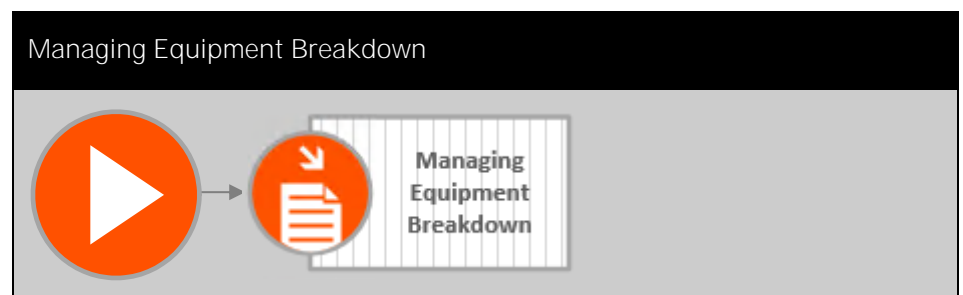
Click on the task to learn how to manage urgent orders



Click on the task to learn how to manage production delays



Click on the task to learn how to manage equipment breakdowns



When equipment has broken down the production plan must be amended to show that the resource is down. How the production plan should be managed, to ensure minimal disruption to the equipment work schedule and overall production plan must be made by the production planner manually.

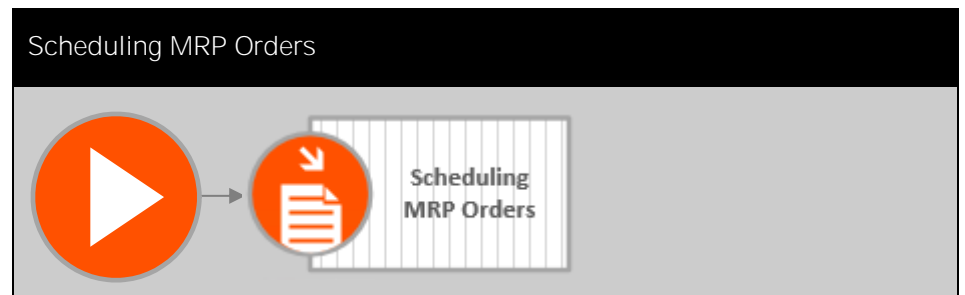
## Adding MRP and CTP Orders

### Supported Functionality

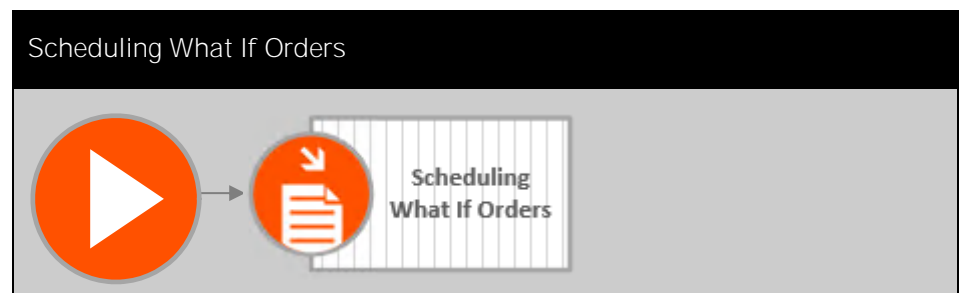
Check the Glossary from the LYNQ help menu to confirm that LYNQ supports MRP orders with your Enterprise Resource Planning application.

Visual APS provides the ability to schedule suggested job orders generated by MRP from Enterprise Resource Planning and What If orders that are created in Visual APS. Adding suggested job orders to the production plan can be useful to determine potential loading in the long term. This is often referred to as rough cut capacity planning. What if orders provide a way to determine a delivery date for a potential order. This is often referred to as capable to promise or CTP.

Click on the task to learn how to schedule MRP orders



Click on the task to learn how to schedule What If orders



## Reviewing Long/Short Term Plan

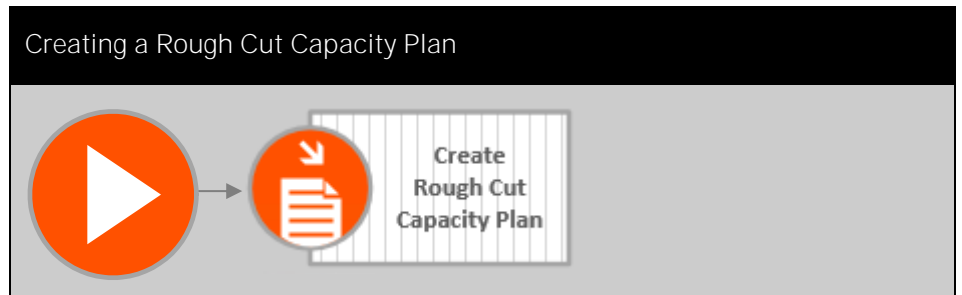
### Export to Excel

The rough cut capacity plan can be exported to Microsoft Excel for further analysis.

A planners “worth” is measured by their ability to achieve the best possible order fulfilment and resource utilisation. Order fulfilment is achieved by keeping past due and unscheduled job orders to a minimum (preferably zero). This is easily checked using the built in workflows mentioned earlier in this training guide.

The capacity chart can be used to view resource utilisation. All work units should be selected and the date range set to a long term range. i.e twenty six (26) weeks. All work units can be selected, including MRP and CTP orders to produce a long-term rough cut capacity plan. Remember that Visual APS is a finite capacity planning application. Level loading has automatically occurred and none of the work units are over loaded as a result.

Click on the task to learn how to create a rough cut capacity plan (RCCP)





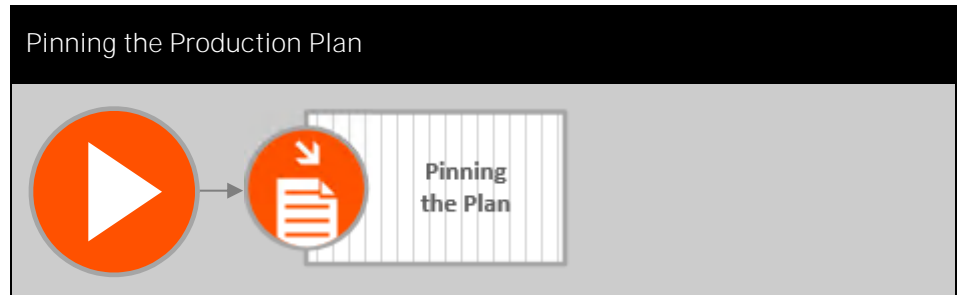
## Firming the Plan

### Boundaries

The "frozen" period will vary depending on the manufacturing environment, but it marks the boundary of which changes to the schedule be made, anywhere outside this period job orders can be moved or re-scheduled.

The production plan can be locked down or frozen from any further changes for a defined period of time, leaving the rest of the production plan to be changed in the future. For example, the planning interval may be set to twelve (12) weeks but only four (4) weeks are firm and the remaining eight (8) weeks are flexible. Visual APS refers to the firming of the production plan as pinning.

Click on the task to learn how to pin the production plan



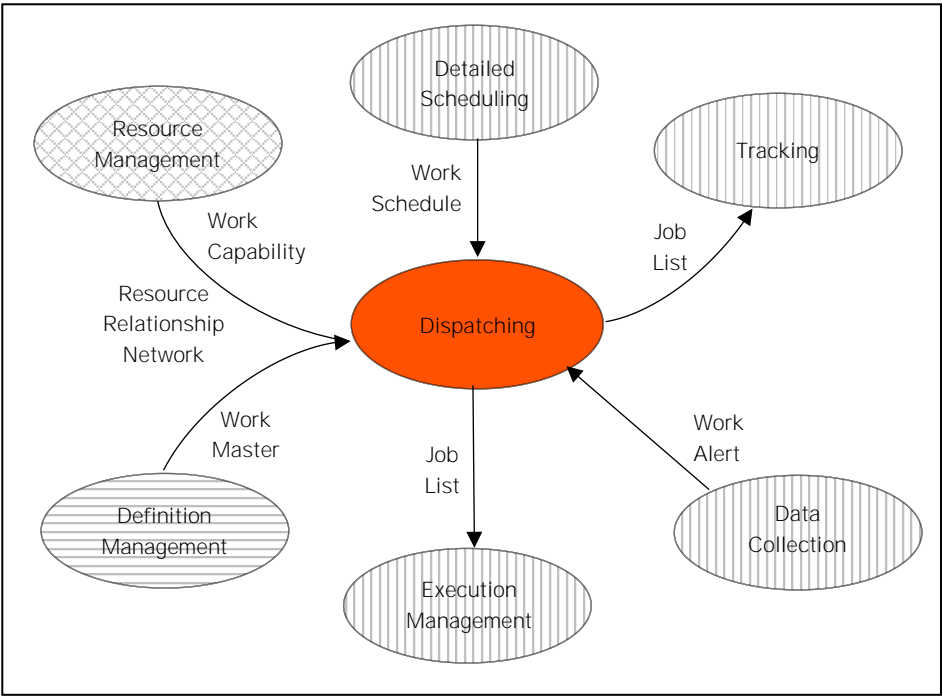
# Production Dispatching

**Dispatched Production**

Dispatching sends job orders to work centres for either manual or automatic execution

Production dispatching commits the priority and order of production demand for equipment and personnel, secures the planned start date/time and due date/time for each step in the production process and provides visibility of the materials that should be used. Steps within the production process may consist of startup, setup, run, processing and/or teardown time. Work schedules and job lists provide visibility of the job orders that have been dispatched to the shop floor.

Production Dispatching Data Flow Diagram



Key

Activity performed in LYNQ

Activity performed in Enterprise Resource Planning

Activity performed in LYNQ & Enterprise Resource Planning

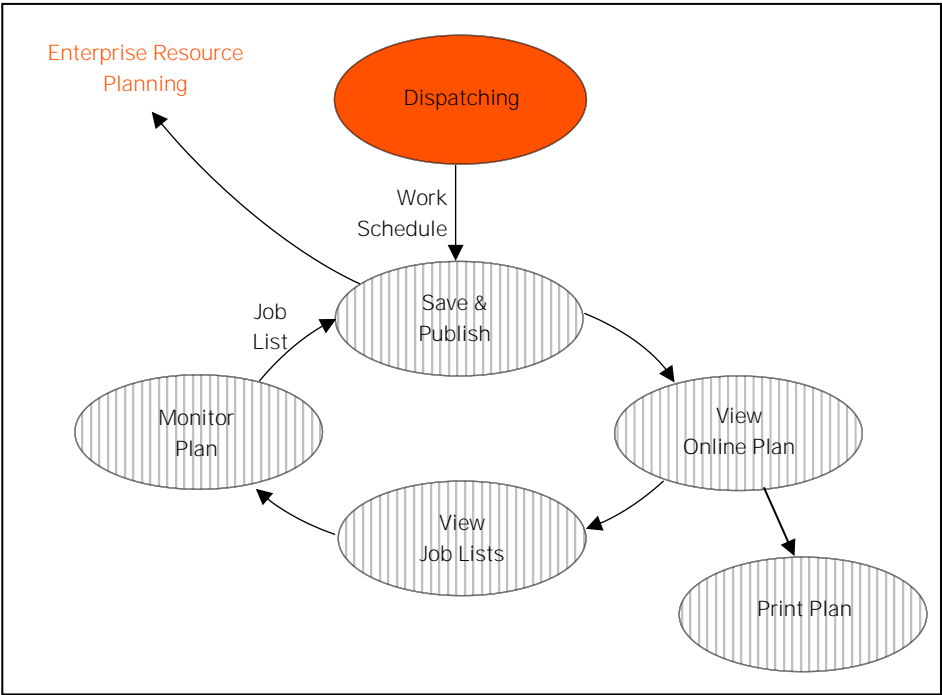
# Production Dispatching

Online visibility

Users that do not have Visual APS installed can view dispatched production in the form on online plans and jobs lists in LYNQ.

You will learn in this chapter how to perform activities of production dispatching, as illustrated in the production dispatching activities diagram. Production Dispatching is an iterative process.

Production Dispatching Activities Diagram



Key

Activity performed in LYNQ

Activity performed in Enterprise Resource Planning

Activity performed in LYNQ & Enterprise Resource Planning

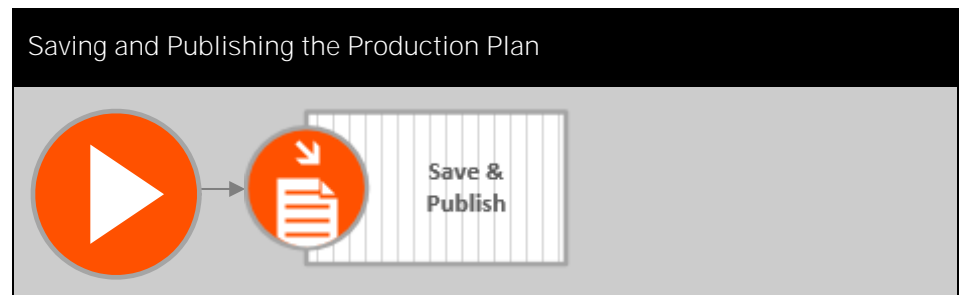
## Save and Publish

### Start and Due Dates

Save and publish commits the job order start and due dates in Enterprise Resource Planning.

To dispatch the work schedule and job lists to the shop floor, the production plan must be saved and published. Once published to the shop floor, the planned start and end dates for job orders and operations will be updated in Enterprise Resource Planning. The schedule indicator in the task panel will change from a yellow thumbs up indicator to a green thumbs indicator once dispatched.

Click on the task to learn how to save and publish the production plan



## Using Dispatching Dashboard

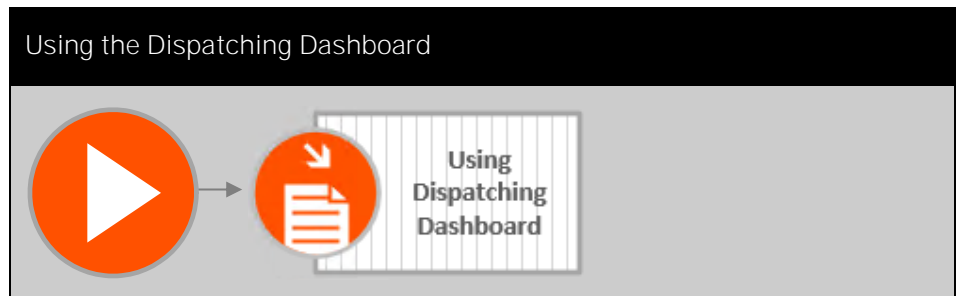
### Data caching

LYNQ performs background caching of the data that you see in dashboards and reports. The caching process runs every 1 to 2 minutes. You must refresh the reports manually to read the latest cached data sets.

There are various reports and dashboards in LYNQ that provide visibility of planned production. These reports and dashboards can be run from Visual APS but sit outside of Visual APS. Anyone in LYNQ with appropriate permissions, can run these reports and dashboards.

Starting with the production dashboard, a high-level view of loading and planned order fulfilment, showing the number of planned job orders that are found within a selected date range, and of which, how many job orders are scheduled, in-progress or late as a result of not starting by the planned start date. Loading is calculated by dividing calendar hours by scheduled hours.

Click on the task to learn how to use the production dashboard



## Using Production Plan

### Large Screen Monitors

The production plan is typically displayed on large screen monitors around the shop floor.

The production plan provides a view of planned production in a Gantt or list view format. The Gantt view provides a “bird’s eye” view of the schedule with visual indicators as data is collected and production is being reported.

Click on the task to learn how to use the production plan



## Using Equipment Plan

### Indicators

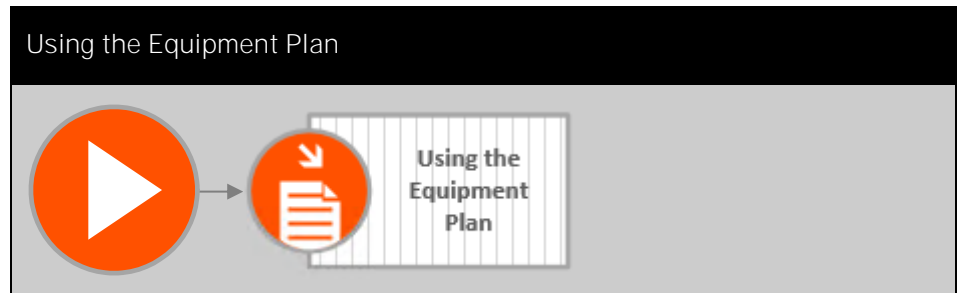
Use the equipment plan to obtain the equipment's operating time, productive time and downtime.

### Images

Upload images to the equipment record in resource maintenance to identify the equipment easily.

The equipment plan shows a view of all loading and the impact of production on the planned equipment. Drilling into the detail view, will show a daily breakdown of the loading and downtime .

Click on the task to learn how to use the equipment plan



## Using Job Lists

### Customise

The columns displayed on job lists are easily customised by clicking on the customise button when the report is open. Columns added to the job lists are visible to all LYNQ users.

The production job list shows a mobile friendly view of job orders that have been dispatched to the shop floor by work centre and work unit, that are ready for execution. Job lists can be exported if required.

Click on the task to learn how to use job lists.





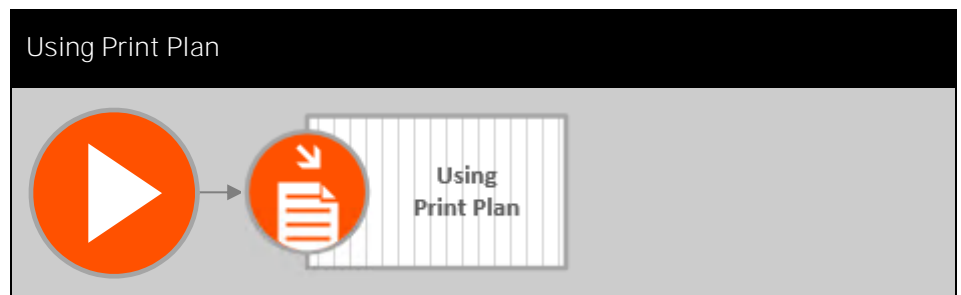
## Using Print Plan

### Custom Print Plan

When using Webhooks in LYNQ, data can pass to third party web based applications, which are capable of supporting parameterised query string values. This allows custom report writing development outside of LYNQ.

LYNQ supports a paperless shop floor operating environment, but appreciates that not all manufacturers are ready to go paperless right away. Therefore, **LYNQ supports the printing of job orders, also known as “shop travellers” on the shop floor.** The printed version includes barcodes for each job order number and each operation number for efficient data collection. The layout and format of the print plan cannot be amended. However, if custom plans are required, you are able to create with webhooks and SSRS reports. See **“Using Webhooks”** later in this guide.

Click on the task to learn how to use print plan



## Monitoring the Plan

### Customise

The columns displayed on production status report are easily customisable by clicking on the customise button when the report is open. Columns added to the production status report are visible to all LYNQ users.

The execution of the production plan can be monitored in various ways. The reports to help measure execution performance include:

- Production Plan
- Production Status
- Production Alerts

The production plan has already been discussed, so **let's take a look at the production status report which hasn't been covered** so far in this chapter. The production status, as its name implies, shows the status of all job orders, and the respective parent and child job relationship. Using visual indicators to show overall operational progress, material issuance position and labour reported, this report provides a quick snapshot of work in progress. Production alerts will be discussed later on in this training guide.

Click on the task to learn how to use production status



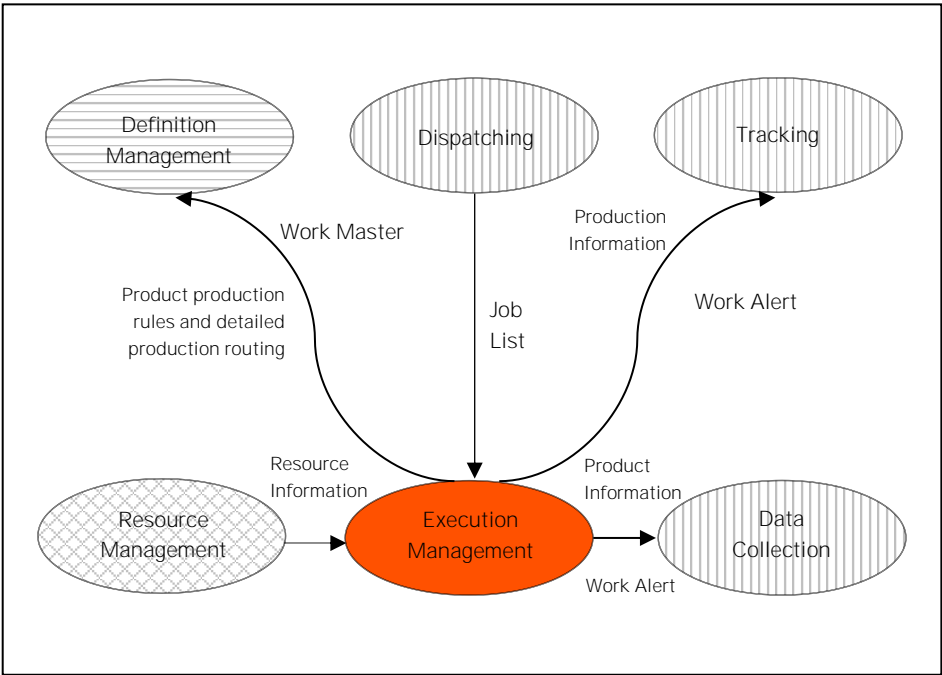
# Execution Management

Manual & Automated

Execution management activities include the coordination of the manual and automated processes in a work centre.

Execution management is the control of work through the sequence of operations as defined by the routing. Ensuring that tasks are released to the correct resources and performed within acceptable standards. Execution Managements flows into data collection.

Execution Management Data Flow Diagram



Key

Activity performed in LYNQ

Activity performed in Enterprise Resource Planning

# Management (Workbench)

**Building Control**

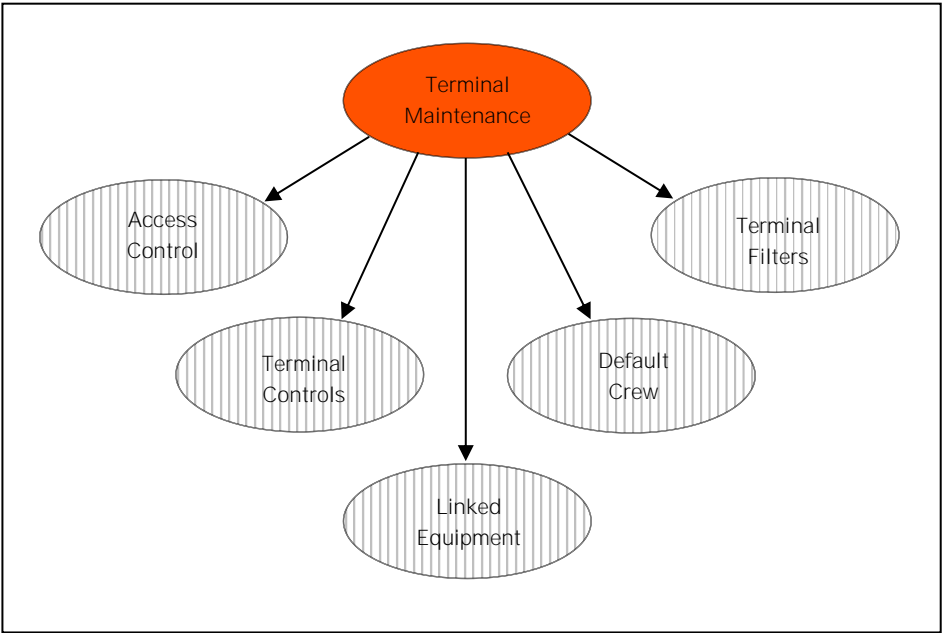
Terminals are configured by equipment, crew or employee to display scheduled/unscheduled job orders or only job orders within a specific period or within custom filter definitions.

You will learn in this chapter how execution management can be used to control the type of activity to be performed during data collection.

Let's start by learning how the terminal feature can be used to build control into the manufacturing process. Terminals determine the functions that are available to a user for data collection and reporting purposes. The terminal definition represents a collection of predefined workbench elements which can be easily added or removed to suit the functions of your employees. Terminals are highly customisable and a flexible feature of LYNQ used for:

- Entrance clock in and clock out
- Production data collection

Workbench Execution Management Activities Diagram



Key

Activity performed in LYNQ

Activity performed in Enterprise Resource Planning

Activity performed in LYNQ & Enterprise Resource Planning

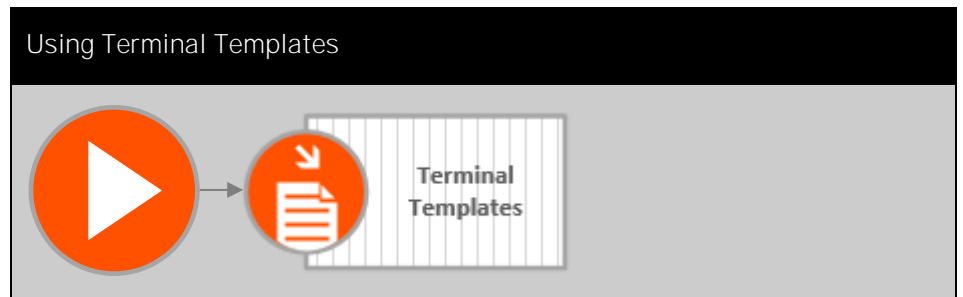
## Terminal Templates

### Templates for Training

Use the different template designs as a learning aid. It is best not to delete these from your training environment.

LYNQ is shipped with 8 pre-configured workbench terminal definitions, ready for immediate use. The configuration of these terminals has been designed to service well established manufacturing models and can be used as a template with minimal further configuration.

Click on the task to learn how to use terminal templates



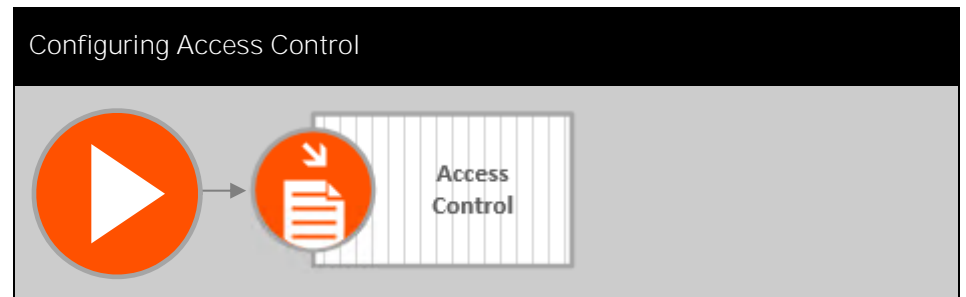
## Access Control

### Groups

Groups organise seats into a hierarchical structure, which models those found in an organisation. Users, employees and equipment seats are associated to one or more groups.

User access can be enabled for a terminal, providing controlled access at the group level. For an additional level of control, terminals can be password protected. Controlling access to terminals in this way, ensures only the correct resources are permitted to work on the activities that the terminal is configured to display.

Click on the task to learn how to configure access control



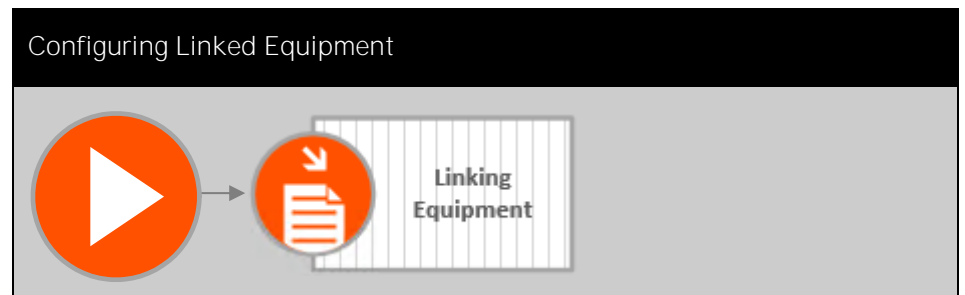
## Linked Equipment

### Limits

The terminal setup does not restrict how many equipment records it can link.

Terminals that are configured to display the workbench are split into two (2) different resource views. A workbench terminal can be configured to show a **view of the employee's** schedule and/or a view of the equipment schedule with additional functions for tracking equipment effectiveness. To enable the workbench to show equipment related functions, equipment must be linked to the terminal.

Click on the task to learn how to link equipment



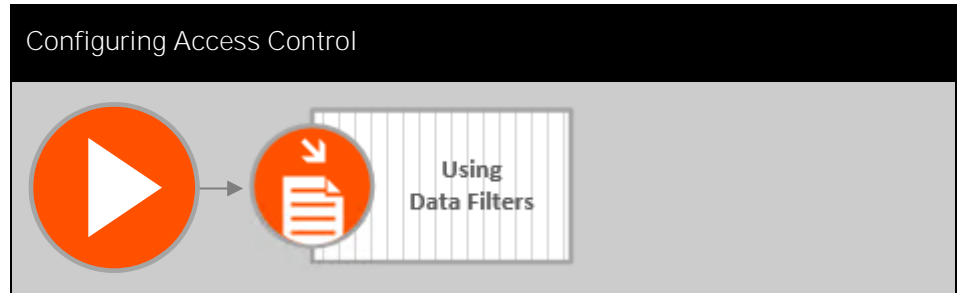
## Data Filters

### Task Filtering

Different terminals can have different filtering conditions.

Data filters can be applied to terminals, providing further control over the data presented in the terminal to a user.

Click on the task to learn how to use data filters





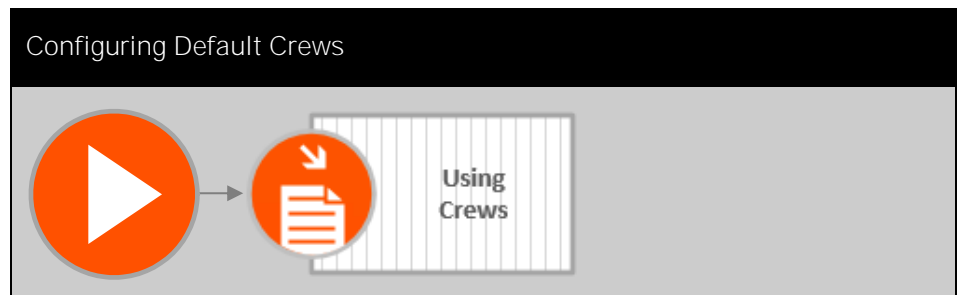
## Default Crew

### Changing Crews

If a terminal's configuration includes the Change Crew button, operators may change crew within the same workbench terminal. Remove this button if operators always work in a fixed crew.

LYNQ defines a crew, as a group of resources, that perform the same activities. Crews can be setup at the resource level or at the terminal level. A terminal can be associated with a default crew. When using the 'Join Crew as Terminal' button on the workbench, the default crew configured against the terminal is joined. Multiple crews can perform data collection activities against the same job orders.

Click on the task to learn how to use data filters



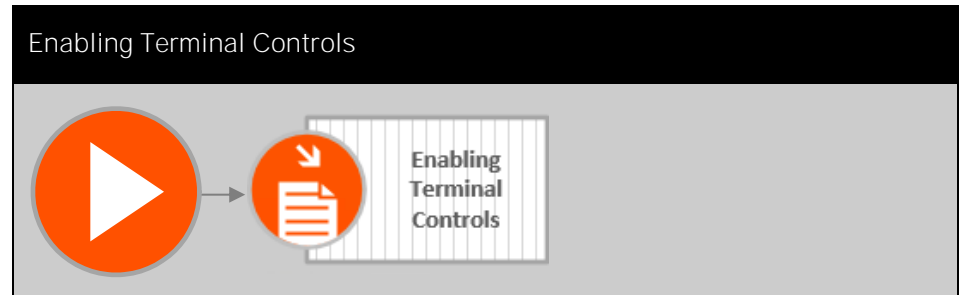
## Terminal Controls

### Different Controls

Different terminals can have different control settings.

Terminal control settings define whether the workbench enables by default, functions such as start task, stop task, report, view attachments, execute webhooks or track classification codes. These are the basic terminal control settings. For an explanation of advanced terminal controls, refer to the advanced setup and configuration guide.

Click on the task to learn how to use terminal controls



# Management (Transactions)

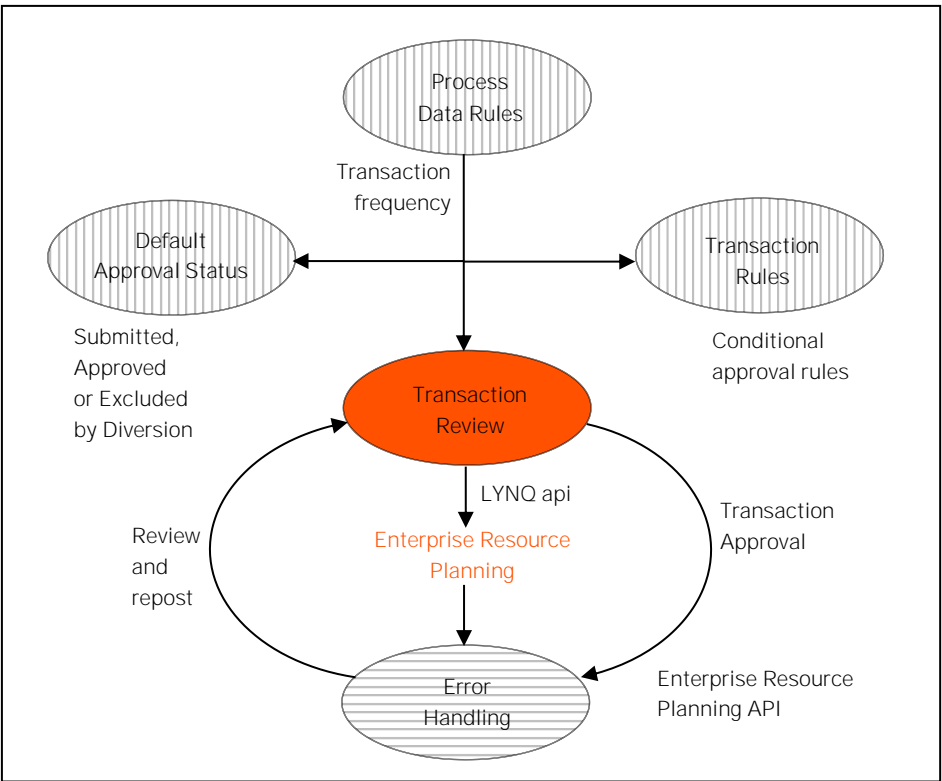
Error Handling

LYNQ returns errors generated by the Enterprise Resource Planning API to the transaction review screen. Users must periodically manage errors to ensure LYNQ is synchronised with Enterprise Resource Planning.

You will learn in this chapter how execution management can be used to control the creation and posting of transactions generated from data collection activities, to Enterprise Resource Planning.

Let's start by learning how data processing rules, default approval statuses and transaction rules can be used to build control into the data flow process as illustrated in the transaction execution management activities diagram.

Transaction Execution Management Activities Diagram



Key



Activity performed in LYNQ



Activity performed in Enterprise Resource Planning



Activity performed in LYNQ & Enterprise Resource Planning

## Transaction Types

### Activity Types

Different Enterprise Resource Planning applications support different activity types (i.e. setup, runtime, and teardown)

Different transaction types are generated in LYNQ when data collection activities are performed. By default, LYNQ is capable of generating transactions for:

- Labour time
- Equipment time
- Operational quantity
- Operational scrap quantity
- Manufactured quantity
- Operational status
- Material issues and rejects
- Production issues

It is important to note that supported transaction types, will be dependent upon the product definition capabilities in Enterprise Resource Planning. Check the glossary from the help menu in LYNQ, to understand which transaction types can be generated and posted to your Enterprise Resource Planning application.

LYNQ extends the data collection features of Enterprise Resource Planning by adding an additional (activity) reporting dimension for labour, time, status quantity and material issue transactions.

Transactions are generated with a combination of all three (3) attributes:

- Job Order
- Operation
- Activity Type (i.e. setup, run, teardown)

All three (3) attributes define the task code. For example, the task code for Job Order 687456 for runtime activity of operation 2 would be defined as 687456.2.Run. The task code for Job Order 698654 for setup activity for operation 1 would be defined as 698654.1.Set.

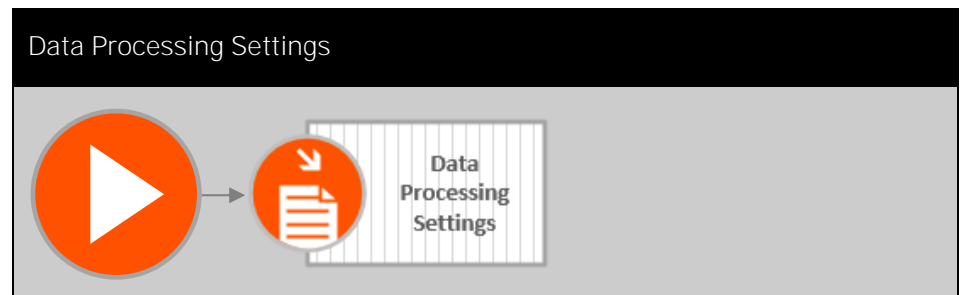
## Transaction Generation Rules

### Automation

LYNQ can generate significant volumes of data when both manual and automated data collection is in use. Data processing settings can help to balance the volume of data generated.

Considering transactions in LYNQ are generated at the granular activity level, it is important to control at which stages in the manufacturing process, transactions are physically generated for review. Generating transactions too frequently can result in extremely large volumes of data, which can be difficult to manage. Generating transactions too infrequently, can result in delays of visualising work in progress.

Click on the task to learn how to enable data processing settings



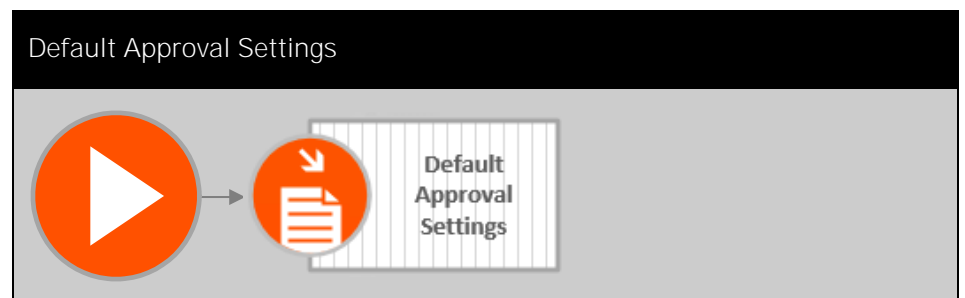
## Default Approval Status

### Complete Control

Set the approval status for activities to Submitted, if complete control of posting to Enterprise Resource Planning is required.

LYNQ maintains three (3) default approval status values for transactions generated through data collection activities. The default values are: submitted, approved and excluded. Transactions with a default approval status of submitted must be approved before posting to Enterprise Resource Planning is permitted. Transactions with a default approval status of approved, do not require approval and will automatically post to Enterprise Resource Planning. Transactions with a default approval status of excluded, will not be approved or posted to Enterprise Resource Planning. The default approval status is configured by task type (activity of setup, run, teardown etc)

Click on the task to learn how to configure default approval settings



## Transaction Rules

### Exception Handling

Transaction rules allows a manufacturer to only deal with approval of exceptions, reducing the level of transaction management required.

Transactions rules provide further flexibility than default approval status settings, which do not allow conditions be applied. Transaction rules can be configured to change the default approval status by:

- Transaction type
- Conditional IF statements for quantity, labour time and issue quantity
- Task type
- Diversion
- Employee
- Equipment

Click on the task to learn how to create transaction rules



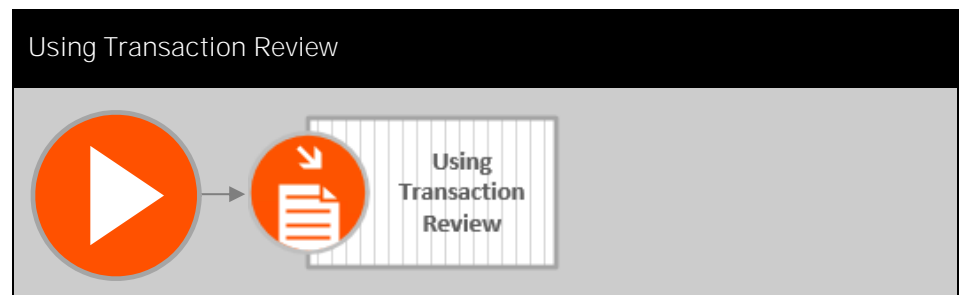
## Transaction Review

### Supervisor Control

Typically, supervisors are responsible for reviewing and approving transactions. It is possible to enable what is effectively record level security, so that supervisors can only see records that relate their own group members. These settings are in Settings, General.

Transaction review provides complete visibility of all transactions generated in LYNQ. This screen can be used for approving transactions that are not automatically approved by the default approval status settings or by transaction rules. Once approved, transactions will post to Enterprise Resource Planning using the LYNQ api component. The integration can be configured to run at set minute or hour intervals. A review of transactions should be done regularly to ensure Enterprise Resource Planning maintains accurate analysis and financial data.

Click on the task to learn how to use transaction review





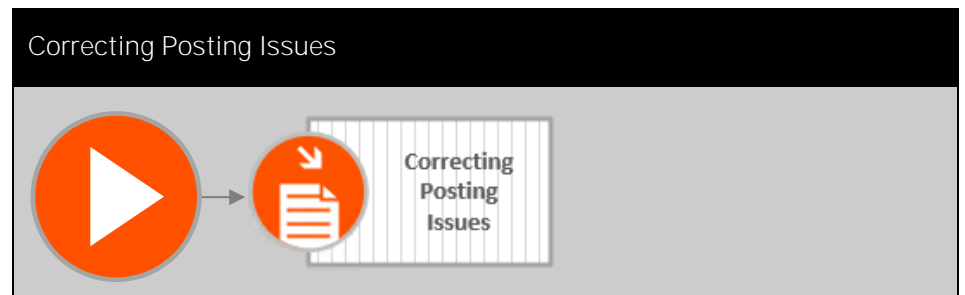
## Correcting Posting Issues

### Minimise Issues

Posting issues should be minimal, with the correct configuration and operational use of LYNQ.

There may be times when transactions generated in LYNQ cannot successfully post to Enterprise Resource Planning. The error message returned in the transaction review screen is typically generated via the API of the Enterprise Resource Planning application. To view common error messages for your Enterprise Resource Planning application, logon to the LYNQ portal and perform a search against the knowledgebase for 'common posting errors'.

Click on the task to learn how to correct posting issues



## Using Webhooks

### Technical Terms

Webhooks functionality delivered in LYNQ differs technically to Webhooks most widely used by developers for retrieving and storing data from a certain event.

By using Webhooks, it is possible to easily extend the execution of LYNQ by passing data to other third party web based applications. In addition to communicating with other external applications, Webhooks facilitate the extension of data displayed in the workbench, workbench reporting screen and on customisable report pages.

Webhooks in LYNQ allows parameterised query strings to be passed to any web based application where there is a common form of data. Webhooks are designed to be flexible and an understanding of the use of parameters in LYNQ and the third party application, is required to configure this feature.

Webhooks can be used in many situations and every use case is different. One good example for their use, is when LYNQ must be able to pass the data in relation to the job order, when reporting manufactured quantities, to a barcode label printing application. The barcode application prints the finished goods label, using data passed from LYNQ as parameters.

The webhooks feature guide is found under guides and whitepapers when clicking on the LYNQ help menu.

## Using Actions

### Manual and Automated

Actions are configured to be either fully automated or configured to run manually.

Actions can be used to enforce and control certain aspects of execution management. This functionality provides a quick and easy way to perform actions against single or multiple resources. For example, when a manufacturer wants to send all operators to break or lunch at a certain time of the day or to clock all operators out at the end of their shift, to reset the accounting date for equipment that may be operational past midnight.

Click on the task to learn how to use actions



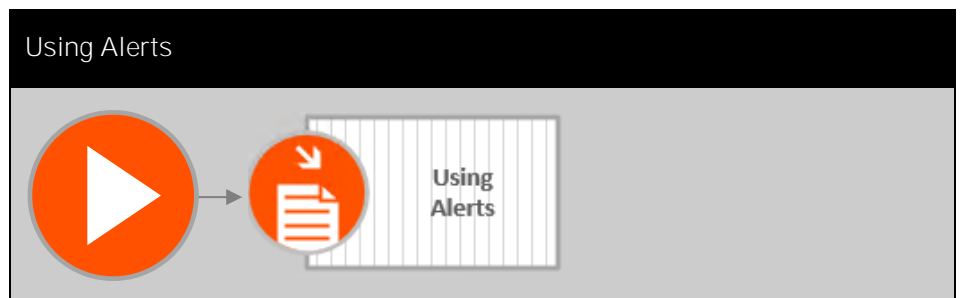
## Using Alerts

### Email Configuration

To send alerts via email, LYNQ uses the SMTP settings configured under Settings in LYNQ. All outgoing email is sent using the account details provided, to the SMTP host provided. LYNQ can only send email to application users. In seat maintenance, configure the email address for each application user that should receive email alerts. Email addresses are automatically read from active directory when clicking on the find button.

A lot happens in any given day on the shop floor and it is impossible to constantly review status screens to monitor the environment. LYNQ helps the production team by providing alerts. Alerts are visible within the application itself but can also be emailed. LYNQ by default, includes common preconfigured alerts to help any manufacturer get started. Alerts can be turned on to monitor performance, quality, or availability for either employees or equipment. Users that are assigned as a group owners will automatically receive alerts for group members (employees or equipment).

Click on the task to learn how to use the Alerts



## Using Issues

### Custom Issues

Users can create custom issues in Advanced Settings.

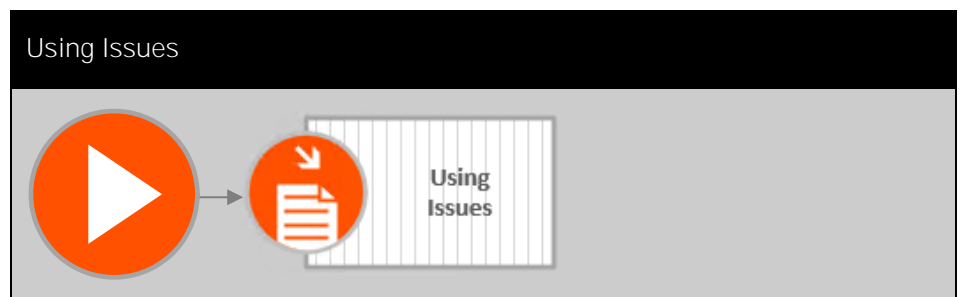
### Improvements

Issues should be reviewed for continuous improvement purposes, discussed later in this training guide.

Prompt action and resolution to production issues arising on the shop floor, will **help manufacturers prevent disruption to manufacturing operations**. In LYNQ's terms, issues are considered serious, where some form of action is required to resolve them. Unlike alerts, which are for informational purposes only

Alerts can be configured to create issues if required, however issues can be raised manually without there being any previous alert generated. Issues can be logged manually from the issue log screen or from the workbench. If tracking of abnormal operations is enabled, operators will be asked to record an issue if an operation is completed faster or slower than specified in the product definition.

Click on the task to learn how to use Issues



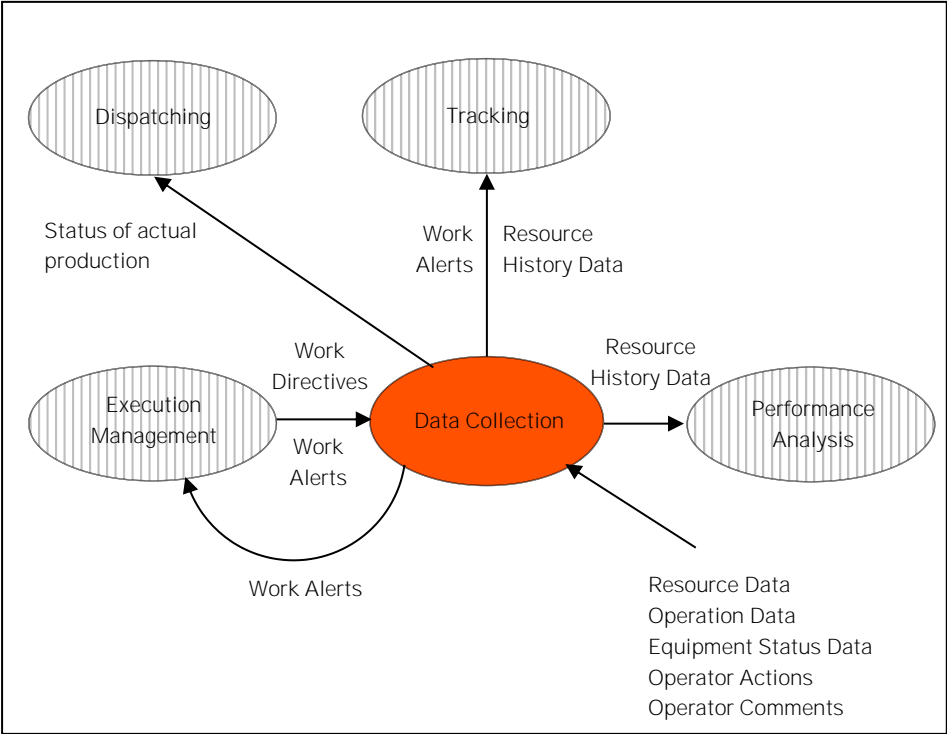
Data Collection

Real-time results

Data collection activities flow back into production dispatching. Ensuring that planning teams are aware of how job orders are progressing. The planner can see how much work has been completed by job order and by operation, with visual indicators to highlight whether the job order is running late. Production tracking and performance analysis provides real-time visibility of the progress and performance of work completed to date.

Data collection is a key component in the production process and refers to the collection, compilation and management of data from production activities. Data collection from a production process can be defined as manual, whereby data is entered by the operator or automated, whereby data is collected from a machine that is equipped with a sensor or programmable logic controller (PLC). Sensors and PLC's provide information about the products during manufacturing. Accurate data collection is essential when calculating key performance indicators such as overall labour effectiveness (OLE) and overall equipment effectiveness (OEE).

Data collection data flow diagram



Key

Activity performed in LYNQ

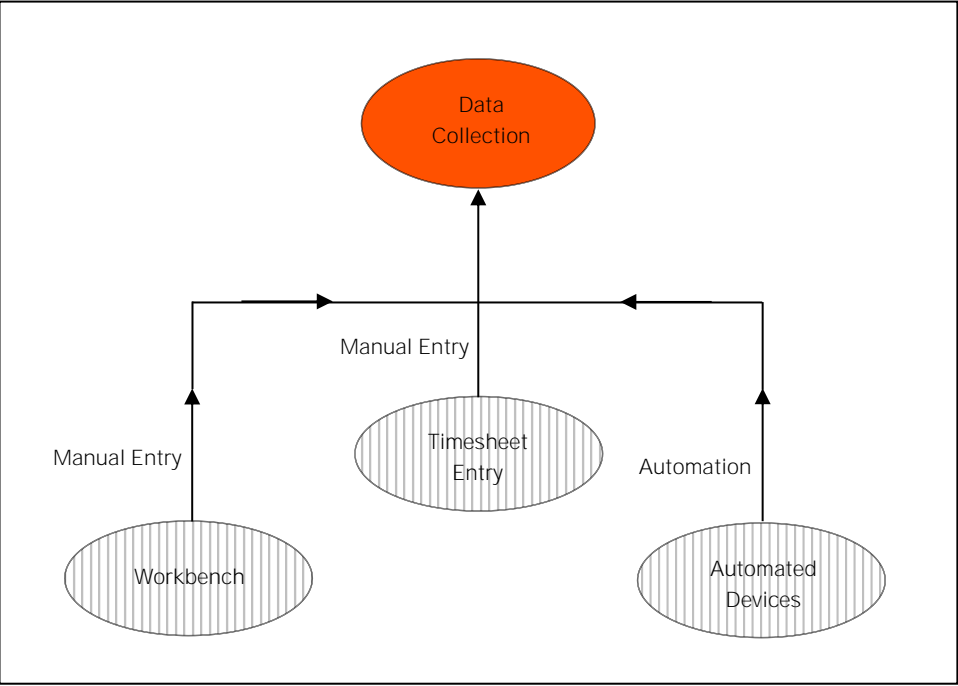
Activity performed in Enterprise Resource Planning

LYNQ API

In addition to data collection via the workbench, timesheets and automated devices, LYNQ support collection of data via its proprietary API. This training guide does not cover the use of the LYNQ API.

You will learn in this chapter how to perform activities of data collection using different methods, as illustrated in the data collection activities diagram.

Data Collection Activities Diagram



Key	
	Activity performed in LYNQ
	Activity performed in Enterprise Resource Planning
	Activity performed in LYNQ & Enterprise Resource Planning

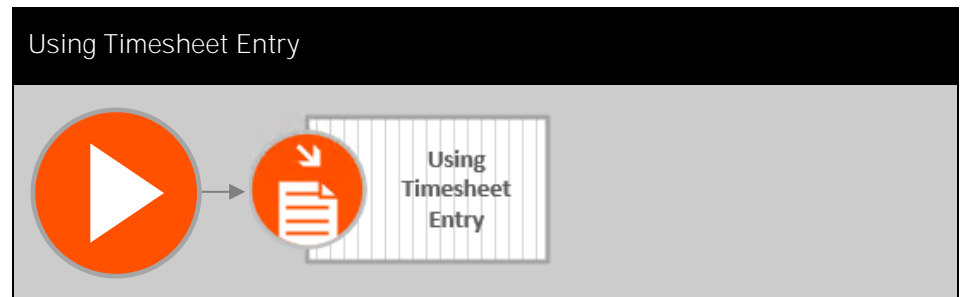
## Timesheet Entry

### Timesheet Layout

Administrators can customise the layout and default values provided in Timesheets within Advanced Settings.

Timesheet entries can be used by employees to enter data rather than using the real time tracking in the workbench. Timesheet entries are manually created by the application user and can be approved, submitted or excluded from posting no differently than transactions generated by the workbench feature.

Click on the task to learn how to use timesheet entry





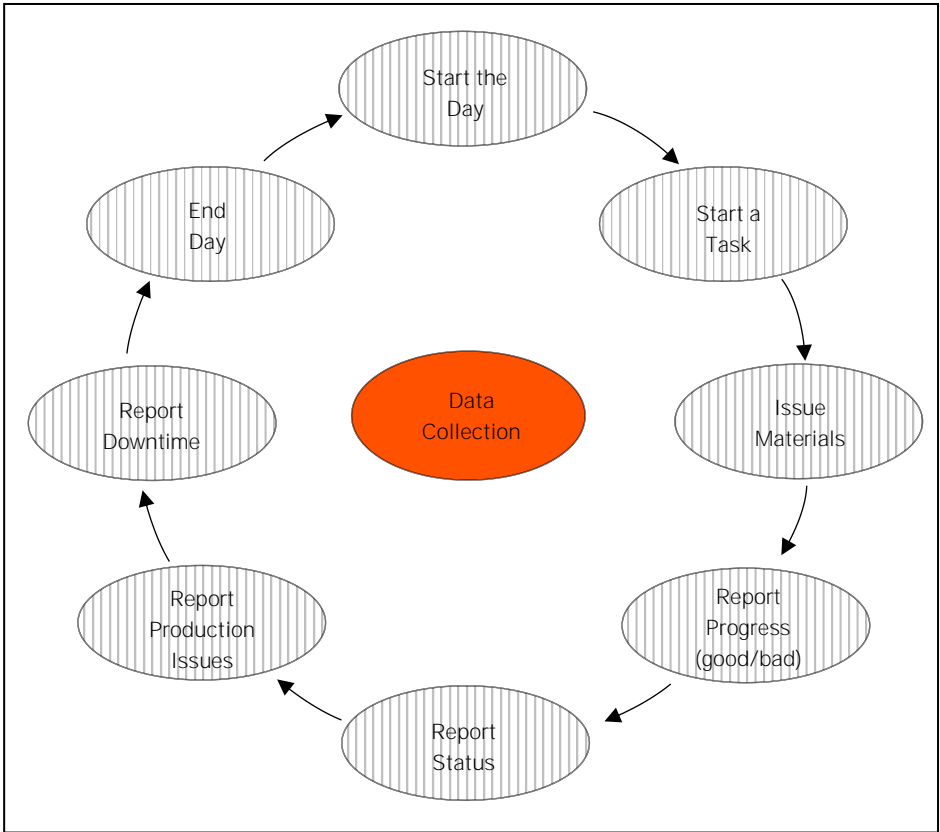
# Workbench

Tablets & Touchscreens

The workbench is optimised for tablet, touchscreen and PC devices. Refer to [system requirements](#) for further details.

Workbench provides real time data collection of production activities. The functionality available in the workbench, depends upon the design of the terminal. Before clocking into the workbench, a terminal must be selected by the user. **Let's take a look at** the advanced terminal that is shipped by default with LYNQ to learn how the workbench is used for data collection.

Workbench Data Collection Activities Diagram



Key

Activity performed in LYNQ

Activity performed in Enterprise Resource Planning

Activity performed in LYNQ & Enterprise Resource Planning

## Start the Day

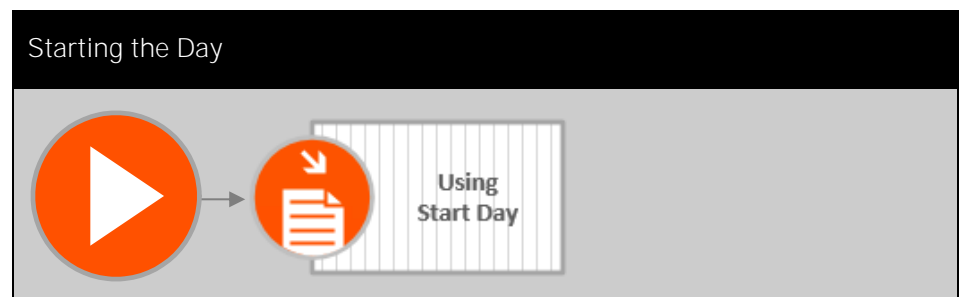
### Not just for shop floor

Keep in mind that clocking can be used for all employees, both on and off the shop floor (i.e. purchasing and/or other administrative personnel).

To measure performance and loss, LYNQ must track the activities from all employees and equipment, from the start of day to the end of the day or shift. To support this, LYNQ provides clocking functionality. The data gathered can be integrated with payroll systems if required.

Start day may be performed from an entrance/clock-in terminal or a shop floor data collection terminal. When the employee selects the function to start day, the date and time is recorded as the start of their office time. In this exercise, clock into LYNQ using the entrance terminal. All subsequent exercises on the subject of workbench, will use the advanced terminal.

Click on the task to learn how to start day



## Start a Task

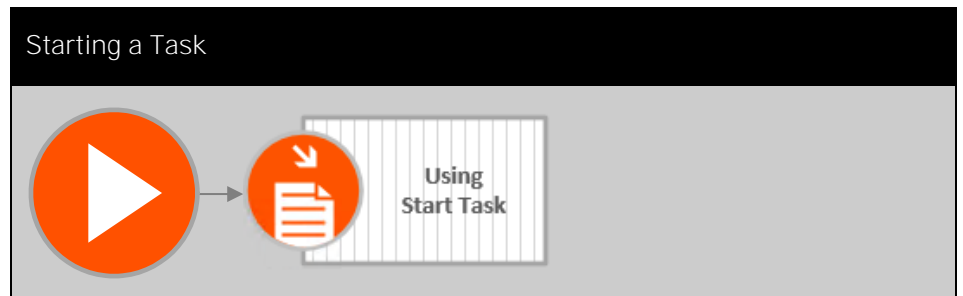
### Multi Jobbing

Employees will only be able to start multiple tasks if multi jobbing has been enabled in the Workbench On Screen Element settings. With this setting turned off, a running task will automatically stop when a new task is started.

Typically, the workbench screen is located at the work centre or work unit which is pre-set with the desired terminal. If the workbench is centrally located on the shop floor, the desired terminal must be selected before clock in.

Tasks can be started by selecting a scheduled task from the work schedule or by clicking on the add task option in either the employee workbench or the equipment workbench. LYNQ is configured to automatically start orders on the planned equipment when an employee starts a task from the employee workbench. The reverse behaviour will happen if an employee starts a task from the equipment workbench.

Click on the task to learn how to start a task



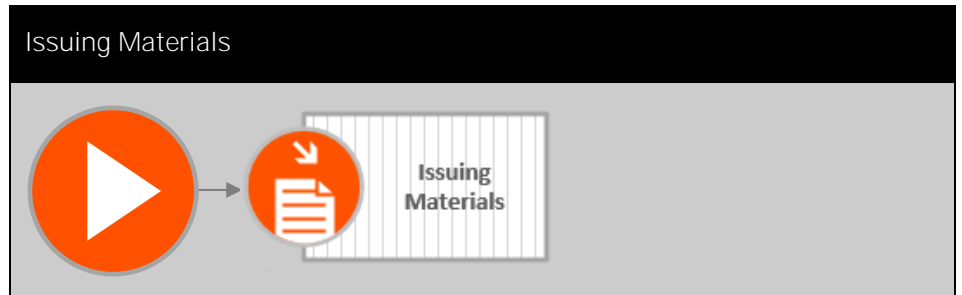
## Issue Materials

### Barcode scan lot/serial

Barcodes can be used to scan the lot, serial and bin details, instead of the user entering data manually. Validation settings allow enforcement of lot, serial and bin details. Validation settings are set in the Workbench On Screen Element settings.

To consume materials used during the manufacturing process, the issue materials function from the workbench is used. Materials are associated to the job order or operation and captured when the job order is created in Enterprise Resource Planning. Materials can be issued for single or multiple job orders.

Click on the task to learn how to issue materials



## Report Progress

### Material Backflush

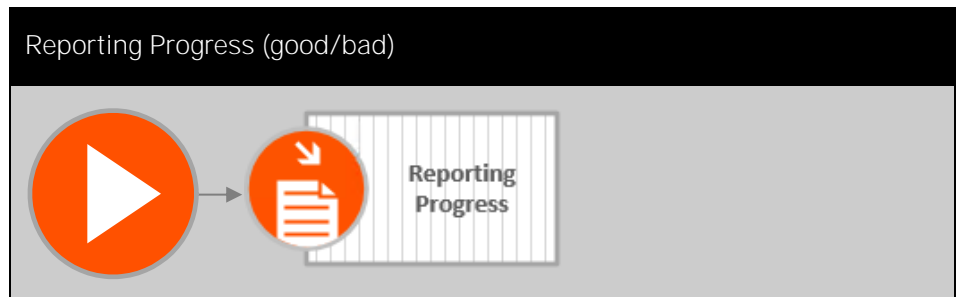
When Material Backflush is enabled in the Workbench On Screen Element Settings, material will be issued directly after the report of progress.

### Final Operation

When reporting quantity against the final operation, LYNQ will assume this is the point when manufactured quantities report to Enterprise Resource Planning. The page heading will show this as the final operation.

Progress for an operation can be reported using the report function. The report function caters for both good and bad quantities on the same screen. After reporting progress, the task in the workbench will automatically update to display the remaining quantity to complete. Quantities can only be entered for runtime operations. The report screen can be customised to include a webhook which can pass data as parameters to third party applications. The third party application must be capable to received parameters query strings. A common use case for webhooks is when the employee wants to print barcode labels when reporting production. Details on how to configure webhooks is found under guides and whitepapers when clicking on the LYNQ help menu.

Click on the task to learn how to report progress



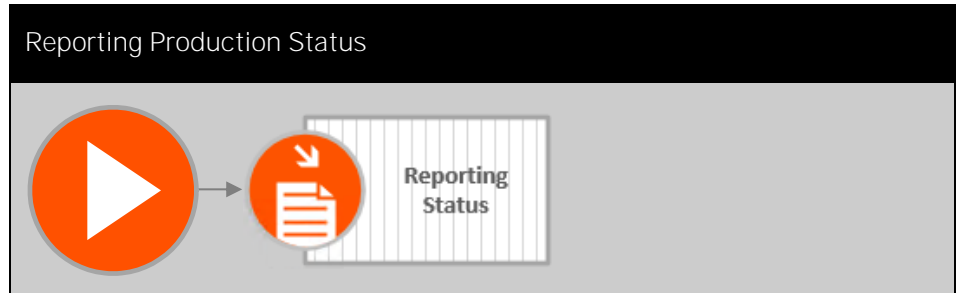
## Report Status

### Integration Settings

If Enterprise Resource Planning supports the posting of status transactions, users may want to configure at what point a status transaction will complete an operation. For example, let us assume Enterprise Resource Planning supports setup, runtime and teardown and data collection is completed against all 3 activities in LYNQ. In this example, the operation must remain open in Enterprise Resource Planning until data collection for teardown is complete. To achieve this, the setting to post status on final activity only must be enabled. This setting can be configured under the API settings in the LYNQ api website.

Once a task has been completed, the report function can be used to report the task as complete. The status field on the report screen allows the task to be either marked as complete or if already completed, as re-opened.

Click on the task to learn how to report status of an operation



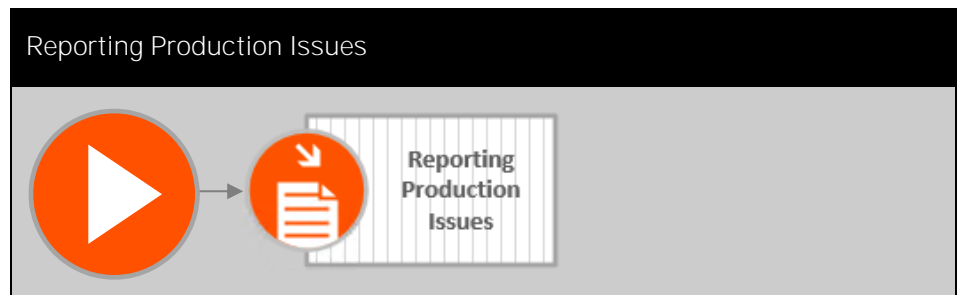
## Report Production Issues

### Alerts

If configured to do so, Alerts can automatically generate production issues. Removing reliance on the user to collect this data.

Production issues can be raised at any time through the workbench. LYNQ is shipping with pre-defined production issues for breakdowns, health and safety, minor stops, production rejects, reduced speed, setup and adjustments and startup rejects. Once generated, issues are visible from the issue log screen and any other relevant screens that the issue relates to. Issues are generally assigned to a user for resolution.

Click on the task to learn how to report production issues



## Report Downtime

### Webhooks

Downtime data can be passed to third party maintenance systems by using Webhooks. Refer to the Webhook page in this training guide for further information.

LYNQ supports the reporting of downtime when either employees or equipment are non-productive. For an employee, this may be associated to breaks, meetings and training. For equipment, this may be associated to equipment failures, general breakdowns, major adjustments, material shortages, operator shortages, setup/changeover, tooling failure, unplanned maintenance or warm up time.

Collecting equipment downtime data helps maintenance teams to prioritise preventive maintenance and equipment replacement. Trends can quickly help to identify whether downtime is isolated to a certain production shift. Whether the downtime is reported by the same operators which may be easily resolved with additional operator training.

Downtime data will reduce the resources availability % and ultimately, the percentages for overall labour effectiveness (OLE) and overall equipment effectiveness (OEE), providing a true reflection of their effectiveness.

Click on the task to learn how to report downtime





## End the Day

### Run more than once

End day can be run more than once in a day and is a quick way to change status of a resource to out/off and stop all tasks that are currently running. When applying upgrades to LYNQ it is recommended that employees are clocked out of the workbench.

**It's possible to quickly** clock out all users with an action. See the actions page in this training guide for further information.

The end day function is used to clock the employee out of the workbench. Any active tasks will be stopped immediately and the employee's status will change to clocked off. The employee's office time will stop being accounted for. The end day function can be run multiple times per day. By default, the end day function is provided on entrance terminals and shop floor data collection terminals.

Click on the task to learn how to report downtime



## Automated Devices

### Device Licenses

To automate equipment, device licenses are required. This type of license differs to the manual resource licenses, assigned to employees and equipment used for manual data collection. Click on the help menu and then select change product license to view the license details.

Factory automation is an exciting new feature first made available in LYNQ 2019. Factory Automation extends the existing manual data collection features in LYNQ, with automated data collection to determine equipment effectiveness (OEE).

Including:

- Up/Downtime (including downtime reason)
- Operational completion (Quantity)
- Operational scrap (including scrap reason)

Click [here](#) to read the factory automation feature guide

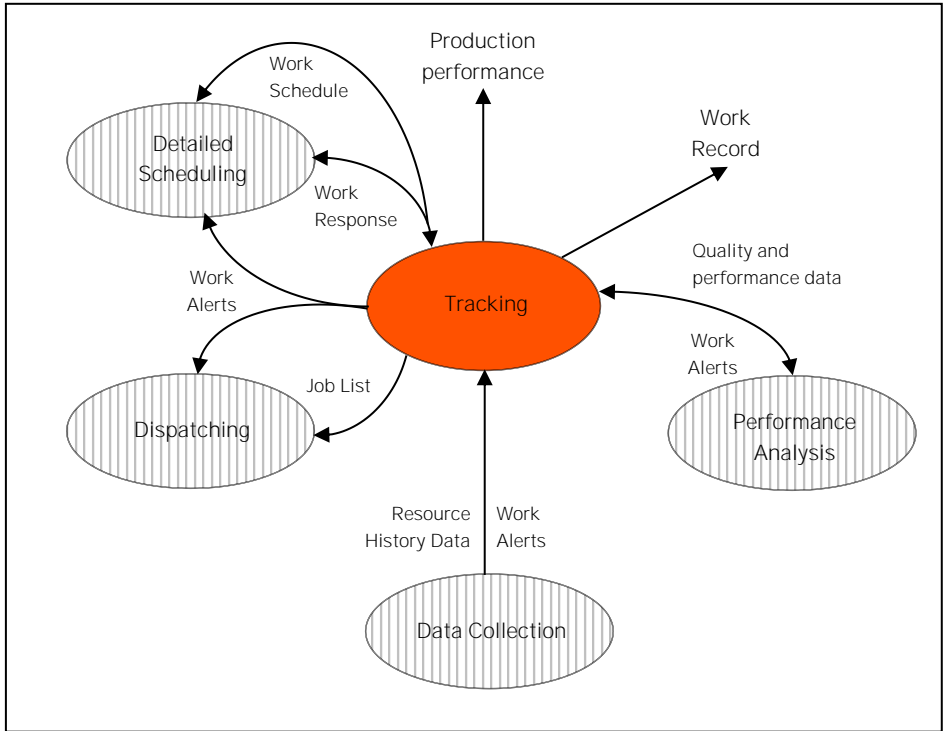
# Tracking

**Data Flow**

All data collection activities flow into production tracking. Tracking provides the manufacturer with production performance and analysis.

Tracking summarises data relating to personnel and equipment used to produce a product. Including the current operating conditions as these may affect the production schedule and how much material has been consumed or produced as a result of data collection. Tracking is presented as a collection or real-time status and progress reports and dashboards.

Production Tracking data flow diagram



Key

Activity performed in LYNQ

Activity performed in Enterprise Resource Planning

Activity performed in LYNQ & Enterprise Resource Planning

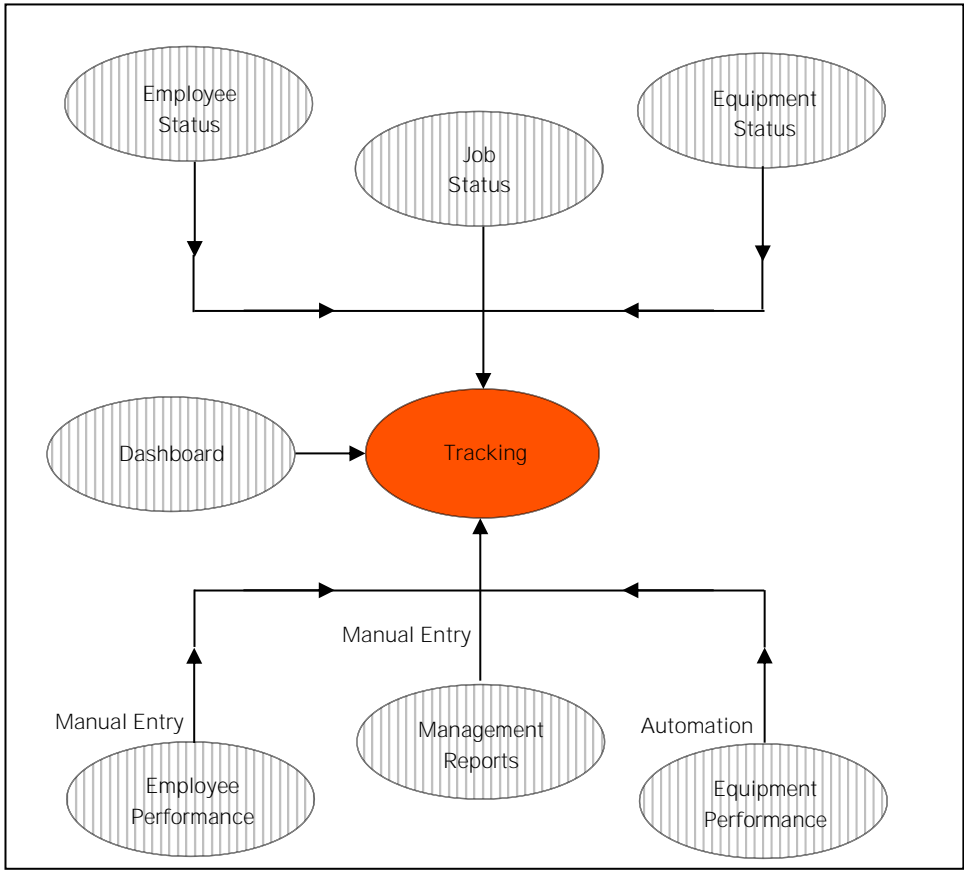
# Tracking

Real-time events

Tracking is updated in real-time, providing complete visibility of the live status of manufacturing operations.

You will learn in this chapter how to perform activities of production tracking using different methods, as illustrated in the tracking activities diagram.

Production Tracking Activities Diagram



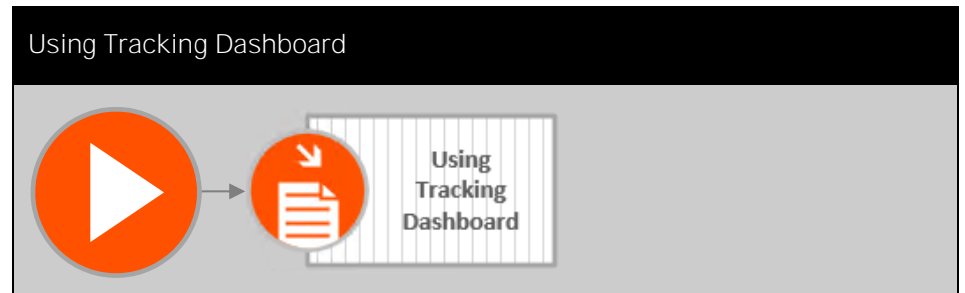
## Tracking Dashboard

### Data caching

LYNQ performs background caching of the data that you see in dashboards and reports. The caching process runs every 1 to 2 minutes. You must refresh the reports manually to read the latest cached data sets.

The tracking dashboard provides a high level view of job orders, products, employees and equipment. Select specific employees and equipment to view status and performance for a selected time period.

Click on the task to learn how to use the tracking dashboard



## Employee Status

### Automatic Refresh

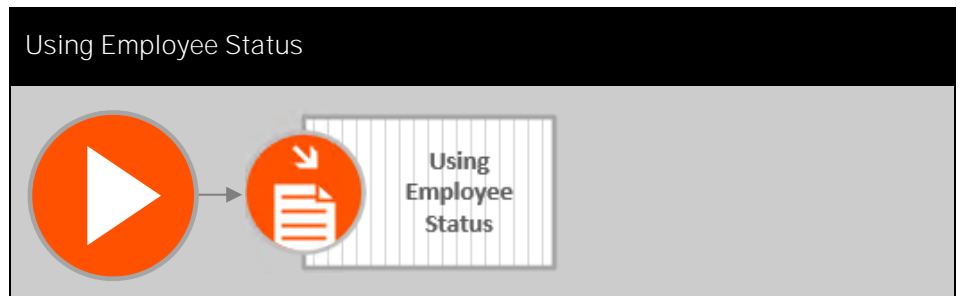
Employee status includes a page setting for automatic refresh. This enables the report to automatically refresh on large monitor screens, without manual intervention.

### Customise

The columns on the Employee status list view are easily customised by clicking on the customise button when the report is open. Columns added to employee status list view are visible to all LYNQ users.

The employee status report provides an at a glance live view of employees, what their current status is, what they are working on, and how they are performing during their shift. Drilling down into each employee card will show a detailed view of their status. When actions are setup in LYNQ and enabled for manual processing, they can be executed from the employee status screen. This provides a very quick and easy way to clock out individual or groups of employees, for example. Actions can be configured to automate certain functions within LYNQ.

Click on the task to learn how to use the employee status report



## Equipment Status

### Automatic Refresh

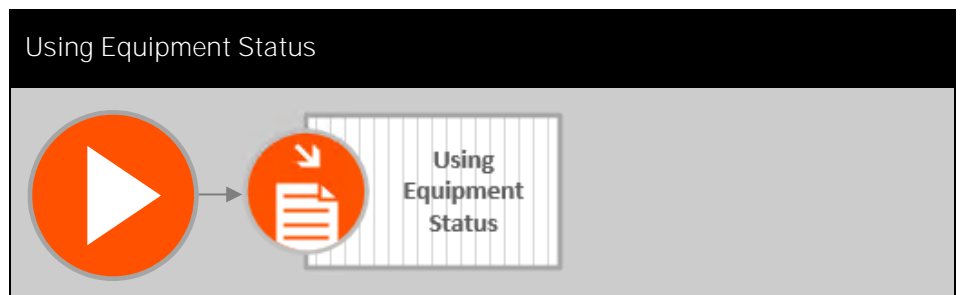
Equipment status includes a page setting for automatic refresh. This provides automatic refresh on large monitor screens, without manual intervention.

### Customise

The columns on the equipment status list view are easily customised by clicking on the customise button when the report is open. Columns added to equipment status list view are visible to all LYNQ users.

The equipment status report provides an at a glance live view of equipment, what the current status is, what jobs order they are running, and how they are performing during the shift. Drilling down into each equipment card will show a detailed view of their status. When actions are setup in LYNQ and enabled for manual processing, they can be executed from the equipment status screen. This provides a very quick and easy way to turn off individual or groups of equipment, for example. Actions can be configured to automate certain functions within LYNQ.

Click on the task to learn how to use the equipment status report



## Job Status

**Automatic Refresh**

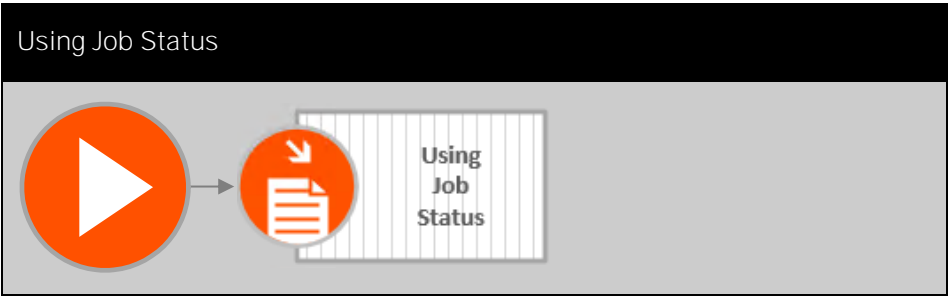
Job status includes a page setting for automatic refresh. This provides automatic refresh on large monitor screens, without manual intervention.

**Customise**

The columns on the job status are easily customised by clicking on the customise button when the report is open. Columns added to job status are visible to all LYNQ users.

The job status report provides a way to review open job orders to check their current status. Progress bars provide visibility of hours booked, materials issued and overall progress at a glance. Drilling down into each job order will provide a way to view the specific job order details, including attached documents and issues recorded.

Click on the task to learn how to use the job status report





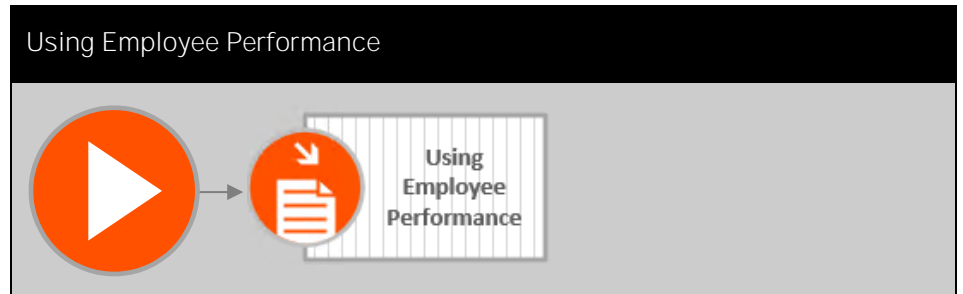
## Employee Performance

### Customise

The columns on the employee performance detail and audit tab are easily customised by clicking on the customise button when the report is open. Columns added to employee performance are visible to all LYNQ users.

The employee performance report provides detailed analysis of an individual employee's performance with supporting detail by operation. Included in this report is an audit trail of all events performed by the employee, a record of the issues and alerts raised in relation to the employee and an adjustments screen to directly edit clocked in and out times.

Click on the task to learn how to use the employee performance report



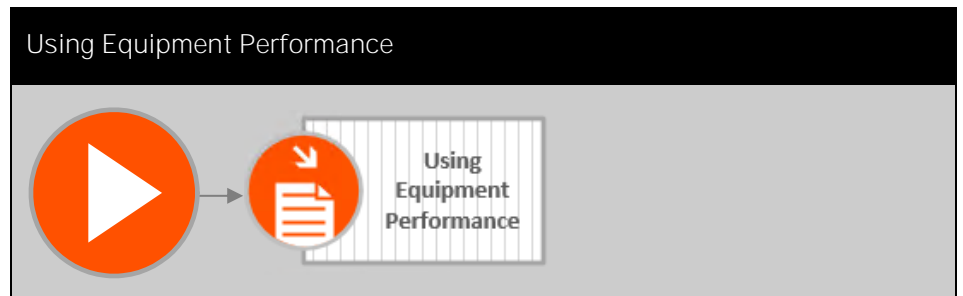
## Equipment Performance

### Customise

The columns on the equipment performance detail and audit tabs are easily customised by clicking on the customise button when the report is open. Columns added to equipment performance are visible to all LYNQ users.

The equipment performance report provides detailed analysis of individual equipment performance with supporting detail by operation. Included in this report is an audit trail of all events performed by the equipment, a record of the issues and alerts raised in relation to the equipment and an adjustments screen to directly edit on and off times.

Click on the task to learn how to use the equipment performance report



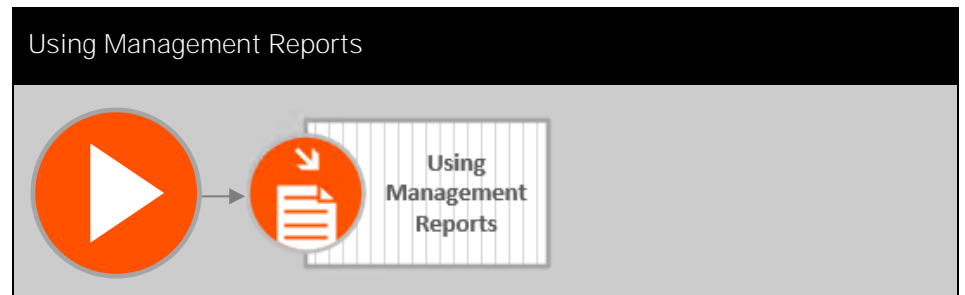
## Management Reports

### Customise

The columns on the management reports detail, availability and pivot tabs are easily customised by clicking on the customise button when the report is open. Columns added to management reports are visible to all LYNQ users.

Management reports provide a view of analytics associated with employee or equipment availability (uptime/downtime) for management purposes. Including daily clock hours reconciliation and an option to create custom management reports using pivot tables.

Click on the task to learn how to use the management reports



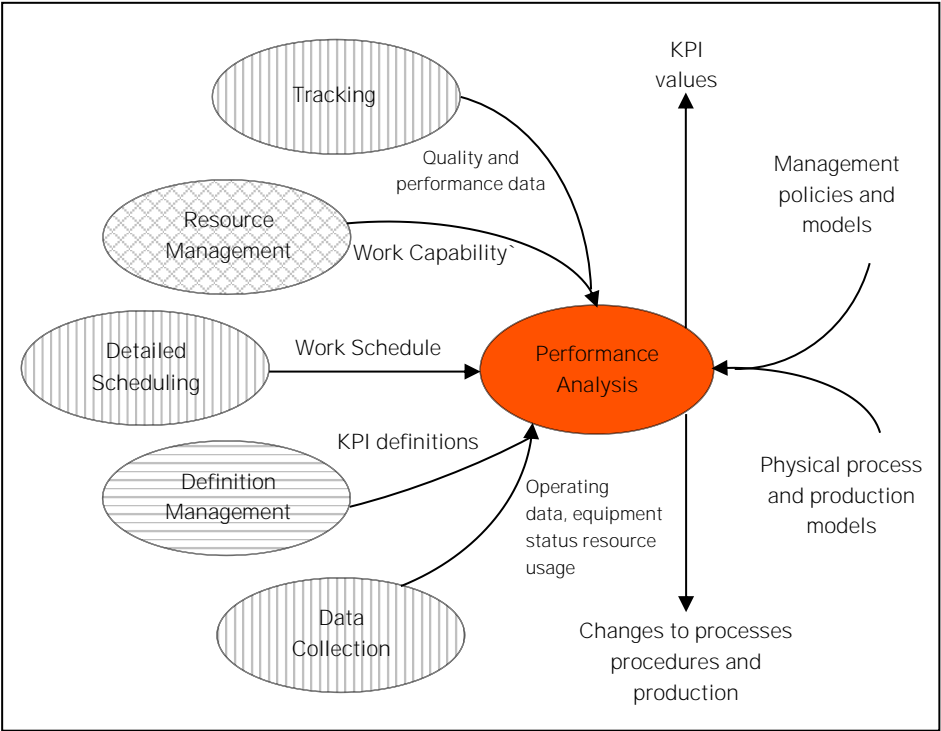
Performance Analysis

Data Flow

All the outcomes from detailed production scheduling, data collection and production tracking are visualised in performance analysis. Performance analysis provides factory level analysis for manufacturing operations management.

Performance analysis deals with the reporting of performance information and includes resource based analysis such as overall labour effectiveness (OLE), overall equipment effectiveness (OEE), total effective equipment performance (TEEP) and product based analysis such as cycle times, procedural efficiencies and production variability.

Performance Analysis data flow diagram



Key

Activity performed in LYNQ

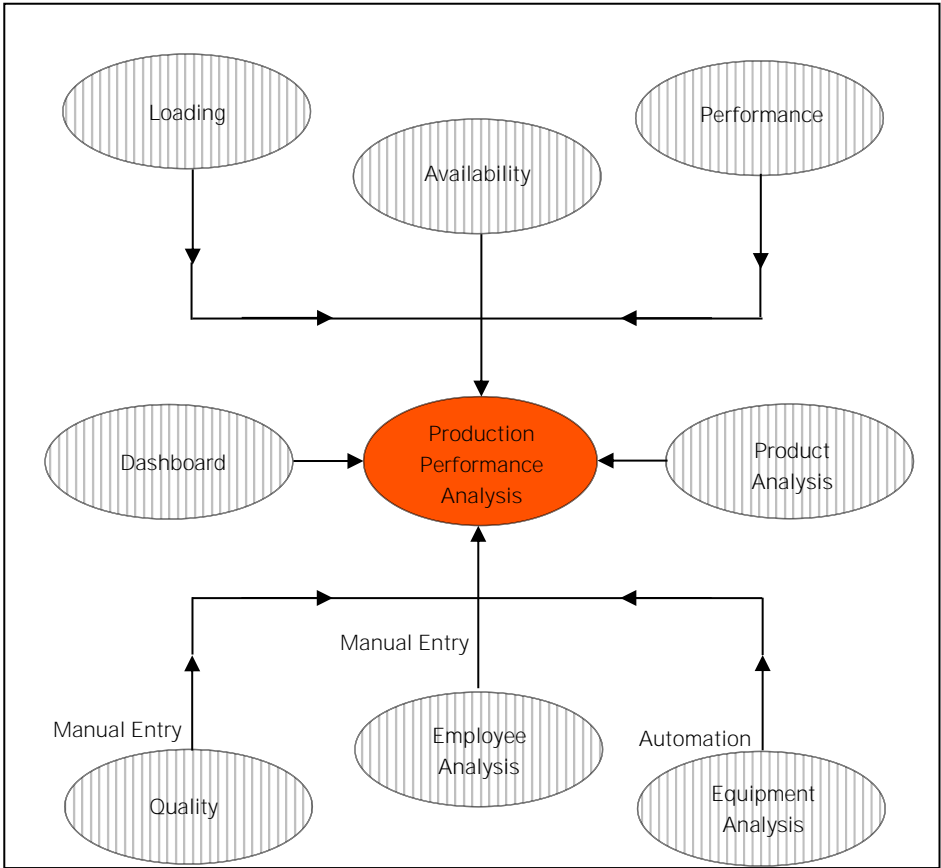
Activity performed in Enterprise Resource Planning

Activity performed in LYNQ & Enterprise Resource Planning

**Source**  
Performance analysis is visible in LYNQ with the exception of manufacturing cost analysis, which is obtained from Enterprise Resource Planning.

You will learn in this chapter how to perform activities of production performance analysis using different methods, as illustrated in the production performance analysis activities diagram.

Performance Analysis Activities Diagram



Key

	Activity performed in LYNQ
	Activity performed in Enterprise Resource Planning
	Activity performed in LYNQ & Enterprise Resource Planning

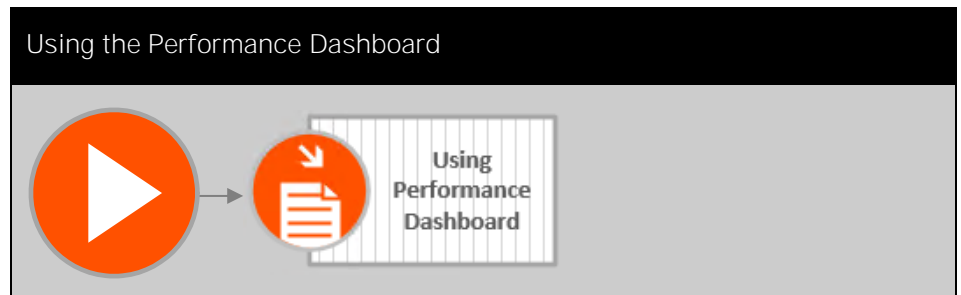
## Performance Analysis Dashboard

### Data caching

LYNQ performs background caching of the data that you see in dashboards and reports. The caching process runs every 1 to 2 minutes. You must refresh the reports manually to read the latest cached data sets.

The dashboard under performance analysis provides factory level analytics of equipment showing both OEE and TEEP key performance indicators. This dashboard supports drilldown to supporting metrics and measurement of loading, availability, performance and quality.

Click on the task to learn how to use the performance dashboard



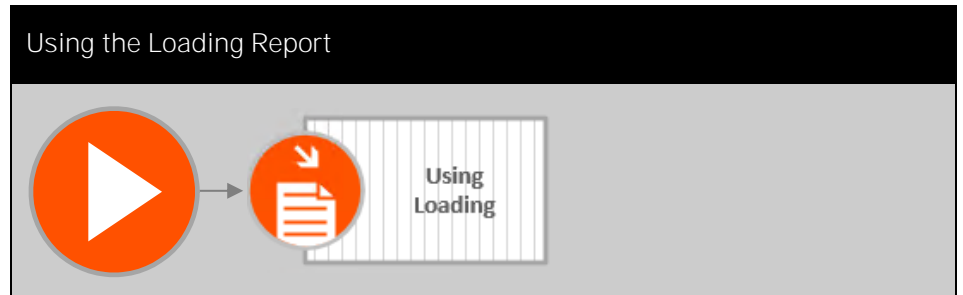
## Loading

### Customise

The columns on the loading details tab are easily customised by clicking on the customise button when the report is open. Columns added to the loading report are visible to all LYNQ users.

The loading report provides detailed analysis of the loading position of resources with comparisons to last month and/or quarter to understand trends. Use this to compare planned uptime with all the time available (calendar time) to gain insight of asset utilisation to support capital expenditure and other management decisions.

Click on the task to learn how to use the loading report



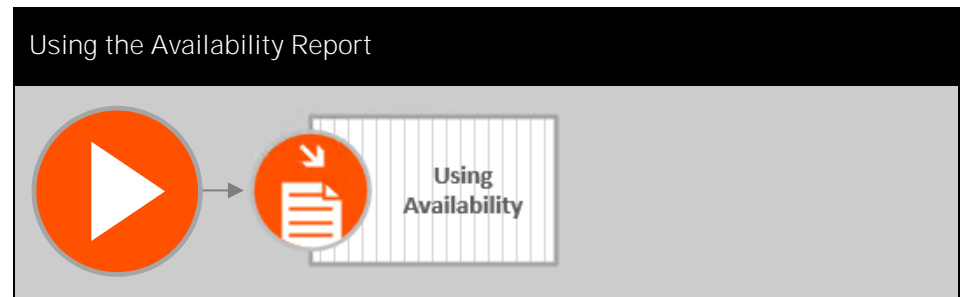
## Availability

### Customise

The columns on the availability details tab are easily customised by clicking on the customise button when the report is open. Columns added to the availability report are visible to all LYNQ users.

The availability report provides a detailed analysis of the availability of employees or equipment with comparisons to last month and/or quarter to understand trends. Use this to gain insight of actual uptime compared with planned uptime and see where unplanned downtime occurs in relation to equipment breakdowns, tooling failures, operator shortages and more.

Click on the task to learn how to use the availability report





## Performance

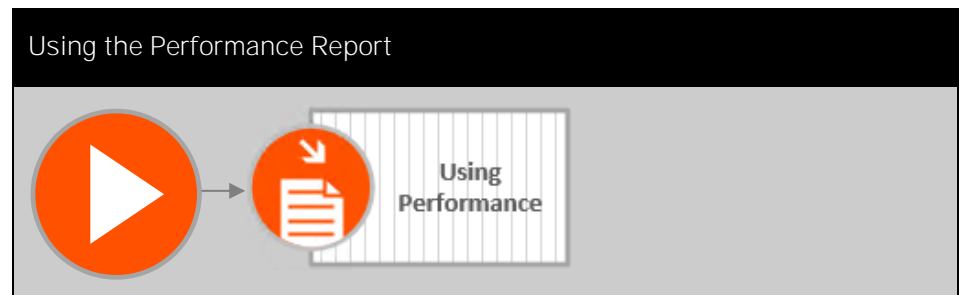
### Customise

The columns on the performance details tab are easily customised by clicking on the customise button when the report is open.

Columns added to the performance report are visible to all LYNQ users.

The performance report provides detailed analysis of the performance of employees or equipment with comparisons to last month and/or quarter to understand trends. Use this to gain insight of why actual run rates differ from planned run rates and see where performance loss occurs in relation to operator inefficiencies, equipment wear and tear, minor stops from component jams and more.

Click on the task to learn how to use the performance report



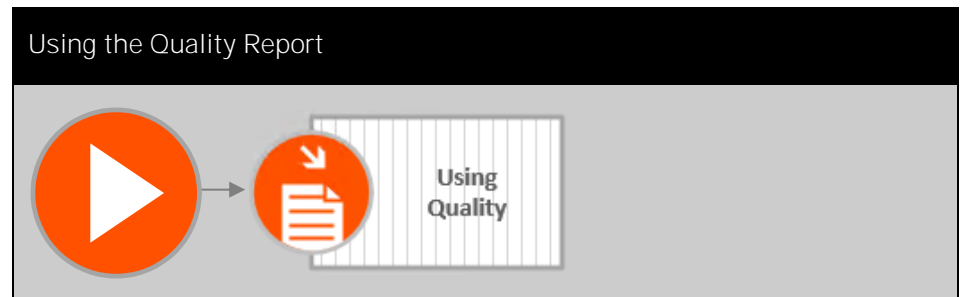
## Quality

### Customise

The columns on the quality details tab are easily customised by clicking on the customise button when the report is open. Columns added to the quality report are visible to all LYNQ users.

The quality report provides detailed analysis of the quality output from employees or equipment with comparisons to last month and/or quarter to understand trends. Use this to gain insight by resource of where product quality issues have affected output.

Click on the task to learn how to use the quality report



## Employee Analysis

### Customise

The columns on the employee analysis by employee, by diversion and availability tabs are easily customised by clicking on the customise button when the report is open. Columns added to the employee analysis report are visible to all LYNQ users.

The employee analysis report provides detailed analysis of employee performance. Filter by individual employees or analyse performance for a specific group of employees. Further analyse by date or diversion.

Click on the task to learn how to use the employee analysis report



## Equipment Analysis

### Customise

The columns on the equipment analysis by equipment, by diversion and availability tabs are easily customised by clicking on the customise button when the report is open. Columns added to the equipment analysis report are visible to all LYNQ users.

The equipment analysis report provides detailed analysis of equipment performance. Filter by individual equipment or analyse performance for a specific group of equipment. Further analyse by date or diversion.

Click on the task to learn how to use the equipment analysis report



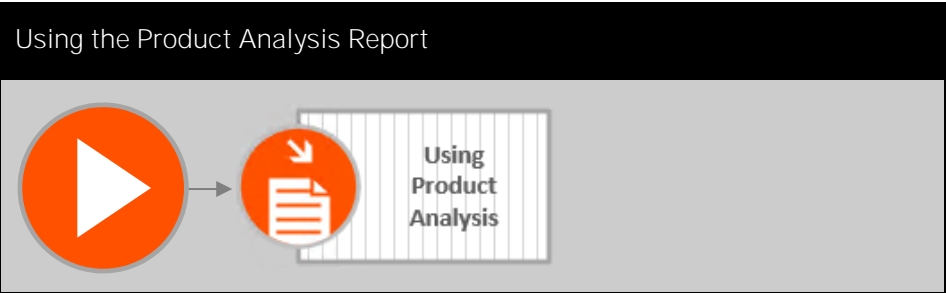
## Product Analysis

Customise

Unfortunately, the on the product analysis report cannot be customised at this time.

The product analysis report provides output and quality analysis for products by employee and/or equipment.

Click on the task to learn how to use the product analysis report



## Continuous Improvement

### Lean manufacturing

Continuous improvement is the visualisation and elimination of loss through the application of countermeasures, resulting in a lean manufacturing environment.

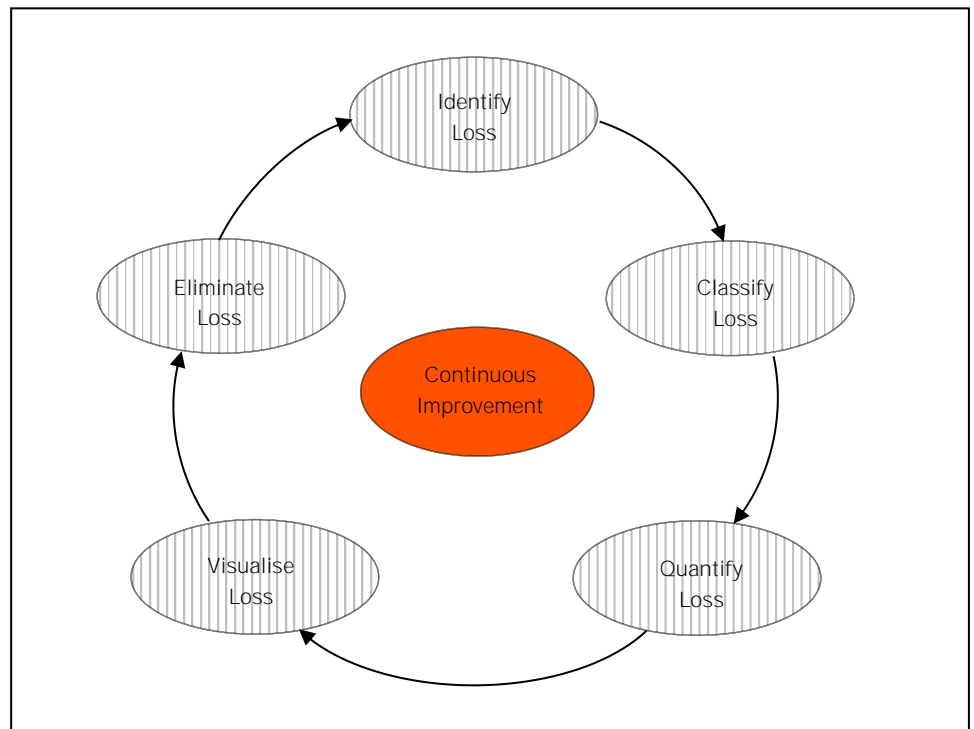
To include continuous improvement activities into the manufacturing process, it is important that a critical look of the outputs from the manufacturing process is performed. Continuous improvement can only be made after areas of loss have been identified. Loss should be classified and quantified to determine which losses should be eliminated first.

The average manufacturer lacks visibility of losses, especially when a manufacturing execution system is not in place. Therefore, preventing the manufacturer from increasing output and/or reducing costs. The hours spent producing good product in a 24 hour day, is a good indicator of how effective a manufacturer is performing.

Thankfully, LYNQ solves these issues by including a loss management report which will easily visualise losses made from the manufacturing process.

You will learn in this chapter how to perform activities of continuous improvements, as illustrated in the continuous improvements activities diagram.

Continuous Improvement Activities Diagram



## Identifying Loss

### Automatically captured

LYNQ automatically captures loss analysis, through data collection activities. Management teams must periodically review the loss management report to improve manufacturing operations.

In LYNQ loss is identified in four categories.

- Loading
- Availability
- Performance
- Quality

Loading loss comes from Visual APS as the calendar time that is not scheduled for operation. Availability loss comes from operators and equipment recording downtime. Performance loss comes from operators and equipment reporting reasons why job orders are running slowly. Quality loss comes from operators and equipment recording scrap and the scrap reason.

Click on the task to learn how to use the loss management report



## Six Big Losses

Six Big Losses are an effective way to categorise equipment-based losses. Six big loss aligns with overall equipment effectiveness (OEE) and provides an excellent target for improvement actions.

## Classifying Loss

Loading loss can be classified as maintenance, idle time and changeover time. Availability loss can be classified as breakdowns, tooling failures, major adjustments etc. Performance loss can be classified as operator inefficiencies from lack of training, slow running due to older equipment. Quality loss can be classified by the various scrap reasons reported.

The classification of Availability, Performance and Quality is often referred to as Six Big Loss.

- Availability loss splits into breakdowns and Setup & Adjustments
- Performance Loss splits into Minor Stops and Reduced Speed.
- Quality Loss is splits into Startup and Production Rejects

### Six Big Loss Diagram





## Quantifying Loss

### Settings

Loss management reads the default system wide labour rate, employee revenue rate, overhead rate, equipment revenue rate setup in Advanced Settings/General. Rates can also be setup at the seat level in seat maintenance, which will override the system wide settings

Whenever a loss is identified and classified it is also quantified, expressed in either hours, cost value or revenue value. Loss is quantified and presented using tree map views. These can be drilled into to get to the supporting detail.

## Visualising Loss

### Employee & Equipment

Loss management provides visualisation of loss for both employee and equipment over time.

LYNQ provides many visualisations of loss in dashboards and reports

- Tracking – Employee Status
- Tracking – Equipment Status
- Performance Analysis – Employee Analysis
- Performance Analysis - Equipment Analysis
- Performance Analysis - Dashboard
- Performance Analysis - Loading
- Performance Analysis - Availability
- Performance Analysis - Performance
- Performance Analysis - Quality

This information should be passed to continuous improvement teams.

## Being World Class

Eliminating loss through continuous improvements will help a company to refine manufacturing processes, allowing them to remain or become more competitive. To be a competitive manufacturer, implementation of lean management will reduce wastage, thereby reducing costs. Loss Management provides the perfect tool for implementing Lean management.

## Eliminating Loss

Continuous improvement teams will often have lean manufacturing or six sigma skillsets. The six sigma methodology is to define, measure, analyse, improve and control. LYNQ provides the first three steps for them. In other words, it provides the definition, the means of measurement and the analysis. The countermeasures to eliminate the loss are often obvious.

While countermeasures are all valid and will affect output, due to their financial impact on the business, they should only be considered after all other possibilities for increasing output have been exhausted or when there is a significant change in the required output.

Let's learn some of the root causes of loss and how to eliminate them.

Loss Type	Causes	Countermeasures
Shift Loss	Classified as non-operation. Often the loss from not having a shift and/or from losing hours due to ineffective loading (i.e. planning and scheduling) is overlooked. However, these losses are often what manufacturers consider the easiest to apply countermeasures, as quick wins. While countermeasures are valid and will affect output, due to their financial impact on the business, they are be considered after all other possibilities for increasing output's <b>been</b> exhausted or when there is a significant change in the required output.	<ul style="list-style-type: none"> <li>• Overtime</li> <li>• Additional Shifts</li> <li>• Extend standard working hours</li> </ul>
Loading Loss	Classified as idle time, maintenance or changeover. If there is a significant change planned in the required output, LYNQ should be first used to provide Rough Cut Capacity Planning (RCCP) visibility to estimate whether the application of additional shifts and/or a change to standard working hours will be sufficient or whether more drastic action is required (e.g. we need to build a new factory).	<ul style="list-style-type: none"> <li>• Bringing forward demand</li> <li>• Cut back hours</li> <li>• Reduce shifts</li> <li>• Reduce standard working hours</li> <li>• Preventative maintenance</li> </ul>

## Being World Class


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Loss Type	Causes	Countermeasures
Availability Loss	Classified as breakdowns, setup and adjustments. Elimination of these losses is centred on improving the sales and operational planning process (S&OP). Balance demand and supply to minimise factory idle time. Review current preventative maintenance plans and consider replacement of equipment to reduce loss because of continued maintenance. Review sequencing rules applied when planning and scheduling with the aim of reducing loss from product changeover. Depending on the classification of losses in this area, apply appropriate countermeasures. For example, if experiencing extensive losses from tooling or equipment breakdowns then either improve preventative maintenance measures or look to replace the resource concerned. Material and operator shortages are often the largest source of loss in this area. Material shortages often reduced from improved materials planning or via the introduction of specialised systems to help with the management of materials and inventory (see WMS – Location Management Systems). Operator shortages are often because of missing paperwork, labels or other documentation. Look to resolve these types of issues with the introduction of a paperless shop floor system or improved label printing applications	<ul style="list-style-type: none"> <li>• Replace tools and/or equipment;</li> <li>• Preventative maintenance</li> <li>• Improve material planning</li> <li>• Improve capacity planning and sequencing</li> <li>• Paperless show floor</li> </ul>

## Being World Class

Eliminating loss through continuous improvements will help a company to refine manufacturing processes, allowing them to remain or become more competitive. To be a competitive manufacturer, implementation of lean management will reduce wastage, thereby reducing costs. Loss Management provides the perfect tool for implementing Lean management.

Loss Type	Causes	Countermeasures
Performance Loss	Classified as reduced speed and minor stops. Performance losses are often a result of old equipment and/or operator training. Look to apply countermeasures such as improved maintenance, replacement of old equipment and providing operators with some extended training. Making the manufacturing process more visible also helps to improve throughput rates. Paperless shop floor can be a useful tool here to display assembly instructions and/or instructional videos at the Department.	<ul style="list-style-type: none"> <li>• Operator training</li> <li>• Replacing tools and/or equipment</li> <li>• Improve cleaning process</li> <li>• Introduction of location management systems (WMS)</li> <li>• Paperless shop floor</li> </ul>
Quality Loss	Classified as startup rejects and production rejects. Quality issues tend to stem from the component materials and/or production process. It is important to conduct thorough root cause or FMEA (Failure modes and effects analysis). Failure modes and effects analysis (FMEA) is a systematic approach for identifying all possible failures in a design, a manufacturing or assembly process, or a product or service. <b>“Failure modes” means the ways, or modes, in which something might fail.</b> Failures are any errors or defects, especially ones that affect the customer, and can be potential or actual. <b>“Effects analysis” refers to studying the consequences of those failures.</b>	<ul style="list-style-type: none"> <li>• Improve quality of material supply</li> <li>• Operator training</li> <li>• Improve tools and/or equipment</li> <li>• Introduction of statistical process control (SPC) systems (e.g. iGrafx®)</li> <li>• Introduction of statistical quality control (SQC) systems (e.g. Minitab®)</li> </ul>



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