LYNQ

Solution Capabilities

GEN2 | REVISION: 1.0

Introducing LYNQ

Achieving delivery, quality and financial goals relies on the effectiveness of your resources. Getting the most from your employees and machines goes beyond scheduling.

It requires intelligent insight and complete visibility of where time is being lost, using technology that can automate data collection and optimise workflow, to seamlessly connect planning and production activities.

LYNQ is reinventing manufacturing execution system (MES) software for small to midsize manufacturers looking for a configurable, plug-and-play solution to digitalise and drive factory performance.
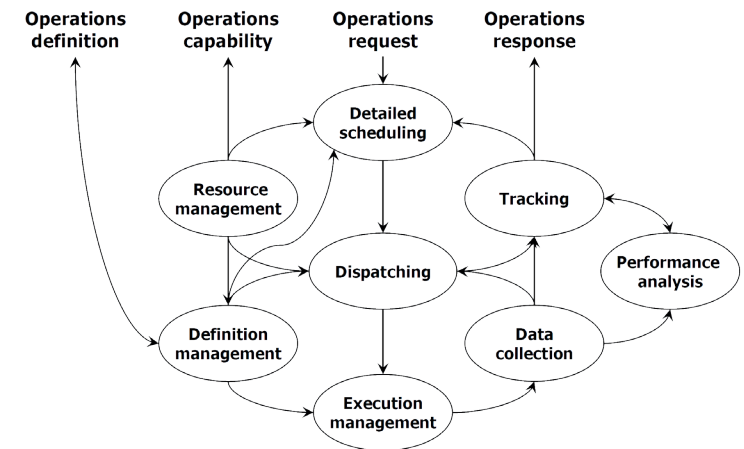
Formed around international standard IEC62264, LYNQ's all-in-one solution can plan, track, automate, analyse and optimise factories to increase efficiency, productivity and profitability.

Source: IEC62264-3 Generic activity model of manufacturing operations management

WHY LYNQ?

- **One solution:** offering fully integrated, bi-directional, planning and production capabilities for reduced total cost of ownership (TCO)
- **Quick to deploy:** in less than 12 weeks with plug and play integration to Enterprise Resource Planning (ERP) systems
- **Configurable:** for any industry and production process

- **Machine connectivity:** with over 140 industrial drivers to PLC/IO devices
- **Insightful:** with out of the box factory performance analytics (OLE, OEE, TEEP) and loss visualisation to drive continuous improvement
- **Return on Investment:** typical ROI in less than six (6) months, based on an increase in the effectiveness of the resources being managed.

FEATURE OVERVIEW:

- Lifetime or subscription licensing based on named resource
- Dual use rights for production and sandbox environments
- Designed for job shop, batch production, production line and mixed mode environments
- Closed-loop, fully integrated solution aligned to international standards for manufacturing operations management IEC62264 and ISO22400
- Supports Lean Six Sigma manufacturing initiatives and methodology (DMAIC)
- Key manufacturing performance indicators and loss analysis out of the box
- Mobile ready, web application with a powerful desktop-based advanced planning and scheduling (APS) component
- Languages (English, French, German, Portuguese, Spanish & Turkish)

- Custom language
- Custom profiles
- Multi time zone support
- Supports touch screen oriented (HMI) data collection
- Supports (IIOT) data collection with automation suite licensing
- Runs from a Microsoft SQL back-end with Microsoft Windows domain authentication and security
- Seamless, flow-less, bi-directional integration with your ERP using approved APIs
- Can be integrated to third party software: payroll, label printing, QMS, DMS, PMS and others
- Deployed as an on premise or cloud hosted solution

Resource Management

1.1   RESOURCE DEFINITION

- Primary (machines, employees) and secondary (tools) resource import from ERP
- Define additional resources for scheduling

1.2   WORK CALENDAR

- Custom activity definition with colour coding: non-working time, working time, lunch, breaks, maintenance, overtime etc...
- Shift definition for multi-shift operation (1st shift, 2nd shift etc..)
- Shift calendars with visibility by minute, hour, day, week, and month
- Easy shift maintenance for planned / unplanned maintenance, bank holidays etc.

1.3   ALTERNATIVE WORK UNITS

- Alternative resource definition
- Ability to define different run rates for alternative resources

1.4   WORK UNIT GROUPING

- Custom grouping options for factory management

1.5   CONSTRAINTS AND FACTORING

- Multiple constraint definition: people, machines, power etc...
- Global factoring for people, machines, time by activity (i.e. setup, run, wait, teardown)
- Product specific factoring for definining different activity times when running the same product on different machines

Definition Management

2.1   JOB IMPORT

- Synchronisation of job orders with ERP
- Captured bill of material import
- Captured route import

2.2   ROUTE EDITING

- On the fly job/route editing for optimised scheduling
- On the fly factoring for optimised scheduling

2.3   PARENT/CHILD JOBS

- Visibility of dependent jobs for optimised scheduling
- Visibility of parent/child jobs for optimised tracking

2.4   PAPERLESS SHOP

2.4.1   Easy access to static files, simple forms supporting online:

- Assembly instructions
- CAD drawings
- Basic data capture with simple forms
- Quality control checks
- Instructional videos
- Other

2.4.2   Link to document management systems for versioning and audit trails

2.4.3   Associate with multiple record types including:

- Job
- Operation
- Employee
- Equipment
- Item

2.4.4   Document library for centralised maintenance

Detailed Scheduling

3.1   JOB LOADING AND PRIORITISATION

3.1.1   Customisable loading of scheduling demand

· Production Jobs
· Related jobs (i.e. parent/child)
· MRP jobs
· What-if jobs
· By period, job status, planner or equipment

3.1.2   Powerful grids and views for job prioritisation

· Job, sub-job, operation and raw material views
· Data filters, grouping and sorting
· Customisable fields, mappings and naming
· Customisable markers and user defined fields
· Data exports to excel

3.1.3   Customisable workflows for identification of scheduling demand and priority

· Urgent
· Unscheduled
· Past Due
· Custom (e.g. by product family, colour etc...)

3.2   FINITE CAPACITY PLANNING

3.2.1   Multiple resource scheduling

· Machine scheduling
· Labour scheduling
· Tool scheduling
· Maintenance scheduling

3.2.2   Gantt graphical planning board

· Detailed visibility (i.e. by minute, hour, day, week, month)
· Colour coded shift and time patterns
· Visibility of schedule, resource utilisation and time phased resource consumption
· Visibility of schedule execution
· Personalisation options

3.2.3   Manual and auto scheduling of individual operations, sequenced operations of a job and sequenced jobs of parent/child hierarchies

· Parallel operations scheduling
· Scheduling with move and queue times
· Schedule with overlapping operations (quantity and percent)
· Schedule setup, run, wait and tear-down activities
· Outside process operation scheduling

3.2.4   Auto scheduling with rule and priority-based workflows

· Forward and backward scheduling
· Schedule optimisation with field-based grouping
· Schedule optimisation with field-based cascade grouping (i.e. schedule by colour: red, green, blue; then by shape: round, rectangle, stripe.)
· Schedule optimisation with custom priority-based grouping
· Schedule optimisation with group sequencing
· Schedule optimisation with group dependency linkages

3.2.5   Drag and drop scheduling

· Autofit
· Auto shift with replace and move options
· Schedule around

3.2.6   Semi-automatic reschedule of late operations with autofit, shift, replace, move and schedule around options

Detailed Scheduling

3.2.7 Fixed jobs and period fencing (pinning)

3.2.8 Alternative resource scheduling with:

· Product specific factoring (i.e. running the same product on different machines at different speeds)
· Load balancing options (ASAP or due date)

3.2.9 Variable resource constraint consumption strategies

· Global factoring (i.e. people, machines and time)
· Product specific factoring (i.e. running the same product on different machines at different speeds)

3.2.10 What If and Capable to Promise (CTP) scenarios for capacity and materials

3.2.11 Dynamic scheduling and execution alerts

· Dynamic visualisation of production progress
· Running late/early visualisation (hours and percent)
· Change tracking by scheduling action
· Schedule early and schedule late visualisation

3.3   MATERIALS PLANNING

· Dynamic time-phased stock consumption and replenishment calculation
· Dynamic job-based availability with good to go, shortage and partial shortage indicators
· Detailed BOM drilldown with component availability, shortage and partial shortage indicators
· Detailed BOM component time-phased stock movement analysis
· Material availability in What If scenarios
· Material reservation and exclusions
· MRP overview & detailed stock movement analysis (on the fly)

3.4   REPORTING AND DASHBOARDS

· Capacity charts and reporting for short and long term (RCCP)
· Overall, weekly or monthly capacity plan
· Capacity plan drill down to regular, MRP and forecast jobs
· Planning dashboard with drillable loading and order fulfillment analysis
· Online production plan with job and operation progress visualisation
· Equipment loading analysis (high level and detailed, live and trended)
· Work centre and machine detailed production plans
· Printable production plan, shop packet and late delivery reports

Dispatching

4.1   PUBLISHING

- Real-time update of ERP manufacturing data
  based on a finite capacity based schedule
- Real-time dispatching of production plans with online access
- Real-time dispatching of job lists to shop floor terminals

4.2   ONLINE PLANS AND DASHBOARDS

- Planning dashboard with drillable loading
  and order fulfillment analysis
- Online production plan with job and
  operation progress visualisation
- Equipment loading analysis (high level
  and detailed, live and trended)
- Work centre and machine detailed production plans
- Printable production plan, shop packet and late delivery reports

4.3   INTERACTIVE JOB LISTS

- Job lists by resource for easy execution
- Materials requirement lists by resource for picking
- Online jobs status view with progress visualisation

Execution Management

5.1 CONFIGURABLE TERMINALS

5.1.1 Configurable web based human-machine interface (HMI)

5.1.2 Fully customisable functional and graphical terminal behaviours

- Entrance terminals
- Factory terminals for employees and equipment
- Shared and dedicated terminals

5.1.3 Visualisation of live job and operational progress and execution statistics

- Real-time publishing of the production plan to factory terminals
- Live execution statistics by shift at employee and equipment level
- Terminal based OLE and OEE key performance indicators

5.1.4 Manual, barcode and RFID terminal access with optional password protection

5.2 JOB MANAGEMENT

5.2.1 Job selection

- Start/end job by an employee, crew or equipment
- Select from jobs list (with option to pre-filter)
- Select from scheduled job list by terminal – machine
- Select from an enforced schedule by terminal - machine
- Select by scanning a barcode

5.2.2 Transaction management

- Operational completion including warehouse/bin/serial/lot control
- Operational and job scrap reporting including scrap reason codes
- Job completion including warehouse/bin/serial/lot control
- Tracking of rework related activity

5.2.3 Job control and validation

- Control operational sequencing by hide/show on terminal
- Warn/prevent status reporting validation
- Warn/prevent quantity reporting validation
- Warn/prevent material reporting validation
- Warn/prevent scrap reporting validation

5.2.4 Custom data capture

- Customisable process parameters (weight, pressure, etc.)
- Customisable activity classification codes
- Custom data capture using Microsoft Sharepoint®, PowerApps® and Flow®

5.2.5 Label printing

- Label print with Bartender
- Label print with SSRS

5.2.6 Document access via operator terminals

- Assembly instructions
- CAD drawings
- Checklists
- Instructional videos
- Links to document management systems where e-signing, audit trail and/or versioning is required (e.g. quality control checks)

5.2.7 Custom reporting and analytics using webhooks

- Custom reporting using Microsoft SQL Server Reporting Services (SSRS)
- Custom analytics using Microsoft Power BI®

Execution Management

5.3   SUPERVISORY CONTROL

5.3.1   Management reports for consolidated tracking

- Attendance (payroll) vs activity (transactions) reconciliation and adjustment
- Calendar view of resource availability with productive, non-productive and total time visibility
- Daily activity audit trail
- Custom configurable pivot reporting

5.3.2   Transaction control & management

- Real-time generation or accumulated transaction control
- Edit/delete transactions generated from shop floor terminals
- Create new transactions directly in transactions review
- Approve transactions prior to posting to ERP
- Configurable rules to drive automatic transaction approval
- ERP posting workflow management
- ERP posting reversals with audit trail
- Management of ERP posting errors

5.3.3   Management actions

- Log off some or all employees
- Turn off some or all equipment
- Access operator workbench
- Custom actions (as defined)

5.3.4   Quick timesheet data entry for handling multiple employees

Data Collection

6.1 AUTOMATIC AND MANUAL DATA COLLECTION

6.1.1 Real-time data collection from employees, crews, equipment and equipment groups using:

- Touch screen based (HMI) for manual start-stop data collection
- Automatic data collection (IIOT) from a digitalised factory
- Combination of automatic (IIOT) and manual (HMI) data collection
- Barcode/RFID entry

6.1.2 Integration with payroll and/or HR systems (optional)

6.1.3 Multi timezone support

6.2 EMPLOYEE TIME AND DATA

6.2.1 Time and attendance clock in/out (i.e. start/end day)

6.2.2 Start-stop style data capture of single and multiple jobs

6.2.3 Multi job time split options:

- Even time split
- Proportional time split
- No time split

6.2.4 Crew/team working options

- Single and multi team working
- Team lead management
- Downtime tracking

6.2.5 Downtime and non-productive time management

- Start/end non-productive and down time (employee, crew, equipment or equipment group)

- Differentiation between non-operational, non-productive, direct and indirect activity
- Unlimited, customisable non-productive codes
- Posting of non-productive time to ERP

6.2.6 Scheduled actions, i.e. auto break or lunch deduction; end of working shift

6.2.7 Optional timesheet data entry

6.2.8 Material issues including warehouse/bin/serial/lot control

- Single component issues
- Multiple component kit issues
- Backflushing options (manual/auto) with or without additional approvals required

6.2.9 Material reject including reject reason codes

6.2.10 Warn or prevent controls for:

- Over/under production
- Over/under material issues
- Completion while open remaining quantity exists
- Serial/lot/bin control
- Scrap/reject reason code enforcement
- Starting an operation while the previous one has not been completed or started

6.3 EQUIPMENT TIME AND DATA (MANUAL/BY OPERATOR)

6.3.1 Downtime and non-productive time management

- Start/end non-productive and down time (employee, crew, equipment or equipment group)

Data Collection

6.3 EQUIPMENT TIME AND DATA CONT...

6.3.1 Downtime and non-productive time management (cont...)

- Differentiation between non-operational, non-productive, direct and indirect activity
- Unlimited, customisable non-productive codes
- Posting of non-productive time to ERP

6.3.2 Equipment state: running, not running, off

6.3.3 Output: good and bad quantities including scrap/reject reason

6.3.4 Multi jobbing time split options for machines

6.4 MACHINE CONNECTIVITY (AUTO)

6.4.1 Industrial connectivity with 140+ native drivers to the most common PLC/IO devices including:

- Allen Bradley
- Siemens
- Fanuc
- Honeywell
- Mitsubishi
- Toshiba
- IFM
- GE
- Yokogawa

6.4.2 Support of industrial automation protocols:

- OPC; MTConnect
- Proprietary protocols - GE NIO, SuiteLink, FastDDE
- IT protocols - MQTT, REST, ODBC and SNMP

6.4.3 Combination of machine data (IIoT) and data entered manually via terminals (HMI) including:

- Job identification and assignment
- Operational quantity
- Operational scrap including reason code
- Equipment downtime with custom classification
- Live assignment of completion and scrap to active running jobs on equipment
- Live equipment tracking, including, status, OEE analysis and loss profile breakdown
- Live equipment alerts and issue logging

6.4.4 Error handling and data management

- Live or controlled data posting to ERP/PLM systems
- Data collection from multiple geographical facilities
- Data historian

Tracking

7.1   REAL-TIME STATUS TRACKING

7.1.1   Live execution dashboard

- Employee and equipment tracking
- Order management indicators with drill downs
- Production output planned vs actual statistics
- Real-time and trending OLE and OEE metrics

7.1.2   Live employee and equipment status

- Card and list views
- Resource photo identification
- Colour-coded productive, non-productive or downtime indication
- Visualisation of overall daily statistics
- Visibility of current jobs and jobs progress
- Visibility of OLE/OEE with supporting metrics
- Live loss visualisation and classification
- Live visualisation of production issues and alerts
- Drill down for detailed information (current activity; progress versus schedule; history of alerts and production issues)

7.1.3   Live job status

- List of open jobs with real time execution analysis
- Indication of open production issues related to a job
- Drill down to job card for detailed analysis
- Overall job execution statistics
- Operations execution statistics
- Raw materials consumption
- Production issues related to a job
- File, link and online-form attachments
- Drill downs to sub job hierarchies

7.2   PERFORMANCE MANAGEMENT

7.2.1   Dashboard with key metrics and statistics

- OLE/OEE: availability, performance and quality
- Loss visualisation and classification

7.2.2   Detailed employee and equipment performance analysis

- Summarised execution statistics by day, week or month
- Planned vs actual productive time
- Direct vs indirect downtime
- Good vs bad parts count
- OLE/OEE key performance indicators

7.2.3   Alerts and production issues visibility

Performance Analysis

8.1   FACTORY PERFORMANCE ANALYSIS

8.1.1   Live factory dashboards with supporting metrics for Overall Labour Effectiveness (OLE), Overall Equipment Effectiveness (OEE) and Total Effective Equipment Performance (TEEP)

8.1.2   Dedicated equipment loading dashboard with actual, averaged and trended analysis

- Loading loss profile
- Categorised qualitative and quantitative loading metrics
- Detailed analysis by individual equipment

8.1.3   Dedicated employee and equipment availability dashboard with actual, averaged and trended analysis

- Availability loss profile breakdown
- Categorised qualitative and quantitative availability metrics
- Detailed analysis by individual employee or equipment

8.1.4   Dedicated employee and equipment performance dashboard with actual, averaged and trended analysis

- Performance loss profile breakdown
- Categorised qualitative and quantitative performance metrics
- Detailed analysis by individual employee or equipment

8.1.5   Dedicated employee and equipment quality dashboard with actual, averaged and trended analysis

- Quality loss profile breakdown
- Categorised qualitative and quantitative quality metrics
- Detailed analysis by individual employee or equipment

8.2   EMPLOYEE PERFORMANCE ANALYSIS

- Overall dashboard with key statistics for actual, averaged and trended OLE analysis
- Detailed OLE analysis by employee
- Detailed OLE analysis by period: daily, weekly and monthly breakdown
- Detailed activity type (diversions) analysis by period: daily, weekly and monthly breakdown
- Detailed calendar view of employee availability with productive, non-productive and total time visibility: daily, weekly and monthly breakdown

8.3   EQUIPMENT PERFORMANCE ANALYSIS

- Overall dashboard with key statistics for actual, averaged and trended OEE analysis
- Detailed OEE analysis by equipment
- Detailed OEE analysis by period: daily, weekly and monthly breakdown
- Detailed activity type (diversions) analysis by period: daily, weekly and monthly breakdown
- Detailed calendar view of equipment availability with productive, non-productive and total time visibility: daily, weekly and monthly breakdown

8.4   PRODUCT ANALYSIS

8.4.1   Actual and trended product performance analysis

- Average product performance by employee and equipment
- Detailed stock code/operation performance analysis with drilldown to daily, weekly or monthly breakdown
- Calculated cycle times by stock code/operation

Performance Analysis

8.4   PRODUCT ANALYSIS (CONT...)

8.4.2   Actual and trended product quality analysis

- Average product quality by employee and equipment
- Detailed stock code/operation quality analysis with drilldown to daily, weekly or monthly breakdown
- Calculated scrap factor by stock code/operation

8.5   LOSS MANAGEMENT

8.5.1   Visualising loss

- Loss management dashboards and visualisation of employees and equipment
- Breakdown and visualisation of plant loss from calendar hours to effective hours
- Loading loss visualisation of planned downtime
- Availability loss visualisation of unplanned downtime
- Performance loss visualisation of reduced speed and minor stoppages
- Quality loss visualisation of production rejects (i.e. scrap reasons)
- Drilldowns to detailed and summarised raw data

8.5.2   Financial indicators

- Global settings for labour rate; overhead rate; employee revenue rate; equipment revenue rate; currency
- Individual asset rate settings for employee and equipment

8.5.3   Financial loss analysis

- Overall loss by percentage (%)
- Overall loss by hour
- Overall loss by rate (i.e. by employee or equipment rate)
- Overall loss by revenue

Alerts and Issues

9.1   INSTANT MESSAGING

· Messaging between employee and higher-level management

· Rich text format messaging with optional email message delivery

· In-application or email alert delivery

· Message notifications

9.2   CONFIGURABLE ALERTS

9.2.1   Automated alert creation and tracking of manufacturing process abnormalities

9.2.2   Multiple process measurement by single resource or organizational groups

· Availability

· Performance

· Quality

· Downtime duration

· Scrap reason

9.2.3   Configurable thresholds

9.2.4   Custom measurement schedules

9.2.5   Automatic designation of alerts based on organisational structures

9.3   ISSUE MANAGEMENT

9.3.1   Simple production issue creation and notification

· Automatic creation of production issues based on exceeded tolerances

· Manual creation of production issues requiring further action

· Automatic notification of issues based on organisational structures

9.3.2   Integrated workflow and insight of production issues

· Assignment of issues for corrective and preventative action

· Tracking of corrective and preventative action activity

· Resolution of corrective and preventative action for historical analysis

9.3.3   Six Big Loss classifications

· Setup and adjustments

· Breakdowns

· Minor stops

· Reduced speed

· Startup rejects

· Production rejects

9.3.4   Custom classifications

· Health & safety

· Specific issues

Administration

10.1 ADMINISTRATION AND ACCESSIBILITY

- Unlimited APS desktop client installs for environment with multiple production planners
- Secure, web-based, configurable SFDC terminals for operators and team leads
- Any device-anywhere access of factory schedules, alerts, messages, documentation and performance analysis
- Separate IT and factory administration settings for simple and secure user, resource, terminal and alert maintenance
- Powerful system insights showing system status and health
- Different Production / Sandbox themes for easy identification

10.2 INFORMATION SHARING AND SECURITY

- Integration with Microsoft Active Directory for single sign on
- Multi factor authentication for workbench employees (e.g. pincode entry required)
- Information access control by organisational group (vertical and horizontal)
- Role-based control for data security, ownership and responsibility
- Easy to understand dashboards with powerful drill downs
- Real time manufacturing process visibility across the organisation
- Online production plan publishing with plan enforcement options

10.3 THIRD PARTY CONNECTIVITY

10.3.1 Optional custom integration to Microsoft Office 365® and Microsoft Power Platform for document management, extended data capture, custom analytics and reporting. Applications include:

- Document management using Microsoft Sharepoint ®
- Extended data capture using Microsoft Sharepoint®, PowerApps® and Power Automate ®
- Custom reporting using Microsoft SQL Server Reporting Services (SSRS)
- Custom analytics using Microsoft Power BI®

10.3.2 Optional custom integration to resource management software for example:

- Payroll Systems (e.g. ADP)

10.3.3 Optional custom integration to quality management software for example:

- Statitical Process Control (e.g. iGrafx)
- Statistical Quality Control (e.g. Minitab)
- Quality Management Systems (e.g. Qpulse)

10.3.4 Optional custom integration to inventory management software providers for example:

- Label Printing (e.g. Bartender, Nice Label, Domino)
- Warehouse Management Systems (WMS)

10.3.5 Optional custom integration to asset maintenance software providers for example:

- Preventative Maintenance Systems (e.g. Fiix, PEMAC)

10.3.6 Optional custom integration to product lifecycle management software providers (PLM) for example:

- Autodesk Fusion 360
- Solidworks

10.3.7 Optional custom integration to other software providers using Webhooks and/or REST API. For example:

- Crystal Reports

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