Leanworx™

Works like magic

# INDUSTRY 4.0

## for machine shops

# Confidentiality

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# Leanworx Product Philosophy

**DEPENDABLE**

*Data that you can trust and make game changing decisions.*

**AFFORDABLE**

*costs less than a cup of coffee per day per machine.*

**SIMPLE**

*Easy to install, use, and scale. Built for effortless adoption.*

## Best run machine shops use LEANWORX.

- 80 companies
- 4500 machines
- Since 6 years

### Top installations

- 375 machines in LUBI Pumps
- 255 machines in SANSERA Aero
- 190 machines in PAL SHELLCAST
- 135 machine sin SSS Springs

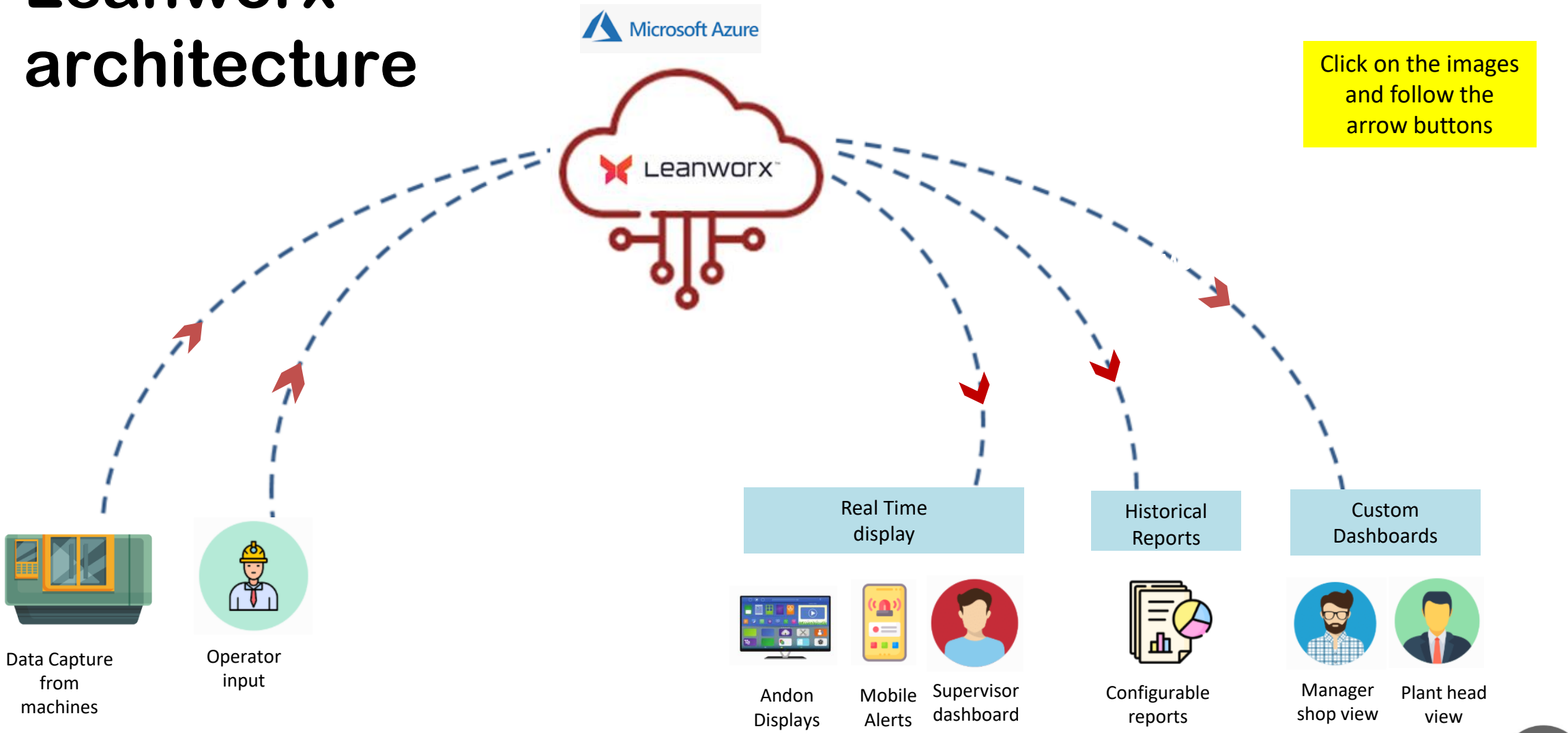
# Unlocking the power of Leanworx

**Core Features & Functionalities**

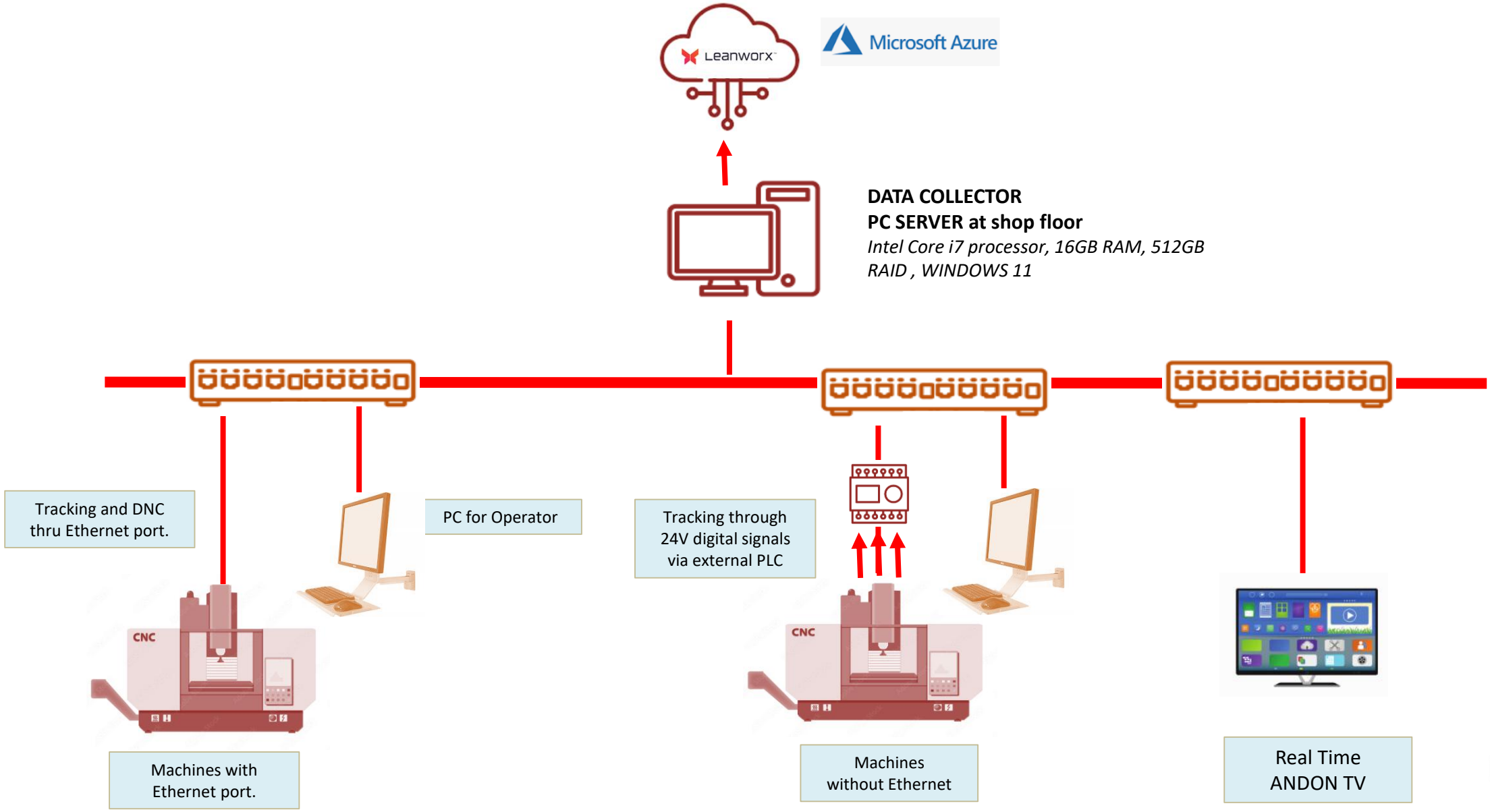
- SaaS model
- Plug & Play
- Customized CEO dashboard
- Track any machine
- Effortless machine Integration
- Customized ANDON display
- Actionable Reports
- Real time ANDON displays
- Alerts on cell phone
- Modular, upgrade-friendly
- API connectors
- Data security by Microsoft
- AI driven analytics
- IIoT Hardware agnostic
- Remote online support

# Leanworx architecture

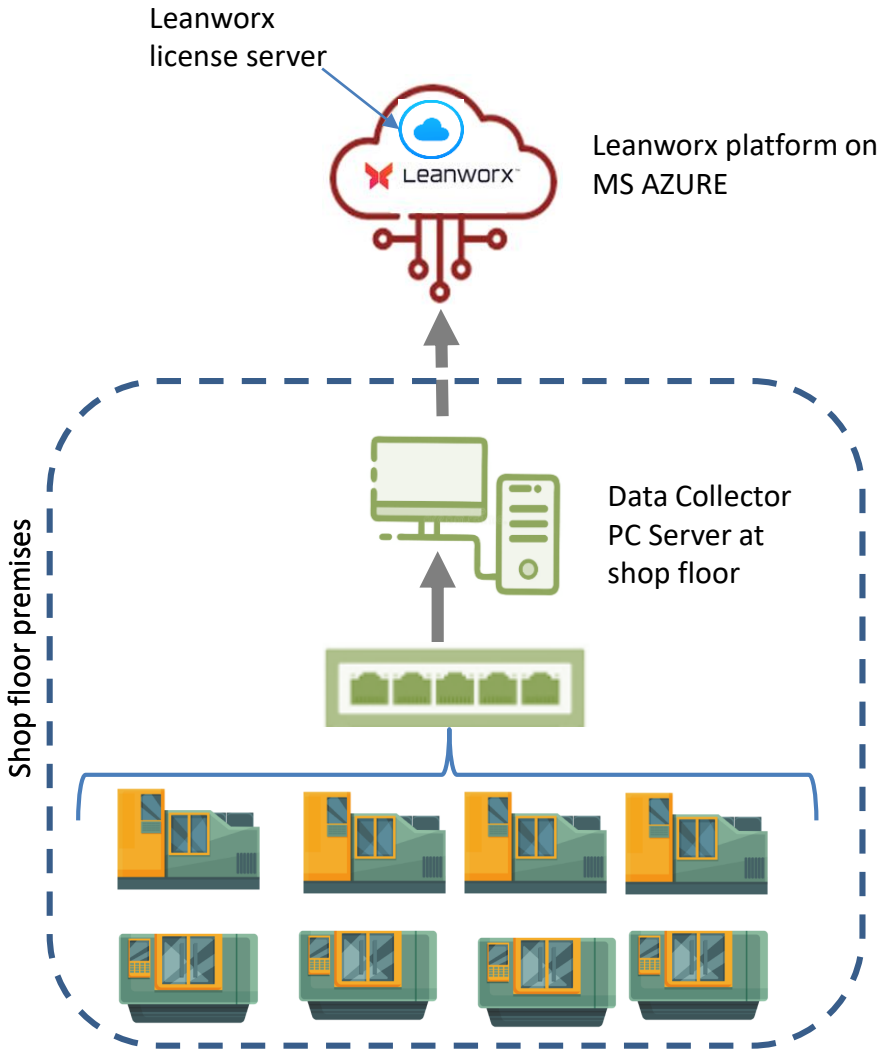
Click on the images and follow the arrow buttons



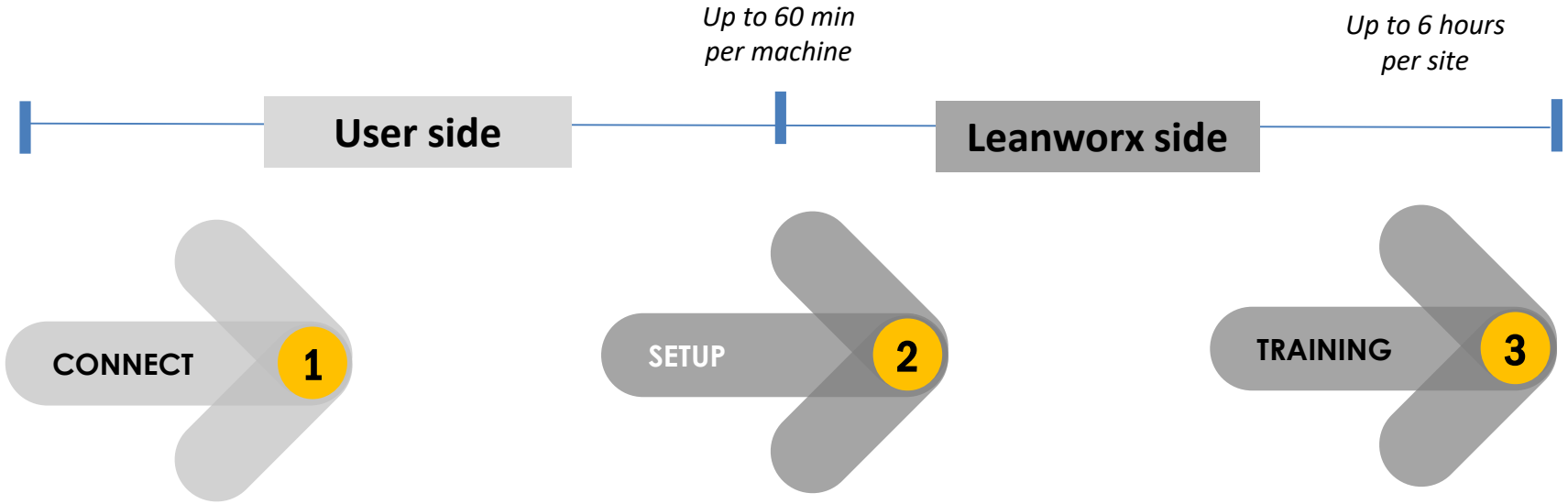
# Schematic of Tracking



# Connectivity



# Deployment and Timelines




- **Connect the machines** to the Data Collector PC via LAN or PLCs
- **Set static IP addresses** on the machines and ensure they respond to a ping test
- **Provide temporary remote** access to the PC for the Leanworx team

- Leanworx **installs its Connect software** for each machine on Data Collector PC.
- Sets up and **activate cloud account** for each.
- **Verifies data accuracy** in coordination with the user team.

- Leanworx **observes data capturing** for a day.
- **Trains user** on how to configure parts, machines, operators, view reports and dashboards.
- **Provides** hand holding support and remote tech support.

# Data Segregation

## Isolated by Design, Secure by Default

- Leanworx prevents data mingling by using separate data queues for each customer.
- A unique set of services is installed for each customer to process their data.
- Each customer, including their plants, has a dedicated MS SQL database for secure data storage.
- Data from each customer is fully isolated to ensure security and integrity.

# Data Security by Microsoft

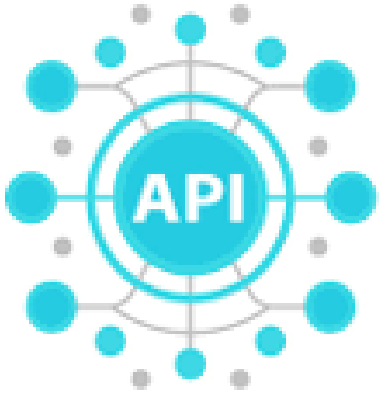
Leanworx utilizes Microsoft Azure Defender for Cloud to safeguard VMs against external threats.

Azure Virtual Private Network (VPN) ensures secure networking for Virtual Machines.

Windows Firewall is enabled on each VM for added protection.

Each VM is secured with Endpoint Security to defend against potential breaches.

# Free APIs : For ERP/MES Integration




## GET Restful APIs

**(To get data from Leanworx)**

- Get raw events
- Get Cycle details
- Get Machine details
- Get Production details
- Get Job details
- Get downtime details
- Get Rejection details
- Get downtime summary
- Get Production summary
- Get Productivity summary
- Get Inspection data

## POST restful APIs

**(To post data to Leanworx)**

- Create Part
- Create Process Plan
- Add operations to a process Plan
- Create Work orders
- Create and Schedule jobs

# Pricing per machine / month

| # | Module Software | Price US$ |
|---|---|---|
| 1 | **Machine Utilization Module**<br>Includes: Reports, Dashboards, Alerts | **$75** |
| 2 | **Machine Productivity (OEE) Module**<br>Includes: Reports, Dashboards, Alerts | **$15** |
| 3 | **Operator Productivity Module**<br>Includes: Reports, Dashboards, Alerts | **$15** |
| 4 | **Machine Maintenance Module**<br>Includes: Reports, Dashboards, Alerts | **$15** |
| 5 | **Andon Display software**<br>On Smart Large TV | **$10** |
| 6 | **Custom built dashboards**<br>Built of Microsoft Power BI tool | **$10** |

**Pricing Notes and Terms:**

1. The prices listed are standard list prices and are subject to Leanworx's standard Terms & Conditions.
2. Pricing is based on a SaaS (Software-as-a-Service) model assumption with a one-year commitment.
3. The Machine Utilization module serves as the core functionality and is a prerequisite for enabling other modules.
4. Prices related to Microsoft Power BI licenses and/or Azure subscriptions, if required, will be charged separately.
5. Hardware must be locally sourced depending on the , use case.

# The Team.

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+1 949.735.7125 (US)

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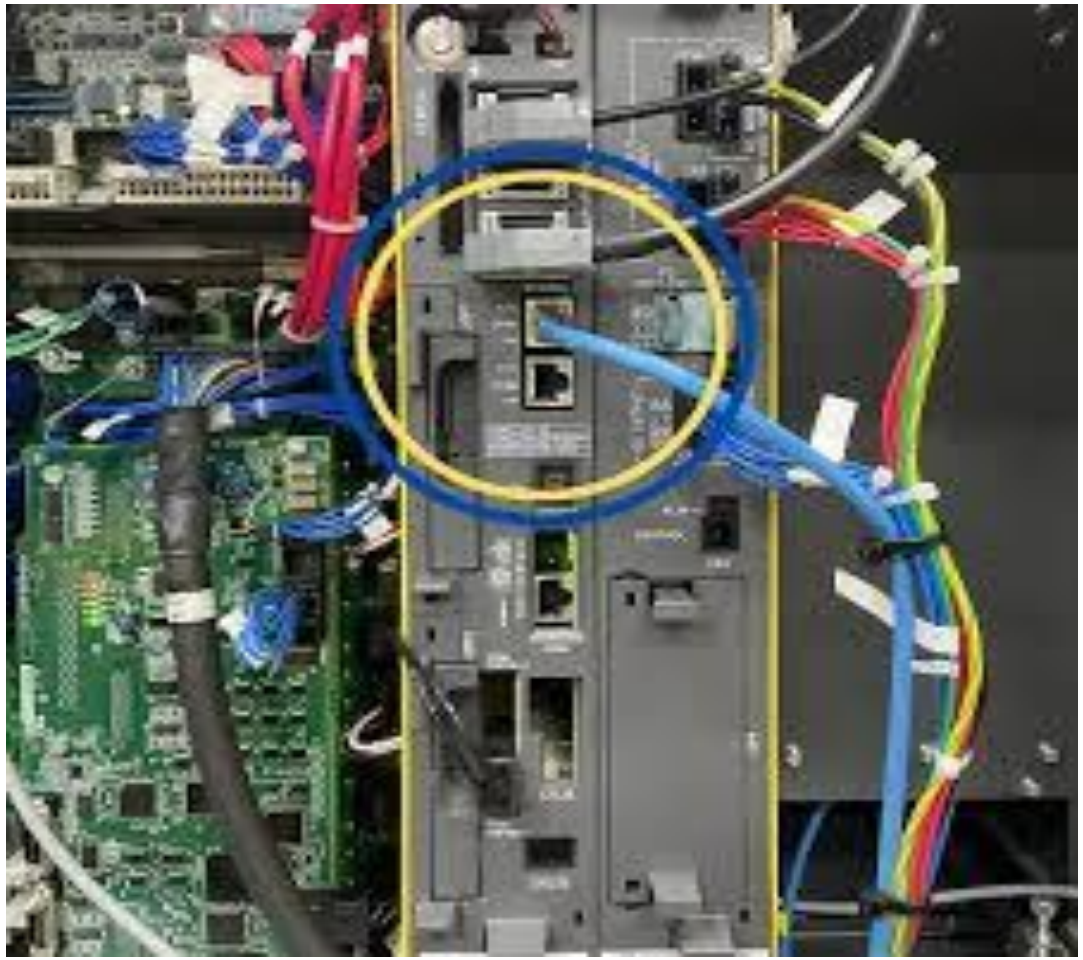
sales@leanworxcloud.com

# Ethernet connectivity



Easy of connecting
any CNC machine with
Ethernet to our Cloud.

Plug & Play

# CNCs supported via Ethernet

**All Machine Types**

- CNC lathes
- Machining centers
- Plastic injection molding
- Hi-speed stamping press
- Hot and cold forging machines
- CNC Grinding machines
- Sand molding & Core shooters
- Die casting machine
- Welding Robots

**Machines from major manufacturers**

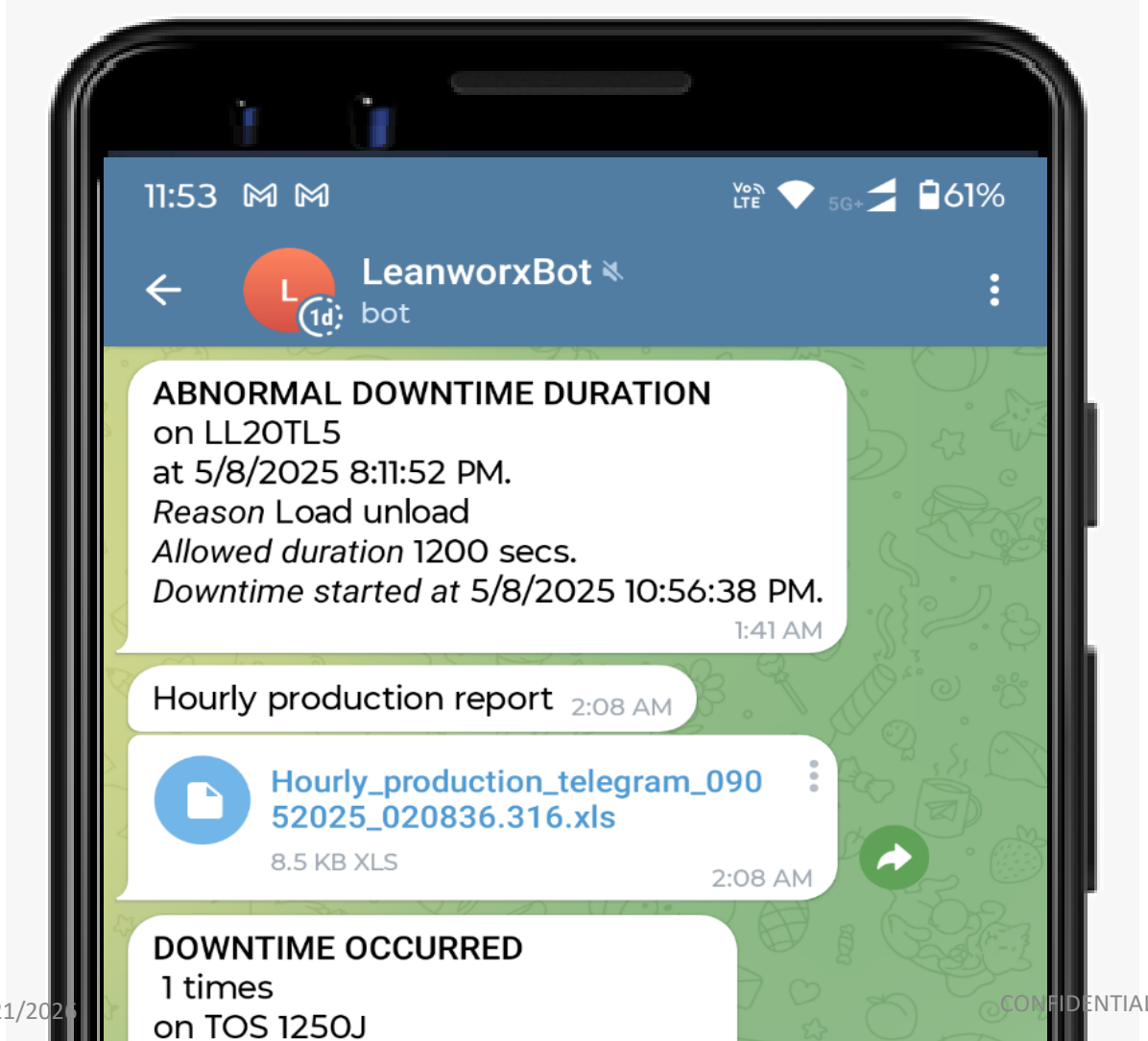
DMG MORI
DELTA
Mazak
HURCO
HAAS
FANUC
SIEMENS
MAKINO
MITSUBISHI ELECTRIC
OKUMA
OPEN POSSIBILITIES

# PLCs supported

To track legacy CNC machines without Ethernet port, Leanworx supports PLCs or IIoT hardware that are non-proprietary

# Operator Input

# Mobile Alerts & Notifications




## Get emergency alerts on mobile app

TELEGRAM FREE

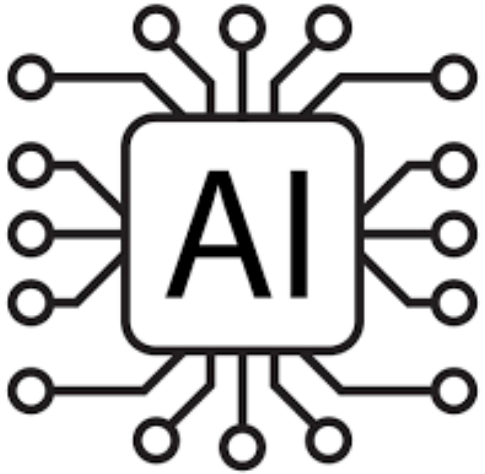
MS TEAMS

- Machine breakdown HELP request
- Machine idle time exceeds limit
- Cycle times exceeds set limits
- Rejections exceeds acceptable limits

# Cloud – Fully managed service

- *High Data security against Malware*
- *High Data integrity against hacking*
- *Auto Data backup and restore*
- *Reports from multiple plant locations*
- *Disaster Management & Recovery*
- *100% uptime guaranteed*
- *Exclusive database for each customer*

# AI-Powered Shop Floor Insights




## Cycle Time Optimization

- Auto cycle-time determination.
- Detects deviations from standard cycle times in real-time.
- Enables real-time alerts to operators for intervention.

## Anomaly Detection

- Flags anomalies such as sudden drops in production rates
- Identifies excessive idle time and prolonged loading/unloading
- Detects spikes in rejection rates

## Performance Insights

- Analyze machine usage, setup times, and changeovers.
- Tracks operator KPIs to spot, reward, and retain top talent
- Uncovers operator training or support needs.

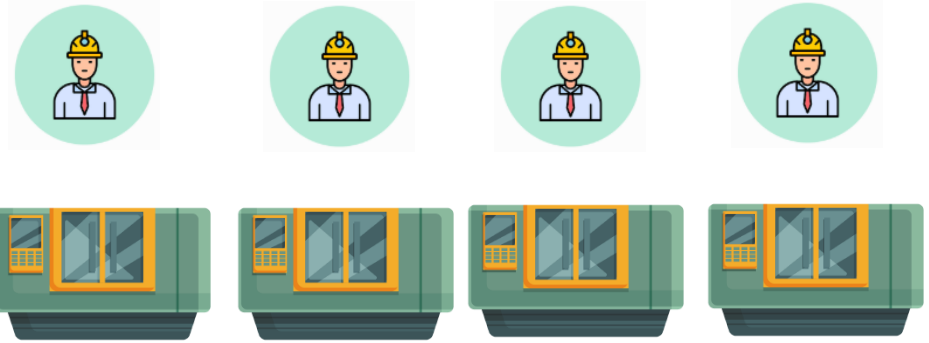
# Reports for every role

Custom dashboard
**for Plant head**

Historical reports
for **Manager**

Real Time display
ANDON and Dashboard
for **Supervisors**

**Operator inputs**
Downtime reasons and
Rejections



1

| | Machine Utilization |
|---|---|
| MUR1 | Hourly parts count report |
| MUR2 | Batch-wise production report |
| MUR3 | Cycle time details report |
| MUR4 | Downtime analysis Pareto/ pie |
| MUR5 | Big downtimes report |
| MUR6 | Downtimes at shift change |
| MUR7 | Historical KPI trends |
| | **Dashboards** |
| MUD1 | Production dashboard - Manager |
| MUD2 | Production dashboard - Supervisor |
| MUD3 | Machine run status bar |
| | **Mobile alerts** |
| MUA1 | Shift target shortfall |
| MUA2 | Shift target completed |
| MUA3 | Downtime due to specific reason |
| MUA4 | Abnormal downtime |
| MUA5 | Abnormal cycle time |
| MUA6 | Abnormal load-unload time |
| MUA7 | Abnormal setup time |
| MUA8 | Job start / Batch start |
| MUA9 | Job end / Batch end |

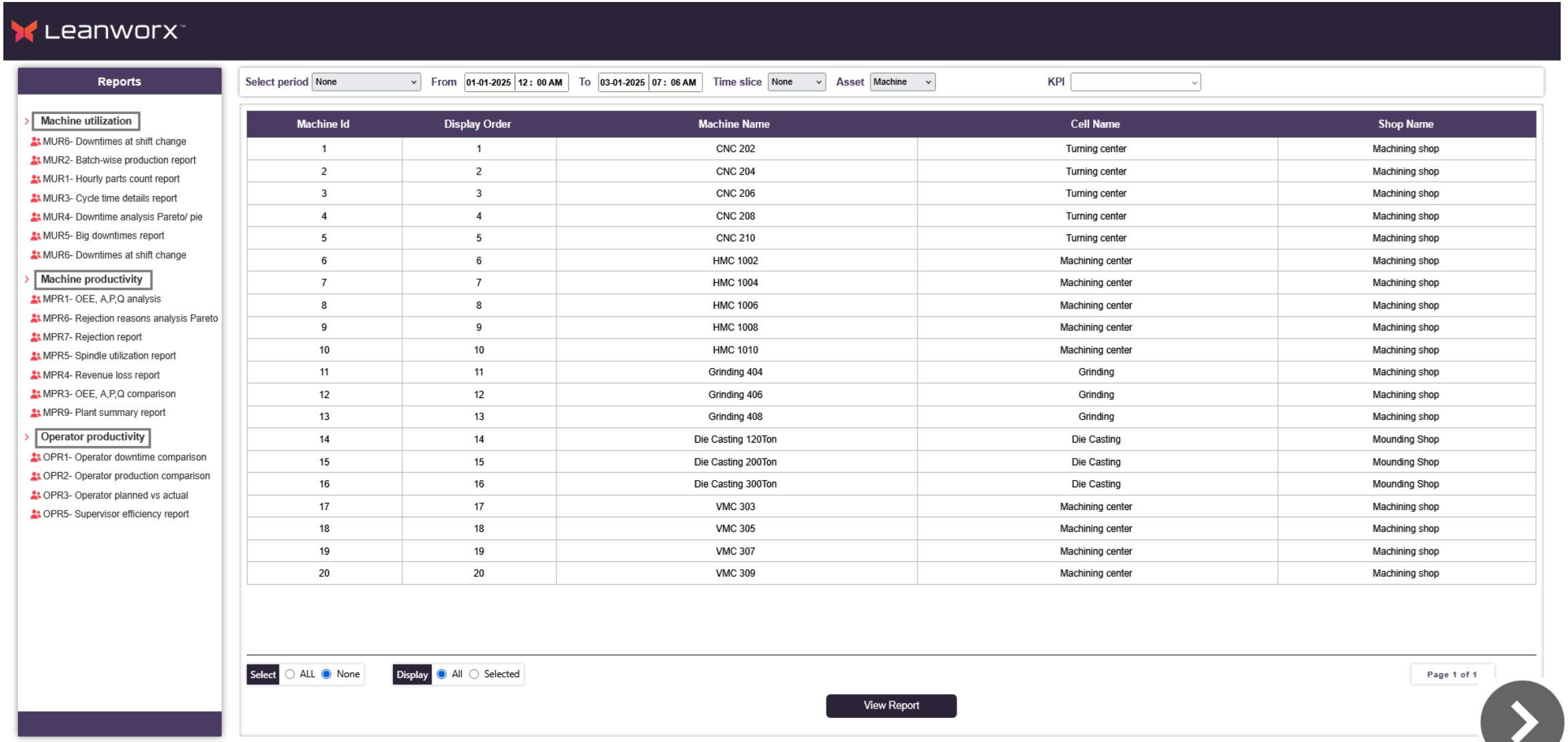
2

| | Machine productivity |
|---|---|
| MPR1 | OEE, A,P,Q analysis |
| MPR2 | OEE, A,P,Q comparison - machines |
| MPR3 | OEE, A,P,Q comparison - cells, shops |
| MPR4 | Revenue loss report |
| MPR5 | Spindle utilization report |
| MPR6 | Rejection reasons analysis Pareto, Pie |
| MPR7 | Rejection report |
| MPR8 | Historical KPI trends |
| MPR9 | Plant summary report |
| | **Dashboards** |
| MPD1 | Productivity dashboard - Manager |
| MPD2 | Production dashboard - Supervisor |
| MPD3 | Machine run status bar |
| | **Mobile alerts** |
| MPA1 | Abnormal rejection % |
| MPA2 | Rejection for specific reason |
| MPA3 | Spindle utilization low |
| MPA5 | Part rejected |
| MPA6 | Machine On / Off |
| MPA7 | OEE below target |
| MPA8 | Spindle utilization below target |

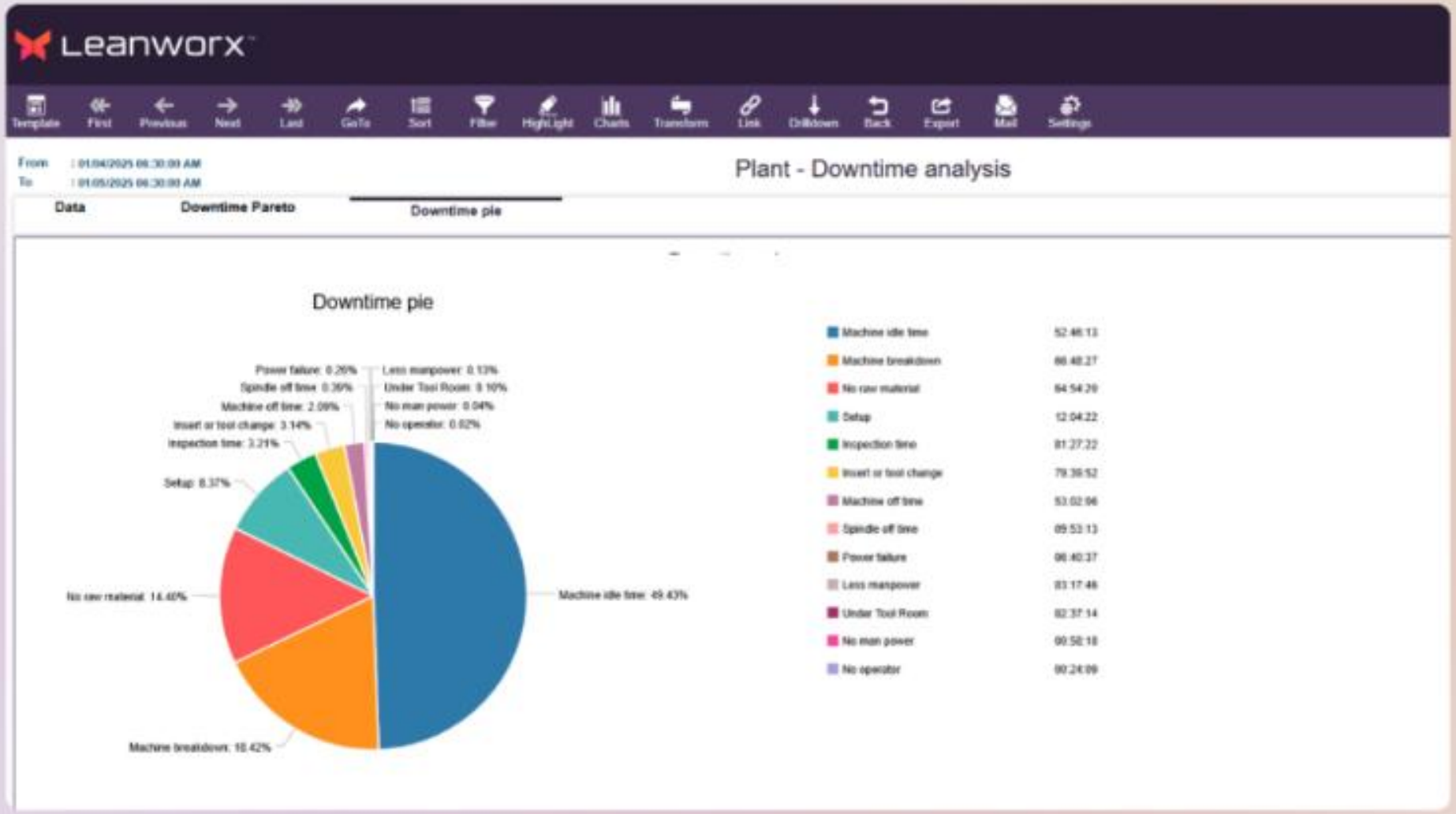
3

| | Operator productivity |
|---|---|
| OPR1 | Operator downtime comparison |
| OPR2 | Operator production comparison |
| OPR3 | Operator planned vs actual |
| OPR4 | Operator rating |
| OPR5 | Supervisor efficiency report |
| OPR6 | Incentives report for HR |
| | **Dashboards** |
| OPD1 | Operator dashboard |
| | **Mobile alerts** |
| OPA1 | No operator login |
| OPA2 | Operator logged in |
| OPA3 | Operator logged out |
| OPA4 | Production below target |
| OPA5 | Rejection too high |

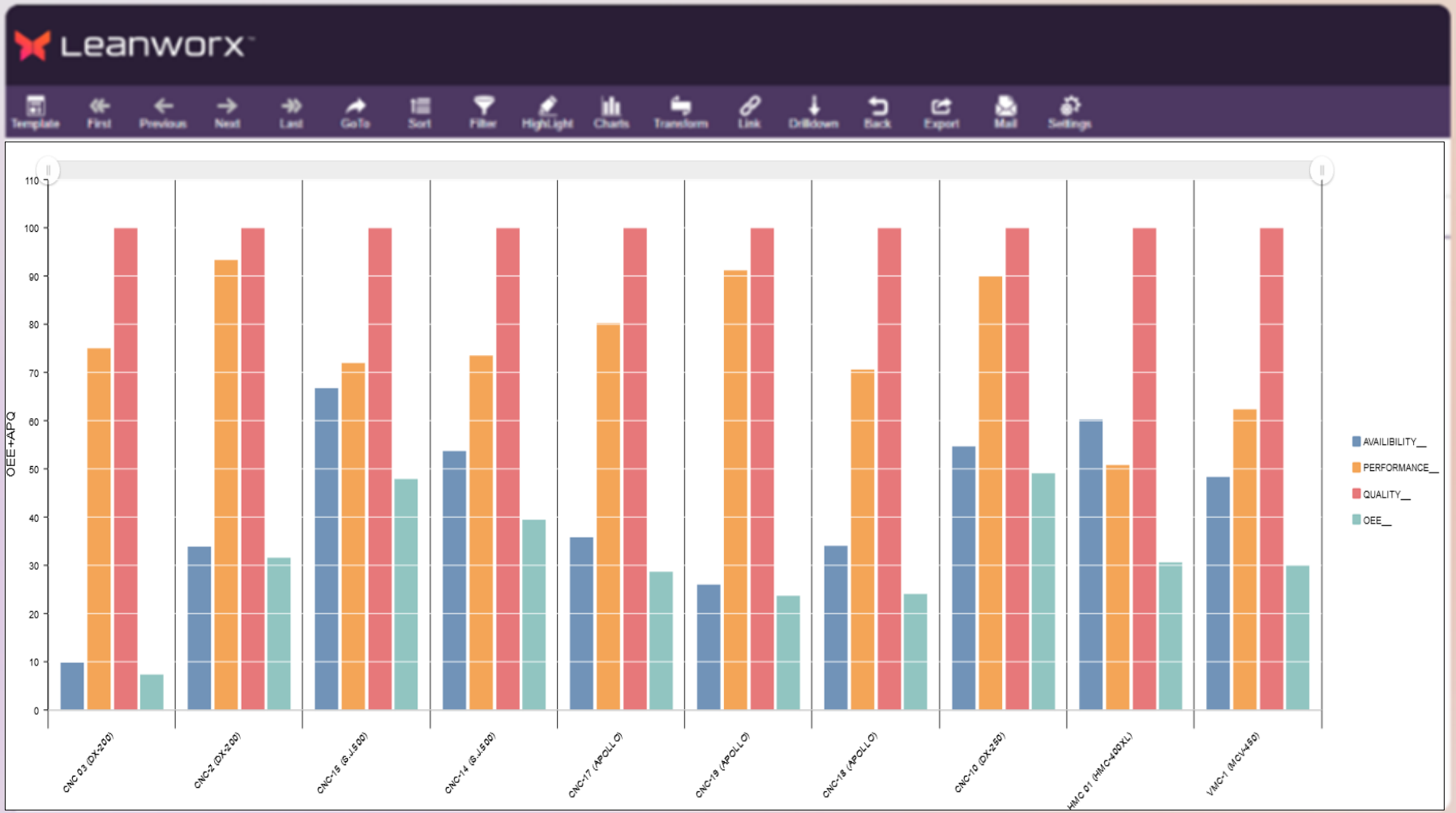
# Reports tree



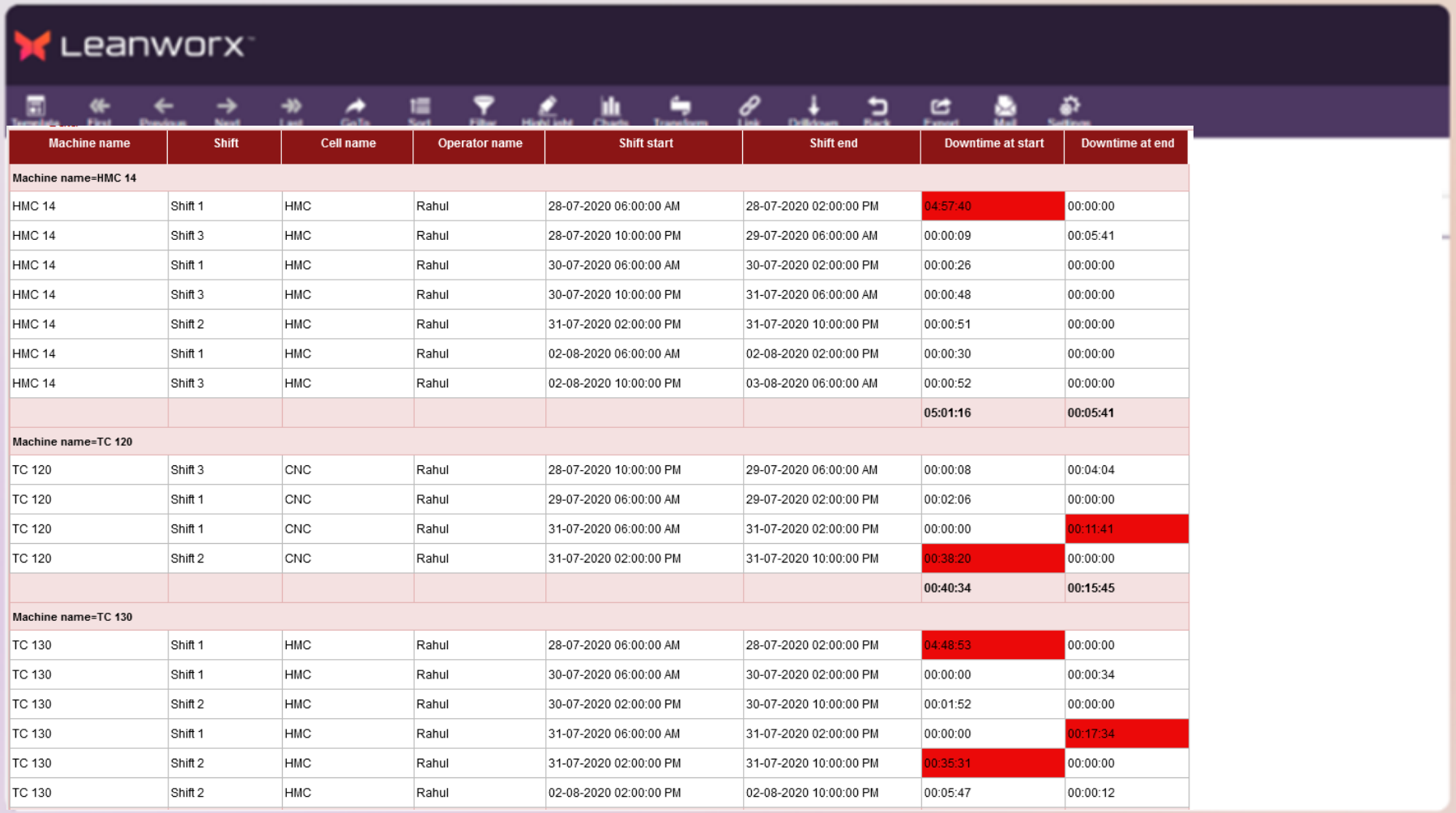
# Machine Downtime Chart



# Machine OEE comparison

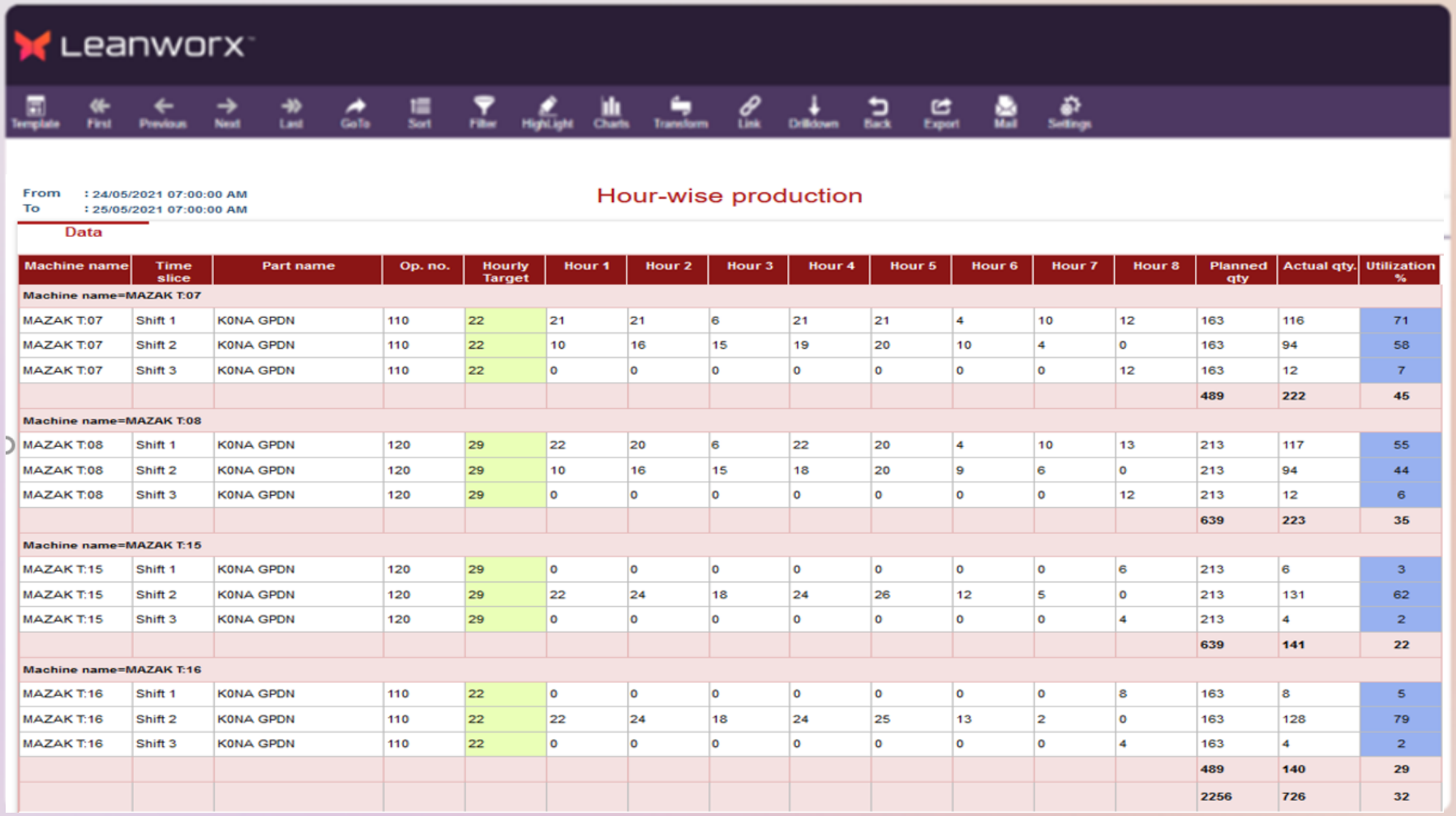


# Machine Downtime at shift change



| Machine name | Shift | Cell name | Operator name | Shift start | Shift end | Downtime at start | Downtime at end |
|---|---|---|---|---|---|---|---|
| **Machine name=HMC 14** | | | | | | | |
| HMC 14 | Shift 1 | HMC | Rahul | 28-07-2020 06:00:00 AM | 28-07-2020 02:00:00 PM | 04:57:40 | 00:00:00 |
| HMC 14 | Shift 3 | HMC | Rahul | 28-07-2020 10:00:00 PM | 29-07-2020 06:00:00 AM | 00:00:09 | 00:05:41 |
| HMC 14 | Shift 1 | HMC | Rahul | 30-07-2020 06:00:00 AM | 30-07-2020 02:00:00 PM | 00:00:26 | 00:00:00 |
| HMC 14 | Shift 3 | HMC | Rahul | 30-07-2020 10:00:00 PM | 31-07-2020 06:00:00 AM | 00:00:48 | 00:00:00 |
| HMC 14 | Shift 2 | HMC | Rahul | 31-07-2020 02:00:00 PM | 31-07-2020 10:00:00 PM | 00:00:51 | 00:00:00 |
| HMC 14 | Shift 1 | HMC | Rahul | 02-08-2020 06:00:00 AM | 02-08-2020 02:00:00 PM | 00:00:30 | 00:00:00 |
| HMC 14 | Shift 3 | HMC | Rahul | 02-08-2020 10:00:00 PM | 03-08-2020 06:00:00 AM | 00:00:52 | 00:00:00 |
| | | | | | | **05:01:16** | **00:05:41** |
| **Machine name=TC 120** | | | | | | | |
| TC 120 | Shift 3 | CNC | Rahul | 28-07-2020 10:00:00 PM | 29-07-2020 06:00:00 AM | 00:00:08 | 00:04:04 |
| TC 120 | Shift 1 | CNC | Rahul | 29-07-2020 06:00:00 AM | 29-07-2020 02:00:00 PM | 00:02:06 | 00:00:00 |
| TC 120 | Shift 1 | CNC | Rahul | 31-07-2020 06:00:00 AM | 31-07-2020 02:00:00 PM | 00:00:00 | 00:11:41 |
| TC 120 | Shift 2 | CNC | Rahul | 31-07-2020 02:00:00 PM | 31-07-2020 10:00:00 PM | 00:38:20 | 00:00:00 |
| | | | | | | **00:40:34** | **00:15:45** |
| **Machine name=TC 130** | | | | | | | |
| TC 130 | Shift 1 | HMC | Rahul | 28-07-2020 06:00:00 AM | 28-07-2020 02:00:00 PM | 04:48:53 | 00:00:00 |
| TC 130 | Shift 1 | HMC | Rahul | 30-07-2020 06:00:00 AM | 30-07-2020 02:00:00 PM | 00:00:00 | 00:00:34 |
| TC 130 | Shift 2 | HMC | Rahul | 30-07-2020 02:00:00 PM | 30-07-2020 10:00:00 PM | 00:01:52 | 00:00:00 |
| TC 130 | Shift 1 | HMC | Rahul | 31-07-2020 06:00:00 AM | 31-07-2020 02:00:00 PM | 00:00:00 | 00:17:34 |
| TC 130 | Shift 2 | HMC | Rahul | 31-07-2020 02:00:00 PM | 31-07-2020 10:00:00 PM | 00:35:31 | 00:00:00 |
| TC 130 | Shift 2 | HMC | Rahul | 02-08-2020 02:00:00 PM | 02-08-2020 10:00:00 PM | 00:05:47 | 00:00:12 |

# Hourly Parts Count



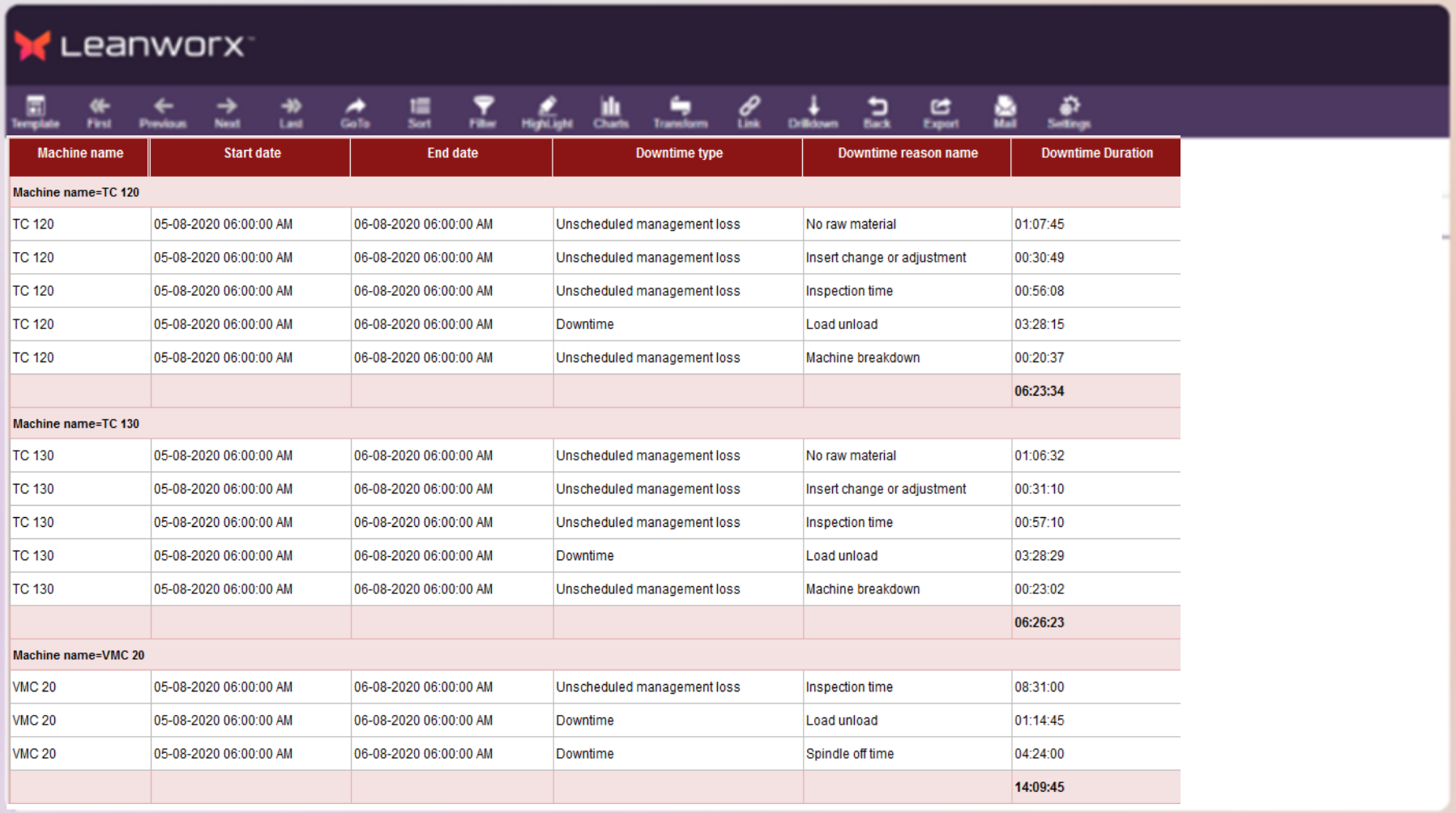

From : 24/05/2021 07:00:00 AM
To : 25/05/2021 07:00:00 AM

## Hour-wise production

Data

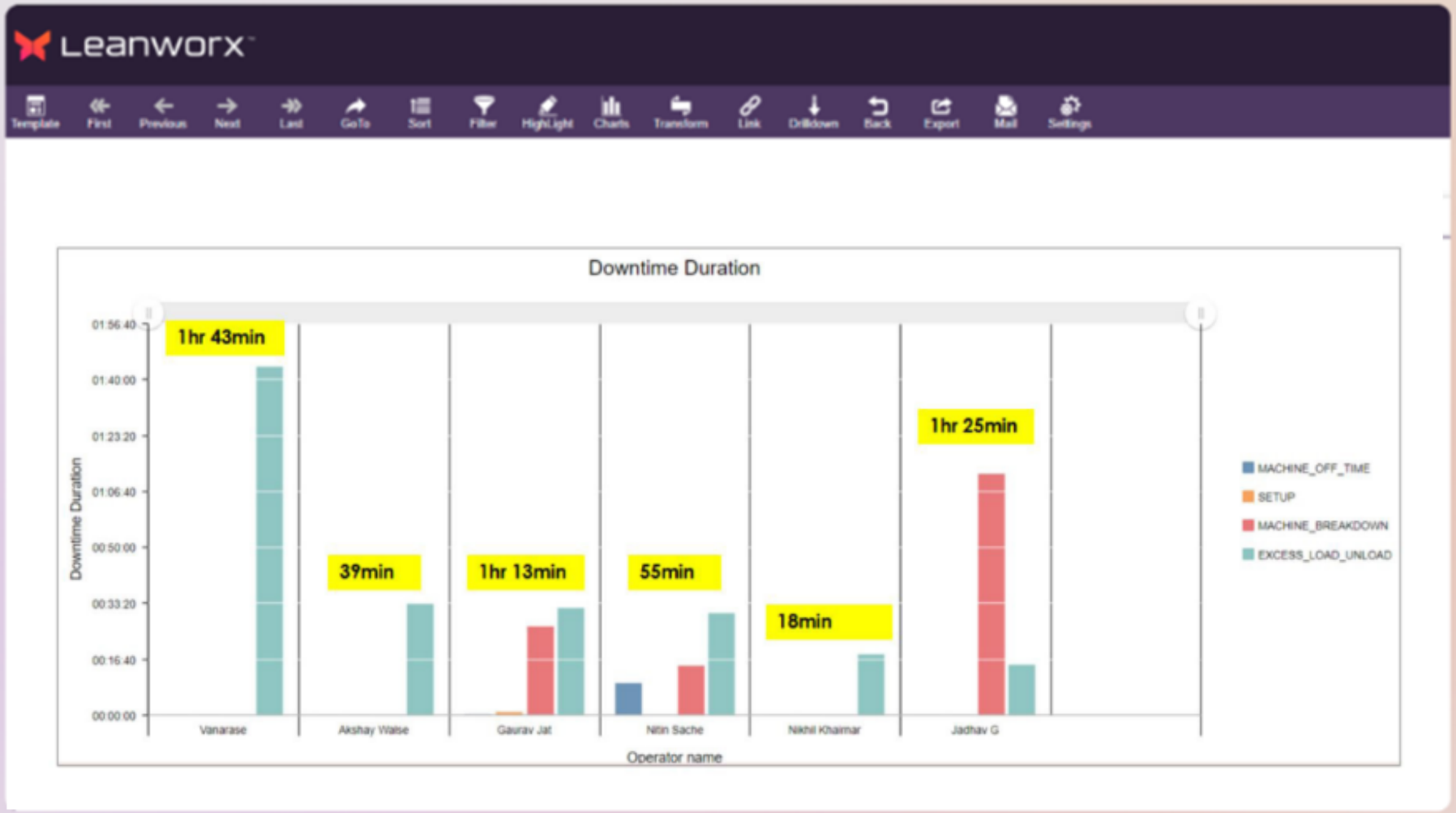
| Machine name | Time slice | Part name | Op. no. | Hourly Target | Hour 1 | Hour 2 | Hour 3 | Hour 4 | Hour 5 | Hour 6 | Hour 7 | Hour 8 | Planned qty | Actual qty. | Utilization % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Machine name=MAZAK T:07** | | | | | | | | | | | | | | | |
| MAZAK T:07 | Shift 1 | K0NA GPDN | 110 | 22 | 21 | 21 | 6 | 21 | 21 | 4 | 10 | 12 | 163 | 116 | 71 |
| MAZAK T:07 | Shift 2 | K0NA GPDN | 110 | 22 | 10 | 16 | 15 | 19 | 20 | 10 | 4 | 0 | 163 | 94 | 58 |
| MAZAK T:07 | Shift 3 | K0NA GPDN | 110 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 163 | 12 | 7 |
| | | | | | | | | | | | | | **489** | **222** | **45** |
| **Machine name=MAZAK T:08** | | | | | | | | | | | | | | | |
| MAZAK T:08 | Shift 1 | K0NA GPDN | 120 | 29 | 22 | 20 | 6 | 22 | 20 | 4 | 10 | 13 | 213 | 117 | 55 |
| MAZAK T:08 | Shift 2 | K0NA GPDN | 120 | 29 | 10 | 16 | 15 | 18 | 20 | 9 | 6 | 0 | 213 | 94 | 44 |
| MAZAK T:08 | Shift 3 | K0NA GPDN | 120 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 213 | 12 | 6 |
| | | | | | | | | | | | | | **639** | **223** | **35** |
| **Machine name=MAZAK T:15** | | | | | | | | | | | | | | | |
| MAZAK T:15 | Shift 1 | K0NA GPDN | 120 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 213 | 6 | 3 |
| MAZAK T:15 | Shift 2 | K0NA GPDN | 120 | 29 | 22 | 24 | 18 | 24 | 26 | 12 | 5 | 0 | 213 | 131 | 62 |
| MAZAK T:15 | Shift 3 | K0NA GPDN | 120 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 213 | 4 | 2 |
| | | | | | | | | | | | | | **639** | **141** | **22** |
| **Machine name=MAZAK T:16** | | | | | | | | | | | | | | | |
| MAZAK T:16 | Shift 1 | K0NA GPDN | 110 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 163 | 8 | 5 |
| MAZAK T:16 | Shift 2 | K0NA GPDN | 110 | 22 | 22 | 24 | 18 | 24 | 25 | 13 | 2 | 0 | 163 | 128 | 79 |
| MAZAK T:16 | Shift 3 | K0NA GPDN | 110 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 163 | 4 | 2 |
| | | | | | | | | | | | | | **489** | **140** | **29** |
| | | | | | | | | | | | | | **2256** | **726** | **32** |

# Machine Downtime Reasons



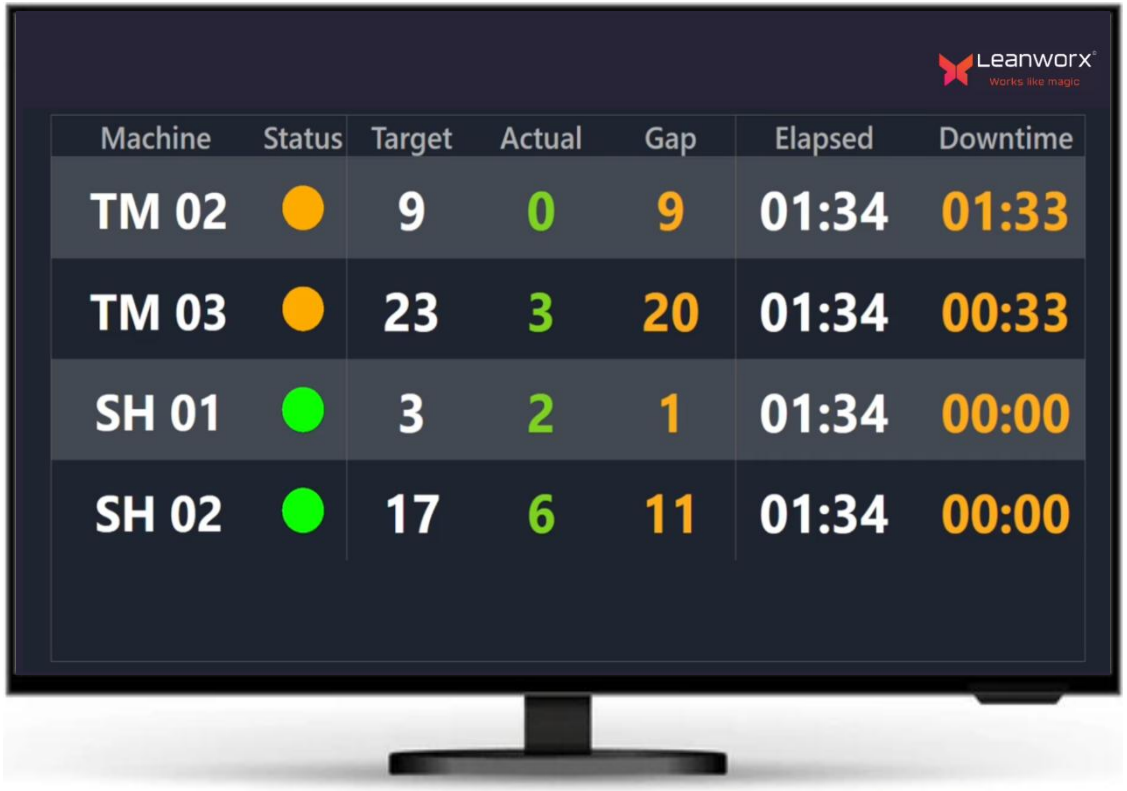

| Machine name | Start date | End date | Downtime type | Downtime reason name | Downtime Duration |
|---|---|---|---|---|---|
| **Machine name=TC 120** | | | | | |
| TC 120 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | No raw material | 01:07:45 |
| TC 120 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | Insert change or adjustment | 00:30:49 |
| TC 120 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | Inspection time | 00:56:08 |
| TC 120 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Downtime | Load unload | 03:28:15 |
| TC 120 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | Machine breakdown | 00:20:37 |
| | | | | | **06:23:34** |
| **Machine name=TC 130** | | | | | |
| TC 130 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | No raw material | 01:06:32 |
| TC 130 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | Insert change or adjustment | 00:31:10 |
| TC 130 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | Inspection time | 00:57:10 |
| TC 130 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Downtime | Load unload | 03:28:29 |
| TC 130 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | Machine breakdown | 00:23:02 |
| | | | | | **06:26:23** |
| **Machine name=VMC 20** | | | | | |
| VMC 20 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Unscheduled management loss | Inspection time | 08:31:00 |
| VMC 20 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Downtime | Load unload | 01:14:45 |
| VMC 20 | 05-08-2020 06:00:00 AM | 06-08-2020 06:00:00 AM | Downtime | Spindle off time | 04:24:00 |
| | | | | | **14:09:45** |

# Machine Downtime Pareto



# Operator performance dashboard for supervisors

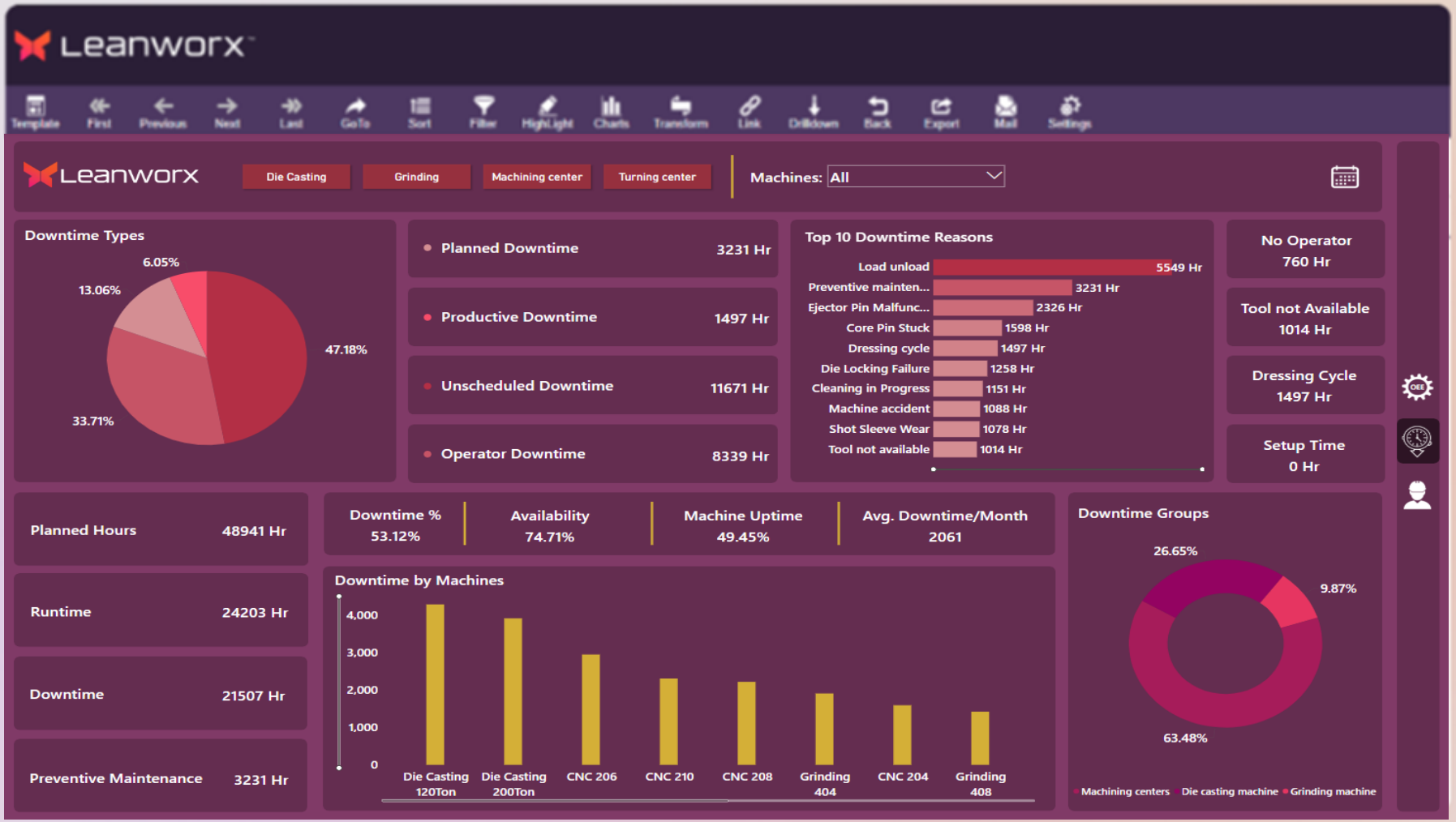
# Real time Andon displays




**For Mass Production**

**For Batch Production**

# Customized Dashboard



# Plant head dashboard

# Plant head dashboard