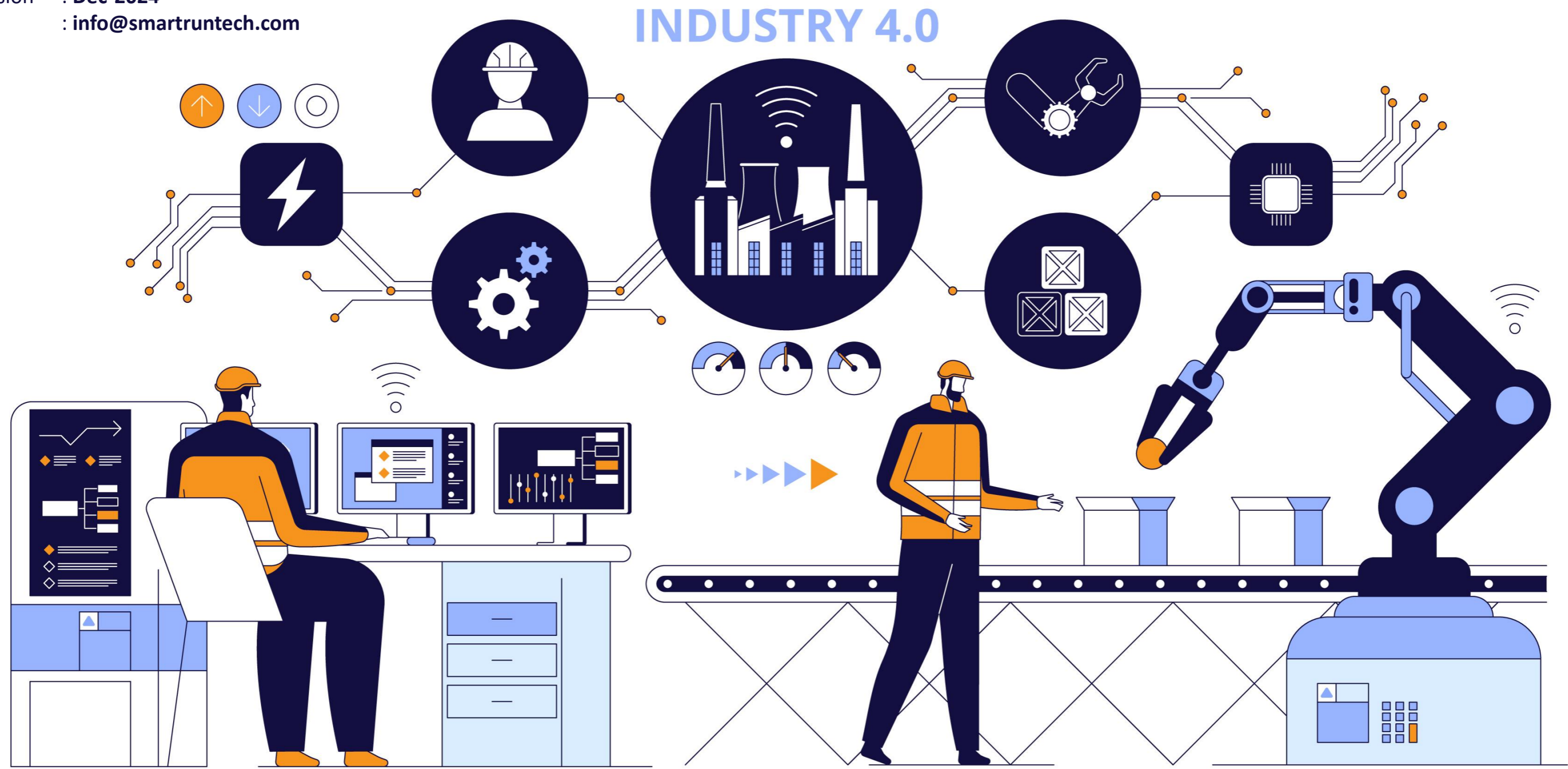


SmartRun Digital Factory Solution

Document version : Dec-2024
Email : info@smartruntech.com



SmartRun Technologies

Data-driven problem solvers

Our Offer

Digital Factory Solution aligned with Industry 4.0 for Lean Manufacturing Process

Business Process Automation through Digitization, Artificial Intelligence, RPA & System Integration

Sustainability aligned with ESG Reporting using IIoT for W.A.G.E.S

Our Success

35+ Customers

100+ projects

25K+ devices connected

15M+ daily IoT events

Award winning solutions

Our Value

Cost-to-Value Proposition
10x

Manpower Cost Reduction
20%

Energy Cost Reduction
10%

Rejection and Warranty Reduction
20%

Line Capacity Improvement
20%

Capex Reduction
10%

Inventory Cost Reduction
5%

Paper & Excel Elimination
25%















OEE Improvement
15%

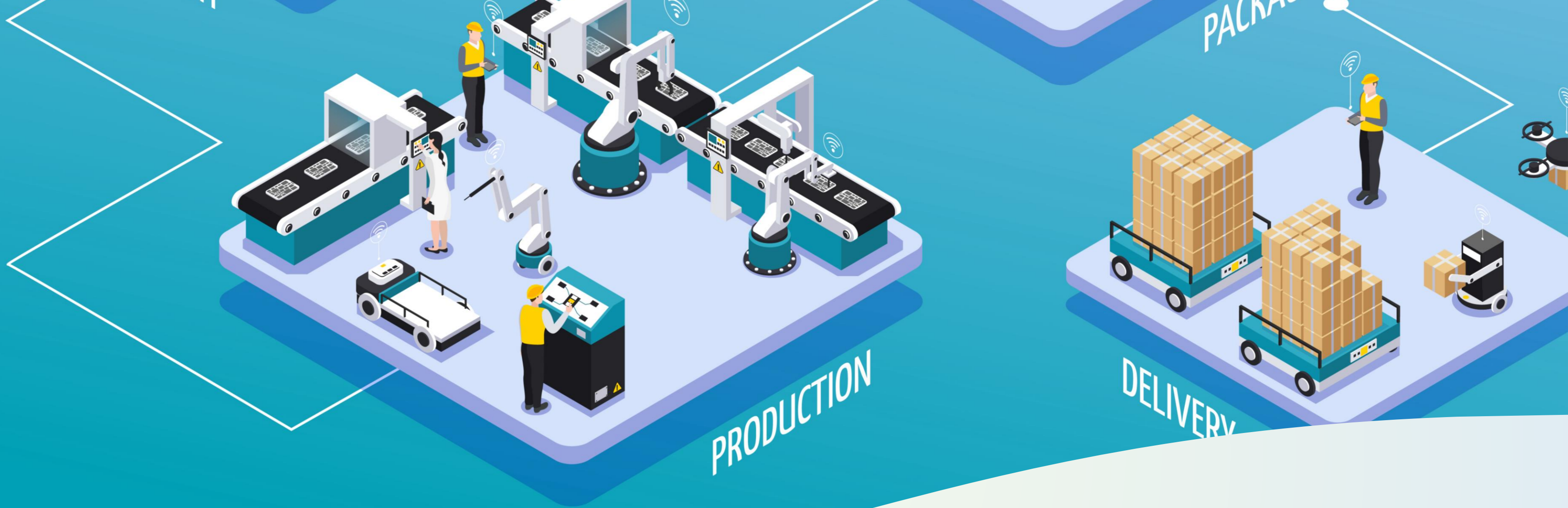
End to End Traceability Data
100%

Process Compliance Improvement
25%

Note: conservatively measured*

SmartRun Clientele

<p>Hi-tech</p> 	<p>Tire</p> 	<p>Appliance</p> 	<p>Fabrication</p> 	<p>Turnkey Projects</p> 	<p>High Precision Machining & Assembly Shop</p>        
<p>Mechatronics</p> 	<p>OEM</p>   	<p>Press Metal Components</p>   		<p>Services</p>           	
<p>HVAC</p>  		<p>Aerospace</p> 			



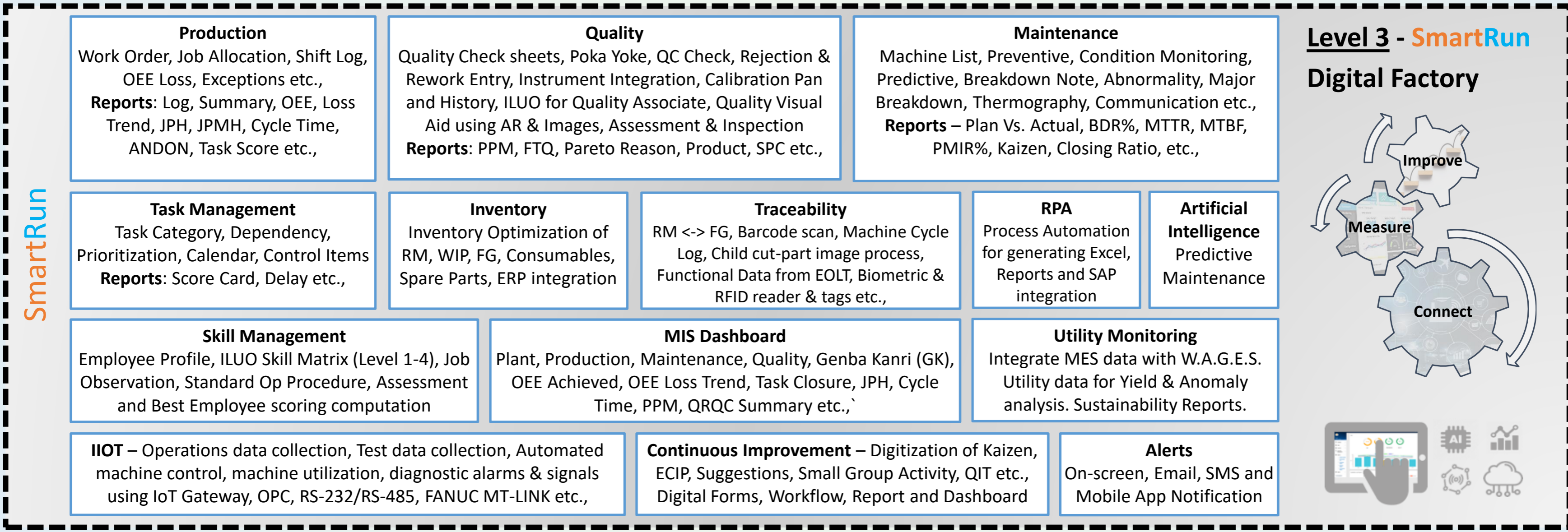
Our differentiated value proposition

- ✓ Manufacturing domain + Process + “Internet of Anything”
- ✓ Correlate KPIs across business process & assets
- ✓ Structured yet agile & flexible
- ✓ Adapting to customer environments & processes
- ✓ Deliver quick tangible results

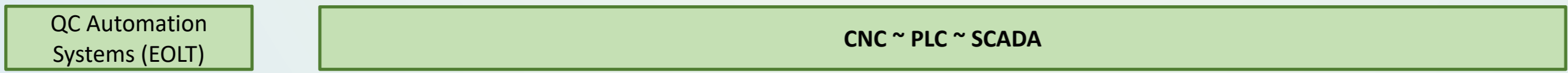
SmartRun Digital Factory Packaged Solution aligned with Industry 4.0



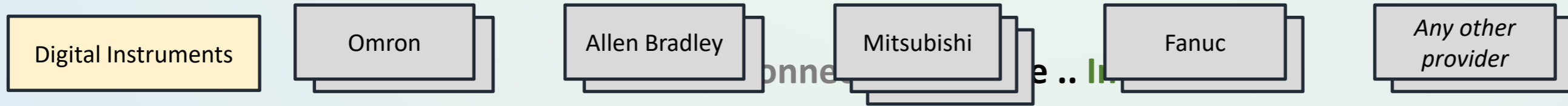
Level 4 – ERP
Business Process Standardization and Compliance



Level 3 - SmartRun Digital Factory

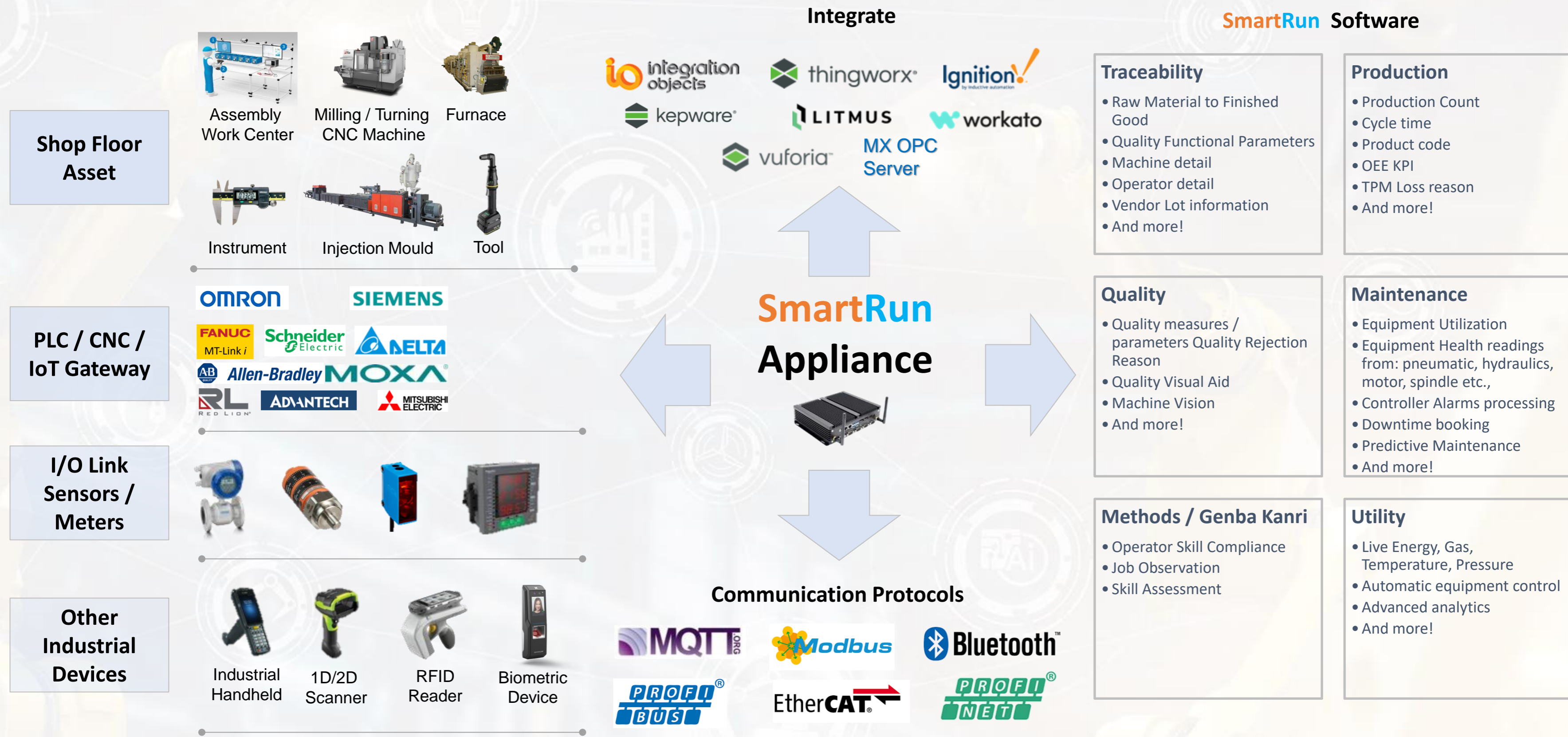


Level 2: Plant Floor Controllers

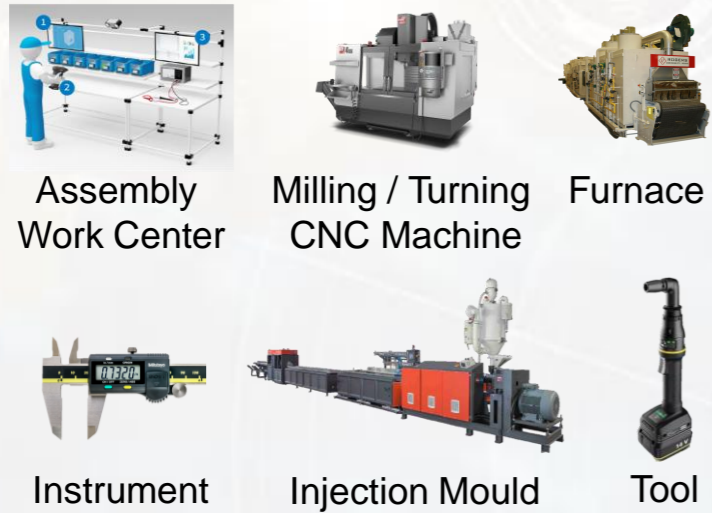


Level 1: Machines

SmartRun IoT Appliance simplifies 'Connect'



Shop Floor Asset



PLC / CNC / IoT Gateway



I/O Link Sensors / Meters



Other Industrial Devices



Integrate



SmartRun Appliance



Communication Protocols



SmartRun Software

Traceability

- Raw Material to Finished Good
- Quality Functional Parameters
- Machine detail
- Operator detail
- Vendor Lot information
- And more!

Production

- Production Count
- Cycle time
- Product code
- OEE KPI
- TPM Loss reason
- And more!

Quality

- Quality measures / parameters Quality Rejection Reason
- Quality Visual Aid
- Machine Vision
- And more!

Maintenance

- Equipment Utilization
- Equipment Health readings from: pneumatic, hydraulics, motor, spindle etc.,
- Controller Alarms processing
- Downtime booking
- Predictive Maintenance
- And more!

Methods / Genba Kanri

- Operator Skill Compliance
- Job Observation
- Skill Assessment

Utility

- Live Energy, Gas, Temperature, Pressure
- Automatic equipment control
- Advanced analytics
- And more!

SmartRun Digital Factory

OEE Monitoring & Reporting based on IoT

Task Management for Action Plan

4M Compliance with Biometric & Barcode integration

150+ Paper/Excel Format Digitization

Skill Management based on Biometric

Approval Workflow

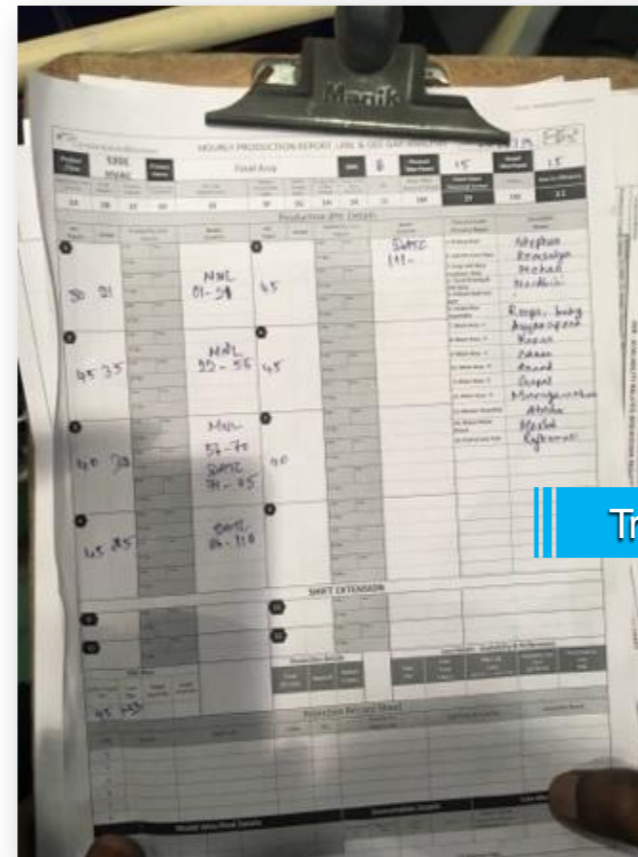
SMS & In-App Notification

Accurate and timely data available to improve decision making

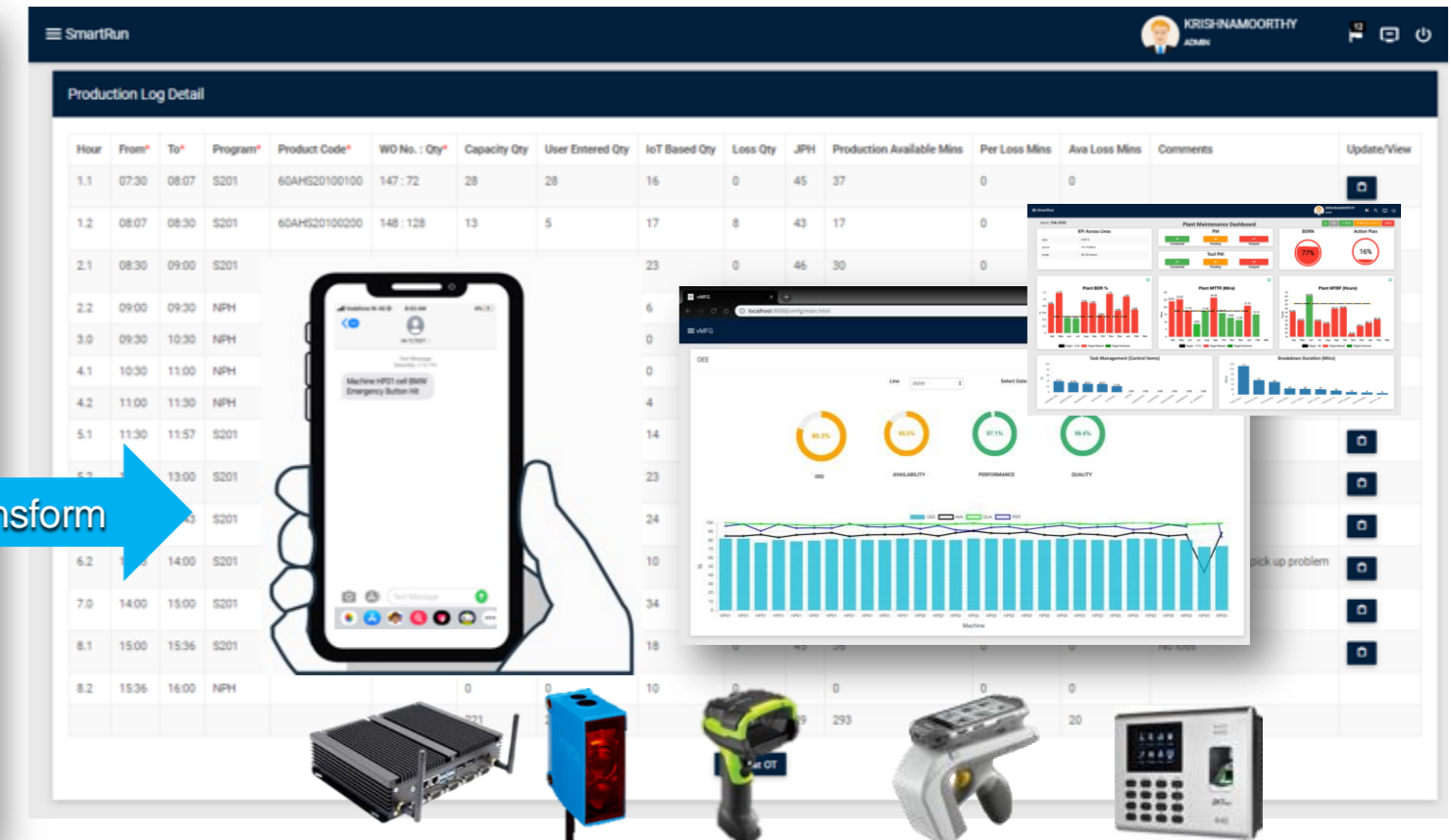
Significantly reduce co-ordination effort and more focus on task execution

Enable change in process and templates quick

Higher compliance in Audit with less effort



Transform

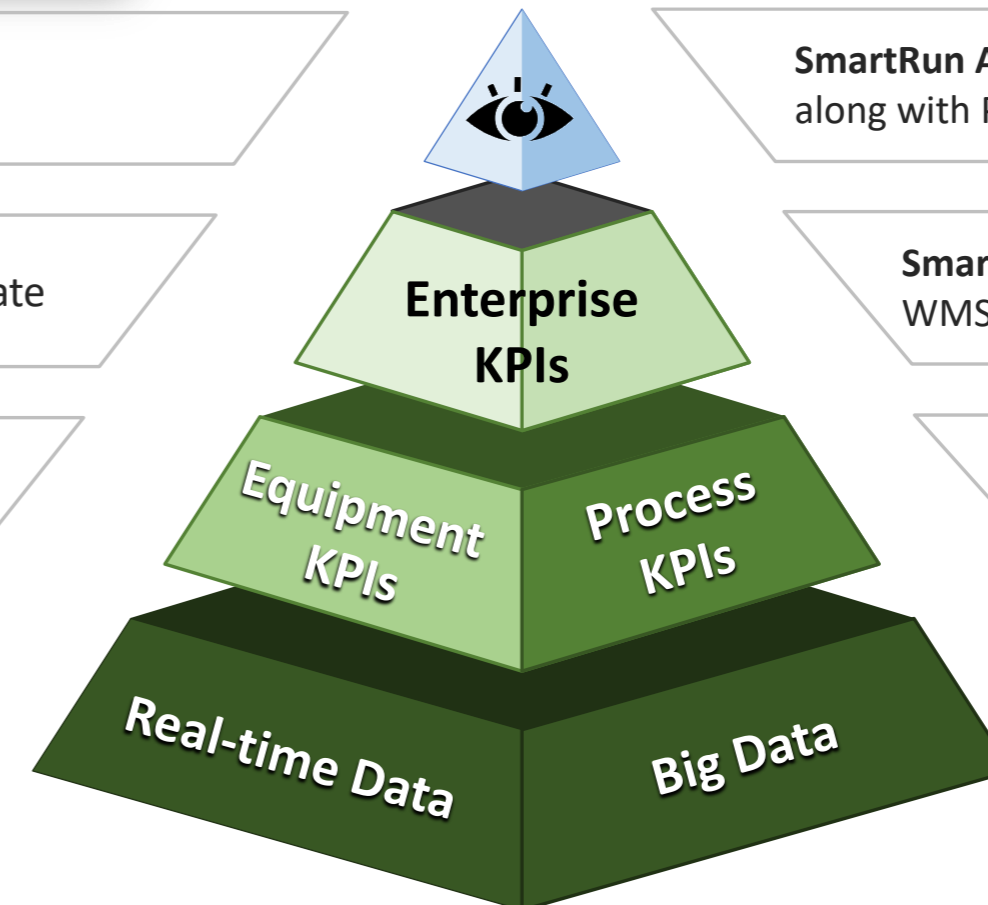


LEVEL 4: Predict & Prescribe

SmartRun AI to predict failures and Poka-Yoke along with Prescriptive next steps

LEVEL 3: Integrate & Automate

SmartRun MES integrated with ERP, WMS, HRMS etc., Workflow automate



Connect .. Measure .. Improve.

SmartRun Sustainability 4.0

Live Utilities Consumption data captured using IoT



Improve ESG Audit Compliance: Carbon footprint, Energy-per-part, Water-per-part, power mix, cost calculations etc.,

Solution available in SaaS (Subscription) and On-Premise Model

IoT for data collection, visualization & control (on/off)

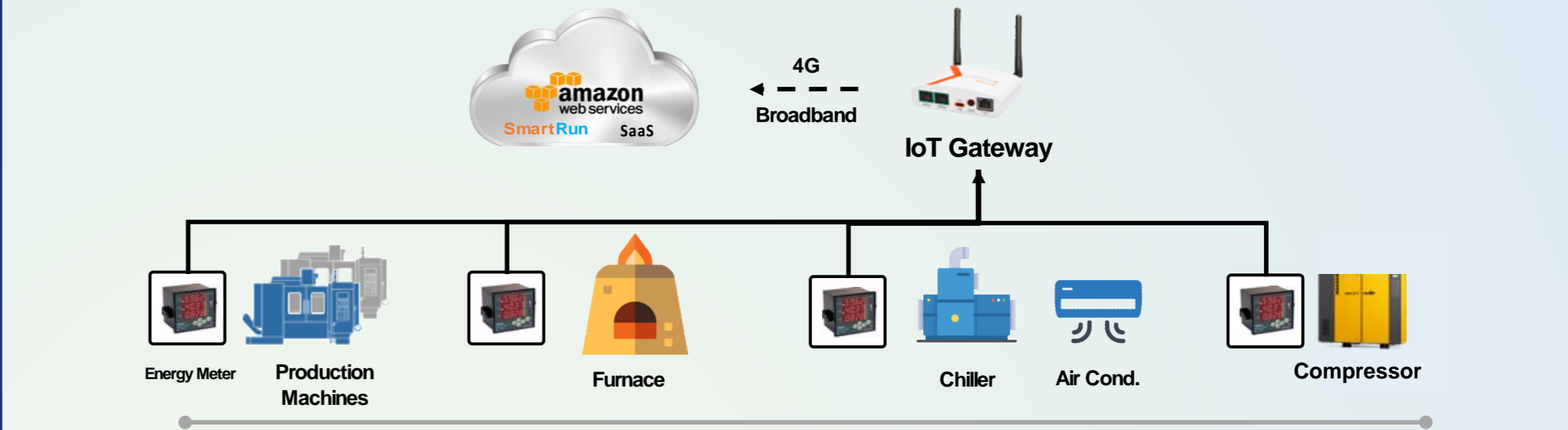
Reduction in Energy consumption by at least 10%. Guaranteed!

With accurate energy consumption data available, changes to reduce consumption easy to apply and measure

No human effort required to record energy readings and create reports

Complex calculation supported in system to measure Energy cost for unit produced

Assist with Energy problem solving related to Amperage Load, Voltage fluctuation etc.,



Energy Dashboard

Date: 12-May-2020 Meter: CAB 1

Energy Day Wise Consumption - May 2020

Energy Consumption Hourly - 12-May-2020

Energy Consumed per 1,000 Oil Coolers - May 2020

Energy Consumption Projection - May 2020

Excess Energy Reason Pareto duration by minutes - May

Energy Day Wise Consumption - Top 10

Meter	kWh
CAB 1	2,155
CAB 2	1,072
Calth...m 2	734
Shop...ing	592
LCOC...Line	581
Tech...nter	489
MPDB	414
Admin	235
ETP O...Oven	229
Tube...Mill	212

Amperage Minute Wise Chart - CAB 1 - 04-Mar-2020

Machine Data for: 21-Jan-2022 - Shift C

Hour	DPO-529 PRODUCTION(nos.)	DPO-530 PRODUCTION(nos.)
Hour 1: 192/384	Hour 1: 192/384	Hour 1: 224/384
Hour 2: 256/384	Hour 2: 256/384	Hour 2: 288/384
Hour 3: 256/384	Hour 3: 256/384	Hour 3: 320/384
Hour 4: 192/384	Hour 4: 192/384	Hour 4: 256/384

Production Vs. Energy Consumption Hourly Details: 21-Jan-2022 - Shift C

Hour	DPO-529 Energy Unit (kWh)	DPO-529 Produced Qty	DPO-530 Energy Unit (kWh)	DPO-530 Produced Qty
22:00-23:00	13.2	192	12.9	224
23:00-00:00	13.9	256	14.1	288
00:00-01:00	15.2	256	13.3	320
01:00-02:00	10.6	160	11.8	256
02:00-03:00	14.2	192	14.3	288
03:00-04:00	13.1	256	13.8	320
04:00-05:00	13.1	256	14.1	320
05:00-06:00	12.5	192	12.5	288
Total	105.9	1760	106.8	2204

BENEFITS

SmartRun Utility W.A.G.E.S Monitoring Solution

Energy

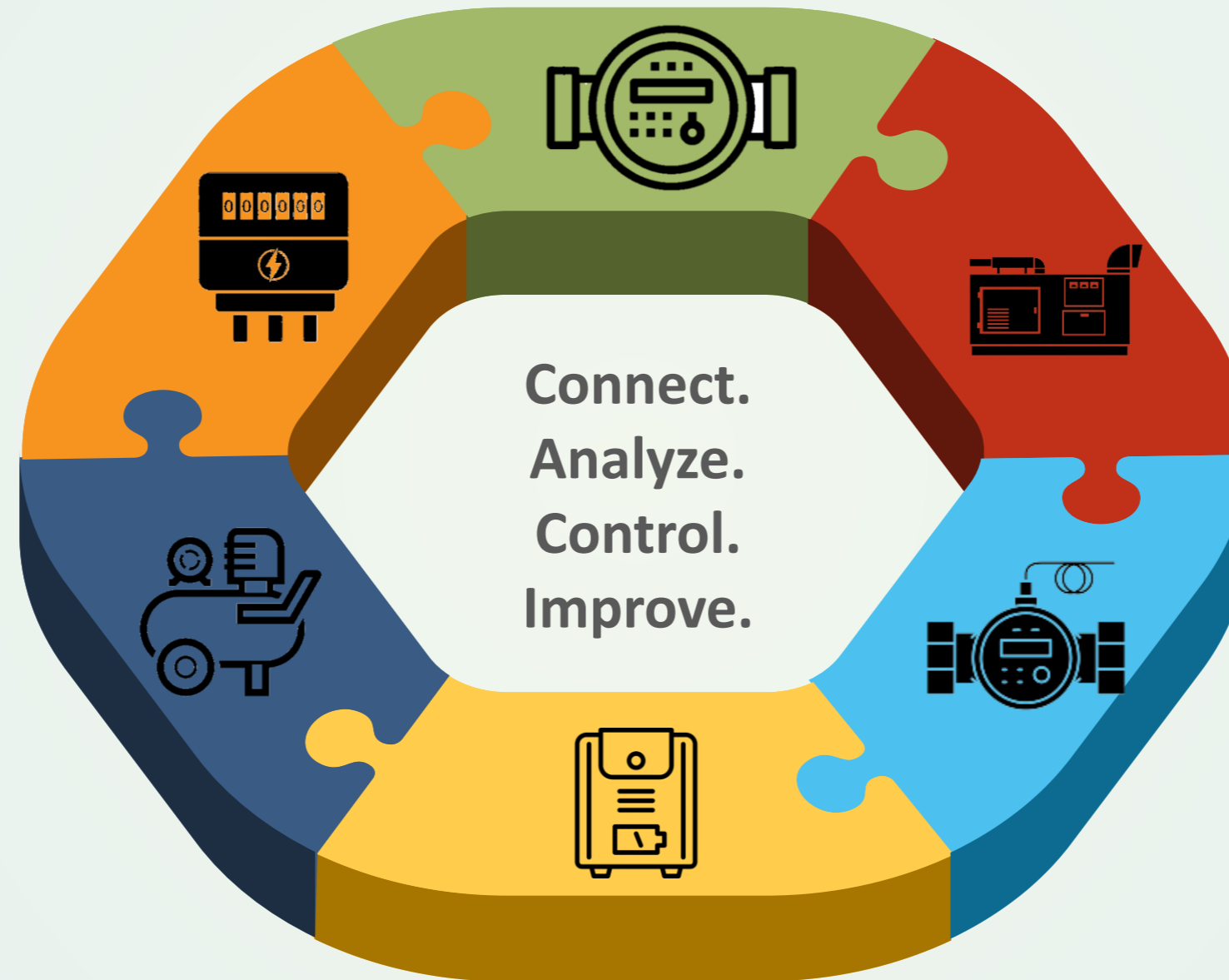
IIoT based Energy, V, A, Power, PF, Harmonics etc., Calculate Energy / Part, Excess Energy Consumption against Planned Energy. Abnormality Notifications and Equipment Control Signal.

Air

IIoT based Air Compressor data collection with CFM, Energy, Temperature, Pressure, Motor Speed & Abnormality. Calculate Energy / CFM

LPG & LNG

IIoT based LPG & LNG Tank & Flow Meter data to include Cumulative, Instant Flow and Pressure



Water

IIoT based Water Flow Meter data to include Cumulative and Instant Flow. Generate Water Balance Sheet

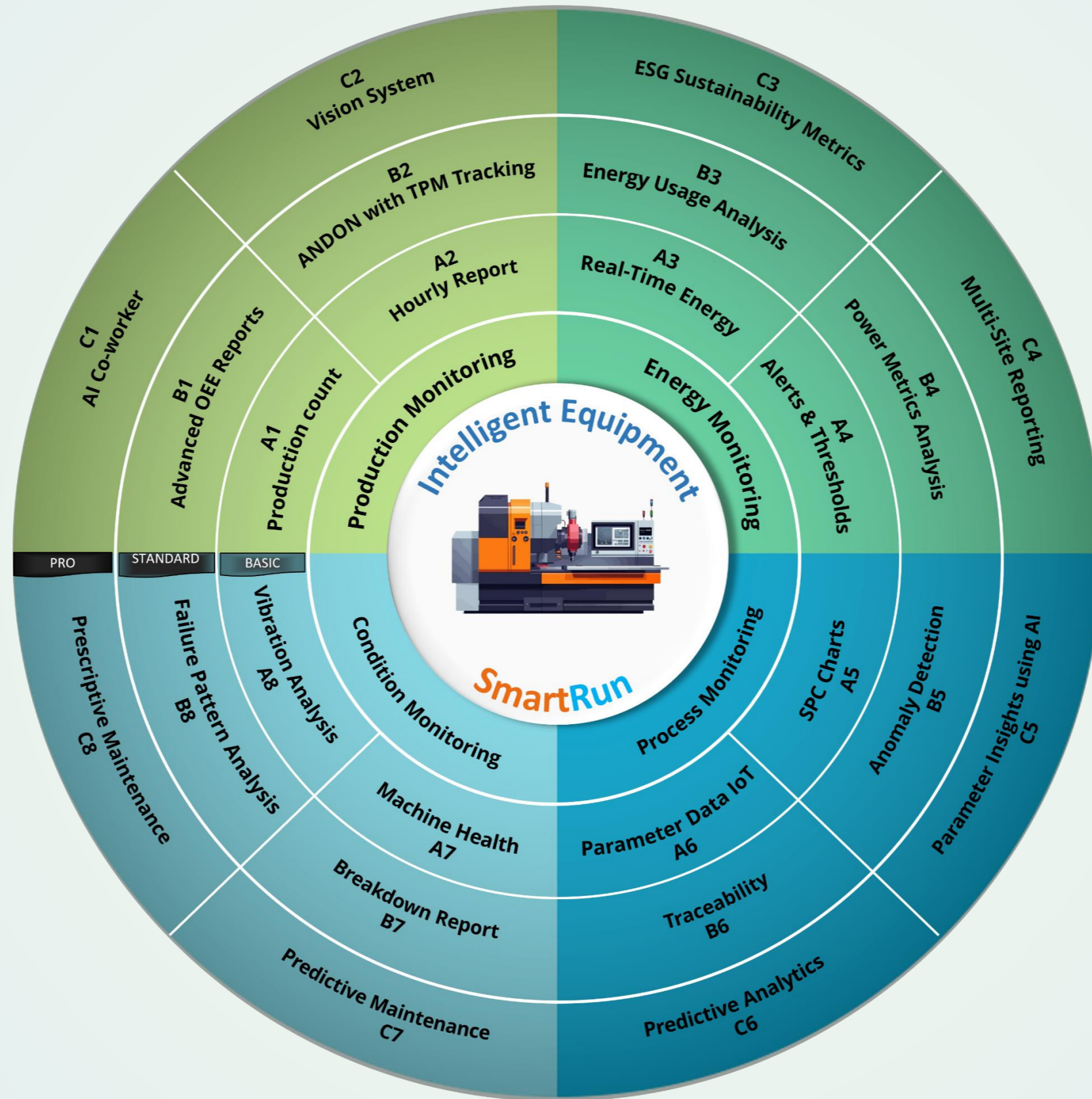
Diesel Generator

IIoT based DG data to include runtime, fuel consumption, Energy generated, oil pressure and alarms

UPS

IIoT based UPS health parameter monitoring including load, Voltage

SmartRun Product Portfolio



SmartRun Process Automation

Automation

- Recipe for Process Automation, Validations, Matching.
- Connectors configurations for ERP, Finance systems
- Apps for Document Status tracking and User Collaboration for Approval

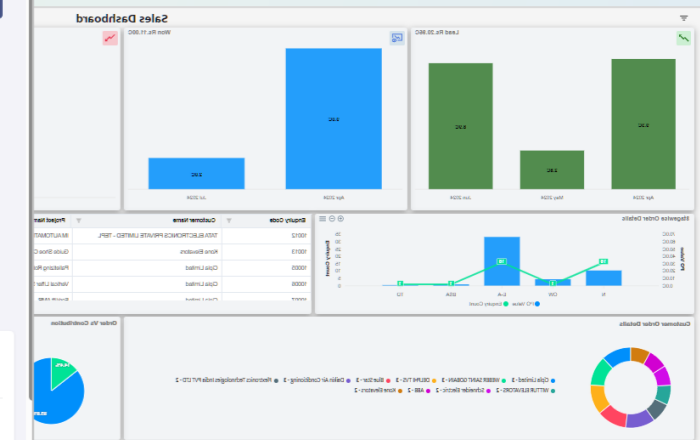
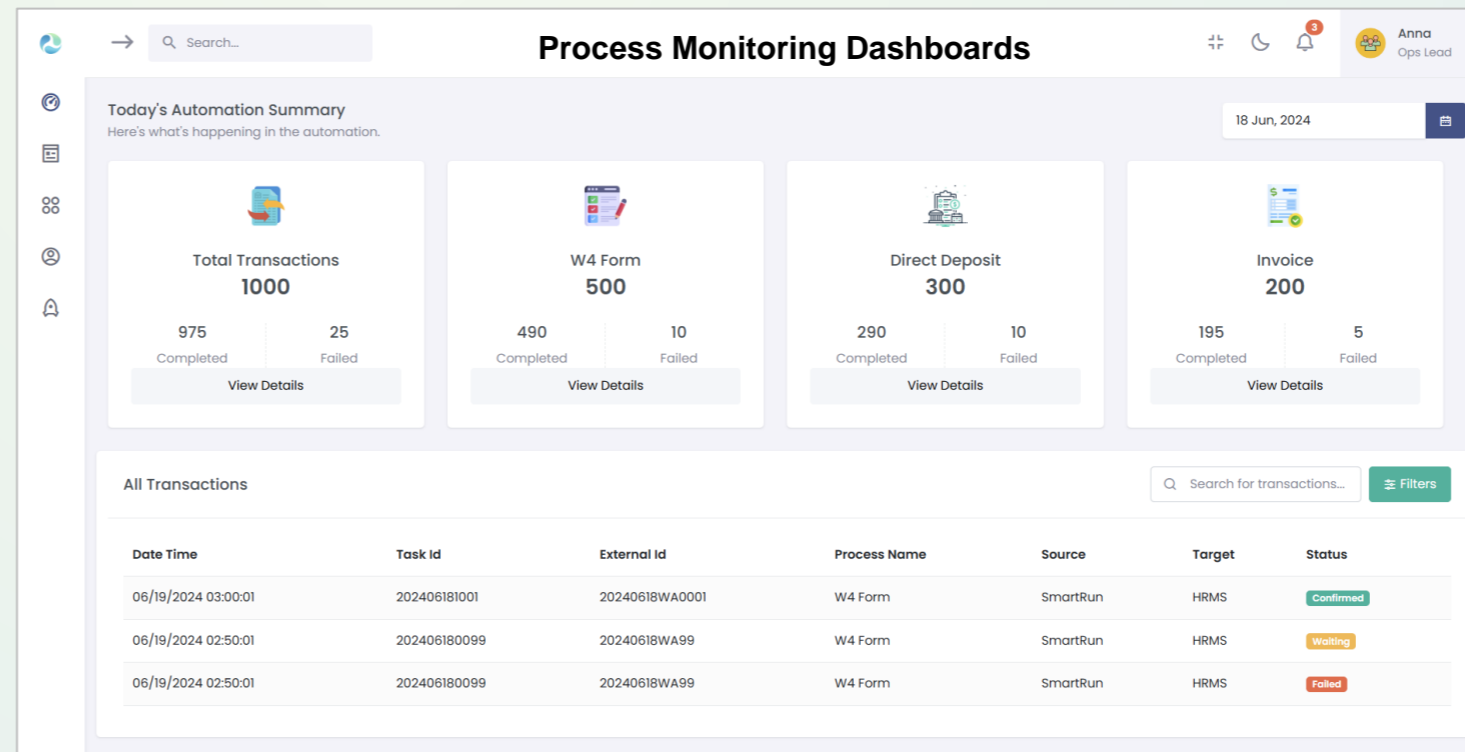
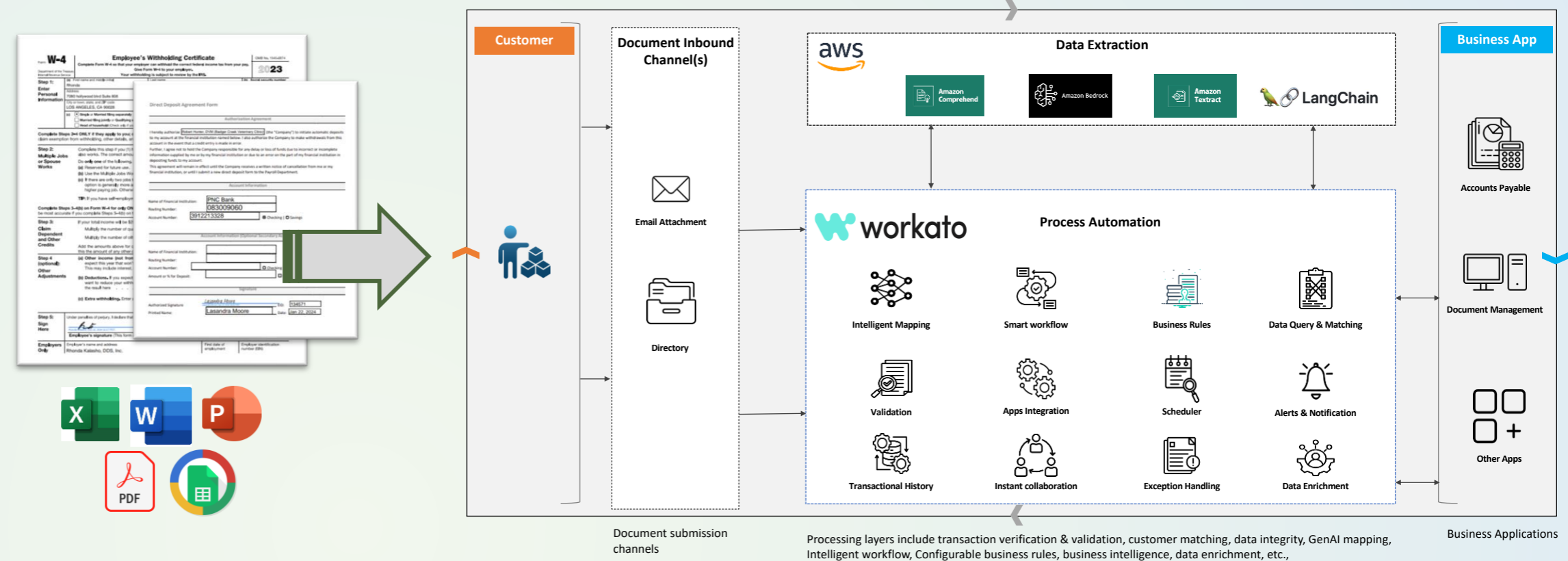
Intelligence

- Transform to more sophisticated experience using AWS Bedrock (next-gen to Abbyy, Kofax)
- Data extraction, classification, anomaly detection, insights,
- Continuously innovate using Bedrock to accelerate value to target customers

Managed Services

- Provide Production Transaction Monitoring Support
- On-going Solution Tuning for further Automation
- SLA based work delivery and KPIs reported

SmartRun Intelligent Document Processing Accelerator using AI-ML



Connect .. Measure .. Improve.

Case Study: Utility Monitoring aligned for ESG Reporting

A multinational Motorcycle Manufacturer



Business challenge

- Pressure to reduce Utilities Cost in terms of consumption, maintenance and reporting
- Dedicated team member effort consumed to log and generate report from Meter readings spread across vast plant facility
- Errors in data collection and report giving wrong information to Finance
- Delay in report availability for Maintenance & Finance team
- Necessity to understand consumption patterns to bring new solution to optimize consumption

Solution Provided

- ✓ IoT based automated data collection, analysis and reporting from following sources
 - **250 Energy Meters**
 - 8 Kaeser Compressors through 2 Sigma4
 - 25 Krohne Water Flow Meters
 - 5 Krohne LPG Mass Flow Meters
 - 8 Transformer Relay Temperature
- ✓ Utility Vs. Yield Analysis Hourly based on Vehicle Production Count which was not possible before
- ✓ Notifications through SMS & Email incase of Abnormality in Energy, Water, LPG & Air Compressor readings
- ✓ Dashboards for Energy, Air, Water & LPG
- ✓ Centralized solution for access across plant

Value Delivered

- Reduction in overall **Utility Cost by 10%** for the Manufacturing Plant by achieved after 6 months of usage
- Yield Vs. Consumption Analysis provides new perspective on **Hourly Energy per Unit** produced across different shifts
- Reduction in Maintenance Team resource cost to collect meter data, update Excel document and generate MIS Reports manually from each meter and groups. **Valued at Rs. 20 Lakhs/yr.**
- Time to Respond **reduced by 40%** on average to Utility Abnormality (Power surge, Low Voltage, Transformer Relay High Temperature etc.,)

Case Study: Digital OEE & Traceability

A Global Automobile Component Manufacturer



Business challenge

- Challenges in **tracking loss to improve OEE**
- **Mundane** work to provide **Traceability of FG to RM**, Man, Machine, Quality and Production Parameter Data
- **Inability to track paper-based** data for Work Orders, QC Inspection, Production Logbook, Inventory Adjustments etc.,
- Challenge in tracking **4M Process compliance**



Solution Provided

- SmartRun software across Production, Genba Kanri, Quality and Maintenance
- Capture functional readings from HVAC EOLT
- Collect IoT data from **15 PLCs**
- **Automate 4M tracking and approval**
- **Plant-wide implementation (12 Lines)**
- **350** paper-based documents digitized
- **50+** Active users daily



Value Delivered

- Increase in OEE by **10%**
- Improve Units Per Hour produced by **50%**
- Improve Equipment uptime by **15%**
- Reduction in work allocation & reporting effort by over **10,000 hrs/year**
- Reduce Energy Consumption by **10%**



Digital Factory: Assembly Line & Furnace Monitoring

A Global HVAC Manufacturer



Business challenge

- **Challenge in meeting production schedule** due to unknown downtime and delays in reporting issue
- **Under-utilization** of production line
- High effort in coordination and planning to maintain the correct **buffer stock of Finished Good** based on customer pull
- Mandate to meet **Sustainability goals** in reducing energy consumption and carbon footprint



Solution Provided

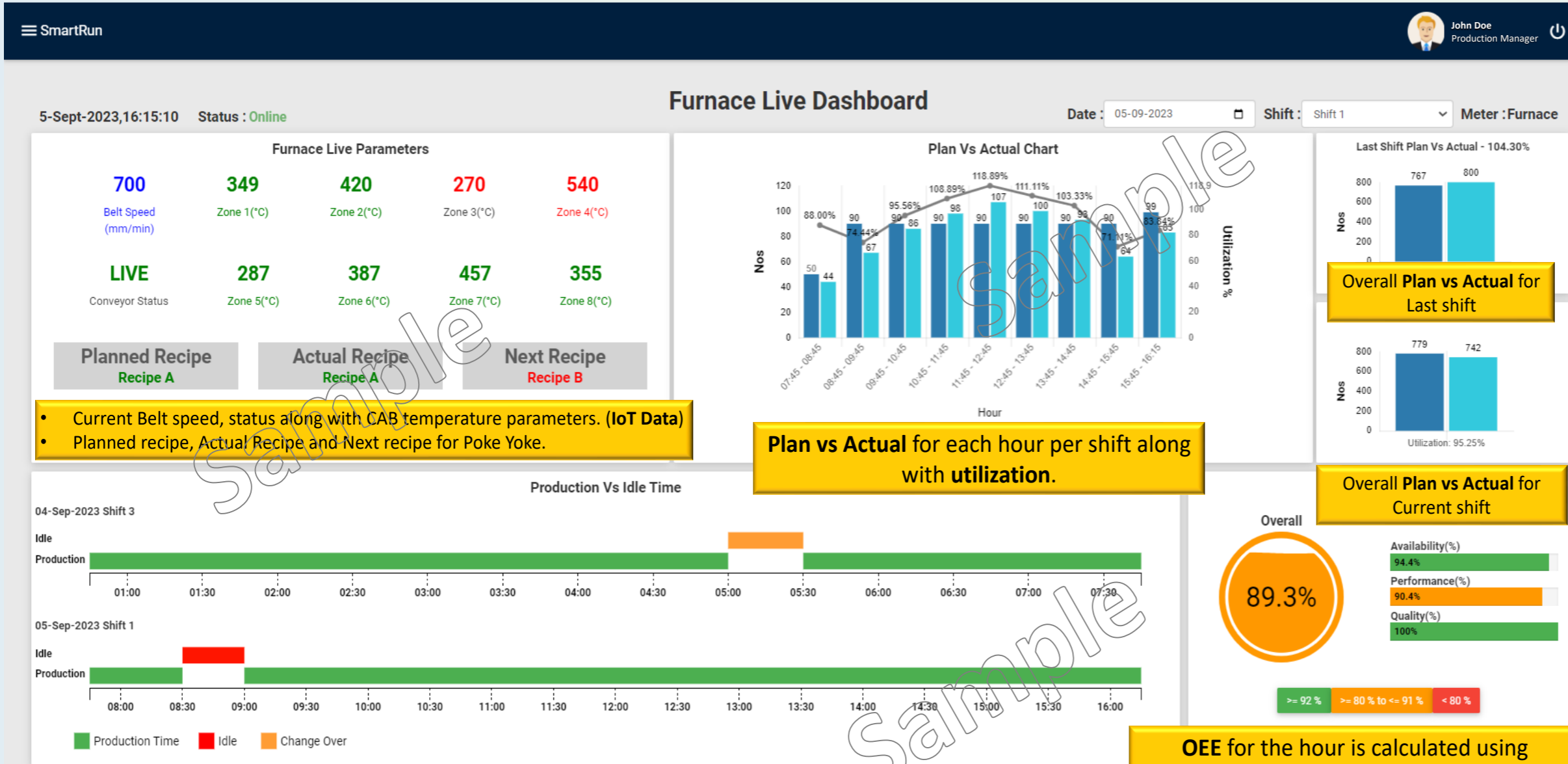
- **Automated Lean aligned Pull-System** based Production Planning for Assembly Line
- **ANDON** based Downtime reporting for Total Productive Maintenance (TPM)
- **Real-time CAB Furnace parameter** and conveyor utilization monitoring using IoT
- **Automated OEE** based on Production Plan, Defects & Downtime entry
- **Automated Energy consumption** analysis with Production Count



Value Delivered

- Optimized FG inventory by **15%**
- Improve Assembly Line and Furnace **OEE** by **15%**
- **Reduced Energy/part by 10%** at Furnace aligned with their Sustainability goals
- **Prevent Defects by 5%** using Vision
- **Poke Yoke for Furnace** Parameter Setting and Product Recipe based on sensor
- **Eliminate human effort** by over 600 person days through Automation

SmartRun Dashboard for Furnace



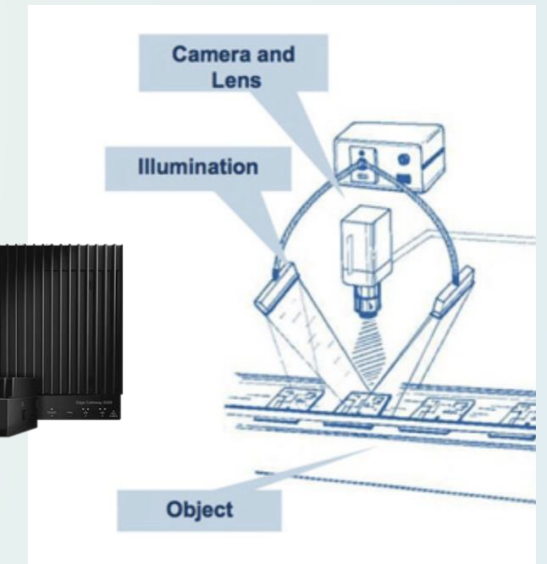
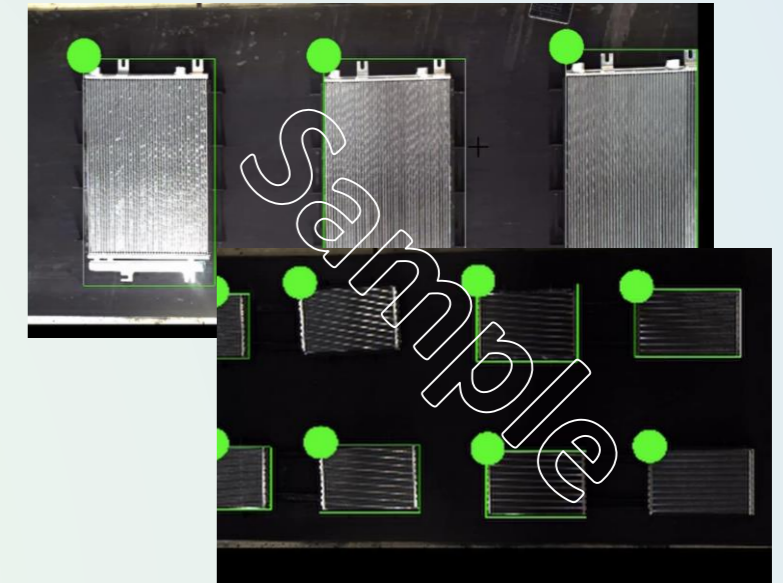
- Current Belt speed, status along with CAB temperature parameters. (IoT Data)
- Planned recipe, Actual Recipe and Next recipe for Poke Yoke.

Plan vs Actual for each hour per shift along with utilization.

Overall Plan vs Actual for Current shift

OEE for the hour is calculated using Availability, Performance and Quality for current hour.

User can visually identify the status of CAB captured through IoT (Production, Idle, Change over, etc.)



- IoT & Vision System based solution for Automated Furnace Monitoring
- Notification to Supervisor in case of anomalies

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