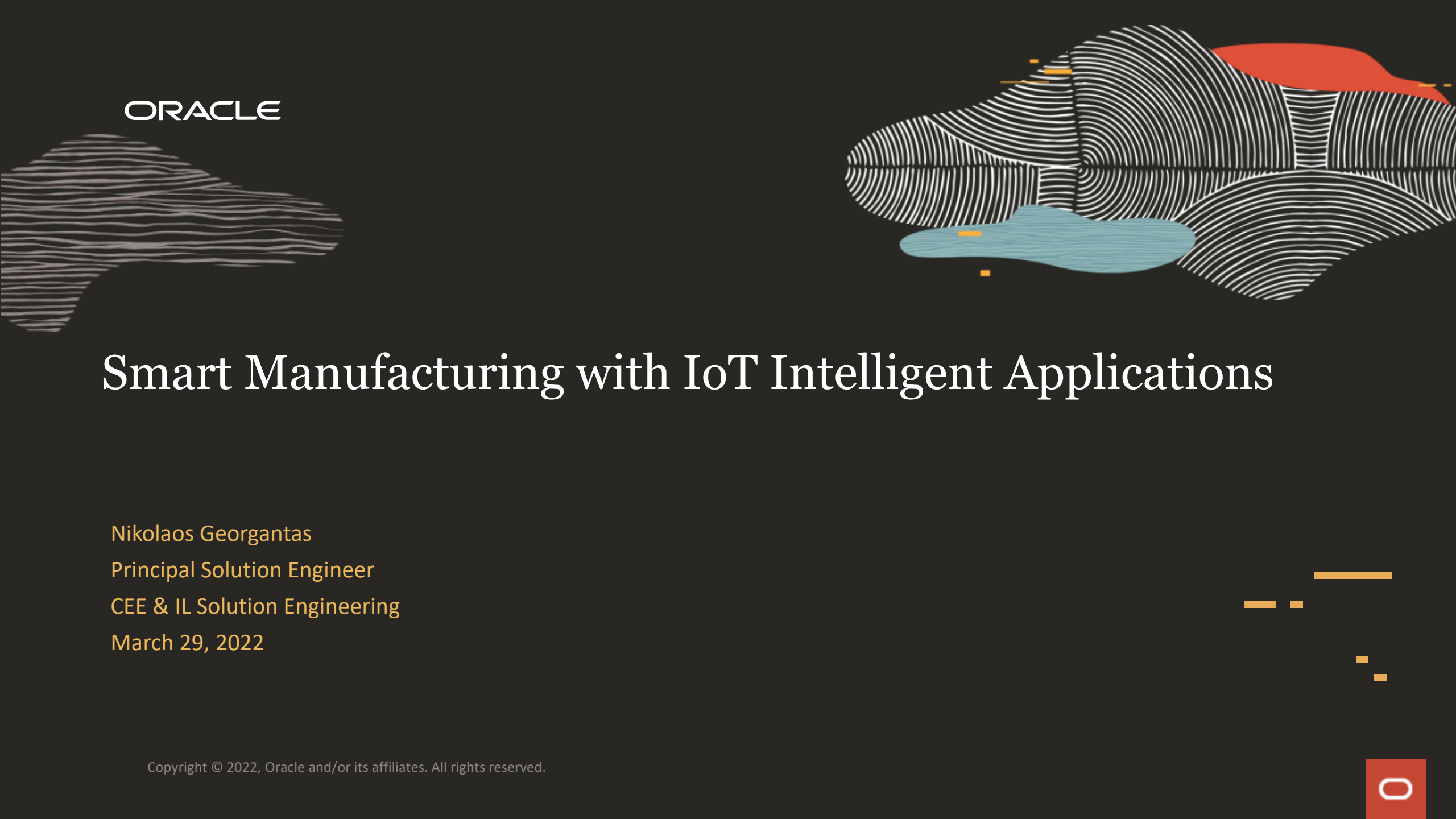




ORACLE

Smart Manufacturing with IoT Intelligent Applications

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CEE & IL Solution Engineering

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Manufacturing Industry Metrics

82%

Companies that have experienced unplanned downtime in last 3 years

\$300K

Average cost of 60 min downtime

<1%

Data collected from factory sensors is analyzed

\$300K

Supply chain officers believe IoT and analytics will be disruptive and important to their digital strategy

50%

Reduction in unplanned downtime by using IoT for predictive maintenance

Information Silos and Reactive Processes Lead to Inefficient Manufacturing

- Lack of real-time visibility into production lines and machines
- Arduous to calculate factory Key Performance Indicators (KPIs), leave alone predicting them
- Unpredictable equipment failures and maintenance costs result in expensive downtime
- Factory managers struggle to maintain quality and yield while providing flexible production processes

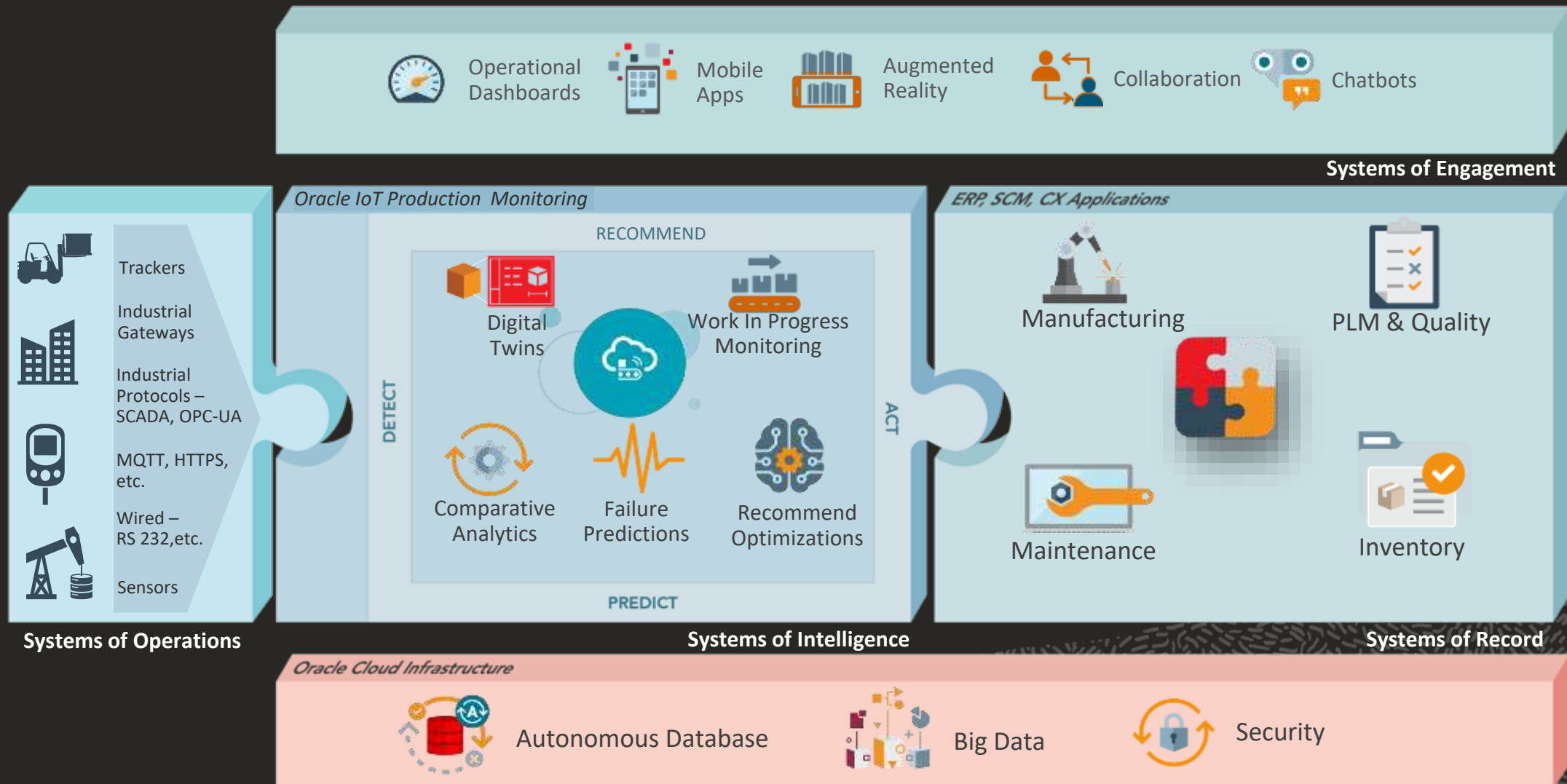


Smart Manufacturing: Real-time Data Using IoT Is an Inflection Point

- Real time visibility into factory KPIs - OEE, cycle time, quality yields.
- IoT enabled applications connect to OPC-UA, SCADA and MES systems for real time tracking
- Predictive maintenance reduces unplanned downtime – AI/ML on IoT and production data
- Actionable Insights enable dynamic supply chain processes – Production plans, Quality, Inventory management etc.



Smart Manufacturing with IoT Intelligent Apps



Smart Manufacturing with IoT Intelligent Apps

AI and machine learning on sensor data

Recommend

- Recommend optimal maintenance plan for machines in factory
- Recommend machine and resource assignment based on usage and health predictions from IoT

Act

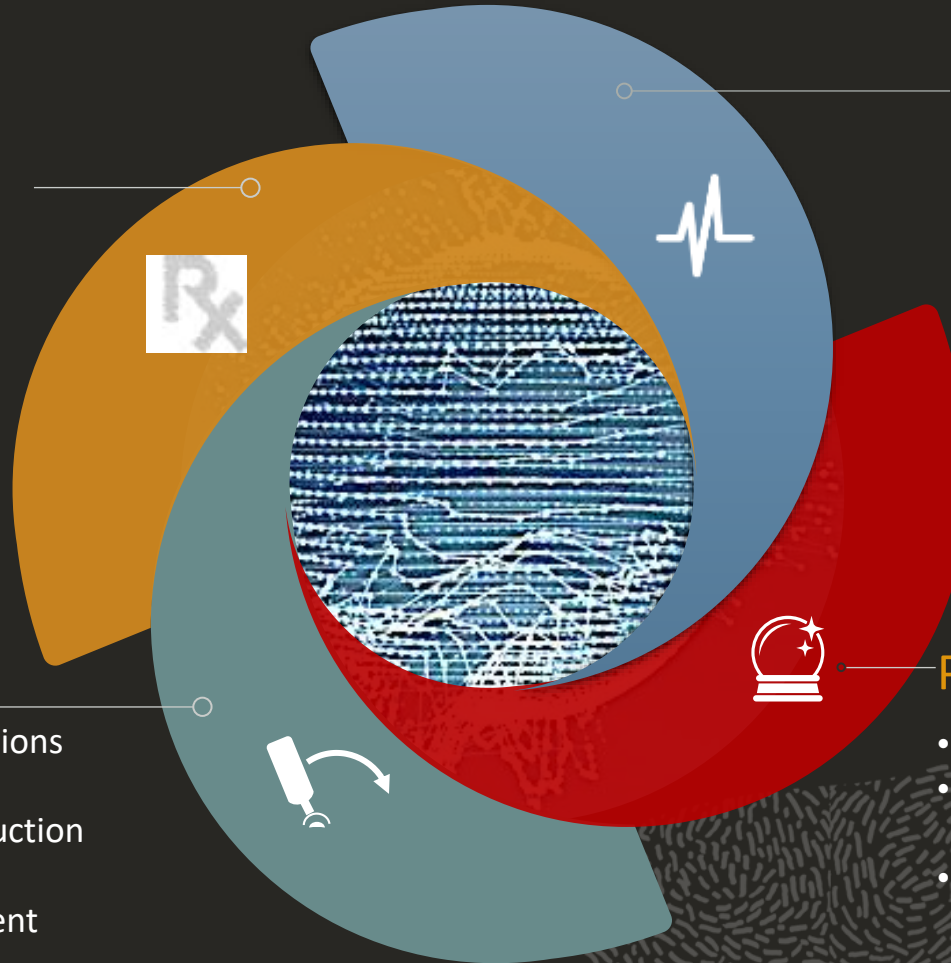
- Automatically create manufacturing exceptions based on IoT anomalies
- Identify alternative resource to avoid production delays due to predicted failures
- Remote diagnostics and control of equipment

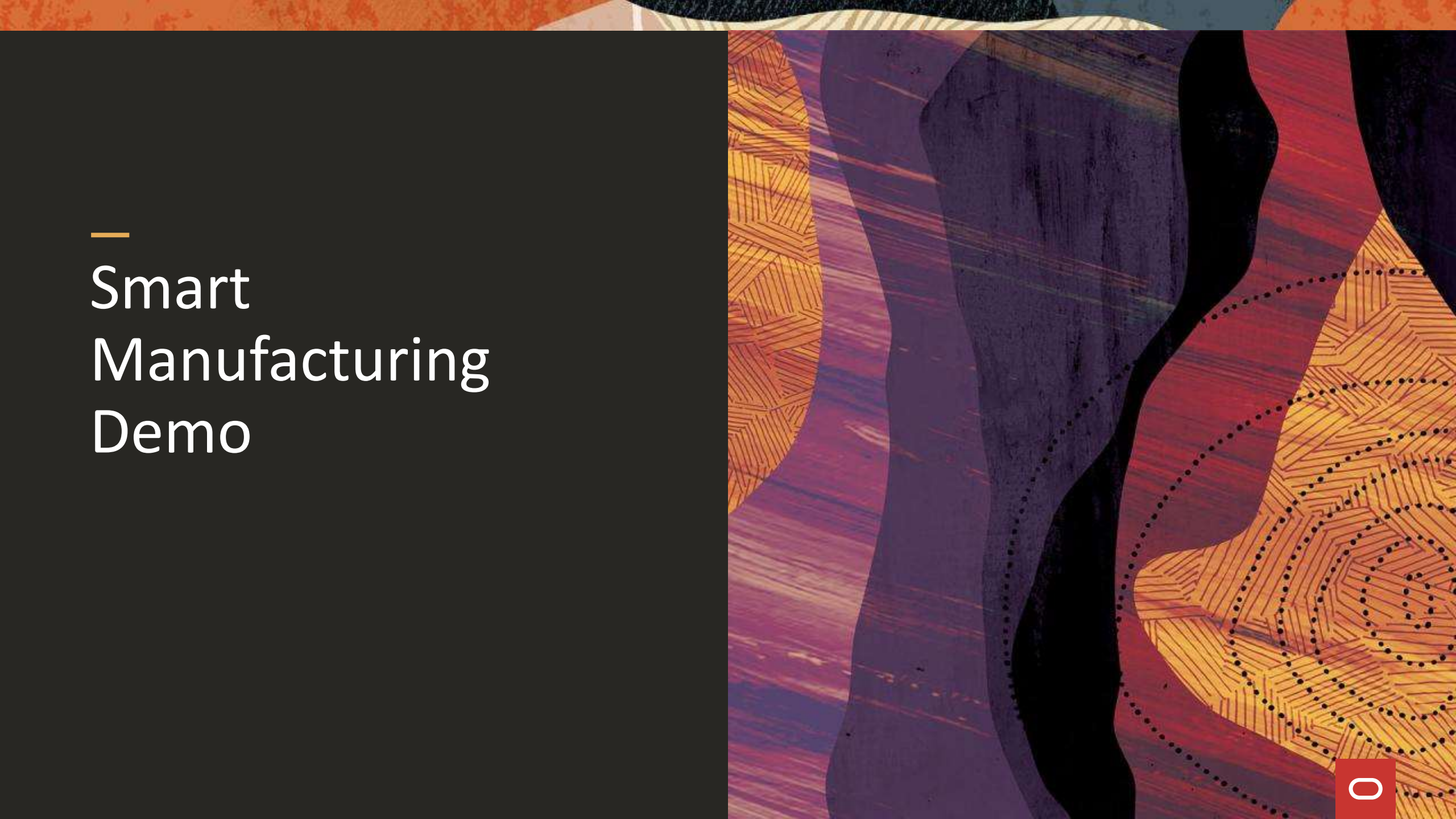
Detect

- Monitor machines in production line - Production Line and Routing views
- Real time visibility into OEE, work order progress, production quality
- Comparative metrics across factories

Predict

- IoT insights for optimal Manufacturing Execution
- Anomaly detection for equipment health and Nelson rules based trend detection
- Advanced Machine Learning and AI algorithms for predicting KPIs and production performance





Smart Manufacturing Demo



 Comparison ☐

 Historical ☐

Factory Metrics				Machine Metrics				
5	8	5	84%	69	97%	0%	3%	
Factories	Lines	Products	Factory Behind Plan	Machines	In Use	Idle	Down	



Comparison ☒

Historical ☐

Factories Behind Plan			Lines Behind Plan			Products Behind Plan			Machines Most in Use			Machines Most Idle			Machines Most Down		
Santa Clara Factory			Santa Clara Main			Braille Cube			AssemblyMachine...			MoldingMachineM...					
92%			92%			91%			100%			98%					
San Francisco Fact...			San Francisco North			Keyboard Cube			AssemblyMachine...			MoldingMachineM...					
88%			88%			85%			100%			98%					
San Diego Factory			San Francisco South			Alphabet Cube			AssemblyMachine...			MoldingMachineM...					
84%			88%			84%			100%			17%					
Santa Barbara Fact...			Santa Barbara South			Standard Cube			AssemblyMachine...								
83%			85%			84%			100%								

7 Days A...

Factory Metrics

5

Factories

8

Lines

5

Products

84%

Factory Behind Plan

Machine Metrics

69

Machines

97%

In Use

0%

Idle

3%

Down

ACME Organization : Map >



Factory Metrics

5

Factories

8

Lines

5

Products

84%

Factory Behind Plan

Machine Metrics

69

Machines

97%

In Use

0%

Idle

3%

Down

ACME Organization : Map

- Search ...
- FACTORY

San Jose Factory

Santa Clara Factory

San Francisco Factory

Santa Barbara Factory

San Diego Factory



Factory Metrics

5

Factories

8

Lines

5

Products

84%

Factory Behind Plan

Machine Metrics

69

Machines

97%

In Use

0%

Idle

3%

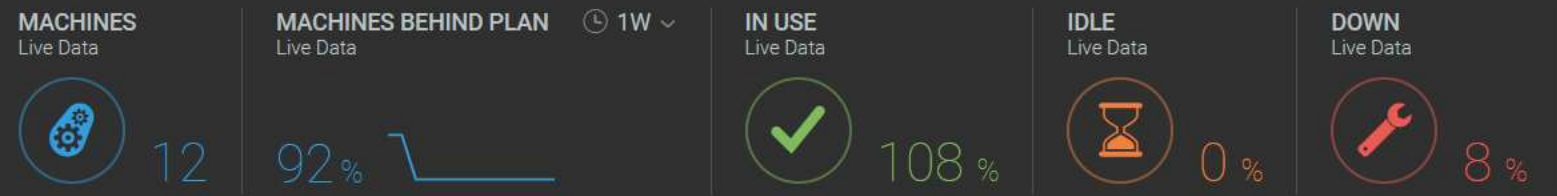
Down

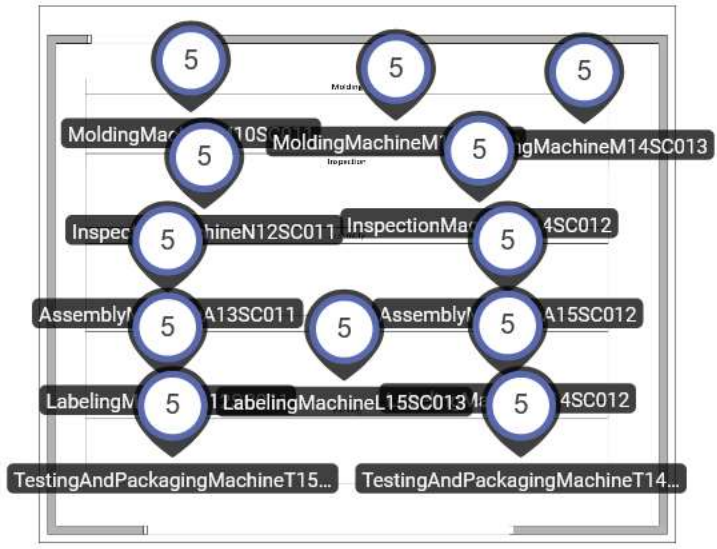


FACTORY METRICS



MACHINE METRICS





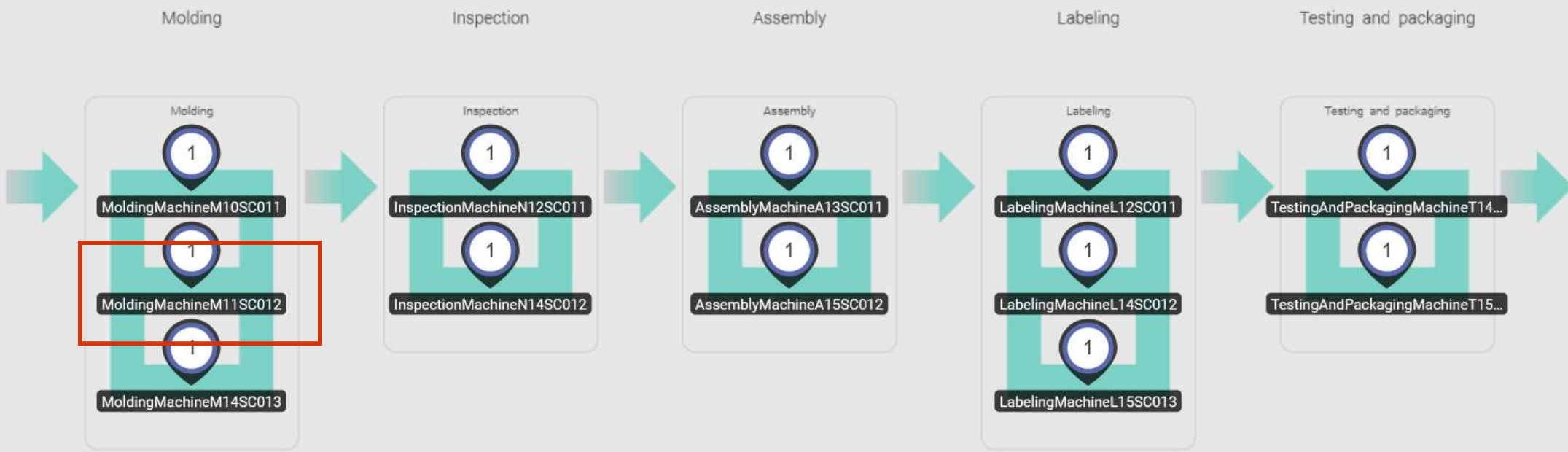
Products

Alphabet Cube

Lines

Santa Clara Main

In Plan





PRODUCTION PLAN PROGRESS



STATUS

Last 7 Days



100 %

BEHIND PLAN PERCENTAGE

Last 7 Days

93 %

1W

PRODUCTION COMPLETE QUANTITY

Live Data

6

OEE

Last 7 Days

0 %

1W

ANALYTICS

ACTIVE WARNINGS

Live Data



0

ANOMALIES DETECTED

Last 24 Hours



2

OPEN INCIDENTS

Live Data



1

PREDICTIONS FOR NEXT 7 DAYS

Next 7 Days



3

PREDICTIONS FOR NEXT 30 DAYS

Next 30 Days

3

TRENDS

Last 24 Hours



2



Time Period

Last 24 Hours

Sensor Attributes

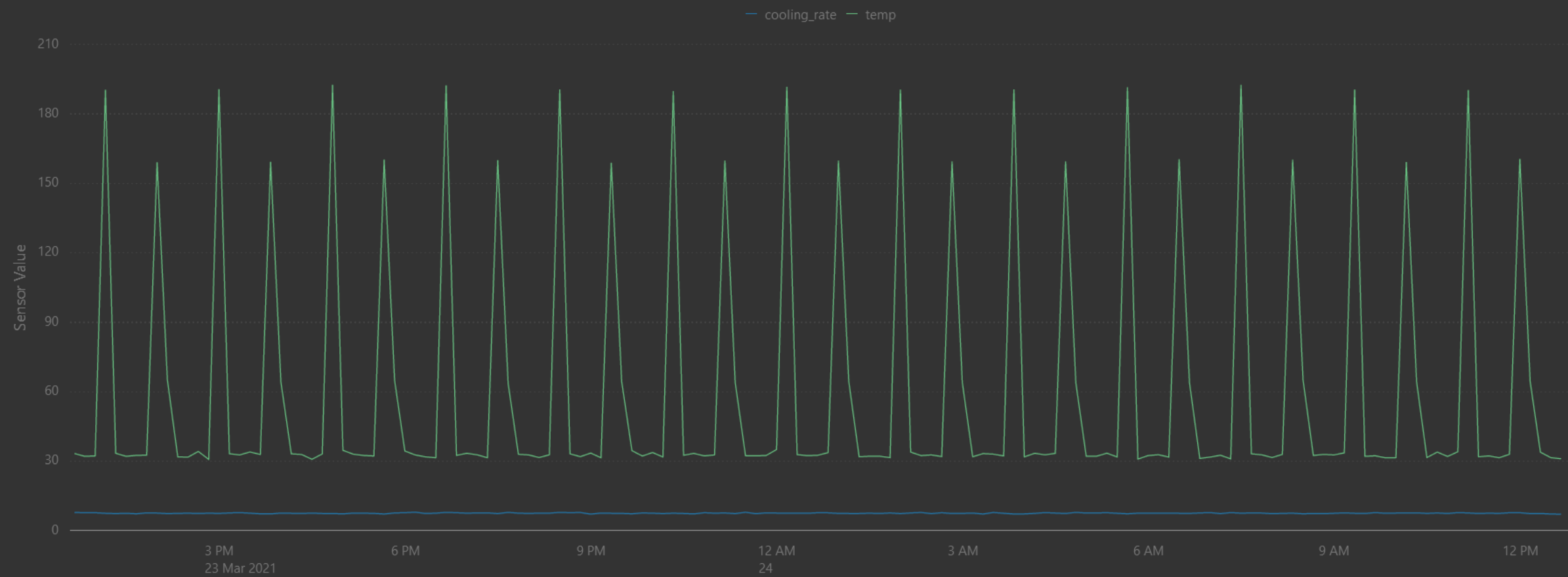
cooling_rate x temp x

Add Comparative Data:

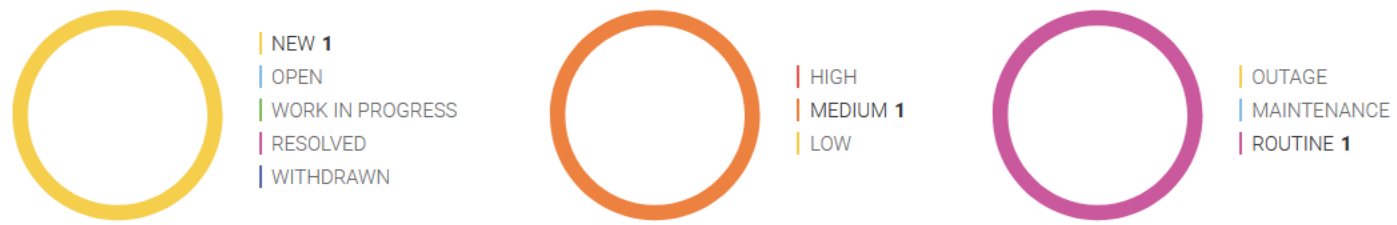
- ☐ Behind Plan ☐ State Changes ☐ Products Manufactured

24 Hours Ago

Now



▲ INCIDENTS SNAPSHOT



STATUS	PRIORITY	TYPE	SOURCE	ID	REPORTED TIME	LAST EDITED	SUMMARY	 
★ New	▲ Medium	Routine	 M11SC012	AE	Sep 09 2020 03:11 PM	Sep 15 2020 09:59 AM	High temperature reported by Mol...	 

- NEW 1
- OPEN
- WORK IN PROGRESS
- RESOLVED
- WITHDRAWN



STATUS	PRIORITY	TYPE	ID	REPORTED TIME	LAST EDITED		
--------	----------	------	----	---------------	-------------	---	---

▲ High temperature reported by Molding Machine M11SC012 with value : 350 : Machine: M11SC012

 New

 Medium

Routine

AE

Mar 17 2021 06:38 AM

Mar 24 2021 12:10 PM

DETAILS
Occurrence Count
200

Rule
Molding Machine High Temperature Incident Rule

Description
High temperature reported by Molding Machine M11SC012 with value : 350

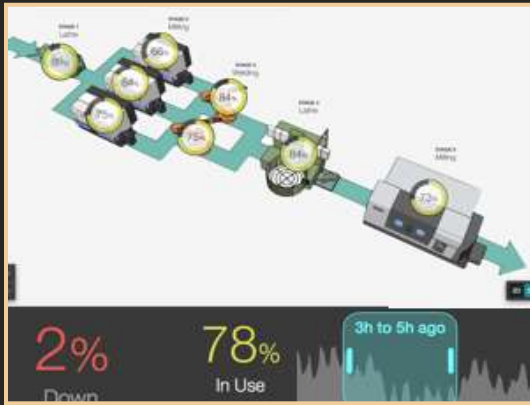
▲ OCCURRENCE DETAILS

☒ First and Last Occurrences ☐ All Occurrences

TIME	SATISFIED PREDICATES
Mar 17 2021 11:30 AM	temp is 350.0
Mar 24 2021 09:21 AM	temp is 350.0

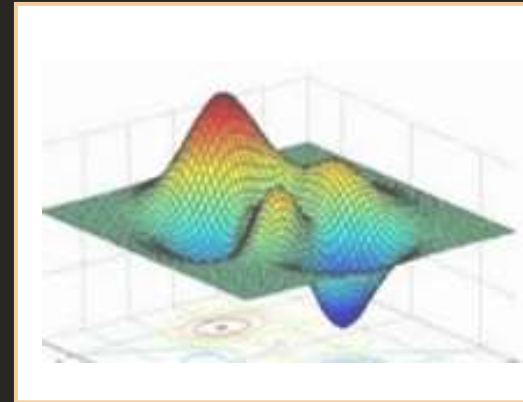
Key Differentiators

Faster time to value



- Domain specific production monitoring app
- Out of the box KPIs and dashboards
- Multi-dimensional Digital Twin to monitor, simulate and control factory equipment and production line

Advanced analytics and predictions



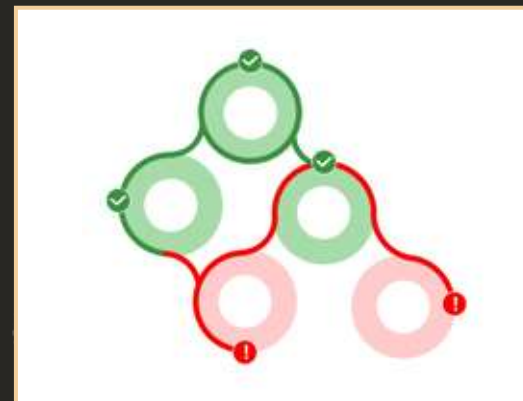
- AutoML – data science in a box to automate machine learning and AI
- Auto selection of algorithms for anomaly detection, predictions
- Trend detection and root cause analysis

Digital thread with enterprise apps



- Integration with SCM manufacturing, maintenance, service logistics
- Predict KPIs and recommend actions
- Automated workflows

Flexible connectivity and integration



- Connect to a variety of industrial gateways and historians
- Support for OPC-UA, MQTT etc.
- Software defined edge
- Integration APIs

Thank You

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