



Business-friendly Solutions



# ITC Infotech SPECTRUM

*powered by Azure IoT for Smart Manufacturing*

Are you not getting a real time performance view of plants/lines/assets. Are you not able to meet targets because of production halt due to unscheduled breakdown of critical equipment? Are you facing challenges being unaware of root causes of scraps/rejects, machine downtimes? Are you worried about lack of visibility of Environment and Sustainability KPIs vs committed targets?

Do you wish you had a view of operator efficiency, line effectiveness, production schedule compliance to enable increased productivity and reduced operational costs? Are you looking for a partner with deep domain and technology expertise to help you navigate with your Industry 4.0 digital transformation journey?

Why are manufacturers moving towards operations on cloud - enabled by Manufacturing Data and Analytics Platform?  
What benefits does it provide?



Deploying IoT capabilities on shop floor including smart devices and sensors leads to generation of large data sets. This entails a scalable centralized Manufacturing Data and Analytics Platform for aggregation and normalization of data for insights and advanced analytics. 'SPECTRUM for Smart Manufacturing' from ITC Infotech is a cloud solution that provides quick launchpad for higher order business use cases implementation at scale.

When should business prefer performing analytics @ Edge?  
What are the advantages?



Edge analytics helps provide insights closer to the equipment where the data is gathered, and is required in the following scenarios:

- Real time data analysis for faster turn around
- Requirement of fast responses when an unexpected change/event happens

ITC Infotech SPECTRUM provides analytics @Edge capabilities and helps with faster and autonomous decision making with insights available closer to source thus avoiding latency.

Why OT Security is important in industry 4.0?



With convergence of IT-OT and movement of manufacturing workloads & data to cloud, visibility of network control traffic with right security policies is critical to protect plant processes and reduce OT security vulnerabilities and incidents.

SPECTRUM provides OT Cybersecurity compliant Industry 4.0 capabilities thus shielding the OT network from security breach.



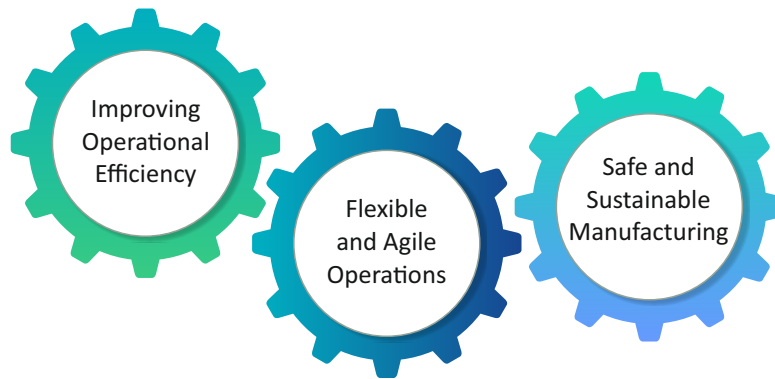
ITC Infotech's **SPECTRUM for Smart Manufacturing** powered by Azure IoT acts as a quick launchpad for Industry 4.0 implementation by bringing prebuilt business solutions, assessment framework, @Edge analytics & decision and deployment toolkit to enable accelerated scaling up of solutions across plants and geographies.

## Manufacturing Challenges

Industry 4.0 solutions have enabled organizations bring business value on their manufacturing operations. With plant connectivity established for consolidation of process and IoT data at shop floor level, plant centric production dashboard and solutions are available for various manufacturing personas. The focus has now shifted to bring this manufacturing data to an enterprise platform for enabling connected value chain and drive business outcome leveraging enterprise dashboards and higher order analytics use cases and thus the need for a **Manufacturing Data and Analytics platform**. These higher order use cases are in the areas of predictive quality and maintenance, adaptive process control, dynamic production scheduling, supply chain control tower and energy & sustainability.

## The Solution – SPECTRUM for Smart Manufacturing

ITC Infotech **SPECTRUM** is comprehensive industry specific solution on Microsoft Azure IOT. As manufacturing organizations navigate towards remote and autonomous operations, the SPECTRUM solution helps rapid customization and quick deployment of OT cybersecurity compliant business use cases to accelerate value realization from Industry 4.0 initiative. The major drivers for digital transformation are:



ITC Infotech is focused on leveraging SPECTRUM to deliver business outcomes for manufacturing sector.

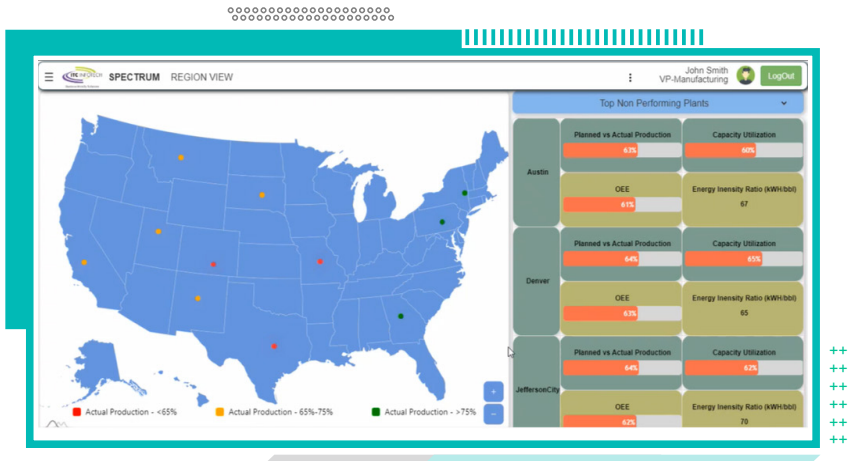
## Solution Features

ITC Infotech SPECTRUM powered by Azure IoT services provides an end-to-end solution for all the facets of Smart Manufacturing right from maturity assessment of plants to global rollout of Industry 4.0 solutions across geographies. SPECTRUM comprises of

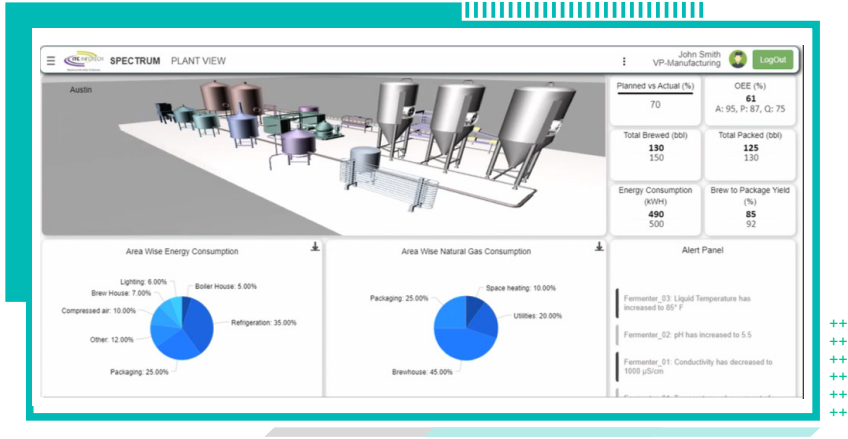
- Framework for Industry 4.0 maturity assessment and OT security assessment of client's manufacturing operations
- Pre-defined reference Manufacturing Data Model to address the need to share heterogeneous data of the manufacturing domain
- IoT Gateway Framework for insights and decision @Edge leveraging analytics @Edge - Worker Safety, Quality Inspection
- Industry business apps - Overall Equipment Effectiveness (OEE), Yield Optimization, Asset Predictive Maintenance, Energy Efficiency, many more
- Solution rollout toolkit for accelerated deployment of solution at scale across multiple plants and geographies



**Global View** provides real time information of manufacturing KPIs across regions for benchmarking of performance for leadership at enterprise level.



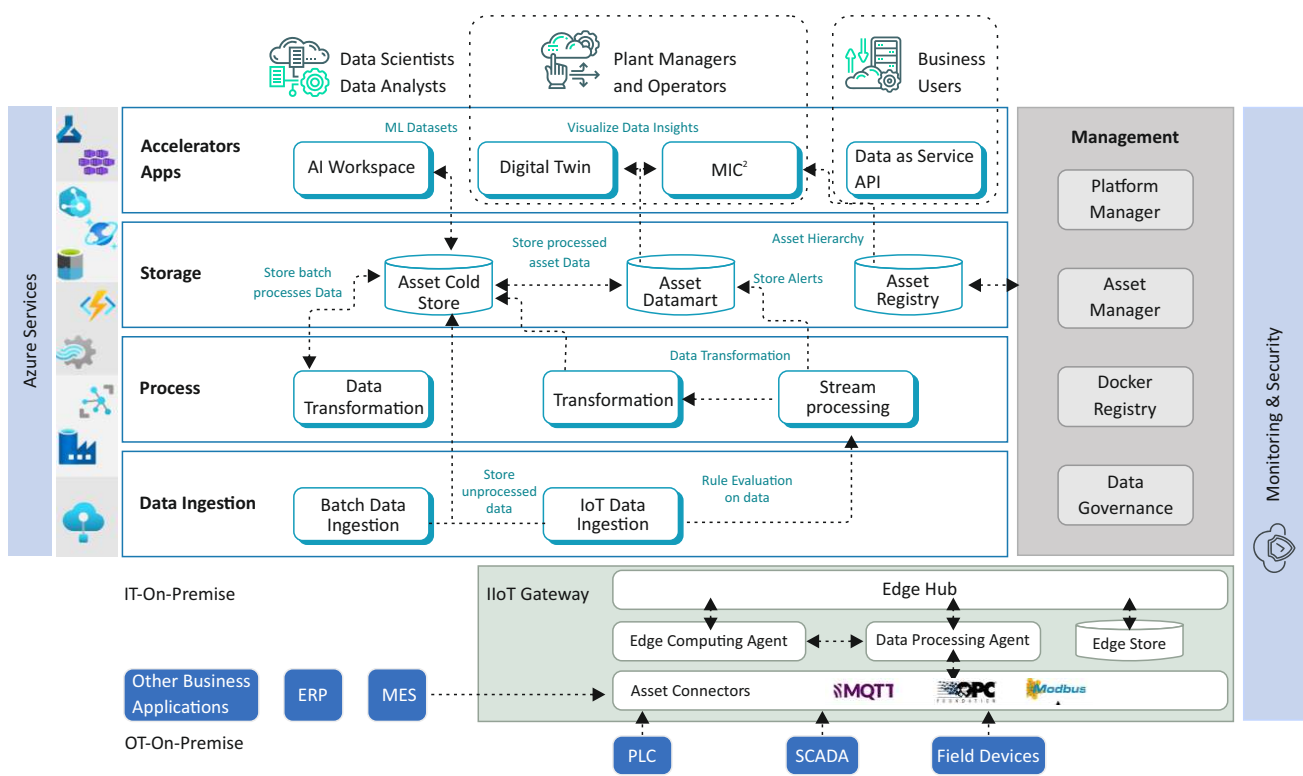
First level of drill down provides Region level KPIs required for a persona like Regional Head.



Second level drill down for Site level KPIs required for Plant Head

## Solution Architecture

A proven architecture using Azure IoT components that is scalable, modular, and OT Secure by design.



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# Personas Need and Productivity Enabler

## Vice President - Manufacturing

**Objective:** Track enterprise-wide and cross-region outcomes by monitoring KPIs and take decisions to meet the objectives

**Enablers:** Operations Command Center provides real-time KPI and visibility across plants

## Shift Supervisor

**Objective:** Optimize use of manufacturing assets and equipment in factory for meeting production target and supply chain efficiency

**Enablers:** Real time view on production efficiency, worker productivity and asset availability

## Quality Control Manager

**Objective:** Oversees product development procedures to ensure products quality and observe conformity of the raw, semi-finished or finished material/goods and capture any non-conformances accordingly.

**Enablers:** Near real time view of the status of non-conformances closure, corrective and preventive actions, accurate quality inspection through computer vision inspection



## Plant Manager

**Objective:** Ensure employees safety and supervise production to ensure plant is running efficiently, safety & compliant with regulations and policies

**Enablers:** Live production dashboard to drive operational efficiency and excellence; enable more cross-functional collaboration with live inventory map, component level tracking and bottleneck management

## Maintenance Engineer

**Objective:** Perform Installation and routine maintenance, troubleshoot issues, and make on-site repairs of manufacturing machines and improve machine life

**Enablers:** Real time view of the machine health, remaining machine life, possible advance machine failure indication

## Production Scheduler

**Objective:** Optimize production capacity utilization, make sure demand is met and any production bottlenecks are addressed in timely manner

**Enablers:** Global network visibility, scenario based planning and real time visibility to plant and line capacity utilization to enable more accurate production scheduling

# Use Cases supported by SPECTRUM



**Real-time Performance Monitoring:** Real-time view of operations and production KPIs to help take necessary interventions for meeting targets



**Asset Condition Monitoring:** Establish shop floor connectivity for real-time machine status, health monitoring, and critical performance data



**Predictive Maintenance:** Predict failure of shop floor equipment based on historical and real-time equipment condition data



**Yield Optimization:** Correlation between input, process, and output parameters for root cause and CAPA analysis



**Supply Chain Control Tower for Demand Planning:** Predict impact on supply chain KPIs like order fulfillment, stock level, transportation, and warehouse cost based on demand variation, production variation, and external factors like weather, epidemic



**Energy Monitoring and Efficiency Improvement:** Improve energy efficiency of plant by developing efficiency improvement models and establishing relationships with causal factors using statistics



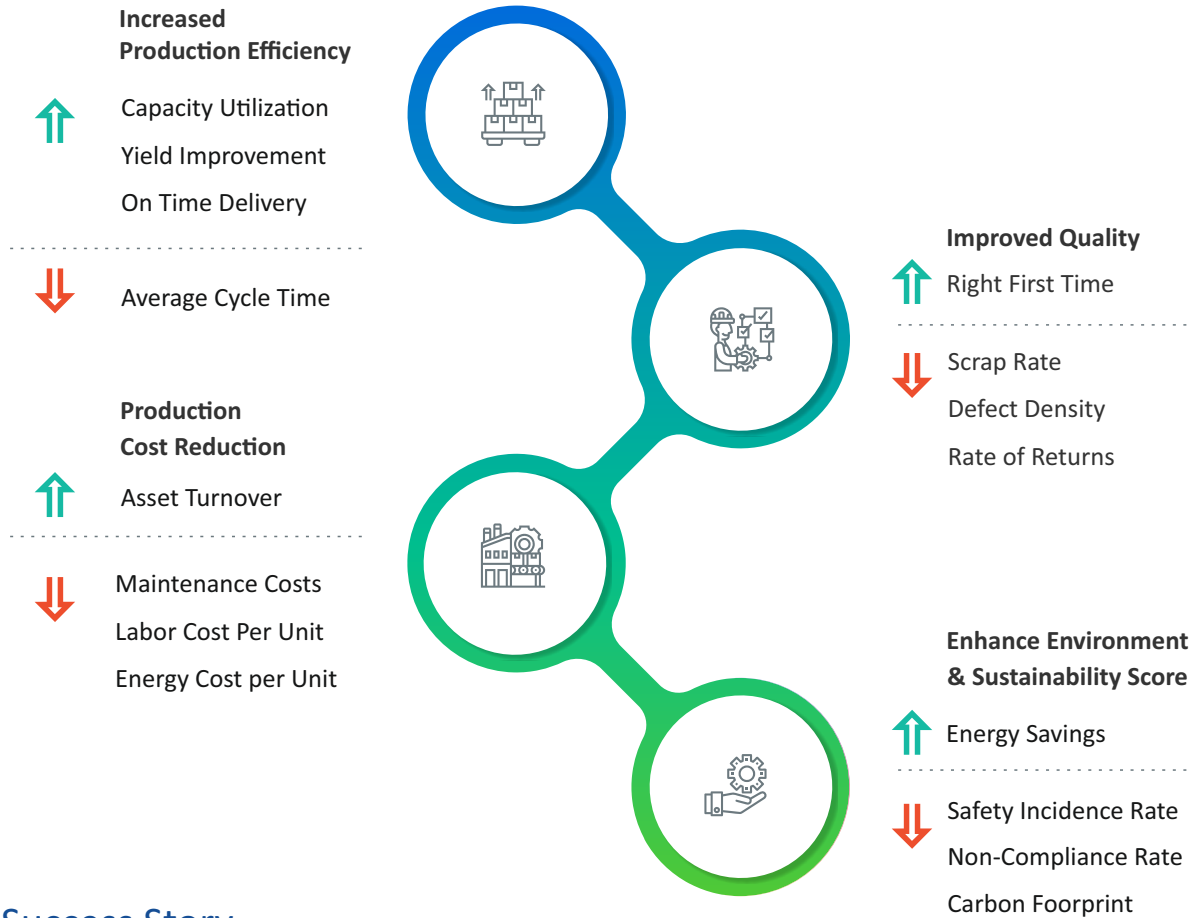
**Quality Inspection @Edge:** Eliminate manual errors and automate the process during end of line quality inspection, improve efficiency of quality inspection process, and accelerate root cause analysis of the defect



**Worker Safety @Edge:** Drive compliance to PPE regulations through computer vision-enabled detection and tracking, track worker movement in the zone, and proactive alerting by predicting movements of humans and vehicles within a certain proximity



## Potential Business Benefits



## Success Story

### CLIENT CONTEXT

Leading CPG manufacturer headquartered in UK with manufacturing plant across continents

### CHALLENGES



- Lack of uniform system and processes across all manufacturing plants; small-scale plants managed processes through manual data capture
- Non-availability of manufacturing data from various systems in a single repository & lack of insights leading to gaps in accurate production planning and market demand not being met
- Absence of inter-plant performance benchmarking – monitoring & reporting not using a standard set of KPIs for global performance benchmarking thus, hindering identification of improvement areas

### SOLUTION



- Enable process standardization and integration, operation benchmarking for 45+ manufacturing plants by implementing SPECTRUM
- This NextGen solution helped to establish foundation for ongoing innovation and continuous improvement of manufacturing operations
- The solution leveraged plant performance KPI templates and plant specific needs were incorporated for operational KPIs
- Process control mechanism implemented to reduce errors in material supply, brand change management & equipment calibration leading to higher process compliance & better performance
- Real time asset visibility and interactive dashboard customized for various shop floor personas
- Connect legacy shop floor assets seamlessly and compatible with multiple communication standards like OPC-UA, MODBUS & Ethernet IP

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### BENEFITS

- Improvement in OEE by 10-15% on account of reduction in unaccounted losses
- 15% reduction in internal waste and reduction in product integrity violations
- Improvement in manpower productivity by 10% on account of non-value added (NVA) tasks reduction and elimination of manual reporting tasks
- Compliance to regulatory standards

## Key differentiator of SPECTRUM solution



### About ITC Infotech

ITC Infotech is a leading global technology services and solutions provider, led by Business and Technology Consulting. ITC Infotech provides business-friendly solutions to help clients succeed and be future-ready, by seamlessly bringing together digital expertise, strong industry-specific alliances, and the unique ability to leverage deep domain expertise from ITC Group businesses. The company provides technology solutions and services to enterprises across industries such as Banking & Financial Services, Healthcare, Manufacturing, Consumer Goods, Travel and Hospitality, through a combination of traditional and newer business models, as a long-term sustainable partner.

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