Cognitive Plant Operations Adviser
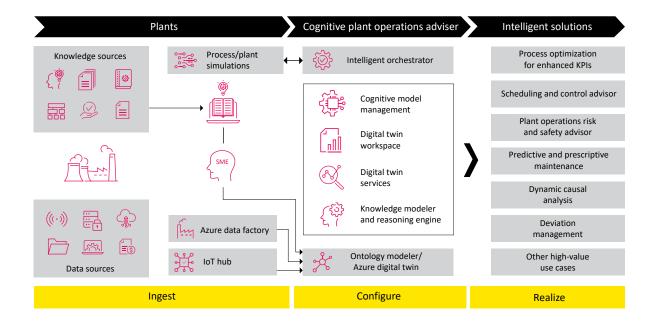
Microsoft Business Unit

For the modern industrial sector, artificial intelligence (AI) and autonomous systems represent the next step toward becoming a safe, sustainable, productive, and innovative organization. Industrial AI applications can improve plant efficiency using plant-aware autonomous systems, and industries are keen to tap this potential for greater benefit. But first there is a need to create systems that can judiciously use available data and process know-how of manufacturing operations to provide better insights and information to operators for real-time decision making. This drives increasingly autonomous decision making, leaving only top-level decisions to the operators.

TCS' Cognitive Plant Operations (CPO) Adviser is built on the concept of composite AI to drive the convergence of IT, operational technology (OT) and engineering technology (ET)—to address challenges in manufacturing plants and create an intelligent solution for decision making.

Overview

Built on Microsoft Azure platform, TCS' CPO Adviser uses proprietary solutions to help enterprises rapidly build, deploy, manage and augment cutting-edge digital solutions for intelligent plant operations. Combining asset information, domain and tacit knowledge with advanced AI algorithms and physics-based models, CPO Adviser provides the inputs for designing intelligent digital twins of plants, systems, and processes. The AI algorithms leverage the data generated by the plant to build models and digital twins. The built-in decision support systems help reason over these and provide analysis, insights and advice. The cognitive model management capabilities ensure that the models and digital twins are continuously monitored and updated to the current state of the plant.

CPO Adviser helps in putting all these together and building solutions with the 'ability to reason' and the 'ability to act' meeting specific KPIs of of a plant. Eventually, it can be leveraged to make the leap to toward autonomous plants in the manufacturing and process industries.

How TCS CPO Adviser works

Our Solution

TCS CPO Adviser provides a platform for building and deploying solutions through six modules:

- **Ontology modeler:** Helps build hierarchical information twins of processes, equipments and all associated entities.

- **Knowledge modeling and reasoning engine:** Supports curation of knowledge from various sources using complex hierarchical graph-based algorithms.

- **Intelligent orchestrator:** Creates workflows that intelligently use various models, knowledge, and data to provide reasoning and advice in real time.

- **Digital twin workspace:** Helps build industrial AI models using a library of 100+ curated and customized AI algorithms.

- **Digital twin services:** Allows deployment of industrial AI applications using a library of 200+ APIs.

- **Cognitive model management:** Supports self-aware, self-diagnosing and self-tuning digital twins and plant simulators.

Benefits

With CPO Adviser, manufacturing industries can create solutions to ensure real or near real-time monitoring of a plant, identify deviations from expected behavior, alert operators about potential problems, and provide recommendations to act upon and prevent possible failures, thereby achieving the following benefits:

- **Reduce O&M cost and improve process and product KPIs:** Optimize manufacturing operations to improve flexibility, yield, reliability, and availability by up to 10%.

- **Increase business continuity:** Reduce downtime with 95% accuracy and save up to 40% on maintenance costs.

- **Reduce product transition time:** Enable quicker transition of a product variation on a manufacturing line by up to 30%.

- **Compliance to sustainability standards:** Reduce energy consumption by up to 10% and emissions by up to 7%.

- **Enable safe working conditions:** Provide advanced alerts on possible safety incidents by up to 3 hours.

TCS advantage

TCS CPO Adviser helps enterprises take advantage of a range of key technology differentiators to build and deploy next generation solutions for plant operations:

- **Synergy between data and knowledge:** Equips operators with the ability to effectively combine real-time data, manufacturing knowledge and artificial intelligence to monitor and optimize equipment and processes, leading to improved uptime and reduced operation costs.

- **Contextual knowledge guidance:** Captures domain knowledge of varied forms using ontology and reasoning in real time to provide contextual guidance to operators and help them make more informed and unbiased decisions.

- **In-built library of algorithms:** Provides a comprehensive repository of configurable ML-DL algorithms to create analytical solutions for automated monitoring, diagnosis, optimization and self-tuning.

- **Modular architecture:** Leverages state-of-the art Azure IoT and advanced analytics along with TCS IP solutions in a modular architecture, thereby providing flexibility and ease of integration with the existing ecosystem.

- **Low-code platform:** Provides the advantages of a no or low-code platform, which provides pre-defined templates for all components and allows for easy creation of solutions.

Tata Consultancy Services

Awards and accolades

#1 IN CUSTOMER SATISFACTION 2020/21 EUROPE — Whitelane Research

TOP EMPLOYER NORTH AMERICA 2021 — CERTIFIED EXCELLENCE IN EMPLOYEE CONDITIONS

TOP EMPLOYER GLOBAL 2020 — CERTIFIED EXCELLENCE IN EMPLOYEE CONDITIONS

ASIA'S OUTSTANDING COMPANIES POLL 2020 ASIAMONEY

STEVIES 2020 — STEVIE AWARD

CONGRATULATION CIO100 WINNERS | 2020

FinanceAsia ASIA'S BEST COMPANIES 2020

DIGITAL IMPACT AWARDS WINNER

CANADIAN HR AWARDS 2020

THE CIVIC 50 POINTS OF LIGHT

FTSE4Good

CDP DISCLOSURE INSIGHT ACTION

2020 Brand Finance® Awards — TOP 3 IT SERVICES BRAND

2020 Brand Finance® Awards — FASTEST GROWING IT SERVICES BRAND FOR THE DECADE 2010 - 2020

AWARDED Superbrands BRITAIN'S CHOICE 2020

AWARDED Superbrands AMERICA'S CHOICE 2020

Contact

Visit the Microsoft Business Unit page on www.tcs.com

Email: BusinessAndTechnologyServices.Marketing@TCS.COM

About Tata Consultancy Services Ltd (TCS)

Tata Consultancy Services is a purpose-led transformation partner to many of the world's largest businesses. For more than 50 years, it has been collaborating with clients and communities to build a greater future through innovation and collective knowledge. TCS offers an integrated portfolio of cognitive powered business, technology, and engineering services and solutions. The company's 500,000 consultants in 46 countries help empower individuals, enterprises, and societies to build on belief.

Visit **www.tcs.com** and follow TCS news **@TCS**.