

# TCUP Analytics

TCS Connected Universe Platform



IoT platforms collect huge amounts of data from diverse sources. Advanced analytics capabilities including machine learning is, therefore, a core requirement of the IoT platforms. Generating insights, predictions and prognosis based on IoT data are the critical success factors for IoT- based digital transformation projects. TCUP Analytics, an addition to TCUP - TCS Connected Universe Platform, solves some of the hard-technical problems encountered in the IoT domain. These include working with small data sets, lack of labels and training samples, unbalanced data sets, missing or irregular data, noisy data and so on. TCUP Analytics has been designed for accelerating IoT-specific analytics using state-of-the-art techniques for solving problems for diverse industry domains such as Manufacturing, Energy & Resources, Aerospace, Utilities and Life Sciences.

## Overview

TCUP Analytics is an advanced analytics component added to TCUP - TCS Connected Universe Platform, TCS's flagship IoT Platform. TCUP Analytics, with its powerful capabilities of data handling and processing, adds a significant value to the existing platform. TCUP Analytics can run advanced analytics on sensor-generated time series data as well as unstructured data such as video and images generated by cameras and other imaging sensors. TCUP Analytics provides cutting edge capability for the entire analytics pipeline out of the box. This includes data engineering, data exploration, diagnostic pattern mining, model building, and model deployment for both time series and video/images.

TCUP Analytics provides a ready-to-use Python library of machine learning and deep learning algorithms that can be used in any Notebook environment. This library is also pre-integrated and tested with TCUP's data management and workflow services and allows seamless testing, training and deployment of models to production.

TCUP has a strong focus on providing Analytics capability on the Edge tier. The models developed using TCUP Analytics can be downloaded and executed on the resource-constrained Edge environment using TCUP Edge. TCUP Edge, powered by TCUP - TCS Connected Universe Platform, is a lightweight IoT platform which is designed to run on resource-constrained devices with low CPU and memory footprint.

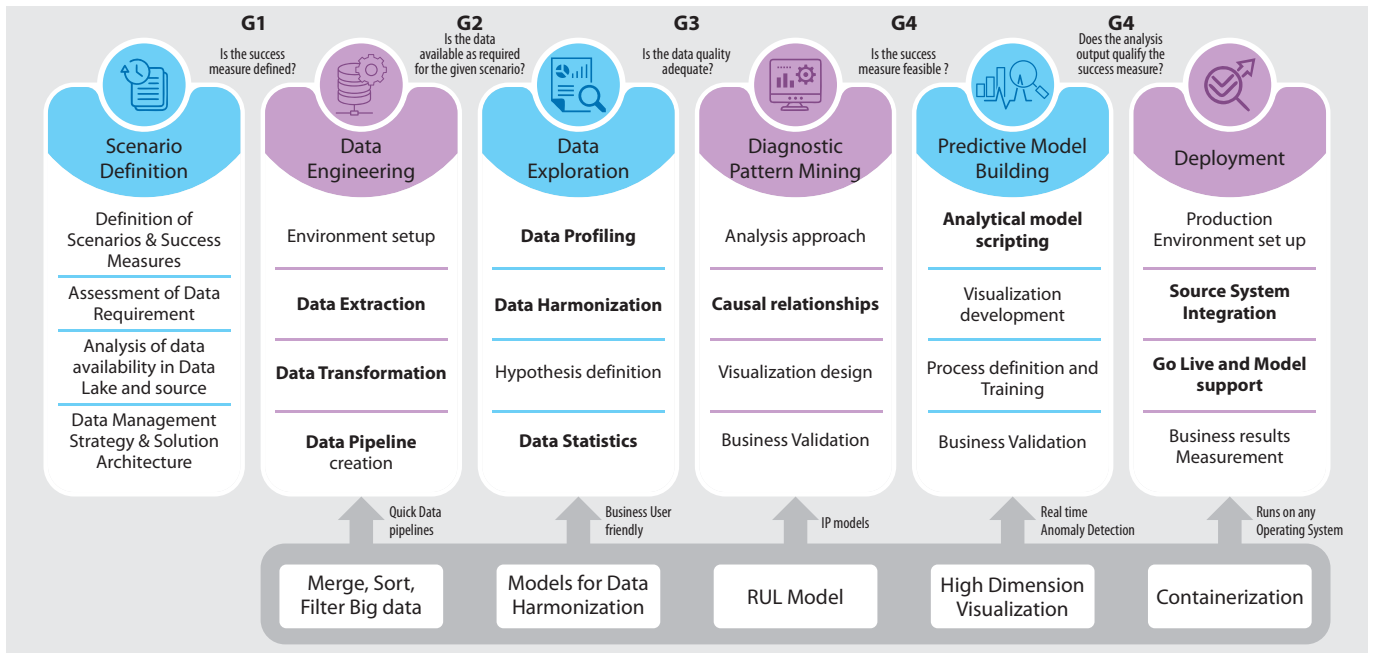
TCUP Analytics facilitates problem solving in practical industrial scenarios providing capabilities such as unsupervised machine learning and automated model tuning.

## Our Solution

TCUP Analytics powers use cases such as failure prediction, equipment health estimation, remain useful life estimation, product quality tracking, and operational expense reduction in diverse domains such as Manufacturing, Energy & Resources, Aerospace, Utilities and Life Sciences.

TCUP Analytics provides machine learning / deep learning algorithms for the following:

- **Data Engineering** – Algorithms for data preparation, transformations, filtering, noise cleaning, missing data imputation, feature extraction, time warping, data balancing and data synthesis
- **Descriptive Analytics** – Algorithms for histograms, heat maps, and visualization of high dimensional data in 2D using advanced techniques
- **Diagnostics** – Algorithms and models for anomaly detection, classification, and unsupervised clustering
- **Prognostics** – Algorithms and models for health index estimation, root cause analysis and remaining useful life computations.



## Benefits

TCUP Analytics uses state of the art Deep Learning techniques to help solve a wide spectrum of problems common to the Industrial IoT domain.

TCUP Analytics provides the following key benefits -

- Efficient way of setting up highly scalable end-to-end-data analytics pipelines by:
  - Using innovative integration of Signal Processing, Feature Engineering and Machine Learning
  - Deploying sophisticated data preparation algorithms to process noisy, unbalanced and unlabeled data
  - Reducing effort to develop AI models using automated feature engineering and hyperparameter tuning
- The library of algorithms is pre-integrated and tested with other platform services - data ingestion services, batch analytics services, ETL and is optimized for execution at the Edge
- Flexibility of deployment on any cloud or edge environment. Makes use of specialized AI accelerator hardware seamlessly
- Flexible pricing model to provide visibility and control over costs as compared to many other platforms where analytics is charged based on API calls or data volume

## The TCS Advantage

- **Leading Innovation for IoT:** TCS has 19 labs across the globe for IoT-specific development and solutions. Its labs cover cybersecurity, AI, robotics and more, which helps TCS drive next level technology.
- **Strategic IoT Partnerships:** TCS has made strong commitments to partnerships with IoT players such as Intel, Dell, and Microsoft Azure to enhance its IoT services portfolio. It has built a customer experience center in collaboration with Intel to showcase technologies including 3D printing, virtual reality and IoT for innovative solutions to customers.
- **Deep Domain Expertise:** TCS provides deep domain expertise across all major industry verticals such as Manufacturing, Energy & Utilities, Retail, and Life-Sciences & Health care.
- **Out of the Box Solutions:** TCUP already powers solutions in Energy management, Fleet management, Health & Safety management, Servitization and Smart Factory solutions.
- **Decades of SI Experience:** As an expert solution integrator, TCS is well versed in the delivery of complex IoT projects. It can handle multiple data sources, ensuring seamless integration of the IoT platform with customer back-end systems.

## Awards & Recognition



### To know more

Visit: <https://www.tcs.com/tcs-connected-universe-platform>

Email: [tcup.iot@tcs.com](mailto:tcup.iot@tcs.com)

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