Cities are turning to technology to cost effectively achieve more livable and sustainable environments for their citizens. Smart cities combine data from multiple city domains and run advanced analytics that drive real-time decision-making and actions at the strategic and operational levels. Cities need a central operations platform that provides cross-domain urban insights for integrated city operations.

TCS IUX City Command Center and City Data Platform is a modular and scalable offering that enables the city manager to view, analyze and optimize city-level functions and events in real-time across departments.

The City Data Platform supports the City Command Center by incorporating a City Data Model and on-boarding cross-domain city data that it exposes for the development of custom solutions.

**Overview**

Visibility Across City Functions
City managers need an intelligent, connected ecosystem to provide more connected transportation options, advanced public safety services, better constituency interactions and even decreased pollution impacts that can make a community more desirable.

TCS IUX Command Center lets managers visualize, monitor and analyze the city-level events & alerts across city domains in real-time. Users can track operational resources and assets (human and non-human).

**Faster and Better Decision Making**
To accelerate multi-departmental response efforts to incidents and emergencies across domains such as Energy, Water and Transport, city managers must understand impacted services and define and execute cross-functional processes for incident resolution. Furthermore, predicting failures and proactive maintenance will streamline operations, reduce costs and provide better experiences to the citizens.

TCS IUX City Command Center uses intuitive and standards-based tools to define Standard Operating Procedures and resolutions for various emergency events, with notifications, resource management, analysis and actions. Users create and manage workflows, monitor status of incident resources and track resolutions.

**Extending the Value of Cross Domain Data**
The IUX City Data Platform supports the City Control Center by on-boarding the data across city domains (real-time and batch) and providing an understanding of the interrelationships. The solution provides standards-based integration with city subsystems including video management systems, video walls and GIS servers. Additionally, the City Data Platform supports PMML and exposes data as an API in JSON for development of custom applications that access data from the IUX Platform, with data pipeline, model development and multi-language support for UTF-8 based languages.

**Our Solution**
IUX City Command Center and City Data Platform make city operations and services more resilient and intelligent by breaking down data and operation silos of multiple city domains for more effective situational awareness and better collaboration and coordination of city resources and services. The offering features:

- **City Data Platform** The City Data Model enables quick integration of relevant data, including emerging IoT sources from cross-city domains, and provides real-time visualizations of critical city functions. It provides standards-based integration with city subsystems including the video management system, video walls and GIS servers. It supports PMML and exposes data as an API in JSON for development of custom applications that access data from the IUX Platform, with data pipeline, model development and multi-language support for UTF-8 based languages.

- **City Command Center** The Integrated City Operational Dashboard lets users visualize, monitor and analyze the impact of city-level events and alerts. Users can track operational resources and assets (human and non-human) for fast and effective support and response. The integrated Video Management System enables real-time event qualification. Integration with city GIS servers enables users to perform geo-spatial analysis and render information on customizable maps with GeoServer integration and PostGIS database. The solution helps predict and avoid critical failures with proactive maintenance.

- **City Emergency Response Module** automates and accelerates multi-departmental response efforts across domains such as Energy, Water and Transport. It enables users to create and manage workflows, monitor status of incident resources and track resolutions.

- **Standard Operating Procedure Tool** uses BPMN standard-based SOP definition to resolve various emergency events with notifications, resource management, analysis and actions.

**Benefits**

**Meet sustainability targets**
- Leverage real-time data to proactively optimize energy usage while maintaining safety and livability.
- Use real-time and historic data to analyze the performance of buildings to meet energy efficiency targets without degrading occupant comfort or safety.

**Lower OpEx and CapEx**
- Reduce total cost of ownership and increase ROI with easy integration into existing lighting and building systems.
- Forecast and set targets with a goal-based approach based on integrated optimization algorithms.
- Use adaptive scheduling agents to replace expensive manual analysis.
- Deploy ‘As A Service’ cloud solution that eliminates the need for costly hardware installations and maintenance.

**Accelerate implementation and benefits realization**
- Integrate key city data into the data model using REST APIs to speed integration.
- Streamline management of multiple energy data sources.
- Scale efficiently with Big Data Connected Intelligence Platform.

**The TCS Advantage**

TCS’ unique value differentiators include:

- **Industry solutions**: Our software has been created by experts with proven experience in energy conservation. Our Intelligent Energy solution with domain-specific data models incorporates the latest technology innovations and expertise from TCS R&D.
- **Faster deployment**: IUX’s open standards platform enables faster solution implementation and integration with your enterprise’s existing lighting systems. The Adaptive Streetlight Optimization and Building Energy Optimization applications feature pre-built domain-specific use cases that accelerate smart deployment. APIs allow for the rapid building and integration of custom applications.
- **Lower cost of ownership**: IUX’s modular architecture lets you buy only what you need now with the option to grow as your needs mature. The IUX applications also extend across additional domains such as water and transportation for collaborative and integrated city initiatives.
- **Simplified business and engagement models**: As-a-Service subscription pricing does not require capital outlay. IUX applications are accessible online on desktop or on mobile devices.
- **Experience Certainty commitment**: Our corporate culture is one of superior delivery and customer certainty. Our consulting clients know the quality of our work, and now, companies can get that same level of quality, speed, and certainty with our Digital Software and Solutions offerings.
Cities are turning to technology to achieve more livable and sustainable environments for their citizens, in cost-effective ways. Smart cities are instrumented and combine data from multiple sources to run advanced analytics and drive decision making at the strategic and operational levels. Based on this information, long term goals are set, monitored and managed, and real time action is possible in order to address immediate opportunities for improvement in alignment with those goals.

Tata Consultancy Services’ (TCS’) Intelligent Energy solution—part of the Intelligent Urban Exchange (IUX) platform—is designed to help cities optimize energy consumption with the Adaptive Streetlight Optimization and Building Energy Optimization applications. The IoT and machine learning capabilities, combined with industry specific analytical models, create city and building specific solutions that are capable of automated data driven decision making to conduct optimization in real-time.

Overview

Adaptive Streetlight Optimization

Many streetlight systems used today lack real-time optimization capabilities. They are based on daylight or night schedules and are cost-prohibitive to maintain. The IUX Adaptive Streetlight Optimization solution can adjust streetlight luminosity based on environmental factors, while maintaining citizen safety. IUX integrates real-time weather, crime, outages, traffic and pedestrian data to create a city specific analytical model that optimizes streetlighting in real time. The platform can integrate with existing streetlight systems to create reports and automate lighting adjustments in real time. Cities retain full control and determine which streets to automate, and which to put on a fixed day/night schedule.

Building Energy Optimization

Buildings are responsible for 40 percent of energy use in most cities, motivating many to find solutions that reduce costs and realize sustainability goals. The IUX Building Energy Optimization delivers a citywide view of energy usage for each building, allowing corrective action for those not meeting efficiency targets. IUX analyzes real-time and historic consumption and benchmarks it against industry performance parameters to identify areas for improvement. Additionally, it quickly identifies streetlights and buildings that are underperforming on the energy efficiency scale with real-time views and alerts, such as a key performance indicator breach, controller/failure, on/off status, and more.

Real-time performance monitoring and analysis: Monitors and analyzes streetlight energy performance against set energy efficiency targets based on real-time and historical data. It benchmarks performance against industry standards to identify areas of improvement. Additionally, it quickly identifies streetlights and buildings that are underperforming on the energy efficiency scale with real-time views and alerts, such as a key performance indicator breach, controller/failure, on/off status, and more.

Recommendations and Actions: Delivers recommended actions using a unique optimization model and a proprietary real-time edge analytics agent that communicates with existing systems. Pre-built energy data models for streetlights and buildings help identify optimal operation. Optimized schedules adapt to a city priorities such as maximum energy savings, minimized consumption, carbon reduction, and more.

Plug and Play Integration: Features easy integration with existing streetlight, infrastructure and building systems with an energy-specific data model. The robust TCS Connected Intelligence Platform ingests data from all types of sources and allows cities and partners to rapidly and easily extend the solutions’ pre-built data model to unique use cases.

Our Solution

TCS IUX Intelligent Energy is a modular offering built on the machine learning capable IoT solution, TCS Connected Intelligence Platform. The offering features:

- Real-time performance monitoring and analysis: Monitors and analyzes streetlight energy performance against set energy efficiency targets based on real-time and historical data. It benchmarks performance against industry standards to identify areas of improvement.
- Recommendations and Actions: Delivers recommended actions using a unique optimization model and a proprietary real-time edge analytics agent that communicates with existing systems.
- Plug and Play Integration: Features easy integration with existing streetlight, infrastructure and building systems with an energy-specific data model. The robust TCS Connected Intelligence Platform ingests data from all types of sources and allows cities and partners to rapidly and easily extend the solutions’ pre-built data model to unique use cases.

Benefits

IUX City Command Center and City Data Platform helps cities:

- Optimize Cross-domain City Management
  - Gain understanding of the status, interdependencies and impacts of core city functions
  - Improve quality and timeliness of incident responses
  - Proactively optimize cross-domain city functions for safety, livability and efficiency

- Lower OpEx and CapEx
  - Reduce total cost of ownership and increase ROI with easy integration into existing systems
  - Reduce capital expenses with As-a-Service subscription pricing
  - Reduce IT infrastructure overhead with cloud-based applications accessible online or on mobile devices
  - Highly scalable with IUX City Data Platform and TCS Connected Intelligence Platform

- Accelerate implementation and benefits realization
  - Integrate key city data into the data model using REST APIs to speed integration, including emerging IoT sources
  - Pre-integration with Geo servers
  - Easy data transformation and exposing the data to develop custom applications

The TCS Advantage

TCS’ Unique Value Differentiators:

- Industry solutions: Our software has been created by experts with proven experience in city operations. Our City Command Center and City Data Platform city data model incorporates the latest technology innovations and expertise from TCS’ R&D.
- Faster deployment: IUX’s open standards platform enables faster solution implementation and integration with your enterprise’s existing systems. APIs allow for the rapid building and integration of custom applications.
- Lower cost of ownership: IUX’s modular architecture lets you buy only what you need now with the option to grow as your needs mature. The IUX applications also extend across additional domains such as water and transportation for collaborative and integrated city initiatives.
- Simplified business and engagement models: As-a-Service subscription pricing does not require capital outlay. IUX applications are accessible online, on desktop or on mobile devices.
- Experience Certainty commitment: Our corporate culture is one of superior delivery and customer certainty. Our consulting clients know the quality of our work, and now, companies can get that same level of quality, speed and certainty with our Digital Software and Solutions offerings.
Awards & Recognition

About TCS Digital Software & Solutions Group
TCS Digital Software & Solutions Group delivers on the promise of Connected Consumer Intelligence™. Our experience working with the world's most successful enterprises drives the development of integrated software that helps them meet the higher expectations of today's wired consumers and citizens. With TCS DS&S Group software, organizations can design experiences that logically connect every touch point of the consumer's digital and physical journey.

To learn more:
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Blog: Catering to the Connected Consumer

About Tata Consultancy Services Ltd (TCS)
Tata Consultancy Services is an IT services, consulting and business solutions organization that delivers real results to global business, ensuring a level of certainty no other firm can match. TCS offers a consulting-led, integrated portfolio of IT and IT-enabled infrastructure, engineering and assurance services. This is delivered through its unique Global Network Delivery Model™, recognized as the benchmark of excellence in software development. A part of the Tata Group, India’s largest industrial conglomerate, TCS has a global footprint and is listed on the National Stock Exchange and Bombay Stock Exchange in India.

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