



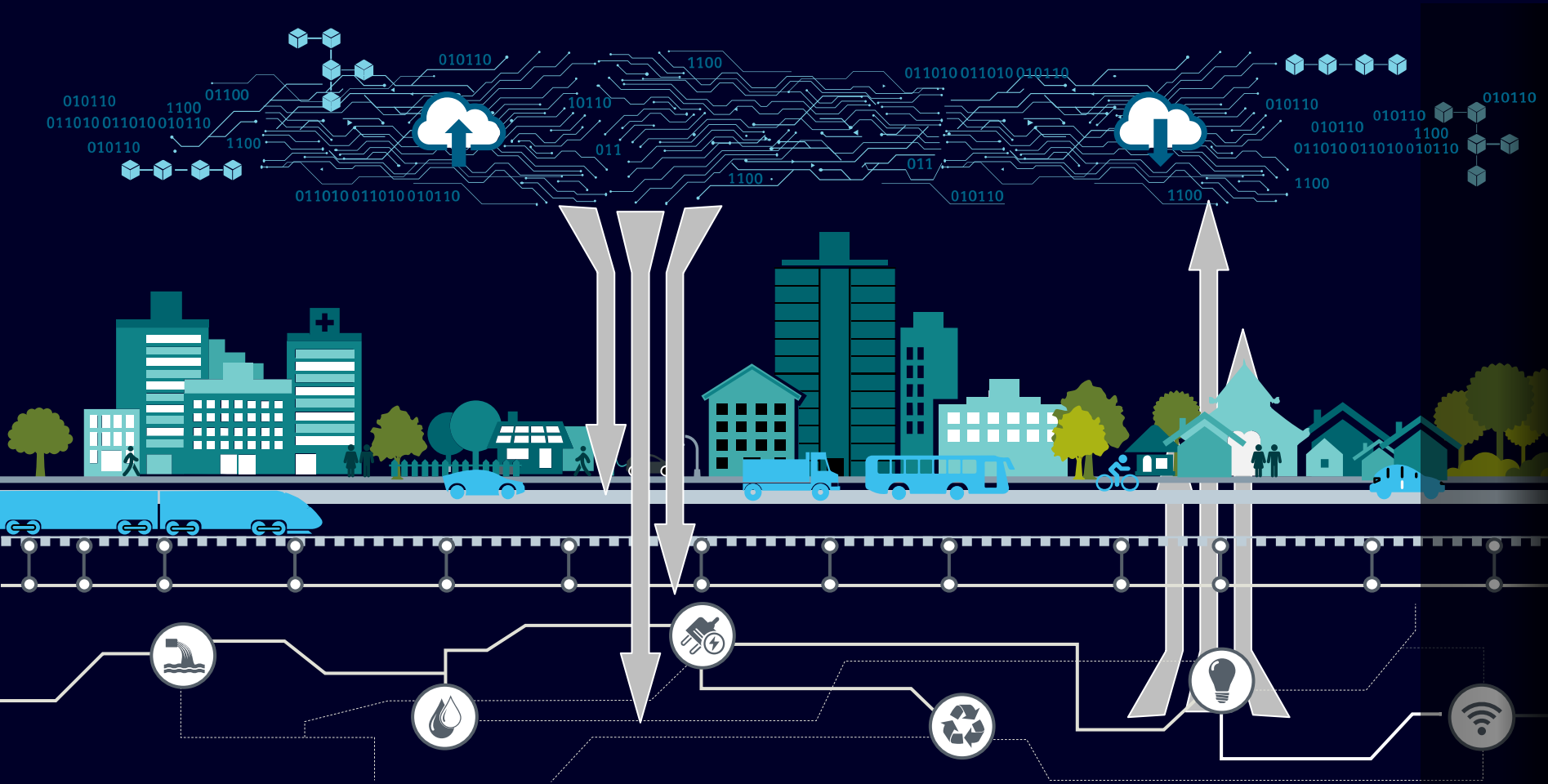
# IoT & Digitalization - Creating a blueprint for future smart cities

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# In a smart cities, the digital layer connects the three other layers to create an integrated ecosystem



## Digital Layer

Overarching layer connecting the other three layers with e.g. IoT platform, data-enabled services, Blockchain

## Vertical Layer

- Vertical mobility within buildings (e.g. water, cooling /heating, energy supply & consumption)

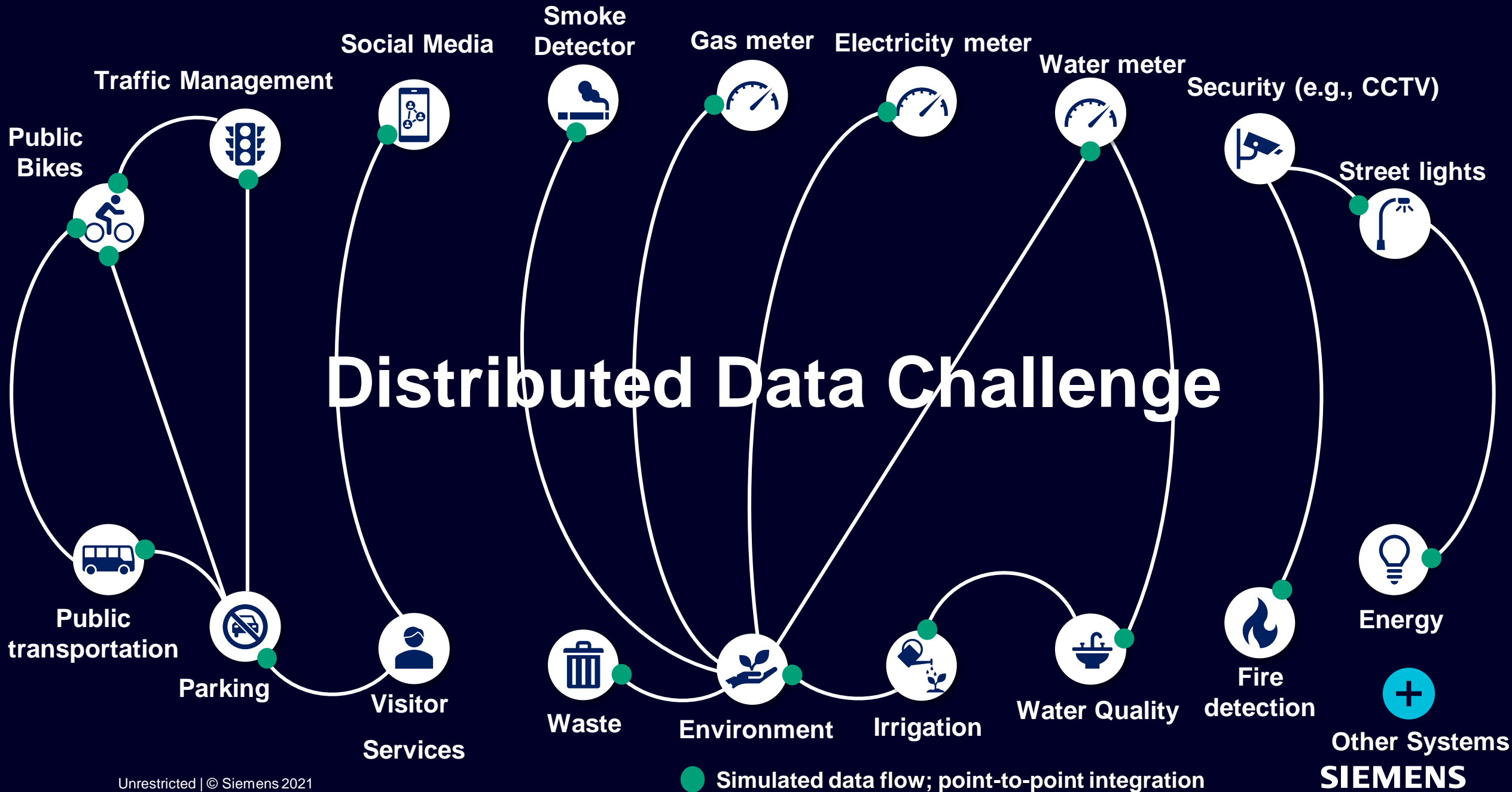
## Surface Layer

- Transportation of people and goods
- Enabling of physical services
- Farming and irrigation

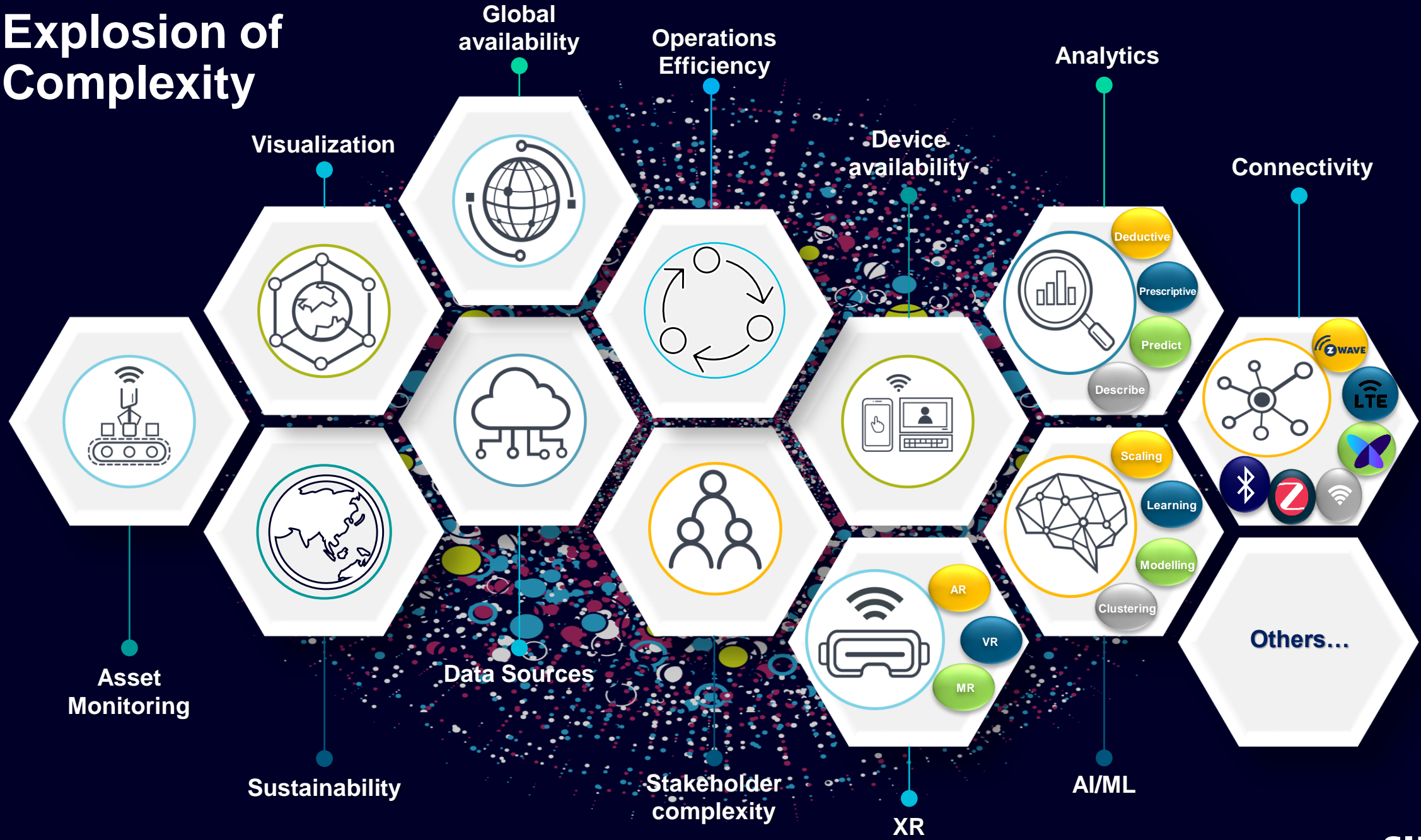
## Sub-ground Layer

- Below the surface operations for delivery of basic supply (water, electricity, etc.)

# Distributed Data Challenge



# Explosion of Complexity





# 63% of digitalization projects Fail!

Only 37% projects succeed<sup>1</sup>

42% miss expectations<sup>1</sup>

21% failing completely<sup>1</sup>

Average overrun was 27%<sup>2</sup>

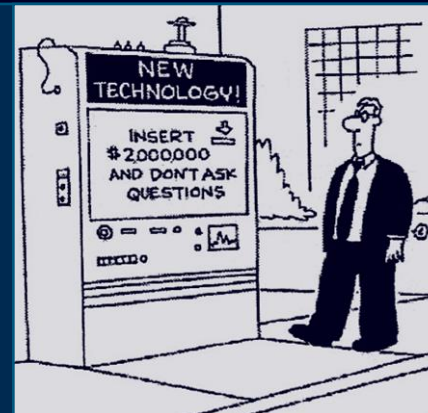
1 in 6 avg 200% cost overrun<sup>2</sup>

70% overrun schedule<sup>2</sup>

35% orgs abandoned a major project<sup>3</sup>

37% of fail to deliver results<sup>3</sup>

86% shortfall of 25% benefits<sup>3</sup>

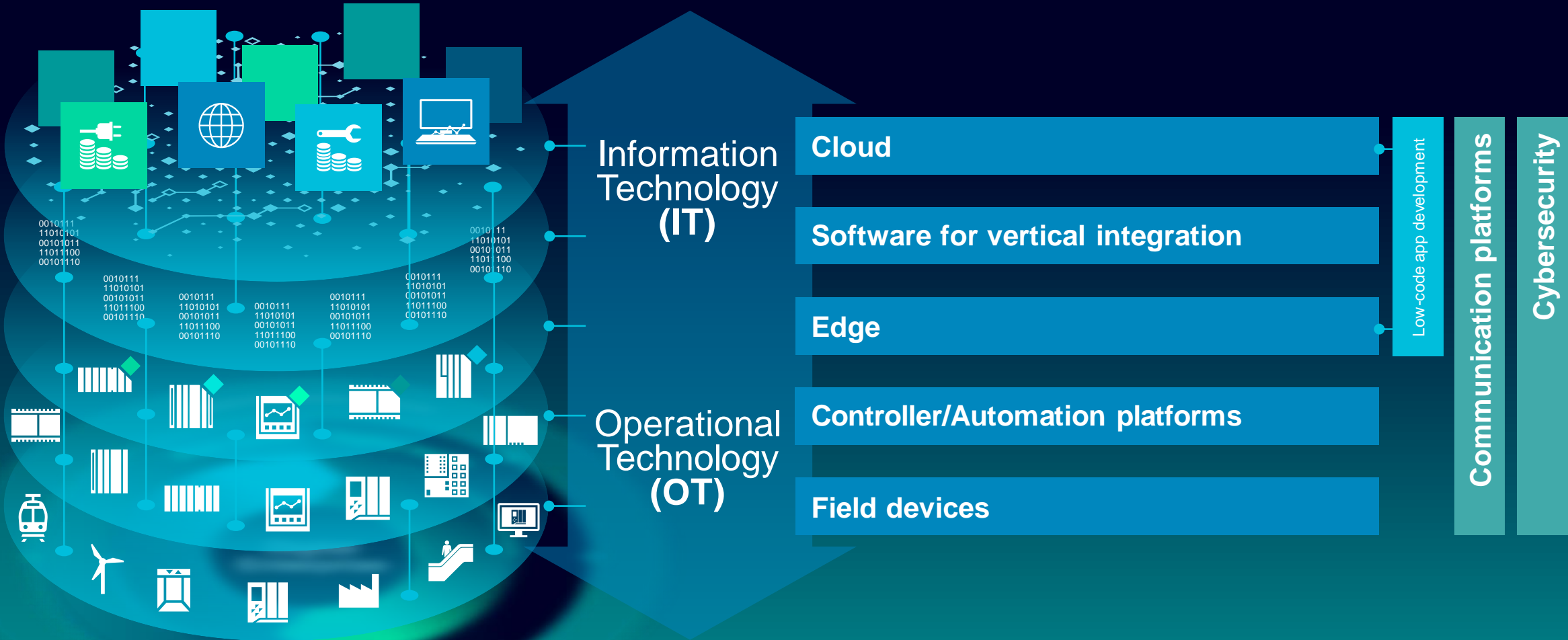


## Benefits of out-of-the-box IoT platform

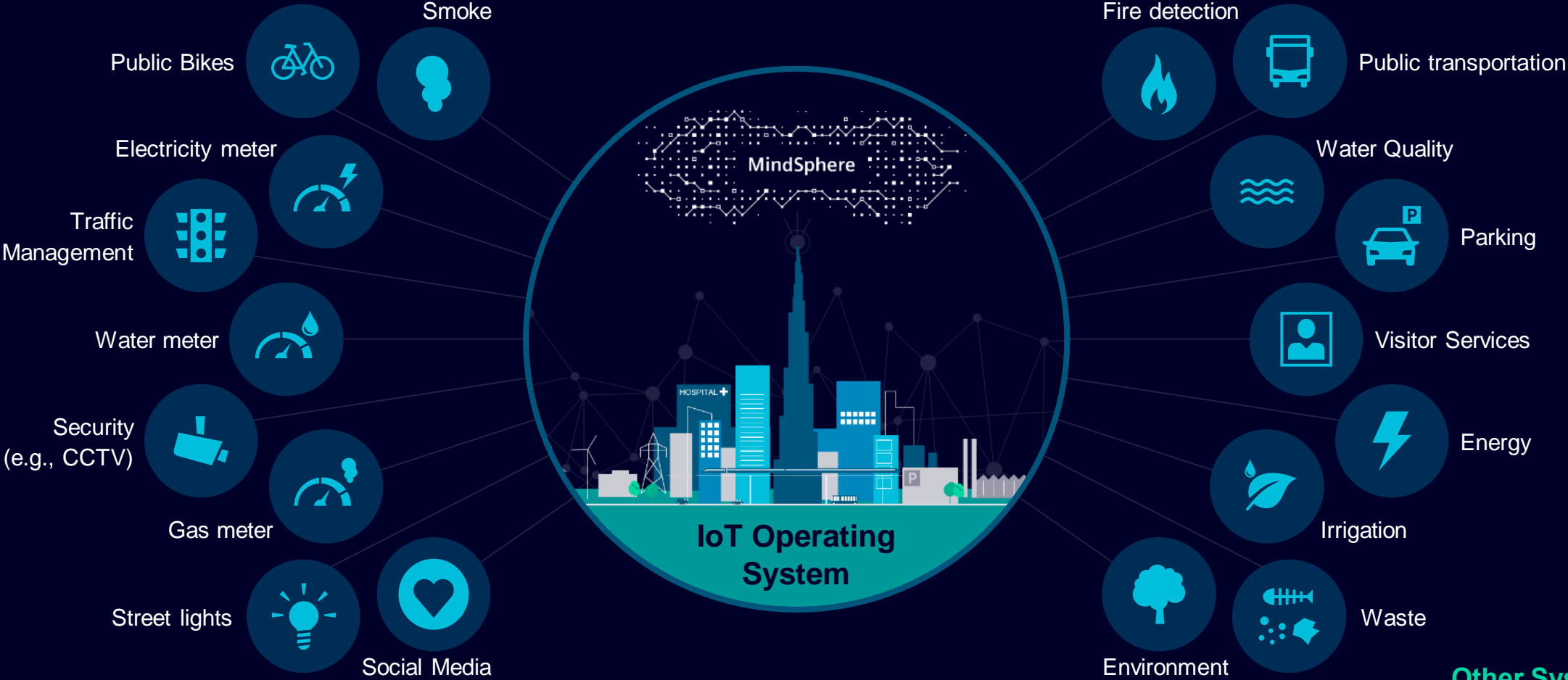
- 60% less time
- 25% less OpEx
- 40% less CapEx
- 90% less risk

1 2018 Chaos report Standish Group | 2 Harvard Business review Study | 3 Logica Management Consulting and the Economist Intelligence Study

# IT / OT integration across all areas and layers – Data intelligence for data-driven decision making



# IoT operating systems can help cities become more competitive, safer, less congested, healthier, greener and more efficient places to live and work



Other Systems ...

Simulated data flow; single source of truth

Unrestricted | © Siemens 2021



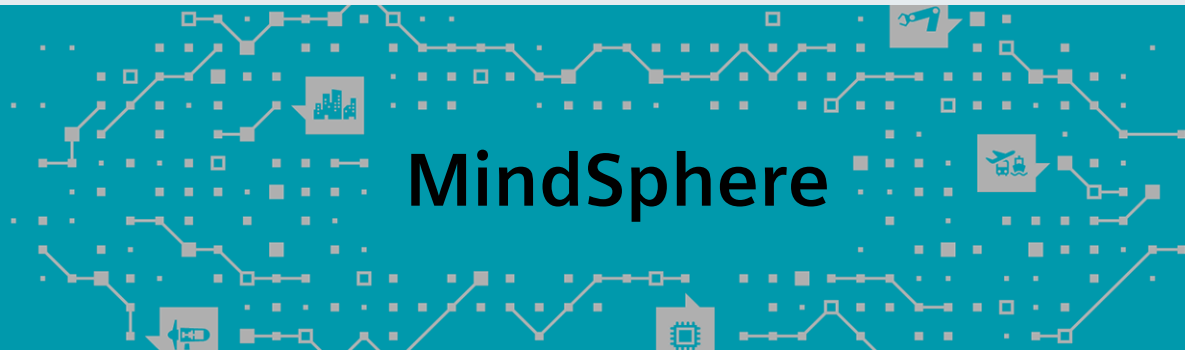
# MindSphere Siemens' cloud-based, open IoT operating system

## Applications

Powerful solutions with advanced analytics



Develop robust IoT solutions faster with global scalability

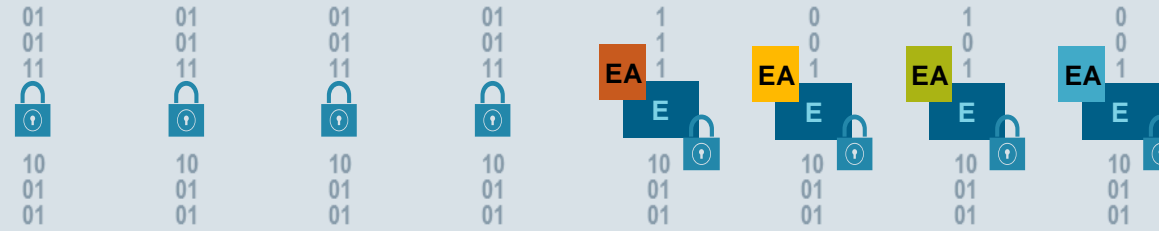


## Edge Management

Edge Device Management, Edge App Management, and Edge App Store

## Connectivity

Connect products, sensors, plants, systems, machines and enterprise applications



## Edge Apps

Siemens, partner (OEM), and 3rd-party Edge Apps

## Edge Devices

Multiple enabled devices hosting the Edge platform

<b>IoT Gateways, Devices &amp; Sensors</b> 	<b>Cloud</b> 	<b>On Premise</b> 	<b>Other, e.g.</b> <ul style="list-style-type: none"> <li>Social Media Platform</li> <li>Environment Systems</li> <li>Enterprise Systems</li> <li>Marketing &amp; Communication</li> </ul>	<b>Custom IoT Agent</b> 
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# Expo 2020 Dubai - Creating a blueprint for future Smart Cities!



Winner of iF World Design 2021 Award!

Reusable, Adaptable and Secure, Siemens inhouse developed MindSphere Native Web App; Platform independent, Scalable

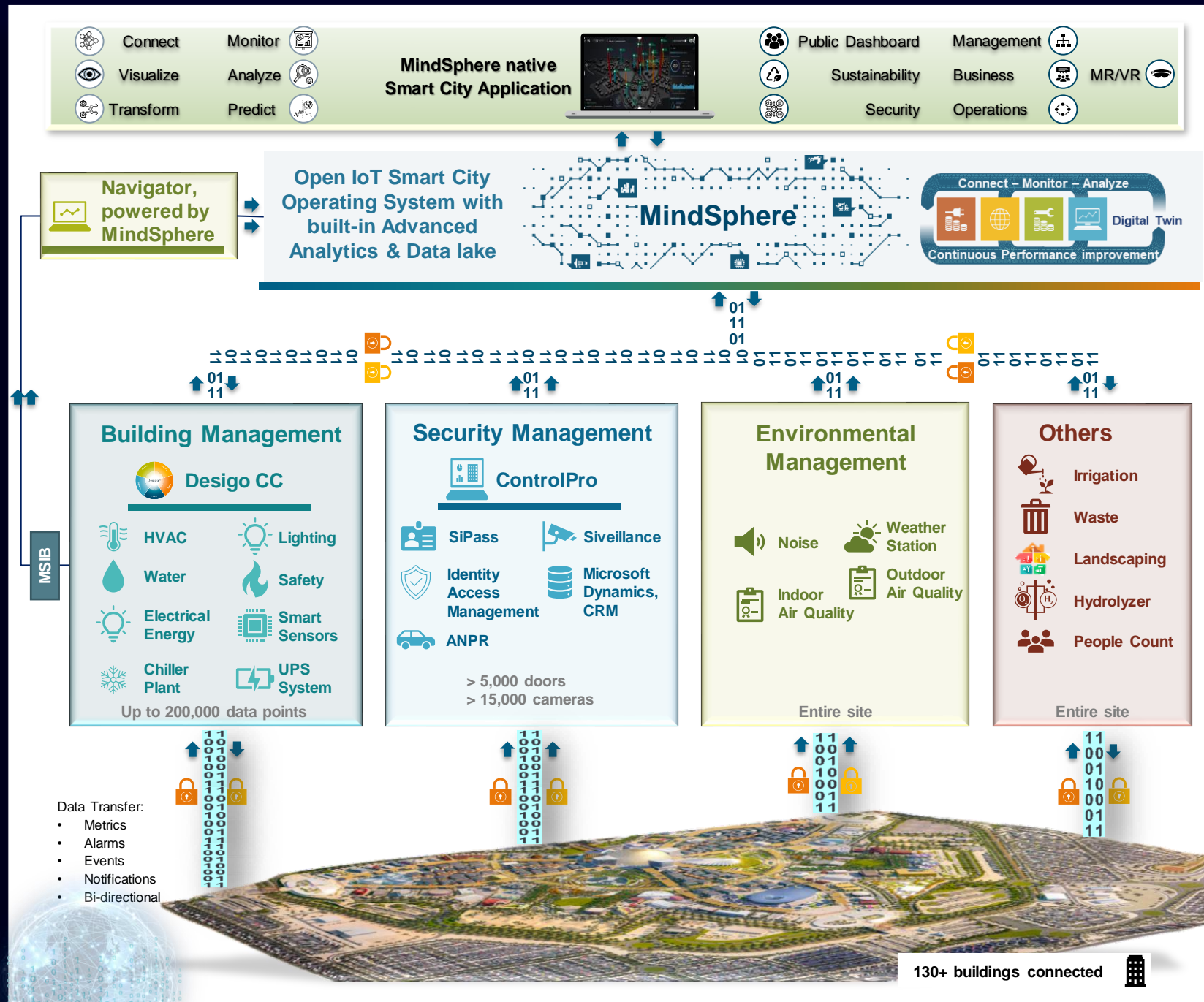
MindSphere Smart City Application is connecting to over 20+ sub-systems (on-premise & cloud) at Expo site

Unique UI navigation combination of 2D / 3D (Digital Twin) + GIS; Navigating through different hierarchies / levels from city level to room level

Custom IoT Agent which is platform, OS & hardware independent. Agent acts as protocol adapter for variety of protocols, e.g. OPC UA, Modbus, BACnet, MQTT, Rest

Predefined components / libraries to add users, personas, KPI's, threshold's and layouts

Built in custom rule engine, flexible alarms and notifications templates (Email & SMS) and custom IoT Agent monitoring.



# Use Case Overview



## Sustainability

## Smart Buildings / Utilities

## Public Safety & First Responder

## Electrical Vehicles & Infrastructure

## Smart Operations

## Potential Smart mobility Use Cases for D2020

- Waste Management
  - Total waste
  - Green Waste
- Environmental Monitoring
  - Outdoor AIQ
  - Indoor AIQ
  - Water Quality
  - Weather monitoring
- Ecology
  - Pesticides, fertilizer
  - Species (native/pest)

- Smart Meter – Electricity
- Smart Meter – Water
- Smart Meter – Gas
- Building Management System (A&E)
- Smart Irrigation
- Smart Lighting
- Carbon

- Security Management System (A&E)
- Noise Monitoring
- Access Control (SiPass)
- Gun Shot Detection
- Drone First Responder
- Wearables

- Electric Vehicles
- EV infrastructure Energy Metering
- Hydrolyzer Dashboard

- E-Governance
- Open Data
- Visitor Engagement
- Public Wi-Fi Hotspot
- Position as a Service
- Crowd & Queue Mgmt.

- Connected Streetlights
- Autonomous Vehicles
- Connect Traffic Management
- Connected Traffic Lights
- Smart Road Sign
- Smart Parking
- Shared Mobility
- Fleet Management

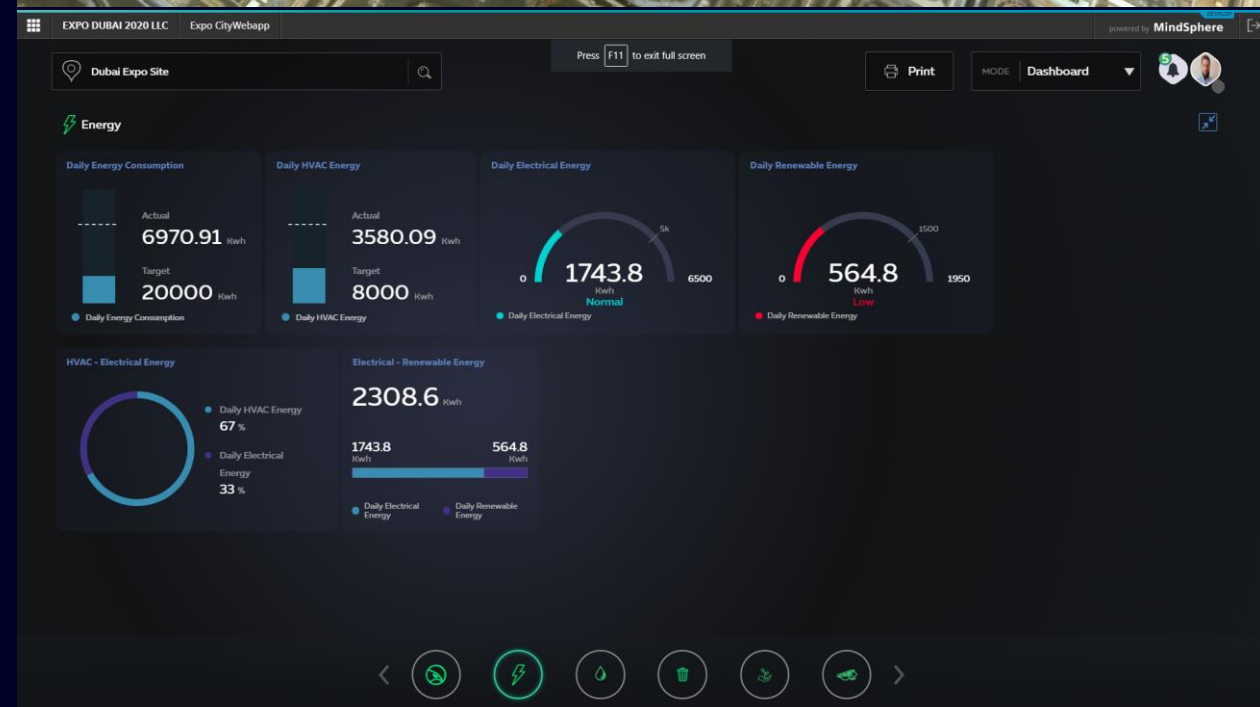
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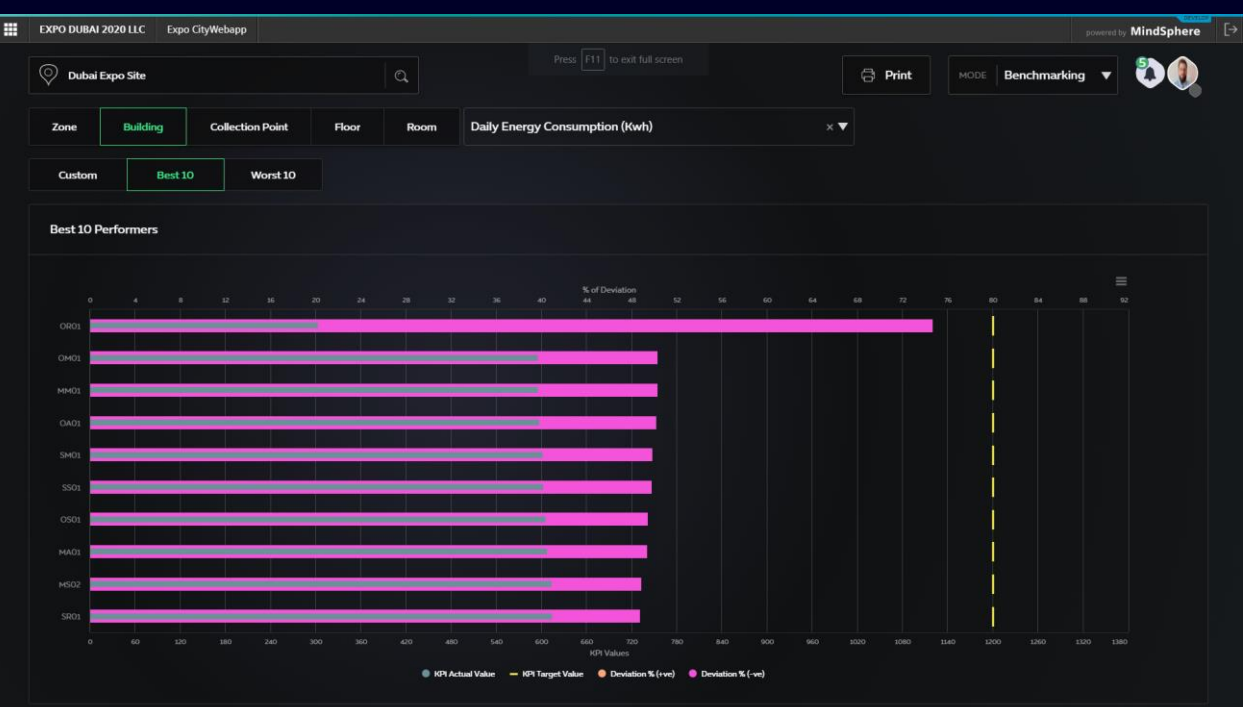
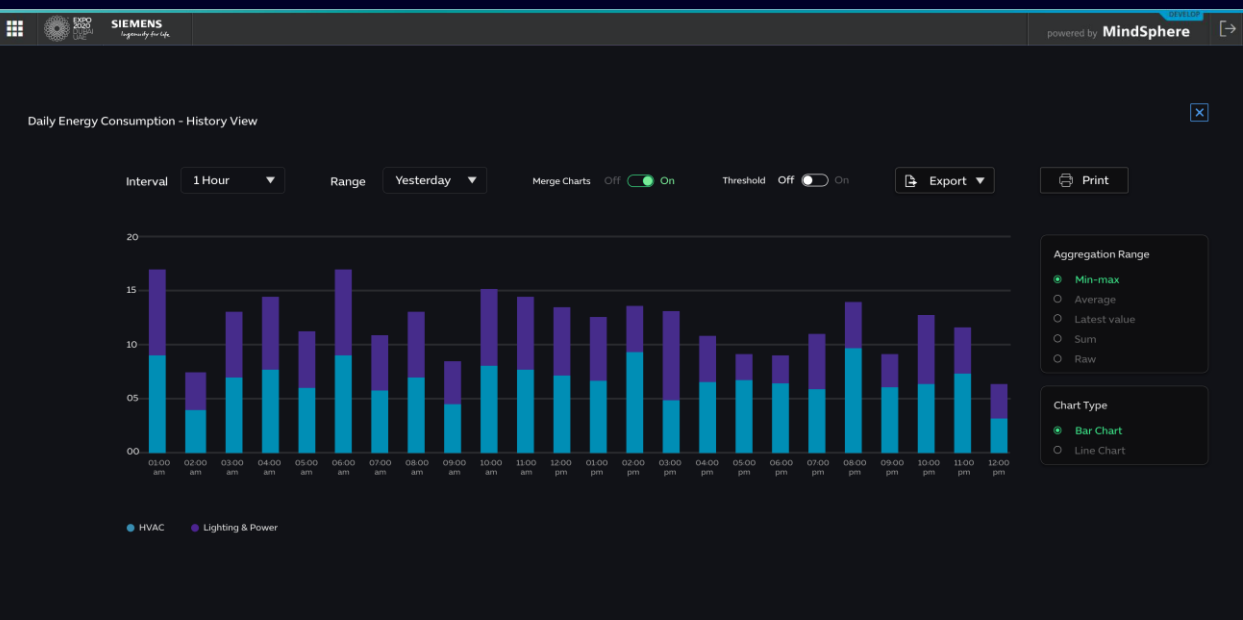
- MindSphere Semantic Data Interconnect (SDI) Integrated Data Lake (IDL) Use Cases

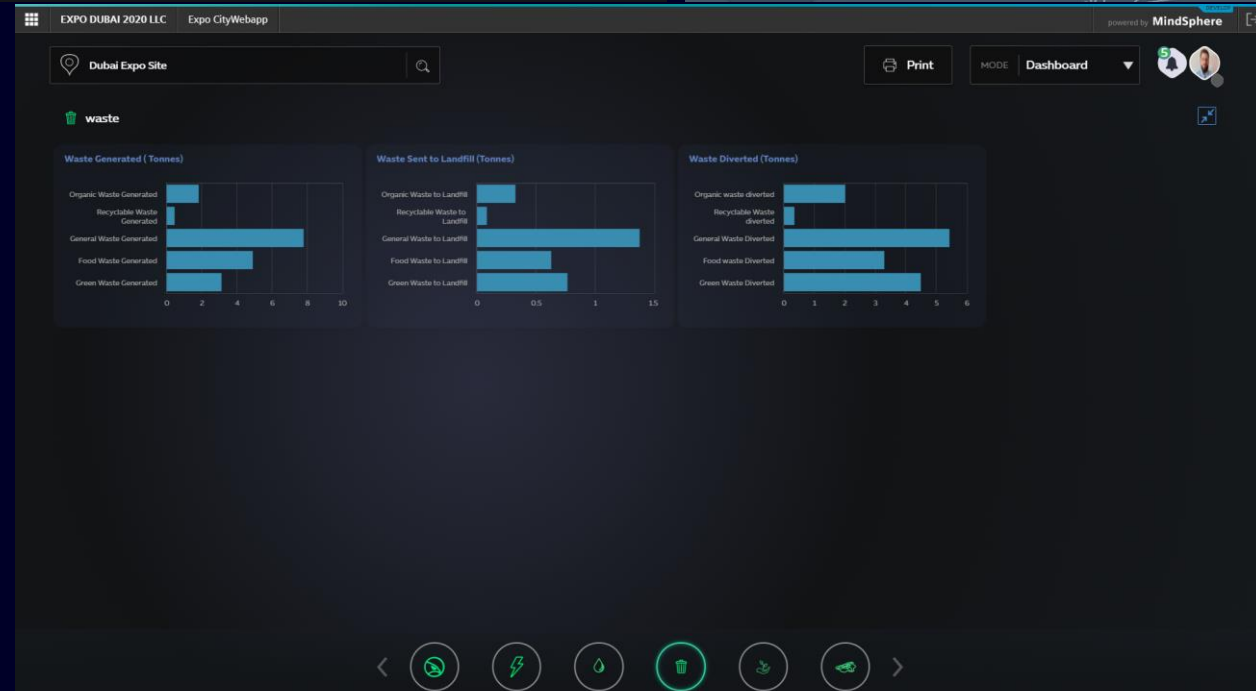
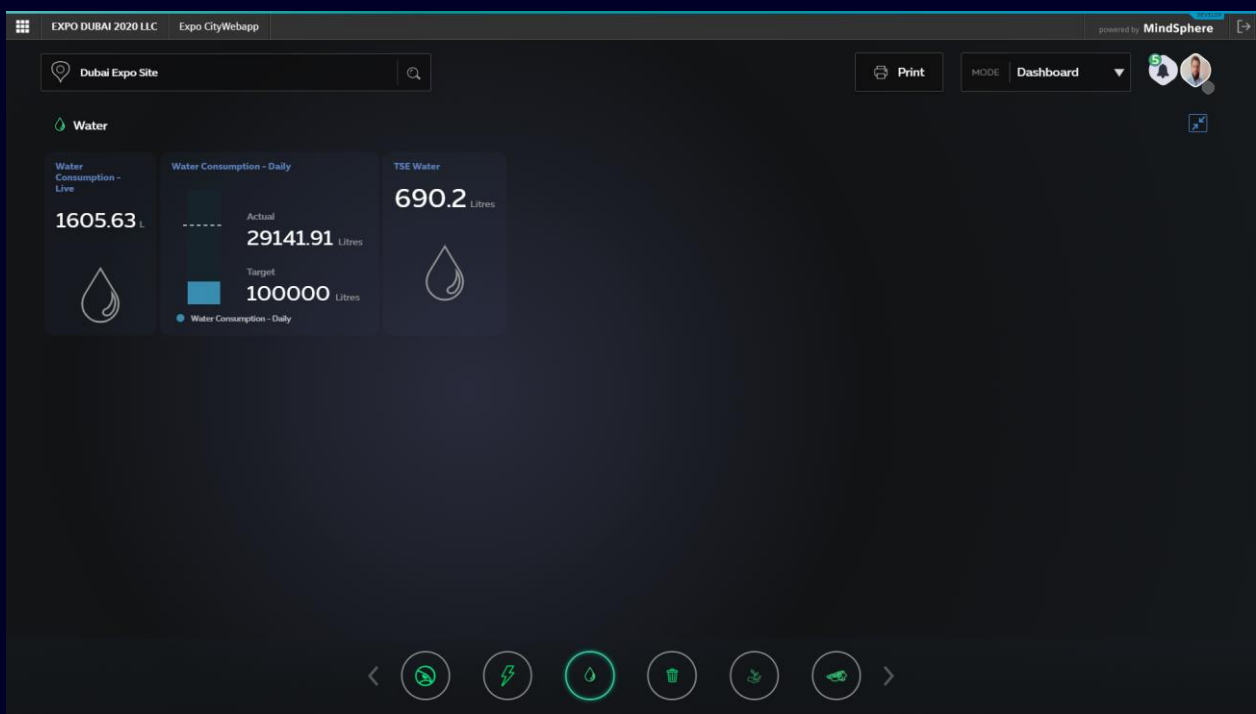
Use Case confirmed with Expo customer  
 In discussion / to be discussed with Expo customer

currently out of scope

# MindSphere Expo Smart City Web Application Live Demo







# Connect & Monitor



Connect new and existing assets and data to an IoT operating system



Monitor continuous view of asset performance

Connectivity

# Analyze & Predict



Applications



Build analytics models and find new insights



Implement automated predictive and prescriptive processes and alarms

# Digitalization journey



# Transform & Optimize



Evaluate the most cost-efficient ways to reduce energy waste



Develop new business models

Digital Services

# Contact

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