Operational Intelligence (OI) brings international expertise in Master System Integration (MSI) around workshop methodology to ratify MSI deliverables in context of key outcomes and experiences sought for a development across four primary levels.

1. **For each stakeholder domain**
2. **To build out on functions already recognized**
3. **To examine interdependencies and data flows**
4. **For seamless alignment with Principal Project Requirements and Digital Engineering strategy as well as workflows.**

Master System Integration (MSI)

OI works hand-in-glove with leading developers, contractors, design teams and owners to:

- Design and deploy ESG, Energy Efficiency and Digital Experience aligned to Key Tenant, Visitor, Wellness, FM, Asset Management and Reporting capabilities for State Significant projects, Precincts and Smart Buildings.

Integral to the broader Oberix Group, our clients benefit from deep expertise across:

- Services, Strategy, Data, Cyber, ESG, MSI, IoT, Building Automation, Energy Management, Efficiency and User Experience

Backed by 30+ years of uninterrupted commercial success and over 300 deep subject experts, headquartered and with leadership in Australia.

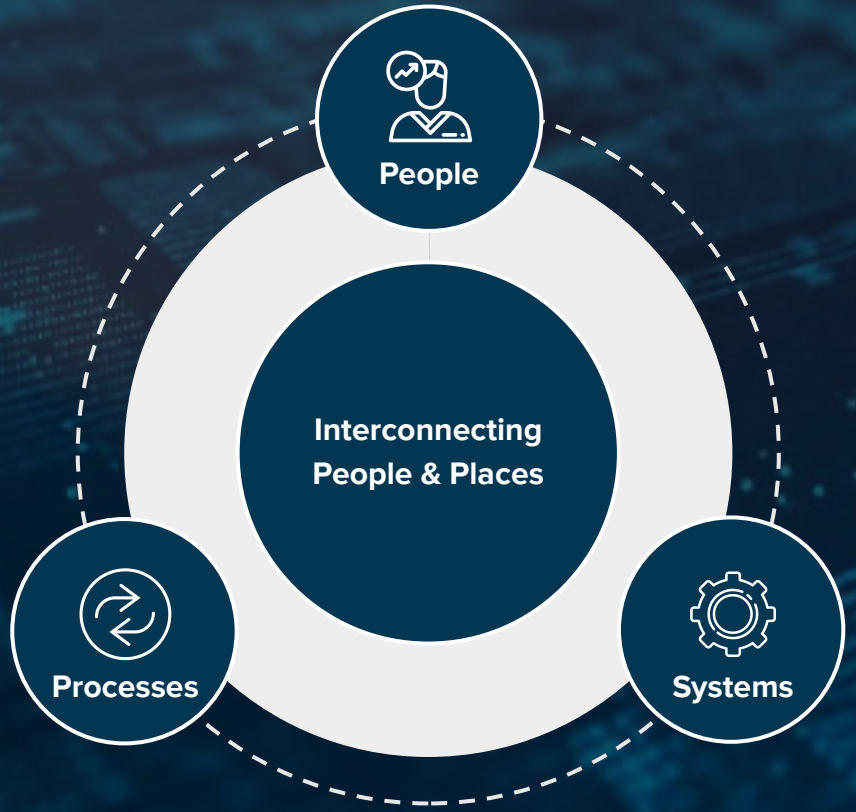
Our seamless, outcomes-based approach to the integration of solutions cement our work's reputation for Resilience, Safety and Reliability with an agile culture to drive Innovation across complex, project stakeholder groups.

OI uses Operational System Integration, innovative technologies and Business Process Management to eliminate barriers hereby delivering new benchmarks around smarter, more engaging, responsive, sustainable and lean built environments.

This delivers the ability to interconnect people, processes and systems as the foundation for sustainability, efficiency, collaboration, experience and communication.

Our operational capability enables the monitoring of workplace systems and processes in real time, for increased resilience, effectiveness, productivity, control and greater financial return on assets.

Project and Services experience include single-pane-of-glass, integrated user and building management solutions using BMS data for the carbon-neutral Barangaroo South precinct in Sydney across 200,000 sqm and 3 mixed-use towers, as well as for the award winning Paya Lebar Quarter in Singapore, Quay Quarter in Sydney, the Celcom Tower in Malaysia as well as Melbourne Quarter.



Our global locations

Since 1992, we've been advising, developing, delivering and maintaining the smartest spaces around the globe.

1. Victoria, Australia
2. Australian Capital Territory, Australia
3. New South Wales, Australia
4. Coffs Harbour, Australia
5. Queensland, Australia
6. South Australia, Australia
7. Western Australia, Australia
8. Singapore
9. Malaysia
10. United Kingdom
11. United States of America
12. Pakistan

Proudly Australian Owned!

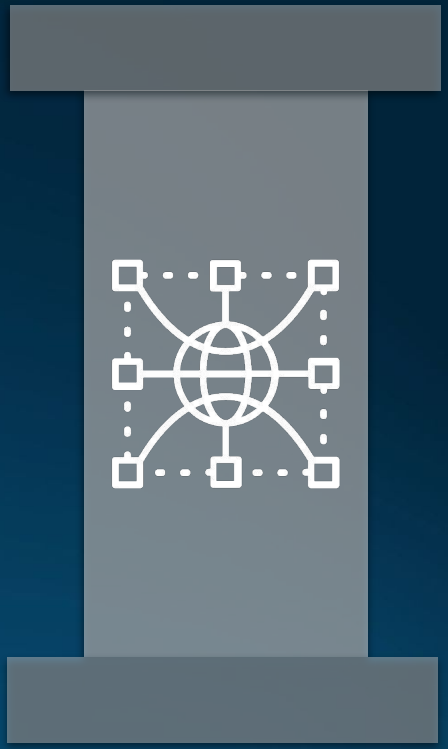
Risk, Performance & Future Proofing

Performance Contracts that predefine and guarantee Outcomes, de-risk our work for clients. The OI approach to Future Proofing is through Early Engagement.

Early Engagement:

- At the vanguard of OI solution development.
- Allows for conversion of business requests to explored and refined solution development.
- Validates resolution hypotheses at an early stage from a day 1 scenario to architecture design for future technology innovation and integration capability.
- Drives down uncertainty, ambiguity, unpredictability, and complexity.
- Drives down shadow expenditure and risk.

PLACE - Levels of Sophistication



Enhance Business
IS:5

Augment Business | IS:4

Smart & Control
IS:3

Smart & Direct
IS:2

Smart & Inform
IS:1

Augment Business | IS:4

Orchestration

Predictive Analytics

- Systematic Coordination of Services & Productivity Behaviour
- E.g
  - Automation of staff Onboarding
- - Integrated Security and Authorization Management

3 Lenses: **People, Place, Purpose**

People

- Who will use the Space
- Who will Operate
- Who will Interact
- Who will be Impacted

Plac e

Physical
Digital
Safety and Security Wellness

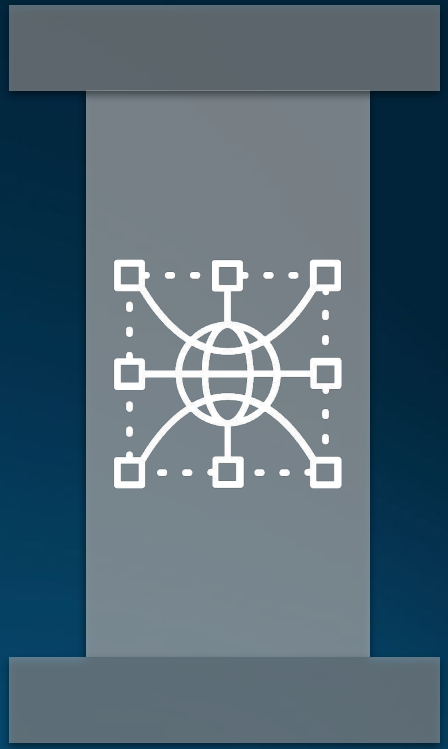
Purpos e

Experience sought
Business Workflows
Cognitive Needs to appeal to (Learn, Explore, Discover, Create)

Level 4: Smart & Augment.

This sophistication level focuses on how a building technology can augment the business operations and how it can integrate with core Business systems.

PLACE - Levels of Sophistication



Enhance Business
IS:5

Augment Business
IS:4

Smart & Control | IS:3

Smart & Direct
IS:2

Smart & Inform
IS:1

Smart & Control | IS:3

Workflow

Event Driven Actions

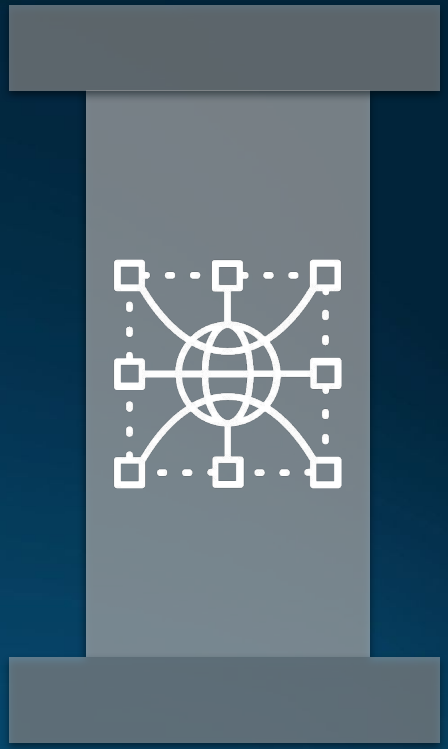
- Integrated control workflows
- Maintenance automation
- Integrated user journeys
- E.g Occupancy driven HVAC controls

Level 3: Smart & Control

This sophistication level focuses on the buildings ability to sense, orchestrate and control.

Typical examples would be integration between sensor driven lighting, occupancy driven HVAC, Lift and access orchestration with maintenance and room availability to leverage and maximize the productive use of available space.

PLACE - Levels of Sophistication



Enhance Business
IS:5

Augment Business
IS:4

Smart & Control
IS:3

Smart & Direct | IS:2

Smart & Inform
IS:1

Smart & Direct | IS:2

User Apps

Interfaces

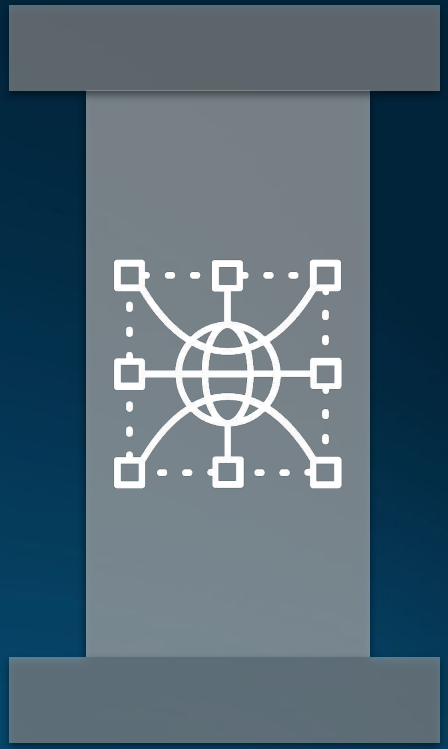
- Wayfinding
- Room booking
- Event notification
- Catering

Level 2: Smart & Direct

This sophistication level focuses on the buildings ability to sense and give direction.

Examples include as raising a service ticket, or providing direction to a room.

PLACE - Levels of Sophistication



Enhance Business
IS:5

Augment Business
IS:4

Smart & Control
IS:3

Smart & Direct
IS:2

Smart & Inform | IS:1

Smart & Inform | IS:1

Sensors

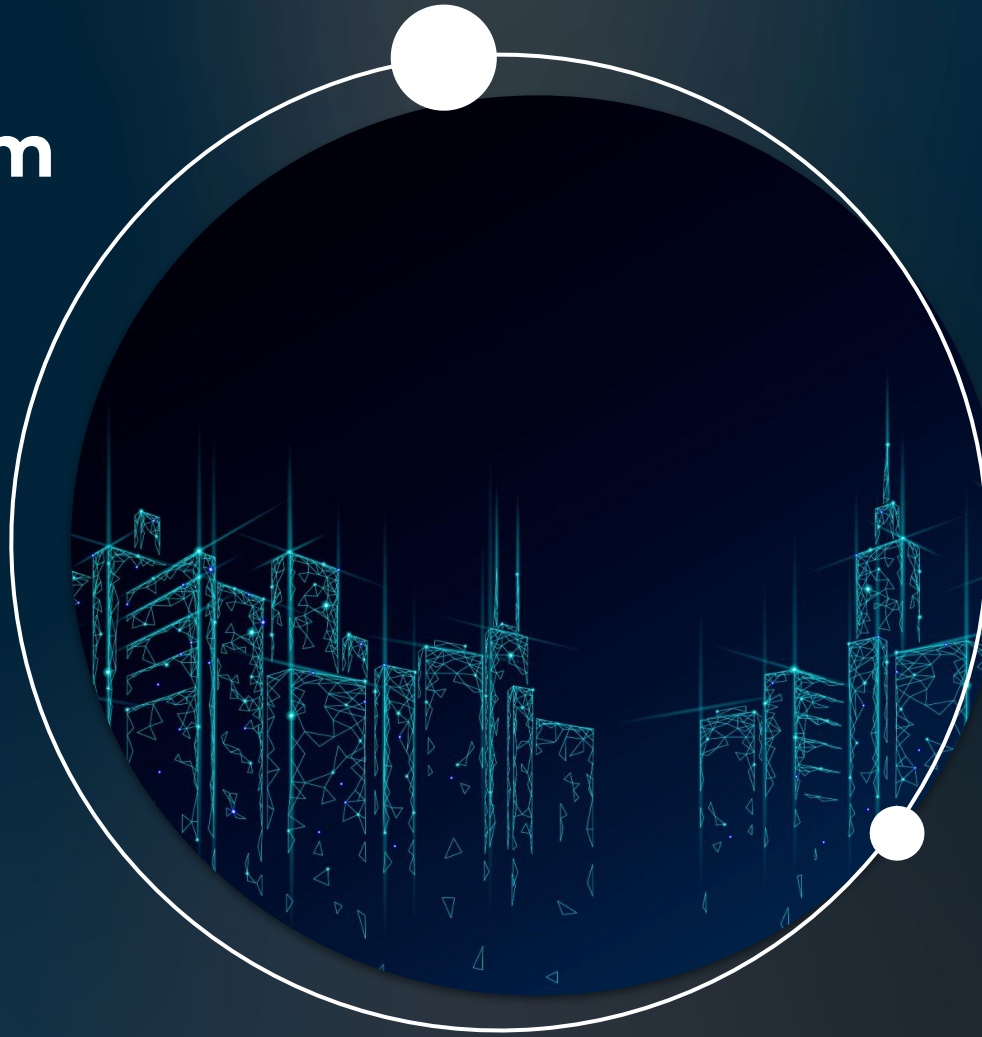
Sensors

- Utility reporting
- Foot traffic
- Usage reporting
- Movement reporting
- Occupancy

Level 1: Smart & Inform

This sophistication level focuses on the buildings ability to sense and provide data.

This covers everything from technologies and digital workflows such as people counters through to HVAC or utility performance data reporting.



Key Outcomes

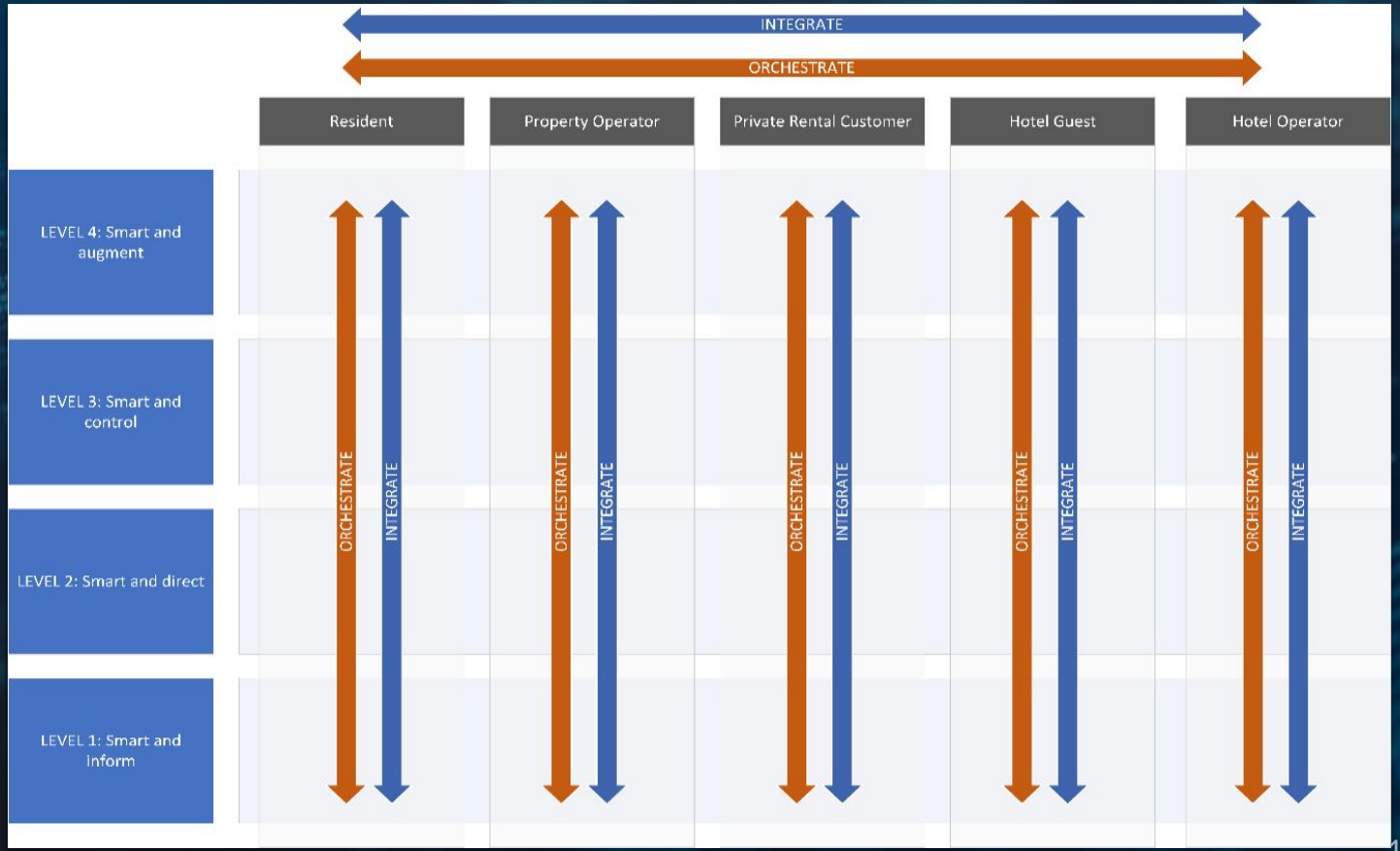
Using cross-functional stakeholder and subject matter expert meetings,
the key outcomes sought are mapped:

- For each stakeholder domain, to build-out on current functions that have already been recognised.
- The interdependencies between functions are then defined.
- The data flows are then assigned.

This Methodology provides:

- Definition of the functions.
- Objective per function.
- Any extra functions noted.
- Key data and integrations.
- Direction of Integration.
- Primary User Journeys involved.

To specify and design a comprehensive Open Building System Interface (OBSI) solution, it is necessary to have a view of all major integration points, and the direction, i.e. East-West or North-South.



Subsystem Integration

OI bring deep- experience in the integration of the following subsystems:

a. Integration Platforms

b. ICN (Integrated Communications Network)

c. Metering (electrical, water, thermal energy, gas);

d. Building Management System (BMS) & HVAC plant;

e. Air Quality Monitoring System;

f. Access Control, Intruder Detection & Intercom (Security);

g. Closed Circuit Television (CCTV);

h. Lighting Control System;

i. Emergency Lighting System;

j. Electrical Switchboards monitoring;

k. Generator control system / SCADA

l. Emergency Power system (UPS / Generators);

m. Carpark Entry/ Exit and Management;

n. Logistics management;

o. End of Trip facilities such as Lockers;

p. Digital Displays / Digital Artwork (AV Installations);

q. Information Boards and Way Finding;

r. Lift, Escalators, and Travelators;

s. Lift Advertising;

t. People Counting / Occupancy Sensors;

u. Public Wi-Fi System;

v. Fire Services (monitoring only);

w. Hydraulic Services;

x. Façade / Blind Control system;

y. Solar PV System;

z. Network Management System / Network Security;

aa. Waste Management;

bb. Public domain Lighting;

cc. Public domain security;

dd. Public domain information kiosks;

ee. Public domain entertainment services.

ff. YARDI property management software

Features

Asset Management

Online digital asset registry for your space. Tag assets with QR codes to track maintenance and service history. Load operator manuals & specifications as well as track insurance & warranty details.

Access Card & Visitor Management

Manage ad-hoc visitors and pre-registered guests easily. Able to support self check-in consoles, large screen self-service kiosks and badge printing. Enable “One-Card” access control across all facilities and devices for easier management.

Induction

Our visitor induction tablet app allows staff and visitors to view any safety instructions, answer questions, and sign disclaimers. Save time and money reducing face to face inductions.

Seat Booking

Enables hot desking. Staff can choose their preferred seating space, find areas near friends & team members, and set comfort parameter for seating areas.

Facility Booking

Transform any space or locker into a bookable facility. Find and book facilities, search available equipment, extend usage of space, order services such as furniture arrangement. Automate reminders & update calendars.

Catering Orders

Simplify food & beverage catering orders for any event. Seamless integration with any booked facility and registered vendors. Send out invites enabling attendees to RSVP and select preferred meals prior to event.

Smart Wall

Transform digital signages into interactive and informative medium, through customisable dashboards that supports RSS Feeds, weather integration, etc.

Facility Management

Enables end-to-end assets & facility management and maintenance to maximise ROI, improve performance and minimise downtime.

Planned Preventative Maintenance Work Order

Ensure spaces and assets function as intended through well-planned maintenance schedule. Perform checks on reserved usage of facility to ensure equipment can be shut down without disturbances to daily operations.

Features

Digital Process & Workflow Editor

Create customised workflows and simplify the integration of disparate systems onto a smart platform e.g. enterprise IT systems, Enterprise Resource Planning (ERP) software, IoT devices, building services control systems.

Integrated Utility Management System

Real-time control & monitoring of building systems and equipment. Connect disparate systems from multiple vendors and location onto a unified platform to maximise operational efficiency through open protocol integration.

Utility Management

Track and manage energy & utility usage and costs across facility using customisable interactive KPI dashboards, smart alerts and notifications.

Incident Management

Automatically detect and respond to critical incidents and threats. Visualise incidents on large screens, remotely monitor incidents with live data feeds (e.g. CCTV feeds, etc.) and collaborate with response teams to respond more efficiently.

Smart Evacuation

Improve emergency response time and evacuation procedure. Cut headcount time in half and account for thousands of people in a fraction of the time, enabling smarter decisions to be made during critical times.

People Counting

Track business performance through the combination of visitor traffic and sales conversion Metrix.

Contract Management

Keep track of supplier and vendor contracts, as well as key details such as validity dates, terms, and documentation. Manage leasing contracts.

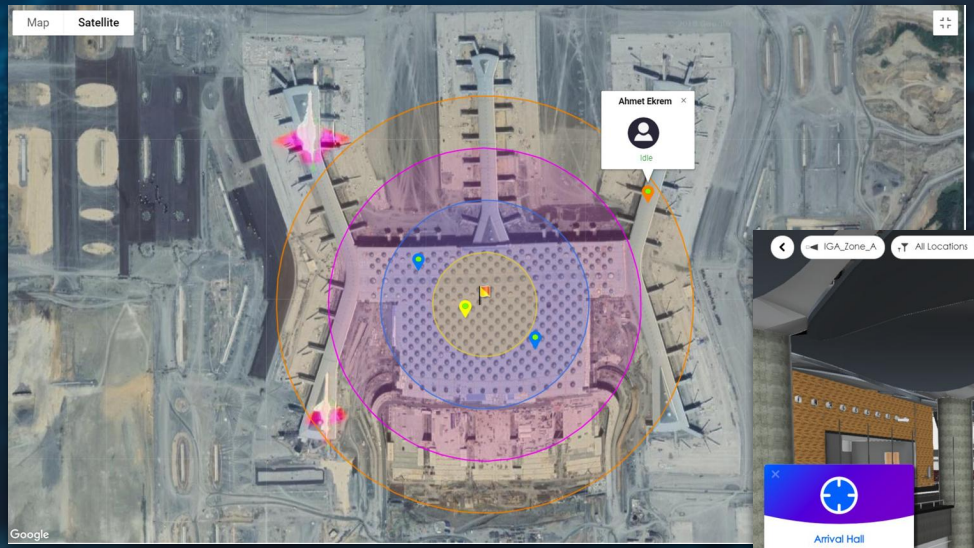
Inventory Management

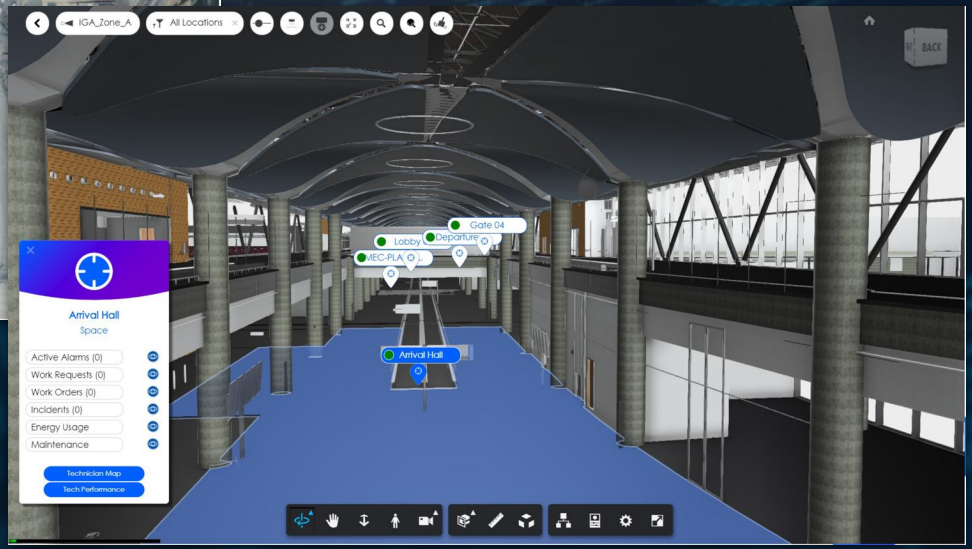
Track inventory levels, reserve & issue inventory, and automate reordering. Seamless integration with the maintenance modules and keeps an audit trail of inventory movement.

Operational BIM

Unlock the full potential of BIM from design & construction phase, to testing & commissioning of equipment, to building operations & maintenance via customisable real-time GUI with real-time monitoring and control.

Examples Dashboard Design

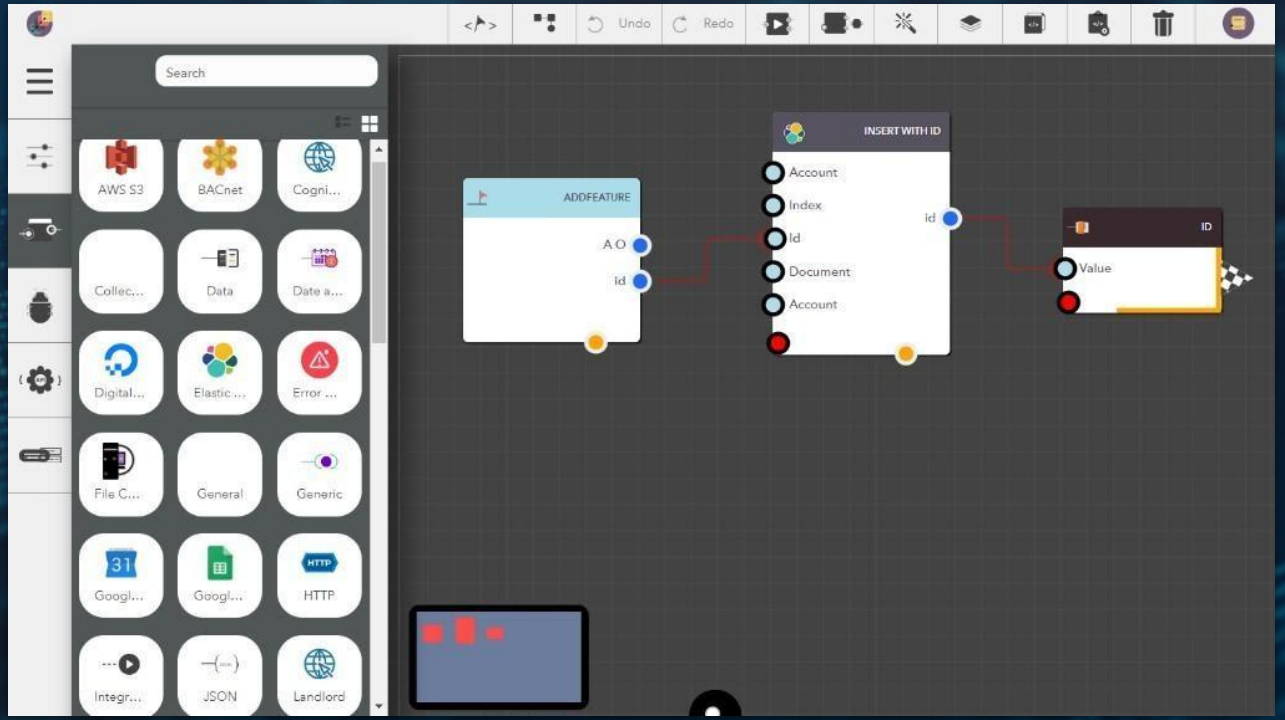




Technology Options

Workflow Editor

Lucy is a development tool which breaks down operational and information technology siloes. Lucy can be used to create tangible data driven insights and deploy any digital workflow, to drive up seamless user experiences and efficiencies and to drive down utilization of resource across energy, management, maintenance and risk.



C2O Analytics

C2O simplifies integration with the building management system (BMS), and enables real-time, data-driven management for AFDD.

C2O is a platform for data integration, intelligent process automation and the creation of a rule-based, model based predictive analytics and AI.

It provides the following capabilities:

Viisual programming interface for defining, creating & modifying rules and models that incorporate advanced analytics and AI.

Basic building blocks connect to and exchange data with other systems and provide a low-code visual environment to compose larger, complex integrations.

Enabling user journeys and business processes through intelligent process automation with dynamic team formation.

C2O is an out of the box solution for AFDD and failure prediction to enable predictive operations and the maintenance of systems.

The solution provides a next generation operating model with an integrated, systems-driven approach including the following capabilities:

- Automated Fault Detection and Diagnosis (AFDD) to proactively determine equipment faults.
- Integration of AFDD with power distribution and energy consumption information to identify opportunities and strategies for automation of optimization.
- Integration of AFDD with for example space condition monitoring ensures spaces are maintained at the right comfort level to eliminate complaints handling In relation to overcooling and undercooling.
- Machine learning based algorithms are used to predict future faults and operational performance deviations.

C2O includes the following key application functionality:

1. Integration to HVAC System via building control system.

2. AFDD and Root Cause Analysis (RCA).

3. Predictive analytics and Machine Learning.

Key Benefits

The integration of model based, and rule based FDD strategies provides a significantly higher level of accuracy for detection of faults, to determine root cause and to optimise equipment settings.

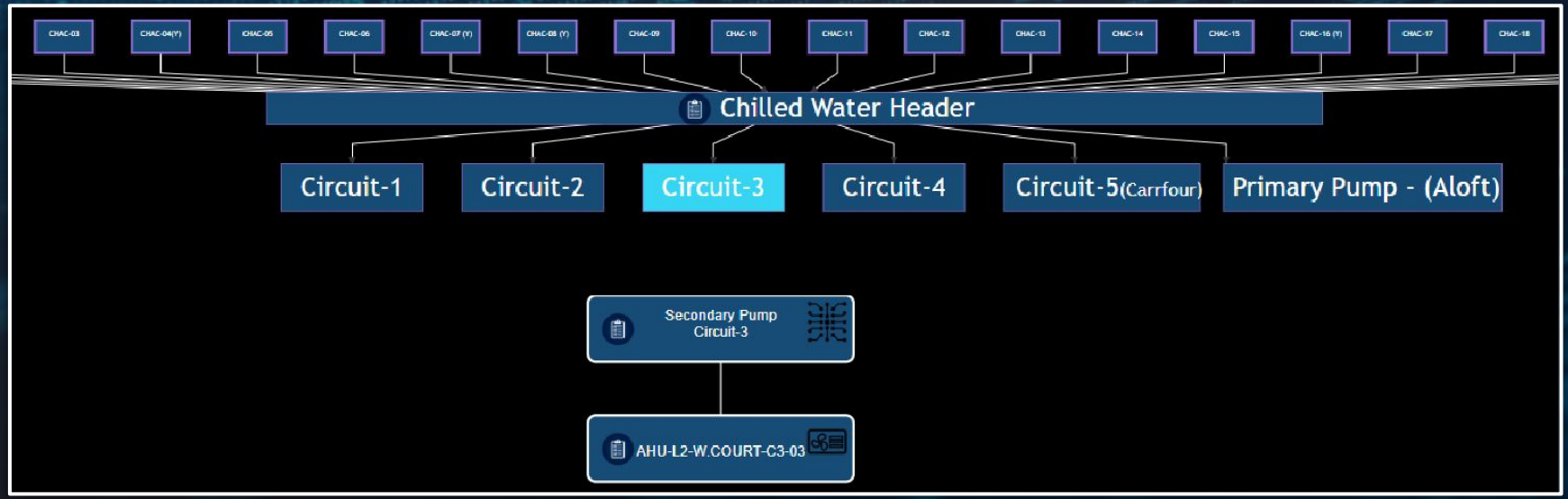
Condition based operations and maintenance enable spaces and equipment to be continuously monitored and commissioned for proactive rectification and improvement.

C2O FDD provides a systems-driven approach to determine root cause of performance deviations, location and timing of systems and equipment maintenance, as well as to provide visibility into operational inefficiencies to facilitate step change improvements to drive down cost and drive up performance.

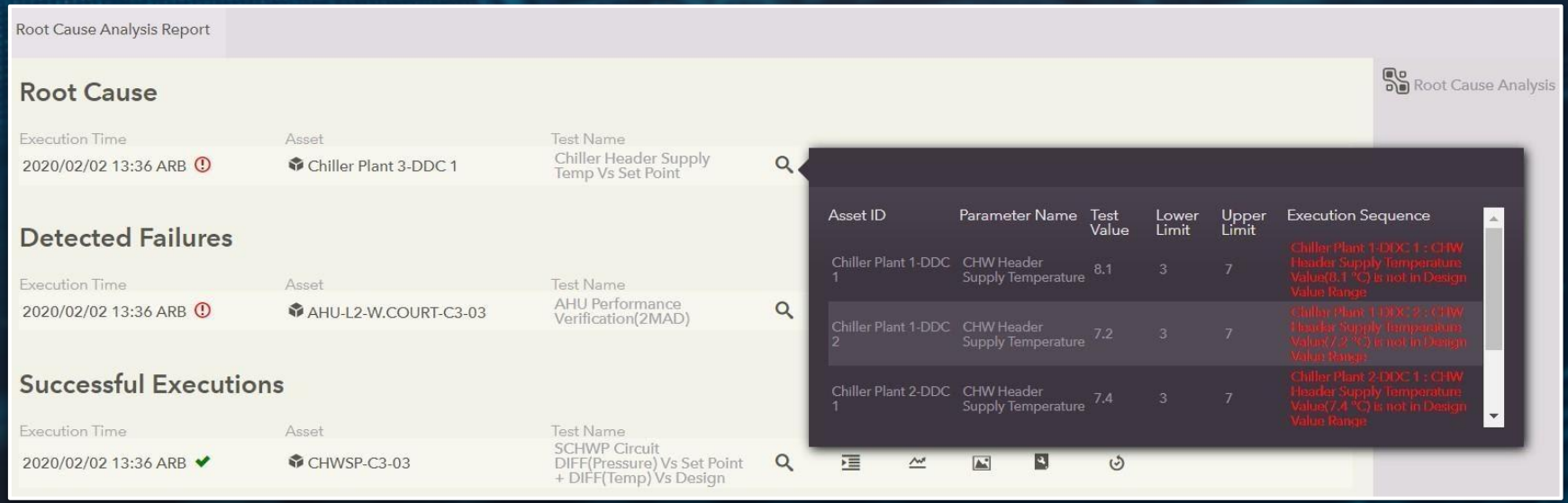
System-Wide Analysis of Faults

C2O FDD Solution can apply AFD tor a single equipment, a system comprising several component equipment or across an entire subsystem.

In the HVAC system network diagram below, C2O AFDD Solution identifies and highlights probable cause in regard to the ACMV network.



Root Cause Analysis



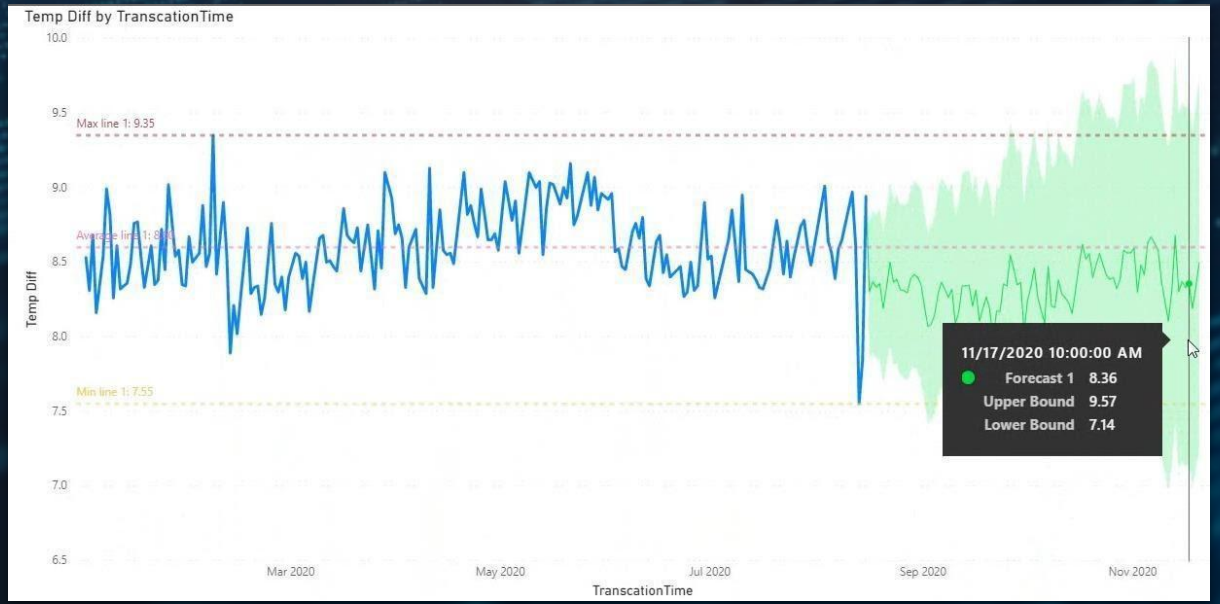
Predictive Operational Analysis

C2O AFDD Solution Predictive Maintenance capabilities drive down maintenance costs and reduce inefficiencies associated with traditional maintenance programs.

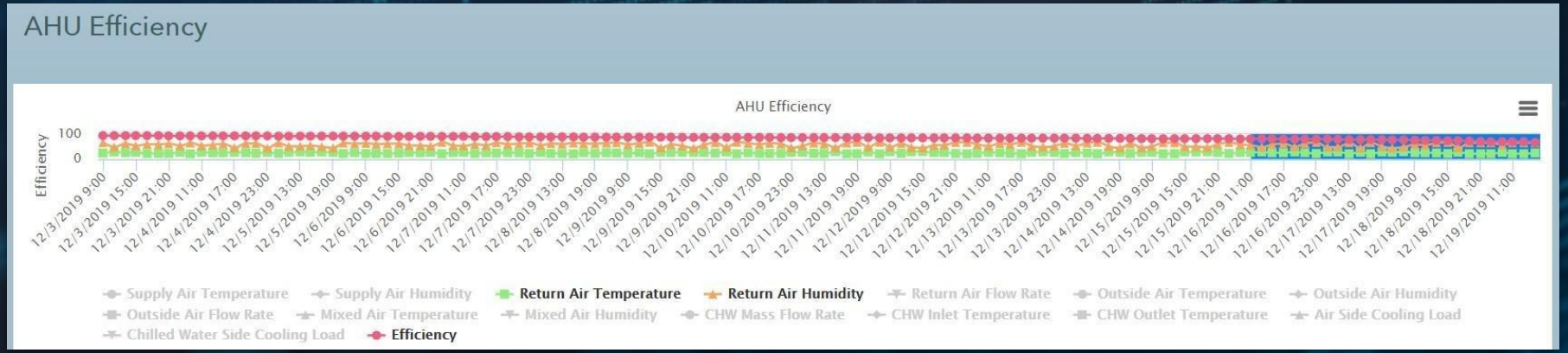
Future equipment and system anomalies are identified enabling PPM maintenance plan adjustment.

Predictive maintenance represents high value in high-energy-consuming equipment such as chiller plants, AHU and FCU.

Predictive equipment and system future performance model:.	
Cooling Coil Fouling	Initial creation and documentation of AHAC scheduling functionality + All AHAC additional features.

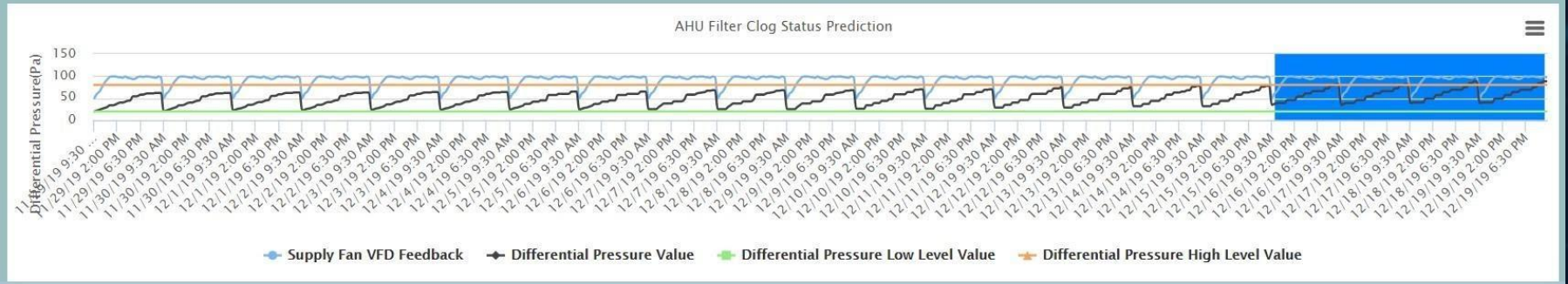


Example models - predictive - equipment and system future performance	
Efficiency check	Ensure optimum operations while detecting and predicting maintenance requirements: 1. Coefficient of Performance (COP) 2. Energy Efficiency Index (EEI) 3. Energy Efficiency Ratio (EER) 4. Seasonal Energy Efficiency Ratio (SEER)



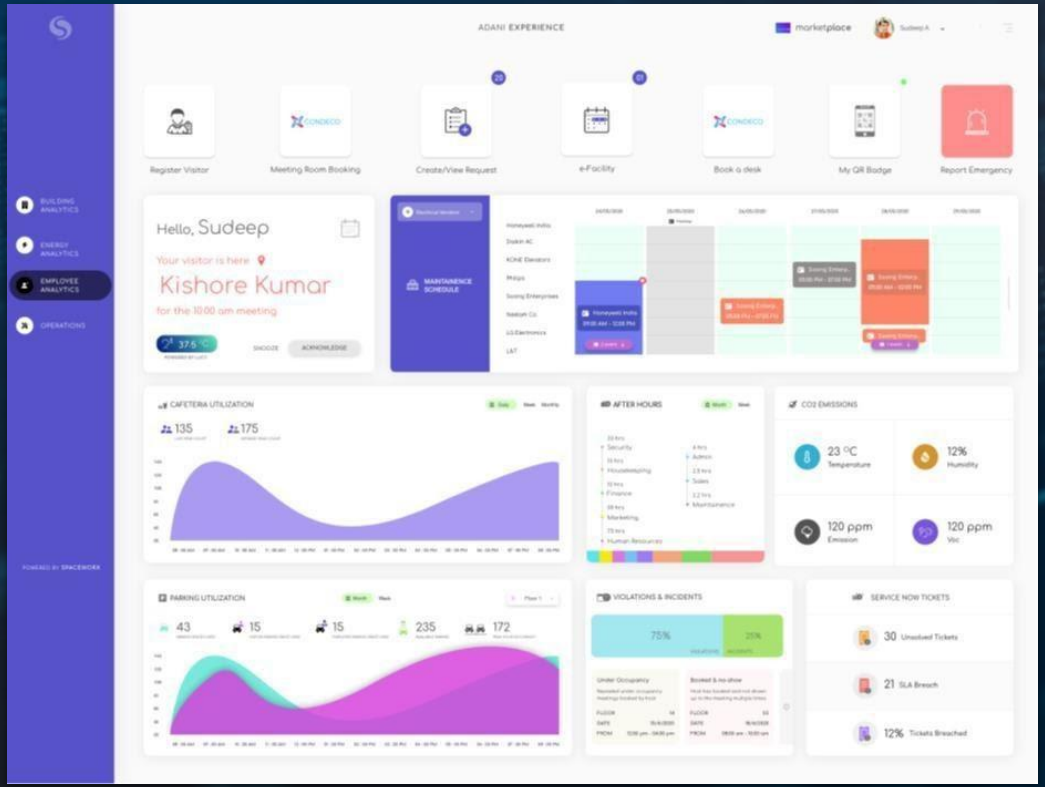
Check: Circuits Pressure Control vs Set Point	Chilled water circuits

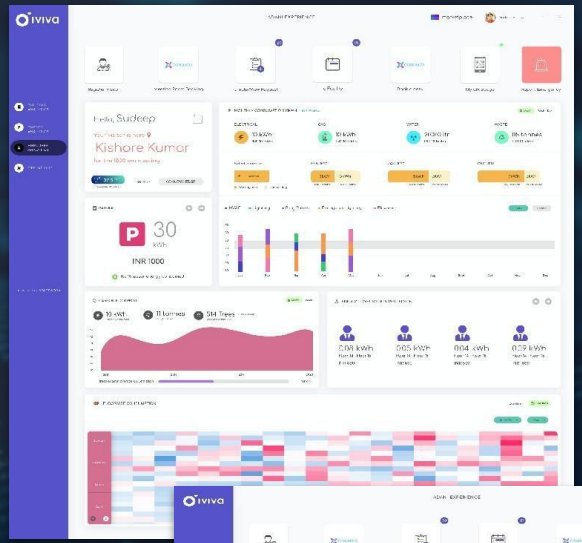
AHU Filter Clog Status Prediction

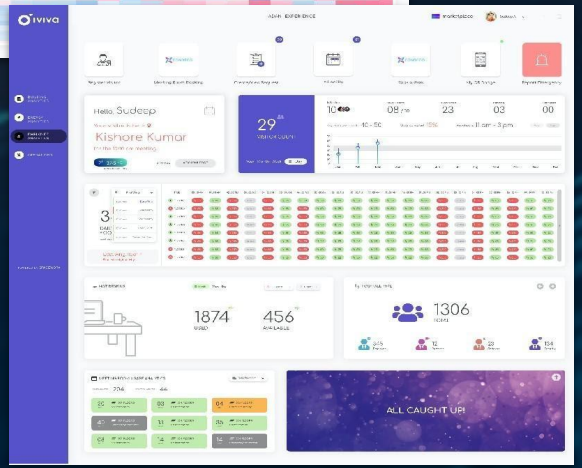


Chilled Water Valve Leak Detection	Off-coil Vs on-coil temperature check
Chilled Water Demand vs Ambient Enthalpy	Chilled Vs ambient water demand changes
Chilled Water Flow vs Ambient Enthalpy	Chilled Vs ambient water supply changes
Chiller Plant Capacity vs Demand	Chilled water demand and supply balance

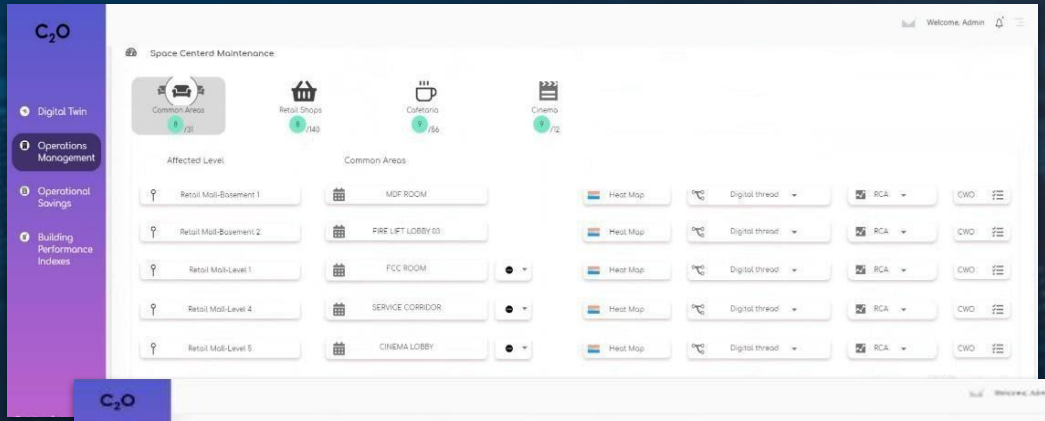
Example - End User Reporting

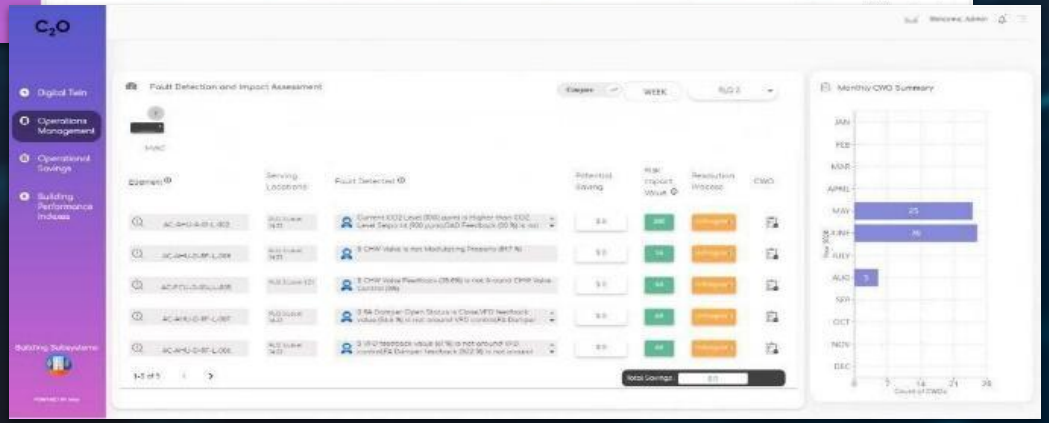






Example - Operational and Analytical Dashboards (Fault, Predictive, Energy)






Electricity Dashboard
Building Electricity Overview
Electricity Demand
Electricity Demand
May 2, 2016 - May 8, 2016
Demand (kW)
Electricity Consumption
Monday, 02 May 2016 - Sunday, 15 May 2016
(kWh)
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Greenhouse Gas Emmissions
Greenhouse Gas Emissions
2016
Carbon Dioxide Emissions (kg)
Progress against Budget
Electricity Progress Against Budget
2016
Accumulated (kWh)
Electricity vs Outside Air Temperature
Electricity Usage vs Outside Air Temperature
April 1, 2016
Electrical Meter Display
Meter Displays
DBH-ESC
NABERS Overview
5 Star Target
NABERS Overview
Chilled Water System
Chilled Water System
LEVEL 3
Tuesday, 13-12-2016 15:33:28
General Fire Alarm Normal
Outside Temperature 29 °C
Outside Humidity 49 %
System Operation
Time Schedule
Cooling Call On
Critical Valve 100 %
Chiller Staging 3
Chiller/Pump Seq 2
Building Load 2,728 kW
Load Shedding Normal
Chillers COP
Chiller 1 8.1
Chiller 2 11.4
Chiller 3 0
Temperature Control
CHW Supply Setpoint 6 °C
CHW Supply 5.5 °C
Flow Control
Diff Press Setpoint 140 kPa
Differential Pressure 141 kPa
Refrigerant Leak Detection
Chiller 1 Normal
Chiller 2 Normal
Chiller 3 Normal
Panel Fault Normal
1,225 kW
68 %
1,512 kW
84 %
0 kW
0 %
30.3 l/s
36.1 l/s
0.3 l/s
141 kPa
Level 31
High Rise AHU
Low Rise AHU

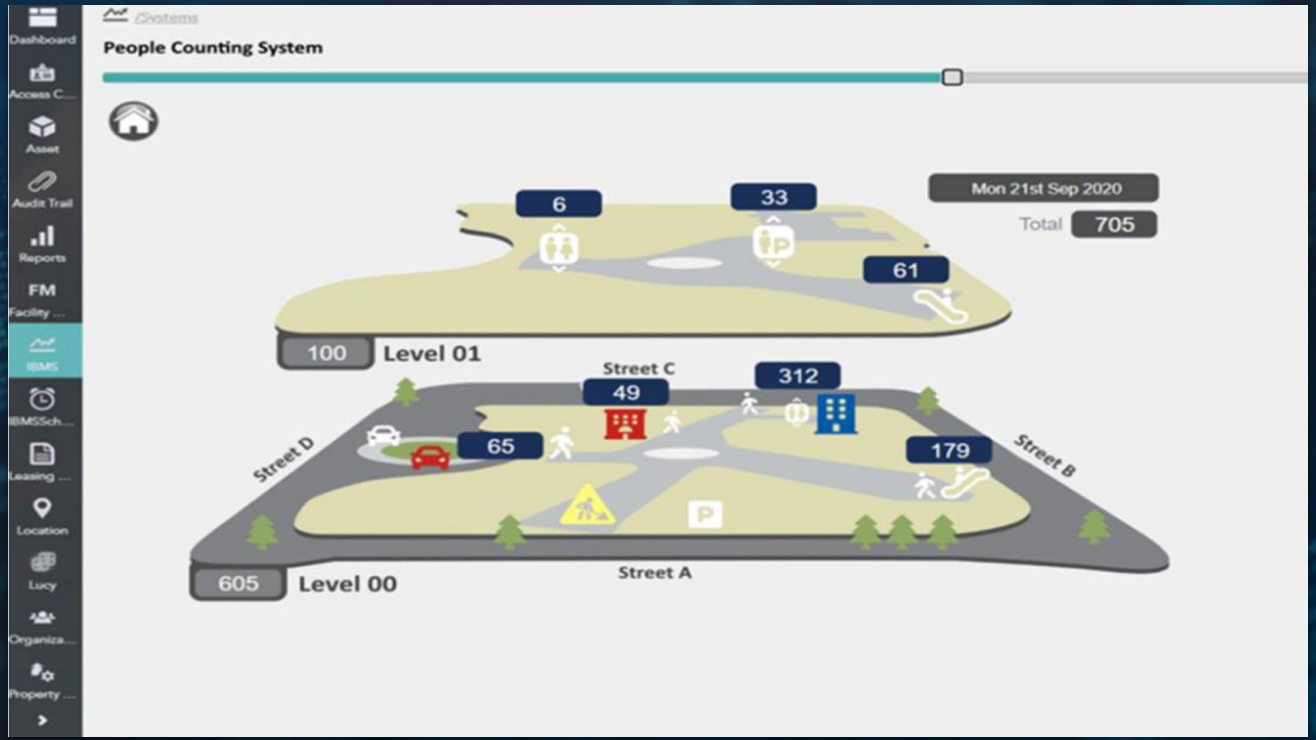
This can be tailored as per client requirements. Each tab in the top of the page will show dedicated graphical information for the subsystem in question

HVAC/Wellness/Comfort Overview

Provides the ability to see the thermal load of each individual floor based on room temperature sensors, on each level, with custom views, across the 3 towers, across one tower or by floor.

People Counting

Provides the ability to view occupancy counts & total net count in floor plan view at each entry/exit point.



Lighting System

Provides ability to see the lighting status of the entire building from one page.

For example, the next graphic demonstrates at least one lighting zone
that has an ‘On’ status, on a particular floor.

View of individual levels enables greater granularity of this ‘On’ condition for interrogation and forward action.