



# OpenBlue

Impactful  
sustainability

## Adoption of Smart FM – A Case Study

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# What we hear from our customers

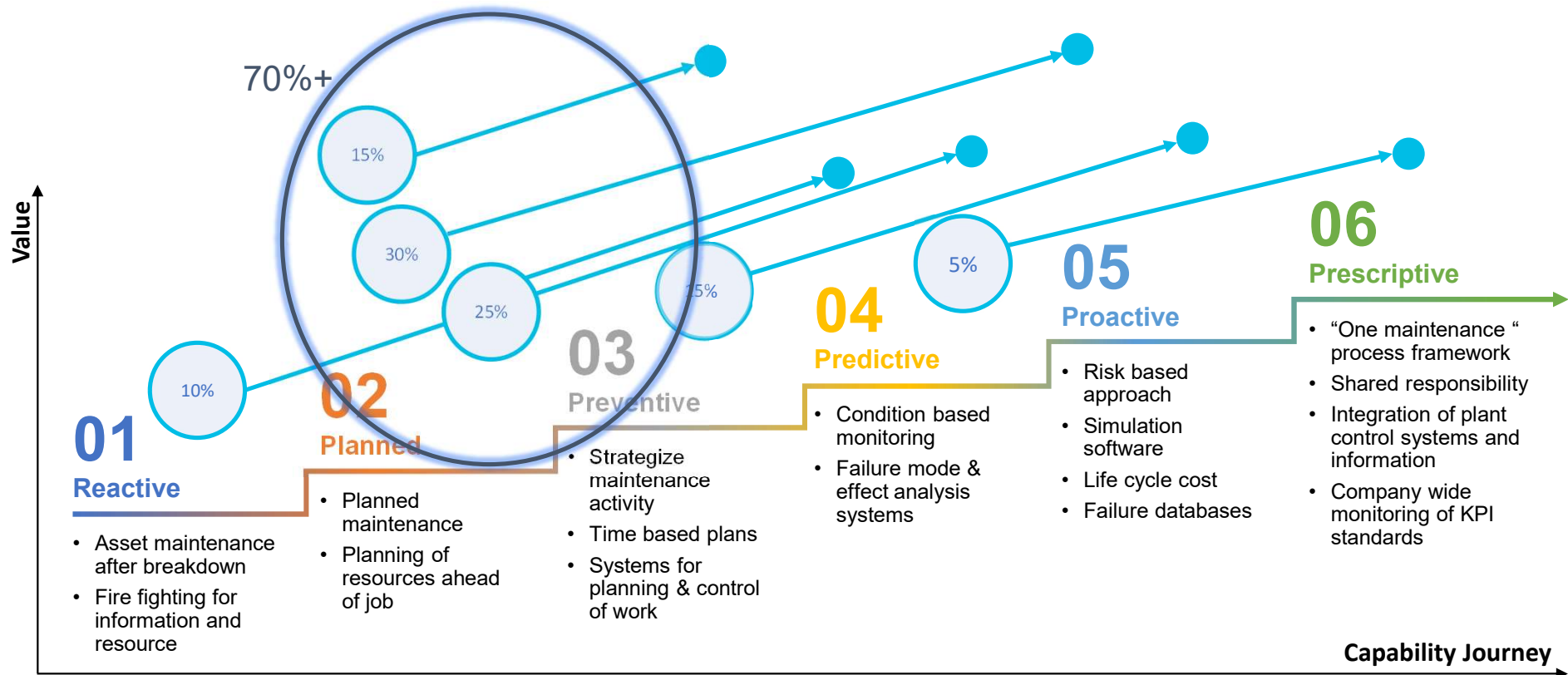
VOC Survey across APAC to understand customers' value perception

## Customers' Biggest Focus Area



## What Customers Fear Most

All our customers are eager to embark or have definitive plans to get to the journey of moving the maturity ladder



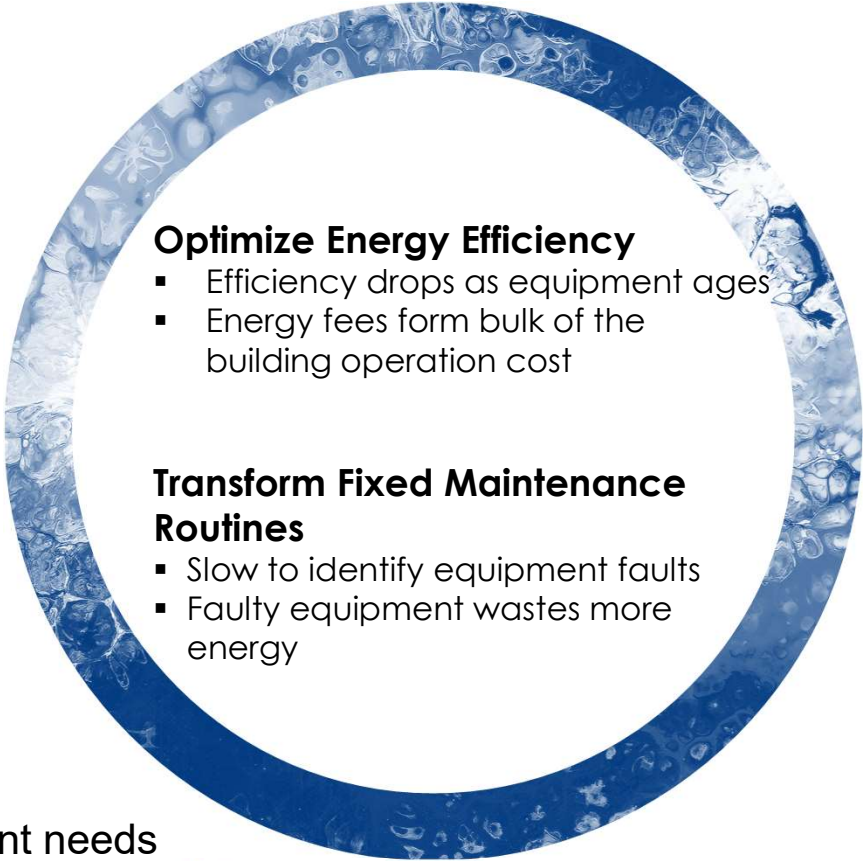
○ Where are you today? ● Where will you be in 2025?





# A sample Case study ...

# ASK



## Digital enablement needs



Integrate "Building Mgmt System" to Operation Platform



Automate the pulling of equipment & CCTV data to the server



Analytics engine processes the data for diagnostic



Centralized command center monitors all equipment & CCTV data



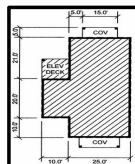
# ...in a portfolio landscape of diverse building operations and systems



42 Buildings in Phase-1



478 Floors



5.5M m2 GFA



11+ BMS Vendors



3K + Meters



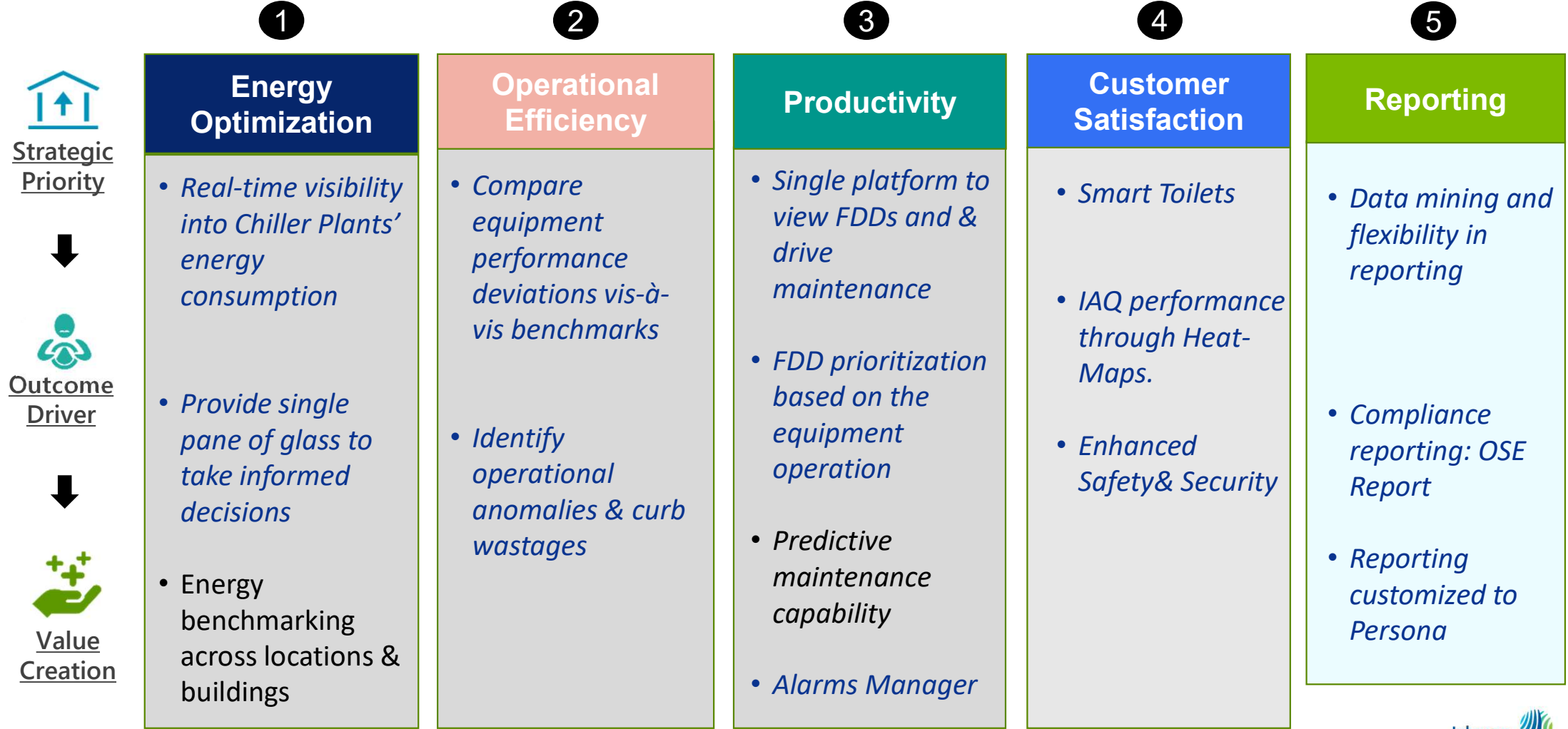
74K + Points



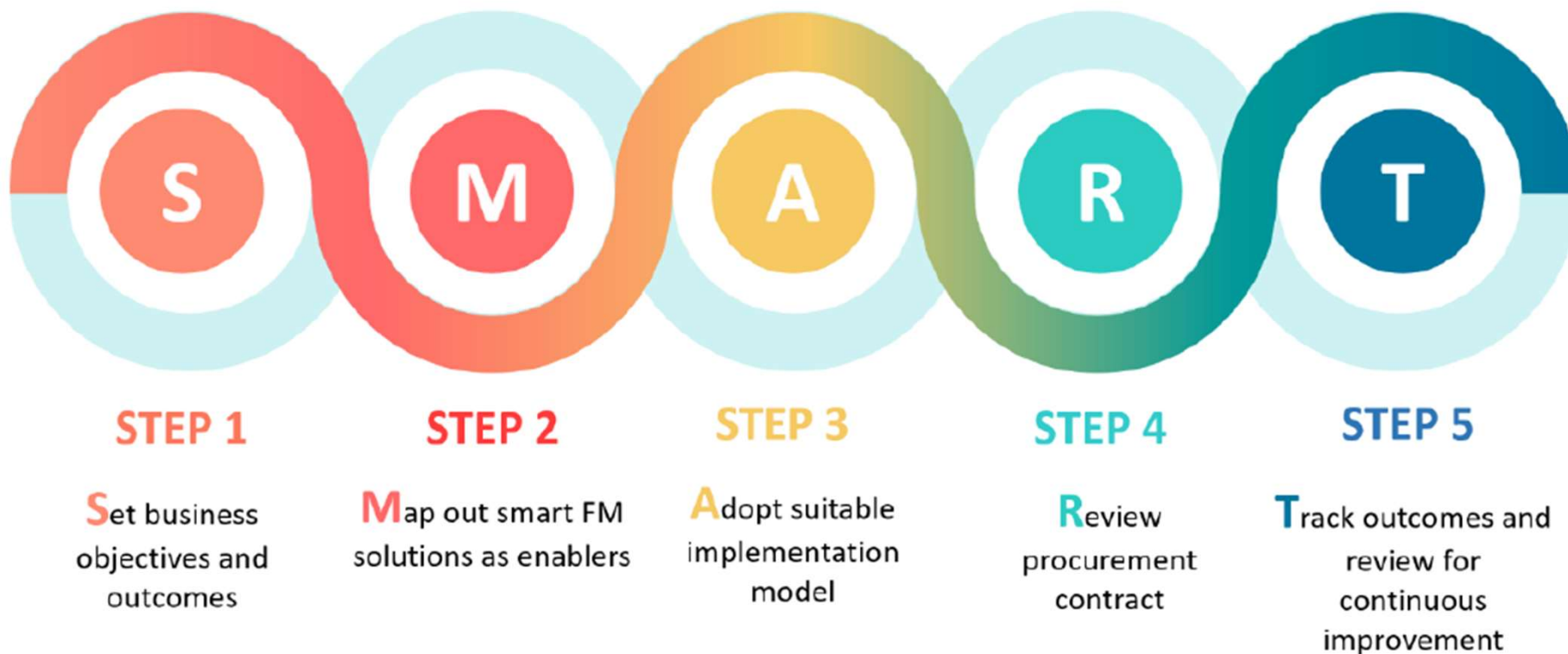
Multiple Protocols



# Journey Kick-off : Value Discovery Workshop



## Alignment with the BCA's Smart FM implementation guide:



# STEP 1

Set business objectives and outcomes

Business Objective (What)

Efficient FM Operation

Delighted Occupants

Enhanced Building Asset

Strategic Pillar/ Value drivers (Why)

- ❑ Reduce energy cost ; Identify operational anomalies & curb wastages
- ❑ Single pane of glass to take informed decisions
- ❑ Compliance reporting
- ❑ Improved internal FM staff productivity

- ❑ Better Indoor air quality parameters to ensure occupant health & comfort
- ❑ Smart Toilets (High volume of user feedback)

- ❑ System uptime
- ❑ Predictive maintenance capability for efficient operations
- ❑ Comparative performance analysis
- ❑ Real-time visibility into CH Plant energy consumption

Foundation (How)

Digitalization

- ❑ People ( Skill dev & Change management)
- ❑ Processes (Tools; as is & to be)

Interoperability

- ❑ Digital Twin
- ❑ HVAC
- ❑ Elevator
- ❑ Video Surveillance
- ❑ Smart Toilet
- ❑ Car Park

Data Collection

- ❑ Multi country
- ❑ 20M+ sq ft
- ❑ 120k+ points
- ❑ 11+ BMS,
- ❑ 3 protocols/APIs

Ref: BCA framework for Smart FM

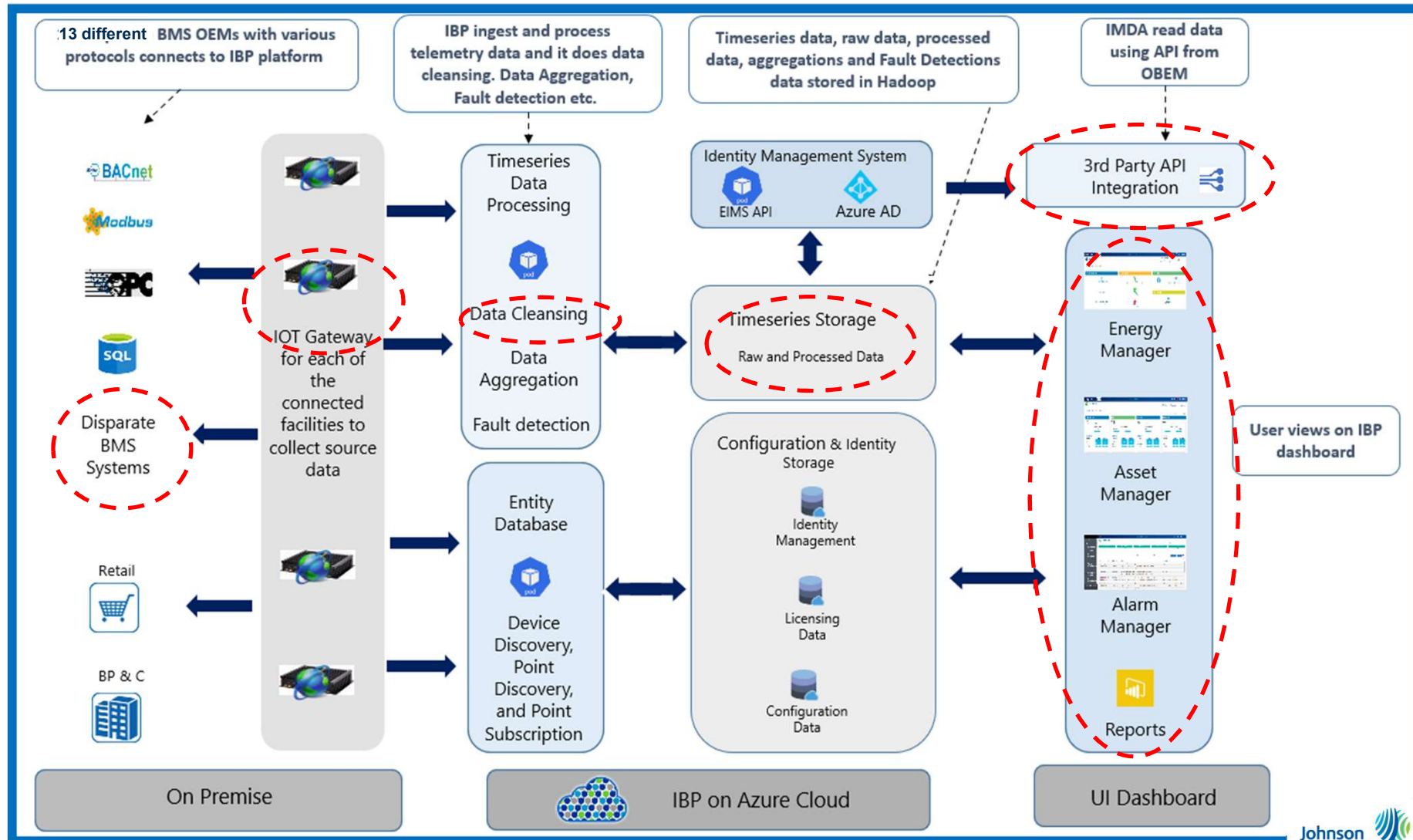


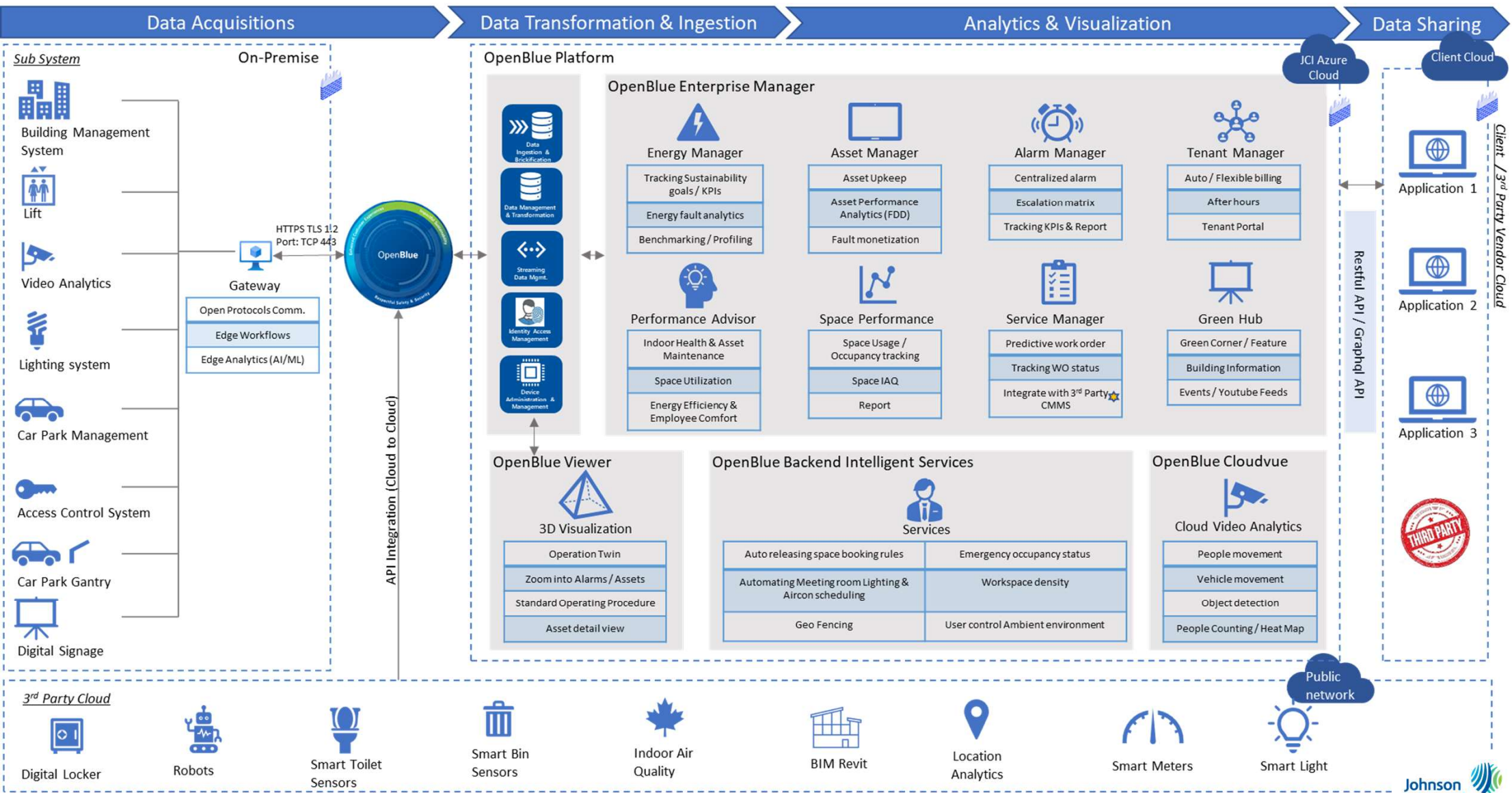


## STEP 2

Map out smart FM solutions as enablers

Key Architecting needs





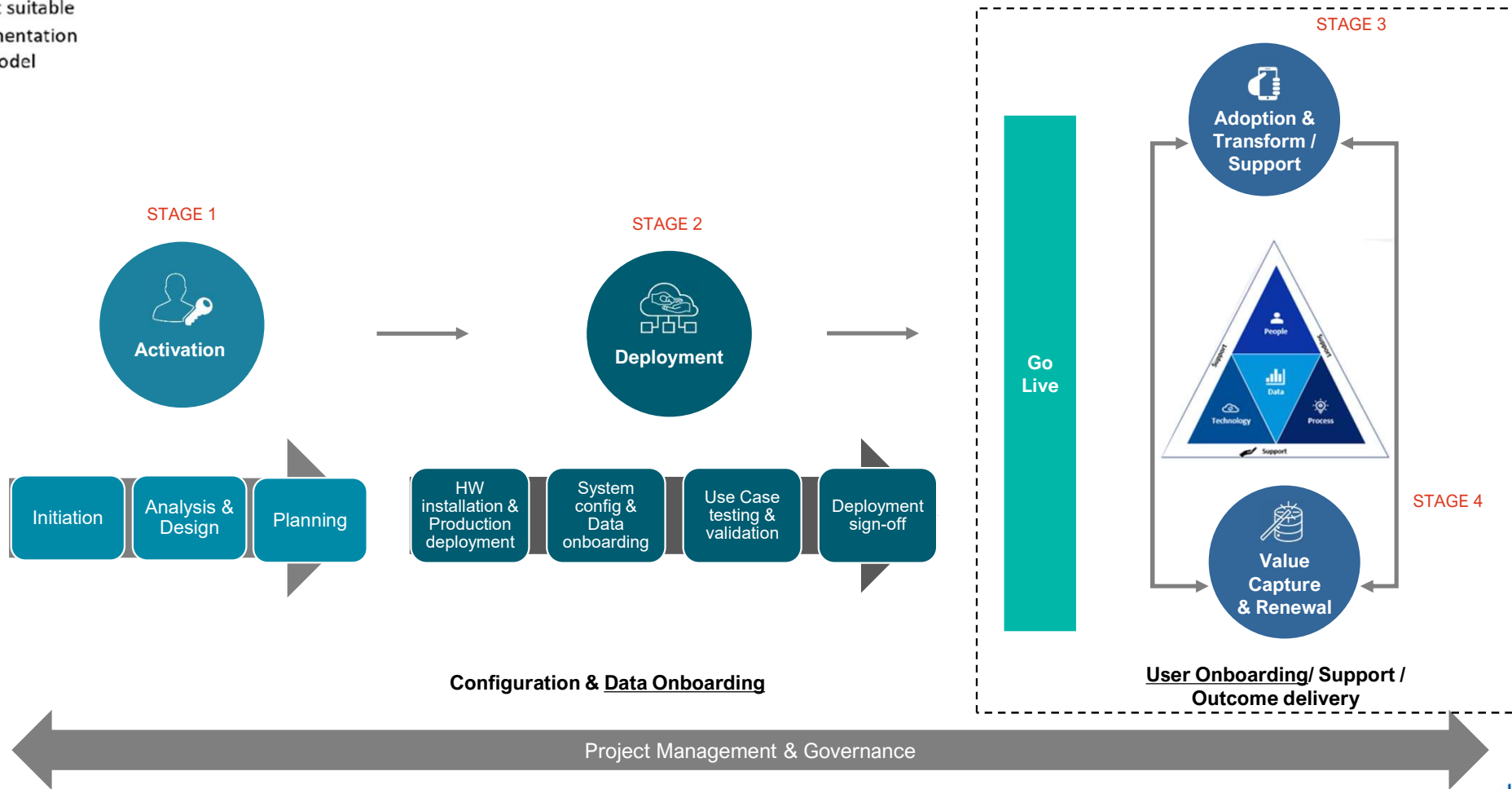
JCI OpenBlue fulfilling the technology as well as functional needs



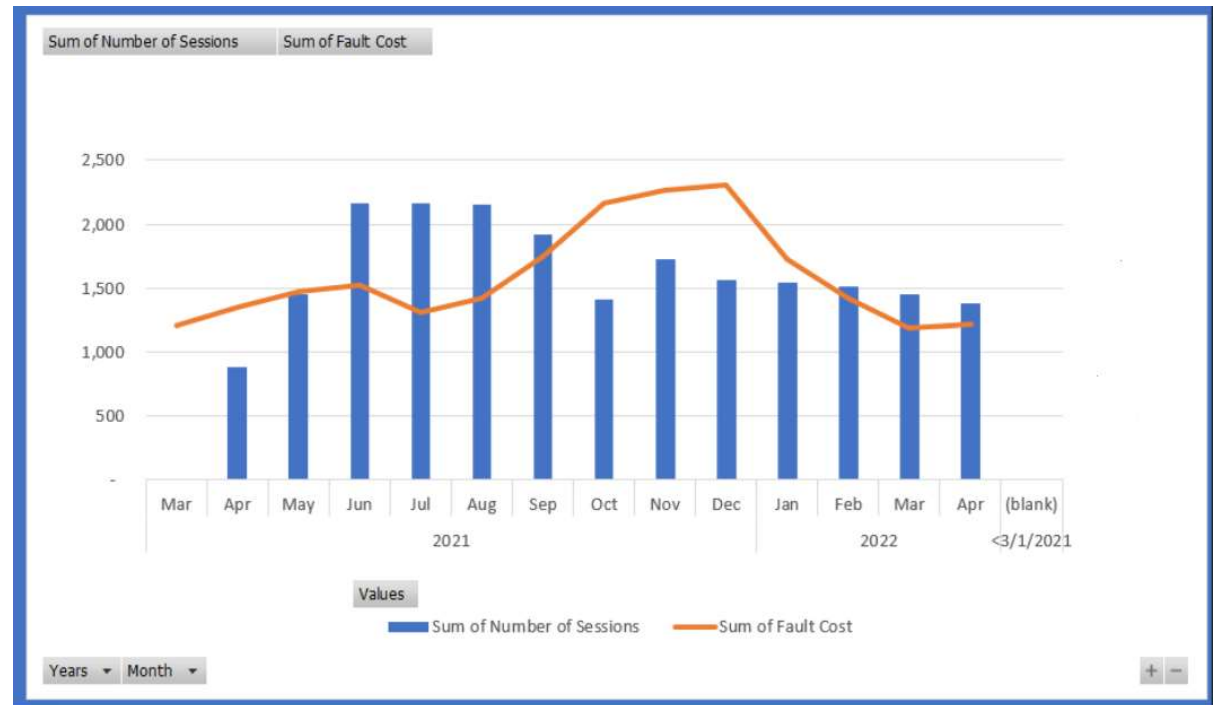
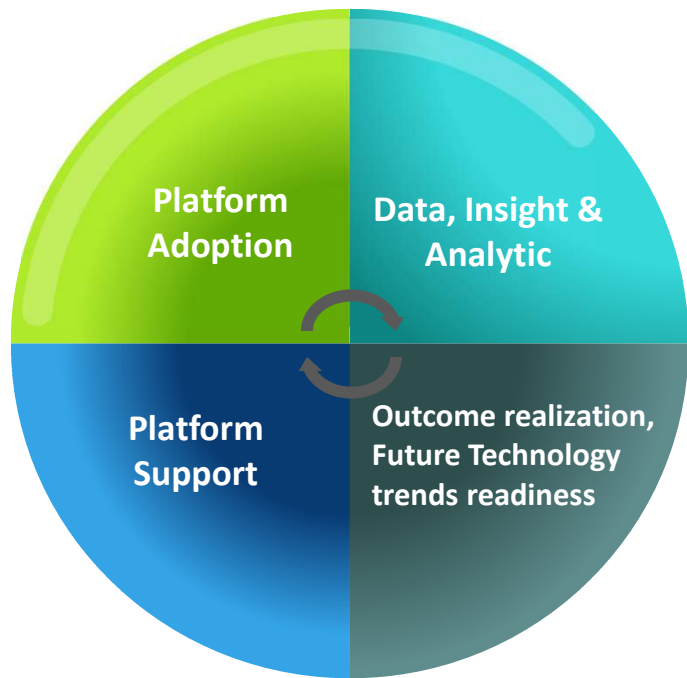
### STEP 3

## JCI's Differentiated "Customer Success Management" Framework

Adopt suitable implementation model



# User Adoption & Digital Enablement – Track and drive

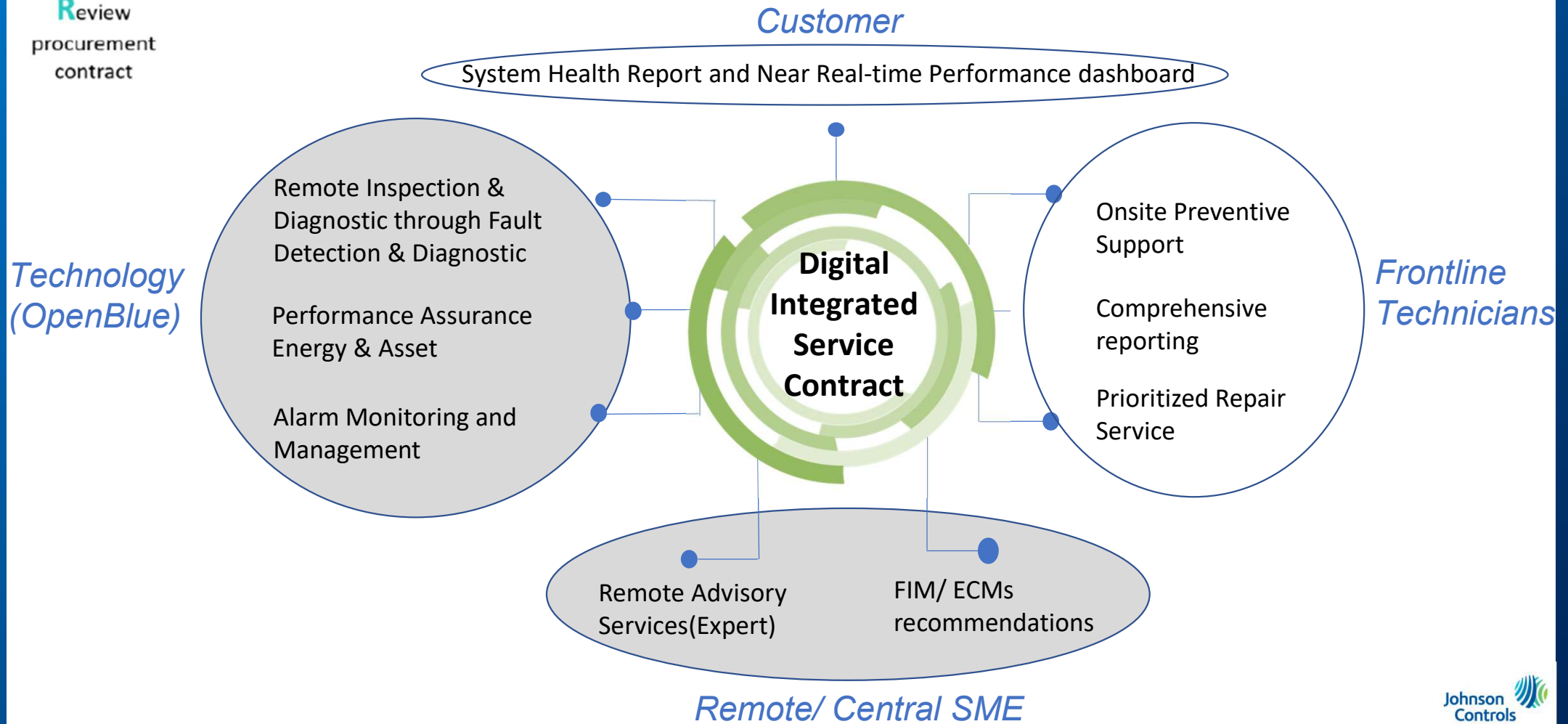


Adoption driving Savings



# STEP 4 Framework for Digitally Enabled Maintenance Contract - Set to disrupt traditional approach

Review  
procurement  
contract



## Outcome till date

<b>STEP 5</b> Track outcomes and review for continuous improvement	Platform Consolidation	'As-a-subscription' model yielded substantial 'Infrastructure cost & maintenance' savings
	Energy Savings	Annual recurring energy savings out of HVAC fault cost
	Maintenance savings	Contract consolidation underway to realize savings potential.
	Compliance Advantages	<ul style="list-style-type: none"><li>• Enables Green Mark</li></ul>
	Foundation for future	<ul style="list-style-type: none"><li>• Key differentiator for future land bids</li><li>• Ease of onboard facilities to the portfolio platform</li><li>• Lays the foundation for future smart estate implementation with digital twin etc.</li></ul>

# Sample Screenshots

**OpenBlue Enterprise Manager**

Intelligent Building Platform / Singapore

Search... Beta

May 2022

**Normalizes multiple locations data sources for uniform assessment**

**Sustainability Manager**

- Electrical Consumption
- EUI
- Water Consumption
- WUI: 5.27 cu m/sq meter/Year
- Thermal Consumption
- Distinct Faults: 21

**Asset Manager**

- Average Building Load/Installed Capacity
- Chiller Plant Efficiency
- Chiller Efficiency
- Cooling Tower Efficiency: 0.04
- Total Fault Cost: 155008.24

**Alarms**

- BMS Alarms
- CPMS Alarms
- Smart Toilet Alerts
- Video MS Alerts

**Connected Buildings**

Search...

Map of Singapore showing locations: Singapore Zoo, CHONG CHANG KANG, ANSON ROAD, UROH LAST, CLEMENSIA, TOA PAYAH, CHIN TOWN, Sentosa, Bukom Island, Jurong Island, TUAS, WESTERN ISLANDS, BOON LAY, PIONEER, SLE, YISHUN.

Energy Consumption

Electricity

WD WK 1M 3M 6M 1Y C

Previous: Mar 21 - May 21 Present: Mar 22 -

**OpenBlue Enterprise Manager**

India - Chennai - CyberVale

Today: 40.37 °C / 28.64 °C Tomorrow: 40.16 °C / 28 °C Wednesday: 40.36 °C

**Asset Manager**

System Info | Fault Management | Define Dashboard

Intelligent Building Platform / Singapore

**Asset ageing & KPI comparison**

**Air Handling Unit**

- Total Installed AHU
- Total AHU: 1,504
- Asset Ageing: AHU Age, AHU Qty, Percentage

**Chilled Water Pumps**

- Total Installed CHWP
- Total CHWP Unit: 212
- Asset Ageing: CHWP Age, CHWP Qty, Percentage

**Elevator**

- Total Installed Elevator
- Total Elevator: 212
- Unutilized Elevator: 17
- Asset Ageing: Elevators Age, Elevators Qty, Percentage

**HVAC Chiller**


- Total Plant Room
- Total Chiller: 178
- Unutilized Chiller: 0
- Asset Ageing: Chiller Age

Johnson Controls

# Sample Screenshots

OpenBlue

## Fault Monetization by Faults



**OpenBlue Enterprise Manager**

**Asset Manager**

**CL-CHWP is overpumping**

**Fault Information**

Fault Name : CL-CHWP Is Overpumping

Equipment Name : 31 IBP-CH Plant header

BAS Point Name : 31 IBP-LR-CH Header HEADER\_CHWRT,31

Space Name : [Redacted] form > Singapore

Category : [Redacted]

Priority : High

Duration(Hrs) : 49.33

Count : 14

First Occurrence : 05-05-2022 00:21:00

Latest Occurrence : 29-05-2022 20:54:00

Est. Cost Impact : [Redacted]

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**Work Order Info**

Status: Work Order not raised

[Email](#) [Create Work Order](#)

---

**Activity**

No activity found. [Add a Note](#)

**Fault Name**

Search

- Chiller plant system inefficiency-Off peak
- Chiller plant system inefficiency-Peak
- CHW-PP-FD-007 Pump Manually Operated
- CL-AHU filter is clogged
- CL-AHU Leaking Chilled Water Valve
- CL-AHU Leaky CHW valve
- CL-AHU purging more than 1hr
- CL-AHU Return air temperature too cold
- CL-AHU Return air temperature too cold ...
- CL-AHU Return air temperature too cold...
- CL-AHU static pressure higher than setpo...
- CL-AHU static pressure higher than setpo...

**Building Selection**

31 IBP-CH Plant header

CL-CDWP is overpumping

Poor Plant Efficiency

Number of Chillers Operated are more than Required

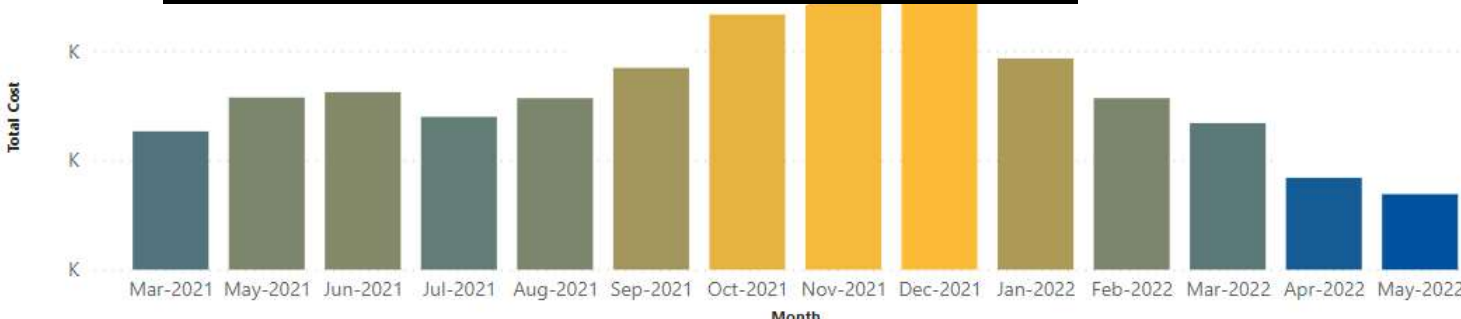
Poor Total Chillers Efficiency

Chilled Water Pump Over-Pumping (Chilled Water Flow Higher than Required)

Spaces Served: Roof

**Total Cost by Month**

Track and reduce energy wastage through actions



Chilled Water Common Return Temperature (line graph)

Chilled Water Common Supply Temperature (line graph)

Legend:  Not In Fault  In Fault (High)

[Add Point](#)

Simplifies complex HVAC system interdependencies for ease of actions



# Quick Recap

## 5-Step SMART Process to Smart FM aiding the Building Owners and FM Managers in their smart FM journey.



### Smart FM Framework

Type/ Scope	Description	Building Level FM Services				Clustering
		Energy	Security	M&E Functions	Environmental Services	
Type 1 Digitised Workflow Automation	When triggered, by an incident, automatically initiates a process that track, log, and close the incident.	EPC Remote Monitor SCADA Portal	Video Monitoring with Incident Detection	Work/Automation System Lift Monitoring	Trivet Sensors, Composites	Smart FM Implementation across: Mixed Developments Portfolio of Buildings District Level
Type 2 Optimisation within System	Use data analytics to optimize systems - quantify FM efficiency - Platform - Preventive/ Predictive maintenance.	Connected Services for Dilute Contamination	Security Risk and Occupants Engagement	Usage and Feedback data to optimize cleaning	Failure Prediction	
Type 3 Integration Across Systems	Optimize resource deployment and utilization across many systems.	Co-sharing or Hot Desk Integrating booking, Scheduling, Security, Space Management, Thermal Control	Connected lighting systems, with temperature/HV and occupancy sensor	Robotics Subscribers	Integrate all systems for building control & optimization	

Table 2. Example of a Smart FM Framework with multiple solutions identified

### Step 1: Set the Business Goals

#### Case Study – Intelligent Building Platform (IBP) for Smart FM

##### Stage 1: Set the Business Goals

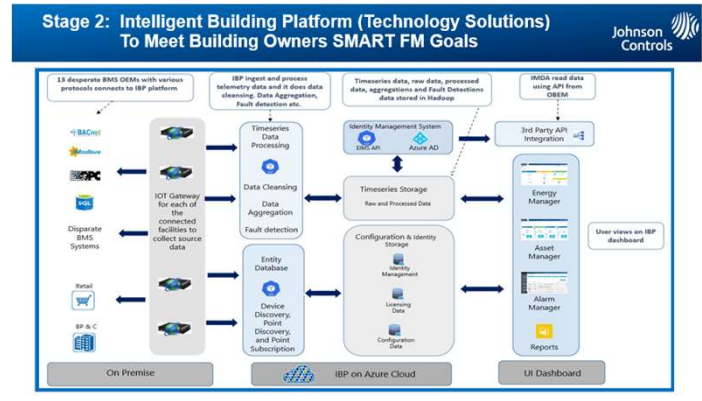
Johnson Controls

#### BCA Guide to SMART FM

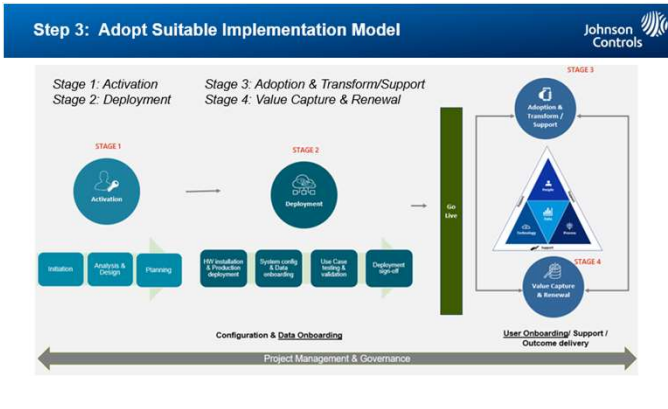
Steps	Building Owners & FM Managers	FMCs and Service/ Solution Providers
1	Set business objectives and outcomes	Understand Building Owners' smart FM goals
2	Map out smart FM solutions as enablers	Position technology solutions to meet Building Owners' smart FM goals
3	Adopt suitable implementation model	Propose suitable implementation models
4	Review procurement contract	Offer longer-term, outcome-based contract
5	Track outcomes and review for continuous improvement	Review effectiveness of adopted solution(s) with Building Owners and their FM Managers

Source: [https://www.bca.gov.sg/GreenMark/other/Smart\\_FM.pdf](https://www.bca.gov.sg/GreenMark/other/Smart_FM.pdf)

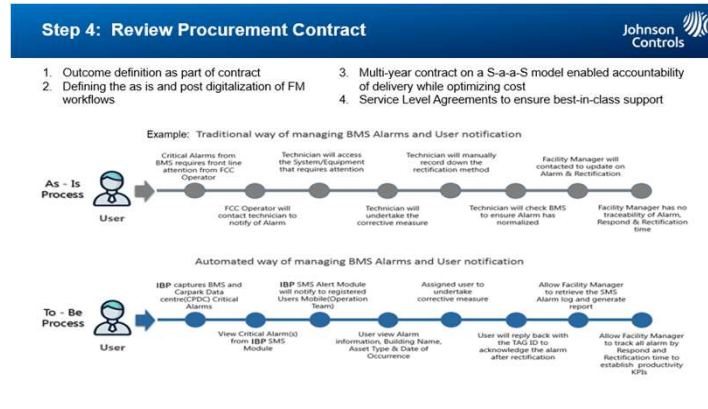
### Step 2: Map Out Smart FM Solutions as Enabler



### Step 3: Adopt Suitable Implementation Model



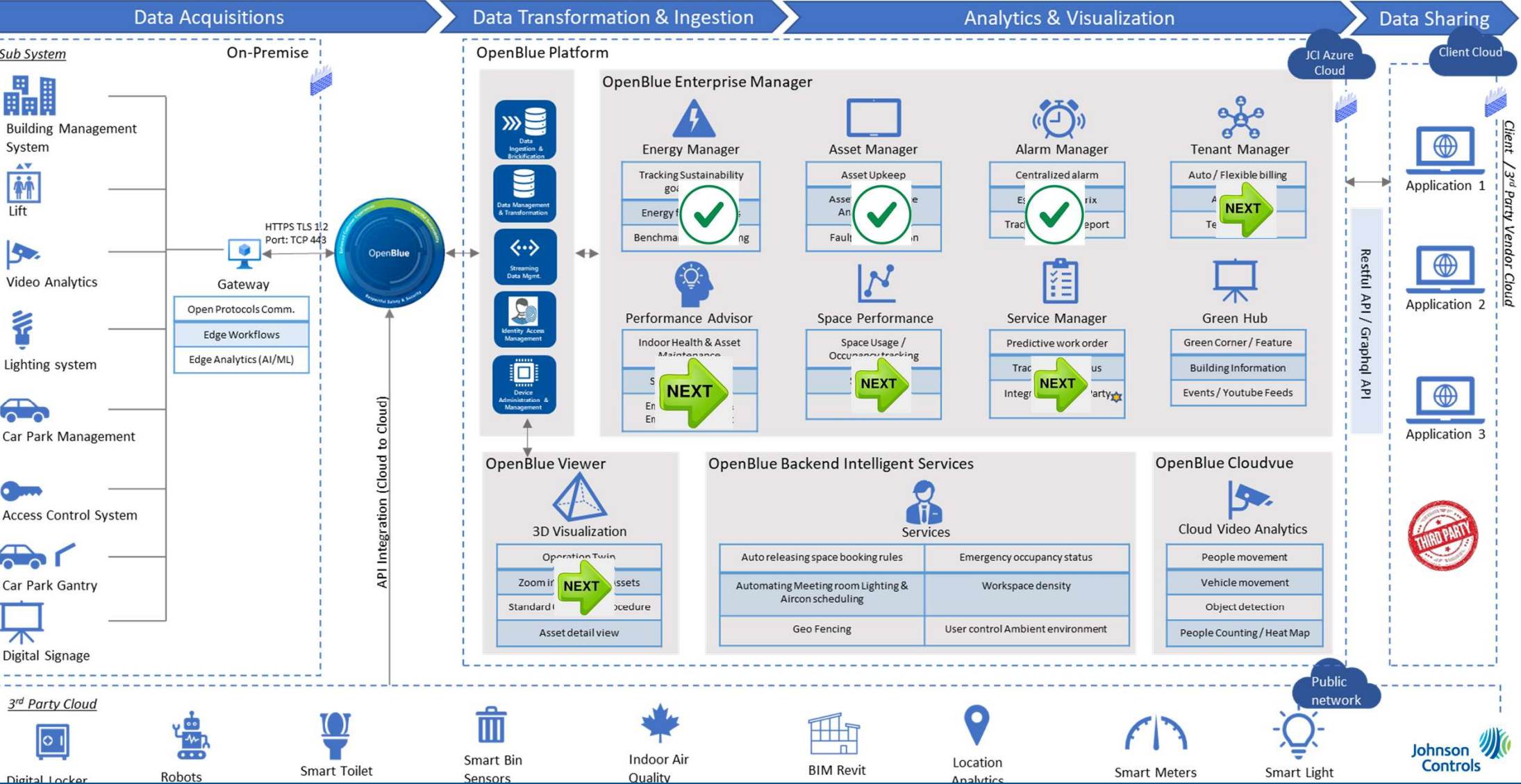
### Step 4: Review Procurement Contract



### Step 5: Track Outcomes & Review for CI



# The foundation is set for the next phase of transformation with further use cases & value creations







**This is how value  
keeps building...**

**Spaces and places are opening up  
to new possibilities.**

