

# Siemens Smart Hospital Future-proofing hospitals

Increasing medical and economic success  
of hospitals, creating environments that heal.



**Hospitals face  
a perfect storm.**

Employees

**Shortage of  
10 m  
healthcare  
workers predicted**

Patients

**Expectations  
are going up  
and up and up**

Cost pressure

**33% of hospitals  
report an  
operating loss**

**Healthcare  
sector**

Sustainability

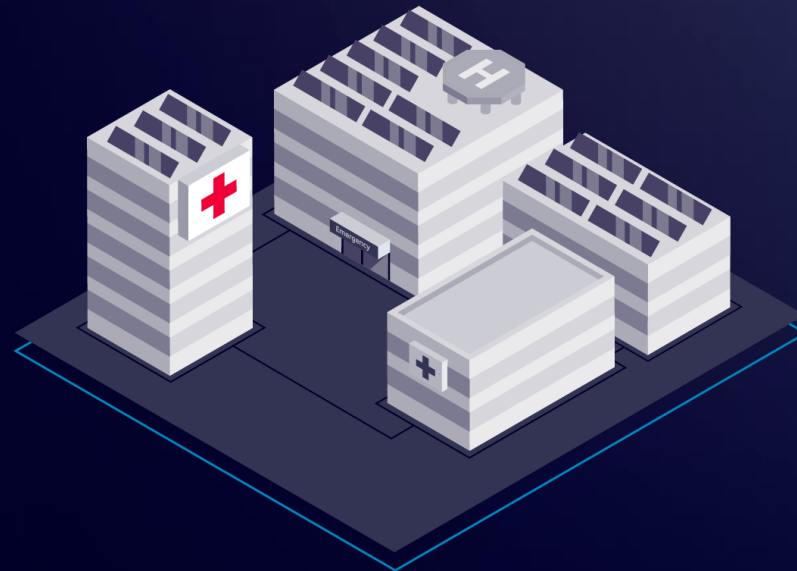
**~ 5% of global  
CO<sub>2</sub> emissions  
caused by  
healthcare sector**

Demographics

**3× people  
aged 80+  
in 2050**

Across the industry, we can observe  
two approaches to improving hospitals

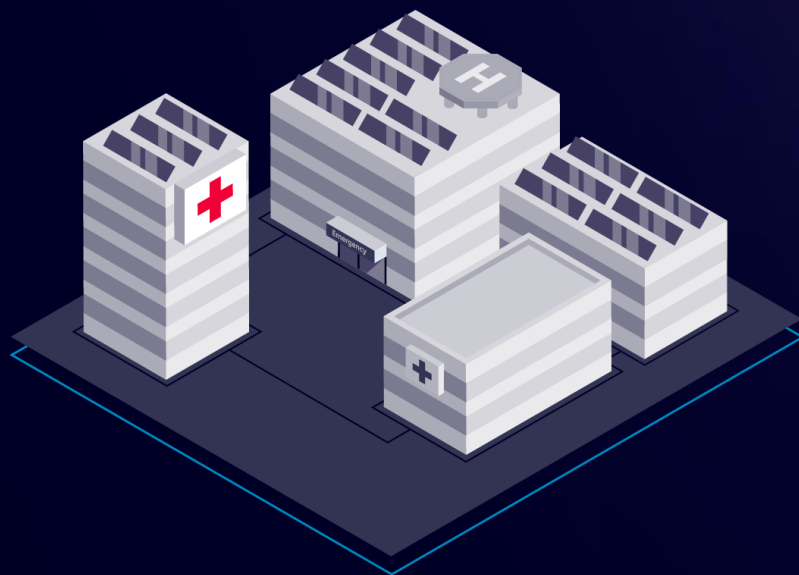
**Approach 1:**  
Providing building technology



Construction | Efficiency | Security

Across the industry, we can observe  
two approaches to improving hospitals

**Approach 1:**  
Providing building technology



Construction | Efficiency | Security

**Approach 2:**  
Improving hospital operations



Staff performance | Patient experience | Protect people and assets

# Combining both perspectives is game-changing for hospitals. But no one offers a holistic solution, yet.

## Hospital building

## Smart hospital

## Hospital operations



**7%**  
shorter project  
schedule

### Reduce construction time and costs

- Project planning and timelines
- System integration

up to  
**50%**  
lower energy  
consumption

### Operate sustainably: be energy efficient and power-resilient

- Decarbonization strategy
- People centricity and societal impact
- Resource-efficient operation
- Energy-efficient operations
- Power resilience

**5 m  
USD**  
damage for  
average  
cyberattack

### Ensure healthcare cybersecurity and comply with standards

- Power resilience
- Compliance

### Drive staff productivity and reduce operational costs

- Improve medical staff productivity & experience
- Increase facility manager productivity and experience
- Improve employee satisfaction

**72 min**  
searching for  
equipment

### Improve patient outcomes and experience

- Increase patient throughput
- Establish a positive healing environment
- Improve visitor experience

**Top 5**  
factor for  
patient  
satisfaction

### Protect people and assets

- Reduce loss and theft of medical equipment
- Ensure people safety and security
- Ensure uninterrupted operations & increase uptime

**-50%**  
security staff  
hours

**Up to 70% fail.**

A key reason for failure is the complexity of managing a multitude of systems

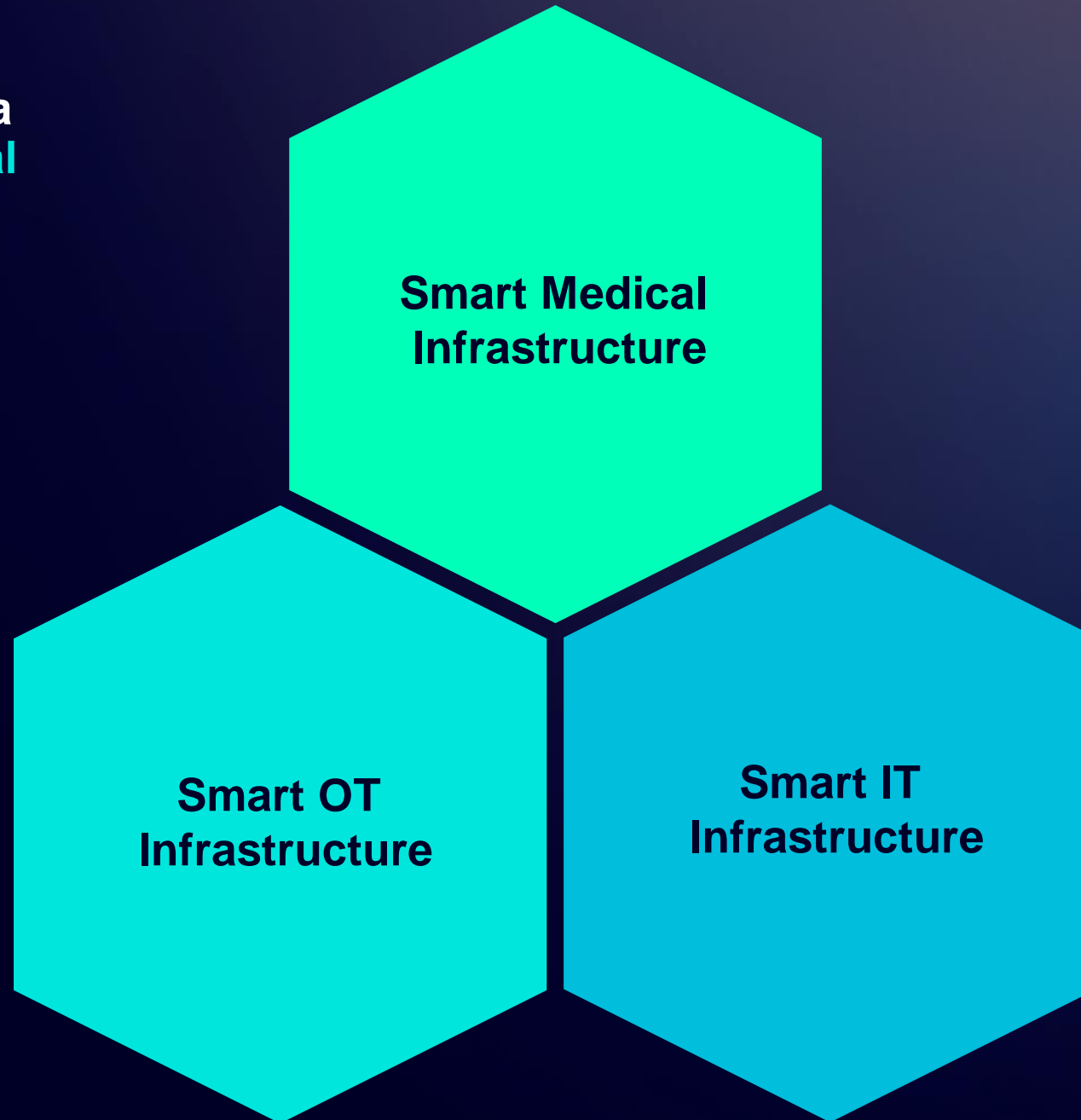


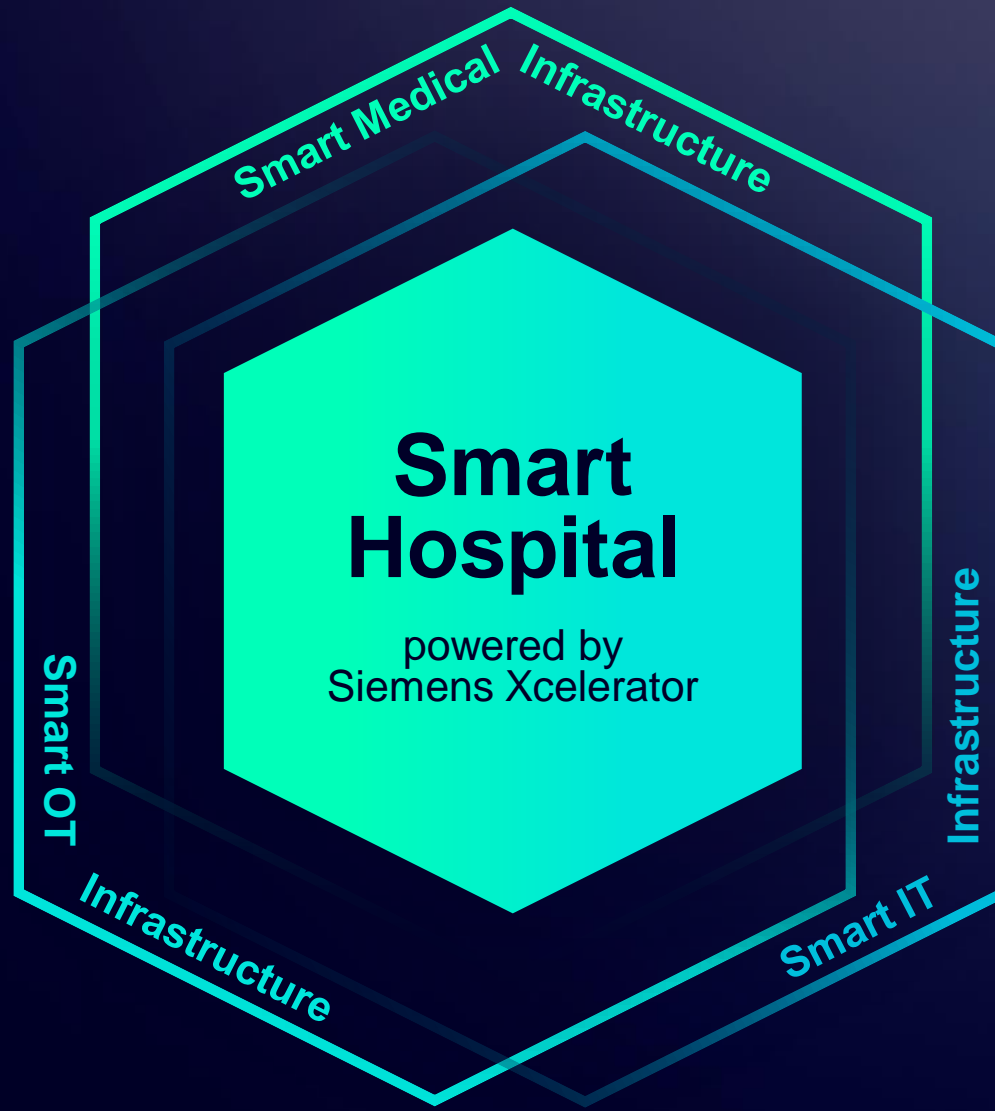


**Xcelerator manages complexity to create a holistic smart hospital solution**



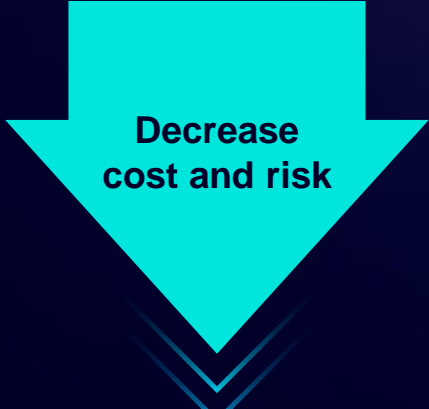
**Xcelerator** manages complexity to create a holistic smart hospital solution





# Six strategic objectives for hospitals

## An impossible challenge?



# Objectives and Outcomes

## Improve patient outcomes and experience

Create a positive healing environment, improve patient experiences and enhance patient outcomes.

[Back to overview](#)

### Outcomes



#### The patient experience

Prioritize wellbeing throughout the care journey, from preparation and arrival to comfort, orientation and convenience during and after the stay.



#### The visitor experience

Deliver a smooth visitor experience from the start. Provide easy wayfinding and flexible waiting rooms, and keep them informed every step of the way.



#### A positive healing environment

Create a healing environment free from disruption, one that adapts to the needs of the patient and facilitates the healing process.

# Drive staff productivity and reduce operational costs

## Reduce process bottlenecks and inefficiencies and foster a positive staff experience and collaboration.

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### Outcomes



#### Physicians, nurses and administrative staff

Optimize staff workflow to increase efficiency and reduce workloads, improving comfort for clinical and technical staff.



#### Facility management staff

Reduce maintenance times and improve asset availability while lowering costs and increasing patient safety and comfort.



#### Operations and uptime

Ensure continuous operations and increase uptime by reducing the number of maintenance requests. Lower costs with predictive, centralized monitoring.



to be released soon

#### Patient throughput

Increase patient throughput based on real-time data. Shift planners can rely on such data to optimize planning and reduce waiting and buffer times.



#### Medical asset utilization

Reduce investments and simultaneously improve the availability of medical equipment.



to be released soon

#### Building asset management

Create an overview of your buildings' health status and improve the impact of budget and resource allocation.



to be released soon

#### Space utilization and allocation

Optimize floor-space utilization in your facility to increase capacity and improve your logistics flows.

## Protect people and assets

Safeguard patients, staff and medical assets within and beyond your hospital.

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### Outcomes



### Patient, staff and visitor security

Decrease security incidents involving staff, patients and visitors with improved operations supervision.



### Health and safety

Reduce fire risk and environmental hazards and evacuate people safely.



### Medical equipment loss and theft

Track medical equipment with transparency and be alerted when it leaves a specified area. Automatically monitor and lock exit routes to avoid theft.



### Critical goods

Detect in advance if critical goods are at risk and protect them.



# Operate sustainably: be energy efficient and power resilient

## Achieve your sustainability goals, drive down energy costs and ensure reliable power supply.

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Outcomes



### Decarbonization strategy

Achieve SUS targets, improve sustainability credentials with our consultants' advice on best practices for complying with regulations and directives.



### People centricity and societal impact

Increase staff efficiency with a healthy indoor climate. Integrate smart technologies to efficiently control temperature, lighting and ventilation.



### Resource-efficient operation

Reduce emissions and waste, use renewable energy, reuse and recycle materials and include additive manufacturing in design and production.



### Energy-efficient operations

Optimize facility operations, reduce energy costs and improve power resiliency at the same time.



### Power resilience

Ensure reliable power supply across your facility and in critical environments like operating rooms, intensive care units and laboratories.

## Ensure healthcare cybersecurity and comply with standards

Implement an integrated approach to ensure continuous operations and protect business reputation.

[Back to overview](#)

### Outcomes



#### Operations and uptime

Reduce IT-related downtime and ensure business continuity. Counter cyber threats that can bring down businesses and result in patient injuries.



#### Compliance

Ensure all systems are operating well and all parameters—air quality, temperature, room pressure—comply with regulatory requirements.



#### Ensure continuous operation and reduce IT related downtime

Monitoring performance of components of BMS, including systems that turn on and off (e.g. humidifier), valve/damper positions, air and water temperatures, air and water flow rates, and pressure drop.

## Reduce construction time and costs

Balance CAPEX and OPEX, improve design and construction efficiency and process automation.

Back to overview

### Outcomes



### Project planning and timelines

Use BIM in design, construction and building operations to help improve project planning, shorten timelines and reduce non-budget change orders.



### System integration

Reduce investment costs with a smart solution architecture—enabling synergies in system design and the reduction of components and installation.

to be released soon

# Outcomes and Use cases

## The patient experience

**Prioritize well-being throughout the care journey, from preparation and arrival to comfort, orientation and convenience during and after the stay.**

Improve patient outcomes and experience

Related use cases

### Delivering a comfortable healing environment

Optimize environmental operations for patients' comfort in rooms, waiting areas, lobbies, cafeterias and beyond.

### Providing wayfinding navigation for patients

Improve patients' experience by helping them navigate the building with an app on their mobile device.

### Controlling the room environment

Allow patients to adjust room temperature, light and shade using a nurse-call pillow speaker or other engagement system.

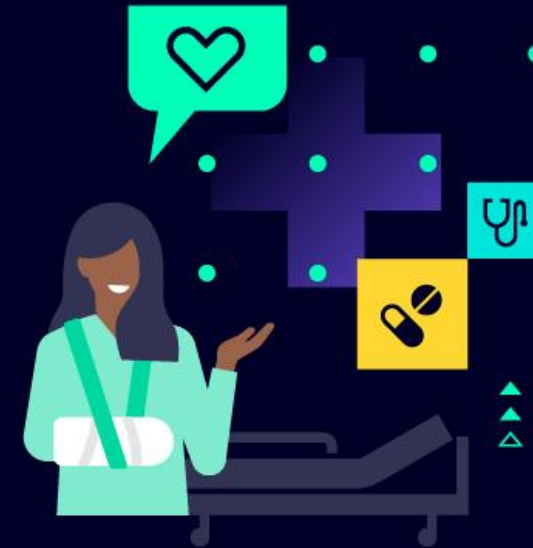
### Ensuring proper lighting in patient areas

Improving lighting conditions and range of control directly correlates with positive patient experiences and healing.

### Accessing hospital services and entertainment

Streamline communication, enabling patients to request services like housekeeping, meal preferences and entertainment.

to be released soon



## The visitor experience

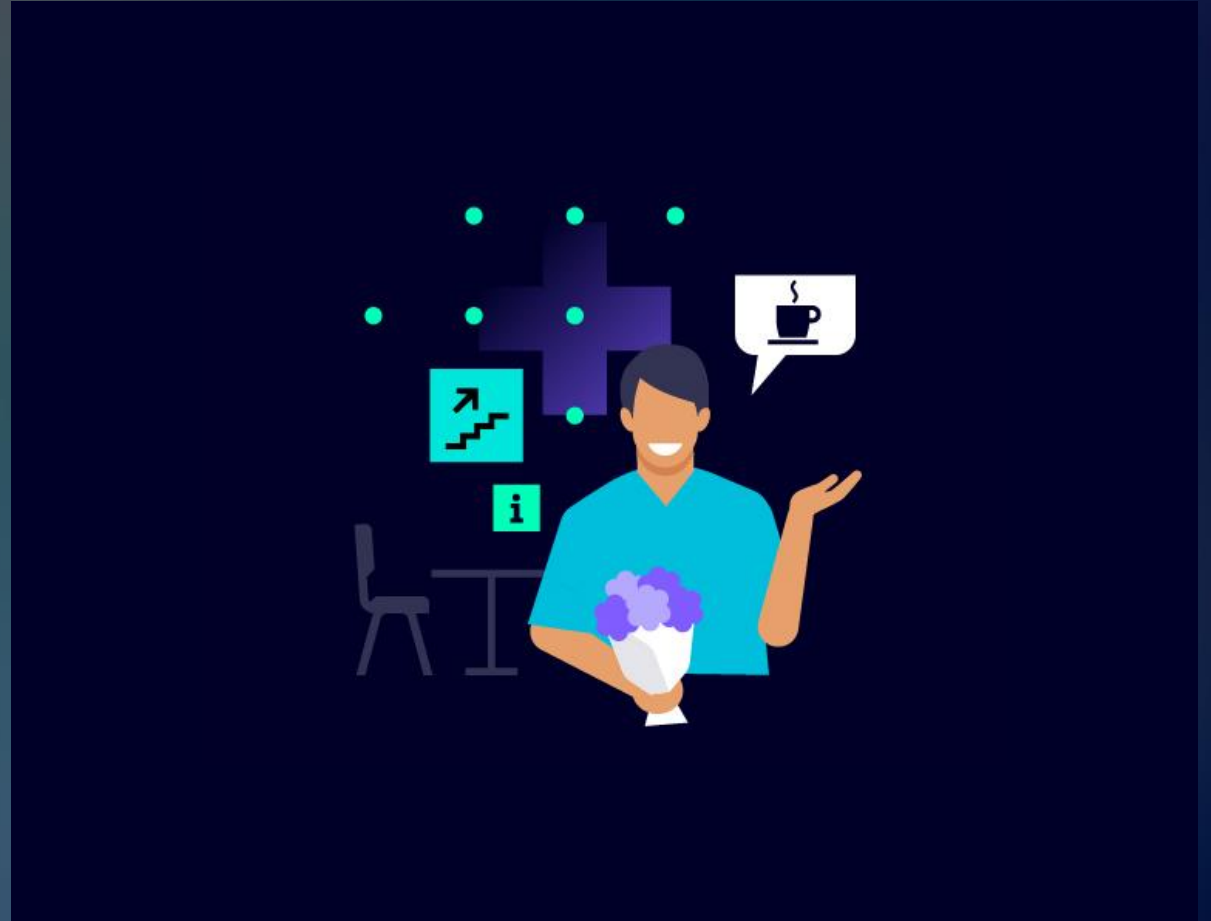
Deliver a smooth visitor experience from the start. Provide easy wayfinding and flexible waiting rooms and keep them informed every step of the way.

Improve patient outcomes and experience

Related use cases

### Provide wayfinding navigation to the visitors

Improve visitor experience by helping the visitor navigate in the building



## A positive healing environment

Create a healing environment free from disruption, one that adapts to the needs of the patient and facilitates the healing process.

Improve patient outcomes and experience

Related use cases

### Minimizing unplanned maintenance

Reduce unplanned corrective maintenance and related disruptions and costs.

### Controlling the room environment

Allow patients to adjust room temperature, light and shade using a nurse-call pillow speaker or other engagement system.

### Eliminate disturbances to patients & staff during fire detector testing and improve operational readiness

Use automated, remote fire detector testing and improve operational readiness without disturbing patients and staff.

### Harmonizing lighting with circadian rhythms

Improving lighting conditions and range of control directly correlates with positive patient experiences and healing.

to be released soon



## Physicians, nurses and administrative staff

Optimize staff workflow to increase efficiency and reduce workloads, improving comfort for clinical and technical staff.

Drive staff productivity and reduce operational costs

Related use cases

<p><b>Providing a comfortable working environment</b> Automatically identify issues that impact room comfort before patients and staff even notice.</p>	<p><b>Employing a smart office</b> Design a flexible workplace with such benefits as desk-booking for visiting staff.</p> <p>to be released soon</p>
<p><b>Expediting the search for medical equipment</b> Help staff quickly track and locate medical equipment and save valuable time for patient care.</p>	<p><b>Providing selected access</b> Grant permission to access selected locations without the need for mechanical keys.</p>
<p><b>Alerting staff about at-risk patients</b> Trigger an alarm automatically when patients leave a pre-designated area without clearance.</p>	<p><b>Ensuring uninterrupted access to critical areas</b> Monitor access to critical areas and notify security personnel when blocking or violations have occurred.</p> <p>to be released soon</p>
<p><b>Logging critical environment data efficiently</b> Improve precision and reduce clinical workload by logging and analyzing environmental data from the operating room.</p> <p>to be released soon</p>	<p><b>Automating service tickets</b> Automatically generate service tickets based on asset location.</p> <p>to be released soon</p>
<p><b>Medical asset booking for nurses</b> Allow medical staff to check the availability of the medical assets and book them if necessary, so that assets will be available for treatment when it is needed.</p>	<p><b>Medical asset scheduling for maintenance</b> Enable the medical engineer to check the availability of the medical assets for a standard service maintenance and schedule a time for maintenance.</p>
<p><b>Monitoring &amp; Controlling Patient Rooms Remotely by Nurse</b> Enable nurses to monitor and control patient room temperature, lights &amp; shading remotely in their responsible area remotely.</p>	<p><b>Use Smart phone to open doors</b> Mobile App acts as a virtual wallet to open doors with compatible BLE readers. Immediate and secure “over-the-air” issuance or revoking of access credentials.</p>



## Facility management staff

**Reduce maintenance times and improve asset availability while lowering costs and increasing patient safety and comfort.**

Drive staff productivity and reduce operational costs

Related use cases

<p><b>Identifying infrastructure issues</b> Automatically identify current and potential issues with facility infrastructure and communicate these to management.</p>	<p><b>Preventive Maintenance efficiency enabled by digital twin</b> Preventive maintenance for high system availability and extend the lifetime of sensitive and critical equipment.</p>	<p><b>Resolving facility issues with a digital twin</b> Get information (from floor plans to open work orders) and resolve issues faster with a digital twin of your facility.</p> <p>to be released soon</p>
<p><b>Finding medical assets faster</b> Locate medical assets that need to undergo preventive maintenance for proper operation.</p>	<p><b>Meeting compliance requirements for fire safety</b> Effectively prepare for fire safety audits by automating reporting process enabling a streamlined effective approach to reporting.</p>	<p><b>Updating asset inventory information</b> Integrate tracking in the asset management system to automatically identify missing assets without a manual inventory.</p> <p>to be released soon</p>
<p><b>Medical asset scheduling for maintenance</b> Enable the medical engineer to check the availability of the medical assets for a standard service maintenance and schedule a time for maintenance.</p>	<p><b>Reporting operations efficiently</b> Make facility management staff reporting more efficient by enabling easy access to data reporting and recording.</p> <p>to be released soon</p>	<p><b>Optimizing supply chain workflows</b> Monitor equipment and medical gas storage levels and automatically order supplies based on need.</p> <p>to be released soon</p>
<p><b>Reactive Maintenance during operation</b> Ad-hoc maintenance and repair tasks due to unforeseen aging and equipment breakage. Ability to swiftly react, identify and fix the source of the disruption, e.g. a plumbing leak.</p>	<p><b>Tracking medical equipment</b> Automatically receive and track equipment and service requests for medical equipment.</p> <p>to be released soon</p>	
<p><b>Automated onboarding and offboarding employees through the SCIM*</b> Automatic creation of an identity within Security Manager / Facility Manager allowing to link imported groups to physical access privileges.</p>	<p><b>Optimizing cleaning</b> Adjust cleaning schedules based on actual usage and only enter empty rooms predesignated for cleaning.</p> <p>to be released soon</p>	

## Operations and uptime

Ensure continuous operations and increase uptime by reducing the number of maintenance requests. Lower costs with predictive, centralized monitoring.

Drive staff productivity and reduce operational costs

Related use cases

### Minimizing unplanned maintenance

Reduce operating costs and disruptions by minimizing unplanned corrective maintenance in facilities and clinical areas.

### Monitoring to minimize false fire alarms

Remotely monitor soiling and danger levels to reduce false fire alarms in environments that could contaminate smoke detectors.

### Integrating one system

Monitor all infrastructure aspects (fire, security, automation) from one integrated building management system.

to be released soon

### Identifying infrastructure issues

Automatically generate infrastructure reports, diagnoses, and provide device-performance data with recommended actions.

### Preventive Maintenance efficiency enabled by digital twin

Preventive maintenance for high system availability and extend the lifetime of sensitive and critical equipment.

### Increasing operating room uptime

Optimize operating room uptime by identifying infrastructure issues in advance to repair or adjust case schedules.

to be released soon

### Managing the building infrastructure from one place

Monitor and manage all aspects of the building infrastructure (fire, security, automation) from one integrated building management system.

### Optimizing security system maintenance & performance

Continuous performance monitoring of the system key components. Identification of outliers to focus on faulty components or components that are generating abnormal level of alarms.

### Continuous monitoring of building management system performance

Monitoring performance of components of BMS, including systems that turn on and off (e.g. humidifier), valve/damper positions, air and water temperatures, air and water flow rates, and pressure drops

### Improving radiology uptime

Improve MRI uptime with power quality monitoring, alerting and reporting to protect the quality of images.

to be released soon

### Reactive Maintenance during operation

Ad-hoc maintenance and repair tasks due to unforeseen aging and equipment breakage. Ability to swiftly react, identify and fix the source of the disruption, e.g. a plumbing leak.

### Surveying emergency entrances

Automatically survey emergency entrances (car and heliports) to detect unwanted occupancy.

to be released soon

## Medical asset utilization

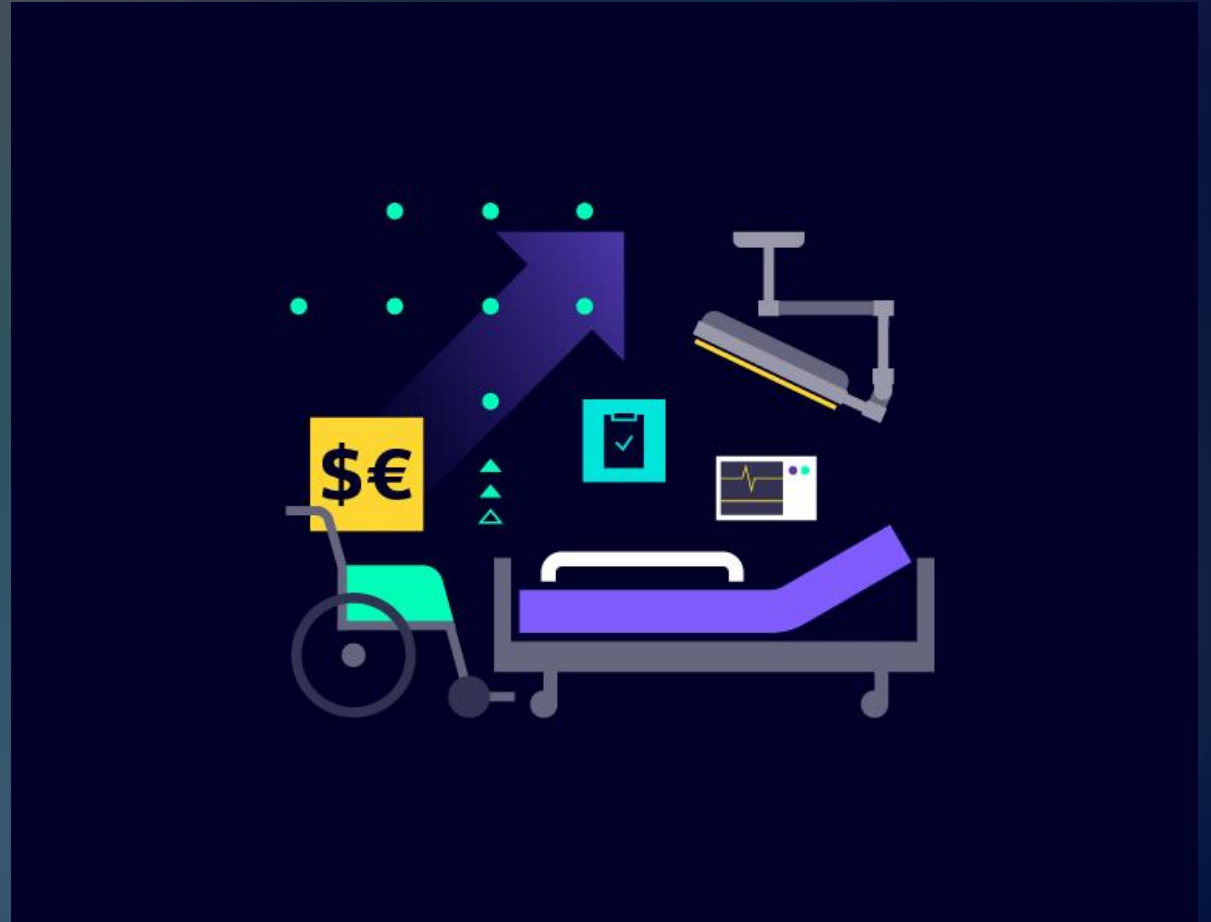
Reduce investments and simultaneously improve the availability of medical equipment.

Drive staff productivity and reduce operational costs

Related use cases

### Medical asset booking for nurses

Allow medical staff to check the availability of the medical assets and book them if necessary, so that assets will be available for treatment when it is needed.



## Patient, staff and visitor security

# Decrease security incidents involving staff, patients and visitors with improved operations supervision.

Protect people and assets

Related use cases

### Providing selected access

Grant permission to access selected locations without the need for mechanical keys.

### Preventive Maintenance efficiency enabled by digital twin

Preventive maintenance for high system availability and extend the lifetime of sensitive and critical equipment.

### Detect patient falls

Keeping a watchful eye over your treatment rooms will empower your nurses to spot a dangerous situation before it happens, while two-way audio helps ensure patients wait for assistance instead of attempting to leave their beds.

### Optimizing security system maintenance & performance

Continuous performance monitoring of the system key components. Identification of outliers to focus on faulty components or components that are generating abnormal level of alarms.

### Manage security incidents fast and effectively (using an integrated security management system)

Many incidents in hospitals need fast and efficient handling. By integrating different security systems and communications channels, alarms reach the right staff at the right time and enables them to act swiftly

### Enabling nurses to monitor multiple patients simultaneously (using video)

Remote patient monitoring can support in situations where the hospital would make use of a costly 1:1 patient sitter service — allowing one nurse to observe multiple patients at once

### Automated onboarding and offboarding employees through the SCIM\*

Automatic creation of an identity within Security Manager / Facility Manager allowing to link imported groups to physical access privileges.

### Protect staff from aggressive/uncooperative patients or visitors

Create a safe place for medical staff when interacting with a patient or visitor. Enable quick alarming and action when staff is in danger

### Finding & Monitoring wandering patients (video analytics)

Mitigate the risk of patients leaving the ward and prevent potential conflicts through live video monitoring, two-way audio communication and potentially personal interaction.

### Use Smart phone to open doors

Mobile App acts as a virtual wallet to open doors with compatible BLE readers. Immediate and secure "over-the-air" issuance or revoking of access credentials.

### Deter aggression towards nursing staff automatically through analytics

By combining video and audio analytics, hospitals can use filters that identify potential threats, such as verbal aggression (duress, anger, or fear) and alert security teams immediately.

### Reactive Maintenance during operation

Ad-hoc maintenance and repair tasks due to unforeseen aging and equipment breakage. Ability to swiftly react, identify and fix the source of the disruption, e.g. a plumbing leak.

### Securing access to high-value and critical assets

Physical access control in hospitals is a crucial component of physical security, especially for protecting valuable assets such as expensive medical equipment and sensitive patient data. Increased level of protection can be achieved using biometric authentication

## Health and safety

# Reduce fire risk and environmental hazards and evacuate people safely.

Protect people and assets

Related use cases

### Monitoring to minimize false fire alarms

Remotely monitor soiling and danger levels to reduce false fire alarms in environments that could contaminate smoke detectors.

### Full transparency and control of fire safety systems via mobile device

Monitoring of multi-site dashboards real-time, viewing and sorting of events, receipt of automated notifications and options to share diagnostic information all conveniently accessible via an intuitive application on a mobile device.

### Optimize performance of fire safety systems

Continuously monitor critical fire safety equipment and retrieve information regarding the system's health. Optimize the fire safety systems performance by minimizing system downtime and business disruptions.



Outcome

## Medical equipment loss and theft

Track medical equipment with transparency and be alerted when it leaves a specified area. Automatically monitor and lock exit routes to avoid theft.

Related strategic objective

Protect people and assets

Related use cases

### Alert when equipment is leaving a certain area (e.g. department)

Sending a notification to the medical staff when a certain medical equipment leaves a designated area.



## Critical goods

Detect in advance if critical goods are at risk and protect them.

Protect people and assets

### Securing access to high-value and critical assets

Physical access control in hospitals is a crucial component of physical security, especially for protecting valuable assets ...



## Decarbonization strategy

Achieve SUS targets, improve sustainability credentials with our consultants' advice on best practices for complying with regulations and directives.

Operate sustainably:  
be energy efficient  
and power resilient

Related use cases

### Reporting CO<sub>2</sub> and tracking decarbonization KPI

Minimize your hospital's CO<sub>2</sub> emissions by collecting and analyzing information on emissions sources.

### Managing the microgrid

Manage the microgrid in order to optimize energy utilization.

to be released soon

### Identify opportunities to reduce resource consumption through monitoring

Metering and display of building performance KPIs including consumption of gas/water /electricity as well as PV power generation etc.

### Optimizing e-car charging

Manage e-car charging and billing to optimize usage.

to be released soon

### GHG emission reduction across processes and footprint

This reduces greenhouse gas emissions by looking holistically at an organization's carbon footprint and finding ways to reduce emissions across all processes

### Providing carbon-neutral radiology services

Identify imaging unit power consumption, provide power usage information, and earn carbon credits to offset CO<sub>2</sub> emissions.

to be released soon

### Integrating renewables as a performance service

Generate & store own green power, Manage energy consumption through facility improvement and building performance optimization measures. The scope can comprise monitoring and supervising, integrating electric vehicle charging.

### Reducing resource consumption

Monitor building performance KPIs including consumption of gas, water, electricity, as well as PV power generation.

to be released soon

### Procuring energy and optimizing supply

Tailor efficiency, procurement and supply to each customer with energy optimization consulting. Reduce costs and risks and foster certainty.

to be released soon

### ISO 50001 implementation and compliance

Be guided in Energy Management System design and implementation in accordance with DIN EN ISO 50001. Define internal workflows, processes and resources.

to be released soon



## People centricity and societal impact

Increase staff efficiency with a healthy indoor climate. Integrate smart technologies to efficiently control temperature, lighting and ventilation.

Operate sustainably:  
be energy efficient  
and power resilient

Related use cases

### Creating healthy indoor climates

Create a healthy indoor climate through dynamic room conditioning (light, shades, air, temperature) and monitoring.

to be  
released  
soon



## Resource-efficient operation

Reduce emissions and waste, use renewable energy, reuse and recycle materials and include additive manufacturing in design and production.

Operate sustainably:  
be energy efficient  
and power resilient

Related use cases

### Tackle water wastage challenges and save energy

Leverage data to identify and reduce water wastage.

to be  
released  
soon

### Technical building asset performance

Digitalization makes maintenance more productive

to be  
released  
soon

### Smart maintenance

Continuous monitoring and benchmarking of performance

to be  
released  
soon

### Space management and efficiency of working spaces

Manage space efficiently using data analysis that incorporates user feedback and environmental information.

to be  
released  
soon

### Diagnosis of building performance

As an owner or operator of a building I want to reduce the energy consumption, energy costs, maintenance costs and CO2 emissions so that I my buildings have lower operating costs and are more sustainable.



## Energy-efficient operations

Optimize facility operations, reduce energy costs and improve power resiliency at the same time.

Operate sustainably:  
be energy efficient  
and power resilient

Related use cases

<p><b>Controlling energy use by occupancy</b> Connect location data to mechanical and electrical systems to automatically manage HVAC, lighting and other resources</p>	<p><b>Integrating solar, thermal and heat pumps</b> Switch to electric heating, maximize simultaneous heating and cooling to support hospitals' cooling requirements while producing domestic hot water.</p> <p>to be released soon</p>
<p><b>Maximizing central utility plant efficiency</b> Reduce energy usage with continuous commissioning to detect deviations and inefficiencies in HVAC systems.</p>	<p><b>Using data to save energy in unoccupied rooms</b> Use data sources like ADT and surgical scheduling to identify unoccupied rooms that can be put into energy-saving mode.</p> <p>to be released soon</p>
<p><b>Reducing HVAC energy consumption</b> Detect periods when HVAC equipment is using more energy than necessary and identify opportunities to reduce consumption.</p>	<p><b>Benchmarking building electricity consumption</b> Compare monthly or annual electricity consumption for the current year against prior years for each connected building.</p> <p>to be released soon</p>
<p><b>Reducing energy consumption of imaging equipment</b> Detect periods of excess energy use with power meters, data integration platforms and advanced analytics. Identify ways to reduce energy consumption.</p> <p>to be released soon</p>	<p><b>Optimizing chiller plant in terms of energy consumption &amp; increasing uptime.</b> As an owner or operator of a building I want to reduce the energy consumption, energy costs, maintenance costs and CO2 emissions of my chiller plant so that my buildings have lower operating costs and are more sustainable.</p>
<p><b>Reducing lighting system energy consumption</b> Identify opportunities to dim lights, replace old light sources with energy-efficient LED lighting, and make lighting available dependent on demand.</p> <p>to be released soon</p>	<p><b>Monitoring and energy management</b> Implement a supervision and management system for your estate's entire energy infrastructure.</p> <p>to be released soon</p>
<p><b>Optimizing timing of HVAC filter changes</b> Identify the optimal time to perform filter changes, when the cost of continued use outweighs the cost to replace based on energy consumption.</p> <p>to be released soon</p>	<p><b>Creating Transparency regarding Energy Consumption</b> Providing transparency through monitoring &amp; reporting for hospitals, medical office buildings, ambulatory surgical centers and other healthcare facilities. It includes electricity, heat, water, and natural gas.</p>

## Power resilience

# Ensure reliable power supply across your facility and in critical environments like operating rooms, intensive care units and laboratories.

Operate sustainably:  
be energy efficient  
and power resilient

Related use cases

### Reduce energy costs through distributed energy resources and peak load management

Load shifting and shedding of non-critical load based on energy market prices and peak load limits.

### Protecting imaging equipment

Identify power quality issues to reduce the likelihood of damage to imaging equipment.

to be released soon

### Power resilience Energy-efficient infrastructure

Having a reliable and resilient electrical infrastructure as the backbone of a sustainable infrastructure is crucial for resource-efficient operation and business continuity.

### Protecting and managing power distribution assets

Extend the lifetime of switchgears, transformers and motors. Improve availability and reliability of OT assets in energy automation.

to be released soon

### Monitoring power across infrastructure

Optimum grid quality can only be achieved when the complete energy supply chain is monitored: from generation to transmission and distribution.

to be released soon

### Optimizing maintenance management

Reduce costs and prevent downtimes from power supply with optimal maintenance management.

to be released soon

### Distributing energy resources

Provide peak electricity supply from battery storage. Microgrid automation enables shedding non-critical load if maximum load would be exceeded.

to be released soon

### Creating energy-efficient infrastructure

Create a reliable and resilient electrical infrastructure as the sustainable backbone of resource-efficient operations and business continuity.

to be released soon

## Operations and uptime

**Reduce IT-related downtime and ensure business continuity. Counter cyber threats that can bring down businesses and result in patient injuries.**

Ensure healthcare cybersecurity and comply with standards

Related use cases

**Continuous monitoring of building management system performance**

Monitoring performance of components of BMS, including systems that turn on and off (e.g. humidifier), valve/damper positions, air and water temperatures, air and water flow rates, and pressure drops

**Ensure core components of Siemens building automation, fire & security are updated for cybersecurity protection**

Update and upgrade systems to maintain the level of security in an evolving threat landscape. Ensure proper backups of systems in case of a system reset.



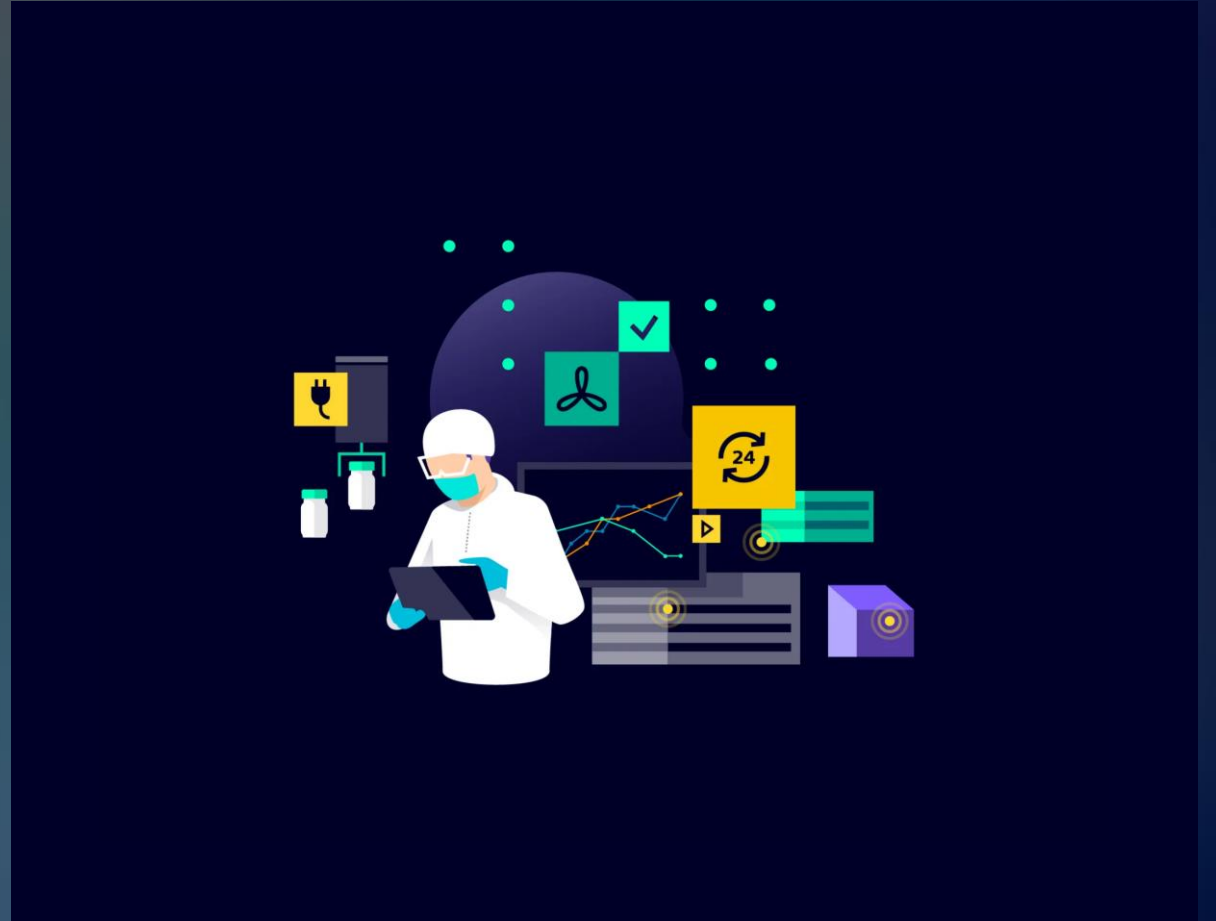
## Ensure continuous operation and reduce IT related downtime

Monitoring performance of components of BMS, including systems that turn on and off, valve/damper positions, air/water temperatures and flow rates, and pressure drop.

Ensure healthcare cybersecurity and comply with standards

### Continuous monitoring of building management system performance

Monitoring performance of components of BMS, including systems that turn on and off (e.g. humidifier), valve/damper positions, air and water temperatures, air and water flow rates, and pressure drops



## Compliance

Ensure all systems are operating well and all parameters—air quality, temperature, room pressure—comply with regulatory requirements.

Ensure healthcare cybersecurity and comply with standards

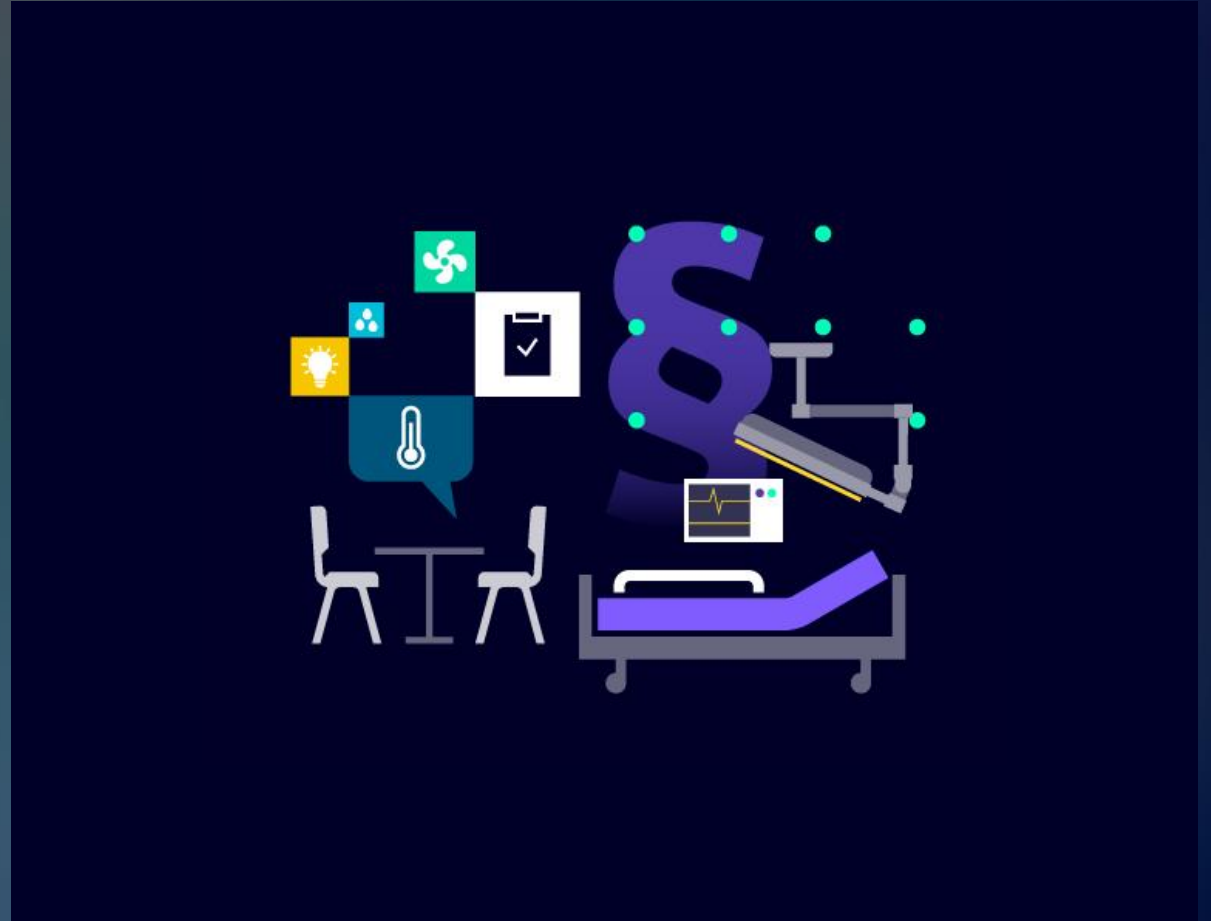
Related use cases

### Regulatory audit management enabled by digital twin

Inspection and re-certification of critical equipment and systems, e.g. wet standpipe sprinkler systems.

### Meeting compliance requirements for fire safety

Effectively prepare for fire safety audits by automating reporting process enabling a streamlined effective approach to reporting.



## Project planning and timelines

Use BIM in design, construction and building operations to help improve project planning, shorten timelines and reduce non-budget change orders.

Reduce construction time and costs

### Information handover across building's lifecycle enabled by digital twin

Reliable transfer of data to another party between the individual life cycle phases of a building. Ensuring information availability and high data quality to make the most of BIM.





# Use Cases

Better patient experience

Better staff performance

More resource-efficient operation

Better compliance

Better system integration

Reduced equipment loss and theft



Use Cases



Location Services (RTLS)



Room Booking



Occupancy



Expediting the search for medical equipment



Book medical asset



Medical Services



Treatment status notifications



Patient information service



Kiosk



Controlling the room environment



Providing wayfinding navigation for patients

Financing

Apps and Services

Out of the Box SaaS Apps



Digital / Remote Services



Ecosystem Apps and Services



Cyber-security

Platform Layer

Data Lake & APIs

IOT Platform



Field Devices & Data Sources



Lighting &Electrical



CCTV



Security



Building Twin



Power Distribution



Microgrid



Elevator



CMMS



HVAC



Fire



Automation



E-mobility



Indoor sensors



Meter Data



IoT Data



Others



Use case

# Providing wayfinding navigation for patients

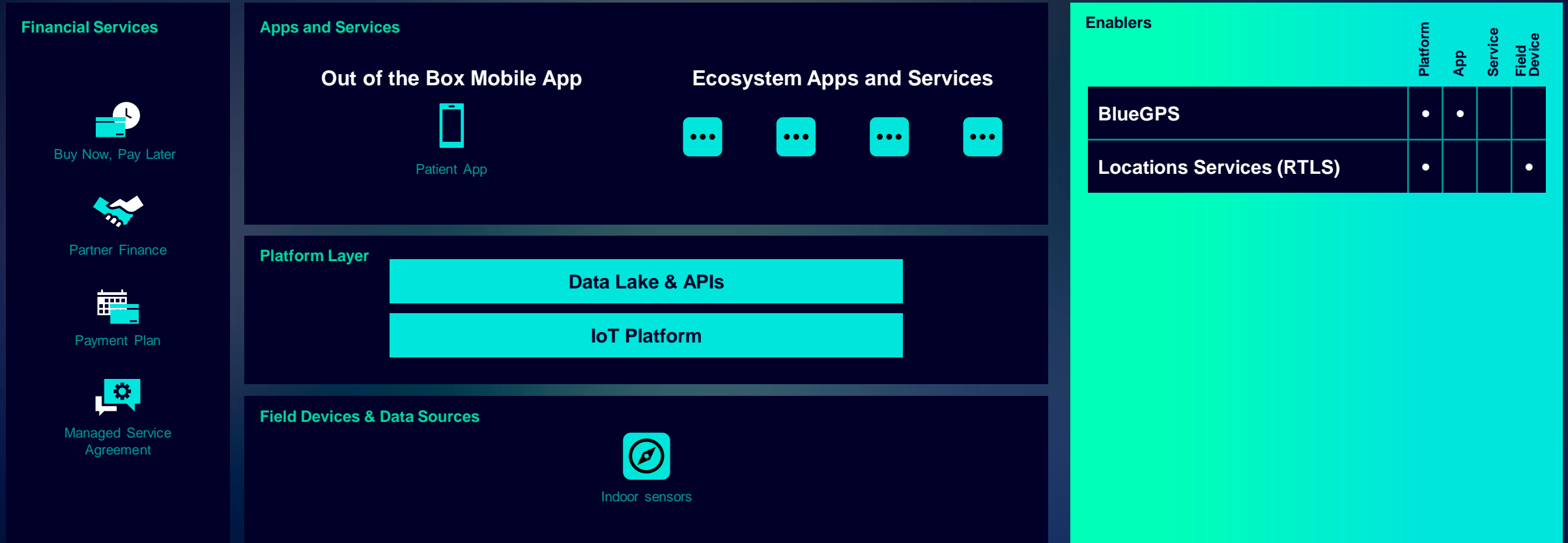
Improve patient experience by helping the patient navigate in the building with an app on their mobile device

Related strategic objective(s)

Drive staff productivity and reduce operational costs

Improve patient outcomes and experience

Reference architecture



Use case

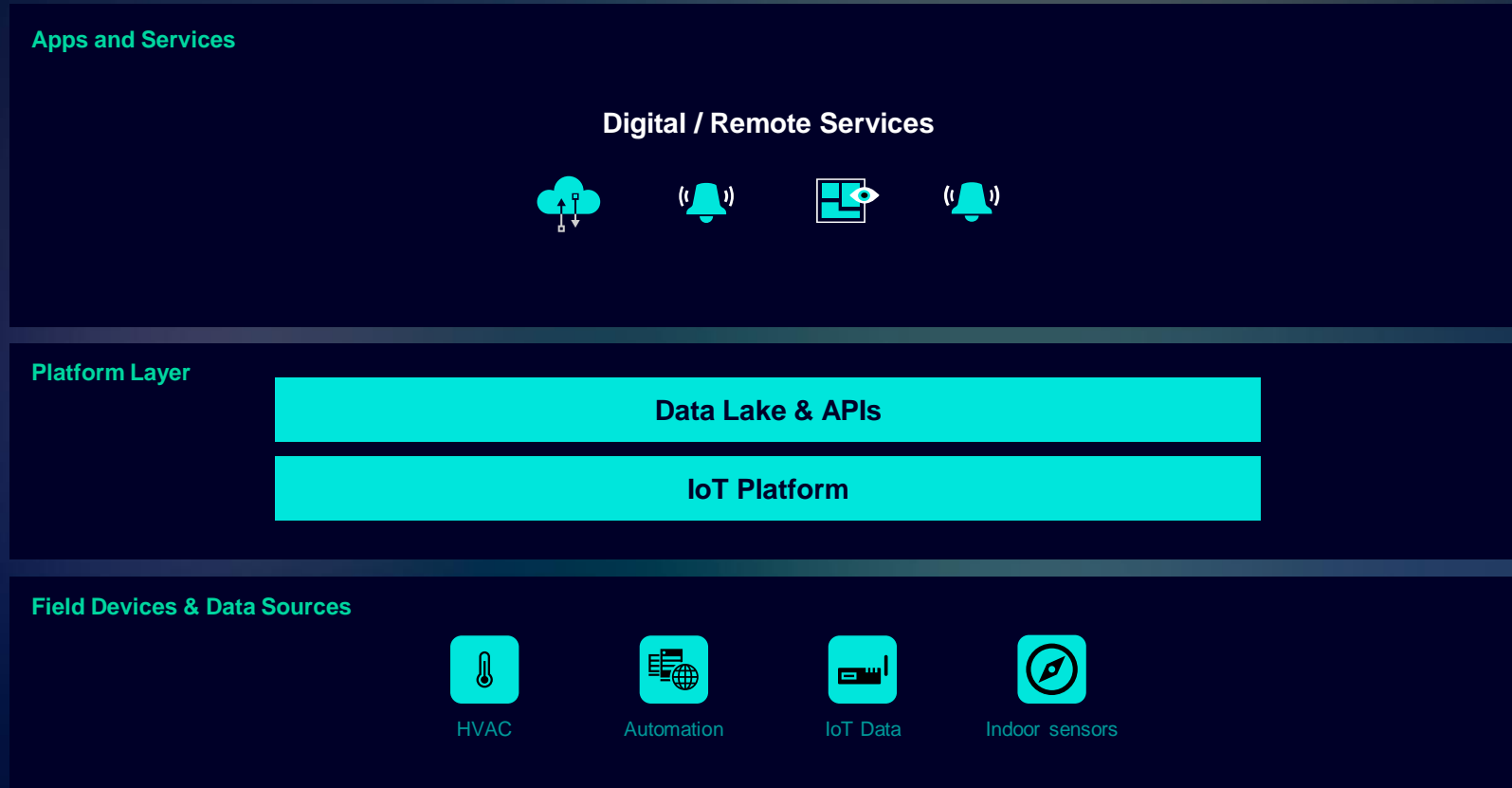
**Delivering a comfortable healing environment**  
 Optimize environmental operations for patients' comfort in rooms, waiting areas, lobbies, cafeterias and beyond.

Please localize/adapt to the target audience/the region

Related strategic objective

Improve patient outcomes and experience

Reference architecture



Use for RAM

**Enablers**

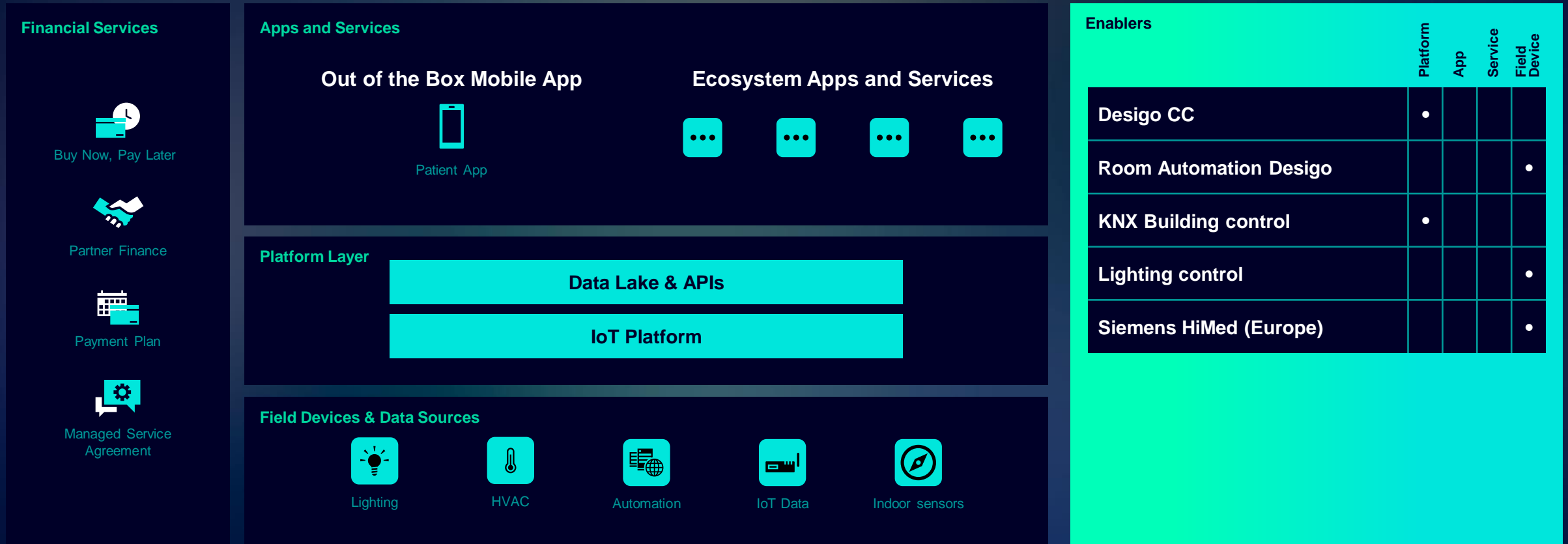
	Platform	App	Service	Field Device
Terminal Unit Performance Analysis		•	•	
Equipment Control Loop Analysis		•	•	
Advanced proactive services		•	•	
Cloud Ops		•	•	
Critical Environments Reporting		•	•	

# Controlling the room environment

Give patients the control to adjust room temperature, lighting and shading using a nurse call pillow speaker or patient engagement system.

Improve patient outcomes and experience

Reference architecture

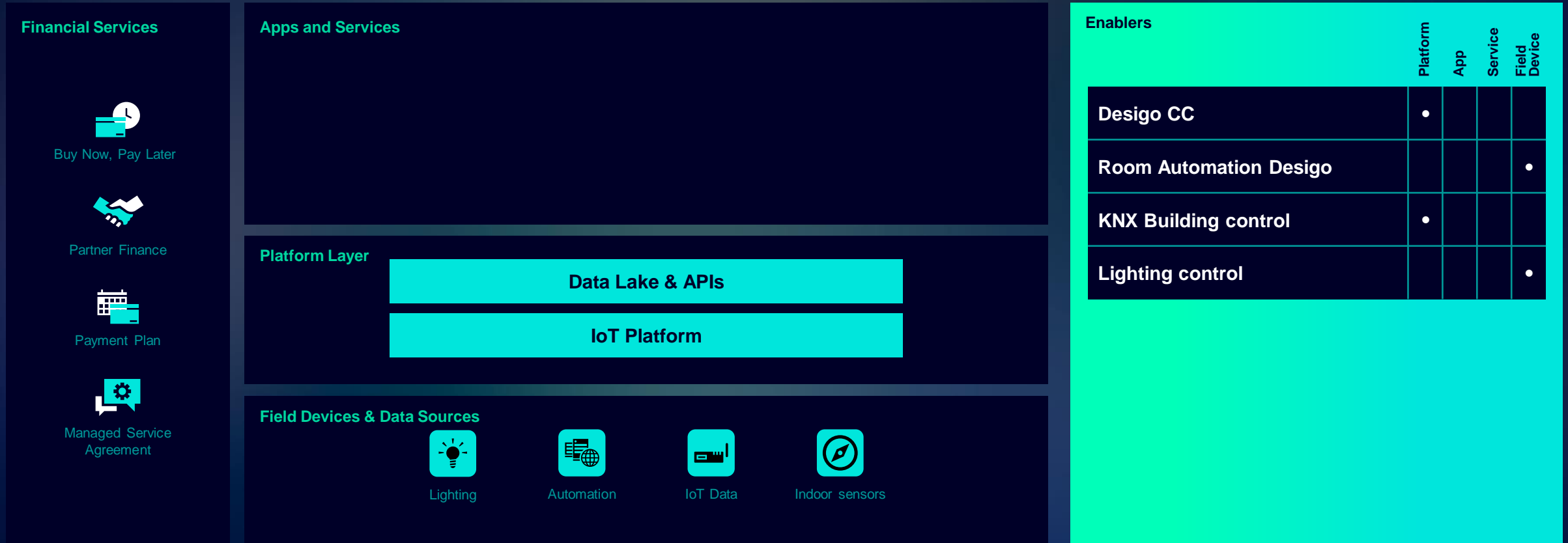


# Ensuring proper lighting in patient areas

Improving lighting conditions and range of control in hospital has a direct correlation to patient experience as well as patient healing.

Improve patient outcomes and experience

Reference architecture

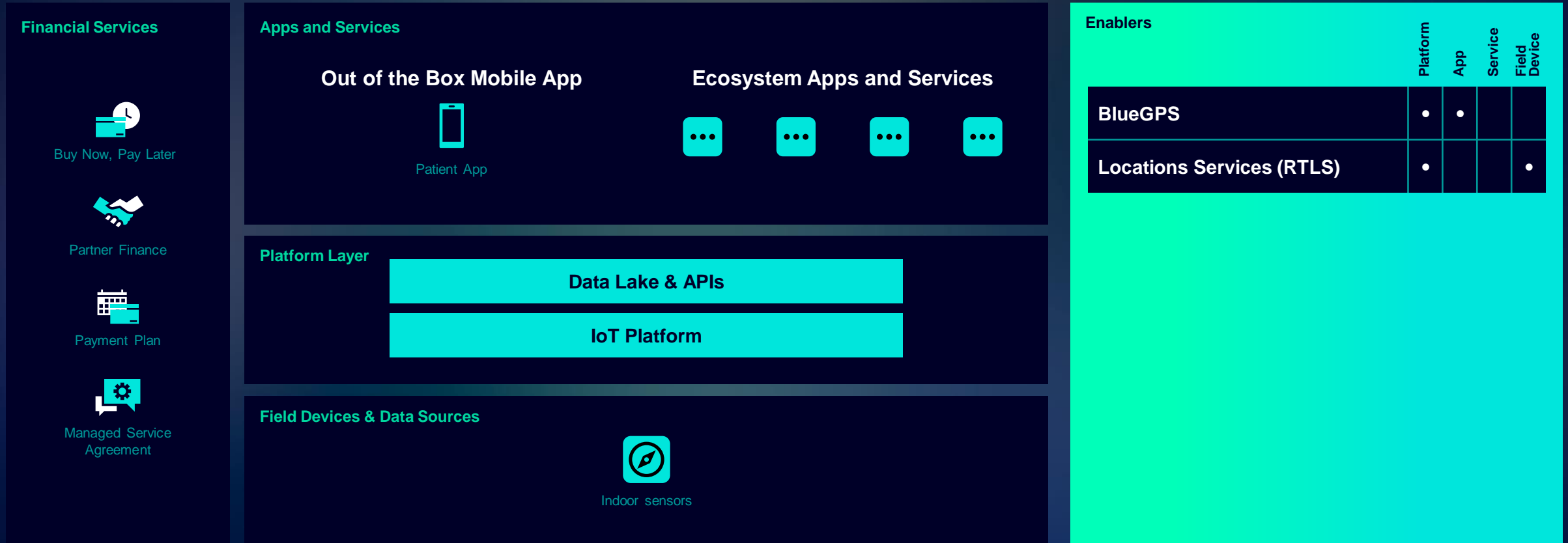


# Provide wayfinding navigation to the visitors

## Improve visitor experience by helping the visitor navigate in the building

Improve patient outcomes and experience

Reference architecture

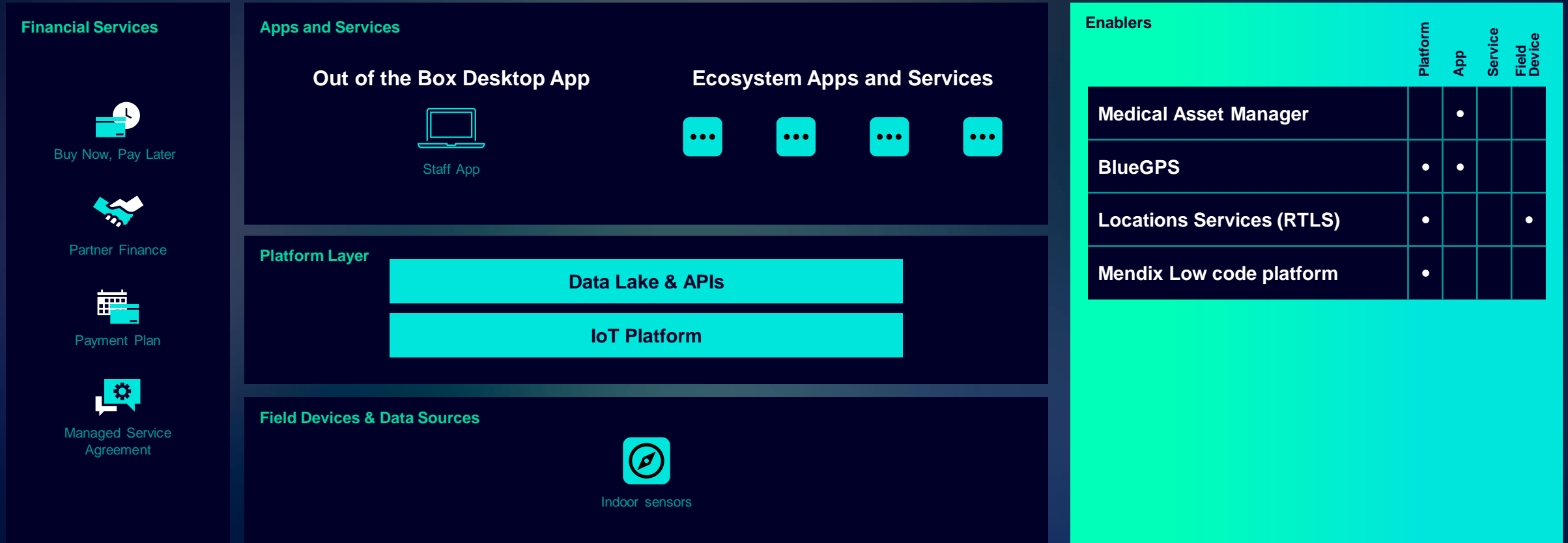


# Finding medical assets faster (clinical engineer)

Locate medical assets that need to have preventive maintenance activities completed for proper operation

Drive staff productivity and reduce operational costs

Reference architecture



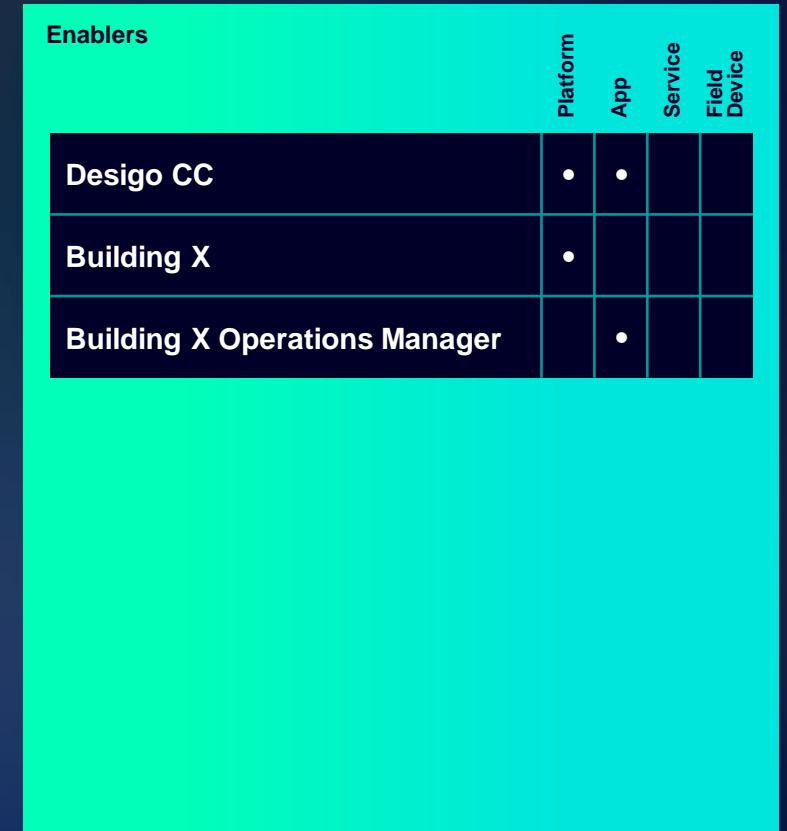
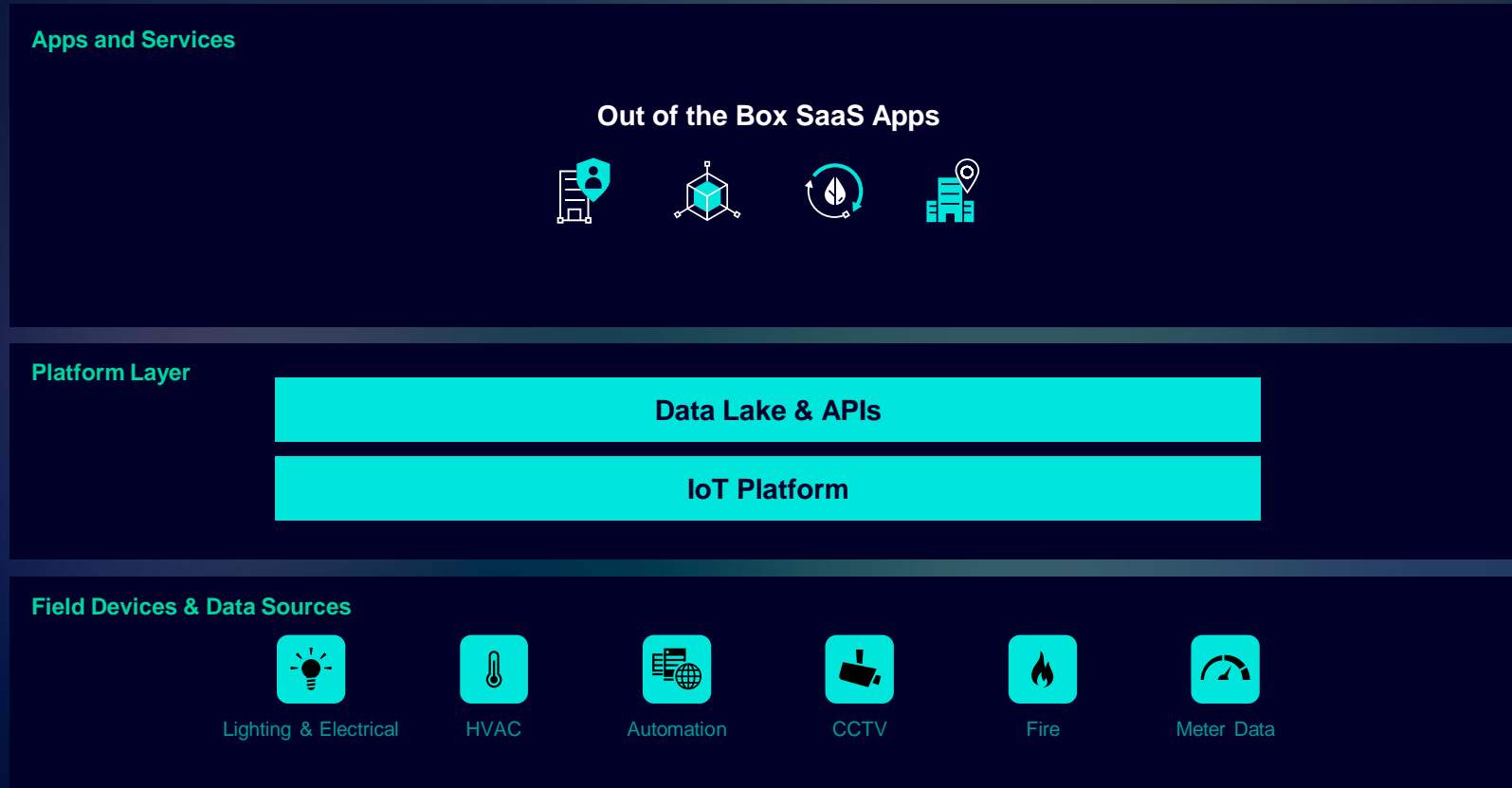


# Managing the building infrastructure from one place

Monitor and manage all aspects of the building infrastructure (fire, security, automation) from one integrated building management system.

Drive staff productivity and reduce operational costs

Reference architecture



Use case

# Minimizing unplanned maintenance

Reduce operating costs by minimizing unplanned corrective maintenance  
 Reduce disruptions caused by unplanned corrective maintenance

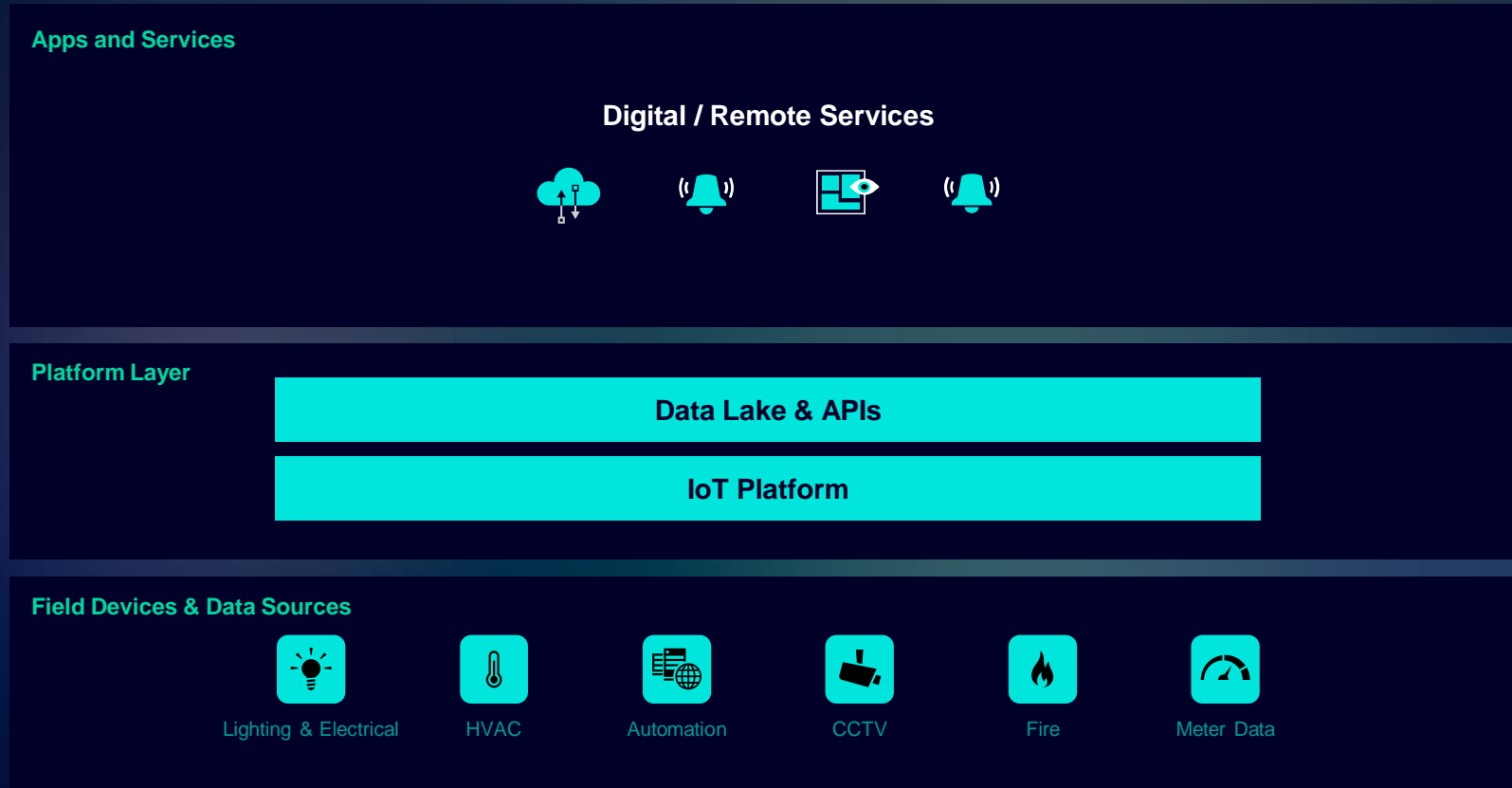
Please localize/adapt to the target audience/the region

Related strategic objective(s)

Drive staff productivity and reduce operational costs

Improve patient outcomes and experience

Reference architecture



Use for RAM

**Enablers**

	Platform	App	Service	Field Device
System Performance Monitoring			•	
BACnet Network analysis			•	
Advanced Proactive Services			•	
CloudOps			•	

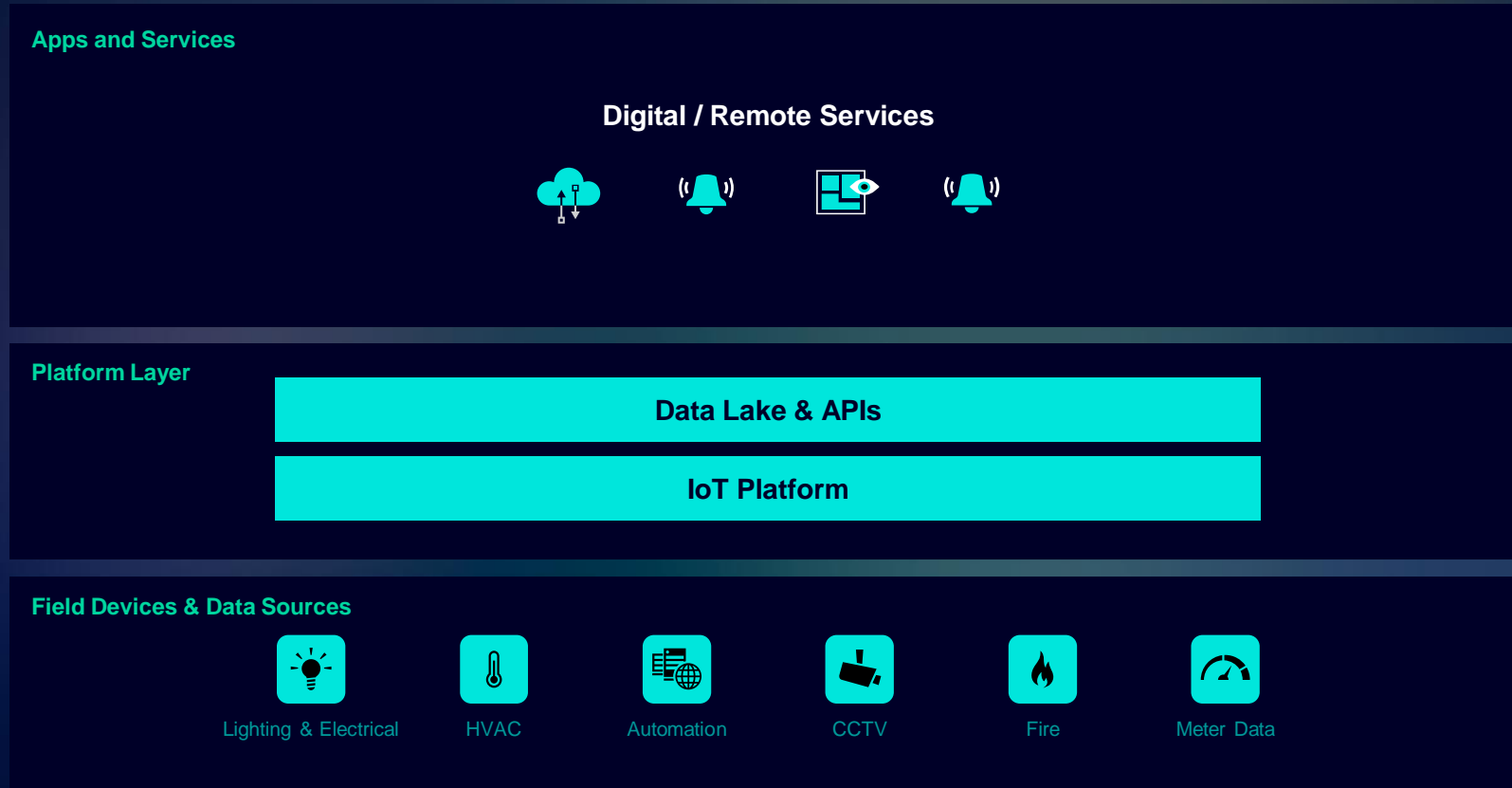
# Identifying infrastructure issues

Automatically identify current and potential issues with facility infrastructure, generate infrastructure reports, diagnoses, and provide device-performance metrics and recommended actions.

Please localize/adapt to the target audience/the region

Drive staff productivity and reduce operational costs

Reference architecture



Use for RAM

**Enablers**

	Platform	App	Service	Field Device
System Performance Monitoring			•	
BACnet Network analysis			•	
Advanced Proactive Services			•	
CloudOps			•	

Use case

# Alert staff that at-risk patients are about to leave an area (Wander Management)

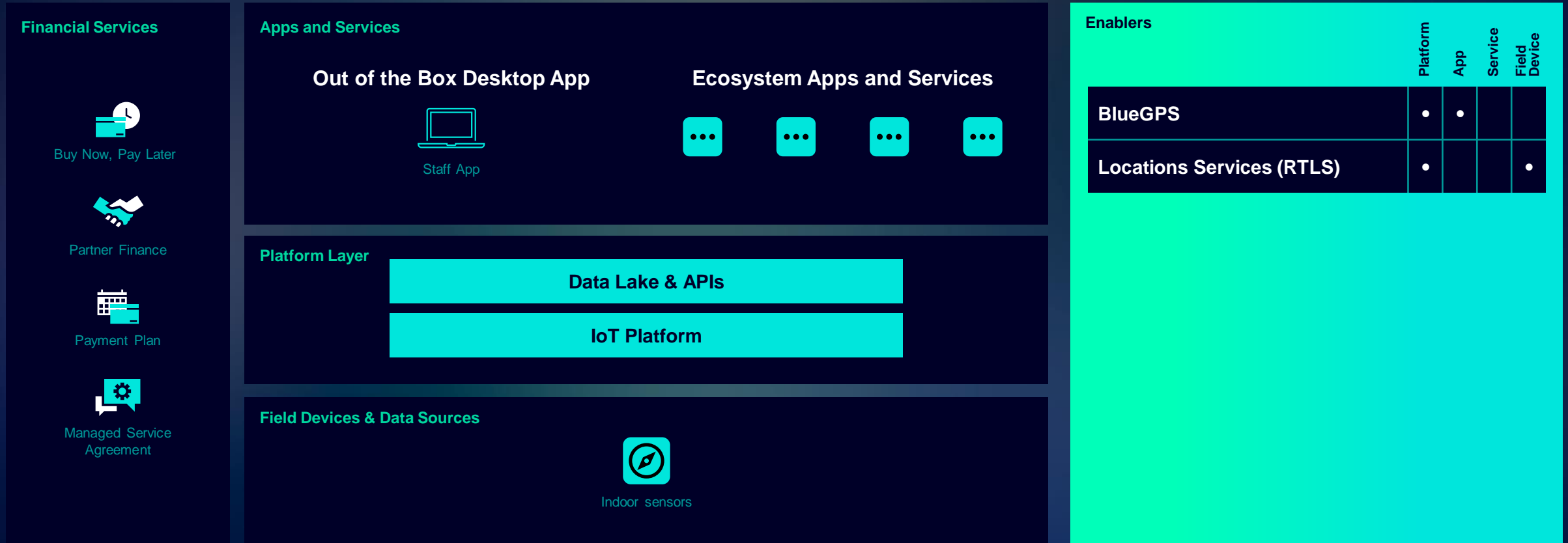
Sending a notification to the medical staff in case a patient who needs to be closely monitored for his/her own safety is about to leave a designated area.

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

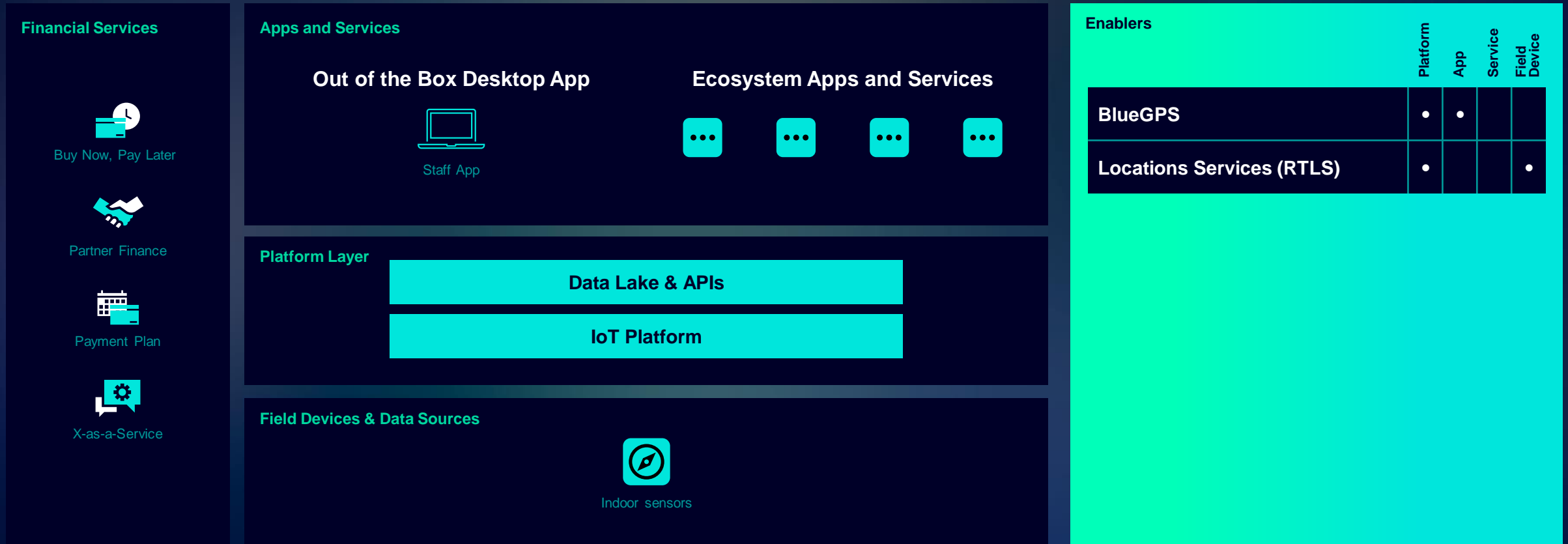
Reference architecture



**Alert when equipment is leaving a certain area (e.g. department)**  
**Sending a notification to the medical staff when certain medical equipment leaves a designated area.**

Protect people and assets

Reference architecture



Use case

# Expediting the search for medical equipment (nurses)

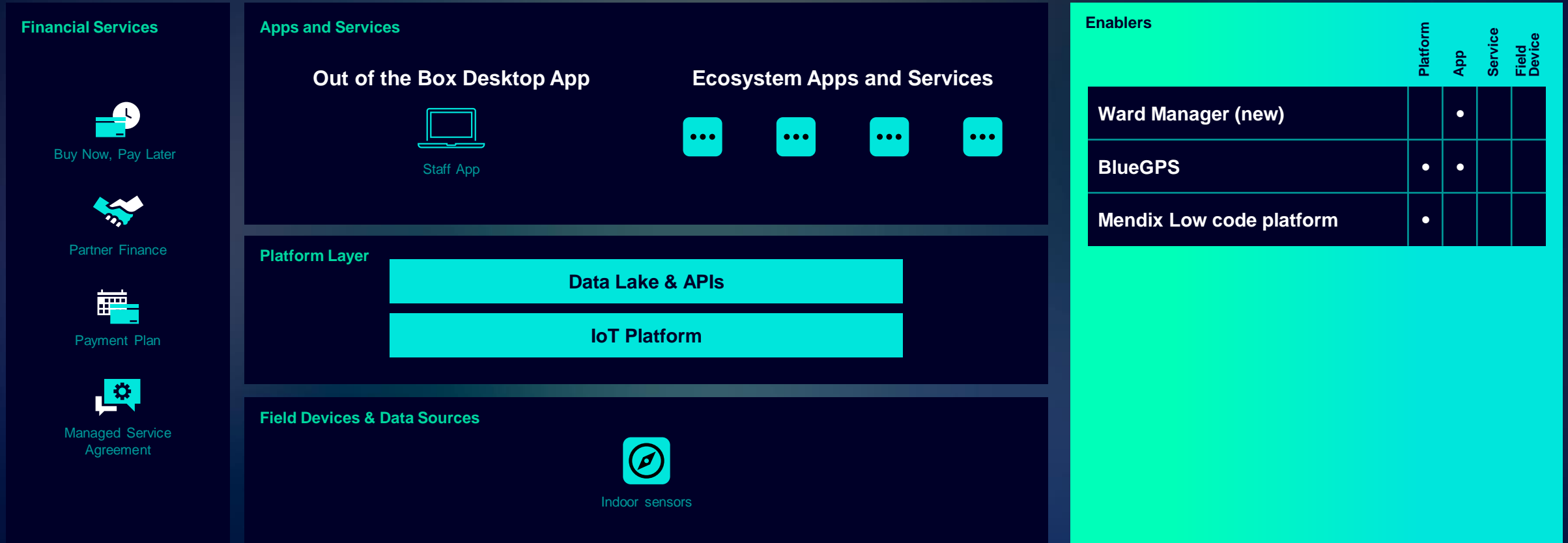
Help staff quickly track and locate medical equipment and save valuable time for patient care.

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

Reference architecture



Use case

# Reducing HVAC energy consumption

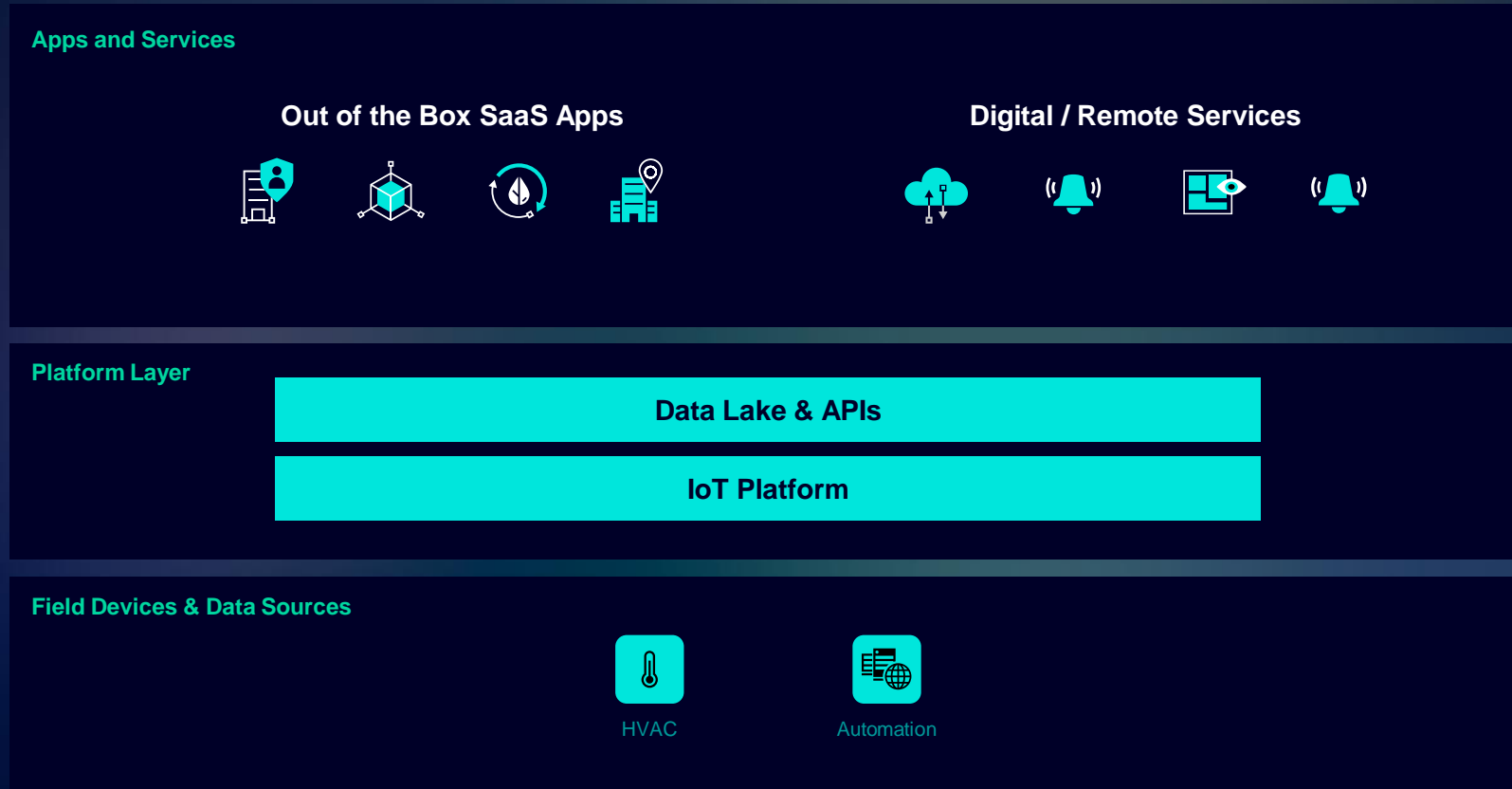
Detect periods when HVAC equipment is using more energy than necessary and identify opportunities to reduce consumption.

Please localize/adapt to the target audience/the region

Related strategic objective

Operate sustainably: be energy efficient and power resilient

Reference architecture



Use for RAM

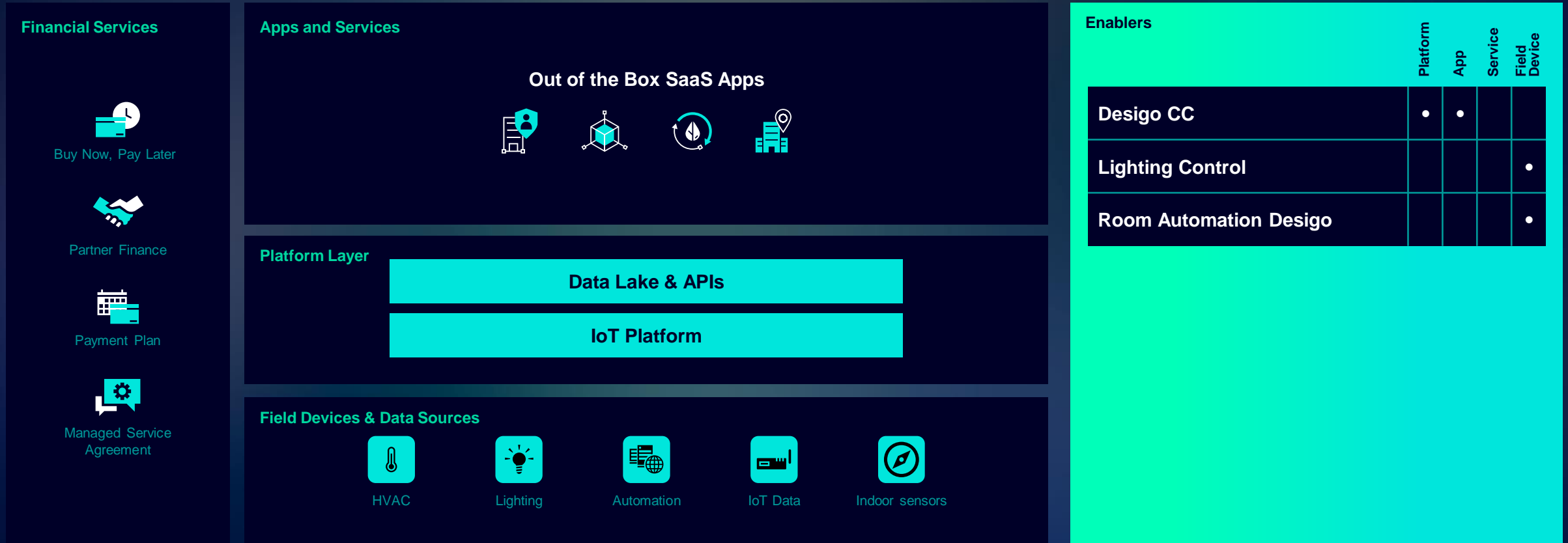
Enablers	Platform	App	Service	Field Device
CloudFIMsDVO			•	
CloudOps			•	
Demand Flow			•	
Smart Building Assessment			•	
Green migration			•	
Smart Building Commissioning			•	
Building X Energy Manager		•		
Desigo CC	•	•		

# Controlling energy use by occupancy

Connect location data to mechanical and electrical systems to automatically manage HVAC, lighting and other resources.

Operate sustainably:  
be energy efficient  
and power resilient

Reference architecture

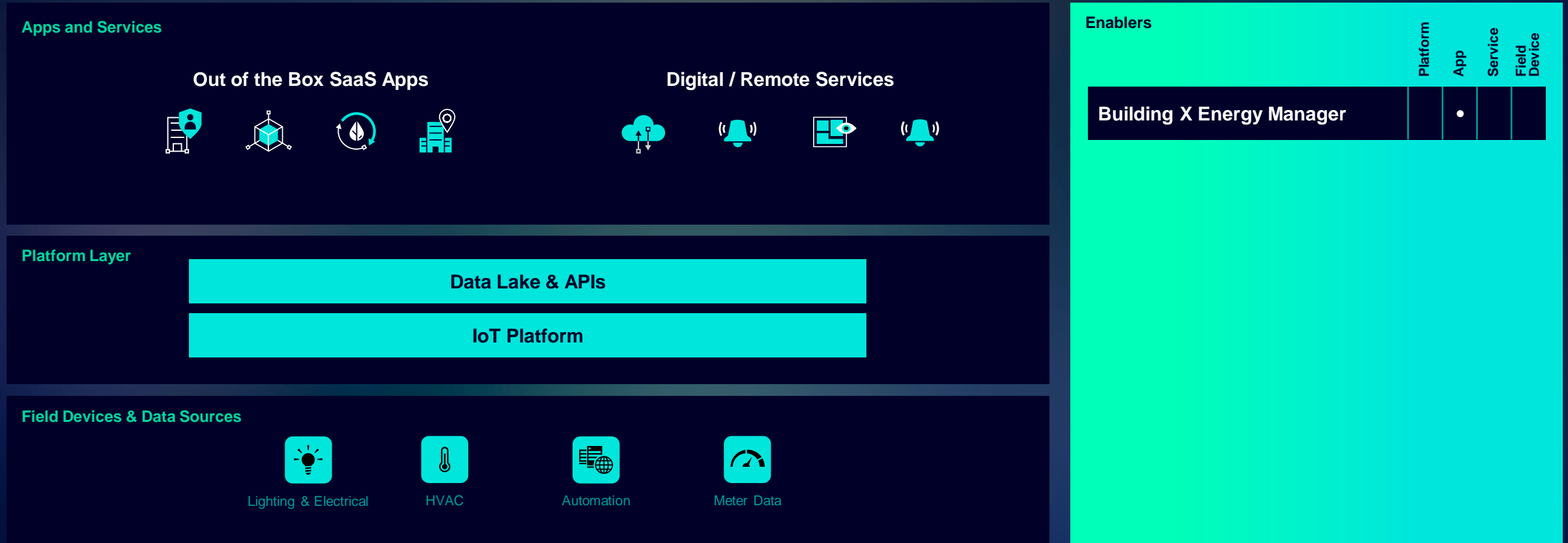




# Identify opportunities to reduce resource consumption through monitoring Metering and display of building performance KPIs including consumption of gas/water/electricity as well as PV power generation etc.

Operate sustainably:  
be energy efficient  
and power resilient

Reference architecture

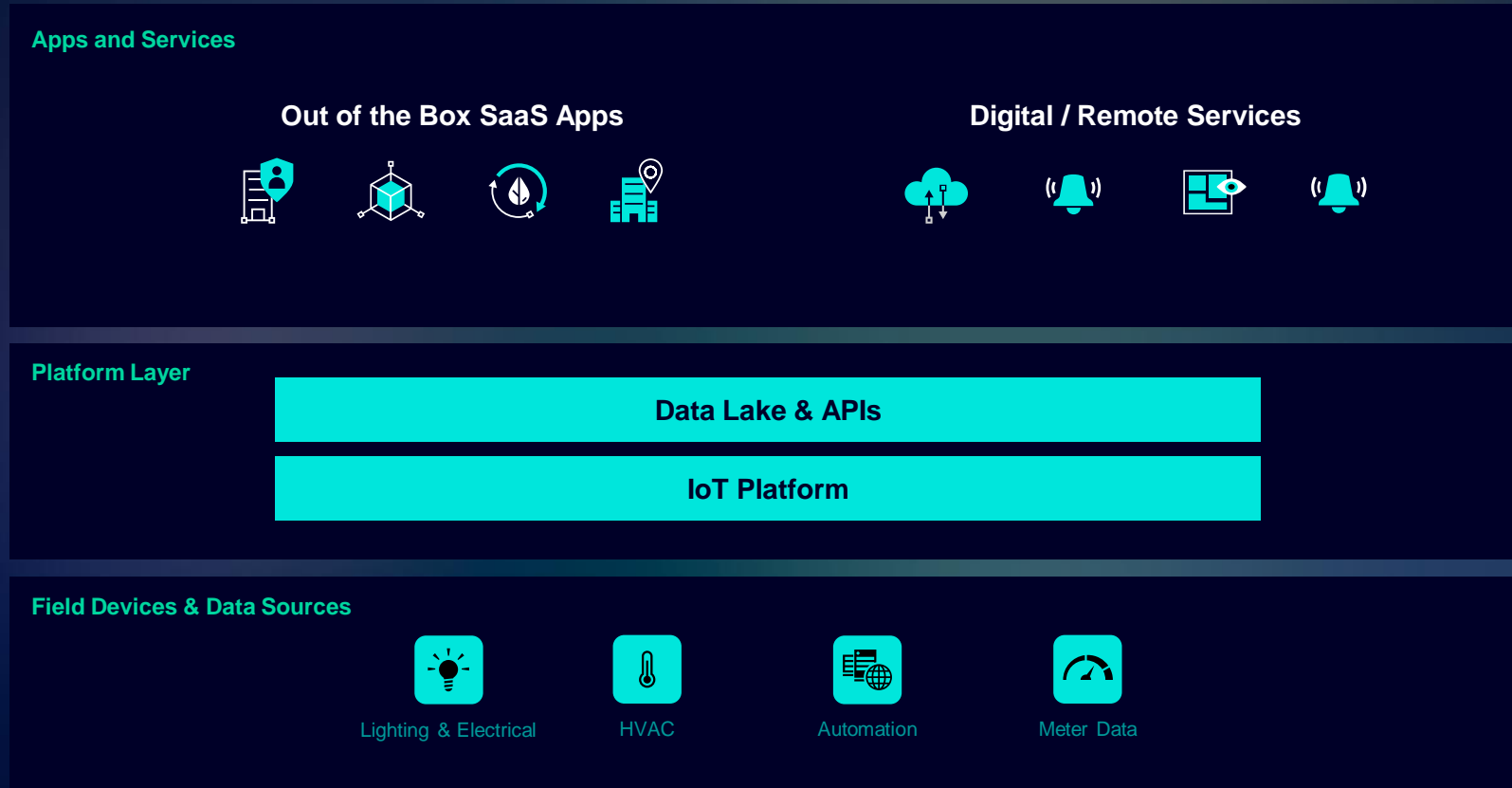


# CO<sub>2</sub> reporting and decarbonization KPI tracking

Minimize your hospital's CO<sub>2</sub> emissions by collecting and analyzing information on emissions sources.

Operate sustainably:  
be energy efficient  
and power resilient

Reference architecture



**Enablers**

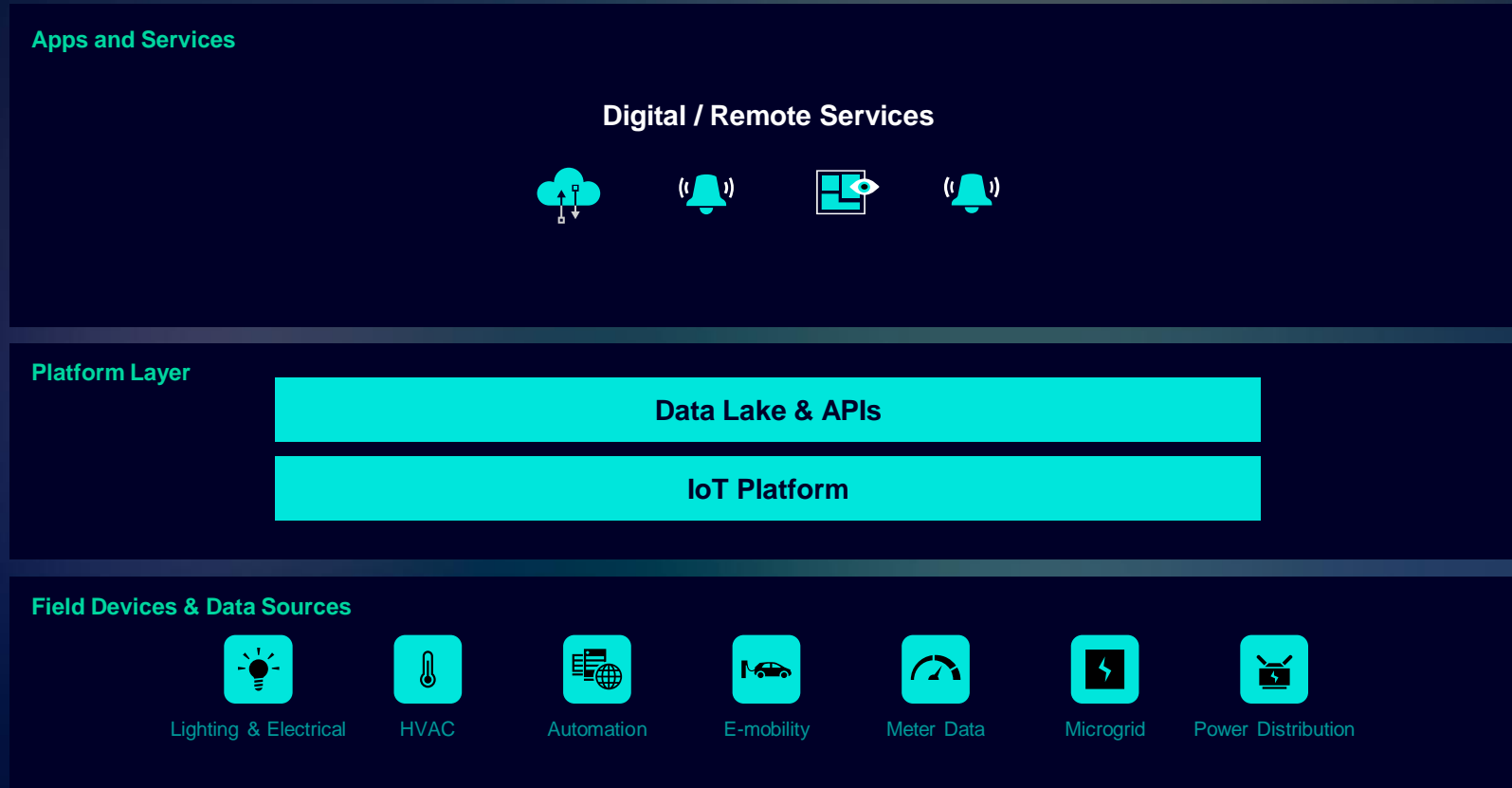
	Platform	App	Service	Field Device
Desigo CC	•	•		
Building X Energy Manager		•		

# Reduce energy costs through distributed energy resources and peak load management

## Load shifting and shedding of non-critical load based on energy market prices and peak load limits.

Operate sustainably:  
be energy efficient  
and power resilient

Reference architecture



**Enablers**

	Platform	App	Service	Field Device
Flexibility as a Service			•	
Peak Demand Limiting Service			•	
Microgrid MGMS based services			•	

Use case

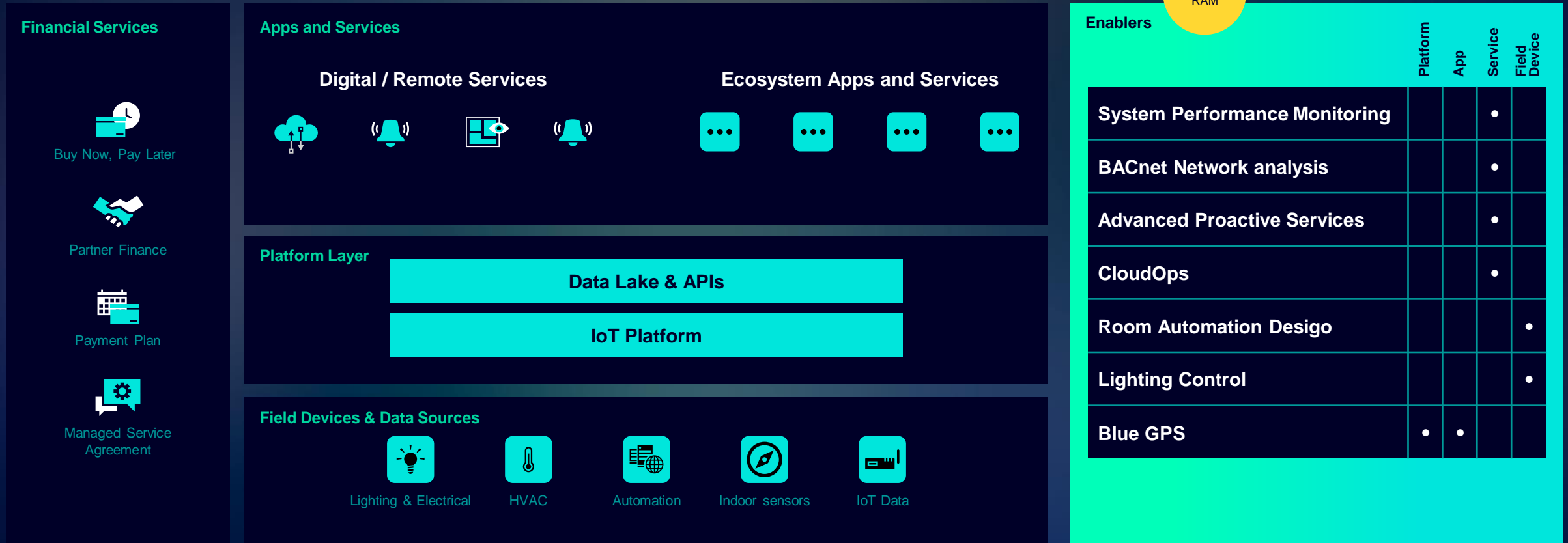
**Providing a comfortable working environment**  
**Automatically identify issues that impact room comfort b**  
**patients and staff even notice.**

Please  
 localize/adapt to  
 the target  
 audience/the  
 region

Related strategic objective

Drive staff  
 productivity and  
 reduce operational  
 costs

Reference architecture



Use case

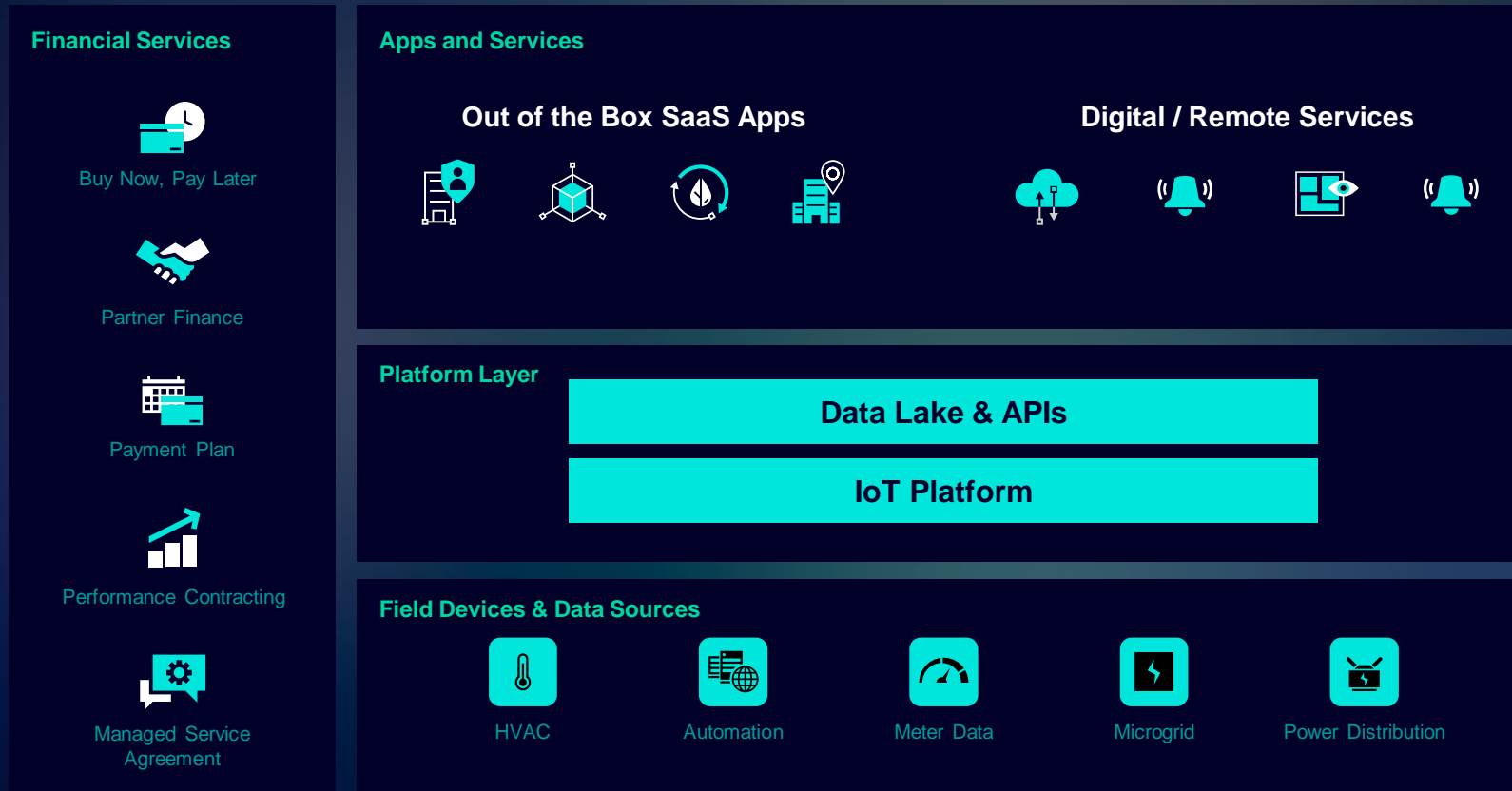
**Maximizing central utility plant efficiency**  
**Reduce energy usage with continuous commissioning to**  
**deviations and inefficiencies in HVAC systems.**

Please localize/adapt to the target audience/the region

Related strategic objective

Operate sustainably: be energy efficient and power resilient

Reference architecture



Use for RAM or APAC

**Enablers**

	Platform	App	Service	Field Device
Green migration			•	
Smart Building Commissioning			•	
Smart Building Assessment			•	
Demand Flow			•	
Building X Energy Manager		•		
SENTRON powermanager		•		
SENTRON powermind		•		

Use case

# Continuous monitoring of building management systems

Monitoring performance of components of BMS, including sensors, valves, and dampers, and off (e.g. humidifier), valve/damper positions, air and water flow rates, and pressure drops

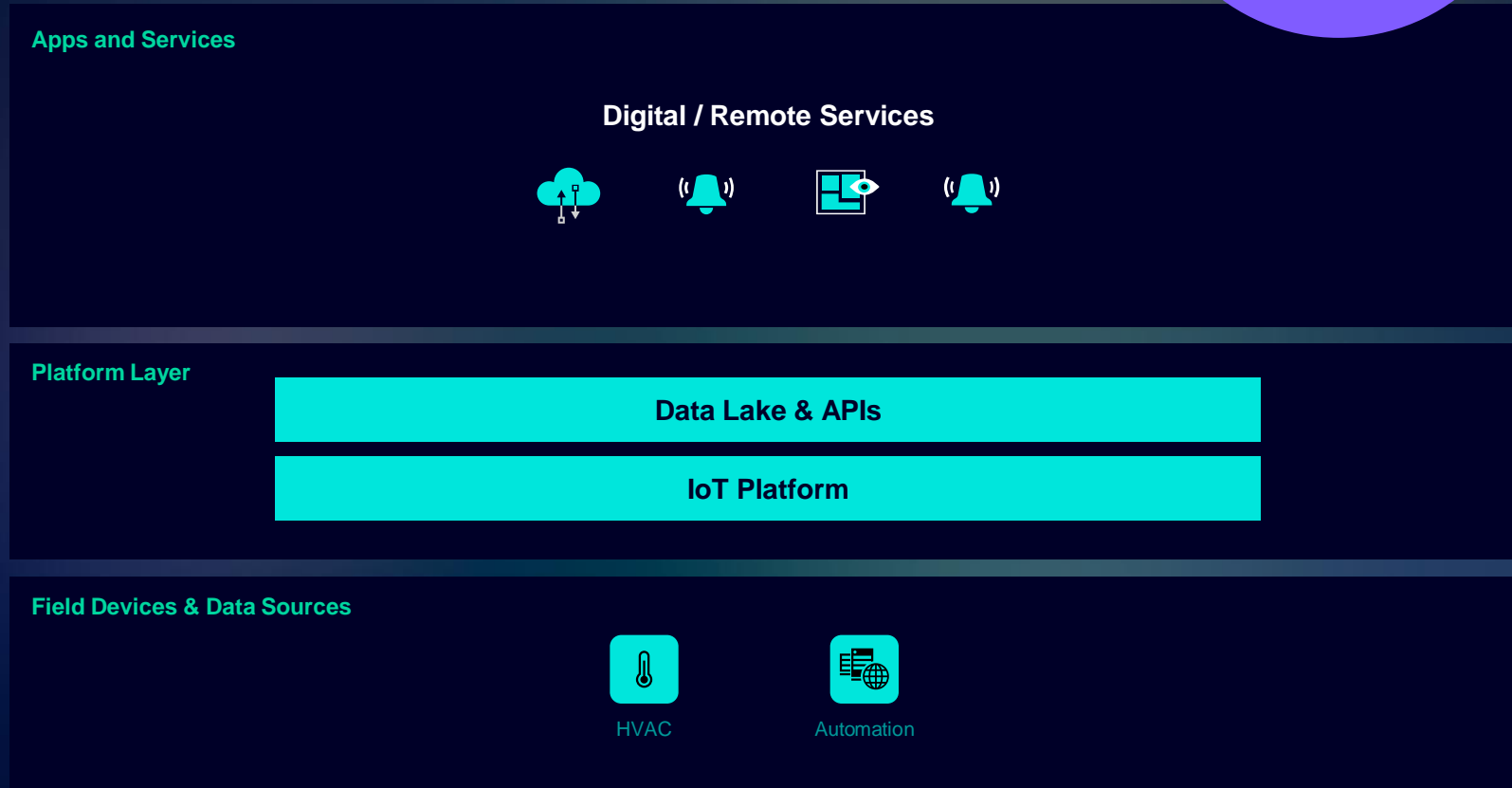
Please localize/adapt to the target audience/the region

Related strategic objective(s)

Ensure healthcare cybersecurity and comply with standards

Drive staff productivity and reduce operational costs

Reference architecture



Use for RAM

Enablers

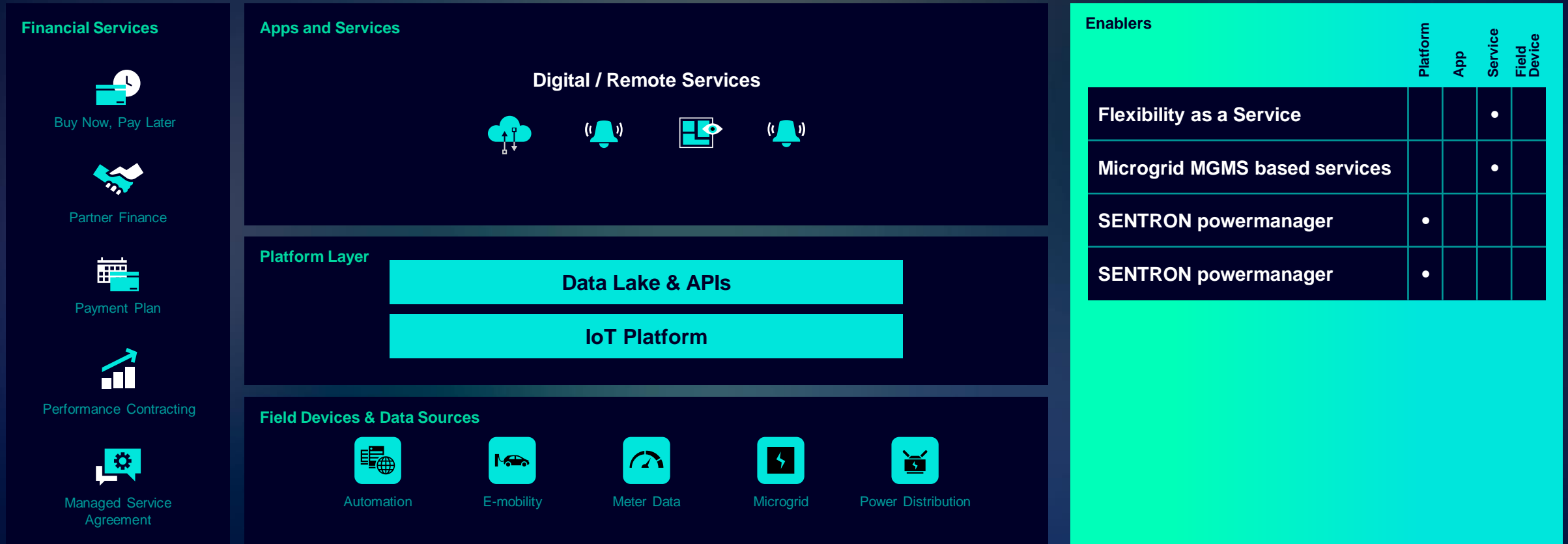
	Platform	App	Service	Field Device
Advanced proactive services			•	
System Performance Monitoring			•	
CloudOps			•	

# Power resilience Energy-efficient infrastructure

Having a reliable and resilient electrical infrastructure as the backbone of a sustainable infrastructure is crucial for resource-efficient operation and business continuity.

Operate sustainably:  
be energy efficient  
and power resilient

Reference architecture

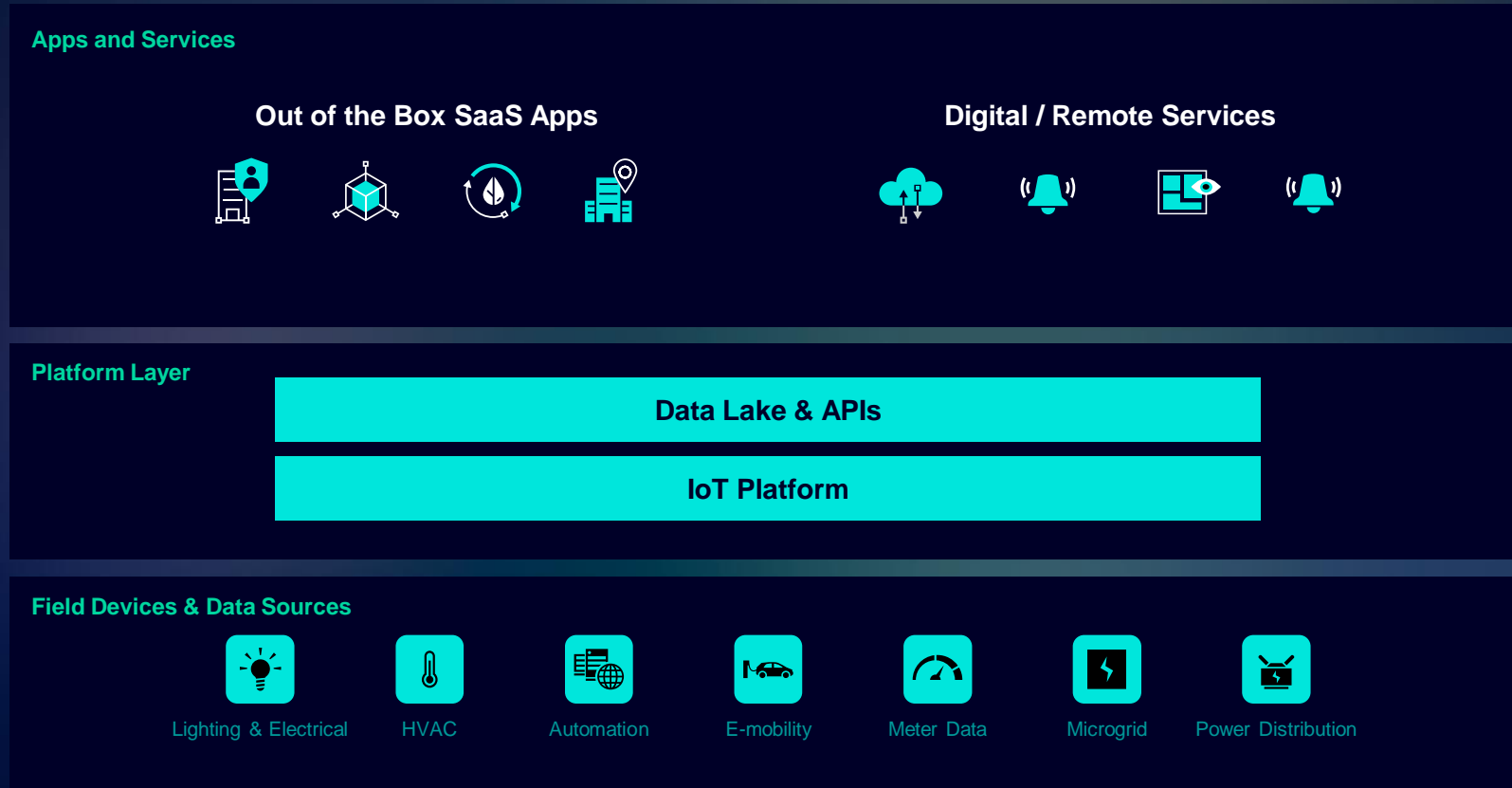


## Creating Transparency regarding Energy Consumption

Providing transparency through monitoring & reporting for hospitals, medical office buildings, ambulatory surgical centers and other healthcare facilities. It includes electricity, heat, water, and natural gas.

Operate sustainably:  
be energy efficient  
and power resilient

Reference architecture



**Enablers**

	Platform	App	Service	Field Device
Energy Data Management (EDM)			•	
Energy Data Management Pure (EDM Pure)			•	
Energy Performance Insights			•	
Energy Monitoring			•	



Use case

# Providing selected access

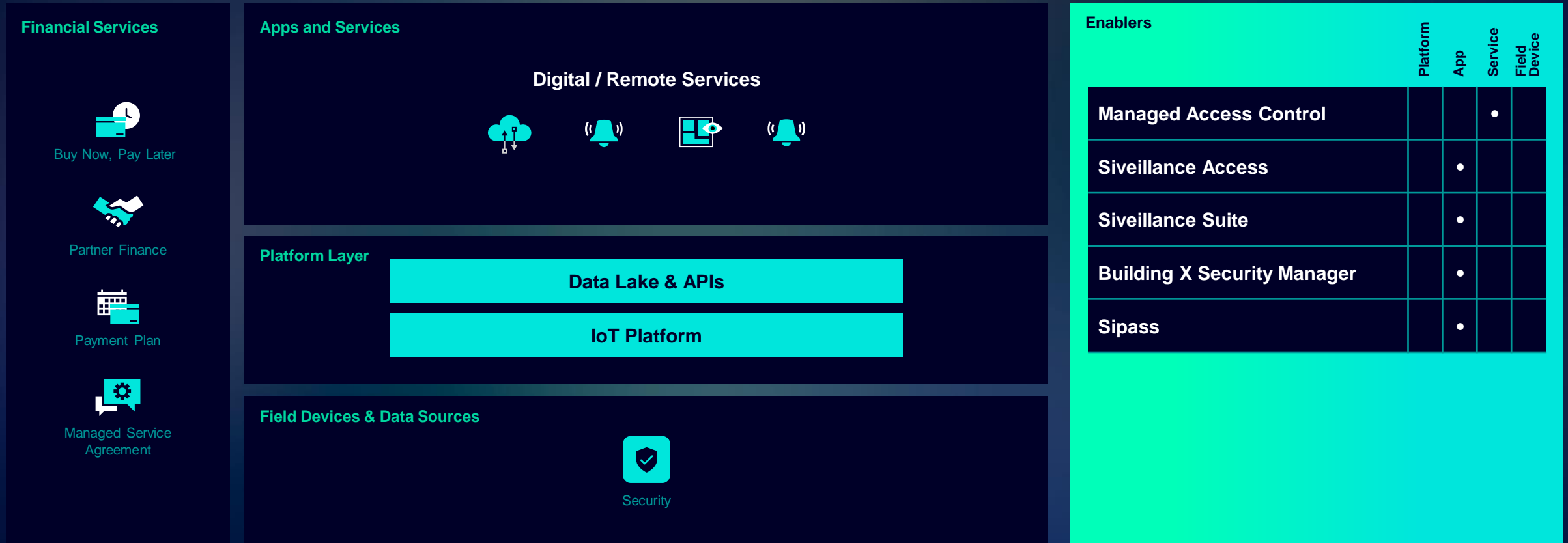
## Grant permission to access selected locations without the need for mechanical keys

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

Reference architecture

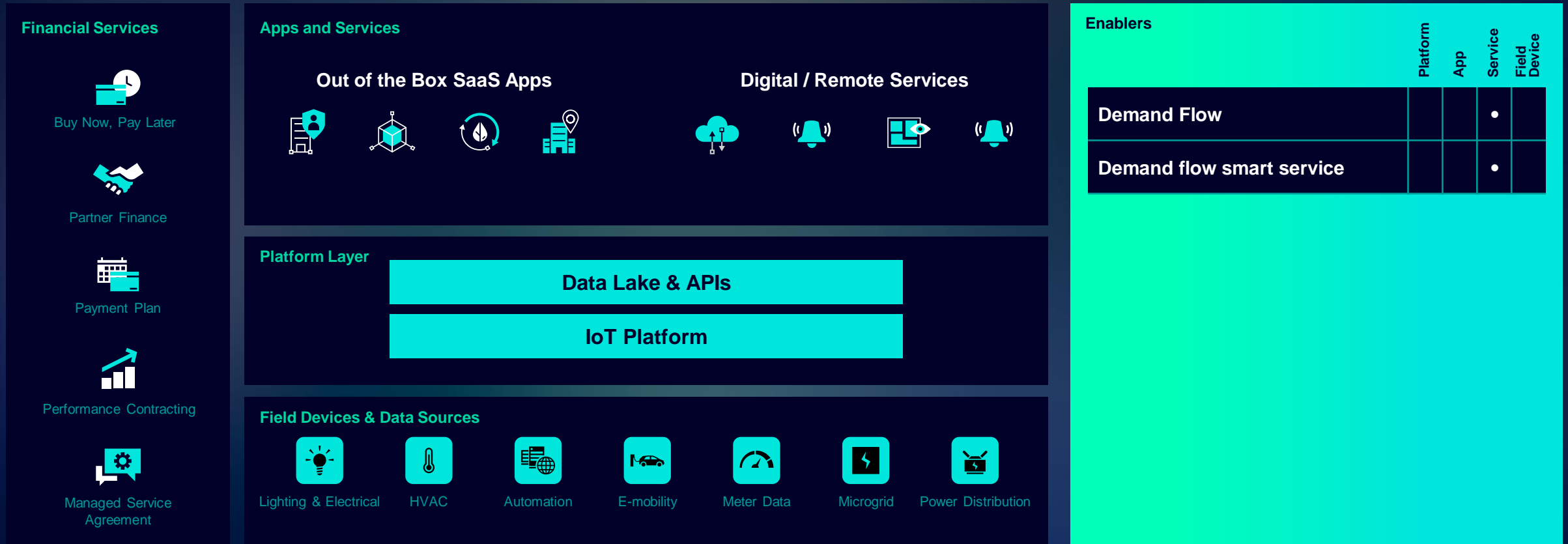


# Optimizing chiller plant in terms of energy consumption & increasing uptime.

As an owner or operator of a building I want to reduce the energy consumption, energy costs, maintenance costs and CO2 emissions of my chiller plant so that my buildings have lower operating costs and are more sustainable.

Operate sustainably:  
be energy efficient  
and power resilient

Reference architecture



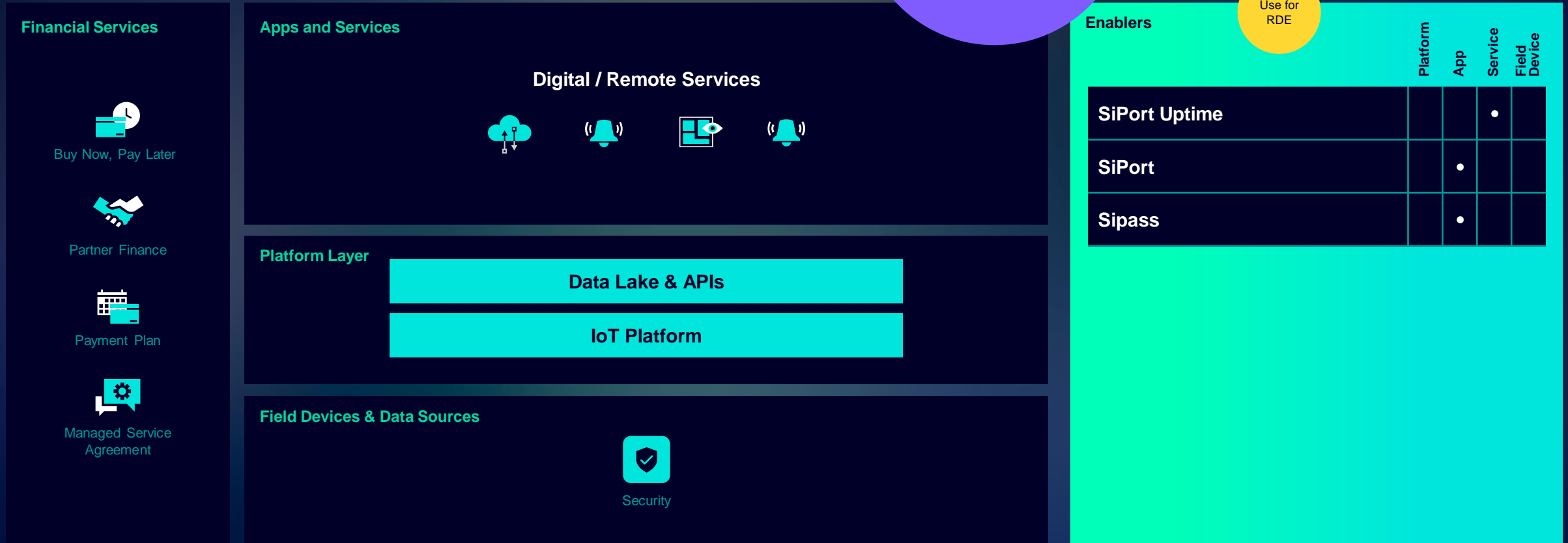
# Optimizing security system maintenance & performance

Continuous performance monitoring of the system key components  
 Identification of outliers to focus on faulty components or those that are generating abnormal level of alarms.

Protect people and assets

Drive staff productivity and reduce operational costs

Please localize/adapt to the target audience/the region



Use case

# Diagnosis of building performance

As an owner or operator of a building I want to reduce the operating costs, maintenance costs and CO2 emissions so that I can lower my operating costs and are more sustainable.

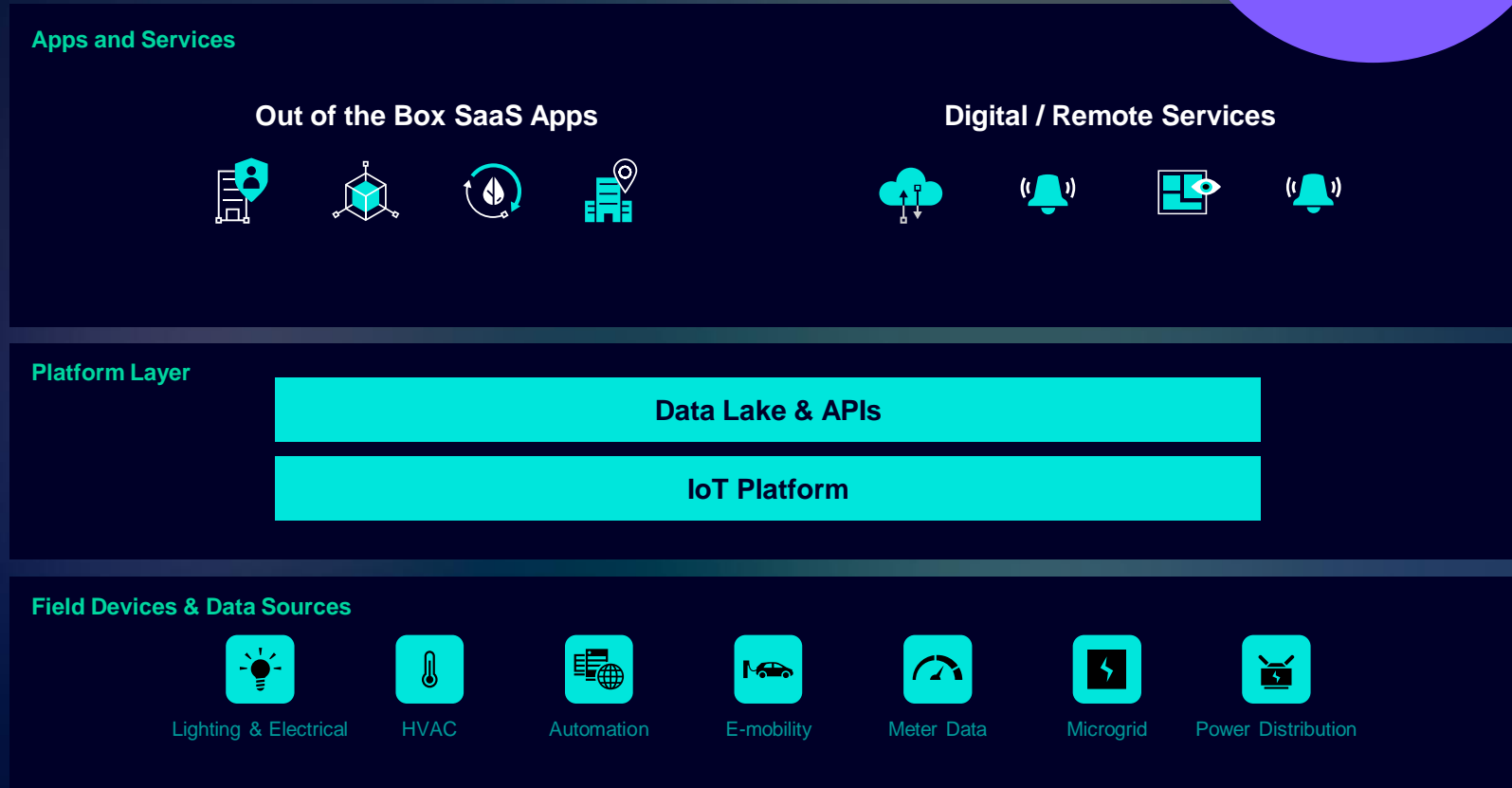
Please localize/adapt to the target audience/the region

Reduction of consumption, energy efficiency and lower CO2 emissions

Related strategic objective

Operate sustainably: be energy efficient and power resilient

Reference architecture



**Enablers**

Use for RAM

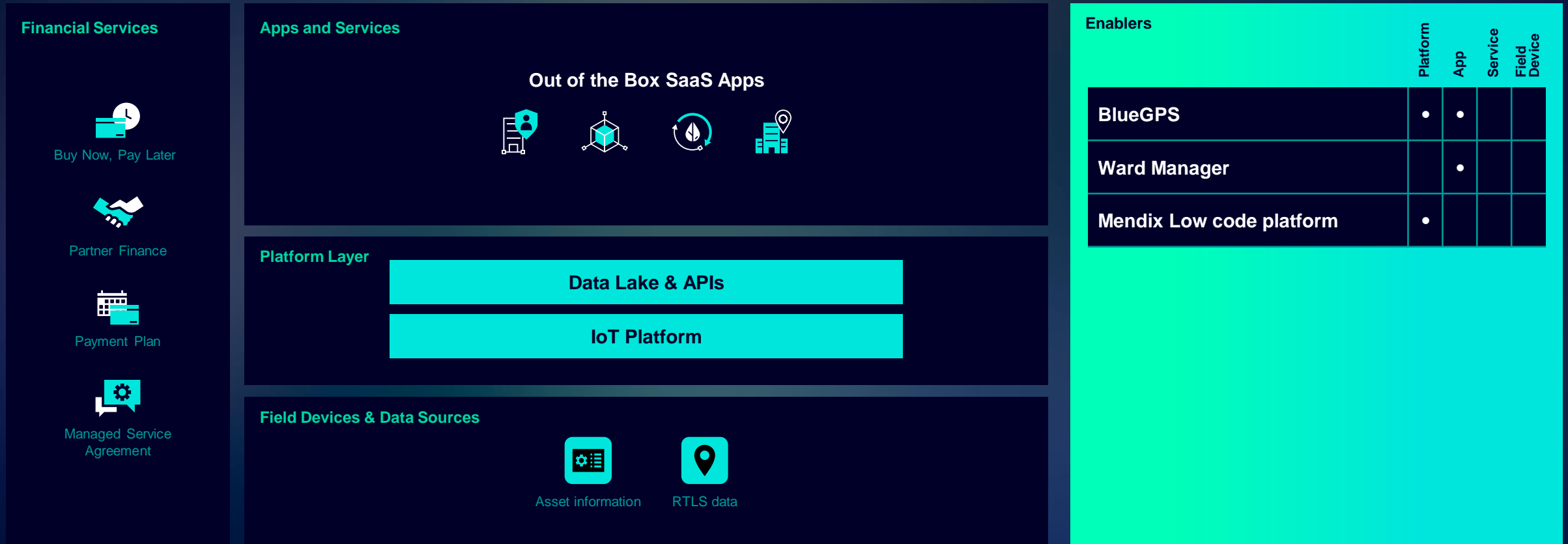
	Platform	App	Service	Field Device
Smart Building Assessment			•	
CloudOps			•	
CloudFIMs			•	

# Medical asset booking for nurses

Allow medical staff to check the availability of the medical assets and book them if necessary, so that assets will be available for treatment when it is needed.

Drive staff productivity and reduce operational costs

Reference architecture

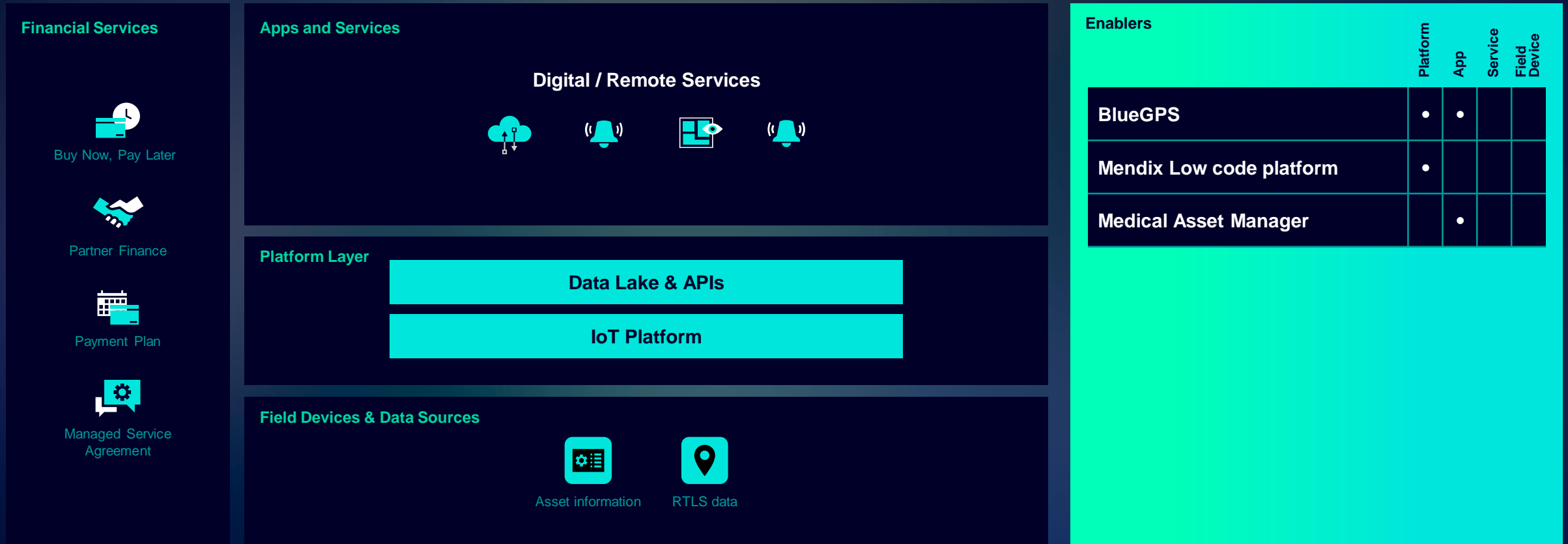


## Medical asset scheduling for maintenance

Enable the medical engineer to check the availability of the medical assets for a standard service maintenance and schedule a time for maintenance. Ability to block the asset for treatment in case of malfunctioning.

Drive staff productivity and reduce operational costs

Reference architecture

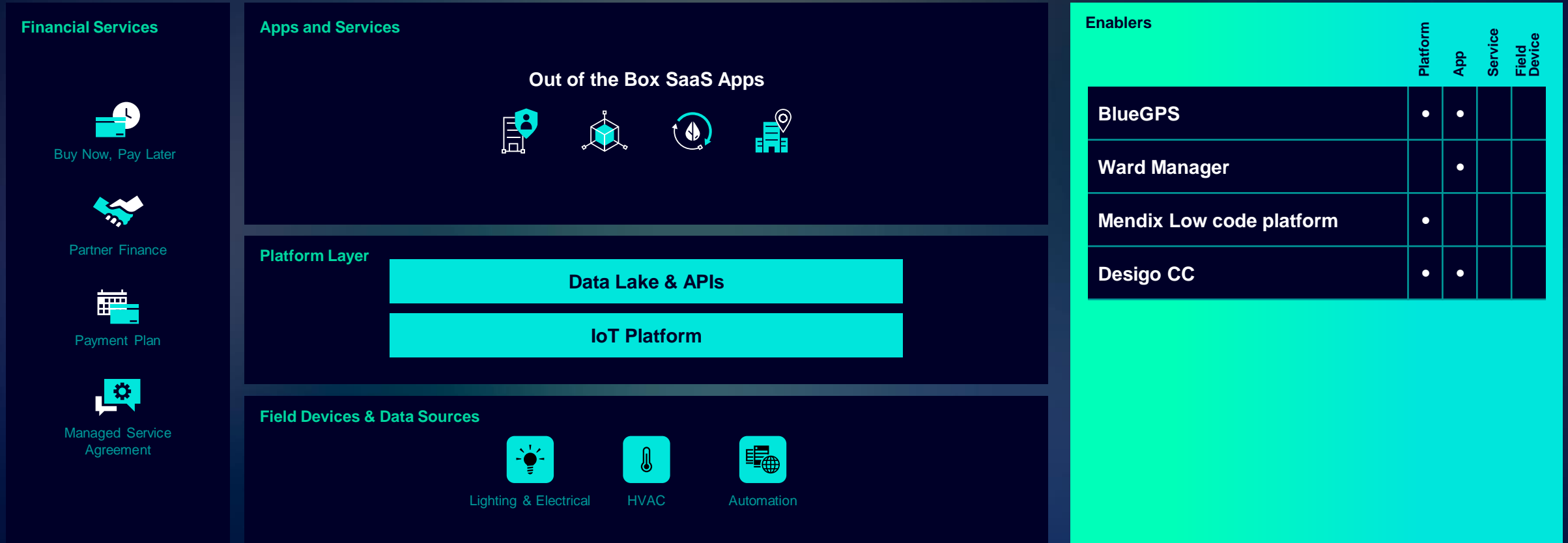


# Monitoring & Controlling Patient Rooms Remotely by Nurse

Enable nurses to monitor and control patient room temperature, lights & shading remotely in their responsible area remotely.

Drive staff productivity and reduce operational costs

Reference architecture



Use case

Ensure core components of Siemens building automation, fire & security are updated for cybersecurity protection

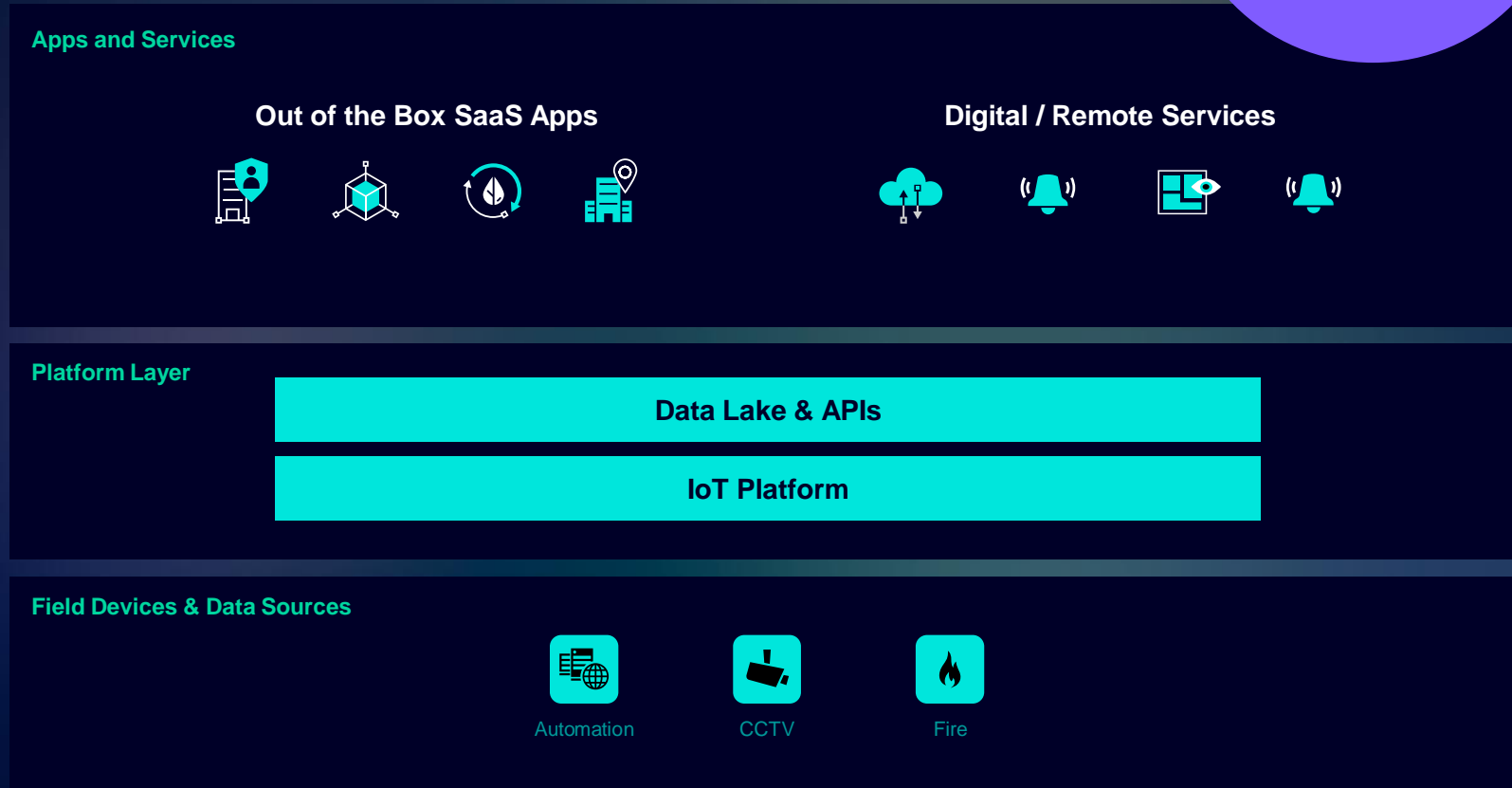
Update and upgrade systems to maintain the level of security in a changing threat landscape. Ensure proper backups of systems in case of an incident.

Please localize/adapt to the target audience/the region

Related strategic objective

Ensure healthcare cybersecurity and comply with standards

Reference architecture



**Enablers**

Use for RDE

	Platform	App	Service	Field Device
Software Update			•	
Software Upgrade			•	
Backup & Restore			•	



Use case

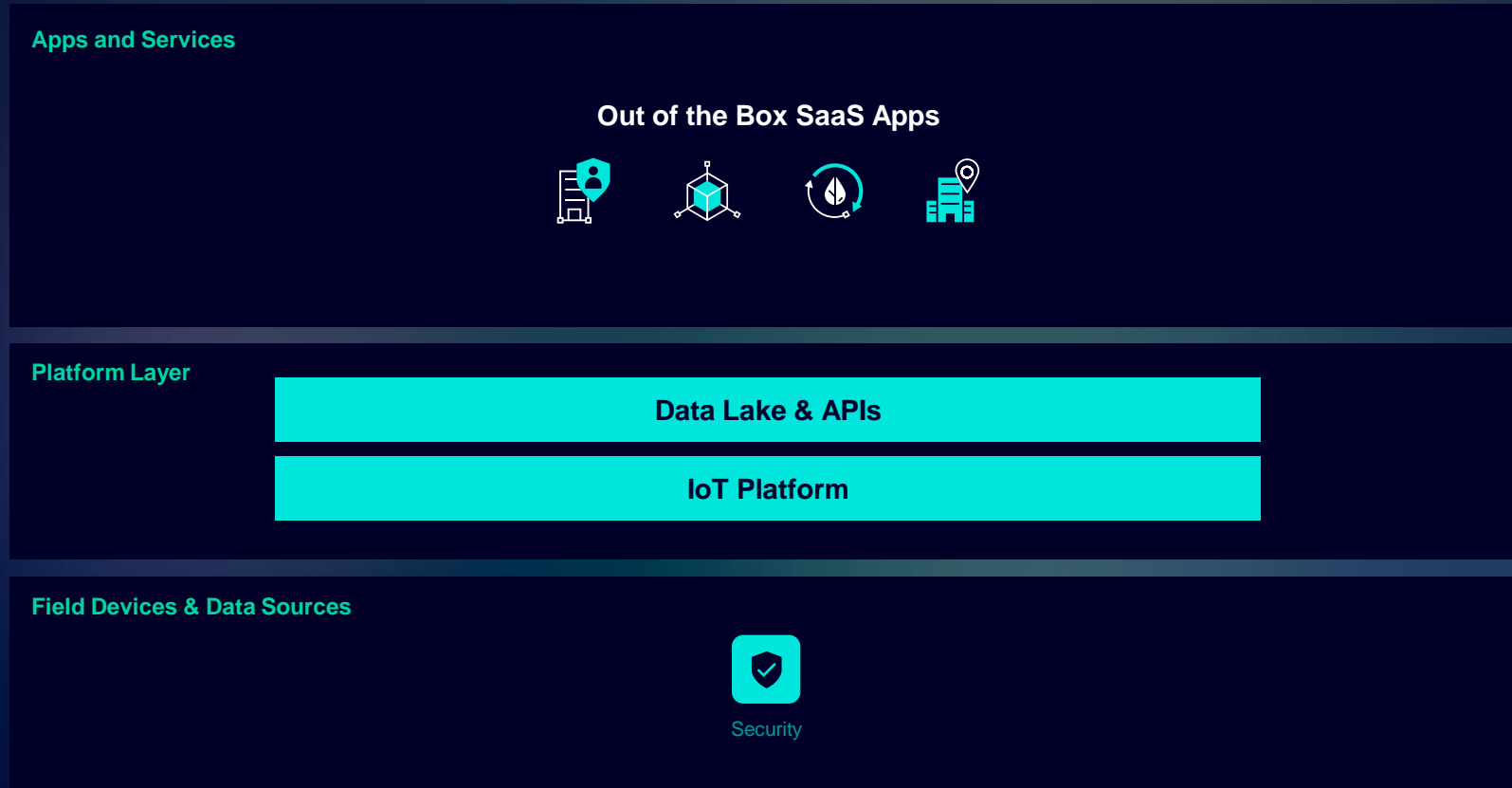
**Automated onboarding and offboarding employees through the SCIM\***  
**Automatic creation of an identity within Security Manager / Facility Manager allowing to link imported groups to physical access privileges. Increases data-consistency, efficiency and security.**

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

Reference architecture



**Enablers**

	Platform	App	Service	Field Device
Building X Security Manager		•		
SiPass integrated		•		
SIPORT (excl. RAM)		•		

Use case

## Use Smart phone to open doors

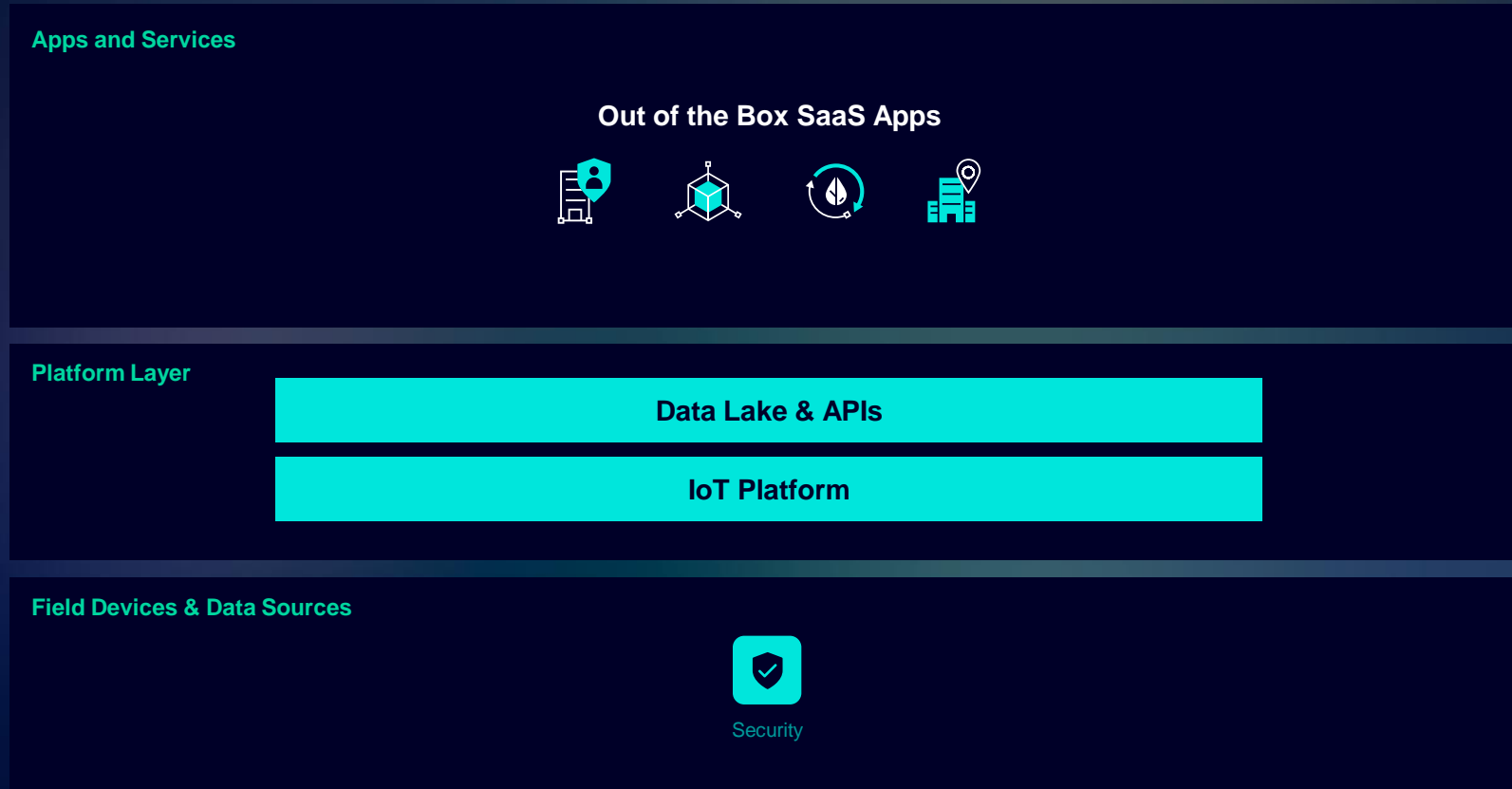
Mobile App acts as a virtual wallet to open doors with compatible BLE readers. Immediate and secure “over-the-air” issuance or revoking of access credentials. Reducing costs of physical cards.

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

Reference architecture



**Enablers**

	Platform	App	Service	Field Device
Building X Security Manager		•		
Siveillance Access Mobile		•		
SiPass integrated		•		
SIPORT (excl. RAM)		•		

Use case

## Reactive Maintenance during operation

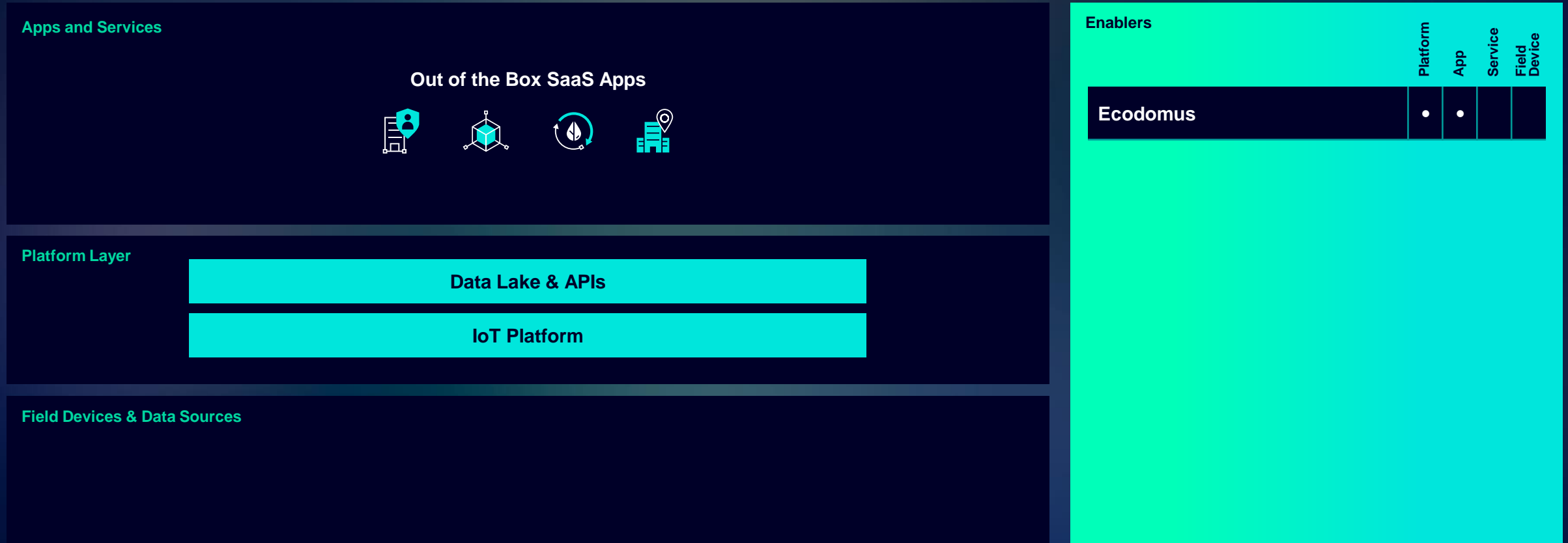
Ad-hoc maintenance and repair tasks due to unforeseen aging and equipment breakage. Ability to swiftly react, identify and fix the source of the disruption, e.g. a plumbing leak.

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

Reference architecture



Use case

# Preventive Maintenance efficiency enabled by digital twin

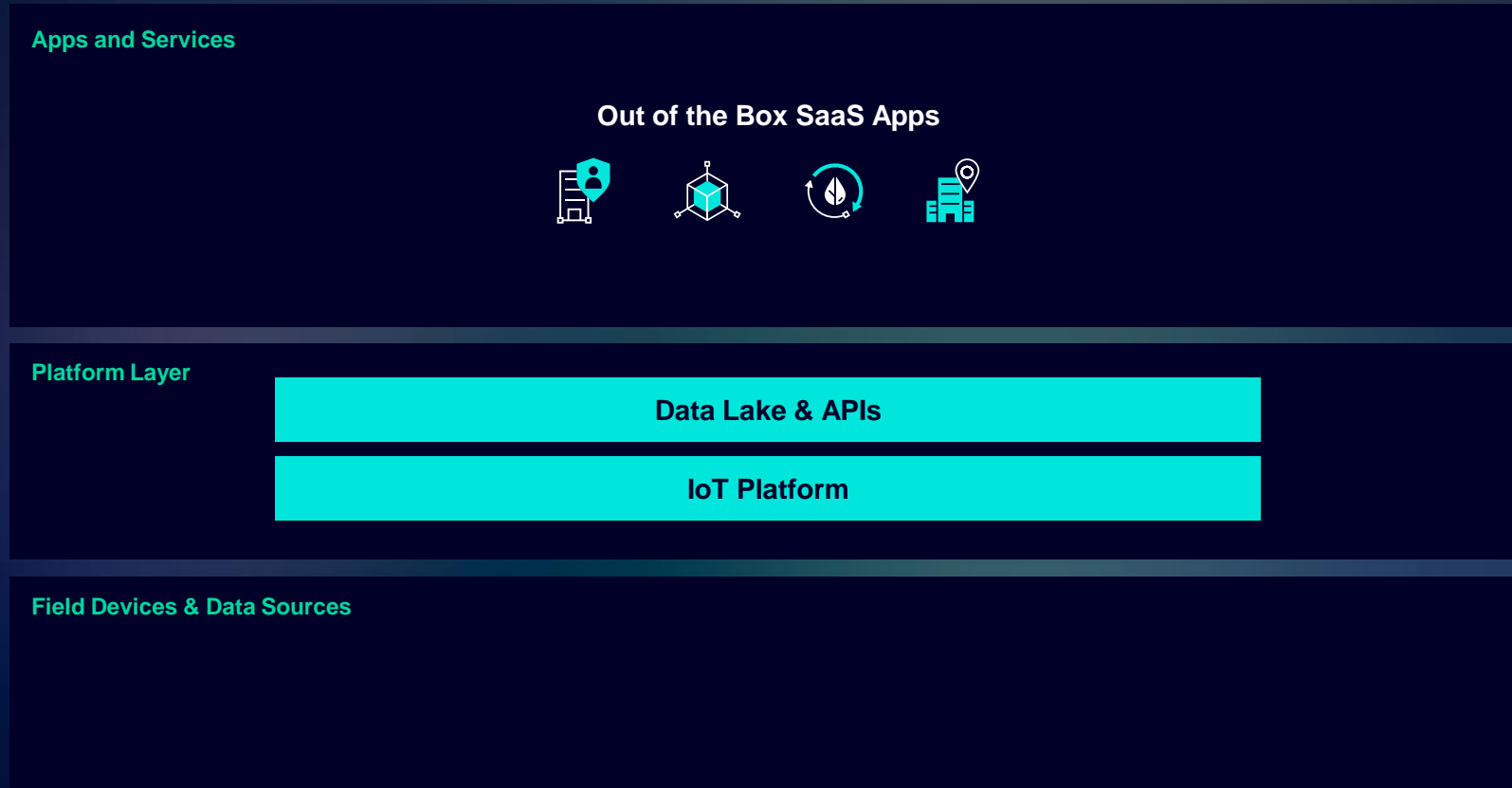
Preventive maintenance for high system availability and extend the lifetime of sensitive and critical equipment. In case of servicing condensers of an AC systems, this can be challenging without technical information available.

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

Reference architecture



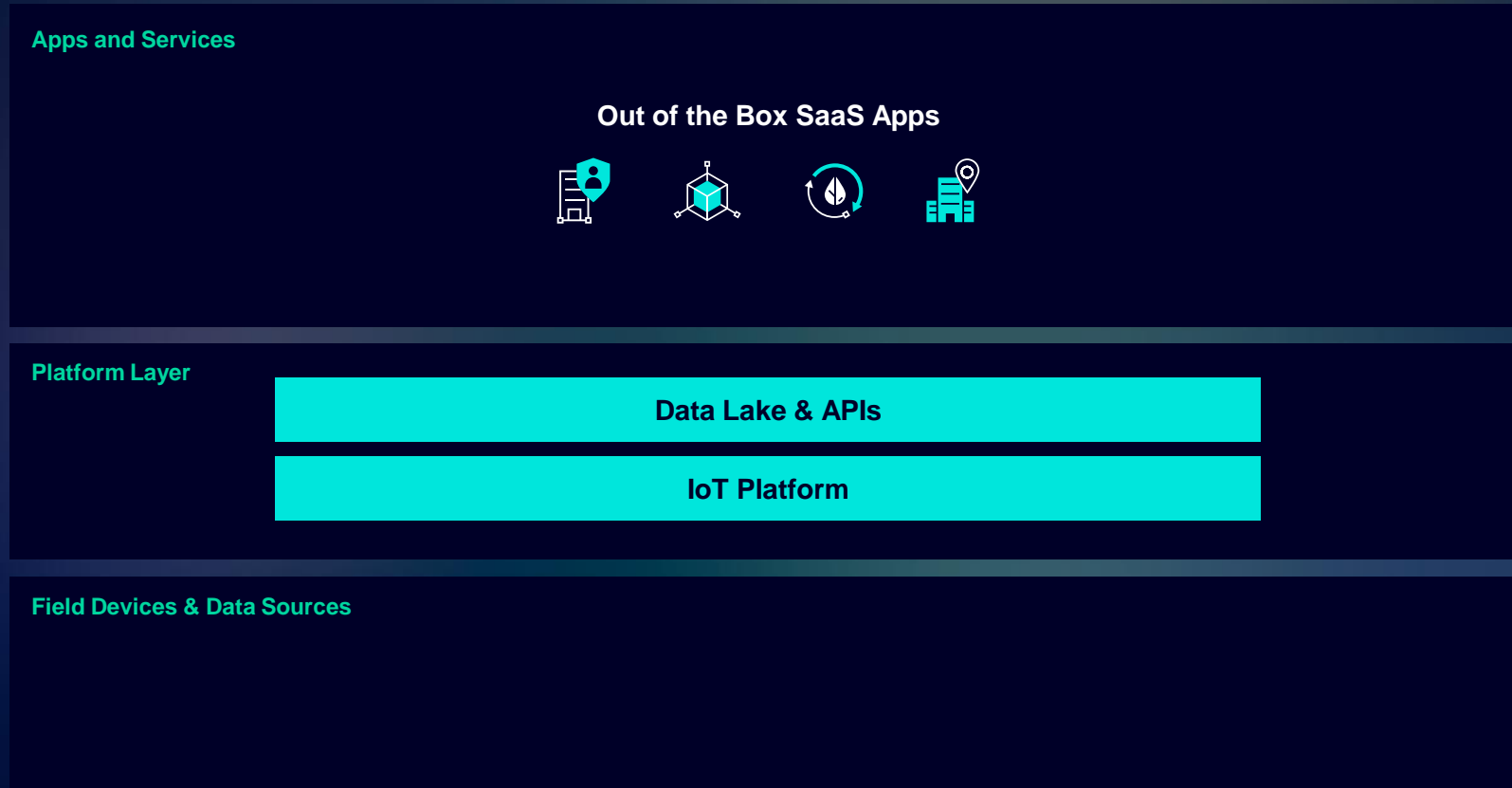
Enablers	Platform	App	Service	Field Device
Ecodomus	•	•		

# Regulatory audit management enabled by digital twin

## Inspection and re-certification of critical equipment and systems, e.g. wet standpipe sprinkler systems.

Ensure healthcare cybersecurity and comply with standards

Reference architecture



**Enablers**

	Platform	App	Service	Field Device
<b>Ecodomus</b>	•	•		

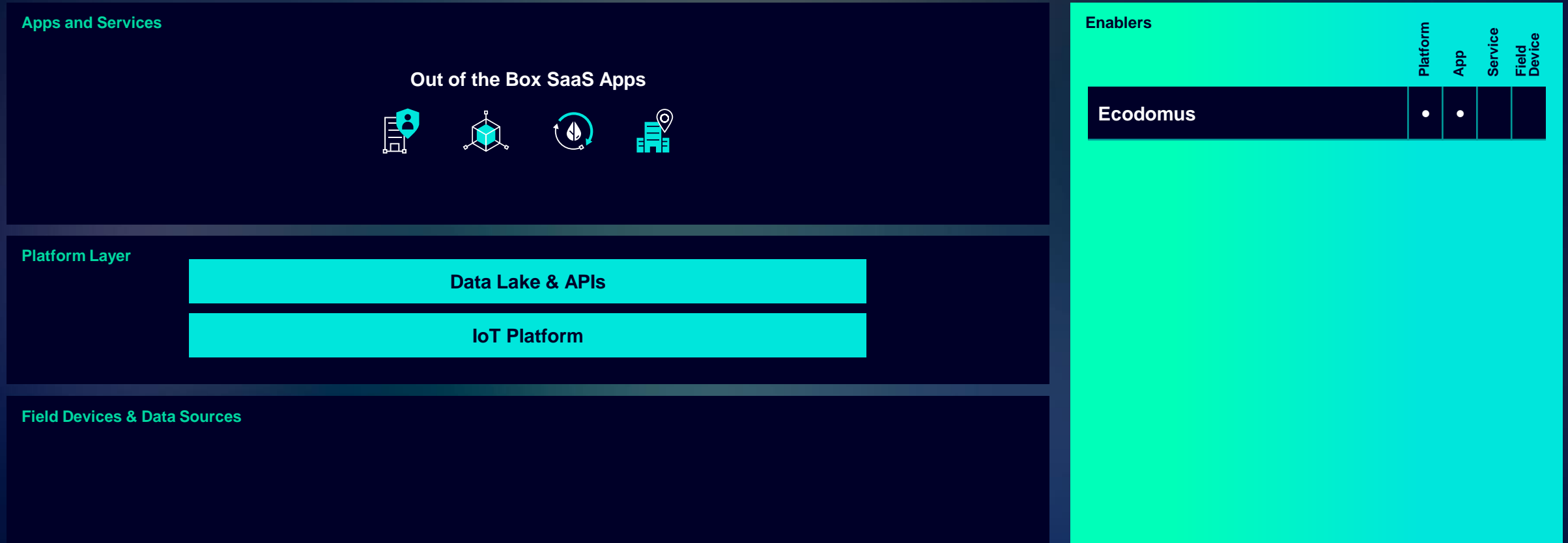
Use case

**Information handover across building's lifecycle enabled by digital twin**  
Reliable transfer of data to another party between the individual life cycle phases of a building. Ensuring information availability and high data quality to make the most of BIM.

Related strategic objective

Reduce construction time and costs.

Reference architecture



Use case

Eliminate disturbances to patients & staff during fire detection and improve operational readiness

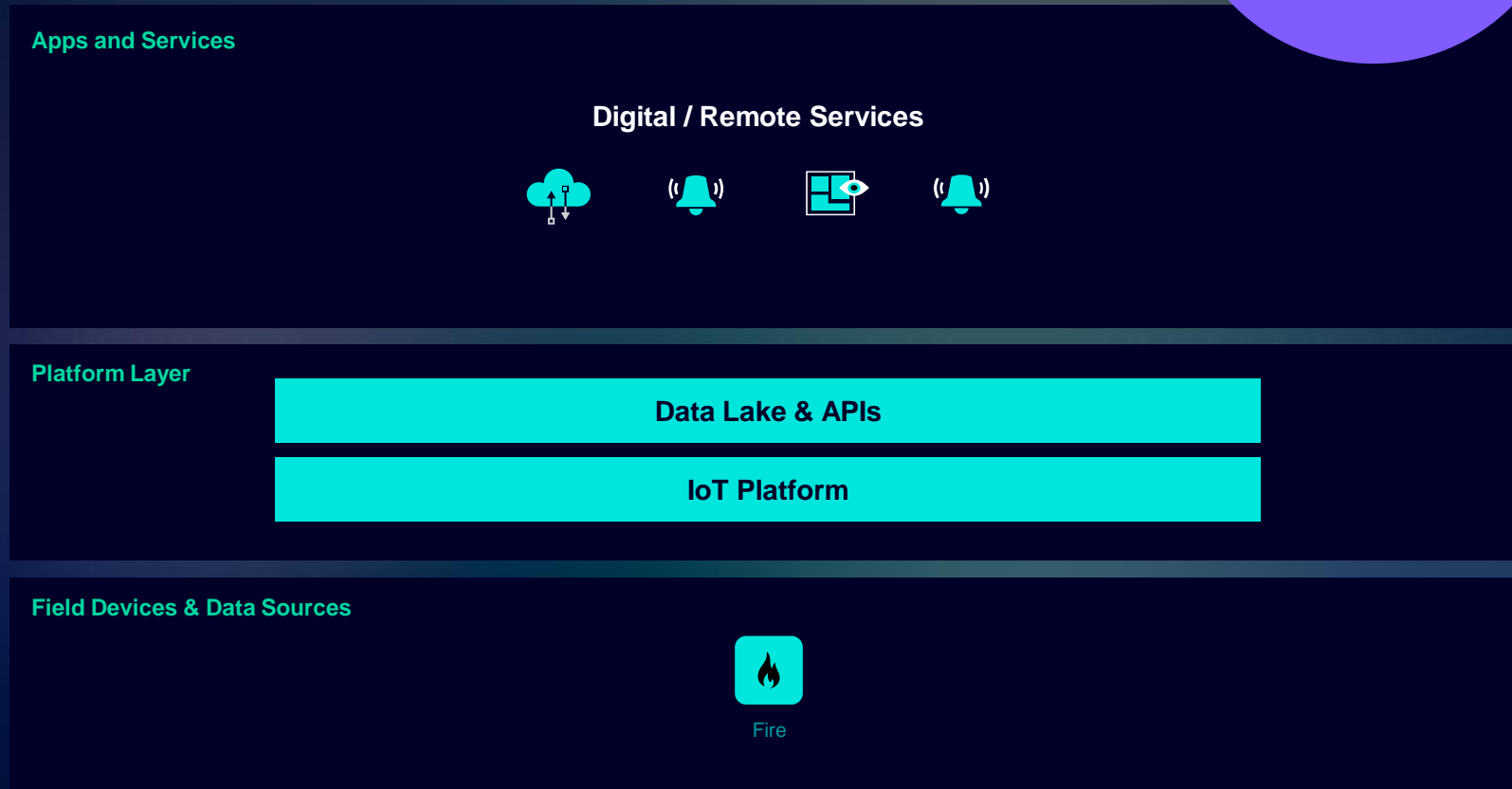
Use automated, remote fire detector testing and improve operational readiness without disturbing patients and staff.

Related strategic objective

Improve patients outcomes and experience

Please localize/adapt to the target audience/the region

Reference architecture



Enablers

Use for EMEA

	Platform	App	Service	Field Device
Disturbance Free Testing			•	
System Performance Optimization			•	

Use case

# Monitoring to minimize false fire alarms

## Remotely monitor soiling and danger levels to reduce false fire alarms in environments that could contaminate smoke detectors

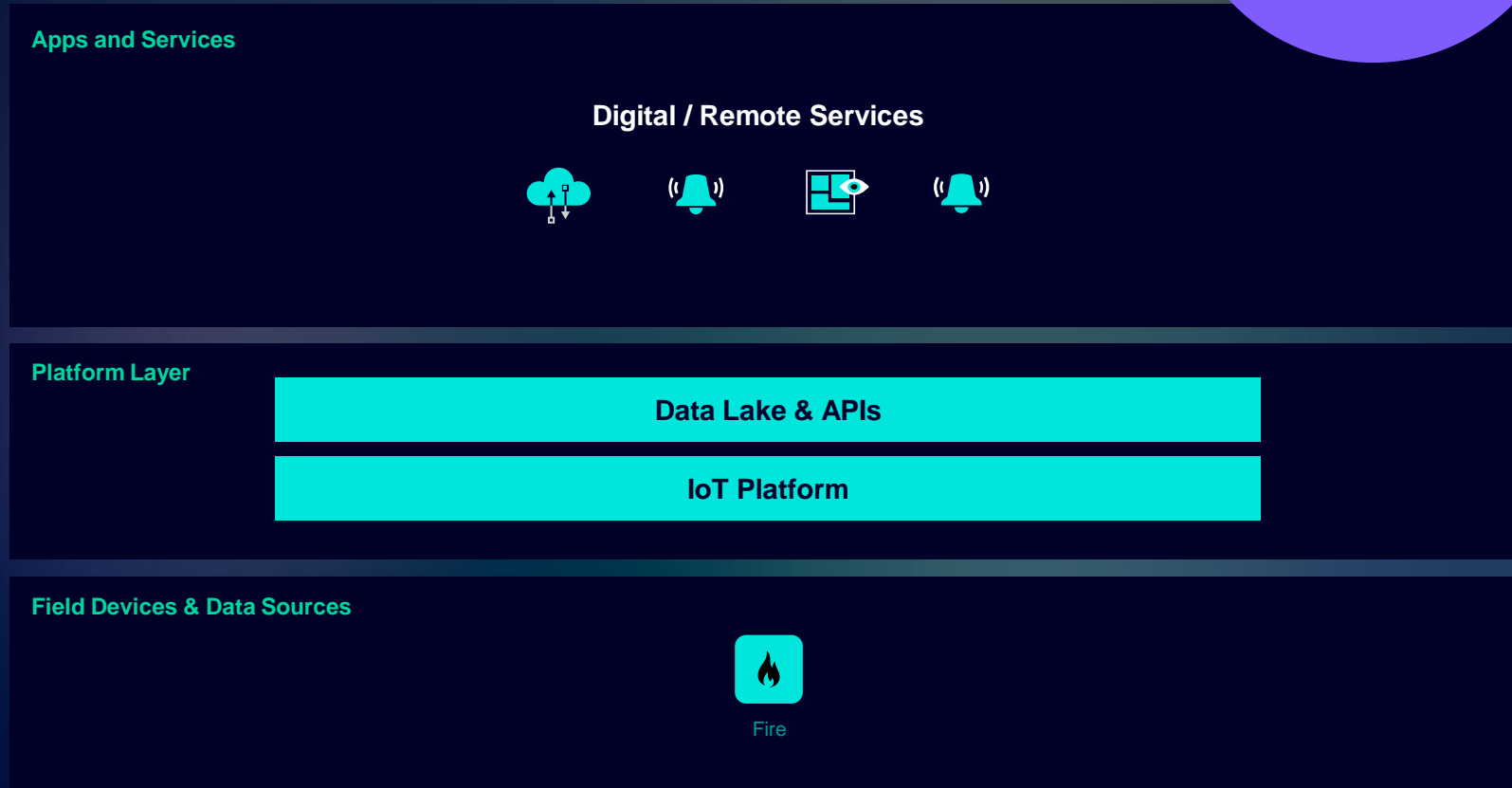
Please localize/adapt to the target audience/the region

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

Reference architecture



**Enablers**

Use for RDE

	Platform	App	Service	Field Device
Soiling Report			•	
Danger Level Report			•	



Use case

# Meeting compliance requirements for fire safety

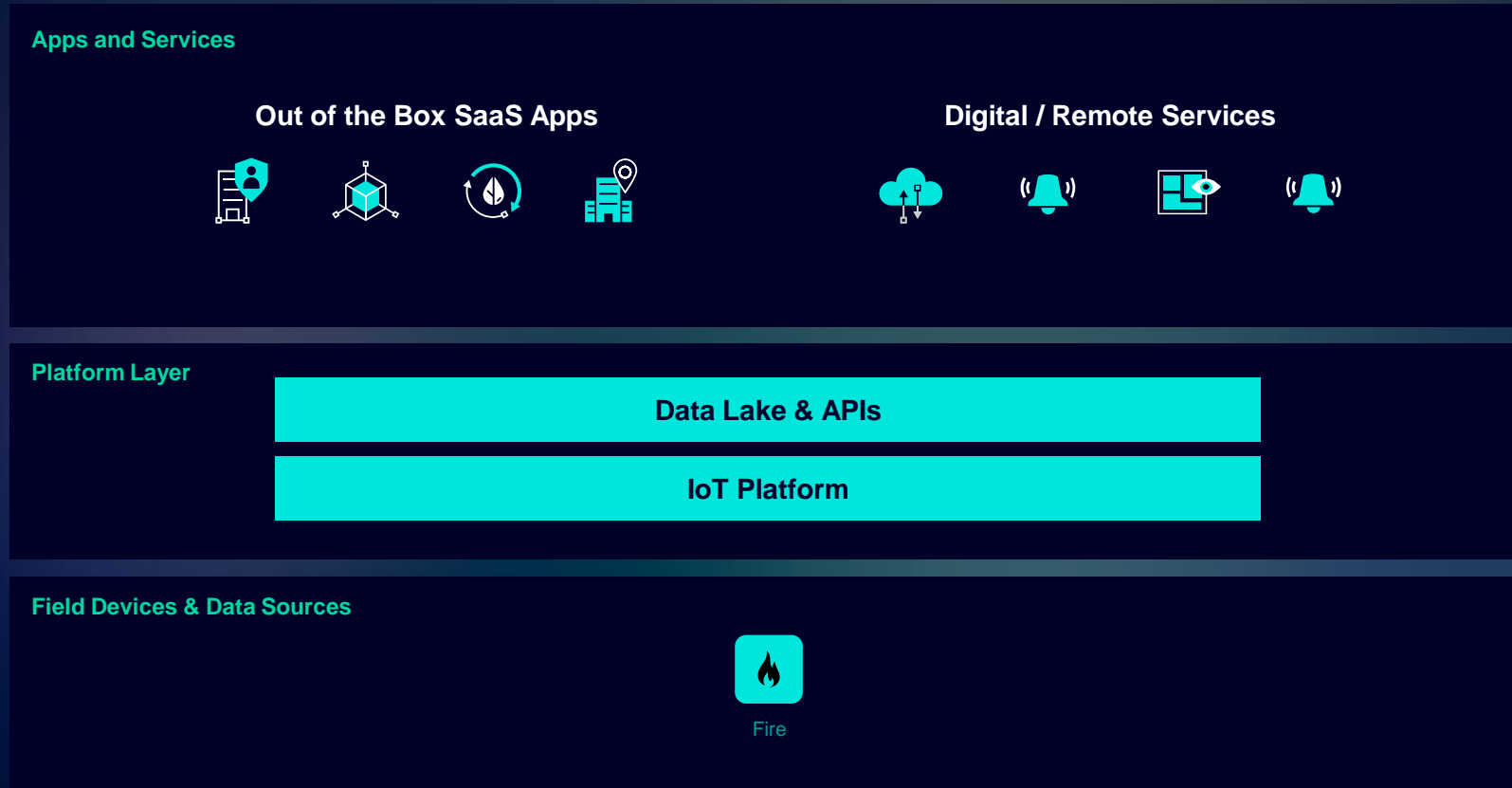
## Effectively prepare for fire safety audits by automating reporting process enabling a streamlined effective approach to reporting.

Related strategic objective(s)

Ensure healthcare cybersecurity and comply with standard

Drive staff productivity and reduce operational costs

Reference architecture



**Enablers**

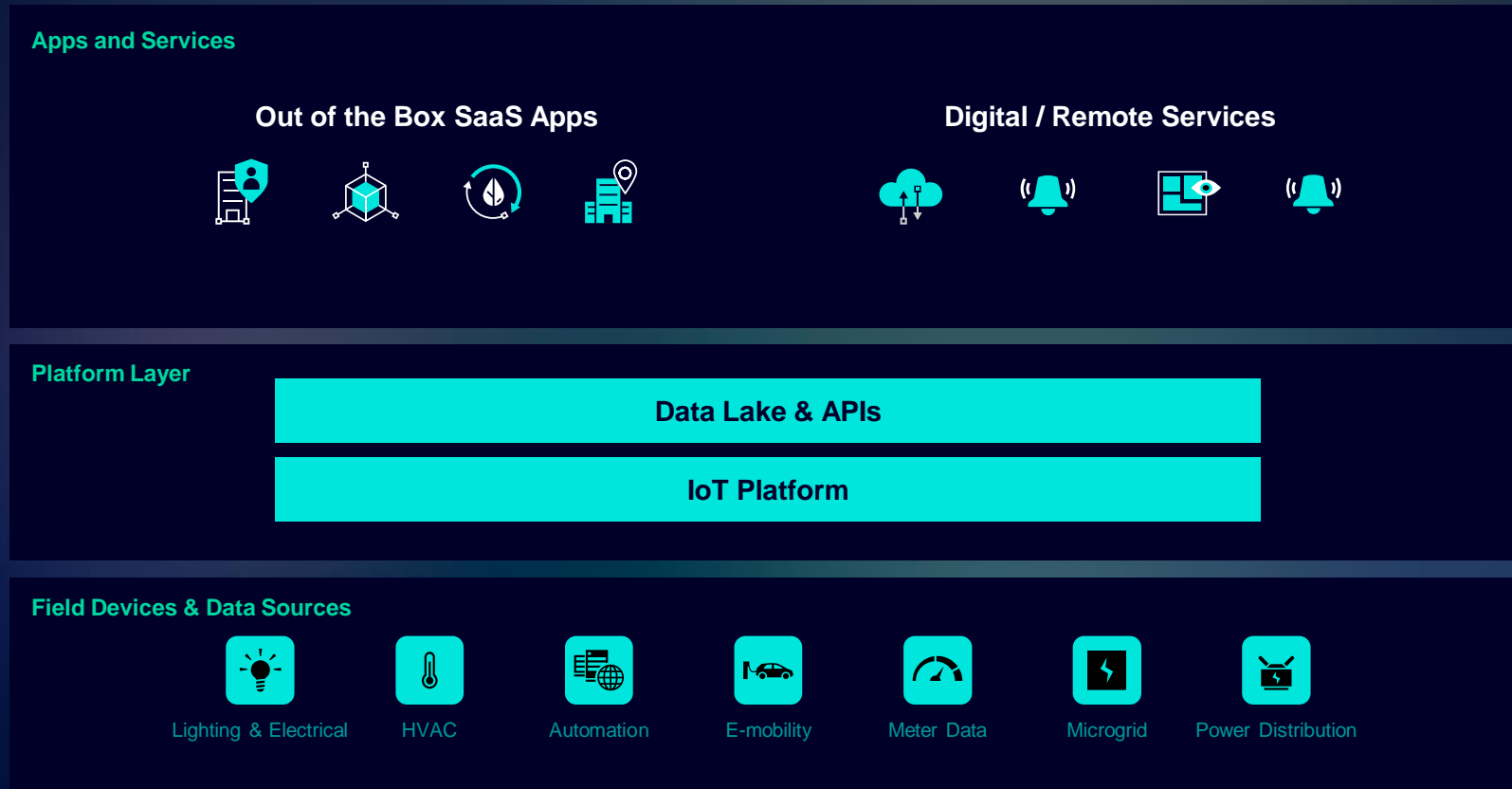
	Platform	App	Service	Field Device
eLog Book			•	

# GHG emission reduction across processes and footprint

This reduces greenhouse gas emissions by looking holistically at an organization's carbon footprint and finding ways to reduce emissions across all processes

Operate sustainably:  
be energy efficient  
and power resilient

Reference architecture



**Enablers**

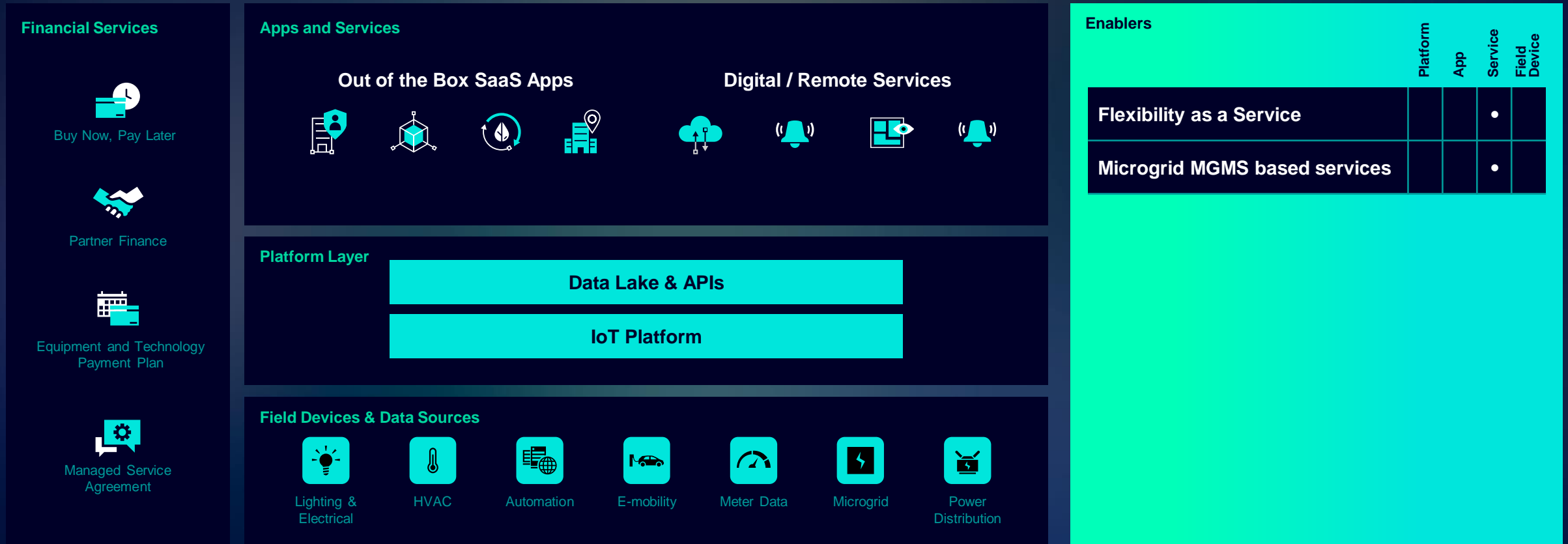
	Platform	App	Service	Field Device
Demand Flow			•	
Smart Building Assessment			•	
Flexibility as a Service			•	

## Integrating renewables as a performance service

Generate & store own green power, Manage energy consumption through facility improvement and building performance optimization measures. The scope can comprise monitoring and supervising, integrating electric vehicle charging.

Operate sustainably:  
be energy efficient  
and power resilient

### Reference architecture

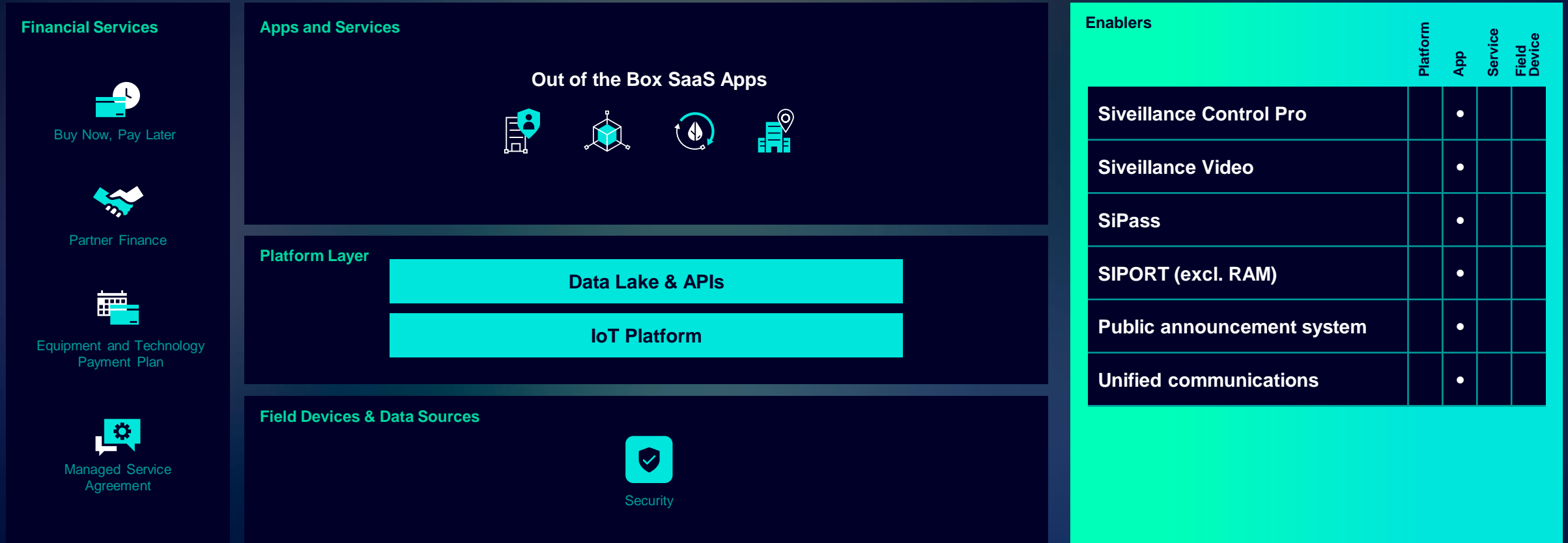


# Protect staff from aggressive/uncooperative patients or visitors

Create a safe place for medical staff when interacting with a patient or visitor. Enable quick alarming and action when staff is in danger

Protect People and Assets

Reference architecture



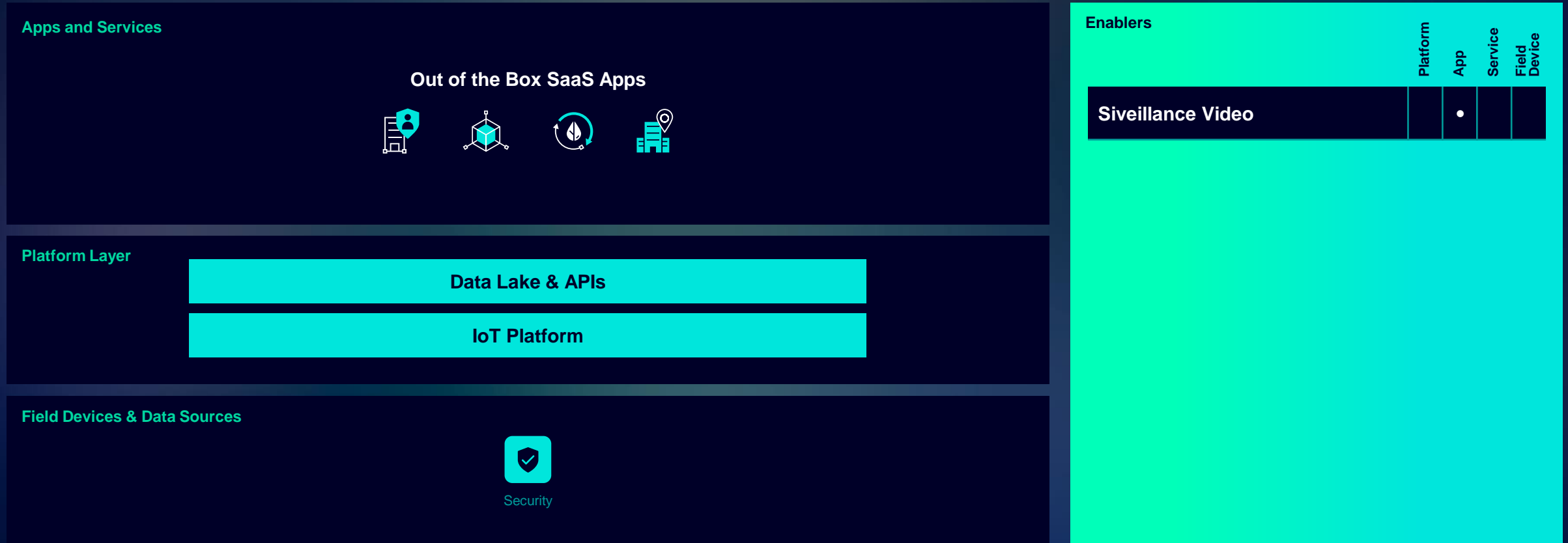
	Platform	App	Service	Field Device
Siveillance Control Pro		•		
Siveillance Video		•		
SiPass		•		
SIPORT (excl. RAM)		•		
Public announcement system		•		
Unified communications		•		

# Deter aggression towards nursing staff automatically through analytics

By combining video and audio analytics, hospitals can use filters that identify potential threats, such as verbal aggression (duress, anger, or fear) and alert security teams immediately.

Protect People and Assets

Reference architecture

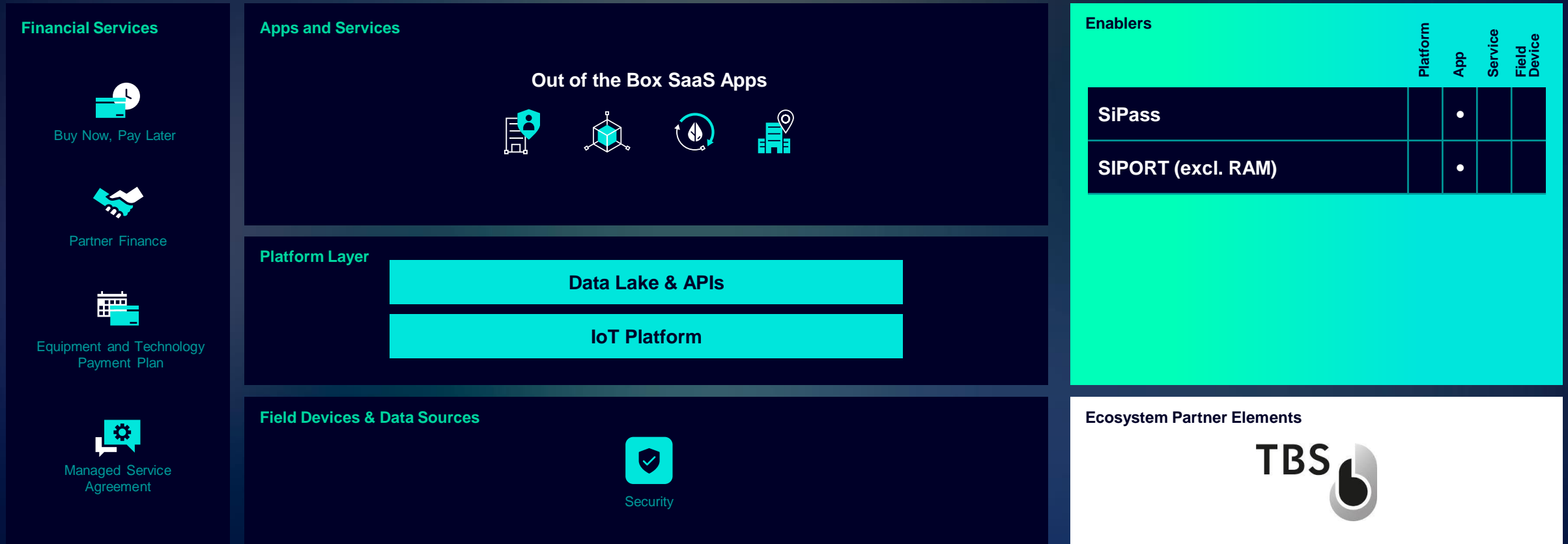


## Securing access to high-value and critical assets

Physical access control in hospitals is a crucial component of physical security, especially for protecting valuable assets such as expensive medical equipment and sensitive patient data. Increased level of protection can be achieved using biometric authentication.

Protect People and Assets

Reference architecture

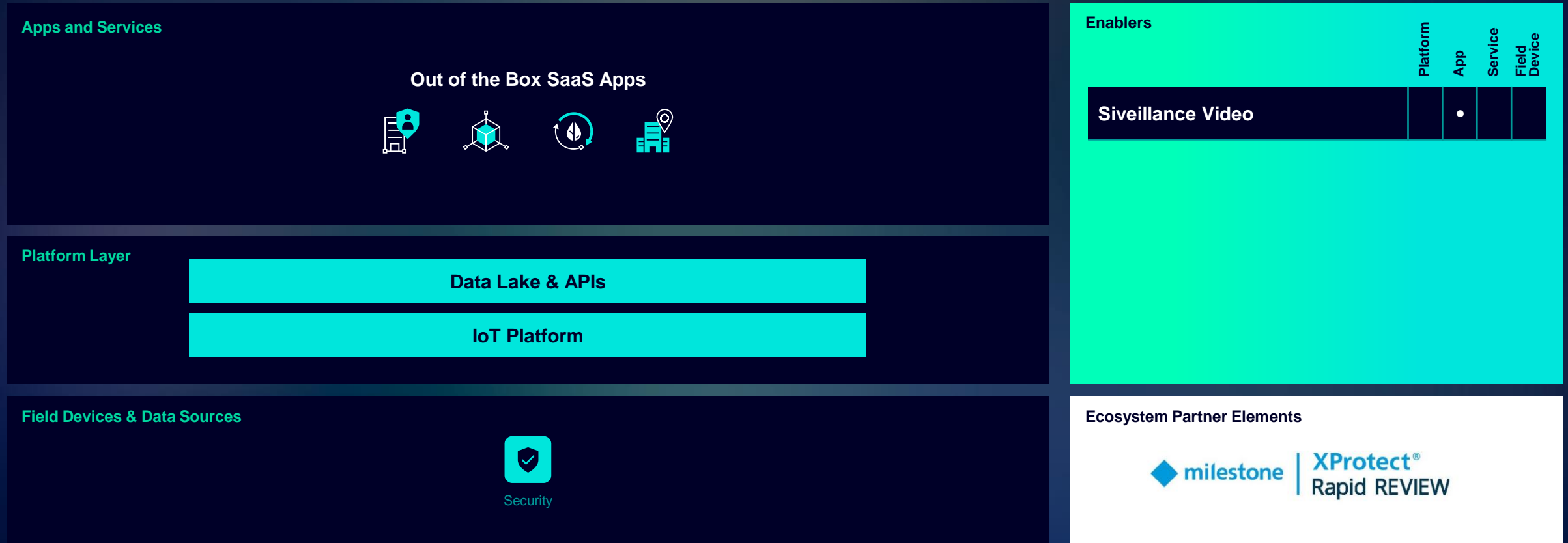


# Finding & Monitoring wandering patients (video analytics)

Mitigate the risk of patients leaving the ward and prevent potential conflicts through live video monitoring, two-way audio communication and potentially personal interaction.

Protect People and Assets

## Reference architecture

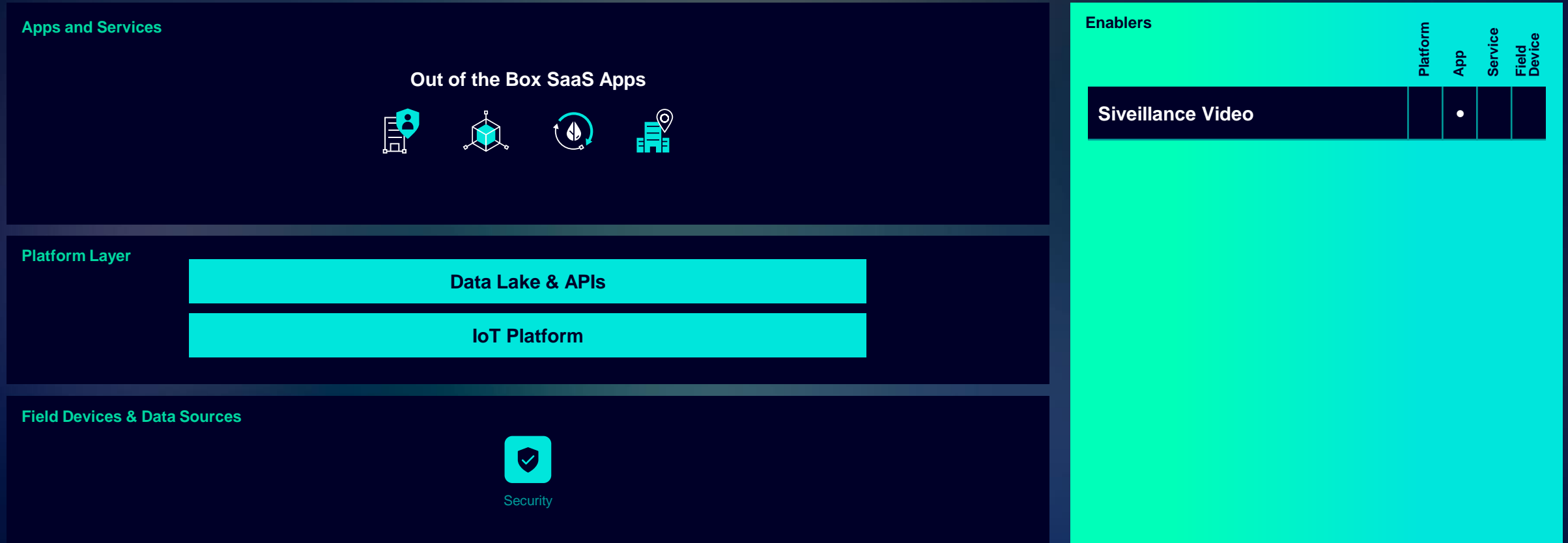


## Detect patient falls

Keeping a watchful eye over your treatment rooms will empower your nurses to spot a dangerous situation before it happens, while two-way audio helps ensure patients wait for assistance instead of attempting to leave their beds.

Protect People and Assets

Reference architecture



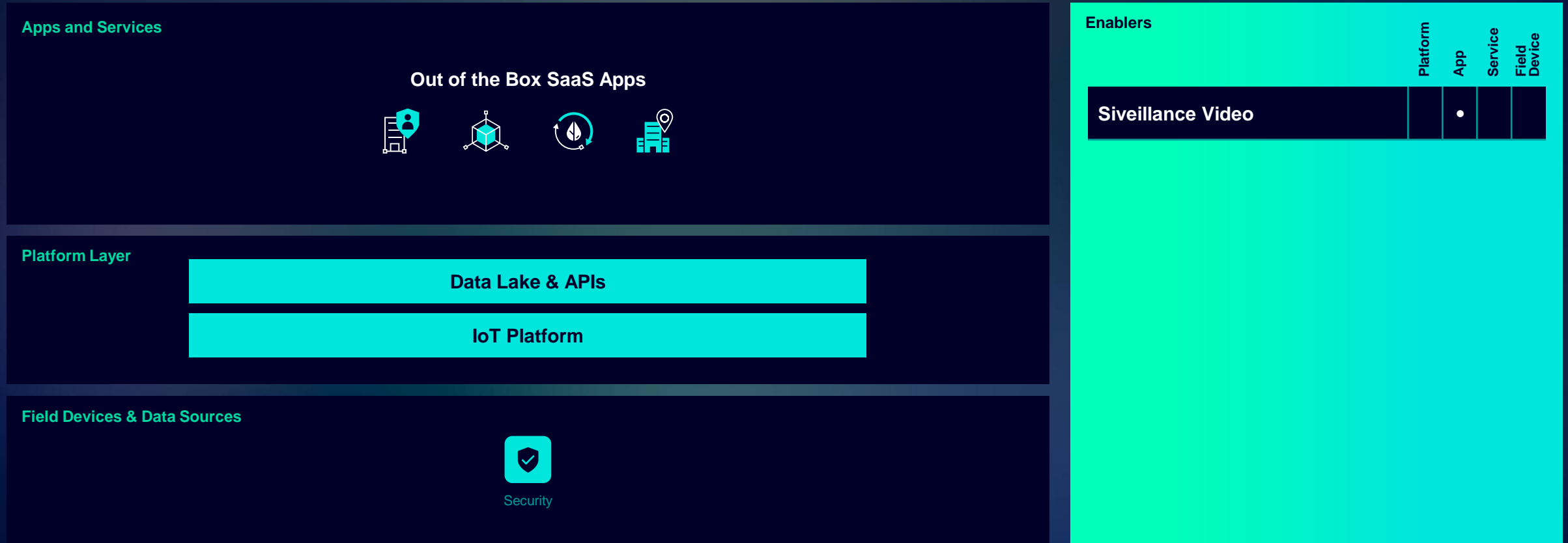


# Enabling nurses to monitor multiple patients simultaneously (using video)

Remote patient monitoring can support in situations where the hospital would make use of a costly 1:1 patient sitter service — allowing one nurse to observe multiple patients at once

Protect People and Assets

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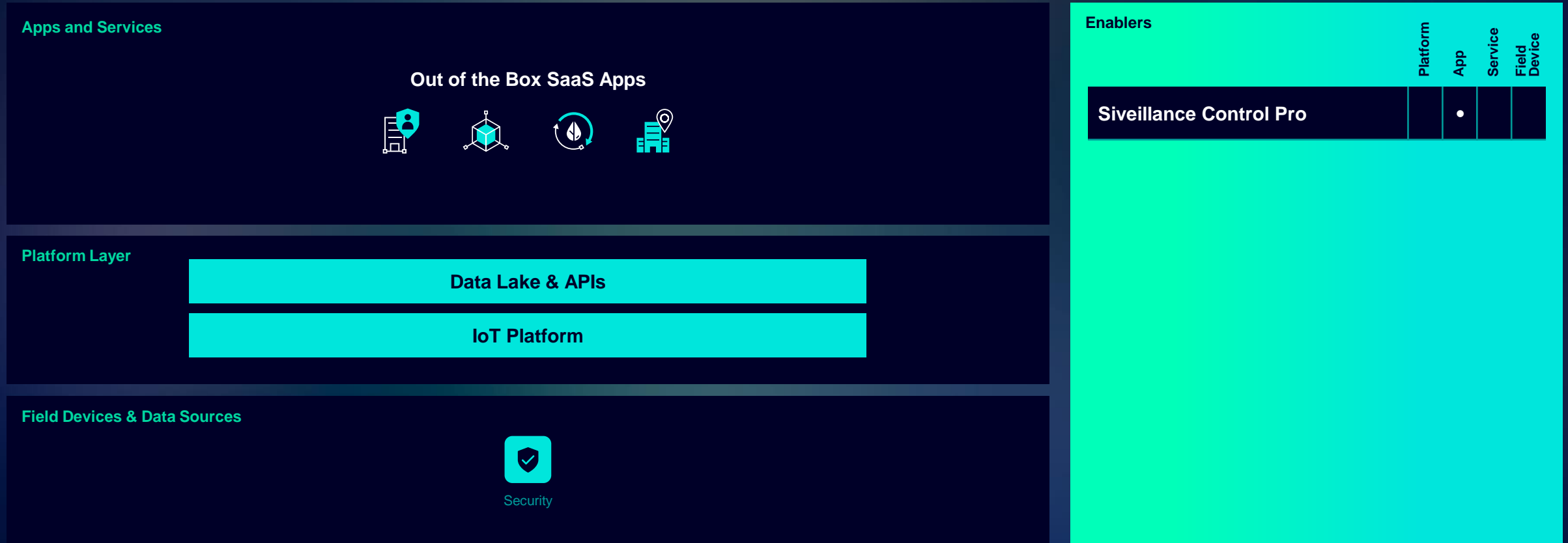
Use case

**Manage security incidents fast and effectively (using an integrated security management system)**  
Many incidents in hospitals need fast and efficient handling. By integrating different security systems and communications channels, alarms reach the right staff at the right time and enables them to act swiftly.

Related strategic objective

Protect People and Assets

Reference architecture



Use case

Full transparency and control of fire safety systems via mobile devices  
Monitoring of multi-site dashboards real-time, viewing and receiving  
automated notifications and options to share diagnostic data  
accessible via an intuitive application on a mobile device

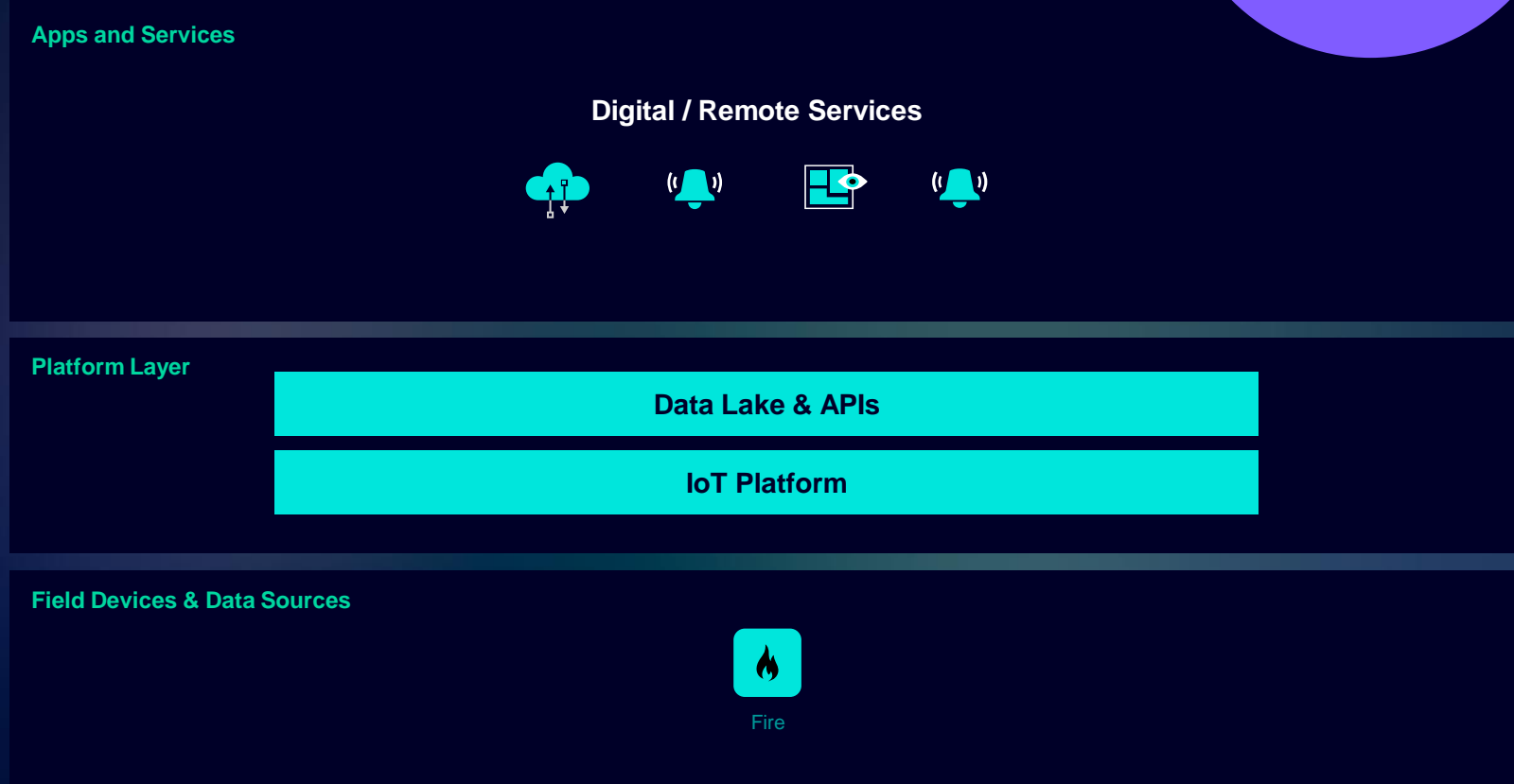
Please localize/adapt to the target audience/the region

Events, receipt of notifications conveniently

Related strategic objective

Protect People and Assets

Reference architecture



Enablers

Use for RDE

	Platform	App	Service	Field Device
<b>Fire Connect as a Service for</b> <ul style="list-style-type: none"> <li>Siemens Sinteso Fire Safety Systems</li> </ul>			•	

Use case

### Optimize performance of fire safety systems

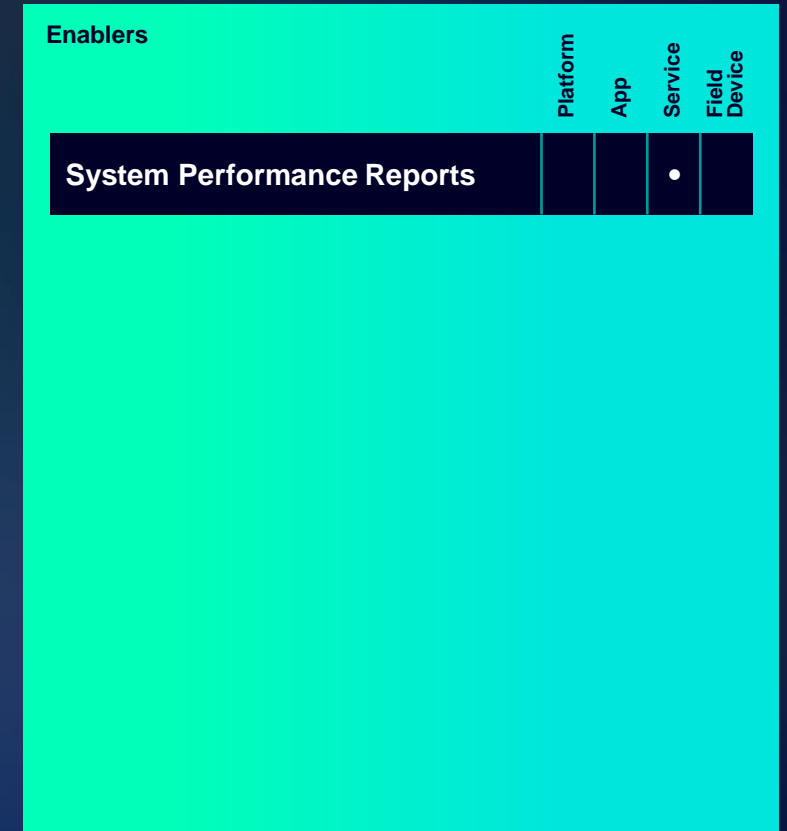
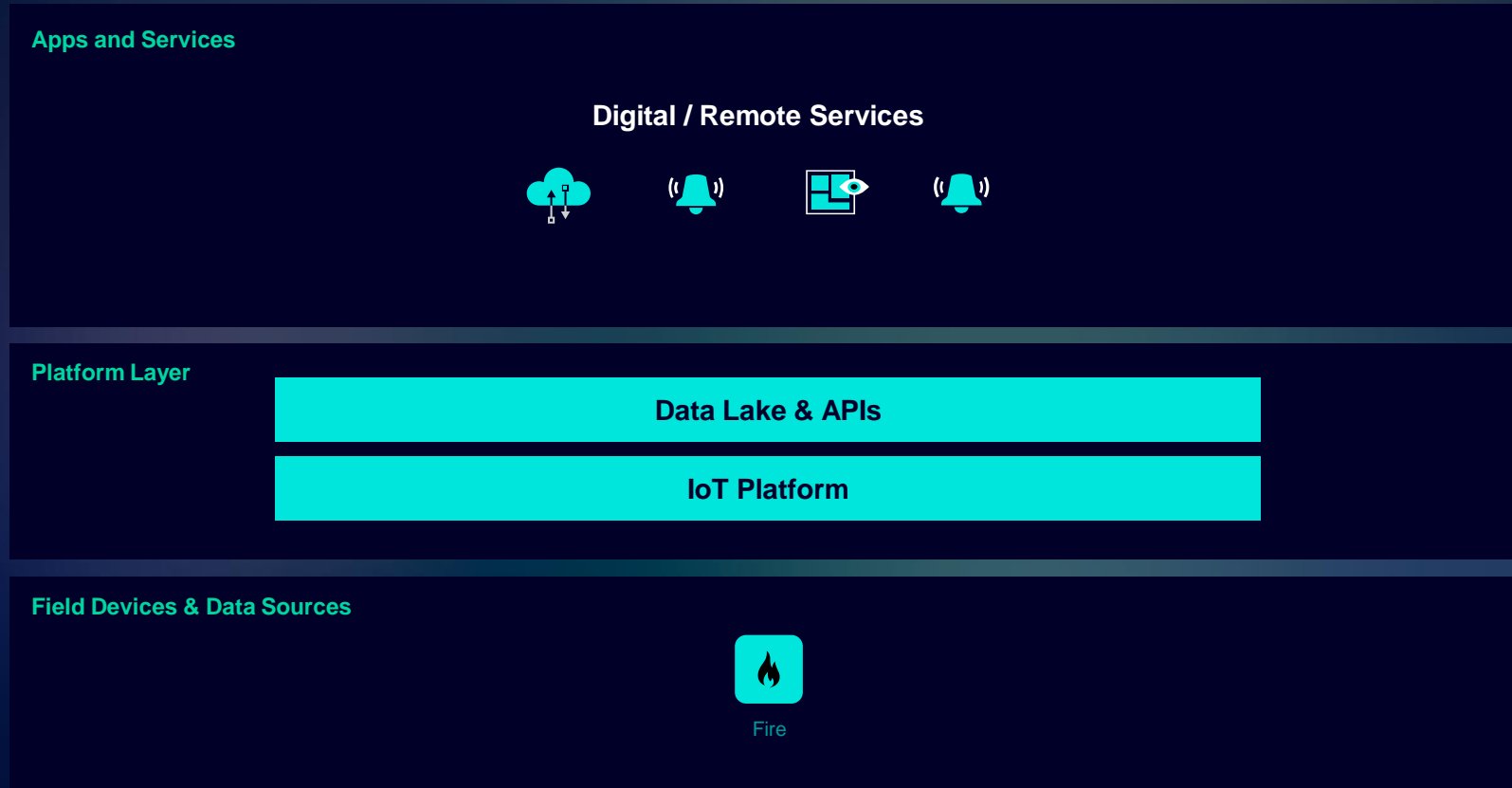
Continuously monitor critical fire safety equipment and retrieve information regarding the system's health. Optimize the fire safety systems' performance by minimizing system downtime and business disruptions.

Related strategic objective(s)

Protect people and assets

Drive staff productivity and reduce operational costs

Reference architecture



Better patient experience

Better staff performance

More resource-efficient operation

Better compliance

Better system integration

Reduced equipment loss and theft



Use Cases



Location Services (RTLS)



Room Booking



Occupancy



Expediting the search for medical equipment



Book medical asset



Medical Services



Treatment status notifications



Patient information service



Kiosk



Controlling the room environment



Providing wayfinding navigation for patients

Financing

Apps and Services

Out of the Box SaaS Apps



Digital / Remote Services



Ecosystem Apps and Services



Cyber-security

Platform Layer

Data Lake & APIs

IOT Platform



Field Devices & Data Sources



Lighting &Electrical



CCTV



Security



Building Twin



Power Distribution



Microgrid



Elevator



CMMS



HVAC



Fire



Automation



E-mobility



Indoor sensors



Meter Data



IoT Data



Others



# Let's accelerate your digital transformation together now



## Identify strategic objectives and form project team

to work with Siemens and design your smart hospital solution



## Define use cases, outcomes and related KPIs

that are approved by your project team, to deliver quick wins and generate value for the hospital



## Run a pilot

project to test the value of the jointly designed solution



## Scale up

Implement more use cases based on experience and measurable outcomes



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# Disclaimer

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