

IoT Platform for

MEP Operation & Maintenance in Existing Buildings



Part 1 Company Overview

Part 2 IoT Platform Introduction

Part 3 Case Studies

Part 4 Demos

Content



Eneuron (HK) Limited 能效通(香港)有限公司

Company Overview

- Base on IoT and AI technology, we provide Deployment & Maintenance of IoT Platform and Value-added Services for owners and operators of the buildings.
- We strive to promote the Digital Transformation of Building Services Engineering through data-driven insights.





Occupants End-users Consumers

> Owners

Increasing the Asset Safety & Value

> Operators / Service Providers

Improving Operation Efficiency Reducing Operation Cost

> Occupants / End-users / Consumers

Enhancing User Experience Enjoying Green Life



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IoT Platform & Modules



EFOS Smart Facility Platform

- **EFOS** Inspection
- EFOS Energy
- EFOS Space
- EFOS Fire
- EFOS Lift
- EFOS Air

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- Smart Toilet System

EFOS 智慧設施平台

- EFOS 數字化巡檢
- EFOS 能效優化
- EFOS 智慧空間
- EFOS 智慧消防
- EFOS 智慧電梯
- EFOS 中央空調雲監測
- 智慧洗手間

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IOT – A Game Changer for MEP O&M





Platform Framework - Business Boundary





Monitoring Scope - Fully Covered MEP Systems



%			*			3			
Electrical	Plumbing	Fire Fighting	HVAC	lift	Boiler	Fan	Lighting	Security	Space
Transformer Generator HV Panel LV Panel	Water Tank Water Pump Sewage Pump Sewage Level	Fire Water Fire Control Panel Smoke	Chiller Chilled Pump Condenser Pump Cooling Tower AHU	Lift Car Shaft & Pit Machine Room	Boiler Water Pump Water Tank Economizer Flue Duct	Fresh Air Exhaust Air FCU	Indoor Lighting Street Lighting Landscape Lighting Emergency Lighting	Perimeter Access Control Wall	Hall Lift Lobby Car Park Toilet Meeting Root
 Electricity Energy Consumption Safety Environment Running Status Fault Status 	 Water Level Leakage Flood Water Pressure Environment Running Status Fault Status Water Quality Water Flowrate 	 Water Level Leakage Flood Water Pressure Environment Running Status Fault Status Fire Panel Alarm Smoke Alarm 	 Energy Quality Electricity Running Status Fault Status Environment 	 Electricity Energy Consumption Safety Leakage Flood Running Status Fault Status 	 Electricity Energy Consumption Running Status Fault Status Environment Temperature Pressure 	 Electricity CO2 PM2.5 Running Status Fault Status 	 Electricity Energy Consumption Illuminance Running Status Fault Status 	 Intrusion Positioning Wall Falling Off Throwing Objects from Height 	Air QualityEnvironmentSanitation

Platform Architecture - Powered on Microsoft Azure





The data that is not frequently used is stored in Azure Blob Storage, and the frequently accessed data is stored in CosmosDB

Users use PC and APP-side applications to web data services

Sensors

6 Azure Ac

Azure Active Directory validate user identity

App Service obtains data requested by customers by querying the databases

- Sensors and Comm Models Certificates
 - European Union CE
 - Singapore IMDA
 - China CCS, CQC, 3C, CMC
- Software Maturity Certificate
 Carnegie Mellon CMMI Level 3 Rating
- Data Security
 - Microsoft Azure IoT Hub
 - Multi-cloud / Hybrid Cloud Deployment
- Insured by PICC (Product Liability Insurance)
 - Temporarily Limited to Mainland China







Openness & Compatibility

HK Shiewceoffa

tatte Rpack Pro



- Mainland China (Shanghai)
- East Asia (Hong Kong)
- Southeast Asia (Singapore)

2 Cloud Application Services

- SaaS
- PaaS

3 Mainstream Communication Protocols

- OPC
- BACnet
- Modbus

Open API



Project Implementation Process



Basic Services – IoT Deployment, Operation and Maintenance

Step 1: Planning Step 2: Deployment Step 3: Data On-line Step 4: Training Step 5: Online Operation



Standard Configuration - <u>Click and Tick</u> Simple Design - <u>Screw on and Plug in</u> Online Supervision - <u>Press and Scan</u> <u>Online Learning and Offline Practicing</u> Online Guidance and Offline Handling

- Value Added Services (Optional)
 - Online Event Handling & Task Dispatching Service
 - Facilities **O&M Process Re-engineering** Consultancy

Platform Application Scenarios

ENEURC 能效通建築



• 24/7 Online

- Push Alarm in 5s
- Online Analysis & Advice



- Online Benchmarking
- Reminding Timely Analysis & Advice





- Smart Lighting
- AC Adjustment
- Air Quality
- Cleanliness (People Counter, AmmoniaConcentration, Service Feedback for Toilet)



- Standardization
- Transparency
- Visualization
- Efficiency & Synergy





Commercial Buildings



Data

Centres



Government Institutes

Hospitals



Industrial

Parks



Railway

Stations



Airport Terminals

Single Project Application

Single Project Scenario 1 - Bridging Management Gap





Single Project Scenario 2 - Unmanned / Online Patrol-Inspection





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Cond In	26°C - 31°C	28.2	28.2	and the second se	Suction Pressure	3 - 4 Bar	5.0	5:0	-
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O&M Based on Paper - Work



O&M Based on APP

Single Project Scenario 3 - A Typical Alarm Handling Process





Positioning

Push to the Operating Centre

KPI Assessment & Knowledge Base



Single Project Scenario 4 - Energy Efficiency Analysis & Optimization



Dynamic Energy Efficiency Optimization through 5 Core Functions



Energy Dashboard

- Data Comparison
- Data Benchmarking



Energy Data

- Automatic Collection
- Manual Input
- Enquiry

Report Forms

- Customized
- Generated Automatically
- One-key Export

Energy Costs

- Total Cost
 - Costs of Different Energy Types, Items, Area, etc.

Device Ledger

 Multi-level Meters Info of Different Energy Types: Locations, Specifications, etc.



Multi-Projects Application

Multi-Projects Application – Based on 3 Management Levels





Multi-Projects Application – Business Perspective





Multi-Projects Application – Management Indicators



	Headquarter	Regions	Projects
Security	HQ Security KPI Regulations Development	 Region Security KPI Event Monitoring & Dispatching Remote Support 	Workorder ImplementationEmergency Management
Efficiency	HQ Efficiency KPI MRO Standards Development	 Region Efficiency KPI Task Dispatching Remote Support 	Workorder Implementation
Energy & Carbon	HQ Energy Cost KPI Carbon Emission KPI	• Region Energy Cost KPI	• Workorder Implementation
Quality & Service	HQ Quality KPI SLA Development	 Region Quality KPI SOP Development Task Dispatching 	Workorder Implementation
Innovation	New Business Tools Business Process Redesign	Business Process Optimization	• None



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Case Study 1 - Smart Inspection





2 Bukit Merah Central (Singapore)

- > Owner: Singapore Land Authority
- > Floor Area: 32,995 Square Meters
- > Managed By: C&W Services Singapore

Phase 1:

- Real-time Monitoring (Electrical, Plumbing, Lift, HVAC, Cleanliness, Indoor Air Quality)
- Change O&M Process
- Staff Restructuring



- PaaS Deployment in Singapore
- Multiple Projects Online
- Integration with Other Subsystems
- Business Process Re-engineering





Case Study 2 - Energy Optimization





AEON STYLE

(Shenzhen, 1st Flagship Store in China)

- > Owner: AEON Group (Japan)
- > Floor Area: **25,000** Square Meters

- Step 1: Monitoring & Analytics (Chiller, Chilled Water Pump, Condenser Water Pump, AHU)
 Step 2: HVAC System Upgrade
- > Step 3: Continuous Optimization



- HAVC energy consumption was reduced by 28%
- Recognized & Subsidized 370,000 RMB by Shenzhen
 - Government



■當规

■节能





Phoenix International Media Center

(Beijing)

- > Owner: Phoenix Satellite Television (Hong Kong)
- > Floor Area: 65,000 Square Meters
- > Managed By: Cushman & Wakefield (Shanghai)

Scenario 1 - Air Conditioning Commissioning

> Effect (Keep Indoor Temperature from 40 °C to 24 °C)

Before Commissioning -

Turn on VRVs **12 hours** in advance

After Commissioning -

Turn on half VRVs 3hours in advance



Scenario 2 - Toilet Management

On Demand Service
 (User Counting, Ammonia
 Concentration, Feedback Panel)



Case Study 4 - Group Management Empowerment





Vanke Service

(Northeast China & South China)

- > Projects Scope: Digitalized Fire Fighting
- > Projects Online: >100 (by January 2021)
- > Building Types: Residential and Commercial Buildings

Monitoring Scope:
 Fire Water Pump, Fire
 Water Tank, Fire Water

Improving fire safety
 level of the projects in
 the whole country





Empowering Group Management

Customers





Ecological Partners

ROI Calculation - One Example



ROI comes from not only what you use as a tool, but also how you use it, for example:

- O&M Process Redesign
- Staff Restructuring

- ✓ Inspection Frequency:
 2h to 168h Interval
- ✓ Inspection Staff:

10 to 2 personnel

✓ Multi Sties Management

100,000 Square Meters / Per O&M Staff





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The demo projects have been authorized by the customers to demonstrate to a third party only for tech introduction!

Demo 1 - Smart Inspection <u>http://119.23.13.88:10000/login.html</u>

Demo 2 - Energy Optimization <u>http://112.74.202.208:9000</u>

Demo 3 - Group Management Empowerment <u>http://47.106.48.157:81/api/Wanke.html?blocCode=603</u>

Thank You



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