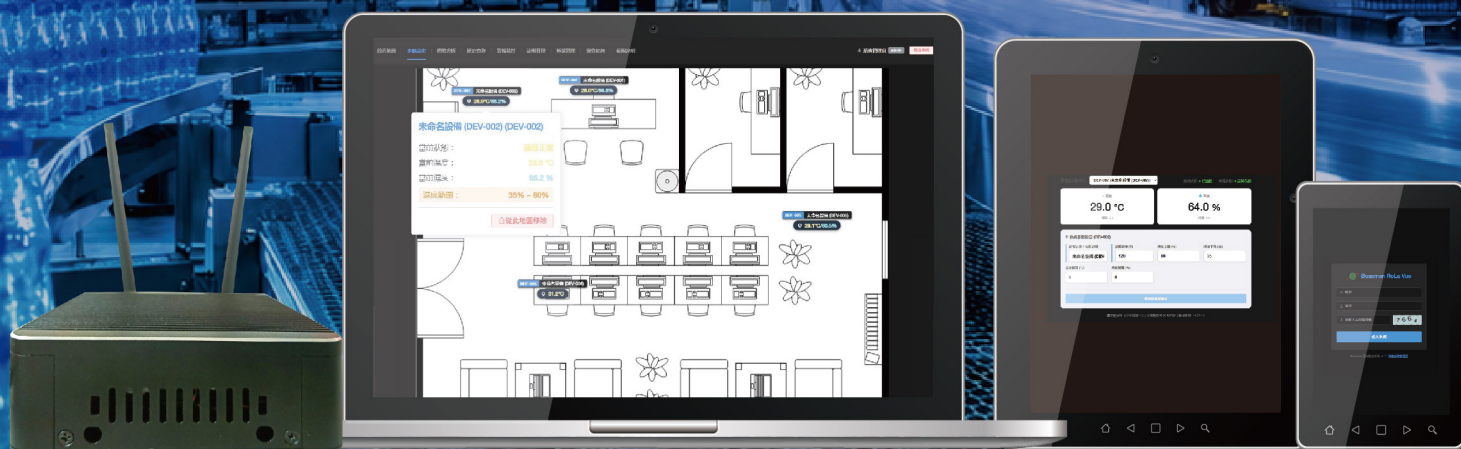


LoRaWAN

Smart Environmental Monitoring Solution

Long Range • Low Power •
High Reliability • Wireless Connectivity



Long-Range
Communication

Public-free wireless
transmission



Energy-Efficient
Architecture

Gateway deployment
Supports up to 200
devices



Secure Data
Protection

AES-128 encrypted
transmission
Data stored locally



Low Power
Consumption

AC-powered devices
Stable operation



Why Choose Bossmen LoRaWAN

Traditional Wired Monitoring

Complex Wiring

Fast installation and flexible deployment

Limited Distance

Kilometer-level wireless coverage

Difficult Expansion

Supports up to 200 devices per gateway

High Maintenance Cost Difficult

Cost Stable, reliable, and easy to maintain

Bossmen LoRaWAN

✓ Wireless Deployment

High Cost & Long Deployment

✓ Long-Range Transmission

Short Range & Signal Attenuation

✓ Flexible Scalability

Rewiring required when adding new devices

✓ Low Maintenance

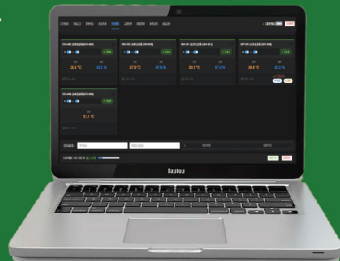
maintenance and higher operating costs



6 Core Advantages of LoRaWAN

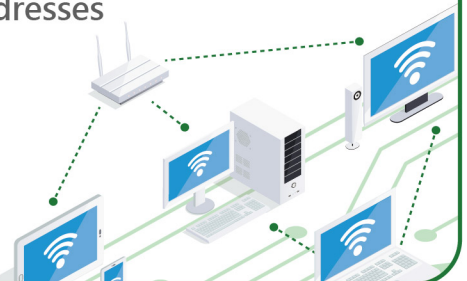
01 Less Wire, Less Cost

No cabling to End
Devices — slash instal-
lation cost & labor



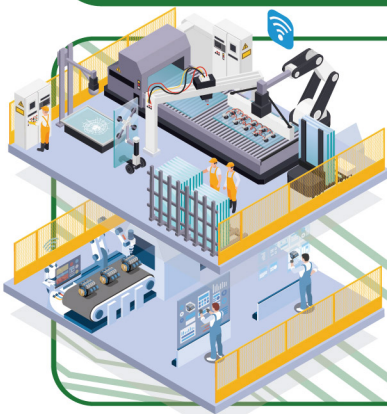
02 Less IP, Happy IT

Only Master ×1 + few Gateways need
an IP — Multiple End Devices consume
zero IP addresses



03 Built Tough. Stays On.

Sub-GHz cuts
through walls, metal,
and industrial noise



04 Quick Setup, Fast Deploy

Minimal wiring = shorter install
time, faster go-live

05 Wide Coverage, Full Control

Few Gateways cover an entire factory
floor

06 Your Data. Your Rules.

AES-128 encrypted. Fully
on-premise — your data never leaves
your facility.



LoRaWAN 應用場域

Museum & Archival Environment



Application Areas



Archival
Storage Rooms



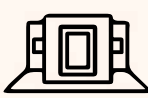
Display
Exhibition Areas



Conservation
Studios



Loading & Receiving
Areas



Exhibition
Spaces



Art Galleries



Archive
Repositories



Temporary Artifact
Storage Areas



Historic
Buildings

LoRaWAN Advantages

- Minimal wiring for historic buildings
- Strong cross-floor signal coverage
- Real-time collection protection alerts
- Low power & low maintenance
- Centralized multi-site management



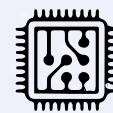
Semiconductor Industry



Application Areas



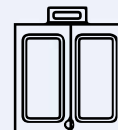
Cleanrooms



Photolithography
Areas



Wafer
Storage Areas



Nitrogen
Cabinets



Chemical
Storage Rooms



Production
Equipment Areas



Laboratories



GMP
Manufacturing Areas



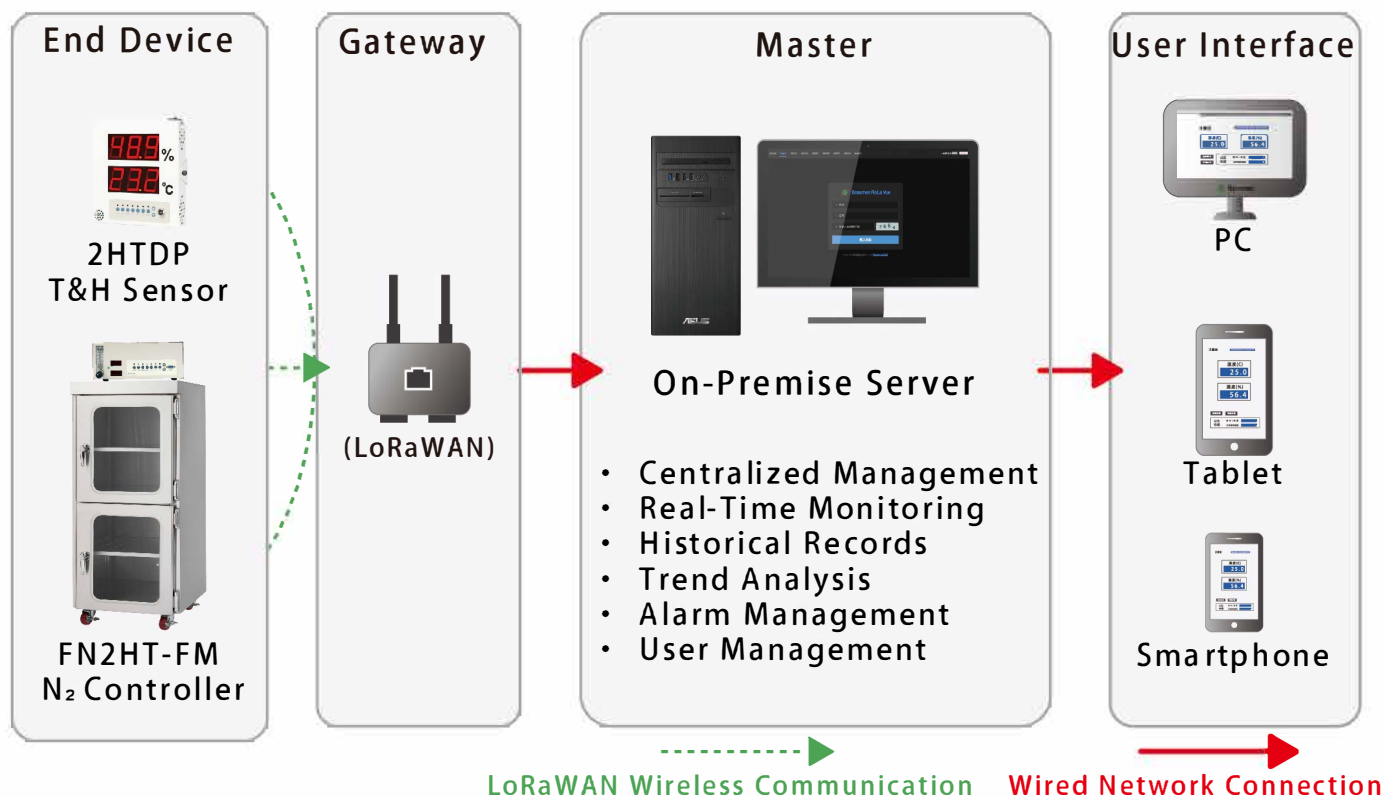
Biological Sample
Rooms

LoRaWAN Advantages

- Minimal cleanroom wiring
- Multi-zone centralized monitoring
- AES-128 secure transmission
- MES / SCADA compatible
- Instant abnormal alerts



System Architecture



Bossmen Integrated Solutions

Complete Smart Environmental Control Solutions from Sensing to Control

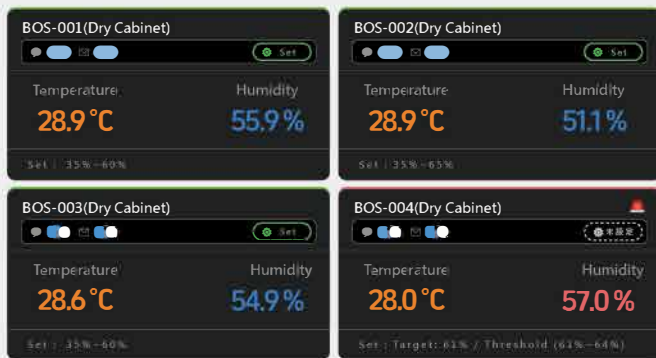


Safe • Reliable • Smart • Scalable

Protect Assets • Improve Efficiency • Accelerate Digital Transformation!



Software Features Overview

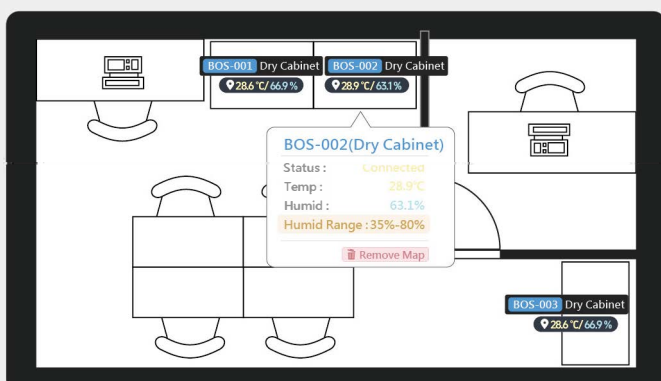
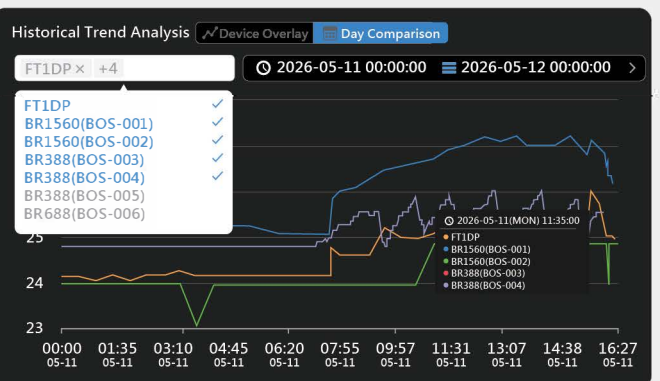
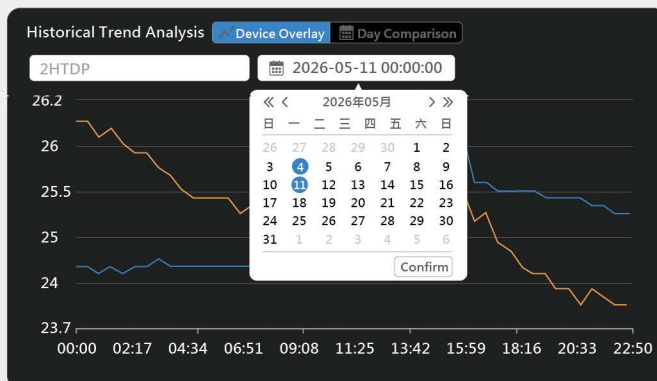
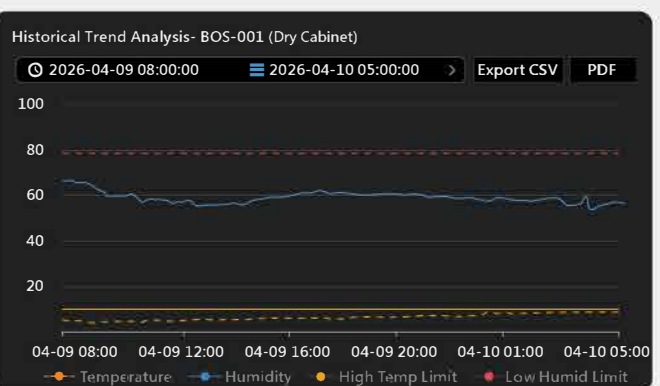


01 Real-Time Monitoring Dashboard

- Real-Time Temp/Humid
- Simultaneous monitoring of multiple devices
- Instant abnormal status alerts
- Web-based real-time updates

02 Historical Trend Analysis

- Long-term environmental data logging
- Visualized trend charts
- Upper and lower alarm threshold management
- Multi-device integration analysis
- Single-device historical comparison
- Supports CSV / PDF export



03 Interactive Floor Map Monitoring

- Visualized device location management
- Real-time area status monitoring
- Multi-zone environmental monitoring
- Quickly identify abnormal devices

04 Alarm & Notification Management

- Real-time abnormal status alerts
- Instant notification reminder
- Multi-device synchronized monitoring
- Supports Email notifications

Time	Temp.(°C)	Hum.(%)	Record Thresholds	Run Status
2026-04-10 13:00	29.1	60.1	30% / 60%	✓ Normal
2026-04-10 13:00	29.1	61.2	30% / 60%	✓ Normal
2026-04-10 13:00	29.2	60.8	30% / 60%	✓ Normal
2026-04-10 13:00	29.1	64.5	30% / 60%	✓ Normal
2026-04-10 13:00	29.1	62.1	30% / 60%	✓ Normal
2026-04-10 13:00	29.3	63.1	30% / 60%	✓ Normal
2026-04-10 13:00	29.1	62.5	30% / 60%	✓ Normal
2026-04-10 13:00	29.2	60.1	30% / 60%	✓ Normal
2026-04-10 13:00	29.1	63.5	30% / 60%	✓ Normal
2026-04-10 13:00	29.2	60.2	30% / 40%	✓ Normal
2026-04-10 13:00	29.3	65.7	30% / 40%	✓ Normal
2026-04-10 13:00	29.1	60.1	30% / 40%	✓ Normal

Time	Username	Name	Action	Details
2026-04-10 13:41	DIDO	LEE	Log In	User login success
2026-04-10 15:47	DIDO	LEE	Log Out	User logout
2026-04-10 09:00	UNA	LIANG	Log In	User login success
2026-04-10 09:11	UNA	LIANG	Settings	Device B05-002 updated
2026-04-10 13:26	UNA	LIANG	Log Out	User logout
2026-04-11 10:00	JUN	CHEN	Log In	User login success
2026-04-11 10:03	JUN	CHEN	Export Rpt	Downloaded report B05-002
2026-04-11 10:06	JUN	CHEN	Export Rpt	Downloaded report B05-002
2026-04-11 10:09	JUN	CHEN	Export Rpt	Downloaded report B05-002
2026-04-11 10:12	JUN	CHEN	Log Out	User logout
2026-04-11 11:00	LEWIS	LIU	Log In	User login success
2026-04-11 11:51	LEWIS	LIU	Log Out	User logout

05 Security & Audit Trail

- User permission level management
- System operation log tracking
- User activity records
- Configuration change tracking
- Exportable audit reports
- Meets Enterprise Security

06 Gateway & Device Management

- Gateway device management
- End Device registration management
- Device EUI management
- Supports multi-site deployment

Device nodes created (19 total)

NO.	Device Name/Location	Device EUI	Model	Action
BOS-001	Dry Cabinet / 1F	BOSSMEN974745	BR1560	Reset Delete
BOS-002	Dry Cabinet / 1F	c549a09e139c00	BR1570	Reset Delete
BOS-003	Dry Cabinet / 1F	01e08dba401400	BR1560	Reset Delete
BOS-004	Dry Cabinet / 2F	c547a09e138c0	BR388	Reset Delete

LoRa List (19 devices)

Device EUI	Name	Note
BOSSMEN97474539	Gateway	

LoRa End Nodes (4 devices)

Device EUI	Name	Note
01e08dba40440000	2HTDP	
03e08dba40540200	BR1560	

08 Remote Parameter Configuration

- Device alarm threshold settings
- TH Threshold Settings
- Data logging interval settings
- Real-time device parameter configuration

Settings Center BOS-001 Connection: Connected | Hardware: Online

溫度
28.9 °C

濕度
65.9 %

System Settings

System Settings

Dry Cabinet

Log Interval (s)
120

Upper Humidity Limit (%)
80

Lower Humidity Limit (%)
35

Temp Offset (°C)
0

Humid Offset (%)
0

Confirm & Apply



LoRaWAN vs. WiFi vs. Cable Network

Technical Analysis

Feature	LoRaWAN	WiFi	Cable Network
 Range	Outdoor: Up to Several km Indoor: 100–300 m	50–100m	Limited by cable length
 End Device Wiring	None	AP-dense deployment	Hardwired per point
 Gateway/ AP Wiring	Minimal	Many APs needed	Extensive cabling
 IP Address Usage	Master ×1 + few Gateways need an IP, End Devices zero IP Multiple End Devices across the factory consume zero IP addresses	Every device needs an IP	Every device needs an IP
 Total Cost	Low	Medium	High
 Maintenance	Very Low	Medium	High (cable fatigue)
 Signal Attenuation	Minimal signal attenuation, stable over long range	Signal degrades rapidly with distance and obstacles	Low attenuation but vulnerable to connector wear and physical damage
 Expandability	High (Plug & Play)	Requires more APs	Requires re-wiring
 Multi-Building / Multi-Site	Few Gateways can cover large areas; depends on building structure Clean rooms / metal shielding require evaluation; must be on the same network domain	Separate AP infrastructure per building	Extensive cabling across buildings
 Encryption	AES-128 (End-to-End)	Requires extra setup	Closed / Physical isolation



Off-Site Remote Access Cloudflare Zero Trust Tunnel

Not a cloud solution. All data remains fully on-premise inside your facility at all times.



Secure Access Anywhere, Anytime



Infrastructure Stays Private



No Public IP Required



MFA-Protected Access



Encrypted & Auditable

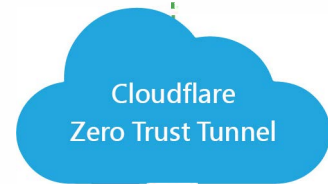


Data Stays On-Premise

External Users



- Tablet
- PC
- Smartphone



On-Premise Network



Master
Server



名詞説明



Master

- Backend server
- Central control core
- Deployed within the internal network



Gateway

- Network bridge device
- Connects End Devices
- Collects and uploads data to the Master server



End Device

- Sensors and controllers
- Terminal monitoring devices

On-Premise

- Data stored within the enterprise
- No reliance on external cloud services
- Secure, controllable, and compliant with cybersecurity requirements

Cloudflare Zero Trust Tunnel

- No need to open network ports
- Data remains on-premise
- Authorized access only
- Encrypted data transmission
- Supports remote access for off-site users