

利用Ruckus IoT實現製造業數位轉型

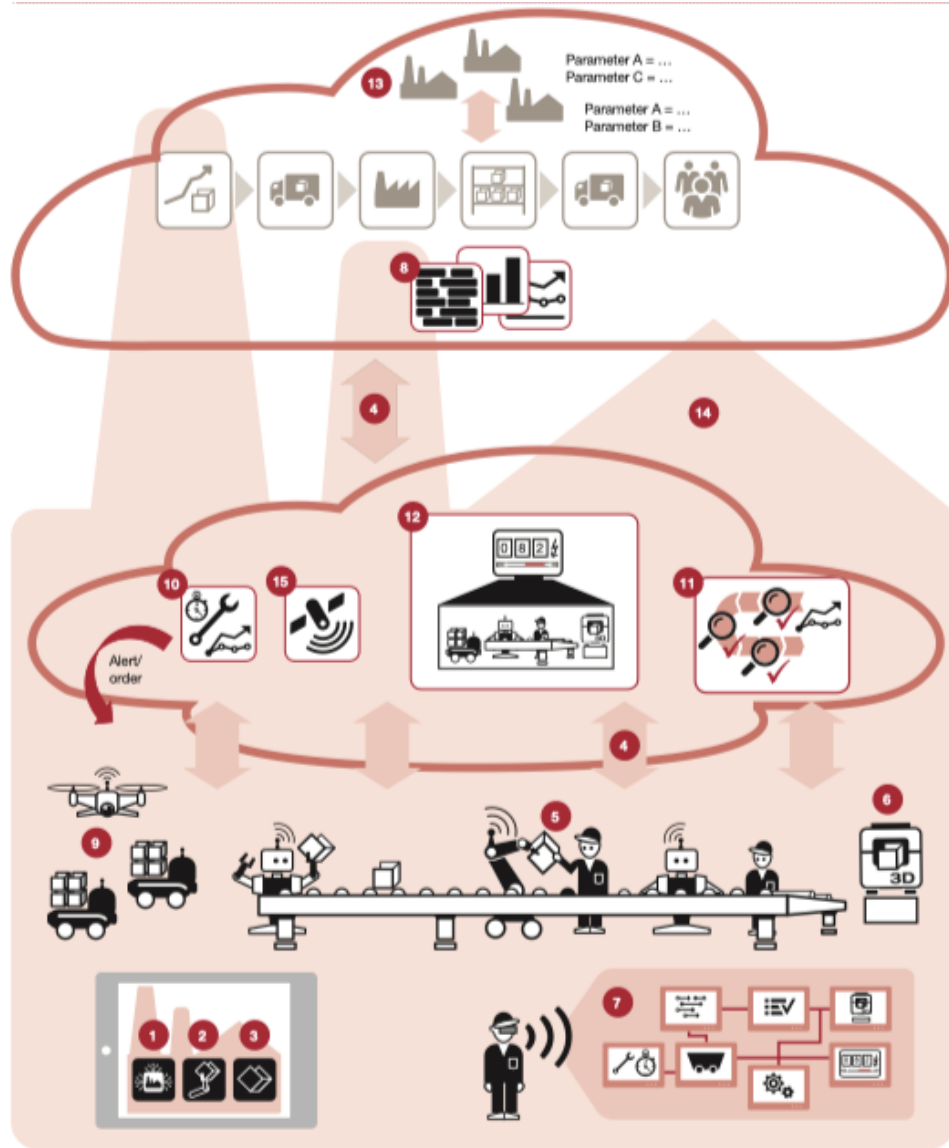
June, 2021

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Technical Manager

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智慧製造的數位化應用



- 數位化工廠需要強大的有線和無線網路
- 高速無線網路連接 – WiFi 6需求
 - 使用者體驗與頻寬需求
 - 穩定的設備連線挑戰
- 有線交換器連接
 - 高POE供電能力
 - 高可用及擴充架構
- 網路可視化以提供大數據來支援機器學習與AI人工智慧
- 追蹤所有連接的設備和用戶

IoT物聯網應用

環境管理



- 自動化消防、漏水及有毒氣體監測
- 空間佔用偵測與管控
- 自主設施電源管理
- 自動照明排程控制

資產追蹤



- 資產、人、物之尋找與管理
- 緊急按鈕安全監控
- 自動化出勤統計

安全監控



- 攝像機和視頻監控整合
- 門禁管制
- 安全警報狀況監控
- 辨識建築物佔用狀況、監測及報告

數據遙測



- 環境狀況監控
- 物品掉落偵測
- 自動運送管理監控
- 物料運送稽核

資產及物流管理



資產追蹤



緊急按鈕



人流
分析

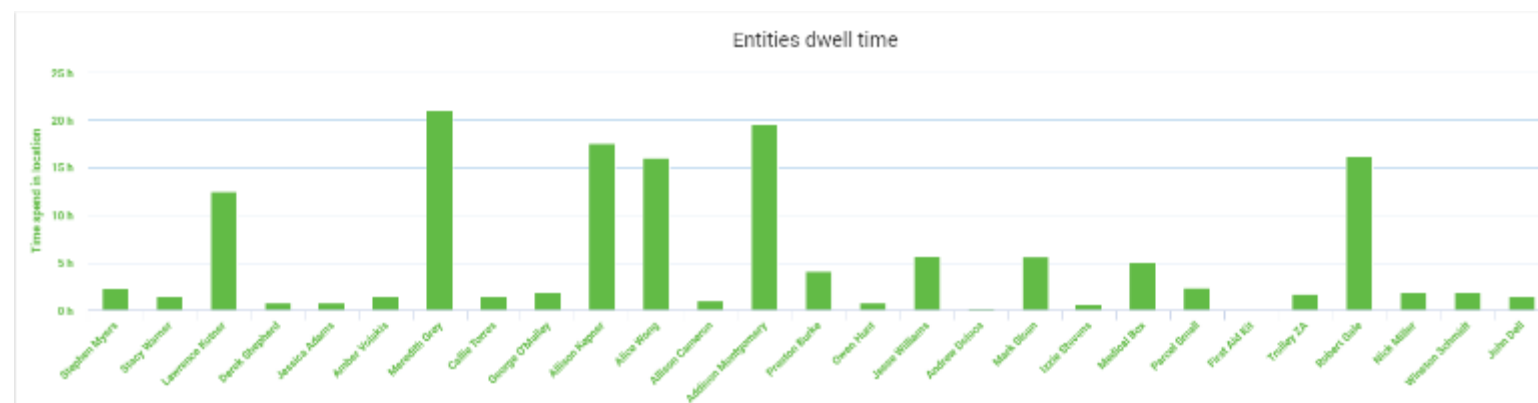
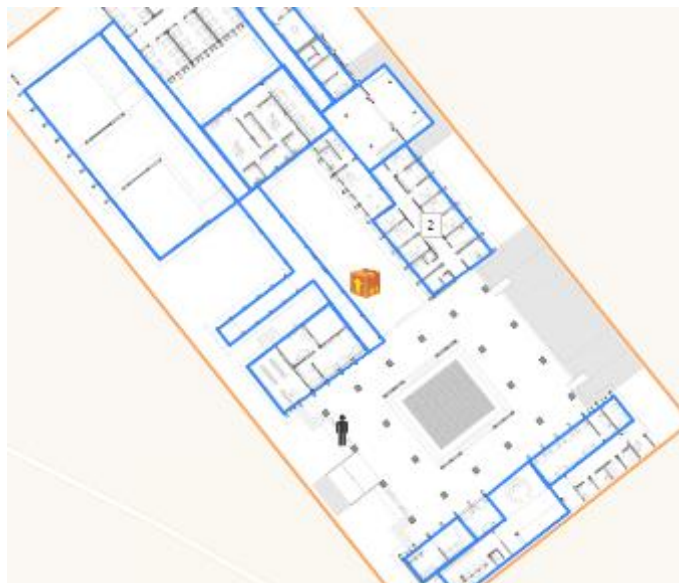


Kontakt.io Beacons (BLE)



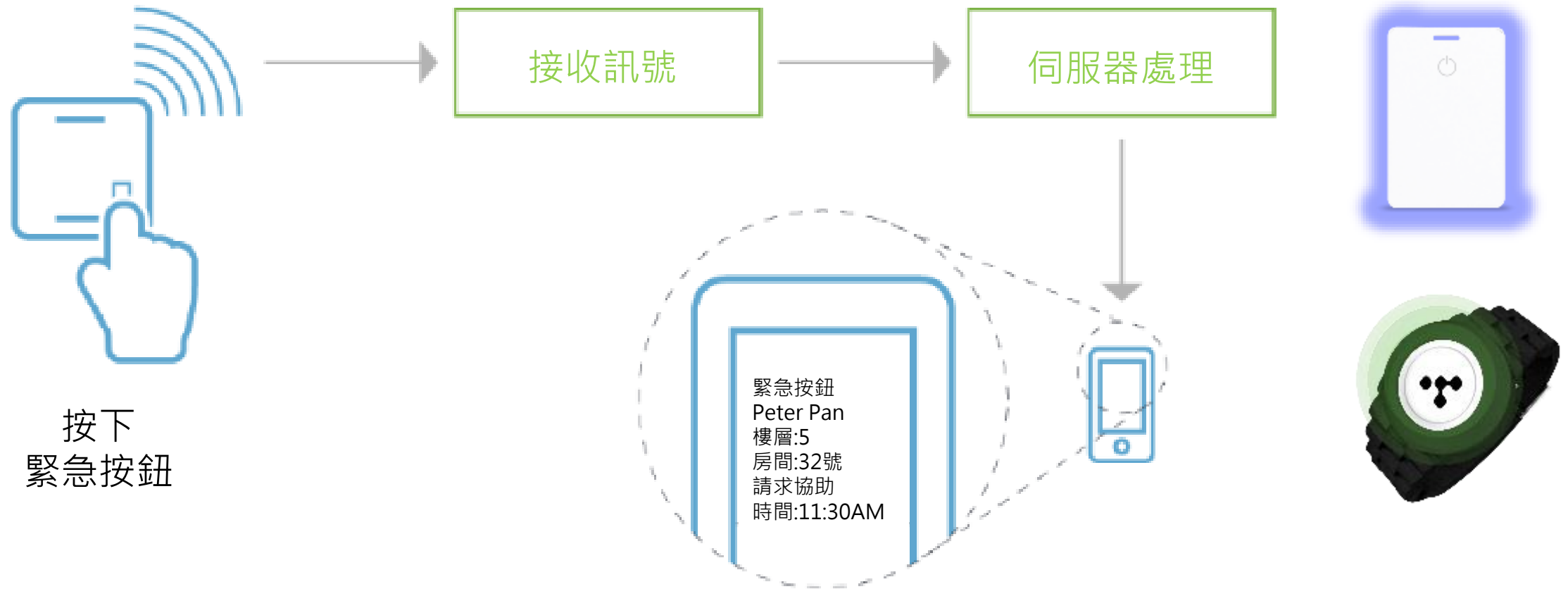
車隊遙測

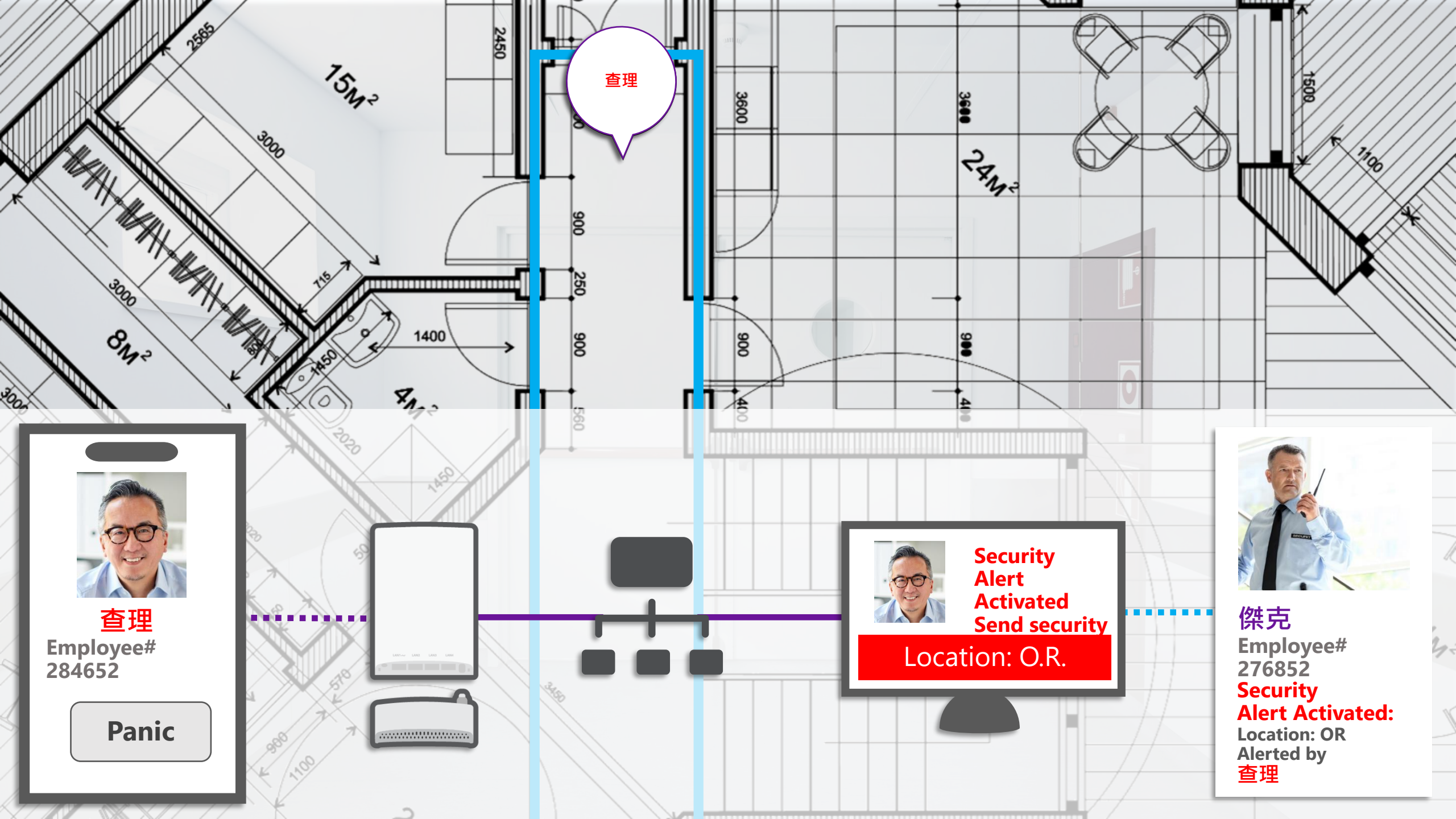
定位型服務應用範例



- 設定地理圍欄區域
- 人流分析可以顯示高流量區域
- 瞭解特定區域的進出和佔用時間
- 瞭解工作空間與資產的利用率，可用於工作流程優化

緊急按鈕





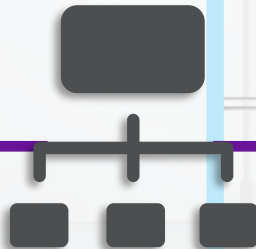
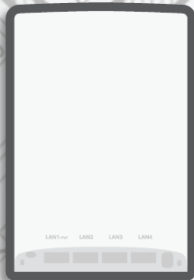
查理



查理

Employee#
284652

Panic



Security
Alert
Activated
Send security

Location: O.R.

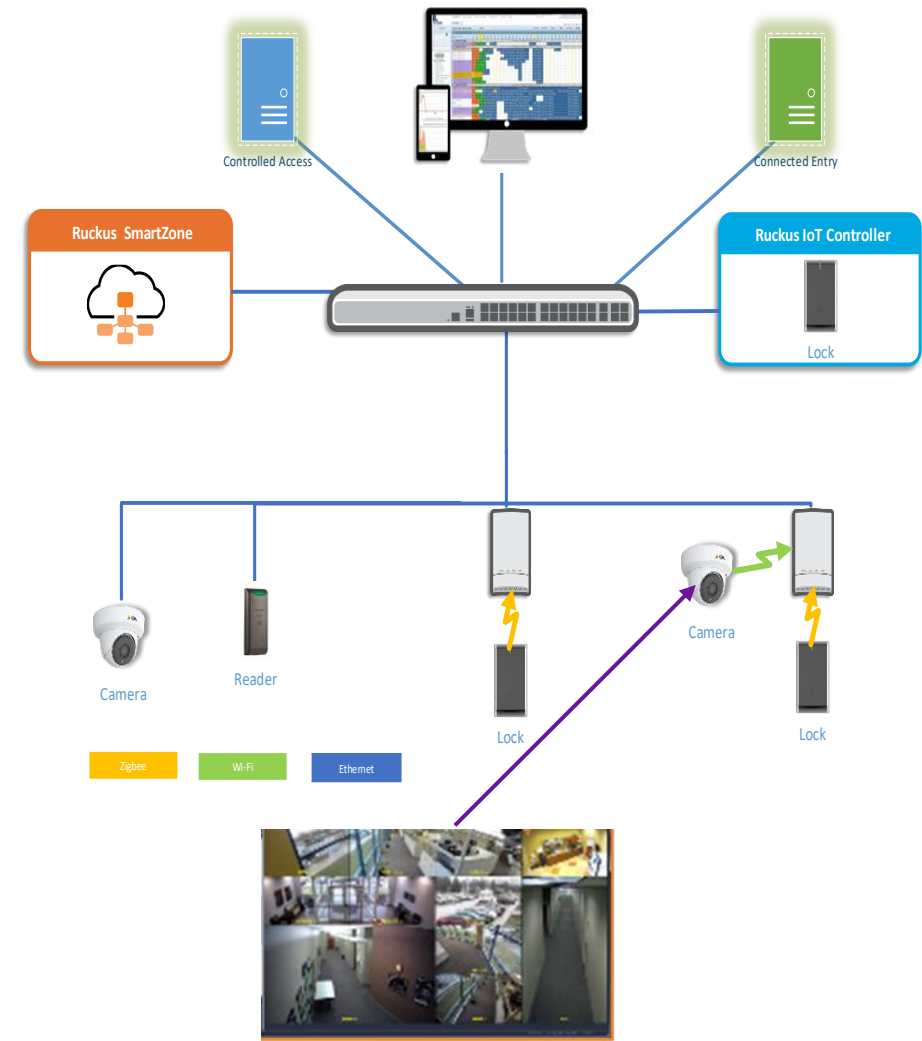
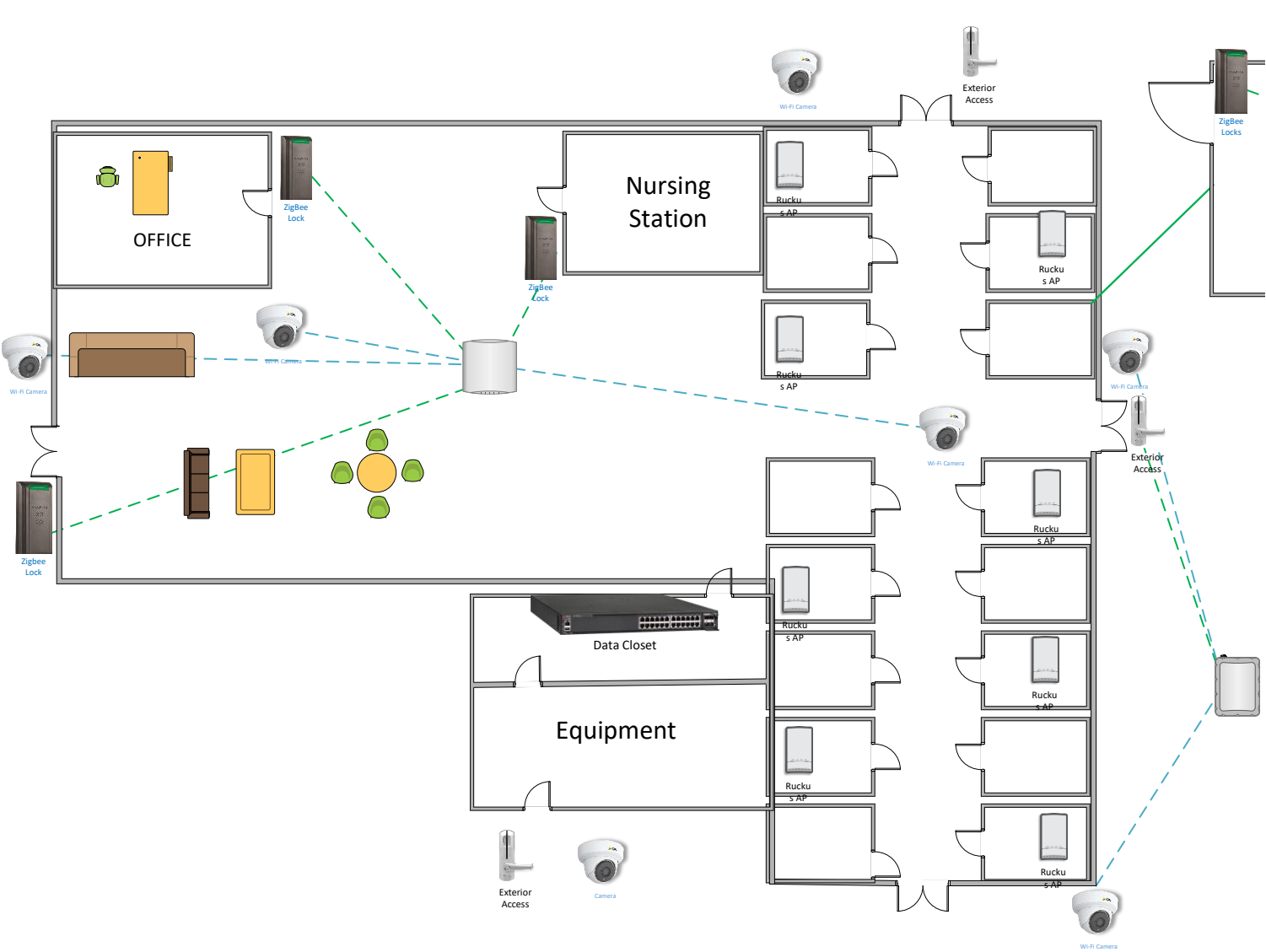


傑克

Employee#
276852

Security
Alert Activated:
Location: OR
Alerted by
查理

安全監控環境



監視器

智慧會議室環境

煙霧偵測

智慧照明

IP Video

智慧窗簾

空間佔用
偵測

空調控制

智慧門鎖

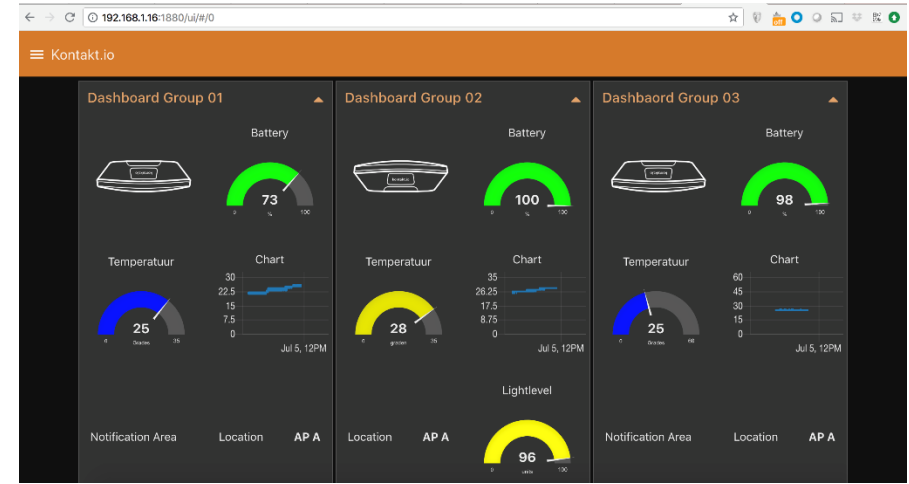
資產追蹤

環境控制

智慧製造環境應用需求



Source: png from pngtree.com



感應偵測



資訊收集

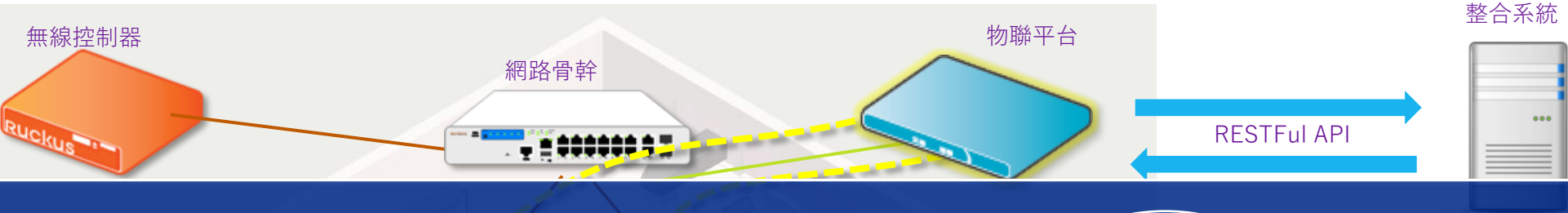


數據分析



智慧處理

透過物聯平台串連全新智慧製造

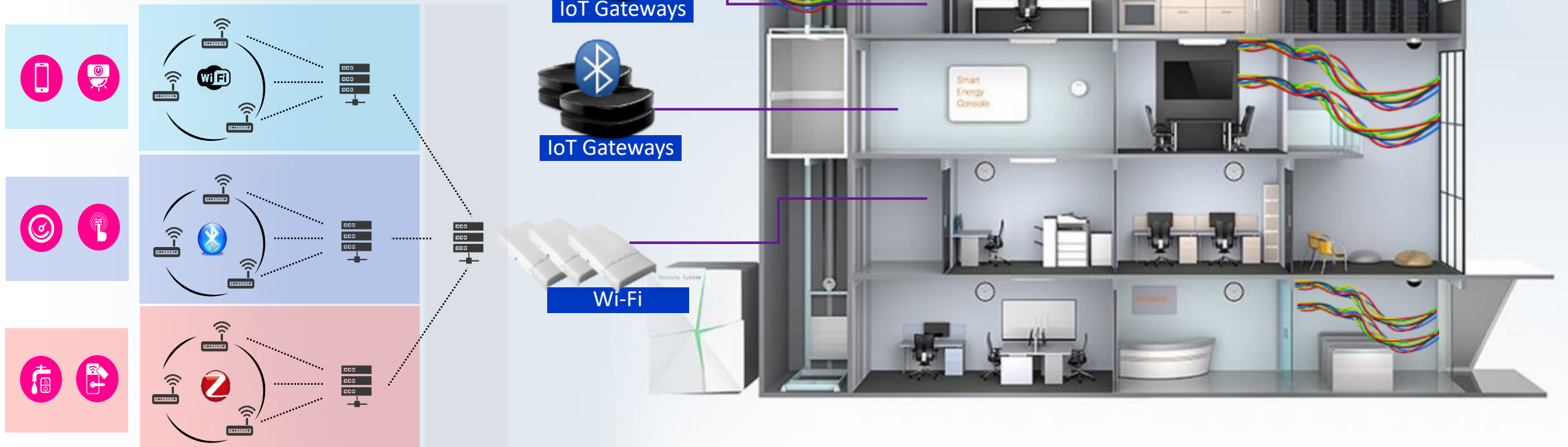


軟體定義自動化感應與控制



打造物聯網環境的挑戰

- 連接傳感器之佈線
- 不同通訊協定的傳感器
- 廠商各自獨立的閘道器
- 各自獨立的管理系統
- 整體投資成本



打造物聯網環境的挑戰

- 各自獨立的協定與系統

傳統傳感器- 佈線麻煩,整合不易



使用不同通訊協定的傳感器

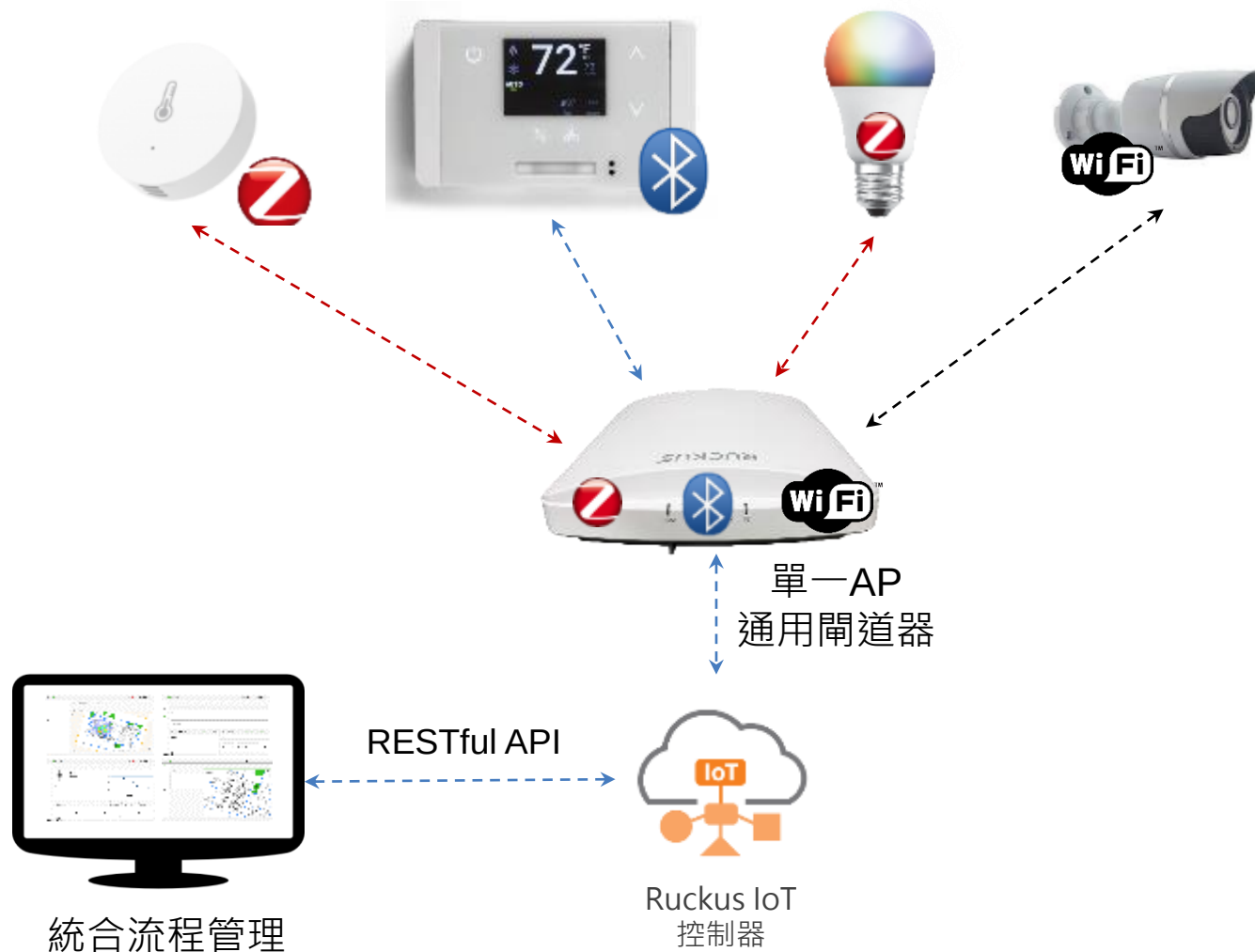


Ruckus整合WiFi6+IoT存取網路

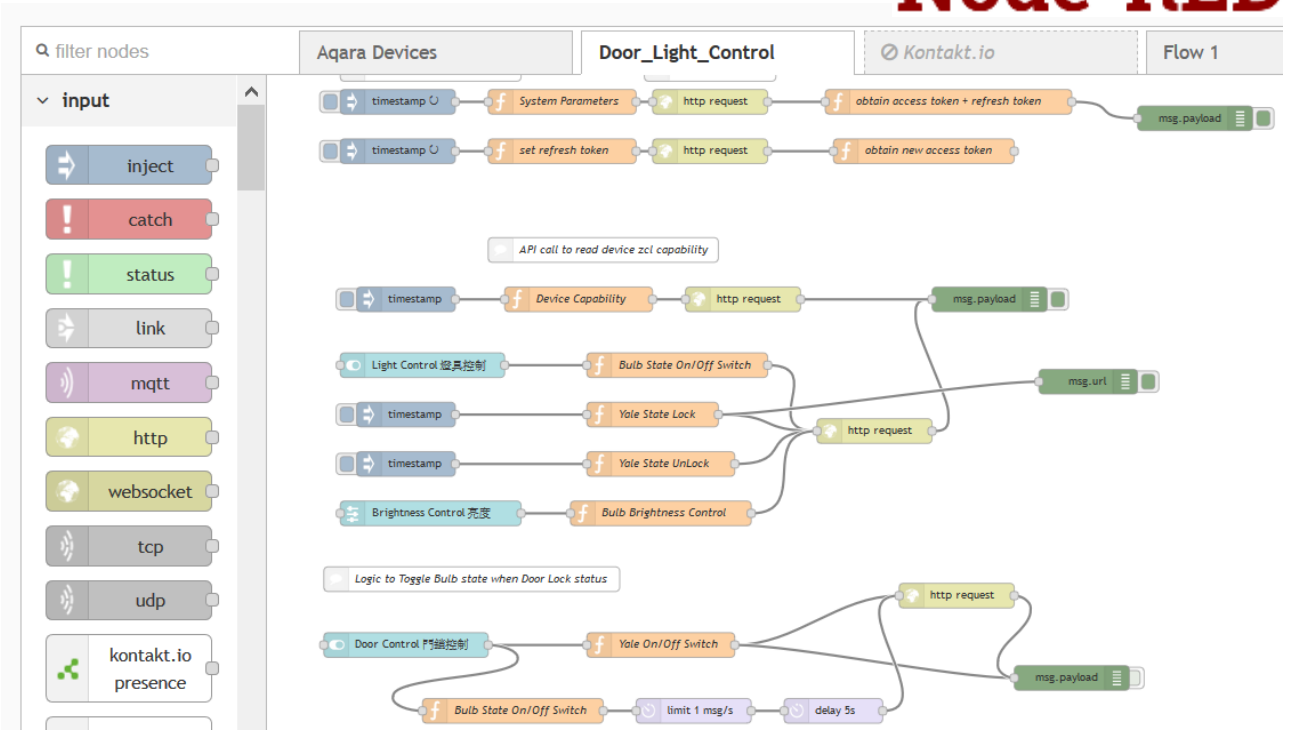
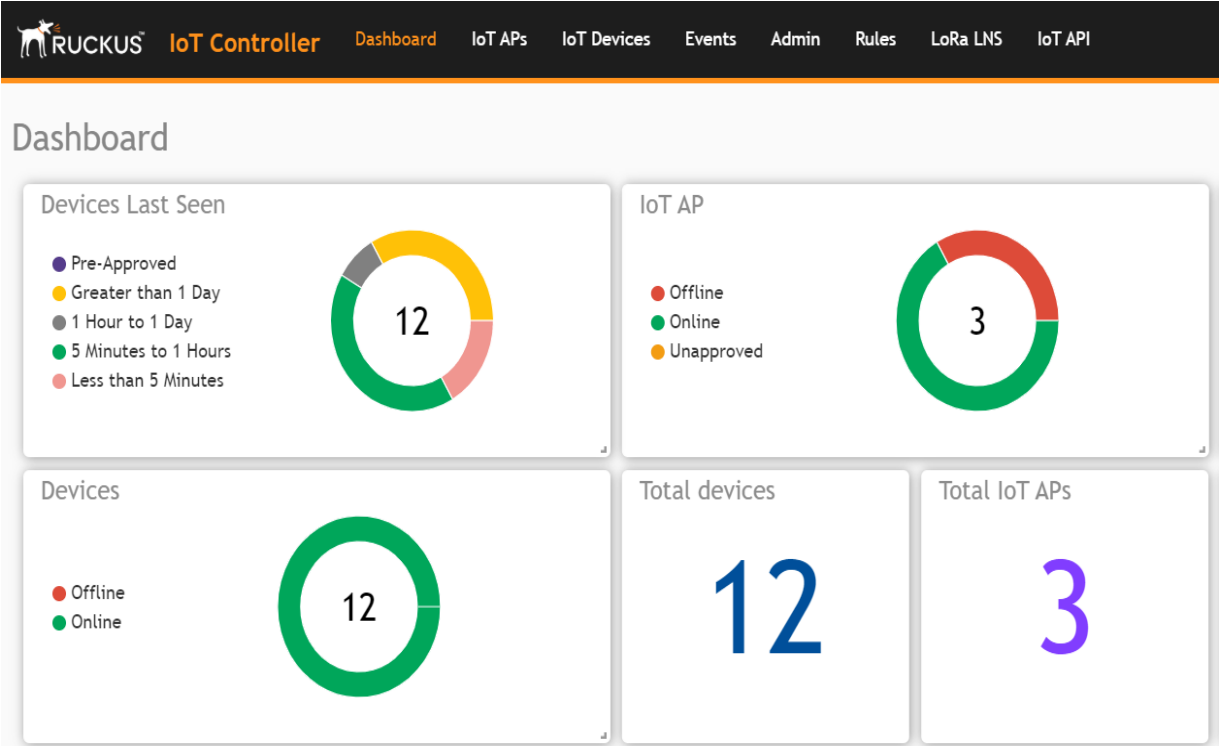


Ruckus IoT整合架構簡化網路

- AP 同時支援WiFi + IoT
- 單一通用閘道器，連接各廠商IoT設備
- 減少佈線 = 減少交換器數量
- 統合管理，整合容易
- 節省總體持有成本



Ruckus IoT控制器及內建規則引擎



Batch Actions: Select Apply

	Name	MAC ID	IoT AP MAC	Protocol	Type	LQI	RSSI	Last Seen	Action	Tags
☐	Light	84:18:26:00:04:A6:69	44:1E:98:22:1D:90	zigbee	Color Dimmable Light	88	-44	28 minutes ago		All Light
☐	MI_Smart_Plug	00:15:8D:00:04:14:2C:58	44:1E:98:22:1D:90	zigbee	Smart plug	97	-38	6 minutes ago		All MI_Smart_Plug
☐	Aqara_Square	00:15:8D:00:02:A6:FD:AE	44:1E:98:22:1D:90	zigbee	Simple Sensor	100	-30	12 minutes ago		All Aqara_Square
☐	ZEN Thermostat	00:24:46:00:00:12:89:5D	44:1E:98:22:1D:90	zigbee	Thermostat	100	-18	14 hours ago		All ZEN Thermostat

Ruckus IoT-Insights

Device
Status

Environment
Devices

Floorplan

Events

Status

Controls

Alarms

COMMSCOPE® IoT-Insights

15:36:12
version_6.1.22

IOT Devices

Search for Device...

State	Device	Alarms
	ACCC8EE44A07	
	BUTTON01	
	CICTHERMO01	
	DOOR01	
	DOOR02	
	DOOR03	
	DOOR04	
	DOOR05	
	DOOR06	
	DOOR07	
	DOOR08	

Environment Devices

Search for Device...

State	Device	Environment
	ReceptionCO2	
	DOOR02	
	PIR02	
	OfficeTHERMO02	
	BUTTON01	
	OfficePressure	
	OfficePressure02	
	DOOR01	

Floorplan

COMMSCOPE®

Floor :1

Event Log

ID	Event	Time	Device	Camera
5813	help	27/11/2020, 15:18:04	HELP01	F44-Reception
5812	vibration	27/11/2020, 15:16:30	GLASS01	F44-Office
5811	vibration	27/11/2020, 15:16:29	GLASS01	F44-Office
5810	contact	27/11/2020, 15:15:28	DOOR06	F44-Reception
5809	contact	27/11/2020, 15:13:48	DOOR05	F44-Reception
5808	contact	27/11/2020, 15:13:23	DOOR04	F44-Lab
5807	help	27/11/2020, 14:48:04	HELP01	F44-Reception
5806	vibration	27/11/2020, 14:46:30	GLASS01	F44-Office
5805	vibration	27/11/2020, 14:46:29	GLASS01	F44-Office
5804	contact	27/11/2020, 14:45:28	DOOR06	F44-Reception
5803	contact	27/11/2020, 14:43:48	DOOR05	F44-Reception
5802	contact	27/11/2020, 14:43:23	DOOR04	F44-Lab
5801	motion	27/11/2020, 14:34:41	CICTHERMO01	F44-CiC
5800	motion	27/11/2020, 14:34:11	CICTHERMO01	F44-CiC
5799	contact	27/11/2020, 14:34:08	DOOR04	F44-Lab
5798	contact	27/11/2020, 14:34:07	DOOR04	F44-Lab

Device	Location	Type	Status	Time
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COMMSCOPE® RUCKUS®

Event Count : 5,813

Controls

Ruckus WiFi 6 系列AP

頂級 - R850



- 2.4 GHz 4x4:4, 1148Mbps
- 5 GHz 8x8:8, 4800Mbps
- Up to 1024 client
- 1/2.5/5G Base-T
- BLE / Zigbee IoT Radio (selectable)

高階 – R750



- 2.4 GHz 4x4:4, 1148Mbps
- 5 GHz 4x4:4, 2400Mbps
- Up to 1024 client
- 1/2.5G Base-T
- BLE / Zigbee IoT Radio (selectable)

中階 - R650



- 2.4 GHz 2x2:2, 574Mbps
- 5 GHz 4x4:4, 2400Mbps
- Up to 512 client
- 1/2.5G Base-T
- BLE / Zigbee IoT Radio (Concurrent)

入門 - R550

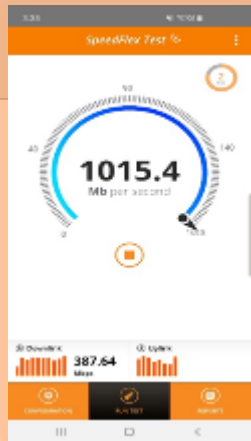


- 2.4 GHz 2x2:2, 574Mbps
- 5 GHz 2x2:2, 1200Mbps
- Up to 512 client
- 1G Base-T
- BLE / Zigbee IoT Radio (selectable)

戶外型 - T750



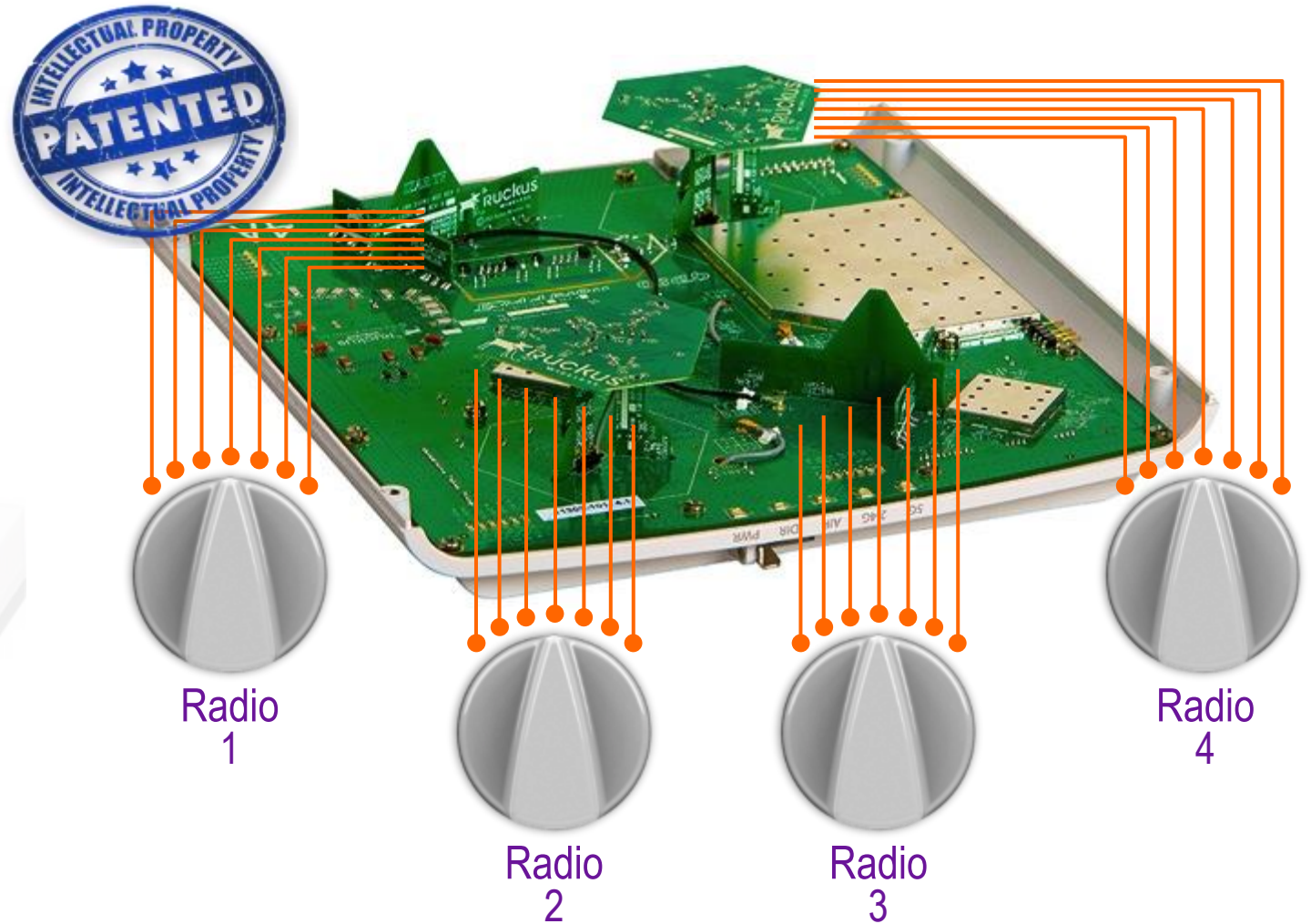
- 2.4 GHz 4x4:4, 1148Mbps
- 5 GHz 4x4:4, 2400Mbps
- Up to 1024 client
- 1x 1/2.5G Base-T, 1xSFP/SFP+, 1 x 1000Base-T
- BLE / Zigbee IoT Radio (selectable)



Ruckus BeamFlex+ 專利智慧陣列天線

無線網路品質取決於訊號控制

- Stronger Wi-Fi signals at **longer ranges**
- Adapts **automatically** to environmental changes
- More concurrent users **per access point**
- **Interference mitigation** and resilience
- Unmatched scalability

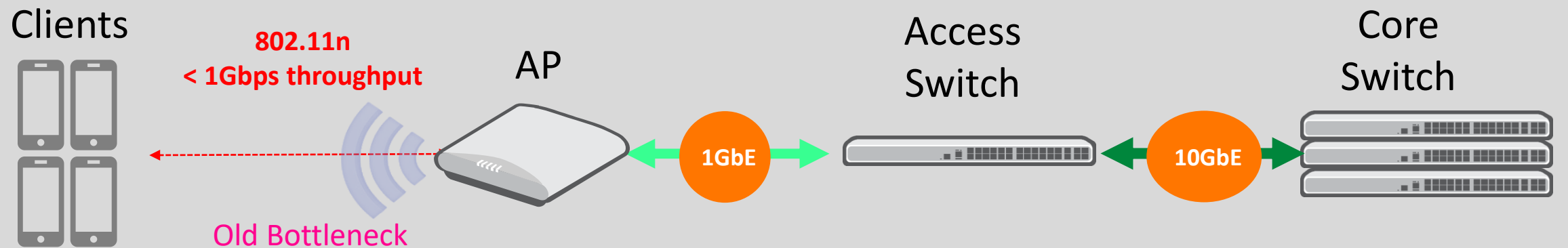
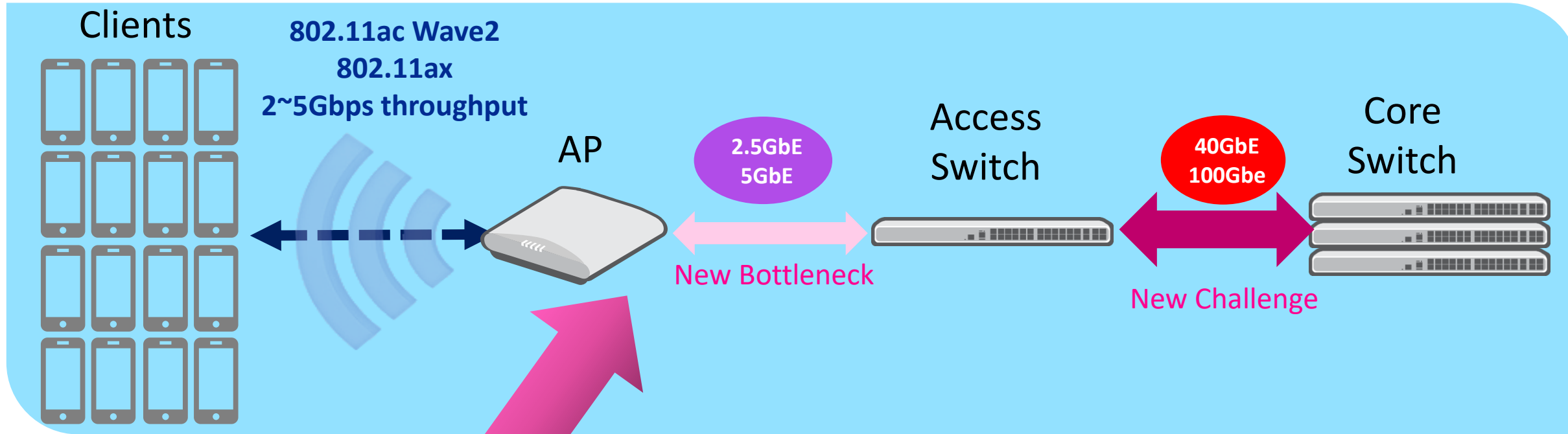


Ruckus無線技術優勢

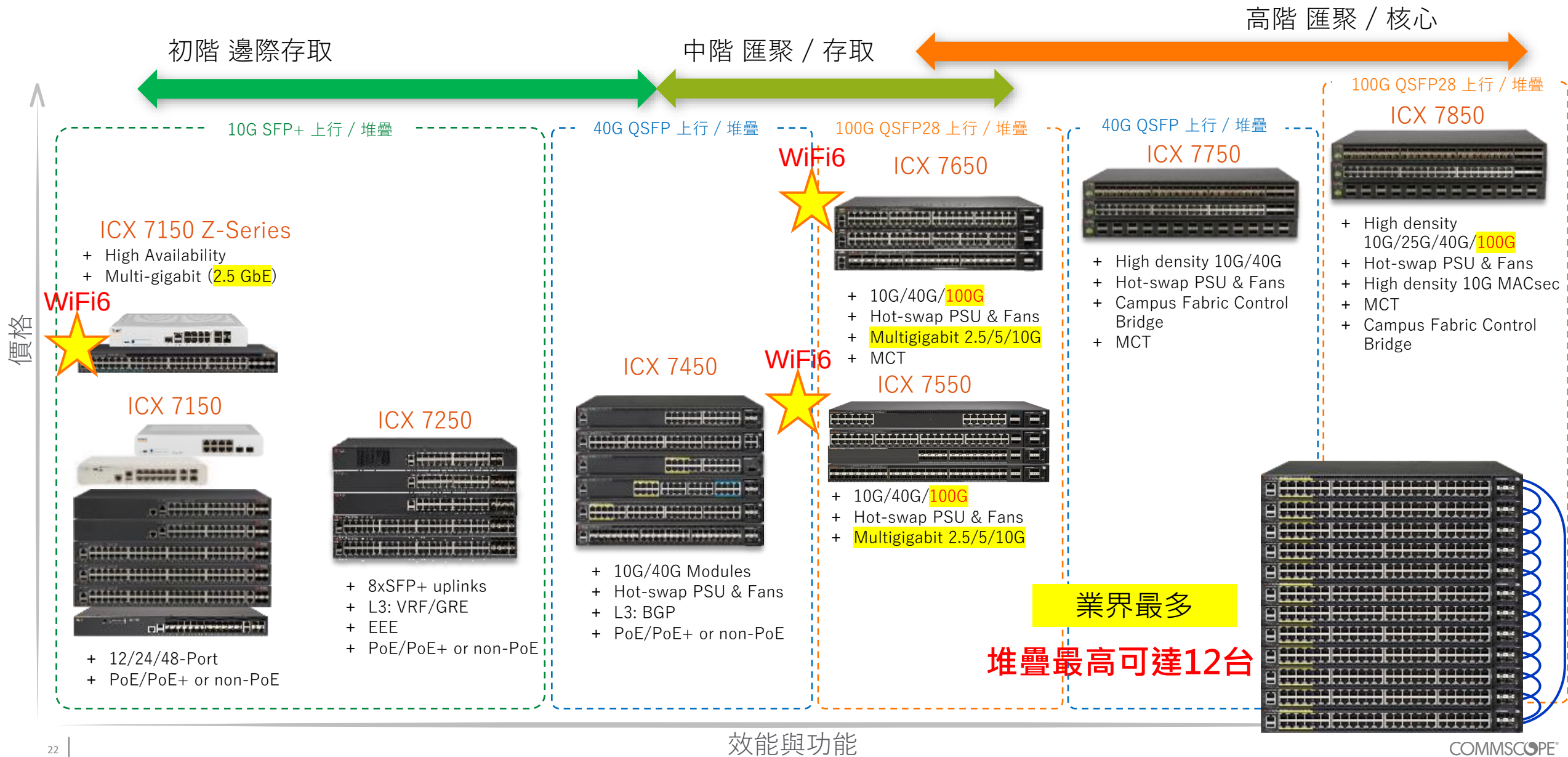
- 針對嚴酷環境設計
 - 高穿透
 - 抗干擾
 - 高密度
- 專利天線技術
 - BeamFlex+ and PD-MRC



Wi-Fi 6 改變了存取層到核心層的網路需求



Ruckus ICX 全系列交換器



ICX7850 100G 高效交換器

高階100G交換器
同享有限終生保固

-32Q:

- 32-port QSFP8 40/100G
 - 20x100G ports for uplink
 - 12x100G ports for uplink or stacking
- All ports breakout to 4x10G/4x25G giving maximum 128 ports

-48FS:

- 48-port 1/10GE SFP+, 8 QSFP28 40/100G with 1588 Version
 - 48x10G ports for access, support LRM and MACsec.
 - 8x100G ports for stacking/uplink
- Uplink ports breakout to 4x10G/4x25G giving maximum 80 ports

-48F:

- 48-port 1/10/25GE SFP28, 8 QSFP28 40/100GE
 - 48x25G ports for access, no LRM, no MACsec support
 - 8x100G ports for uplink and stacking
- Uplink ports breakout to 4x10G/4x25G giving maximum 80 ports



資料中心

骨幹網路

運營商網路

Ruckus ICX 7150 交換器家族

提升交換能力的入門款可堆疊交換器

WiFi6



ICX 7150-C10ZP



ICX 7150-C08P

ICX 7150-C12P

ICX 7150-24



ICX 7150-24P



ICX 7150-48



ICX 7150-48P



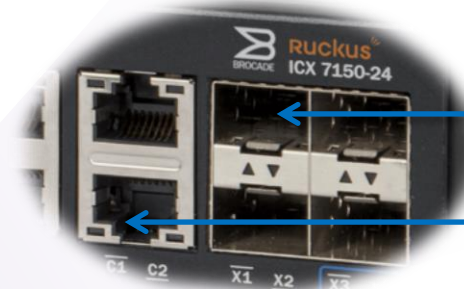
ICX 7150-48PF



ICX 7150-48ZP



ICX 7150-24F



4組 1GbE 兩用上行(Uplink)連接埠
可選購授權升級 10 GbE (SFP+)

多2組 1 GbE 乙太網路埠

- 最大支援12台堆疊交換器
- Non-PoE機種為無風扇設計(包含Compact 機種)
- 支援運作中軟體更新機制(In Service Software Upgrade ; ISSU)
- 提供 Base Layer 3 功能 (Static and RIP)
- 可加購授權升級 Layer 3 動態路由 (OSPF, VRRP, PIM, PBR)
- 支援 Campus Fabric 技術 (Port Extender)
- 支援 sFlow , OpenFlow 1.3

WiFi6

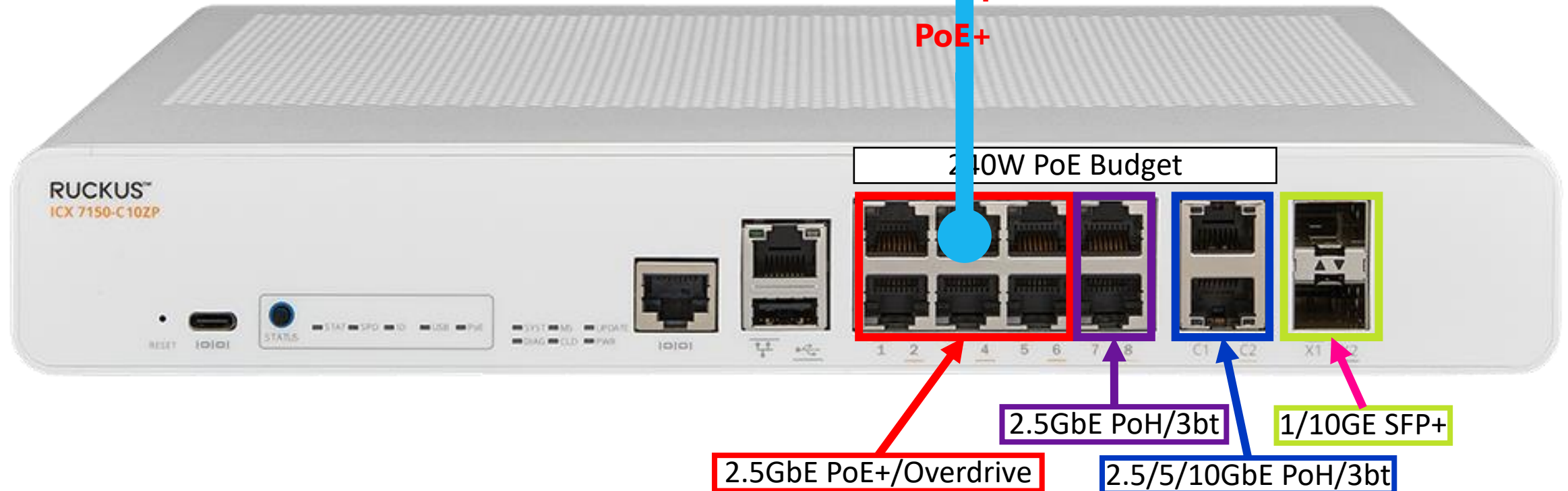


ICX 7150-C10ZP Multi-Giga Switch 滿足 WIFI-6 效能需求

- Available Now
- **8 x 2.5G** , 2 x 10GbE , **2 x 10G SFP+**
- 240W PoE budget (8 x WIFI6 AP)
- Unified management for wifi + wired
- Compact size (30.4cm x 30.5cm x 4.4cm)

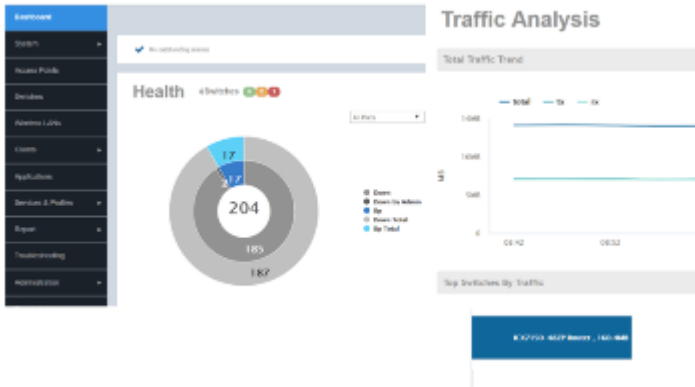


2.5Gbps
PoE+



整合有線無線管理

Dashboard with Traffic Analysis



ICX Switch Mgmt

The table displays a list of switches with columns for Name, MAC, Model, Ports, Port Status, and Alerts. The status bar indicates 58 healthy, 3 warning, and 1 error.

Name	MAC	Model	Ports	Port Status	Alerts
MySwitch1	XCX0000000000	XCX0000000000	10	10	10
MySwitch2	XCX0000000000	XCX0000000000	10	10	10
MySwitch3	XCX0000000000	XCX0000000000	10	10	10
MySwitch4	XCX0000000000	XCX0000000000	10	10	10
MySwitch5	XCX0000000000	XCX0000000000	10	10	10
MySwitch6	XCX0000000000	XCX0000000000	10	10	10
MySwitch7	XCX0000000000	XCX0000000000	10	10	10

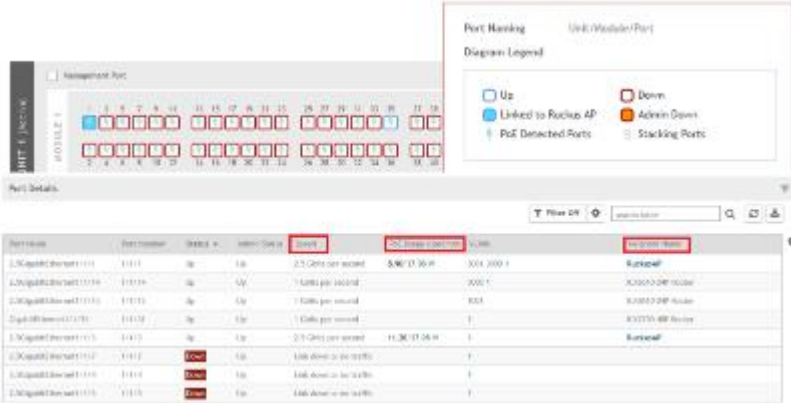
ICX Firmware Mgmt

The dialog shows the 'Upgrade Firmware' process. It includes fields for 'Uploaded Firmware' (F308090), 'Firmware Type' (Switch), and 'Apply Firmware' (How). A warning message states: 'Warning: Make sure firmware upgrade is not scheduled at same time when on-demand or automatic config-backup [run at 00:00 hours everyday] is scheduled for the selected switch(es)'.

ICX Config Mgmt

The dialog shows the 'Switch Config Diff' for a specific switch. It lists configuration changes between the current state and a previous state, including details like 'Configured at 1/1/1' and 'Configured at 1/1/1'.

Front Panel View

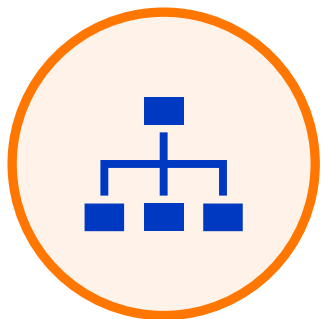


ICX Configuration

The configuration page shows settings for Layer 2, including 'VLAN 100', 'VLAN 101', and 'VLAN 102'. It includes options for 'VLAN 100', 'VLAN 101', and 'VLAN 102'.

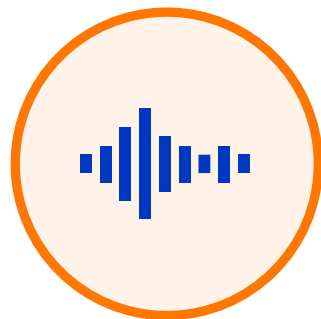
網路可視化分析

網路所產生的資料



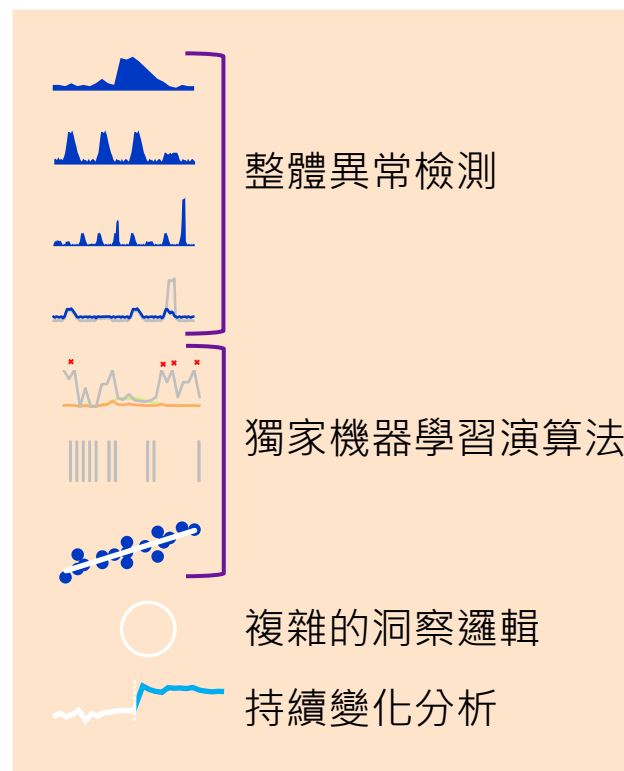
- 計數器、績效指標、事件以及執行
- 透過API串流傳送

資料、事件、組態處理

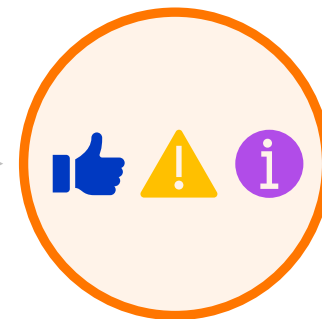


- 機器學習資料基準線
- 透過大數據擷取、索引、聚合、儲存

機器智能



主動可視

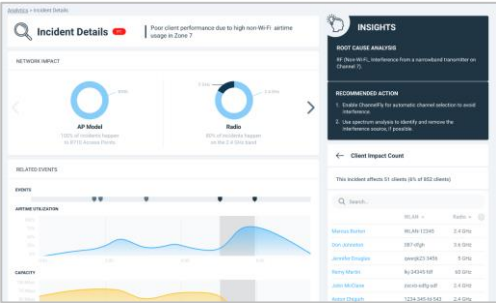


- 全時人工智能助理
- 根據用戶影響對事件自動分類
- 依需求通知

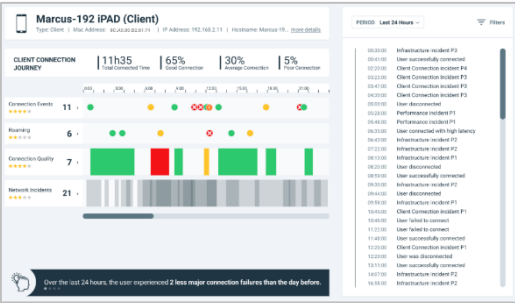
Ruckus Analytics協助分析處理



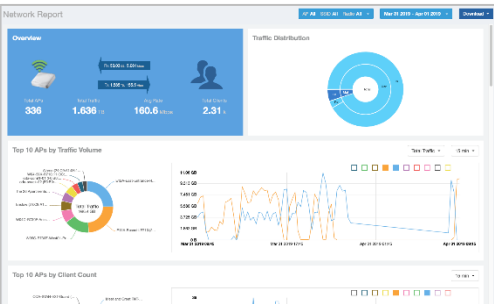
網路健康儀表板



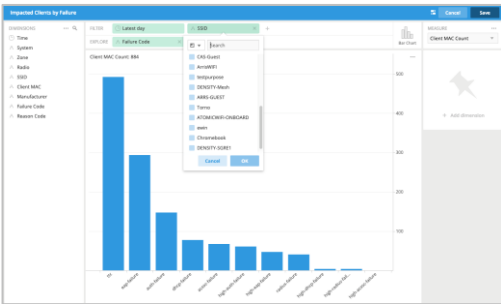
機器學習事故處理



用戶端障礙排除工具



強大的報表分析



用戶資料深度瀏覽

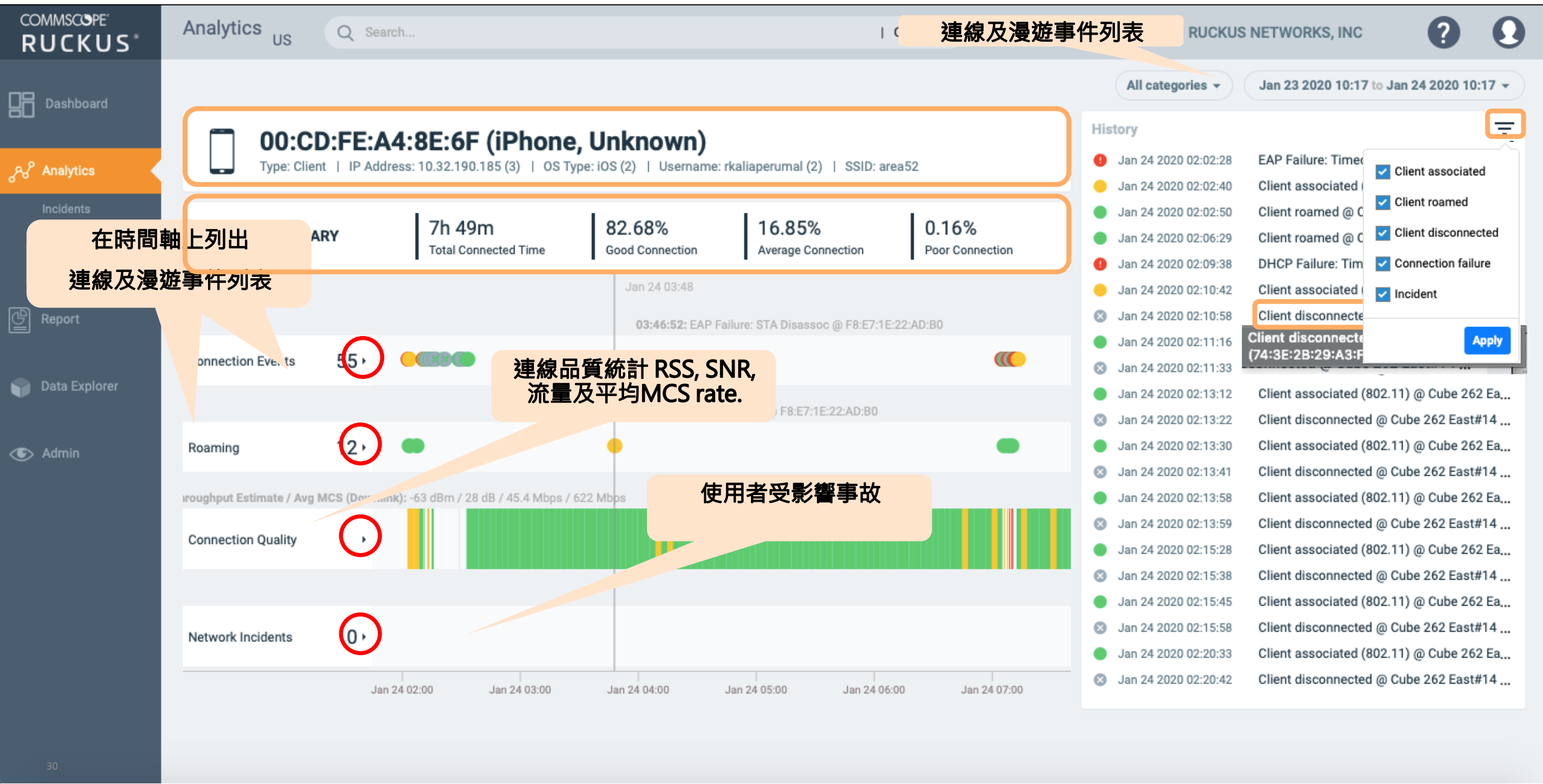


網路服務品質保障

Ruckus Analytics 儀表板 – 事故檢測



Ruckus Analytics - 使用者故障排除



使用者故障排除 – 可視化連線診斷



00:CD:FE:A4:8E:6F (iPhone, Unknown)

Type: Client | IP Address: 10.32.190.185 (3) | OS Type: iOS (2) | Username: rkaliaperumal (2) | SSID: area52

HEALTH SUMMARY

7h 49m

Total Connected Time

82.68%

Good Connection

16.85%

Average Connection

0.16%

Poor Connection

Success, failure, connection,
disconnect 事件

點選故障事件以
檢視細節資訊

Connection Events

55

Success

17

Failure

13

Connection Event Details

DETAILS

AP MAC F8:E7:1E:22:AD:B0
AP Name Cube 287 East#13
SSID area52
Radio 5 GHz
Failure Type EAP Failure
Reason STA Disassoc

802.11 Authentication Request
802.11 Authentication Response
802.11 Reassociation Response
802.11 Reassociation Request
EAP Request
802.11 Disassociation (Disassociation_STA)



All categories ▾

Jan 23 2020 10:17 to Jan 24 2020 10:17 ▾

History

- Jan 24 2020 02:15:38 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:15:45 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:15:58 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:20:33 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:20:42 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:28:17 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:28:27 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:28:59 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:29:11 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:29:25 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:29:35 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:32:31 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 03:46:52 **EAP Failure: STA Disassoc @ Cube 287 E...**
- Jan 24 2020 03:47:04 Client roamed @ Cube 287 East#13 (F8:E...
- Jan 24 2020 04:24:17 DHCP Failure: Timeout Expired @ Cube 16...
- Jan 24 2020 04:27:09 Client associated (802.11) @ Cube 287 Ea...
- Jan 24 2020 07:04:00 DHCP Failure: Timeout Expired @ Cube 16...
- Jan 24 2020 07:05:05 Client associated (802.11) @ Cube 166 Ea...
- Jan 24 2020 07:05:21 EAP Failure: STA Disassoc @ Cube 262 Ea...
- Jan 24 2020 07:05:22 Client roamed @ Cube 262 East#14 (74:3...
- Jan 24 2020 07:05:22 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 07:06:06 Client associated (802.11) @ Cube 166 Ea...
- Jan 24 2020 07:06:36 Client disconnected @ Cube 166 East #9 (...)
- Jan 24 2020 07:06:39 Client associated (802.11) @ Cube 166 Ea...

品質分析 – 漫遊及連線品質分析



00:CD:FE:A4:8E:6F (iPhone, Unknown)

Type: Client | IP Address: 10.32.190.185 (3) | OS Type: iOS (2) | Username: rkaliaperumal (2) | SSID: area52

HEALTH SUMMARY

7h 49m

Total Connected Time

82.68%

Good Connection

16.85%

Average Connection

0.16%

Poor Connection

Connection Events

55 ▶



Roaming

12 ▶



Success

10



Slow

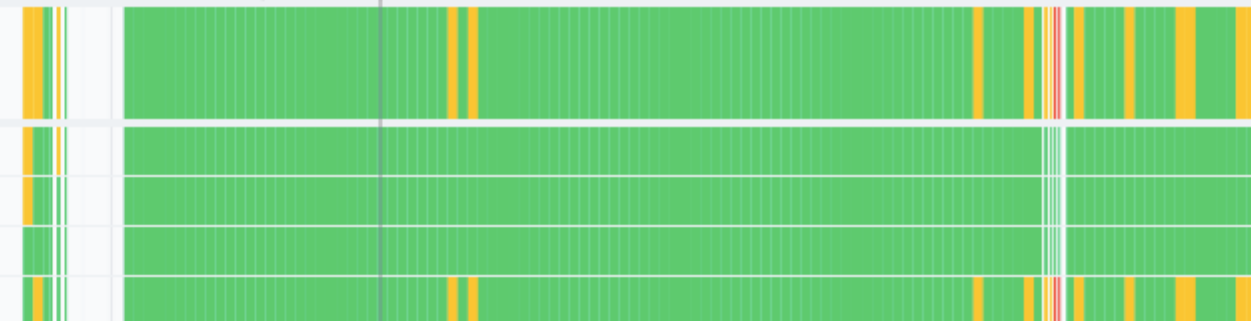
2



Throughput Estimate / Avg MCS (Downlink): -63 dBm / 28 dB / 45.4 Mbps / 622 Mbps

Connection Quality

▶



RSS



SNR



Throughput Estimate



Avg MCS (Downlink)



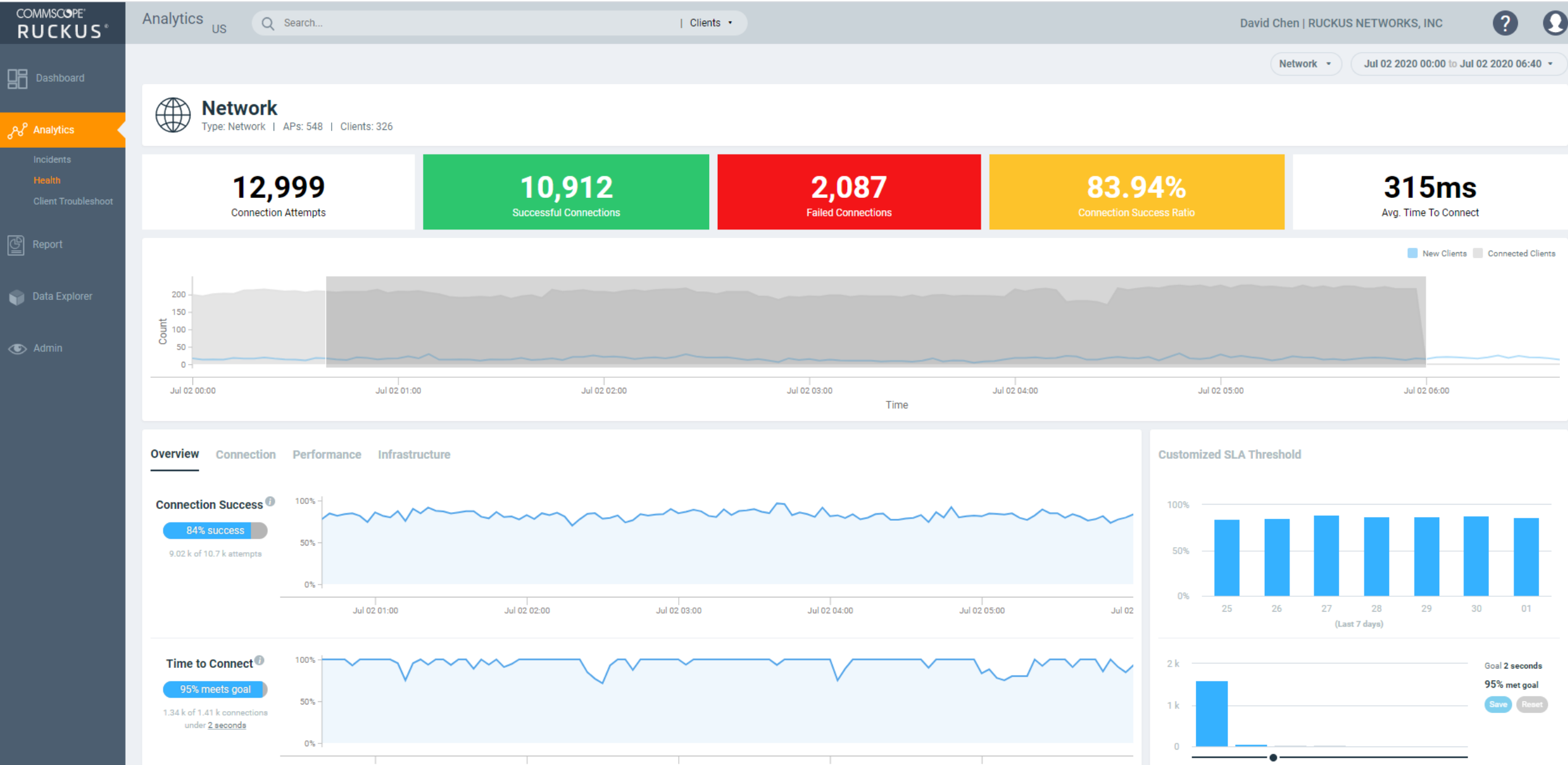
All categories ▾

Jan 23 2020 10:17 to Jan 24 2020 10:17 ▾

History

- Jan 24 2020 02:02:28 EAP Failure: Timeout Expired @ Infront of ...
- Jan 24 2020 02:02:40 Client associated (802.11) @ Infront of Ba...
- Jan 24 2020 02:02:50 Client roamed @ Cube 287 East#13 (F8:E...
- Jan 24 2020 02:06:29 Client roamed @ Cube 187 East #8 (74:3...**
- Jan 24 2020 02:09:38 DHCP Failure: Timeout Expired @ Cube 26...
- Jan 24 2020 02:10:42 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:10:58 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:11:16 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:11:33 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:13:12 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:13:22 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:13:30 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:13:41 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:13:58 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:13:59 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:15:28 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:15:38 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:15:45 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:15:58 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:20:33 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:20:42 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:28:17 Client associated (802.11) @ Cube 262 Ea...
- Jan 24 2020 02:28:27 Client disconnected @ Cube 262 East#14 ...
- Jan 24 2020 02:28:59 Client associated (802.11) @ Cube 262 Ea...

網路健康狀況



Zoom 準備就緒, 視訊體驗品質保證

Call Details

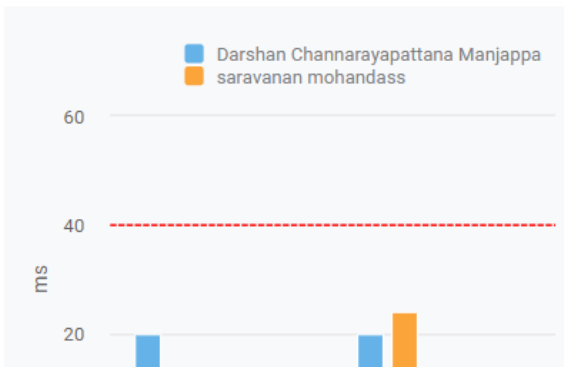
Name	Start Time	End Time	Duration	No. of Participants	QoE
Darshan-Authenticated-User-4	Apr 07 2021 03:35:24	Apr 07 2021 03:50:05	14m 41s	2	

Participants	Client MAC		Device	IP	Network Type	AP	AP MAC	SSID	Radio	Join Time	Leave Time
Darshan Channaray...	30:35:AD:A6:D2:EA		Mac	134.242.238.1	Wifi	RuckusAP	D8:38:FC:1E:B1:30	1@Eng_Dars_Zoom...	5 GHz	03:35	03:50
saravanan mohand...	30:35:AD:AC:C7:CC		Mac	134.242.238.1	Wifi	Darshan-R730-Mesh1	70:CA:97:0B:6E:00	8@MLISAtestingZo...	5 GHz	03:36	03:50

Call Statistics



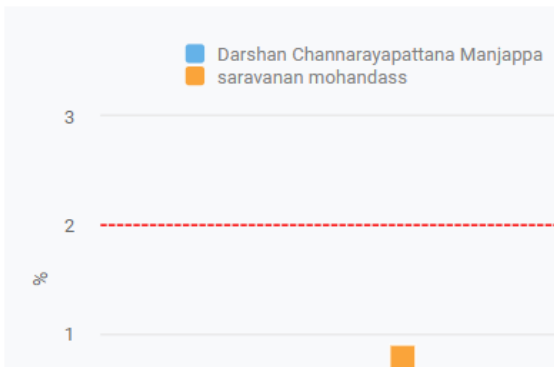
Jitter



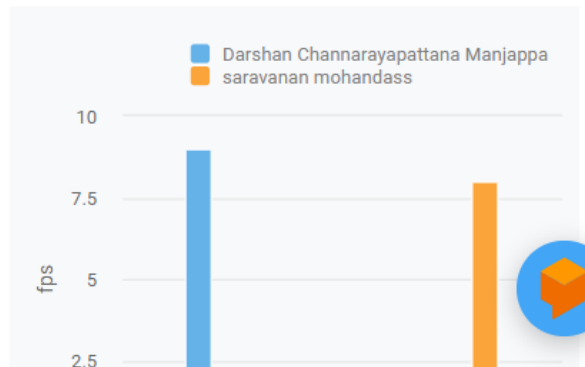
Latency



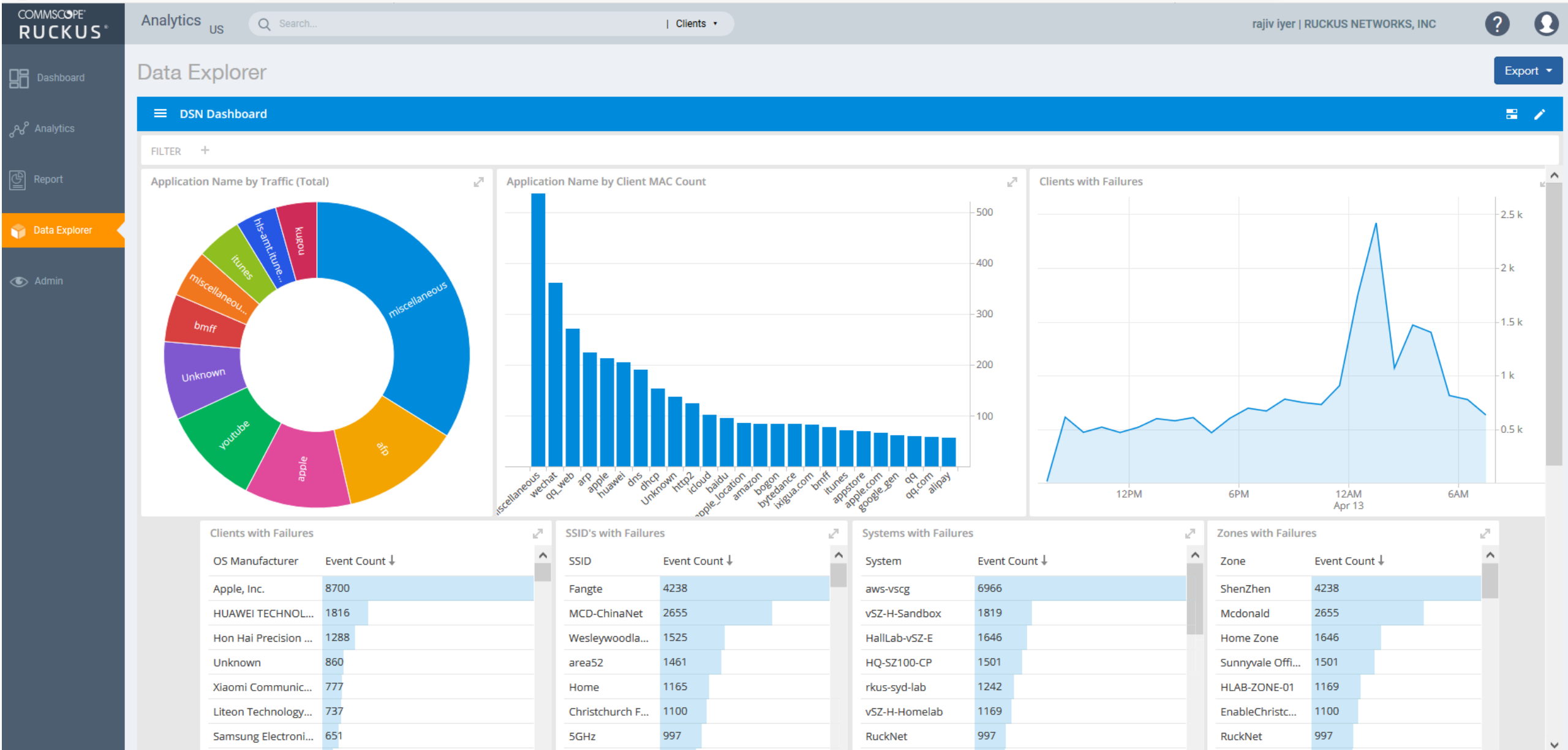
Packet Loss



Video Frame Rate



數據瀏覽 - 客制化儀表板



Ruckus 全系列解決方案

Software & SaaS

Security & Policy



Cloudpath

Network Intelligence



SmartCell Insight



Ruckus Analytic

Location



SPoT

Tools for partners



Intangi / Yagna

Control & Management

Physical Appliance



SmartZone
ZoneDirector

Virtual Appliance



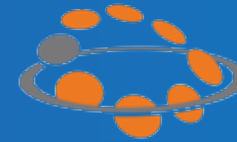
SmartZone

Cloud-managed



Ruckus Cloud Converged

Controllerless



Ruckus Unleashed

Gateway IoT



IoT Suite

Switches

Access



ICX 7150



ICX 7250



ICX 7450

Aggregation



ICX 7550



ICX 7650



ICX 7750

Core



ICX 7850

Access Points

Outdoor



T, P, E Series

Indoor



R Series

Specialty



C, H, M Series

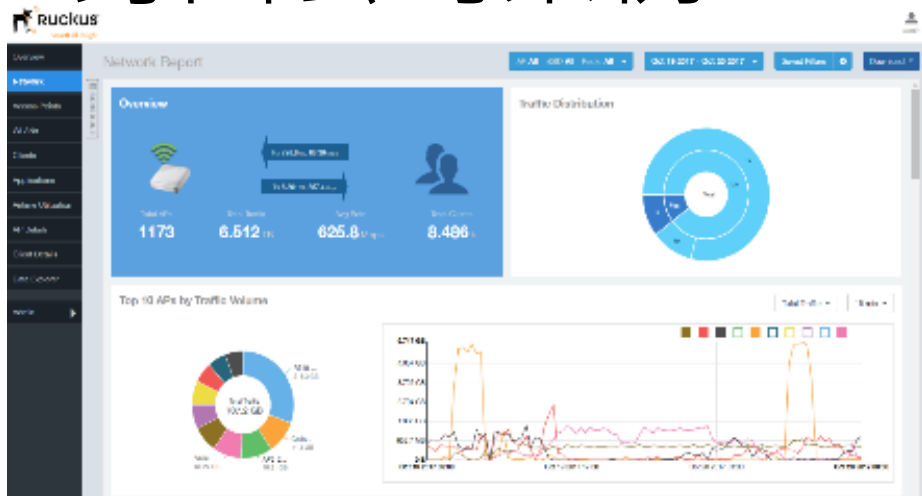
LTE



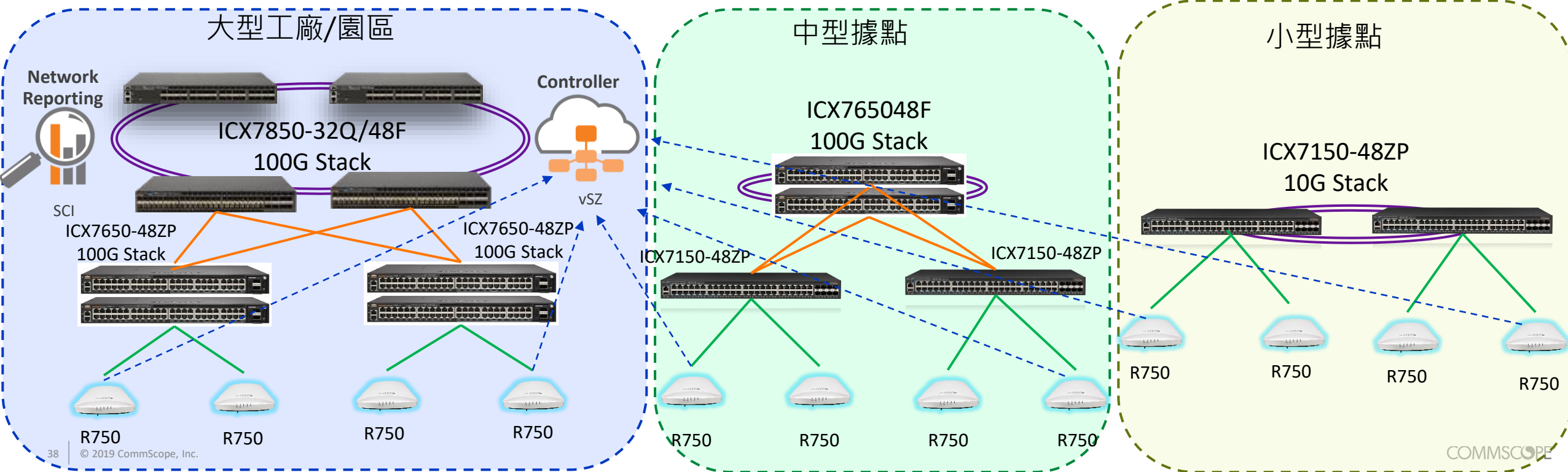
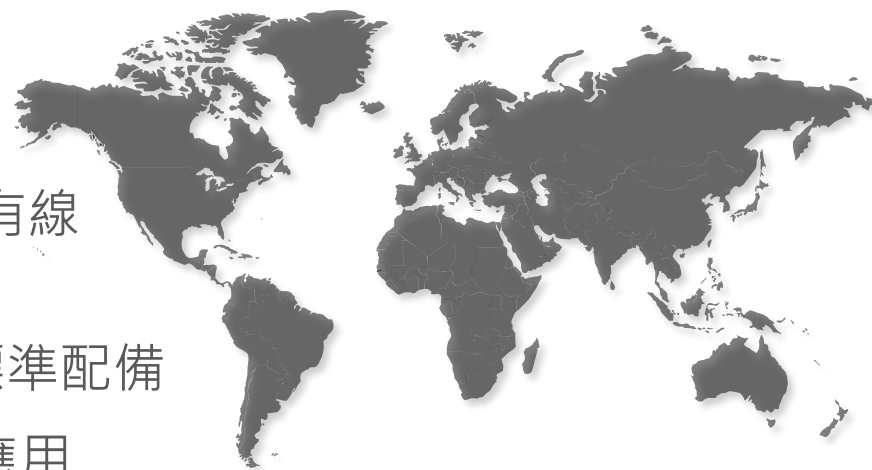
Q Series

成功案例分享

跨國公司案例



- 全球200+ 業務據點
- 50+個大型工廠/園區
- 全球標準化採用Ruckus 有線 (ICX) + 無線整合方案
- 2020年起採用WiFi 6為標準配備
- SCI + IoT + SPoT(定位)應用

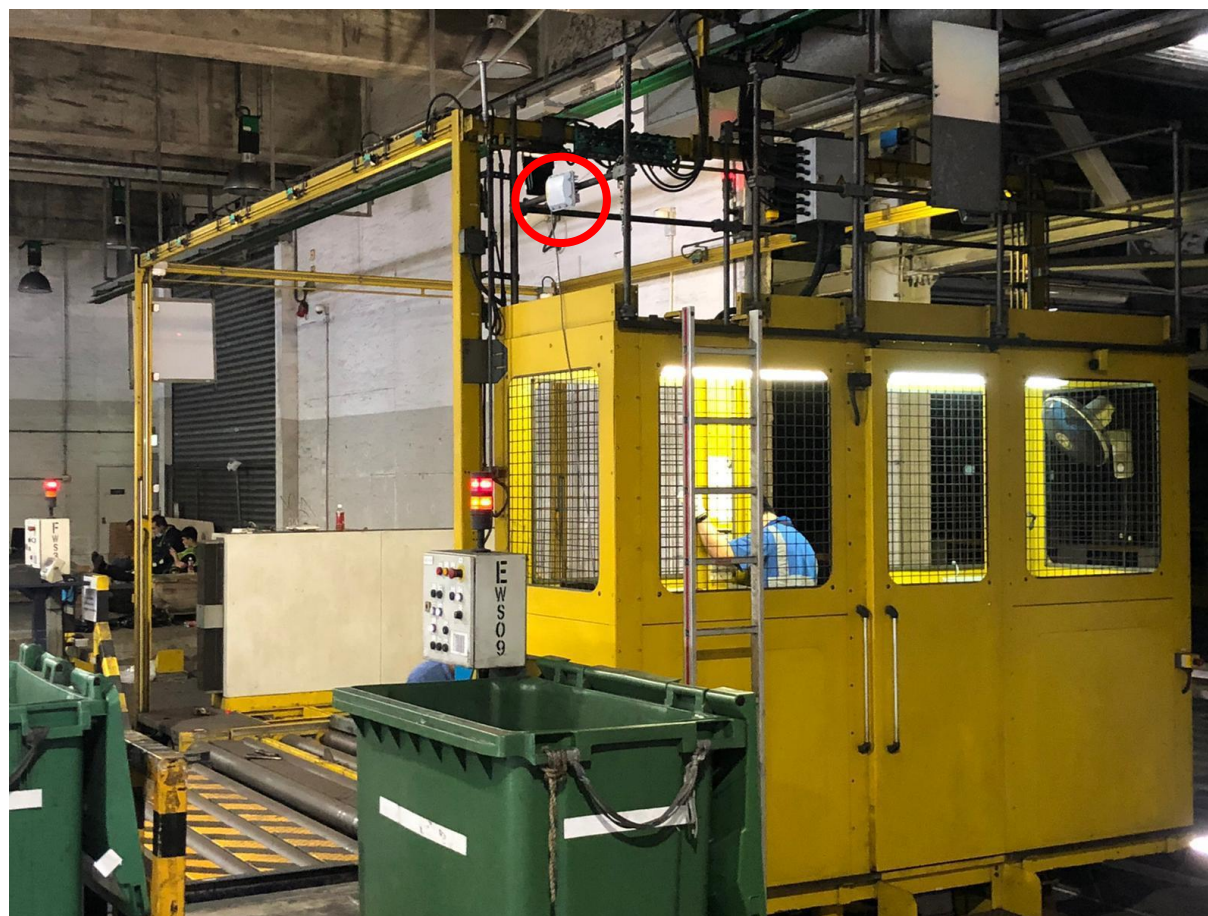


AAT 亞洲空運中心

香港國際機場空運貨站營運商，採用自動化貨物處理系統及先進資訊科技設備，為客戶提供二十四小時高效貨物處理服務

Product: ZD, R510, T310, ICX7650, ICX7150

升降轉運車

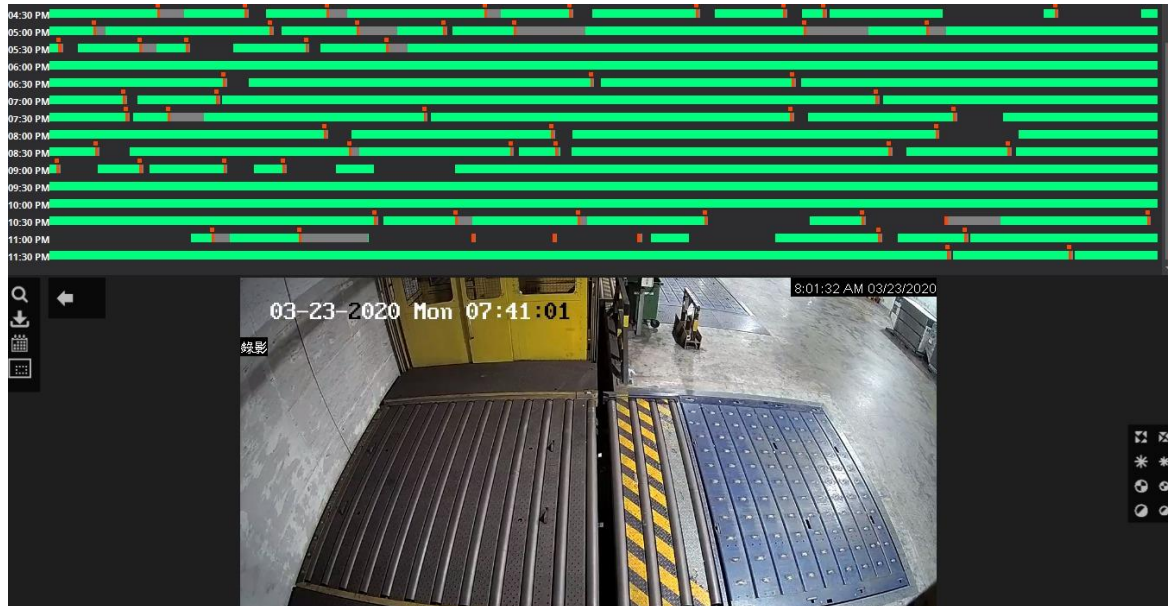


AAT 亞洲空運中心

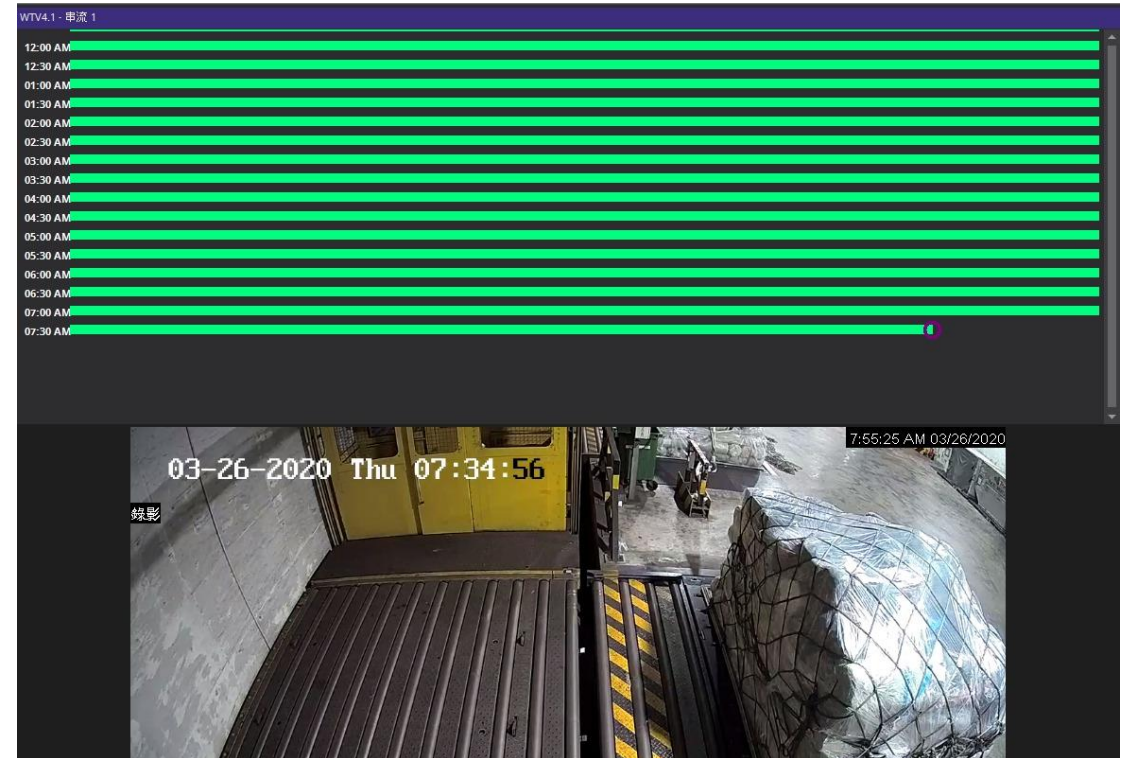
Case studies: <https://ezone.ulifestyle.com.hk/article/2723240/亞洲空運中心選用CommScope%20Ruckus%20Wi-Fi> 解決方案提升營運效率及服務

香港國際機場空運貨站營運商，採用自動化貨物處理系統及先進資訊科技設備，為客戶提供二十四小時高效貨物處理服務

Product: ZD, R510, T310, ICX7650, ICX7150



Before



After

Thank You

David Chen

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