

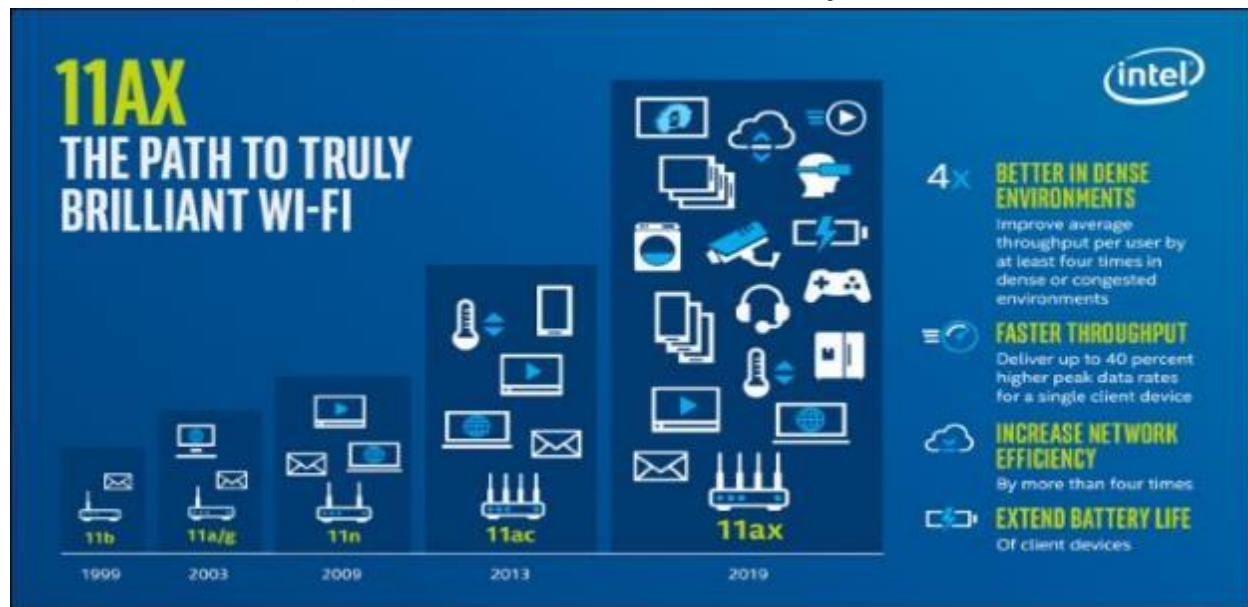
Ruckus WiFi6 趨勢戰情報

David Chen

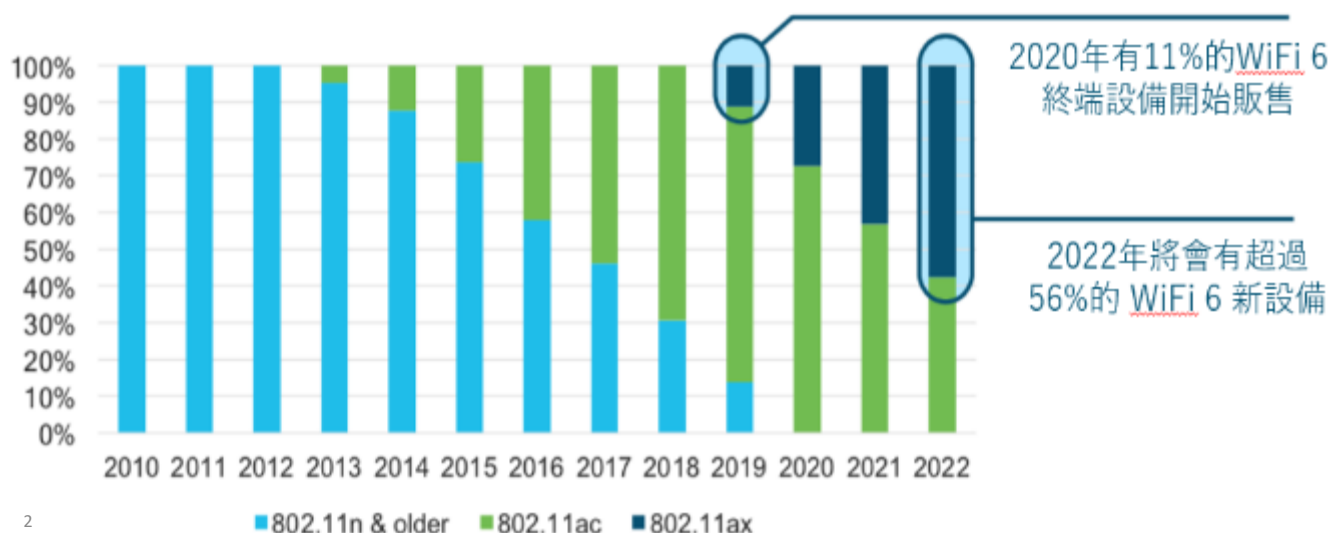
Technical Manager

david.chen2@commscope.com

一大波WiFi 6手機來襲



802.11ax 終端設備成長指數



iPhone

SAMSUNG

- 40% 速度提升
 - 1024-QAM vs 256-QAM(11ac)
- 4X 承載密度提升
 - OFDMA
 - DL & UL MU-MIMO
 - BSS-colouring
- 7X 電池壽命提升
 - TWT (target wake time bit)

如何達到最佳效能?

相互爭道
(CSMA/CA)

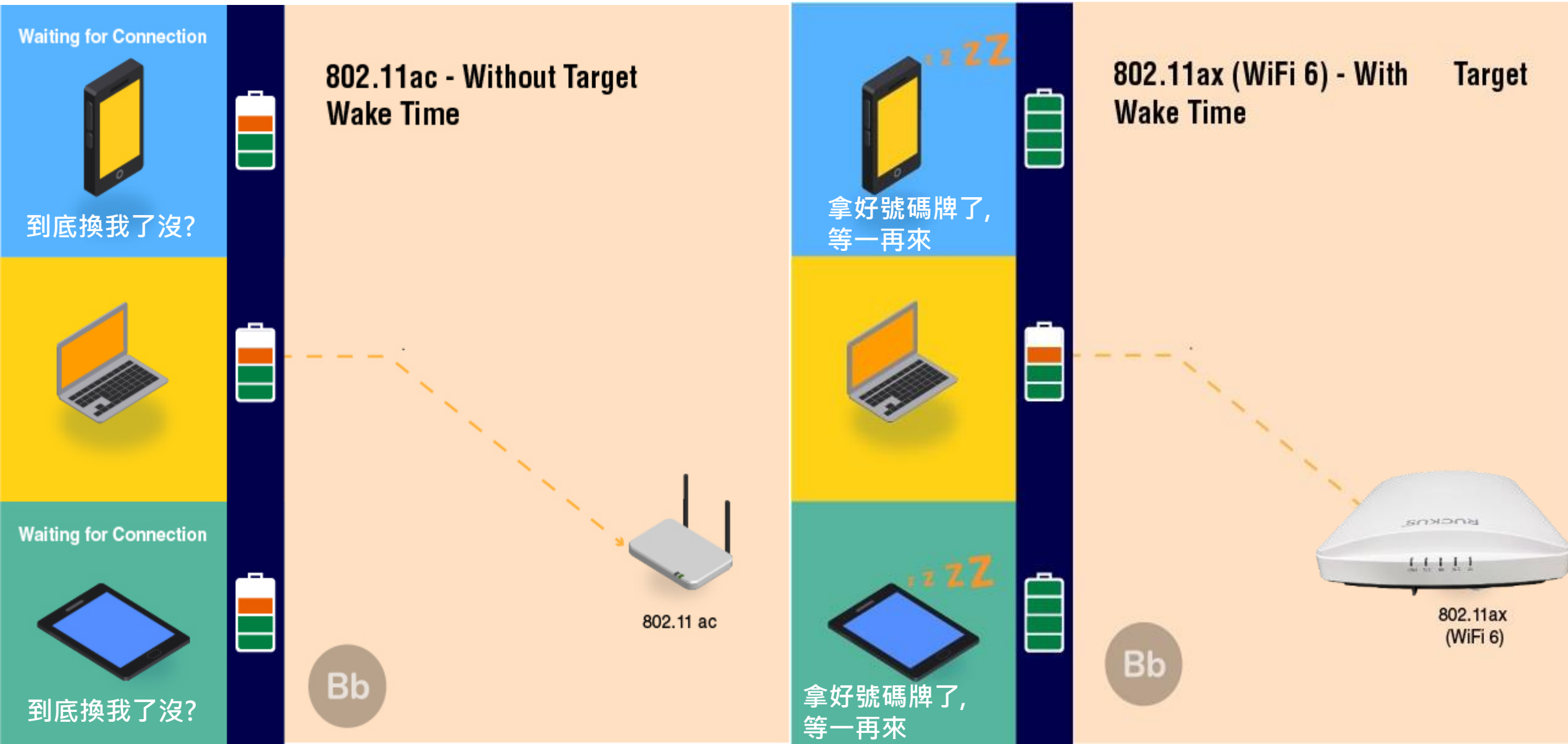
Wi-Fi 5 (11ac)



依序排隊

Wi-Fi 6 (11ax)

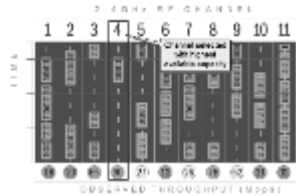
WiFi-6 Target Wake Time – 7x 電池續航力



創新無線技術提升WiFi6至更高層次



BeamFlex+
專利智慧天線



ChannelFly
進階頻道選取



封包式動態
調適功率



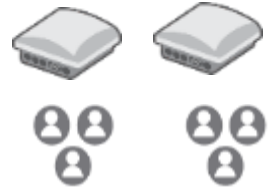
自動調適基地台
含蓋範圍



臨時性路過
用戶端優化管理



傳輸空時
耗用疏導



優化網路
承載效率

優化無線品質, 提升使用體驗

專利智慧天線技術，可大幅提升有效訊號強度並改善訊噪比，為長距離具挑戰性的環境提供最佳通訊品質

監測各無線頻道訊號品質，自動切換至最佳頻道以優化整體效能

每個傳輸封包動態調整傳輸功率 = 降低多餘訊號，最佳化傳輸效能

偵測臨近基地台訊號，自動調整訊號範圍來優化無線頻道涵蓋，同時減少同頻干擾，取得更好的網路效能

避免瞬間大量臨時性路過用戶設備，影響即有連線網路效能，並提升穩定度

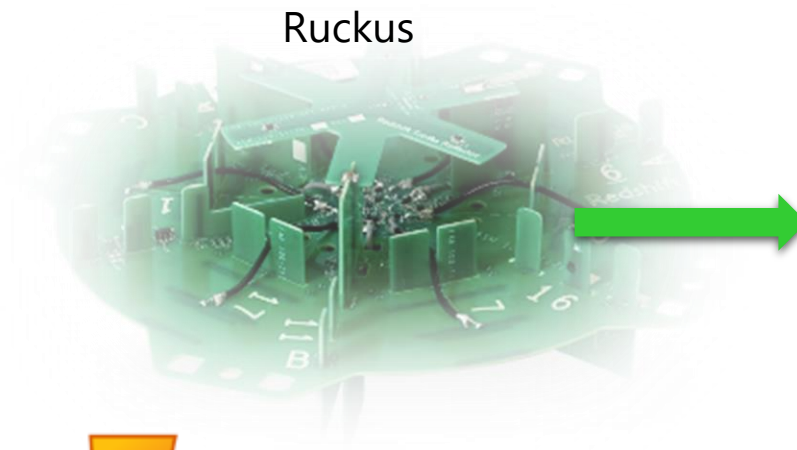
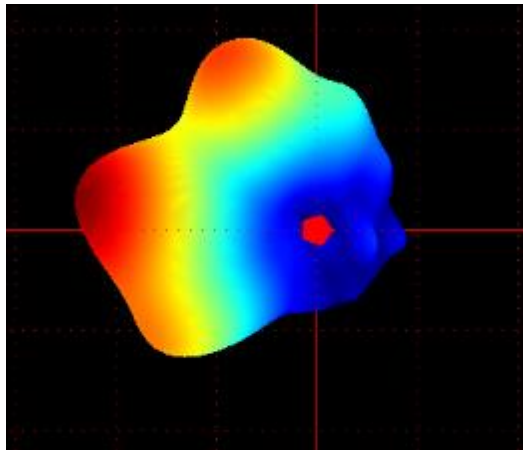
透過減少壅擠環境中的管理流量，提高可用無線空時，有效提升頻譜利用率及設備效能

即時將每個客戶端引導到最佳無線資源，以實現最佳連接品質

Ruckus BeamFlex : 具備更佳的效果



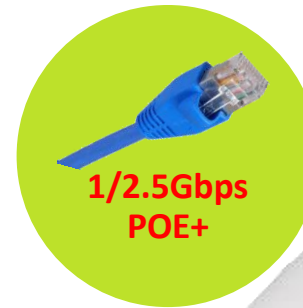
BeamFlex技術減少干擾



- 超過4,000 種天線格式組合
- BeamFlex 可提升高達10dB的降噪效益

Ruckus高階WiFi6 AP – R750

4x4:4 + 2.5G Ethernet



Manage radio coexistence

Ruckus WiFi 6 系列AP

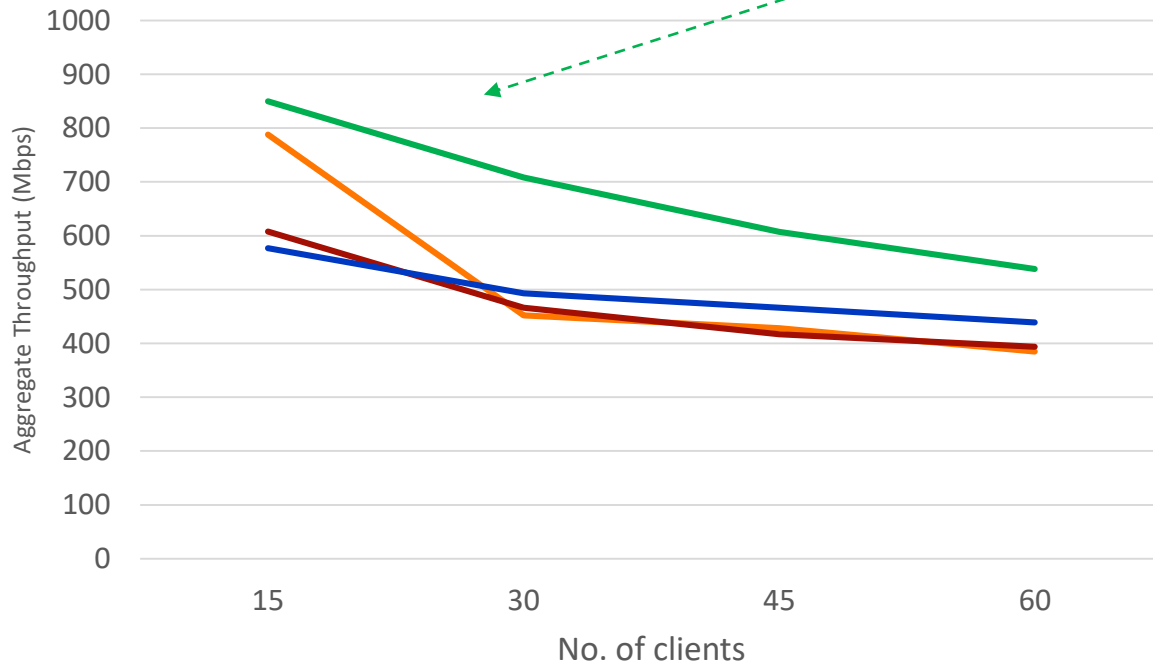
頂級 - R850 (近期供應)	中階 - R650	入門 - R550 (近期供應)	戶外型 - T750
			
– 2.4 GHz radio: 4x4:4 802.11b/g/n/ax – 1148 Mbps max PHY rate – 5 GHz radio: 8x8:8 802.11a/n/ac/ax – 4800 Mbps max PHY rate – Up to 1024 client associations – 1x 1/2.5/5G Base-T, 1x10/100/1000Base-T Ethernet Ports – 802.3at, uPoE, PoH input, 48VDC input – BLE / Zigbee IoT Radio (selectable)	– 2.4 GHz radio: 2x2:2 802.11b/g/n/ax – 574 Mbps max PHY rate – 5 GHz radio: 4x4:4 802.11a/n/ac/ax – 2400 Mbps max PHY rate – Up to 512 client associations – 1x 1/2.5G Base-T, 1x10/100/1000Base-T Ethernet Ports – 802.3at PoE input, 48VDC input – BLE / Zigbee IoT Radio (Concurrent)	– 2.4 GHz radio: 2x2:2 802.11b/g/n/ax – 574 Mbps max PHY rate – 5 GHz radio: 2x2:2 802.11a/n/ac/ax – 1200 Mbps max PHY rate – Support for onboard IoT radios, BLE & ZigBee (selectable) – Up to 512 client associations – 2x10/100/1000Base-T Ethernet Ports – 802.3at PoE input, 48VDC input	– 2.4 GHz radio: 4x4:4 802.11b/g/n/ax – 1148 Mbps max PHY rate – 5 GHz radio: 4x4:4 802.11a/n/ac/ax – 2400 Mbps max PHY rate – Up to 1024 client associations – 1x 1/2.5G Base-T, 1xSFP/SFP+, 1 x 1000Base-T – 802.3bt PoE input, AC input – BLE / Zigbee IoT Radio (selectable) – Omni / Sector / External antennas options

WiFi6 AP效能比較

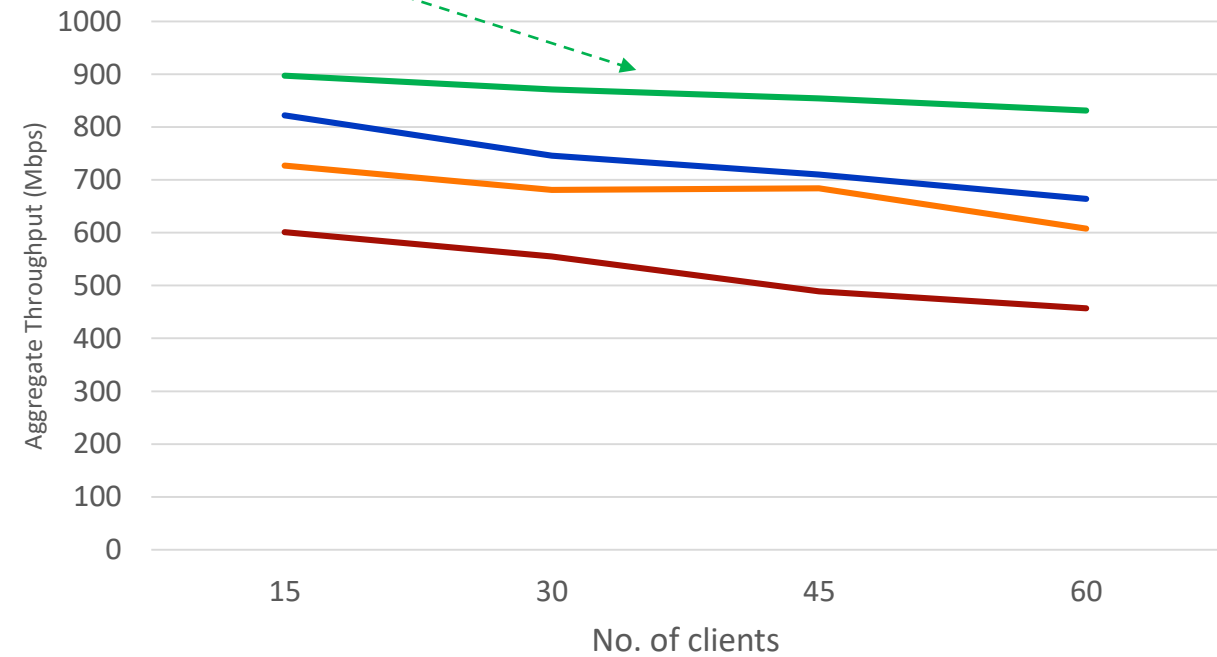
Ruckus R750



TCP-DL



TCP-UL



— Ruckus R750 — AH廠牌 — A廠牌 — C廠牌

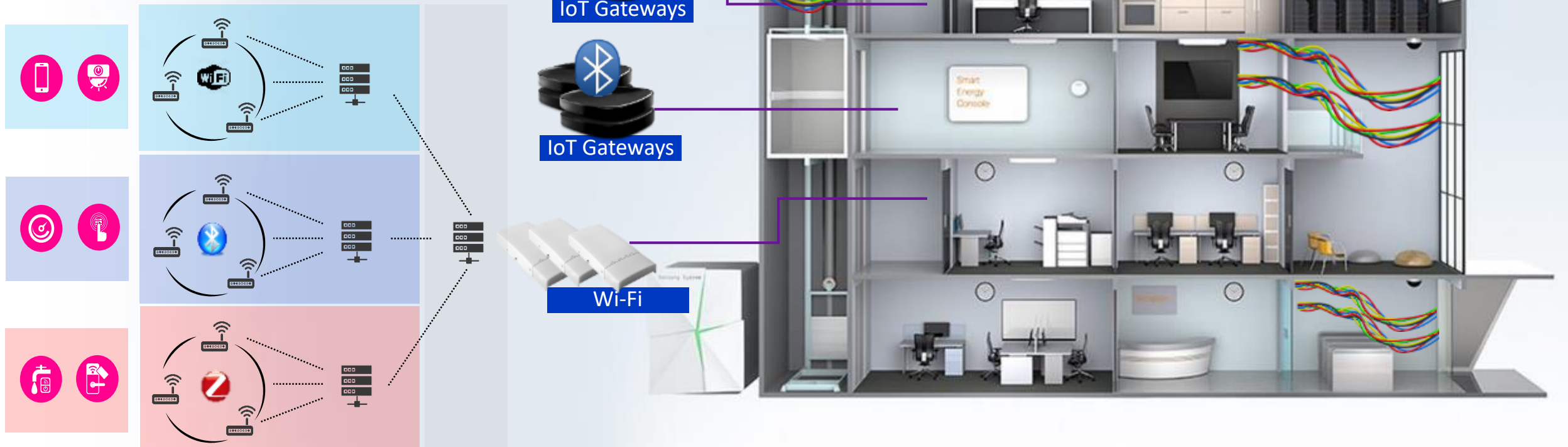
— Ruckus R750 — AH廠牌 — A廠牌 — C廠牌

WiFi 6 – 不僅是速度的提升 專為高效能、高密度及大量IoT連線設備所設計



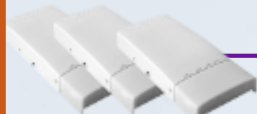
打造物聯網環境的挑戰

- 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



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



Wi-Fi + IoT



IoT 設備



IoT 整合網路與平台

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



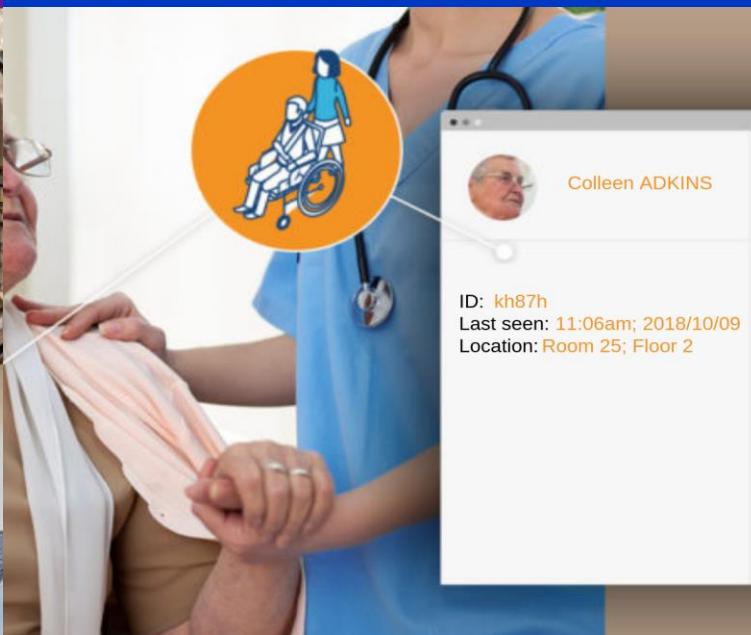
- 環境狀況監控
- 物品掉落偵測
- 自動運送管理監控
- 物料運送稽核

定位型服務應用

Asset Tracking 資產追蹤



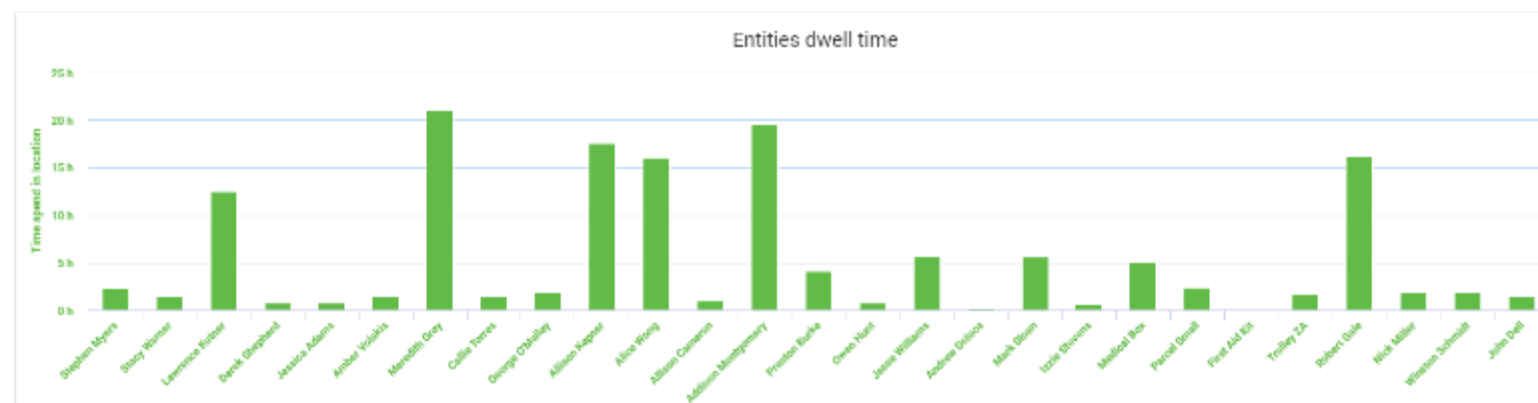
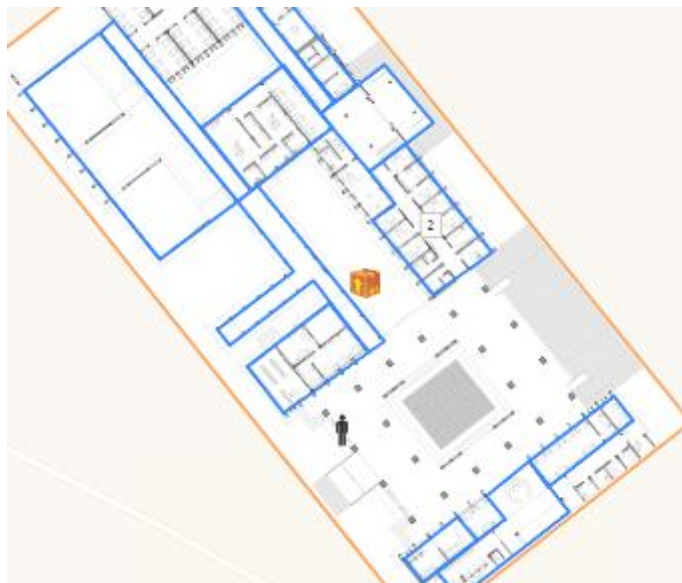
Geofencing 地理圍欄



Condition Monitoring 狀態監測

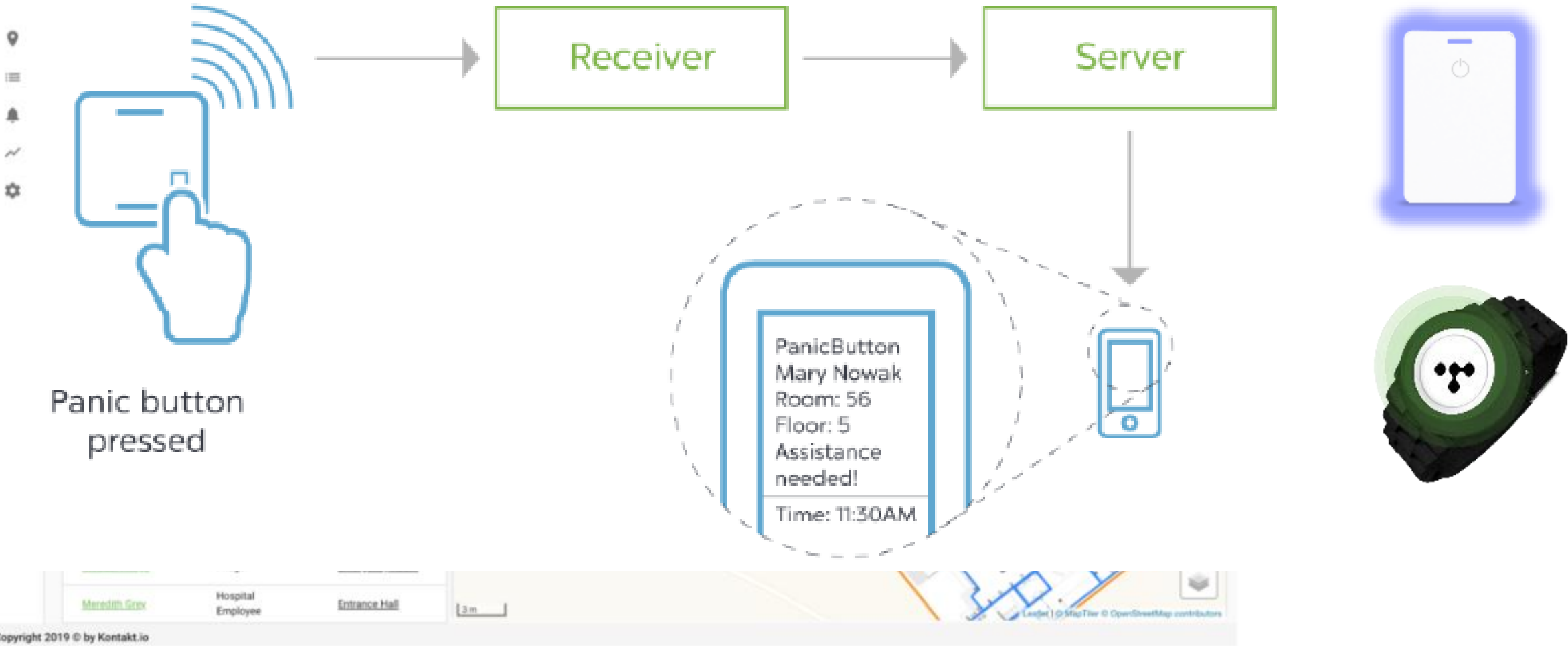


定位型服務應用範例

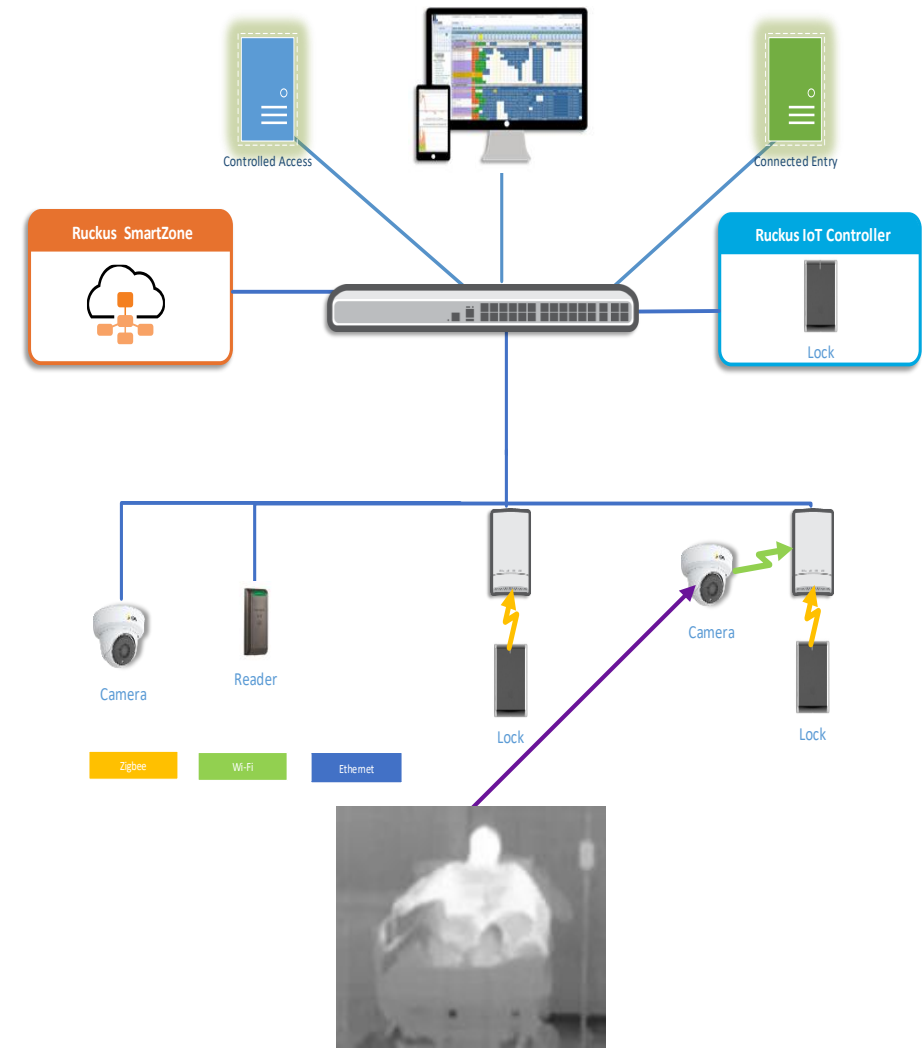
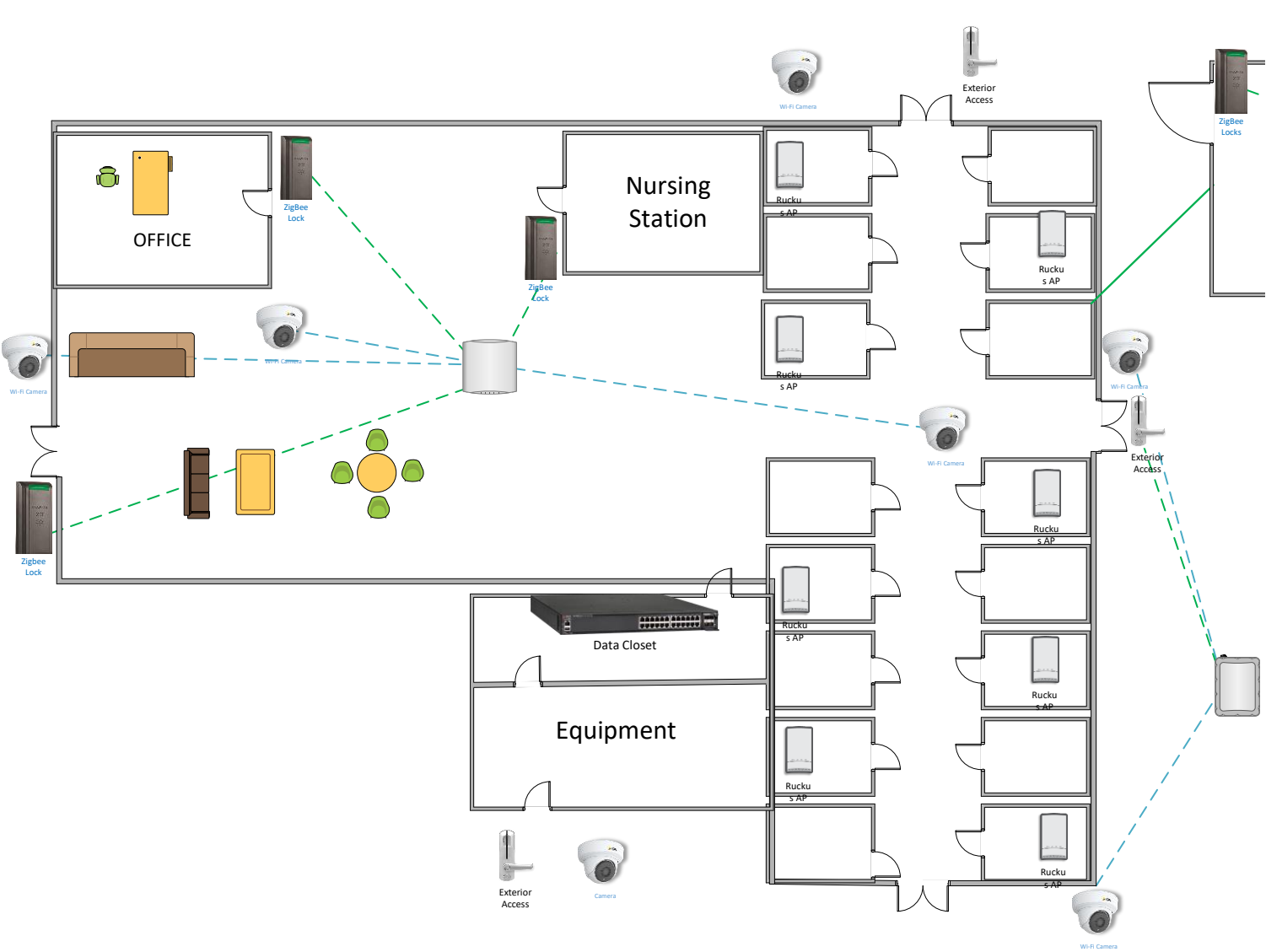


- 設定地理圍欄區域
- 人流分析可以顯示高流量區域
- 瞭解特定區域的進出和佔用時間
- 瞭解工作空間與資產的利用率，可用於工作流程優化

定位與緊急按鈕

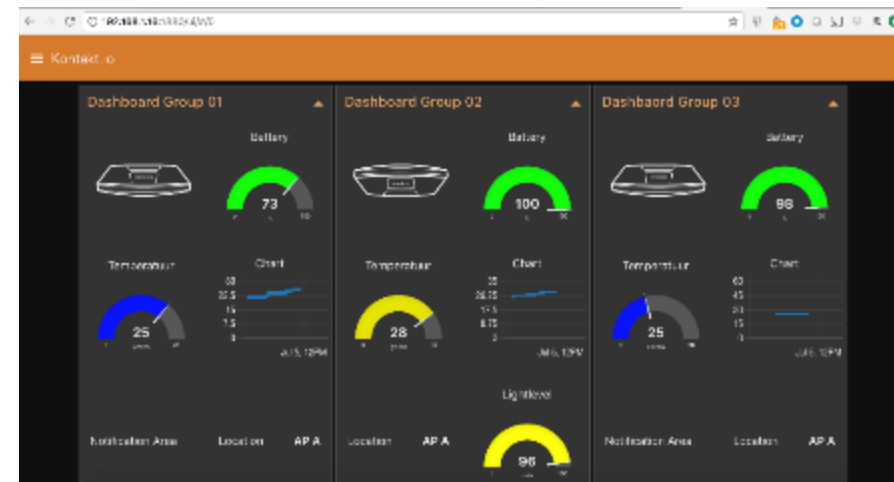


安全監控環境



熱感監視器

智慧製造環境應用需求



感應偵測



資訊收集



數據分析



智慧處理

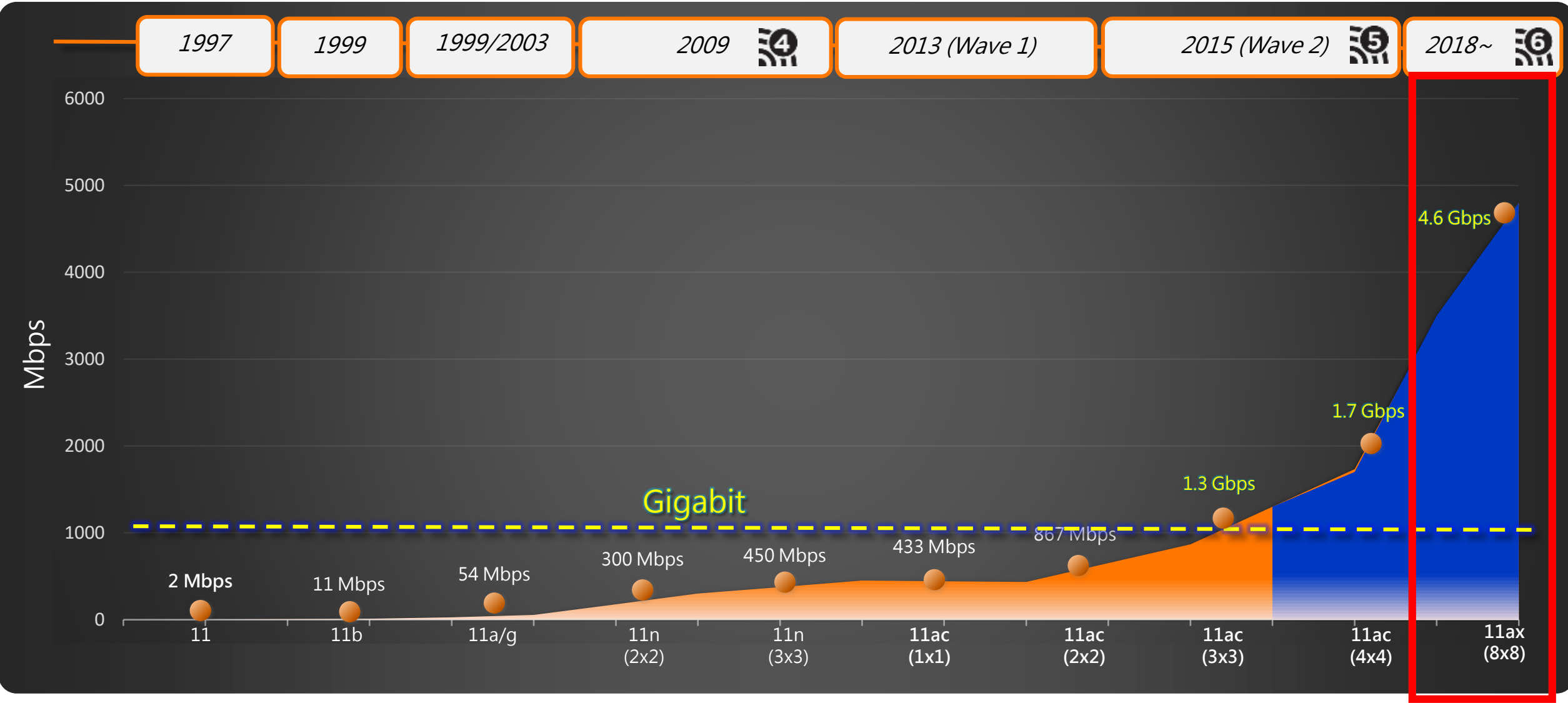
透過物聯平台串連全新智慧製造



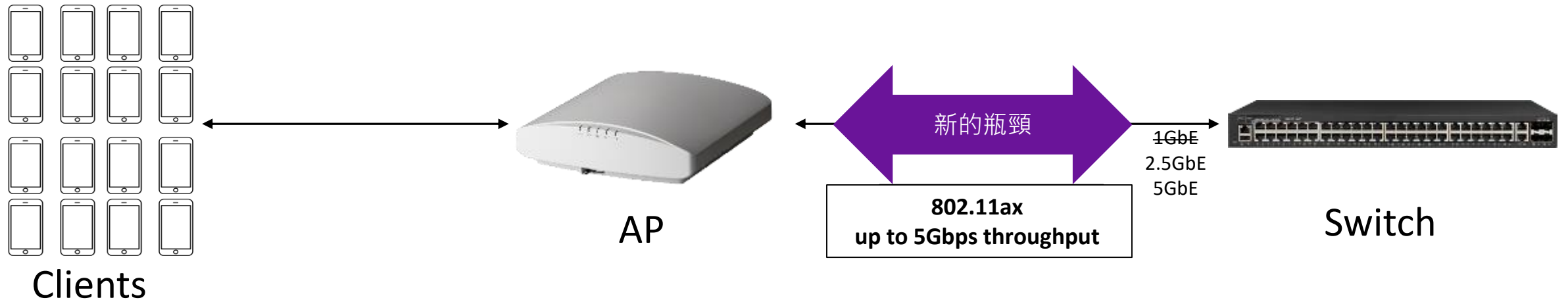
Ruckus WiFi6 + IoT整合優勢

	Ruckus	C廠牌	A廠牌	M廠牌
未來無線技術擴充	Yes	No	No	No
IoT Controller	Yes	Yes (僅硬體式,價格昂貴)	No	No
第三方廠商整合	Yes	No	No	No

超越有線1GbE的無線傳輸速度 – WiFi6



網路瓶頸點改變了



新的網路瓶頸點已經由AP對行動裝置，
改變到AP與交換器間的上連頻寬

是時候該考慮提升比1G更高的頻寬了

註:

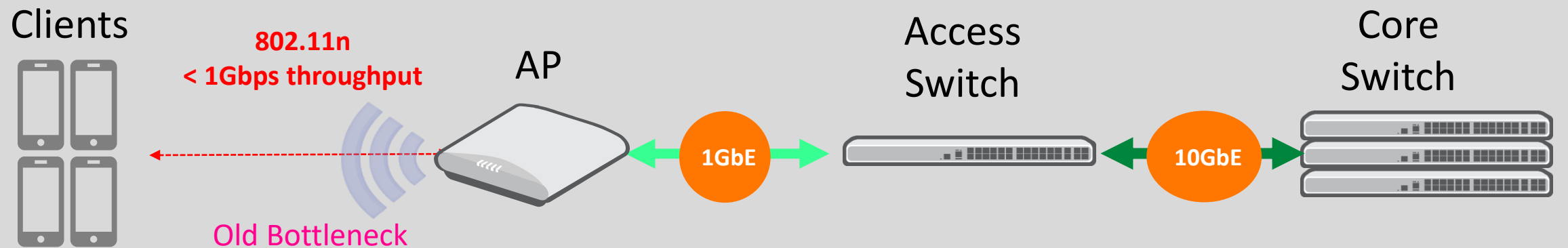
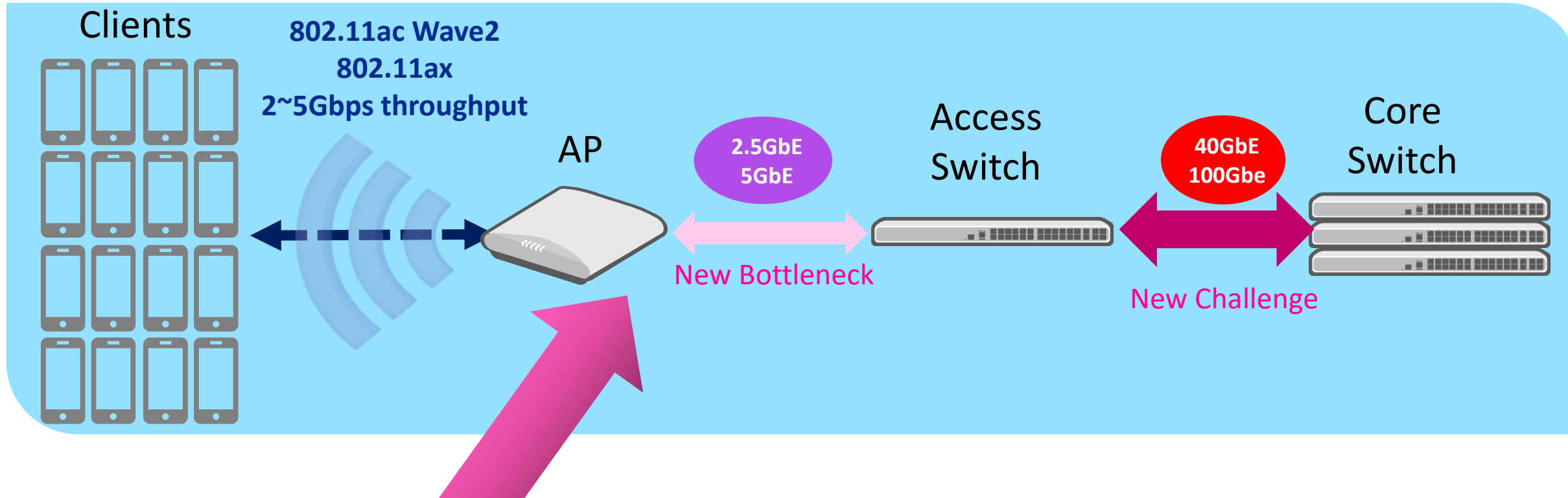
- 自2018年起802.11ac Wave 2 佔接近100% 的AP出貨量 - Dell 'Oro
- 兩埠1GbE或許可以增加頻寬，但需要兩倍的佈線及兩倍的交換器埠(成本效益不佳)

越來越多的高電力應用需求

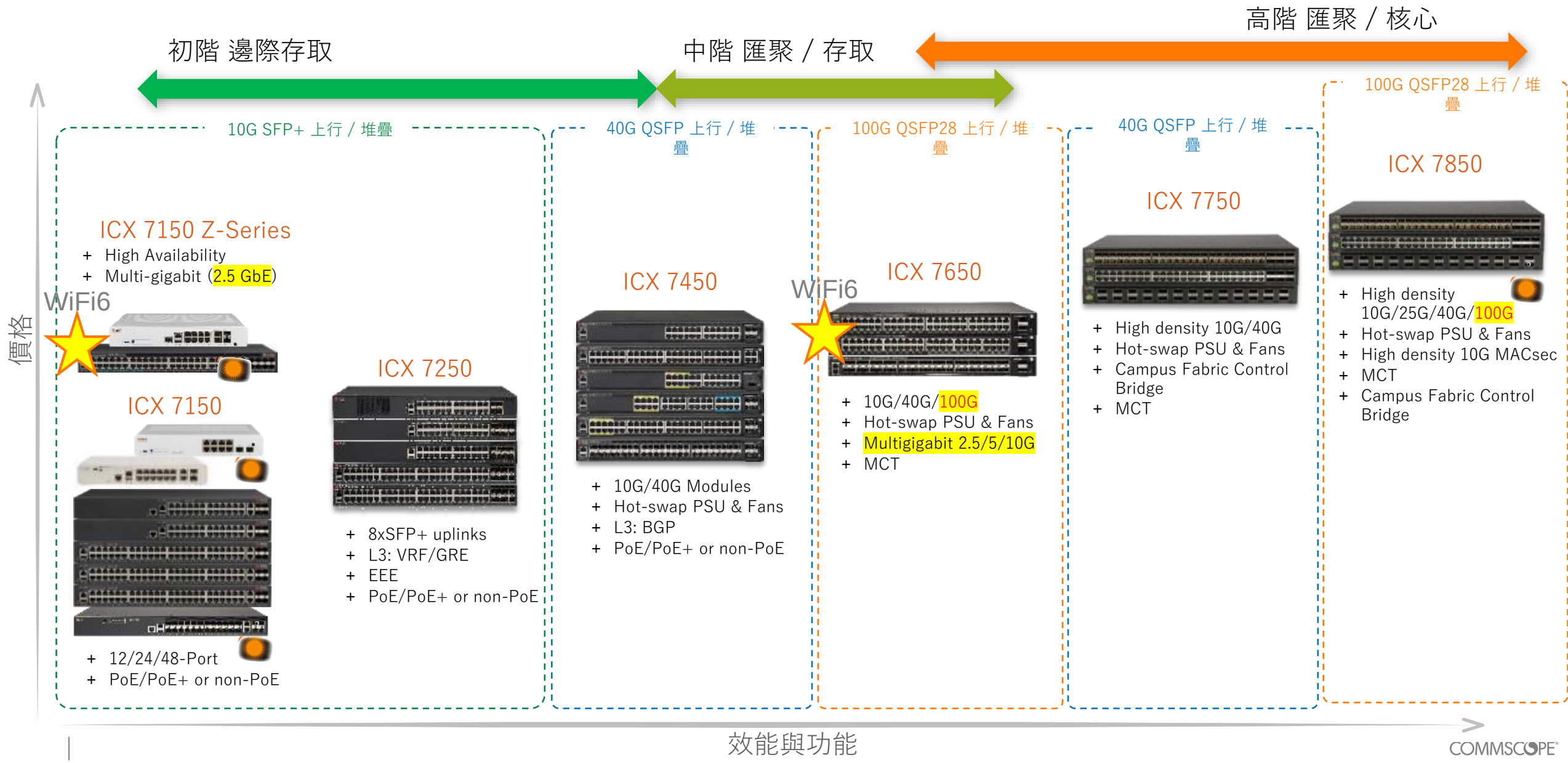
Standard	Power at Switch	802.11a/n	802.11ac	802.11ax and beyond	Other Powered Devices
PoE 802.3af	15W				
PoE+ 802.3at	30W				
PoE++ 802.3bt	60W (4-pair)				
High-Power 802.3bt	90W (4-pair)				 

電子看版

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 高效交换器

-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



Data Center

Campus Core & Aggregation

Multi-Service Operators

ICX7850 受到各電信業者的青睞

<https://www.crn.com/slide-shows/mobility/crn-s-2019-products-of-the-year/8>

Winner Of CRN2019 Products of The Year

- ✓ ICX 7850 provide high density aggregation with up to 100G, good for multi-Gigabit network growth.
- ✓ ICX 7850 offers advanced stacking, upto 12 switches
- ✓ SmartZone network controller provides configuration, monitoring and troubleshooting capabilities.
- High-performance
- Use existing fiber and network infrastructure
- Simple upgrade to the enterprise edge network
- Ruckus, now part of CommScope, is bringing more Gigabit throughput from the core to the edge of the network.



Ruckus ICX 7650 交換器

多量高階WiFi6佈置選擇

ICX 7650-48ZP

- 24x 1/2.5/5/10GE PoH (802.3bt*)
- 24x 1GE PoE+



Aggregation/Core

ICX 7650-48F

- 24x 1/10GE SFP+
- 24x 1GE SFP Fiber ports



* IEEE 802.3bt pending ratification (90 Watts) - Compatible with 60W UPoE



Ruckus ICX 7150-Z 交換器

Software Features / Capabilities

Same SW features as other ICX 7150 models

Uplinks / Stacking

8x1/10GE SFP+

Stacks with other ICX 7150 models
(First 4 Ports usable for stacking)



16x 2.5GBase-T UPoE/PoH ports
802.11ac Wave 2 AP Compatible
(up to 90 Watt per port)

32x 1G POE+ ports

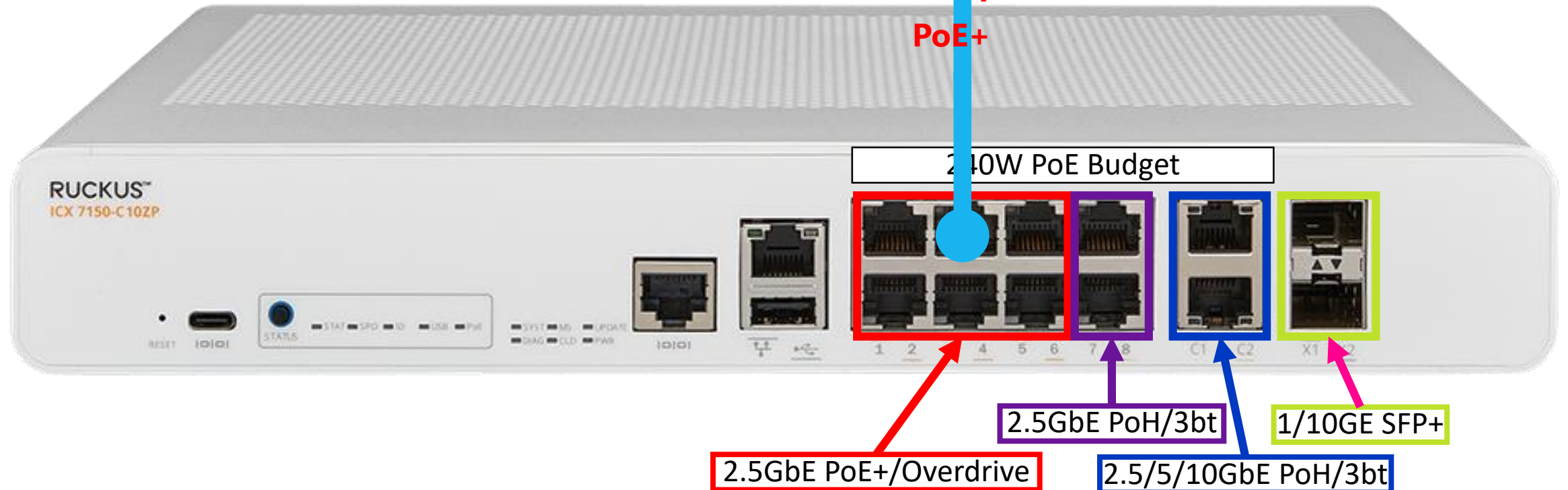
多量WiFi6佈置選擇

ICX 7150-C10ZP 滿足 WIFI-6 效能需求

- **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+



建構新一代100G + Multi-gig + WiFi6網路 (ICX7850+ICX7650/7150)

Core/Backbone

100 GbE High Performance Backbone

Aggregation/Core

10/40/100GbE Aggregation

Multi-Gigabit Access

ICX7650-48ZP Advanced Performance
ICX7150-48ZP High Performance
ICX7150-C10ZP Compact Performance

Wireless Access Points

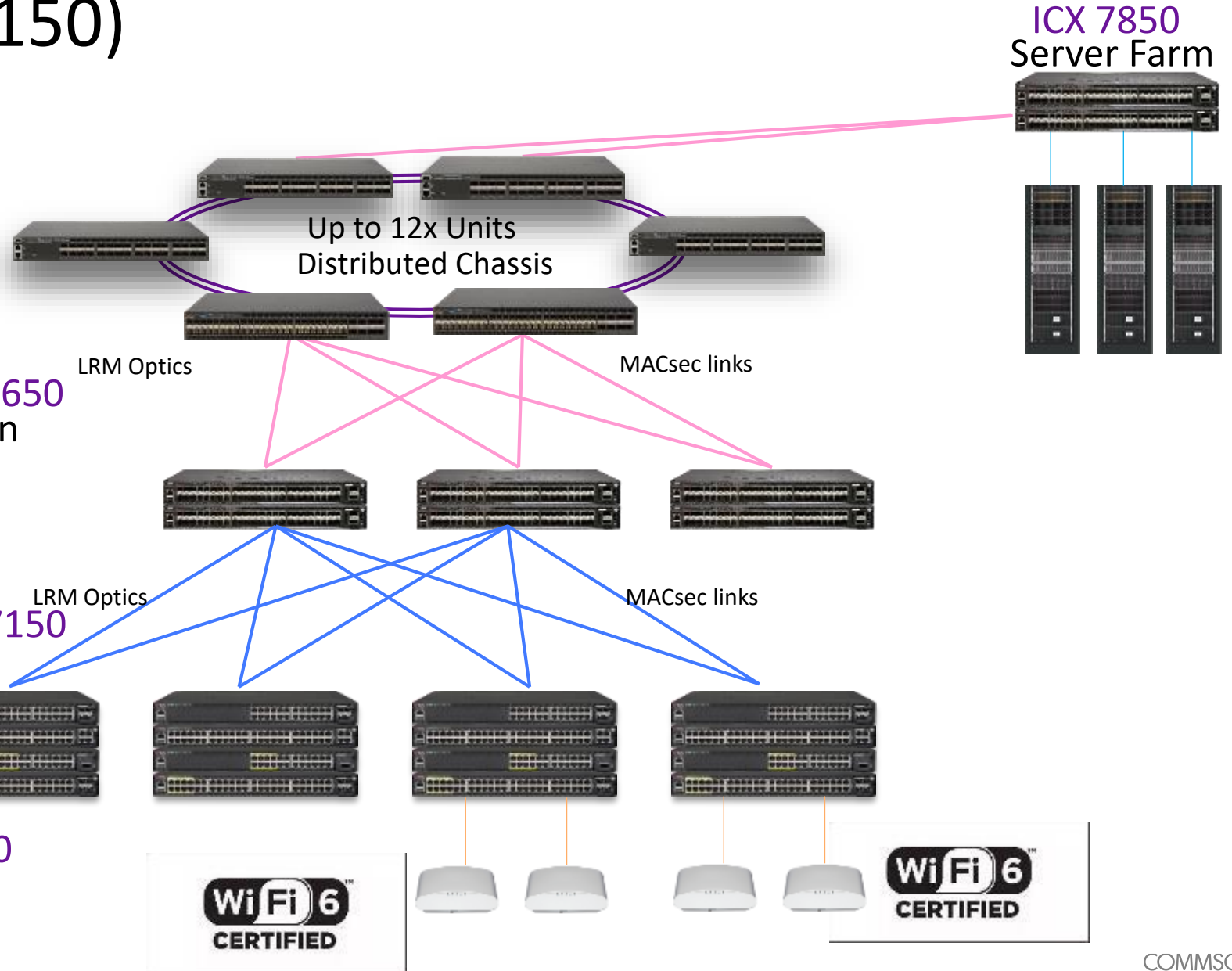
R730 Wi-Fi 6 w/5GbE
R750 Wi-Fi 6 w/2.5GbE
R720 Wi-Fi 5 w/2.5GbE

ICX 7850
Core

ICX 7850/7650
Aggregation

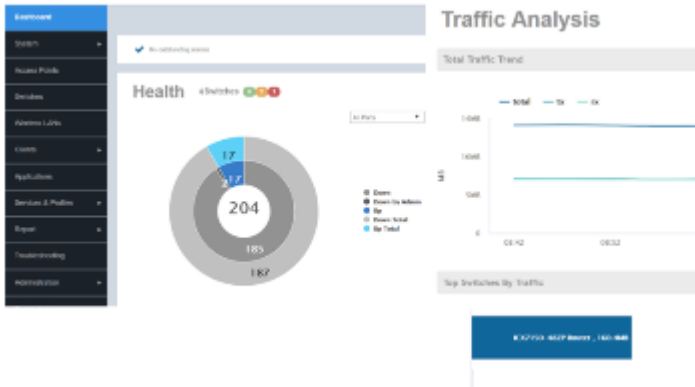
ICX 7650/7150
Access

R730/R750
Wi-Fi 6



整合有線無線管理

儀表板及流量統計



ICX交換器管理

The interface shows a list of ICX switches under the 'System' tab. The table includes columns for Name, MAC, Model, Ports, Port Status, and Alerts. The switches are grouped into 'MyDomain1', 'San Jose', 'GroupA', 'MyGroup2', and 'Default'. The status bar at the top indicates 59 healthy, 3 warning, and 1 error.

Name	MAC	Model	Ports	Port Status	Alerts
MySwitch1	XX:XX:XX:XX:XX:XX	XXXXXX	XX	XX	XX
MySwitch2	XX:XX:XX:XX:XX:XX	XXXXXX	XX	XX	XX
StackMember1	XX:XX:XX:XX:XX:XX	XXXXXX	XX	XX	XX
StackMember2	XX:XX:XX:XX:XX:XX	XXXXXX	XX	XX	XX
MySwitch3	XX:XX:XX:XX:XX:XX	XXXXXX	XX	XX	XX
MySwitch4	XX:XX:XX:XX:XX:XX	XXXXXX	XX	XX	XX
MySwitch5	XX:XX:XX:XX:XX:XX	XXXXXX	XX	XX	XX

ICX 軟體管理

The interface shows the 'Upgrade Firmware' process. It includes a dropdown for 'Uploaded Firmware' (F308090), radio buttons for 'Firmware Type' (Switch, Router), and radio buttons for 'Apply Firmware' (Now, Later). A 'Schedule Firmware' section allows for scheduling the upgrade. 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)'. The bottom has 'OK' and 'Cancel' buttons.

ICX 設定檔管理

The interface shows a 'Switch Config Diff' window. It compares two configurations: 'Left Panel: 100001-100001-100001-100001' and 'Right Panel: 100001-100001-100001-100001'. The table lists configuration items and their status (e.g., 'spending time 100001', 'spending time 100001').

Item	Status	Details
spending time 100001	OK	spending time 100001
spending time 100001	OK	spending time 100001
spending time 100001	OK	spending time 100001

交換器連接埠管理

The interface shows a 'Port Management' window. It includes a 'Port Ranking' section with a diagram showing port status (Up, Down, Admin Down, Stacking Ports). The bottom section is a table of port details.

Port Name	Port ID	Status	Details
100001-100001-100001-100001	100001	OK	spending time 100001
100001-100001-100001-100001	100001	OK	spending time 100001
100001-100001-100001-100001	100001	OK	spending time 100001

ICX 功能設定

The interface shows the 'Function Settings' window. It includes sections for 'Switch', 'ACL', and 'Layer 2'. The 'Switch' section has options for 'Switch Mode', 'Switch Type', and 'Switch Priority'. The 'ACL' section has options for 'ACL Type', 'ACL Priority', and 'ACL Rule'. The 'Layer 2' section has options for 'Layer 2 Mode', 'Layer 2 Type', and 'Layer 2 Priority'. The bottom has 'OK' and 'Cancel' buttons.

連線裝置追蹤



內建故障分析工具

Lab-SZ-100
2023-02-14 12:13:23

default

Dashboard
System
Access Points
Monitoring APs
Switches
Wireless LANs
Clients
Firewall
Services & Profiles
Report
Troubleshooting
Administration
Events & Alarms
Diagnostics
System Info

Troubleshooting

1
Type: Client Connection

2
Client: 08:00:1B:1C:34:17

3
Select APs: Select Total APs: 2

4
Connectivity Trace: Start Stop Clear

Connection

Click and drag in the plot area to zoom in

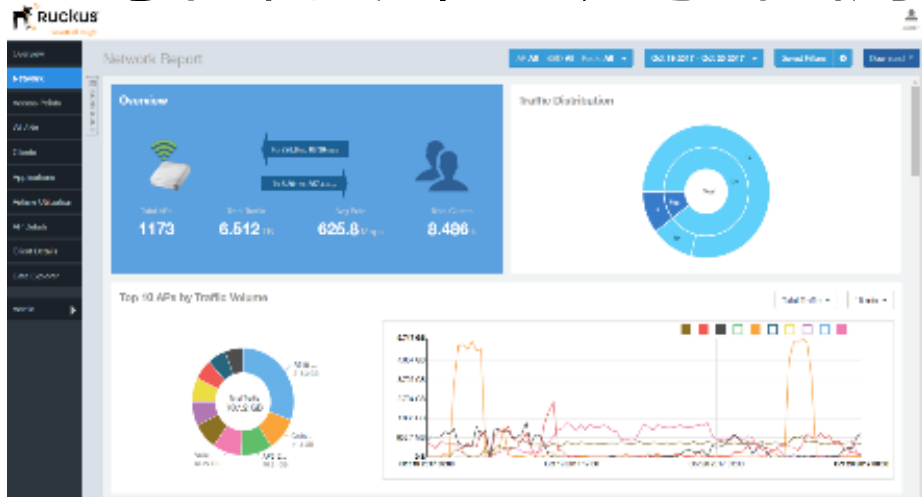
10 Feb 17 Feb

AP: 0/20 (08:10:AB:23:10:50) SSID: lab-test-wifi Radio: 2.4GHz

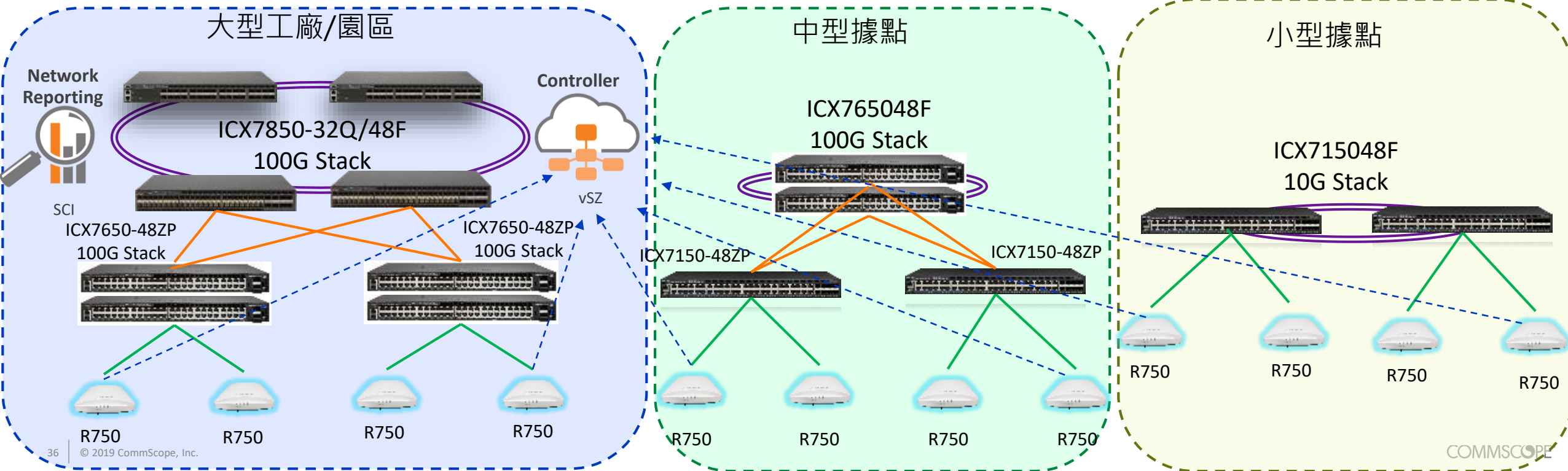
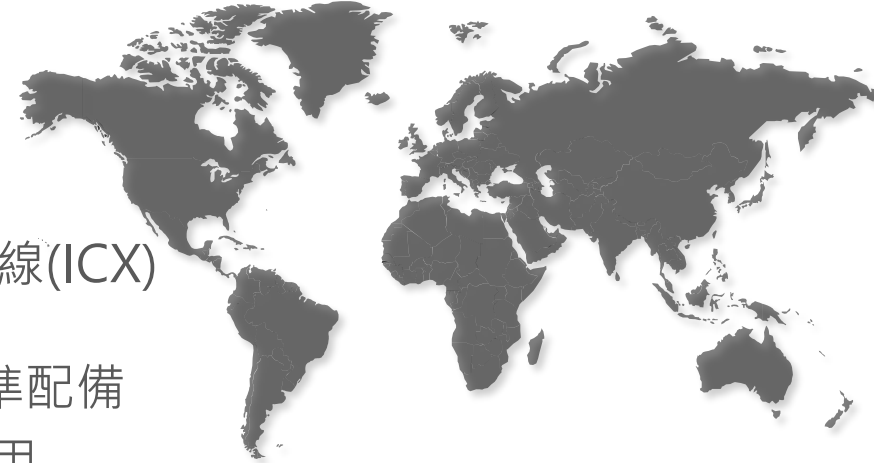
✓	802.11 Authentication Request
✓	802.11 Authentication Response
✓	802.11 Association Request
✓	802.11 Association Response
✓	4-Way Handshake - Frame 1
✓	4-Way Handshake - Frame 2
✓	4-Way Handshake - Frame 3
✓	4-Way Handshake - Frame 4
✓	DHCP Request
✓	DHCP NAK
✓	DHCP Discover
✓	DHCP Discover
✓	DHCP Discover
✓	DHCP Discover
✓	DHCP Discover

成功案例分享

跨國製藥公司案例



- 全球200+ 業務據點
- 49個大型工廠/園區
- 跨79個國家運作
- 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



Thank You

David Chen

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