

Wi-Fi 6 新世代 製造應用新里程

David Chen

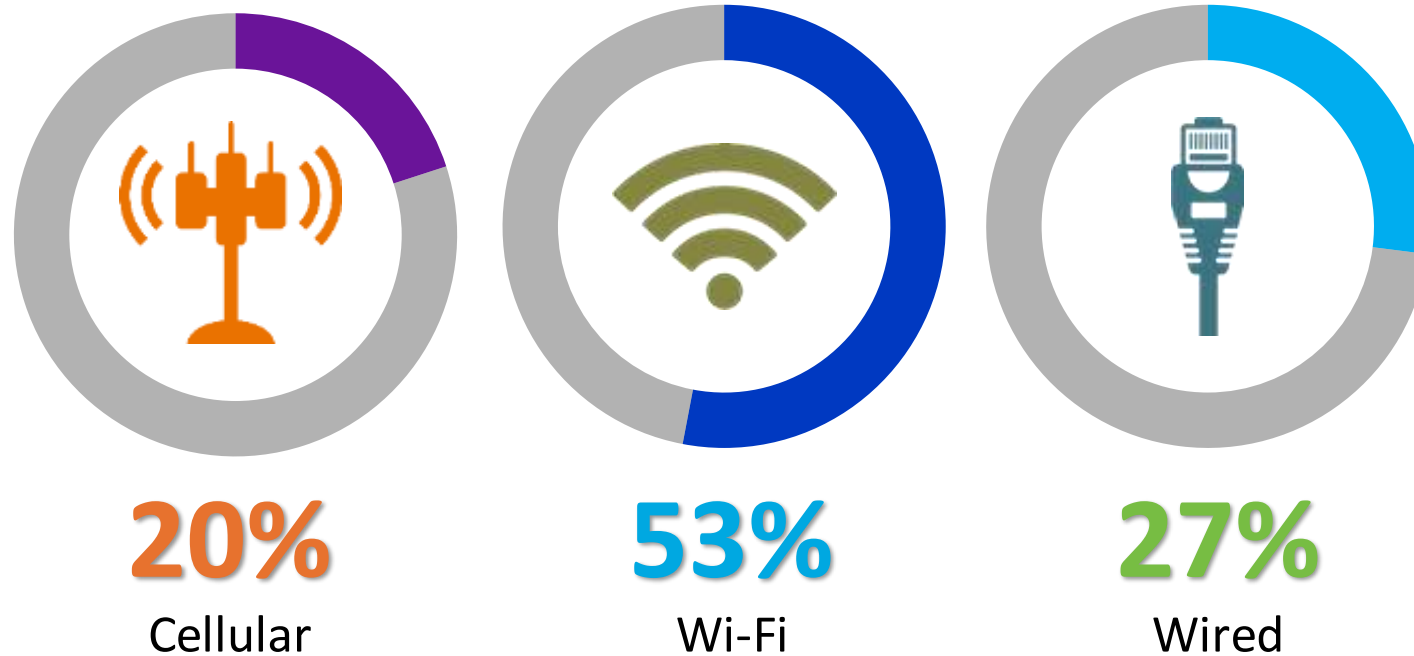
Technical Manager

david.chen2@commscope.com

第四次工業革命

- 建立在前所未有的資料量、速度和多用途網路之上
- 由大數據、AI、5G、統合網路與物聯網等新興技術趨勢推動

2021 全球網路流量



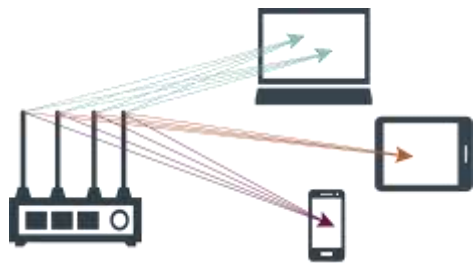
- 1000x 更高頻寬
- 超過 20 Billion THINGS (IoT)
- > 50% machine to machine 連接

*Source: Global Internet Traffic
(2021)*

你準備好了嗎？

Wi-Fi CERTIFIED 6™ 關鍵功能

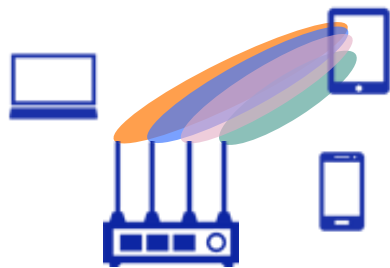
Downlink Multi-User MIMO



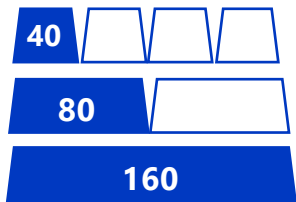
Downlink and Uplink OFDMA



Transmit Beamforming



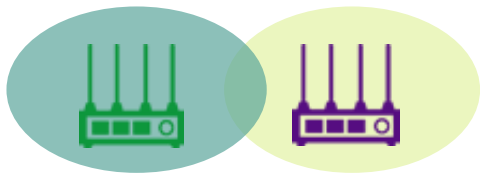
160 MHz Channel Bandwidth



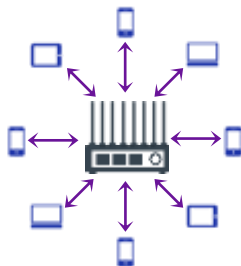
Target Wake Time



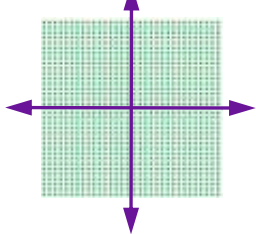
BSS Coloring



8 Spatial Streams



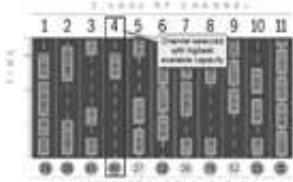
1024-QAM



Ruckus創新無線技術提升WiFi6至更高層次



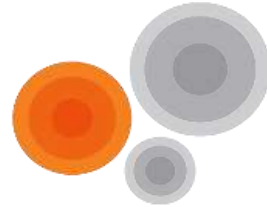
BeamFlex+
專利智慧天線



ChannelFly
進階頻道選取



封包式動態
調適功率



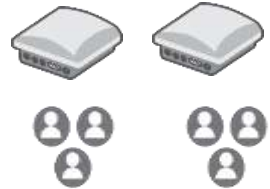
自動調適基地台
含蓋範圍



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

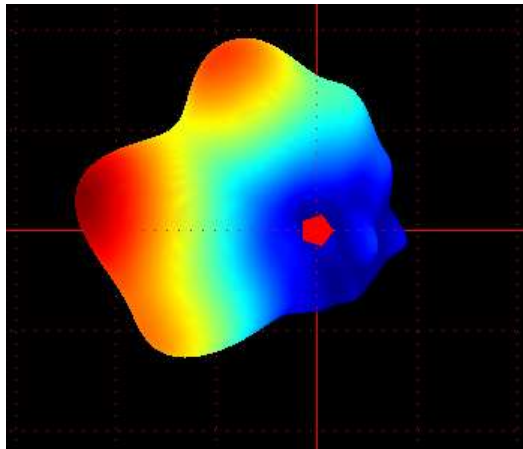
透過減少壅擠環境中的管理流量，提高可用無線空時，有效提升頻譜利用率及設備效能

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



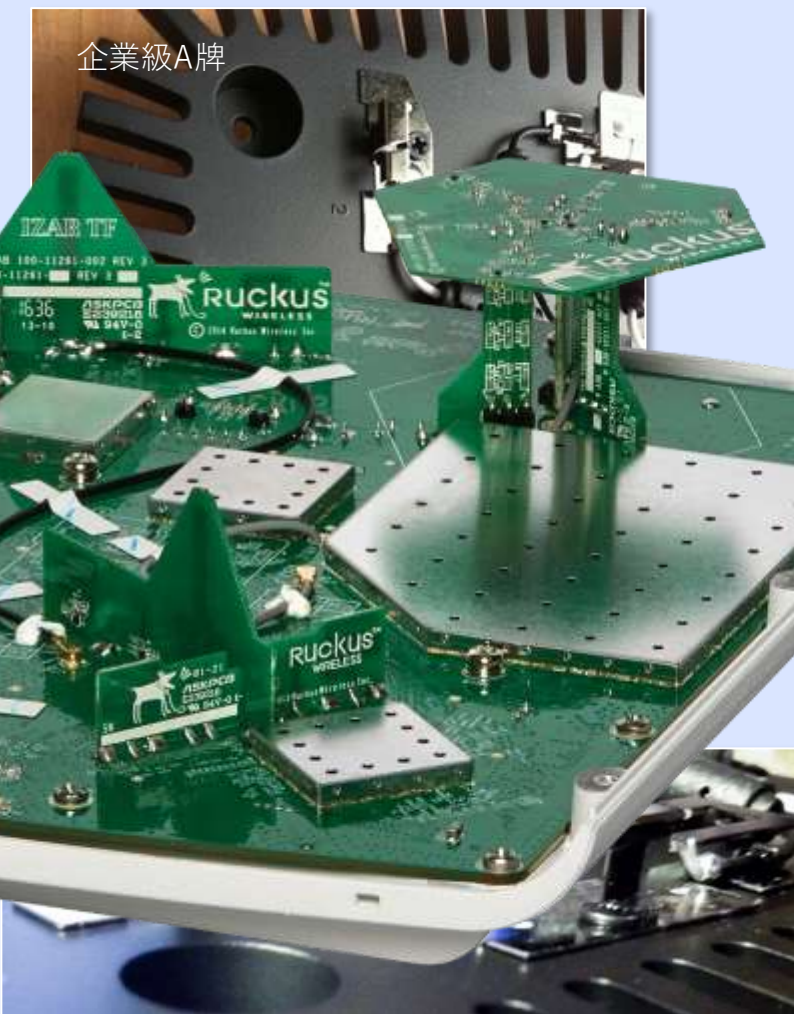
- 超過4,000 種天線格式組合
- BeamFlex 可提升高達10dB的降噪效益

來看看用料跟設計的差異

企業級C牌



企業級A牌

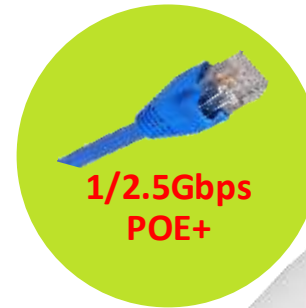
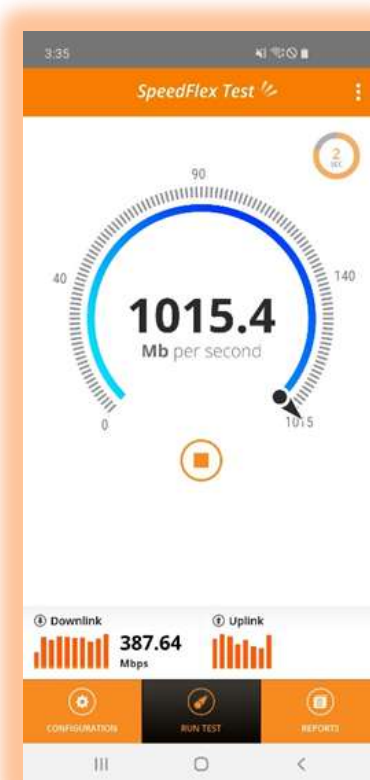


BeamFlex 智慧型矩陣天線

平面型倒F天線(Planar inverted-F antenna)(簡稱 PIFA)

Ruckus高階WiFi6 AP – R750

4x4:4 + 2.5G Ethernet

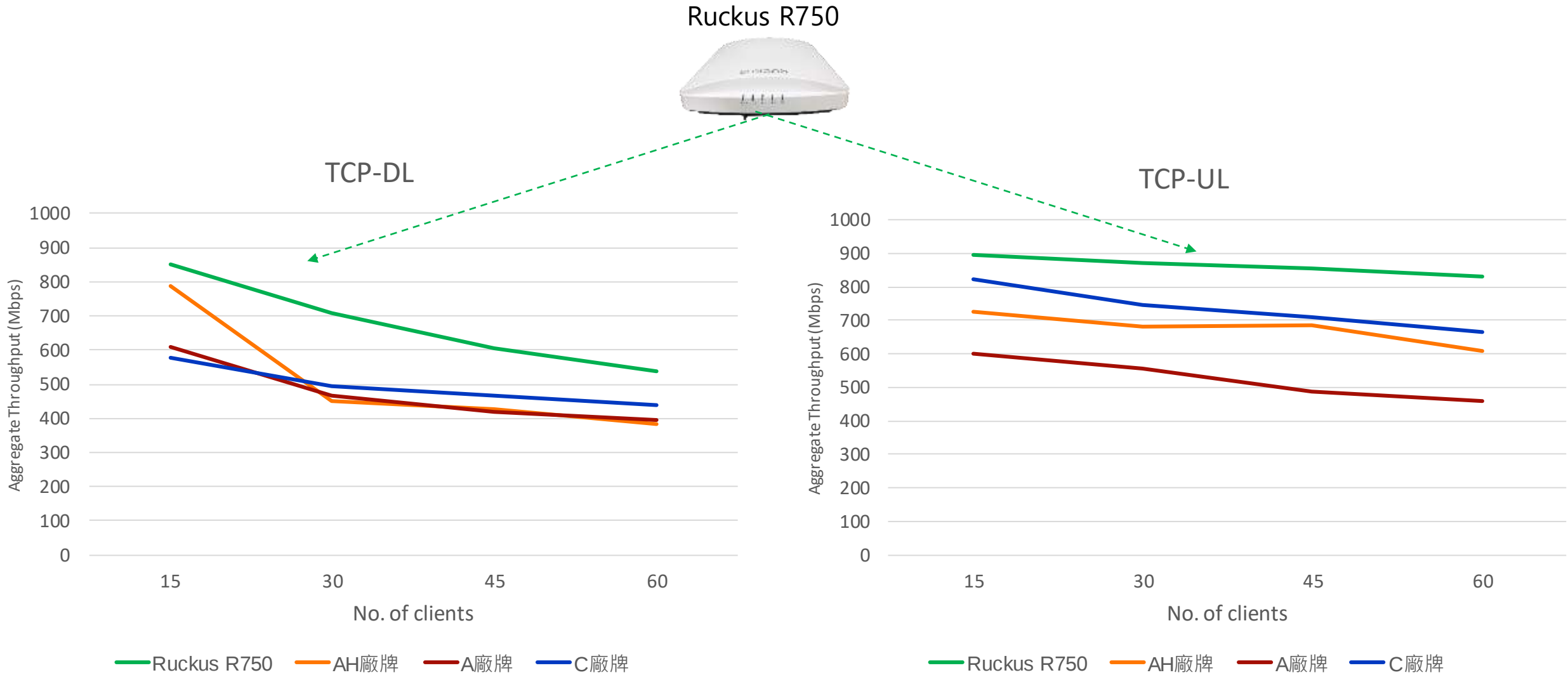


Manage radio coexistence

Ruckus WiFi 6 系列AP

頂級 - R850	中階 - R650	入門 - R550	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



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



- 各自獨立的協定與系統

使用不同通訊協定的傳感器



Ruckus整合WiFi6+IoT存取網路



傳統電話



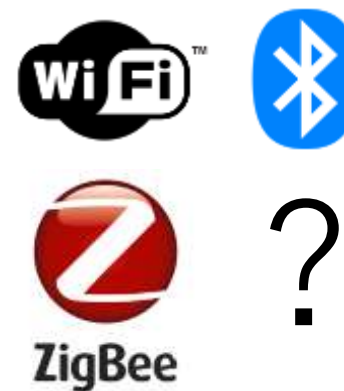
手機
是迷你電腦



WiFi 5 無線基地台

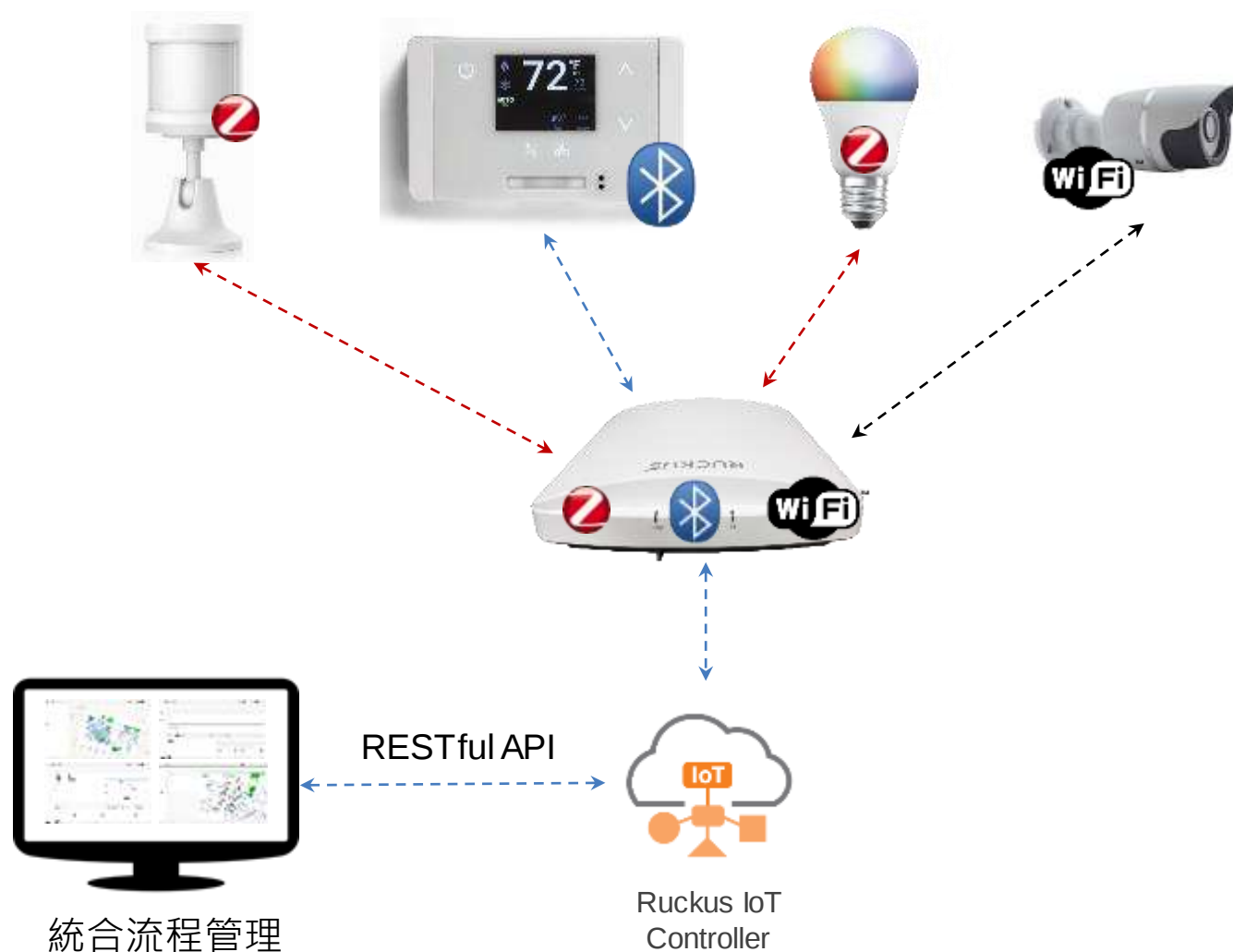


WiFi 6基地台
是融合式 WiFi 6 基地台

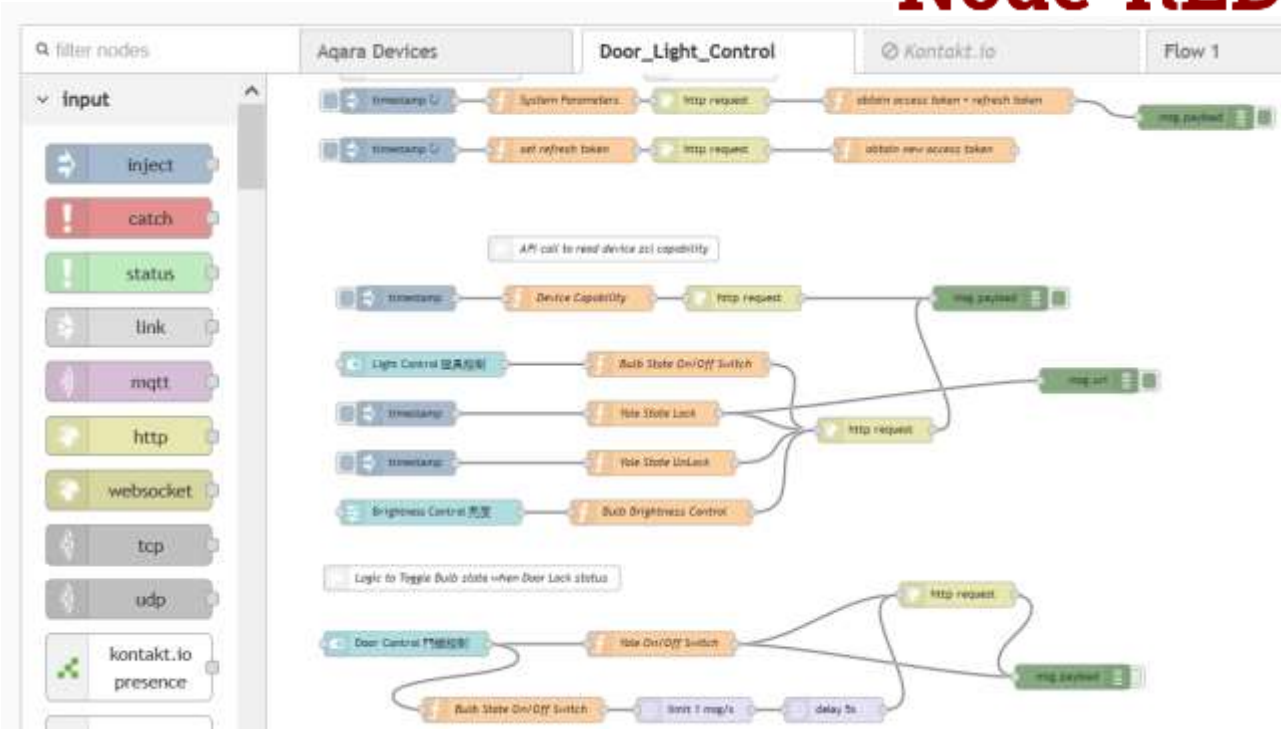
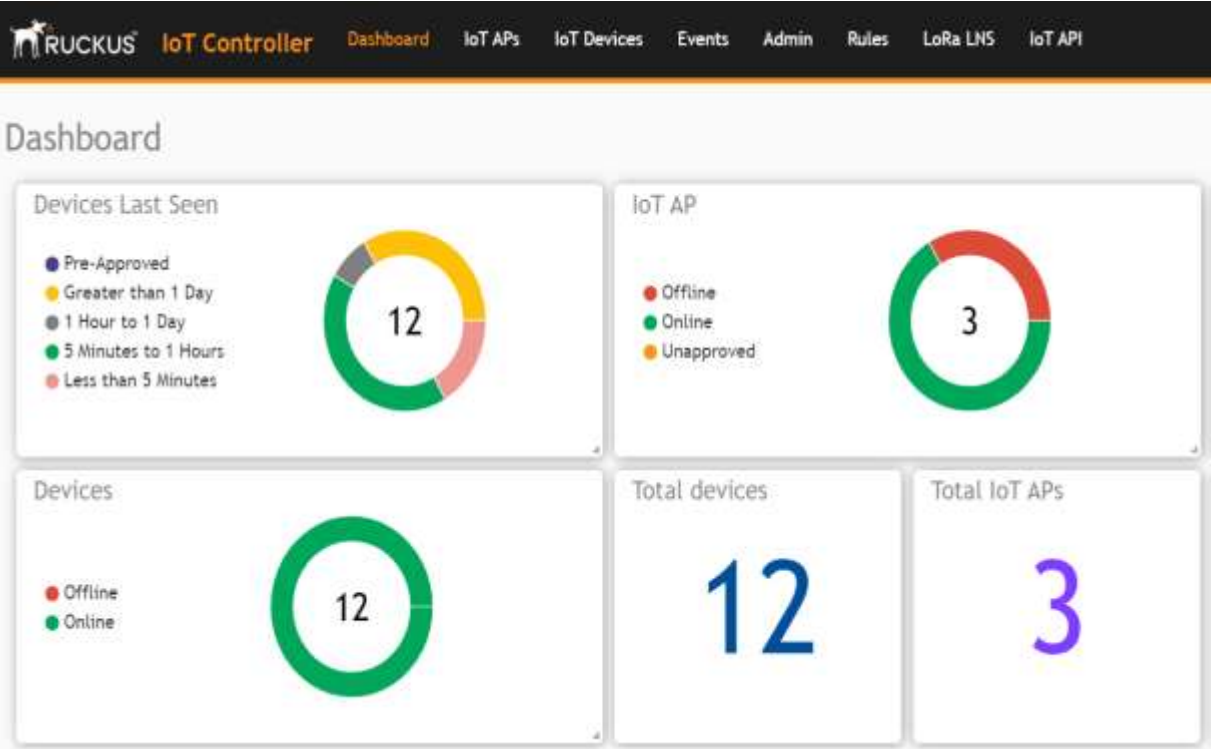


Ruckus IoT整合架構簡化網路

- 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	84:18:26:00:00:04: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

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

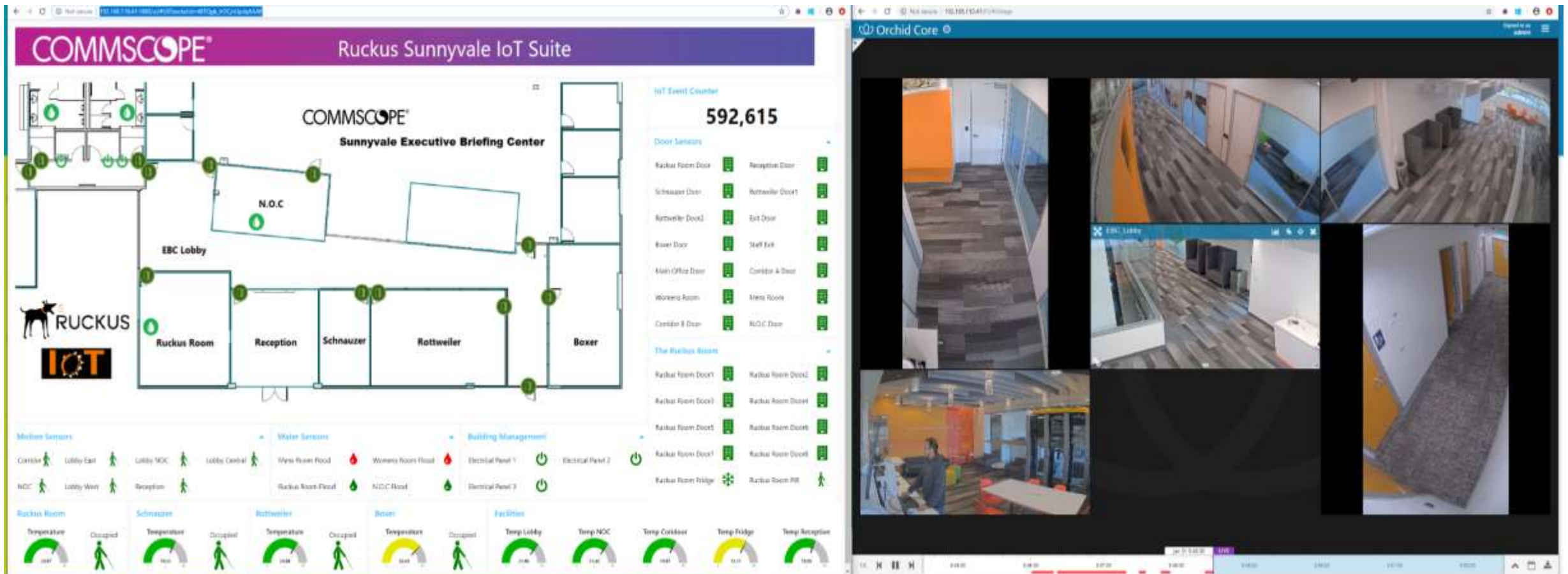


- 環境狀況監控
- 物品掉落偵測
- 自動運送管理監控
- 物料運送稽核

環境管理

自動化監控事件

- 大量的事件記錄(門, 移動, 漏水偵測, 溫度, 環境狀態)
- 傳感器事件與監視器連動整合記錄



資產及物流管理



資產追蹤



緊急按鈕



人流
分析

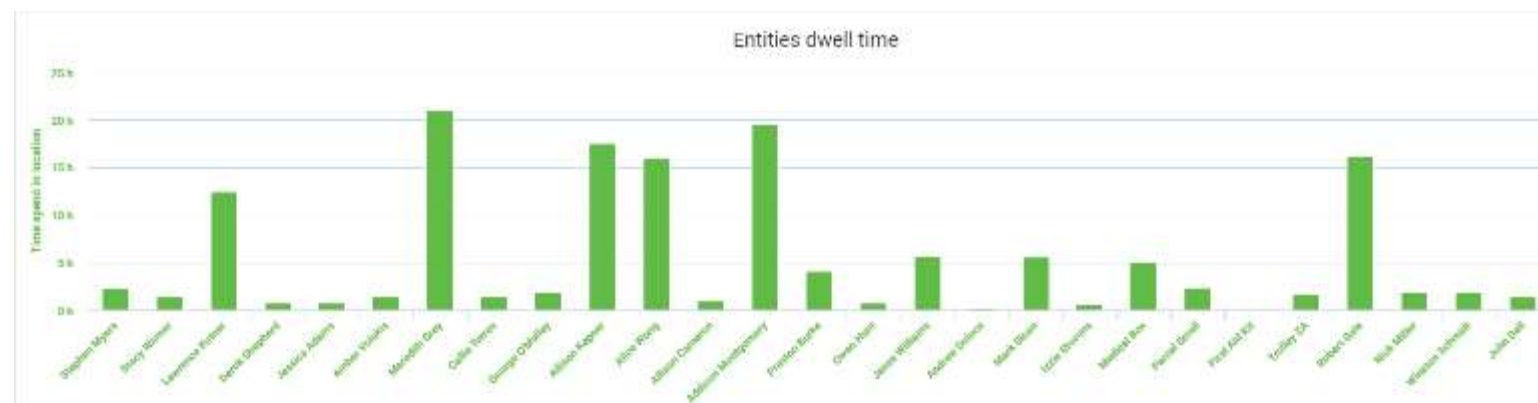


Kontakt.io Beacons (BLE)



車隊遙測

定位型服務應用範例

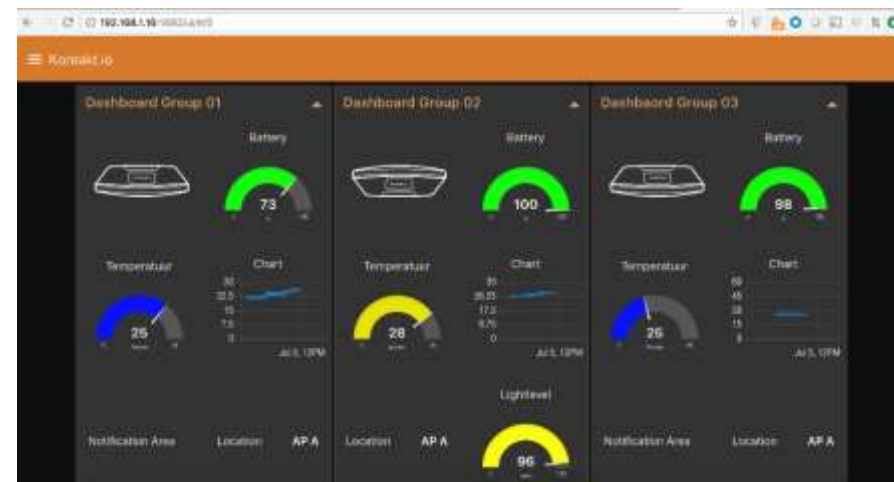


- 設定地理圍欄區域
- 人流分析可以顯示高流量區域
- 瞭解特定區域的進出和佔用時間
- 瞭解工作空間與資產的利用率，可用於工作流程優化

智慧製造環境應用需求



Source: png from pngtree.com



感應偵測



資訊收集

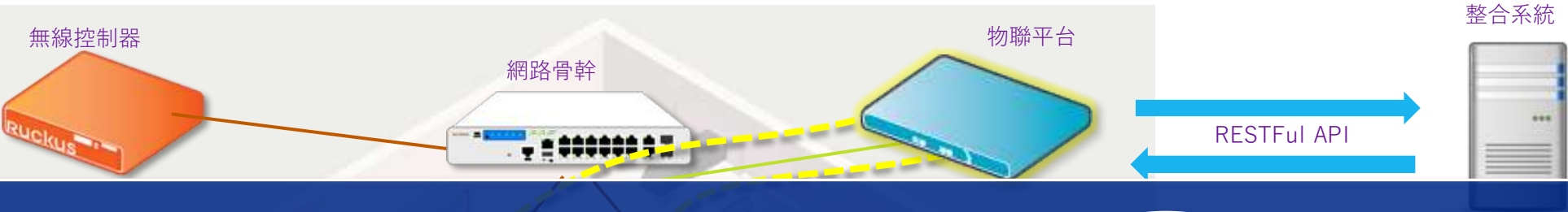


數據分析

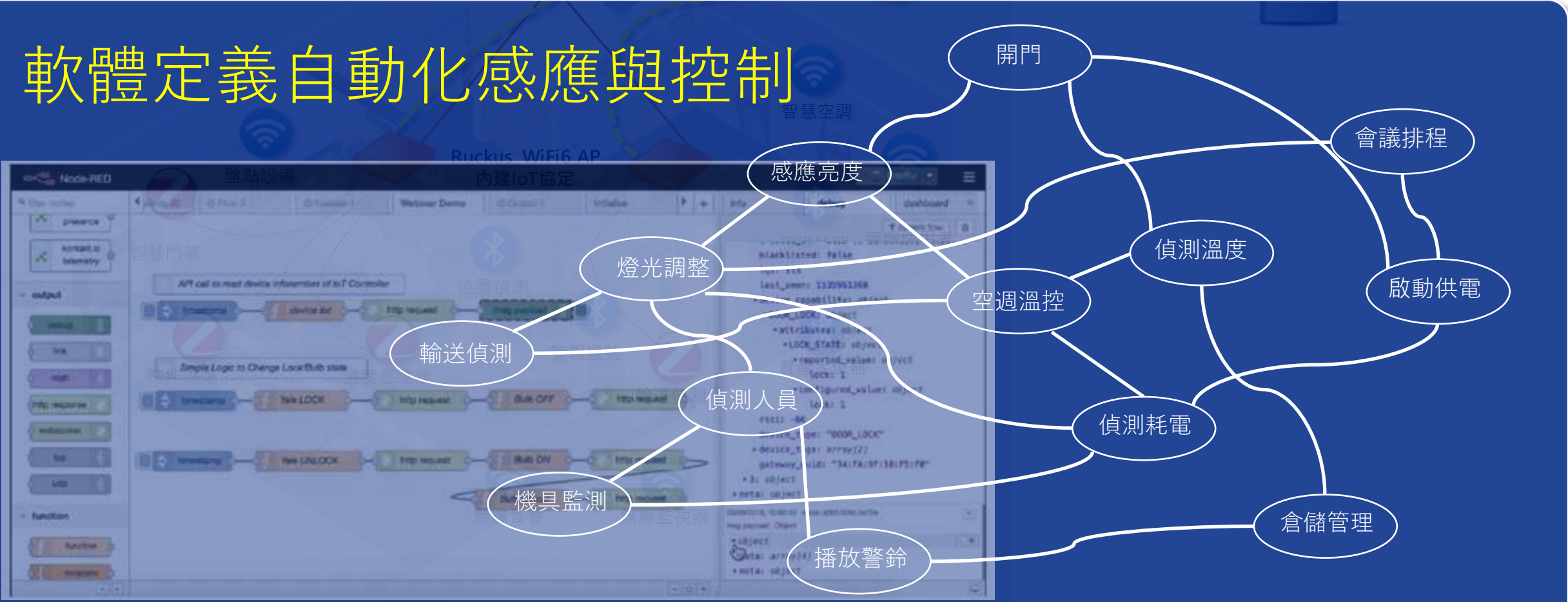


智慧處理

透過物聯平台串連全新智慧製造

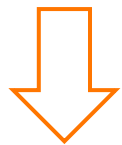


軟體定義自動化感應與控制



2.4GHz/5GHz 可用的頻道漸漸不夠用了？

2.4 GHz 下的世界



FCC	# Non-Overlapping Channels		
	2.4 GHz	5 GHz	6 GHz
20 MHz	3	25	59
40 MHz	1	12	29
80 MHz		6	14
160 MHz		2	7

- 更多可用頻道可用 (6GHz)
- 更高頻寬、更低延遲
- 更多連線數量
- 純WiFi6/6E設備連接



Commscope Ruckus 為您準備好邁向未來 Wi-Fi 6/6E 新世代

- Wi-Fi 6
= 10 Gbps
- Wi-Fi 6E
> 10 Gbps
- Wi-Fi 6/6E PoE 需求
= 60W 或更高

2. AP 所需流量
每5年約可增加10倍

3. AP PoE 電力需求
持續增加

4. AP 佈建密度日漸
增加 → 更多的佈
線以供裝新的AP

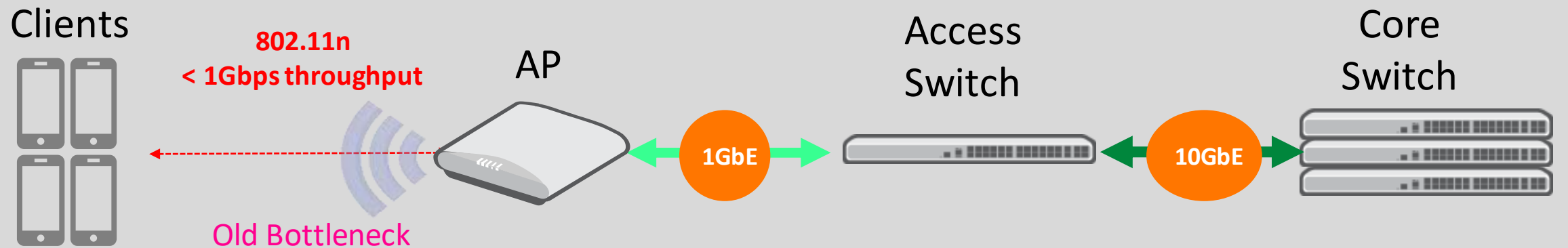
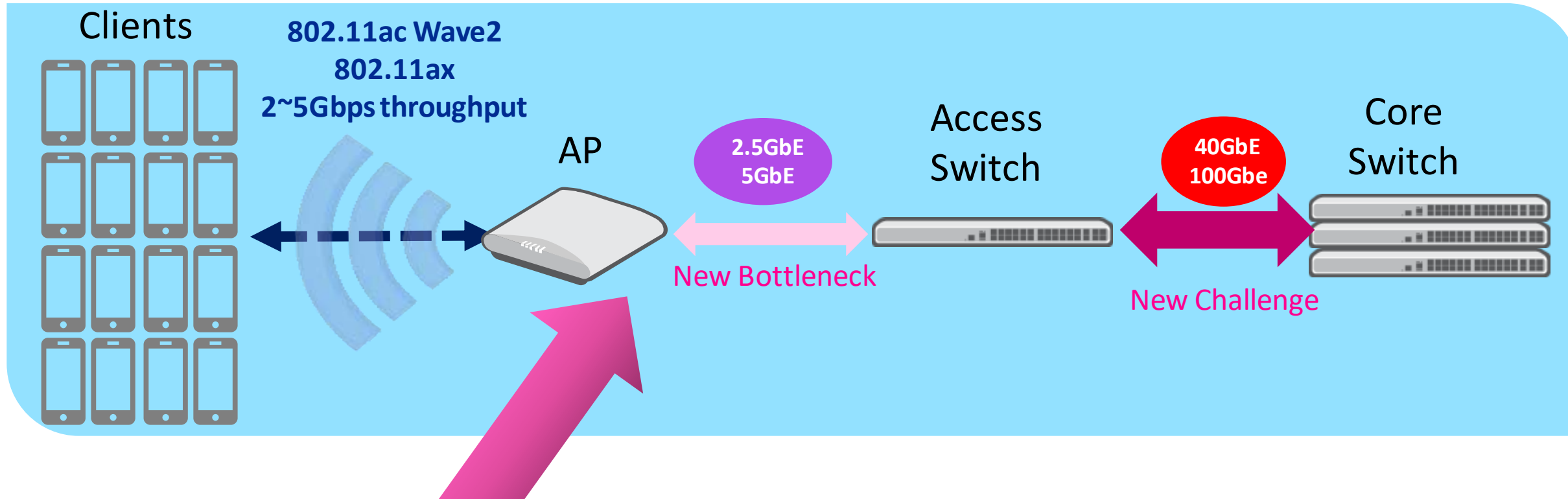
1. AP 每3~5年
汰換更新世
代

5. 無線網路是未來的
的主流，並將提供
更多的服務

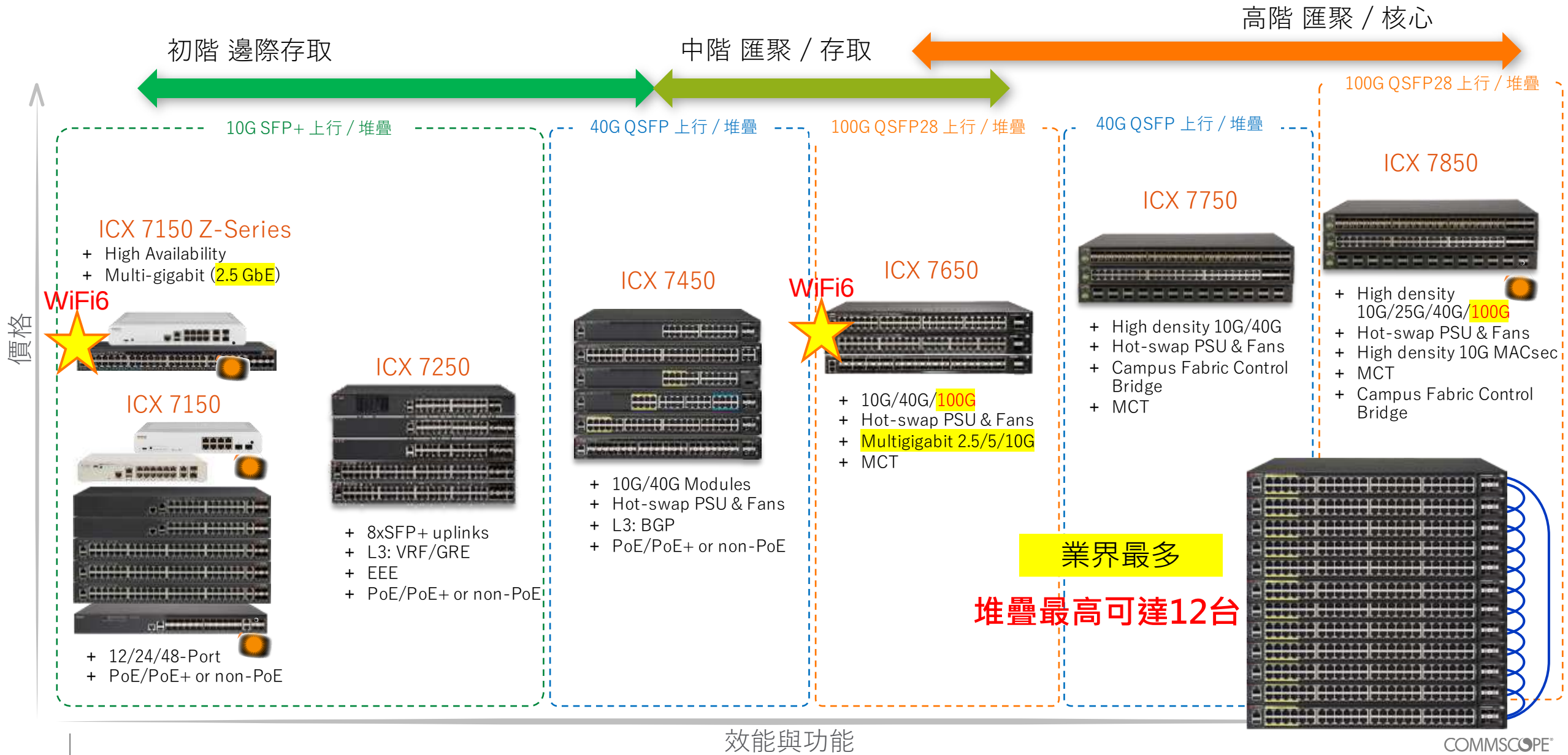
高度建議為AP佈建
Cat6A以上的線材



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

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

Core/Backbone

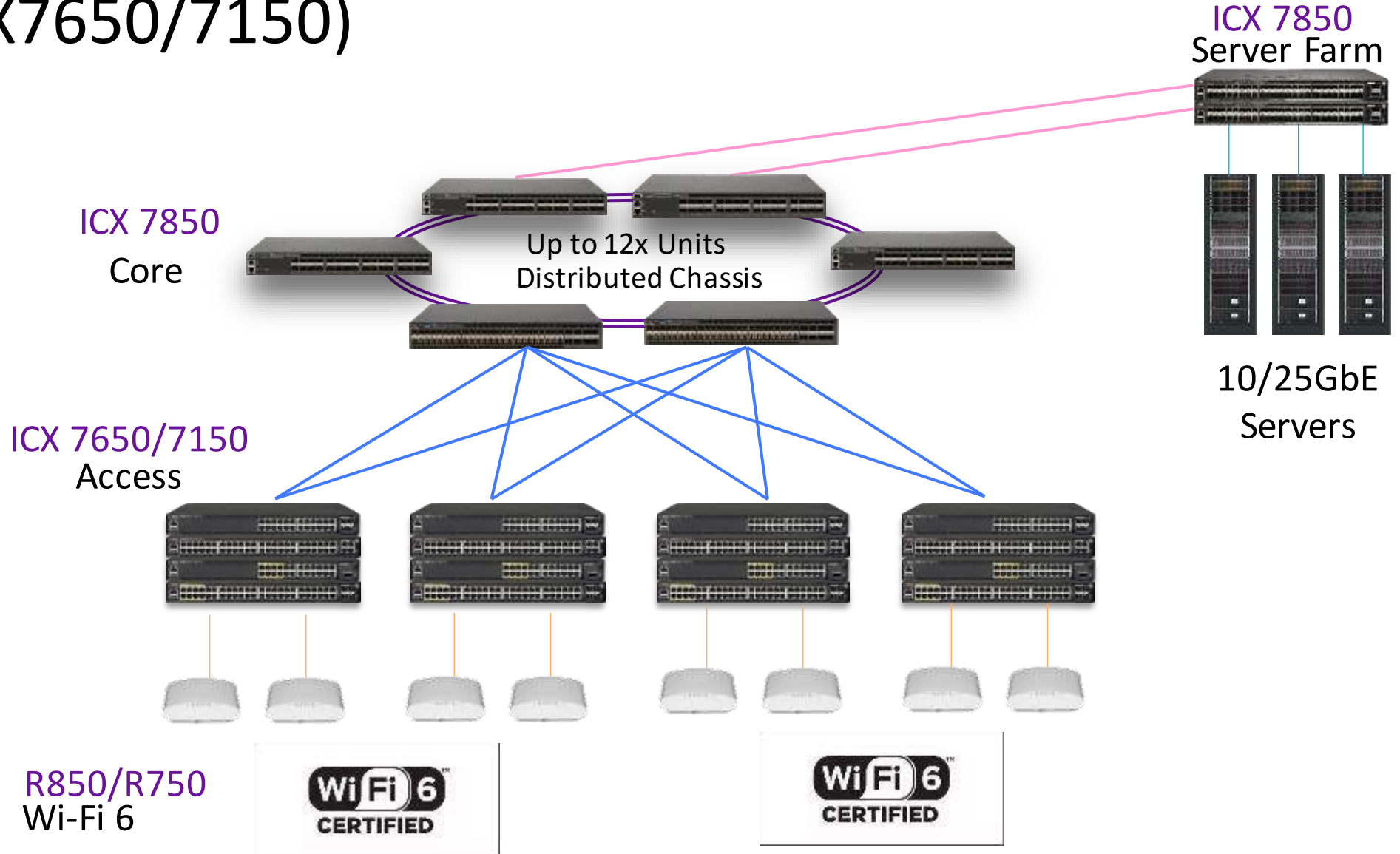
100 GbE High Performance Backbone
10/100 GbE Connecting Access

Multi-Gigabit Access

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

Wireless Access Points

R850 Wi-Fi 6 w/5GbE
R750 Wi-Fi 6 w/2.5GbE
R650 Wi-Fi 6 w/2.5GbE



整合有線無線管理

儀表板及流量統計



ICX交換器管理

[illegible]

ICX 軟體管理

Upgrade Firmware

*Only firmwares compatible will be shown in the dropdown. Selecting Switch or Router image will overwrite the firmware, irrespective of current type.

Uploaded Firmwares: F308090

Firmware Type: ☒ Switch ☐ Router

Apply Firmware: ☒ Now ☐ Later

Schedule Firmware:

Note: Schedule will be executed based on local(browser) timezone.

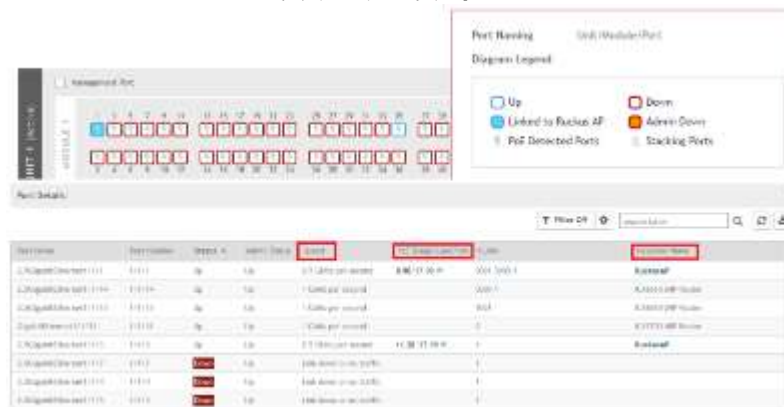
Warning: Make sure firmware upgrade is not scheduled at same time when on-demand or automatic config-backup [run at 00:00 hours everyday] is scheduled for the selected switch(es)

OK Cancel

ICX 設定檔管理

The screenshot shows the Cisco Packet Tracer interface with the 'Config' tab selected. The 'Switch Configuration' window is open, displaying the configuration for 'Switch1'. The configuration includes the hostname 'Switch1', IP address '192.168.1.1', and various interface settings. The 'Switch' tab is highlighted in the top navigation bar. The 'Config' tab is also highlighted in the top navigation bar. The 'Switch Configuration' window is open, showing the configuration for 'Switch1'. The configuration includes the hostname 'Switch1', IP address '192.168.1.1', and various interface settings.

交換器連接埠管理



ICX 功能設定

內建故障分析工具

[illegible]

成功案例分享

The screenshot displays the Ruckus CloudView Network Dashboard. The interface includes a sidebar with navigation options like Overview, Settings, and Reports. The main content area is divided into several sections:

- Overview:** A blue section showing key metrics: 1173 Access Points, 6,512 Clients, 625.8 MB/s Traffic, and 8,496 Users. It includes a Wi-Fi icon and a user icon.
- Traffic Distribution:** A donut chart showing the distribution of traffic across different categories.
- Top 10 APs by Traffic Volume:** A donut chart showing the top 10 access points by traffic volume, with a legend indicating traffic volume ranges.
- Traffic Analysis:** A line chart showing traffic volume over time, with a legend indicating different traffic types.

-

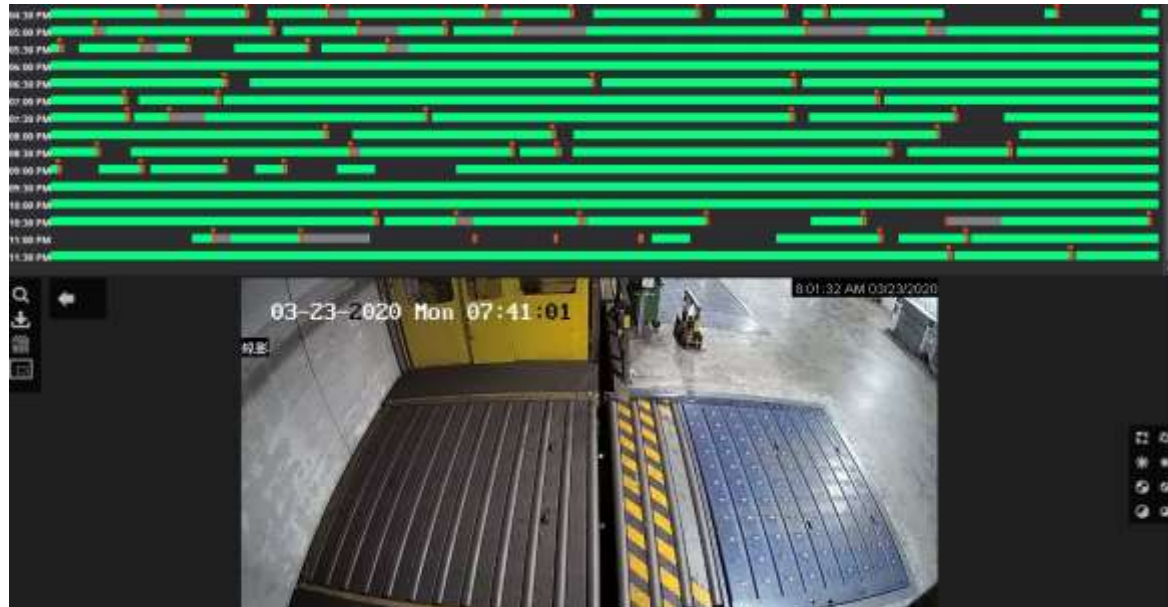


AAT 亞洲空運中心

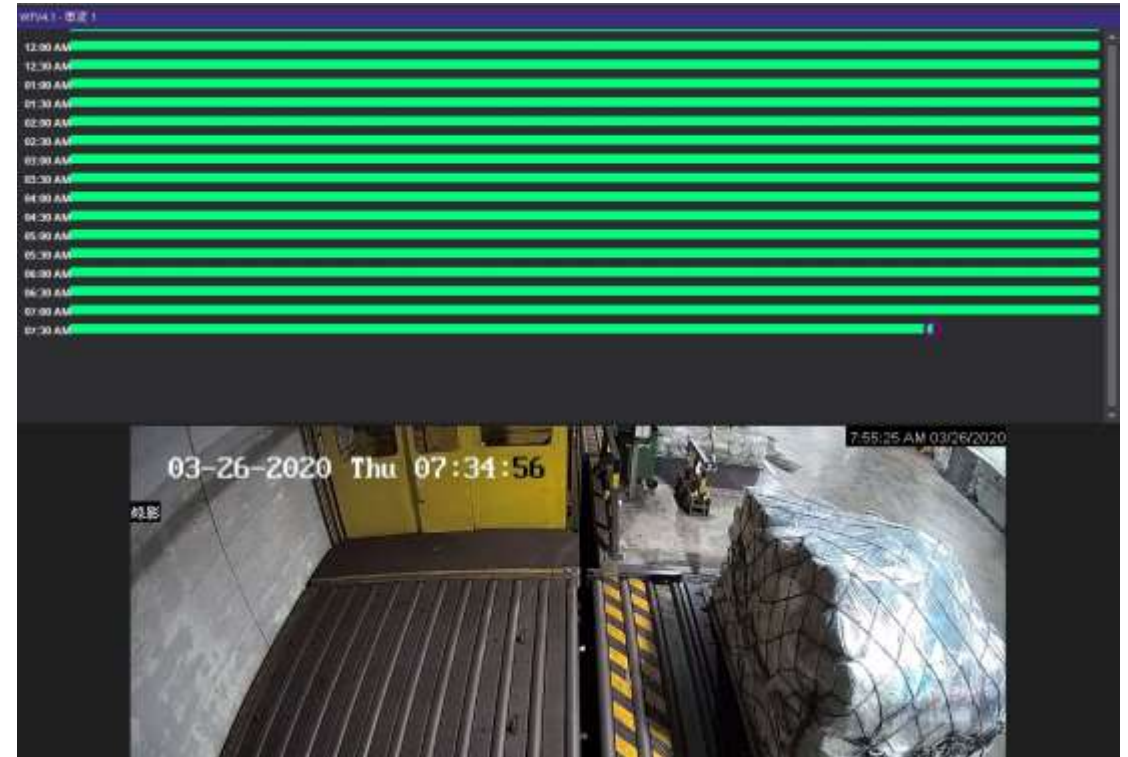
Case studies: [https://ezone.ulifestyle.com.hk/article/2723240/亞洲空運中心選用CommScope%20Ruckus%20Wi-Fi](https://ezone.ulifestyle.com.hk/article/2723240/亞洲空運中心選用CommScope%20Ruckus%20Wi-Fi解決方案提升營運效率及服務)解決方案提升營運效率及服務

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

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