

WiFi6、IoT物聯網結合應用

加速實現智慧校園

Oct. 2020

David Chen

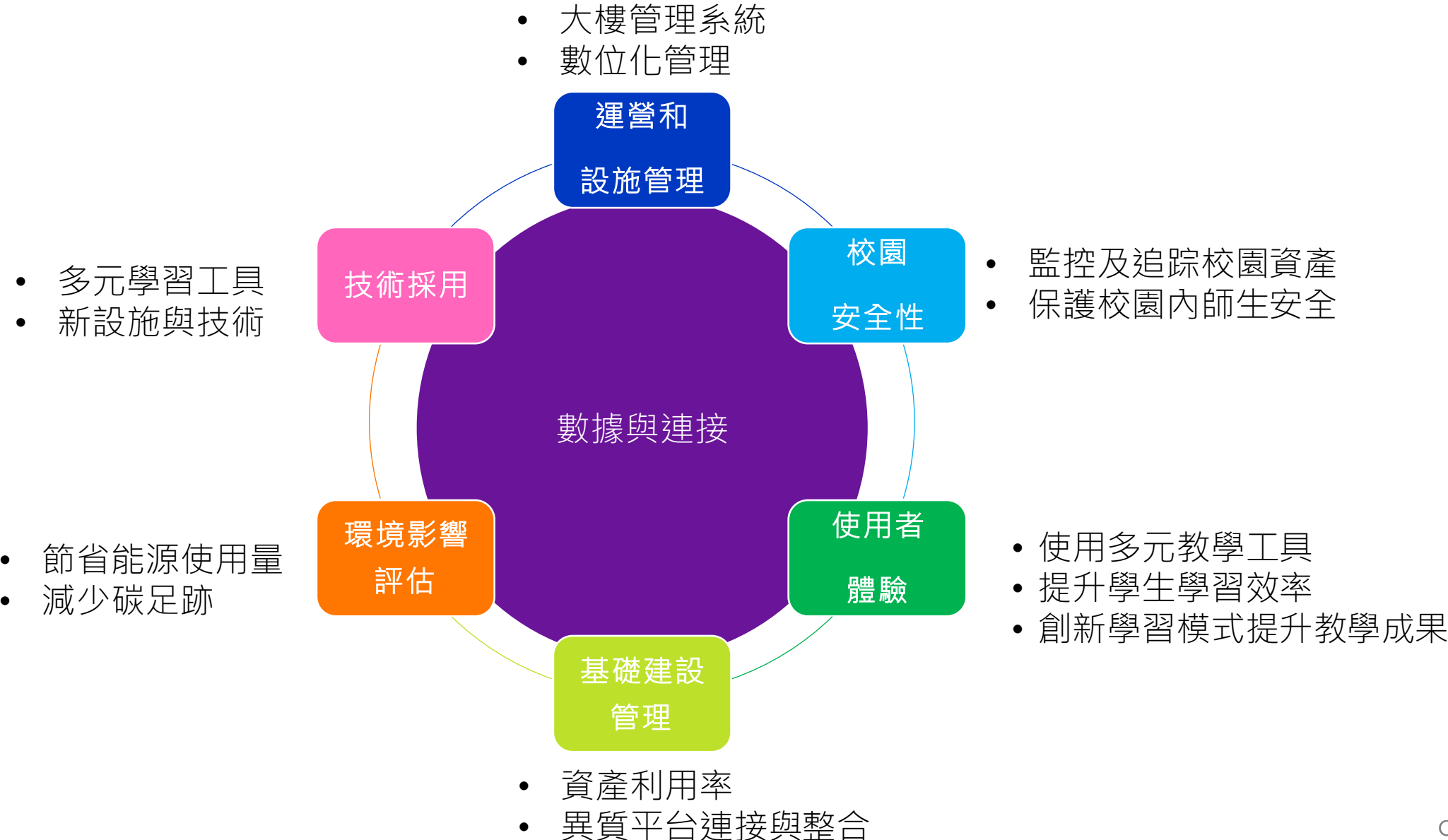
Technical Manager

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學校發展新趨勢 – 智慧校園

如何在節省運營成本的情況下，還能持續發展具備吸引學生的優勢？

邁向智慧校園的趨勢與驅動力





大樓自動化



感應器



電腦



印表機



無線AP



IP電話



門禁控制



數位看板



攝影機



智慧照明

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

物件追蹤



- 資產、人、物之尋找與管理
- 緊急按鈕安全監控
- 自動化出席統計

安全監控



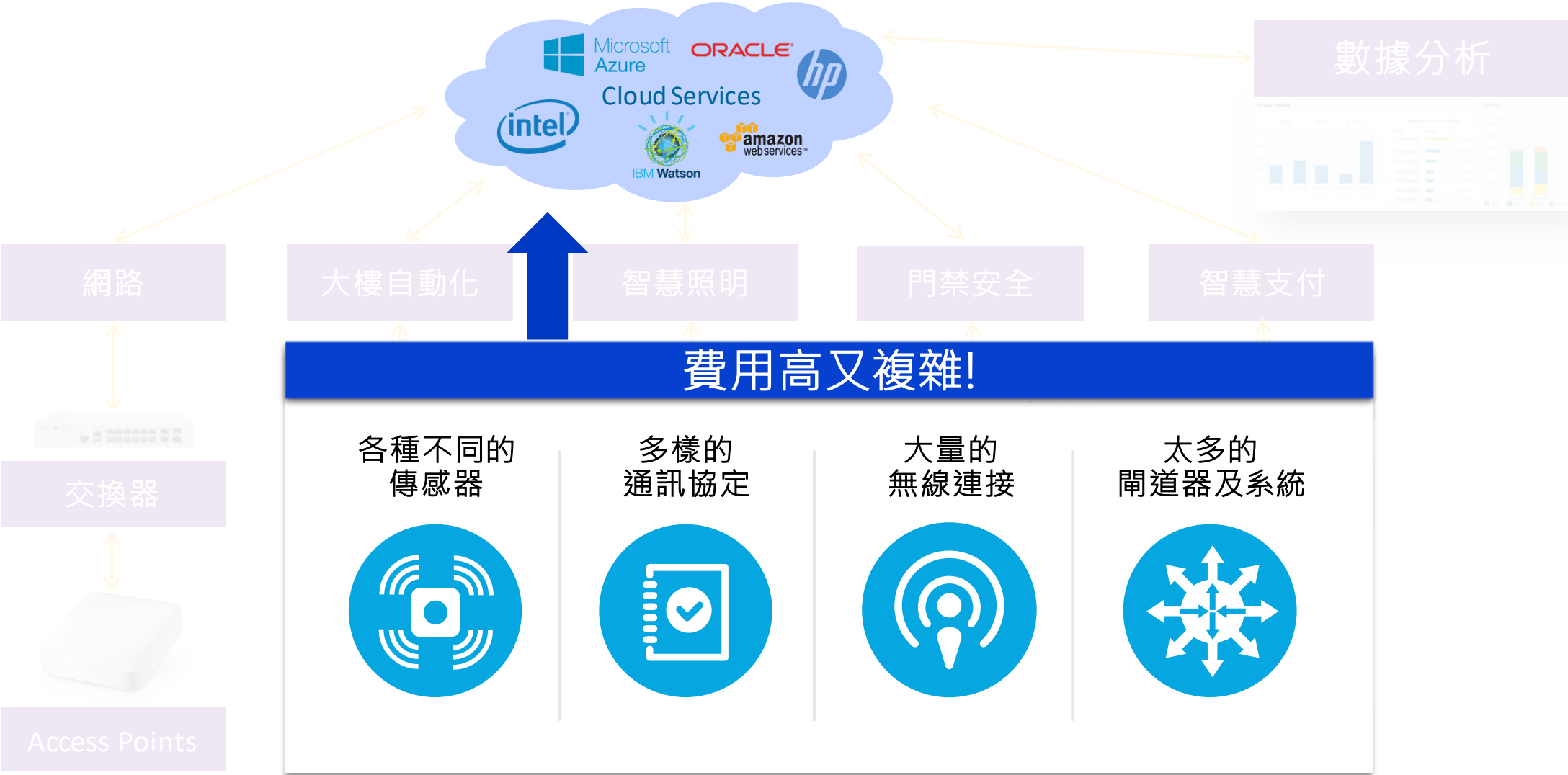
- 攝像機與監控整合
- 門禁管制
- 安全警報狀況監控
- 辨識建築物佔用狀況、監測及報告

數據遙測



- 環境狀況監控
- 設備狀態偵測
- 運送管理監控
- 物料運送稽核

物聯網環境的挑戰 – 太多閘道器及系統

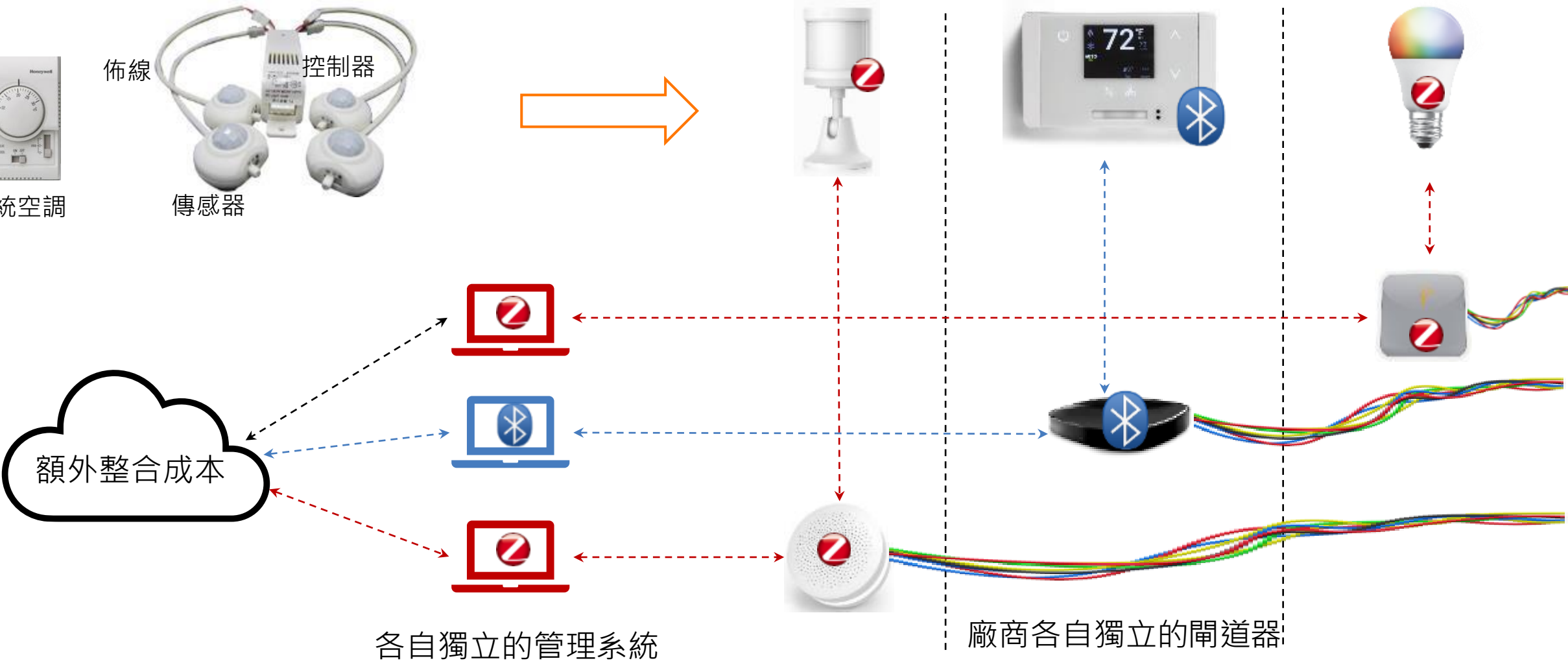


各自獨立的協定與系統

傳統傳感器- 佈線麻煩,整合不易



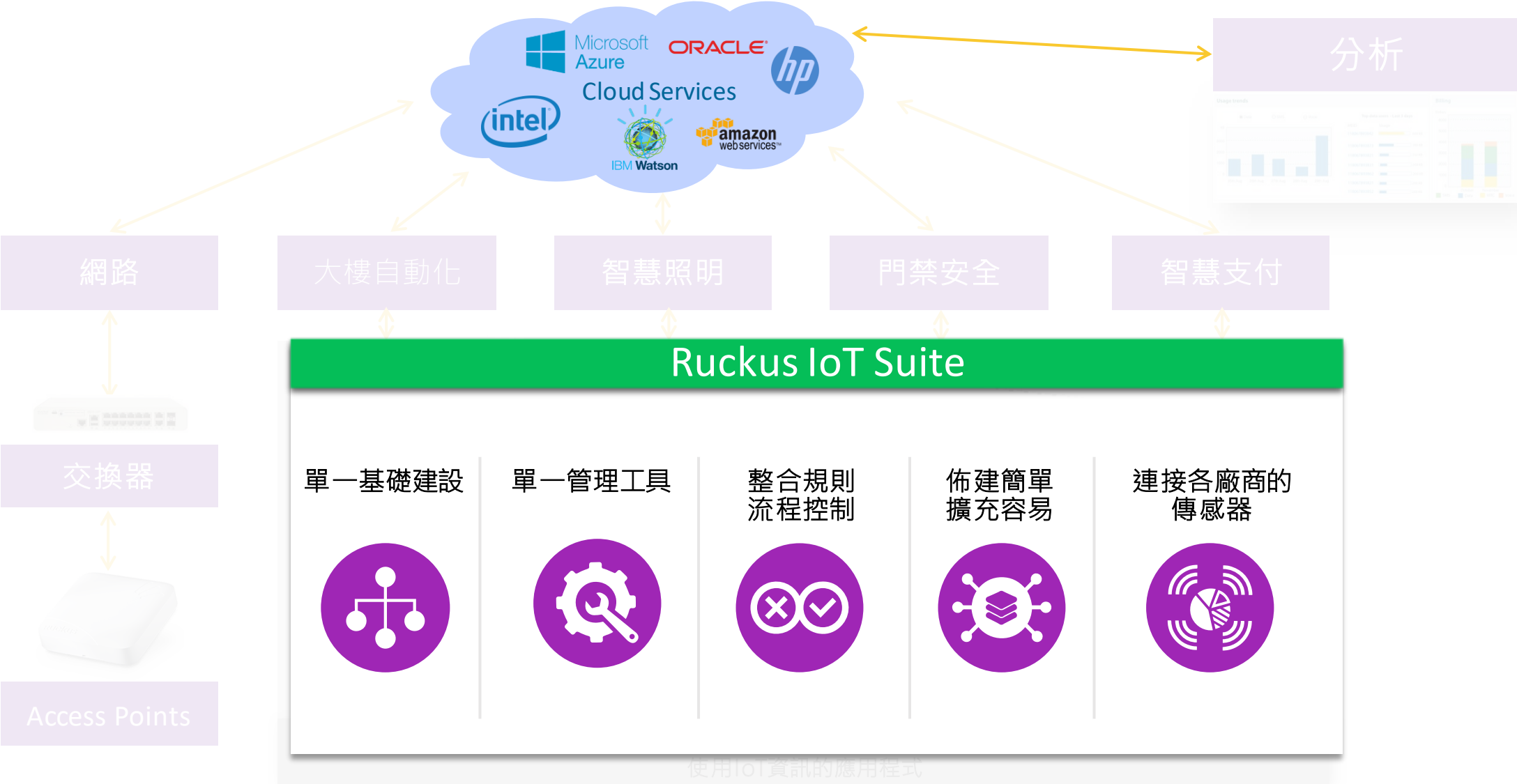
使用不同通訊協定的傳感器



Ruckus整合WiFi6+IoT存取網路

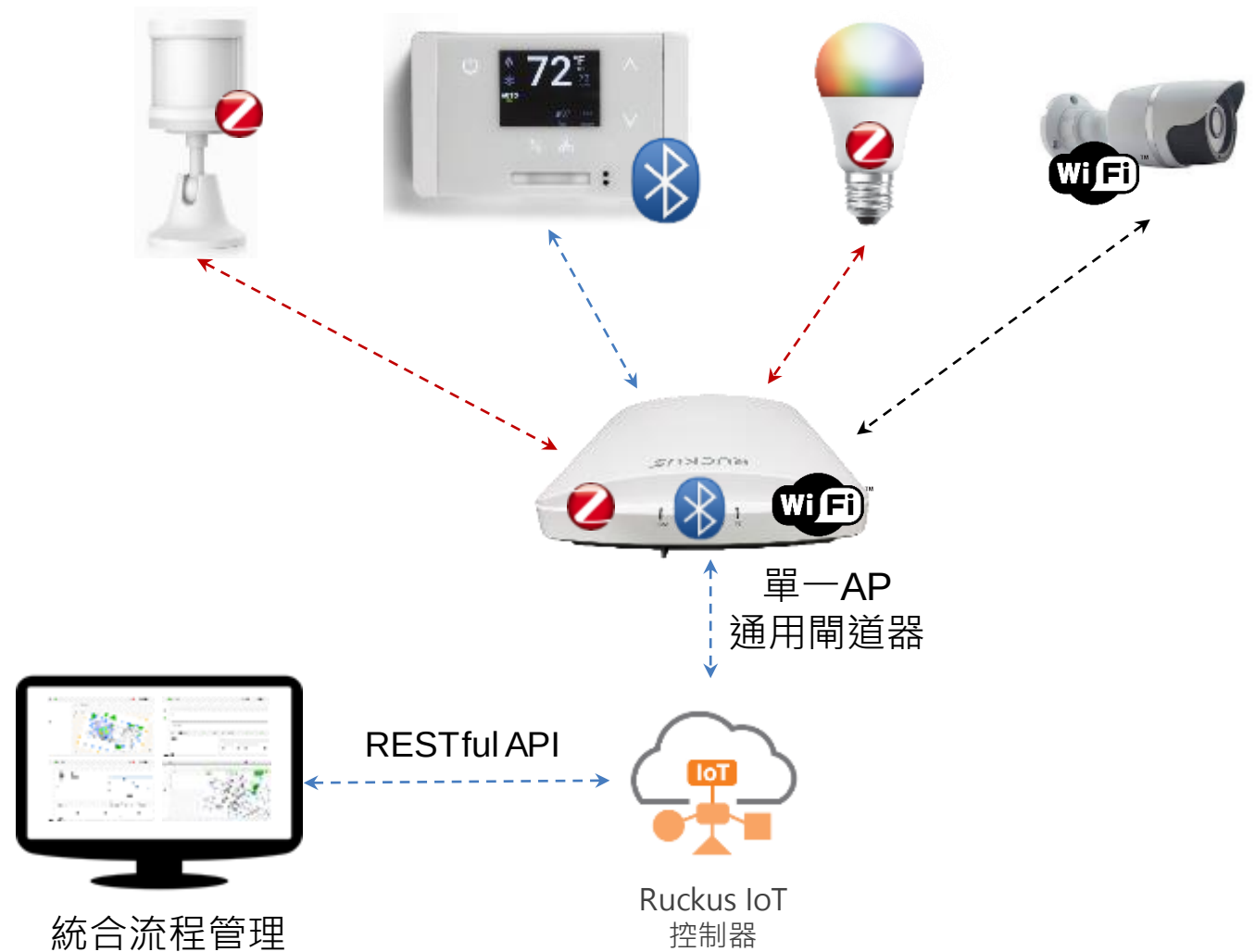


Ruckus IoT Suite整合方案

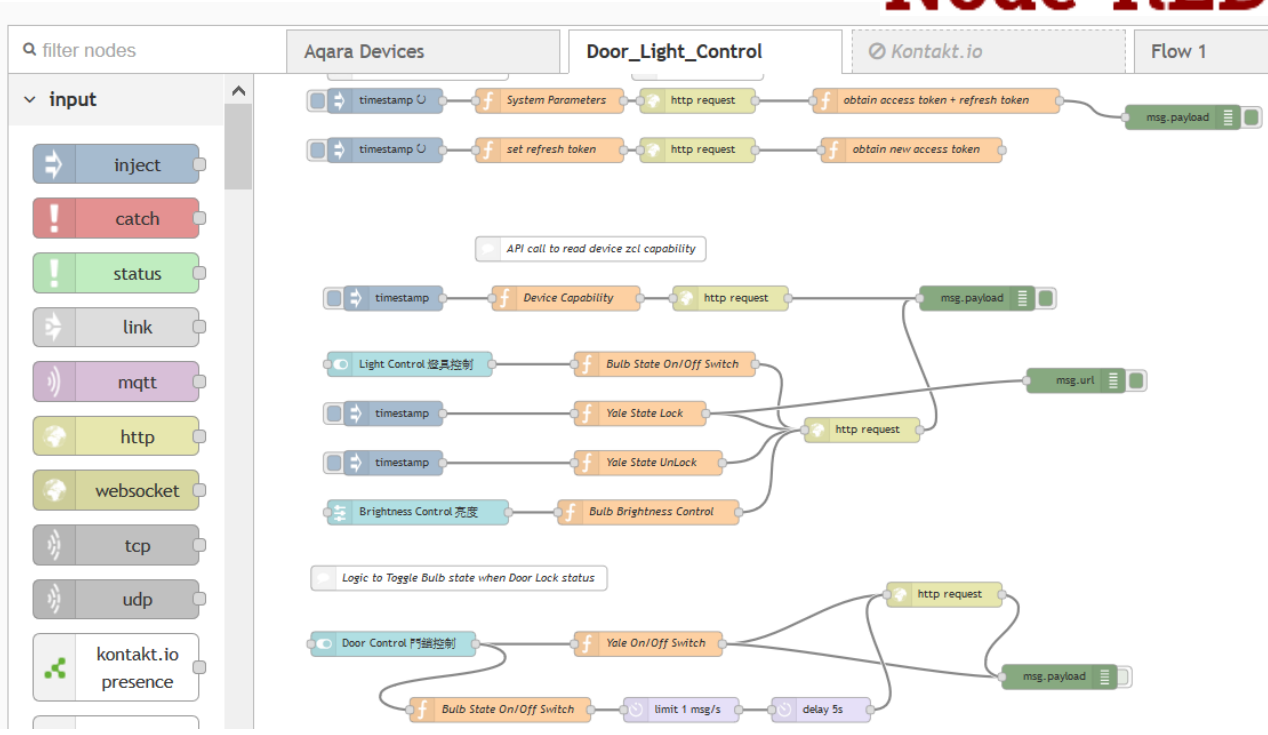
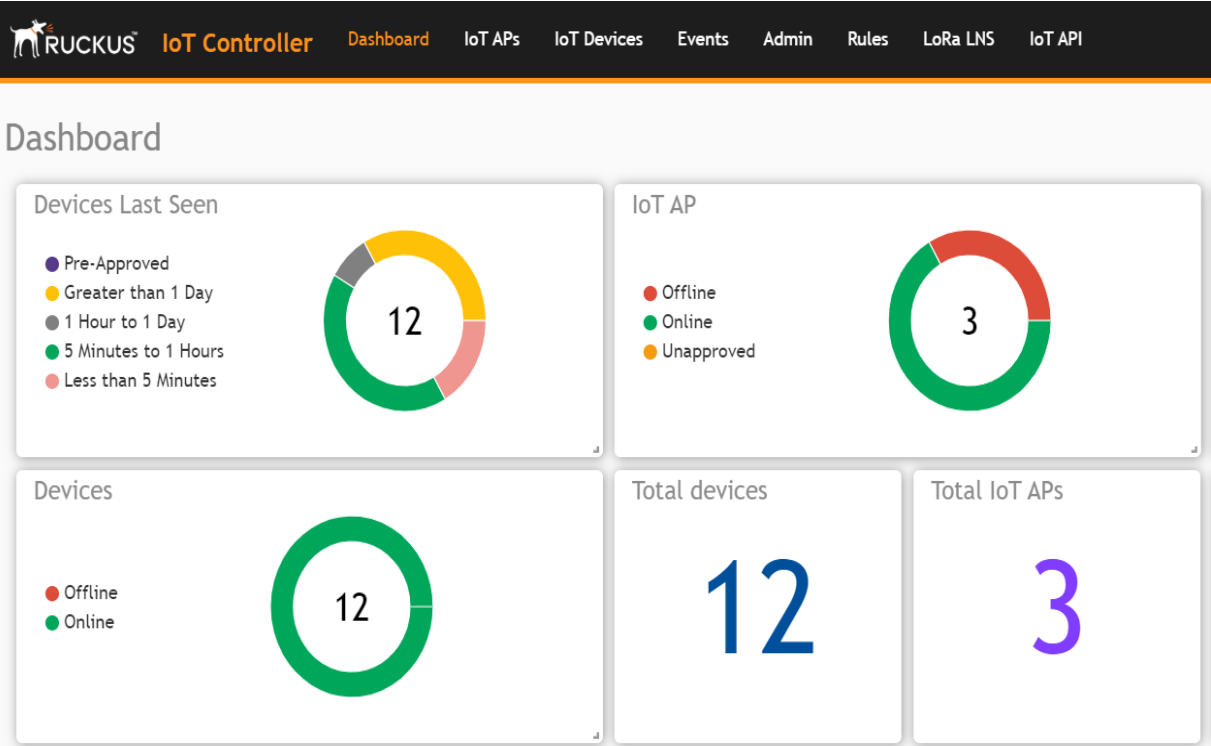


Ruckus IoT整合架構簡化網路

- 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

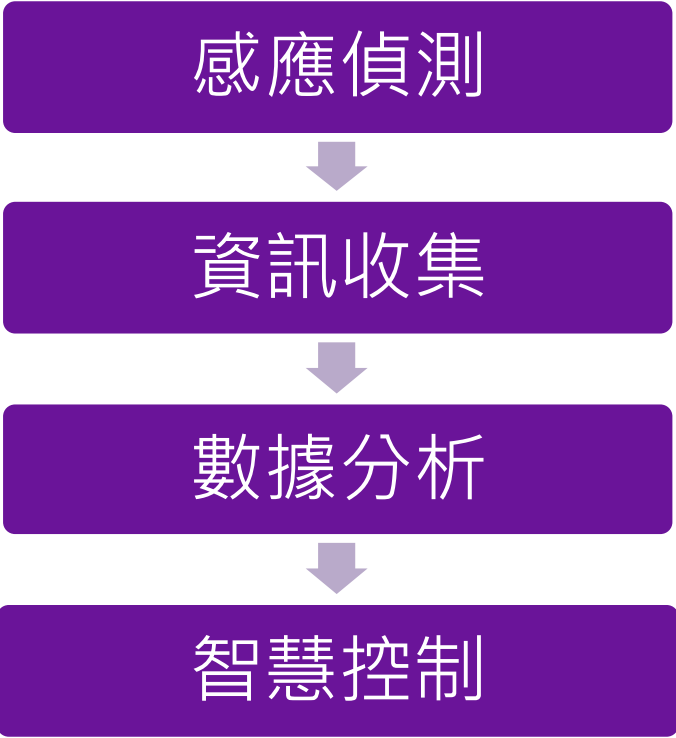
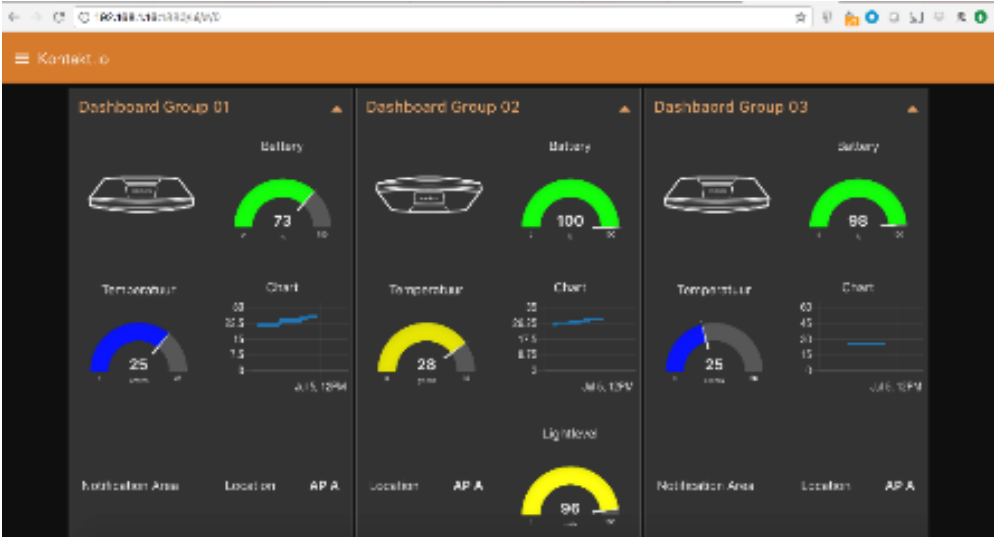


Ruckus IoT控制器及內建規則引擎



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

智慧校園環境應用



自動化監控事件與規則引擎整合

傳感器事件與監視器連動整合記錄

COMMScope®

RUCKUS IoT Suite

version_4.0.2b

Sensors Reading

溫度

0

23 C

50

濕度

0

55 %

100

氣壓

50

101 KPa

200

IOT Events

Vape

Door Sensor

Motion Sensor

Flood Sensor

Event Playback

Camera

17:28:00

17:29:00

17:30:00

17:31:00

17:32:00

17:33:00

17:34:00

17:35:00

PLAY VIDEO

END PLAYBACK

Database Report

I...	Event	Time	Device	Camera
755	Motion	2020-10-05 17:42:41	AMS001	Office
754	Motion	2020-10-05 17:39:24	AMS001	Office
753	Motion	2020-10-05 17:37:47	AMS001	Office
752	Motion	2020-10-05 17:35:25	AMS001	Office
751	Motion	2020-10-05 17:34:03	AMS001	Office
750	Open/Closed	2020-10-05 17:31:54	SDS001	ConferenceR...
749	Motion	2020-10-05 17:31:29	AMS001	Office
748	Open/Closed	2020-10-05 17:31:11	ADS001	ConferenceR...
747	Motion	2020-10-05 17:30:04	AMS001	Office
746	Open/Closed	2020-10-05 17:29:44	ADS001	ConferenceR...
745	Open/Closed	2020-10-05 17:29:34	SDS001	ConferenceR...
744	Open/Closed	2020-10-05 17:28:17	SDS001	ConferenceR...
743	Open/Closed	2020-10-05 17:27:18	SDS001	ConferenceR...
742	Motion	2020-10-05 17:26:54	AMS001	Office
741	Motion	2020-10-05 17:21:47	AMS001	Office
740	Motion	2020-10-05 17:20:07	AMS001	Office
739	Motion	2020-10-05 17:14:57	AMS001	Office
738	Motion	2020-10-05 17:13:46	AMS001	Office
737	Motion	2020-10-05 17:03:33	AMS001	Office
736	Open/Closed	2020-10-05 16:59:48	SDS001	ConferenceR...
735	Open/Closed	2020-10-05 16:58:39	SDS001	ConferenceR...
734	Motion	2020-10-05 16:52:44	AMS001	Office

LOAD VAPE EVENTS

LOAD ALL EVENTS

Event Query

Select Event

Event ID 748

Door

Select Location

Select Device

Event Summary

Event Counter

13

COMMScope®

完整豐富的IoT生態合作系統

TODAY

ASSA ABLOY
CONNECTED ENTRY



I2CONFIGURE
AXIS
COMMUNICATIONS
VIDEO / VMS



TraknProtect
PANIC BUTTON



SOTER
VAPE DETECTION



telkonet
ENERGY MANAGEMENT



kontakt.io
AVSYSTEM
LOCATION SERVICES



Std.
IoT



UP NEXT

dormakaba
CONNECTED ENTRY



REACT
mobile
PANIC BUTTON



SmartThings
HOME AUTOMATION (MDU)



OMRON
HEALTHCARE



更多設備支援，輕鬆升級物聯網環境



門窗傳感器



人體傳感器



震動傳感器



溫濕度傳感器



智慧插座



單火開關

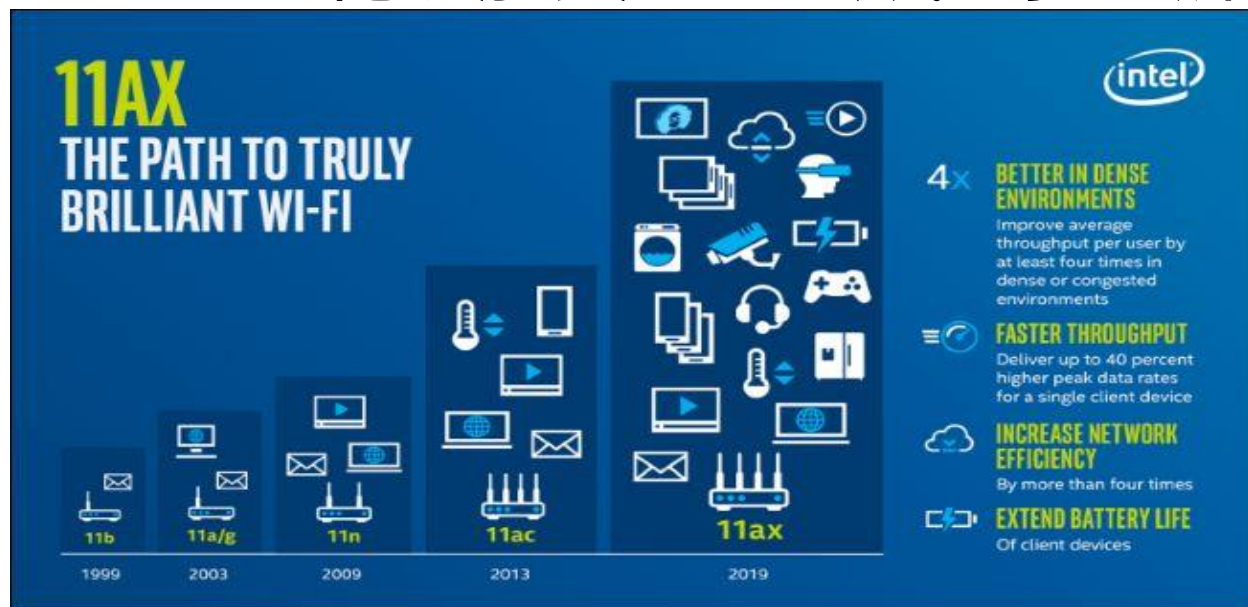


零火開關

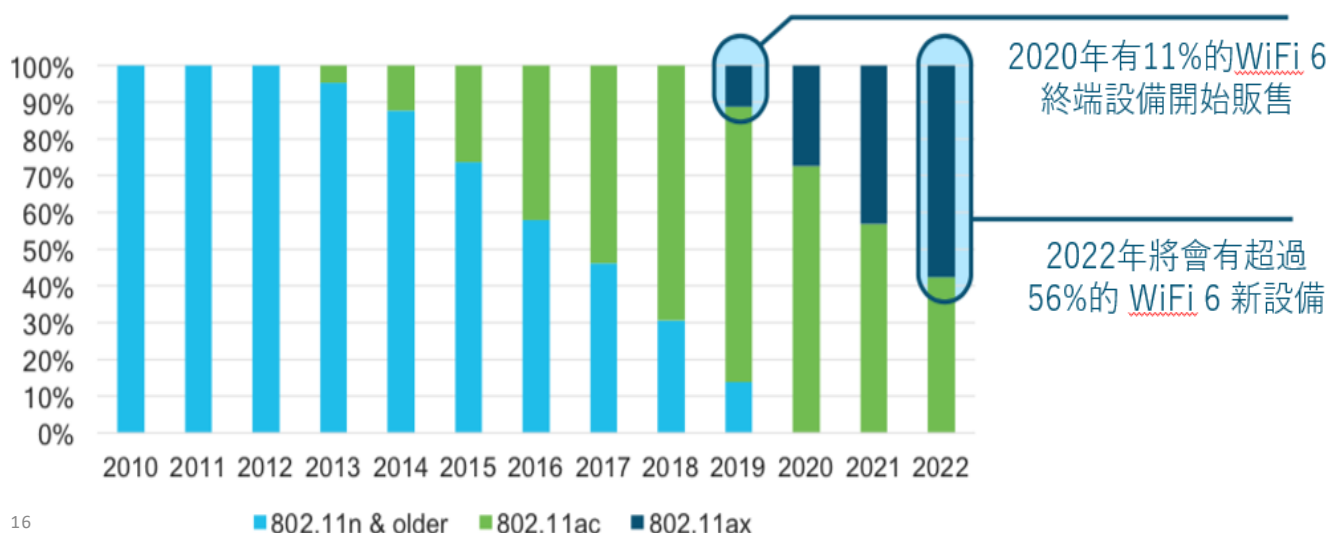


埋入式插座

WiFi 6行動裝置已成為主流



802.11ax 終端設備成長指數

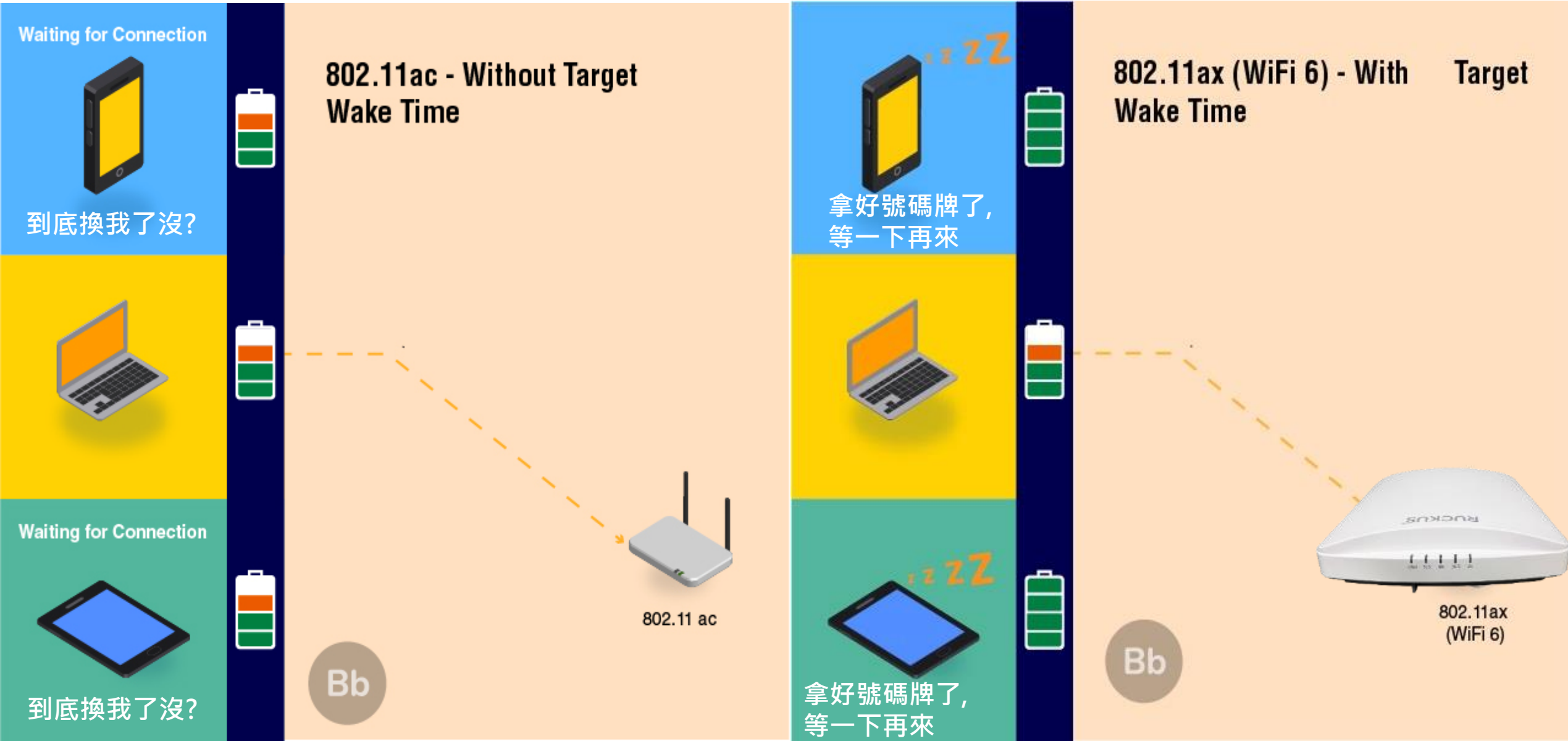


iPhone

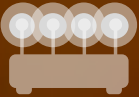
SAMSUNG

- 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)

WiFi-6 Target Wake Time – 7x 電池續航力



WiFi 6 OFDMA 技術提升傳輸效率



傳統WiFi

WiFi 6 OFDMA 技術提升傳輸效率



WiFi 6

AP Wi-Fi 6 R1 認證項目

Features	R1/R2	R850	R750	T750/SE	R650	R550
DL OFDMA **	R1/M	Y (37)	Y (37)	Y (37)	Y (37)	Y (37)
UL OFDMA **	R1/M	Y (37)	Y (37)	Y (37)	Y (37)	Y (37)
DL MU-MIMO ++	R1/M	Y	Y	Y	Y	Y
Transmit Beamforming	R1/M	Y	Y	Y	Y	Y
Individual Target Wake Time (power save)	R1/M	Y	Y	Y	Y	Y
Spatial Reuse (BSS Coloring)	R1/M	Y	Y	Y	Y	Y
Longer Guard Interval	R1/M	Y	Y	Y	Y	Y
Advanced Coding (BCC, LDPC)	R1/M	Y	Y	Y	Y	Y
Higher Order Modulation (1024 QAM)	R1/O	Y	Y	Y	Y	Y
WPA-3 (separate certification)	M	Y	Y	Y	Y	Y
Agile Multiband (separate certification)	M	Y	Y	Y	Y	Y

NOTES:

- DL/UL OFDMA & DL MU-MIMO – Baseline WFA certification requirements
 - ** OFDMA: DL – Transmit to min. 4 users & UL – Receive from at least 4 users
 - ++ MU-MIMO: DL – Required for APs with support for 4SS or more radio chains
- WPA3 and Agile Multiband (formerly Multiband Operation) are pre-requisites for Wi-Fi 6 certification

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



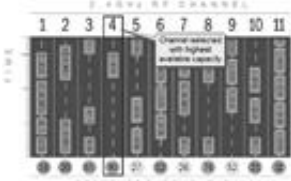
- 2.4 GHz 4x4:4, 1148Mbps
- 5 GHz 4x4:4, 2400Mbps
- Up to 1024 client
- 1x 1/2.5G Base-T, 1xSFP/SFP+, 1 x 1000Base-T
- BLE / Zigbee IoT Radio (selectable)



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



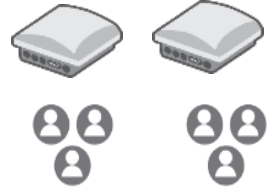
自動調適基地台
含蓋範圍



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

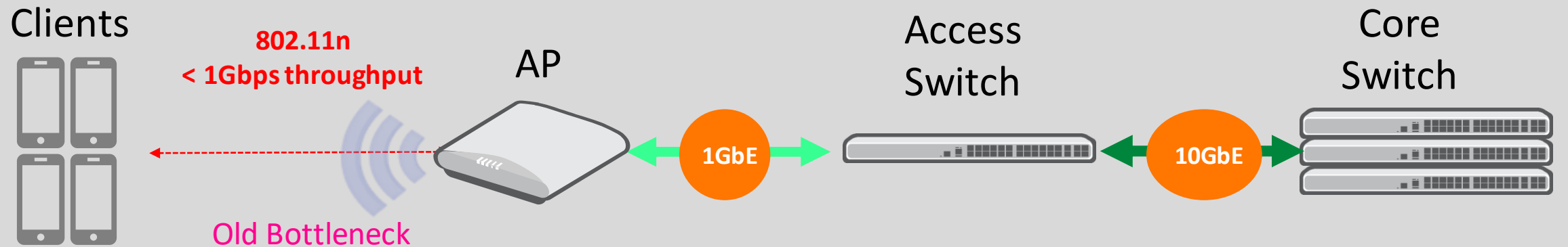
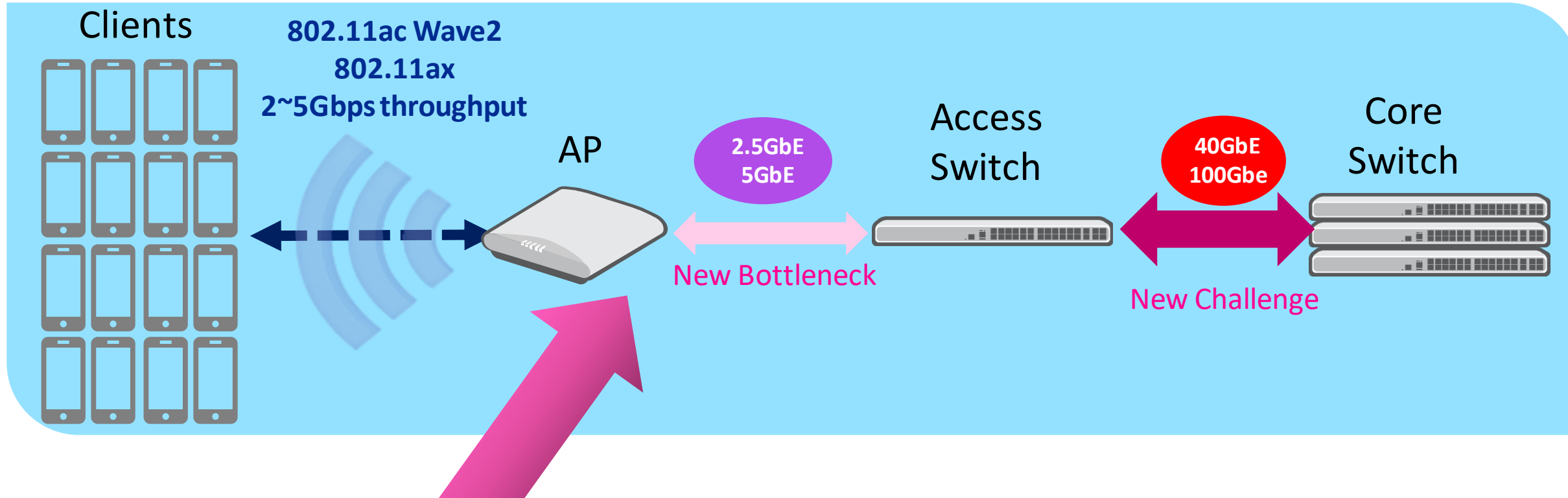
偵測臨近基地台訊號，自動調整訊號範圍來優化無線頻道涵蓋，同時減少同頻干擾，取得更好的網路效能

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

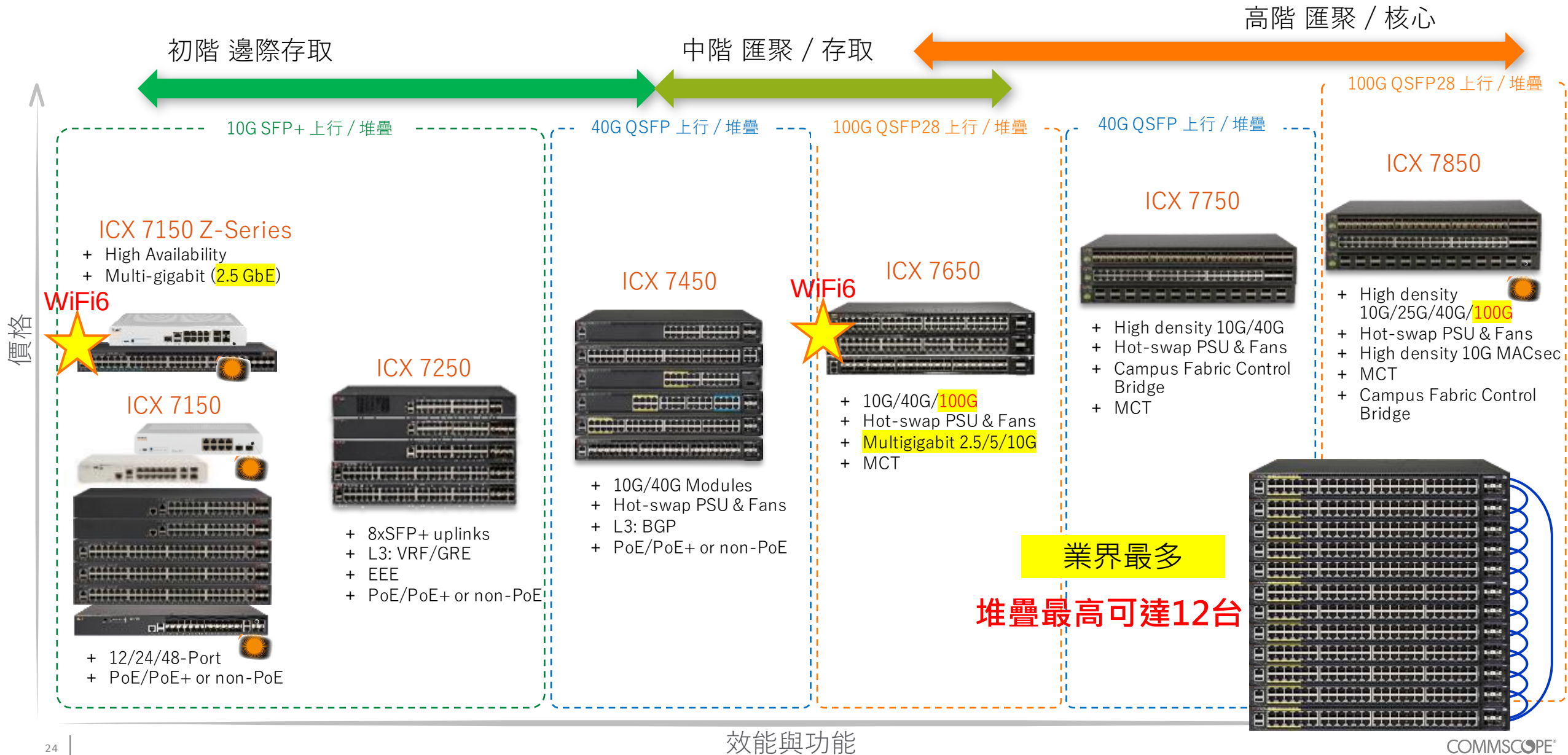
透過減少壅擠環境中的管理流量，提高可用無線空時，有效提升頻譜利用率及設備效能

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

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

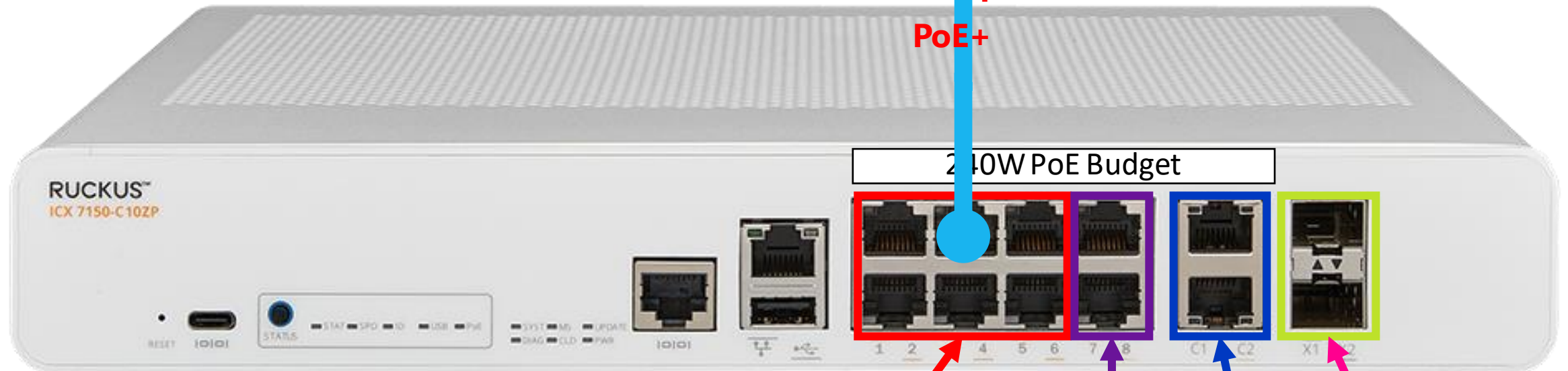


ICX 7150-C10ZP 滿足 WIFI-6 效能需求

- **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+



240W PoE Budget

2.5GbE PoE+/Overdrive

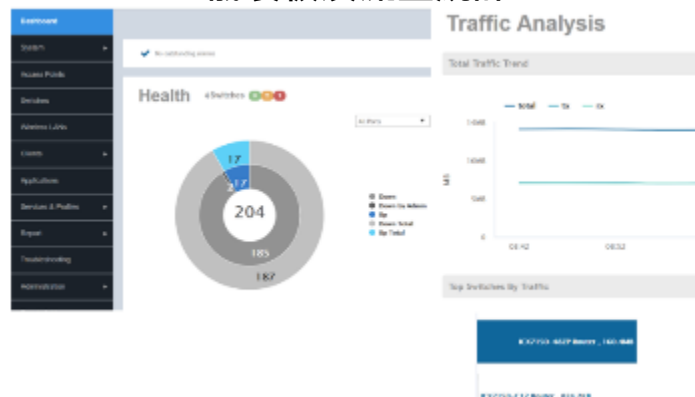
2.5GbE PoH/3bt

2.5/5/10GbE PoH/3bt

1/10GE SFP+

整合有線無線管理

儀表板及流量統計



ICX交換器管理

ICX Switches 59 healthy 3 warning 1 error

System

- MyDomain1
 - San Jose
 - GroupA
 - M/ptes
 - GroupX
- MyGroup2
- Default

Name	MAC	Model	Ports	Port Status	Alerts
MySwitch1	XX:XX:XX:XX:XX:XX	XXXXXXX	XX	XX	XX
MySwitch2	XX:XX:XX:XX:XX:XX	XXXXXXX	XX	XX	XX
StackMember1	XX:XX:XX:XX:XX:XX	XXXXXXX	XX	XX	XX
StackMember2	XX:XX:XX:XX:XX:XX	XXXXXXX	XX	XX	XX
MySwitch5	XX:XX:XX:XX:XX:XX	XXXXXXX	XX	XX	XX
MySwitch6	XX:XX:XX:XX:XX:XX	XXXXXXX	XX	XX	XX
MySwitch7	XX:XX:XX:XX:XX:XX	XXXXXXX	XX	XX	XX

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:

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

[Cancel](#)
[Refresh & Restore](#)
[Puls](#)
[Health](#)
[Traffic](#)
[Alert](#)
[Event](#)
[LLDP Neighbors](#)
[Private History](#)
[Troubleshooting](#)

Backup & Restore

Water backup runs daily, or manually in test, dev or beta envs when on-demand or scheduled firmware upgrade is running for the selected multiplay(s).

[Go Config Restore](#)
[Go Config Diff](#)
[Go Config View](#)
[Go Config Download](#)
[Delete](#)

Name	Date and Time	Type	Size	Status	Config Restore	Feature Restore
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A
Water-12-01-17-04:10:00-0425	2019-01-17 04:10:00	Scheduled	8,327,962 B	Success	N/A	N/A

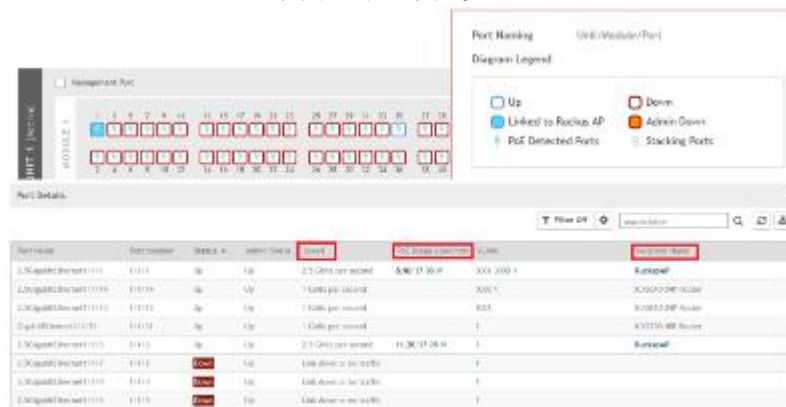
Switch Config Diff

Left Panel: 10AS1C1-3E32-5A-1210-M0000400
 Right Panel: 10AS1C1-3E32-5A-1210-M0000400

20 opening inner SW on
 21 1
 22 1401, 2001 by port
 23 Suggested eth1 1/2/1
 24 create inner/face ver 2001
 25 1
 26 1
 27 1
 28 1
 29 1
 30 1
 31 1
 32 1
 33 1401, 2001 by port
 34 create inner/face 1/1/1 on 1/1/1
 35 create inner/face 1/1/1 on 1/1/1

20 opening inner SW on
 21 1
 22 1401, 2001 by port
 23 Suggested eth1 1/2/1
 24 create inner/face ver 2001
 25 1
 26 1
 27 1
 28 1
 29 1
 30 1
 31 1
 32 1
 33 1401, 2001 by port
 34 create inner/face 1/1/1 on 1/1/1
 35 opening inner SW on

交換器連接埠管理



ICX 功能設定

The screenshot shows the MikroTik WinBox interface. On the left, the 'Switch' configuration window is open, showing the 'VLAN 10' interface configuration. The 'Switch' tab is selected, and the 'VLAN 10' interface is highlighted. The configuration shows 'VLAN ID' set to 10, 'MTU' set to 1500, and 'Speed' set to 100. The 'Switch' tab is also visible, showing the 'VLAN 10' interface configuration.

On the right, the 'IP Address List' configuration window is open, showing the 'IP Address List' configuration. The 'IP Address List' tab is selected, and the 'IP Address List' is highlighted. The configuration shows 'Name' set to 'IP-List', 'Start Address' set to '192.168.1.1', 'End Address' set to '192.168.1.254', and 'Speed' set to 100. The 'IP Address List' tab is also visible, showing the 'IP Address List' configuration.

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
Hostname: SZ-101
Version: 5.2.0.3.689

Troubleshooting

1
Type: Client Connection

2
Client: 08:00:1B:1C:3A:67

3
Select APs: Select Global APs: 2

4
Connectivity Tools: Start Stop Clear

Connection

Click and drag in the plot area to zoom in

10 Feb 17 Feb

AP: 0/20 (1B:1C:3A:67:1C:3A:67) SSID: lab-4x-wifi11 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

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

Core/Backbone

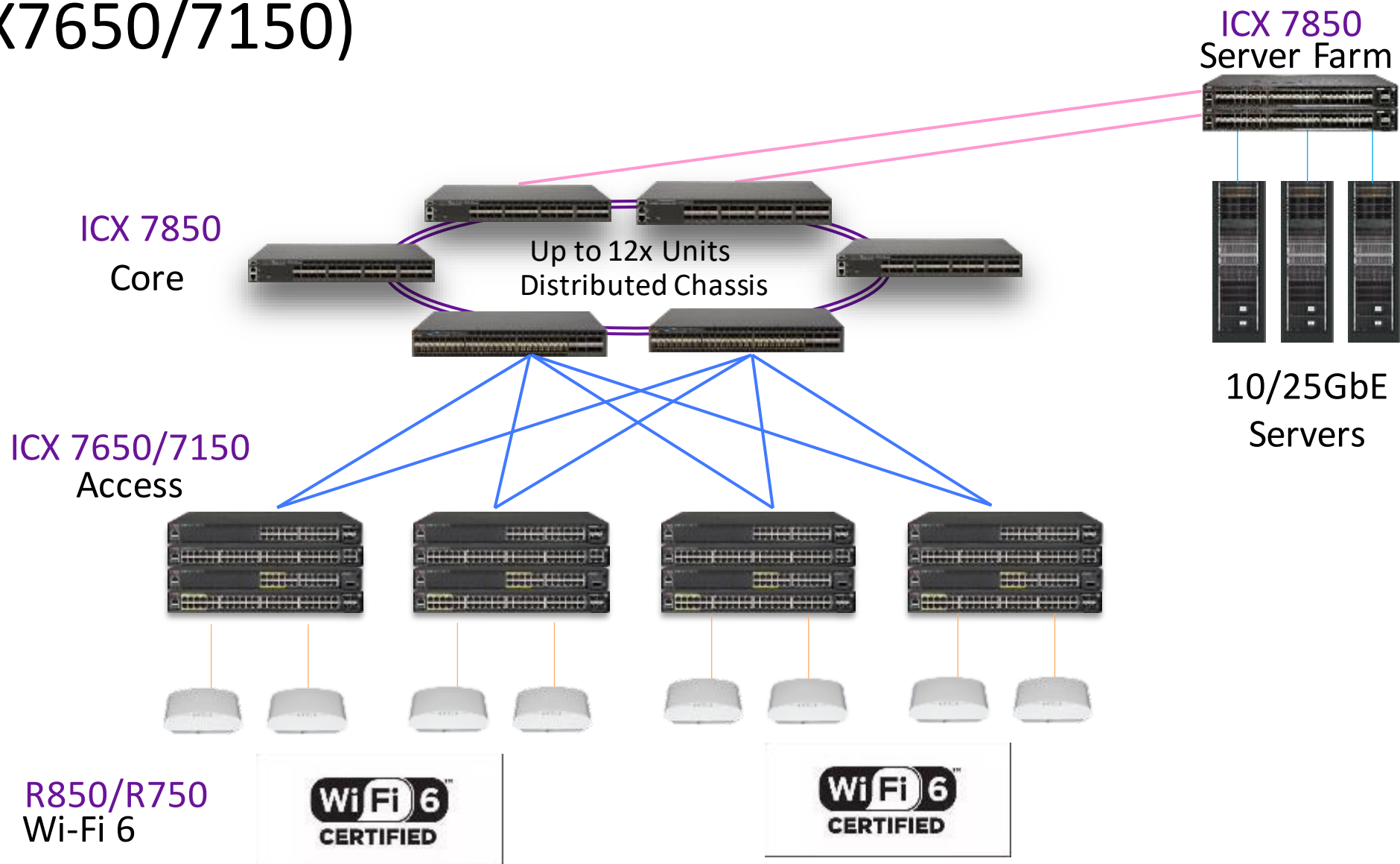
100 GbE High Performance Backbone
10/100 GbE Connecting Access

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



Thank You

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