www.ORingnet.com

ORing Company Profile
IIOT

Get connected Anytime, Anywhere.

公司簡介– 主要里程碑

2019 德國Weidmüller集團入股ORing。
獲得10萬台IoT 設備訂單，取得桃園市智慧路燈案標案。

2018 NB-IOT / CAT-M1產品發表，威力工業物聯網產品大規模部署

2017 IIOT I/O-Gateway-ORIO以及連結傳感偵測器通過了由諾基亞/愛立信實驗室進行的NB-IoT測試，並推出ORing的第一個ORing Pass雲端平台

2016 推出第一個配備銅線介面與PoE功能的軌道車廂用2.5G/10G乙太網路交換器

2015 威力工業網絡公司通過了國際鐵路行業標準認證
發表通過IEC-61850認證三層且具10G速度傳輸的模組化交換機
發表通過IEC-61850導軌式交換機

2014 提升X-Roaming轉換速度至60ms / 發表為海洋應用設計具IEC 60945認證產品

2013 通過UL C1D2防爆認證 / 整合媒體複聯通訊協定(MRP)與Modbus至交換機產品中

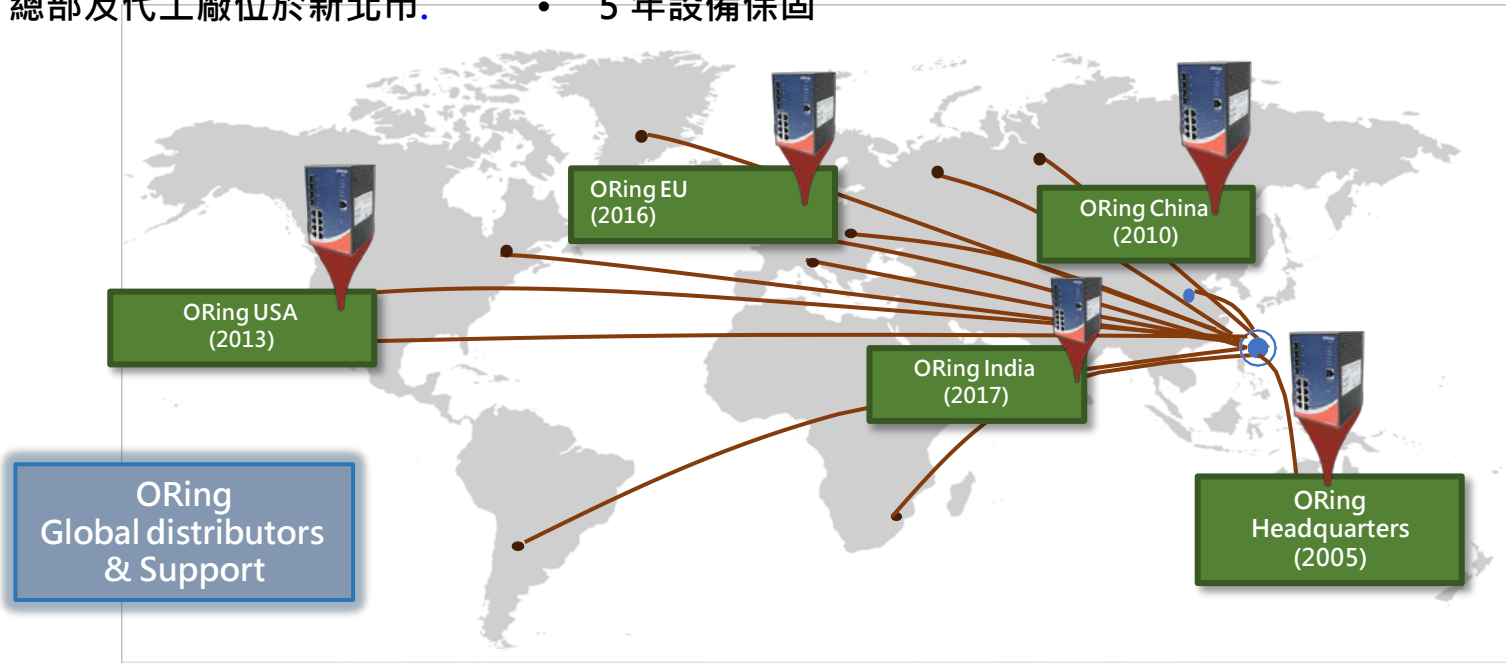
2012 發表專為電廠設計具IEC-61850認證的交換機 /
序列設備伺服器支援Windows 7 & Windows 8

2011 發表專為軌道運輸設計具EN50155的系列產品/AXIS通訊聯手開發IP監視器市場

2010 發表工規全Giga傳輸速度的網路交換機
發表大功率支援IEEE 802.3at 乙太網供電全Giga交換機

ORing Worldwide

- 2005 年成立
- 資本額 500,000,000
- 實收資本額 153,036,000
- 總部及代工廠位於新北市.
- 全球員工> 200人 ； R&D > 130人
- 4 間海外分公司 (China, Europe , USA, India)
- 全球技術支援及代理商
- 5 年設備保固



產品介紹及應用分析– 八大產品線

ORing Product Line

Industrial Ethernet Switch

- Managed L2/L3
- Lite-managed
- Unmanaged
- Copper/Fiber
- 10/100/1000Mbps and 10G
- Fixed or Modular design
- PoE 802.3af/at/bt
- PoE Injectors/Splitters/Extenders

Industrial Media Converter

- Copper/ PoE to Optical Fiber
- Ethernet to VDSL

Industrial Serial Products

- Serial to Ethernet/Wireless Device Server
- Serial to Optical Fiber
- Serial to Serial / Repeater
- Modbus TCP to Modbus RTU

Wireless Access Point

- Industrial Wireless Access Point
- Outdoor IP67 Wireless Access Point
- IEEE 802.11a/b/g/n/ac
- Dual RF

Industrial VPN Router

- Industrial Cellular VPN Router
- Outdoor IP67 Cellular VPN Router
- 3G and 4G LTE
- Dual Modem / Dual SIM
- IEEE 802.11 a/b/g/n

ORing IoT Product Line. (MQTT-Sparkplug compliance)

NB-IoT, LoRa, ZigBee, BT, WiFi
Ethernet, Serial port, DIDO, AIAO

R **IOT Gateway**

L **Lighting**

M **Parking**

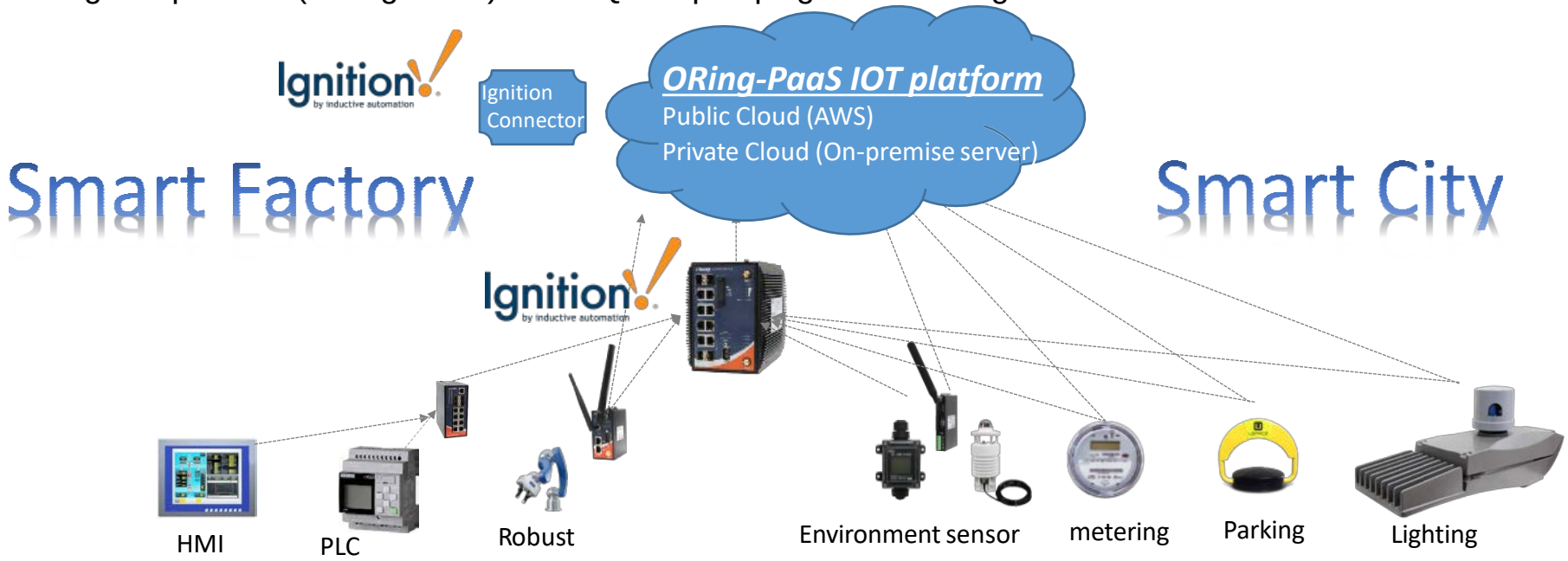
S **Sensor & Metering**

NEMA, Zhaga, Box
1~10V, Dali, Photo sensor, G sensor

environment sensors

ORing + Ignition solutions
From edge to the cloud , From smart factory to smart City

- ORing sensor node devices and IOT gateway are MQTT-Sparkplug compliance
- ORing Ignition Edge gateway is ignition on board and support docker programming for edge computing
- ORing IOT platform (ORing-PaaS) with MQTT-Sparkplug broker and ignition connector



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ORing IIoT 介紹

Dao Chen

Get connected Anytime, Anywhere.

ORing IIoT in Taiwan

Top1 IIoT聯網設備廠商，NB-IoT 設備累計出貨 > 120,000pcs

專案名稱	年度
桃園市水銀路燈汰換統包工程（南區）	2016
亞洲矽谷IoT 場域	2017
107年度臺北科學藝術園區智慧型路燈設置統包工程服務	2018
107年度延平南路等處LED智慧路燈統包工程	2018
泰山區107年度試辦智慧路燈提升效率	2018
高速公路智能調控LED路燈試辦工程	2018
國家研究院，沙崙能源環境智慧管理平台 研發與展示案	2018
高雄市哈瑪星社區智慧路燈示範計畫	2018
牡丹水庫智慧營運與管理技術建置第二期	2018
臺南市智慧防汛網第一期建置計畫	2018
108年度二河局轄區洪水預警及防汛整合作業	2018
水滴智慧城智慧路燈系統前瞻建置計畫統包工程	2019
台中水滴智慧城防汛工程	2019
南寮漁港智慧燈控	2019
桃園市全面換裝智慧路燈既維護案	2019
高雄市全面換裝智慧路燈既維護案	2020
水利署深耕培力計畫	2020
消防主機聯網	2020
Uspace 共享停車	2020

「互通互聯」的發展歷程

1960 1980 1990 2000 2010

大型主機 | 微型電腦 | 個人電腦 | 桌面網際網路 | 移動網際網路

LAN Ethernet Wireless

100萬 1,000萬 1億 10億 100億





2020

物聯網

500億 (用户數/設備數)



- 成本低
- 傳輸距離遠
- 穿透性佳
- 電量低，不須佈線
- 易設定，快速整合
- 資料庫技術提升

IoT 常見技術

- 傳輸距離遠
- 穿透性高
- 價格低
- 耗電量低

標準LPWAN技術

- 傳輸條件嚴苛，訊號涵蓋未完全
- 電池壽命即為產品壽命，越省電，壽命越長
- 眾多應用，眾多平台，不同資料格式轉換
- 巨量設備建置，設定，管理

物聯網技術需求

- ORIO
  多備援的傳輸技術
- 低功耗的MCU使用
- 針對產品特性設計節電腳本
- Open Gateway
- Magi-Collect
- Magi-Connect
- Magi-City Management System

威力核心技術

ORing

物聯網引言 1

1. 既有經驗
2. 物聯網常見技術

物聯網商機及成功案例 2

1. 智慧交通
2. 智慧防汛
3. 消防聯網
4. 地層下陷預防
5. 共享停車
6. 智慧城市-智慧路燈

ORing 產品介紹 3

1. 平台及硬體架構
2. 產品說明
3. 節電設計說明
4. 維運APP 及平台
5. Open Gateway

Why ORing? 4

1. 物聯網成功關鍵

物聯網商機開發來源

V

社會需求，民氣可用
交通安全
智慧防汛
消防聯網

新商業模式
Uspace 共享停車

政府需求，循循善誘
地層下陷問題改善

智慧管理，ROI 回本
智慧路燈管理

五楊霧氣警示燈控制器 -發現需求

起霧颳風路漆黑　駕駛開「五楊」心驚

記者 林志偉 林君舫 桃園 報導　2013/02/25 17:09

小 中 大

部分通車的五楊高架橋，卻讓駕駛晚上開得心驚驚，有民眾日前行經中壢路段，不但沒有路燈，而且當晚還起霧、颳大風，前方一片漆黑，能見度頂多50公尺，讓駕駛膽戰心驚，而國工局表示，未來將會在部分路段加設霧中行車警示器，讓駕駛沿著護欄小心行駛。

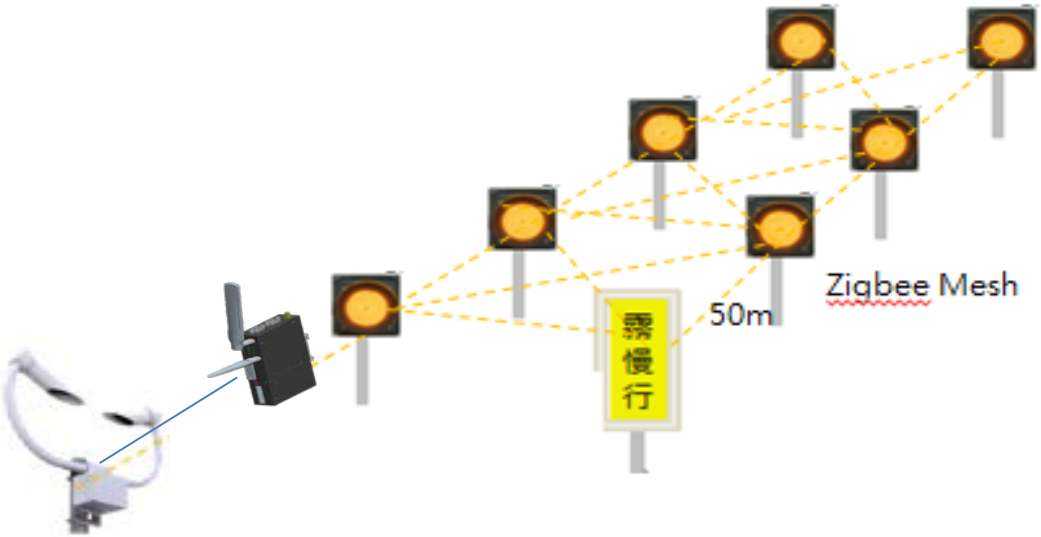
駕駛：「超恐怖的耶。」

前方一片漆黑，不但沒有路燈，更慘的是竟然還起大霧、颳大風，駕駛嚇得小心行駛，就怕一閃神發生車禍意外。駕駛：「什麼都看不到。」

- 傳輸條件嚴苛，且基地台涵蓋未完全
- 拉電困難，電池或太陽能系統決定系統壽命

五楊霧氣警示燈控制器 –技術說明

- 本地端智慧調控
  (起霧才開燈)
- 太陽能充放電控制系統
  (確保系統效率)
- 電池健康度警報及用電資料
  (平台管理)



台南防汛系統-發現需求

台南永康社區淹水！住戶忙清掃南市議員忙打口水戰
udn 聯合新聞網 - 20 小時前
50多年來從未淹水的永康區中華路154巷淹水，今天趁天晴住戶忙著清理 ... 台南市政府表示，目前已調派四部抽水機待命，只要下雨就啟動抽水， ...

台南永康雨下30毫米竟淹水疑箱涵遭灘漿阻塞
Yahoo奇摩新聞 (新聞發布) - 17 小時前

台南永康淹水24小時清淤預計明晚完成
台灣大紀元 - 1 分鐘前

台南永康雨下20分鐘...竟離奇淹水！王定宇控：人為因素
三立新聞網 (新聞發布) - 2018年9月8日

台南》永康中華路淹出民怨代理市長李孟諺親自進箱涵
中時電子報 (新聞發布) - 17 小時前

疑地下箱涵阻塞台南永康水淹及膝
評論 - 華視新聞 - 2018年9月8日

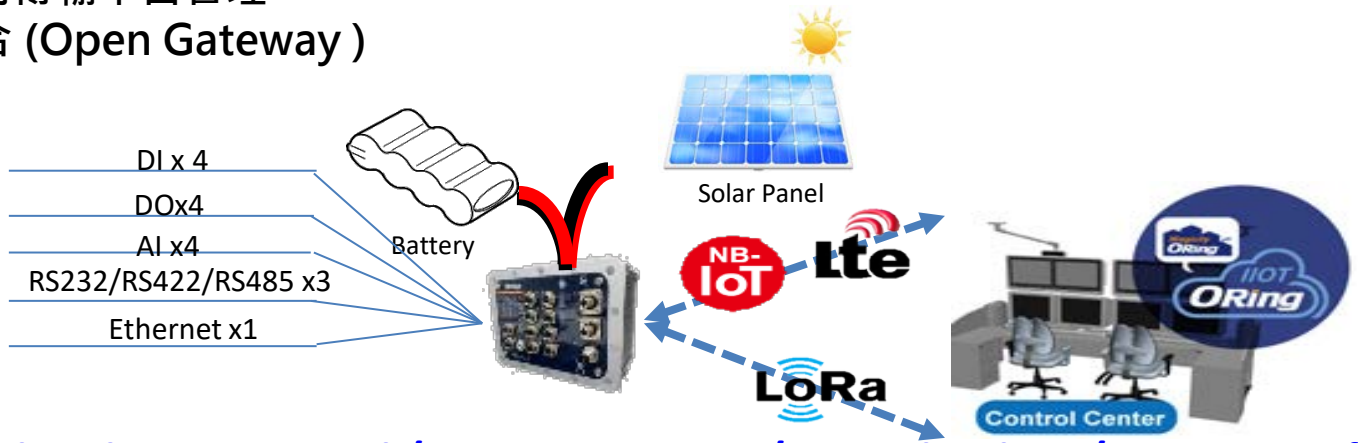
Yahoo奇摩... 台灣大紀元 華視新聞 三立新聞網 ... 中時電子報 ... 自由時報電...

- 傳輸條件嚴苛，且基地台涵蓋未完全
- 拉電困難，電池或太陽能系統決定系統壽命
- 需整合眾多設備及系統

台南防汛系統-技術說明

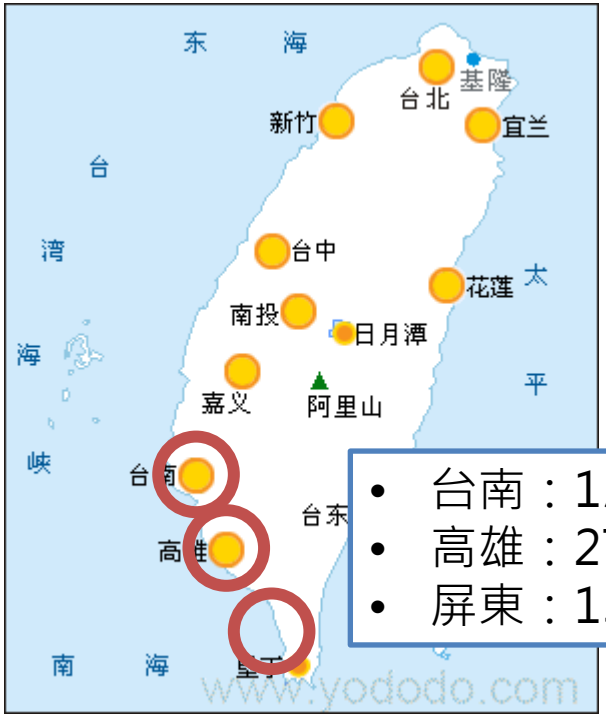
- LoRaWAN +NB-IoT 雙備援系統
- 跨通訊技術傳輸平台管理
- 多設備整合 (Open Gateway)

雨量計
風向計
水位計
流量計
油量計
電壓計
GPS
馬達控制
閘門控制



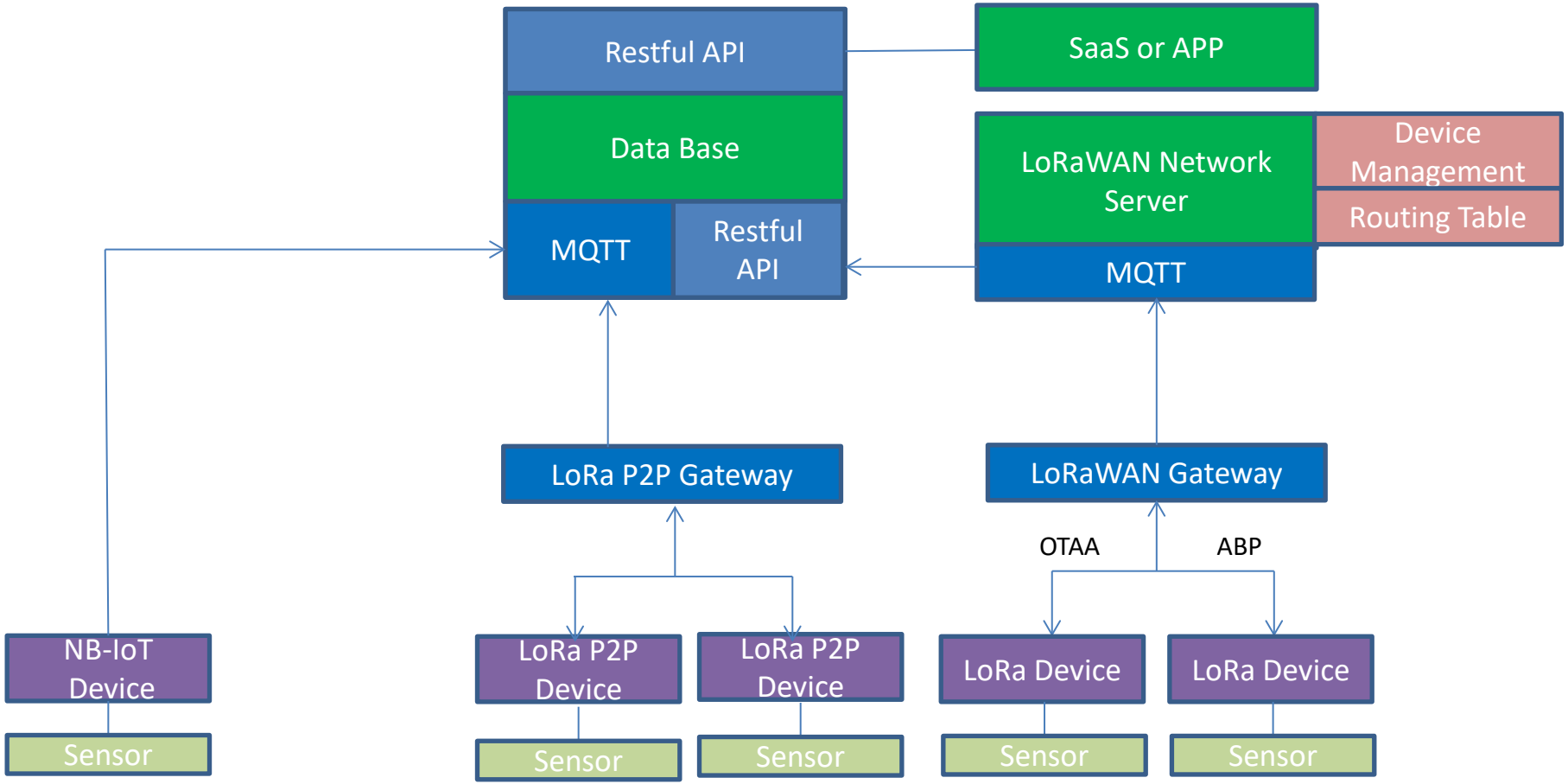
Solar Charger Control / Sensor Gateway / RF Redundant / Water Proof

暴雨结果大不同



- 台南：1處
- 高雄：275處
- 屏東：15處

台南防汛系統-傳輸架構技術說明



智慧消防- 發現需求

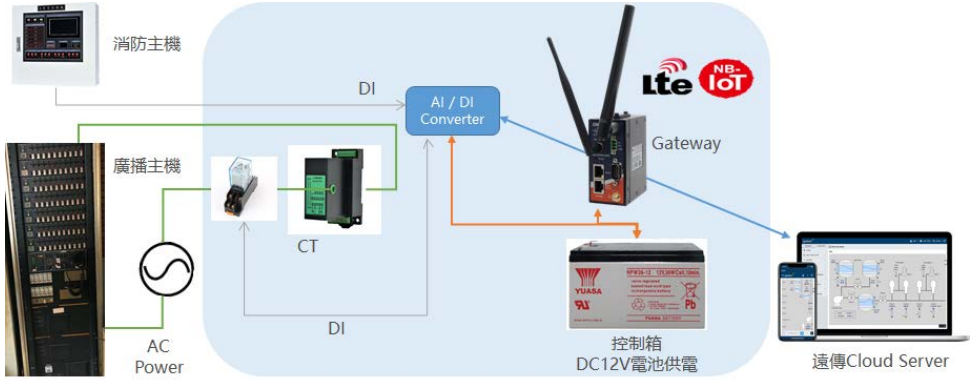
4月26日，台北林森錢櫃大火奪走6條人命，更燒出公安問題。為了避免又有業者便宜行事，關掉火警受信總機，阻礙黃金逃生時間，台北市消防局今（2）天到了另外一家星聚點KTV，舉辦消防搶救演練，模擬火警發生的疏散SOP，要是消防設備被關掉，都會第一時間通報，而錢櫃也派各分店的「防火管理人」前來觀摩。

警鈴聲大作，KTV的B1廚房竄出濃煙、火舌，打火班先行出動。店員第一時間，趕緊拿滅火器搶救，疏散包廂民眾，甚至拉水線自救。

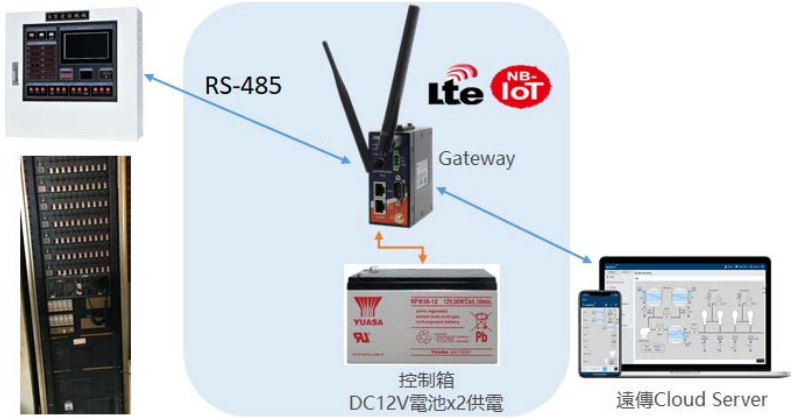
只是火煙實在太大，消防隊獲報也趕到，深入火場滅火，外頭雲梯車緩緩升空，救出受困民眾。台北市星聚點KTV，全員出動，包含警消一共動員150人，逼真演練。

- 八大行業仍為了抽菸，施工等需求，偷關受信設備
- 政府只能透過臨檢巡查，但通常臨檢前，業主已經重啟系統，永遠稽查不到問題

智慧消防- 系統架構



既有消防系統，採用外掛Sensor，偵測廣播設備電力，消防主機的乾接點，確認是否有被偷關



新型態受信主機，具有Modbus介面可直接透過ORing 設備聯網

智慧消防- 平台畫面


高雄市政府
Kaohsiung City Government
嗨，使用者
2020/10/24 15:21
6F
5F 14:57
4F 14:54
3F
2F
1F
N
401
403
402
404
405
406
407
416
415
413
408
STAIRS
ELEVATOR & STAIRS
E
STAIRS 14:56
409 14:54
418
417
414
412
411
410
4F平面圖
建物資訊
建物名稱 某某大廈
建物地址 104 台北市中山區松江路199號
聯絡電話 02 1234 5678


高雄市政府
Kaohsiung City Government
嗨，使用者
連線率
94.2%
4146/4563
告警資訊
消防設備01 主機電源斷電
消防設備02 廣播電源電流過低
消防設備03 警報器電流過低
消防設備04 主機備援電壓過高
消防設備05 設備離線
消防設備06 RSSI 數值偏小
消防設備07 主機電源斷電
消防設備08 廣播電源電流過低
消防設備09 警報器電流過低
消防設備10 主機備援電壓過高
消防設備11 設備離線
消防設備12 RSSI 數值偏小
Ever Rich昇恆昌內湖旗艦店
內湖區
五分埔商圈
松山慈惠堂
南港區
告警/已處理次數
告警趨勢
地區告警統計
告警類別統計
設備導入趨勢圖

物聯網商機開發來源

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交通安全
智慧防汛
消防聯網

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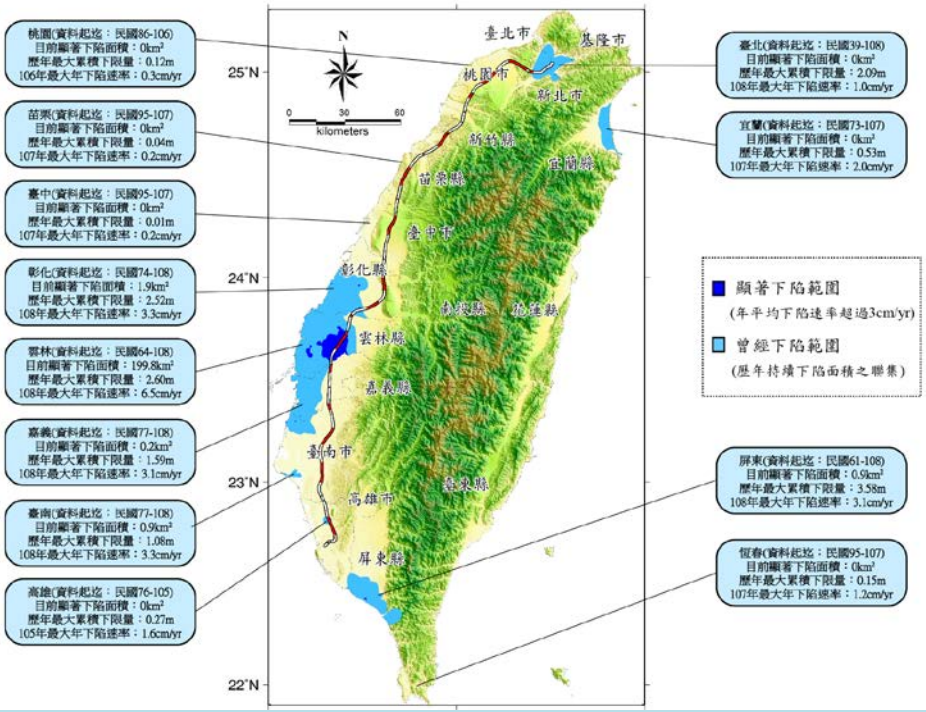
Uspace 共享停車

V

政府需求，循循善誘
地層下陷問題改善

智慧管理，ROI 回本
智慧路燈管理

智慧培力-發現需求



- 地層下陷嚴重
- 地下水超抽
- 農民不聽勸導

智慧培力-問題解決

Step 1 : 提供農民遠端控制功能，不需要巡田水
Step 2 : 預約抽水時間改為預約抽水量
Step 3 : 依據農民預約狀況及地下水觀測井的數據，調整各田地抽水時間，錯開抽水尖峰時段
Step 4 : 農民走向智慧農業，藉由平台管理

Map-device-info 9d

Map-addWell-setting 15d

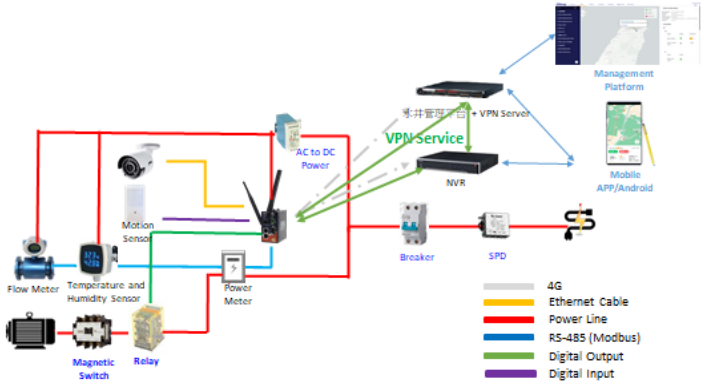
Map-device-schedule 15d

Map-device-schedule-delete 15d

智慧培力-技術架構

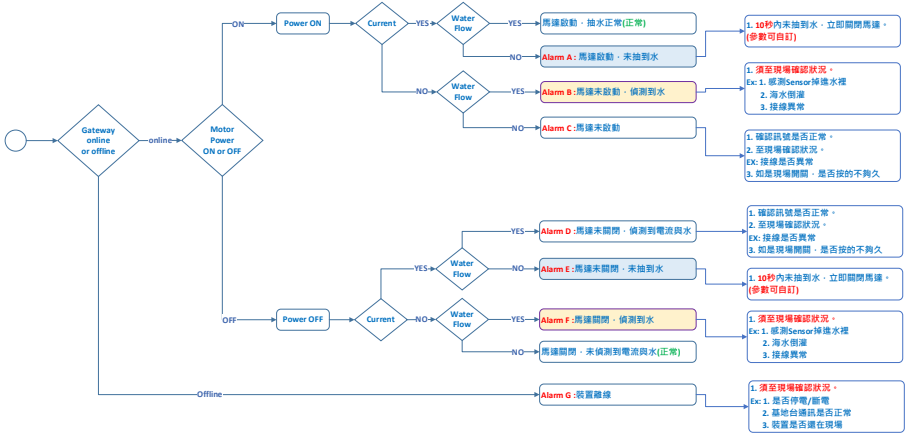
Open Gateway 系統架構

- 整合水流計，馬達用電
- 整合各式控制IO
- 影像監控



Smart IO 功能

- 馬達空轉，水位過低，抽不到水
- 未抽水，但水壓過高，仍出水
- 馬達開啟，電流異常



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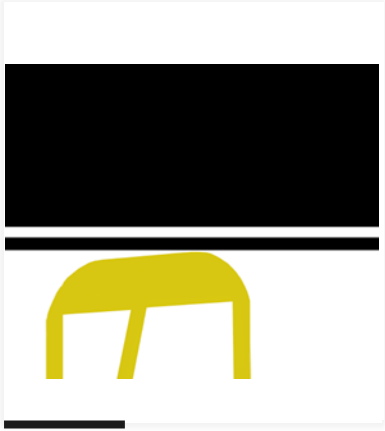
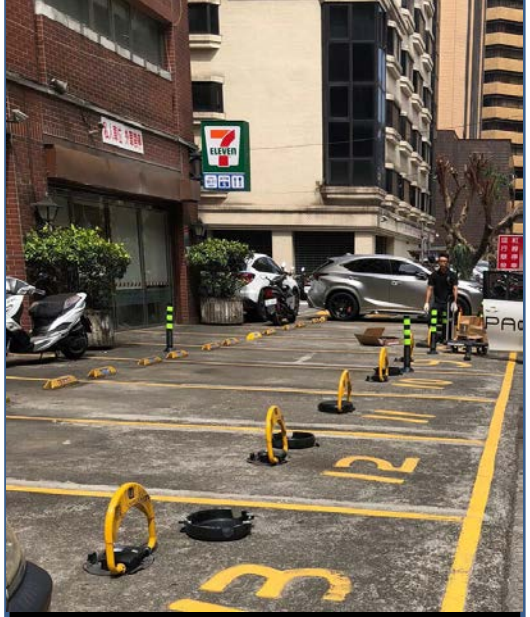
智慧停車 –既有產品比較



	USPACE智慧地鎖	傳統手動地鎖	鐵柵欄
操控性	全自動遙控升降	需下車手動操控不易	需搬動，容易吹倒
阻擋性	侵入警報，自動回彈	未上鎖容易搬動	疑被移動，阻擋性差
耐壓性	塑鋼纖維，5公噸耐壓	輾壓即損，損壞率高	面積單薄易損壞
防水性	IP6X防水、防鏽處理	易脫漆、生鏽生雜草	易脫漆、生鏽

智慧停車 –
社區收益比較



月租戶閒置共享

合作車位數

15格

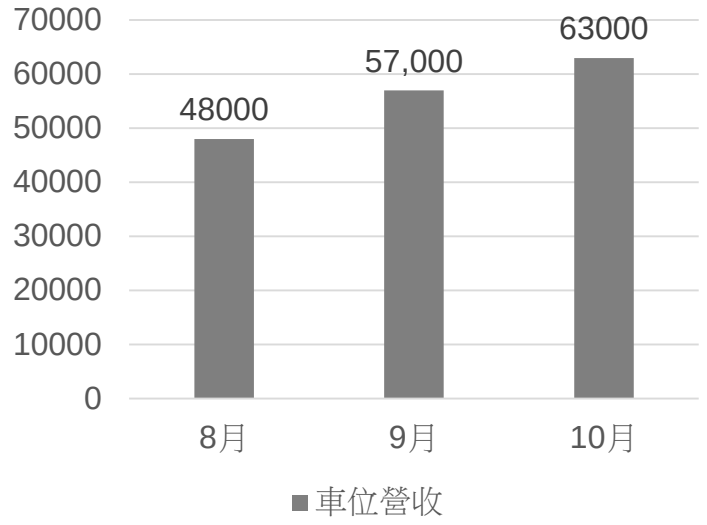
每日平均開放

6小時

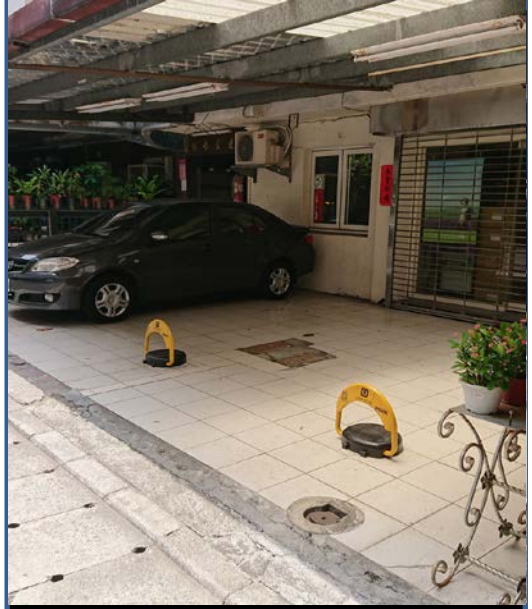
案例
明園大廈

$56,000

每月增加管委會營收



智慧停車 –
個人收益比較



閒置時開放共享

合作車位數

2格

平均價位

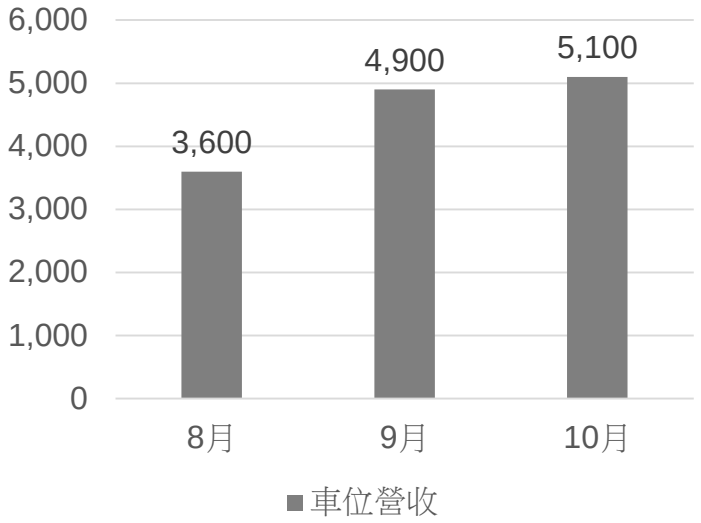
35元

案例

住家車位

$4,500

每月車位閒置臨停營收



物聯網商機開發來源

社會需求，民氣可用
交通安全
智慧防汛
消防聯網

新商業模式
Uspace 共享停車

政府需求，循循善誘
地層下陷問題改善

V

智慧管理，ROI 回本
智慧路燈管理

桃園智慧路燈 PFI 專案

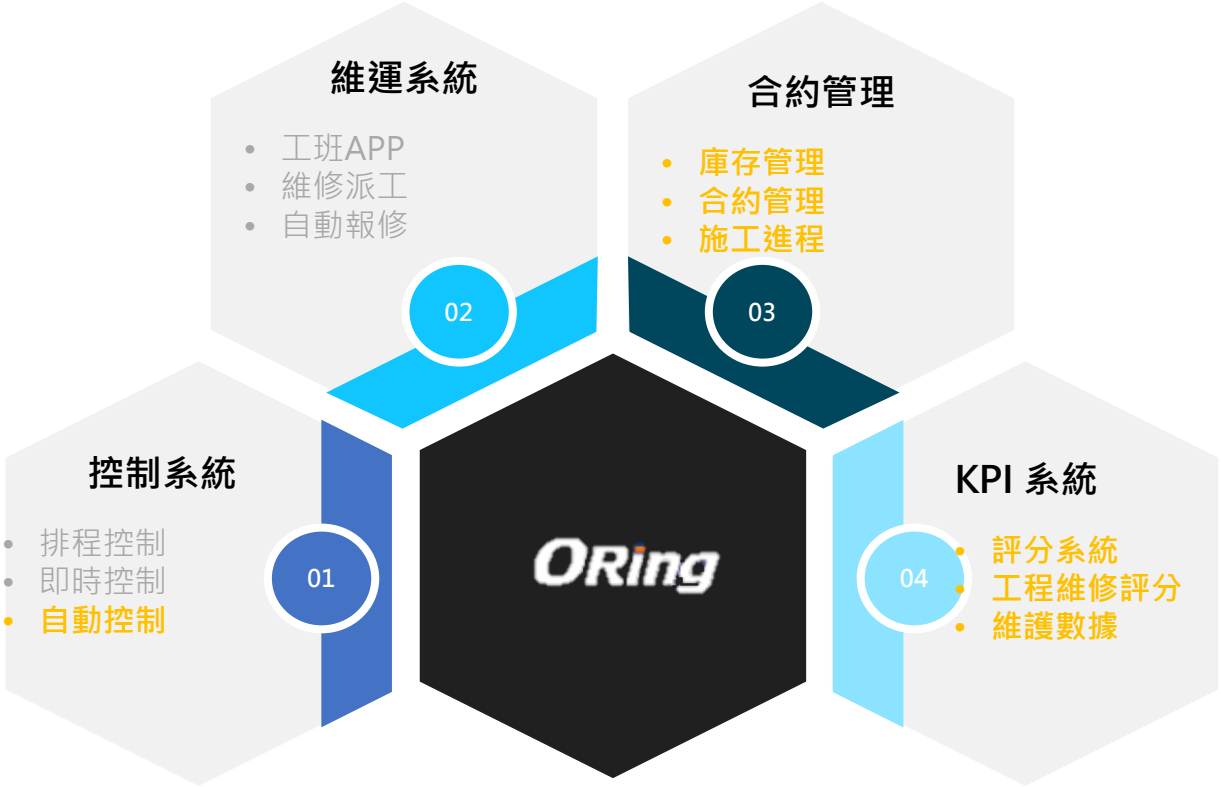
Present Three Awards of 2019 Smart City / Mayor Cheng: keep developing smart city and improving the administrative efficiency

Release Unit： Department of Public Information
Release Date： 2019-04-10
Providers： Press Liaison Section

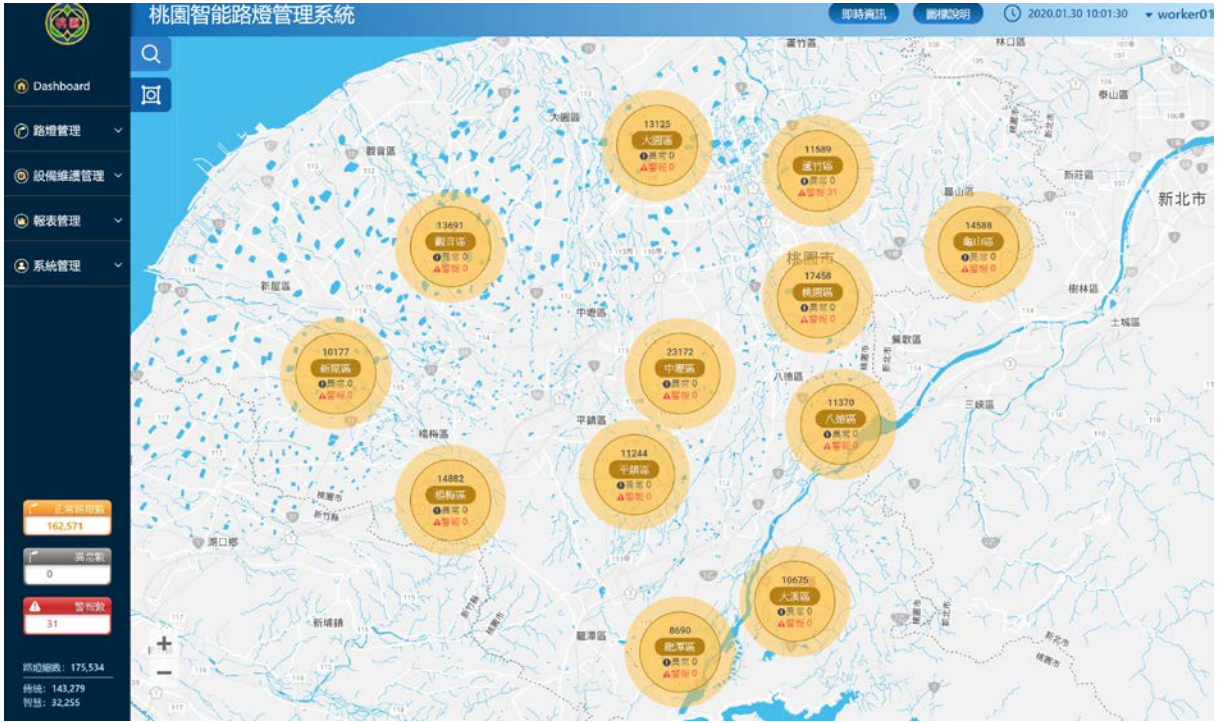
Taoyuan City Mayor Cheng Wen-Tsan hosted the municipal administrative meeting on April 10 and accepted "2019 Smart City Awards" won by Department of Youth Affairs, Department of Information Technology, Department of Water Resources, and Department of Public Works. Mayor Cheng stated "2019 Smart City Summit & Expo" was held at Taipei Nangang Exhibition Center from March 26 to 29 this year (2019). It was the largest professional expo of smart city, covering smart medicine, smart architecture, smart education, smart energy, smart transportation, and smart security protection. Taoyuan City's Department of Youth Affairs and Department of Information Technology won the first prize of "2019 The Best Start-Up Friendly City " among municipalities; Department of Water Resources won "2019 Smart City Innovative Application Award" with the smart underground water management system; Department of Public Works won "2019 Smart City Innovative Application Award" with the smart street lights and the IoT application platform. These three awards showed Taoyuan's broad application of smart city development.

數量	160k pcs
預算	**56 億 (小於既有路燈電費及每年維護費)**
合約內容	• 新設智慧路燈 • 維運8 and 17年
KPI	• 維修效率 < 24hr • 偵測準確度> 99.7 % • 路燈故障數量 • 居民回饋或縣市承辦評分 • 節能績效
節電費用	60% Before : 250W HPS After : 100W LED

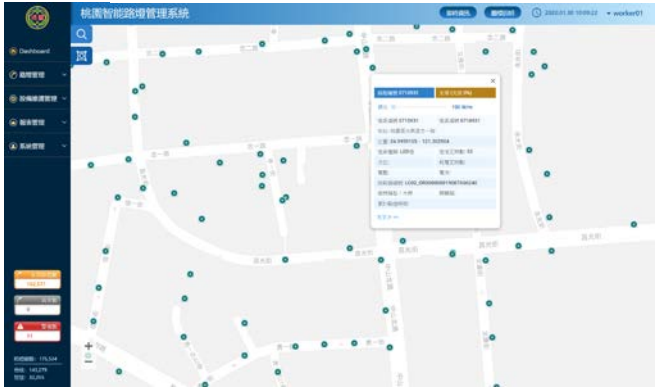
桃園智慧路燈系統架構


維運系統
工班APP
維修派工
自動報修
02
合約管理
庫存管理
合約管理
施工進程
03
控制系統
排程控制
即時控制
自動控制
01
ORing
KPI 系統
評分系統
工程維修評分
維護數據
04

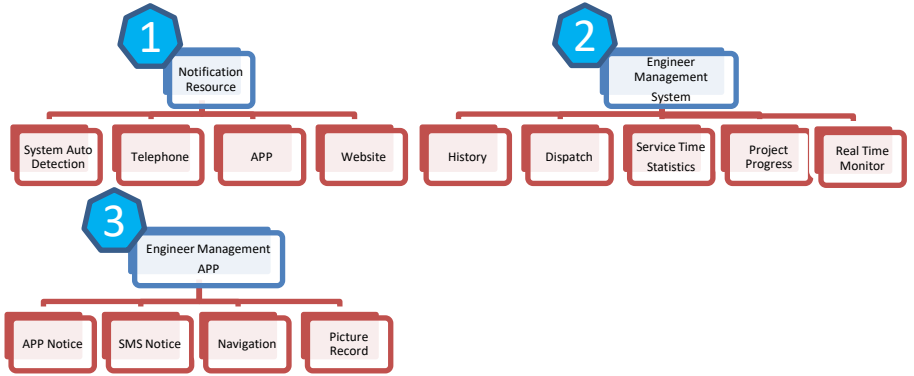
桃園智慧路燈平台畫面



- Group Management
- Alarm Notice
- Street Light Information



桃園智慧路燈工程管理



桃園線上即時資訊

		蘆竹區	大園區	新屋區	中壢區	平鎮區	觀音區
北	總數	11,589	13,125	10,177	23,172	11,244	13,691
	正常	11,589	13,125	10,177	23,172	11,244	13,691
	報修	0	0	0	0	0	0
	維修中	0	0	0	0	0	0

		桃園區	龜山區	八德區	大溪區	楊梅區	復興區	龍潭區
南	總數	17,458	14,588	11,370	10,675	14,882	1,910	8,690
	正常	17,458	14,588	11,370	10,675	14,882	1,910	8,690
	報修	0	0	0	0	0	0	0
	維修中	0	0	0	0	0	0	0

桃園智慧路燈庫存管理

- Every controllers should provide the IMEI and IMSI number to get the approval letter before the installation. And get the system ID and Key to do the security control.
- Monitor the stock quantity to keep the safety volume.

桃園智慧路燈KPI管理

KPI System will record the period.
If > 24hrs. System will penalty the bidder.

Auto Detection
or
Other Inform

Worker Dispatch

Close the case

KPI system will calculate the defect rate.

物聯網引言 1

1. 既有經驗
2. 物聯網常見技術

物聯網商機及成功案例 2

1. 智慧交通
2. 智慧防汛
3. 消防聯網
4. 地層下陷預防
5. 共享停車
6. 智慧城市-智慧路燈

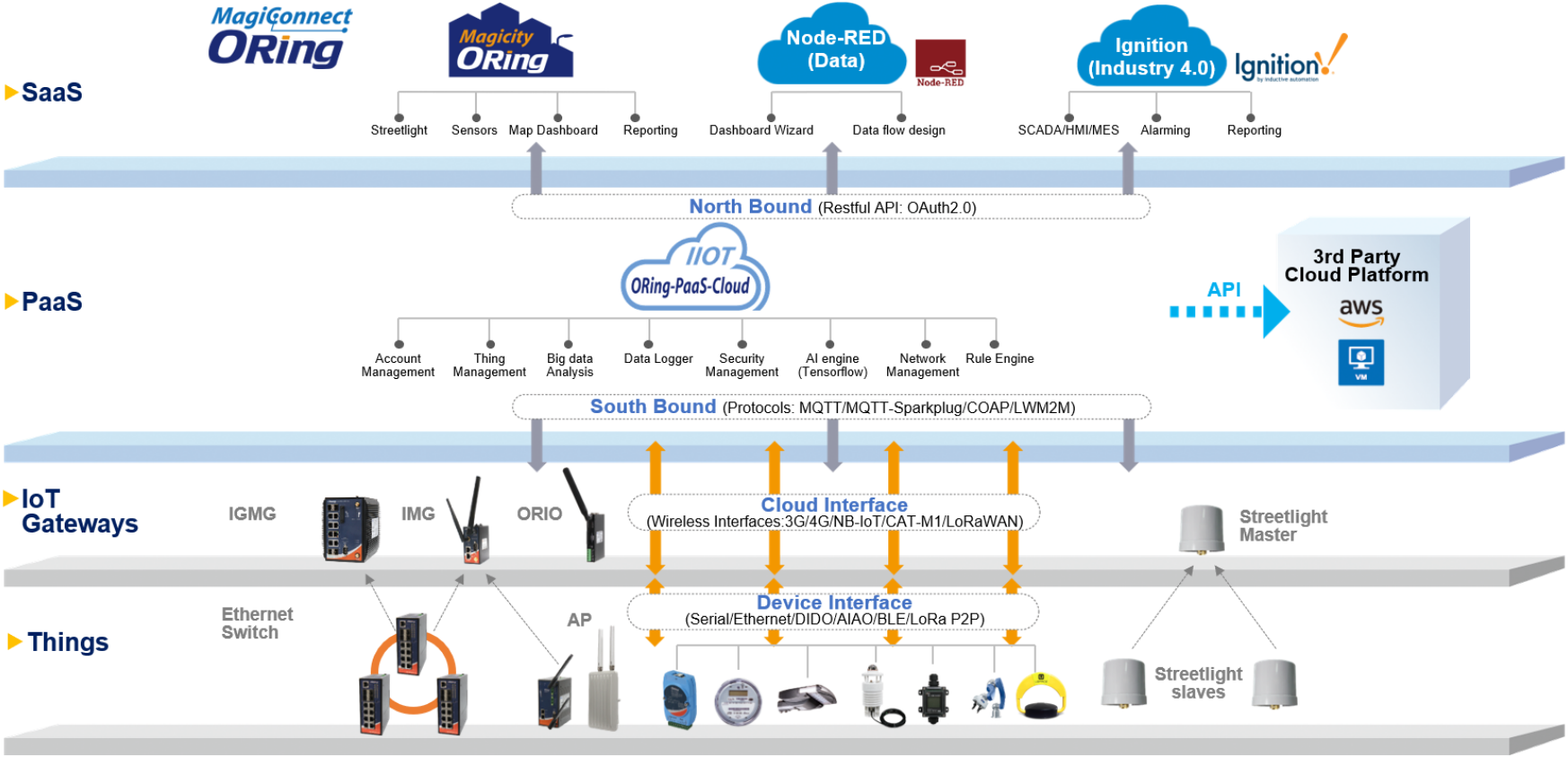
ORing 產品介紹 3

1. 平台及硬體架構
2. 產品說明
3. 節電設計說明
4. 維運APP 及平台
5. Open Gateway

Why ORing? 4

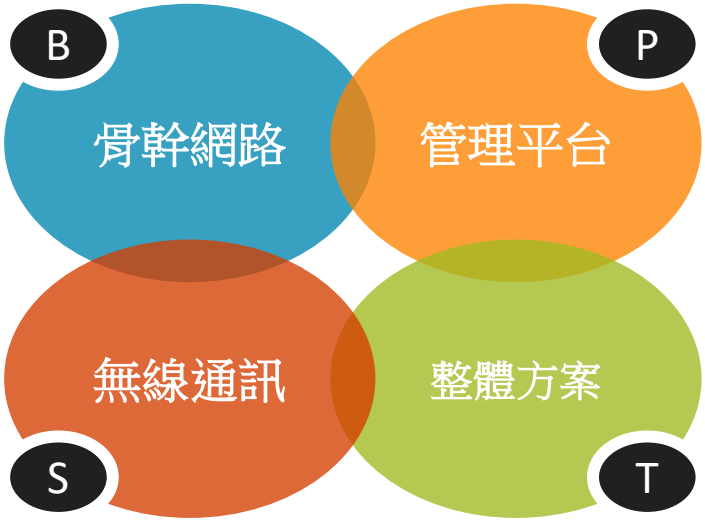
1. 物聯網成功關鍵

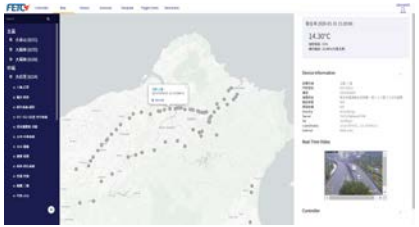
IIoT Platform Architecture



物聯網產品

LoRa , NB-IoT , CatM1 , Wifi, BLE





Air box, Meter, Parking, Waste, Water Quality

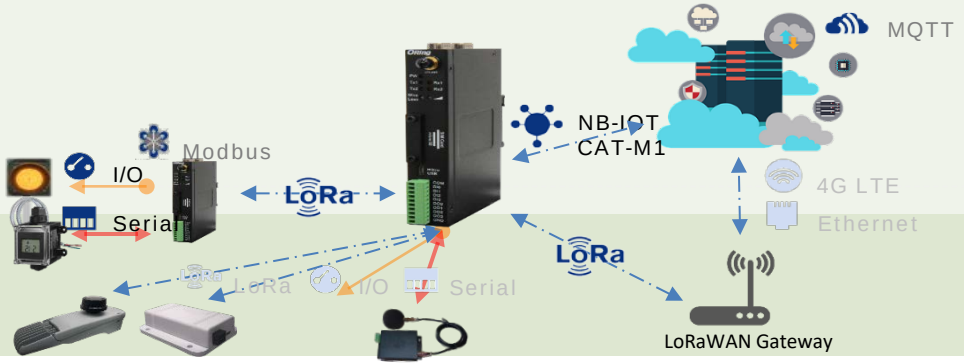
骨幹及機房網路

工業規格，高耐溫，保固五年	
主要產品	工業級乙太網路交換機 工業級光電轉換器 工業級串列設備聯網伺服器 工業級無線網路基地台 工業級無線行動路由器 工業級網路配件及網路管理軟體
主要功能	資料採集 高速網路管理 網路備援系統設計 VPN 建立及管理 網路設備管理系統
應用	有線及大資料通訊 系統骨幹網路 機房網路建立

無線通訊

工業規格，高耐溫，保固五年

主要產品	NB-IoT Gateway LoRa Gateway NB-IoT Sensor Node LoRa Sensor Node
主要功能	RS-485 資料採集 內建Sensor 回報資料 內建電池設備，減少佈線成本 低功耗設備 通訊格式轉換
應用	環境感應器整合 PLC 控制器整合 管理平台界接



ORIO 內建電池型產品系列

除標準PSM, EDRX 的模組標準休眠模式外
搭配低功耗MCU，擬定動作劇本，做最優化的電量使用

- 5~10年電池壽命
- 雙無線通訊備援
- 動作腳本優化

LoRa NBIoT
瓦斯表

- 半年電池壽命
- 雙無線通訊備援
- 動作腳本優化

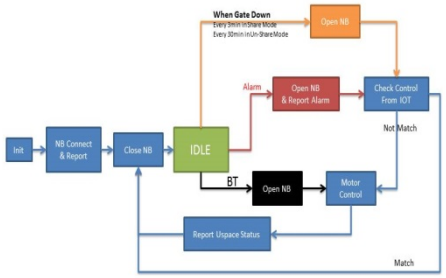
NBIoT BT
車位地鎖

- 充放電控制
- 電壓偵測，低電量警示

太陽能警示燈

ODM節電劇本設計

- 離峰or 尖峰時間自動切換
- 省電or 即時模式切換
- 待停or 占用模式



劇本設計

條件										
48										
0										
31										
pre test 及耗電量測										
測試方法	SGS 測試值				行為每月重複次數	累積行為時間			一個月的消耗電量	
取3min 的平均值	0.05	mA			長時間	31天的小時數	744	hr	37.2000	mAh
離開休眠待機模式時，成功從平台得到開關閥指令的週期及平均電量。(需紀錄示波器或data logger 數值)	50	mA	25	s	1488	F * H / 3600	10.3333	hr	516.6667	mAh
離開休眠待機模式時，讓表並上傳度數(需紀錄示波器或data logger 數值)	50	mA	4	s	0	F * H / 3600	0	hr	0.0000	mAh
								單月耗電總和	553.8667	mAh
								預估十年耗電	66464.0000	mAh

欣高定義，建議由各家廠商完成耗電量測及預估後，定義頻率
廠商及SGS測試
實驗結果

使用DC 直流供應器，確認廠商所提供的電池最低工作電壓。(可正常上傳資料)
須可進行120次放電週期，方為通過測試，但以達到最低電壓為測試截止條件

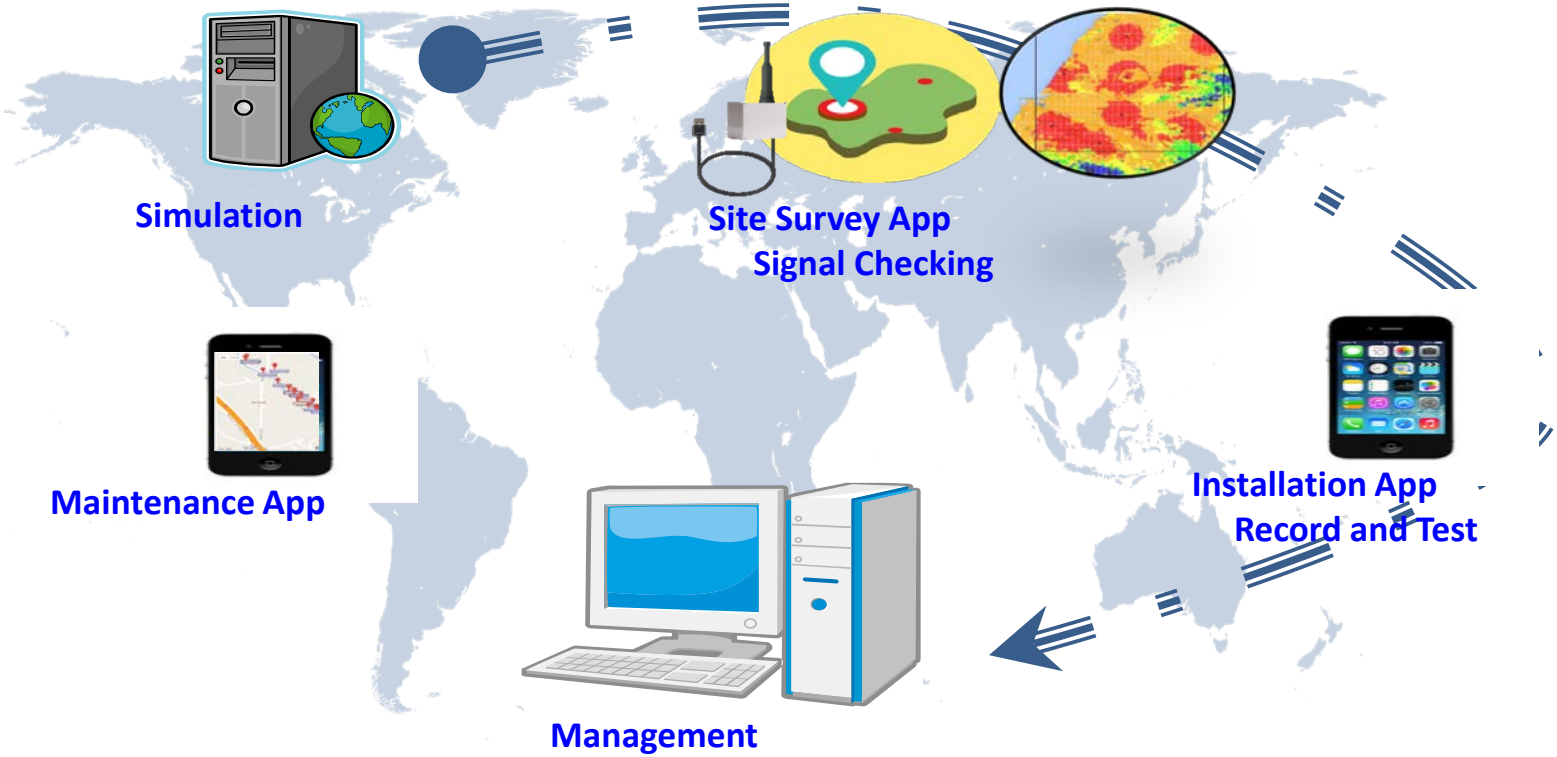
電力計算驗證

Gain 20%
Battery Life

Save 10%
Maintain Fee

Save 5%
Project Budget

智慧安裝一站服務 – 訊號Survey/施工紀錄APP/管理報表



智慧安裝一站服務

1. Plan

APP shows the installation plan includes area and device.

2. Scan

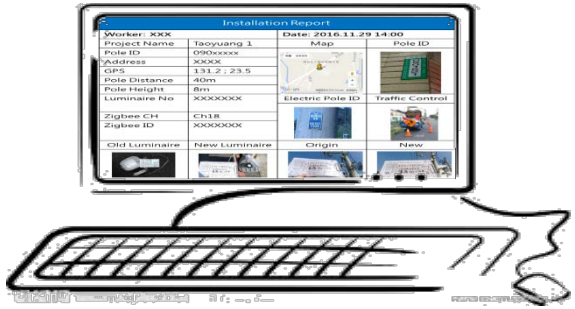
Scan QR/Bar code of controller.

3. Record

Record the GPS, Pole ID and pics. Upload the all information and records to CMS.

4. Report

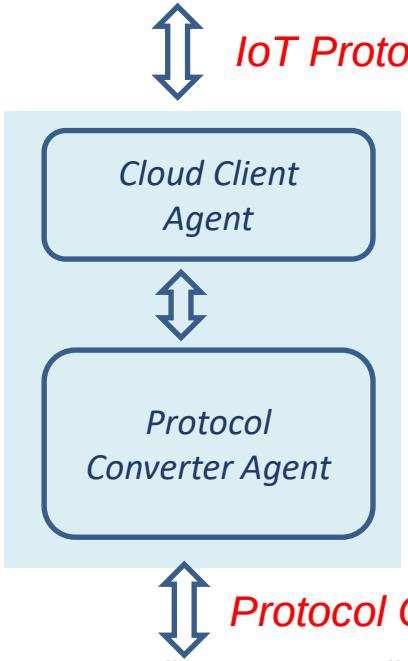
CMS check information and output the installation report.



ORing Open Gateway

Protocol Converter: ORing Open Gateway

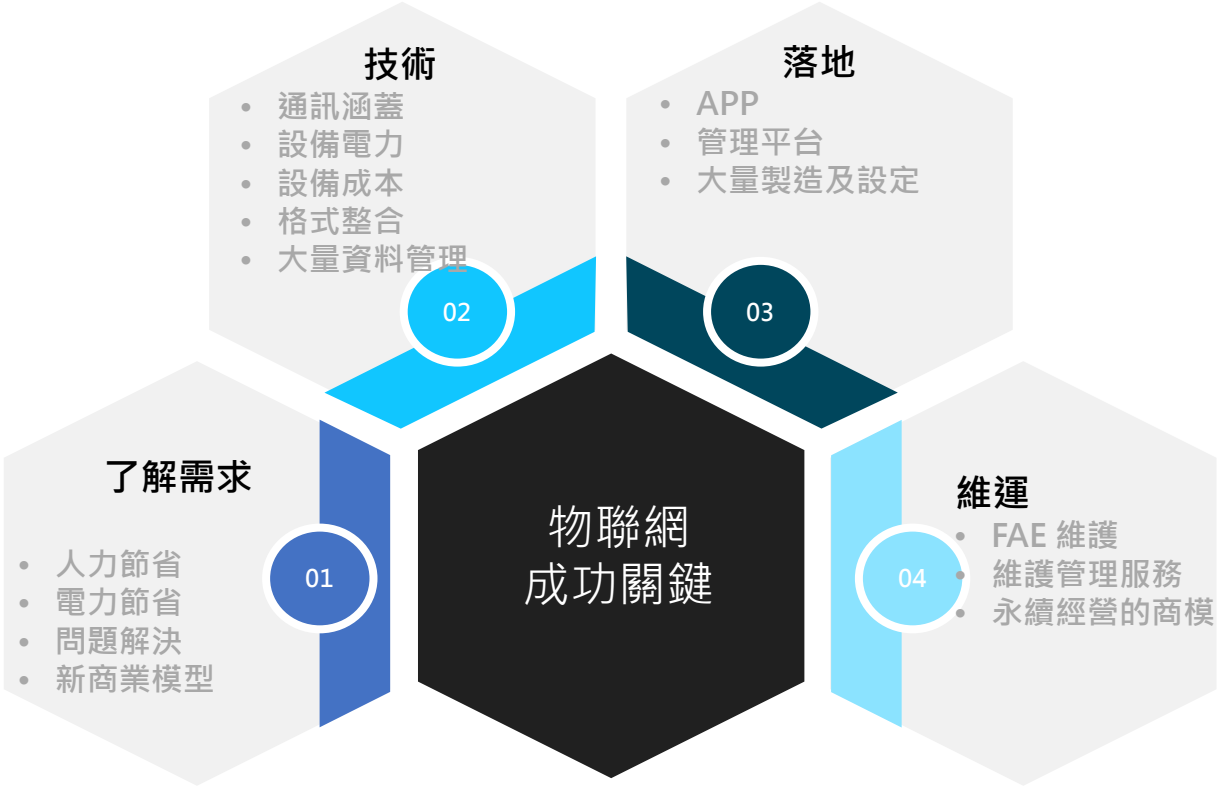
ORing PaaS, AWS, Azure, CHT, AT&T …



Modbus RTU, Modbus ASCII, Modbus TCP, SNMP, …

Public/Private Cloud	ORing-PaaS, AWS, Azure, CHT, AT&T , APPIoT , Impact…	
Open Gateway	MQTT, CoAP, LWM2M …	
	ORing Device + Open Gateway Module (Physical Device)	**PC + Open Gateway Pro (Software Solution)**
Device	Serial, Modbus TCP, Modbus RDU, ASCII, SNMP…	
	Switches, PLC, Sensors…	

物聯網成功關鍵

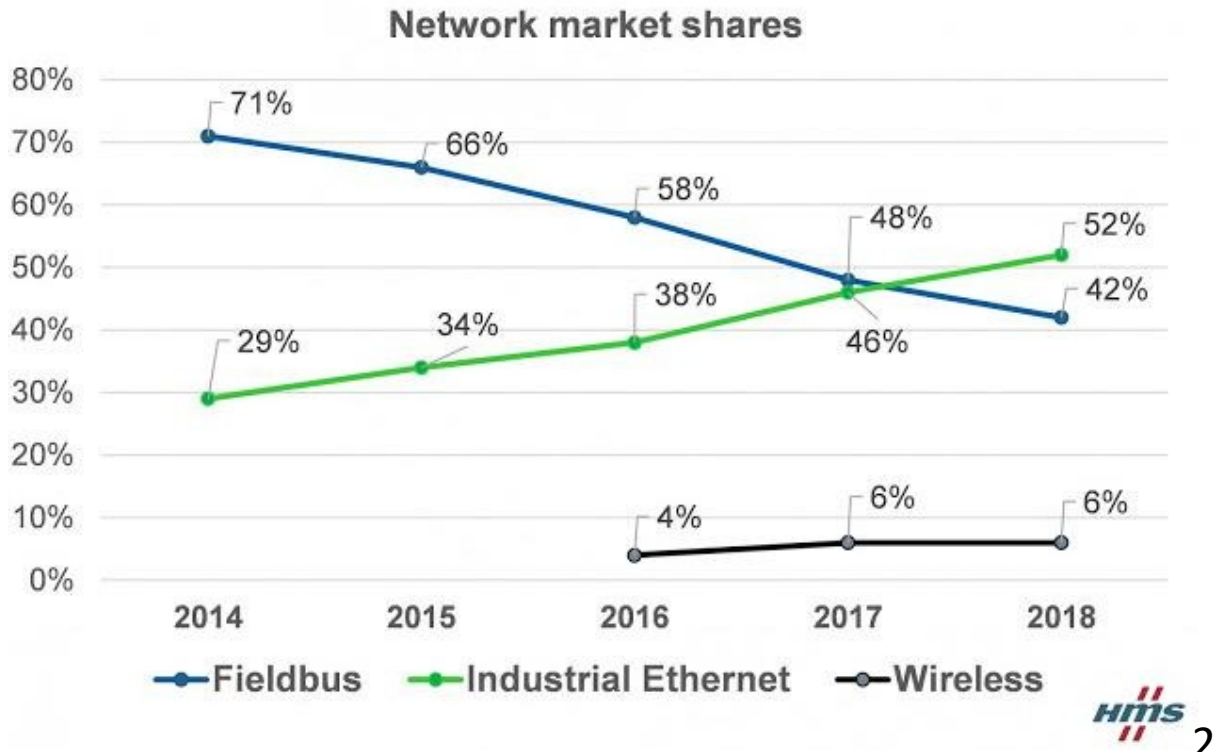

技術
通訊涵蓋
設備電力
設備成本
格式整合
大量資料管理
02
落地
APP
管理平台
大量製造及設定
03
了解需求
人力節省
電力節省
問題解決
新商業模型
01
物聯網
成功關鍵
維運
FAE 維護
維護管理服務
永續經營的商模
04

www.ORingnet.com

TSN
Time-Sensitive Networking

Get Connected Anytime, Anywhere

Industrial Ethernet Is Now Bigger Than Fieldbuses Industrial



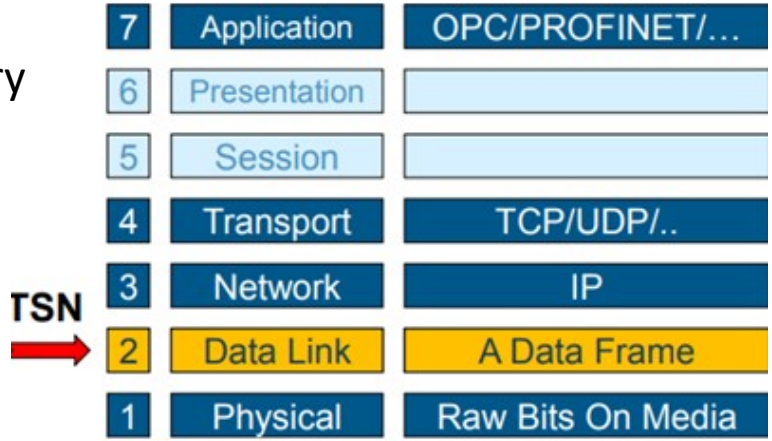
2019

What Is TSN?

- TSN is all about Layer 2 of the OSI model and is an extension to IEEE 802.1 to make Ethernet
  More Robust and Reliable

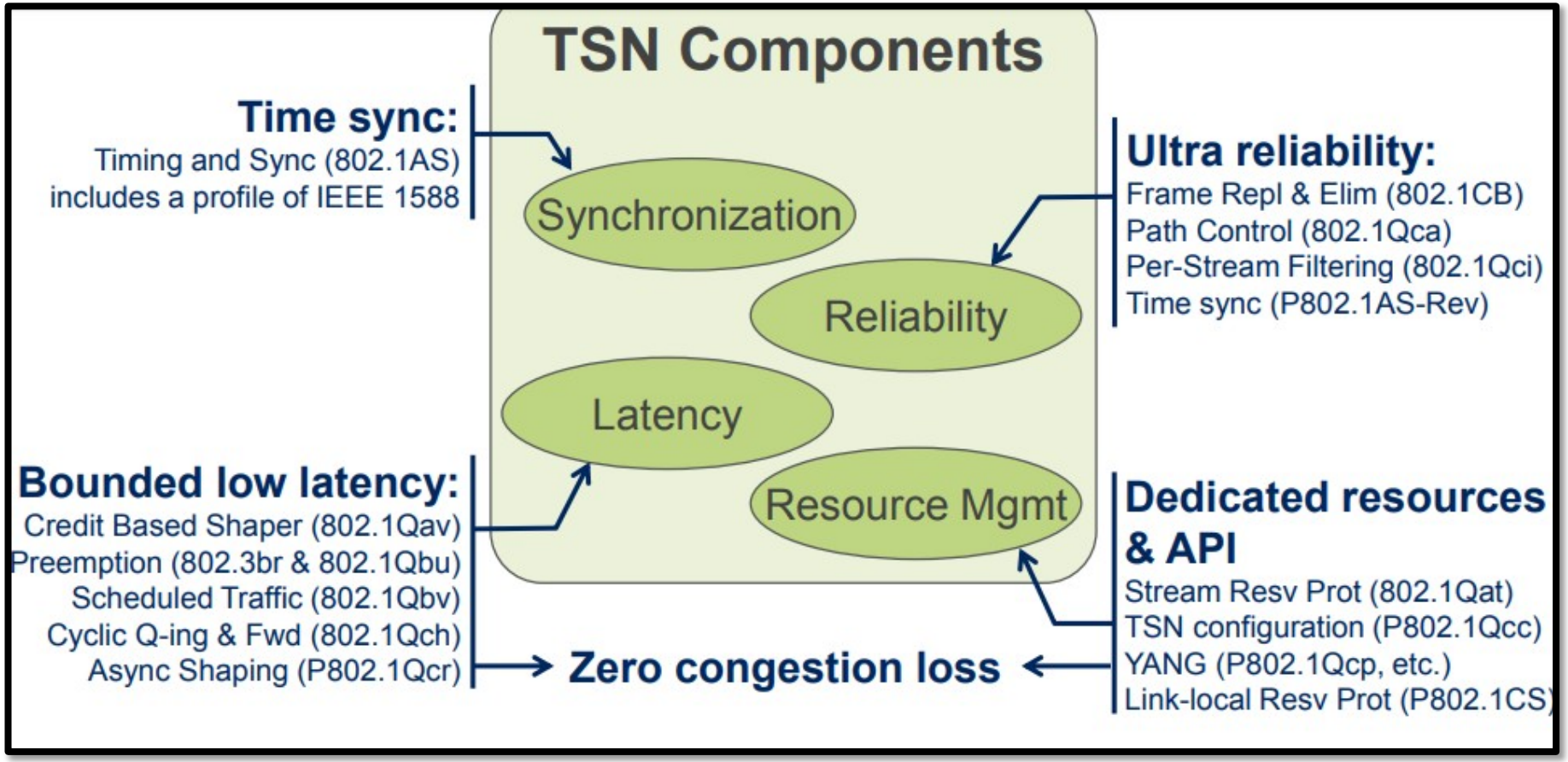
- Features are targeted at industrial, automotive, and AVB

- TSN uses time to ensure predicable message delivery



Status of Related Standards

Standard	Title	Status	Publication Date
IEEE 802.1BA-2011	Audio Video Bridging (AVB) Systems	Current, amended by Cor1-2016 [11]	30 September 2011
IEEE 802.1AS-2020	Timing and Synchronization for Time-Sensitive Applications (gPTP)	Current [12][13]	30 January 2020
IEEE 802.1Qav-2009	Forwarding and Queuing Enhancements for Time-Sensitive Streams	Incorporated into IEEE 802.1Q	5 January 2010
IEEE 802.1Qat-2010	Stream Reservation Protocol (SRP)		30 September 2010
IEEE 802.1aq-2012	Shortest Path Bridging (SPB)		29 March 2012
IEEE 802.1Qbp-2014	Equal Cost Multiple Paths (for Shortest Path Bridging)		27 March 2014
IEEE 802.1Qbv-2015	Enhancements for Scheduled Traffic		18 March 2016
IEEE 802.1Qbu-2016	Frame Preemption		30 August 2016
IEEE 802.1Qca-2015	Path Control and Reservation		11 March 2016
IEEE 802.1Qch-2017	Cyclic Queuing and Forwarding		28 June 2017
IEEE 802.1Qci-2017	Per-Stream Filtering and Policing		28 September 2017
IEEE 802.1Q-2018	Bridges and Bridged Networks (*incorporates 802.1Qav/Qat/aq/Qbp/Qbv/Qbu/Qca/Qci/Qch and other amendmends*)	Current[14]	6 July 2018
IEEE 802.1AB-2016	Station and Media Access Control Connectivity Discovery (Link Layer Discovery Protocol (LLDP))	Current[15]	11 March 2016
IEEE 802.1ABdh	Station and Media Access Control Connectivity Discovery - Support for Multiframe Protocol Data Units (LLDPv2)	Preparation[16]	5 September 2019
IEEE 802.1AX-2020	Link Aggregation	Current[17][18]	30 January 2020
IEEE 802.1CB-2017	Frame Replication and Elimination for Reliability	Current[19]	27 October 2017
IEEE 802.1CBdb	FRER Extended Stream Identification Functions	Draft 0.5[20]	20 February 2020
IEEE 802.1CM-2018	Time-Sensitive Networking for Fronthaul	Current[21][22]	8 June 2018
IEEE 802.1CMde	Enhancements to Fronthaul Profiles to Support New Fronthaul Interface, Synchronization, and Syntonization Standards	Draft 1.1[23]	11 February 2020
IEEE 802.1Qcc-2018	Stream Reservation Protocol (SRP) Enhancements and Performance Improvements	Current[24]	31 October 2018
IEEE 802.1Qcy-2019	Virtual Station Interface (VSI) Discovery and Configuration Protocol (VDP)	Current[25]	4 June 2018
IEEE 802.1Qcj	Automatic Attachment to Provider Backbone Bridging (PBB) services	Draft 1.2 [26]	12 December 2019
IEEE 802.1Qcr	Asynchronous Traffic Shaping	Draft 2.0[27]	16 December 2020


TSN Components
Time sync:
Timing and Sync (802.1AS)
includes a profile of IEEE 1588
Synchronization
Reliability
Latency
Resource Mgmt
Ultra reliability:
Frame Repl & Elim (802.1CB)
Path Control (802.1Qca)
Per-Stream Filtering (802.1Qci)
Time sync (P802.1AS-Rev)
Bounded low latency:
Credit Based Shaper (802.1Qav)
Preemption (802.3br & 802.1Qbu)
Scheduled Traffic (802.1Qbv)
Cyclic Q-ing & Fwd (802.1Qch)
Async Shaping (P802.1Qcr)
Zero congestion loss
Dedicated resources & API
Stream Resv Prot (802.1Qat)
TSN configuration (P802.1Qcc)
YANG (P802.1Qcp, etc.)
Link-local Resv Prot (P802.1CS)

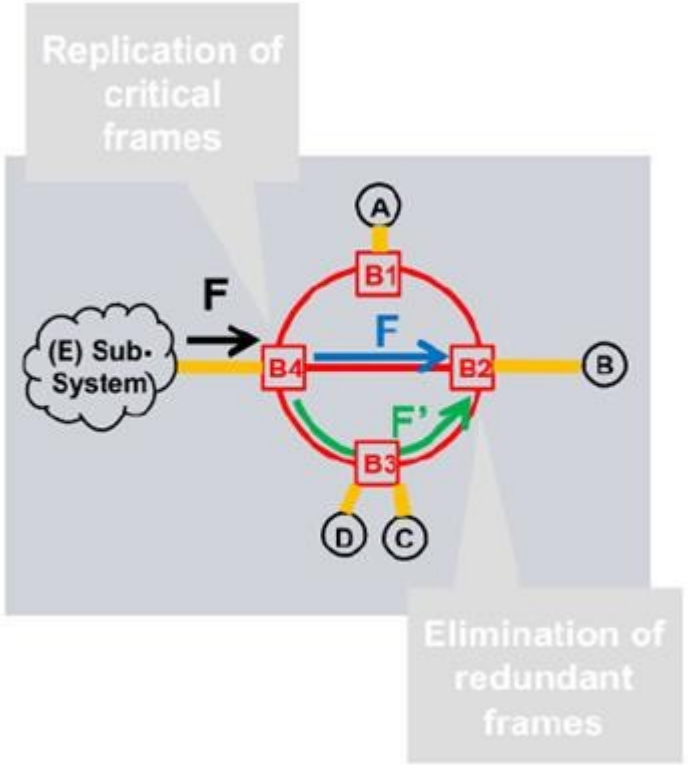
802.1CB Seamless Redundancy

▸ Purpose:
Provide lightweight redundancy for reliable delivery of traffic streams

How?
▸Send two copies of a message along maximally disjoint path to ensure delivery

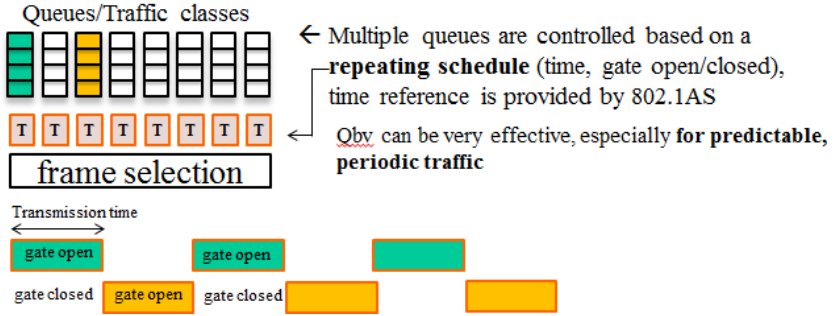
▸Use of redundant paths minimize packet loss due to Link or device failures Congestion

▸ Discard duplicate frames upon reception



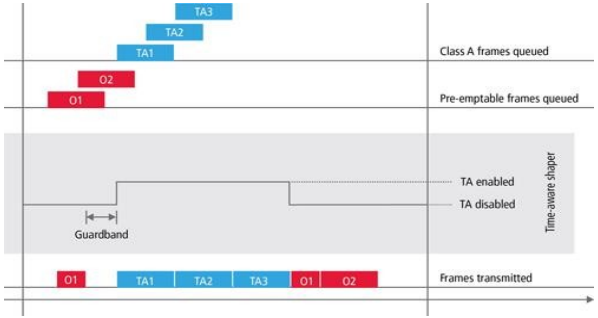
802.1Qbv Time Aware Shaper

- 802.1Qbv defines Time-Aware shaper for Ethernet switches

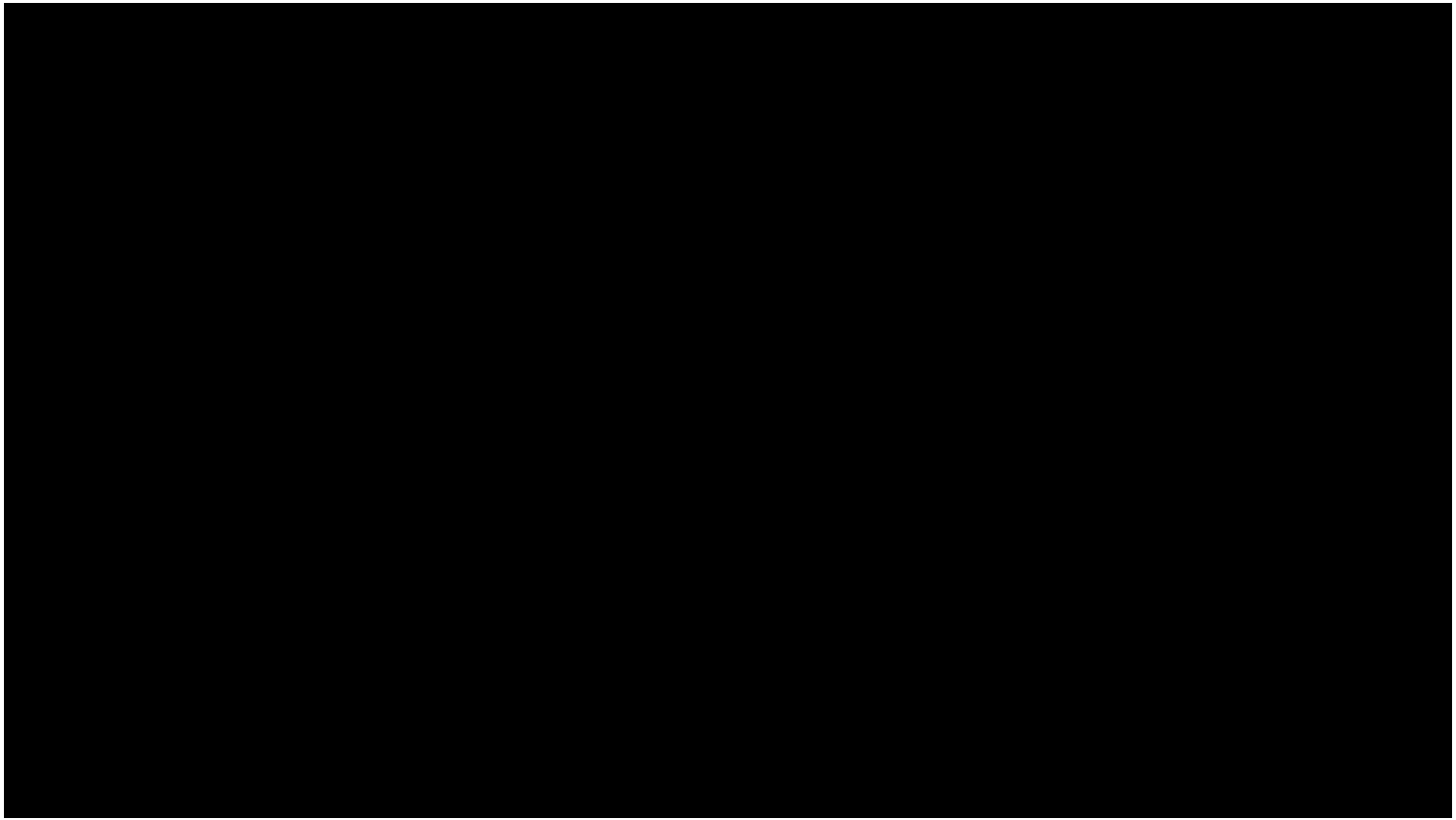


802.1Qbu Preemption

Time-critical frames can suspend the transmission of non-time-critical frames while one or more time-critical frames are transmitted



TSN Video



Oring TSN Switch

	ORing Gen 1 TSN product (AVB)	ORing Gen 2 TSN product	ORing Gen 3 TSN product
Switch Chipset	**BCM5616X**	**BCM5357X(L2) / BCM5617X(L3) VSC7558**	**BCM5357X(L2) / BCM5617X(L3) VSC7558**
IEEE 802.1AS	✓	✓	✓
IEEE 802.1Qav	✓	✓	✓
IEEE 802.1Qat	✓	✓	✓
IEEE 802.1Qbv		✓	✓
IEEE 802.1Qbu			✓
IEEE 802.1Qca			✓
IEEE 802.1CB		✓	✓
IEEE 802.1Qci			✓
IEEE 802.1Qch			✓

TSN switch

Next Gen Switch
Modular Rack-mount Switch

Planning

IGS-RX164GP+ Product Hardware Specification

- 112Gbps switching fabric
- Forwarding rate: 95.23Mpps
- 4GB DDR3 SDRAM and 2GB Flash Memory
- Total VLAN entry size: 4K
- Full L3 Managed switch
  - OSPF/ RIRv1/v2/VRRP
- 1,000 multicast routes at L3 (IPv4) managed level
- up 512vunicast routes at L3 (IPv6) managed level

- Dual Power Input (12-48VDC)
- Dual image firmware

Mechanical and Environments

- Hardened Grade (-40~70c)
- IP 30

- **16** x Gigabit copper speed

Copper Port

- Support 4 x 1G/2.5G/10G SFP+
- SFP plug, LC type, MM/SS, BIDI

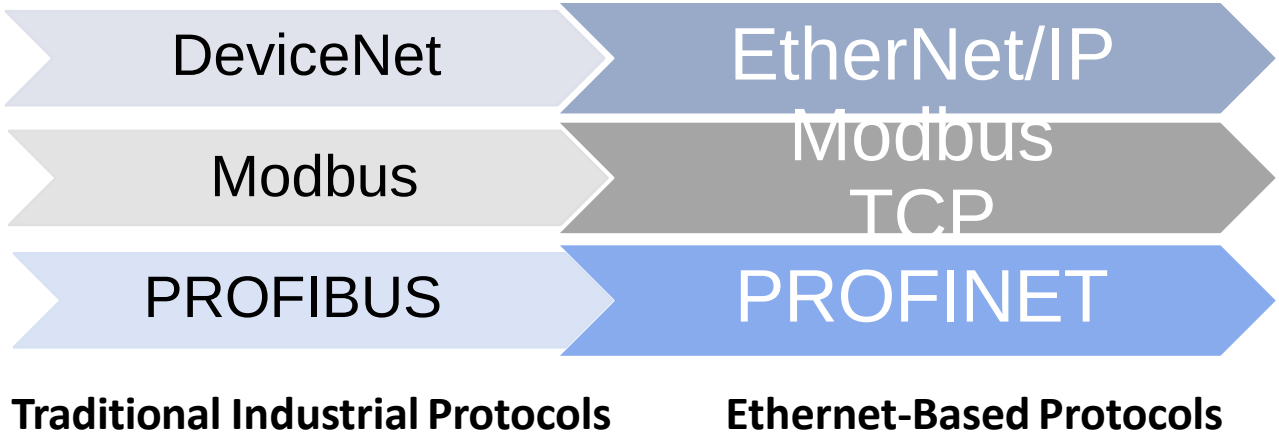
SFP Port

EtherNet/IP

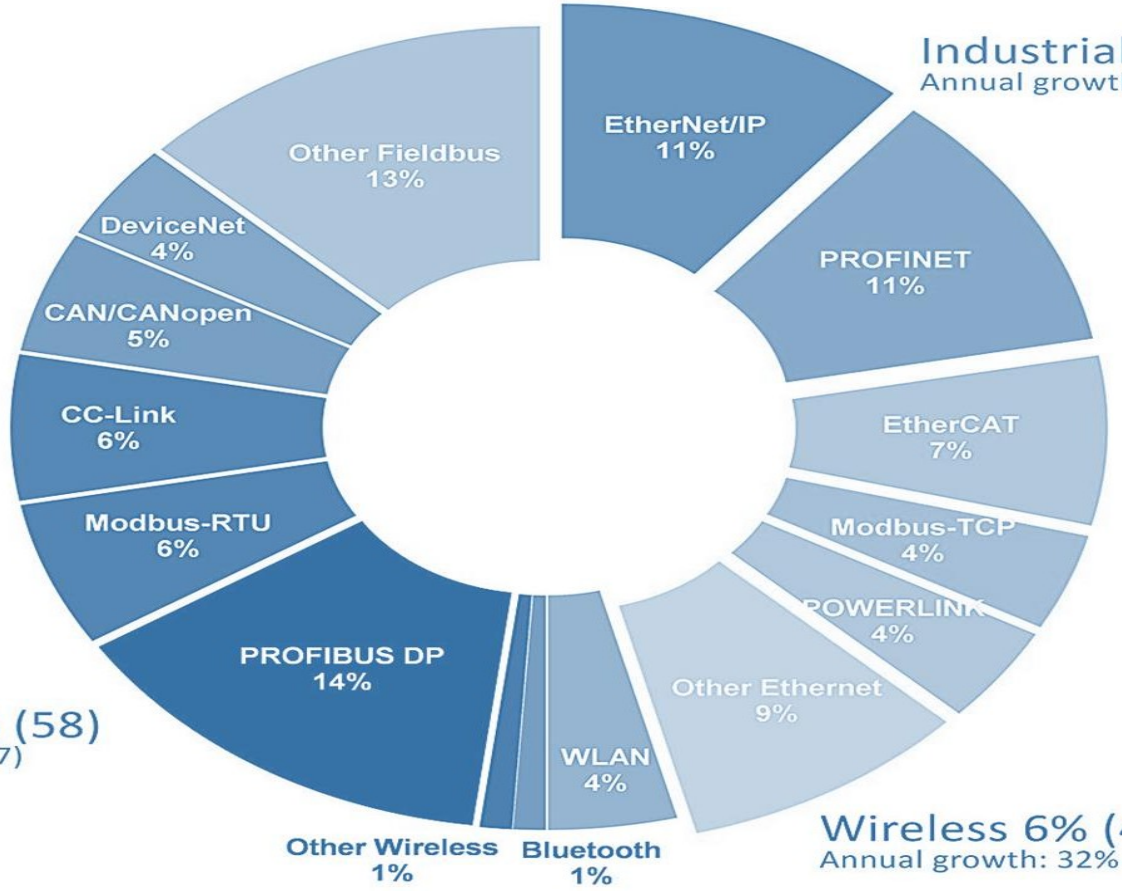
ORing
www.ORingnet.com

Industrial Ethernet Protocols

- Traditional Industrial Protocol to Ethernet-Based Protocol
  - Increased Speed (e.g.. RS-232 9.6 kbit/s to Gigabit Ethernet Gbit/s)
  - Increased Distance (Cat5e/Cat6 cables or optical fiber)
  - Better Interoperability with devices



Market Shares - HMS



Industrial Ethernet: 46% (38)
Annual growth: 22% (20)

Fieldbus: 48% (58)
Annual growth: 4% (7)

Wireless 6% (4)
Annual growth: 32% (30)

EtherNet/IP Introduction

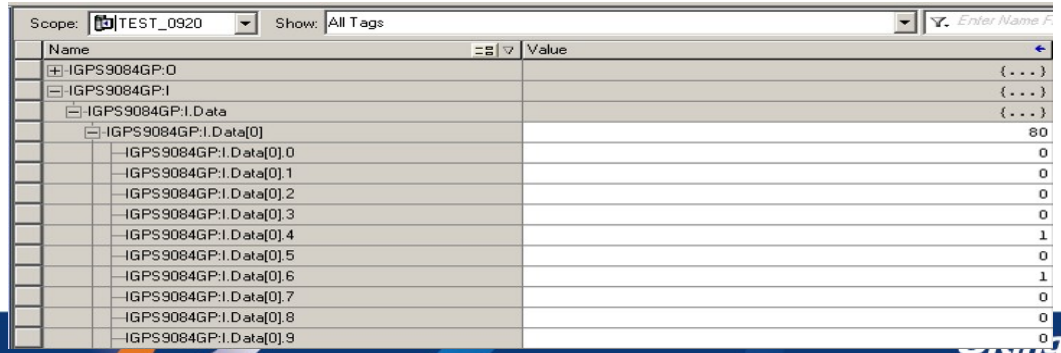
- Organization: ODVA, Founded 1995, over 300 members
- Industrial automation applications
- Part of ODVA CIP (Common Industrial Protocol)
  - A unified communication architecture allows users to integrate I/O control, device configuration and data collection across networks.
- Industrial Ethernet Protocols
  - EtherNet/IP is the CIP on Ethernet, it uses TCP/IP to encapsulate CIP messages, which is compatible with IEEE 802.3 standard Ethernet.

ORing CIP Object

- ORing switches support the following objects for PLCs and SCADA systems to monitor:
  - Identity Object - Vendor ID, Device Type, Product Name…
  - Assembly Object - Data, size…
  - TCP/IP Interface Object - IP Address, Gateway Address, Domain Name…
  - Ethernet Link Object - Interface Speed , Unicast packets…
  - Port Object - Port Number, Port Name…
  - ORing Networking Object (Vendor Specific) - O-Ring Master/Slave, O-Ring Port1 Status…

Monitor EtherNet/IP

1. Create Device on EtherNet/IP based software (Rockwell Studio 5000)
2. Upload the EDS File to the software
3. Create the Implicit messaging or Explicit Messaging monitor
4. Monitor EtherNet/IP messaging

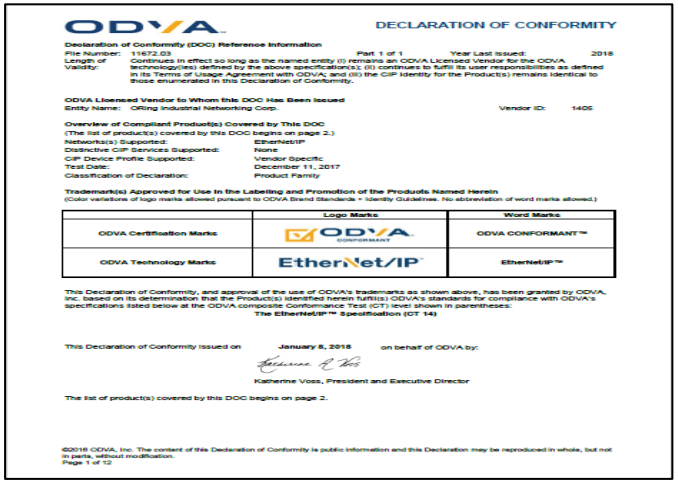


EtherNet/IP Products

- 9000 Series L3/L2 Ethernet Switch
  - Rack-mount (e.g. RGS-R9XXX)
  - Din-Rail (e.g. IGPS-9XXX)

IGPS-9084GP

RGS-PR9000



ODVA DECLARATION OF CONFORMITY

Declaration of Conformity (DOC) Reference Information

File Number: 11672.03 Part 1 of 1 Year Last Issued: 2018

Length of Validity: Continues in effect so long as the named entity (i) remains an ODVA Licensed Vendor for the ODVA technology(ies) defined by the above specification(s); (ii) continues to fulfill its user responsibilities as defined in its Terms of Usage Agreement with ODVA; and (iii) the CIP Identity for the Product(s) remains identical to those enumerated in this Declaration of Conformity.

ODVA Licensed Vendor to Whom this DOC Has Been Issued

Entity Name: ORing Industrial Networking Corp. Vendor ID: 1405

Overview of Compliant Product(s) Covered by This DOC

(The list of product(s) covered by this DOC begins on page 2.)

Networks(s) Supported: EtherNet/IP

Distinctive CIP Services Supported: None

CIP Device Profile Supported: Vendor Specific

Test Date: December 11, 2017

Classification of Declaration: Product Family

Trademark(s) Approved for Use in the Labeling and Promotion of the Products Named Herein

(Color variations of logo marks allowed pursuant to ODVA Brand Standards + Identity Guidelines. No abbreviation of word marks allowed.)

	Logo Marks	Word Marks
ODVA Certification Marks	ODVA CONFORMANT	ODVA CONFORMANT™
ODVA Technology Marks	EtherNet/IP	EtherNet/IP™

This Declaration of Conformity, and approval of the use of ODVA's trademarks as shown above, has been granted by ODVA, Inc. based on its determination that the Product(s) identified herein fulfill(s) ODVA's standards for compliance with ODVA's specifications listed below at the ODVA composite Conformance Test (CT) level shown in parentheses:

The EtherNet/IP™ Specification (CT 14)

This Declaration of Conformity issued on January 8, 2018 on behalf of ODVA by:

Katherine Voss, President and Executive Director

The list of product(s) covered by this DOC begins on page 2.

ODVA CONFORMANT

EtherNet/IP

Rockwell Automation

✓Compatible with Rockwell PLC/SCADA(Studio 5000/RSlogix5000)

Profinet

ORing

www.ORingnet.com

Industrial Ethernet Protocols

- Traditional Industrial Protocol to Ethernet-Based Protocol
  - Increased Speed (e.g.. RS-232 9.6 kbit/s to Gigabit Ethernet Gbit/s)
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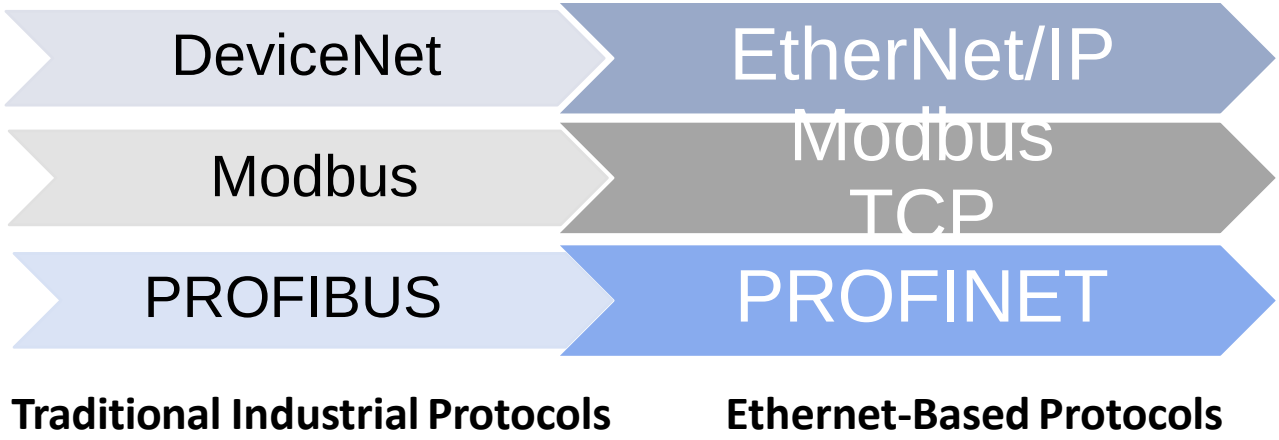
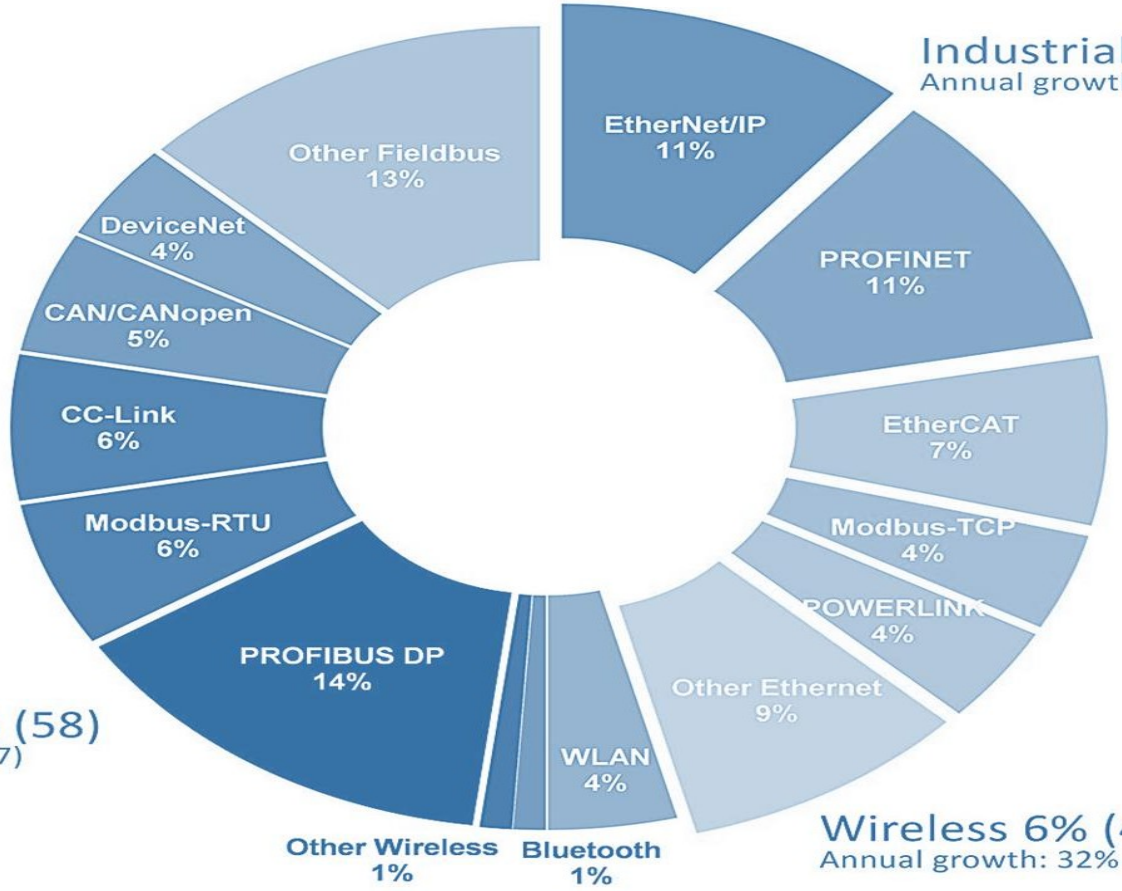


Market Shares - HMS



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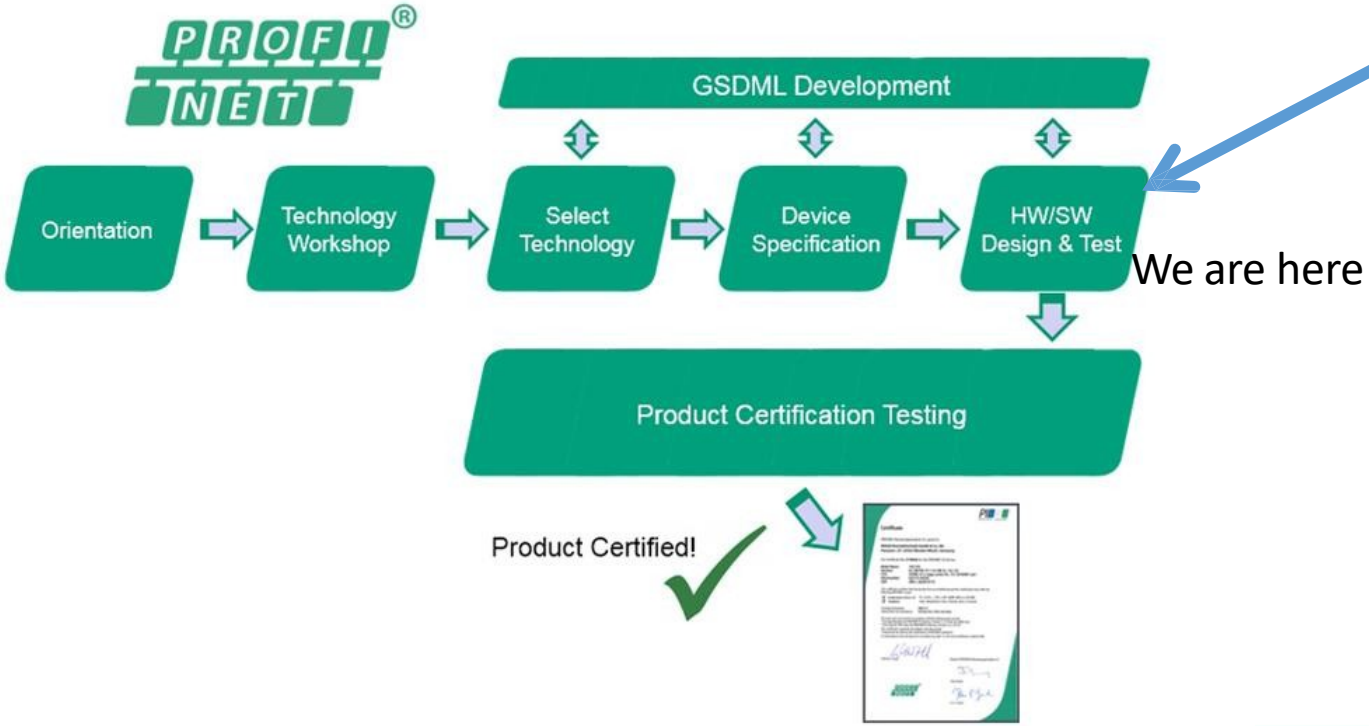
Profinet test procedure

Oring
Current Stage



ORing Profinet Object

- ORing switches support the following objects for monitor:

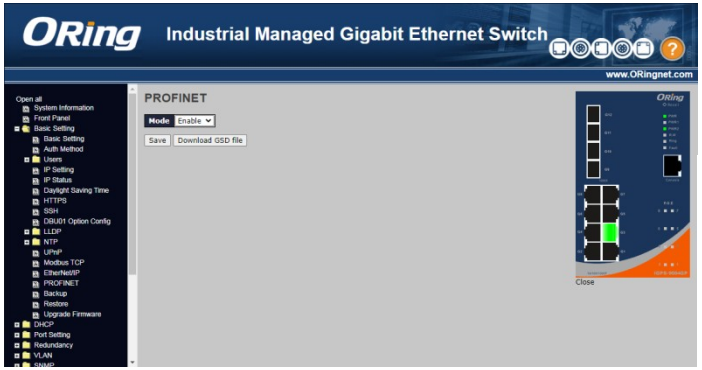
Device Alarm (Index 1)

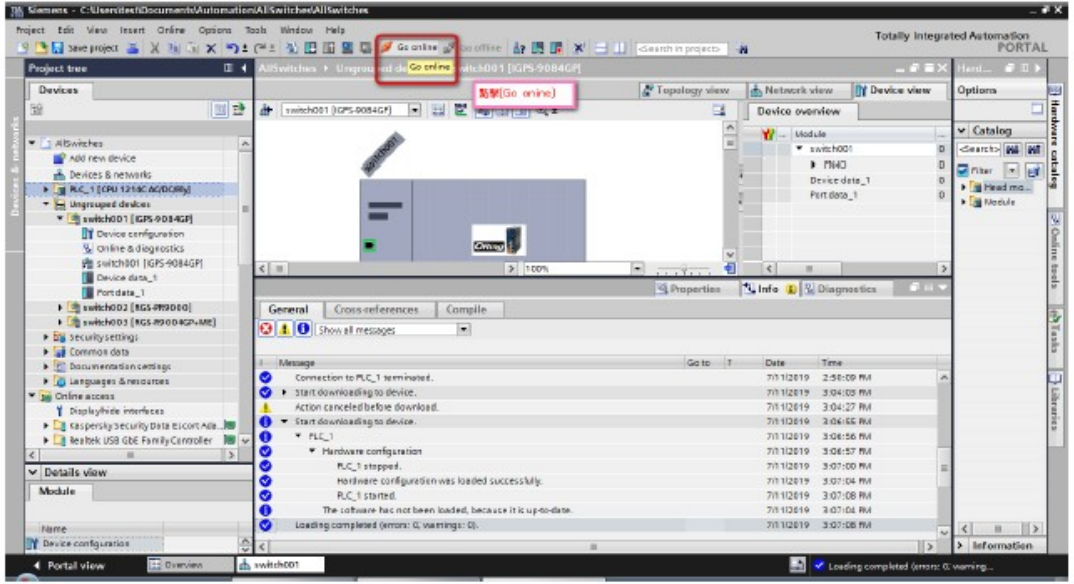
Byte	Name	Access	Value	Description
0	Status Alarm	Read/Write	0	Do not send any alarms
			1	Send alarm if any status change
1	Power Alarm 1	Read/Write	0	Do not send power failed alarms
			1	Send alarm if power 1 fails
2	Power Alarm 2	Read/Write	0	Do not send power failed alarms
			1	Send alarm if power 2 fails

Device Status (Index 2)

Byte	Name	Access	Value	Description
0	Device Status	Read Only	0	Unavailable
			1	Available
			2	Device bootup fails
1	Fault Status	Read Only	0	Unavailable
			1	Available
			2	Device detect fault
2	Power 1 Status	Read Only	0	Unavailable
			1	Available
			2	Power 1 fails
3	Power 2 Status	Read Only	0	Unavailable
			1	Available
			2	Power 2 fails
4	Power 3 Status	Read Only	0	Unavailable
			1	Available
			2	Power 3 fails
5	Reserved			
6	Redundant Mode	Read Only	0	Unavailable
			1	RSTP
			2	O-Ring
			3	O-Chain
7	Ring Status	Read Only	0	Unavailable
			1	Healthy
			2	Break

Monitor status via Profinet





Profinet Products

- 9000 Series L3/L2 Ethernet Switch
  - Din-Rail /Rack mount (e.g. IPS-9XXX/ RGS-9XXX)

Product roadmap

Industrial Ethernet Switch Product Roadmap

Unmanaged Products:

IGPS-1082GP-BT
-8 x Gigabit
-2 x SFP port
-240W BT PoE

IGS-180B
-8 x Gigabit
-Mini type

IGS-182GP
-8 x Gigabit
-2 x SFP port
-Cost effective

IGPS-182GP-60W
-8+2 full Gigabit
-240W BT PoE
-50-57VDC
Planning

IGPS-142GP-60W
-4+2 full Gigabit
-120W BT PoE
-50-57VDC
Planning

INJ-101GT-BT series
-100W BT PoE max
-50-57VDC
-12-57VDC
Planning

IE(G)S-15(8)0B-L
-5(8) x 10/100(/1000)
-Very Low cost w/ Plastic housing
-12-48VDC
Planning

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Q1 2020

Q2 2020

Q3 2020

Q4 2020

Industrial Ethernet Switch Product Roadmap

L2+ Managed Products:

IGPS-9084GP-LA-24V
-8+4 full Gigabit
-12 to 57 VDC
-120W PoE

IGPS-9084GP-BT
-8 x Gigabit
-2 x SFP port
-240W BT PoE

Planning

IGPS-9822DGP+-BT
-8 x Gigabit
-4 x 2.5G/10G SFP port
-240W BT PoE

Planning

Q2 2020	Q3 2020	Q4 2020	Q1 2021

Industrial Ethernet Switch Product Roadmap

L2+/L3 Managed Products:

IGS-RX164GP+
-16+4 L3 switch
-10G SFP

IGPS-RX884GTP+
-8+8+4 L3 switch
-100W PoE budget

IGS-RX884DGP+
-8+8+4 L3 switch
-2.5G/10G SFP

RGS-X244DGP
-24+4 full Gigabit
-Cost effective

2021

TSN Products:

RGS-9004GP+-TSN
-Modular / 6 slots
-48G+4x10G full Gigabit
-TSN support

Planning

RG(P)S-PRX004GP+MG
-L3 switch
-3 slot for modular

Q2 2020	Q3 2020	Q4 2020	Q2 2021

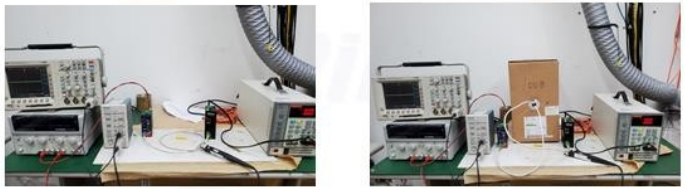
Appendix – BT Measurement

4. Measurement Setup and Result

The PSE output power and delivered PD input power is measured. PSE output power which means the power transmitted onto Ethernet cable by PSE side. Delivered PD input power which means the power delivered at RJ-45 jack on PD device, notice that this power value will affect by cable loss. The simplified block diagram, setup picture and measured result are shown below.

Setup picture:

PSE output power measurement using short cable (left) and long cable (right).



Delivered PD input power measurement using short cable (left) and long cable (right).

PSE output power	Delivered PD input Power	
	Cable Length = 1M	**Cable Length = 100M**
45W	45W	41.3W
60W	60W	56W
75W	75W	66.7W
90W	90W	80.5W

*The length unit of the cable is meter.

*Ethernet Cable: TE connectivity CAT 5E 4UTP 24AWG.

Thank You.