



## 校園有線、無線網路管理-興大附農

報告人：資訊室 林孟郁

# ■ 報告大綱



興大附農

- 學校背景介紹
- 資訊網路線路架構
- 網管軟體使用
- 無線網路架構
- 網路資安防護架構



興大附農

■ 創立於民國26年(1937年)，迄今將近有八十多年歷史。

- 1937年 臺中州立農業學校
- 1945年 臺灣省立臺中農業職業學校
- 1959年 臺灣省立臺中高級農業職業學校
- 2000年 國立臺中高級農業職業學校
- 2014年 國立中興大學附屬臺中高級農業職業學校

■ 以培養農業基層技術人才為宗旨。

■ 畢業校友三萬餘人，分佈國內外公民營機構及產業界。

■ 成為國內之農業職業教育指標學府。

■ 校友皆為農業界菁英及翹楚。





- **本部校區** (臺中市臺中路) 11公頃。
- 校園環境生態豐富，景緻優美學習環境優質。

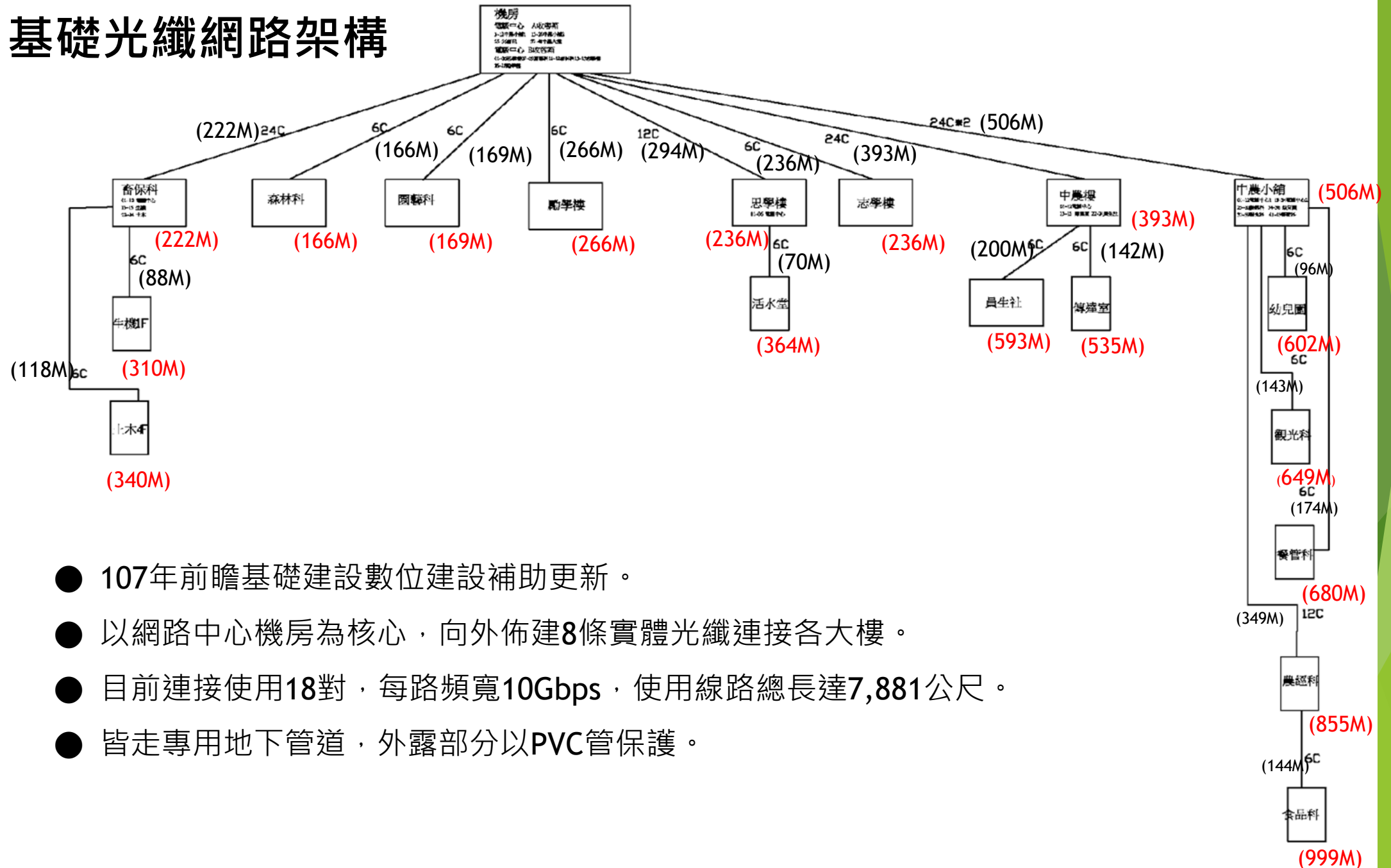
就是覺得很大，  
大樓棟距就是很寬







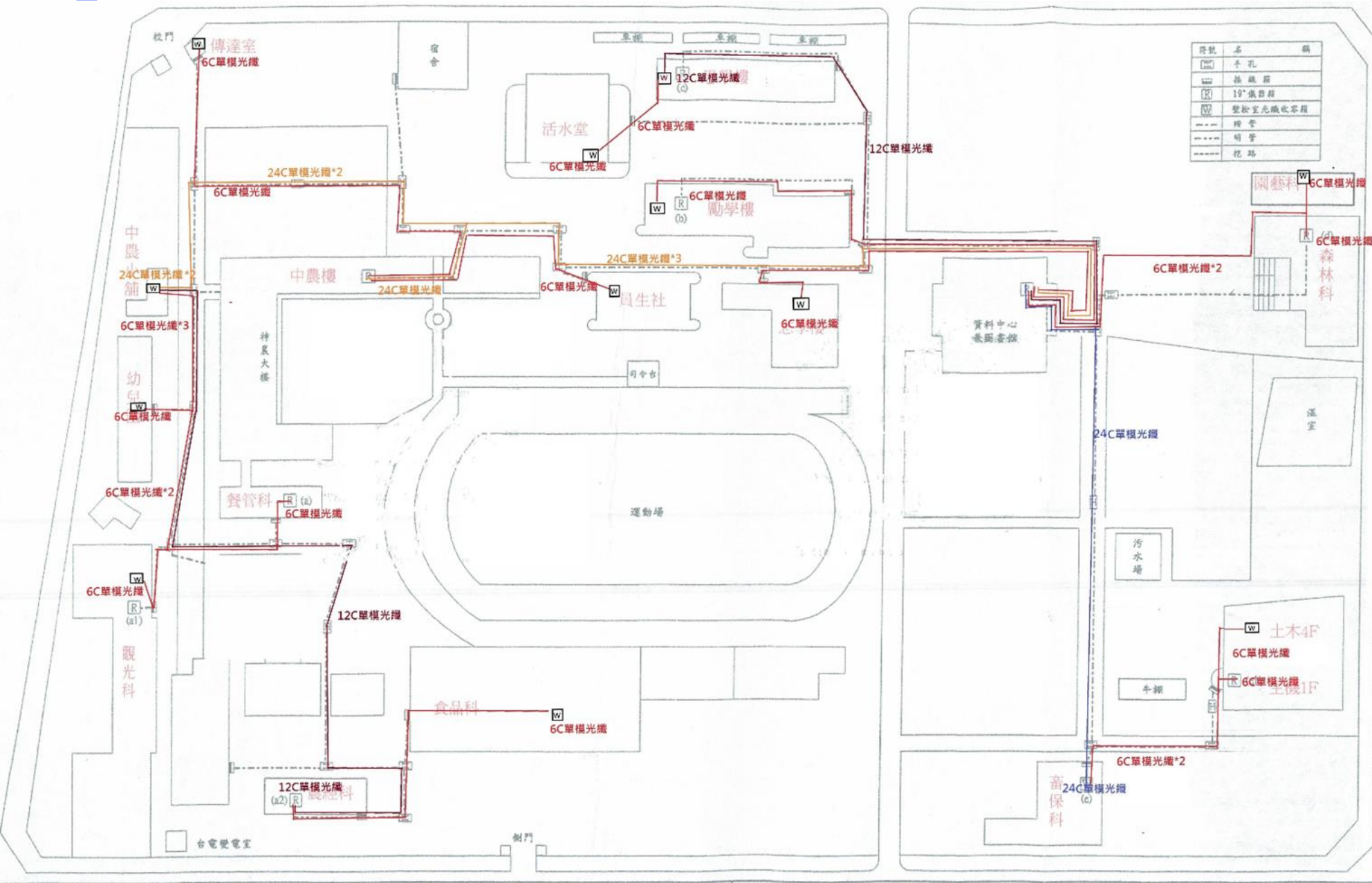
# 基礎光纖網路架構



- 107年前瞻基礎建設數位建設補助更新。
- 以網路中心機房為核心，向外佈建8條實體光纖連接各大樓。
- 目前連接使用18對，每路頻寬10Gbps，使用線路總長達7,881公尺。
- 皆走專用地下管道，外露部分以PVC管保護。



# 基礎光纖網路架構



- 民87年以前已完成地下專用管道佈建。
- 94年時，多模光纖使用光電轉換器連接(100Mbps)。
- 99年起逐年買新SW，改插SPF(1Gbps)
- 107前瞻更新SW，抽換單模光纖，使用SPF+(10Gbps)

# 基礎光纖網路架構



機房端光纖線路集中管理於光纖式核心交換器，每埠皆為10Gbps之規格。



光纖佈放皆走專用管道





# 邊際網路架構

- 107年前瞻計畫新佈，每間教室3埠，全用完了。
  - ◆ 數位講桌(教學電腦)
  - ◆ 無線AP
  - ◆ 數位無聲廣播系統



# 基礎光纖網路架構

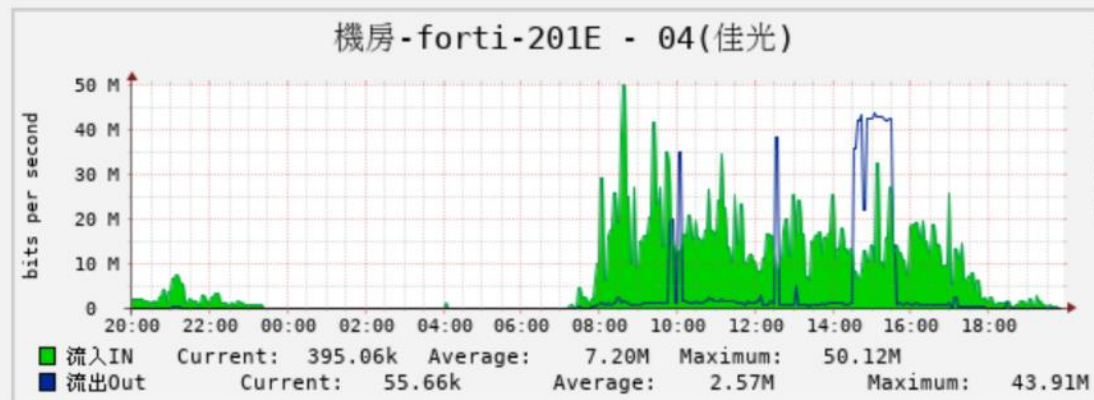
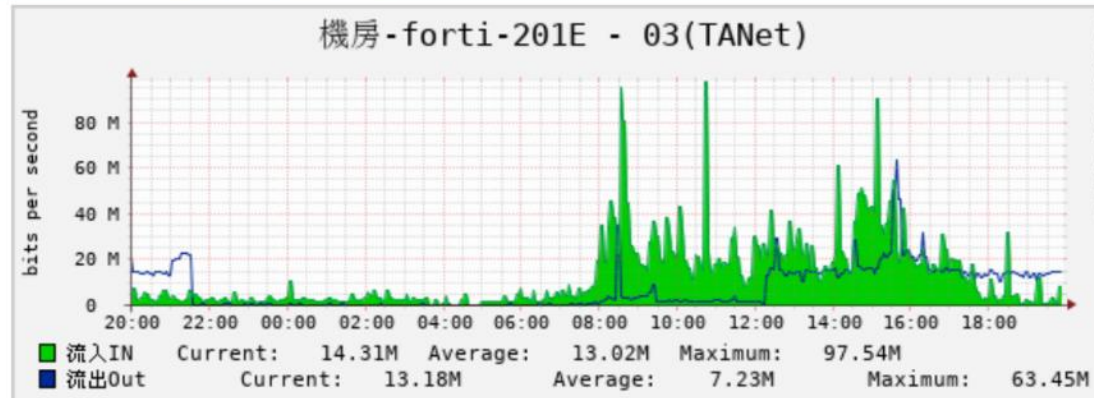


各大樓機櫃內交換器向上承接光纖，向下以UTP線路至各教室及辦公室

# 對外連線架構



h Template: Interface - Traffic (bits/sec)



- 本校對外連線有兩電路。
- 臺灣學術網路電路連接中興大學區網中心，頻寬500Mbps。
- 商用網路採台灣佳光電訊電路，頻寬300Mbps。

# 主要使用設備

## ● 各大樓中繼交換器 HPE 5130(107年)

- ◆ L2埠交換器
- ◆ 48 埠 GE + 4埠XGE。
- ◆ 每台以10Gbps SPF+與交換器 HPE 5940 連接。
- ◆ 提供終端點電腦連接或下一層交換器連接。

## ● 無聲廣播系統

- ◆ 自成一套網路線路系統，不與校園網路共用。
- ◆ 因為使用頻寬大(HDMI over TCP/IP)，機房與各大樓間也獨立使用光纖。
- ◆ 各大樓獨立交換器。

## ● L3 核心交換器 HPE 5940(107年)

- ◆ 純光纖埠交換器
- ◆ 48 埠 XGE(10Gbps) + 6埠FGE(40Gbps)。
- ◆ 目前校園網路校內各大樓總共用18對光纖，插10Gbps SPF+。
- ◆ 無聲廣播系統獨立使用15對光纖，以VLAN跟校園網路區隔。



# 主要使用設備

- 各大樓邊際交換器
  - ◆ 109年前瞻及歷年其他計畫逐批購買
  - ◆ Edgcore 2100 , POE , 連接無線AP
  - ◆ Aruba 2540
  - ◆ Aruba 1930 , POE , 連接無線AP。



# 主要使用設備-網路設定

- 設定VLAN區隔網路
- 學校行政辦公室與教室雜處於同一區域，個別設定vlan麻煩
- 獨立科館大樓內單純，可單獨區分vlan
- 電腦教室獨立vlan，無線網路獨立vlan、機房主機獨立vlan
- IP管理使用private ip固定式，於不同大樓使用不同網段，由網管單位統一管理發放。
- 啟用STP/RSTP，斬斷迴圈的羈絆
- 啟用LLDP，發現與鄰居間的羈絆
- 啟用NTP/SNTP，你的時間就是我的時間





## 網管軟體

nm-lite	流量數據統計，已沒新版更新支援了
lpaudit	流量數據統計，很久沒新版更新支援了
MRTG	流量圖監控(沒在用了)
CACTI	比MRTG功能性更好的流量圖監控，豐富外掛
LibreNMS	完整設備監控
Nfdump+nfsens	連線數據統計，接收netflow、sflow資料分析
iMC	針對HPE自家出品的交換器完整設備監控
Pixis	以IP為主體，偵測事件發生網管軟體

## 網管軟體-nm-lite

- 世新大學電算中心發展，現已停更，只剩一篇論文可查
- 於交換器設定mirror port，於主機網卡設定混雜模式  
( promiscuous mode )
- 預設統計一天、一周、一月內某一時間區段內流量排名  
(位元數、封包數)
- 可透過指令模式指定統計  
某一時間區間流量排名

### 興大附農網路流量排行榜

- [最近五分鐘排行榜](#) (每五分鐘更新)
- [最近十分鐘排行榜](#) (每五分鐘更新)
- [最近一小時排行榜](#) (每五分鐘更新)
- [前一小時排行榜](#) (每小時更新)
- [最近一日排行榜](#) (每小時更新)
- [昨日排行榜](#) (每日更新)
- [最近一週排行榜](#) (每日更新)

# 網管軟體-nm-lite

開始時間2023/08/09 09:55

結束時間2023/08/09 10:00

有效時間5分

依流入 Bytes 量排序

Number	IP	Bytes (Flow Inside)	Bytes (Flow Outside)	Bytes (Total)	Packets (Flow Inside)	Packets (Flow Outside)	Packets (Total)
1	192.168.55.154	1,209,011,405	0	1,209,011,405	367,564	0	367,564
2	192.168.62.155	212,334,162	0	212,334,162	33,463	0	33,463
3	192.168.20.24	174,094,034	0	174,094,034	119,114	0	119,114
4	192.168.5.30	88,791,849	0	88,791,849	63,769	0	63,769
5	192.168.56.1	53,582,577	0	53,582,577	38,115	0	38,115
6	192.168.20.85	41,259,133	0	41,259,133	28,675	0	28,675
7	10.0.5.135	37,361,795	0	37,361,795	12,101	0	12,101
8	192.168.57.26	37,039,243	0	37,039,243	25,985	0	25,985
9	192.168.20.163	32,696,332	0	32,696,332	24,139	0	24,139
10	192.168.51.22	31,287,846	0	31,287,846	22,275	0	22,275
11	192.168.20.39	28,667,928	0	28,667,928	5,734	0	5,734
12	10.0.6.242	23,970,600	0	23,970,600	16,254	0	16,254
13	10.0.0.225	23,794,997	0	23,794,997	38,348	0	38,348
14	192.168.20.33	23,040,996	0	23,040,996	48,700	0	48,700
15	192.168.62.8	21,027,872	0	21,027,872	15,786	0	15,786
16	192.168.56.16	20,504,623	0	20,504,623	9,932	0	9,932
17	192.168.20.206	20,335,819	0	20,335,819	42,152	0	42,152
18	192.168.52.134	20,005,735	0	20,005,735	5,023	0	5,023
19	192.168.20.16	19,878,625	0	19,878,625	9,518	0	9,518
20	192.168.55.144	16,273,096	0	16,273,096	10,066	0	10,066
21	192.168.20.11	16,224,395	0	16,224,395	18,628	0	18,628
22	192.168.20.74	15,454,130	0	15,454,130	3,181	0	3,181
23	192.168.57.1	14,964,048	0	14,964,048	7,049	0	7,049
24	192.168.2.34	13,602,263	0	13,602,263	1,712	0	1,712
25	192.168.52.132	13,084,011	0	13,084,011	11,820	0	11,820
26	192.168.52.5	12,628,752	0	12,628,752	5,906	0	5,906

- 依照流量位元組數多寡，由高到低列出前30名IP，
- 自重新裝過後flow outside的資料就不再出現。



# 網管軟體-nm-lite

依流入 封包量 排序

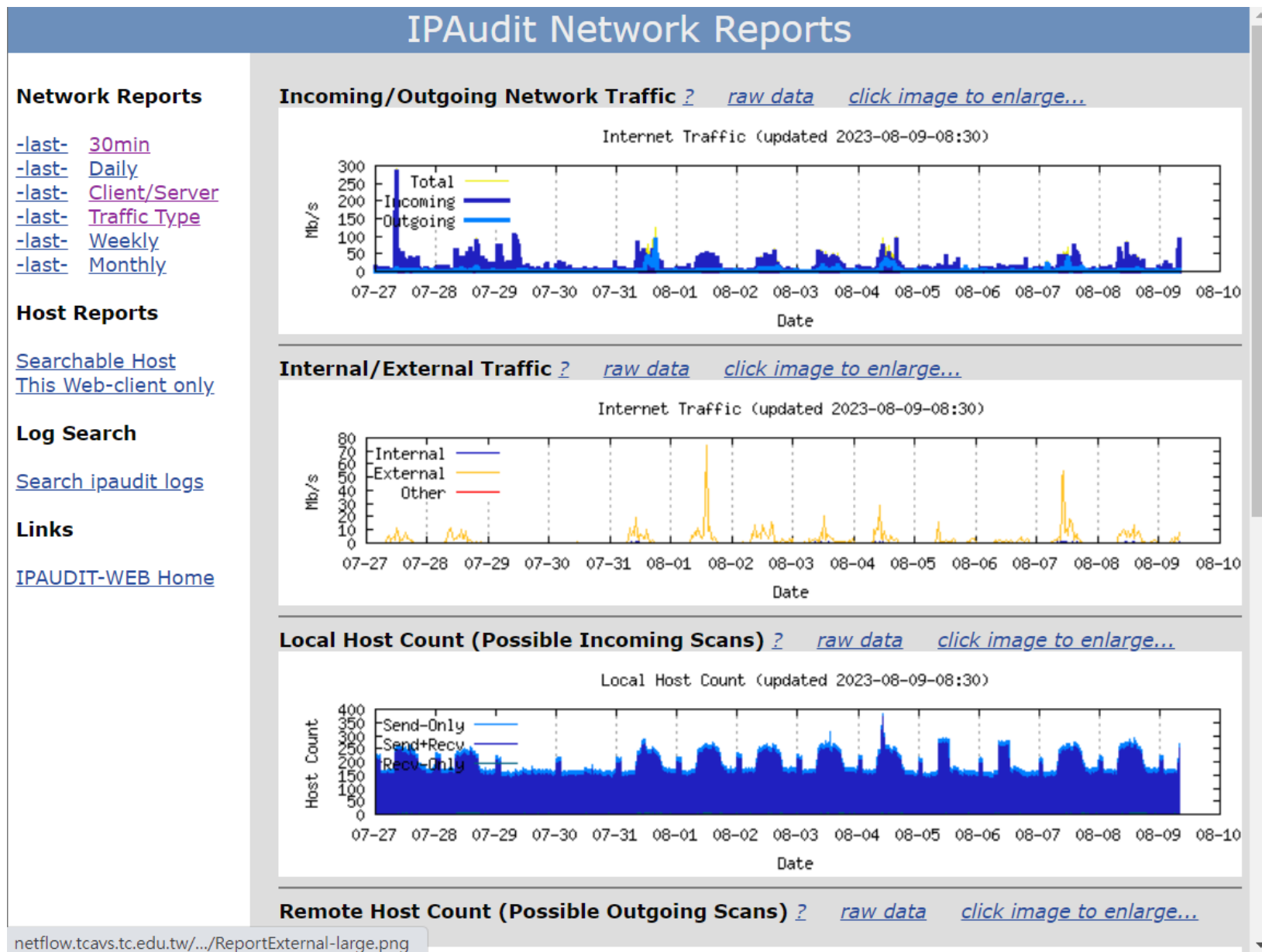
Number	IP	Bytes (Flow Inside)	Bytes (Flow Outside)	Bytes (Total)	Packets (Flow Inside)	Packets (Flow Outside)	Packets (Total)
1	192.168.55.154	10,677,471,678	0	10,677,471,678	3,270,670	0	3,270,670
2	192.168.62.8	784,612,957	0	784,612,957	468,442	0	468,442
3	192.168.20.206	222,771,769	0	222,771,769	461,041	0	461,041
4	192.168.56.24	133,115,990	0	133,115,990	446,070	0	446,070
5	192.168.20.33	415,876,670	0	415,876,670	353,970	0	353,970
6	192.168.56.1	603,178,453	0	603,178,453	346,719	0	346,719
7	192.168.51.22	1,044,236,012	0	1,044,236,012	311,831	0	311,831
8	192.168.30.17	447,740,695	0	447,740,695	307,117	0	307,117
9	192.168.57.26	541,404,784	0	541,404,784	297,480	0	297,480
10	192.168.20.85	385,094,622	0	385,094,622	270,132	0	270,132
11	192.168.20.62	324,272,912	0	324,272,912	219,925	0	219,925
12	192.168.5.30	274,796,748	0	274,796,748	204,230	0	204,230
13	192.168.62.155	640,415,249	0	640,415,249	185,860	0	185,860
14	192.168.62.2	237,823,845	0	237,823,845	174,165	0	174,165
15	192.168.56.16	340,442,653	0	340,442,653	166,266	0	166,266
16	10.0.0.225	221,466,231	0	221,466,231	156,175	0	156,175
17	10.0.7.37	575,428,490	0	575,428,490	142,533	0	142,533
18	192.168.62.160	174,899,259	0	174,899,259	134,501	0	134,501
19	192.168.20.71	200,280,237	0	200,280,237	133,769	0	133,769
20	192.168.20.24	178,514,081	0	178,514,081	129,605	0	129,605
21	192.168.52.134	223,275,813	0	223,275,813	122,904	0	122,904
22	192.168.52.5	183,548,755	0	183,548,755	113,282	0	113,282
23	192.168.20.63	125,884,473	0	125,884,473	107,599	0	107,599
24	192.168.20.93	141,234,588	0	141,234,588	105,079	0	105,079
25	192.168.52.132	108,599,226	0	108,599,226	100,600	0	100,600
26	192.168.20.182	132,559,502	0	132,559,502	96,071	0	96,071
27	10.0.1.202	110,566,608	0	110,566,608	95,940	0	95,940
28	192.168.20.204	140,157,921	0	140,157,921	91,648	0	91,648
29	192.168.57.1	282,118,596	0	282,118,596	82,338	0	82,338

- 依照流量封包數多寡，由高到低列出前30名IP，
- 系統還提供命令列功能，可設定起訖時間來統計。
- 用web介面來選擇時間。然後送後透台執行。後來php預設禁止使用system()後臺執行。

## 網管軟體-Ipaudit

- 定時統計每 30 分鐘、每天、每周、每月時間區段內流量排名、特定行為應用排名
- 可指定個別細項條件查詢
- 現已停更(2015止)，專案網頁仍在
- 於交換器設定mirror port，於主機網卡設定混雜模式 ( promiscuous mode )

# 網管軟體-Ipaudit



- 主畫面，預設以圖形顯示統計數據
- 左側為功能選單



# 網管軟體-Ipaudit

## 30 minute Traffic Report

[Home](#)[Index](#)

Wed, Aug 09 2023, 08:00 AM

[« Prev Report](#)

General Stats		Incoming/Outgoing Traffic (bytes)		Internal/External Traffic (bytes)		Local Hosts		Remote Hosts	
<b>Connections</b>	99,813	<b>Incoming</b>	19,956,213,867	<b>Internal</b>	135,333,028	<b>Probed</b>	250	<b>Probed</b>	3,192
<b>Packets</b>	15,363,940	<b>Outgoing</b>	924,744,699	<b>External</b>	1,823,687,662	<b>Responding</b>	268	<b>Responding</b>	2,868
<b>Bytes</b>	22,839,979,256	<b>Total</b>	20,880,958,566	<b>Other</b>	0	<b>Total</b>	270	<b>Total</b>	3,195

### Possible Incoming Scan Hosts

IP	Host Name	Local Hosts Contacted
<a href="#">013.107.005.088</a>		3
<a href="#">204.079.197.200</a>	a-0001.a-msedge.net	2
<a href="#">052.113.194.132</a>		2
<a href="#">020.205.115.081</a>		2
<a href="#">040.099.065.098</a>		2
<a href="#">052.109.052.148</a>		2
<a href="#">040.099.034.002</a>		1
<a href="#">013.107.042.014</a>		1
<a href="#">184.050.190.070</a>	a184-50-190-70.deploy.static.akamaitechnologies.com	1
<a href="#">091.228.165.145</a>	h1-epnsbroker02.eset.com	1
<a href="#">052.182.143.208</a>		1
<a href="#">040.099.036.242</a>		1
<a href="#">060.240.141.114</a>	60-240-141-114.binet.jp.binet.net	1

- 每30分鐘流量報告
- 點選IP可看個別流量連線紀錄

# 網管軟體-Ipaudit

Busiest Remote Hosts				
IP	Host Name	Incoming (bytes)	Outgoing (bytes)	Total (bytes)
<a href="#">027.100.064.013</a>	13-64-100-27.tinp.net.tw	7,345,874,646	61,402,725	7,407,277,371
<a href="#">142.251.042.238</a>	tsa01s11-in-f14.1e100.net	3,817,235,870	2,467,376,308	6,284,612,178
<a href="#">209.197.003.008</a>	vip0x008.map2.ssl.hwcdn.net	5,001,032,948	71,809,458	5,072,842,406
<a href="#">142.251.043.014</a>	tsa03s08-in-f14.1e100.net	254,869,135	4,543,157,038	4,798,026,173
<a href="#">163.028.085.013</a>	-	2,748,372,093	62,901,275	2,811,273,368
<a href="#">163.028.005.131</a>	-	2,440,874,957	52,484,060	2,493,359,017
<a href="#">163.028.085.012</a>	-	1,984,953,255	48,415,616	2,033,368,871
<a href="#">111.119.027.128</a>	https-111-119-27-128.nrt.llnw.net	1,571,633,221	24,174,448	1,595,807,669
<a href="#">117.018.232.240</a>	-	1,141,014,774	7,954,741	1,148,969,515
<a href="#">163.028.225.111</a>	-	1,091,915,902	15,338,075	1,107,253,977
<a href="#">163.028.005.025</a>	-	1,101,431,578	5,787,801	1,107,219,379
<a href="#">111.119.027.000</a>	https-111-119-27-0.nrt.llnw.net	1,068,638,243	12,742,228	1,081,380,471
<a href="#">163.028.005.017</a>	-	1,059,998,415	8,555,688	1,068,554,103
<a href="#">142.251.043.010</a>	tsa03s08-in-f10.1e100.net	98,092,515	922,505,035	1,020,597,550
<a href="#">023.246.057.133</a>	ipv4-c073-hkg001-ix.1.oca.nflxvideo.net	960,494,040	12,481,293	972,975,333
<a href="#">142.251.085.198</a>	tsa03s09-in-f6.1e100.net	874,514,307	20,098,879	894,613,186
<a href="#">027.100.064.012</a>	12-64-100-27.tinp.net.tw	847,220,043	19,134,079	866,354,122
<a href="#">023.246.057.162</a>	ipv4-c076-hkg001-ix.1.oca.nflxvideo.net	779,963,388	10,853,470	790,816,858
<a href="#">172.217.145.134</a>	tsa03s11-in-f6.1e100.net	684,988,740	30,173,033	715,161,773
<a href="#">034.104.035.123</a>	123.35.104.34.bc.googleusercontent.com	641,669,364	11,643,711	653,313,075

Elapsed time is 2 seconds

# 網管軟體-Ipaudit

Possible Incoming Scan Hosts		
IP	Host Name	Local Hosts Contacted
<a href="#">210.171.224.207</a>	-	1
<a href="#">010.000.006.186</a>	-	1
<a href="#">192.192.061.126</a>	-	1
<a href="#">118.163.081.061</a>	118-163-81-61.hinet-ip.hinet.net	1
<a href="#">010.000.000.112</a>	-	1
<a href="#">192.083.183.252</a>	-	1
<a href="#">210.176.136.129</a>	unknown.telstraglobal.net	1
<a href="#">211.022.103.158</a>	211-22-103-158.hinet-ip.hinet.net	1
<a href="#">020.090.156.032</a>	-	1
<a href="#">001.174.224.103</a>	1-174-224-103.dynamic-ip.hinet.net	1
<a href="#">091.228.165.147</a>	h1-epnsbroker04.eset.com	1
<a href="#">211.075.251.221</a>	211-75-251-221.hinet-ip.hinet.net	1
<i>Elapsed time is 12 seconds.</i>		

# 網管軟體-Ipaudit

Possible Outgoing Scan Hosts		
IP	Host Name	Remote Hosts Contacted
<a href="#">192.168.053.001</a>	-	26
<a href="#">192.168.020.034</a>	-	21
<a href="#">192.168.056.013</a>	-	20
<a href="#">192.168.002.001</a>	dns.tcavs.tc.edu.tw	19
<a href="#">192.168.020.235</a>	-	19
<a href="#">192.168.020.249</a>	-	18
<a href="#">192.168.030.081</a>	-	16
<a href="#">192.168.030.052</a>	-	16
<a href="#">192.168.020.206</a>	-	16
<a href="#">192.168.056.011</a>	-	14
<a href="#">192.168.080.020</a>	-	13
<a href="#">192.168.052.134</a>	-	12
<a href="#">192.168.030.043</a>	-	12
<a href="#">192.168.030.076</a>	-	11
<a href="#">192.168.030.030</a>	-	11
<a href="#">192.168.020.220</a>	-	11
<a href="#">192.168.055.144</a>	-	11
<a href="#">192.168.055.036</a>	-	8
<a href="#">192.168.054.003</a>	-	7
<a href="#">192.168.020.130</a>	-	6

*Elapsed time is 1 seconds.*



# 網管軟體-Ipaudit

Busiest Host Pairs						
Local IP	Local Host Name	Remote IP	Remote Host Name	Incoming (bytes)	Outgoing (bytes)	Total (bytes)
<a href="#">192.168.020.206</a>	-	<a href="#">027.100.064.013</a>	13-64-100-27.tinp.net.tw	7,344,370,164	61,303,809	7,405,673,973
<a href="#">192.168.020.206</a>	-	<a href="#">142.251.042.238</a>	tsa01s11-in-f14.1e100.net	3,649,143,059	2,257,148,988	5,906,292,047
<a href="#">192.168.020.034</a>	-	<a href="#">142.251.043.014</a>	tsa03s08-in-f14.1e100.net	114,709,592	4,316,635,532	4,431,345,124
<a href="#">192.168.080.140</a>	-	<a href="#">209.197.003.008</a>	vip0x008.map2.ssl.hwcdn.net	3,736,520,401	55,494,267	3,792,014,668
<a href="#">192.168.020.085</a>	-	<a href="#">163.028.085.013</a>	-	2,309,070,928	54,666,754	2,363,737,682
<a href="#">192.168.080.140</a>	-	<a href="#">163.028.005.131</a>	-	1,899,993,476	38,805,005	1,938,798,481
<a href="#">192.168.020.085</a>	-	<a href="#">163.028.085.012</a>	-	1,839,597,360	44,760,785	1,884,358,145
<a href="#">192.168.080.140</a>	-	<a href="#">117.018.232.240</a>	-	1,099,846,905	7,142,250	1,106,989,155
<a href="#">192.168.080.140</a>	-	<a href="#">111.119.027.128</a>	https-111-119-27-128.nrt.llnw.net	1,087,242,399	15,161,163	1,102,403,562
<a href="#">192.168.080.140</a>	-	<a href="#">163.028.005.025</a>	-	1,022,004,199	4,897,239	1,026,901,438
<a href="#">192.168.080.140</a>	-	<a href="#">111.119.027.000</a>	https-111-119-27-0.nrt.llnw.net	1,009,976,463	11,799,223	1,021,775,686
<a href="#">192.168.080.140</a>	-	<a href="#">163.028.005.017</a>	-	974,359,924	7,706,658	982,066,582
<a href="#">192.168.020.085</a>	-	<a href="#">023.246.057.133</a>	ipv4-c073-hkg001-ix.1.oca.nflxvideo.net	960,494,040	12,481,293	972,975,333
<a href="#">192.168.002.053</a>	-	<a href="#">142.251.043.010</a>	tsa03s08-in-f10.1e100.net	20,564,168	876,039,625	896,603,793
<a href="#">192.168.080.160</a>	-	<a href="#">209.197.003.008</a>	vip0x008.map2.ssl.hwcdn.net	809,776,050	9,241,364	819,017,414
<a href="#">192.168.020.085</a>	-	<a href="#">023.246.057.162</a>	ipv4-c076-hkg001-ix.1.oca.nflxvideo.net	779,963,388	10,853,470	790,816,858
<a href="#">192.168.020.085</a>	-	<a href="#">027.100.064.012</a>	12-64-100-27.tinp.net.tw	682,006,555	15,699,890	697,706,445
<a href="#">192.168.080.140</a>	-	<a href="#">163.028.225.111</a>	-	674,358,801	7,905,850	682,264,651
<a href="#">192.168.080.140</a>	-	<a href="#">034.104.035.123</a>	123.35.104.34.bc.googleusercontent.com	623,282,311	11,166,026	634,448,337
<a href="#">192.168.020.085</a>	-	<a href="#">142.251.085.198</a>	tsa03s09-in-f6.1e100.net	609,760,446	14,195,077	623,955,523

Elapsed time is 0 seconds.

# 網管軟體-Ipaudit

## Daily Client / Server Report

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Local Mail Clients					
IP	Host Name	Connections	Incoming (bytes)	Outgoing (bytes)	Total (bytes)
<a href="#">192.168.002.060</a>	moodle.tcavs.tc.edu.tw	7	0	3,626	3,626
<a href="#">192.168.020.086</a>	-	2	12,393	18,621	31,014
<a href="#">192.168.030.062</a>	-	2	12,195	13,450	25,645
<a href="#">192.168.056.029</a>	-	2	14,818	10,897	25,715
<a href="#">192.168.058.007</a>	-	2	16,122	25,868	41,990
<a href="#">192.168.030.250</a>	-	1	6,985	39,663	46,648
<a href="#">192.168.003.053</a>	-	1	882	547	1,429
<a href="#">192.168.080.015</a>	-	1	1,957	3,364	5,321
<a href="#">192.168.020.104</a>	-	1	8,561	6,723	15,284
<a href="#">192.168.020.141</a>	-	1	6,190	6,179	12,369

*Elapsed time is 1 seconds.*

- 以服務(port)來區分client與server角色連線紀錄
- 太早發展，只有基礎服務，跟不上目前多樣的服務種類

# 網管軟體-Ipaudit

Local HTTPS Clients					
IP	Host Name	Connections	Incoming (bytes)	Outgoing (bytes)	Total (bytes)
<a href="#">192.168.020.206</a>	-	972,799	11,120,732,960	2,368,463,388	13,489,196,348
<a href="#">192.168.055.025</a>	-	16,970	166,885,753	114,649,682	281,535,435
<a href="#">192.168.002.250</a>	-	10,268	188,290,900	43,896,554	232,187,454
<a href="#">192.168.020.130</a>	-	9,910	230,994,909	138,480,562	369,475,471
<a href="#">192.168.020.032</a>	-	9,111	87,486,357	20,565,787	108,052,144
<a href="#">192.168.030.030</a>	-	7,776	123,583,337	147,630,221	271,213,558
<a href="#">192.168.002.100</a>	-	7,263	173,607,298	31,329,173	204,936,471
<a href="#">192.168.020.155</a>	-	6,031	118,908,382	61,008,874	179,917,256
<a href="#">010.000.002.060</a>	-	5,711	839,907,452	68,746,869	908,654,321
<a href="#">192.168.020.222</a>	-	5,347	80,066,625	49,174,487	129,241,112
<a href="#">192.168.020.085</a>	-	5,027	12,085,158,716	425,499,493	12,510,658,209
<a href="#">192.168.055.036</a>	-	4,911	229,434,490	65,146,775	294,581,265
<a href="#">192.168.053.001</a>	-	4,445	1,083,528,114	47,655,511	1,131,183,625
<a href="#">192.168.080.140</a>	-	4,271	2,982,403,798	84,468,529	3,066,872,327
<a href="#">192.168.020.034</a>	-	4,199	982,777,190	4,371,785,037	5,354,562,227
<a href="#">192.168.030.043</a>	-	3,734	35,862,621	14,312,481	50,175,102
<a href="#">192.168.057.029</a>	-	3,707	78,652,067	58,676,492	137,328,559
<a href="#">192.168.030.096</a>	-	3,304	150,955,156	126,930,812	277,885,968
<a href="#">192.168.020.251</a>	-	3,122	44,446,212	27,189,580	71,635,792

- 以服務(port)來區分client與server角色連線紀錄

# 網管軟體-Ipaudit

Local HTTPS Servers					
IP	Host Name	Connections	Incoming (bytes)	Outgoing (bytes)	Total (bytes)
<a href="#">192.168.002.060</a>	moodle.tcavs.tc.edu.tw	2,326	29,185,927	786,645,251	815,831,178
<a href="#">192.168.002.248</a>	-	713	5,981,366	128,003,308	133,984,674
<a href="#">192.168.002.076</a>	-	180	1,248,676	34,472,533	35,721,209
<a href="#">008.218.225.078</a>	-	20	124,136	1,536,031	1,660,167
<a href="#">008.241.141.250</a>	-	20	287,101	6,126,048	6,413,149
<a href="#">008.255.194.122</a>	-	17	108,765	1,637,963	1,746,728
<a href="#">003.115.003.213</a>	ec2-3-115-3-213.ap-northeast-1.compute.amazonaws.com	6	11,410	54,012	65,422
<a href="#">192.168.002.053</a>	-	6	7,256	348,019	355,275
<a href="#">003.124.028.136</a>	ec2-3-124-28-136.eu-central-1.compute.amazonaws.com	5	8,139	11,737	19,876
<a href="#">008.253.224.250</a>	-	4	7,019	23,281	30,300
<a href="#">003.035.062.090</a>	ec2-3-35-62-90.ap-northeast-2.compute.amazonaws.com	3	14,626	12,165	26,791
<a href="#">003.069.161.138</a>	ec2-3-69-161-138.eu-central-1.compute.amazonaws.com	2	3,503	13,328	16,831
<a href="#">003.039.064.124</a>	ec2-3-39-64-124.ap-northeast-2.compute.amazonaws.com	2	7,166	18,351	25,517
<a href="#">003.000.070.014</a>	ec2-3-0-70-14.ap-southeast-1.compute.amazonaws.com	2	8,079	13,504	21,583
<a href="#">003.038.235.054</a>	ec2-3-38-235-54.ap-northeast-2.compute.amazonaws.com	2	6,441	9,218	15,659

- 以服務(port)來區分client與server角色連線紀錄



# 網管軟體-Ipaudit

## Daily Client / Server Report

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- 以服務(port)來區分client與server角色連線紀錄

Local Mail Clients					
IP	Host Name	Connections	Incoming (bytes)	Outgoing (bytes)	Total (bytes)
<a href="#">192.168.002.060</a>	moodle.tcavs.tc.edu.tw	7	0	3,626	3,626
<a href="#">192.168.020.086</a>	-	2	12,393	18,621	31,014
<a href="#">192.168.030.062</a>	-	2	12,195	13,450	25,645
<a href="#">192.168.056.029</a>	-	2	14,818	10,897	25,715
<a href="#">192.168.058.007</a>	-	2	16,122	25,868	41,990
<a href="#">192.168.030.250</a>	-	1	6,985	39,663	46,648
<a href="#">192.168.003.053</a>	-	1	882	547	1,429
<a href="#">192.168.080.015</a>	-	1	1,957	3,364	5,321
<a href="#">192.168.020.104</a>	-	1	8,561	6,723	15,284
<a href="#">192.168.020.141</a>	-	1	6,190	6,179	12,369

*Elapsed time is 1 seconds.*

# 網管軟體-Ipaudit

## IPAudit - Log Search

[Home](#)

Data Available from 2023-07-29-00:00 to 2023-08-09-08:00.

### Search Form

Submit

Start Date:  *Eg: yesterday, -2 days, last Wednesday, 2001-03-13-12:30*

End Date:

IP Address:

Local Port:  *Eg: 21,23*

Remote Port:  *Eg: 21,23*

Max Lines Displayed:  *Eg: 200*

Print Incr:  *Eg: 2*

Min Session Size:  *Eg: 200, 2k, 1G*

Max Session Size:  *Eg: 200, 2k, 1G*

Protocol:

First Talker:

Last Talker:

Local IP	Remote IP	Proto-	Local	Remote	Incoming	Outgoing	Incoming	Outgoing	First Packet	Last Packet	First	Last
		col	Port	Port	Bytes	Bytes	Packets	Packets	Time	Time	Talker	Talker
192.168.62.160	13.107.5.88	tcp	65209	<a href="#">443</a>	54	0	1	0	08:00:18.8126	08:00:18.8126	R	-
192.168.20.247	13.107.5.88	tcp	62664	<a href="#">443</a>	54	0	1	0	08:00:32.9128	08:00:32.9128	R	-
192.168.20.78	13.107.5.88	tcp	54614	<a href="#">443</a>	17.6k	1.7k	20	15	08:00:41.3518	08:01:46.8518	L	R
192.168.20.67	13.107.5.88	tcp	60491	<a href="#">443</a>	54	0	1	0	08:00:42.9175	08:00:42.9175	R	-
192.168.62.10	13.107.5.88	tcp	<a href="#">1449</a>	<a href="#">443</a>	54	0	1	0	08:00:44.4279	08:00:44.4279	R	-
192.168.20.35	13.107.5.88	tcp	49849	<a href="#">443</a>	22.6k	1.9k	24	18	08:00:44.6476	08:02:50.1275	L	R
192.168.20.35	13.107.5.88	tcp	49856	<a href="#">443</a>	17.6k	1.6k	20	13	08:00:51.0744	08:01:59.1479	L	R
192.168.20.182	13.107.5.88	tcp	61413	<a href="#">443</a>	54	0	1	0	08:00:55.4597	08:00:55.4597	R	-

- 個別IP流量連線紀錄
- 可以在此下個別參數看更多資料

## 網管軟體-CACTI

- 定期(5分鐘)透過snmp蒐集交換器每埠的網路流量數據
- 顯示以5分、30分、2小時、1天的平均流量統計曲線圖
- 發展出豐富的外掛，只要snmp能取得數據都可轉化成圖，  
UPS負載、無線連線數、CPU負載....
- 在校最常用的系統
- 外掛weather map、MacTrack、monitor...

# 網管軟體-CACTI

console graphs mactrack weathermap monitor thold

Console -> Devices Logged in as

Create  
New Graphs  
Management  
Graph Management  
Graph Trees  
Data Sources  
Devices  
Weathermaps  
Notification Lists  
Thresholds  
Device Tracking  
Sites  
Devices  
SNMP Options  
Device Types  
Vendor Macs  
Tracking Utilities  
Tracking Tools  
Mac Watch  
Mac Authorizations  
Collection Methods  
Data Queries  
Data Input Methods  
Templates  
Graph Templates  
Host Templates  
Data Templates  
Threshold Templates  
Import/Export  
Import Templates

Devices

Type: Any Status: Any Search: Rows per Page: 30 Go Clear

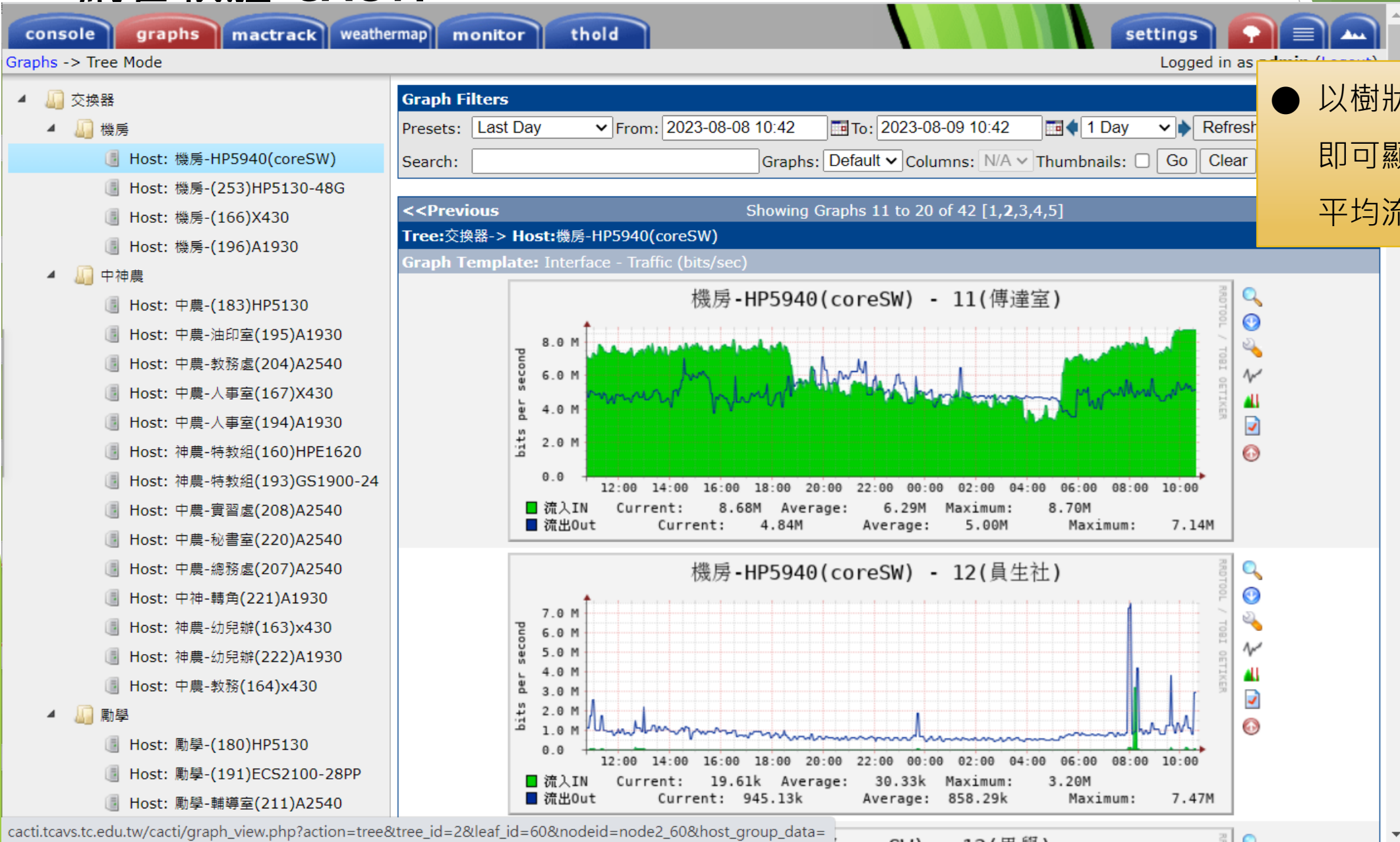
<< Previous Showing Rows 31 to 60 of 100 [1,2,3,4]

Description**	ID	Graphs	Data Sources	Status	In State	Hostname	Current (ms)	Average (ms)	
中農-教務處(204)A2540	142	11	11	Up	330d 22h 48m	192.168.3.204	1.01	2.03	99.98
中農-油印室(195)A1930	136	4	4	Up	330d 22h 48m	192.168.3.195	2.76	2.92	99.96
中農-秘書室(220)A2540	158	8	8	Up	330d 22h 48m	192.168.3.220	1.1	2.03	99.98
中農-總務處(207)A2540	145	11	11	Up	330d 22h 48m	192.168.3.207	12.66	2.15	99.96
傳達室(184)HP5130	85	3	3	Up	312d 1h 18m	192.168.3.184	1.59	0.99	99.97
勵學-(180)HP5130	81	13	14	Up	330d 22h 48m	192.168.3.180	1.57	1.13	99.97
勵學-(191)ECS2100-28PP	107	16	16	Up	330d 22h 48m	192.168.3.191	29.99	17.63	99.94
勵學-軍械室(153)-D1210	130	24	24	Up	250d 19h 18m	192.168.3.153	8.05	10.58	85.44
勵學-輔導室(211)A2540	149	10	10	Up	330d 22h 48m	192.168.3.211	0.92	2.17	99.15
勵學-進修部(171)H1950	168	4	4	Up	217d 18h 28m	192.168.3.171	4.82	4.43	98.73
勵學-進修部(210)A2540	148	20	20	Up	330d 22h 48m	192.168.3.210	1.52	2.93	99.97
員生社-(182)HP5130	83	4	4	Up	330d 22h 48m	192.168.3.182	1.54	1.02	99.97
園藝-(177)HP5130	78	12	12	Up	597d 1h 23m	192.168.3.177	3.7	4.54	99.96
園藝-小木屋(216)A2540	154	6	6	Up	307d 19h 43m	192.168.3.216	1.44	2.56	68.77
圖書館-2F書庫(202)A2540	133	15	15	Up	597d 1h 23m	192.168.3.202	1.02	2.15	99.98
圖書館-3F計概(219)A2540	157	4	4	Up	597d 1h 23m	192.168.3.219	0.84	2.07	99.98
圖書館-3F電信(217)A2540	155	0	0	Up	597d 1h 23m	192.168.3.217	0.93	1.93	65.84
圖書館-4F(201)A2540	140	8	8	Up	597d 1h 23m	192.168.3.201	0.97	2.08	99.98
圖書館-共一(205)A2540	143	15	15	Up	188d 19h 48m	192.168.3.205	1.19	2.09	99.88
土機-土木辦(175)HP5130	77	14	14	Up	597d 1h 23m	192.168.3.175	1.67	1.34	99.83
土機-土木辦(199)A1930	131	8	8	Up	597d 1h 23m	192.168.3.199	1.82	1.95	99.97
土機-機電IP監視器(230)GS1900-HP	174	4	5	Up	171d 22h 8m	192.168.3.230	2.83	5.34	99.99
土機-機電辦(174)HP5130	93	16	16	Up	171d 22h 8m	192.168.3.174	3.56	4.04	99.97

- 列管設備清單
- 點選後可看個別設備設定

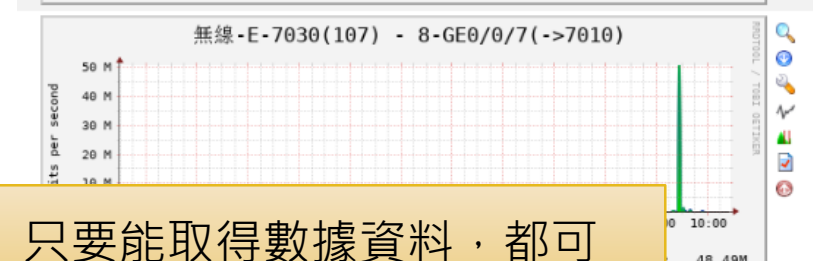
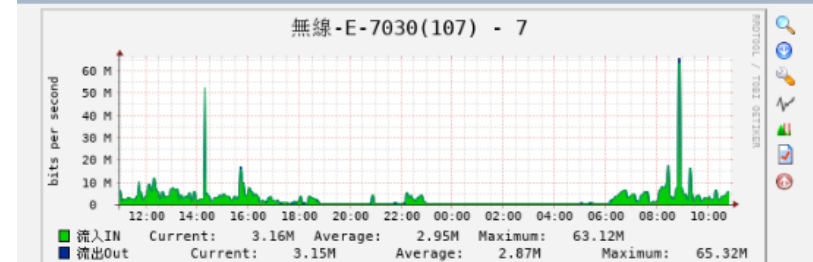
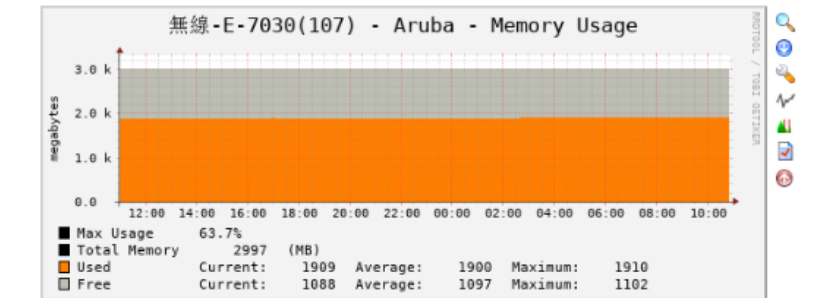
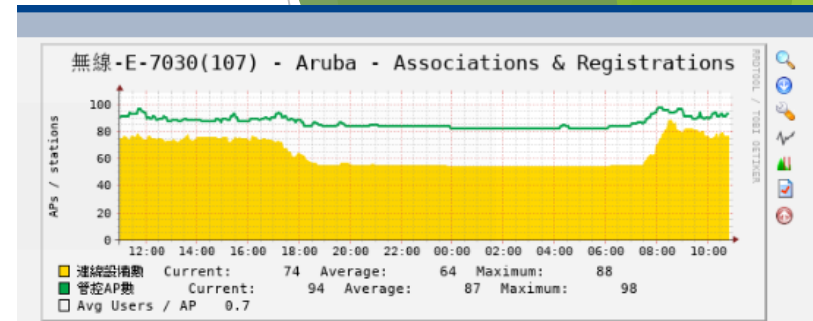
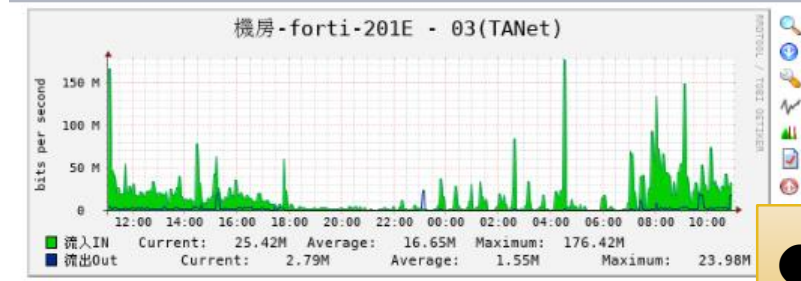
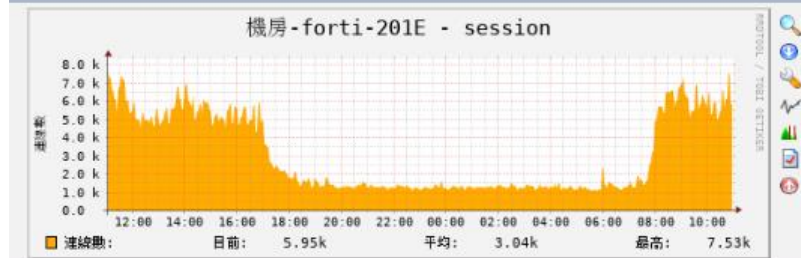
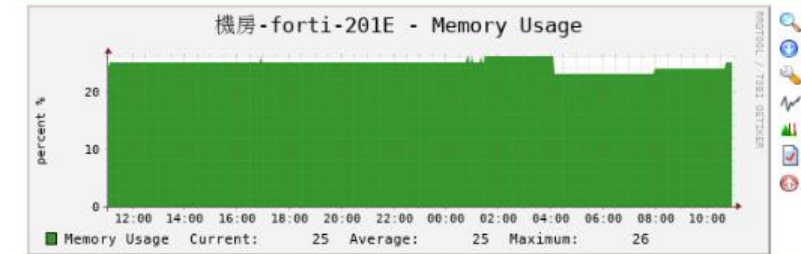
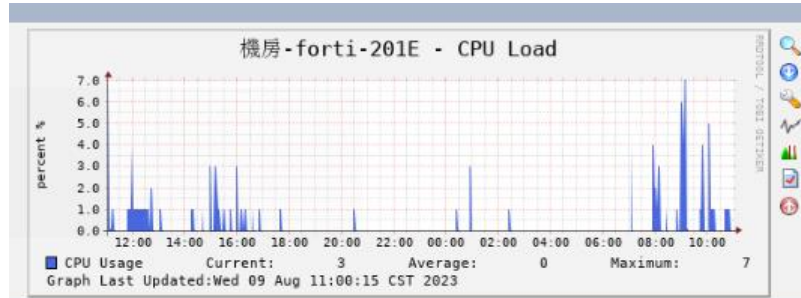
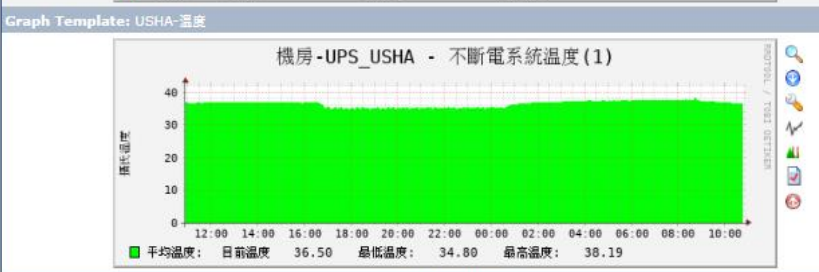
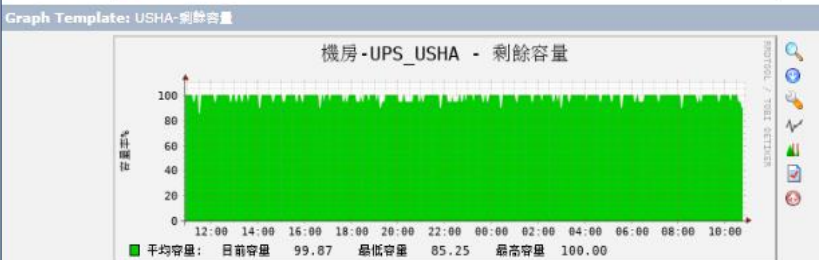
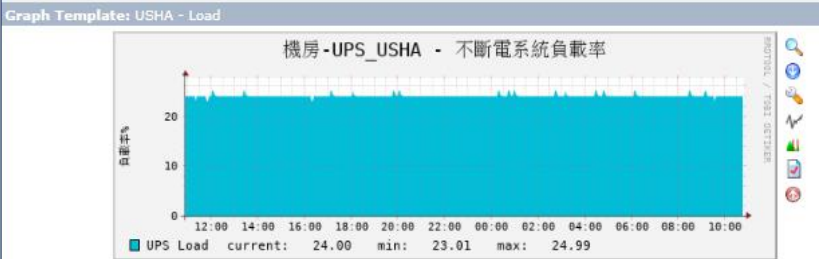
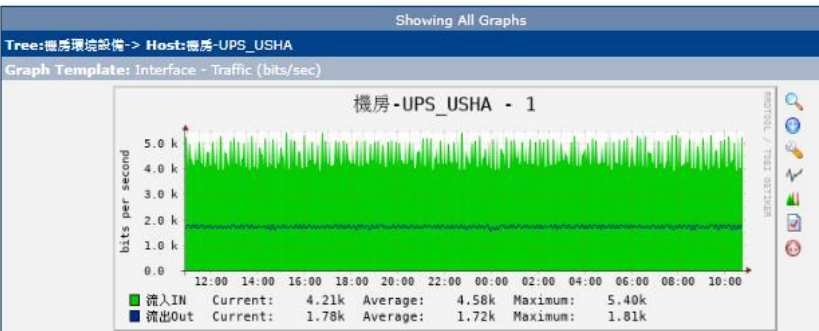


# 網管軟體-CACTI



● 以樹狀圖來點選設備，即可顯示每一埠5分鐘平均流量

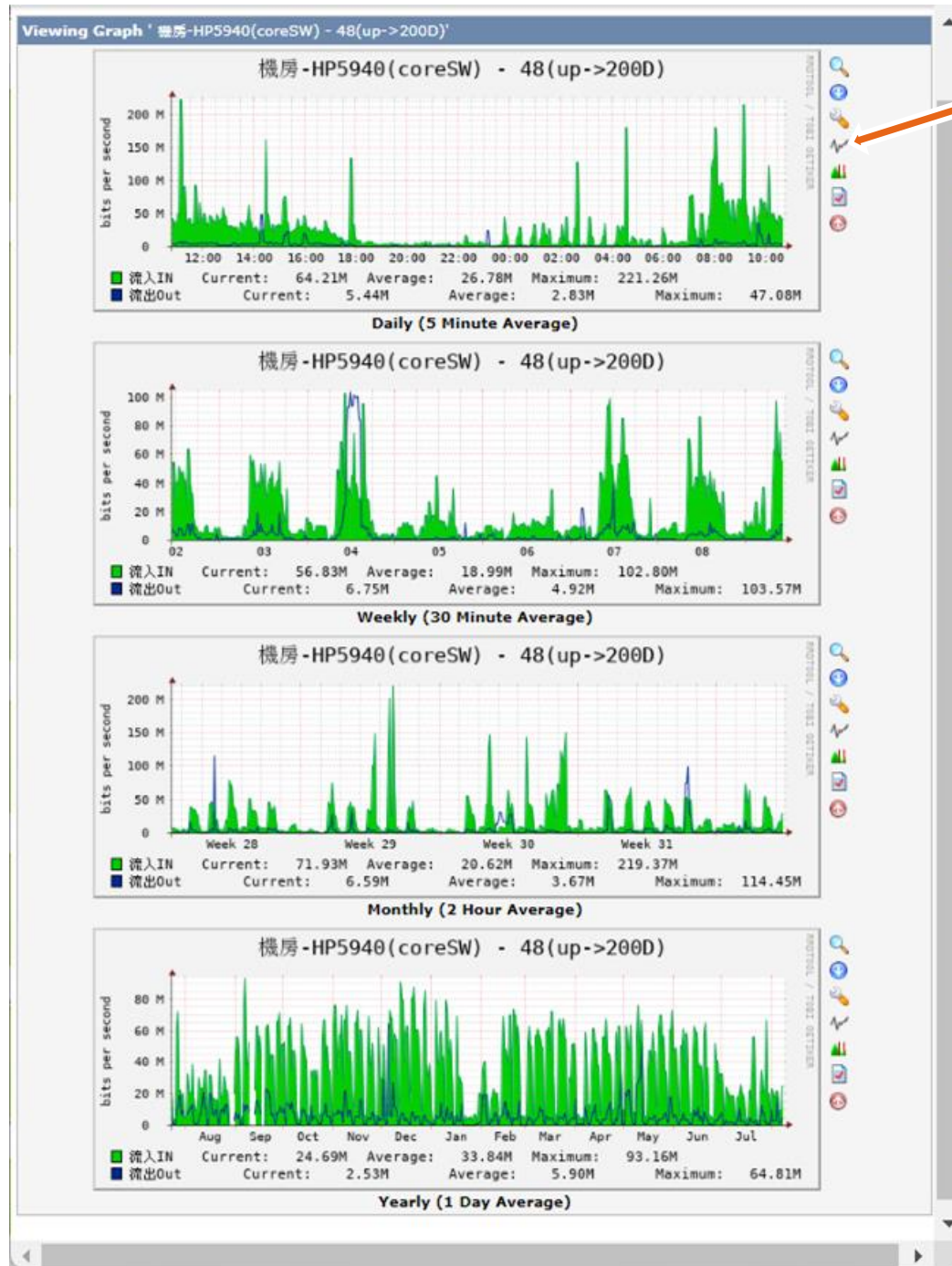
# 網管軟體-CACTI



● 只要能取得數據資料，都可以轉成圖表



# 網管軟體-CACTI



- 可察看更短時間即時流量 (5、10秒...)

- 點選設備某一埠的圖後，就會顯示進一步的詳細資料
- 每5分鐘、每30分鐘、每2小時、每1天為單位的平均圖表。

# 網管軟體-CACTI

console graphs **mactrack** weathermap monitor thold

MacTrack Viewer Logged in as **admin** (Logout)

Sites Devices IP Ranges IP Addresses **MAC Addresses** Interfaces Graphs

### Device Tracking - MAC to IP Report View

Site: TCAVS Device: All Rows: Default Go Clear Export

IP Address: Matches 192.168.62.155 VLAN Name: All Show: Aggregated

Mac Address: Authorized: All

Port Name: Search:

<< Previous		Showing Rows 1 to 3 of 3 [1]									Next >>	
Switch Name**	Switch Hostname	ED IP Address	ED MAC Address	Vendor Name	Port Number	Port Name	VLAN ID	VLAN Name	Last Scan Date	Count		
機房-HP5940(coreSW)	192.168.2.254	192.168.62.155	FC:34:97:3D:EC:61	Asustek Computer Inc.	14	Ten-GigabitEthernet1/0/14 Interface	20	VLAN 0020	2023-09-05 17:30:09	11	<input type="checkbox"/>	
活水堂-(179)HP5130	192.168.3.179	192.168.62.155	FC:34:97:3D:EC:61	Asustek Computer Inc.	03	03	20	VLAN 0020	2023-09-05 17:30:09	11	<input type="checkbox"/>	
活水堂-資訊室(212)A2540	192.168.3.212	192.168.62.155	FC:34:97:3D:EC:61	Asustek Computer Inc.	13	13	1	DEFAULT_VLAN	2023-09-05 17:30:09	11	<input type="checkbox"/>	

<< Previous Showing Rows 1 to 3 of 3 [1] Next >>

**Scanning Rate:** Every 2 Hours, **Status:** Idle, **LastRuntime:** 92.6 seconds, **Processes:** 12 processes, **Devices:** 74, **Next Run Time:** 2023-09-05 23:40:09

Choose an action: Delete Go

- 我最常用的外掛MacTrack
- 可以查詢某一個IP/MAC出現在哪幾台SW



# 網管軟體-CACTI

- 可以查看某台SW每個PORT底下有哪些IP/MAC

Sites Devices IP Ranges IP Addresses MAC Addresses Interfaces Graphs

Device Tracking - MAC to IP Report View

Site: TCAVS Device: 中農-人事室(194)A1930(192.168.3.194) Rows: Default Go Clear Export

IP Address: [ ] VLAN Name: All Show: Most Recent

Mac Address: [ ] Authorized: All

Port Name: [ ]

Search: [ ]

<< Previous Showing Rows 1 to 17 of 17 [1] Next >>

Actions	Switch Device	Switch Hostname	ED IP Address	ED MAC Address	Vendor Name	Port Number**	Port Name	VLAN ID	VLAN Name	Last Scan Date	
	中農-人事室(194)A1930	192.168.3.194	192.168.8.117	CC:D0:83:C1:6F:02	Aruba, A Hewlett Packard Enterprise Company	01	01	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.8.76	B0:B8:67:C1:53:BA	Hewlett Packard Enterprise	02	02	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.8.77	B0:B8:67:C1:53:26	Hewlett Packard Enterprise	03	03	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.8.89	D0:15:A6:CF:58:72	Aruba, A Hewlett Packard Enterprise Company	04	04	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.8.47	B4:5D:50:CA:FF:8A	Aruba, A Hewlett Packard Enterprise Company	05	05	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.8.119	CC:D0:83:C1:70:12	Aruba, A Hewlett Packard Enterprise Company	06	06	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.5.158	00:12:5F:19:BC:E4	Awind Inc.	07	07	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.5.159	00:12:5F:19:BC:E3	Awind Inc.	08	08	1		2023-08-08 17:40:17	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.5.59	D4:61:37:03:F3:80	Ieee Registration Authority	08	08	1		2023-08-08 17:40:17	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194		22:E4:93:DE:49:C5		09	09	1		2023-08-09 08:15:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.5.160	00:12:5F:19:BC:E2	Awind Inc.	09	09	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.5.163	00:12:5F:19:BC:DF	Awind Inc.	10	10	1		2023-08-02 20:30:17	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.5.63	D4:61:37:03:F3:D8	Ieee Registration Authority	10	10	1		2023-08-02 20:30:17	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.5.162	00:12:5F:19:BC:E0	Awind Inc.	11	11	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.8.118	CC:D0:83:C1:71:B4	Aruba, A Hewlett Packard Enterprise Company	12	12	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.6.1	00:0F:3A:A3:CA:20	Hisharp	15	15	1		2023-08-09 10:20:15	<input type="checkbox"/>
	中農-人事室(194)A1930	192.168.3.194	192.168.8.151	60:26:EF:CB:62:5A	Aruba, A Hewlett Packard Enterprise Company	16	16	1		2023-08-09 10:20:15	<input type="checkbox"/>

<< Previous Showing Rows 1 to 17 of 17 [1] Next >>

# 網管軟體-CACTI

- 可以查看某台Sw下某個interface(port)有錯誤資料產生(效率不佳)

MacTrack View Interfaces Logged in as **admin** (Logout)

Sites Devices IP Ranges IP Addresses MAC Addresses Interfaces Graphs

**Scanned Device Interfaces**

Site: TCAVS Filters: Errors Accumulating Bandwidth: N/A Go Clear Export

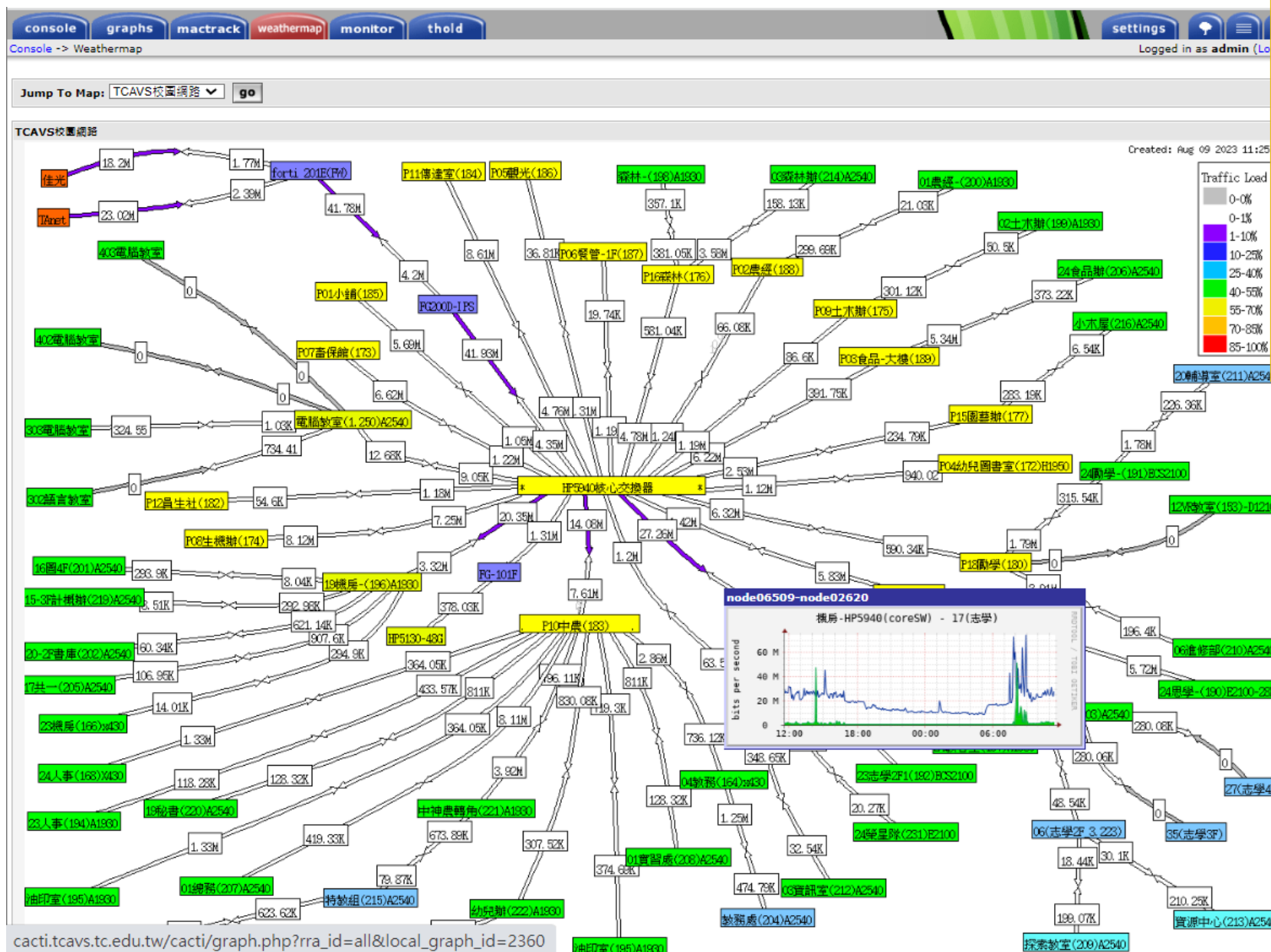
Type: All Device: All Rows: 30

Search:   Show Total Errors

<< Previous Showing Rows 1 to 30 of 73 [1,2,3] Next >>

Actions	Hostname	Type	Name	Description	Alias	InBound %	OutBound %	In Bytes Second	Out Bytes Second	In Err Total**	In Disc Total	UProto Total	Out Err Total	Out Disc Total	Status	Last Change	Last Scanned
	傳達室(184)HP5130	TYPE_HP5130-24G	GigabitEthernet1/0/1	GigabitEthernet1/0/1		0.2 %	5.5 %	28.29 k	666.3 k	566648	0	494348	0	35585504	Up	15d:16h:34m	09-05 21:40:09
	機房-(196)A1930	TYPE_ARUBA1930	8	8		0 %	0 %	776	23.59 k	338988	0	0	0	0	Up	225d:23h:23m	09-05 21:40:09
	中神-轉角(221)A1930	TYPE_ARUBA1930	3	3		0 %	0 %	901	24.65 k	314529	0	0	0	0	Up	237d:6h:9m	09-05 21:40:09
	機房-(196)A1930	TYPE_ARUBA1930	9	9		0 %	0 %	1.978 k	24.69 k	310366	0	0	0	0	Up	247d:9h:23m	09-05 21:40:09
	中神-轉角(221)A1930	TYPE_ARUBA1930	15	15		0 %	0 %	884	24.38 k	303412	0	0	0	0	Up	237d:6h:9m	09-05 21:40:09
	中農-人事室(194)A1930	TYPE_ARUBA1930	1	1		0 %	0 %	869	23.18 k	299147	0	0	0	0	Up	237d:6h:10m	09-05 21:40:09
	中農-油印室(195)A1930	TYPE_ARUBA1930	4	4		0 %	0 %	847	24.41 k	272036	0	0	0	0	Up	200d:8h:54m	09-05 21:40:09
	中農-油印室(195)A1930	TYPE_ARUBA1930	8	8		0 %	0 %	862	24.39 k	271777	0	0	0	0	Up	200d:8h:53m	09-05 21:40:09
	土機館-土木辦(199)A1930	TYPE_ARUBA1930	14	14		0 %	0 %	771	22.94 k	268081	0	0	0	0	Up	200d:8h:54m	09-05 21:40:09
	土機館-土木辦(199)A1930	TYPE_ARUBA1930	10	10		0 %	0 %	829	22.95 k	268051	0	0	0	0	Up	200d:8h:19m	09-05 21:40:09
	中農-總務處(207)A2540	TYPE_ARUBA2540	20	20		0 %	0 %	769	23.16 k	255508	0	0	0	0	Up	200d:8h:53m	09-05 21:40:09
	活水堂-資訊室(212)A2540	TYPE_ARUBA2540	12	12		0 %	0 %	708	25.22 k	250443	0	0	0	0	Up	71d:4h:50m	09-05 21:40:09

# 網管軟體-CACTI



即時流量的氣象圖

- 可顯示某一對線路(埠)5分鐘平均流量
- 因它目前還用cacti 0.88.X版，現已有1.2.X版



# 網管軟體-CACTI

● 主機/SW存活監控

The screenshot displays the CACTI monitoring interface with the following sections:

- Navigation:** console, graphs, mactrack, weathermap, monitor, thold
- Monitoring:** Logged in as admin (Logout), Last Refresh: 11:32:05 am, Mute
- Aruba controller:**
  - 無線-C-620(.16): Status: Up, IP Address: 192.168.2.16, Ping: 2.94 ms, Last Fail: 2023-03-17 11:35:00, Availability: 99.99%
  - 無線-D-7010(.74): Status: Up, IP Address: 192.168.2.74, Ping: 1.66 ms, Last Fail: 2023-03-17 11:35:00, Availability: 99.98%
  - 無線-E-7030(107): Status: Up, IP Address: 192.168.2.107, Ping: 0.93 ms, Last Fail: 2023-03-17 11:35:00, Availability: 99.23%
- ESXi 5.x:**
  - c103-vm61: Status: Up, IP Address: 192.168.2.61, Ping: 0.52 ms, Last Fail: 2021-11-11 20:15:00, Availability: 84.16%
  - c103-vm94: Status: Up, IP Address: 192.168.2.94, Ping: 0.37 ms, Last Fail: 2022-07-15 16:05:00, Availability: 99.61%
  - c35-vm64: Status: Up, IP Address: 192.168.2.64, Ping: 0.31 ms, Last Fail: 2023-03-26 15:05:00, Availability: 99.98%
  - c35-vm67: Status: Up, IP Address: 192.168.2.67, Ping: 0.3 ms, Last Fail: 2022-07-23 13:40:00, Availability: 99.96%
  - c35-vm71: Status: Up, IP Address: 192.168.2.71, Ping: 0.42 ms, Last Fail: 2022-08-26 17:30:00, Availability: 99.99%
  - c36-vm24: Status: Up, IP Address: 192.168.2.24, Ping: 0.38 ms, Last Fail: 2022-07-23 13:40:00, Availability: 99.95%
  - c36-vm32: Status: Up, IP Address: 192.168.2.32, Ping: 0.29 ms, Last Fail: 2022-07-23 13:40:00, Availability: 99.86%
  - c36-vm70: Status: Down, IP Address: 192.168.2.70, Ping: 0.73 ms, Last Fail: 2022-07-12 14:45:00, Availability: 81.05%
  - c81-vm78: Status: Up, IP Address: 192.168.2.78, Ping: 0.64 ms, Last Fail: 2022-07-15 15:55:00, Availability: 100%
  - c81-vm79: Status: Up, IP Address: 192.168.2.79, Ping: 0.28 ms, Last Fail: 2023-02-09 17:10:00, Availability: 99.8%
  - c81-vm80: Status: Up, IP Address: 192.168.2.80, Ping: 0.47 ms, Last Fail: 2022-10-03 05:00:00, Availability: 99.99%
- extremeSW:**
  - 中興-人專室(167)X430: Status: Up, IP Address: 192.168.3.167, Ping: 16.05 ms, Last Fail: 2023-05-09 06:55:00, Availability: 99.77%
  - 中興-教務(164)x430: Status: Up, IP Address: 192.168.3.164, Ping: 15.4 ms, Last Fail: 2023-05-01 14:50:00, Availability: 99.59%
  - 機房-(166)X430: Status: Up, IP Address: 192.168.3.166, Ping: 1.39 ms, Last Fail: 2022-12-01 22:15:00, Availability: 99.95%
  - 神農-幼兒園(163)x430: Status: Up, IP Address: 192.168.3.163, Ping: 1.36 ms, Last Fail: 2023-03-24 15:35:00, Availability: 99.91%
- Fortigate:**
  - 機房-forti-101F: Status: Up, IP Address: 192.168.2.247, Ping: 0.19 ms, Last Fail: 2022-05-25 21:15:00, Availability: 100%
  - 機房-forti-200D: Status: Up, IP Address: 192.168.2.251, Ping: 2.03 ms, Last Fail: 2023-03-17 11:35:00, Availability: 99.32%
  - 機房-forti-201E: Status: Up, IP Address: 192.168.200.253, Ping: 1.58 ms, Last Fail: 2022-12-01 22:10:00, Availability: 99.95%
- Generic SNMP-enabled Host:**
  - 中興-人專室(194)A1930: Status: Up, IP Address: 192.168.3.194
  - 中興-實習處(208)A2540: Status: Up, IP Address: 192.168.3.208
  - 中興-教務處(204)A2540: Status: Up, IP Address: 192.168.3.204
  - 中興-維修處(207)A2540: Status: Up, IP Address: 192.168.3.207
  - 勸學-(191)ECS2100-28PP: Status: Up, IP Address: 192.168.3.191
  - 勸學-維修部(210)A2540: Status: Up, IP Address: 192.168.3.210
  - 圖書館-小木屋(216)A2540: Status: Up, IP Address: 192.168.3.216
  - 東經-4F(201)A2540: Status: Up, IP Address: 192.168.3.201

# 網管軟體-CACTI

console graphs mactrack weathermap monitor **thold**

Console -> Thresholds Logged in as **admin** (Logout)

Thresholds Log Host Status

**Threshold Status**

Template: All Host: All Status: All Rows: 30 Search:  Go Clear

<< Previous Showing Rows 1 to 5 of 5 [1] Next >>

Actions	Name	ID	Type	Trigger	Duration	Repeat	Warn Hi/Lo	Alert Hi/Lo	BL Hi/Lo	Current	Triggered**	Enabled
	機房-HP5940(coreSW) - Traffic - 48 [traffic_in]	1	High/Low	Never	N/A	Every 10 Minutes	-/-	300000000/-	N/A	46,541,346.2133	no	Enabled
	機房-HP5940(coreSW) - Traffic - 48 [traffic_out]	2	High/Low	5 Minutes	N/A	Every 10 Minutes	-/-	300000000/-	N/A	3,497,569.4933	no	Enabled
	機房-HP5940(coreSW) - Traffic - 2 [traffic_in]	7	High/Low	5 Minutes	N/A	Every Hour	300000000/-	300000000/-	N/A	12,158.73	no	Enabled
	機房-HP5940(coreSW) - Traffic - 1 [traffic_out]	6	High/Low	5 Minutes	N/A	Every Hour	200000000/-	300000000/-	N/A	115,699.0467	no	Disabled
	機房-HP5940(coreSW) - Traffic - 1 [traffic_in]	5	High/Low	5 Minutes	N/A	Every Hour	200000000/-	300000000/-	N/A	709,008.3833	no	Disabled

<< Previous Showing Rows 1 to 5 of 5 [1] Next >>

Alarm	Baseline Alarm	Warning	Notice	Ok	Disabled
-------	----------------	---------	--------	----	----------

ALERT: 機房-HP5940(coreSW) - Traffic - 48 [traffic\_in] [traffic\_in] is still above threshold of 300000000 with 307660220.16

tcavs802@gms.tcavs.tc.edu.tw <tcavs802@gms.tcavs.tc.edu.tw> 7月27日 週四 上午8:45 (13 天前) ☆ ↶ ⋮  
寄給我 · tcavs802

An Alert has been issued that requires your attention.

TIME: 2023-07-27 08:45:19  
Host: 機房-HP5940(coreSW) (192.168.2.254)  
URL: [http://cacti.tcavs.tc.edu.tw/cacti/graph.php?local\\_graph\\_id=2365&rra\\_id=1](http://cacti.tcavs.tc.edu.tw/cacti/graph.php?local_graph_id=2365&rra_id=1)  
Message: ALERT: 機房-HP5940(coreSW) - Traffic - 48 [traffic\_in] [traffic\_in] is still above threshold of 300000000 with 307660220.16

機房-HP5940(coreSW) - 48 (up->2000)

bits per second

Current: 309.76M Average: 29.31M Maximum: 663.24M

● 門檻警戒值，超過設定值可發告警信件



# 網管軟體-CACTI (1.2.X版)畫面



## 網管軟體-libreNMS

- 每5分鐘透過snmp蒐集交換器、主機網路流量數據
- 支援IPMI機制，能取得主機(設備)更詳細資料
- 完整的設備監控功能，可取代CACTI
- 進階可自訂條件告警擴充彈性高
- 各家設備資料收集完整

# 網管軟體-libreNMS



### Top Devices

Device	Traffic
CoreSW5940(2_254)	
192.168.200.253	
192.168.2.251	
機房-(196)A1930	
志學-教官室(181)HP5130	

### Device Summary

Summary	Devices	Ports	Services
<b>Up</b>	79	954	0
<b>Down</b>	14	1242	0
<b>Ignored tag</b>	0	0	0
<b>Alert disabled</b>	0	NA	NA
<b>Disabled/Shutdown</b>	0	145	0
<b>Total</b>	93	2349	0

### Graylog

Search [ ] 15 [ ] [ ]

Timestamp	Level	Source	Message	Facilit
No results found!				

### Top Interfaces

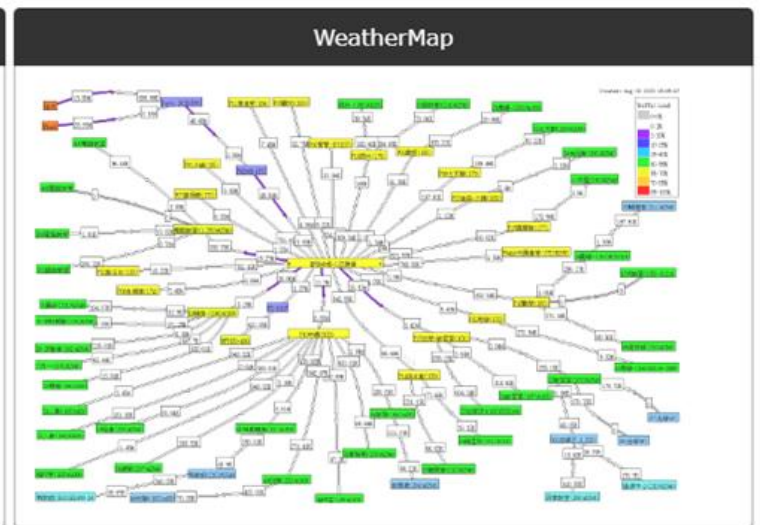
Top 5 interfaces polled within 15 minutes

Device	Interface	Total traffic
CoreSW5940(2_254)	Te1/0/48	
CoreSW5940(2_254)	Te1/0/45	
192.168.2.251	port2	
192.168.2.251	port1	
CoreSW5940(2_254)	Vlan-interface200	

### Alerts

Search [ ] 50 [ ] [ ]

Timestamp	Rule	Hostname	Location
No results found!			





# 網管軟體-libreNMS

- 受監控設備列表
- 還可以自動繪出拓樸圖

Lists: Basic | **Detail** | Graphs: Bits | CPU | Load | Memory | Uptime | Storage | Disk I/O | Poller | Ping | Temperature

Search [All] [All OS] [All Versions] [All Platforms] [All Featuresets] [All Locations] [All Device Types] Search Update URL Reset [Refresh] 50 [Grid]

S.	Id	M.	Vendor	Device	Metrics	Platform	Operating System	Up/Down Time	Location	Actions
19				餐管-(187)HP5130 sw_192.168.3.187	31 10	5130 24G 4SFP+ EI Switch	HPE Comware 7.1.070 (3208P12)	220d 4m 16s		
38				食品-食品辦(206)A2540 aruba2540-sw206	37 14	JL354A 2540-24G-4SFP+	HP ProCurve YC.16.10.0002	209d 23h 33m 10s		
25				食品-(189)HP5130 sw_192.168.3.189	31 13	5130 24G 4SFP+ EI Switch	HPE Comware 7.1.070 (3208P12)	220d 4m 27s		
70				電教(1.250)A2540 aruba2540-sw001250	37 6	JL354A 2540-24G-4SFP+	HP ProCurve YC.16.10.0002	220d 2h 47m 40s		
36				農經-(200)A1930 aruba1930-sw200	31	1930 24G Class4 PoE 4SFP/SFP+ 370W JL684A	HP ProCurve 1.0.1.0	209d 23h 37m 56s		
21				農經-(188)HP5130 sw_192.168.3.188	31 14	5130 24G 4SFP+ EI Switch	HPE Comware 7.1.070 (3208P16)	220d 4m 54s		
20				觀光-(186)HP5130 sw_192.168.3.186	31 11	5130 24G 4SFP+ EI Switch	HPE Comware 7.1.070 (3208P12)	206d 16h 8m 44s		
31				神農-特教組(193)GS1900-24 gs1900-24	26	GS1900-24	ZyXEL Ethernet Switch V2.60(AAHL.4)	220d 2h 53m 38s	sp_office	
73				神農-特教組(160)HPE1620 hpe1620-24g	26		HPE Comware	1y 59d 22h 42m 19s	special education team	
89				神農-幼兒辦(222)A1930 aruba1930-sw222	31	1930 24G Class4 PoE 4SFP/SFP+ 370W JL684A	HP ProCurve 1.0.1.0	137d 23h 29m 30s		
91				神農-幼兒辦(163)x430 163-24g	32	X430-24t	Extreme XOS 15.5.0.1 (15501.1)	137d 23h 28m 48s		

# 網管軟體-libreNMS



Overview Devices Services Ports Health Wireless Routing Alerts

64 admin

Global Search

Hewlett Packard Enterprise  
CoreSW5940(2\_254)  
TCAVS

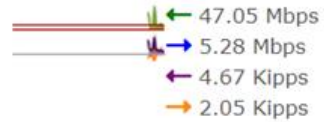
Traffic

Overview Graphs Health Ports VLANs Neighbours STP Inventory Logs Alerts Alert Stats Latency Notes

## Ten-GigabitEthernet1/0/48

Ten-GigabitEthernet1/0/48 Interface

Default



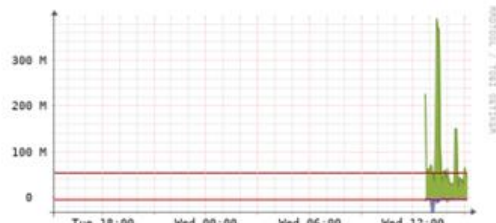
1 Gbps Ethernet  
fullDuplex -  
VLAN: 200

ec:9b:8b:ca:63:db  
MTU 10000

Graphs | Real time | ARP Table | FDB Table | Eventlog | Notes | Health | VLANs

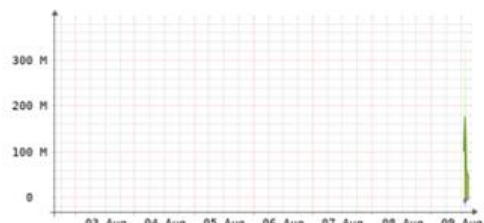
Create Bill

## Interface Traffic



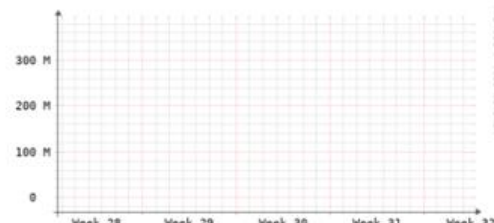
bps	Now	Ave	Max	95th %
In	47.12M	83.52M	391.56M	55.10M
Out	5.08M	5.53M	32.50M	3.34M
Total	100.18GB	(In 93.96GB Out 6.23GB)		

Port Speed 1 Gbps



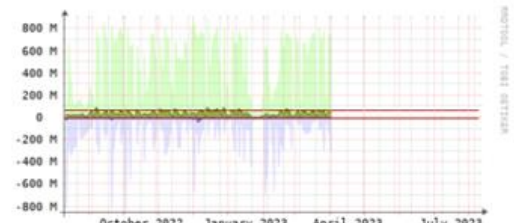
bps	Now	Ave	Max	95th %
In	43.66M	87.09M	391.56M	-nan
Out	3.66M	5.51M	32.50M	-nan
Total	104.18GB	(In 97.98GB Out 6.20GB)		

Port Speed 1 Gbps



bps	Now	Ave	Max	95th %
In	114.29M	114.29M	391.56M	-nan
Out	7.31M	7.31M	32.50M	-nan
Total	218.88GB	(In 205.73GB Out 13.16GB)		

Port Speed 1 Gbps



bps	Now	Ave	Max	95th %
In	48.19M	35.80M	888.11M	65.31M
Out	10.07M	6.02M	855.94M	11.77M
Total	105.68TB	(In 90.46TB Out 15.22TB)		

Port Speed 1 Gbps

## Interface Packets



## 網管軟體-Nfdump+nfsens

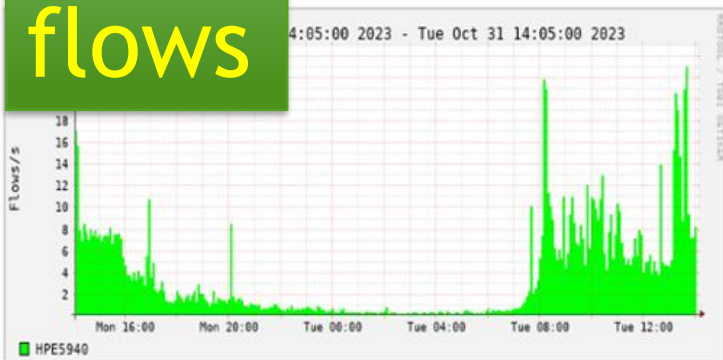
- 以nfdump為後端資料接收
- nfsens為前端網頁資料呈現
- 設備須支援netflow或sflow傳送連線流量記錄
- 在設備上sflow以埠(或介面)為單位用取樣(sampling)傳出紀錄，非100%傳出紀錄
- 每5分鐘統計一次
- 要另外使用網頁目錄認證方式(.htaccess檔)

# 網管軟體-Nfdump+nfsens

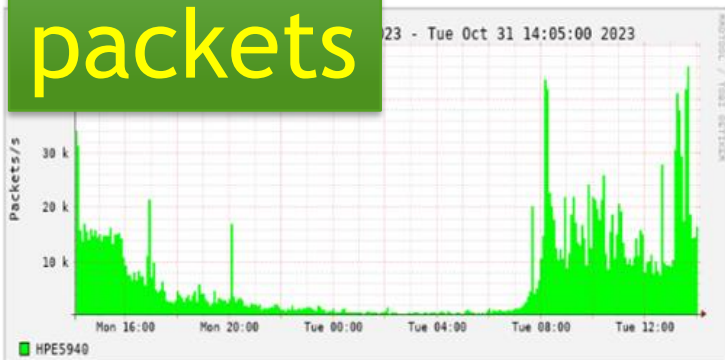
Home Graphs Details Alerts Stats Plugins live [Bookmark URL](#) Profile: live ▼

## Overview Profile: live, Group: (nogroup)

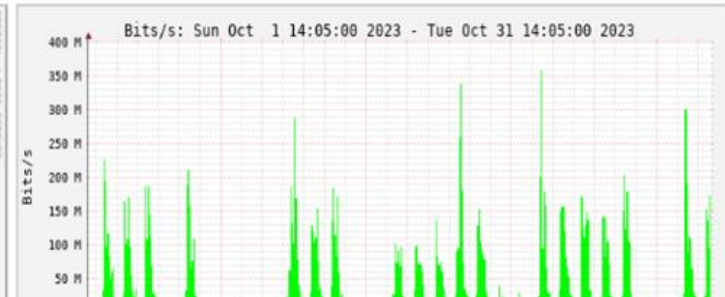
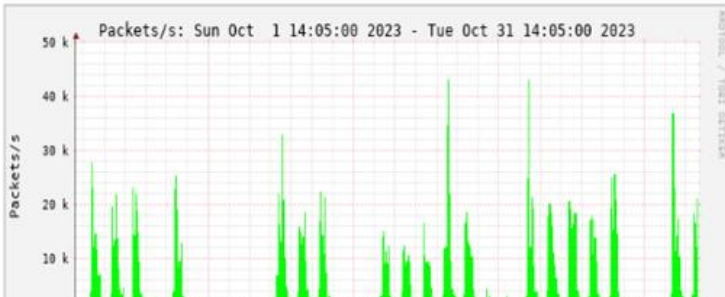
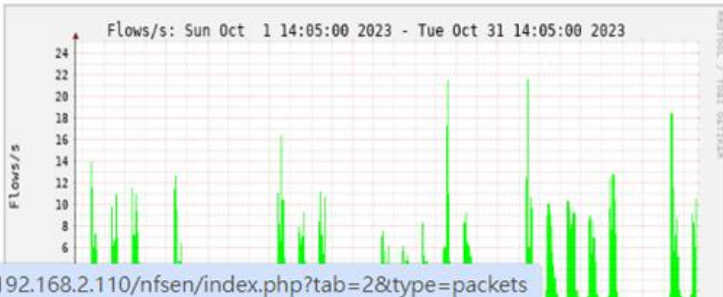
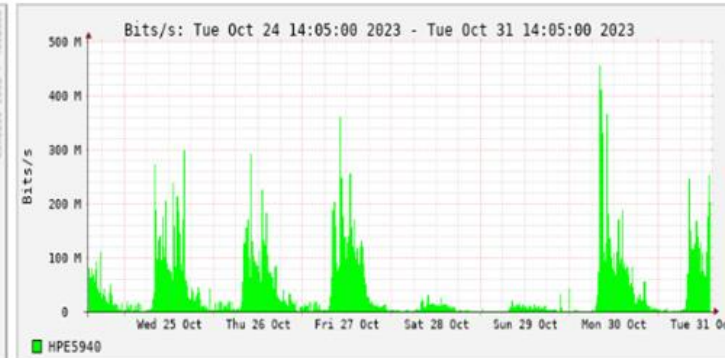
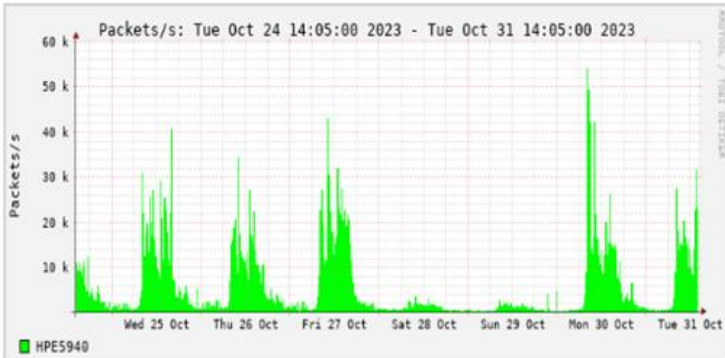
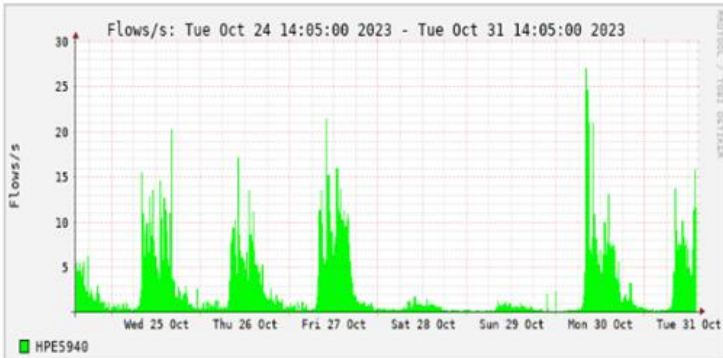
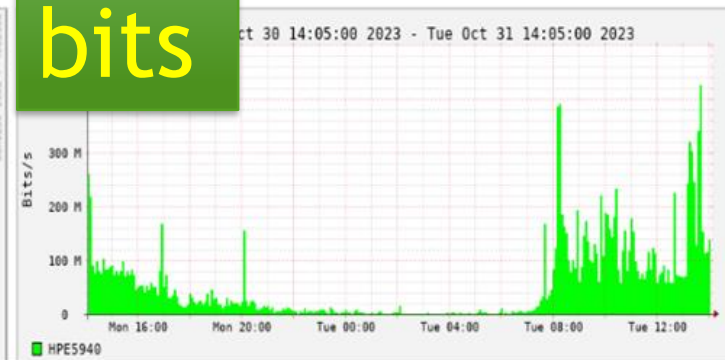
flows



packets



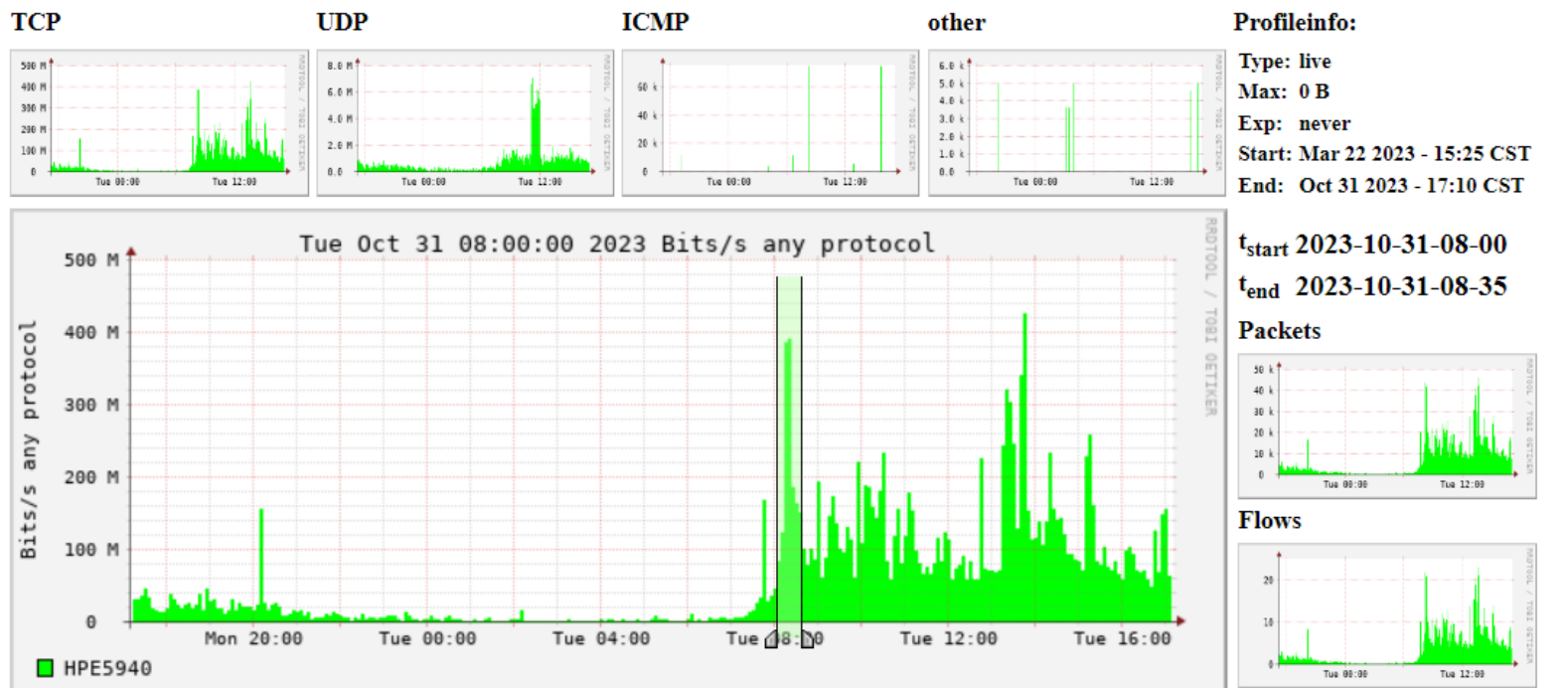
bits



# 網管軟體-Nfdump+nfsens

Home | Graphs | Details | Alerts | Stats | Plugins | live [Bookmark URL](#) Profile: live ▼

Profile: live



Select  ▼

Display:  << < | ^ > >> >|

Lin Scale  Stacked Gr  
 Log Scale  Line Graph

Statistics timeslot Oct 31 2023 - 08:00 - Oct 31 2023 - 08:35

Channel:	Flows:					Packets:					Traffic:				
	all:	tcp:	udp:	icmp:	other:	all:	tcp:	udp:	icmp:	other:	all:	tcp:	udp:	icmp:	other:
<input checked="" type="checkbox"/> HPE5940	11.1 /s	11.0 /s	0.1 /s	0.0 /s	0 /s	22.2 k/s	22.0 k/s	175.8 /s	0.8 /s	0 /s	191.4 Mb/s	190.4 Mb/s	1.0 Mb/s	9.3 kb/s	0 b/s
<b>TOTAL</b>	<b>11.1 /s</b>	<b>11.0 /s</b>	<b>0.1 /s</b>	<b>0.0 /s</b>	<b>0 /s</b>	<b>22.2 k/s</b>	<b>22.0 k/s</b>	<b>175.8 /s</b>	<b>0.8 /s</b>	<b>0 /s</b>	<b>191.4 Mb/s</b>	<b>190.4 Mb/s</b>	<b>1.0 Mb/s</b>	<b>9.3 kb/s</b>	<b>0 b/s</b>

All  None Display:  Sum  Rate

● Details上半部可指定區間，顯示統計資料

# 網管軟體-Nfdump+nfsens

● Details 下半部可進一步查詢詳細紀錄

Statistics timeslot Oct 31 2023 - 08:00 - Oct 31 2023 - 08:35

Channel:	Flows:					Packets:					Traffic:				
	all:	tcp:	udp:	icmp:	other:	all:	tcp:	udp:	icmp:	other:	all:	tcp:	udp:	icmp:	other:
<input checked="" type="checkbox"/> HPE5940	11.1 /s	11.0 /s	0.1 /s	0.0 /s	0 /s	22.2 k/s	22.0 k/s	175.8 /s	0.8 /s	0 /s	191.4 Mb/s	190.4 Mb/s	1.0 Mb/s	9.3 kb/s	0 b/s
TOTAL	11.1 /s	11.0 /s	0.1 /s	0.0 /s	0 /s	22.2 k/s	22.0 k/s	175.8 /s	0.8 /s	0 /s	191.4 Mb/s	190.4 Mb/s	1.0 Mb/s	9.3 kb/s	0 b/s

All None Display:  Sum  Rate

## Netflow Processing

Source:  Filter:

Options:  List Flows  Stat TopN

Top:

Stat:  order by

Limit:  Packets >  -

Output:  / IPv6 long

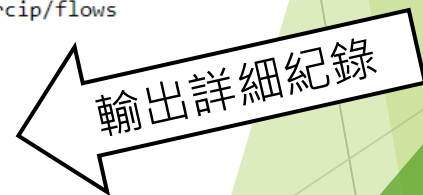
Clear Form process



```
** nfdump -M /usr/local/nfsen/profiles-data/live/HPE5940 -T -R 2023/10/31/nfcpad.202310310800:2023/10/31/nfcpad.202310310835 -n 10 -s srcip/flows  
nfdump filter:
```

```
any  
Top 10 Src IP Addr ordered by flows:
```

Date first seen	Duration	Proto	Src IP Addr	Flows(%)	Packets(%)	Bytes(%)	pps	bps	bpp
2023-10-31 08:05:20.852	1977.125	any	209.197.3.8	3035(11.4)	6.1 M(11.4)	9.2 G(16.0)	3070	37.3 M	1517
2023-10-31 08:01:15.837	2268.140	any	34.104.35.123	2465( 9.2)	4.9 M( 9.2)	7.5 G(13.1)	2173	26.4 M	1520
2023-10-31 08:00:42.835	2294.142	any	61.58.159.25	2107( 7.9)	4.2 M( 7.9)	6.4 G(11.1)	1836	22.3 M	1517
2023-10-31 08:00:41.288	1836.661	any	163.28.224.206	1636( 6.1)	3.3 M( 6.1)	5.0 G( 8.7)	1781	21.7 M	1520
2023-10-31 08:09:02.866	1626.100	any	163.28.225.111	932( 3.5)	1.9 M( 3.5)	2.8 G( 4.9)	1146	13.9 M	1519
2023-10-31 08:11:20.875	1485.531	any	163.28.5.129	471( 1.8)	942000( 1.8)	1.4 G( 2.5)	634	7.7 M	1517
2023-10-31 08:00:27.833	2297.143	any	172.217.160.106	323( 1.2)	646000( 1.2)	888.6 M( 1.5)	281	3.1 M	1375
2023-10-31 08:00:00.833	2399.147	any	142.251.42.238	286( 1.1)	572000( 1.1)	378.4 M( 0.7)	238	1.3 M	661
2023-10-31 08:22:34.790	890.181	any	192.168.57.62	284( 1.1)	568000( 1.1)	41.4 M( 0.1)	638	371879	72
2023-10-31 08:00:05.832	2382.147	any	142.251.42.225	256( 1.0)	512000( 1.0)	705.0 M( 1.2)	214	2.4 M	1376

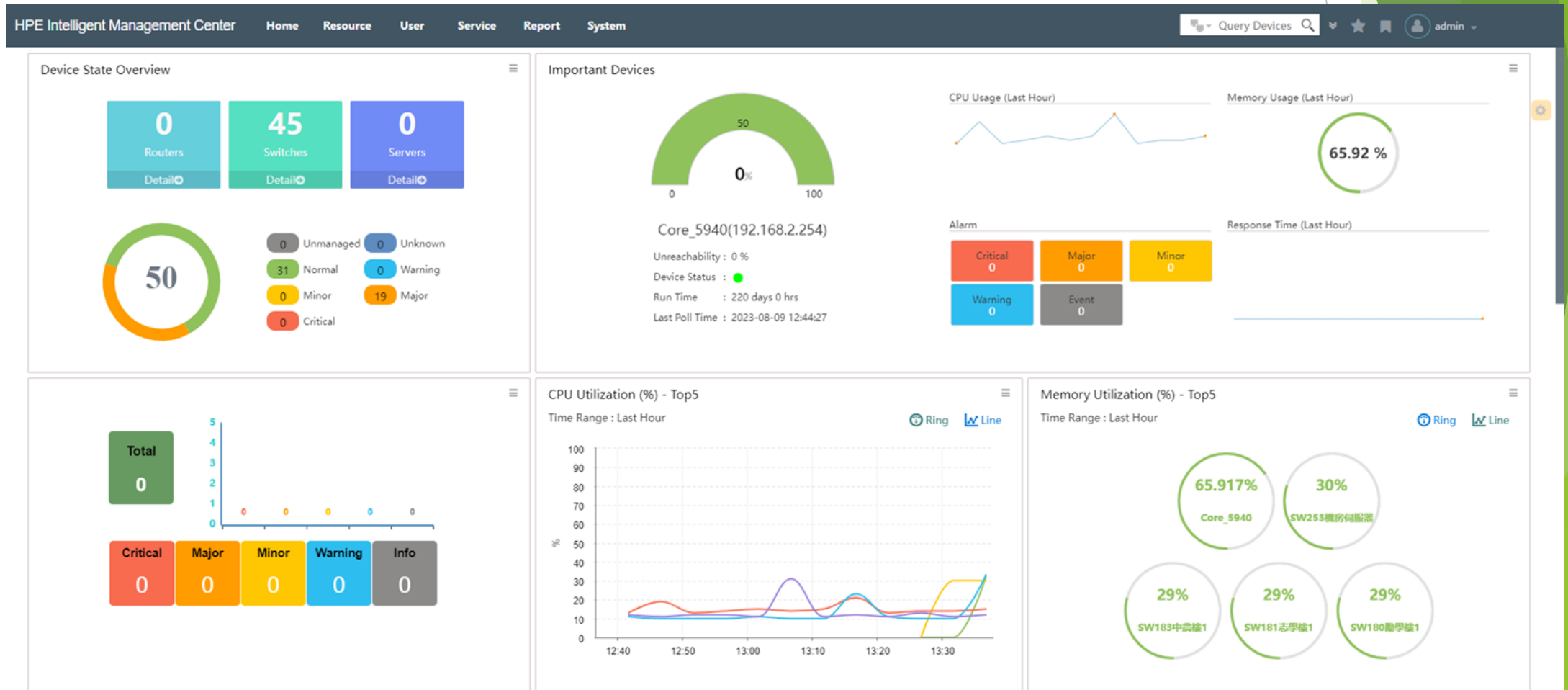


```
Summary: total flows: 26657, total bytes: 57.4 G, total packets: 53.3 M, avg bps: 191.5 M, avg pps: 22222, avg bpp: 1077  
Time window: 2023-10-31 08:00:00 - 2023-10-31 08:39:59  
Total flows processed: 26657, Blocks skipped: 0, Bytes read: 3950504  
Sys: 0.014s flows/second: 1847588.0 Wall: 0.011s flows/second: 2272355.3
```



# 網管軟體iMC

- 針對HPE自家出品的交換器完整設備監控
- 商業版軟體，有授權數量限制☹️



# 網管軟體-iMC

- 若是HPE自家的產品，  
就可以得到詳細的資訊

HPE Intelligent Management Center

Home Resource User Service Report System

Query Devices

View Management

Resource > Aruba2540-SW201(192.168.3.201)

Add to My Favorites Help

Network Topology

Port Group >>>

Custom View >>>

IP View >>>

Device View >>>

Rack View >>>

Resource Management >

Terminal Access >

Performance Management >

Device Details

<b>Device Label</b>	Aruba2540-SW201 [Modify]	<b>System Name</b>	Aruba2540-SW201 [Modify]
<b>Device Status</b>	Normal	<b>Contact</b>	[Modify]
<b>IP Address</b>	192.168.3.201	<b>Location</b>	[Modify]
<b>Mask</b>	255.255.255.0	<b>Runtime</b>	209 day(s) 22 hour(s) 10 minute(s) 36 second(s) 190 millisecond(s)
<b>sysOID</b>	1.3.6.1.4.1.11.2.3.7.11.182.18	<b>Last Poll</b>	2023-08-09 13:39:51
<b>Device Model</b>	HPE ARUBA 2540 24G 4SFP+ Switch	<b>Login Type</b>	Telnet [Modify]
<b>Device Category</b>	Switches [Modify]	<b>Interfaces</b>	37Interface List
<b>System Description</b>	Aruba JL354A 2540-24G-4SFP+ Switch, revision YC.16.10.0002, ROM YC.16.01.0002 (/ws/swbuildm/rel_ajanta_qaoff/code/build/cpm(swbuildm_rel_ajanta_qaoff_rel_ajanta))		
<b>Maintenance Tag</b>	No Maintenance Tag [Modify]		

Service Monitoring Trap Destination

Monitoring Service Total Items: 0. Customize

Performance Monitor

Monitor Index	Monitored Value	Operation
Average CPU Usage (%) in Last Hour - [CPU:.0]	0.000%	Stop Monitor
Average Memory Usage (%) in Last Hour - [Memory:.1]	28.448%	Stop Monitor
Average Response Time of Device (ms) in Last Hour - [Device]	0.000 ms	Stop Monitor
Average Device Unreachability Proportion (%) in Today - [Device]	0.000%	Stop Monitor

Performance at a Glance Modify Display Indexes

Configure >

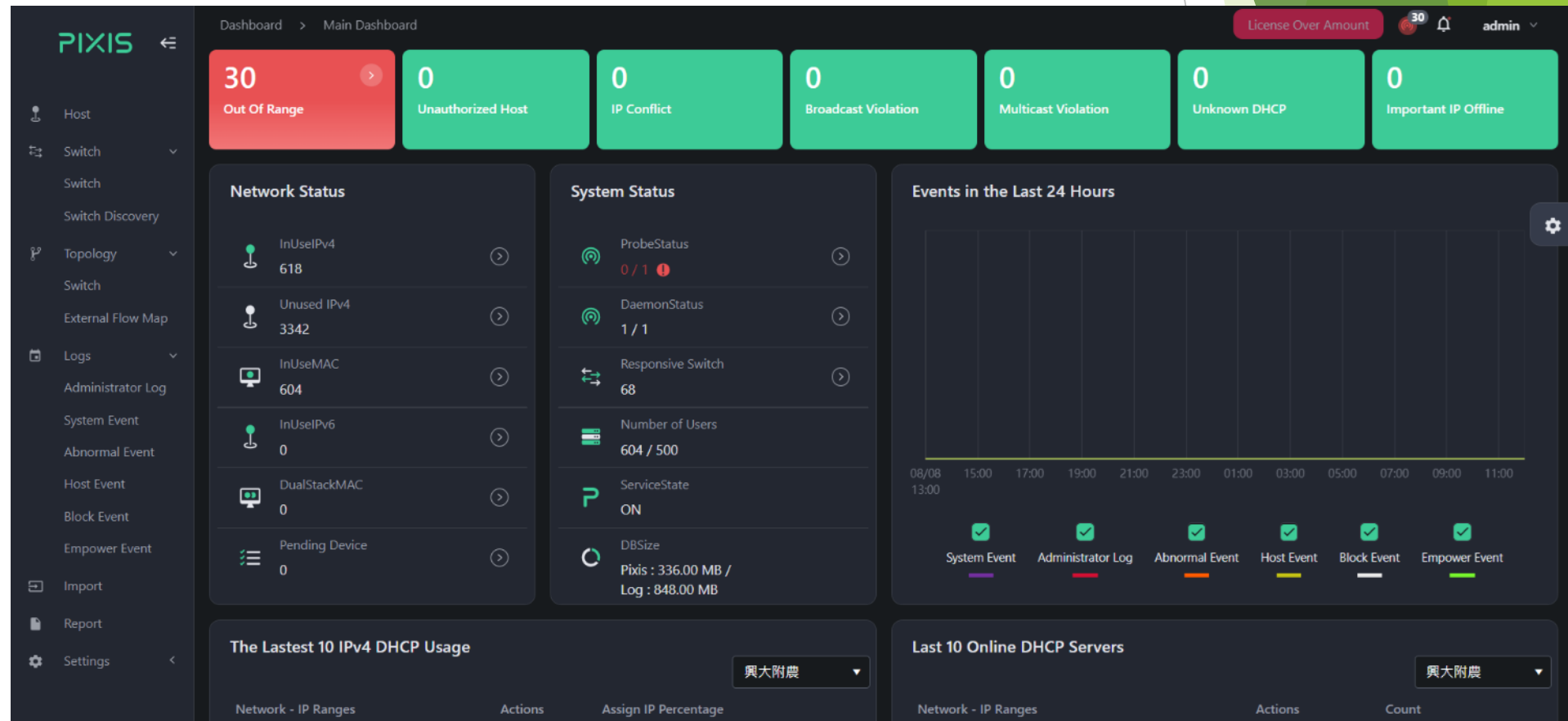
Performance Monitor >

VLAN Management >

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# 網管軟體-pixis

- 比較是針對IP host行為做監控管理
- 商業版軟體，有授權數量限制☹️
- 對SW也有監控



# 網管軟體-pixis

The screenshot displays the PIXIS Host List interface. The top navigation bar includes the PIXIS logo, a search bar, and various filters like 'Time-limit Authorized MAC' and 'General Authorized MAC'. The main content area shows a table of 49 to 64 records. The table columns are: Online Status, MAC, IPv4, IPv6, Site, OS, Domain Group, Switch Name, Used Switch Port, Email, Link Local, Duid, and Iaid. The table contains 10 rows of data, with the 4th row highlighted. The bottom of the interface features a pagination control showing page 4 of 16.

License Over Amount 30 admin

## Host List

Display Setting Register Host Export Time-limit Authorized MAC General Authorized MAC

Search IP / MAC / Host Name MAC View Host Status = Null value IP Status = Online Append Filter

Show 49 to 64 records ( Total 604 records ).

Online Status	MAC	IPv4	IPv6	Site	OS	Domain Group	Switch Name	Used Switch Port	Email	Link Local	Duid	Iaid
Online	002673CF70CF	192.168.30.120		興大附農			志學-教官室(181)HP5130	Gi1/0/13				
Online	781C5A893265	192.168.52.6		興大附農			圖藝-(177)HP5130	Gi1/0/4				
Online	D45D64C34591	192.168.62.2		興大附農		WORKGROUP	勸學-輔導室(211)A2540	2				
Online	049226DEB39E	192.168.80.159		興大附農		WORKGROUP	圖書館-共一(205)A2540	3				
Online	1831BF9331DF	192.168.58.1		興大附農		WORKGROUP	志學-教官室(181)HP5130	Gi1/0/3				
Online	EC988BCA63A0	192.168.6.254		興大附農								
Online	D45D64C2E4D8	192.168.62.6		興大附農		WORKGROUP	勸學-輔導室(211)A2540	7				
Online	D017C2CA6CB0	192.168.62.11		興大附農		WORKGROUP	勸學-輔導室(211)A2540	11				
Online	1831BF9263EA	192.168.20.146		興大附農		WORKGROUP	勸學-進修部(210)A2540	7				

« < 2 3 4 5 6 > » 16



# 網管軟體-pixis

● 自動畫出網路拓樸圖(用LLDP)

The screenshot displays the PIXIS network management interface. On the left is a navigation sidebar with options like '儀表板', '網路設備', and '拓樸圖'. The main area shows a network topology for '興大附農' (Xingda Attached Farm). The diagram features a central switch (PIXIS 102.188.3.185) connected to numerous other devices, including switches and servers. Each device node includes details such as its name, IP address, and MAC address. The connections are color-coded by bandwidth, with a legend at the bottom ranging from 0m to 10G. The interface also includes a top navigation bar with '拓樸圖 > 區域 [興大附農]', a notification for '上線 MAC 數量已經超過授權數量', and a user profile 'admin'.

# 網管軟體-pixis

## ● 偵測&紀錄特定事件

Event > Abnormal Event

License Over Amount 29 admin

### Abnormal Event

Export

This Year: 2023/01/01 00:00:00 2023/12/31 23:59:59

Type = Broadcast Violation Append Filter

Show 1 to 6 records ( Total 6 records ).

Time	Type	Site	IP	MAC	Host Name	NIC Vendor	Note
2023/02/09 17:19:03	Broadcast Violation	興大附農		0050568EDB68	K12ACCSQL	VMware Inc.	6998 Bytes / Sec
2023/02/09 17:16:59	Broadcast Violation	興大附農		D0BF9C3ABF88	SERVER_2_34	Hewlett Packard	10220 Bytes / Sec
2023/02/09 17:16:46	Broadcast Violation	興大附農		3C7C3FC2FD5B		ASUSTek COMPUTER INC.	5451 Bytes / Sec
2023/02/09 17:14:46	Broadcast Violation	興大附農		984BE1057614		Hewlett Packard	10037 Bytes / Sec
2023/02/09 17:14:46	Broadcast Violation	興大附農		5CF3FC4E6A08		IBM Corp	10511 Bytes / Sec
2023/02/09 17:14:45	Broadcast Violation	興大附農		0050568E6609	IMCSRV	VMware Inc.	45088 Bytes / Sec

1 16

# 無線網路架構(第1代)

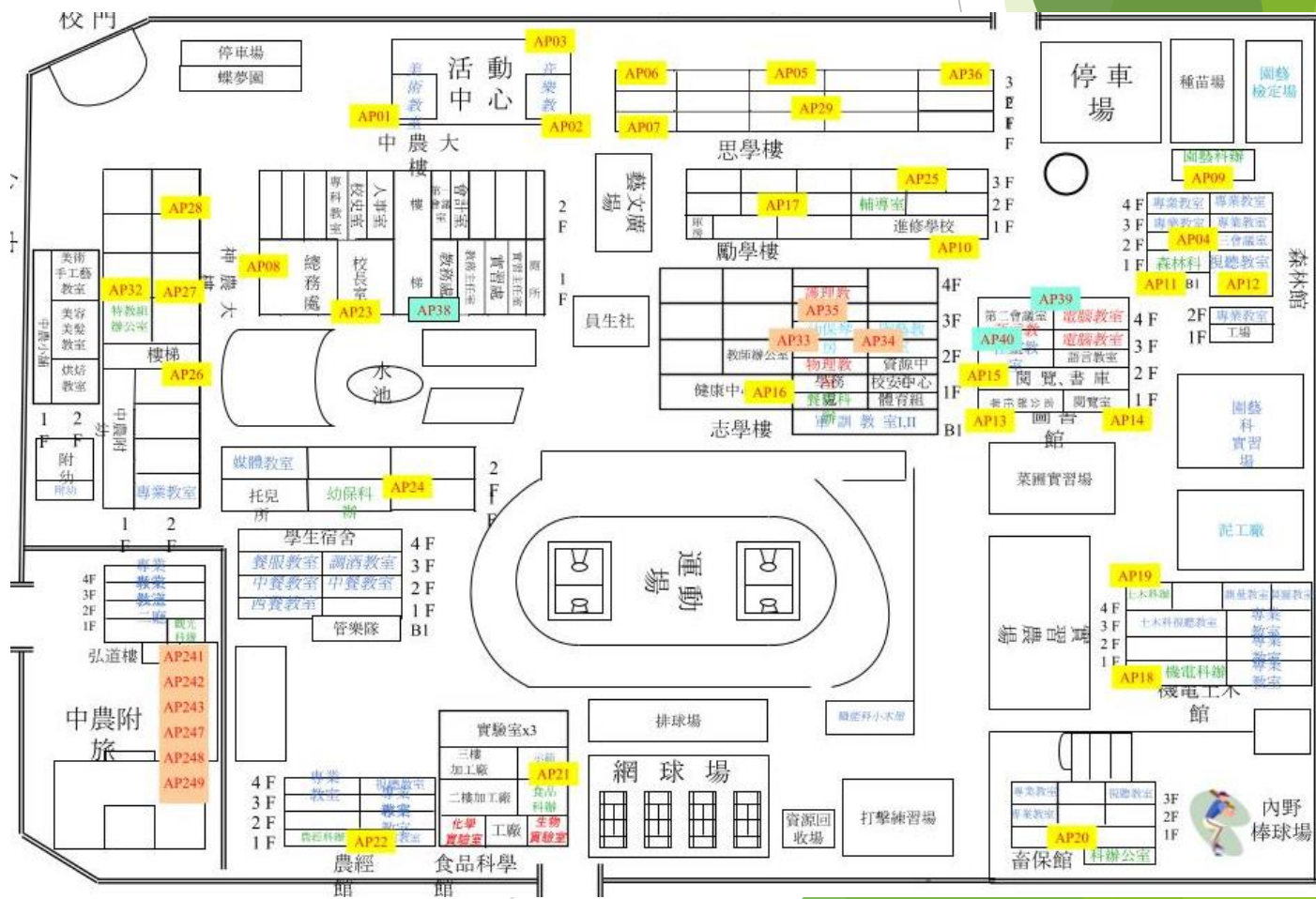
- 自96年優質化計畫開始引進aruba系統
- 控制器aruba 800 \* 2，基地台AP-60 \* 31，就是接上各大樓SW
- 安裝分散於各教室內，數個班共用
- 97年加入tanetroaming





# 無線網路架構(第1.5代)

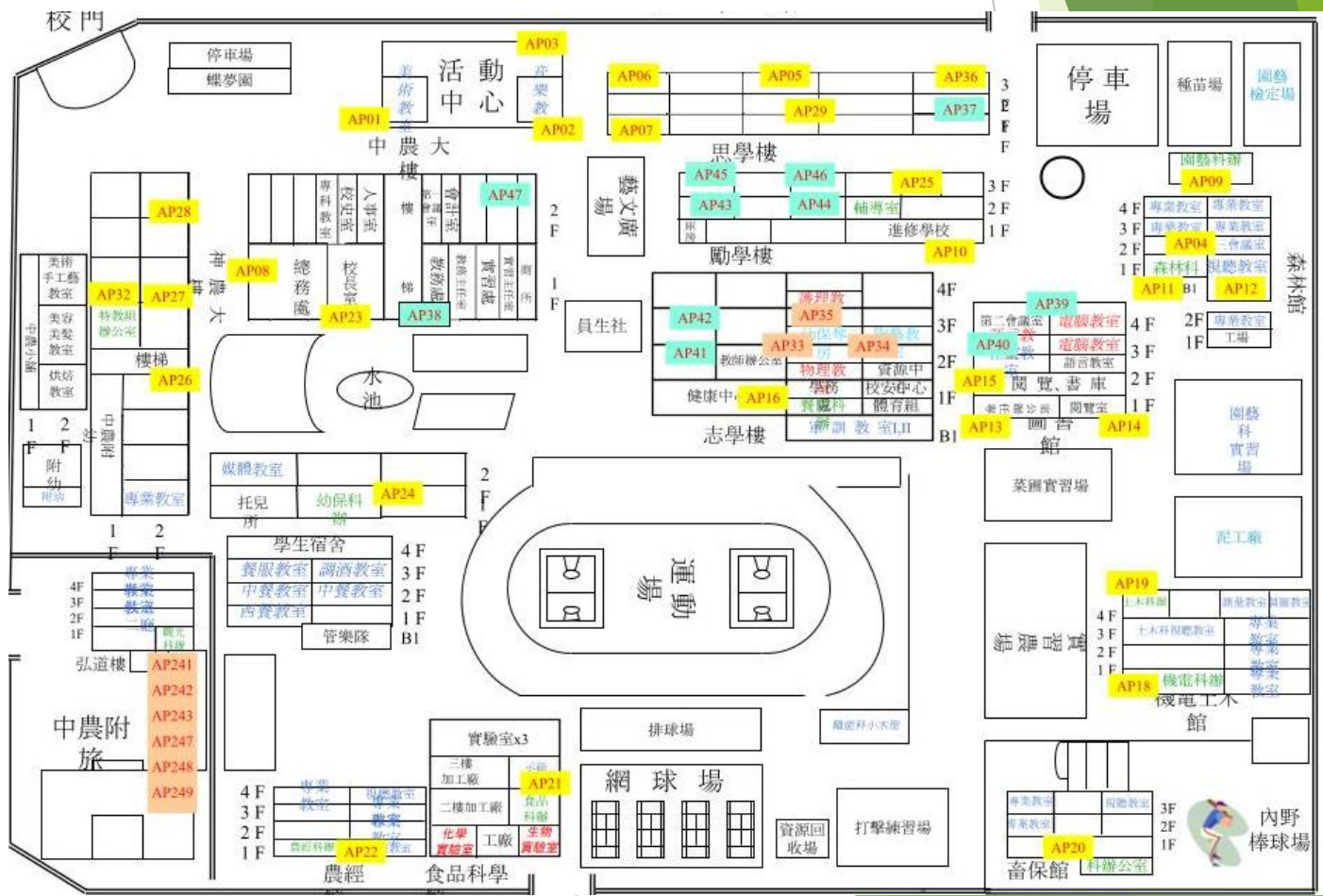
- 借101年實習旅館買aruba 620，於104年內另購3台AP-104
- 本來說可以控制32台，升級韌體後變只能8台
- 也就這幾台，沒再多了





# 無線網路架構(第2代)

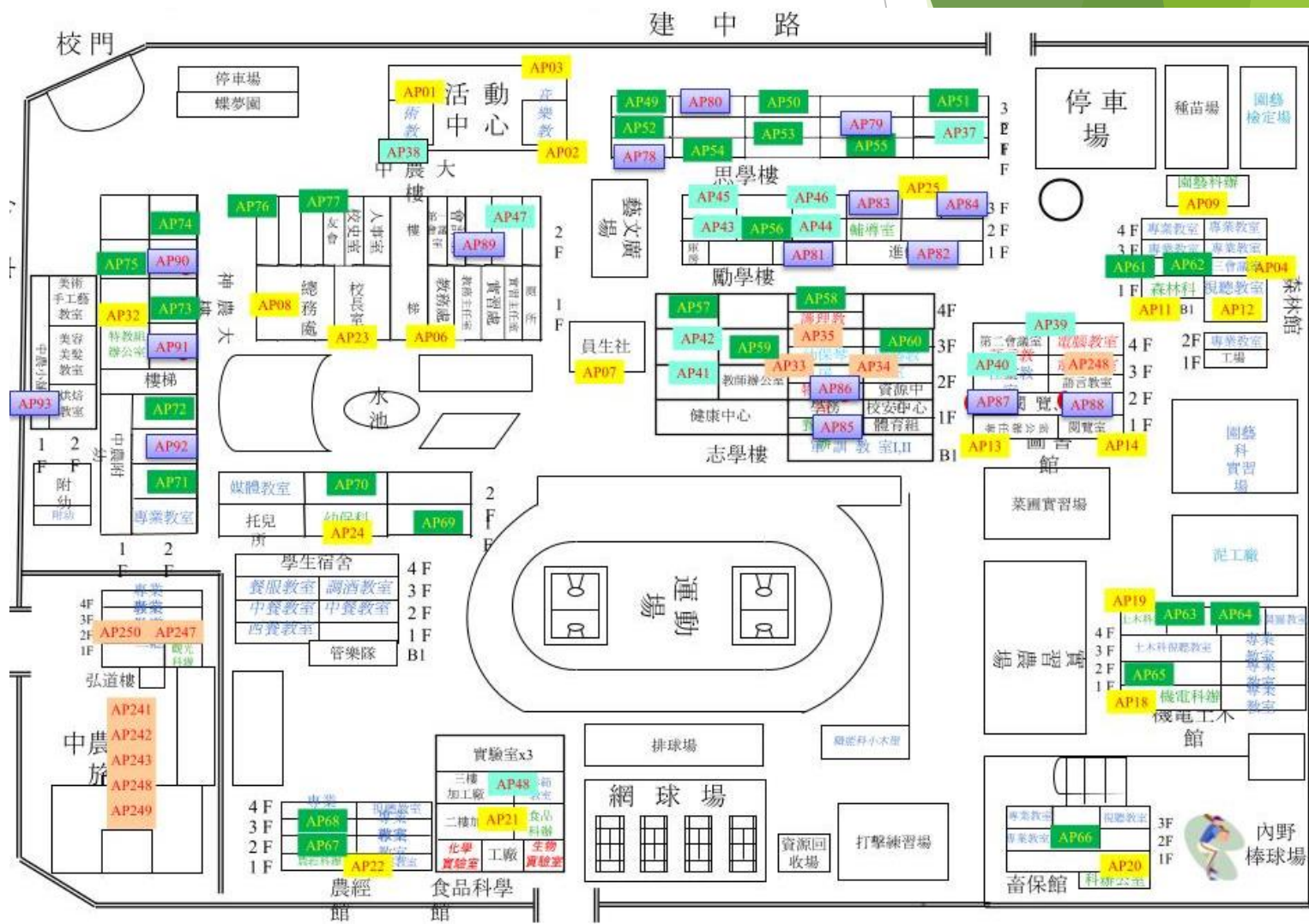
- 106年優質化引入aruba7010
- 藉不同計畫分別購入AP204，填補教室空缺





# 無線網路架構(第3代)

- 109年前瞻計畫買入第二台aruba7030、AP305，填補大部分教室空缺
- 整合2台7030，引入aruba的MM架構
- 購買POE交換器使用



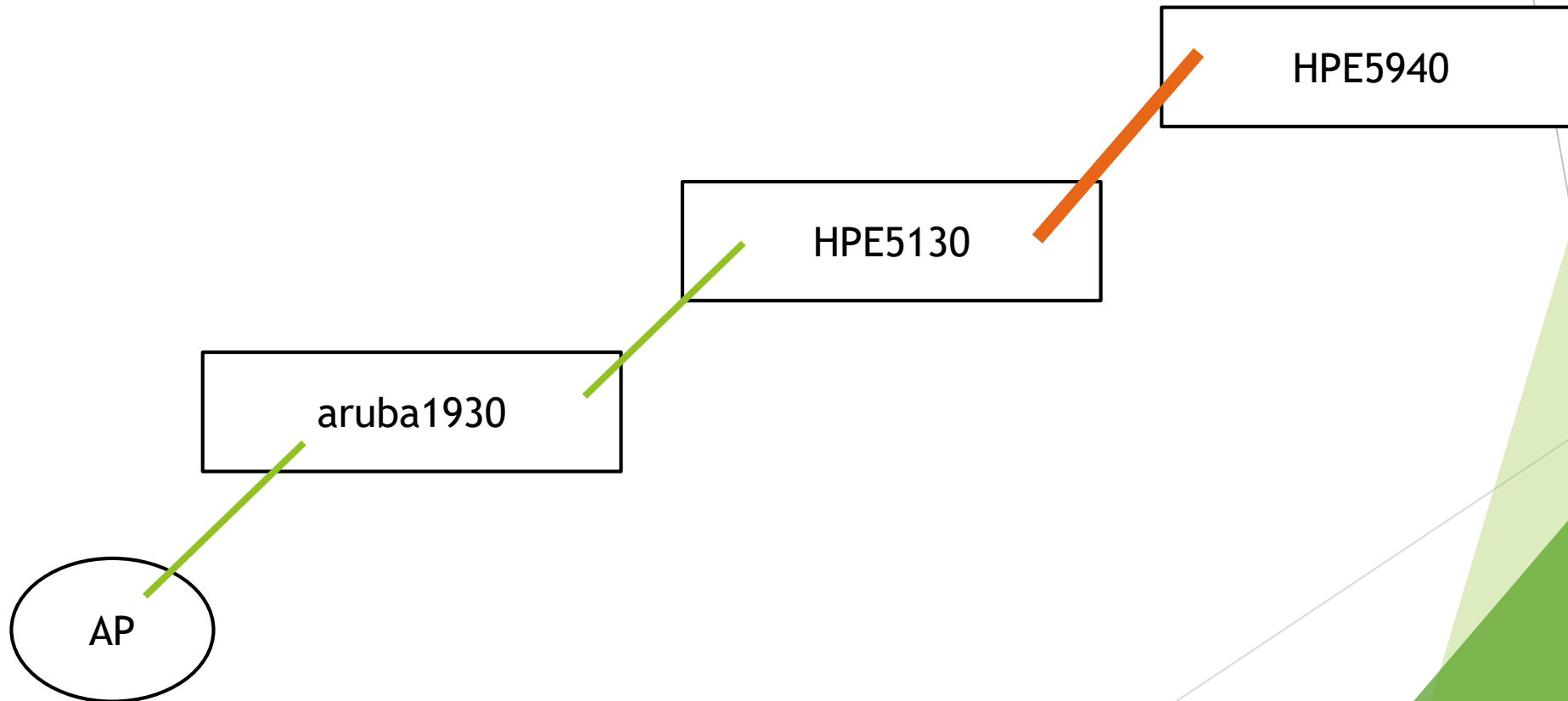






## 無線網路架構(第3代)

- 各大樓POE交換器(Aruba1930)接於HPE5130之下
- 到核心SW為2層距離
- Aruba1930有4埠SPF+支援10Gbps，未來可改走光纖直上coreSW。



## 無線網路-管理系統

- 採用Aruba MM (ARUBA MOBILITY MASTER)架構
- 利用VM建立一台管理主機，整合管理實體控制器(7030 \*2)
- 另有一台相同VM協同運作。
- 所有設定皆於MM上設定，然後派送到控制器

# 無線網路-管理系統



MOBILITY MASTER  
ArubaMM-VA\_1

CONTROLLERS

2 0

ACCESS POINTS

106 1

CLIENTS

80 0

ALERTS

0

admin

Managed Network

Search

## Dashboard

### Overview

Infrastructure

Traffic Analysis

Security

Services

Configuration

Maintenance



Mobility Master

00:50:56:8e:22:0f

ArubaMM-VA\_1

Managed Network (2)

Tcavs (2)

Aruba7030-1

Aruba7030-2



## CLIENTS

Grouped by health



## WLANS

Show WLANs with most clients

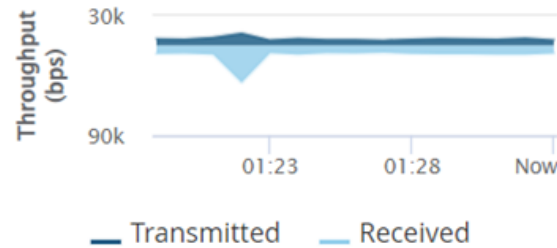


4 WLANs are currently active



## USAGE

Show Tx & Rx



1.93 MB has been transferred in the last 15 minutes



## RADIOS

Grouped by channel quality



ArubaMM-VA,8.6.0.19

# 無線網路-管理系統

● 查看AP的資訊

The screenshot displays the Aruba Mobility Master interface for ArubaMM-VA\_1. At the top, there are summary statistics for CONTROLLERS (2), ACCESS POINTS (106), CLIENTS (80), and ALERTS (0). The main navigation menu on the left includes Dashboard, Overview, Infrastructure, Traffic Analysis, Security, Services, Configuration, and Maintenance. The central dashboard shows a summary for 107 Access Devices, with a table listing AP173, AP172, and AP171. AP171 is selected, showing its details and channel utilization for 2.4 GHz and 5 GHz channels. The 2.4 GHz channel utilization is 71% Free, 15% Tx time, and 13% Rx time. The 5 GHz channel utilization is 95% Free, 2% Tx time, and 1% Interference. A table at the bottom lists other APs like AP170 and AP169.

aruba MOBILITY MASTER ArubaMM-VA\_1

CONTROLLERS 2 ACCESS POINTS 106 CLIENTS 80 ALERTS 0 admin

Managed Network > Search

Dashboard Overview Infrastructure Traffic Analysis Security Services Configuration Maintenance

← 2 Controllers 107 Access Devices 0 Uplinks 1 Cluster

Access Points 106 filtered by Status Up

NAME	STATUS	CLIENTS	UPTIME	MANAGED BY	GROUP	MODEL
> AP173	Up	0	26w	Cluster	tcavs	505
> AP172	Up	0	26w	Cluster	tcavs	505
> AP171	Up	0	11w 5d	Cluster	tcavs	505

**DETAILS**  
Name: AP171  
IP address: 192.168.8.171  
MAC address: 34:3a:20:c9:ab:56  
AP group: tcavs  
Model: 505  
Managed by: Cluster

**RADIO 2.4 GHZ - CHANNEL 1**  
Show information about channel utilization

Current Utilization

- Tx time (15%)
- Rx time (13%)
- Interference (2%)
- Free (71%)

**RADIO 5 GHZ - CHANNEL 48-**  
Show information about channel utilization

Current Utilization

- Tx time (2%)
- Rx time (2%)
- Interference (1%)
- Free (95%)

> AP170	Up	2	24w 5d	Cluster	tcavs	505
> AP169	Up	0	2w 4d	Cluster	tcavs	505

ArubaMM-VA,8.6.0.19



The screenshot displays the Aruba Mobility Master (ArubaMM-VA\_1) interface. The top navigation bar includes the Aruba logo, the system name 'MOBILITY MASTER ArubaMM-VA\_1', a help icon, and the user 'admin'. Below this, a summary bar shows 'Managed Network > Tcavs' with statistics for CONTROLLERS (2), ACCESS POINTS (106), CLIENTS (78), and ALERTS (0). The main content area is divided into a left sidebar and a main configuration pane. The sidebar lists various system components, with 'WLANs' selected. The main pane shows a table of WLAN configurations, with 'eduroam' selected. Below the table, the configuration details for 'eduroam' are shown, including fields for Name (ssid), Primary usage (Employee/Guest), Select AP Groups, and Broadcast on.

**MOBILITY MASTER**  
ArubaMM-VA\_1

admin

Managed Network > Tcavs

CONTROLLERS: 2  
ACCESS POINTS: 106  
CLIENTS: 78  
ALERTS: 0

NAME (SSID)	AP GROUP	NET MANAGEMENT	INFORMATION
eduroam	tcavs	WPA2-Enterprise	--
TANetRoaming	tcavs	Open	--
TCAVS	tcavs	Open	--
tcavs_st	tcavs	Open	--

**eduroam** | General | VLANs | Security | Access

Name (ssid): eduroam

Primary usage:  Employee  Guest

Select AP Groups: [v]

Broadcast on:  default

Cancel Submit

ArubaMM-VA, 8.6.0.19

## 無線網路-存取管理

- 建立SSID tanetroaming，採網頁式入口認證
- 建立SSID eduroam，採802.1X認證
- 2組學術網路漫遊用SSID只開放80、443埠
- 校內建SSID tcavs，採網頁式入口認證
- 校內建SSID tcavsX，採802.1X認證
- 校內專用SSID開放較多埠，方便同仁於校內使用。
- 認證機制建立free radius主機，提供漫遊中心漫遊認證，同時透過ldaps連接google LDAPS，做校內帳號認證。

## 無線網路-帳密存取管理

- 第一代  
校內自建mail server(centos5) , 本機帳號轉至LDAP提供認證
- 第二代  
學校改用google服務 , 用free radius(centos6)以pop3向google認證
- 第三代  
用free radius(ubuntu 22)向google LDAPS服務做認證

# 機房管理

## ● 設置環控系統，可監控：

- ◆ 溫度
- ◆ 濕度
- ◆ 消防偵煙
- ◆ 電力迴路
- ◆ 空調控制
- ◆ 漏水
- ◆ 可發告警4G簡訊





# 機房管理

- 設置容量20KV不斷電系統
- 提供緊急狀況備用電源
- 4年更換一次電池



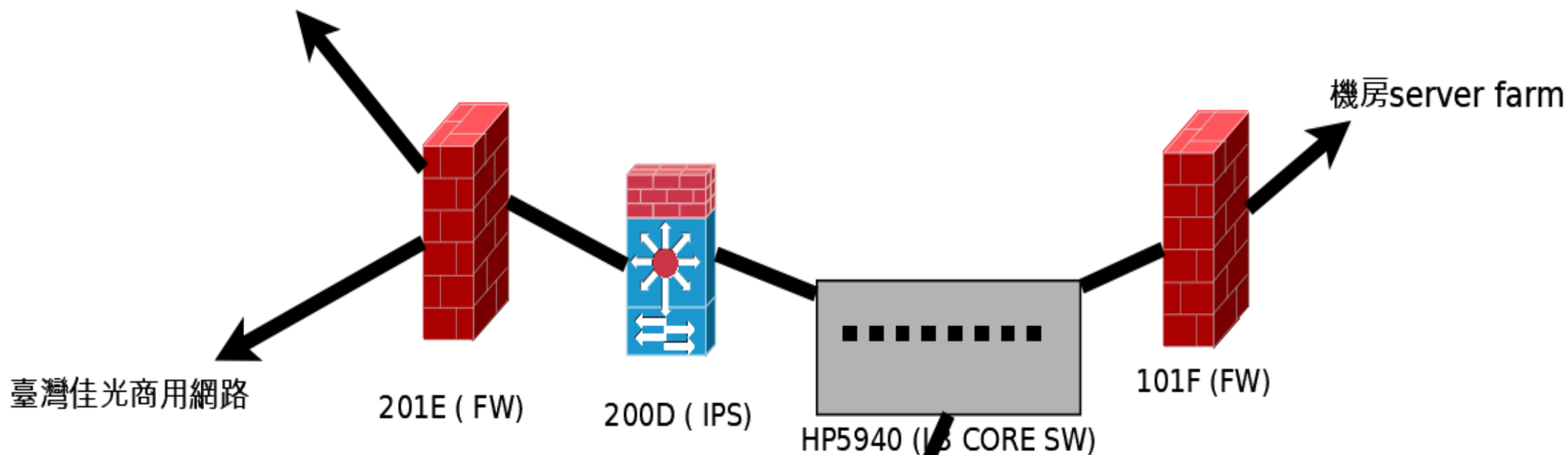
The screenshot displays the USHA UPS Monitor web interface. The browser address bar shows the URL 192.168.2.10. The interface includes a navigation menu on the left and a central summary window titled "概括性視窗". The summary window contains a table of key performance indicators and system status.

UPS狀態	變流器供電
目前市電電壓 (伏特)	218.5
輸出電壓 (伏特)	221.9
輸出負載 (%)	32
電池剩餘容量 (%)	90
電池電壓 (伏特)	13.3
UPS溫度 (°C)	32.0
輸入頻率 (赫茲)	60.0
EMD溫度 (°C)	0
EMD 濕度 (%)	
EMD Alarm-1	Unknown
EMD Alarm-2	Unknown
UPS下次關機時間 (時:分 日/月/年)	
UPS下次開機時間 (時:分 日/月/年)	
USHA系統日期 (日/月/年)	03/11/2021
USHA系統時間 (時:分:秒)	10:33:37
USHA運轉時間 (天時:分:秒)	73days 17:29:44



# 網路資安防護架構

臺灣學術網路



- 以HP5940 為核心L3交換器
- 以forti 201防火牆阻絕分隔校內外網路。
- 以forti 200D 擔任IPS過濾校內外惡意連線。
- 以forti 101F 做為機房內部防火牆，與校園網路隔離。
- 使用者端安裝防毒軟體防護電腦。

各大樓內電腦  
\*電腦防火牆  
\*防毒軟體

# 資安設備

- 設置硬體式IPS(Fortinet 200D)
  - ◆ 對於惡意入侵連線加以阻絕
- 設置對外防火牆(Fortinet 201E)
  - ◆ 管理對內、外埠開關

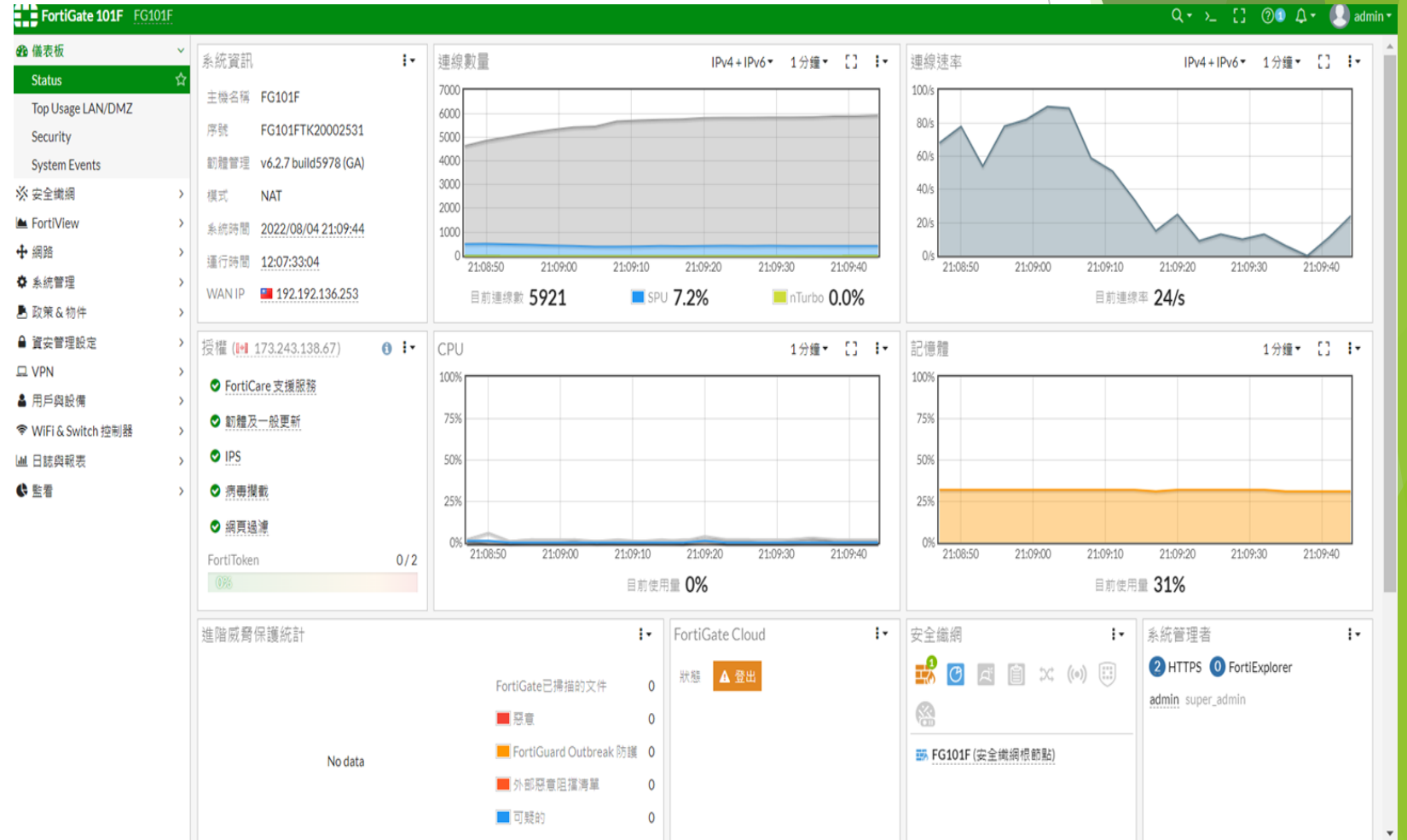
The screenshot displays the FortiGate 200D management interface. The top navigation bar shows the device name 'FortiGate 200D' and ID 'FG200D4613803915'. The left sidebar contains a menu with 'FortiGuard' selected. The main content area is titled 'FortiGuard服務網路' and shows a table of service entitlements and their status.

Entitlement	狀態
FortiCare 支援服務	✓ 註冊 - tcavs203@mitux.tcavs.tc.edu.tw <a href="#">啟動入口網站</a>
硬體版本	✓ 進階硬體保固 - 於 2022/12/29 過期
進階支援	✓ Premium - 於 2022/12/29 過期
韌體及一般更新	✓ 授權 - 於 2022/12/29 過期
應用程式控管特徵值	○ 版本 21.00366 <a href="#">升級資料庫</a>
設定 & OS 辨視	○ 版本 1.00138
網際網路服務資料庫版本	○ 版本 7.02569
入侵防禦	✓ 授權 - 於 2022/12/29 過期 最後更新 2022/08/04
IPS 定義	○ 版本 21.00367 <a href="#">升級資料庫</a>
IPS引擎	○ 版本 4.00076
惡意 URL	○ 版本 4.00428
病毒偵測與攔截	✓ 授權 - 於 2022/12/29 過期
AV 定義	○ 版本 90.04755 <a href="#">升級資料庫</a>

At the bottom of the interface, there is a search bar and a taskbar showing 'ESMC\_Installer\_x...exe'. A '全部顯示' button is located in the bottom right corner.

# 資安設備

- 設置硬體式機房防火牆(Fortinet 101F)
- 隔絕機房主機與校園網路，避免內部攻擊
- 可記錄校園內部連線紀錄





網管工作，有些是一種興趣，雖然全校都沒有人懂你在做什麼。但是當你試出一個系統或是解決一個困擾很久但沒人在乎的問題時，自己一個人在心裡高興的，就自己在那高興。

郁郁寡歡

報告完畢，敬請指教。