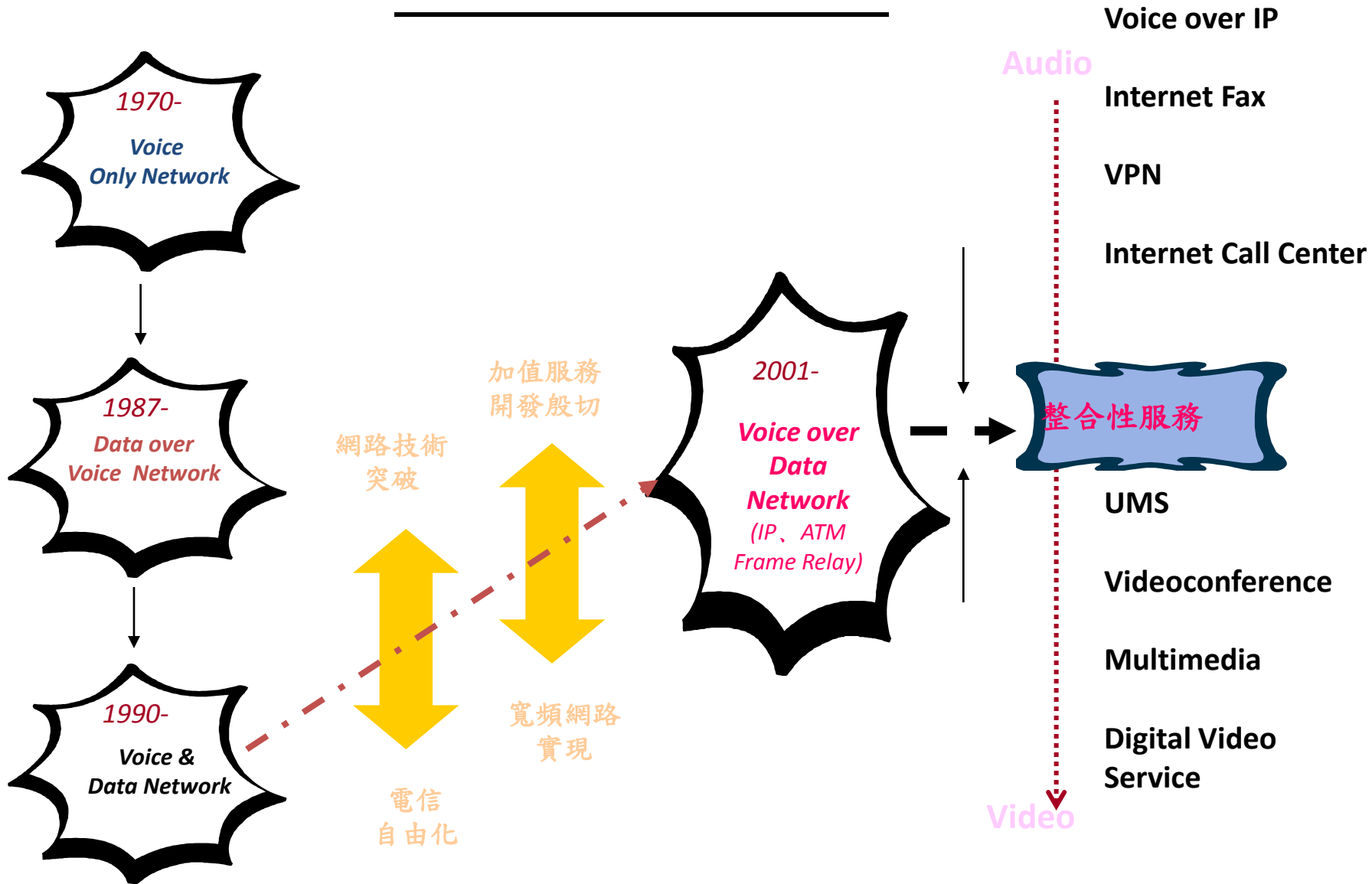


# 加值應用與音質監控

主講人：鄭鈞文

kaiser@gentrice.net

# A New World



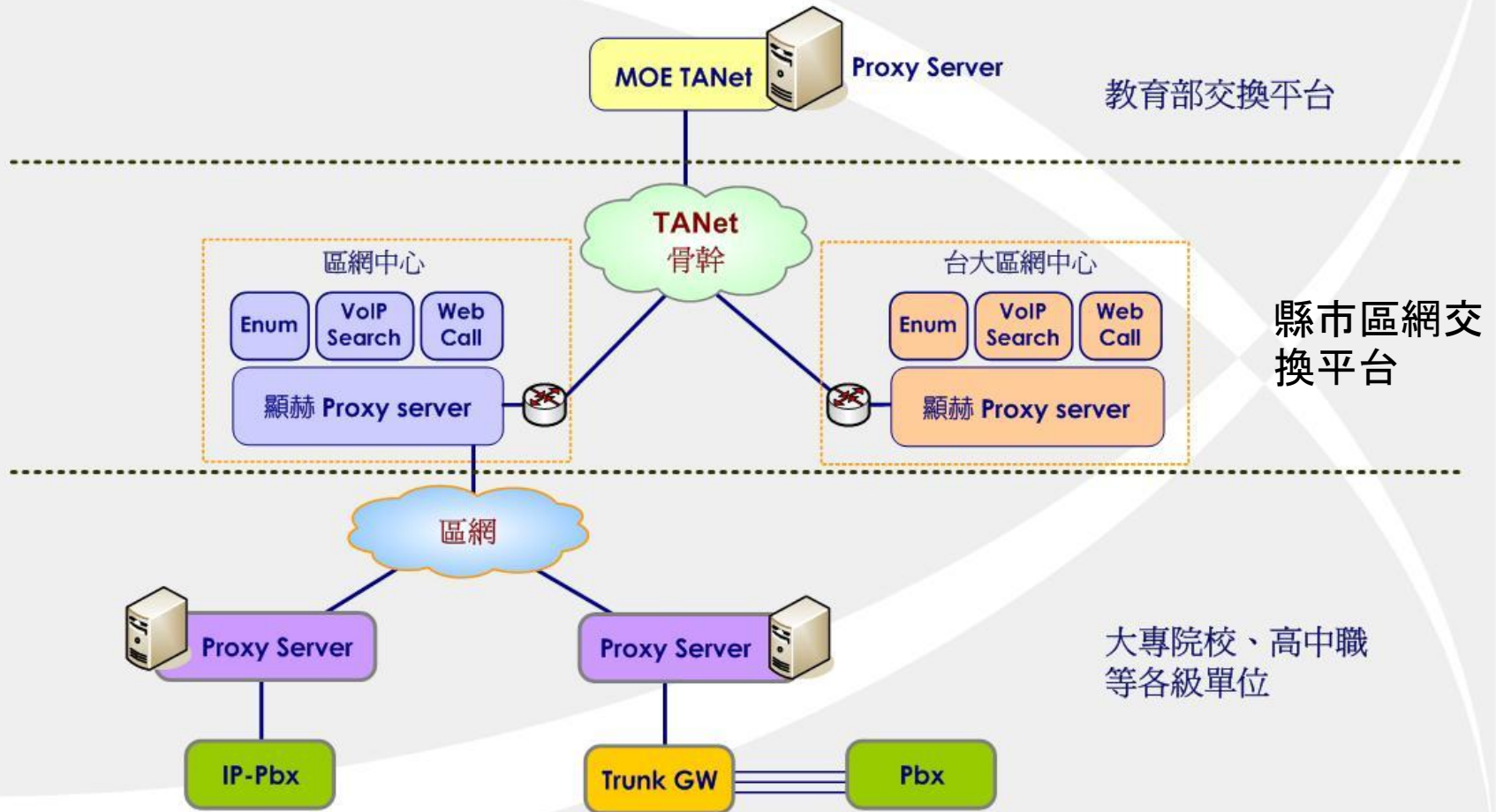
資料來源：工研院電通所ITIS,2000.1

# An system view of VoIP Quality & Management

# TANet voip platform

顯赫資訊 

TANet VoIP 架構圖



# Carrier voip management

- First voip in 1985, Israeli
- CHT start deploying voip around 2000
- Gentrice Working with MYCOM for voip traffic management including IPv6 traffic
  - MYCOM, UK-based company,
  - 2007 , invest NTD\$ 1 billion setup R&D in taipei
  - Telcom grade **performance management** solution provider
  - Service assurance

## Global Presence

### EMEA

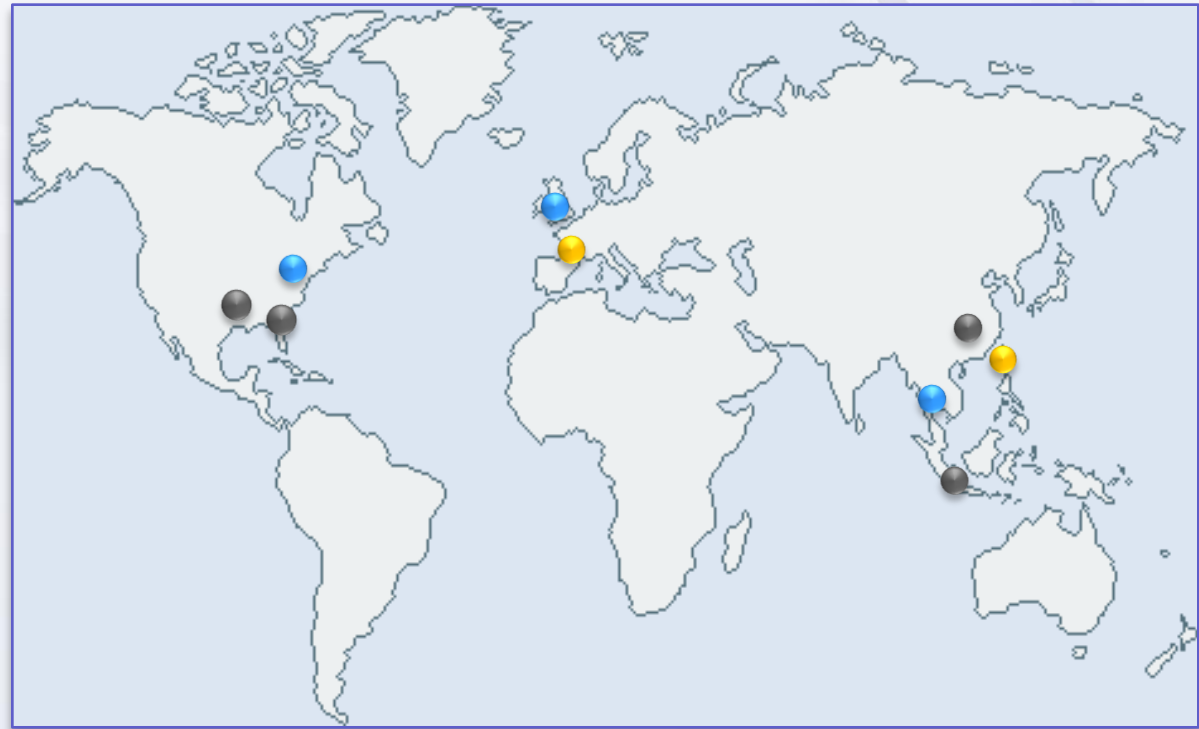
- London, UK
- Paris, France

### Americas

- Atlanta
- Dallas
- Orlando

### APAC

- Bangkok, Thailand
- Taipei, Taiwan
- Jakarta, Indonesia
- Beijing, China



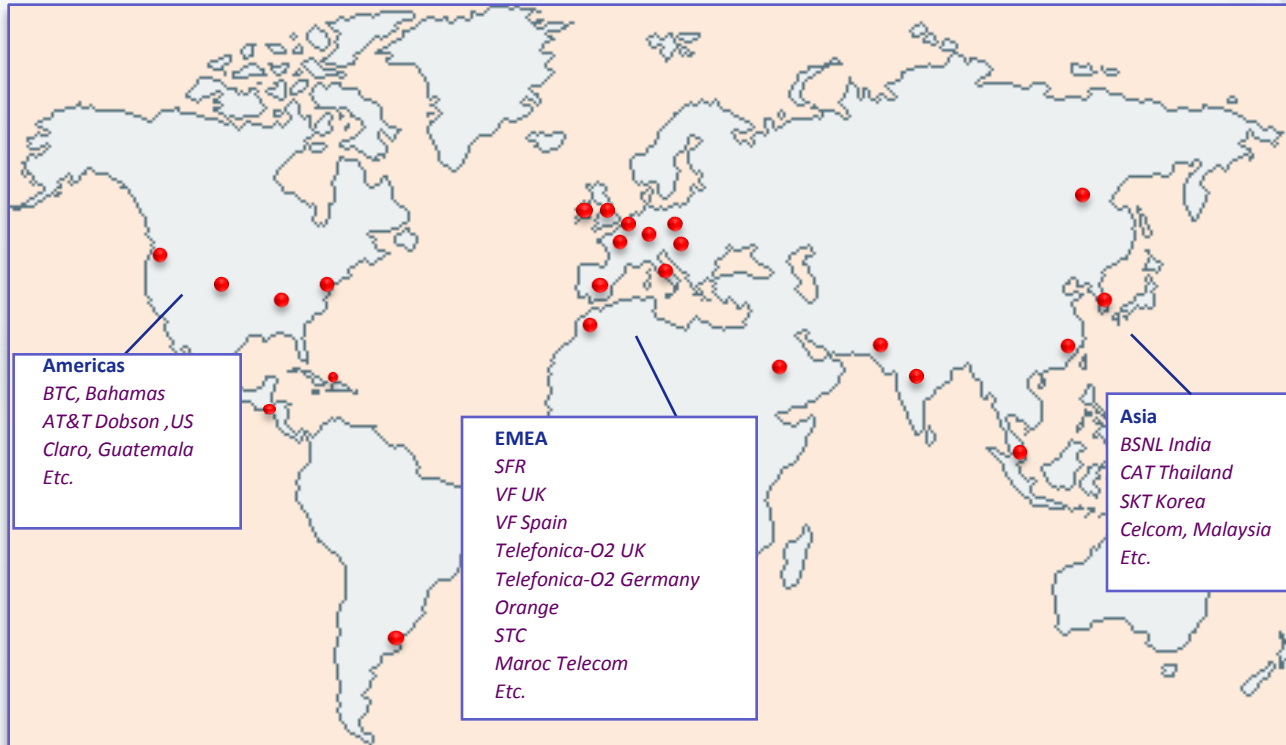
● Headquarters

● R&D Centres

● Offices

**24 x 7 worldwide support**

## Customer References



*Strong presence with major operators*

## Global Partnerships

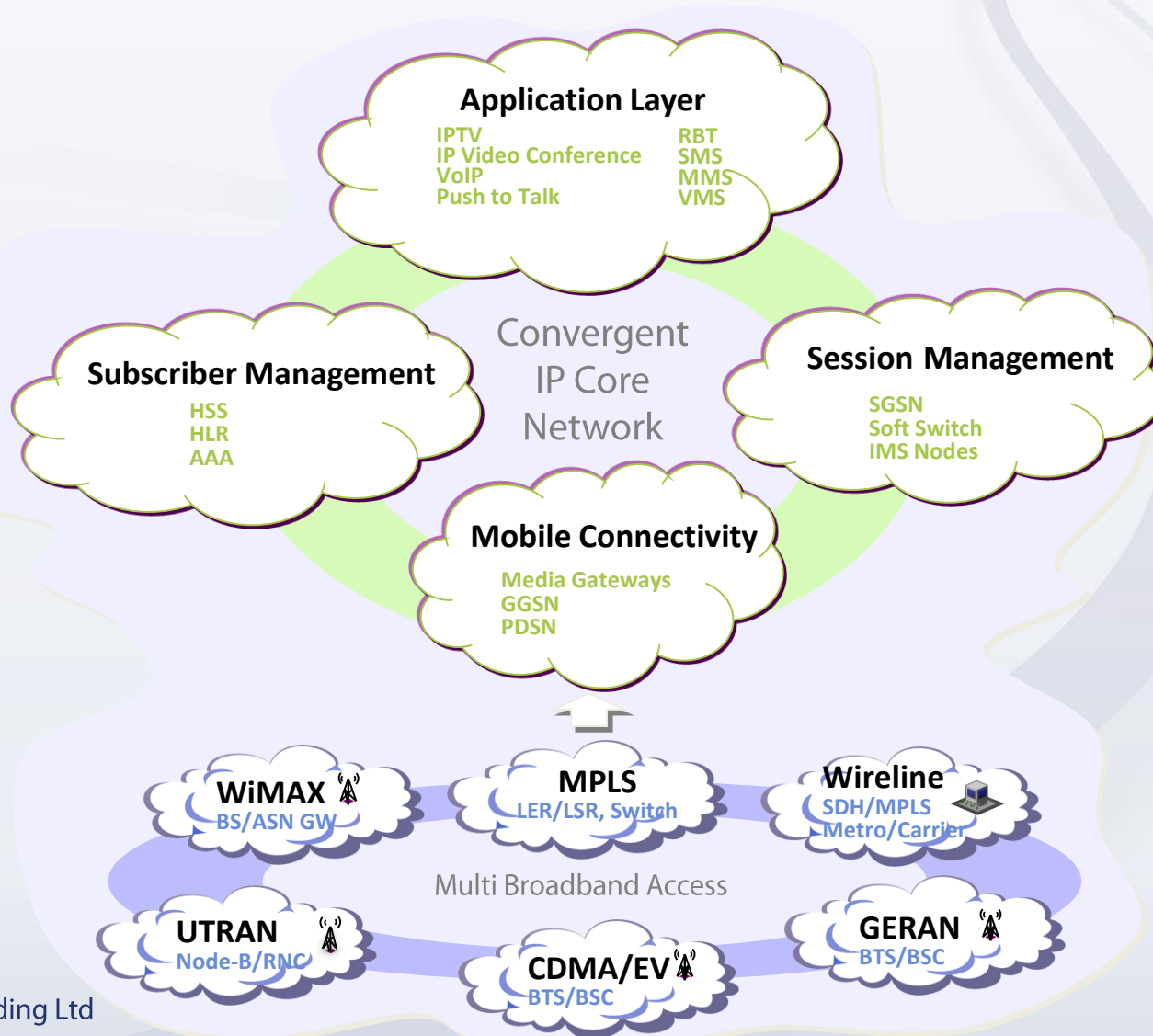
**NORTEL**



Alcatel-Lucent



## End-to-End Performance Management



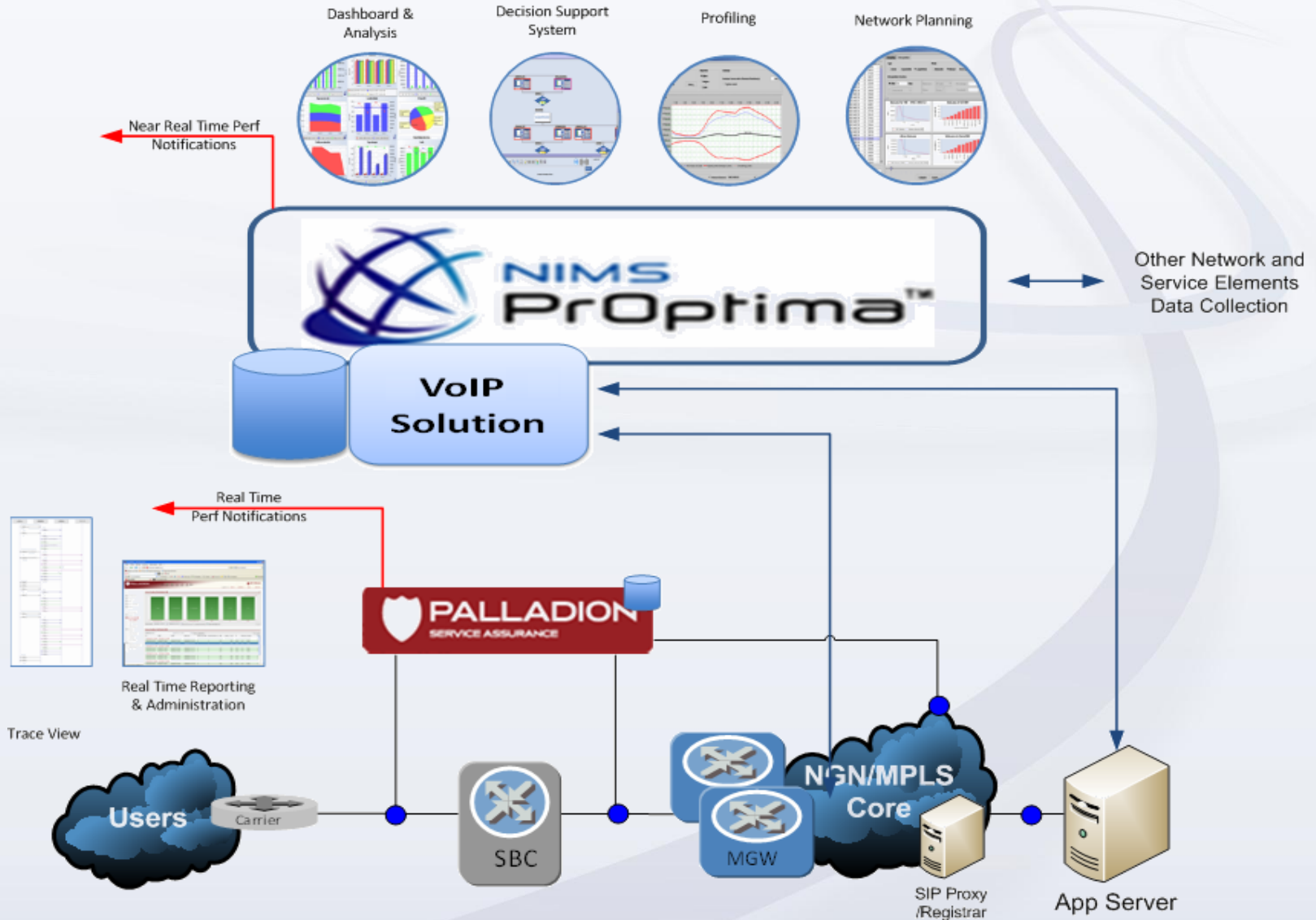
# MYCOM

## Multi-vendor solution

Extensive library of more than 200 off-the-shelf interfaces, covering the following technologies:

GSM/GPRS/EDGE Access  
UMTS Access  
HSDPA and HSUPA  
CDMA/1x, EVDO Access  
WiMax  
Packet Core Network  
Circuit Core Network  
IMS Core Network  
NGN Network  
IP/MPLS Backbone  
ATM, FR Switching  
Microwave, PDH, SDH Transmission  
VAS Platforms (SMS, MMS, IN, WAP, etc.)  
OSS - Inventory, Fault Management...





# MYCOM VoIP Customer Assurance Solution Benefits

Reactive Management:  
reduce mean-time to  
repair

- Troubleshoot performance related problem at the call trace level through drill-down
- Correlation of resource and traffic related statistics
- Root-cause analysis: querying of low-level SIP protocol information

Proactive Management:  
impact analysis for  
proactive customer  
management

Customer impact analysis as part of trunk and other NGN resource QoS degradation  
Aggregated call/customer experience measure allowing to anticipate customer complaints

Predictive  
Management

Traffic pattern profiling/alarm identifying potential customer problems  
Service/network level capacity planning/ forecasting

## VoIP management

- Rich set of KPI, KQI
- Call relative information
- Capacity planning, service optimization
- Customers experience management
- SIP mediation/correlation
- Service trouble identification/ trouble shooting

- Standard KPIs:
  - Call success ratio, number of calls per day/hour, average call length, etc...
  - Number of calls to specific numbers/destinations, Statistics per user, etc...
- The VoIP Assurance solution provides the following relevant information:
  - **Detection of call setup failures** (not possible through CDRs file generation and usually 1 to 5 % call setup failures in early NGN deployments)
  - **Metrics about SIP messages and transactions:** Number of OPTIONS messages, number of REGISTERED transactions ended in 401 or 407, etc...
  - **Metrics about User agents statistics:** how many registered users use a particular software version, how many calls are created with a particular software version
  - **Metrics on End-to-End Call Flow** understanding (such as call closure issues)
  - **Metrics on Voice quality metrics** (packet loss, jitter, R value, MOS)

# MYCOM VoIP Customer Assurance Solution Features

- Service optimization and capacity planning
  - Advanced reporting and analysis through VoIP Service & Network Health pre-defined KPIs/KQIs and advanced reporting & analysis features
  - Allows understanding the use of SIP-based services across the various network resources with a view to optimize the underlying network and services
  - Collect environmental and resource **related statistics as a complement** to the service and call related stats supporting the capacity planning process
- Customer experience management
  - Provide aggregated customer experience reports on VoIP quality and call transactions
  - **Provide per call transaction details and audio quality**
  - Subscriber behaviour analysis report

# MYCOM VoIP Customer Assurance Solution Features

- SIP Mediation & Correlation highlights
  - Understands both SIP messages and the associated media RTP traffic carrying the speech
  - Provides real time reporting functionality supporting the troubleshooting and diagnostics as well as real-time alarming for critical SLA monitoring on audio quality as an example
  - **Response Time Measures** system performance **to prevent possible service abuse**
  - measures **subscriber behavior to detect service abuse**
  - User Tracking Monitors and tracks all subscriber SIP events
  - Statistics and analyses for all deployed SIP clients
  - Behavioral Analyses **detects abnormal, faulty or fraudulent behavior of users**
  - Captures and traces provides detailed statistics to thoroughly investigate service
  - **Service Detail records** provides details of service usage parameters
  - Voice quality monitors quality audio streams

# MYCOM VoIP Customer Assurance Solution Features

- Service events and resource data mediation
  - Support IMS and/or Pre-IMS architectures
  - Data capture at SIP and RTP/RTCP layers
  - Can be **plugged on the customer, access or service provider side** and vendor agnostic
  - Provide a rich set of **in-built KPIs/KQIs**, reports on call activity, audio quality, application behaviour, ...
  - Collect environmental and resource related statistics as a complement to the service and call related stats
- Service problem identification & troubleshooting
  - Can be hooked into fault management systems for real-time reporting on SLAs, can also detect revenue assurance related issues
  - **Near-Real time Root-cause analysis on an end-to-end basis** through Decision Support System
  - **Call tracing and views** to troubleshoot specific issues down to the data capture

# Challenge

- Network
  - Carrier: Closed environment, managed network
  - TANET: Open environment, unmanaged network
- Service
  - Carrier: standard feature
  - TANET: has to support value-added apps
- Human resource
  - Carrier: full time, dedicated employee
  - TANET: project based

# Call based voip quality management

# Some test in lab

- Active test call
- Passive call monitoring

# 主動式偵測

- Dial by SIP /PSTN
- Test voice quality, sip signaling, DTMF ...
- Service availability

# 系統構成

- Dialer
  - An application to make SIP/PSTN call
- Analytical part
  - Comparing the audio
- Reporting
  - Mysql store the CDR with MOS,PESQ

# Pre-processing

- Calculate RMS Amplitude
  - `sox $sourcefile.wav -e stat`
- Adjust amplitude
  - `sox -v $amp_multiplier degraded.wav adjusted-degraded.wav`
- Silence Trim
  - `sox degraded.wav trim1.wav silence 1 0 -60d`
  - `sox trim1.wav trim2.wav reverse`
  - `sox trim2.wav trim3.wav silence 1 0 -60d`
  - `sox trim3.wav trim4.wav reverse`

# 聲波比較

AutoMOS Dialer - Calldetails - Mozilla Firefox  
File Edit View History Bookmarks Tools Help  
http://vmdex/calldetails/wavcompare/6480  
AutoMOS Dialer ...No Updates...

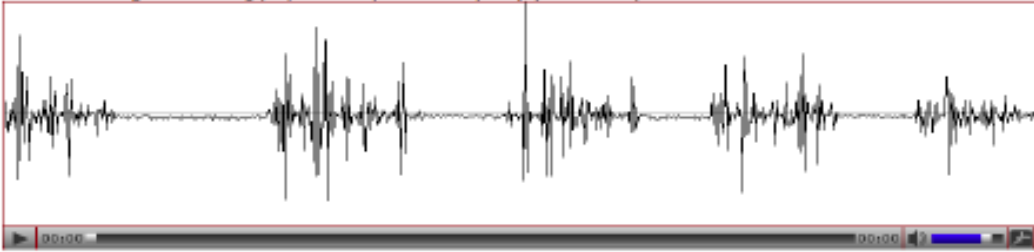
Home Test Schedules **Logs** Test Call Configuration  
[View Auto-Dialer Raw Logs](#) [View QOS Scoring Logs](#) [View Switch Logs](#) [Clear All Scores \(1\)](#)

## Compare Waveforms

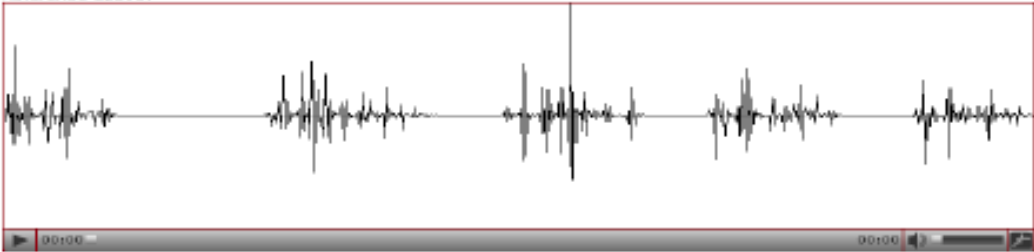
MOS: 4.86  
PESQ: 3.57  
Percent: 95.03

Compare these waves to quick-visualize any major differences (easier than listening!)


Reference: Original recording played - comparison for quality (benchmark)



Trimmed Test: Final sample used for MOS scoring. Let's make sure our trimming function doesn't harm the final score. This should match the Reference above.

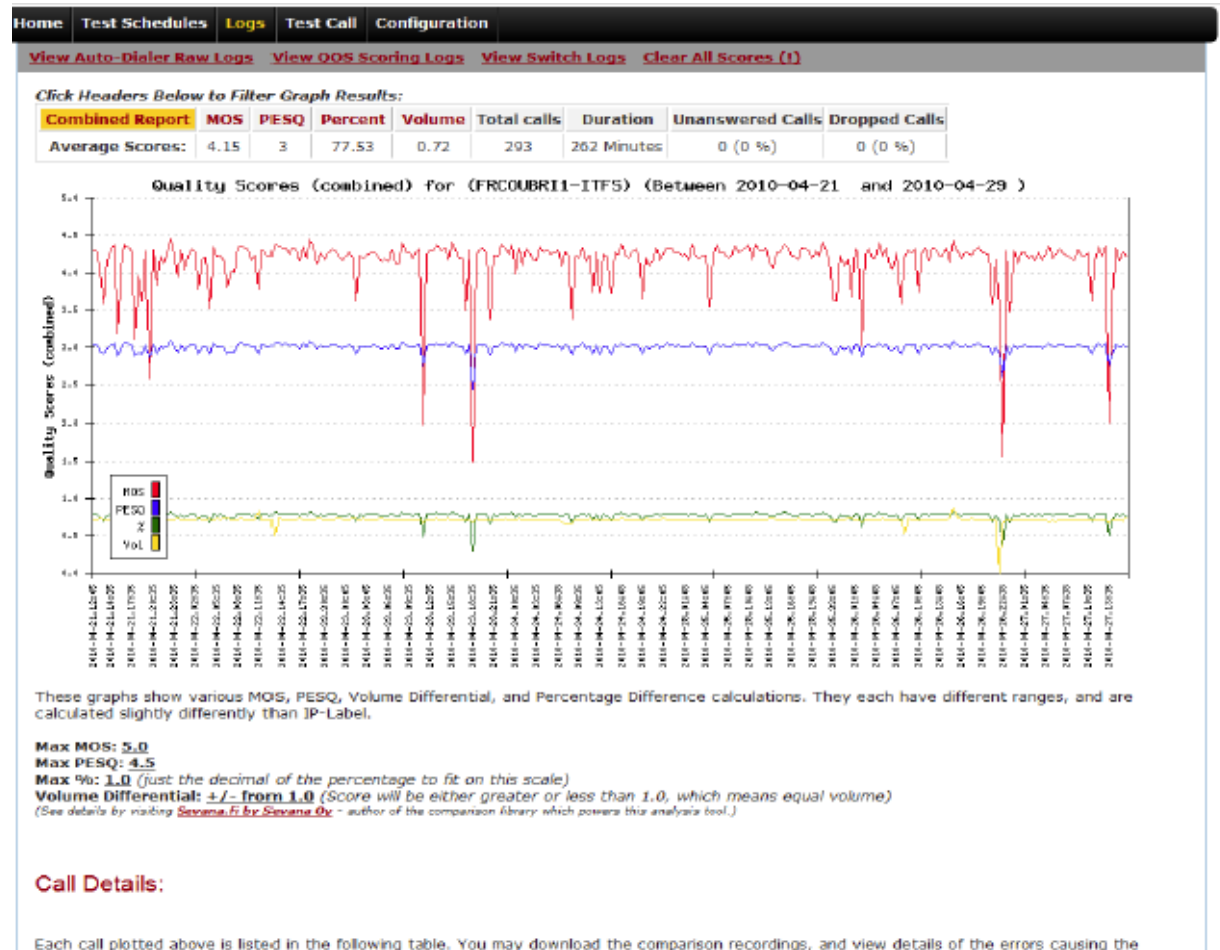


RAW Test: Raw recording sampled during conference - contains silence "padding" which is automatically trimmed... (sometimes it trims too much, so we can check here. This file should look like the one above, only with the extra silence at the beginning and end...!)



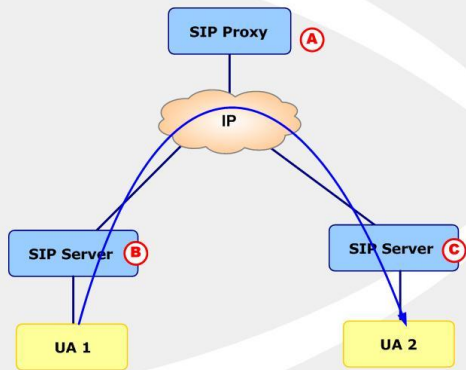
# Call quality Visualization

MOS  
PESQ  
Volume

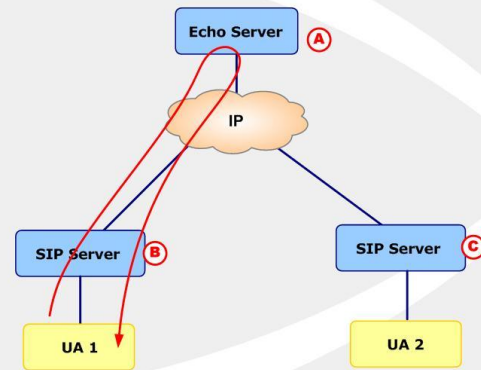


# 偵測方式

顯赫資訊 ✂ 主動偵測 1



















顯赫資訊 ✂ 主動偵測 2



# Add test server

[Endpoints](#) | [Non-intrusive](#) | [Intrusive testing](#) | [Reports](#) | [Alerts](#) | [System status](#) | [Logout](#)

No	Description	Echo server	Audio	Regular check	MOS	PESQ	%	
1	<a href="#">echo@iptel.org - Male English</a>	<a href="#">echo@iptel.org</a>	 	2010-10-28 23:32:28 (60 sec.)	3.11	2.87	58.06	  
2	<a href="#">echo@iptel.org - Male Chinese</a>	<a href="#">echo@iptel.org</a>	 	2010-10-28 23:33:27 (60 sec.)	3.30	2.88	61.99	  
3	<a href="#">test</a>	<a href="#">guest@voip.comune.prato.it/05741837999</a>	 	2010-10-28 23:33:48 (45 sec.)	4.17	3.00	77.89	  

 Add new:

Name:

Periodic check:

Echo server (id):

Audio (id):

# Schedule calls

[Endpoints](#) | [Non-intrusive](#) | [Intrusive testing](#) | [Reports](#) | [Alerts](#) | [System status](#) | [Logout](#)

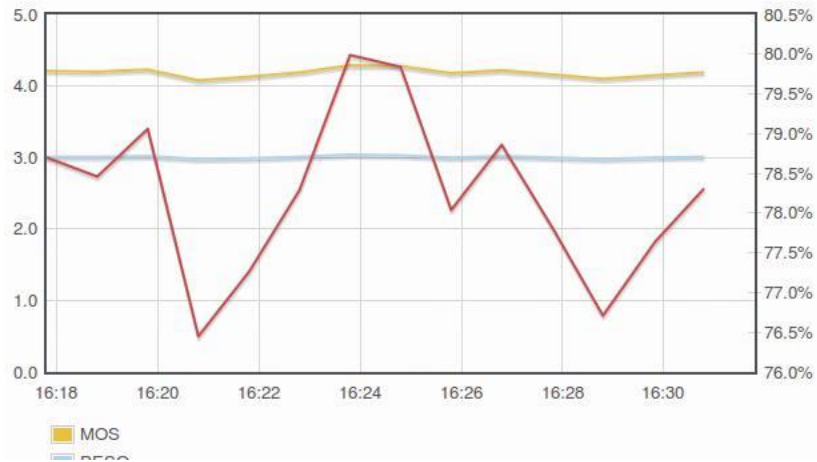
Results received done:

No	Time	MOS	PESQ	%	Orig	Deg
1	<a href="#">2010-10-28 23:17:48</a>	4.21	3.01	78.70		
2	<a href="#">2010-10-28 23:18:48</a>	4.20	3.01	78.46		
3	<a href="#">2010-10-28 23:19:48</a>	4.23	3.02	79.06		
4	<a href="#">2010-10-28 23:20:48</a>	4.08	2.98	76.45		
5	<a href="#">2010-10-28 23:21:48</a>	4.13	2.99	77.26		
6	<a href="#">2010-10-28 23:22:48</a>	4.19	3.01	78.29		
7	<a href="#">2010-10-28 23:23:48</a>	4.29	3.04	79.99		
8	<a href="#">2010-10-28 23:24:48</a>	4.28	3.03	79.84		
9	<a href="#">2010-10-28 23:25:48</a>	4.18	3.00	78.04		
10	<a href="#">2010-10-28 23:26:48</a>	4.22	3.02	78.86		
11	<a href="#">2010-10-28 23:27:49</a>	4.16	3.00	77.80		
12	<a href="#">2010-10-28 23:28:48</a>	4.10	2.98	76.71		
13	<a href="#">2010-10-28 23:29:50</a>	4.15	3.00	77.64		
14	<a href="#">2010-10-28 23:30:48</a>	4.19	3.01	78.31		
15	<a href="#">2010-10-28 23:31:48</a>					

4

# Quality graph

8	<a href="#">2010-10-28 23:24:48</a>	4.28	3.03	79.84	▶	⏪	⏩
9	<a href="#">2010-10-28 23:25:48</a>	4.18	3.00	78.04	▶	⏪	⏩
10	<a href="#">2010-10-28 23:26:48</a>	4.22	3.02	78.86	▶	⏪	⏩
11	<a href="#">2010-10-28 23:27:49</a>	4.16	3.00	77.80	▶	⏪	⏩
12	<a href="#">2010-10-28 23:28:48</a>	4.10	2.98	76.71	▶	⏪	⏩
13	<a href="#">2010-10-28 23:29:50</a>	4.15	3.00	77.64	▶	⏪	⏩
14	<a href="#">2010-10-28 23:30:48</a>	4.19	3.01	78.31	▶	⏪	⏩
15	<a href="#">2010-10-28 23:31:48</a>				▶	⏪	⏩



# IP Telephony

- Why IP telephony
  - lower cost
  - efficient use of the data network bandwidth
- Issues in IP telephony
  - Transmission quality
  - Latency
  - Ease of use
  - Bandwidth
  - Transparent

# Voice Quality and Delay

- Degraded voice quality
  - high compression ratio
  - dropped/late packets
  - out of order packets
- Delayed voice
  - non-deterministic network traffic
- How much human can tolerate?

# Voice Coding Bandwidth

	Bytes	G.723.1 kbps	G.729a kbps
Frame size		30 ms	20 ms
Coder		6.3	8.0
RTP	12	3.2	9.6
UDP	8	2.1	6.4
IP	20	5.3	16.0
Total	40	16.9	30.0
IPv6 Total	54	20.7	51.2

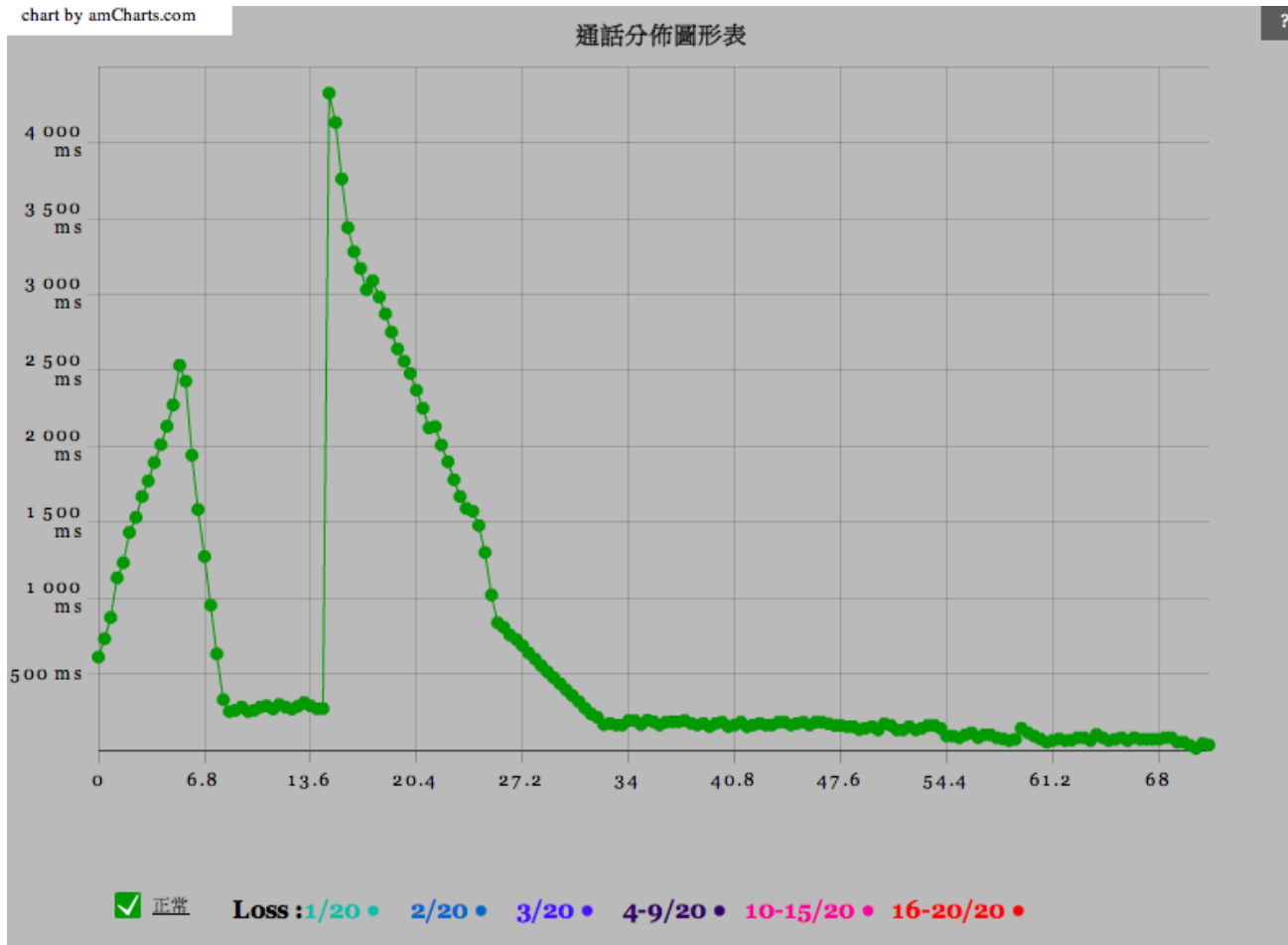
# RTP monitoring

<a href="#">Download</a>	2010-07-05 14:11:24	01:16	0222260665 Gentrice Proxy payload: 18	0953887157	192.168.0.197 MOS(fix 50,fix 200,adapt 500): 3.3 3.6 1 delay: 13:13:12:9:9:9:1 loss: 0:0:0:0:0:0:0:0:0:0	220.128.253.230 MOS: 4.5 4.5 4.3  0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0:0
--------------------------	------------------------	-------	---	------------	---	--

variable delay [ms]	50 - 70		70 - 90		90 - 120		120 - 150		150 - 200		200 - 300		> 300	
loss	1	2	3	4	5	6	7	8	9	10				

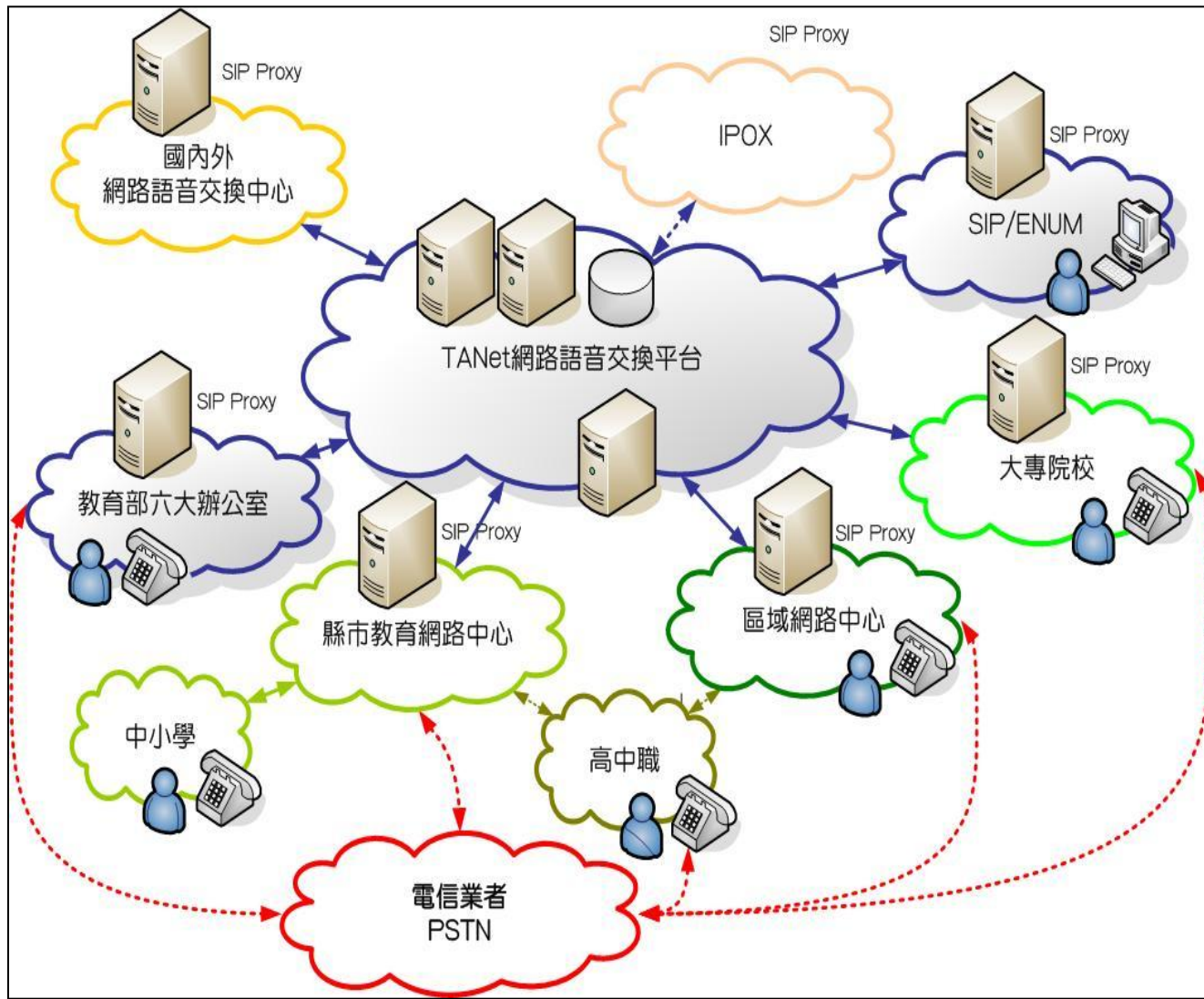
# Delay distribution

$(\text{ArriveTime}(n) - \text{ArriveTime}(n-1)) - (\text{RTPtimestamp}(n) - \text{RTPtimestamp\_B}(n-1))$



# VoIP 架構

# TANET 交換平台

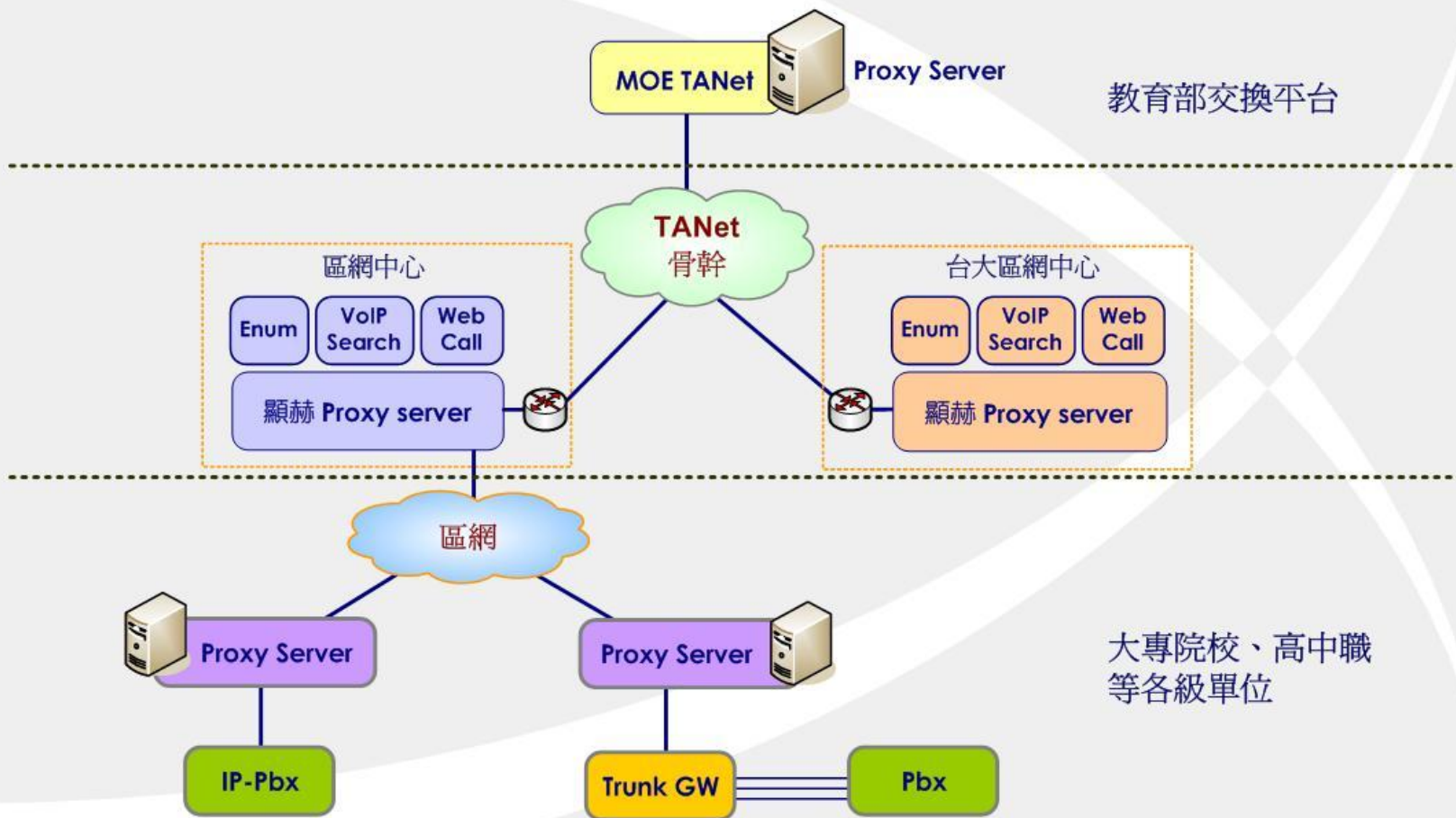


# TANet 區網

顯赫資訊



TANet VoIP 架構圖

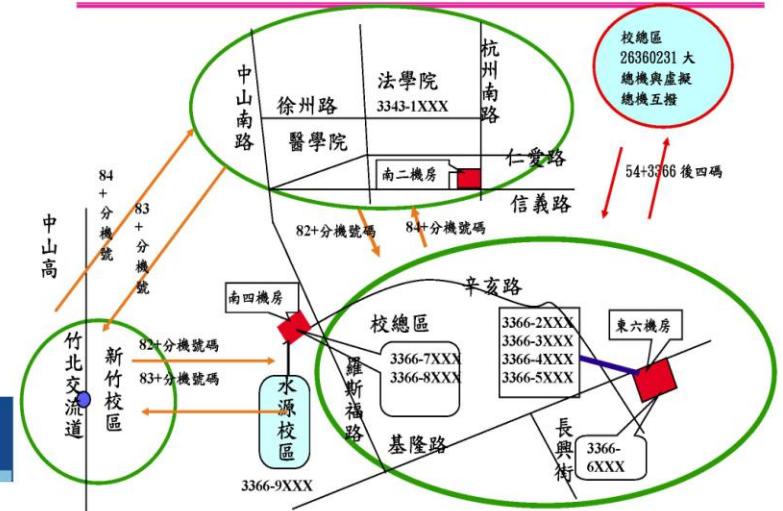




# 台大範例

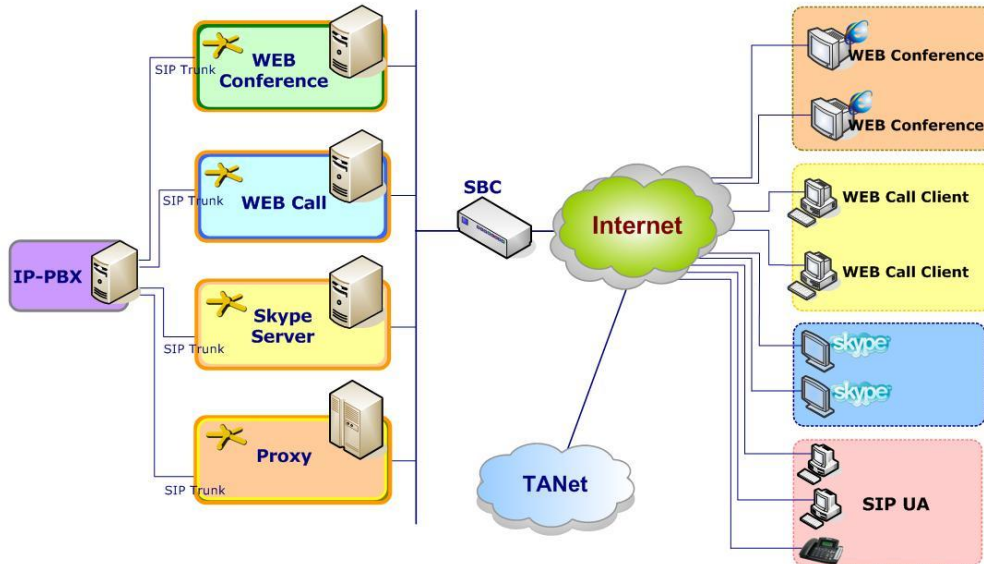
- 集中三處交換局
- 以PRI進行市話整合
- 跨校區voip連通

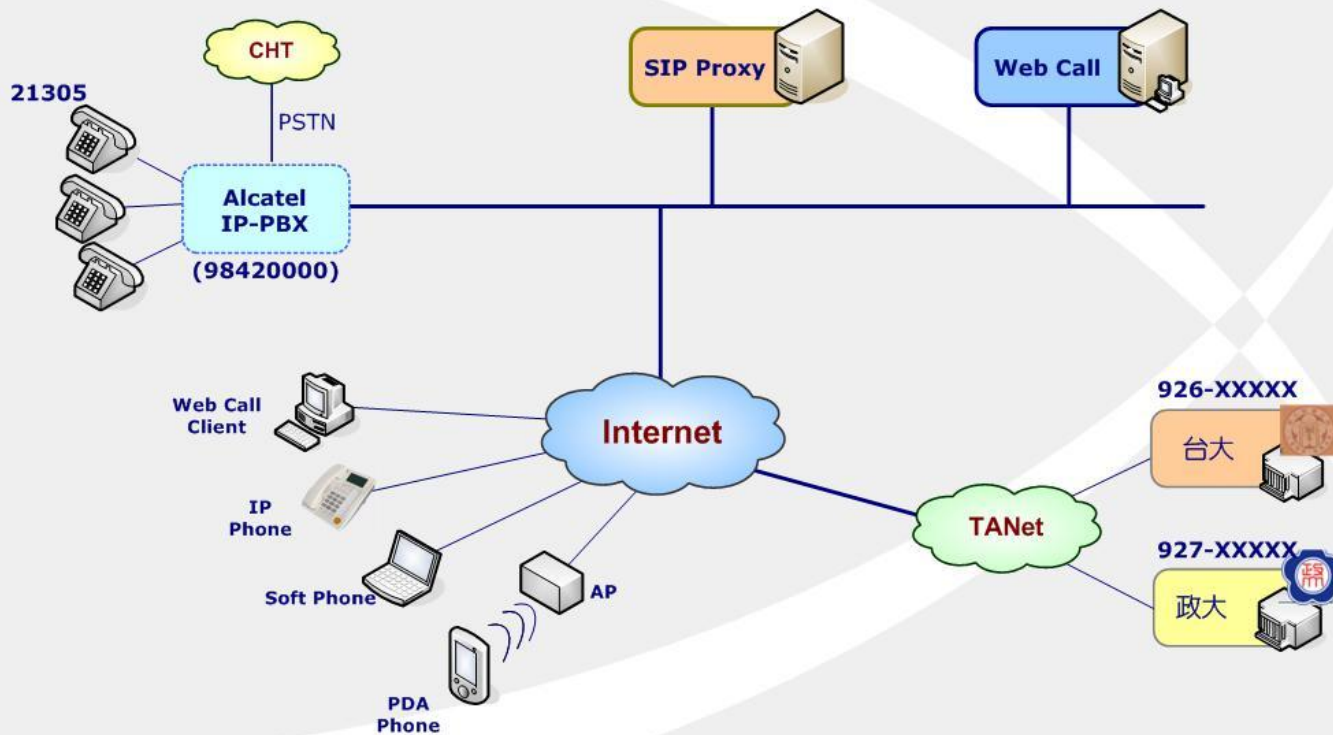
校總區使用中華電信虛擬總機後之通信架構



顯赫資訊 

台灣大學網路電話架構示意圖

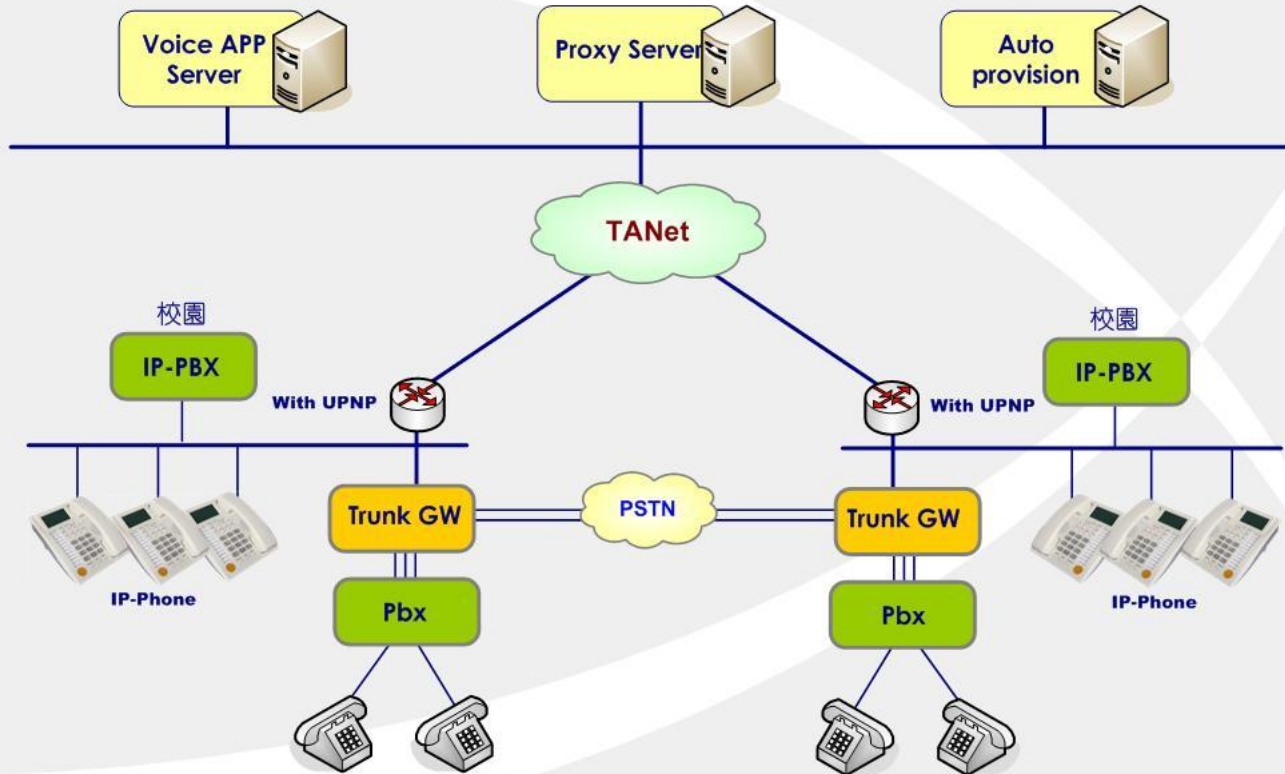




# 架構圖

顯赫資訊 

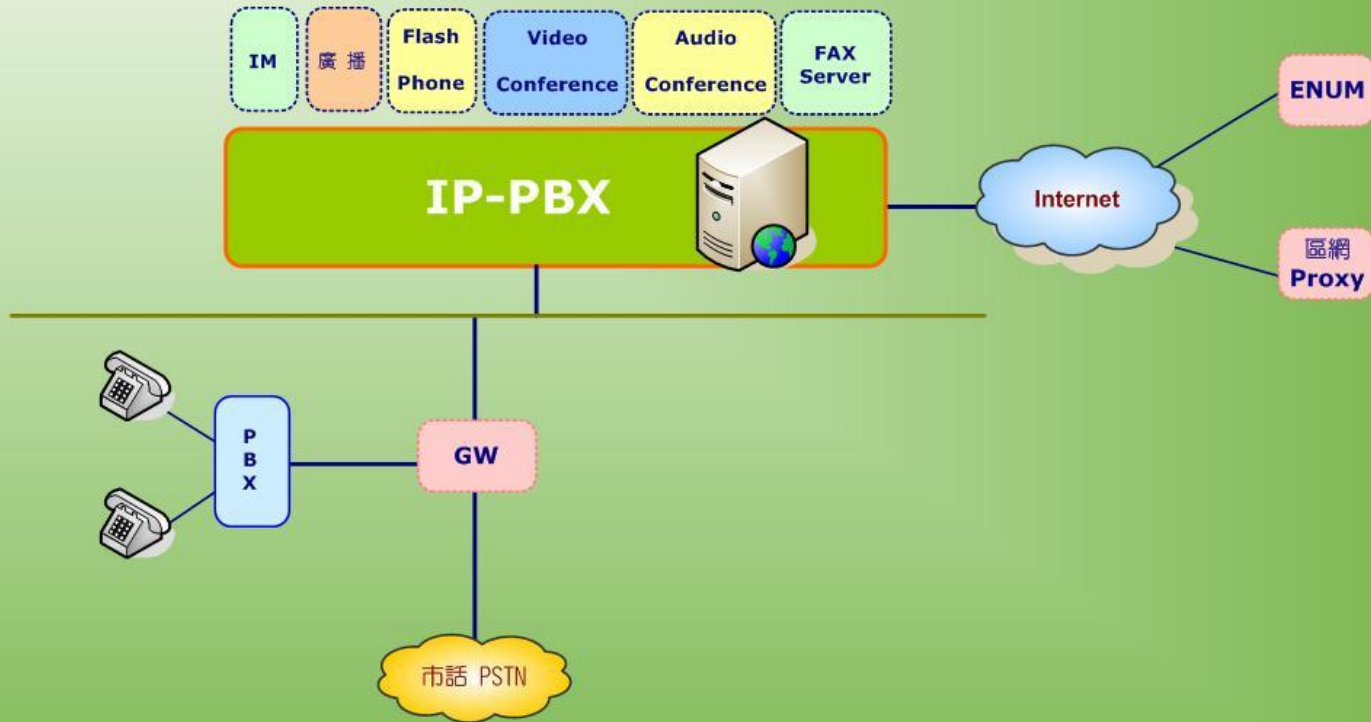
台北市教網中心 VoIP 建議圖



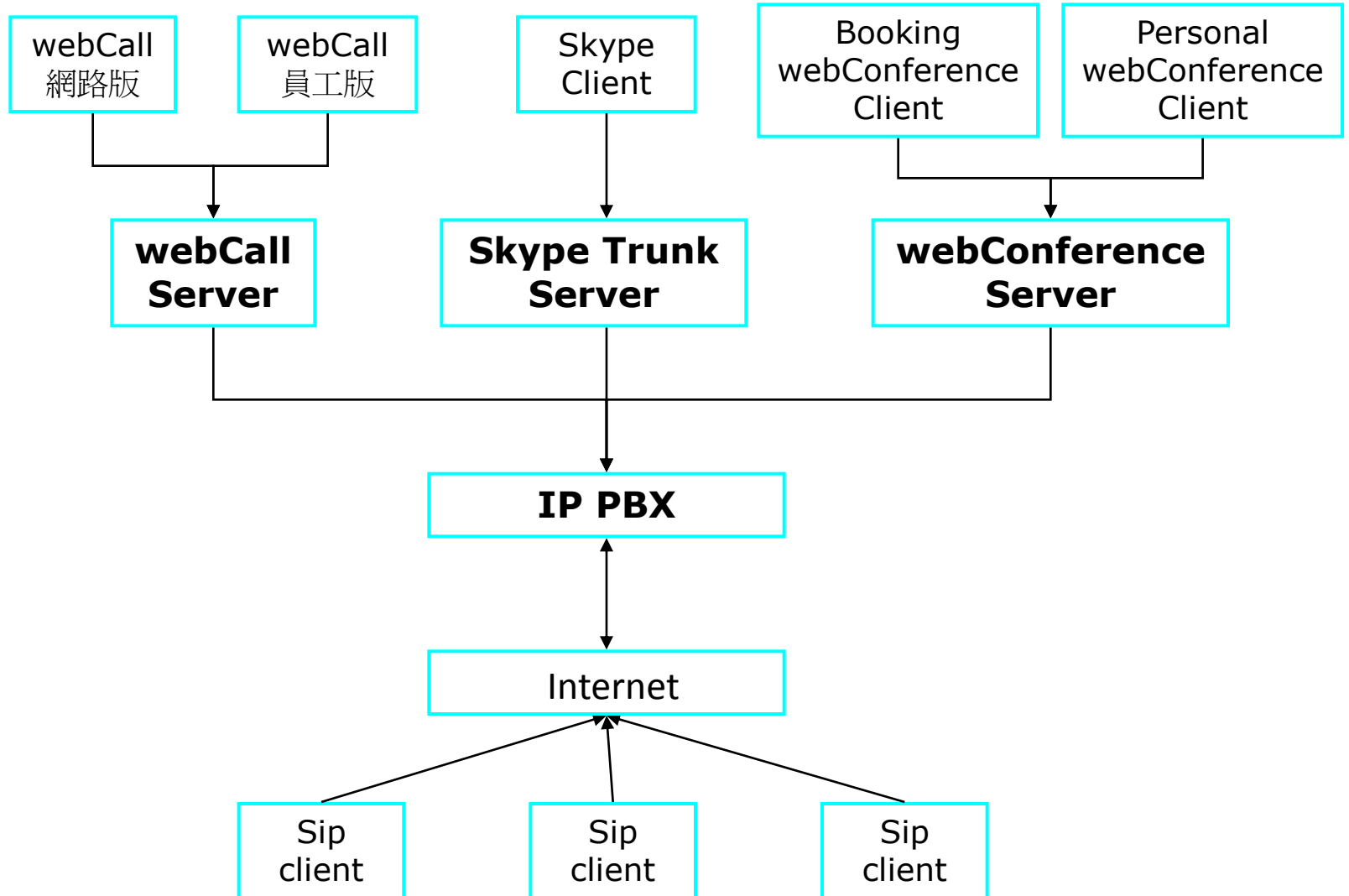
# IP-PBX voip規劃

顯赫資訊 

校園 IPPBX

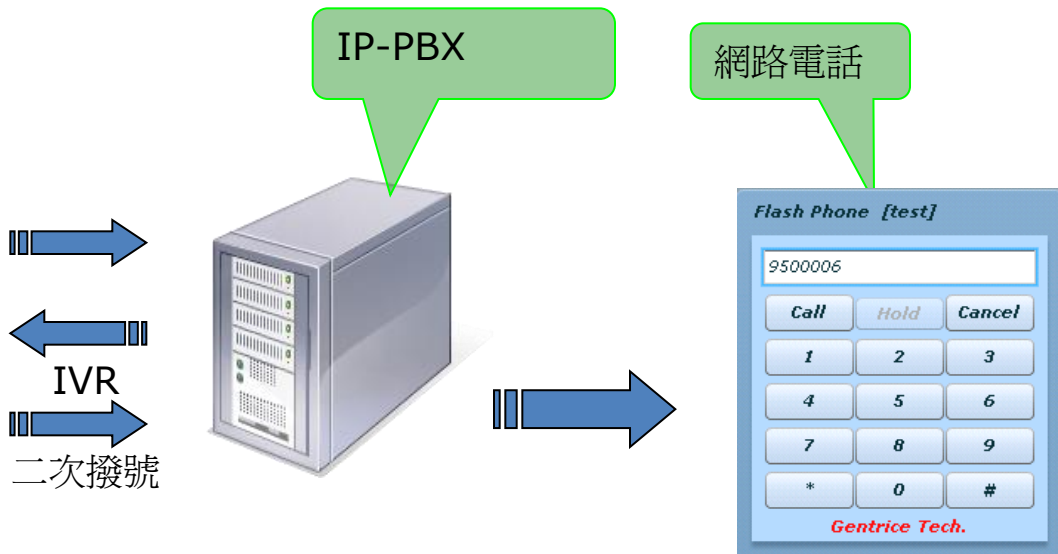


# Application Structure



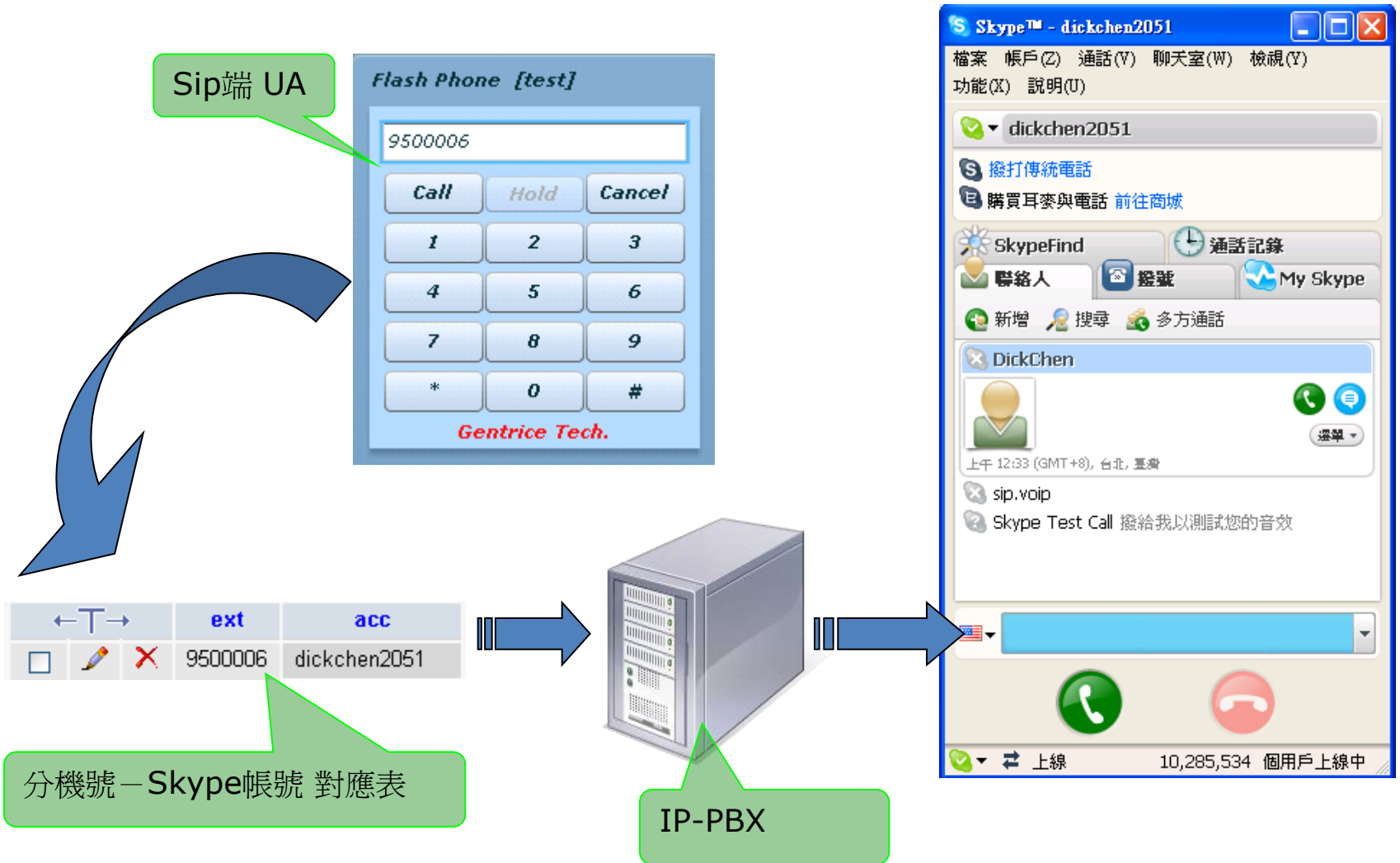
# 應用加值

# Skype Trunk (外 call 內)



使用Skype 輸入NTU的Skype代表帳號，撥出接通NTU的IVR後，立即以鍵盤輸入分機號，即可與指定分機號通話

# Skype Trunk (內 call 外)

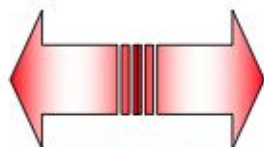


# SIP應用管理平台

## NAS iSCSI



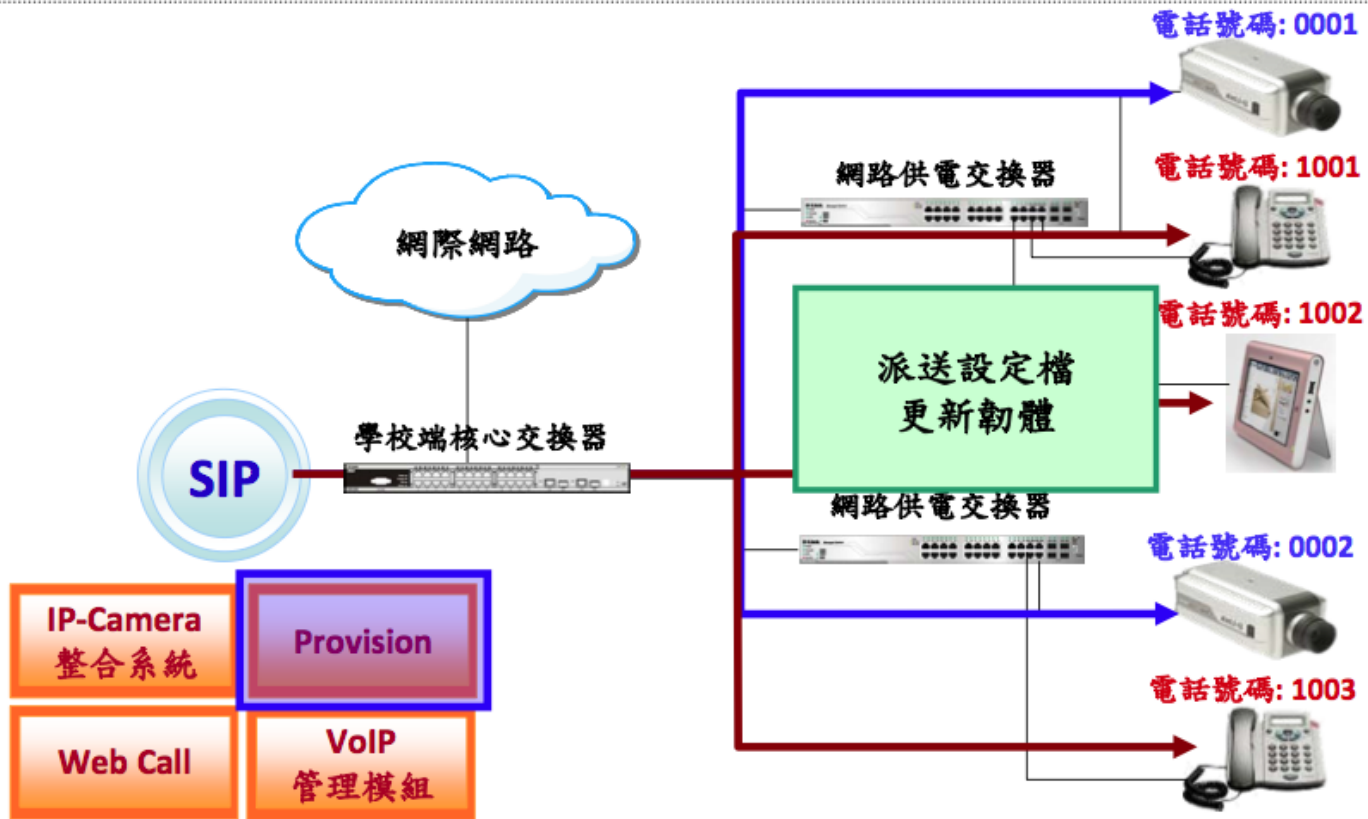
- 儲存數位教學內容
- 數位圖書館
- 語音信箱
- 儲存監控視訊



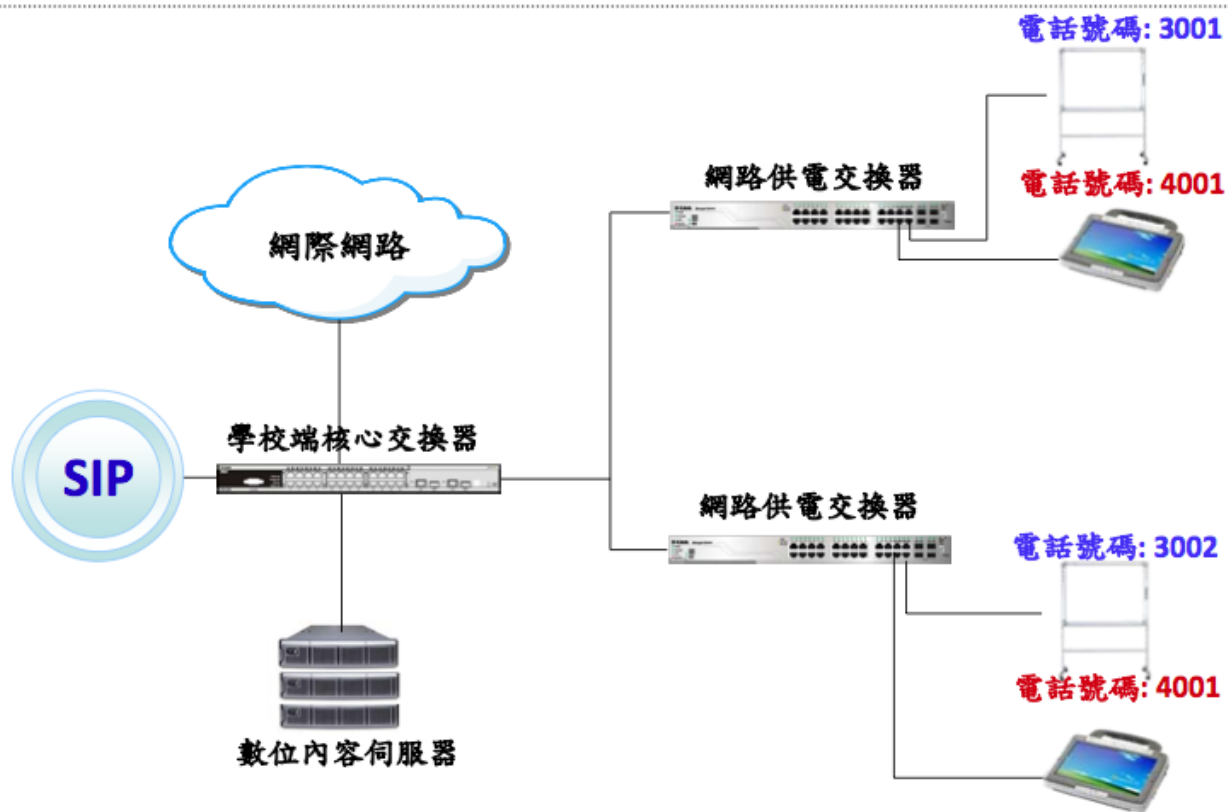
儲存需求  
還原備份  
虛擬光碟



# 校園網路應用管理平台 - Provision

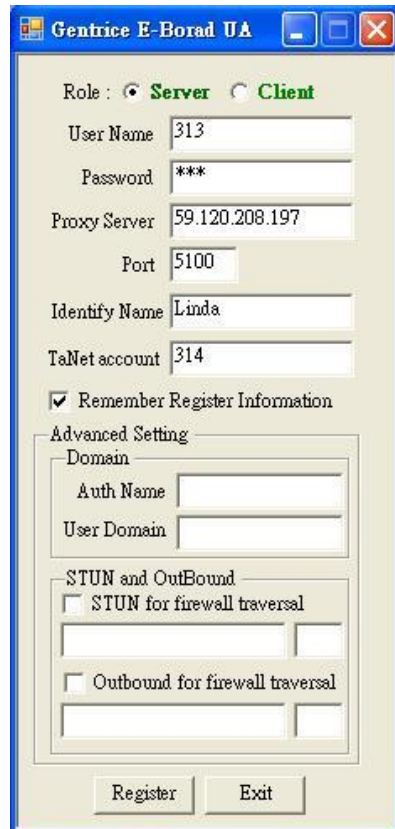


# 校園網路應用管理平台 - 電子白板/書包



# 電子白版整合

- 電子白版可配合sip協定，進行互動



Gentrice E-Borad UA

Role :  Server  Client

User Name: 313

Password: \*\*\*

Proxy Server: 59.120.208.197

Port: 5100

Identify Name: Linda

TaNet account: 314

Remember Register Information

Advanced Setting

Domain

Auth Name:

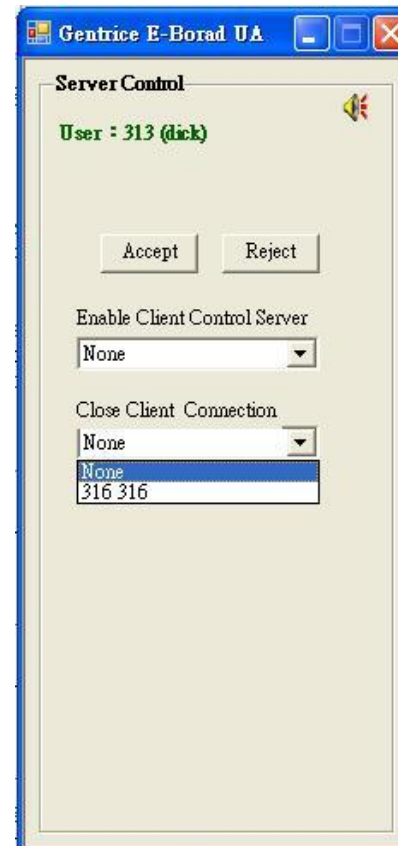
User Domain:

STUN and OutBound

STUN for firewall traversal

Outbound for firewall traversal

Register Exit



Gentrice E-Borad UA

Server Control

User : 313 (lick)

Accept Reject

Enable Client Control Server

None

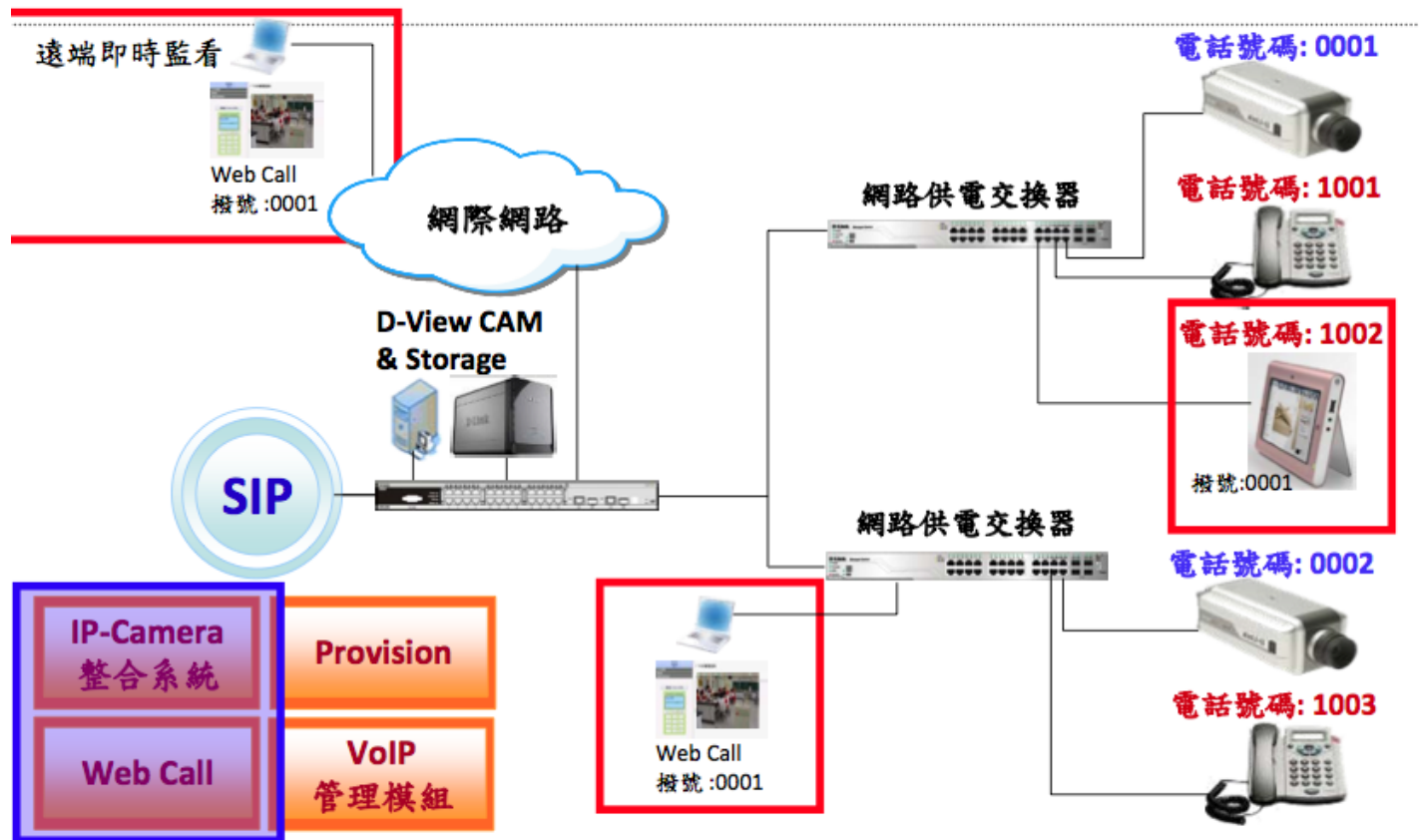
Close Client Connection

None

None

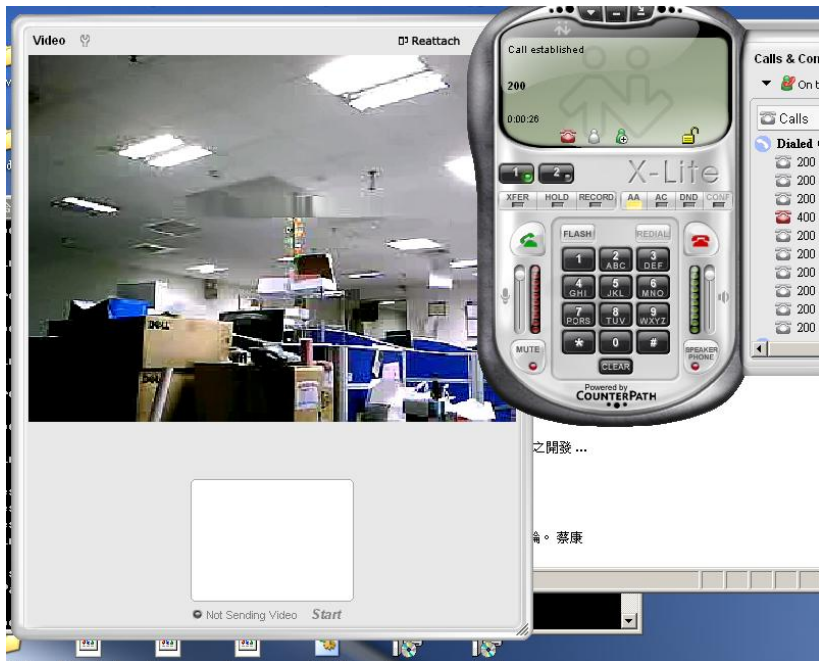
316 316

# 校園網路應用管理平台 - 及時監控影像



# IP-CAM整合

- IP-CAM(網路攝影機)
  - RTSP 協定
  - 用相同的SDP協定



## DCS-6600系列



**DCS-6620G**  
光學變焦無線網路攝影機

## DCS-5000系列



**DCS-5220(紅利積點商品)**  
3GPP 行動即時監控/遠端短片即時錄製  
不需安裝軟體/802.11g無線網路



**DCS-5300G**  
專業級802.11g無線網路攝影機，具備可動式鏡頭

## DCS-3000系列



**DCS-3110**  
1.3百萬畫素影像，MPEG4/M-JPEG  
雙影像壓縮格式



**DCS-3410**  
日夜間全時錄影，PoE網路供電，數位IO介面，RS-485介面



**DCS-3415**  
18倍光學變焦，CF 儲存介面，DVI/DO  
外接告警介面



**DCS-3420**  
雙向語音即時對話/可更換廣角鏡頭/  
可外接夜視LED燈夜間監視/網路  
&BNC雙介面

## DCS-2100系列

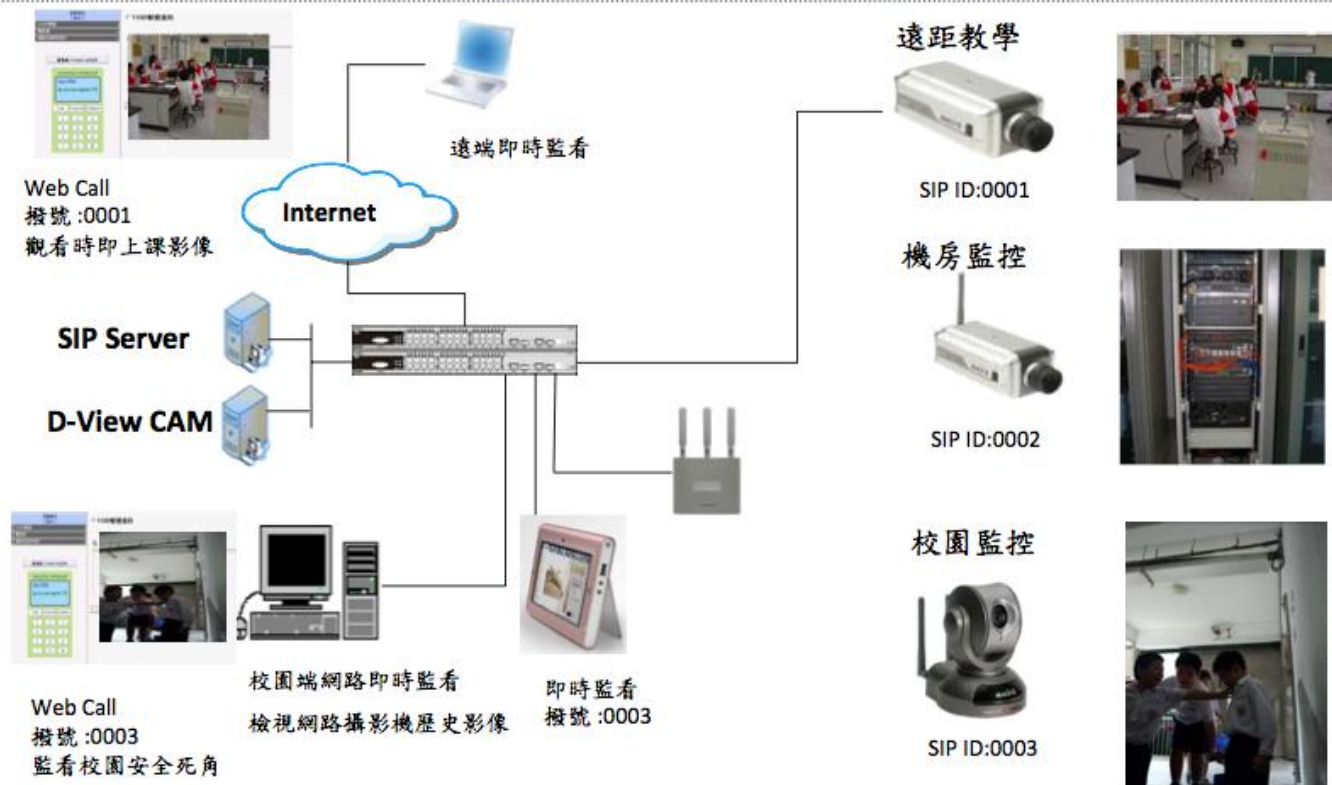


**DCS-2120(紅利積點商品)**  
支援D-Link Live 線上監視平台，3GPP  
行動監視，802.11g 無線架設



**DCS-2121**  
支援130萬畫素動態影像遠端監視，支援3GPP可透過行動手機上網即時觀看

# 校園網路攝影機SIP整合應用



帳號:40009 姓名: 聯絡電話:

### 帳號 - 語音增值服務

- |              |  |       |  |        |  |
|--------------|--|-------|--|--------|--|
| 勿干擾:         | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 | 會議功能: | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 | 直接轉接:  | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 |
| 語音信箱:        | <input checked="" type="radio"/> 啟用 <input type="radio"/> 停用 | 註冊認證: | <input checked="" type="radio"/> 啟用 <input type="radio"/> 停用 | 忙碌轉接:  | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 |
| Enum lookup: | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 | 鈴聲秒數: | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 | 無應答轉接: | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 |
| 指定來電顯示:      | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 |       |  | 無服務轉接: | <input type="radio"/> 啟用 <input checked="" type="radio"/> 停用 |

### 語音信箱型態

- 語音信箱類型:  語音作業繳交  語音信箱留言
- 語音信箱聽取方式:  電子信箱  電話聽取

確定

-SIP個人線上管理系統

電話記錄與統計

語音作業

### 個人語音資料管理

目前頁數 1 / 1 頁, 共 1 筆

打包下載 上一頁 下一頁

搜尋學號:

搜尋




說明: 可使用模糊搜尋, 例如: 輸入 '203', 結果將顯示所有學號包含 '203' 的資料

刪除 / 全選

開始時間 >

結束時間: >

搜尋

管理	日期	時間	學號	檔案大小	來電號碼
  	20090308	19:01	020355	27kb / (0分:0秒)	40011

目前頁數 1 / 1 頁, 共 1 筆

上一頁 下一頁

# Flash web call 整合

國立臺灣大學  
計算機及資訊網路中心  
Computer and Information Networking Center

English 首頁 訊息公告 中心簡介 服務陣容 服務及O&A 聯絡我們

成員名單：(看到 就表示您可以和此人直接使用網路通話!)

成員	職稱	聯絡電話	E-Mail	職掌	代理人
林選	組長	33665002		監督執行網路組業務	作業管理組 組長林智仁
李光達	程式設計師	33665008		宿舍網路的管理 法學院暨學院會館維護 北區區域網路中心的營運	吳俊鋒
李美姿	程式設計師	33665010		宿舍網路管理 校園網路管理系統維護與管理 電話撥接系統維護 網路組ISO相關業務	曾偉彪
羅添添	助理程式設計師	33665006		Proxy、News、FTP、BBS) IP位址與網域名稱管理 負責TANet不當資訊防制系統 總管計劃 TWAREN網路維護 VoIP網路電話業務	
曾卓凱	技正	33665011		水潭校園網路維護 無線網路、網路管理與維護 協助網路安全之相關業務 遠端提供電話技術支援 網管系統開發與維護	李美姿

Gentrice Flash WebCall

Connecting...

Call Cancel

MIC: \_\_\_\_\_

No sip account register

# Flash 多點線上會議系統



# 班班有電話進線控制

**GENTRICE**  
New Telecom Center  
顯赫資訊 X IPPBX 管理系統

伺服器 群組設置與門號管理 Session 通話記錄與統計 監控 路由 進階設定 系統

※ 進階設定

- 總機號碼設置
- 語音公佈欄設定
- 進線時間規則**
- 會議室

說明：  
進線時間規則。

## 進線時間規則

### 進線時間規則

#### 拒接時段

<input checked="" type="checkbox"/>	星期:	Monday	-	Friday	時間:	10	00	-	11	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00
<input type="checkbox"/>	星期:	Monday	-	Friday	時間:	00	00	-	00	00

# Google的整合

- 撥號整合

台大 - Google 搜尋 - Microsoft Internet Explorer


檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

← 上一頁 → 搜尋 ☆ 我的最愛


網址(AD) http://www.google.com.tw/search?hl=zh-TW&q=台大

Google 搜尋 登入 Gentrice 台大 Go

**台大的相關新聞**

 **板中35人進台大北縣第一** - 1 天前  
昨天大學分發考試入學放榜，北縣指考第1類組榜首、國立板橋高中學生鍾婉屏錄取台大財經系。第2類組榜首、板橋高中李靖彥錄取台大電機系。第3類組榜首、三重市私立格致...  
[聯合新聞網 - 167 則相關文章 >](#)  
[選校不選系 高分生就愛台大 - 聯合新聞網 - 5 則相關文章 >](#)  
[台灣/學生鍾婉台大 清交成：心態不健康 - 中央日報 - 3 則相關文章 >](#)

**台大 在 台北市 附近的本地商家結果 - 變更位置**

 **A 國立台灣大學人類學系標本陳列室** - www.ntu.edu.tw  
大安區羅斯福路四段1號 - [02-2363-0231](#)  
[詳細資訊 >](#)

**B 台大郵局** - www.post.gov.tw  
大安區羅斯福路四段1號 - [02-2363-3435](#)  
[詳細資訊 >](#)

**C 立德台大專賣會館** - www.leaderhotel.com  
大安區羅斯福路四段83號 - [02-8369-2858](#)  
[共 10 篇評論等等 >](#)

[在 台北市 附近的更多結果 >](#)

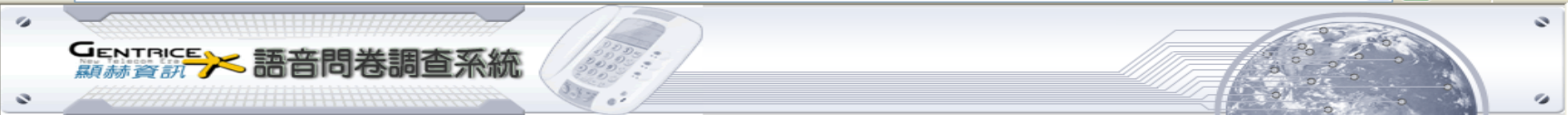
**國立臺灣大學圖書館\*NTU LIBRARY**  
全校典藏現已逾三百萬冊/件，其中所收藏古籍善本資料逾五萬件，為國內各大學之最，亦為政府出版品指定寄存圖書館之一。

# 表單回覆系統

- 填表即可產生ivr問卷系統
- 快速統計各類級回報

The screenshot displays the Gentrice IVR Survey System interface. The main content area shows a list of survey questions with their corresponding DTMF types and statistical status. The questions are numbered 1 through 7, covering topics like nasal discharge, coughing, and H1N1 symptoms. The statistics column indicates whether each question has been counted, with some questions already counted (e.g., questions 1 and 2).

問卷題號	問卷內容	DTMF類型	是否已做統計	管理
7	全班學生共有幾人流鼻涕	數值	未統計	[edit] [delete]
6	全班學生共有幾人咳嗽	數值	未統計	[edit] [delete]
5	全班學生共有幾人發燒	數值	未統計	[edit] [delete]
4	全班學生因新型流感H1N1症,未到校人數共有幾人	數值	未統計	[edit] [delete]
3	全班學生共有幾人	小計(自動統計答案)	目前已統計的題號為1,2	[edit] [delete]
2	全班女學生共有幾人	數值	未統計	[edit] [delete]
1	全班男學生共有幾人	數值	未統計	[edit] [delete]



※ 調查統計

問卷數值統計

說明:

針對撥話時間、VoIP 帳號並選擇通話紀錄型態作撥話通數與秒數統計。

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語音調查統計 (H1N1A型流感，班級統計調查)

事件主題: H1N1A型流感，班級統計調查

統計圖表

全班男學生共有幾人



此問卷統計結果: 67

全班女學生共有幾人

