VoIP

Voice over IP Gateway

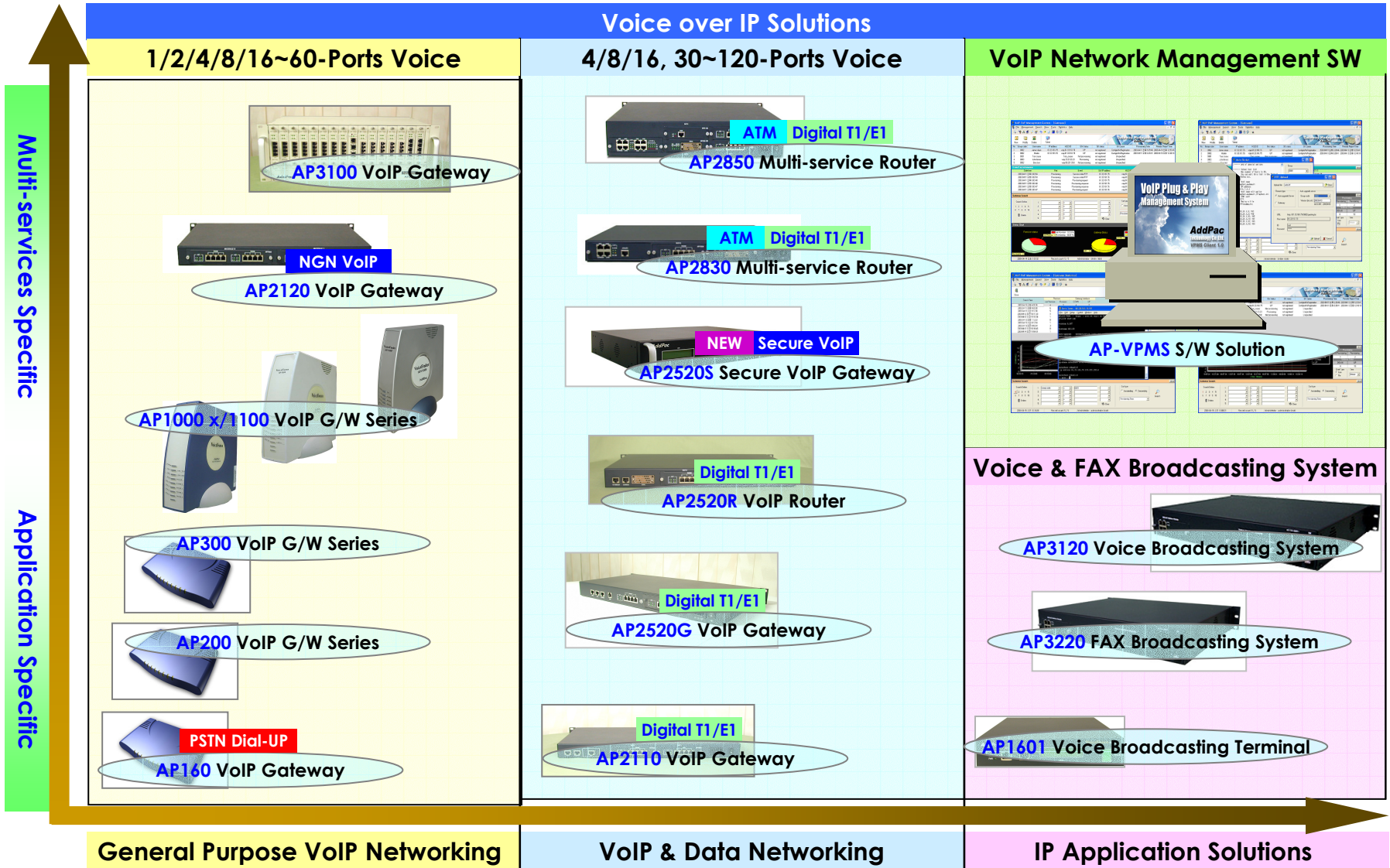**July 2003**

Technical Sales and Marketing

Addpac Technology

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AddPac VoIP Products Road-Map

Voice over IP Solutions

1/2/4/8/16~60-Ports Voice	4/8/16, 30~120-Ports Voice	VoIP Network Management SW

Multi-services Specific

Application Specific

AP3100 VoIP Gateway

NGN VoIP
AP2120 VoIP Gateway

AP1000 x/1100 VoIP G/W Series

AP300 VoIP G/W Series

AP200 VoIP G/W Series

PSTN Dial-UP
AP160 VoIP Gateway

ATM **Digital T1/E1**
AP2850 Multi-service Router

ATM **Digital T1/E1**
AP2830 Multi-service Router

NEW **Secure VoIP**
AP2520S Secure VoIP Gateway

Digital T1/E1
AP2520R VoIP Router

Digital T1/E1
AP2520G VoIP Gateway

Digital T1/E1
AP2110 VoIP Gateway

VoIP Plug & Play Management System
AddPac

AP-VPMS S/W Solution

Voice & FAX Broadcasting System

AP3120 Voice Broadcasting System

AP3220 FAX Broadcasting System

AP1601 Voice Broadcasting Terminal

General Purpose VoIP Networking	VoIP & Data Networking	IP Application Solutions

AddPac AP1000 Series Products Road-Map

4-Ports Voice Interface with Ethernet

AP1000 Gateway

4-Port FXS Voice
2-port 10Mbps Ethernet Interface
1-Port PSTN Back-up
1-Port Console, Voice QoS Features
APOS & AP-VPMS Support

AP1002 Gateway

2-Port FXS & 2-Port FXO Voice
2-port 10Mbps Ethernet Interface
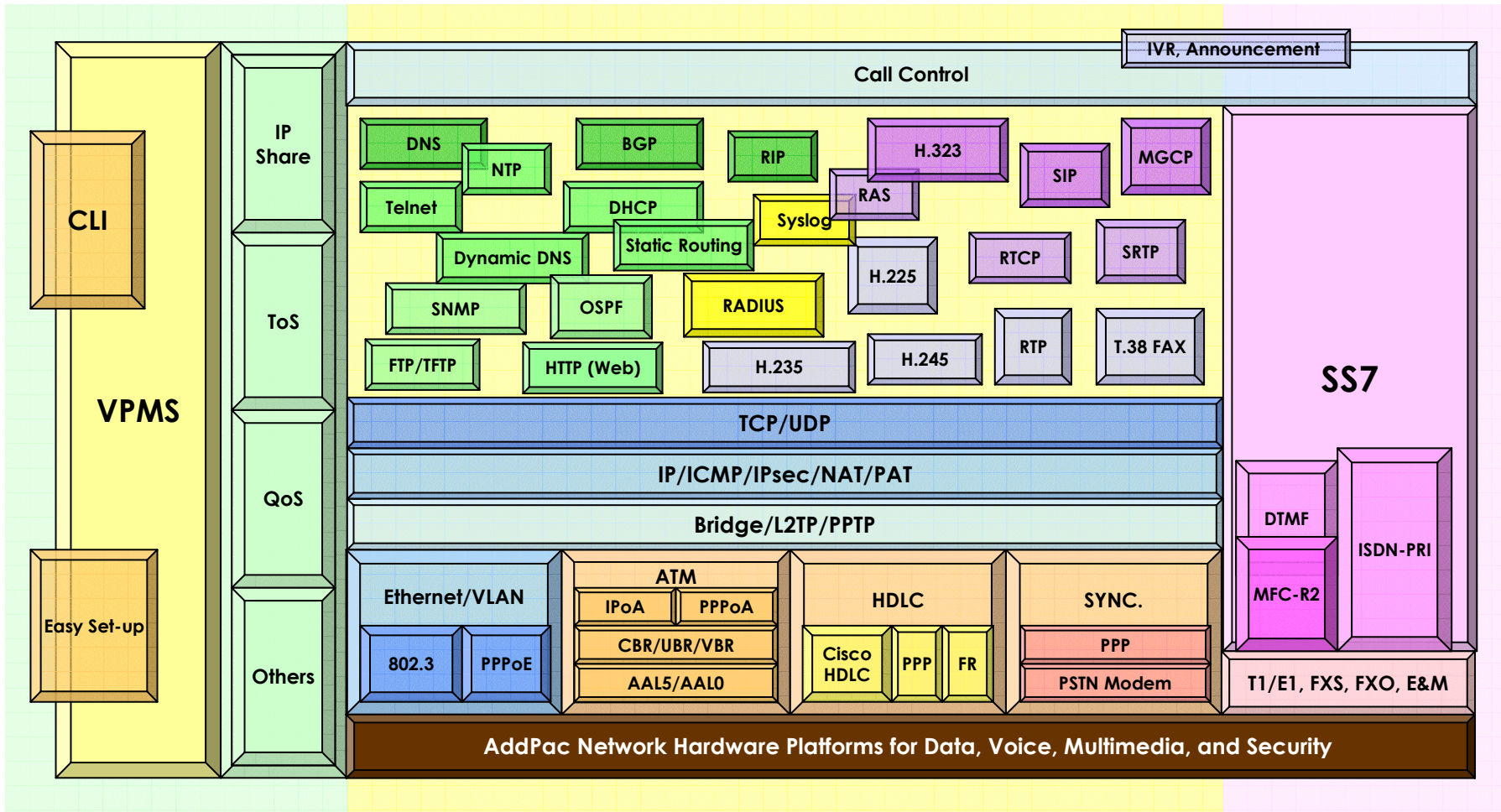1-Port Console, Voice QoS Features
APOS & AP-VPMS Support

AP1005 Gateway

4-Port FXO Voice
2-port 10Mbps Ethernet Interface
1-Port Console, Voice QoS Features
APOS & AP-VPMS Support

Performance

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APOS Internetworking Protocol Stack

AP1000 Series VoIP Gateway Product Overview
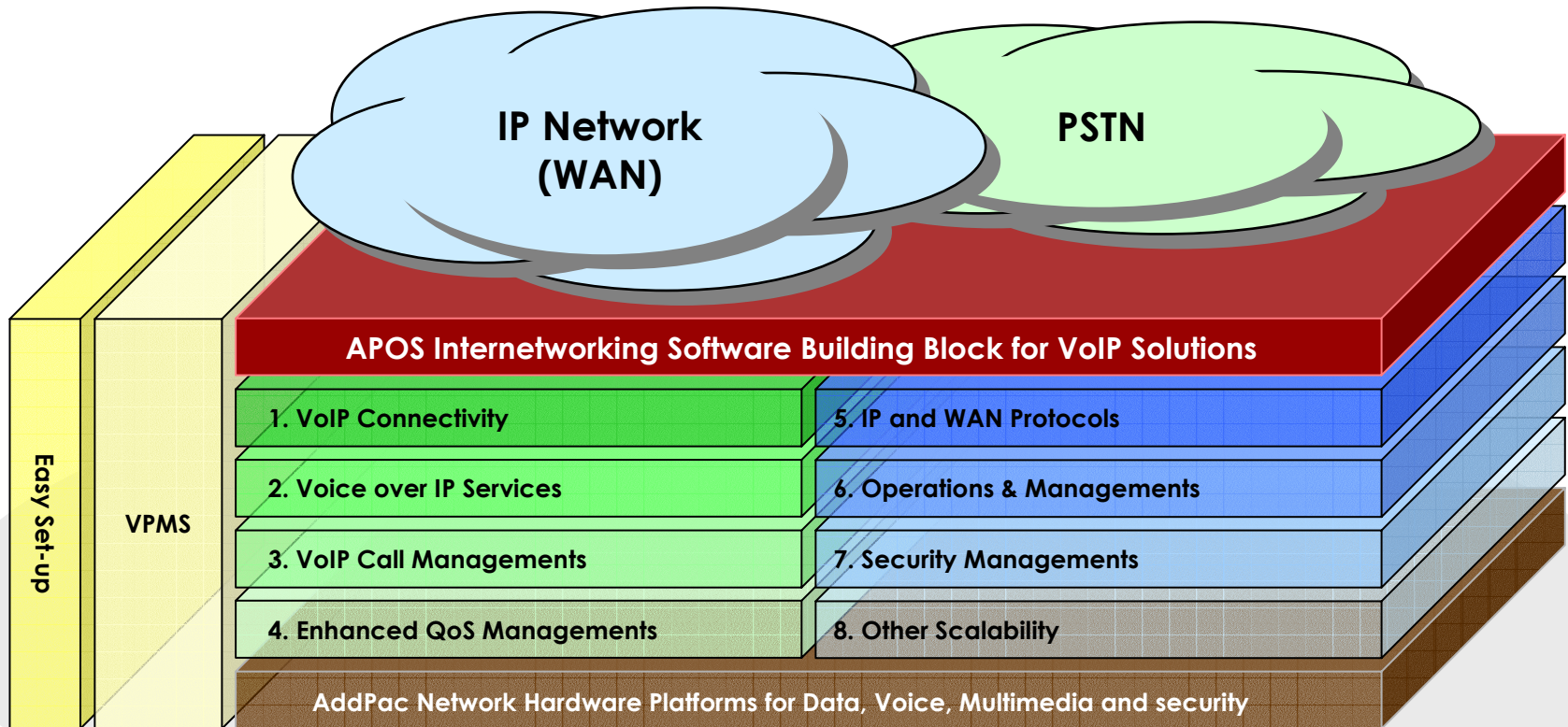
APOS Internetworking S/W World

- **APOS Internetworking Software World**
  - **AddPac Operating System (APOS)**
  - **Support Industry Standard**
  - **Integrated Networking Protocols**
  - **Optimized Performance & Functionality**
  - **Easy to use, Installation, and Maintenance**

PSTN Back-up

VPMS (Plug & Play)

FoIP

SIP

PSTN

IP Network (WAN)

H.323

MGCP

IP Routing

PPPoE

Web based Management

1011001 Data

IP Sharing

FTP/TFTP

VLAN Routing

Triple Stack H.323/SIP/MGCP

SNMP

Cisco Style CLI

DHCP

NAT/PAT

Telnet

Easy Set-Up Software

FAX

Voice Codec

Analog Phone

Voice & FAX

APOS Internetworking S/W World (cont.)

IP Network (WAN)

PSTN

APOS Internetworking Software Building Block for VoIP Solutions

1. VoIP Connectivity	5. IP and WAN Protocols
2. Voice over IP Services	6. Operations & Managements
3. VoIP Call Managements	7. Security Managements
4. Enhanced QoS Managements	8. Other Scalability

AddPac Network Hardware Platforms for Data, Voice, Multimedia and security

Easy Set-up

VPMS

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AP 1000 Series VoIP Gateway Product Overview

VoIP Gateway Connectivity

- **FXS**
  - RJ-11 Hardware interface
  - Polarity inverse generation function
  - Caller-id generation function
  - Busy-out function support
  - Ring cadence setting function
  - Ring frequency setting function
  - European type II telephone support
  - Surge protect support

- **FXO**
  - RJ-11 Hardware interface
  - Polarity inverse detection function
  - Caller-ID detection function
  - Busy-out function support
  - PSTN backup or busy-out function with Hook off in case of power down
  - Clear down tone registration and detect function
  - Hook flash timing setting function
  - Ring detect timeout setting function
  - Ring number setting function
  - For outbound calls, connect when voice is detected

FXS

FXO

PSTN

7

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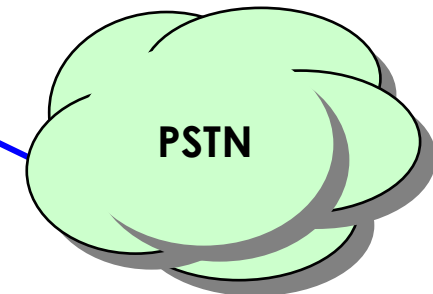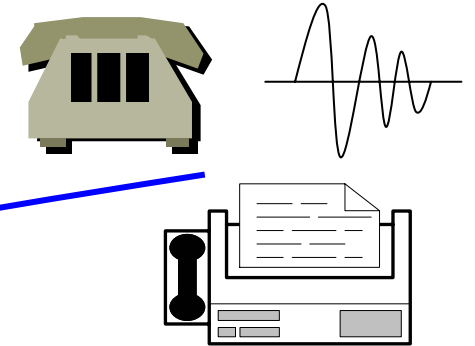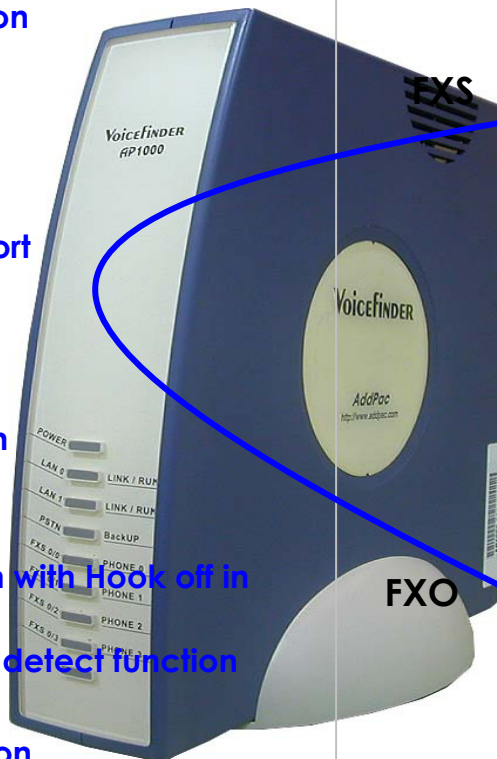
Voice over IP Service

- **H.323, SIP, and MGCP Triple Stack**
  - **Concurrent Triple VoIP Stack Software**
  - **Single Hardware with Three VoIP Service**
  - **New APOS-NX Version**

- **H.323**
  - **ITU-T Standard H.323 v3 Support**
  - **Support H.245 Tunneling**
  - **Including H.235 Security Features**

- **SIP**
  - **IETF RFC3261 or RFC2543 SIP Standard**

- **MGCP**
  - **IETF RFC2705bis-02 Standard MGCP 1.0**

H.323

SIP

IP Network (WAN)

MGCP

Concurrent Triple VoIP Stack
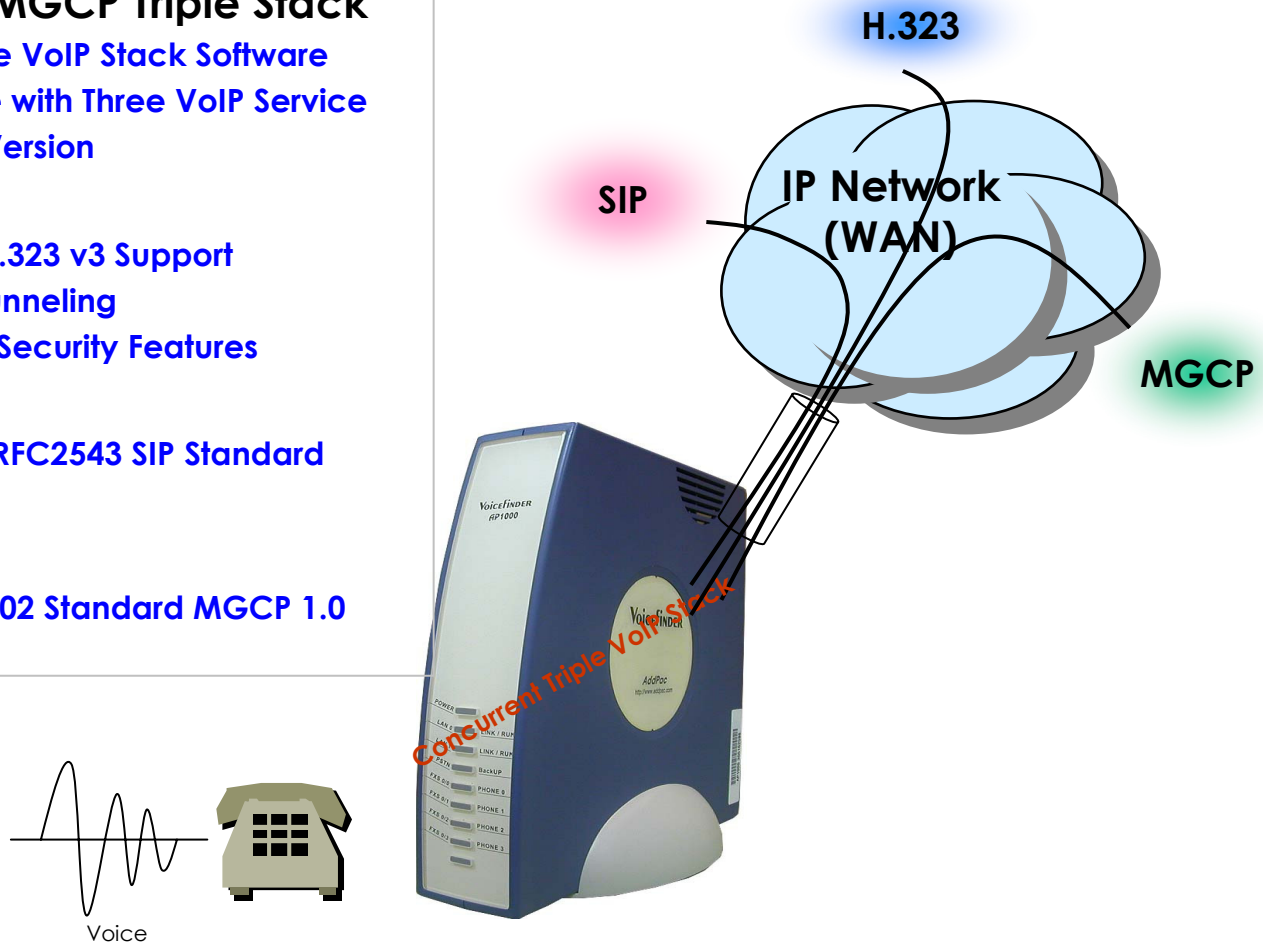
Voice

Voice over IP Service (cont.)

- **H.323**
  - Fast connect, normal connect support
  - H.245 tunneling support
  - Q.931 response message setting for inbound VoIP calls
  - H.245 logical channel open timing selection function
  - Start H.245 procedure support
  - DTMF / Hook flash relay with H.245 alphanumeric / signal
  - Secondary gatekeeper support
  - Gatekeeper assignment according to the domain name
  - Gatekeeper discovery with multicast
  - Lightweight RRQ support
  - Signaling TCP port assignment
  - Resource threshold setting with RAI
  - H.235 clear-token, crypto-token support
  - canMapAlias support
  - Technical prefix (supported prefix) support
  - Public IP assignment in NAT environment

- **SIP**
  - Gateway-based / Endpoint-based registration support
  - Secondary proxy-server assignment function
  - SIP signaling port change function
  - SIP proxy server assignment according to the domain name
  - T.38 real-time fax relay support
  - DTMF relay support with RFC2833 / OPTION message
  - Re-INVITE support

- **MGCP**
  - Secondary call agent assignment function
  - Default package assignment
  - Announcement Server Package, Generic Media Package, Handset Package, Line Package, Trunk Package support
  - MGCP call agent assignment according to the domain name
  - T.38 real-time fax relay support
  - DTMF relay support based on RFC2833

Voice over IP Service (cont.)

- **Voice Codec**
  - G.711 A-Law, G.711 U-Law
  - G.726 r16, G.726 r32
  - G.729A
  - G.723.1 r63, G.723.1 r53
  - VAD (Voice Activity Detection) function support
 - DTMF relay support (H.323, SIP, MGCP common) based on RFC2833

- **RTP**
  - Redundant RTP packet transmission in case of severe packet loss
  - Dynamic jitter buffer management and RPT packet jitter and loss compensation with heuristic & DSP error concealment
  - Static jitter buffer setting support
  - Voice frame per RTP packet number control for each codec
  - In-band ring-back tone support
  - Virtual ring-back tone support
  - Tone parameter change support

VoIP

- **FAX**
  - Fax relay mode supporting T.38, inband-T.38, bypass mode
  - Lost packet compensation with redundant setting in case of T.38 fax relay
  - Fax relay mode, rate setting for remote end
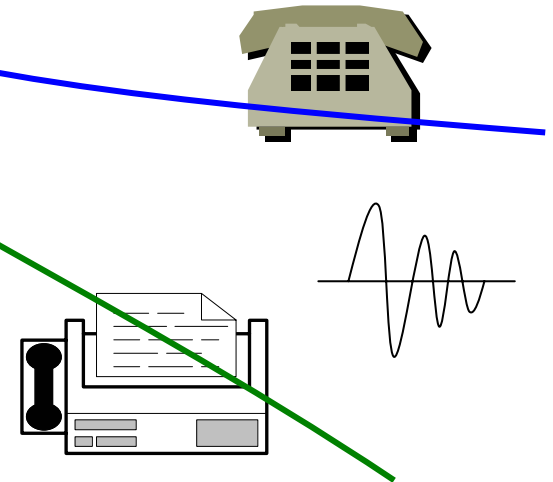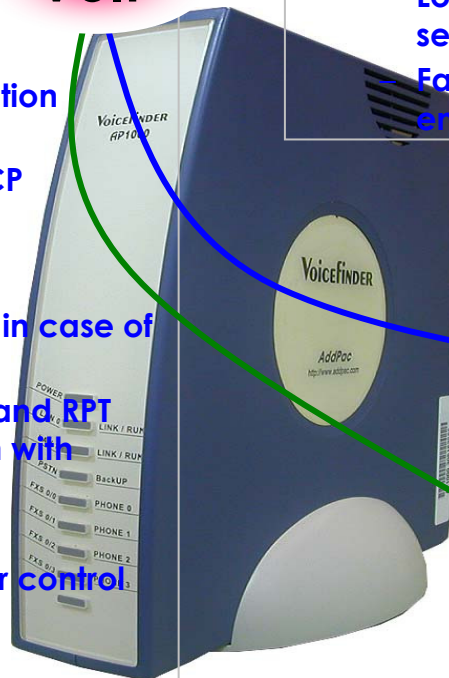
AP1000 Series VoIP Gateway Product Overview

VoIP Call Managements

- **VoIP Call Controls**
  - Hot line connection function with PLAR (Private Line Auto Ring Down)
  - Leased line emulation function
  - Connection monitoring function
  - Fault tolerant with Redundancy and Call Distribution among Gateways for load balancing
  - Call attempt with IP address
  - H.323, SIP, MGCP inbound call connection for each voice port
  - Multiple E.164 setting for one voice port
  - One E.164 or digit pattern can be assigned to more than one voice port
  - Hunting with Longest match/ priority/ sequence/ random
  - One stage call setup by Digit forwarding
  - Call barring with specific digit patterns
  - Calling and called number conversion for PSTN outbound calls
  - PSTN rerouting in case of VoIP call attempt failure

- **VoIP Call Controls (cont.)**
  - Call transfer for internal calls
  - Call pickup for internal calls
  - Calling and called number conversion for VoIP outbound calls
  - Calling and called number conversion for VoIP inbound calls
  - Fax broadcasting call control

AddPac
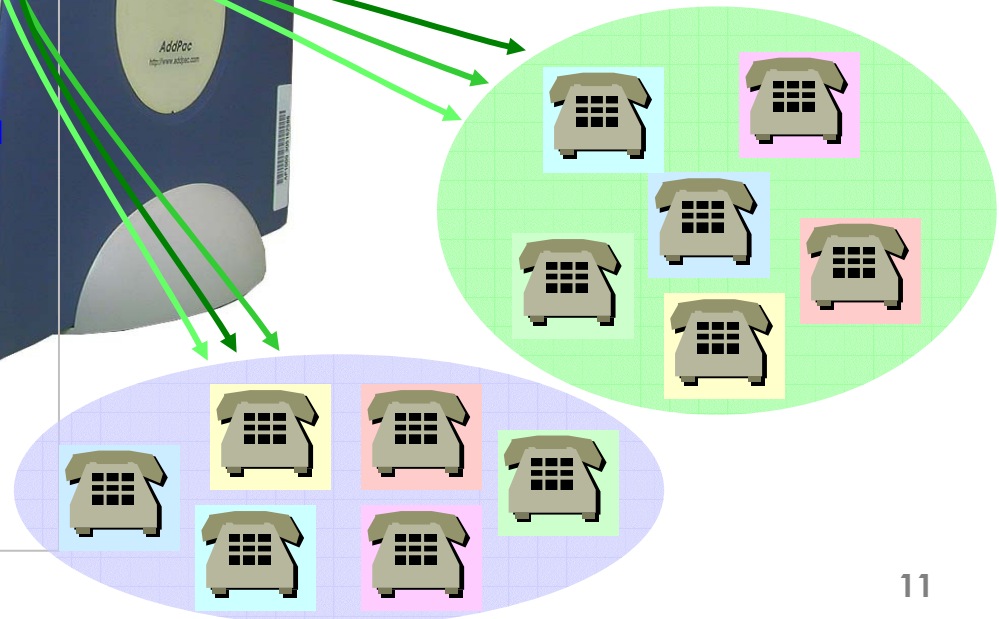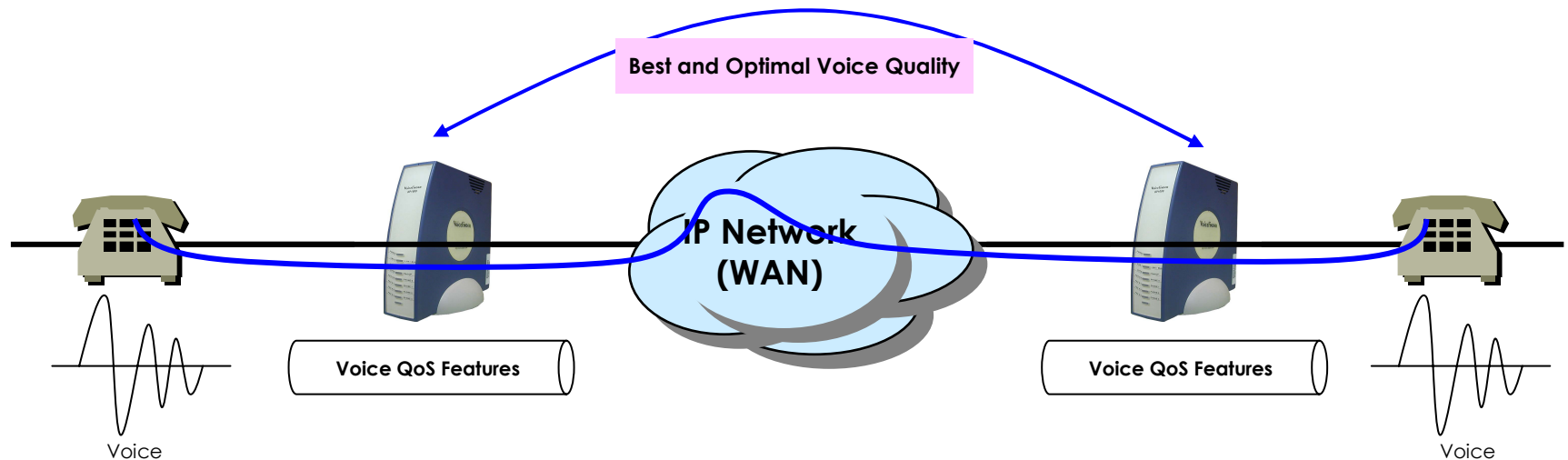
AP1000 Series VoIP Gateway Product Overview

Enhances QoS Managements

• Enhances Transmit Voice QoS Features

- Voice Traffic Priority Queuing
- QoS Service Profiling
- Providing Virtual Network Transmit Algorithm
- Real-time Voice Traffic QoS Support
- RTP Packet Transmit Interval Control
- Supporting RTP Packet Redundancy Scheme
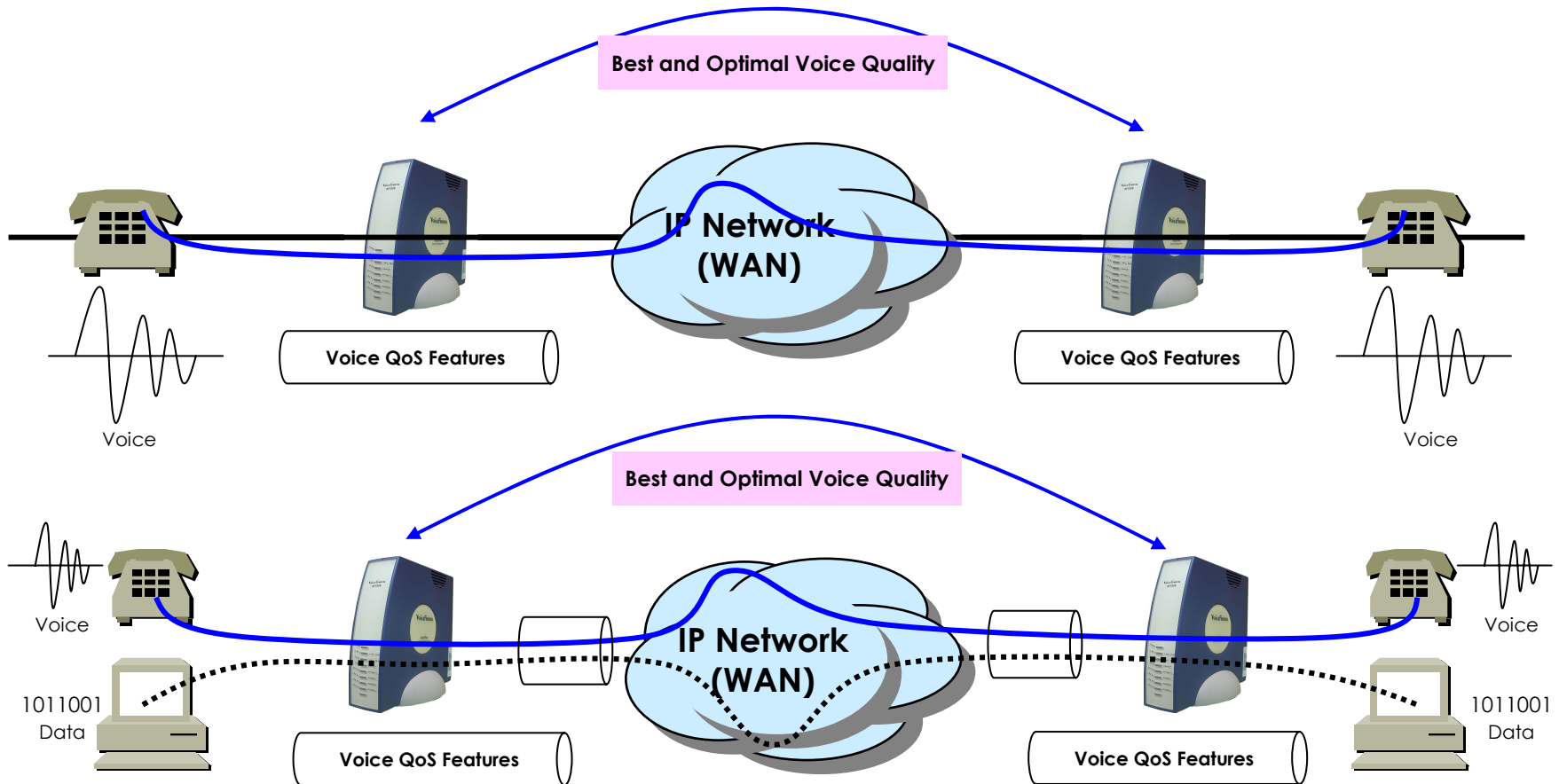- IP Header Control such as ToS, Diffserv

• Enhances Receive Voice QoS Features

- Dynamic Jitter Buffer Management
- Error Concealment
- Support T.38 FAX Data Error Recovery Scheme

Best and Optimal Voice Quality

IP Network (WAN)

Voice QoS Features

Voice QoS Features

Voice

Voice

AddPac

Enhances QoS Managements (cont.)

Best and Optimal Voice Quality

IP Network (WAN)

Voice QoS Features

Voice QoS Features

Voice

Voice

Best and Optimal Voice Quality

IP Network (WAN)

Voice QoS Features

Voice QoS Features

Voice

Voice

1011001 Data

1011001 Data

AddPac

Enhances QoS Managements (cont.)

Best and Optimal Voice Quality

Voice

1011001
Data

Voice QoS Features

IP Network
(WAN)

Voice QoS Features

Voice

1011001
Data

Best and Optimal Voice Quality

Voice

FAX

1011001
Data

Voice QoS Features

IP Network
(WAN)

Voice QoS Features

Voice

FAX

1011001
Data

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Enhances QoS Managements (cont.)

AP1000 Series VoIP Gateway Product Overview

IP and WAN Protocols

- **IP Routing Protocols**
  - **Multi-protocol Internetworking Services**
  - **Static IP routing**
  - **RIP v1/v2 (opt.)**
  - **OSPF v2 routing protocols support (opt.)**
  - **Transparent Bridging (IEEE Spanning Tree Protocol)**

- **WAN Protocols**
  - **Point-to-Point Protocol (PPP)**
  - **High-level Data Link Control (HDLC) Protocol**
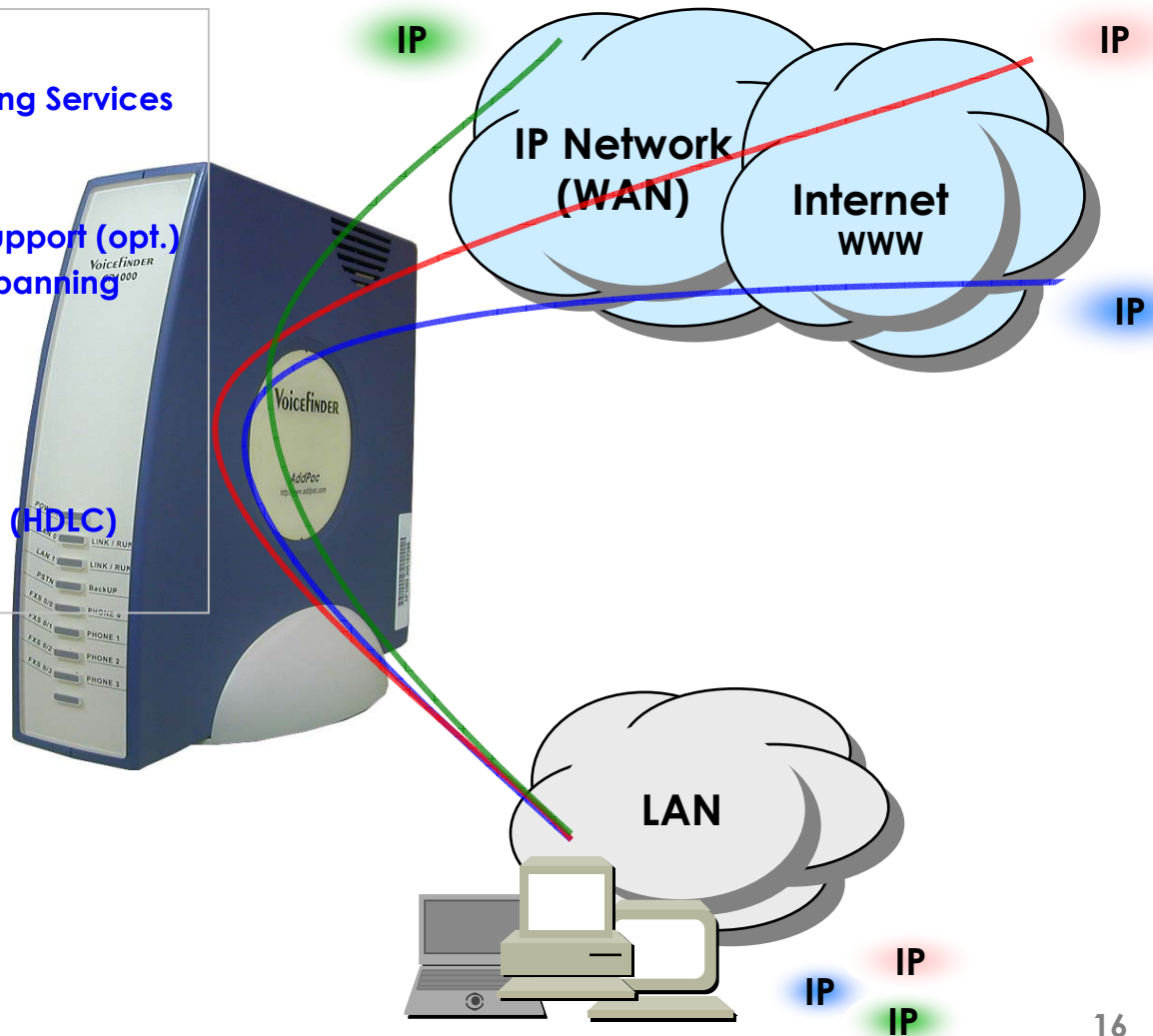
Network Managements

- **SNMP**
  - Standard Simple Network Management Protocol(SNMP) Agent support
  - MIB v1 and v2 Support

- **Web-based Management**
  - Standard Voice Interface
  - Standard PSTN Back-up Interface

- **Watch-dog Function**
  - Hardware, Software watch-dog services

- **Remote Management**
  - Telnet
  - Rlogin
  - Console

- **Auto Upgrade Service**
 - HTTP server based APOS image and configuration file auto-upgrade support

- **Batch Job Function**
  - Text based script downloading

- **Easy Set-up Service**
  - MS Windows Graphical User Interface (GUI) based installation Software Solution
  - Easy installation Set-up service

- **Interoperable with AP-VPMS Service**
  - AddPac VoIP Plug & Play Management System (AP-VPMS)

IP Network (WAN)

AddPac

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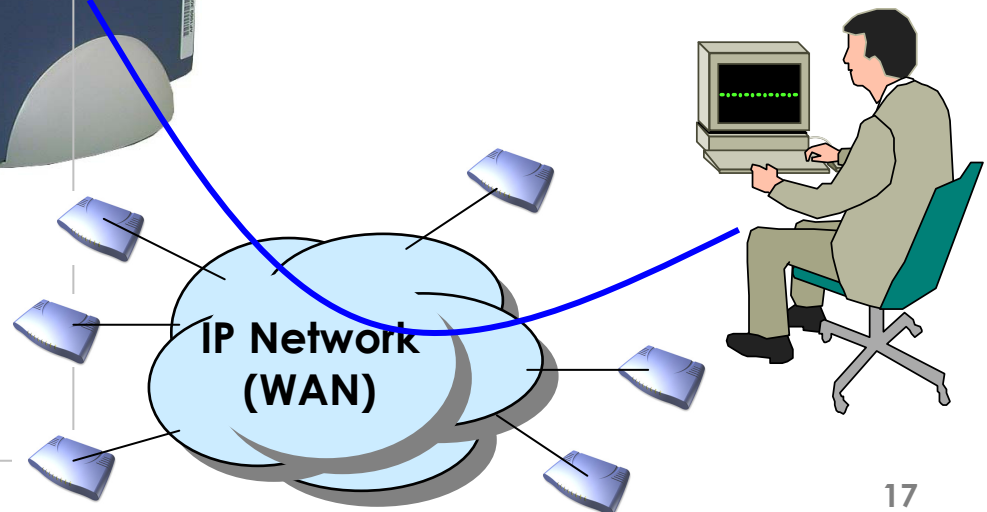
Security Managements

- **IP packet filtering**
- **IP access list**
- **User authentication function**
  - **Password Authentication Protocol (PAP)**
  - **Challenge Handshake Authentication Protocol (CHAP)**
- **Enable/Disable specific protocols**
- **Auto-square connect of console and Telnet session**
- **Account Management function for multi-level user**
- **SNMP/TELNET/FTP/HTTP/TFTP port assignment function**
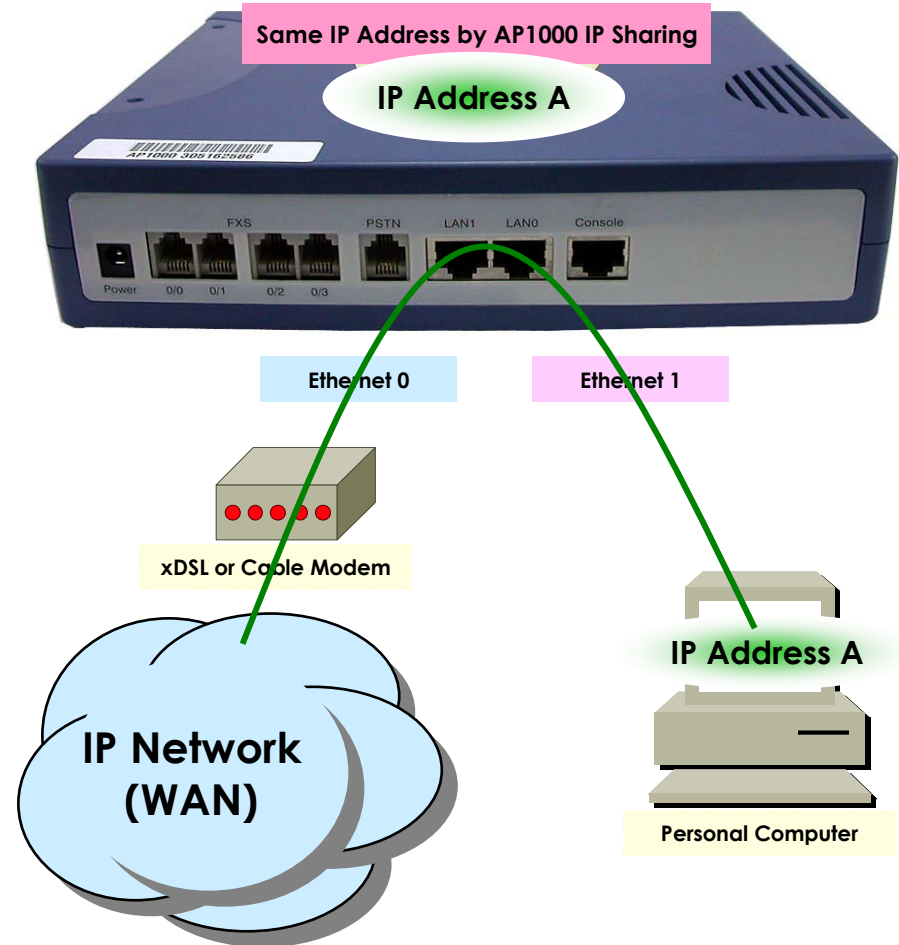- **SNMP/TELNET/FTP access list management**
- **Boot mode security checking function**
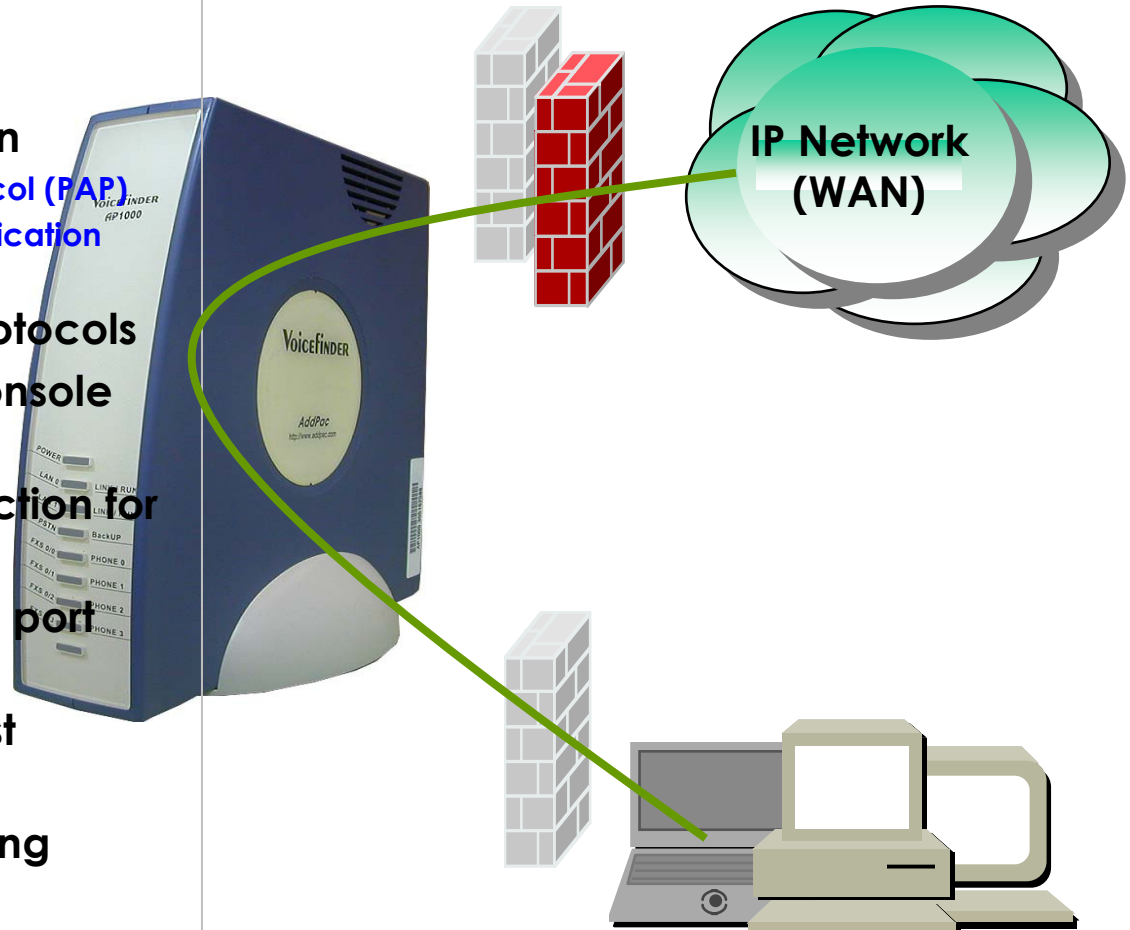
IP Network (WAN)

AP1000 Series VoIP Gateway Product Overview

Network Scalability

- **IP Sharing Feature**
  - **Single IP Address, Multiple IP Network Access**
  - **Public IP Address Sharing by VoIP Gateway**

- **IP Sharing Network Environment**
  - **Support Legacy Network Environment**
  - **xDSL Modem based Broadband Network**
  - **Cable Modem based Broadband Network**
  - **Leased line Network Environment**

- **Both support Fixed and Dynamic IP**
- **Support Standard Network Protocols**
  - **PPPoE**
  - **PPPTP**
  - **DHCP**

AP1000 VoIP Gateway Series

Same IP Address by AP1000 IP Sharing

IP Address A

FXS   PSTN   LAN1   LAN0   Console

Power   0/0   0/1   0/2   0/3

Ethernet 0

Ethernet 1

xDSL or Cable Modem

IP Network (WAN)

IP Address A

Personal Computer

Network Scalability (cont.)

- **Bridging Service**
  - **Spanning Tree Bridging protocol (IEEE) support**
- **DHCP**
  - **Server and Relay**
- **IP Accounting**
- **PAT (Port Address Translation)**
- **NAT (Network Address Translation)**
- **Cisco Style CLI (Command Line Interface)**
- **PPTP (Point-to-Point Tunneling Protocol)**
- **NTP (Network Time Protocol)**
- **FTP/TFTP**
  - **Server and Client support**
- **DNS**
  - **Dynamic DNS Client support**

IP Network (WAN)

20
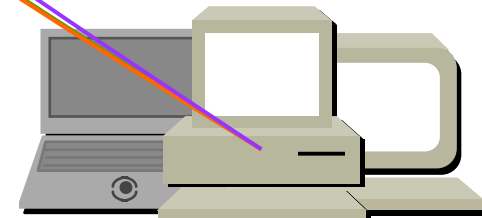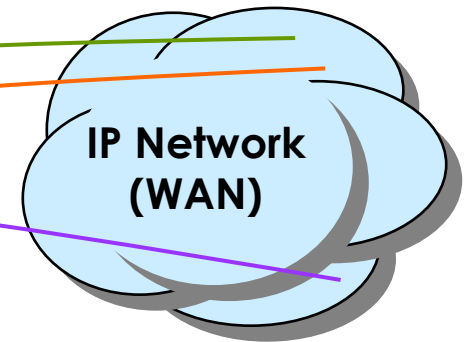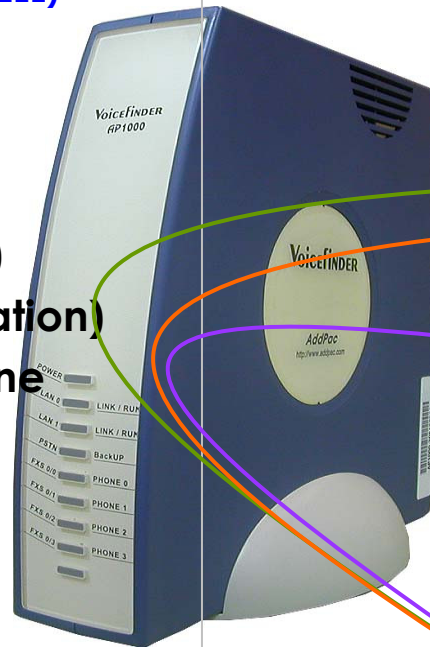
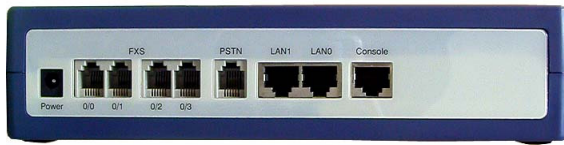## VoIP Plug & Play System (VPMS)

- **AddPac AP-VPMS Support**
  - **AddPac VoIP Plug & Play System (VPMS)**
  - **Best EMS Solutions for AddPac VoIP G/W**

- **Requirements Hardware Platform**
  - **Over 1GHz Intel Pentium 4 Machine**
  - **Over 1GB Main Memory**
  - **Over 40GB Hard Disk Memory**
  - **Microsoft Windows Advanced Server or Windows 2000 Server or Windows XP Professional**
  - **DBMS : Microsoft MS-SQL Server 2000**

IP Network (WAN)

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AddPac
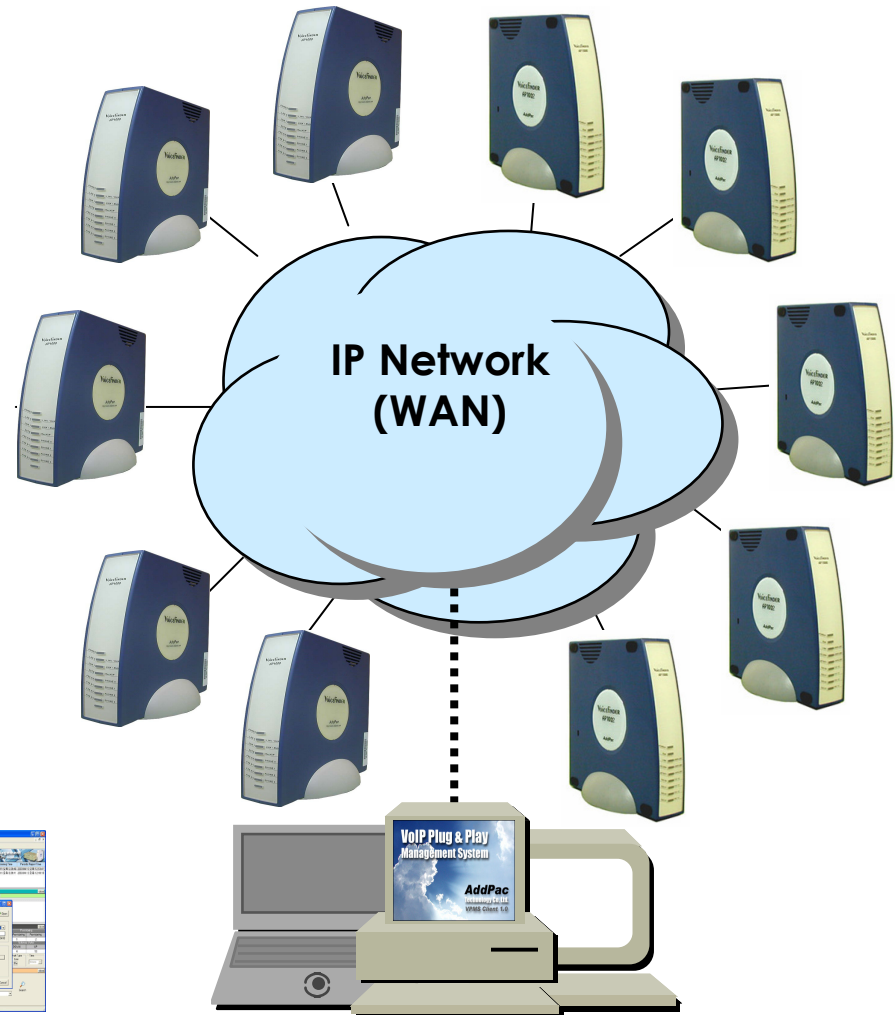
AP1000 Series VoIP Gateway Product Overview

Network Configurations

- **Front View Side of AP1000 Series**
- **AP1000**
  - **4-Port FXS Voice Interface**
  - **1-Port Console**
  - **2 -Port 10Mbps Ethernet**
  - **1 -Port PSTN Back-up**
- **AP1002**
  - **2-Ports FXS & 2 Ports FXO Voice Interface**
  - **, 1-Port Console**
  - **2 -Port 10Mbps Ethernet**
- **AP1005**
  - **4-Port FXO Voice Interface**
  - **1-Port Console**
  - **2 -Port 10Mbps Ethernet**

- **AddPac AP-VPMS Support**
  - **AddPac VoIP Plug & Play System (VPMS)**
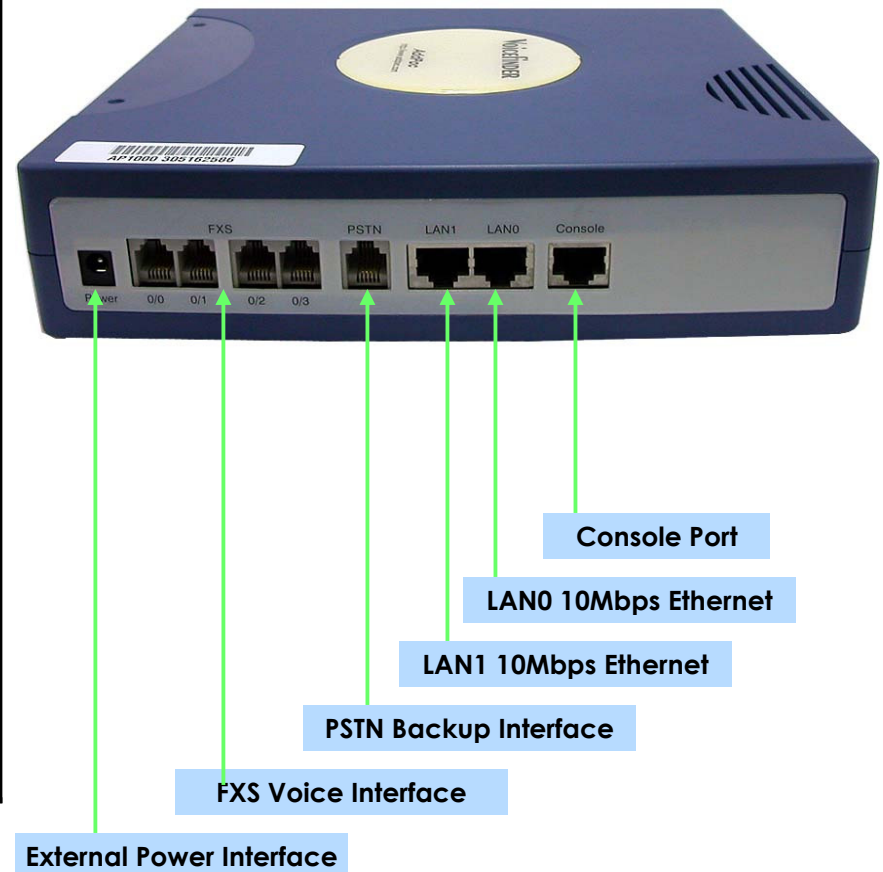 - **Best EMS Solutions for AddPac VoIP G/W**

AddPac

AP1000VoIP Gateway Product Overview

Hardware Specification

Hardware Specifications

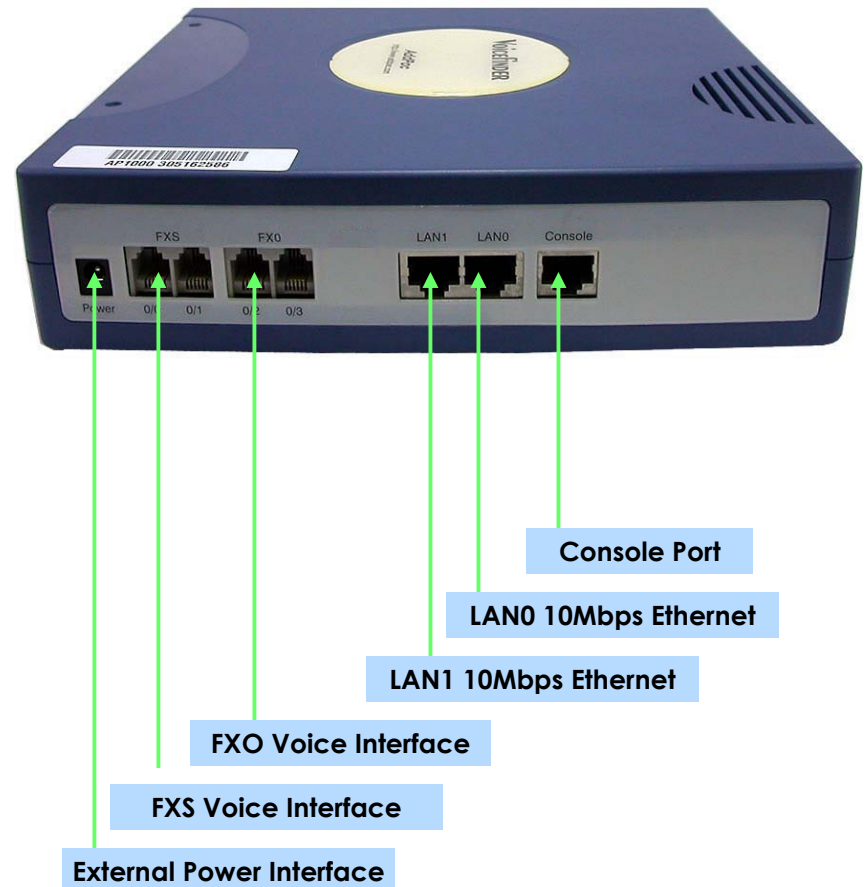| AP1000 VoIP Series	Basic Specifications
CPU	32Bit RISC Microprocessor
Voice Interface	4-Ports FXS Voice Interface(RJ-11)
Ethernet Interface	2-Ports 10Mbps Ethernet Interface(RJ-45)
Console Port	1-Port RS-232C Console Port(RJ-45)
PSTN Backup Port	1-Port PSTN Backup Port(RJ-11/Only AP1000)
Flash Memory	2 Mbyte High-speed Flash Memory
Main Memory	32 Mbyte High-speed SDRAM
Boot Memory	512Kbyte Flash Memory
Power Requirement	External Power Supply Adaptor / VAC 110~220V, 5V 2A 10Watt
Operating Temperature	0ºC ~ 50ºC (32 ºF ~ 122ºF)
Storage Temperature	-40ºC ~ + 85ºC (-40ºC ~ 185ºF)
Relative Humidity	5% ~ 95% (Non-condensing)
Dimensions	50mm x 210mm x 210mm (H x W x D)
Weight (g)	400g

Network interface Configurations

Console Port

LAN0 10Mbps Ethernet

LAN1 10Mbps Ethernet

PSTN Backup Interface

FXS Voice Interface

External Power Interface

Hardware Specification

Hardware Specifications

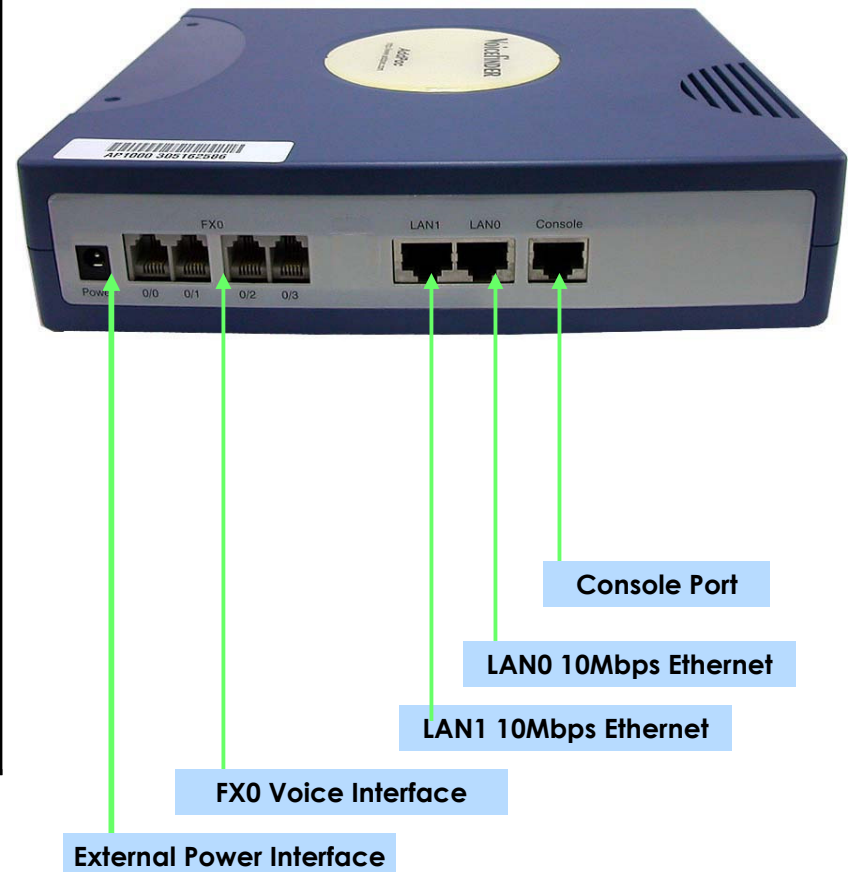| AP1000 VoIP Series	Basic Specifications
CPU	32Bit RISC Microprocessor
Voice Interface	2FXS & 2 FXO Voice Interface(RJ-11)
Ethernet Interface	2-Ports 10Mbps Ethernet Interface(RJ-45)
Console Port	1-Port RS-232C Console Port(RJ-45)
Flash Memory	2 Mbyte High-speed Flash Memory
Main Memory	32 Mbyte High-speed SDRAM
Boot Memory	512Kbyte Flash Memory
Power Requirement	External Power Supply Adaptor / VAC 110~220V, 5V 2A 10Watt
Operating Temperature	0°C ~ 50°C (32 °F ~ 122°F)
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Network interface Configurations

Console Port

LAN0 10Mbps Ethernet

LAN1 10Mbps Ethernet

FXO Voice Interface

FXS Voice Interface

External Power Interface

AddPac

Hardware Specification

Hardware Specifications

AP1000 VoIP Series	Basic Specifications
CPU	32Bit RISC Microprocessor
Voice Interface	4-Ports FXO2Voice Interface(RJ-11)
Ethernet Interface	2-Ports 10Mbps Ethernet Interface(RJ-45)
Console Port	1-Port RS-232C Console Port(RJ-45)
Flash Memory	2 Mbyte High-speed Flash Memory
Main Memory	32 Mbyte High-speed SDRAM
Boot Memory	512Kbyte Flash Memory
Power Requirement	External Power Supply Adaptor / VAC 110~220V, 5V 2A 10Watt
Operating Temperature	0°C ~ 50°C (32 °F ~ 122°F)
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Network interface Configurations

Console Port

LAN0 10Mbps Ethernet

LAN1 10Mbps Ethernet

FX0 Voice Interface

External Power Interface

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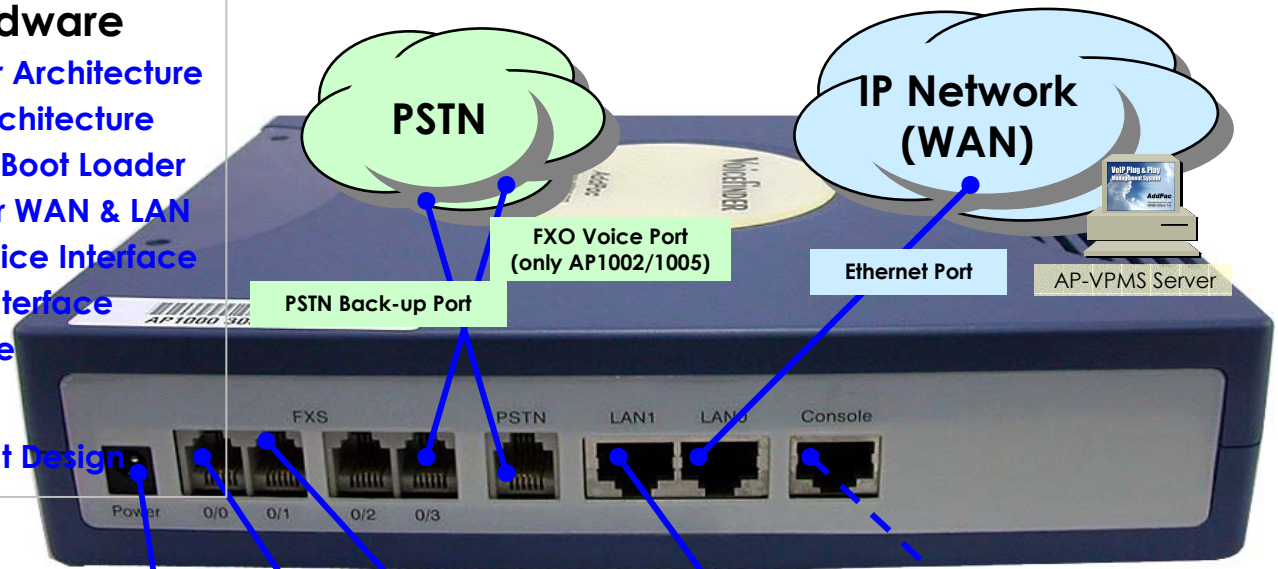# AP1000 Series VoIP Gateway Product Overview

Networking Interface

- **High-performance Hardware**
  - **32bit RISC Microprocessor Architecture**
  - **High-performance DSP Architecture**
  - **High-speed Memory with Boot Loader**
  - **Dual Ethernet Interface for WAN & LAN**
  - **Standard FXS and FXO Voice Interface**
  - **Standard PSTN Back-up Interface**
  - **RS-232C Console Interface**

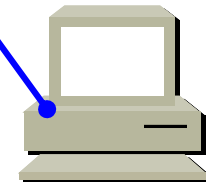- **Compact Design**
  - **Small, Light, and Compact Design**

PSTN

IP Network (WAN)

FXO Voice Port (only AP1002/1005)

PSTN Back-up Port

Ethernet Port

AP-VPMS Server

Ext. Power Supply

FXS Voice Port

LAN Port

RS-232C Console

AP1000 VoIP Gateway Series

Analog Phone   **FAX**

AddPac VoIP Gateway Network Diagram Example

Legend:
- DID, FXS Analog Voice Interface
- DOD, FXO Analog Voice Interface
- Voice+Data, Ethernet or WAN Interface
- Analog Voice Interface for Broadcasting System
- Analog Phone
- AP200/300 VoIP Gateway
- Leased Line/ATM/Frame-Relay/IP Router, xDSL/Cable Modem
- AddPac Voice over IP Gateway, Multiservice Router
- PBX, Key Phone, Broadcasting System
- Back-bone Router

Head Office
- Broadcasting System
- PBX
- Fax
- LAN

PSTN

Wide Area Network (Leased Line, IP, FR, ATM, xDSL, Cable, etc.)

IP Based Network
- EMS
- MG
- GK
- BS

Branch Office A
- Key Phone System
- Fax
- Broadcasting System
- LAN

Branch Office B
- Key Phone System
- Fax
- Broadcasting System
- LAN

Other Branch Office
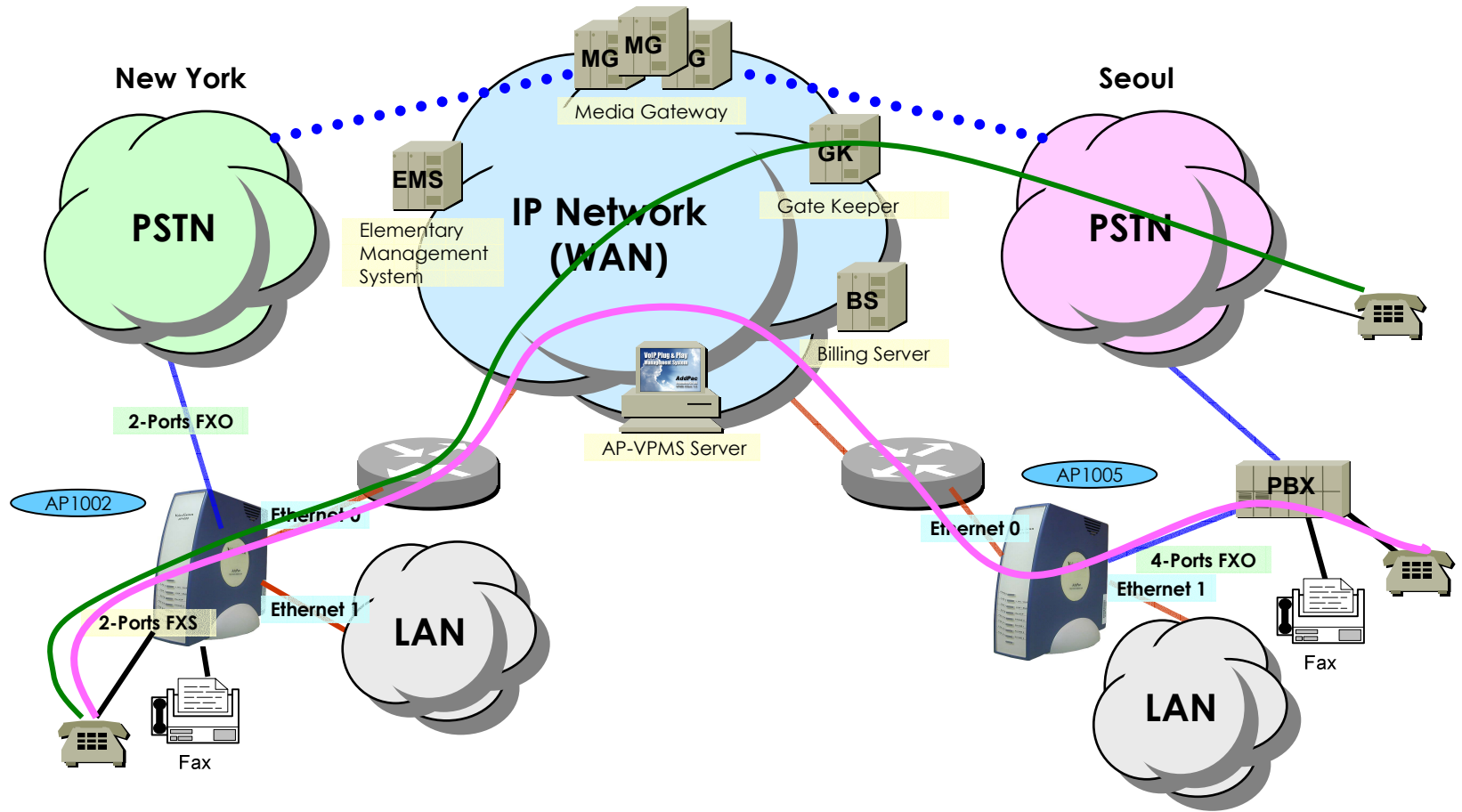
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AP1000 Voice Networking Configuration

New York

Seoul

MG MG G
Media Gateway

EMS
Elementary Management System

GK
Gate Keeper

IP Network (WAN)

PSTN

PSTN

BS
Billing Server

PSTN Back-up

AP-VPMS Server

PSTN Back-up

AP1000

Ethernet 0

Ethernet 1

4-Port FXS

LAN

Voice

Fax

AP1000

Ethernet 0

4-Port FXS

Ethernet 1

LAN

Voice

Fax

	FXS Analog Voice Interface		Leased Line/ATM/Frame-Relay/IP Router, xDSL/Cable Modem, etc.
	FXO Analog Voice Interface		AddPac AP1000 Voice over IP Gateway
	Voice+Data, Ethernet or WAN Interface		Analog Phone
	TRUNK n x E1 Voice Interface for PSTN Interworking		

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AP1002 &1005 Voice Networking Configuration

Legend:

FXS Analog Voice Interface	Leased Line/ATM/Frame-Relay/IP Router, xDSL/Cable Modem, etc.
FXO Analog Voice Interface	AddPac AP1002/1005 Voice over IP Gateway Series
Voice+Data, Ethernet or WAN Interface	Analog Phone
TRUNK n x E1 Voice Interface for PSTN Interworking	

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AP1000 Series VoIP Gateway Product Overview

Ordering and Pricing

- **AP1000 Series VoIP Gateway Pricing & Ordering**
  - **AddPac Technology Regional Sales Managers**
  - **Authorized Sales and Marketing Representatives**
  - **Please Contact www.addpac.com**

Model	Product Description	Available	Remarks
AP1000	Fixed 4-Ports FXS Voice Interface, 2-Ports 10Mbps Ethernet, 1-Port PSTN Back-up Interface, 1-Port Console, APOS Software with Voice Traffic QoS	**Now**	
AP1002	2-Ports FXS and 2-Ports FXO Voice Interface, 2-Ports 10Mbps Ethernet, 1-Port Console, APOS Software with Voice Traffic QoS	**Now**	
AP1005	4-Ports FXO Voice Interface, 2-Ports 10Mbps Ethernet, 1-Port Console, APOS Software with Voice Traffic QoS	**Now**	

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AP1000 Series VoIP Gateway Product Overview

Comparison Table

	AP1000 VoIP Gateway Series		
	AP1000	**AP1002**	**AP1005**
▶ FXS Voice Ports (RJ11)	4	2	-
▶ FXO Voice Port (RJ11)	-	2	4
▶ PSTN Backup Voice Port (RJ11)	1	-	-
▶ 10Mbps Ethernet Ports (RJ45)	2	2	2
▶ Console Ports (RJ45)	1	1	1
▶ CPU	32Bit RISC	32Bit RISC	32Bit RISC
▶ Flash Memory	2Mbyte	2Mbyte	2Mbyte
▶ Main Memory (SDRAM)	32Mbyte	32Mbyte	32Mbyte
▶ Power Supply	Ext. PSU	Ext. PSU	Ext. PSU
▶ Internetworking OS	APOS	APOS	APOS
▶ H.323, SIP VoIP Protocol, T38 FAX, MGCP	YES	YES	YES
▶ PPPoE, PPTP Network Protocols	YES	YES	YES
▶ Enhanced QoS Management Feature	YES	YES	YES
▶ IP Routing Protocols Including NAT	YES	YES	YES
▶ Network Management Protocols	YES	YES	YES
▶ Support Network Environments	ADSL, VDSL, Cable Modem, Leased Line, ATM, Frame-Relay, Including Conventional Broad Band Networking		

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Thank you !

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