AP1100FN

4-Port FXS 4-Port FXO VoIP Gateway
High Performance VoIP Gateway Solution

VoIP Gateway Service +
Light SIP Proxy Service

AddPac

AddPac Technology

Sales and Marketing

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- Hardware Specification
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Product Overview

- H.323/SIP Dual Concurrent Stack Embedded
- High Performance RISC & Programmable DSP Architecture
- One(1) 10/100Mbps Fast Ethernet, One(1) 10Mbps Ethernet
- High Performance LAN-to-LAN Routing Capability
- G.711/G.726/G.723/G.729, T.38 Fax , VAD, etc
- Powerful Network Protocols (PPPoE, DHCP, Static Routing, etc)
- Firmware Upgradeable Architecture
- Light SIP Proxy Support (Mini Call Manager Service)
- SNMS (VoIP Plug&Play Management System) for Large Scale Deployment
- Advanced Voice QoS Mechanism
- Small, Light and Compact Design
- Power Switch for Stability and Status LEDs
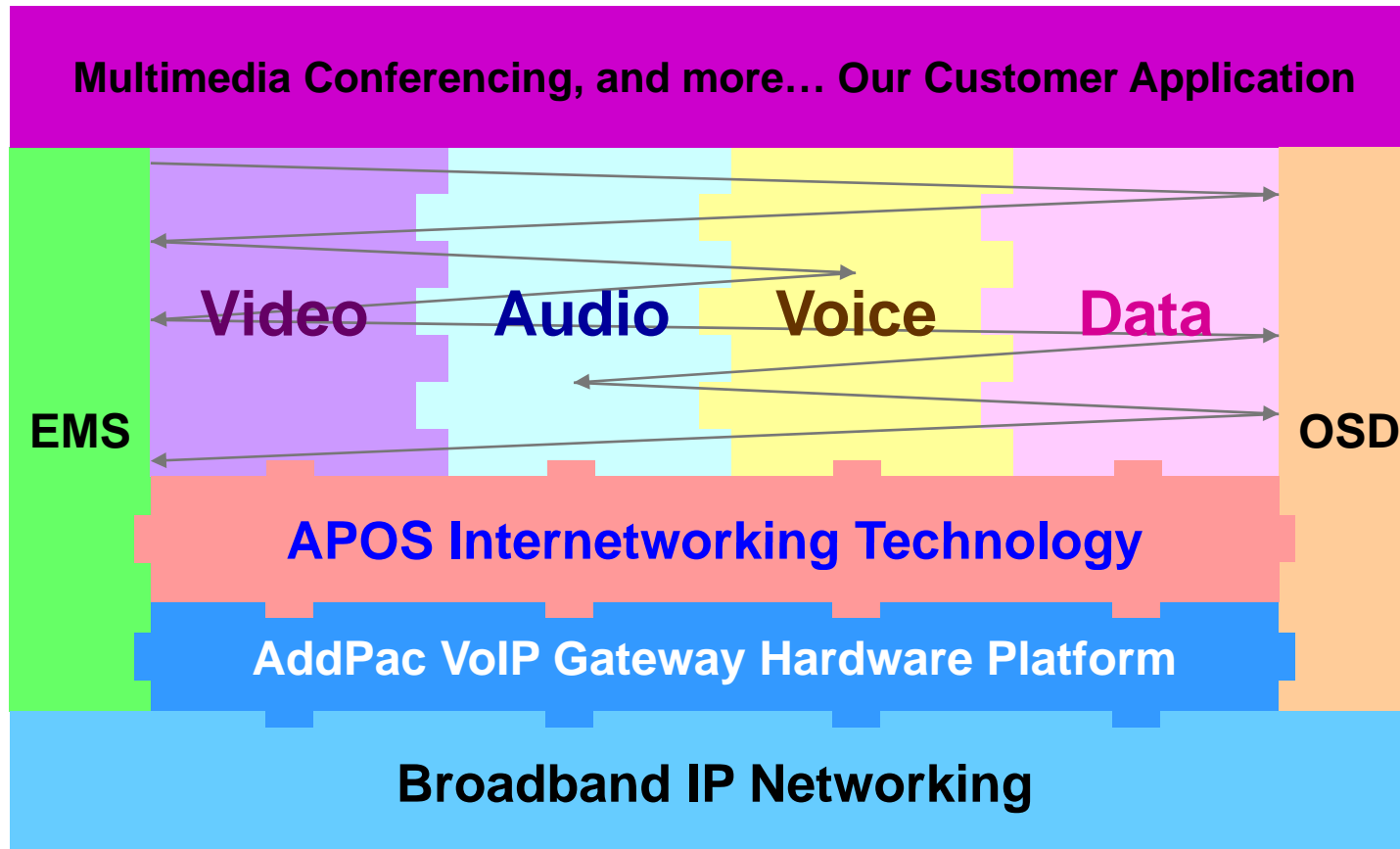- 4-Port FXS 4-Port FXO Interface

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Product Highlights

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

**State-of-art Signaling
H.323, SIP
Concurrent Dual Stack**

**SNMS Large Scale VoIP
Gateway Management Support**

**Small, Light and
Compact Design**

**Excellent Voice Quality
G.729/G.723/G.726/G.711**

**High Performance RISC CPU
+ Programmable DSP**

**Web based
Smart Easy Setup™**

**Broadband IP Networking
With 10/100Mbps
Fast Ethernet**

**APOS™Technology
Firmware Upgradeable Architecture**

**High Performance
LAN-to-LAN Packet Routing
Processing**

Powerful Network Protocol Support

**4-Port FXS, 4-Port FXO
Analog Interface**

**Advanced Voice
Traffic QoS Mechanism**

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APOS Technology

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

Multimedia Conferencing, and more… Our Customer Application

Video   Audio   Voice   Data

EMS

OSD

APOS Internetworking Technology

AddPac VoIP Gateway Hardware Platform

Broadband IP Networking

• APOS : AddPac Internetworking Operating System
• OSD : On- Screen Display
• EMS : Element Management System

Hardware Specification
AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

RISC
CPU

High-end
DSP

- RISC Microprocessor Computing Power
  + High End Programmable DSP
- VoIP Analog Interface
  - Quad(4) FXS Port
  - Quad(4) FXO Port
- Network Interface
  - One(1) 10/100Mbps Fast Ethernet (RJ45)
  - One(1) 10Mbps Ethernet (RJ45)
- Power Supply
  - External Power Adaptor (5V, 5A)
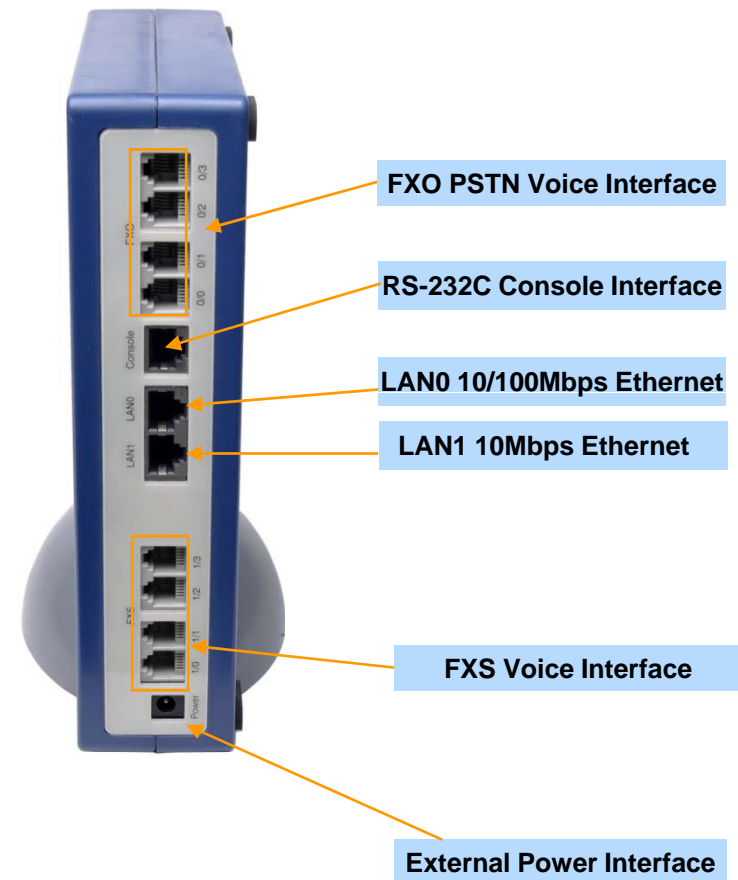- Power On/Off Switch
- Power LED, LAN LED, FXS Port LED

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Hardware Specification

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

Hardware Specifications

| AP1100F VoIP Series Model A Type	Basic Specifications
CPU	32Bit RISC Microprocessor
Analog Voice Interface	4-Port FXS Voice Interface (4xRJ11) + 4-Port FXO Voice Interface (4xRJ11)
Ethernet Interface	1-Port 10/100Mbps Fast Ethernet Interface(1xRJ45) 1-Port 10Mbps Ethernet Interface(1xRJ45)
Flash Memory	8Mbyte High-speed Flash Memory
Base Memory	64Mbyte High-speed SDRAM
Power Requirement	External Power Supply Adaptor / VAC 110~220V, 50/60Hz, 25Watt
Operating Temperature	0ºC ~ 45ºC (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)

Network interface Configurations

FXO PSTN Voice Interface

RS-232C Console Interface

LAN0 10/100Mbps Ethernet

LAN1 10Mbps Ethernet

FXS Voice Interface

External Power Interface

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VoIP (Voice over IP) Service

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- **H.323, SIP Dual Stack**
- **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**

H.323

SIP

IP Network (WAN)

Concurrent Dual VoIP Stack

Voice

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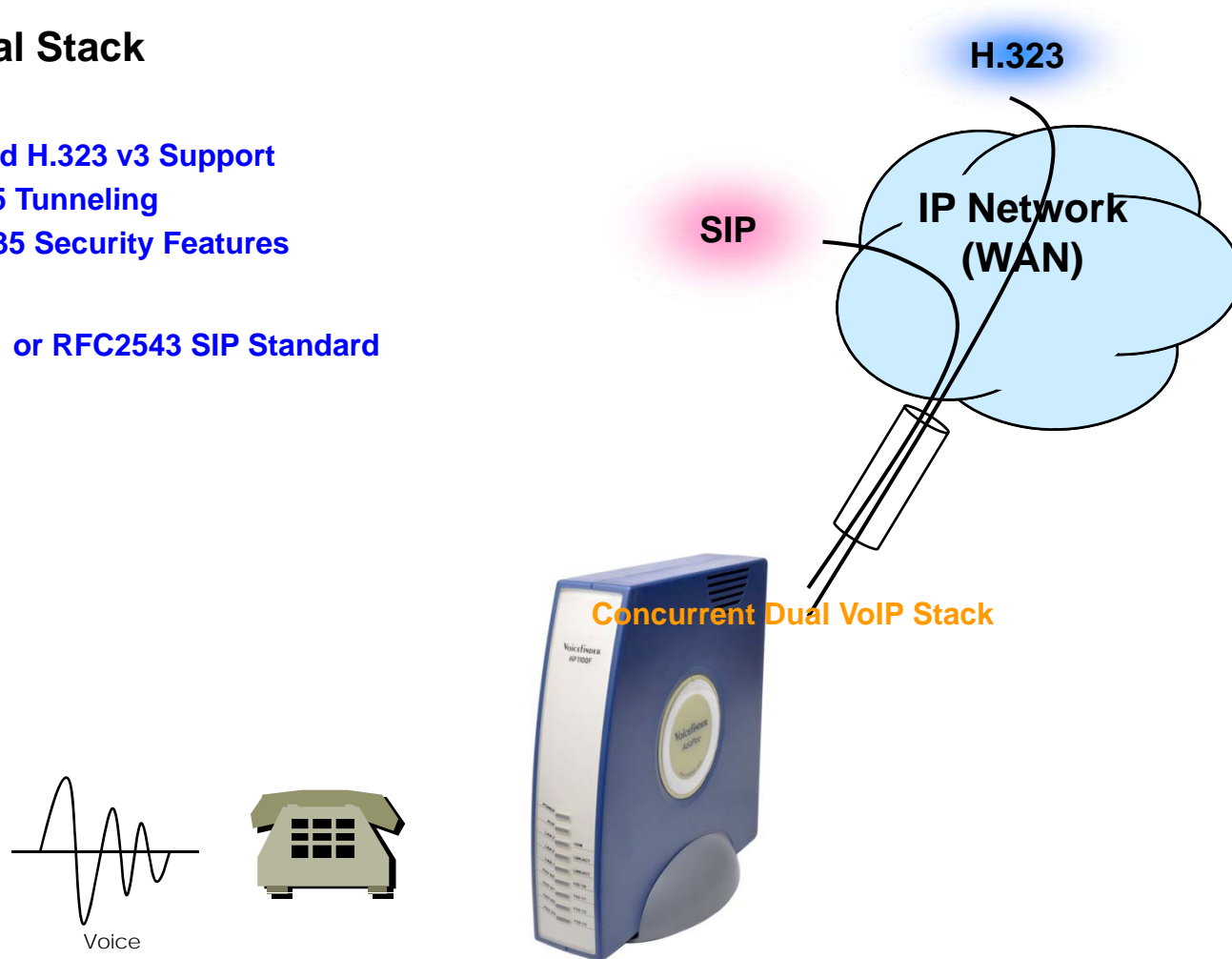
VoIP (Voice over IP) Service

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- **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**

VoIP (Voice over IP) Service

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- **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**

- **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**

VoIP

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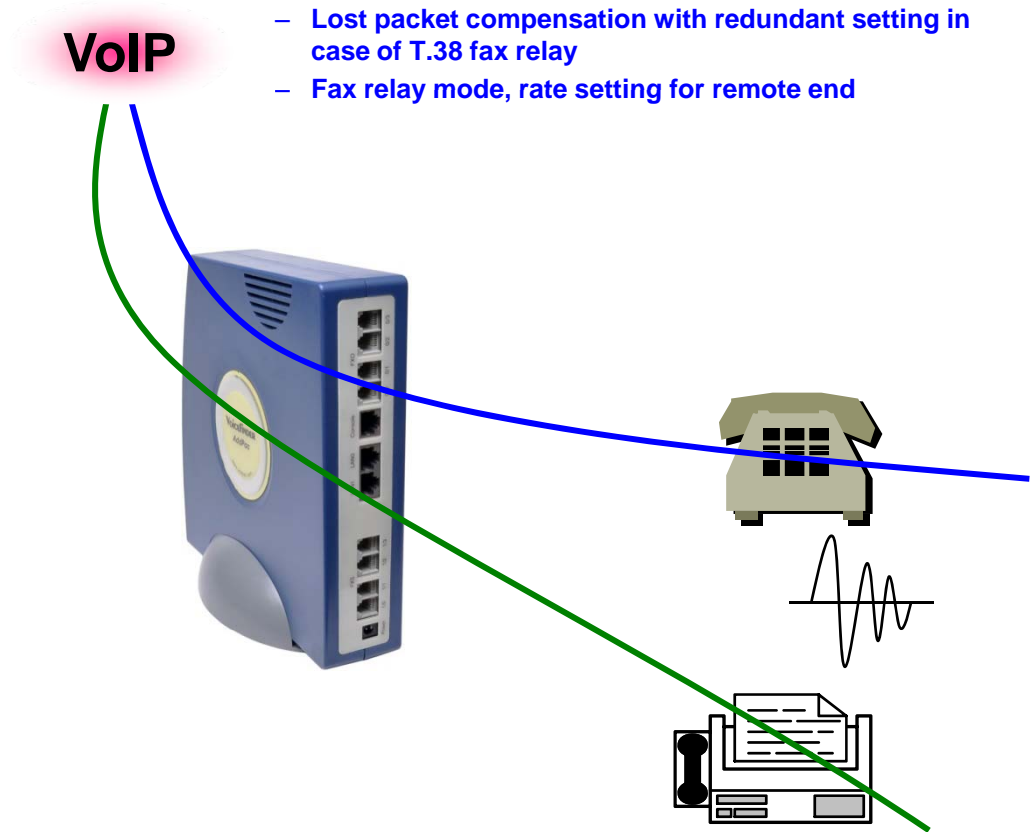
VoIP (Voice over IP) Service

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- **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

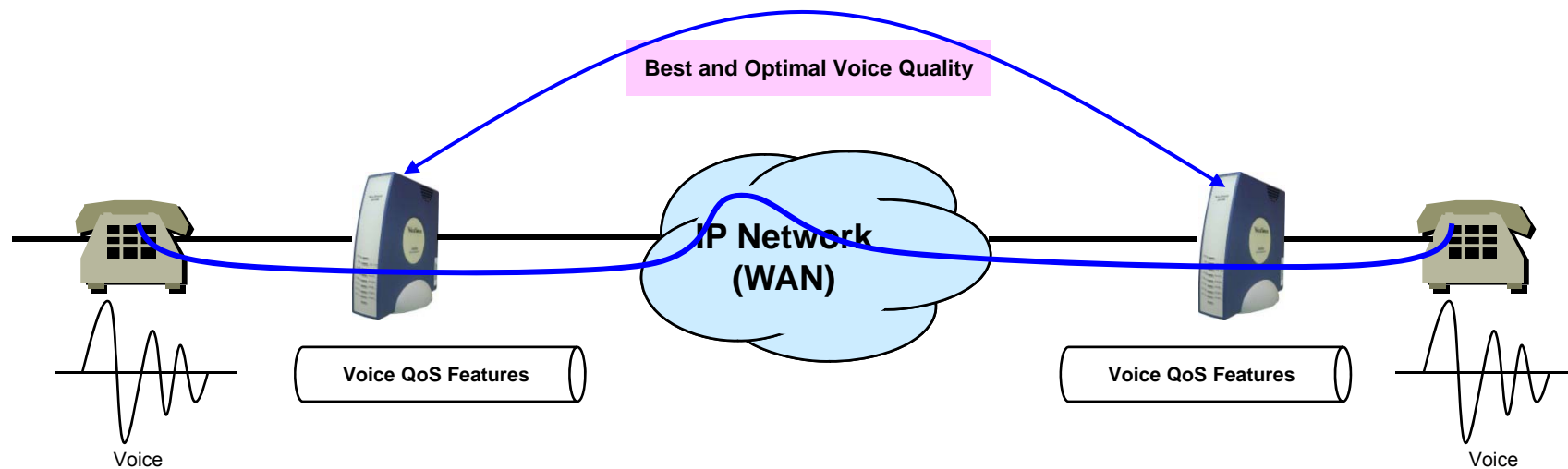- **VoIP Call Controls (cont.)**
  - Call transfer for internal calls
  - Call pickup for internal calls
  - Calling and called number conversion for VoIP outbound calls
  - Calling and called number conversion for VoIP inbound calls
  - Fax broadcasting call control

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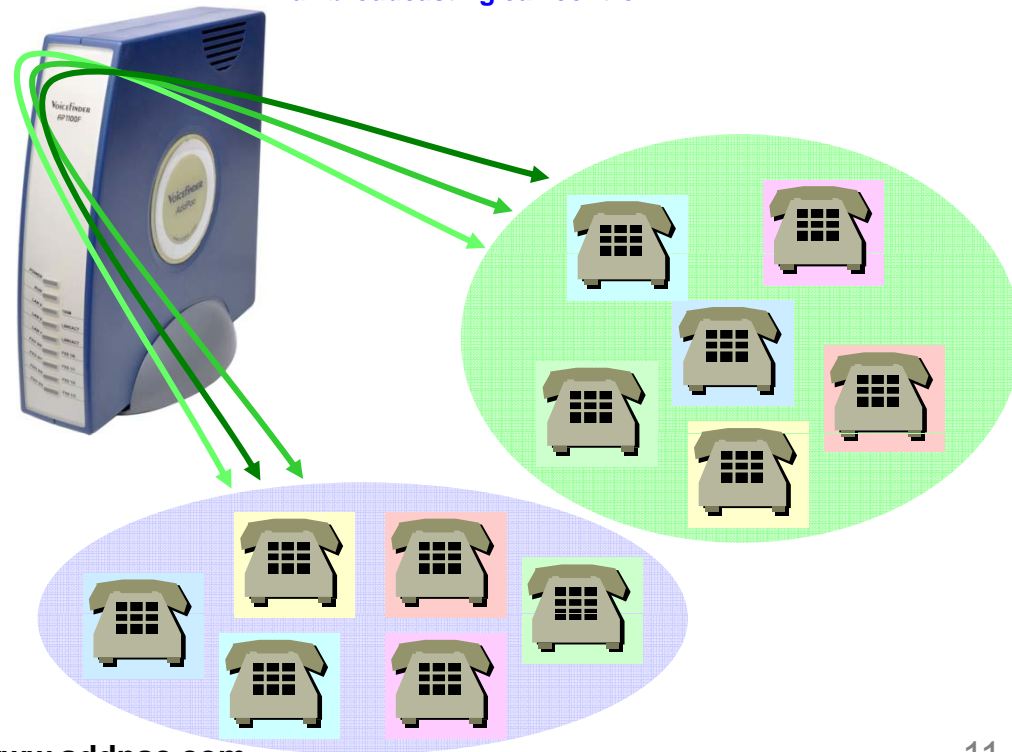
Advanced QoS Features

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- **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

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Network Protocols

Basic Network Protocols
- ARP, IPv4, TCP, UDP, ICMP, SCTP, IGMP, MLD

Routing Protocol
- IPv4 : Static

Service Protocol
- FTP, Telnet, TFTP, DHCP Server/Relay, SNMP Server
- CDP (Cisco Discovery Protocol)
- DNS Resolver , DDNS(nsupdate)
- Bridge
- Syslog

IPv4 Address Configuration
- Fixed (Static)
- DHCP
- PPPoE

Miscellaneous
-Cisco Style CLI
- Standard & Extended IPv4 Access List
- Multi-level User Account Management
- IP accounting
- STUN Client

IP

IP Network (WAN)

Internet WWW

IP

IP

LAN

IP

IP

IP

IP

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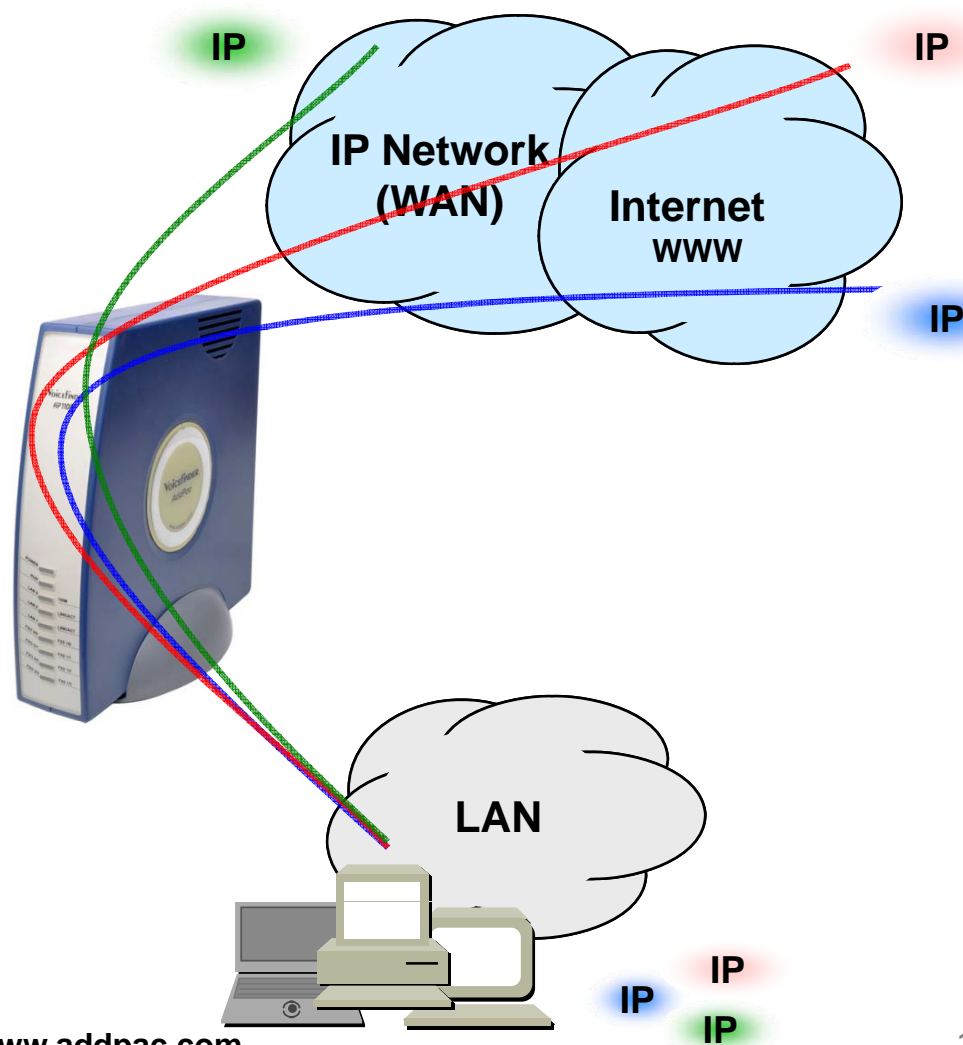
Network Management

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

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

- **Web-based Management**
  - Smart Easy Setup
  - Standard Voice Interface
  - Standard PSTN Back-up Interface

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

- **Remote Management**
  - Telnet
  - Rlogin

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

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

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

IP Network (WAN)

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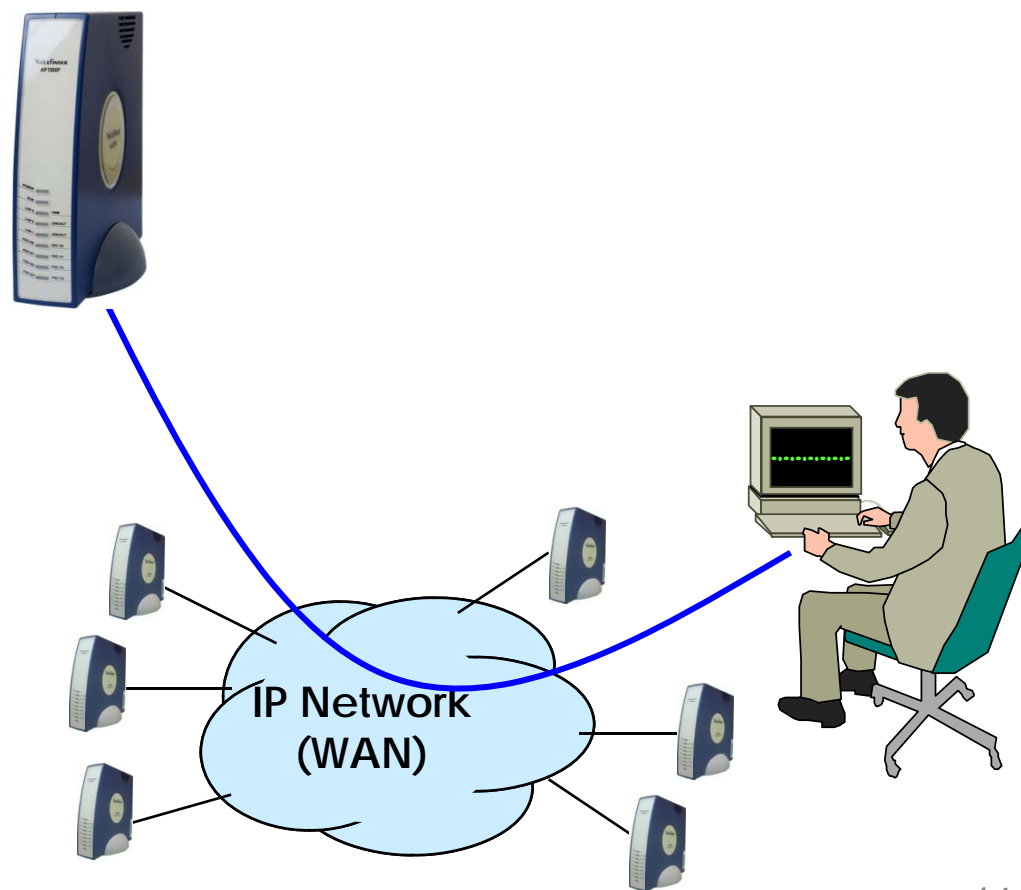
Security Management
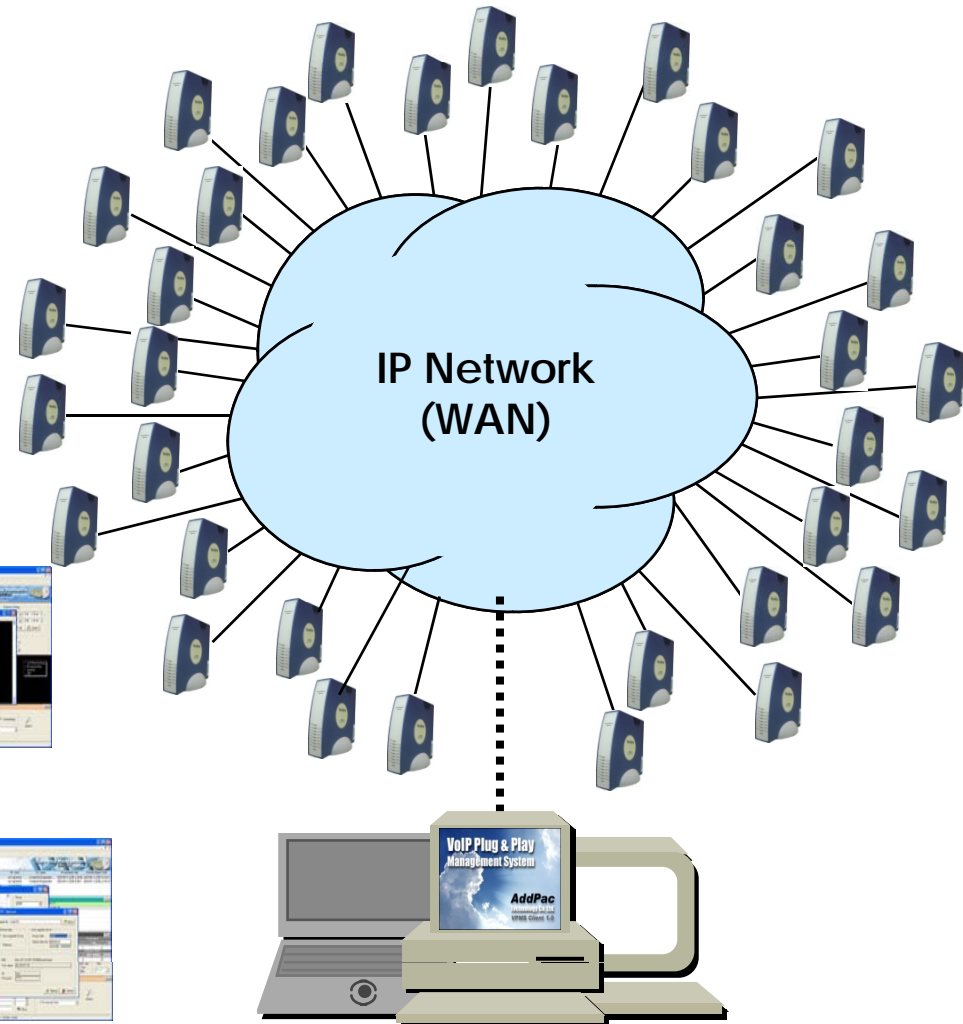
AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- **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 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)

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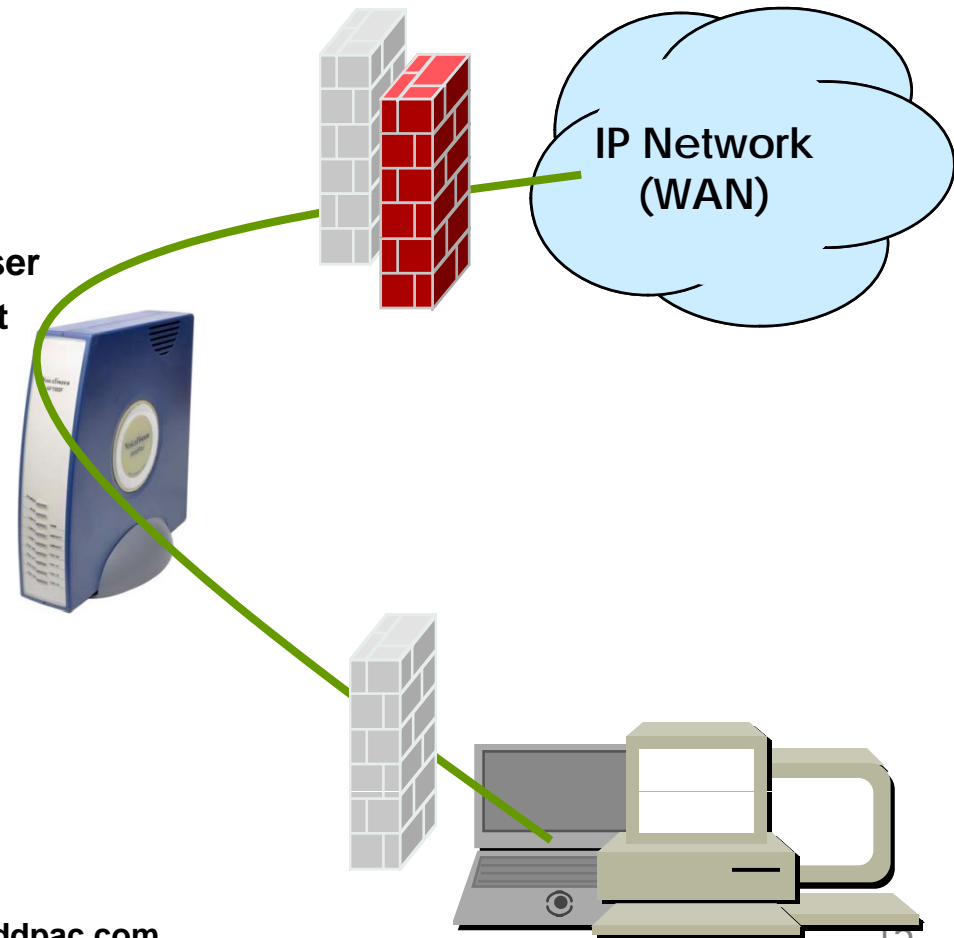
SNMS (Smart Network Management System)

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- **AddPac AP-SNMS Support**
  - **AddPac Smart Network Management System**
  - **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)

FXO Service Feature List

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

FXO Service Features	
	Polarity inverse detection function
	Caller-ID detection function
	Clear down tone registration and detect function
	Hook flash timing setting function
	Ring detect timeout setting function
	Ring number setting function
	Voice-confirmed connect function

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Polarity Inverse Detection Function

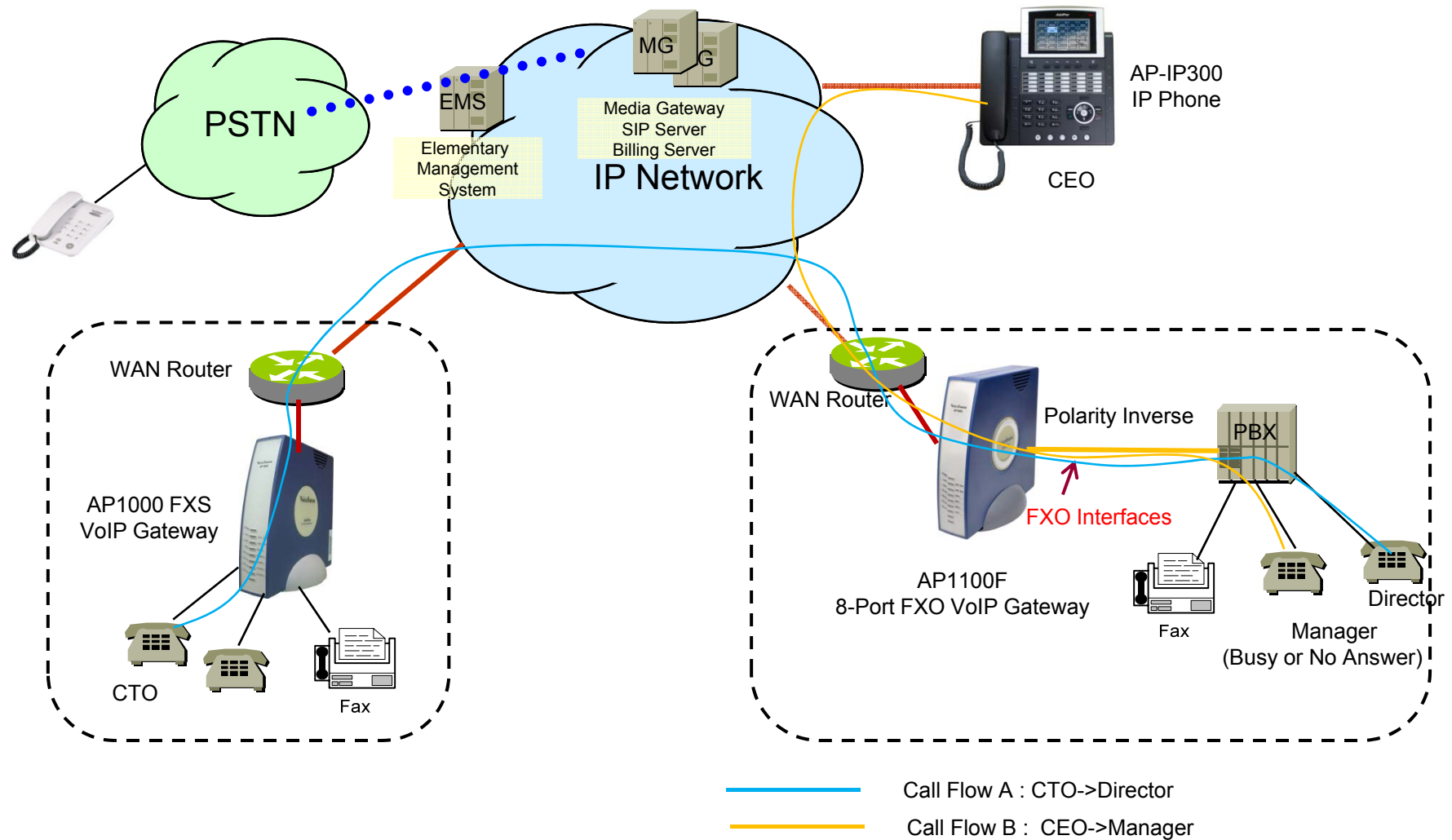## AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- Polarity inverse detection function

  — The FXO port detects the polarity inverse signal coming from Legacy PBX

  — When there is an incoming VoIP call via the FXO port to Legacy PBX, the gateway sends call connect message to Softswitch after detecting the polarity inverse signal on the FXO port.

  — Using Polarity Inverse Signal, a accurate billing service is available.

When polarity inverse function is enabled

- In case of A flow, Billing is start when the director hooks off.
- In case of B flow, Billing is not start because manager port is busy or no answer
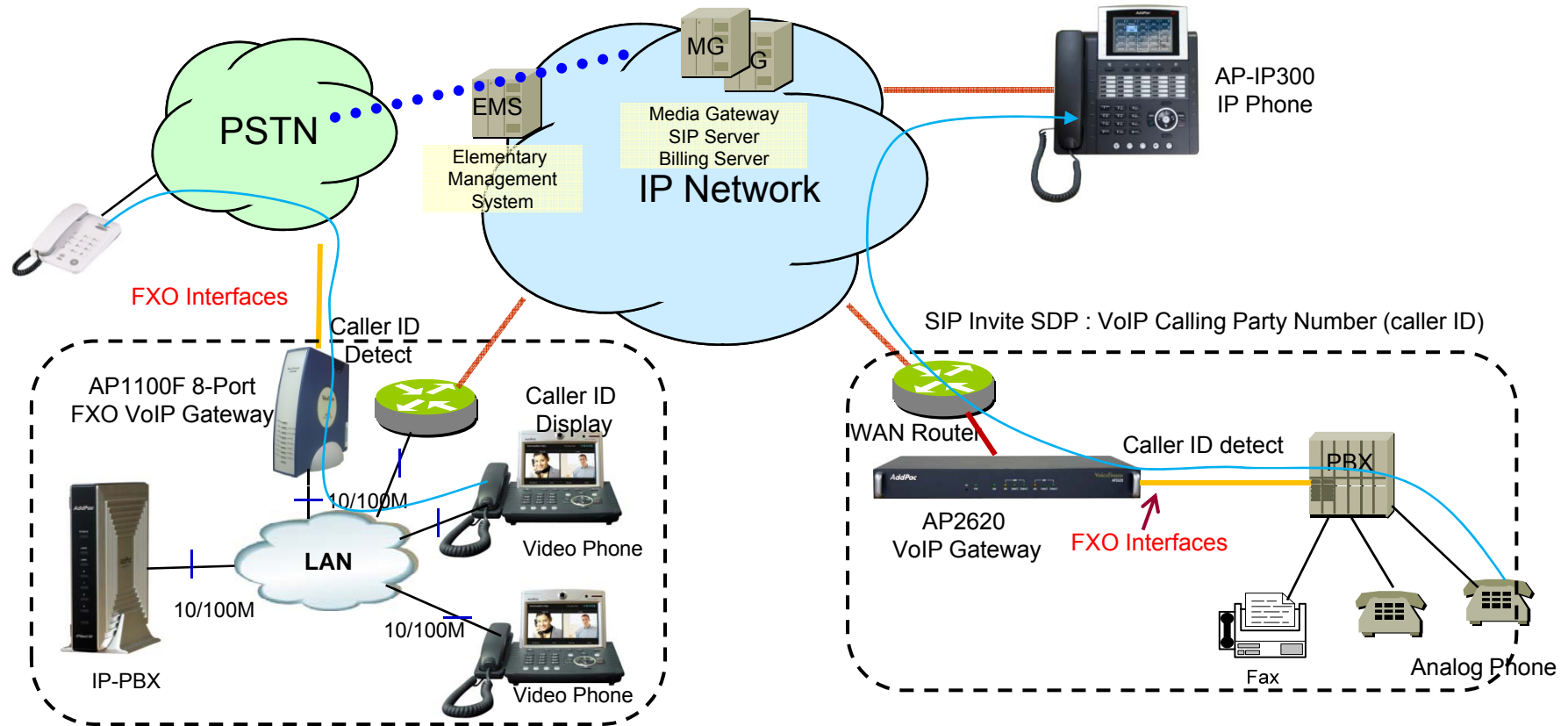
Polarity Inverse Detection Function

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

Caller ID Detect Function
AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

- Caller-ID detection function
  - The FXO port is connected to PSTN or PBX, and is able to detect Caller-ID.
  - When a VoIP call is originated from the FXO port, the FXO port detects the caller-ID and uses the number as the VoIP calling party number.
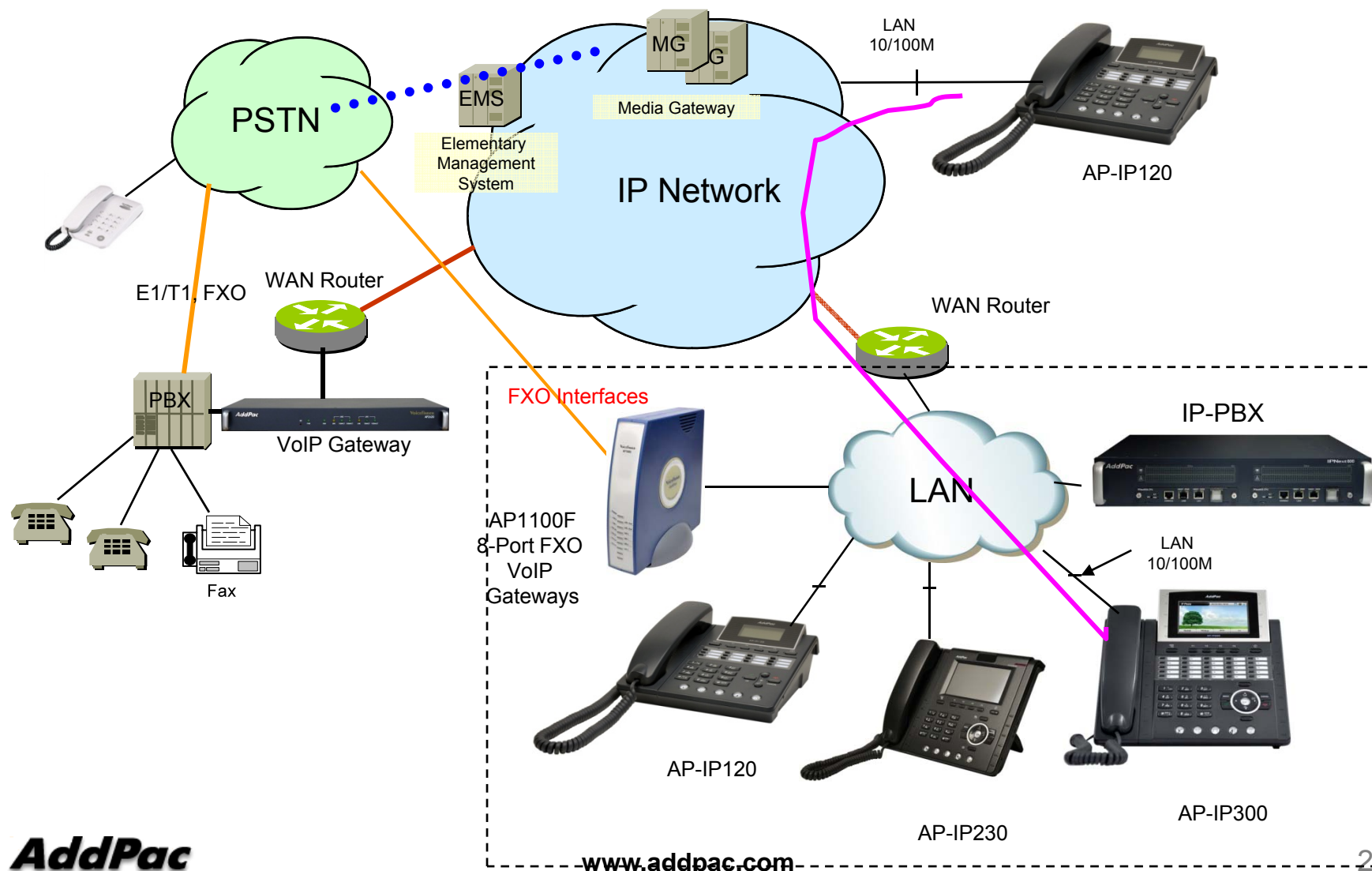
FXO Service Description

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

Features	Description
Voice-confirmed connect function	When FXO port is connected to PBX extension and the subscriber does take the call, connect message is not sent to sender side and billing is not included.
Ring number setting function	Use this command to set the maximum number of rings to be detected before answering a call over an FXO voice port. In that case, the FXO interface would answer if the equipment online did not answer the incoming call in the configured number of rings.
Clear down tone registration and detect function	Clear-down-tone detects call termination of FXO port connected to and generated from PSTN or PBX. The value of clear-down-tone (busy tone, fast busy tone) is different for each PSTN and PBX. So use voice class clear-down-tone for registration process in global configuration mode.
Hook flash timing setting function	Different from call-transfer, you need to press hook-flash button twice for conference call. Basically, it takes 500 ms (0.5 sec) to recognize hook-flash button from the AddPac gateway. If you think 500ms (0.5 sec) is too short, you can change hook-flash detect timeout value when hook-flash duration time of PBX is more than 500ms.

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Network Diagram for FXO Call

AP1100FN 8-Port FXO VoIP Gateway

LAN 10/100M

MG G

EMS

Media Gateway

Elementary Management System

PSTN

IP Network

AP-IP120

E1/T1, FXO

WAN Router

VoIP Gateway

WAN Router

PBX

FXO Interfaces

IP-PBX

AP1100F 8-Port FXO VoIP Gateways

LAN

LAN 10/100M

Fax

AP-IP120

AP-IP230
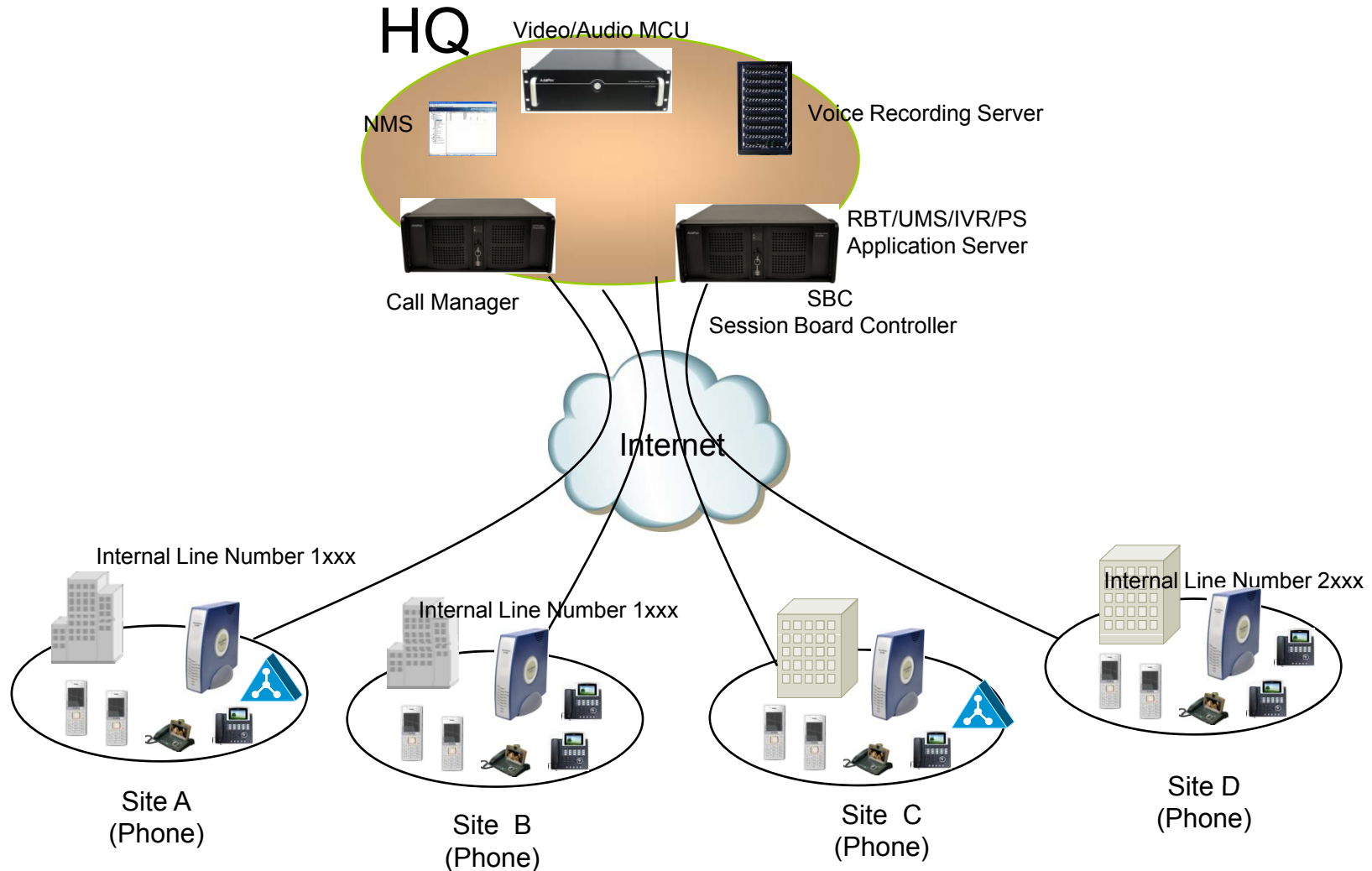
AP-IP300

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Light Call Manager Service
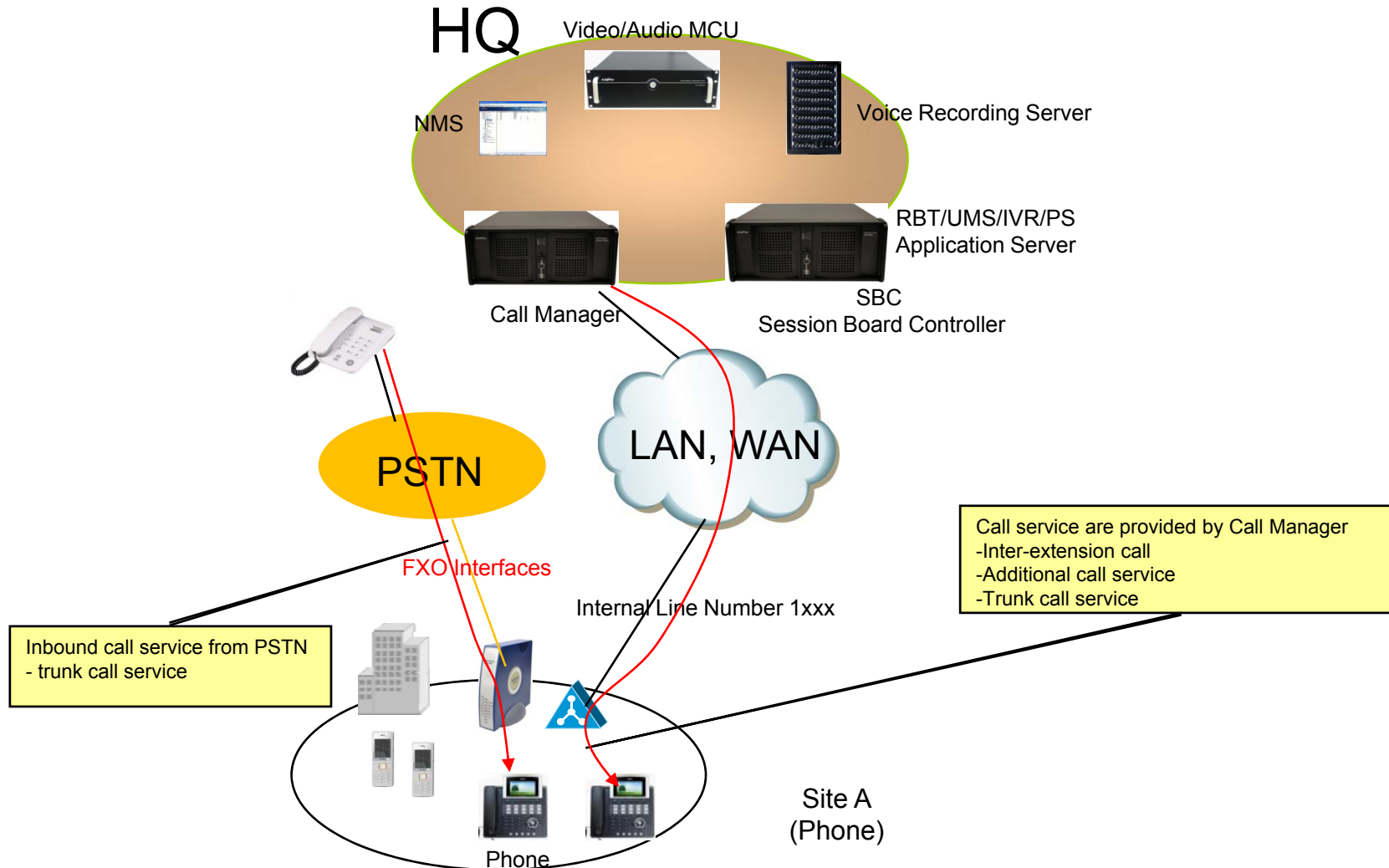
Light Call Manager Service Features

- Support basic SIP registration service
  - Support basic SIP register service (no authentication).

- Support basic call service
  - Support inter-extension call service
  - NOT support addition call service – hold resume pickup, etc.

- Support PSTN call service
  - Support Inbound and outbound call service

- Can be used as a backup call manager
  - If a main VoIP call manager is not available, extensions are registered to light call manager(AP1100FN).
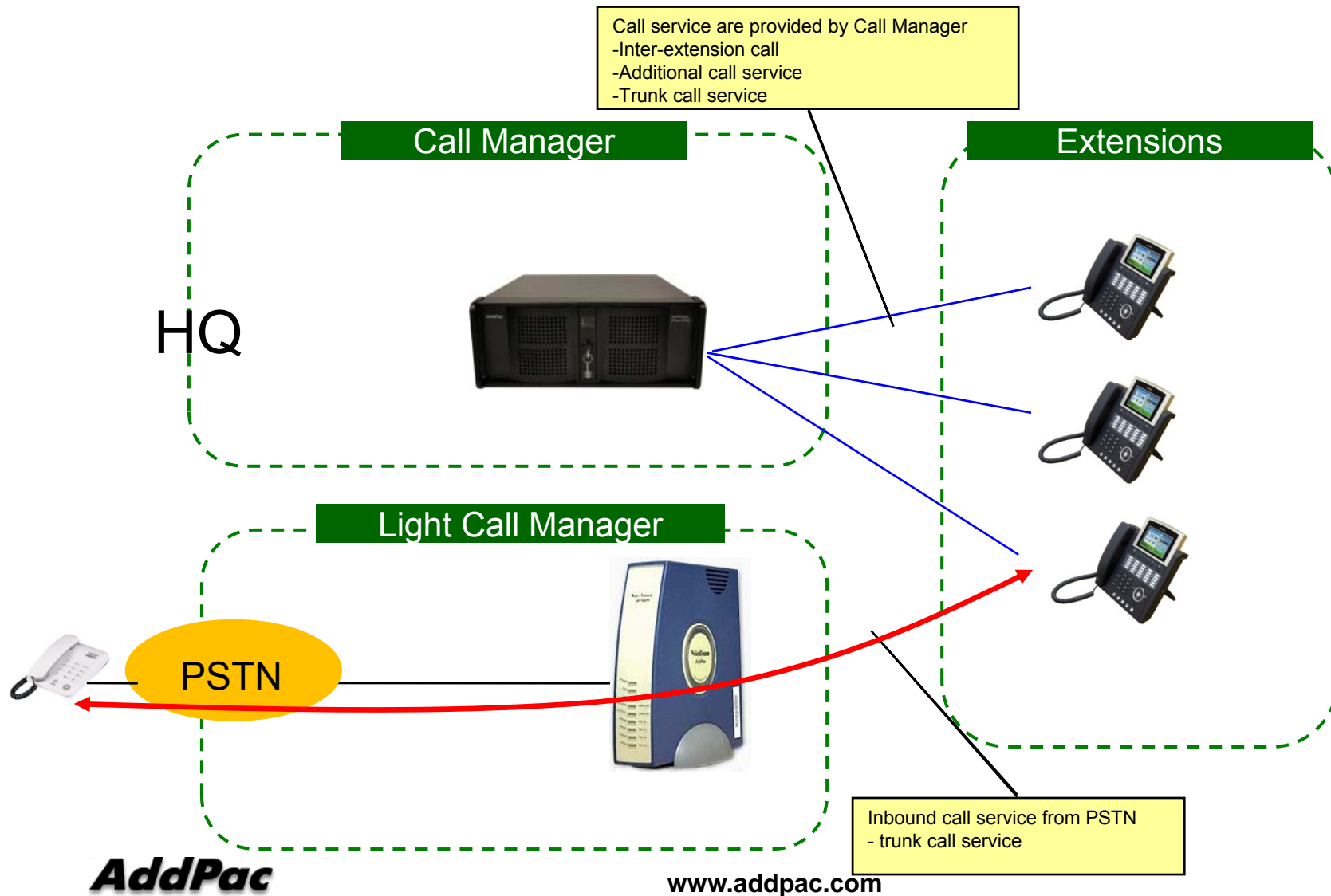
Network Diagram

HQ

Video/Audio MCU

NMS

Voice Recording Server

RBT/UMS/IVR/PS
Application Server

Call Manager

SBC
Session Board Controller

Internet

Internal Line Number 1xxx

Internal Line Number 1xxx

Internal Line Number 2xxx

Site A
(Phone)

Site B
(Phone)

Site C
(Phone)

Site D
(Phone)

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Network Diagram
(PSTN Inbound)

HQ

Video/Audio MCU

NMS

Voice Recording Server

RBT/UMS/IVR/PS
Application Server

SBC
Session Board Controller

Call Manager

LAN, WAN

PSTN

FXO Interfaces

Internal Line Number 1xxx

Call service are provided by Call Manager
-Inter-extension call
-Additional call service
-Trunk call service

Inbound call service from PSTN
- trunk call service

Site A
(Phone)

Phone

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Call Service Diagram
- Trunk call service in normal state

Call service are provided by Call Manager
-Inter-extension call
-Additional call service
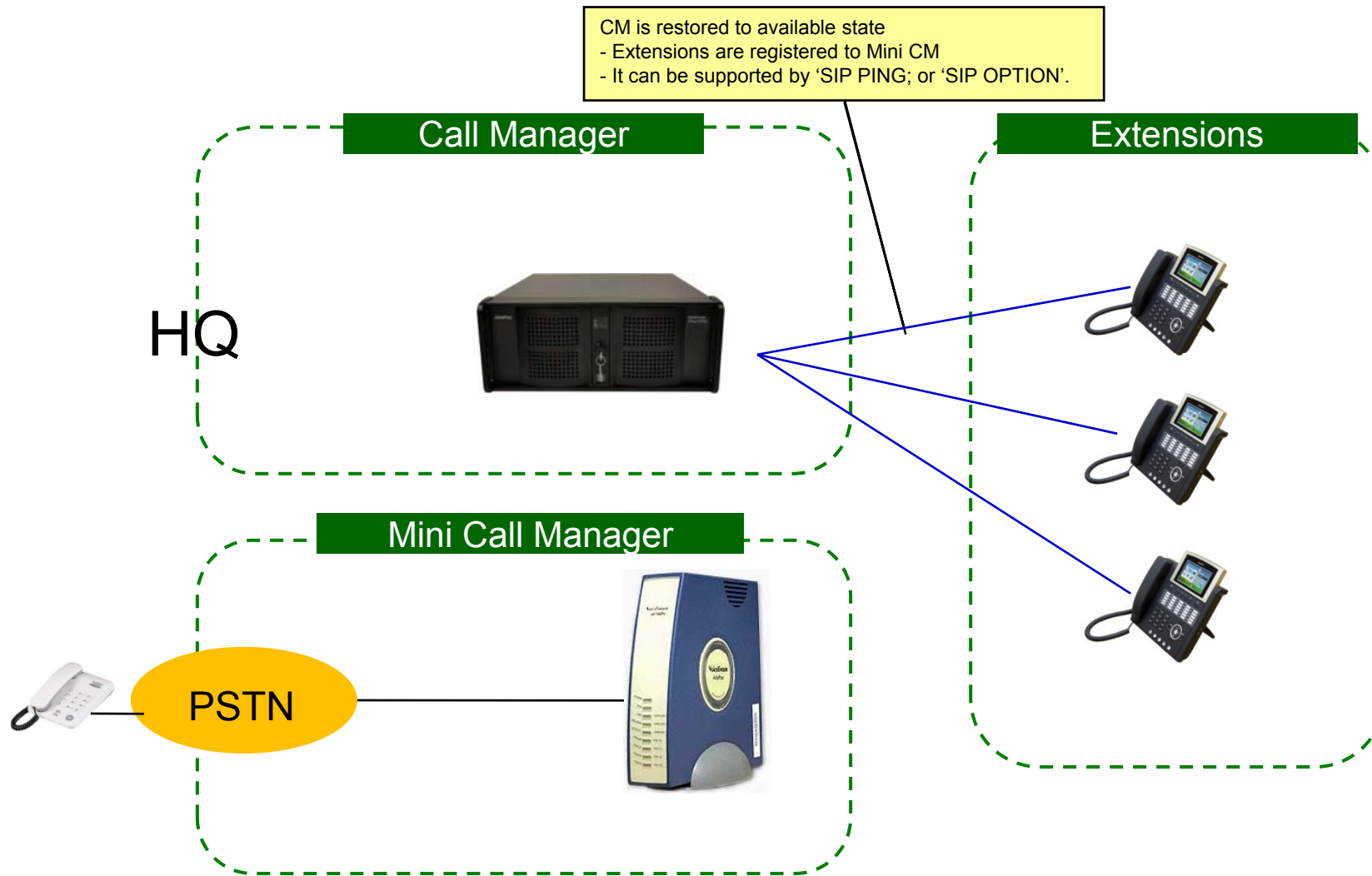-Trunk call service

Call Manager

Extensions

HQ

Light Call Manager

PSTN

Inbound call service from PSTN
- trunk call service

Call Service Diagram
- backup call service in abnormal state

CM is not available state
-Extensions are registered to Mini CM

Call Manager

Extensions

HQ

Mini Call Manager

PSTN

Mini CM support call service
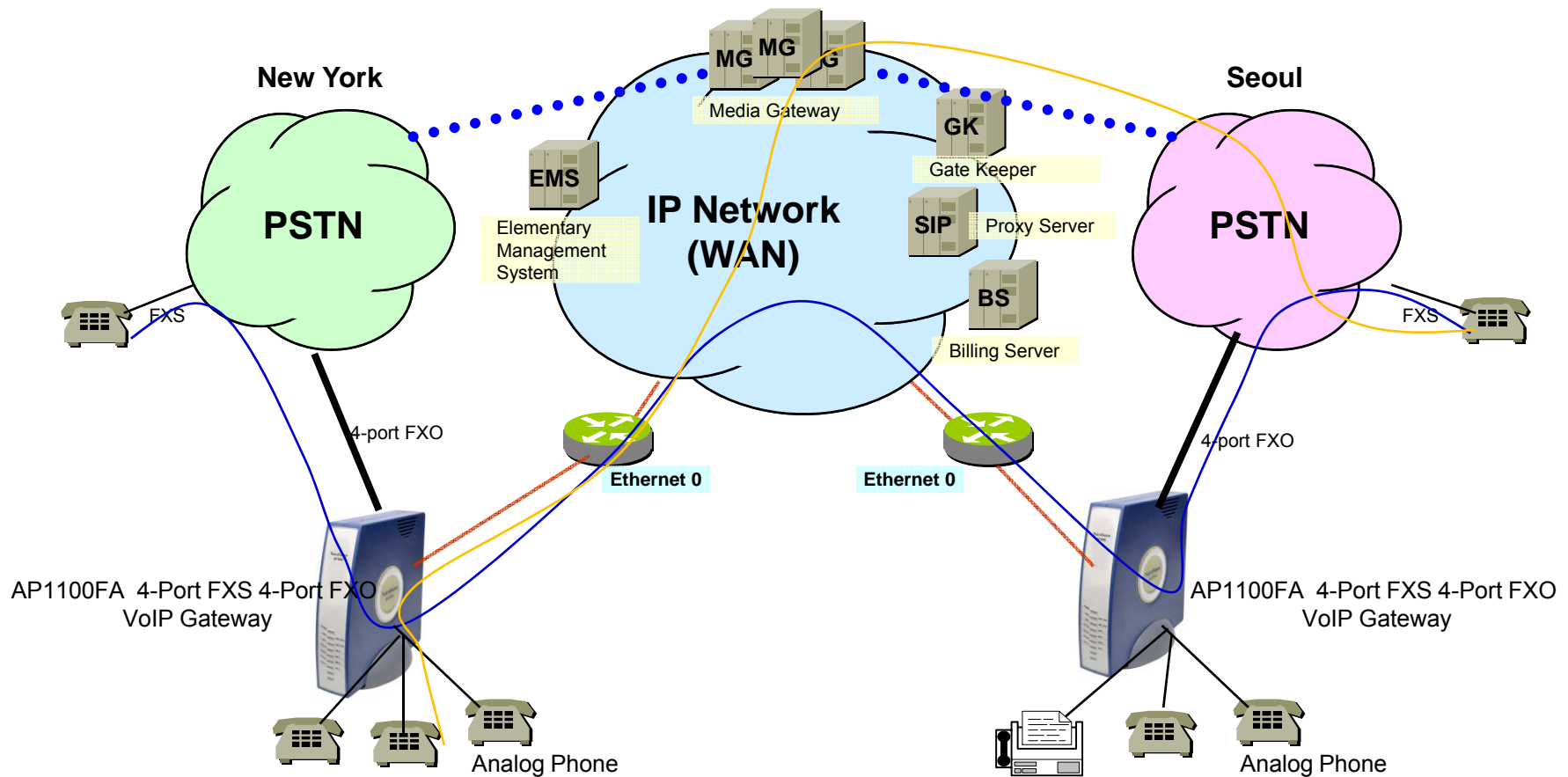-SIP registration service
-Trunk call service
- Inter-extension call service

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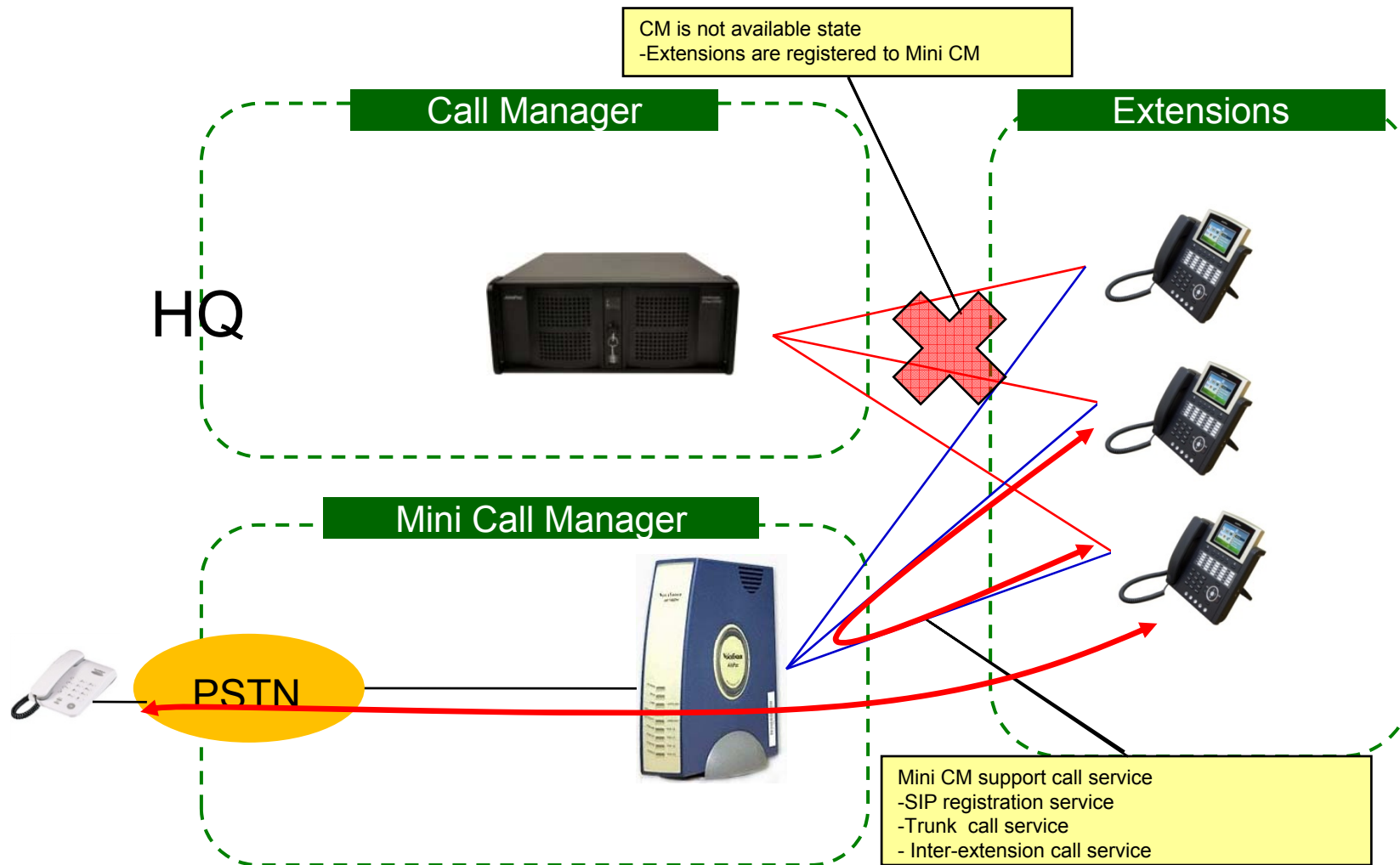
Call Service Diagram
- restore to CM

CM is restored to available state
- Extensions are registered to Mini CM
- It can be supported by 'SIP PING; or 'SIP OPTION'.

Call Manager

Extensions

HQ

Mini Call Manager

PSTN

Standard Application

AP1100FN 4-Port FXS 4-Port FXO VoIP Gateway

New York

Seoul

MG MG G

Media Gateway

GK

Gate Keeper

EMS

Elementary
Management
System

IP Network
(WAN)

PSTN

PSTN

SIP Proxy Server

BS

Billing Server

FXS

FXS

4-port FXO

4-port FXO

Ethernet 0

Ethernet 0

AP1100FA 4-Port FXS 4-Port FXO
VoIP Gateway

AP1100FA 4-Port FXS 4-Port FXO
VoIP Gateway

Analog Phone

Fax

Analog Phone

FXO Analog Voice Interface	Leased Line/ATM/Frame-Relay/IP Router, xDSL/Cable Modem, etc.
Voice+Data, Ethernet or WAN Interface	Analog Phone
TRUNK n x E1 Voice Interface for PSTN Inter-working	

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Ordering Information

- **AP1100FN 8-Port FXO VoIP Gateway Hardware**
  - AP1100FN VoIP Gateway Main Body (Model C Type)
  - RISC Microprocessor with High-end Programmable DSP Architecture
  - 1-Port 10/100Mbps Fast Ethernet(RJ45)
  - 1-Port 10Mbps Ethernet(RJ45)
  - 8-Port FXO (RJ11)
  - Including Network Cable & Ext. Power Supply, etc.
- **Built-in APOS Internetworking Software for AP1100FN**
- **Including 1 Year Hardware Warranty**
- **Product Documents**
  - Install and Operation Guide (PDF)
- **Pricing**
  - AddPac Technology Regional Sales Manager
  - Authorized Sales and Marketing Representatives
  - Please Contact www.addpac.com

Thank you!

AddPac Technology Co., Ltd.
Sales and Marketing

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