Network Product Technical Training

VoiceFinder VoIP Gateway Series

AddPac Technology Network Product

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Contents

1. AddPac VoIP Gateway(1/3)

Hardware Specification(example : AP2520R)

Microprocessor - Motorola 32bit RISC Microprocessor

Memory 1. Flash Memory - 4/8 Mbyte
2. SDRAM Memory - 32/64 Mbyte
3. Boot Memory - 512 Kbyte

WAN Port - One(1) Serial Port (V.35 Interface)

LAN Port - One(1) 10/100Mbps Ethernet (RJ-45 Interface)

Console Port - One(1) RS-232C Interface

Network Module Slot - Two(2) Interface Module Slot

Power Requirement - 110~220 VAC , 50/60Hz, 15Watt

H x W x D (mm) - 43mm x 435mm x 205mm

1. AddPac VoIP Gateway(2/3)

Support Protocol and Service

Routing Protocol
1. Static
2. RIP v1/2
3. OSPF v2, and IEEE 802.1Q VLAN Routing

WAN Protocol
1. Point-to-Point Protocol (PPP)
2. Frame-Relay PVC (Inverse ARP Support)
3.High-level Data Link Control (HDLC) Protocol
4.HDLC Encapsulation (Interoperability with CISCO HDLC)

Voice over IP Service
1. ITU-T H.323 v2 VoIP Protocol with ITU-T H.235 Security Feature
2. G.723.1, G.729.A, G.711 Voice Compressions
3. Voice Processing Features Supports - VAD, DTMF, CNG, G.168, and T.38 G3 FAX Relay
4. ITU-T H.323 Gateway, Gatekeeper Support

Security Functions
1. Access Control and Data Protections
2. Standard & Extended IP Access List
3. PPP User Authentication Supports (CHAP & PAP)

1. AddPac VoIP Gateway(3/3)

4. Enable/Disable for Specific Protocols
5. Auto-disconnect for Telnet/Console Sessions
6. Multi-Level User Account Management

Network Managements

1. Standard SNMP Agent (MIB v2) Support
2. Traffic Queuing and Frame-Relay Flow Control
3. Web based Managements using HTTP server Interface
4. Remote Management using Console, Rlogin, Telnet

Other Scalability Features

1. Traffic Management Function
2. Traffic Queuing and Frame-Relay Flow Control
3. Transparent Bridging Function
   : Spanning Tree Bridging Protocol Support
4. DHCP Server & Relay Functions
5. IP Accounting Function
6. PAT(Port Address Translation) Function
7. NAT(Network Address Translation) Function

2. Basic Management Function

- OS & configuration up-grade or backup using Ftp, Tftp, Web
- Auto upgrade
- SNMP
- Web based management
- Security (User account management,telnet access control,access list)
- Equipment Configuration Check (dial plan & other equipment configuration information)
- Equipment Status Check (check the equipment status such as port, line status during operation)
- Debugging (call trace and other real-time debugging information analysis)
- Boot Loader (Password recovery mode)

2-1. OS & configuration up-grade or backup

Feature

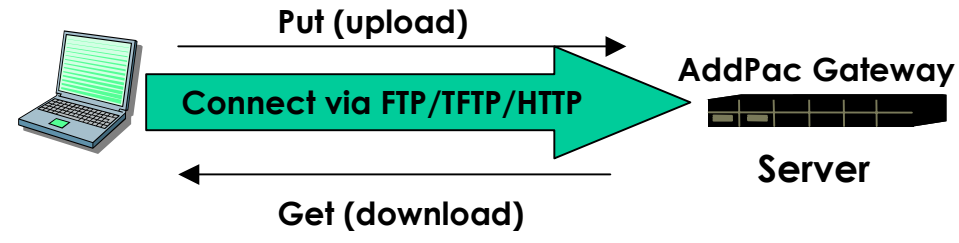
Server : tftp/ftp/http Supports
Client: ftp Support

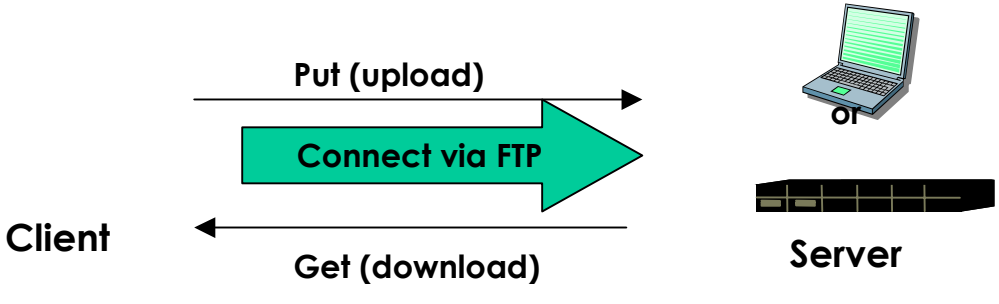
Command about Server
router(config)# service ftpd
router(config)# service tftpd
router(config)# service httpd

Command for Client
router# ftp [host [port]]

OS image/config file name
for example: Ap2110_v5_67.bin
mean: Version 5.67 ap2110 image
for example : config.cfg
mean: addpac gateway configuration information file

Notice
configuration file name is fixed (config.cfg), so do not change file name





2-2. Auto Upgrade

Web Server Setting : To install APOS™ and configuration file automatically, Packing.List file should be existed for APOS.

Packing.List File Example

For example, if home directory of web server is c:/web, APOS image(ex: AP2110 VoIP Gateway, APOS version v5_64) and Packing.list file should be located at c:/web/download/apos directory. Following file shows the contents of Packing.List file.

./ap2110_v5_64.bin 5.64B1 05 May 2002 10:11:12
./config.cfg 20020531 10 May 2002 10:11:12

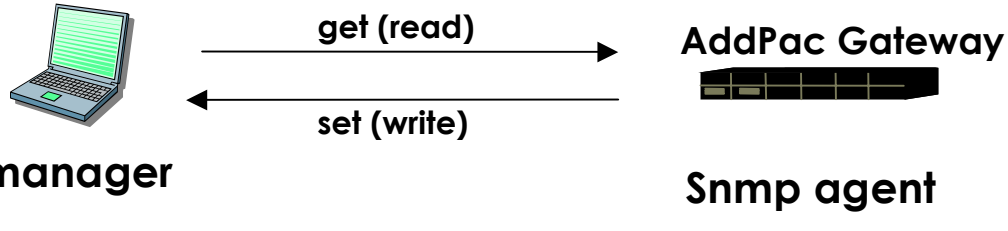
Command Procedure at VoIP Gateway Side for Automatic S/W Upgrade Function

router(config)# auto-upgrade action (Enter after URL configuration)
router(config)# auto-upgrade authentication <login> <password>
(Only text authentication type support)
router(config)# auto-upgrade auto-reboot
router(config)# auto-upgrade configuration-serial
router(config)# auto-upgrade interval
router(config)# auto-upgrade url
Example
http://123.45.67.8/download/apos/packing_ap2110.list
http://down.addpac.com/apos/packing.list
router(config)# auto-upgrade verbose

2-3. SNMP

SNMP agent : snmp version 2
MIB : version 2 , VoIP enterprise MIB Support

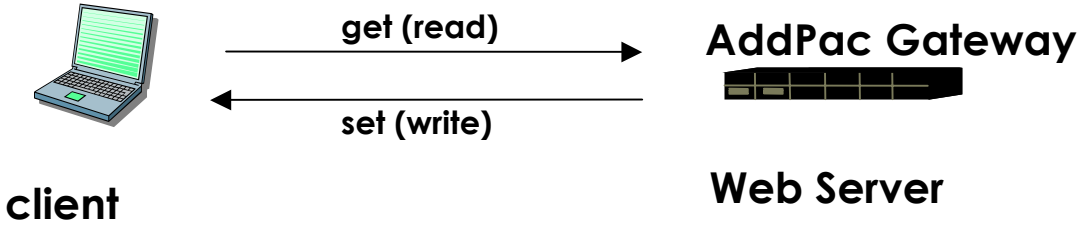
Configuration command for Agent
router(config)# snmp community <host ip> <community name>
router(config)# snmp <location/contact/name> string
router(config)# snmp host <trap host ip>
router(config)# service snmpd



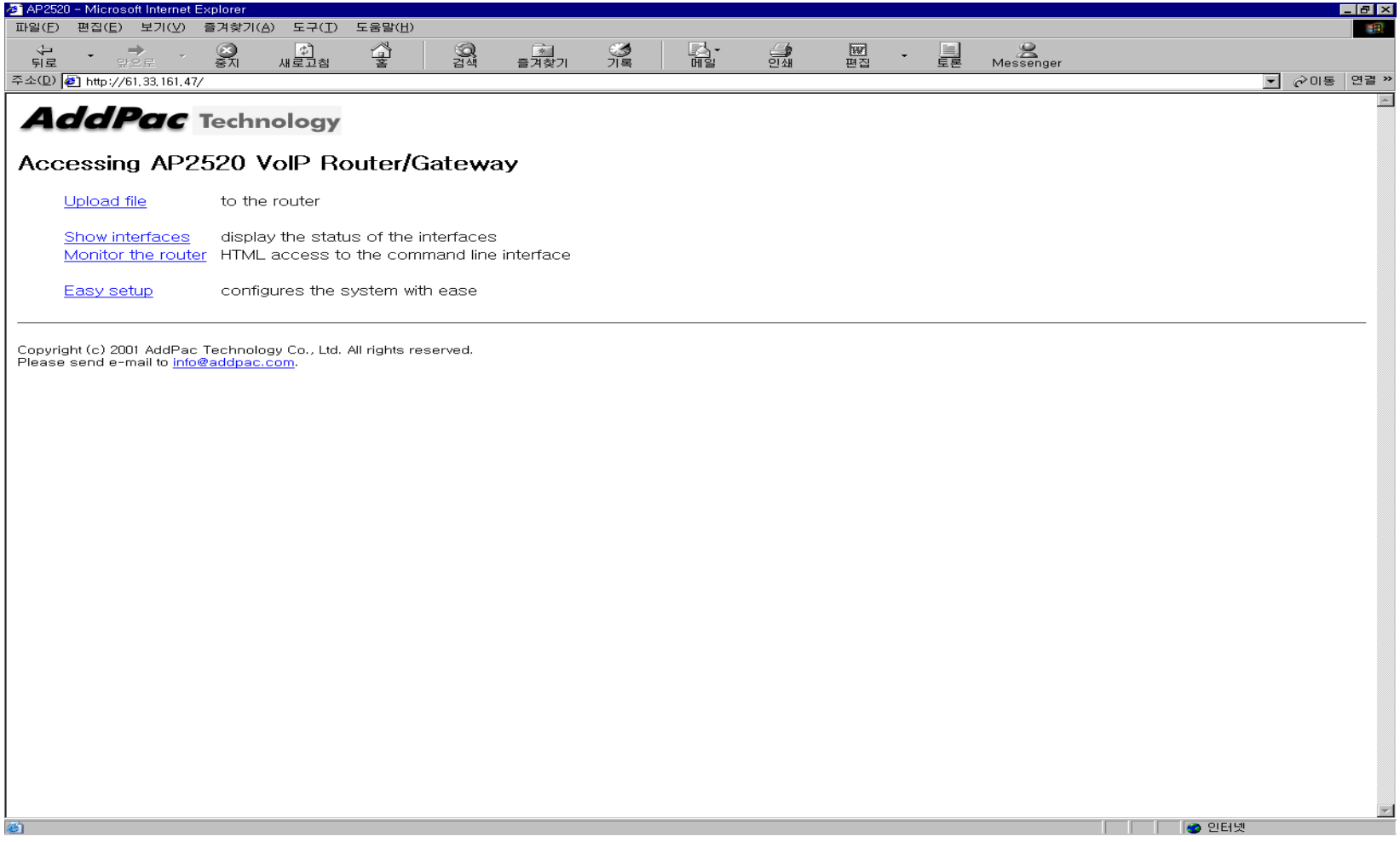
2-4. Web based management(1/3)

Web server :
Web based management supports 90% CLI (command line Interface based on RS-232C console) commands approximately.
And Web based management supports the OS and configuration Upload.

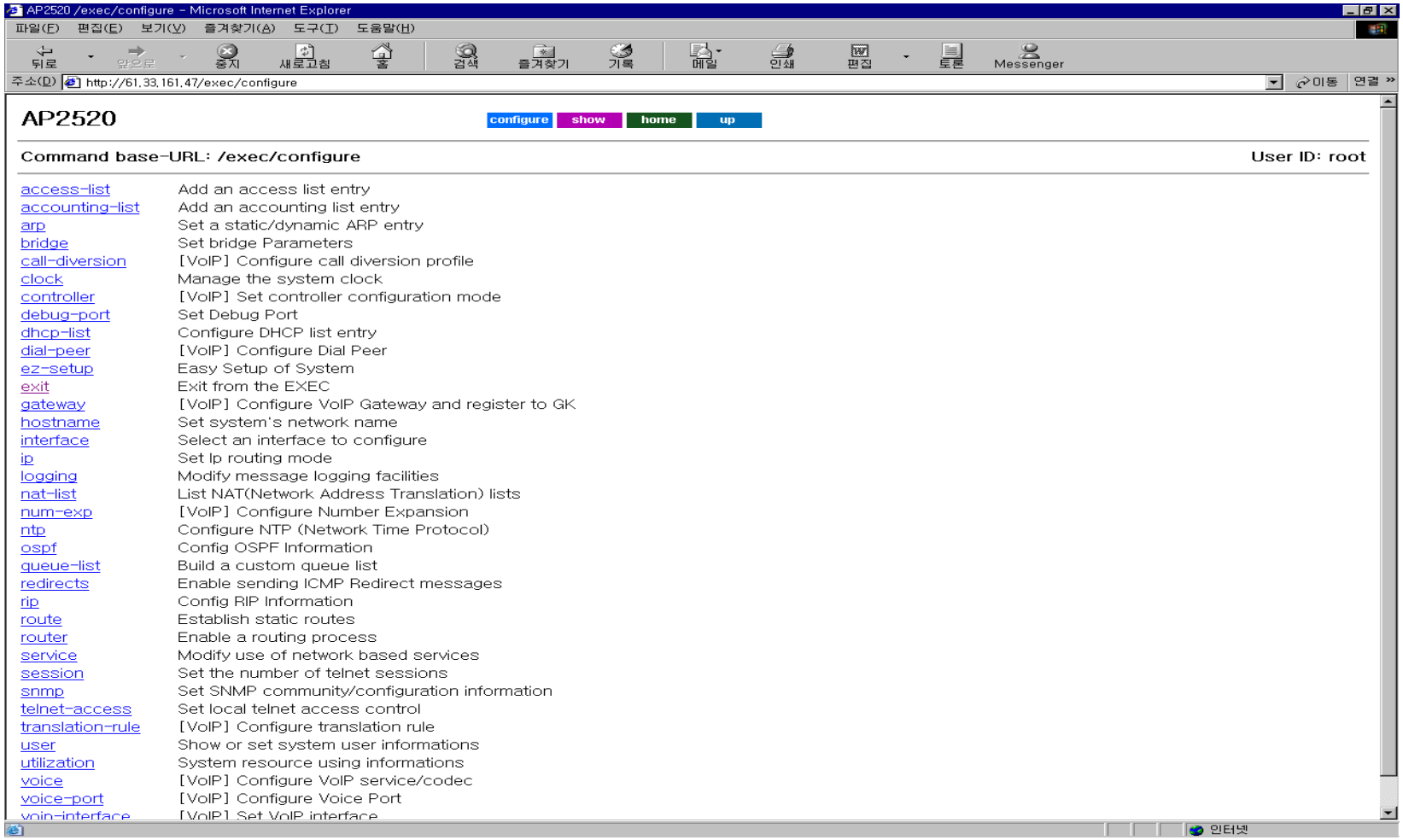
Configuration command for Web Server
router(config)# service httpd



2-4. Web based management(2/3)



2-4. Web based management(3/3)



2-5. Access Control(security) (1/2)

Function : account management, telnet access control, access list(packet filtering)

Configuration command

User account management

router(config)# user add <username> <password> <level>
router(config)# user change <username> <old-password> <new-password>
router(config)# user level <username> <password> <level>
router(config)# user timeout <username> <timeout-value(sec)>

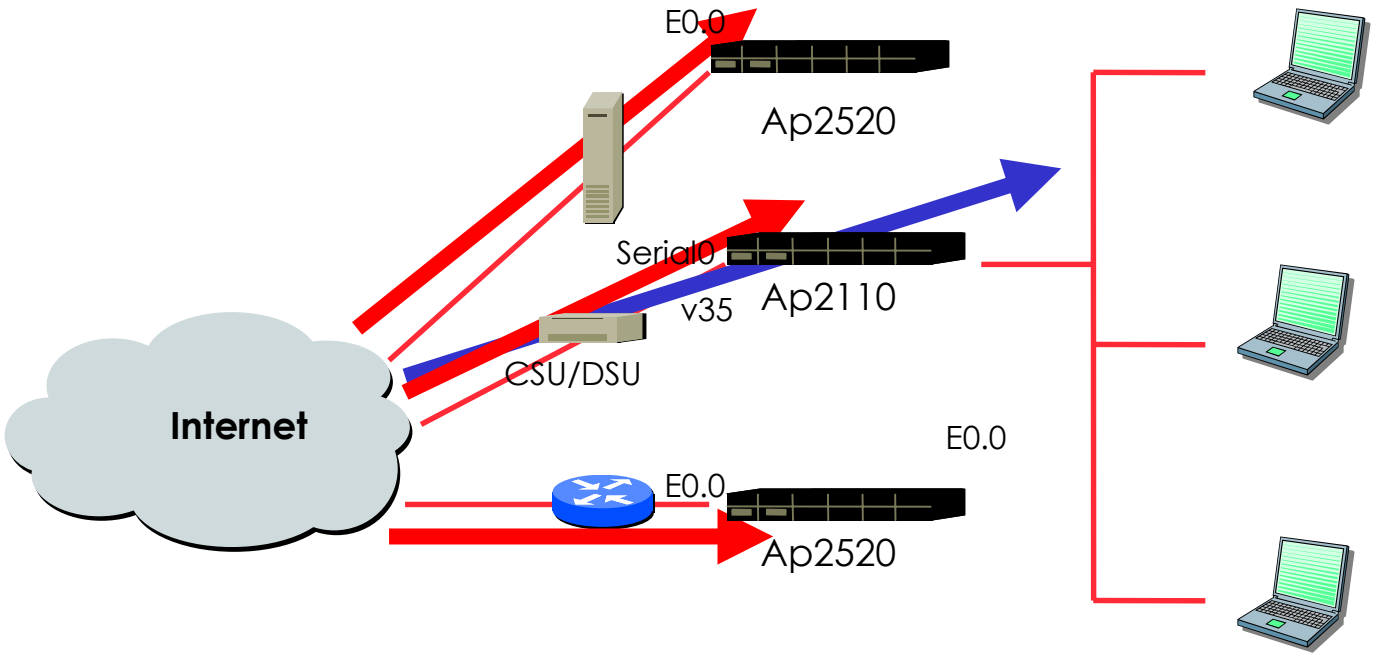
telnet access control

router(config)# telnet <host/network> [mask]

Standard/extend access list

router(config)# access-list <0-29/30-59> <permit/deny> <icmp/ip/tcp/UDP> .....
router(config-ether0.0)# ip access 30 <in/out>
Example
pool setting
router(config)# access-list 30 permit ip host 1.1.1.1 2.2.2.2 255.255.255.0
router(config)# access-list 30 permit tcp 1.1.1.1 255.255.255.0 host 2.2.2.2 eq www
Binding
router(config-ether0.0)# ip access 30 in

2-5. Access Control(security) (2/2)



telnet/user account /access list security check

packet filtering(as gateway router) using Access list

2-6. Equipment Configuration Check(1/2)

Using the "show command", we can see the current configuration and setting information of the equipment. It can be possible at all depth of command hierarchy.

Major Command List

router# show running-config ; This command can show all configuration information of equipment. It does not show the default configuration information.

Detail information (This commands show the detailed information including default configuration information)

General command

router# show <access-lists/accounting-list/arp/bridge/call/call-diversion/,,,,,>

Line interface related command

router(config)# show <line/interface/ip/,,,,,,>

Voip setting command

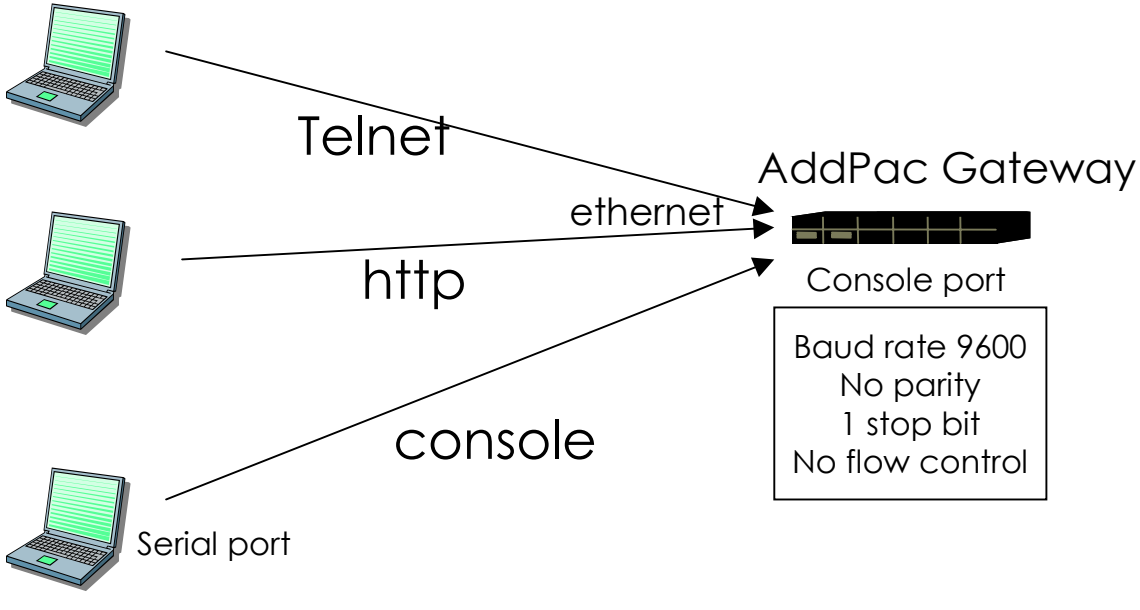
router(config)# show voice port <,,,,> ; FXO/FXS/E&M/E1 port status and setting information

router(config)# show dial-peer <,,,,,> ; gateway's dial plan information

router(config)# show gateway ; VoIP related global setting information for gateway

router(config)# show translation-rule ; Show current translation rule information

2-6. Equipment Configuration Check(2/2)



Real time monitoring of current AddPac Gateway status : Root Login

2-7. Equipment Status Check

Using the "show command", we can see the current configuration information of the equipment. It can be possible at all depth of command hierarchy.

major command

Line interface status command

router(config)# show interface ; network interface Status

VoIP status check command

router(config)# show voice port <,,,,> ; FXO/FXS/E&M/E1 port status and setting information

router(config)# show call history <,,,,> ; call history information(CID)

router(config)# show call active <,,,,> ; show call information about current active calls

router(config)# show gateway ; VoIP related global setting information of gateway and gatekeeper registration status information

router(config)# show dialplan ; show the dial-plan about port/voip peer

router(config)# show rule <,,,> ; show the input digit translation rules

2-8.Debugging (1/5)

Support the real-time call tracing and lan packet decoding during equipment in-service operation
(This commands is usable at top level of command hierarchy)

major command

```
debug access-list          ;Set IP access list for debugging
debug  dhcpc               ;DHCP Client protocol information
debug  dhcpd               ;DHCP Server protocol information
debug  frame-relay         ;Frame Relay information
debug  ospf                ;OSPF protocol information
debug  ppp                 ;PPP (Point to point protocol) information
debug  serial              ;Serial interface information
debug  rip                 ;RIP protocol information
debug  tcpip               ;TCP/IP protocol information
debug  voip                ;[VoIP] VoIP protocol information
debug  rta                 ;[VoIP] Rta protocol information

router(config)# debug-port    ; Debug message is displayed in current commanding terminal(tty)
                                (default : console). This command is very usable at remote debugging
                                via telnet.
```

2-8. Debugging(2/5)

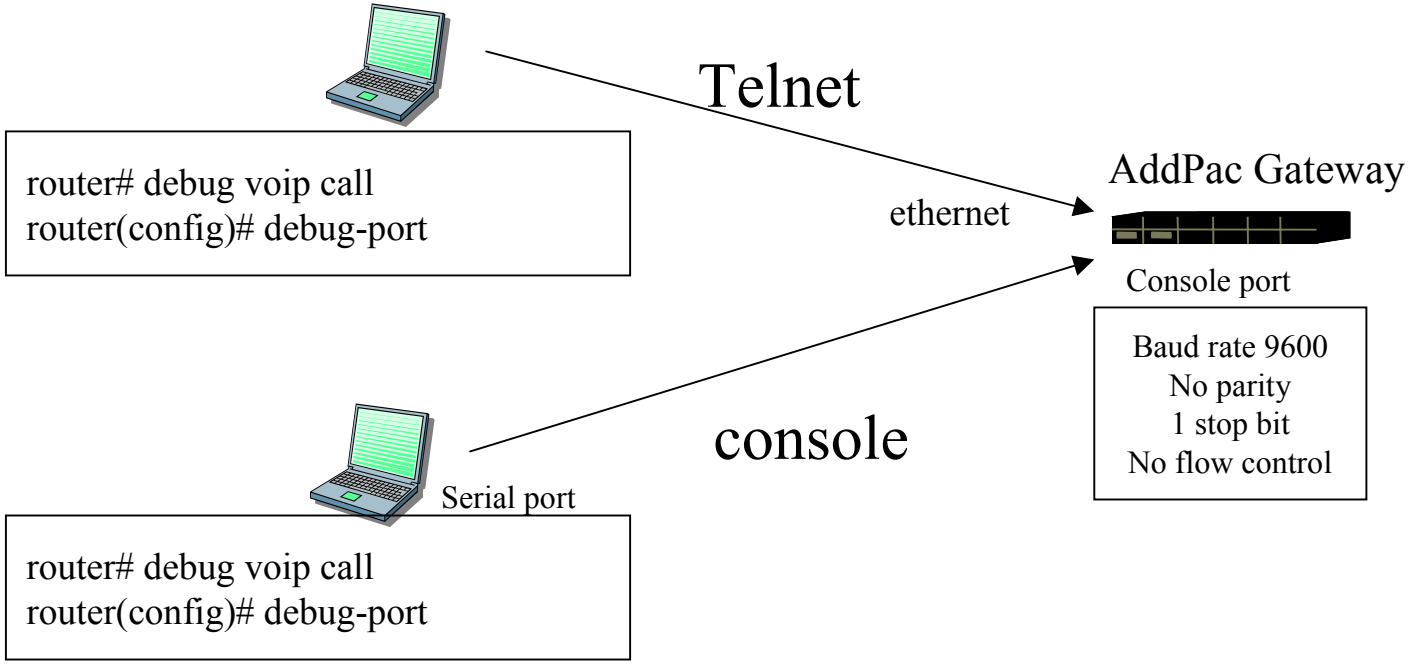
VoIP call trace related debugging command

debug voip < call/h225-asn1/h245-asn1/ras-asn1>
;Decoding the Q.931 and RAS message.

debug voip port <port-no>
; Trace only specific port

debug rta ipc ;IPC message
debug rta rtp ;RTP (Real-time Transfer Protocol) Packet
debug rta rtperr ;RTP (Real-time Transfer Protocol) Packet Error
debug rta rtcp ;RTCP (Real-time Transfer Control Protocol) Packet
debug rta t38 ;T38 Fax Protocol
debug rta http ; HTTP Protocol
debug rta e1 ;E1 Link
debug rta r2 ;R2 Signaling
debug rta q921 ;ISDN Q921 Packet
debug rta q931 ;ISDN Q931 Packet
debug rta all ;above all

2-8. Debugging(3/5)



Real-Time Monitoring of current AddPac Gateway Status : Root Login

2-8. Debugging(4/5)

```
router# debug voip call
router# config
 Enter configuration commands, one per line. End with
        CNTL/Z
router(config)# debug-port
router(config)# 1      <CEP    000300> : Call Received
2      <CEP    000300> : Call Initiated : calledNumber()
        callingNumber() crv(0)
3      <Call   59>     : Created status(InitiatedByFXS)
4      <Call   59>     : Digit(5)
5      <Call   59>     : Digit match
        checked(MatchedPartially)
6      <Call   59>     : Digit(6)
7      <Call   59>     : Digit match
        checked(MatchedPartially)
8      <Call   59>     : Digit(8)
9      <Call   59>     : Digit match checked(MatchedAll)
10     <Call   59>     : Digit(3)
11     <Call   59>     : Digit match checked(MatchedAll)
12     <Call   59>     : Digit(8)
13         <Call   59>     : Digit match
        checked(MatchedAll)
14     <Call   59>     : Digit(4)
15     <Call   59>     : Digit match checked(MatchedAll)
16     <Call   59>     : Digit(8)
17     <Call   59>     : Digit match checked(MatchedAll)
18     <Time   59>     : Inter digit timer timeout.
19     <Call   59>     : Digit(#)
20     <Call   59>     : MatchAllProcess After Sorted
                <0>  id(1000) dest(...T) prefer(0)
            selected(36)
```

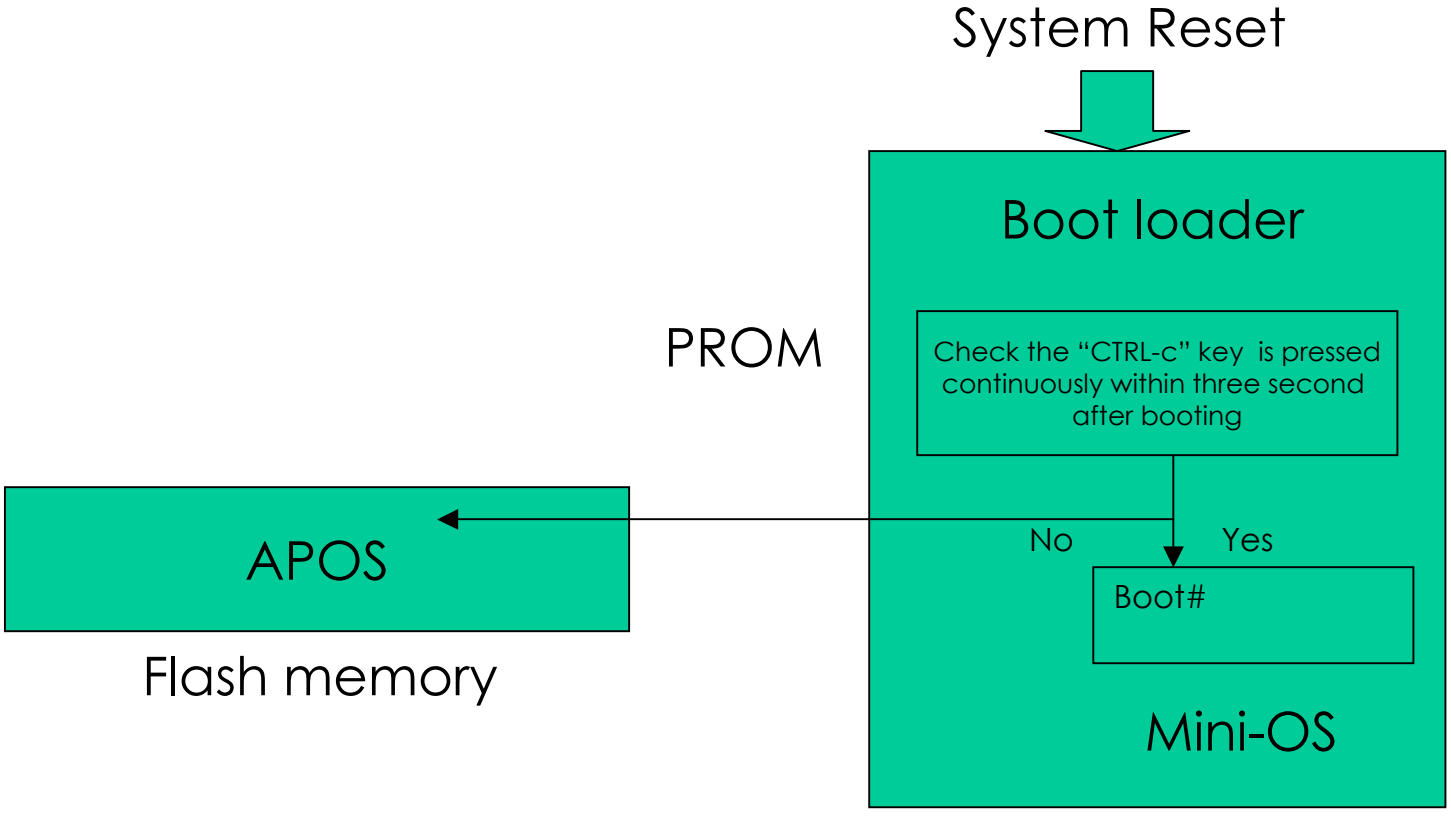
```
21     <Call   59>     : Initiate callee with dial-peer(...T)
         status(CalleeDeterminedAll)
22     <H323   59>     : InitiateOutCall: calledNum(5683848)
         callingNum(25683845) target(ras)
23     <H323   59>     : DoCall: calledAddr(5683848@)
         callingAddr(25683845)
24     <GK     59>     : Send ARQ.
25     <GK     59>     : Received ACF.
26     <H225   59>     : Try signalling TCP connect
         (61.74.195.162:1720)
27     <H225   59>     : Signalling TCP connect success
28     <H323   59>     : local capabilities.
                  number of capabilities = 7
                        1 : g7231 (6.3k)
                        2 : g729 (8k)
                        3 : g711ulaw (64k)
                        4 : g711alaw (64k)
                        5 : T.38
                        6 : UserInput/basicString
                        7 : UserInput/hookflash
29     <Q931   59>     : Send SETUP
30     <Call   59>     : Alert from(ffffffff) pseudo(1)
31     <Q931   59>     : Received CALL PROCEEDING
32     <Q931   59>     : Received ALERTING
33     <Call   59>     : Alert from(ffffffff) pseudo(0)
34     <Q931   59>     : Received ALERTING
```

2-8. Debugging(5/5)

```
35    <Chan   59>    : Open - number(129) direction(receive)
            session(voice) c
odec(g7231r63)
                  - Local : Data(23100) Cont(23101)
            Addr(61.33.161.47)
                  - Remote : Data(32720) Cont(32721)
            DataAddr(210.217.13
.167) ContAddr(210.217.13.167)
36    <Q931   59>    : startH245(forced with Facility)
37    <Call   59>    : Alert from(ffffffff) pseudo(0)
38    <H245   59>    : Send TCS request.
39    <H245   59>    : Send MSD request.
40    <H245   59>    : Received TCS request.
41    <H323   59>    : remote capabilities matching to local
            capabilities.
                  number of capabilities = 4
42    <H245   59>    : Send TCS ack.
43    <H245   59>    : Received MSD request.
44    <H245   59>    : Send MSD ack.
45    <Q931   59>    : Received CONNECT
46    <Call   59>    : Connected from(ffffffff)
47    <H323   59>    : Call with suwon established
48    <Chan   59>    : Open - number(101) direction(transmit)
            session(voice)
codec(g7231r63)
                  - Local : Data(23100) Cont(23101)
            Addr(61.33.161.47)
                  - Remote : Data(32720) Cont(32721)
            DataAddr(210.217.13
.167) ContAddr(210.217.13.167)
49    <H245   59>    : Received TCS ack.
50    <H245   59>    : Received MSD ack.
51    <Call   59>    : Terminated  from(300) this(Local:CallClear)
            before(NUL
L) forced(0)
```

```
52    <Chan   59>    : Close - number(129) direction(receive)
53    <Chan   59>    : Close - number(101) direction(transmit)
54    <Q931   59>    : Send RELEASE COMPLETE
55    <GK     59>    : Send DRQ.
56    <H245   59>    : Control  channel closed
57    <GK     59>    : Received DCF.
58    <H323   59>    : Call TO <suwon> terminated
            reason(Local:CallClear)
59    <Time   0>     : Gatekeeper TTL timeout.
60    <GK     0>     : Send RRQ.
router(config)# end
router# no debug all
```

2-9. Boot Loader(1/2)



Waiting three(3) second for key input detection at RS-232C console port after booting

2-9. Boot Loader(2/2)

Function
Password recovery
OS uploading
Command
show root password
BOOT# show password
root password change
BOOT(config)# password <new-passwd> <repeat new-passwd>
ip address configuration (This IP address is different with APOS IP address)
BOOT(config)# address <ip address> <mask>**)**

BOOT#config
BOOT(config)# password router router

Cntl-c,Cntl-x

Serial port

console

Baud rate 9600
No parity
1 stop bit
No flow control

Console port

ethernet

AddPac Gateway

FTP

C:\>ftp 61.33.161.94
Connected to 61.33.161.94.
220 FTP server (Version 1.12) ready.
User (61.33.161.94:(none)): root
331 Password required for root.
Password:
230 User root logged in ok.
ftp> bin
200 Type set to I.
ftp> put ap2520rom_v5_67.bin

3. Basic Network diagram and Configuration

- Cable Modem Environment (DHCP client)
- ADSL Modem (PPPoE) Environment (Dynamic IP)
- ADSL Modem (MyIP) Environment
- ADSL Modem (multi-IP) or Released line Environment
- Leased Line Router Environment (Operating as VoIP Router)
- QoS, Bridge Mode

3-1. Cable Modem Environment (DHCP client)(1/3)

Mandatory command List

Ethernet 0.0

DHCP Client

QoS – recommendation

e164 for Dial peer FXS/FXO/VoIP

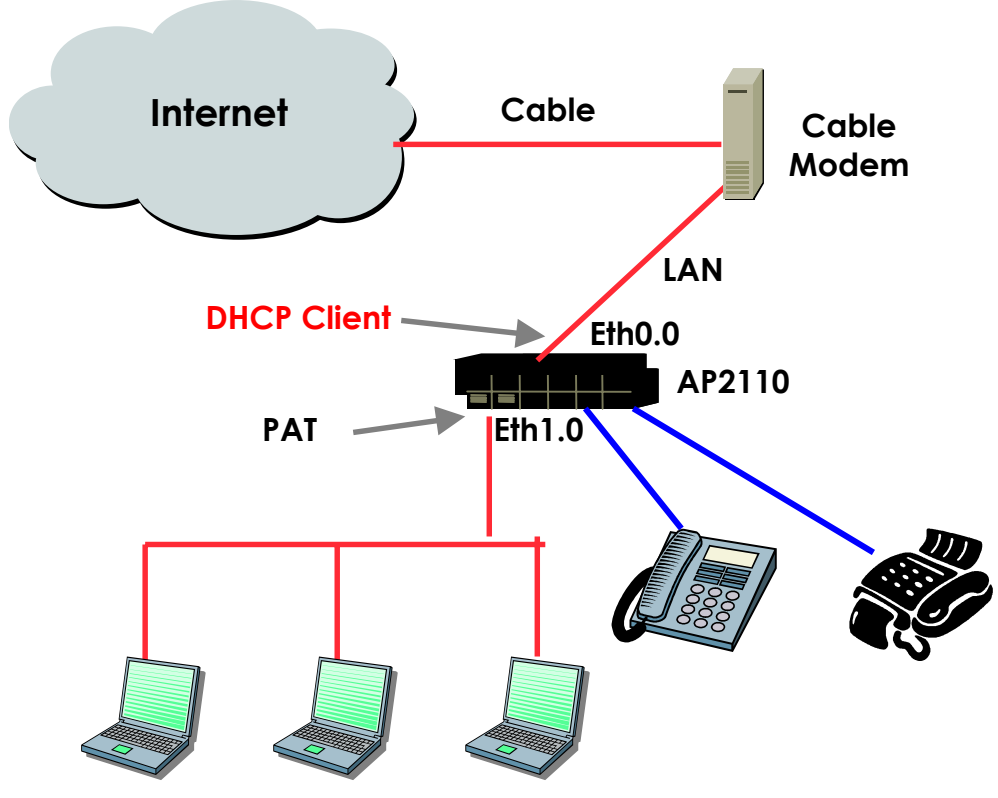
VoIP Interface Configuration (default eth0.0)

Optional command List

Configuration for Gate-Keeper

Ethernet 1.0

private IP Address & PAT



3-1. Cable Modem Environment (DHCP client)(2/3)

```
!
version 5.58
!
nat-list 1 pat static-entry tcp 1720  local
nat-list 1 pat group-static-entry udp 22000 30000 local
nat-list 1 pat group-static-entry tcp 10000 22000 local
nat-list 1 pat static-entry tcp 23  local
nat-list 1 pat group-static-entry tcp 20 21 local
nat-list 1 pat group-static-entry udp 67 68 local
nat-list 1 pat static-entry icmp ping  local
!
interface ether0.0
 ip address dhcp
 qos-control 200 100
!
```

```
interface ether1.0
ip address 10.1.1.1 255.255.255.0
 ip nat-group 1 pat ether0.0


!
snmp name AP1100
!
!
!
! VoIP configuration.
!
!
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
```

3-1. Cable Modem Environment (DHCP client)(3/3)

```
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 25553051
 port 1/0
!
dial-peer voice 1 pots
 destination-pattern 25553052
 port 1/1
!
dial-peer voice 2 pots
 destination-pattern 25553053
 port 1/2
!
dial-peer voice 3 pots
 destination-pattern 25553054
 port 1/3
!
!
!
! Voip peer configuration.
!
```

```
dial-peer voice 1000 voip
 destination-pattern ...T
 session target ras
 dtmf-relay h245-alphanumeric
!
dial-peer voice 1001 voip
 destination-pattern 20..
 session target 168.126.4.4
 dtmf-relay h245-alphanumeric

! Gateway configuration.
!
gateway
 h323-id addpactest
 gkip 211.192.1.1
 register
!
!
! Clear down tone
!
!
voip-interface ether0.0
!
```

3-2. ADSL Modem (PPPoE) Environment (dynamic IP)(1/2)

Mandatory command List

Ethernet 0.0
- PPPoE
- QoS – recommendation

e164 for Dial peer FXS/FXO/VoIP

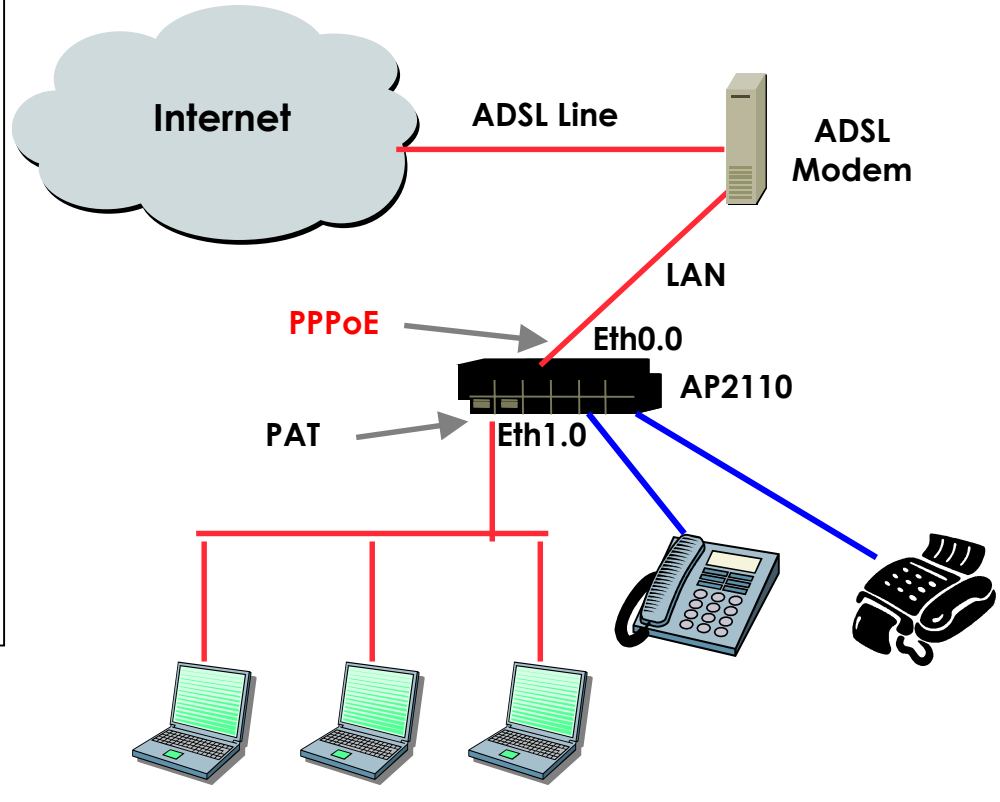
VoIP Interface Configuration (default eth0.0)

Default route

Optional command List

Configuration for Gate-Keeper

Ethernet 1.0
- private IP Address & PAT



3-2. ADSL Modem (PPPoE) Environment (dynamic IP)(2/2)

```
……..
…….
…
!
!
interface ether0.0
 no ip address
 encapsulation pppoe
 ppp authentication pap callin
 ppp pap sent-username addpac password addpac
!
……..
……
route 0.0.0.0 0.0.0.0 ether0.0
!
!
…..
…
```

3-3. ADSL Modem(MyIP) Environment

Mandatory command List

Ethernet 0.0
- ip address
- QoS – recommendation

Dial peer FXS/FXO/VoIP e164

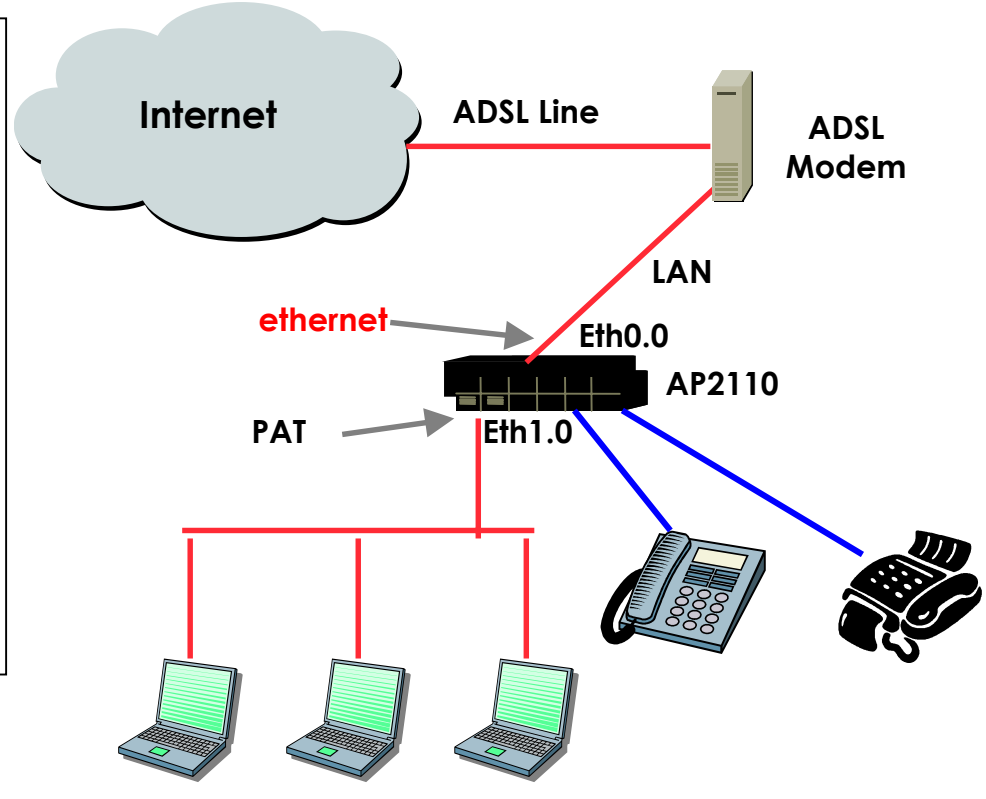
VoIP Interface Setting (default eth0.0)

Default route

Optional command List

Configuration for Gate-Keeper

Ethernet 1.0
- private IP Address & PAT



3-4. ADSL Modem(multi-IP) Or Leased Line

Mandatory command List

Ethernet 0.0

ip address

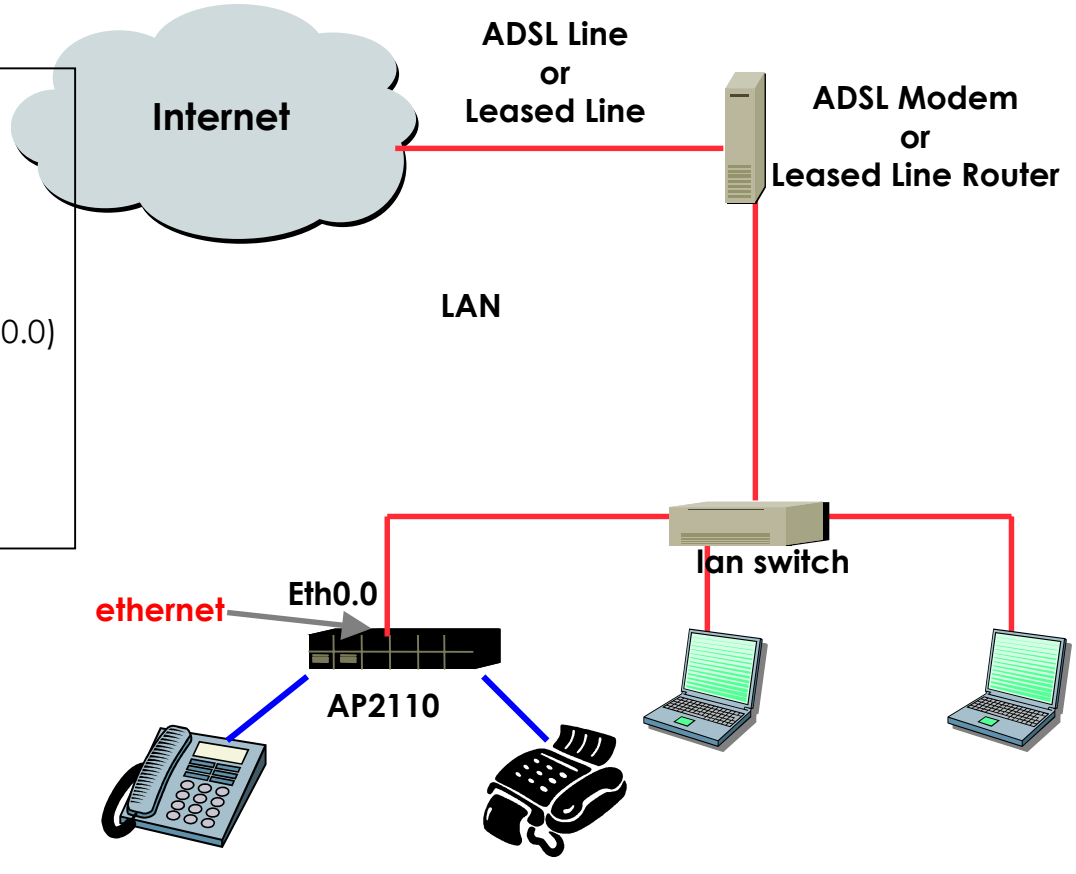
Dial peer FXS/FXO/VoIP e164

VoIP Interface Setting (default eth0.0)

Default route

Optional List

Gate-Keeper Parameter Setting



3-5. Leased Line Router environment (Operating as VoIP router)

Mandatory command List

Serial 0
- ip address
- encapsulation PPP(HDLC)
- QoS – Recommend

Ethernet 0.0
- ip address

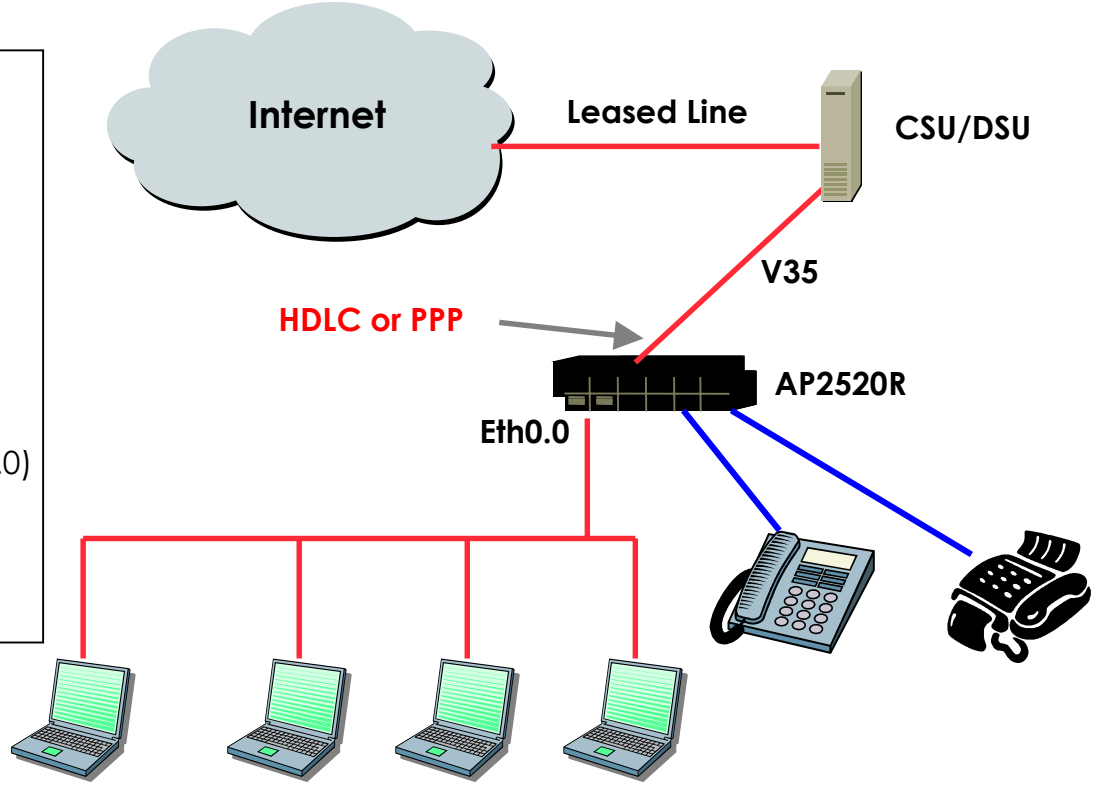
Dial peer FXS/FXO/VoIP e164

VoIP Interface Setting (default eth0.0)

Default(or static) route

Optional command List

Gate-Keeper Parameter Setting



3-6. QoS, Bridge mode

Mandatory command List

Ethernet 0.0
- Ip address
- bridge
- QoS – Recommand

Ethernet 1.0
- no ip address
- bridge

Dial peer FXS/FXO/VoIP e164

VoIP Interface Setting (default eth0.0)

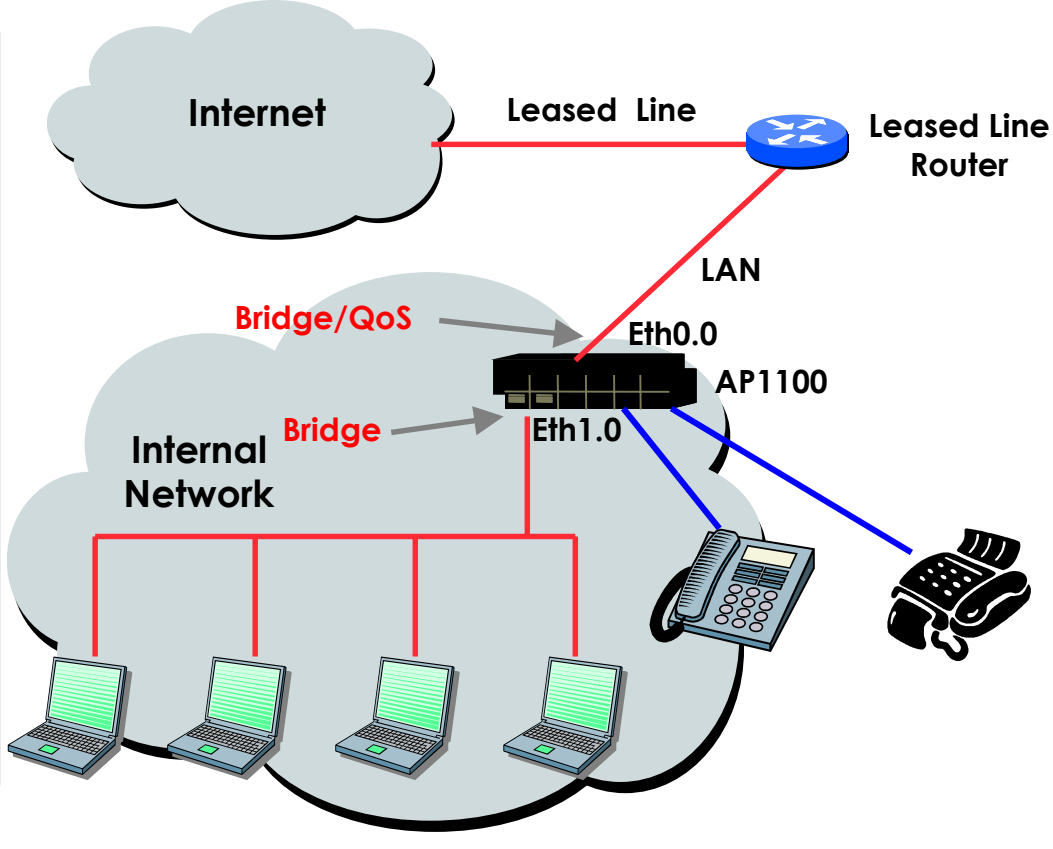
default route

no ip routing

No Bridge Spanning Tree

Optional command List

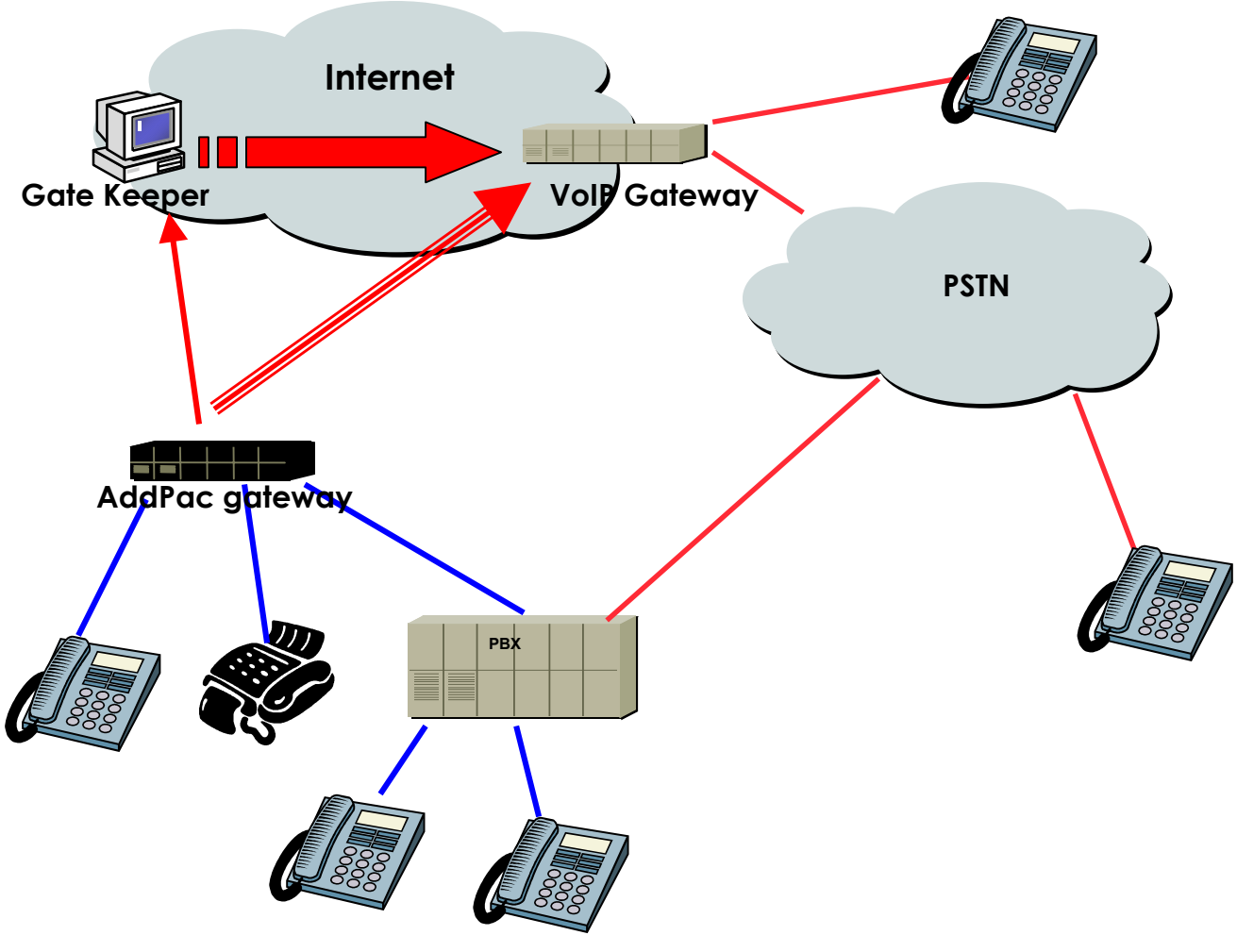
Gate-Keeper Parameter Setting



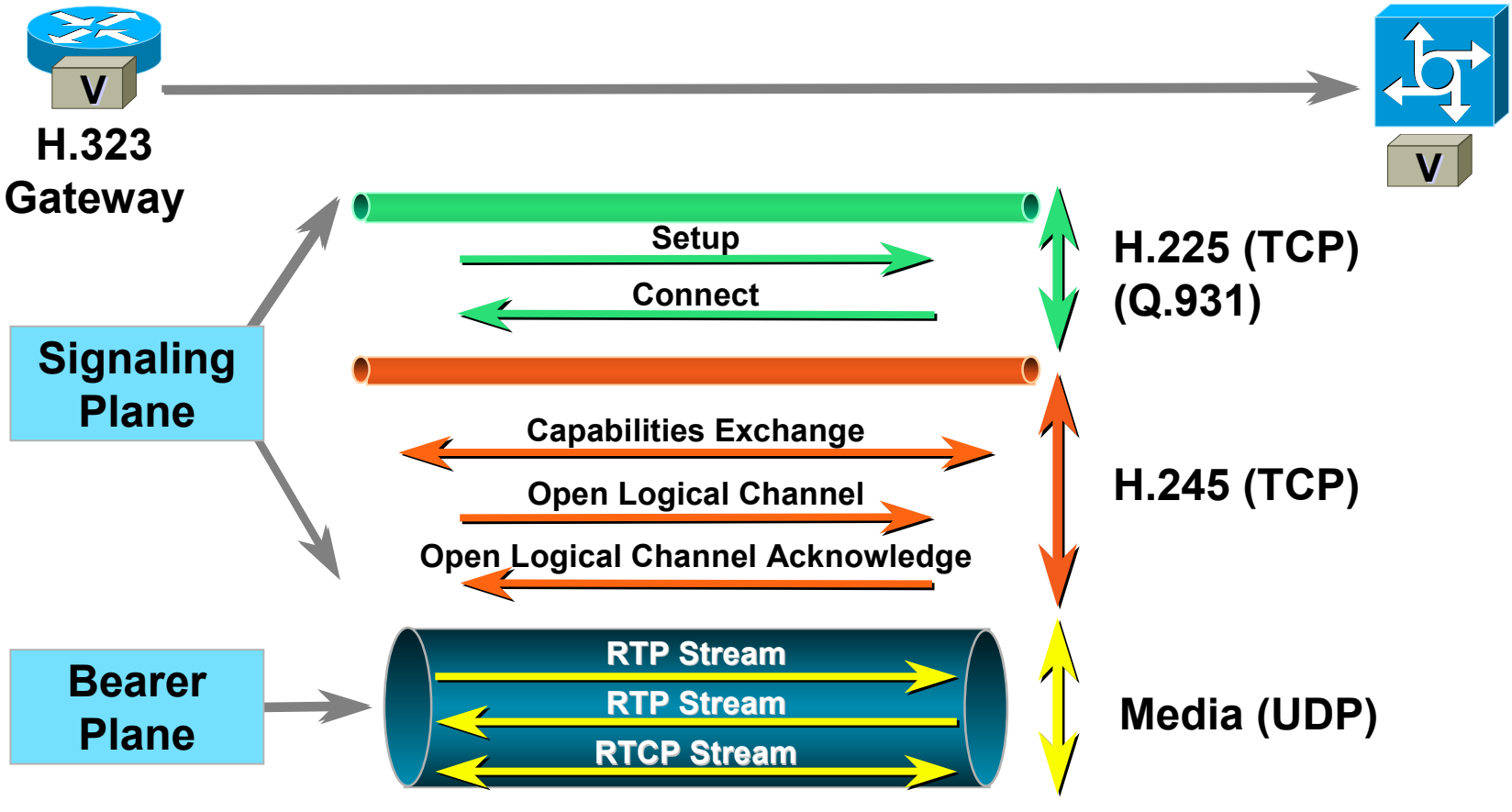
4. H.323 call setup Procedure Overview

- PSTN Inter-networking call Scenario
- H323 end-to-end signaling
- Gatekeeper Registration
- Gatekeeper Call Admission
- Direct Endpoint Call Signaling
- Gatekeeper Routed Call Signaling (Q.931)
- Gatekeeper Routed Call Signaling (Q.931/H.245)
- Both endpoints registered to the same Gatekeeper
- Both gatekeepers direct call signaling

4-1. PSTN Inter-networking Call Scenario

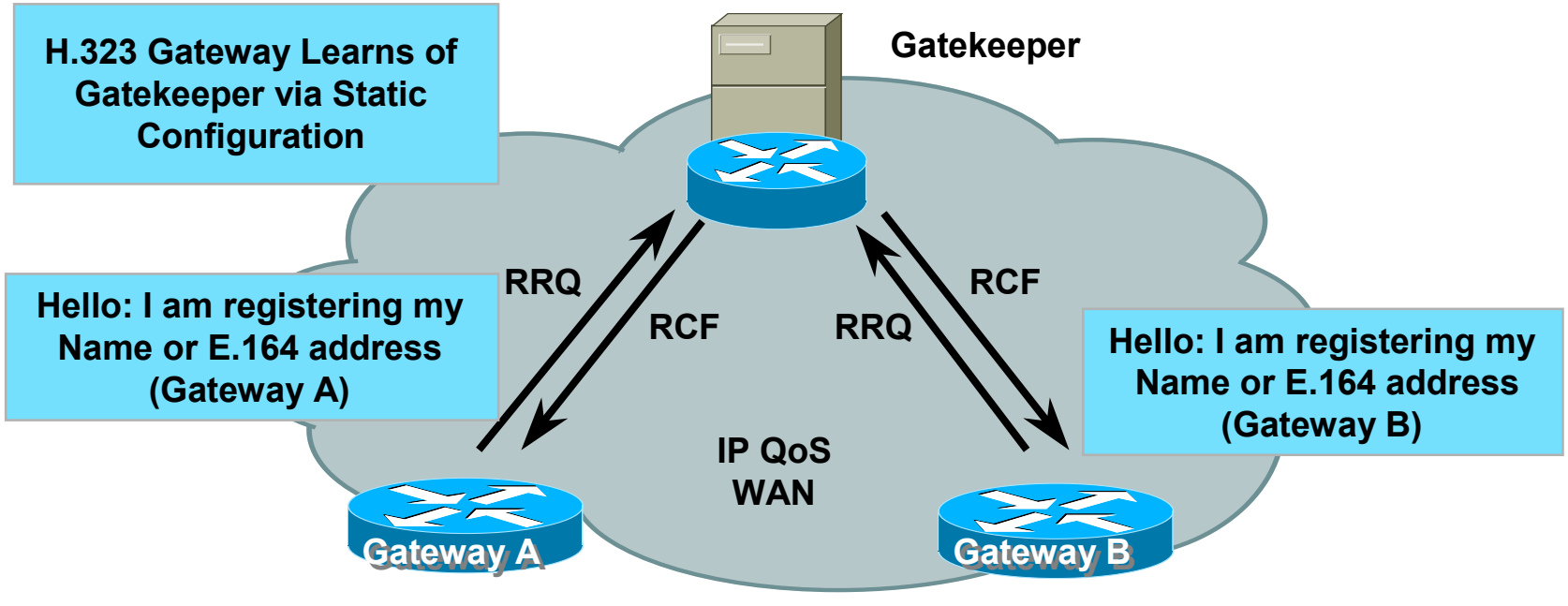


4-2. H323 end-to-end signaling



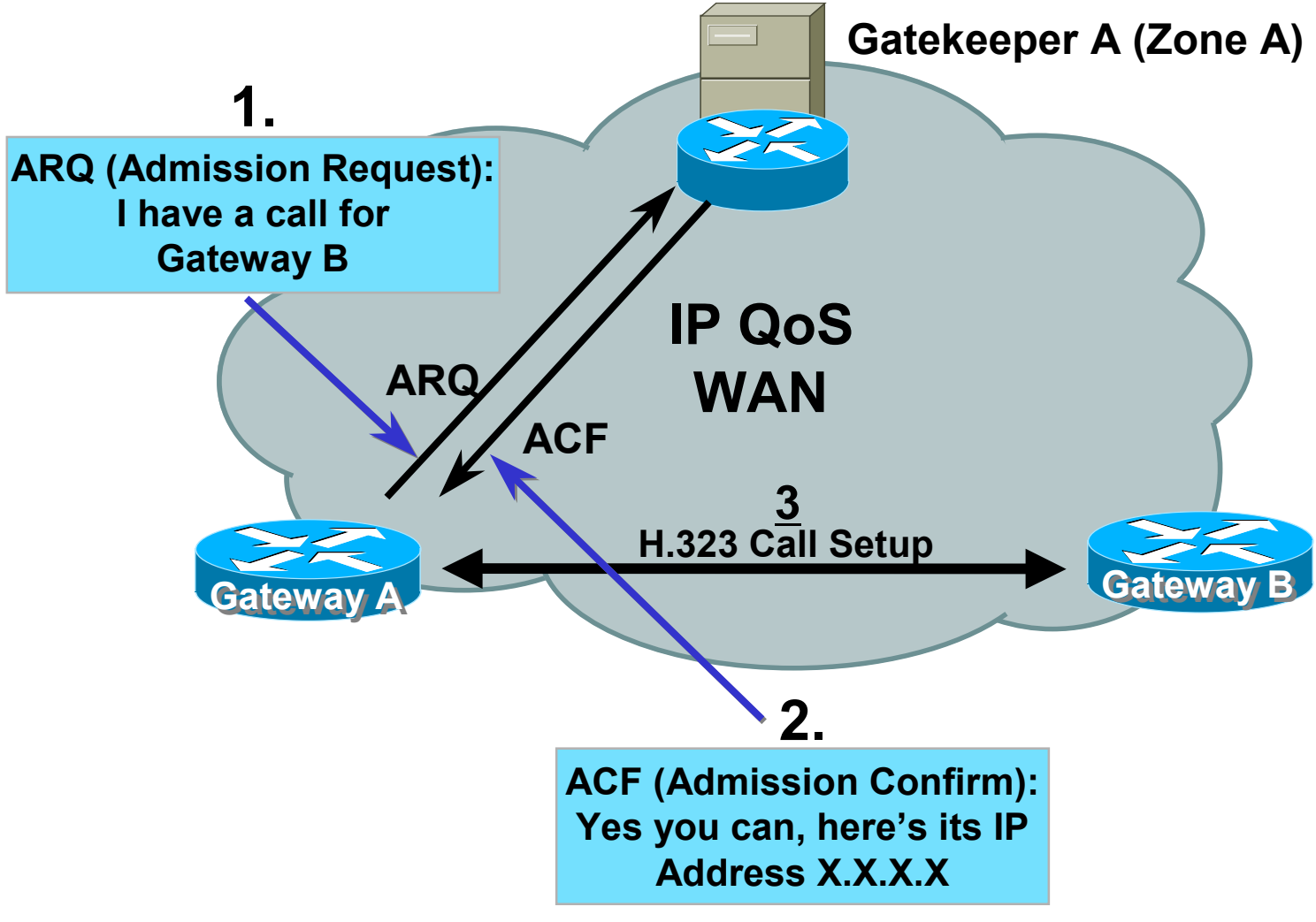
4-3. Gatekeeper Registration

H.323 Gateway Learns of Gatekeeper via Static Configuration

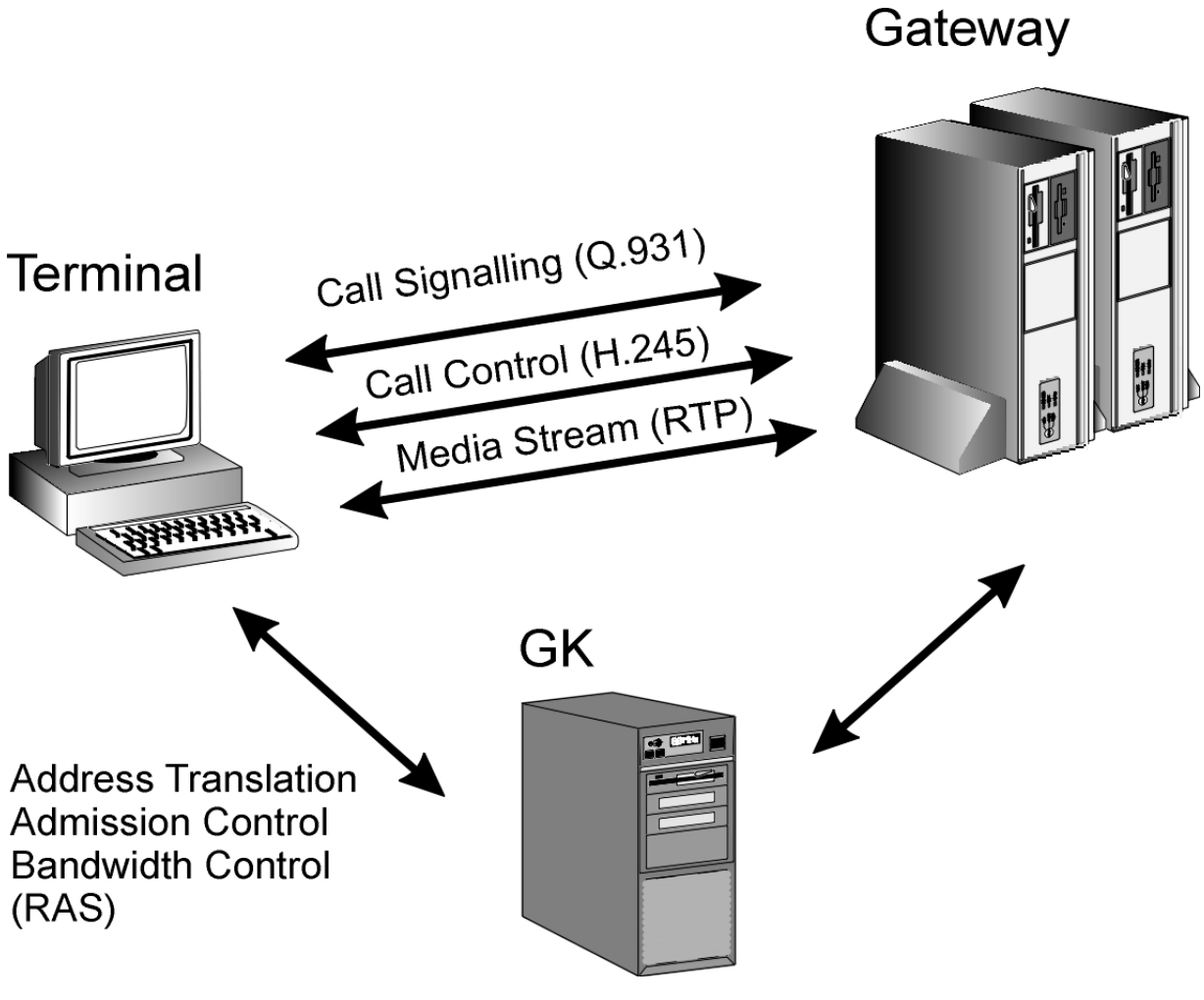


RAS—Registration Admission and Status
UDP Transport Port 1719
RRQ—Registration Request
RRJ—Registration Reject
RCF—Registration Confirm

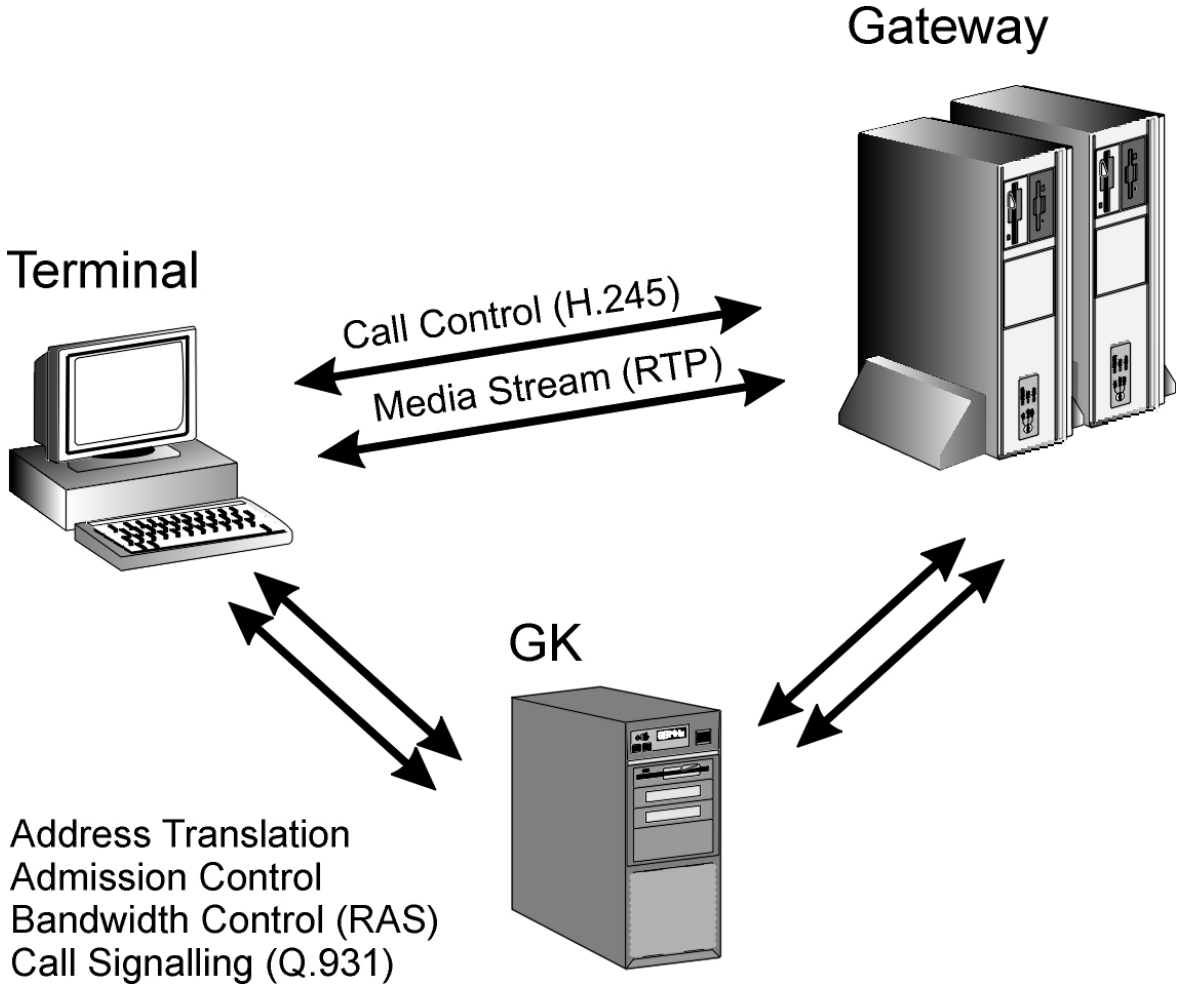
4-4. Gatekeeper Call Admission



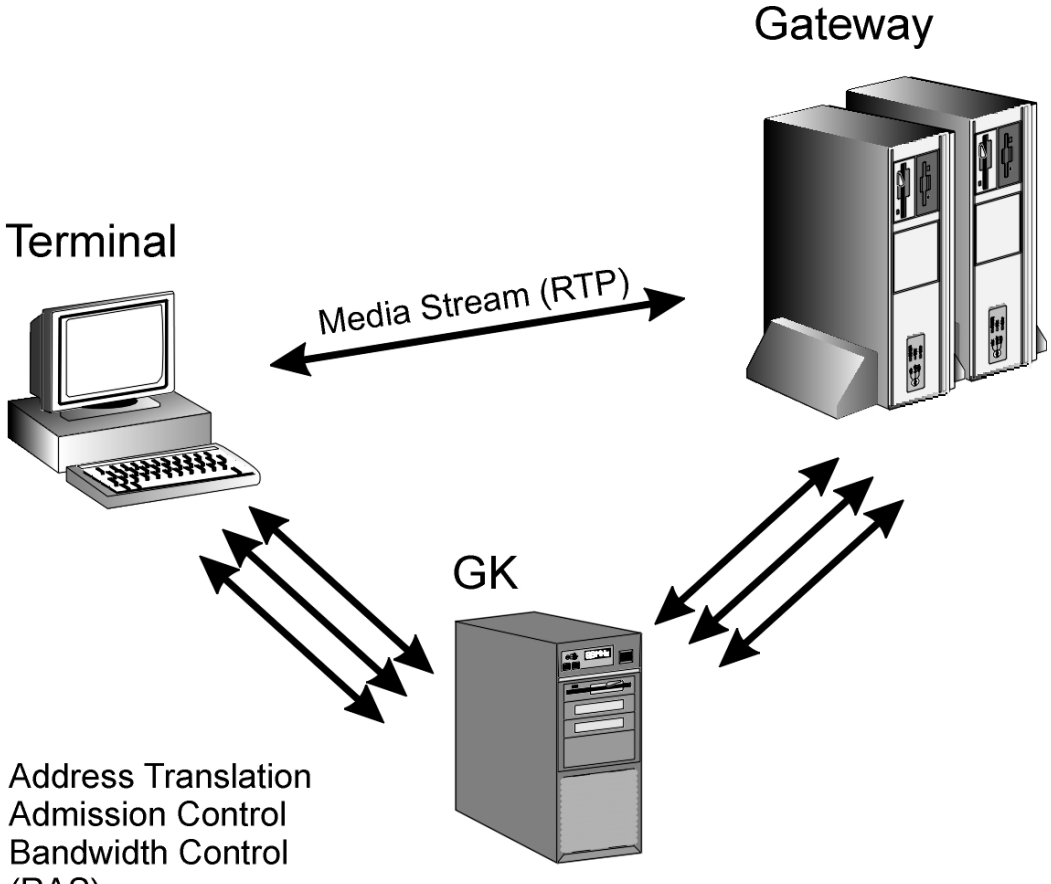
4-5 Direct Endpoint Call Signaling



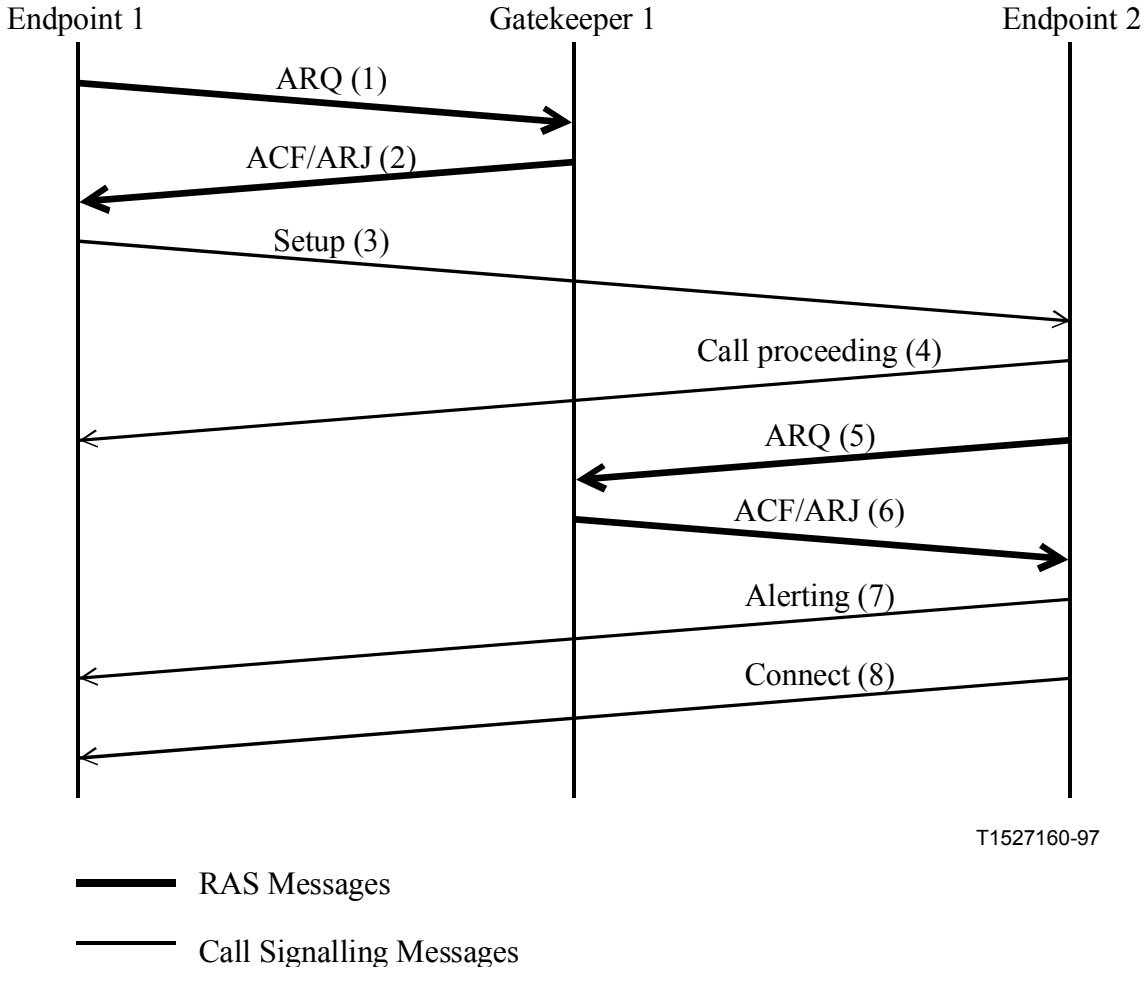
4-6 Gatekeeper Routed Call Signaling (Q.931)



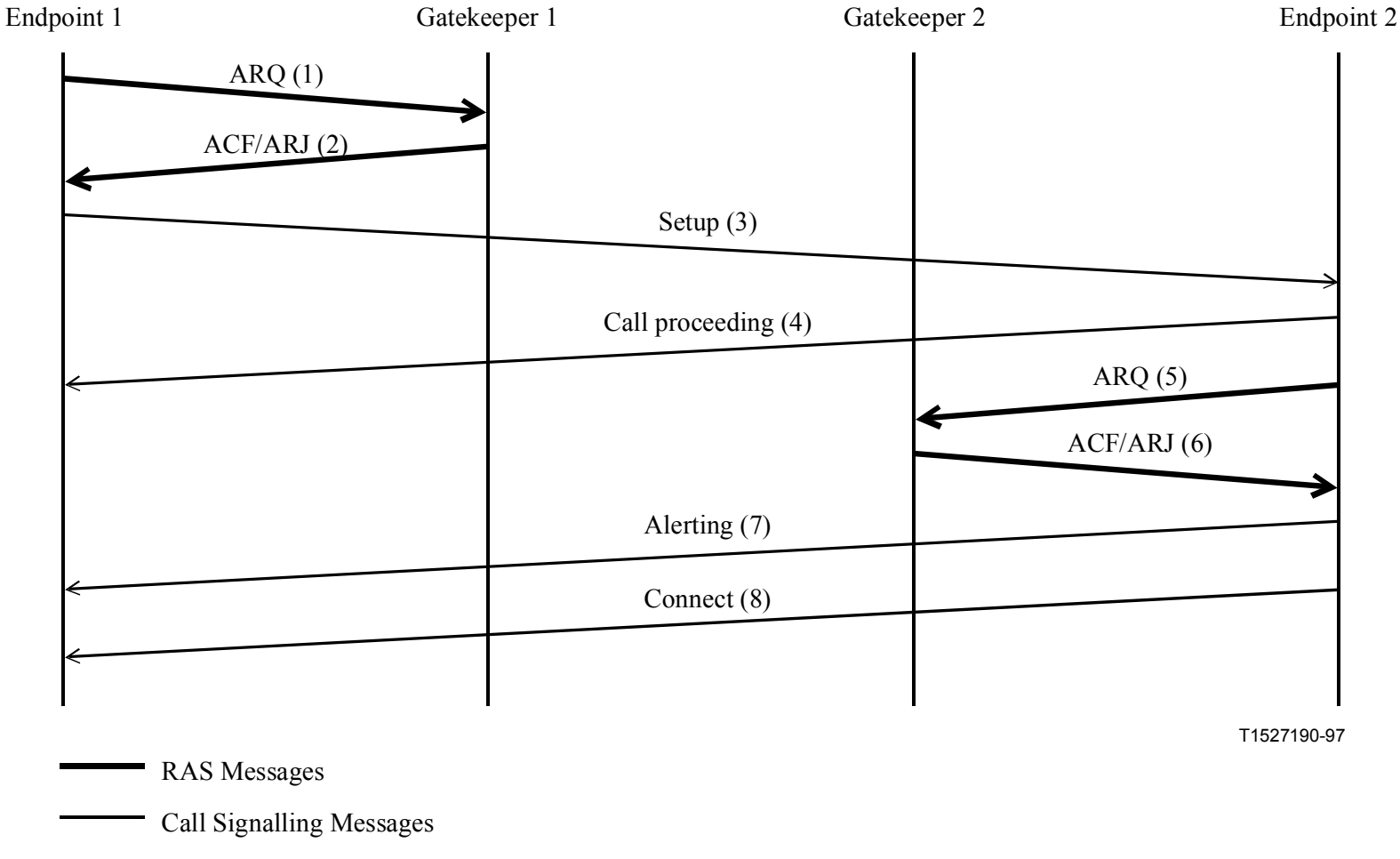
4-7 Gatekeeper Routed Call Signaling (Q.931/H.245)



4-8 Both endpoints registered to the same Gatekeeper



4-9 Both gatekeepers direct call signalling



5. VoIP Configuration and Setting

- H323 signaling Parameter Setting (h232 call setup procedure, option)
- Gatekeeper Parameter Setting (GK IP/h323 id/e164/ras port,timeout)
- time out parameter
- number plan
- Etc

5-1 H323 Signaling Parameter Setting (1/1)

Setting OCL(Open Logical Channel) whether opening befor/after connect or after connecting h245 procedure
router(config-vservice-voip)# h323 call channel <early/late/latest> ;default = early

Determine how to send H323 call response message
%default is sending alert only if receiving port is FXS, otherwise, sending progress message.
router(config-vservice-voip)# h323 call response <alert/progress/none/default> ;default = default

Determine H323 call setup mode
In case setting Preferred-slow, if addpac gateway is sending side, process setup as slow-start ,
if receiving side, other side is fast, then fast-start or slow, then slow-start
router(config-vservice-voip)# h323 call start <fast/slow/preferred-slow> ; default = fast

H245 tunneling enable/diable Setting
router(config-vservice-voip)# h323 call tunnel <enable/disable> ; default = enable

When H245 tunneling is disabled, h245setup **Mandatory command List**
router(config-vservice-voip)# force-h245address-at-setup ; default=enable
router(config-vservice-voip)# force-starth245 ; default=enable
%CF: When H245 tunneling is enabled (default)
router(config-vservice-voip)# force-h245address-at-setup ; default=disable
router(config-vservice-voip)# force-starth245 ; default=disable

5-2 Gatekeeper Parameter Setting

Gatekeeper ip address setting
router(config-gateway)# gkip <ip address> ; default= none

Deciding whether GRQ message is sending or not
router(config-gateway)# discovery ; default=disable

H323 id setting
router(config-gateway)# h323-id <string> ; default=voip.<ether0.0 ip address>

Send RRQ
router(config-gateway)# register

RAS signaling port setting
router(config-gateway)# signalling-port <port-num> ; default= 1720

RAS source port number fixed
router(config-gateway)# fixed-ras-port ; default=fixed(port num=22000)

5-3 time out and number plan parameter

timeout parameter setting

```
router(config-vservice-voip)# timeout tinit      ; set initial digit timeout value
router(config-vservice-voip)# timeout tring      ; set ringing timeout value
router(config-vservice-voip)# timeout t301       ; set Q.931 alert -> connect timeout value
router(config-vservice-voip)# timeout t303       ; set Q.931 setup -> alert timeout value
router(config-vservice-voip)# timeout tras       ; set RAS msg ack timeout value
router(config-vservice-voip)# timeout tttl       ; set RAS Time To Live timeout value
router(config-vservice-voip)# timeout tidt       ; set inter digit timeout value
router(config-vservice-voip)# timeout treg       ; set GK Registration retry timeout value
```

"show gateway" command can be used to check the correct parameter setting

```
router#show gateway
```

number plan parameter setting

```
router(config)# dial-p voice <tag-id>  <pots/voip>
router(config-dialpeer-pots-100)# destination-pattern <number>
router(config-dialpeer-pots-100)# port <0-1>/<0-3>
router(config-dialpeer-voip-2000)# sess target <ras/ip address>
```

5-4 Other Commands

Local Ring-back-tone parameter setting
router(config-vservice-voip)# local-ringback-tone <alert/early/<cr>> ; default=<cr>
Alert: Playing Local ring back-tone after receiving alerting message.
Early: Playing Local ring back-tone after sending setup message.
<cr> ; Playing Local ring back-tone in coming first whatever RTP(in-band) or alert.

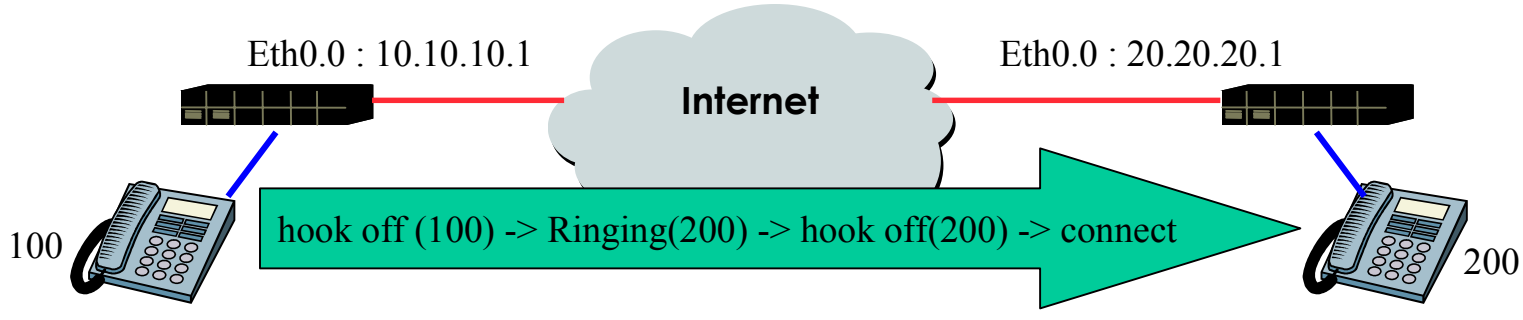
Setting whether sending In-band Ring-back-tone to caller
router(config-vservice-voip)# in-band-ringback-tone ; default= enabled

VoIP port(TCP/UDP) minimize option
router(config-vservice-voip)# minimize-voip-ports <<cr>/<multiply <number> >
; default=no minimize

6 . Supplementary function

- connection PLAR
- call pickup/forwarding
- number translation
- PSTN backup & inbound pots peer

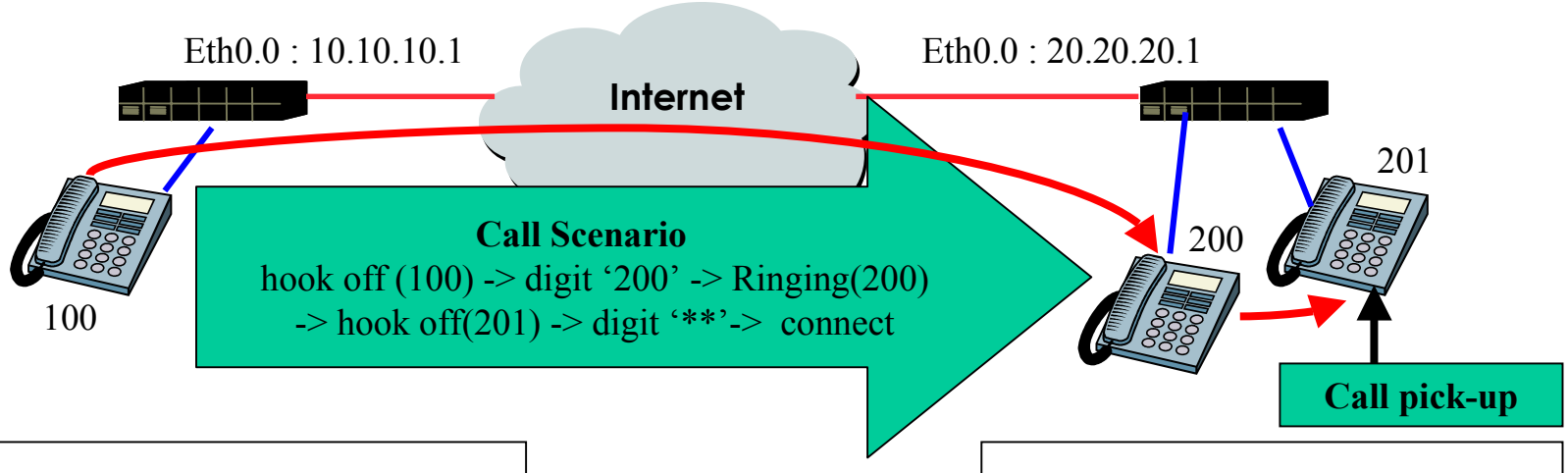
6-1 PLAR(Private Line Auto Ring-down)




```
interface ether0.0
 ip address 10.10.10.1 255.255.255.0
....
voice-port 0/0
 connection plar 200
....
dial-peer voice 0 pots
 destination-pattern 100
 port 0/0
....
dial-peer voice 1000 voip
 destination-pattern 200
  session target 20.20.20.1
 dtmf-relay h245-alphanumeric
```

```
interface ether0.0
 ip address 20.20.20.1 255.255.255.0
....
dial-peer voice 0 pots
 destination-pattern 200
 port 0/0
....
dial-peer voice 1000 voip
 destination-pattern 100
  session target 10.10.10.1
 dtmf-relay h245-alphanumeric
....
```

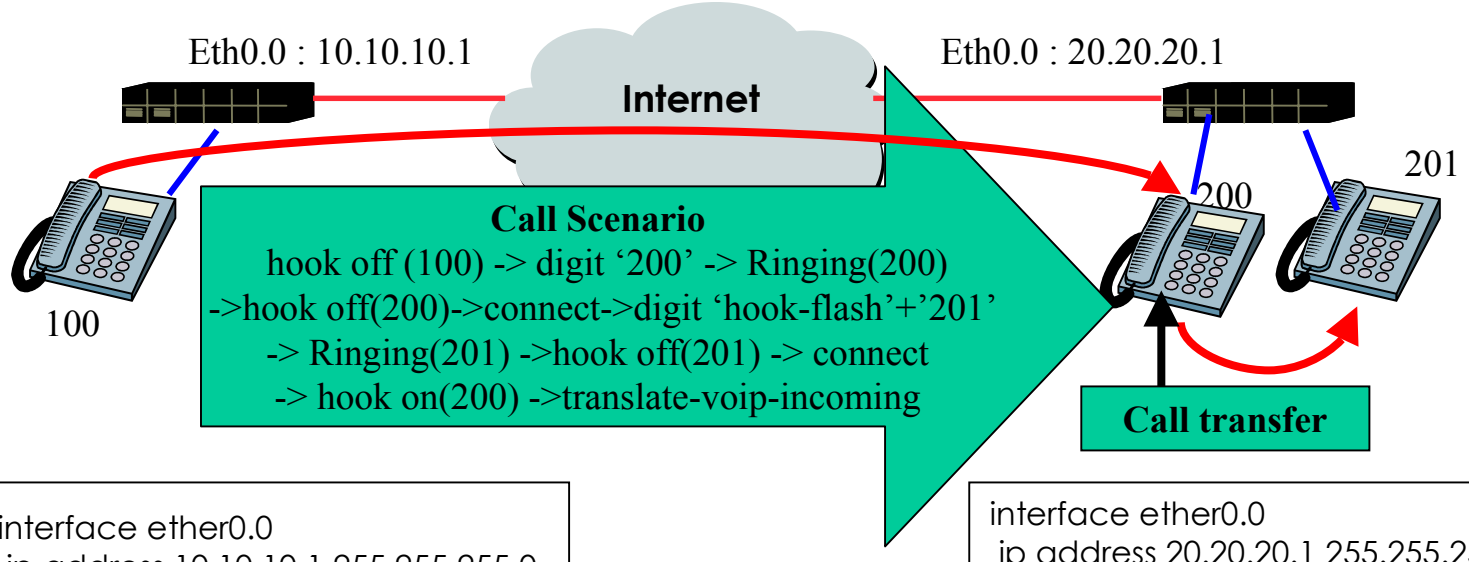
6-2 call Pick-up/transfer(1/2)




```
interface ether0.0
 ip address 10.10.10.1 255.255.255.0
....
dial-peer voice 0 pots
 destination-pattern 100
 port 0/0
....
dial-peer voice 1000 voip
 destination-pattern 200
  session target 20.20.20.1
 dtmf-relay h245-alphanumeric
```

```
interface ether0.0
 ip address 20.20.20.1 255.255.255.0
....
dial-peer voice 0 pots
 destination-pattern 200
 port 0/0
....
dial-peer voice 1000 voip
 destination-pattern 100
  session target 10.10.10.1
 dtmf-relay h245-alphanumeric
....
dial-peer call-pickup **
```

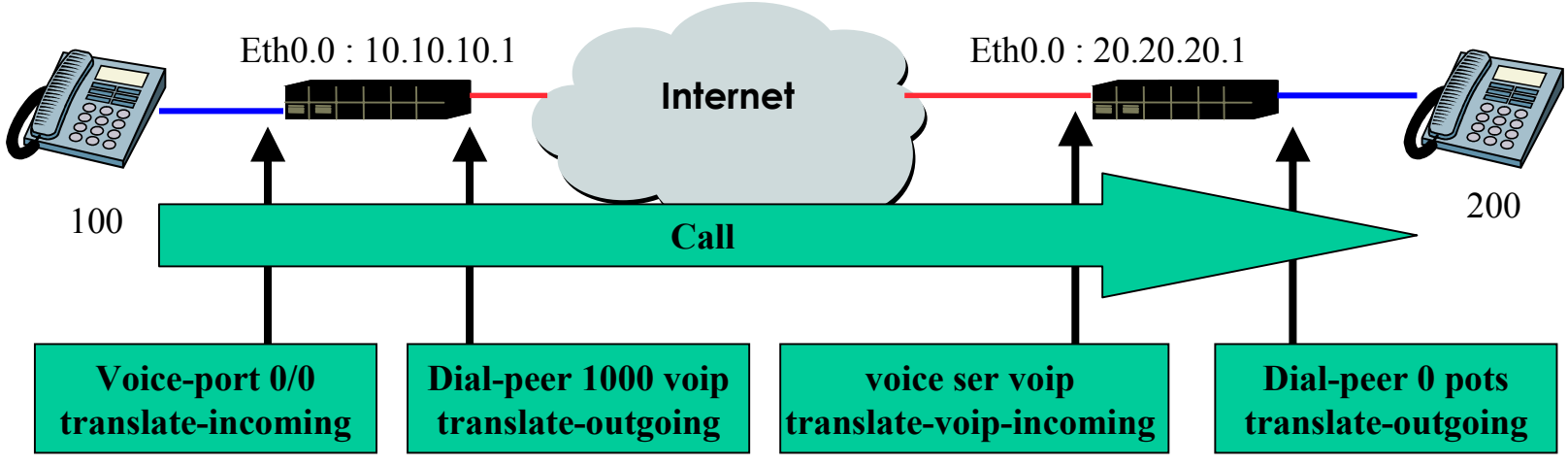
6-2 call Pick-up/transfer(2/2)




```
interface ether0.0
 ip address 10.10.10.1 255.255.255.0
....
dial-peer voice 0 pots
 destination-pattern 100
 port 0/0
....
dial-peer voice 1000 voip
 destination-pattern 200
  session target 20.20.20.1
 dtmf-relay h245-alphanumeric
```

```
interface ether0.0
 ip address 20.20.20.1 255.255.255.0
....
dial-peer voice 0 pots
 destination-pattern 200
 port 0/0
....
dial-peer voice 1000 voip
 destination-pattern 100
  session target 10.10.10.1
 dtmf-relay h245-alphanumeric
....
router(config)# dial-peer call-transfer h
```

6-3 number translation



Translation rule

router(config)# translation-rule <tag-id>

router(config-translation-rule#0)# rule <index> <input pattern> <output-pattern>

Translation rule application

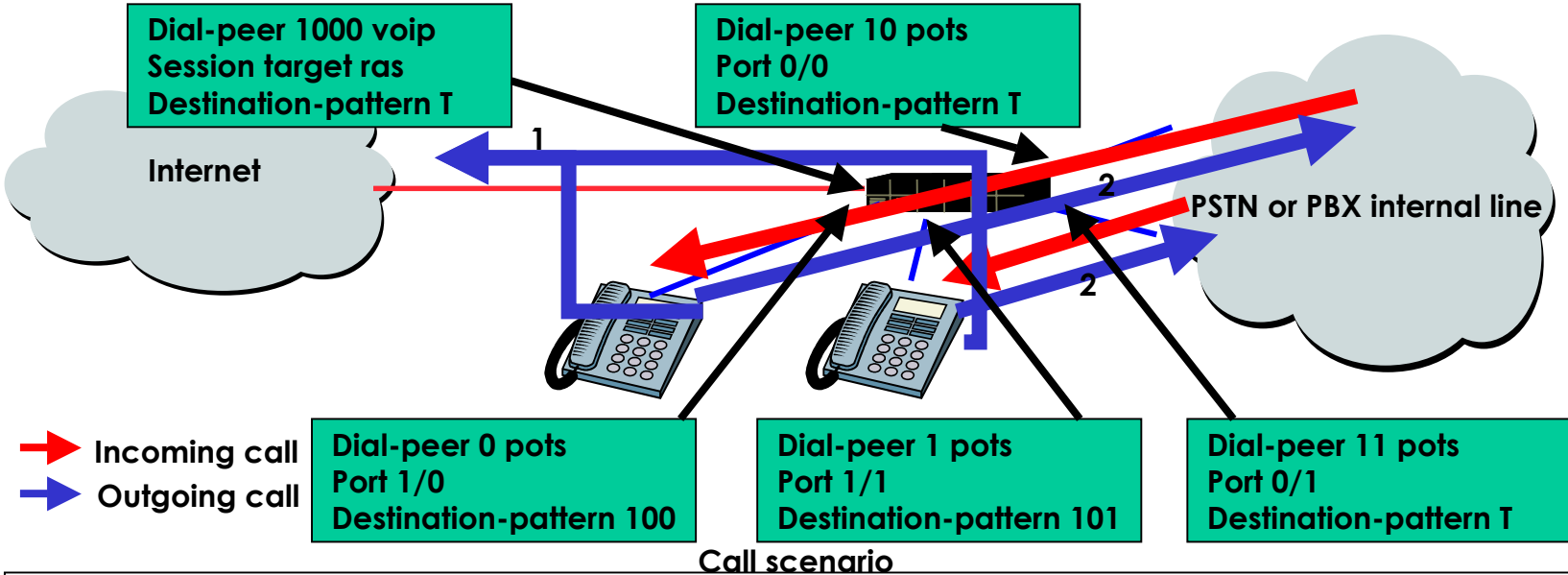
router(config-voice-ports-0/0)# translate-incoming <calling-number/called-number>

router(config-dialpeer-voip-1000)# translate-outgoing <calling-number/called-number>

router(config-vservice-voip)# translate-voip-incoming <calling-number/called-number>

router(config-dialpeer-pots-0)# translate-outgoing <calling-number/called-number>

6-4 PSTN backup & inbound pots peer(1/2)



Call scenario

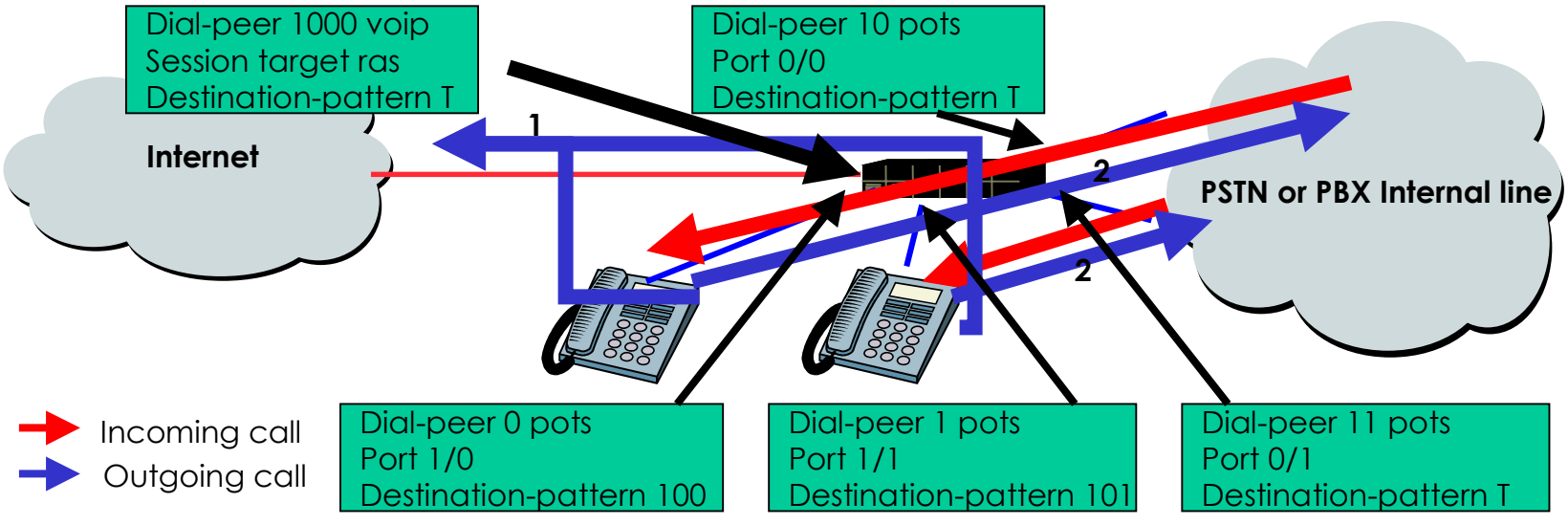
Out going call

Hook off(port 1/0) -> digit any number -> VoIP call is possible ?(AddPac gateway)
-> possible -> call transfer to VoIP Service Provider (Gatekeeper) -> call connected (conversation)
->impossible (Gatekeeper down or internet link down) -> call transfer to port 0/0(PSTN) -> call connected
Hook off(port 1/1) -> digit any number -> VoIP call is possible?(AccPac gateway)
-> possible-> call transfer to VoIP Service Provider (Gatekeeper) -> call connected
->impossible (gatekeeper down or internet link down) -> call transfer to port 0/0(PSTN) -> call connected

Incoming call

call (port0/0) -> Ringing(port 1/0) -> hook off (port 1/0) -> call connected (conversation)
call (port0/1) -> Ringing(port 1/1) -> hook off (port 1/1) ->call connected (conversation)

6-4 PSTN backup & inbound pots peer(2/2)



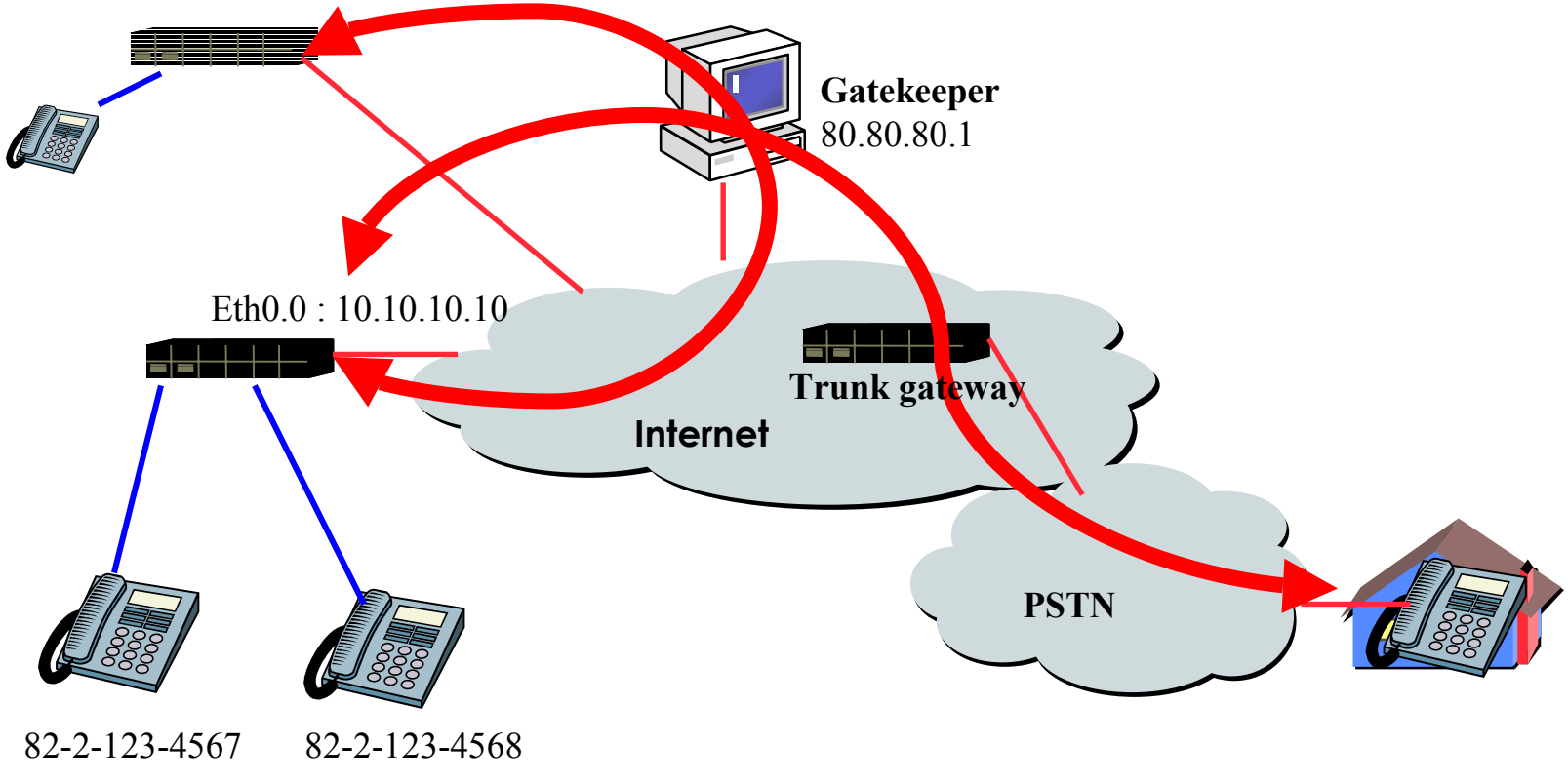
Setting command

```
router(config-vservice-voip)# busyout monitor <gatekeeper/voip-interface>
                              ;VoIP interface Status Monitoring Condition Setting
router(config-voice-ports-0/0)# connection  plar 100
router(config-voice-ports-0/1)# connection  plar 101
router(config-dialpeer-pots-10)# inbound-pots-peer 0
router(config-dialpeer-pots-10)# preference 1
router(config-dialpeer-pots-11)# inbound-pots-peer 1
router(config-dialpeer-pots-11)# preference 1
router(config-dialpeer-voip-1000)# preference  0
```

7. Example

- VoIP call connection diagram using Gatekeeper
- Gatekeeper and internal direct call connection diagram
- Internal direct call connection (plar)
- direct call connection using FXS or FXO interface (plar) : Example
- number translation
- Inhibit specific number outgoing call (number translation application 2)
- PSTN Backup (normal)
- PSTN Backup (inbound pots peer)
- Trunk – Inter-working with Voice broadcasting equipment
- Gatekeeper and internal direct call application – number translation, plar

7-1 VoIP call connection diagram using Gatekeeper(1/3)



7-1 VoIP call connection diagram using Gatekeeper(2/3)

```
!
version 5.67
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
! VoIP configuration.
! Voice service voip configuration.
!
```

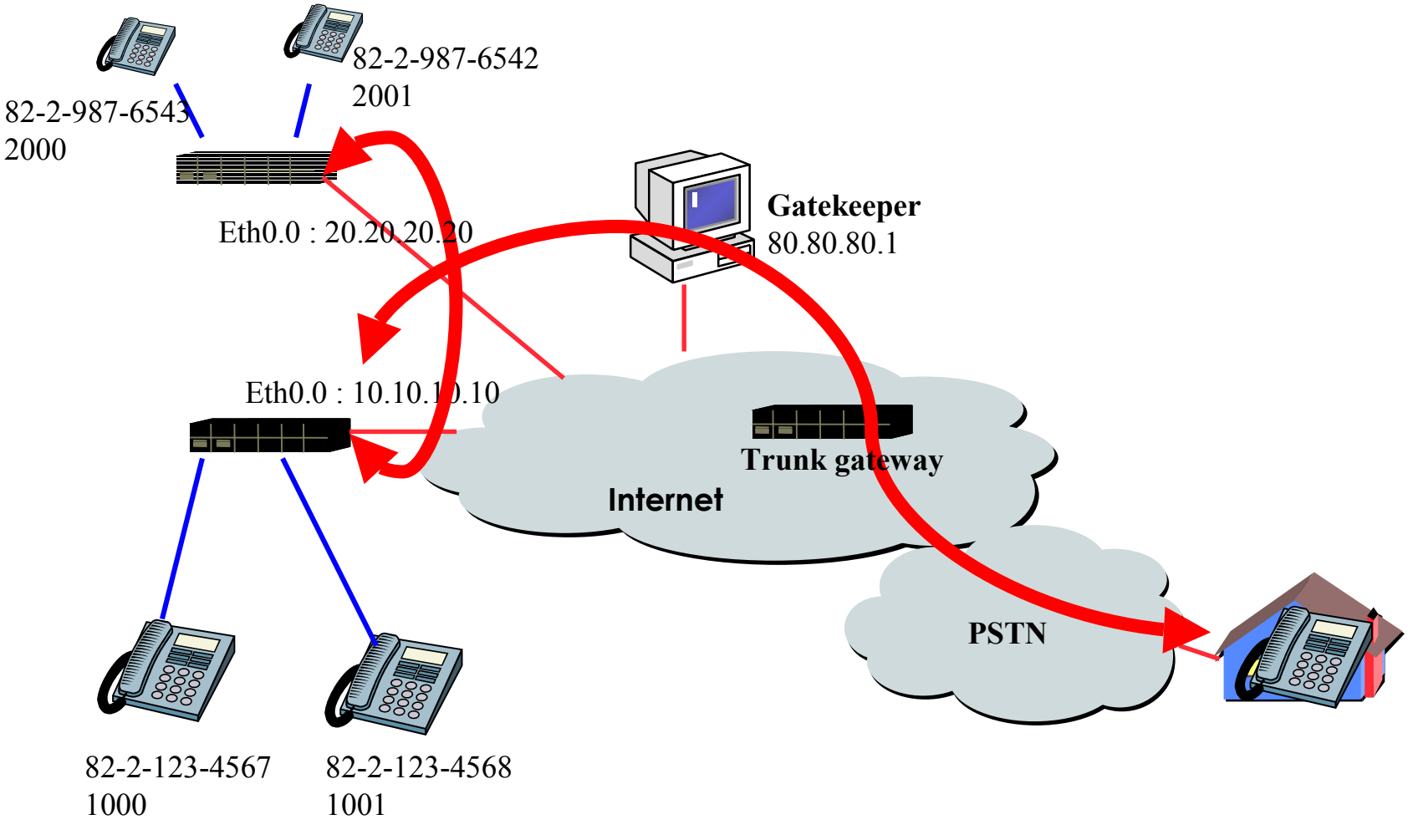
```
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
voice-port 0/2
!
voice-port 0/3
!
voice-port 1/0
```

7-1 VoIP call connection diagram using Gatekeeper(3/3)

```
voice-port 1/1
!
voice-port 1/2
!
voice-port 1/3
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 8221234567
 port 0/0
!
dial-peer voice 1 pots
 destination-pattern 8221234568
 port 0/1
!
! Voip peer configuration.
!
```

```
dial-peer voice 1000 voip
 destination-pattern ..T
 session target ras
 dtmf-relay h245-alphanumeric
!
! Gateway configuration.
!
gateway
 h323-id addpac
 gkip 80.80.80.1 1719 128
 register
!
! Clear down tone
!
voip-interface ether0.0
!
```

7-2. Gatekeeper and internal direct call connection diagram (1/6)



7-2. Gatekeeper and internal direct call connection diagram (2/6)

router-A

```
!
version 5.67
!
hostname router-A
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
! VoIP configuration.
```

router-B

```
!
version 5.67
!
hostname router-B
!
interface ether0.0
 ip address 20.20.20.20 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 20.20.20.1
!
! VoIP configuration.
```

7-2. Gatekeeper and internal direct call connection diagram (3/6)

```
! Voice service voip configuration.
!
!voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
voice-port 0/2
!
voice-port 0/3
```

```
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
voice-port 0/2
!
voice-port 0/3
```

7-2. Gatekeeper and Internal direct call connection diagram (4/6)

```
voice-port 1/0
!
voice-port 1/1
!
voice-port 1/2
!
voice-port 1/3
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 8221234567
 port 0/0
!
dial-peer voice 1 pots
 destination-pattern 8221234568
 port 0/1
```

```
voice-port 1/0
!
voice-port 1/1
!
voice-port 1/2
!
voice-port 1/3
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 8229876543
 port 0/0
!
dial-peer voice 1 pots
 destination-pattern 8229876542
 port 0/1
```

7-2. Gatekeeper and internal direct call connection diagram (5/6)

```
dial-peer voice 10 pots
 destination-pattern 1000
 port 0/1
 no register e164
!
dial-peer voice 11 pots
 destination-pattern 1001
 port 0/1
 no register e164
!
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern ..T
 session target ras
 dtmf-relay h245-alphanumeric
```

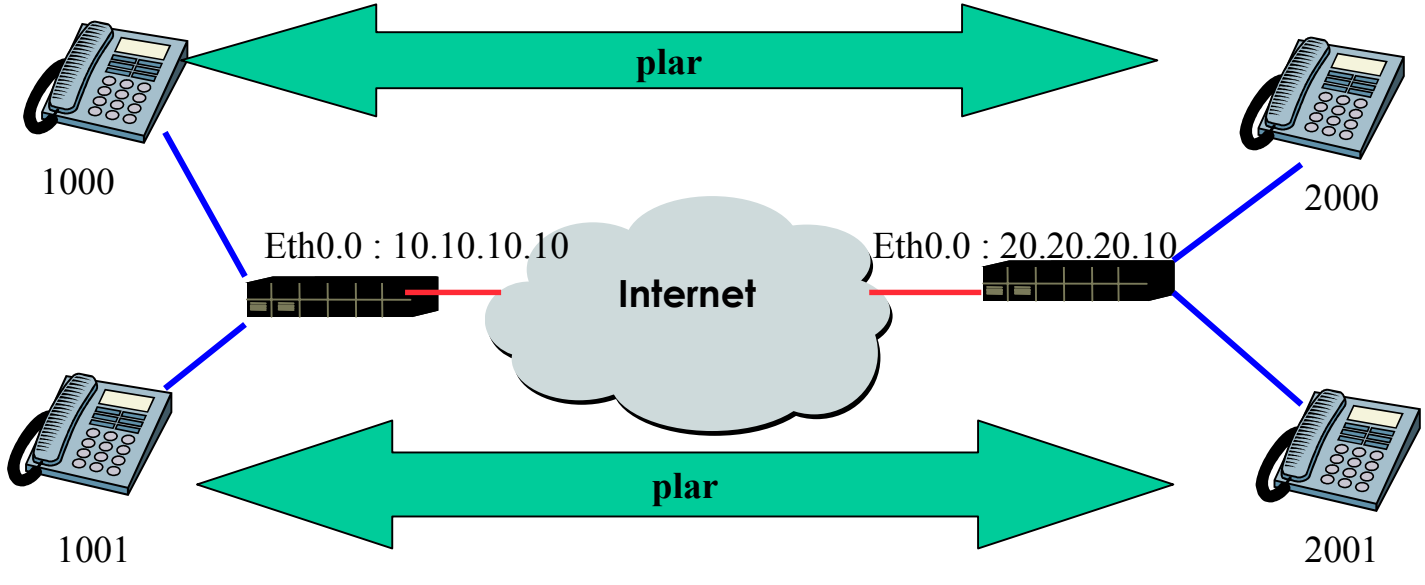
```
dial-peer voice 10 pots
 destination-pattern 2000
 port 0/1
 no register e164
!
dial-peer voice 11 pots
 destination-pattern 2001
 port 0/1
 no register e164
!
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern ..T
 session target ras
 dtmf-relay h245-alphanumeric
!
```

7-2. Gatekeeper and internal direct call connection diagram (6/6)

```
dial-peer voice 1001 voip
 destination-pattern 200.
 session target 20.20.20.20
 dtmf-relay h245-alphanumeric
!
! Gateway configuration.
!
gateway
 h323-id addpac-gw1
 gkip 80.80.80.1 1719 128
 register
!
! Clear down tone
!
voip-interface ether0.0
!
```

```
dial-peer voice 1001 voip
 destination-pattern 100.
 session target 10.10.10.10
 dtmf-relay h245-alphanumeric
!
! Gateway configuration.
!
gateway
 h323-id addpac-gw2
 gkip 90.90.90.1 1719 128
 register
!
! Clear down tone
!
voip-interface ether0.0
```

7-3. Internal direct call connection (plar)(1/5)



7-3. Internal direct call connection (plar)(2/5)

router-A

```
!
version 5.67
!
hostname router-A
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
! VoIP configuration.
```

rouer-B

```
!
version 5.67
!
hostname router-B
!
interface ether0.0
 ip address 20.20.20.20 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 20.20.20.1
!
! VoIP configuration.
```

7-3. Internal direct call connection (plar)(3/5)

```
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
voice-port 0/2
!
voice-port 0/3
```

```
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
voice-port 0/2
!
voice-port 0/3
```

7-3. Internal direct call connection (plar)(4/5)

```
voice-port 1/0
 connection plar 2000
!
voice-port 1/1
 connection plar 2001
!
voice-port 1/2
!
voice-port 1/3
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 1000
 port 1/0
!
```

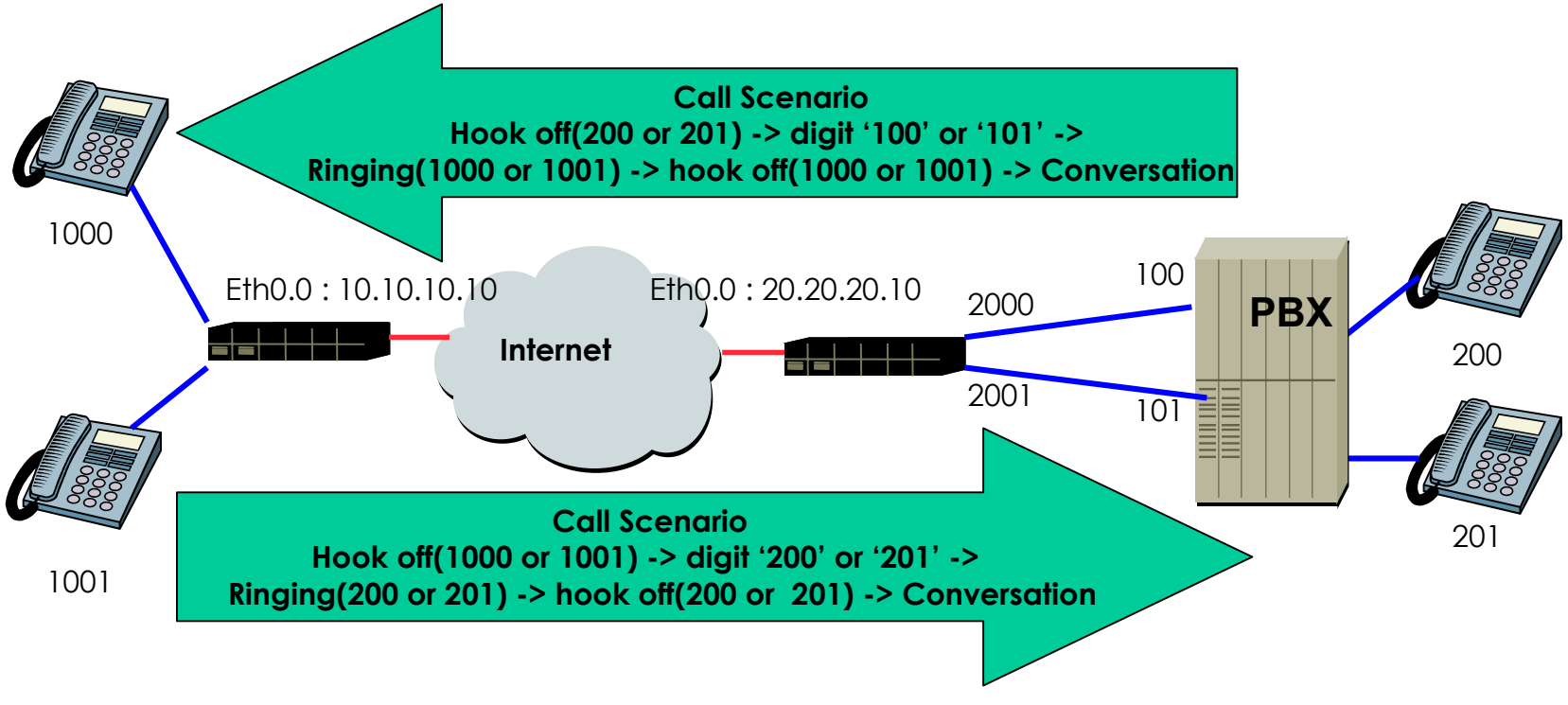
```
voice-port 1/0
 connection plar 1000
!
voice-port 1/1
 connection plar 1001
!
voice-port 1/2
!
voice-port 1/3
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 2000
 port 1/0
!
```

7-3. Internal direct call connection (plar)(5/5)

```
dial-peer voice 1 pots
 destination-pattern 1001
 port 1/1
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern 200.
 session target 20.20.20.1
 dtmf-relay h245-alphanumeric
!
! Gateway configuration.
!
gateway
 h323-id voip.10.10.10.10
!
! Clear down tone
!
voip-interface ether0.0
```

```
dial-peer voice 1 pots
 destination-pattern 2001
 port 1/1
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern 100.
 session target 10.10.10.1
 dtmf-relay h245-alphanumeric
!
! Gateway configuration.
!
gateway
 h323-id voip.20.20.20.20
!
! Clear down tone
!
voip-interface ether0.0
```

7-4. direct call connection using FXS or FXO interface (plar) :Example



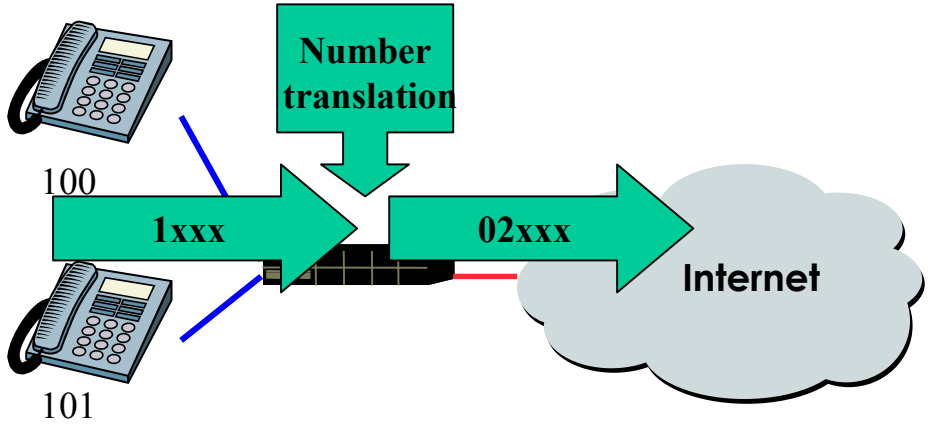
Requirement

Although #100, #101 users are locating remote site, using just like directly to inside Line #100, #101 of PBX

7-4. direct call connection using FXS or FXO interface (plar) :Example

Same as 7-3	blank

7-5. Number Translation Application (1/3)



Requirement

All users are pressing the digit starting with 1, and change digit number "1" with two digit number "02"
Other digits are send without translation.

7-5. Number Translation Application (2/3)

```
!
version 5.67
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
! VoIP configuration.
! Voice service voip configuration.
!
```

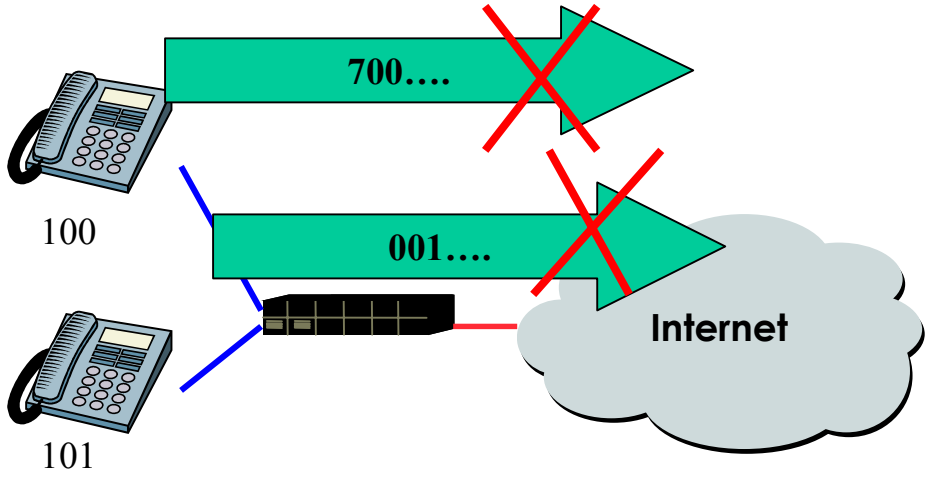
```
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
voice-port 0/2
!
voice-port 0/3
!
voice-port 1/0
```

7-5. Number Translation Application (1) (3/3)

```
voice-port 1/1
!
voice-port 1/2
!
voice-port 1/3
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 100
 port 0/0
!
dial-peer voice 1 pots
 destination-pattern 101
 port 0/1
!
! Voip peer configuration.
!
```

```
dial-peer voice 1000 voip
 destination-pattern ..T
 session target ras
 translate-outgoing  called-number 0
 dtmf-relay h245-alphanumeric
!
! Gateway configuration.
!
gateway
 h323-id addpac
 gkip 80.80.80.1 1719 128
 register
!
! Translation Rule configuration.
!
translation-rule 0
 rule 0      1                    02
```

7-6. Number Translation Application (2)(1/4)



Requirement

#100 phone users are restricted to using 700 service
#101 phone users are allowed to using 700 service
All user are restricted to dialing number starting with 001

7-6. Inhibit specific number outgoing call – number translation application (2/4)

```
!
version 5.67
!
!
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
!
!
! VoIP configuration.
```

```
!
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
!
! Voice port configuration.
!
voice-port 0/0
 translate-incoming called-number 0
!
voice-port 0/1
 translate-incoming called-number 1
!
```

7-6. Inhibit specific number outgoing call – number translation application (3/4)

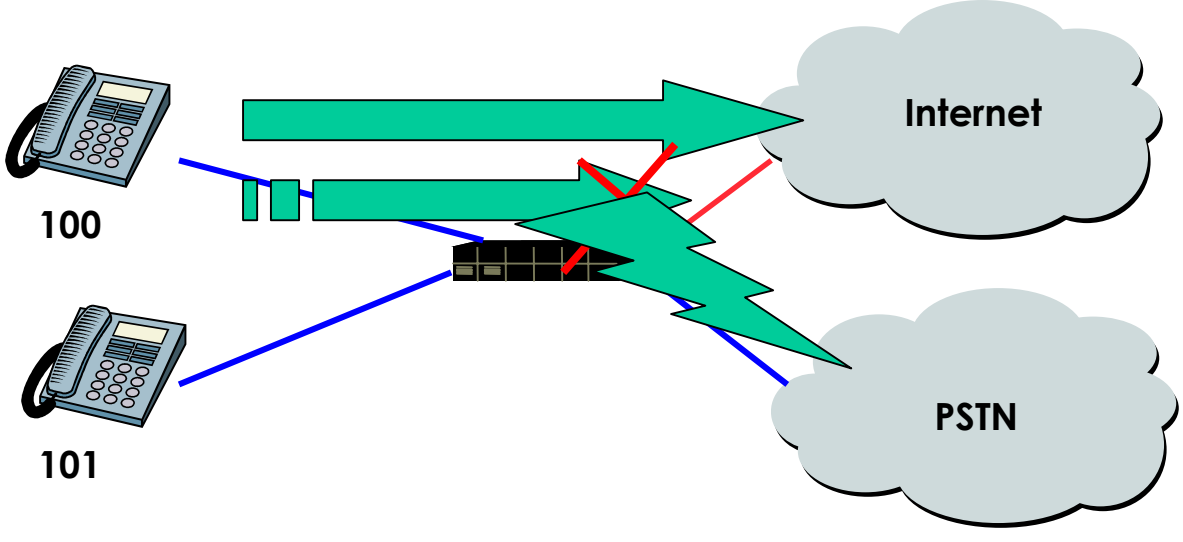
```
voice-port 0/2
!
voice-port 0/3
!
voice-port 1/0
!
voice-port 1/1
!
voice-port 1/2
!
voice-port 1/3
!
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 8221234567
 port 0/0
!
dial-peer voice 1 pots
 destination-pattern 8221234568
 port 0/1
!
!
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern ..T
 session target ras
 dtmf-relay h245-alphanumeric
!
dial-peer voice 2000 voip
 destination-pattern ###
 dtmf-relay h245-alphanumeric
 shutdown
!
```

7-6. Inhibit specific number outgoing call – number translation application (4/4)

```
!
! Gateway configuration.
!
gateway
 h323-id addpac-gw
 gkip 90.90.90.1 1719 128
 register
!
!
! Translation Rule configuration.
!
translation-rule 0
 rule 0     00[1-2]          ###
 rule 1     700              ###
!
translation-rule 1
 rule 0     00[1-2]          ###
!
```

```
!
!
! Clear down tone
!
!
voip-interface ether0.0
!
```

7-7. PSTN Backup (normal)(1/4)



Requirement

If VoIP Interface is available and VoIP call processing with Gatekeeper is normal, VoIP Service is possible via Internet.
If VoIP Interface is down or call processing with Gatekeeper is abnormal, otherwise VoIP Service is impossible via Internet, VoIP Gateway provides PSTN connection service using PSTN backup Interface.

7-7. PSTN Backup (normal)(2/4)

```
!
version 5.67
!
!
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2520
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
!
!
! VoIP configuration.
```

```
!
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
voice-port 0/2
!
```

7-7. PSTN Backup (normal)(3/4)

```
voice-port 0/3
!
voice-port 1/0
!
voice-port 1/1
!
voice-port 1/2
!
voice-port 1/3
!
!
!
! Pots peer configuration.
!
dial-peer voice 4 pots
 destination-pattern 8221234567
 port 1/0
!
```

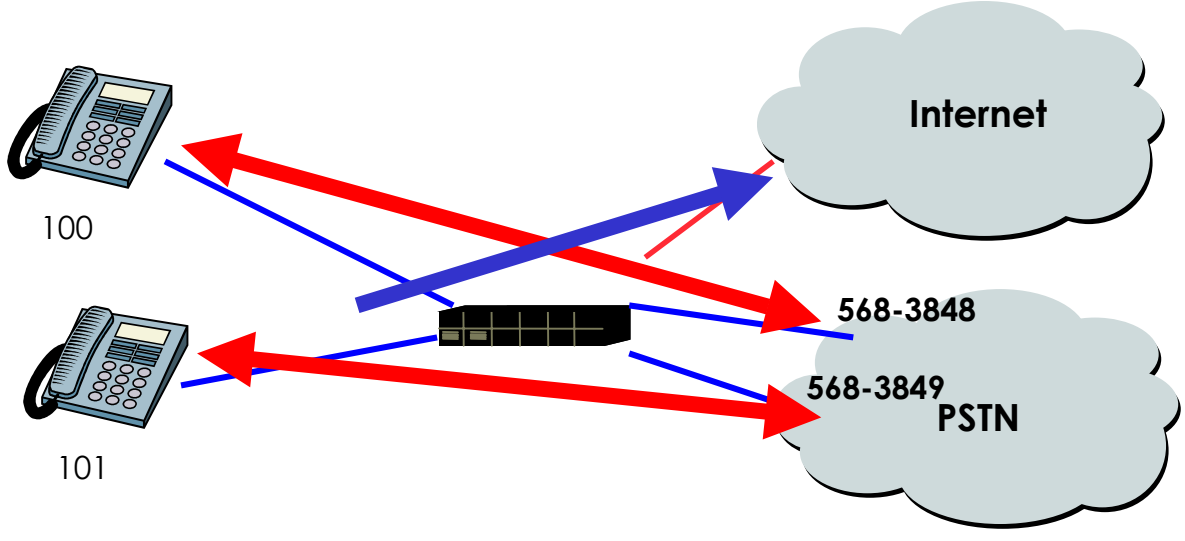
```
dial-peer voice 5 pots
 destination-pattern 8221234568
 port 1/1
!
dial-peer voice 10 pots
 destination-pattern ..T
 port 0/0
 preference 1
!
dial-peer voice 11 pots
 destination-pattern ..T
 port 0/1
 preference 2
 Huntstop
!
!
! Voip peer configuration.
!
```

7-7. PSTN Backup (normal)(4/4)

```
!
dial-peer voice 1000 voip
 destination-pattern ..T
 session target ras
 dtmf-relay h245-alphanumeric
!
!
!
!
!
!
! Gateway configuration.
!
gateway
 h323-id addpac-gw
 gkip 90.90.90.1 1719 128
 register
!
```

```
!
! Clear down tone
!
!
voip-interface ether0.0
!
```

7-8. PSTN Backup (inbound pots peer)(1/4)



Requirement

Out-going call

If VoIP Interface is available and VoIP call processing with Gatekeeper is normal, VoIP Service is possible via Internet.

If VoIP Interface is down or call processing with Gatekeeper is abnormal, otherwise VoIP Service is impossible via Internet, VoIP Gateway provides PSTN connection service using PSTN backup Interface. For example, 100 Phone user can use the PSTN line number 568-3848, 101 Phone user can use the PSTN line number 568-3849.

In-coming call

From outside, if call to 568-3848, 100 Phone is ringing, if call to 568-3849, 101 Phone is ringing.

7-8. PSTN Backup (inbound pots peer)(2/4)

```
!
version 5.67
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
! VoIP configuration.
! Voice service voip configuration.
!
```

```
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
voice-port 0/2
!
voice-port 0/3
!
```

7-8. PSTN Backup (inbound pots peer)(3/4)

```
voice-port 1/0
connection  plar 100
!
voice-port 1/1
connection  plar 101
!
voice-port 1/2
!
voice-port 1/3
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 100
 huntstop
 port 0/0
!
```

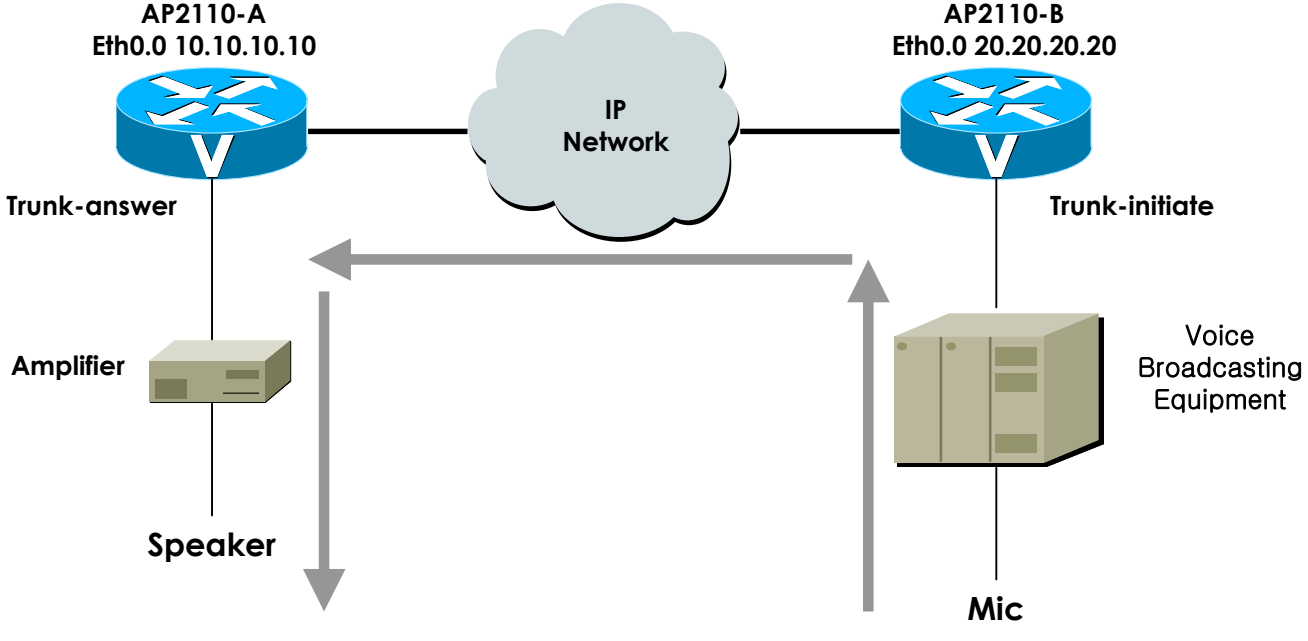
```
dial-peer voice 1 pots
 destination-pattern 101
huntstop
 port 0/1
!
dial-peer voice 10 pots
 destination-pattern T
 inbound-pots-peer  0
 preference 1
 huntstop
 port 1/0
!
dial-peer voice 11 pots
 destination-pattern T
 inbound-pots-peer  1
 preference 1
 huntstop
 port 1/1
```

7-8. PSTN Backup (inbound pots peer)(4/4)

```
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern T
 session target ras
 dtmf-relay h245-alphanumeric
!
! Gateway configuration.
!
gateway
 h323-id addpac
 gkip 80.80.80.1 1719 128
 register
!
! Clear down tone
!
voip-interface ether0.0
```

blank

7-9. Trunk – Inter-working with Voice broadcasting equipment (1/5)



7-9. Trunk – Inter-working with Voice broadcasting equipment (2/5)

router-A

```
!
version 5.67
!
hostname router-A
!
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
!
```

router-B

```
!
version 5.67
!
hostname router-B
!
!
interface ether0.0
 ip address 20.20.20.20 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2110
!
route 0.0.0.0 0.0.0.0 20.20.20.1
!
!
```

7-9. Trunk – Inter-working with Voice broadcasting equipment (3/5)

```
! VoIP configuration.
!
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
!
! Voice port configuration.
!
voice-port 0/0
 connection trunk-answer 2000
!
voice-port 0/1
 connection trunk-answer 2001
```

```
! VoIP configuration.
!
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
!
! Voice port configuration.
!
voice-port 0/0
 connection trunk-initiate 1000
!
voice-port 0/1
 connection trunk-initiate 1001
```

7-9. Trunk – Inter-working with Voice broadcasting equipment (4/5)

```
voice-port 0/2
!
voice-port 0/3
!
voice-port 1/0
!
voice-port 1/1
!
voice-port 1/2
!
voice-port 1/3
!
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 1000
 port 0/0
```

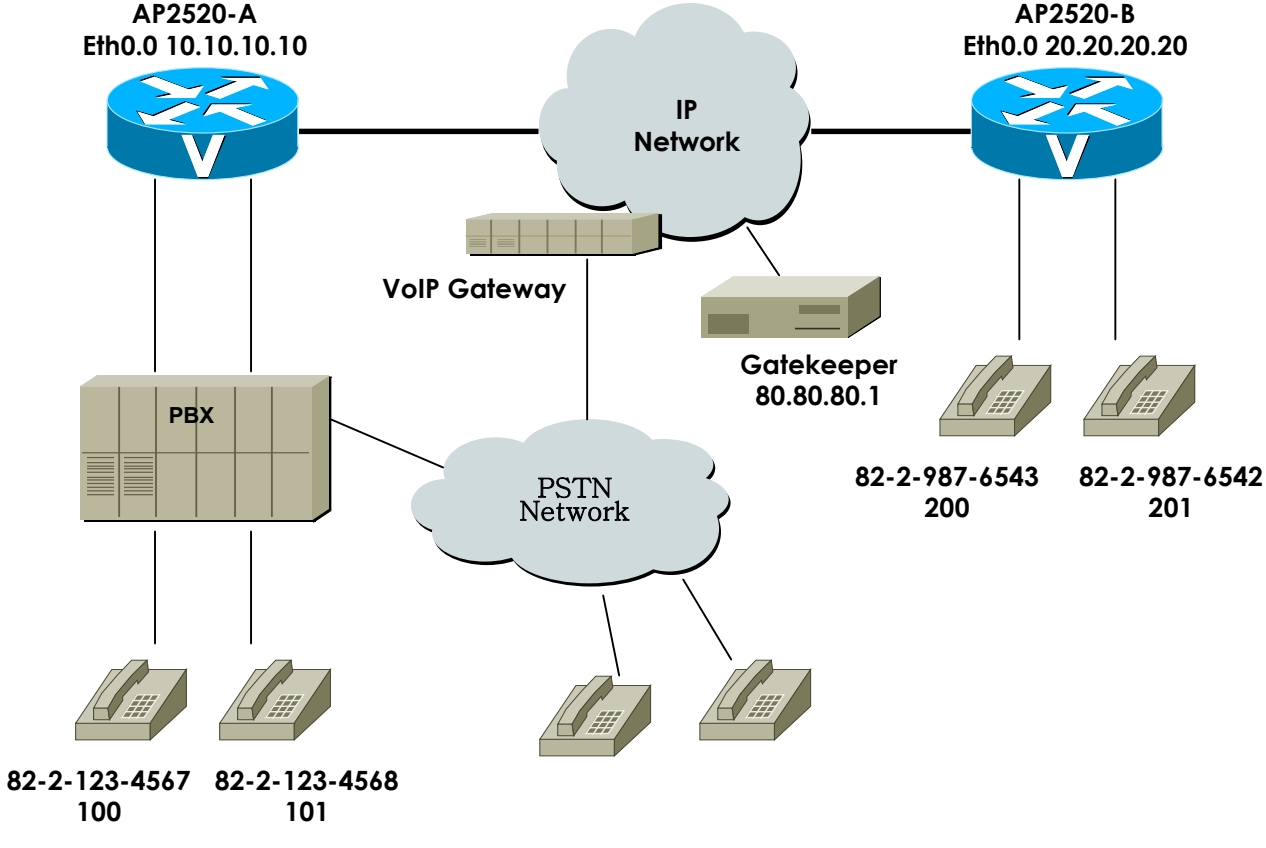
```
voice-port 0/2
!
voice-port 0/3
!
voice-port 1/0
!
voice-port 1/1
!
voice-port 1/2
!
voice-port 1/3
!
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 2000
 port 0/0
```

7-9. Trunk – Inter-working with Voice broadcasting equipment (5/5)

```
dial-peer voice 1 pots
 destination-pattern 1001
 port 0/1
!
!
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern 200.
 session target 20.20.20.20
 dtmf-relay h245-alphanumeric
!
!
! Gateway configuration.
!
gateway
 h323-id voip.10.10.10.10
!
```

```
dial-peer voice 1 pots
 destination-pattern 2001
 port 0/1
!
!
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern 100.
 session target 10.10.10.10
  dtmf-relay h245-alphanumeric
!
!
! Gateway configuration.
!
gateway
 h323-id voip.20.20.20.20
! 100
```

7-10. Gatekeeper and internal direct call application – number translation, plar (1/7)



7-10. Gatekeeper and internal direct call application – number translation, plar (2/7)

router-A

```
!
version 5.67
!
hostname router-A
!
!
interface ether0.0
 ip address 10.10.10.10 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2520
!
route 0.0.0.0 0.0.0.0 10.10.10.1
!
!
```

router-B

```
!
version 5.67
!
hostname router-B
!
!
interface ether0.0
 ip address 20.20.20.20 255.255.255.0
!
interface ether1.0
 no ip address
!
snmp name AP2520
!
route 0.0.0.0 0.0.0.0 20.20.20.1
!
!
```

7-10. Gatekeeper and internal direct call application – number translation, plar (3/7)

```
! VoIP configuration.
!
!
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
```

```
! VoIP configuration.
!
!
! Voice service voip configuration.
!
voice service voip
 fax protocol t38 redundancy 0
 fax rate 14400
 h323 call start fast
 security permit-FXO
!
!
! Voice port configuration.
!
voice-port 0/0
!
voice-port 0/1
!
```

7-10. Gatekeeper and Internal direct call application – number translation, plar (4/7)

```
voice-port 0/3
!
voice-port 1/0
 connection plar 111200
!
voice-port 1/1
 connection plar 111201
!
voice-port 1/2
!
voice-port 1/3
!
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 8221234567
 port 0/0
```

```
voice-port 0/3
!
voice-port 1/0
 translate-incoming called-number 0
!
voice-port 1/1
 translate-incoming called-number 1
!
voice-port 1/2
!
voice-port 1/3
!
!
! Pots peer configuration.
!
dial-peer voice 0 pots
 destination-pattern 8229876543
 port 0/0
```

7-10. Gatekeeper and Internal direct call application – number translation, plar (5/7)

```
dial-peer voice 1 pots
 destination-pattern 8221234568
 port 0/1
!
dial-peer voice 4 pots
 destination-pattern 000200
 port 1/0
!
dial-peer voice 5 pots
 destination-pattern 000201
 port 1/1
!
!
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern ..T
 session target ras
```

```
dial-peer voice 1 pots
 destination-pattern 8229876542
 port 0/1
!
dial-peer voice 4 pots
 destination-pattern 111200
 port 1/0
!
dial-peer voice 5 pots
 destination-pattern 111201
 port 1/1
!
!
! Voip peer configuration.
!
dial-peer voice 1000 voip
 destination-pattern ..T
 session target ras
```

7-10. Gatekeeper and Internal direct call application – number translation, plar (6/7)

```
 dtmf-relay h245-alphanumeric
!
dial-peer voice 1001 voip
 destination-pattern 111...
 session target 20.20.20.1
 dtmf-relay h245-alphanumeric
!
!
!
!
!
! Gateway configuration.
!
gateway
 h323-id addpac-gw1
 gkip 80.80.80.1 1719 128
 register
!
```

```
 dtmf-relay h245-alphanumeric
!
dial-peer voice 1001 voip
 destination-pattern 000...
 session target 10.10.10.10
 dtmf-relay h245-alphanumeric
!
!
!
!
!
! Gateway configuration.
!
gateway
 h323-id addpac-gw2
 gkip 80.80.80.1 1719 128
 register
!
```

7-10. Gatekeeper and Internal direct call application – number translation, plar (7/7)

```
!
! Clear down tone
!
!
voip-interface ether0.0
!
```

```
!
! Translation Rule configuration.
!
translation-rule 0
 rule 0     ...              000200%01%02%03
 rule 1     9                0002009
!
translation-rule 1
 rule 0     ...              000201%01%02%03
 rule 1     9                0002019
!
!
!
! Clear down tone
!


voip-interface ether0.0
!
```