

i2Chip makes the difference!

TCP/IP Chip



i2Chip Application Modules

Sep, 2001
WIZnet Inc.



Application Modules

- Application modules can be used with EVBs
 - WebCam : Internet camera applications
 - IP Phone : Internet phone and voice applications
 - Remote Controller : Home & factory automation and controlling applications
- Current available application modules

EVb	WebCam	IP Phone	Internet Audio	VoIP	Remote controller
8051(Atmel, Dallas)	O	O	N/A	O	O
i386	O	N/A	N/A	N/A	O
SH-3	O	N/A	O	N/A	O
PIC	N/A	N/A	N/A	N/A	O



IP Phone Module

■ What's IP Phone Module

- Total package helping designers to develop internet voice applications easily

■ Functions

- IP Phone to IP Phone call
- IP Phone to normal PSTN phone call or IP Phone to cellular phone call
- Call Server and VoIP gateway Interfacing

■ Package Included

- 8051 based IP Phone Board
- All accessories
- All source codes and schematics
- Quick start guide & User's manual
- Identification of online technical support

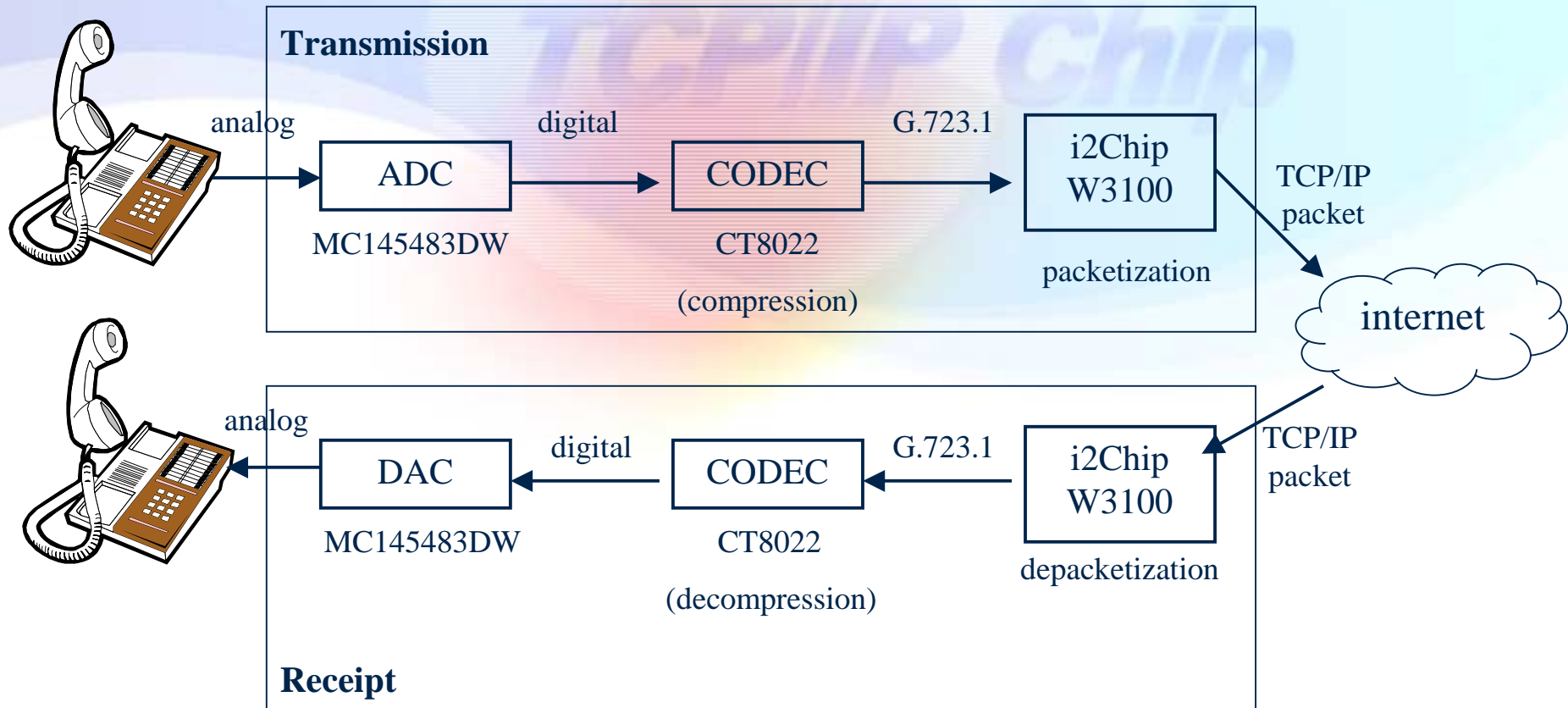


IP Phone Module



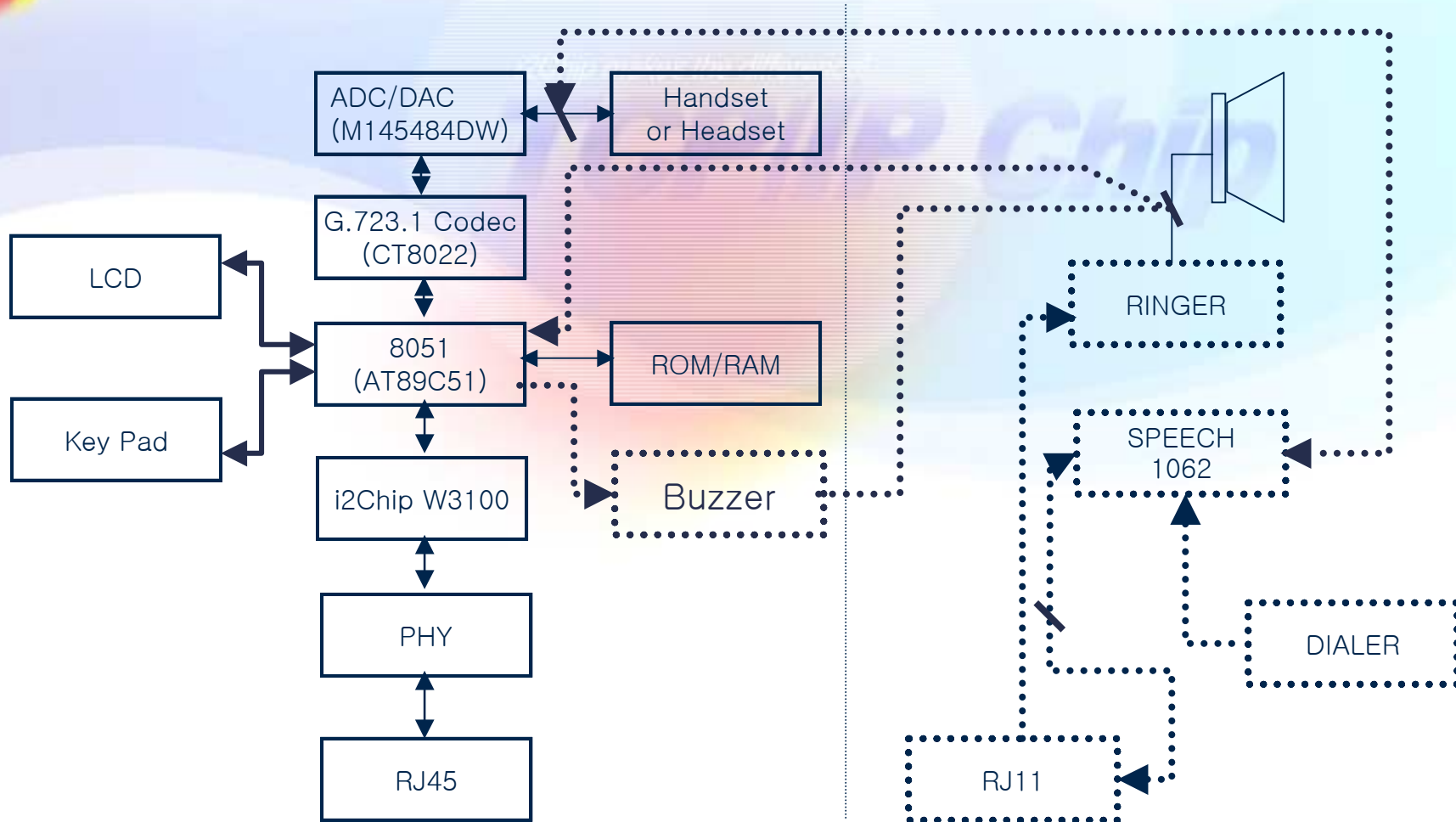
Flow Diagram

i2Chip makes the difference





Block Diagram

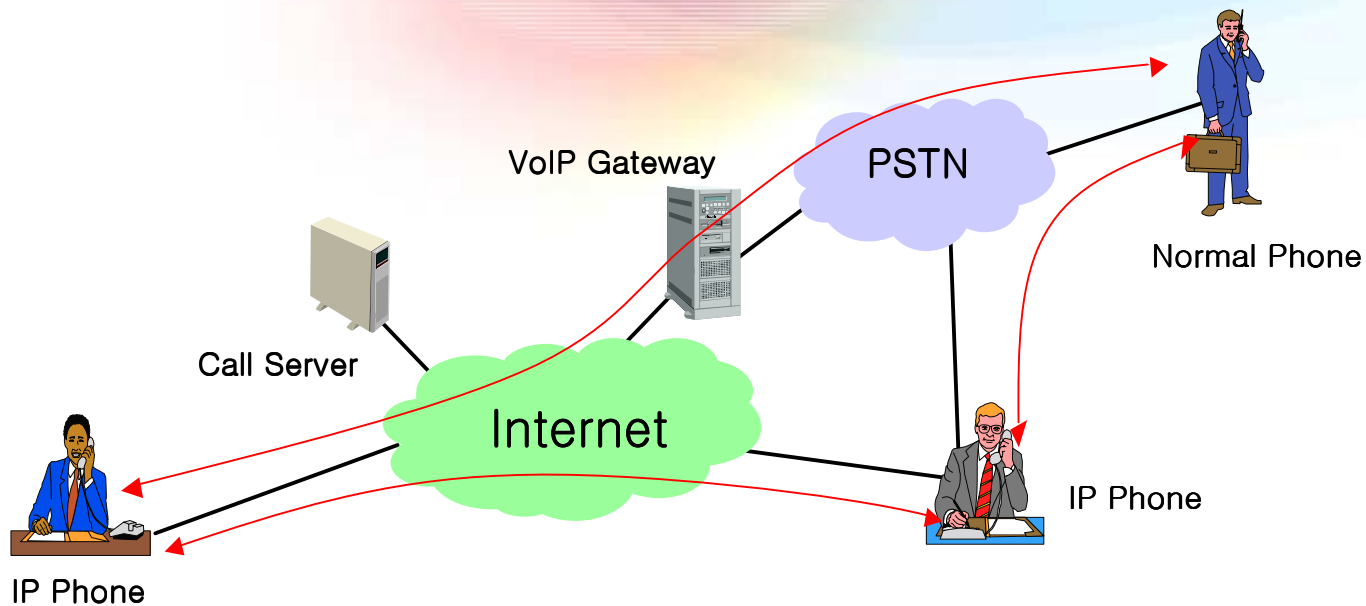




Application Example

- Target Market
 - Replacement of PC dependant IP Phones
 - Replacement of existing PSTN market

- System Architecture





IP Phone Advantages

- Comparison with software-embedded Internet Phone

Items	i2Chip Internet Phone	Software-embedded Internet Phone
Cost	\$ 24	\$33 + OS license fee
Development Time	5 months	10 months (Additional OS, Network development)
# of Engineers	4 engineers	8 engineers
Quality	Fixed QoS (by Hardware Processing)	Variable QoS (by Software Processing)

- Available Module

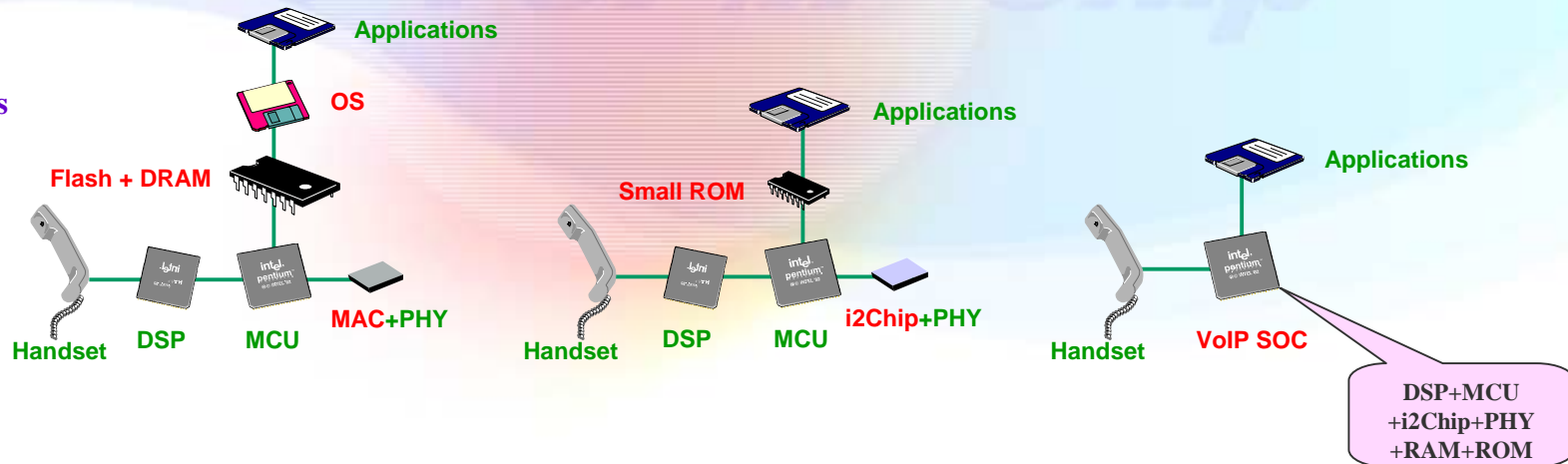
- 8051 based IP Phone Module(Internet and PSTN communication)
- 8051 based VoIP Module(Internet communication only)



Competitiveness of IP Phone

- Software TCP
- i2Chip W3100 ASIC
- i2Chip VoIP SOC
(To be developed)

System Components



Comparison in Development Cost

ARM7 + RTOS + Software TCP/IP

- # of R&D engineers required : 8
- Development period required :10 months
- Cost : \$33 + License Fee \$150,000
- Additional time needed for OS,Network development

i2Chip + Low-end MCU

- # of R&D engineers required : 4
- Development period required : 5 months
- Cost : \$24

i2Chip-embedded SoC for Web camera

- # of R&D engineers required : 2
- Development period required : 3 months
- Cost : \$14

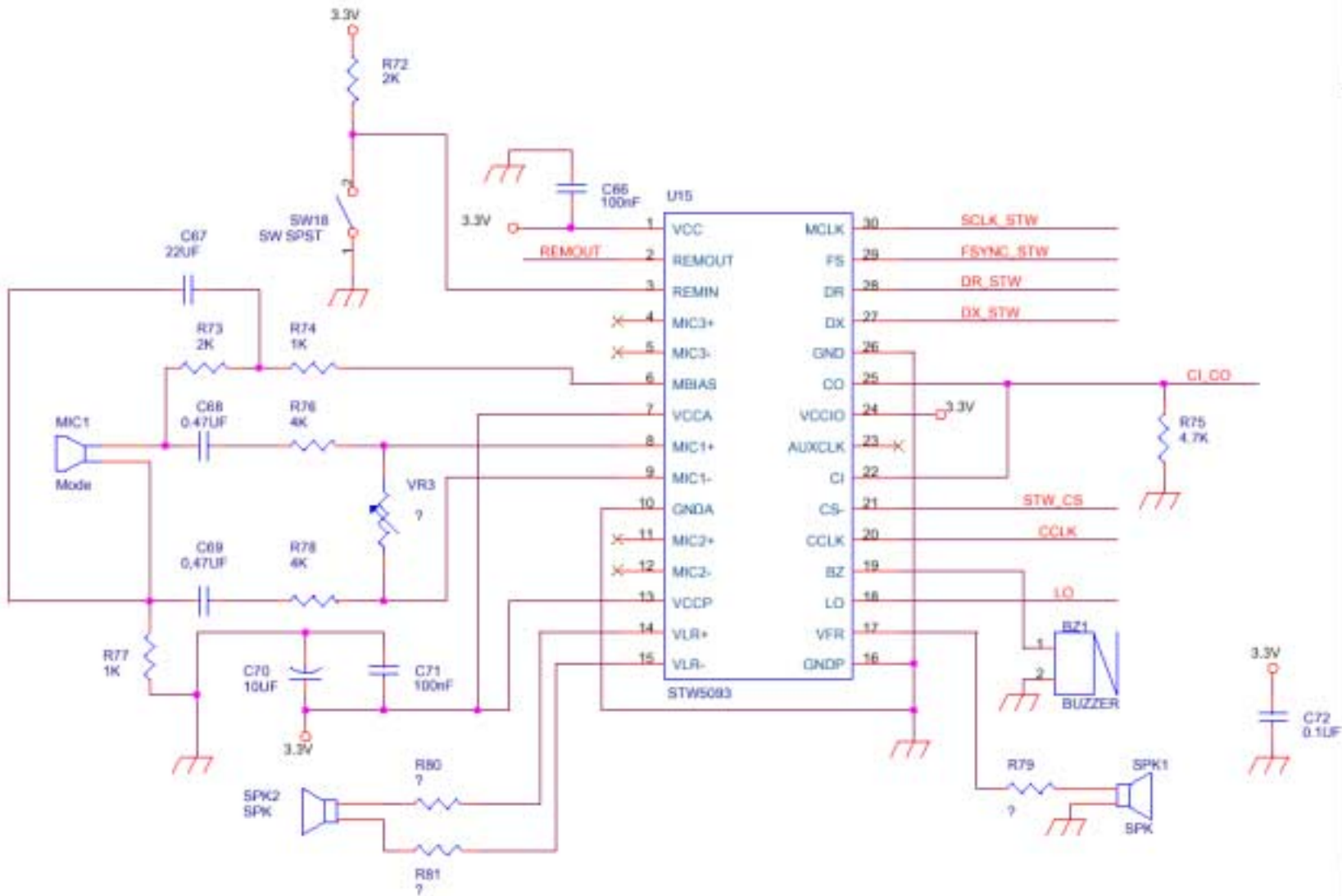


Specification

Items	Sub items	Specifications
Components	Processor	8051 MCU
	Memory	SRAM:128KBytes, ROM:32Kbytes(internal)
	TCP / IP	i2Chip W3100(Hardwired TCP/IP chip)
	OS	None
Interface	Internet	1 RJ45(Ethernet)
	PSTN	1 RJ11
	Keypad	12(basic key) + 7
	Display	16X3 character LCD
	Voice Interface	Handset/Headset
Standard	Call setup	Split H.323
	Codec	G.723.1
Power requirements	Input	DC 5V
	Operating Temperature	0°C ~ +50°C

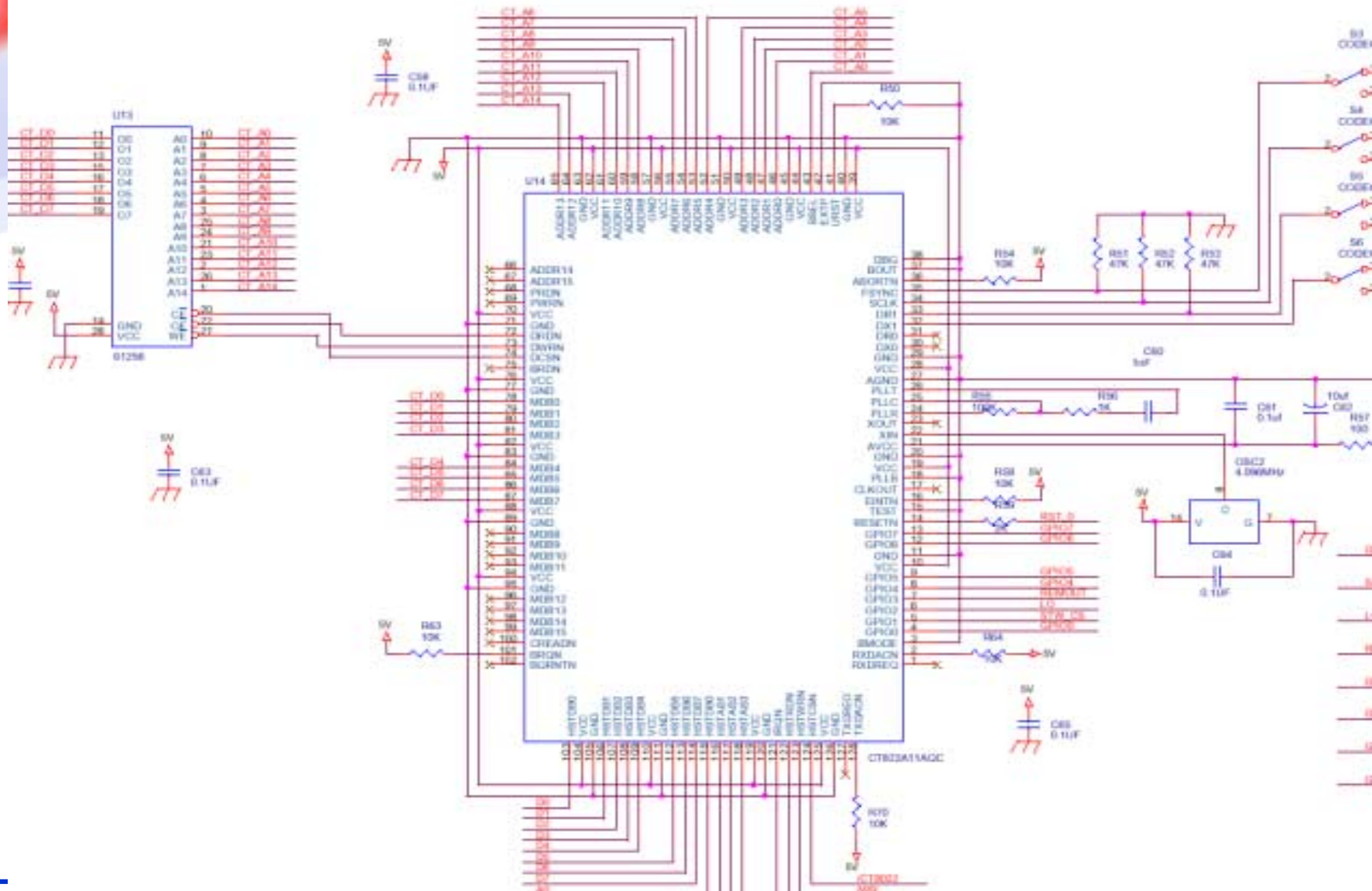


Schematic-ADC/DAC





Schematic-CODEC





Call Server

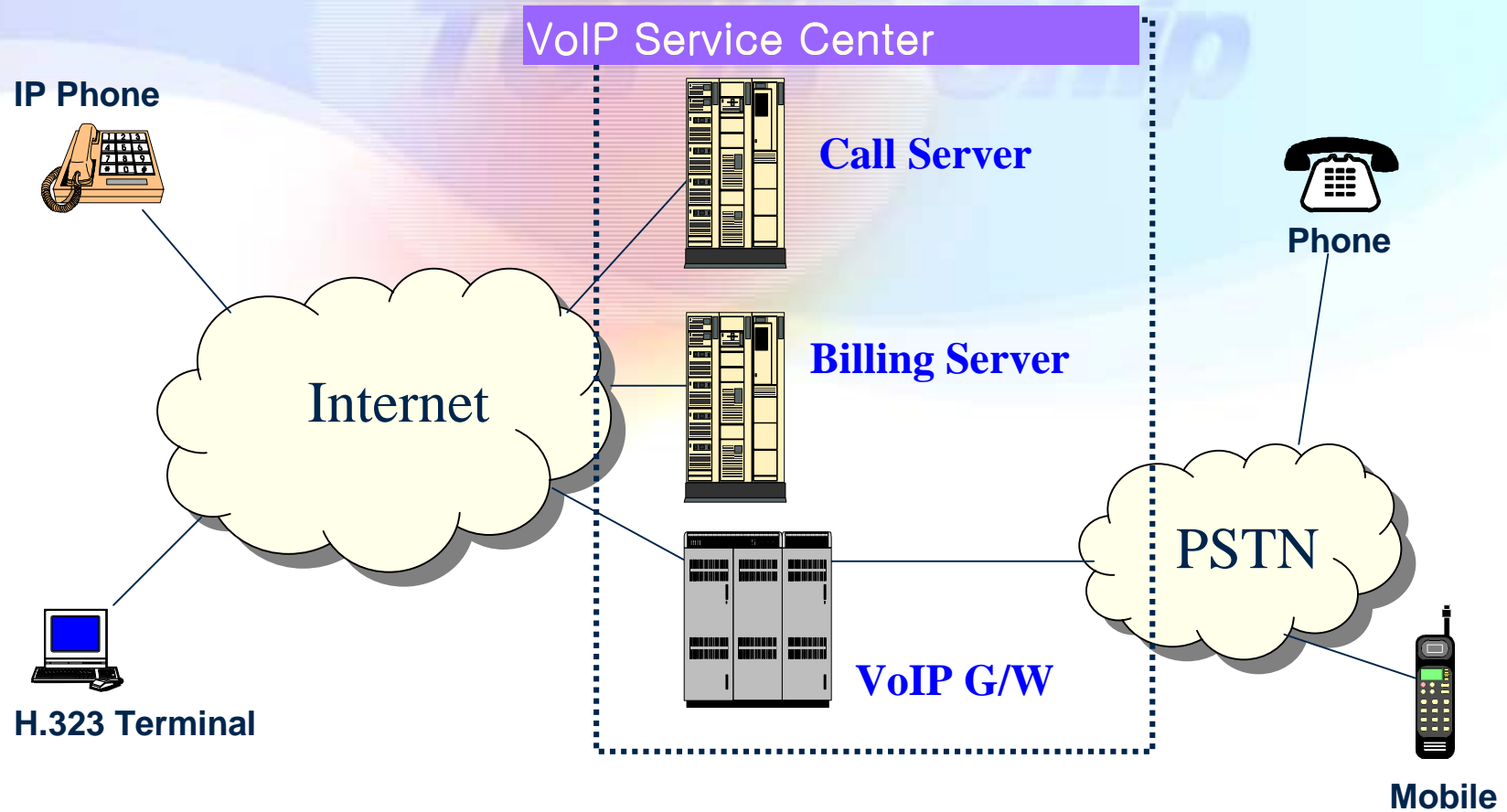
- Call Server Features
 - Simplify call connection and releasing of IP Phone
 - IP Phone transmits and receives only RTP data packets
 - IP Phone cost down
 - No H.323 protocol stack in IP Phone terminal
 - Small memory size required
 - Use low cost MCU
 - Enhanced Interoperability
 - Interoperability by Call Server without modification of IP Phone terminal

- Call Server System Requirements

Items	Requirements
Processor	Pentium-III 800MHz
Memory	256M Bytes
Network	100M Ethernet NIC
OS	Windows NT 4.0
HDD	12G Bytes



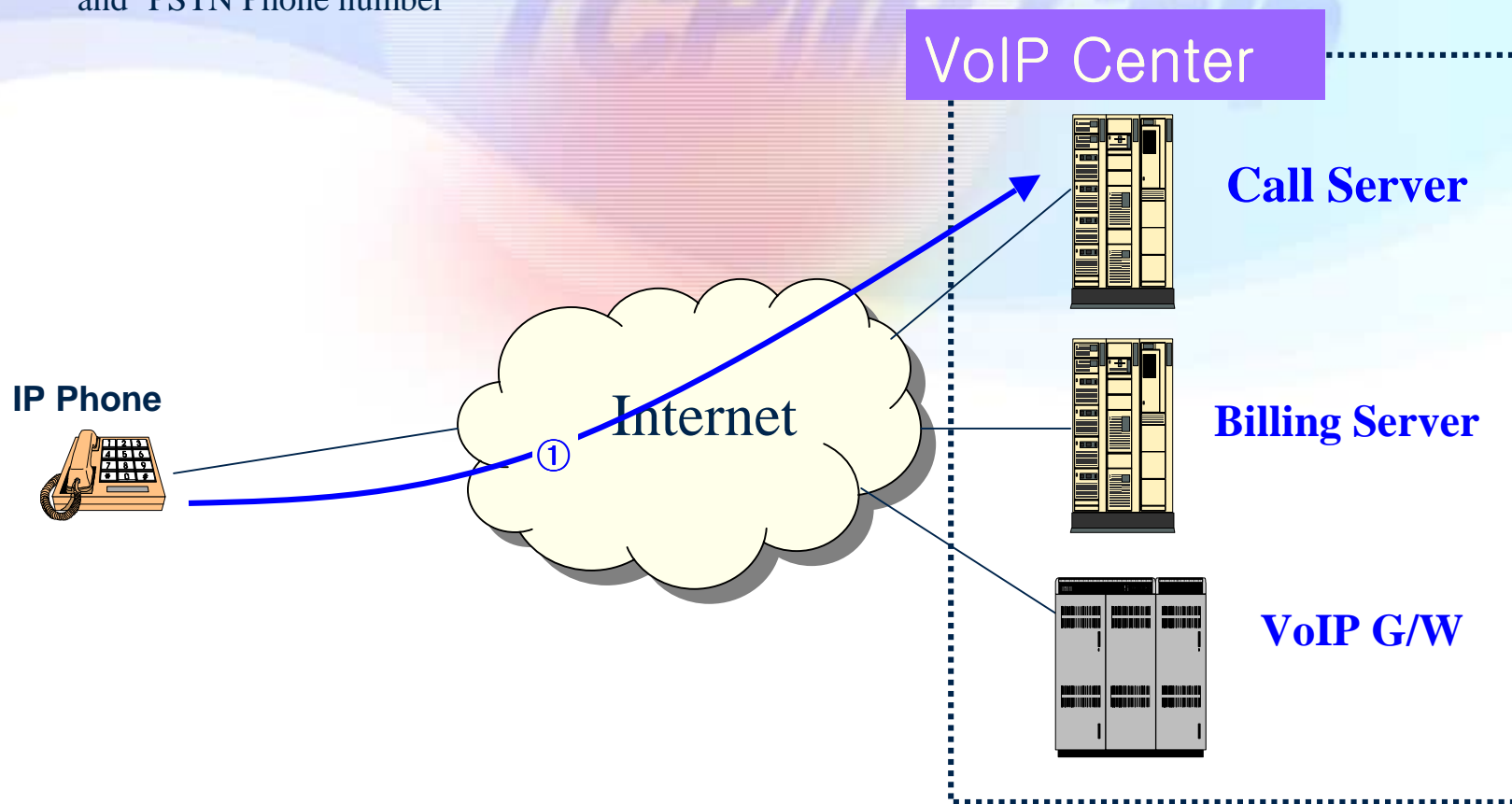
Network configuration





Working Flow – Initialization

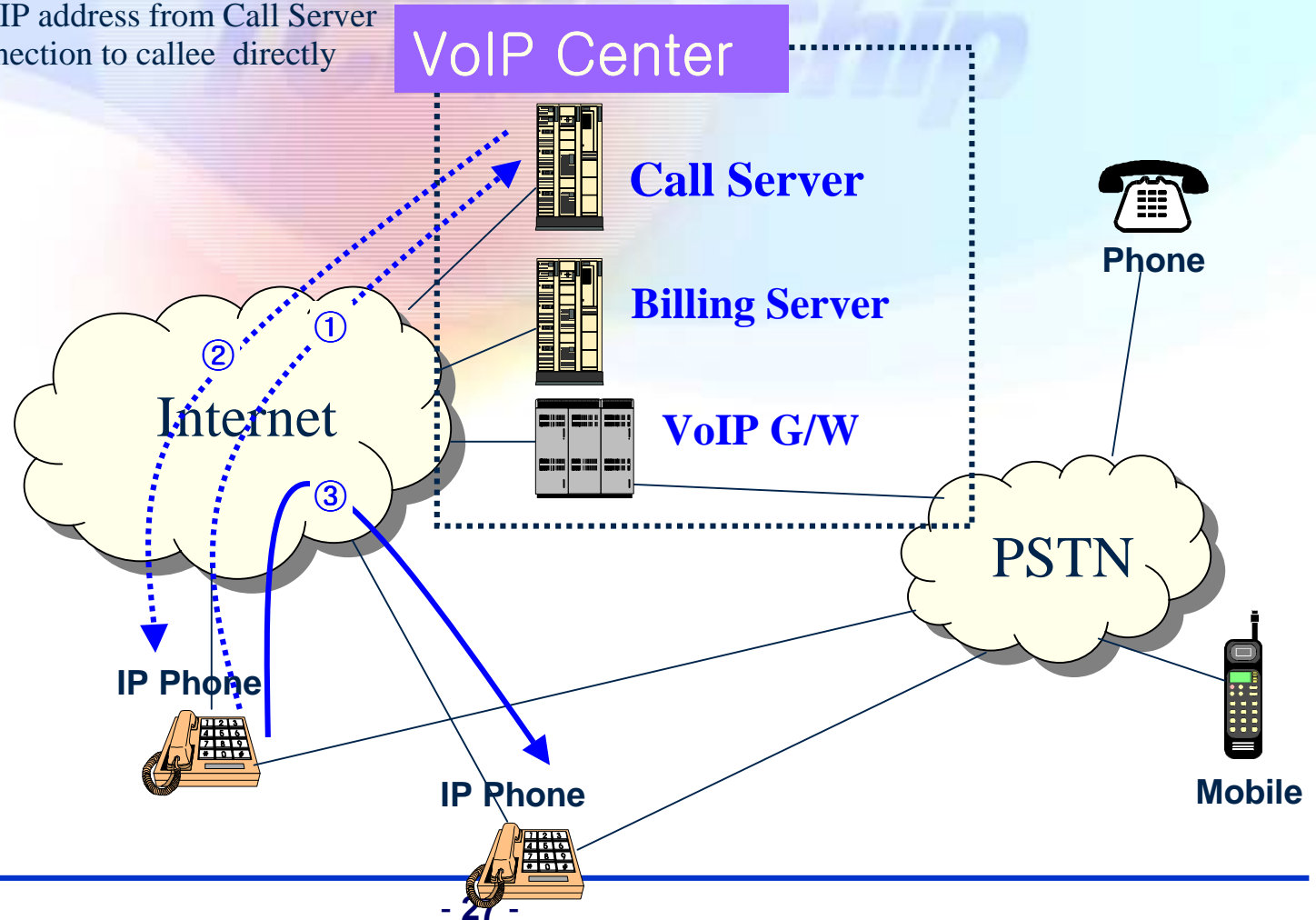
- ① Registration to Call Server 'IP Address' and 'PSTN Phone number'





Working Flow – “IP Phone-to-IP Phone”

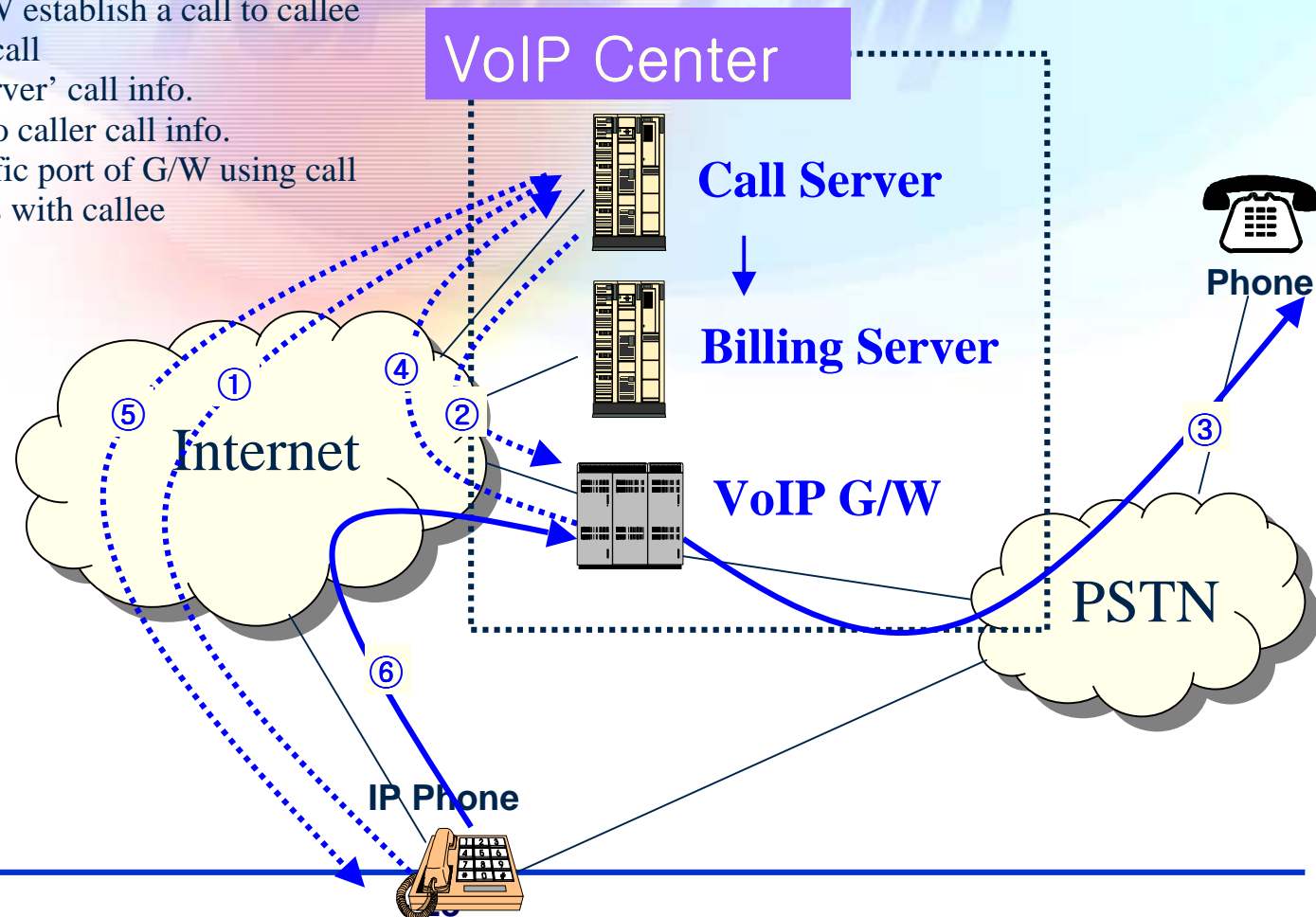
- ① Request Call Server to establish a call with callee's phone number
- ② caller receive callee's IP address from Call Server
- ③ caller try to make connection to callee directly





Working Flow – “IP Phone-to-PSTN”

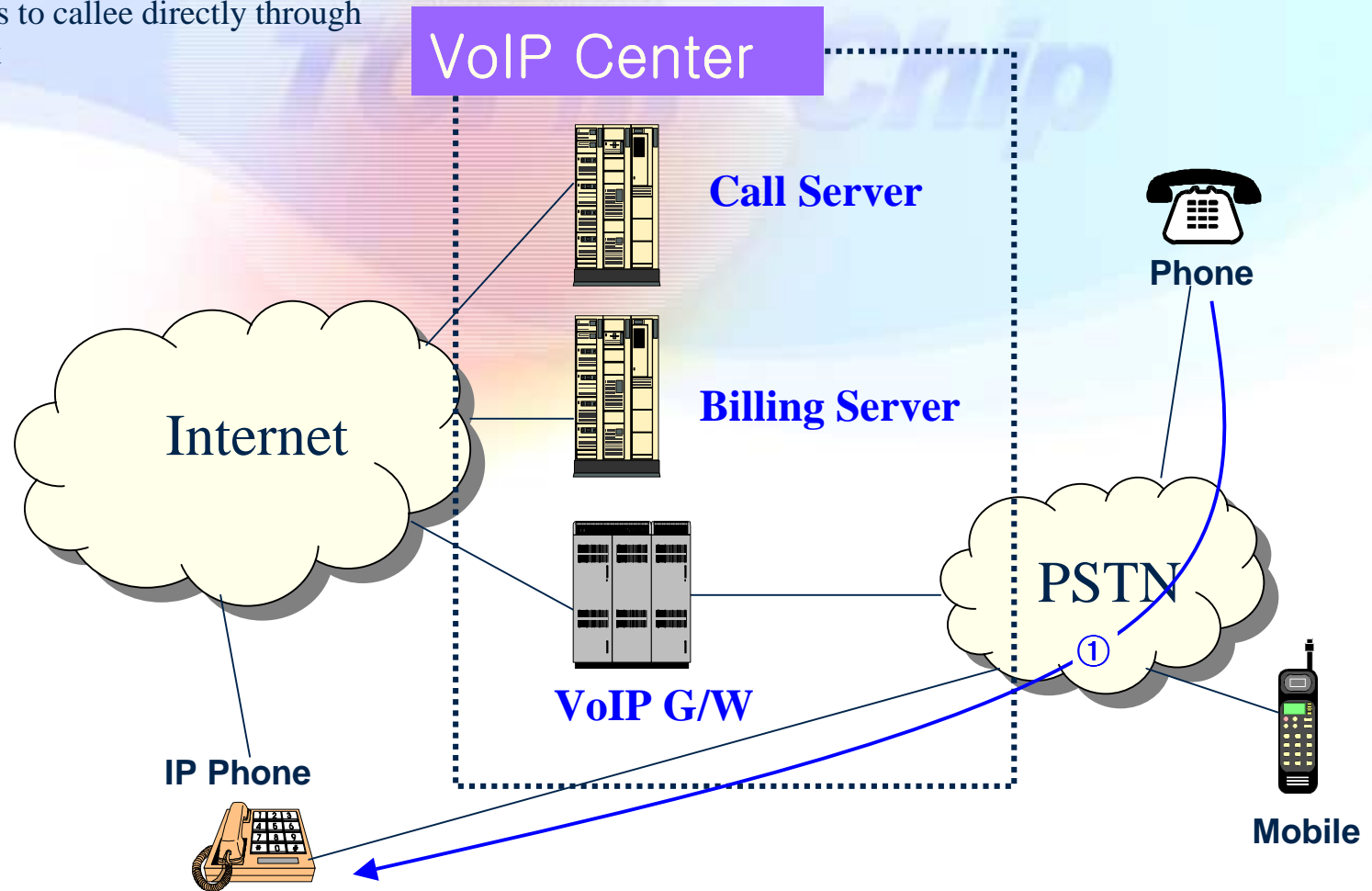
- ① Request ‘Call Server’ to establish a call with callee’s phone number
- ② ‘Call Server’ makes G/W establish a call to callee
- ③ G/W establishes PSTN call
- ④ G/W returns to ‘Call Server’ call info.
- ⑤ ‘Call Server’ responds to caller call info.
- ⑥ Caller connects to specific port of G/W using call info., and communicates with callee





Working Flow – “PSTN-to-IP Phone”

- ① Caller connects to callee directly through PSTN network





Status of Development

Function	Description	Implementation		Remark
		IP Phone	Call Server	
Initialization	Static IP / Dynamic IP selection	○	-	
	Network Info. configuration	○	-	
	Registration to Call Server	X	X	
Outbound call processing	IP Phone – to – IP Phone	○	-	
	IP Phone – to – PSTN Phone	○	○	
Inbound call processing	PSTN Phone – to – IP Phone	X	-	Necessary to integrate with PSTN
Voice processing	Recording/Playback	○	-	
	Compression/Decompression	○	-	
Integration to PSTN	DTMF Tone generation	X	-	Necessary to integrate with PSTN
	Auto switching between IP Phone to PSTN	X	-	Necessary to integrate with PSTN
Etc.	Ring back Tone	X	-	
	Receiving bell function	X	-	Necessary to integrate with PSTN
	Dialing function(with keypad)	○	-	
	LCD display	○	-	

○ : already implemented

X : not implemented yet