



	2002/05/31	TTA-ITTL-NETC-OLT-STP-xxx	0.1
/			
VoIP-SIP			

VoIP – H.323

0.1

2002/05/31

(TTA)

IT (ITTL)

(NETC)

+82-31-724-0164

0.1 2002/05/31



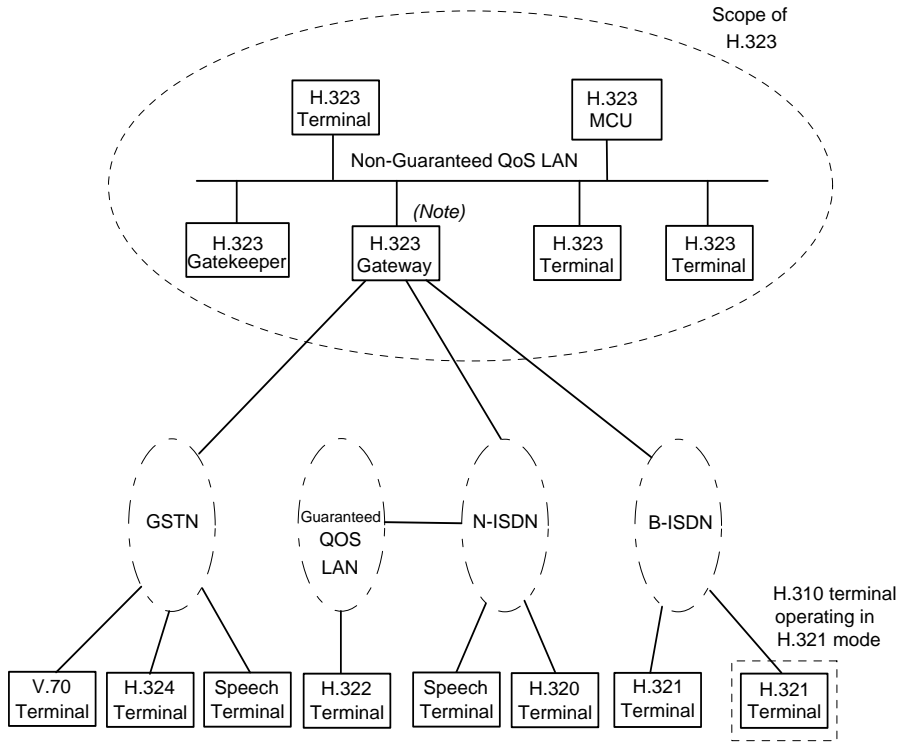
< >

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1 H.323



Note: A gateway may support one or more of the GSTN, N-ISDN and/or B-ISDN connections.

1 : Elements of H.323 Networking

1.1 H.323

- , H.225.0 , ,
- 1.1.1 : H.225 H.245
- 1.1.2 (H.225.0) :
- 1.1.3
- 1.1.4 : TCP/UDP, Unicast/Multicast
- 1.1.5 : H.261, QCIF
- 1.1.6

1.2 Gateway

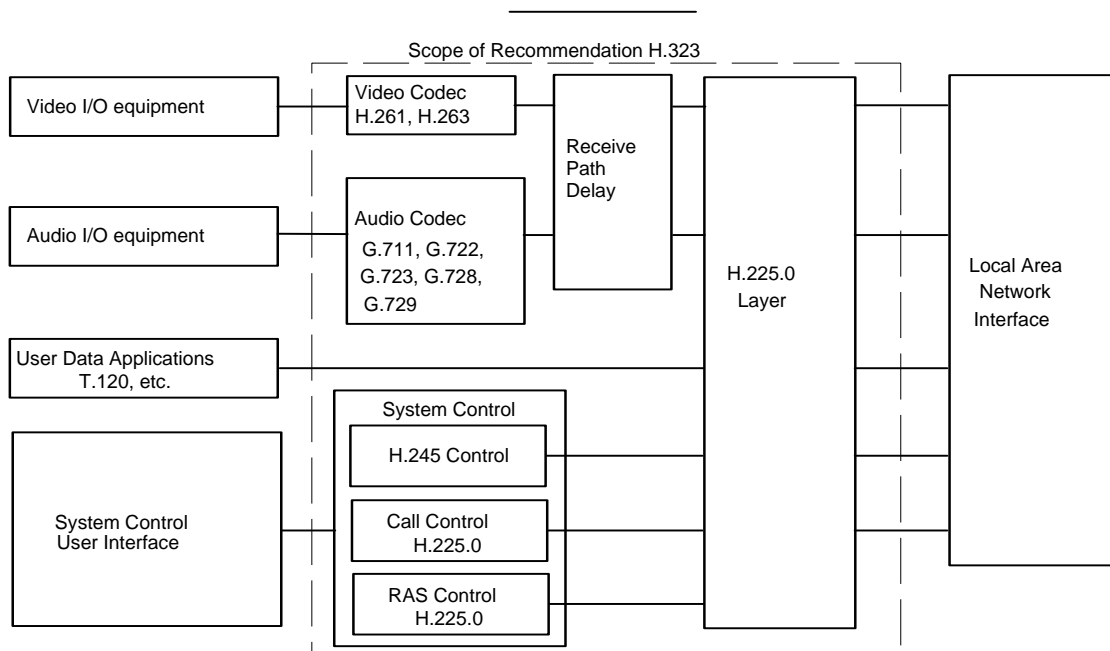
- SCN(Switched Circuit Network) H.323

1.3 Gatekeeper

- 1.3.1 Address Translation : H.323 aliases E.164
- 1.3.2 Admissions Control : ARQ/ACF/ARJ
- 1.3.3 Bandwidth Control : BRQ/BCF/BRJ
- 1.3.4 Zone Management
- 1.3.5 Call Control Signaling
- 1.3.6 Call Authorization
- 1.3.7 Bandwidth Management
- 1.3.8 Call Management

1.4 MCU/MC/MP

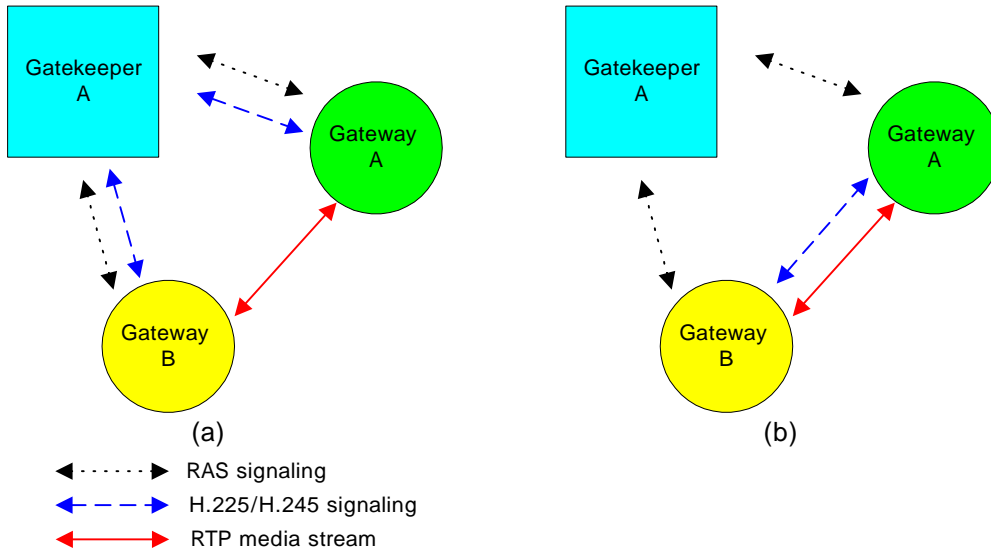
- 1.4.1 MC(Multipoint Controller) : Capability Set
- 1.4.2 MP(Multipoint Processor) : 가 /
- 1.4.3 MCU(Multipoint Controller Unit) : MC MP



2 : Relationships of H.323 Components

2 H.323

2.1 1 (Intra-Domain)

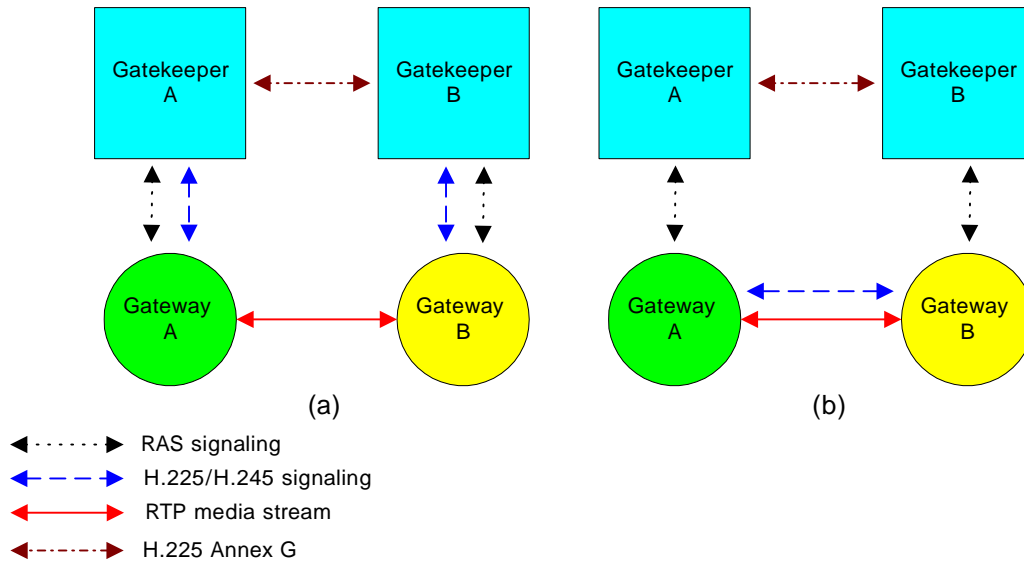


3 Intra-domain

(a) Gatekeeper Routed Call setup (GRC), (b) Directly Routed Call setup (DRC).

3 gatekeeper
 gatekeeper gateway gateway
 GRC DRC , H.245 conference
 call gatekeeper Gateway
 1 (a) H.225 H.245가 gatekeeper
 , (b) RAS gateway gatekeeper
 Intra-domain RAS, H.225 call signaling, H.245
 , Fast start
 가 H.225 Release call
 Disconnect RAS 가 . RAS, H.225/H.245, Fast Start
 가
 , MOS PSQM NETC

2.2 2 (Inter-Domain)



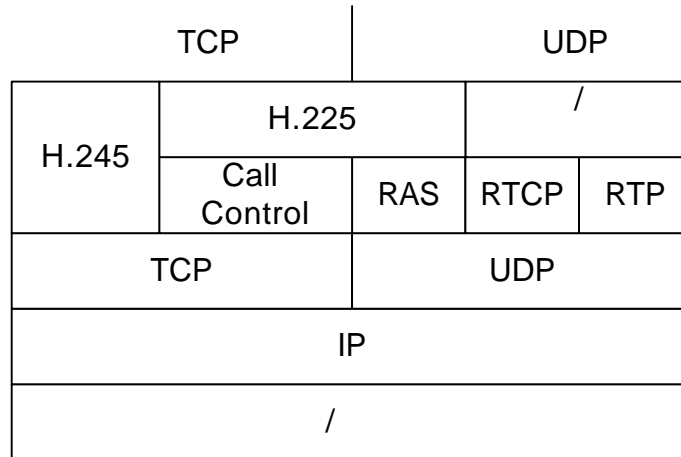
4 . Inter-domain

(a) Gatekeeper Routed Call setup (GRC), (b) Directly Routed Call setup (DRC).

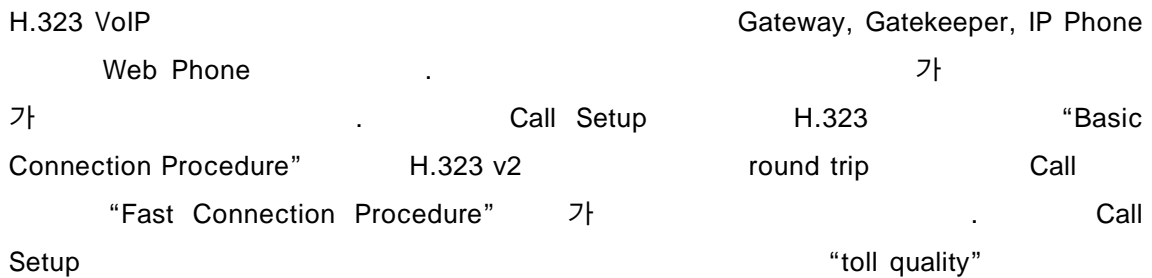
Inter-domain	Intra-domain	가	GRC	DRC	.
gatekeeper	gateway	gateway	gatekeeper	gateway	
RAS, H.225/H.245, Fast Start, Voice quality,			Voice Codec	gatekeeper	
Intra-domain			gatekeeper		
가 . Gatekeeper	H.225 Annex G				가



3 H.323



5 : Layers of the H.323 Protocol Suite



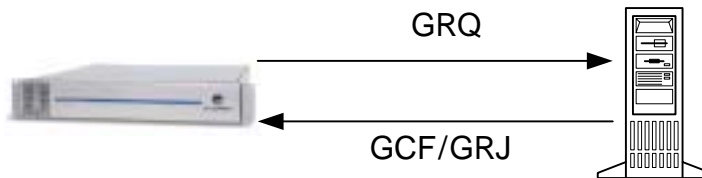
- 1) RAS
- 2) (H.225)
- 3) (H.245)
- 4) Fast Connection
- 5) Voice Quality
- 6) H.225.0 Annex G

3.1 RAS

- UDP

3.1.1 (Gatekeeper Discovery)

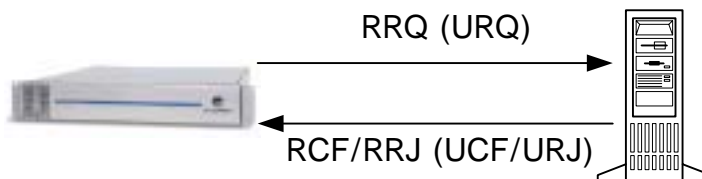
- Manual Method : IP 가
- Automatic Method :



6 : Gatekeeper Auto Discovery

3.1.2 (Registration)

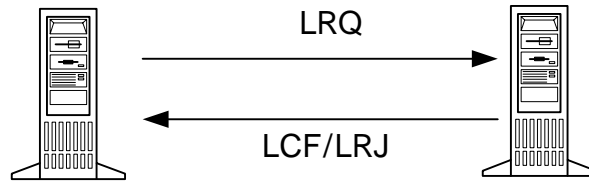
, MCU가 Zone 가 IP/Alias



7 : Endpoint Registering and Endpoint and Gatekeeper Unregistering

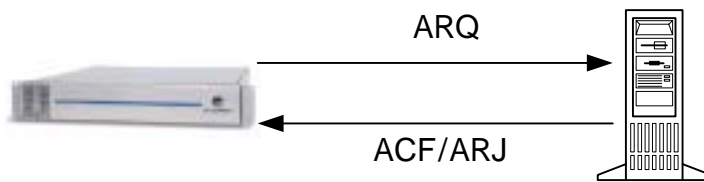
3.1.3 (Endpoint Location)

alias 가
RAS



8 : Endpoint Location

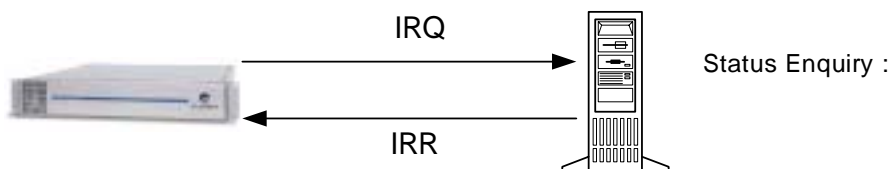
3.1.4 (Admissions)



9 : Admission

3.1.5 (Status Information)

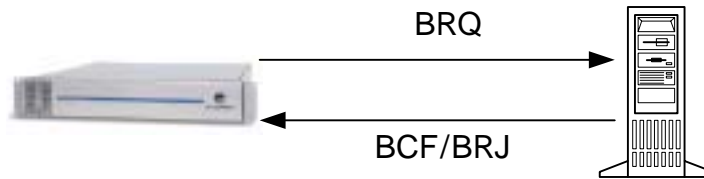
가 .()
Polling 10 .



10 : Status Information

3.1.6 (Bandwidth Control)

가



11 : Bandwidth Control

3.2 (H.225)

- (TCP Port 1720), Q.931, Q.932(가)

3.2.1 Setup

. Well-Known H.225 TCP Port 1720

3.2.2 Call Proceeding

가

3.2.3 Alerting

3.2.4 Connect

(),

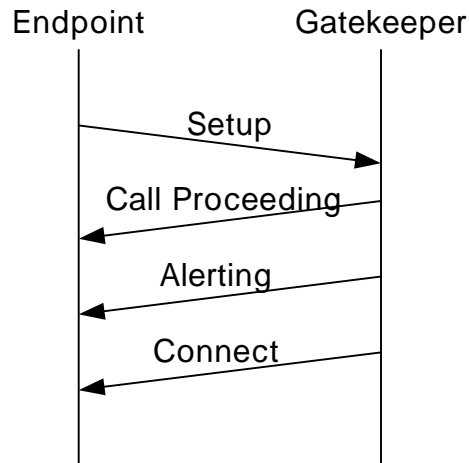
H.245 UDP/IP 가 .

3.2.5 Facility

Q.932 가 .

- H.323 2가

Direct Endpoint Call Signaling
Gatekeeper Routed Call Signaling

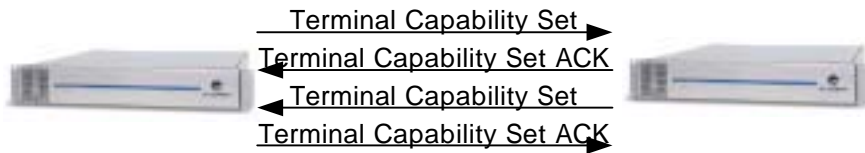


12 : Call Setup Signaling Messages

3.3 (H.245)

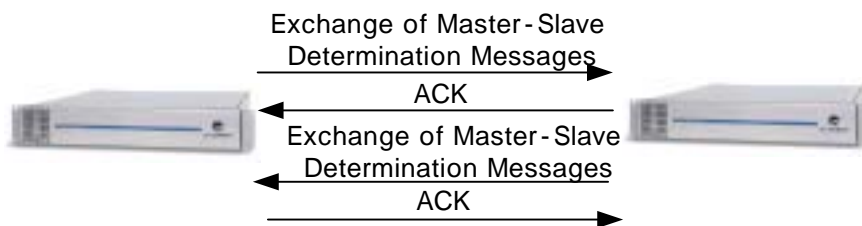
- H.245 : H.323
- , Gatekeeper Routed Call Signaling
 - Direct H.245 Control
 - Gatekeeper Routed H.245 Control

3.3.1 Capability Exchange



13 : Capability Exchange

3.3.2 Master-Slave Termination



14 : Master-Slave Termination

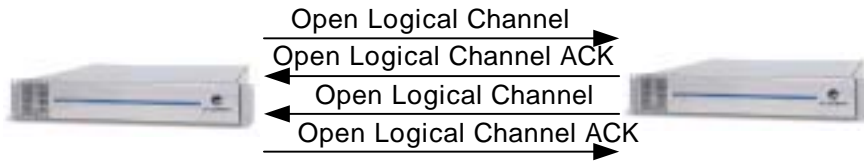
3.3.3 Round-Trip-Delay

H.245 entity가



3.3.4 Logical Channel Signaling

Logical open/close



15 : Logical Channel Signaling

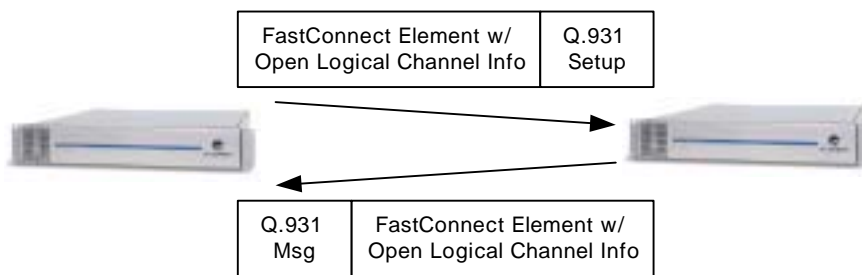
3.4 Fast Connection

3.4.1 Call

. Q.931 Setup

Open Logical Channel H.245

H.245 Terminal Capability Set Master/Slave Determination



16 : Fast Connection

3.4.2 Call

H.245 Q.931 Release Complete



3.5 Voice Quality

3.5.1 End to End Speech Quality

Delay End-to-End Speech Quality PSTN Quality
 VoIP 가 . VoIP
 MOS 가 . 가
 , ,
 가 PSQM .
 Voice Quality 가 가
 가 .
 Voice Quality 가
 Mean-Option-Score(MOS) Perceptual Speech Quality Measure(PSQM)

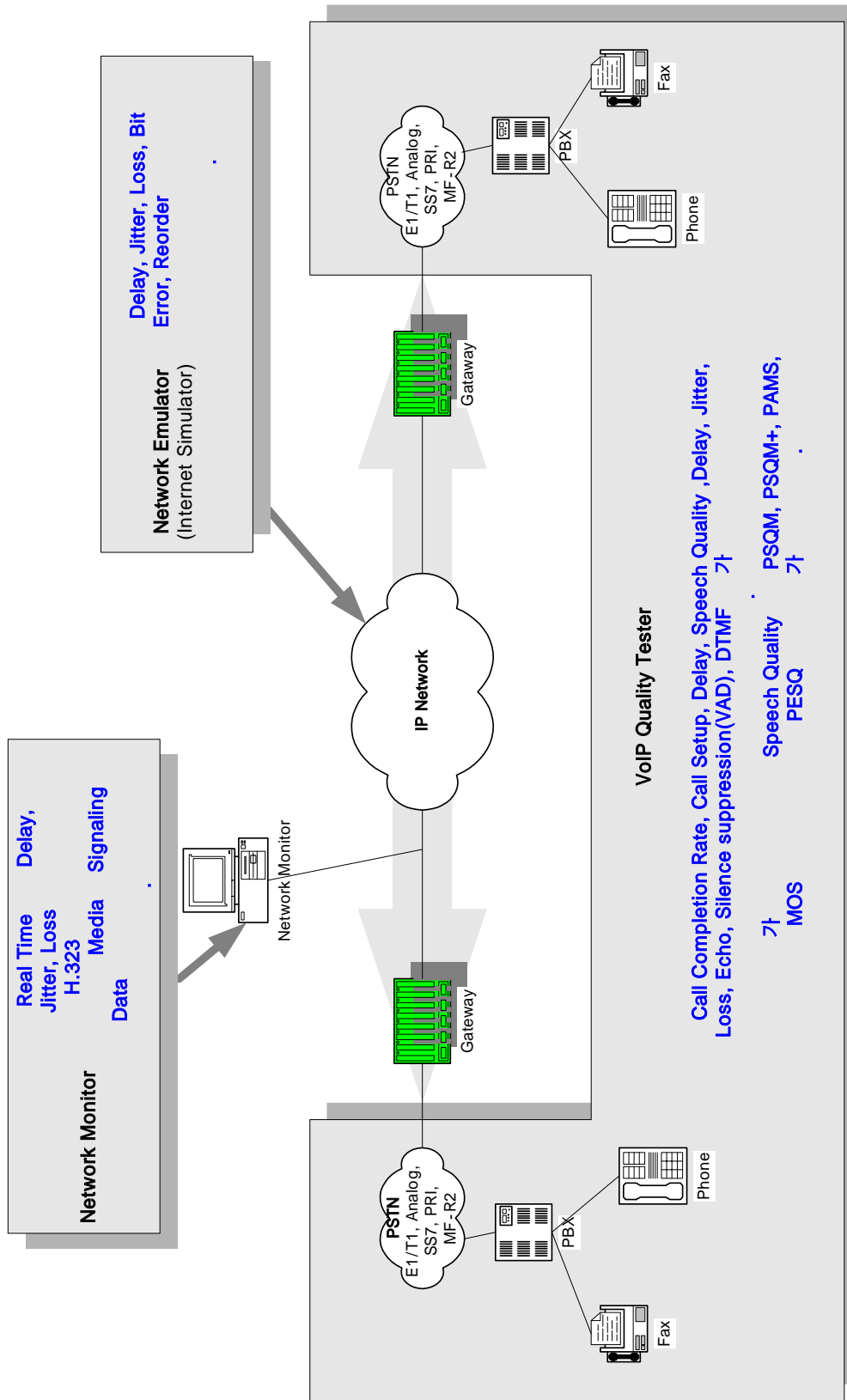
PSQM/MOS

		Bit Rate(kbps)	PSQM	MOS
A-law, u-law PCM	G.711	64	<0.3	4.5
ADPCM	G.726	32	1.5	4.1
LD-CELP	G.728	16	1.6	4.0
MP-MLQ/ACELP	G.723.1	6.4(5.3)	1.8	3.8
CS-ACELP	G.729	8	1.6	4.0
LPC	USFS-1015	2.4	4.4	2.3
CELP	USFS-1016	4.8	3.0	3.0
VSELP	IS-54/IS-136	7.95	2.4	3.5
ACELP	IS-641	7.4	1.6	4.0
RPE-LTP	GSM Full-rate	13	2.4	3.5
VSELP	GSM Half-rate	5.6	2.4	3.5
ACELP	GSM Enhanced Full-rate	12.2	1.6	4.0

1 Bit Rate/PSQM/MOS

MOS PSQM

가



17 Voice Quality Test Network



3.5.2 Delay

Delay Talker가 Listener
 End-to-End Delay
 PSTN Delay, IP Network Delay, VoIP Delay
 Delay Narrow Audio Spike Acoustic PING
 DSP Maximum Length Sequence(MLS) MLS
 Normalized Cross Correlation ITU-T G.114(One-Way Transmission
 Time) Quality Voice 150ms

3.5.3 Jitter

Jiiter packet
 packet inter-
 arrival time Jitter Buffer(Packet Buffer,
 packet.)가 packet

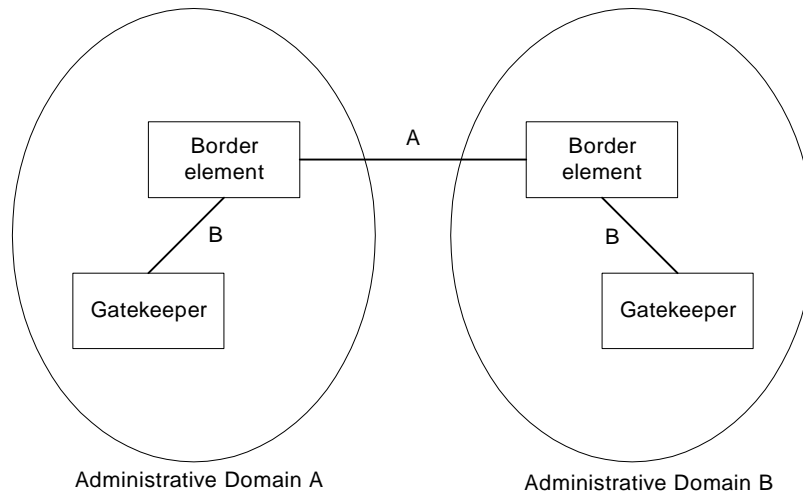
3.5.4 Packet Loss

Non-real-time , packet loss drop packet
 가 real-time voice ,
 window packet
 voice Delay가 가
 voice packet 5~10% loss voice quality

3.5.5 Echo

Echo talker talker
 Echo Echo Level(Echo Return Loss, ERL)
 Echo Delay가 Echo Level (-25 dB), Echo Delay가
 (25~30ms) Echo Delay(30ms) 가
 Echo Canceller
 가 single double talk 가 가

3.6 H.225.0 Annex G

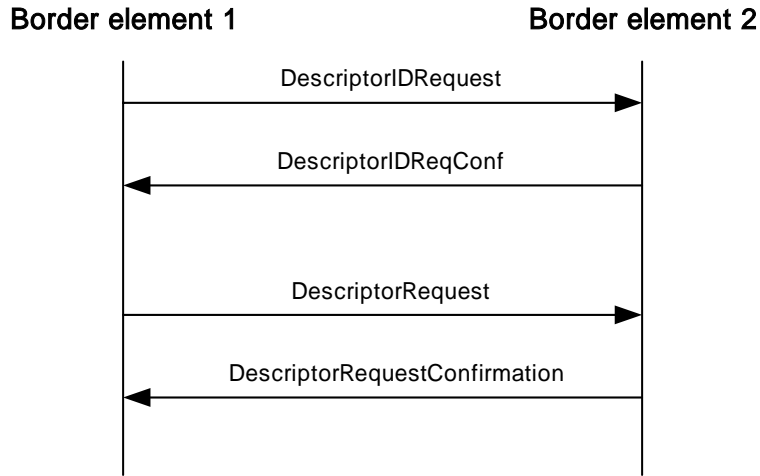


18 System Reference Points

gatekeeper administrative domain
 domain border element
 18 . , border element gateway
 gatekeeper . H.225.0 RAS
 administrative domain Annex G
 administrative domain
 zone 가 gatekeeper 가
 . , gatekeeper 가 zone
 . , zone .

3.6.1 Exchange of Zone information

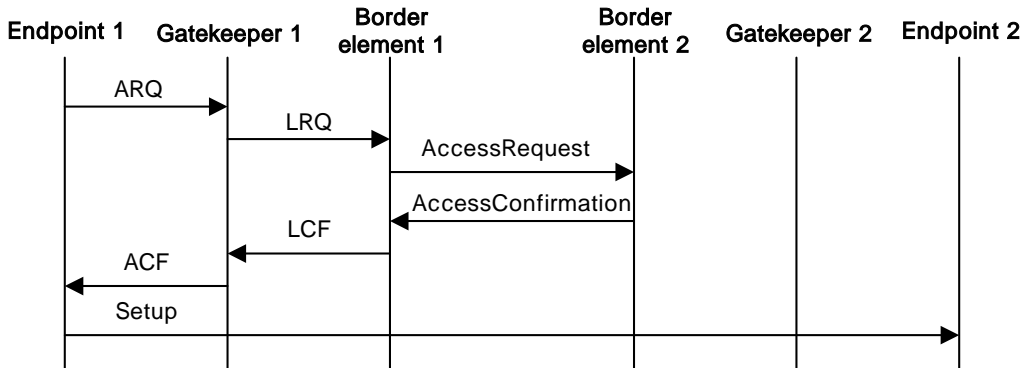
Border element 가 administrative address template
 descriptor . address template
 descriptor alias routing
 .
 19 descriptor administrative domain
 . descriptor ID
 ID . Border element administrative
 domain .



19 Descriptor Exchange

3.6.2 Inter-zone

20 gatekeeper zone 가



20 Placing a Call

zone endpoint 가 endpoint가 gatekeeper
zone LRQ border element가 gatekeeper
zone , descriptor
20 AccessRequest
gateway 가 AccessRequest
gatekeeper endpoint setup
zone LRQ/LCF



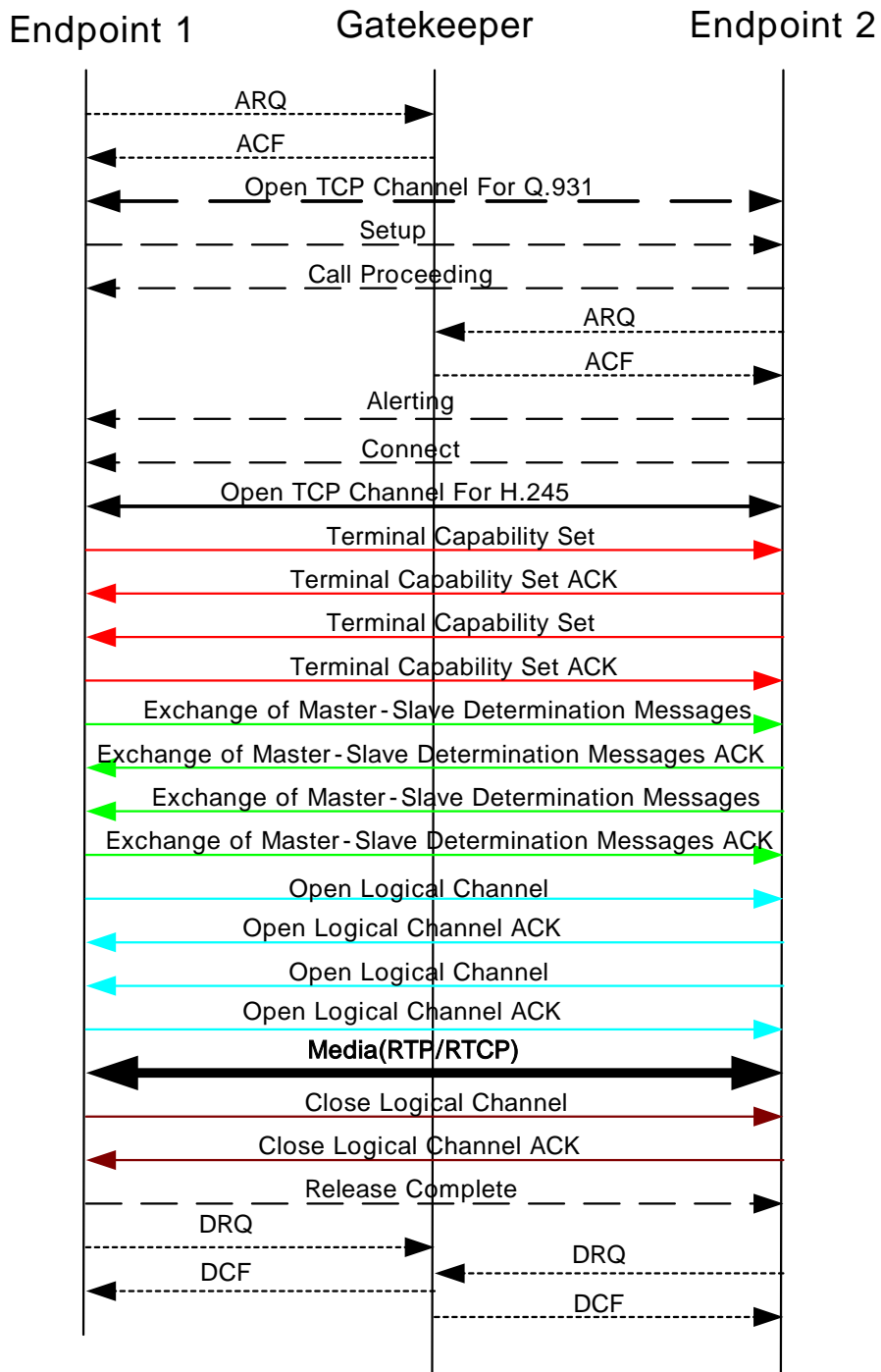
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border element gatekeeper zone descriptor
exchange 가 gatekeeper 1 border element 1
LRQ gatekeeper 1 gatekeeper 2 LRQ

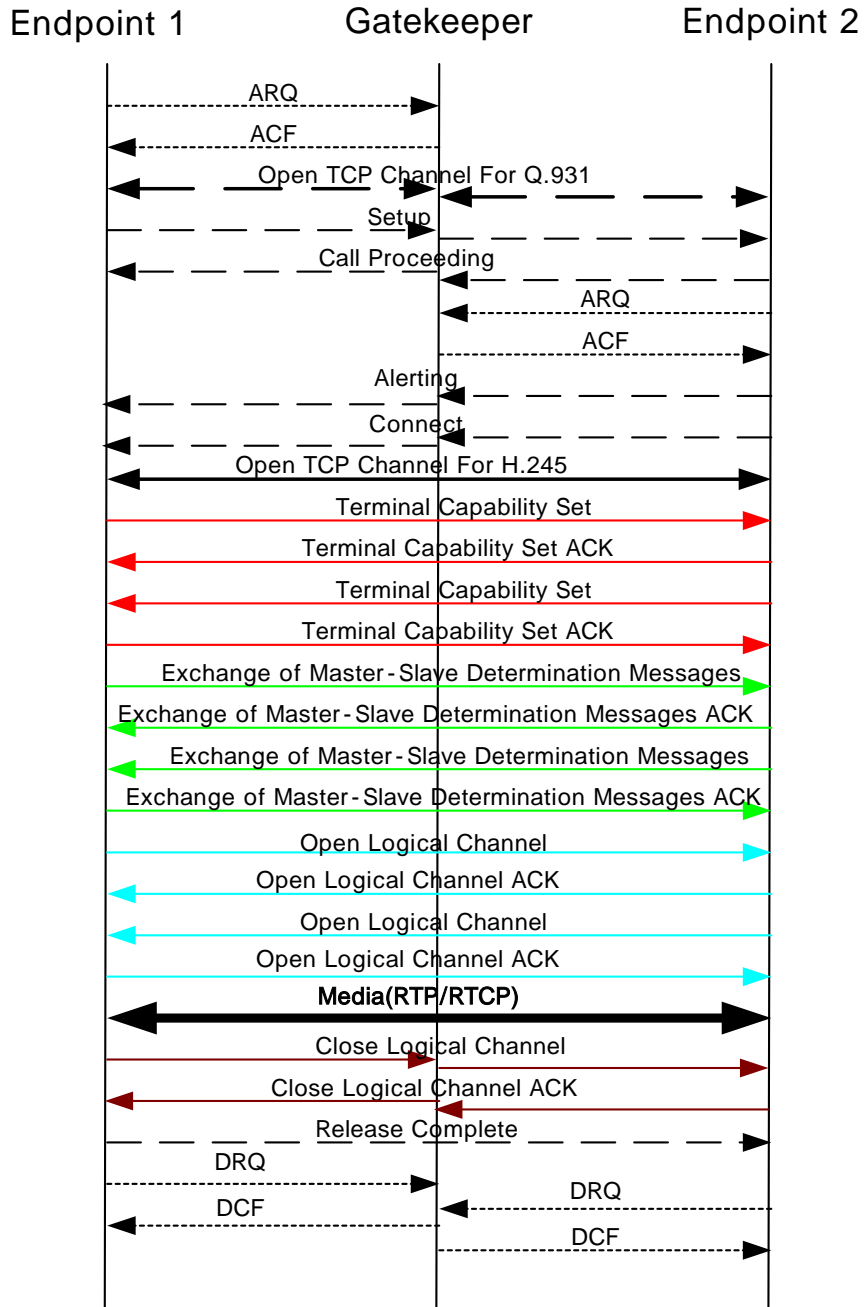


4 H.323 Call-Flows

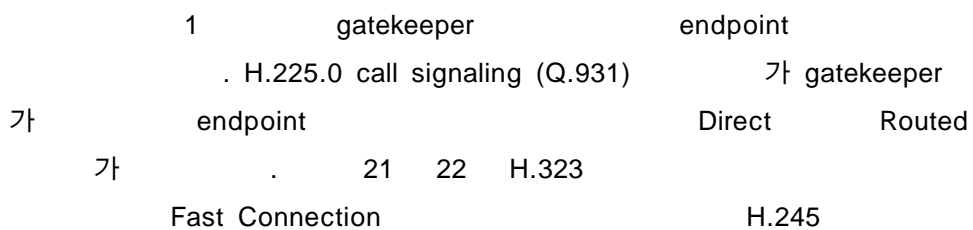
4.1 1



21 Direct Endpoint Signaling - Same Gatekeeper



22 Gatekeeper-Routed Call signaling-Same Gatekeeper





Q.931 Setup

OpenLogicalChannel

4.2

2

2

gatekeeper zone

endpoint

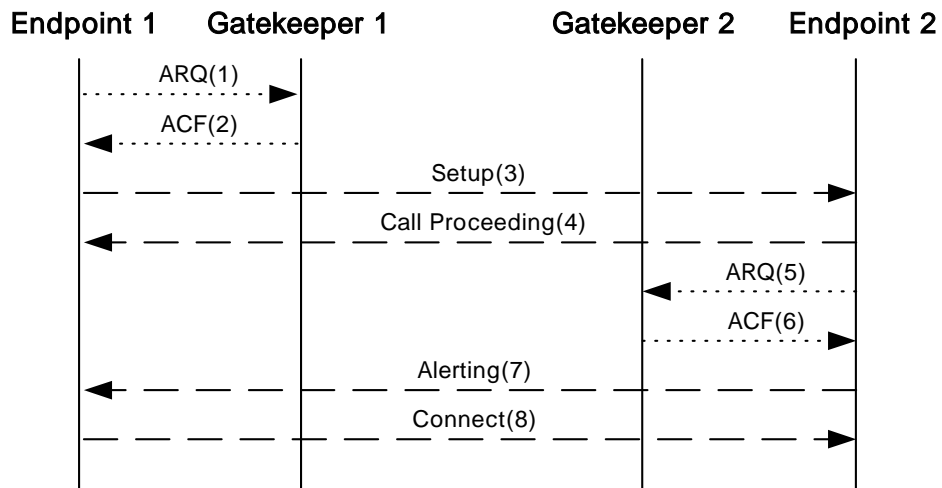
H.245

gatekeeper zone

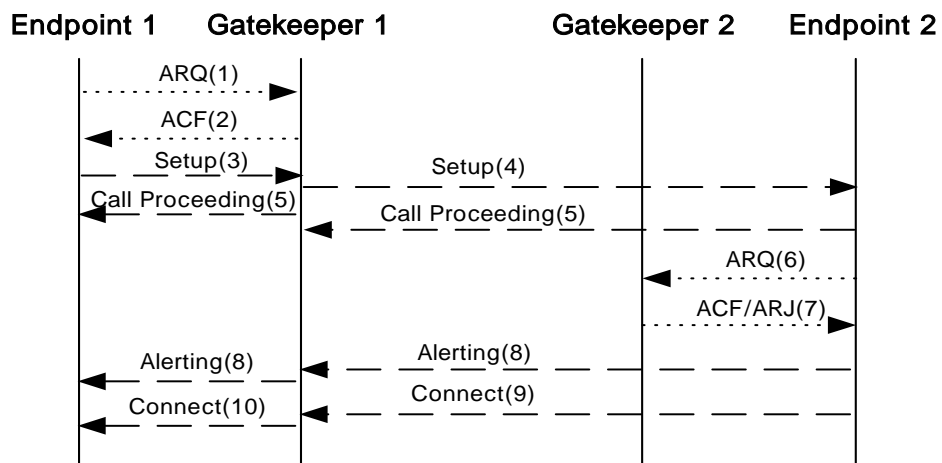
direct-direct, routed-direct, direct-routed,

routed-routed

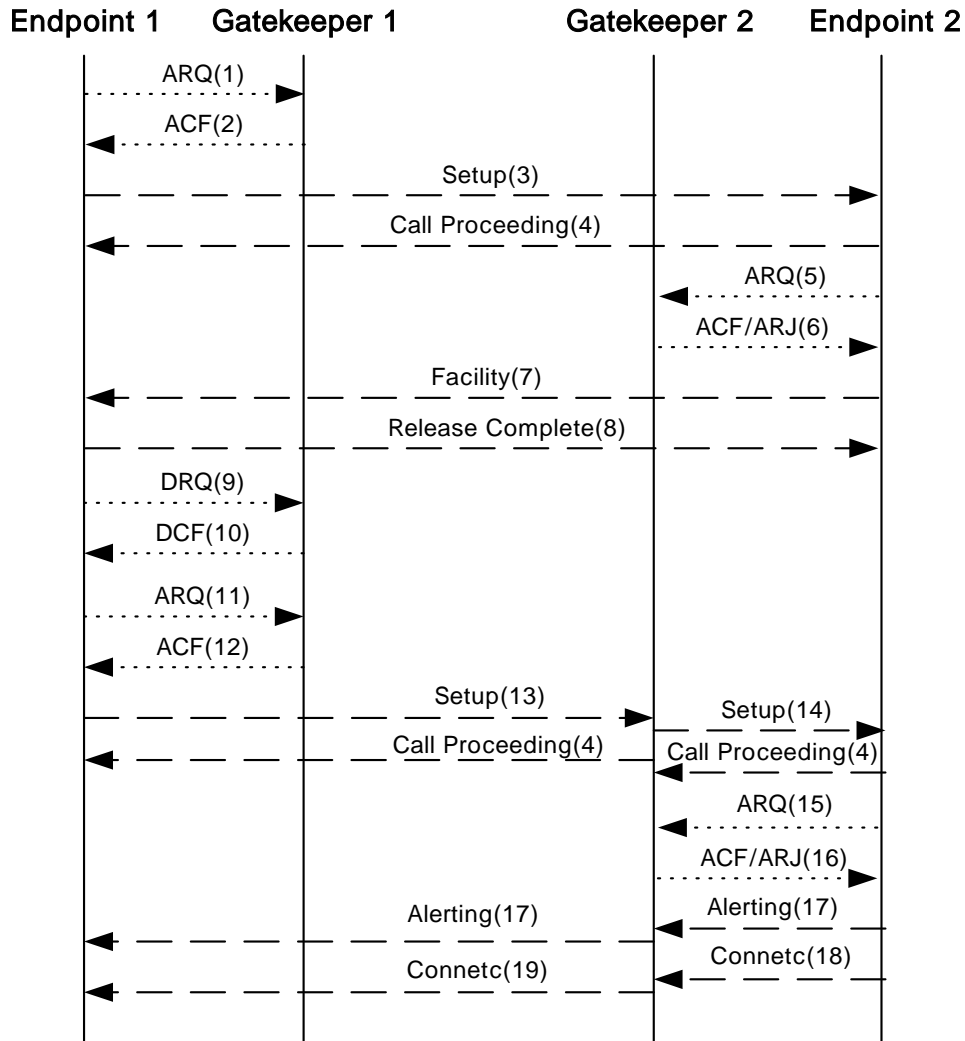
가



23 Both endpoints registered – Both gatekeepers direct call signaling

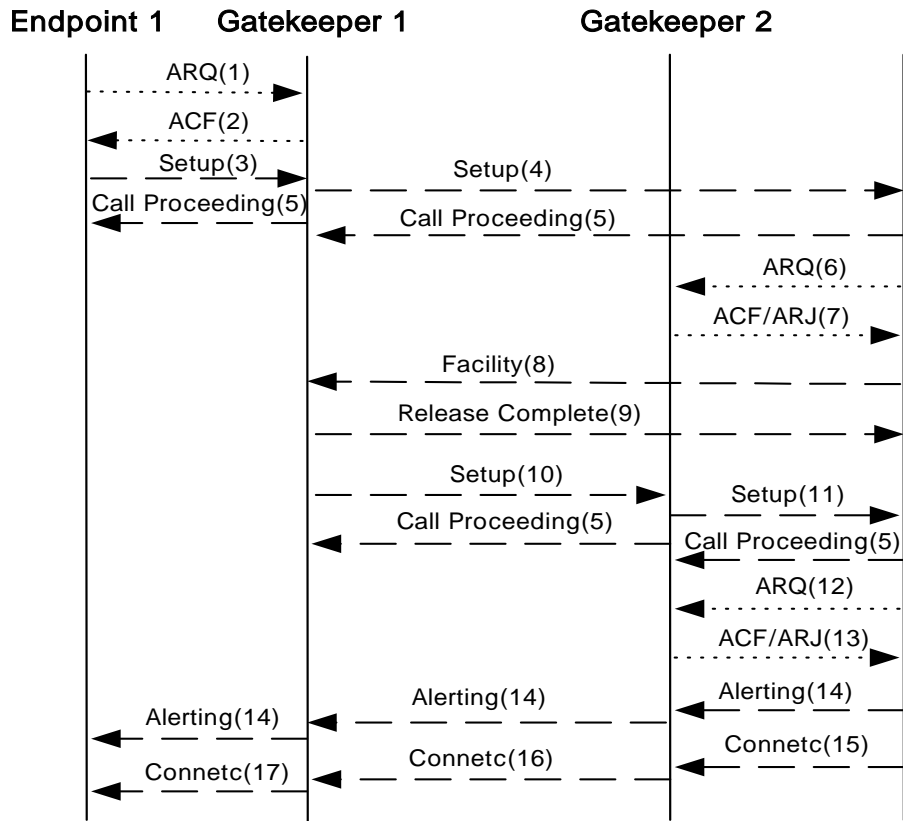


24 Both endpoints registered – Routed/direct call signaling



25 Both endpoints registered – Direct/routed call signaling

	endpoint	가	zone	gatekeeper
admission	gatekeeper		가	gatekeeper
	.		admission	
endpoint	.		LRQ/LCF	
	.	H.225 Annex G		
			zone	
가	.			
Inter-zone		1	Intra-zone	가
Fast Connection		.	Faststart	H.245
	Q.931 Setup		OpenLogicalChannel	가



26 Both endpoints registered – Both Gatekeepers routing call signaling



2002/05/31

TTA-ITTL-NETC-OLT-STP-xxx

0.1

5

5.1

1

NETC VoIP Score Sheet													
											1 = performed role properly		
											0 = failed to perform role		
											x = unable to test due to other failure		
Date :		Scenario 1		M	M	M	M	O	O	O	O	O	
Time :		Scenario 2		M	M	M	M	O	O	O	O	M	
Name :													
Entity	Company	Test System	RAS signaling	H.225 call signaling	H.245 signaling	Fast start	Voice quality	Voice Codec				H.225 Annex G	Percent Done Correctly
								G.711	G.723.1	G.729A	G.7xx		
A Originates call													
Gateway A													
Gateway B													
Gatekeeper A													
Gatekeeper B													
B Originates call													
Gateway A													
Gateway B													
Gatekeeper A													
Gatekeeper B													
Total:													
Result													

2 1

20

VoIP

Call

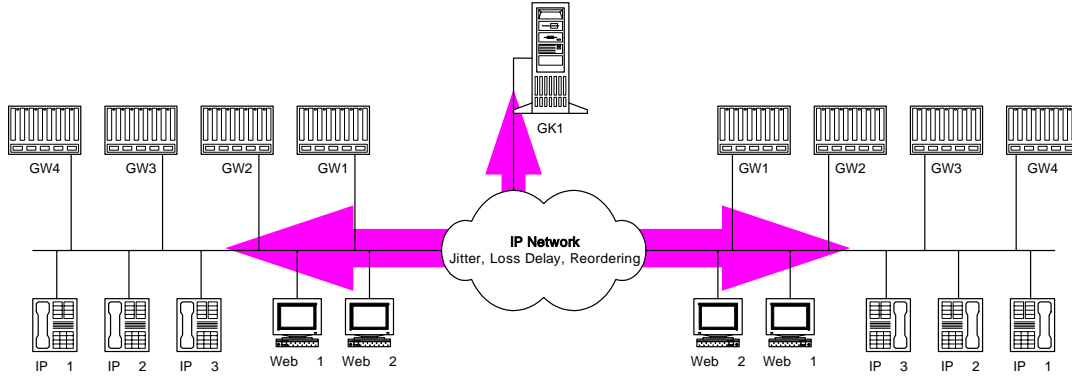
가

Gateway

Gatekeeper가

5.2

2



27 Intra-Domain IOP Network

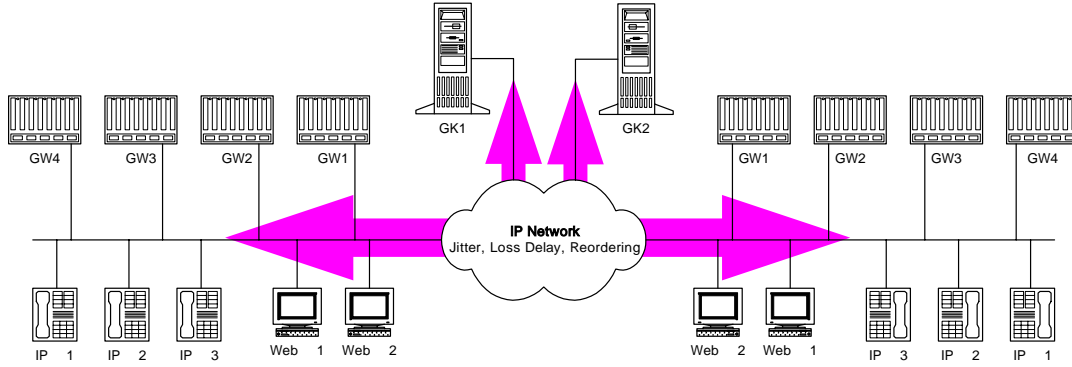
Intra-Domain . IP
 Gatekeeper가 Gateway, IP Phone, Web Phone
 . 가 Gatekeeper 가 End to End 가

1										
GK1		GW1	GW2	GW3	GW4	IP 1	IP 2	IP 3	Web 1	Web 2
	GW1									
	GW2									
	GW3									
	GW4									
	IP 1									
	IP 2									
	IP 3									
	Web 1									
	Web 2									

3 2

5.3

3



28 Inter-Domain IOP Network

Inter-Domain . IP
 Gatekeeper가 Zone Gateway, IP Phone, Web
 Phone 가 Gatekeeper
 가 가 Gatekeeper 가 End to End 가

		2								
		GK1								
		GW1	GW2	GW3	GW4	IP 1	IP 2	IP 3	Web 1	Web 2
GK2	GW1									
	GW2									
	GW3									
	GW4									
	IP 1									
	IP 2									
	IP 3									
	Web 1									
	Web 2									

4 3