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2002/05/31

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ITTL  
NETC  

+82- 31- 724- 0164
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<td>H.225.0 Annex G</td>
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1  H.323  

1.1  H.323  

1.1.1  H.225/H.245  

1.1.2  H.220 (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)  

1  H.323  

Scope of H.323  

Note: A gateway may support one or more of the GSTN, N-ISDN and/or B-ISDN connections.
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) : /  
   1.4.3 MCU(Multipoint Controller Unit) : MC. MP.  

2 : Relationships of H.323 Components
2. H.323  

2.1. 1 (Intra-Domain) 

(a) Gatekeeper Routed Call setup (GRC), (b) Directly Routed Call setup (DRC).
2.2 2 (Inter-Domain)

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

RAS signaling
H.225/H.245 signaling
RTP media stream
H.225 Annex G
3 H.323 VoIP 

<table>
<thead>
<tr>
<th>TCP</th>
<th>UDP</th>
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<td>H.245</td>
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<tr>
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<td>UDP</td>
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<td>IP</td>
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</table>

5: Layers of the H.323 Protocol Suite

H.323 VoIP Gateway, Gatekeeper, IP Phone

Web Phone Call Setup 

H.323 v2 Call Setup “Fast Connection Procedure” round trip 

“toll quality” 

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

-  3.1.1  (Gatekeeper Discovery)

Manual Method:  IP  

Automatic Method:  SQL  

3.1.2  (Registration)

3.1.3  (Endpoint Location)
8：Endpoint Location

3.1.4 入室 (Admissions)

9：Admission

3.1.5 状態情報 (Status Information)

Polling 10．
3.1.6 " censorship (Bandwidth Control)"

... (Diagram with BRQ and BCF/BRJ)

... 11 : Bandwidth Control
3.2 [ H.225 ]

- [ H.225 ] TCP Port 1720, Q.931, Q.932

3.2.1 Setup

- Well-Known H.225 TCP Port 1720

3.2.2 Call Proceeding

3.2.3 Alerting

3.2.4 Connect

- H.245 UDP/IP

3.2.5 Facility

- Q.932

Direct Endpoint Call Signaling
Gatekeeper Routed Call Signaling

```
Endpoint                        Gatekeeper
                                      
Setup
Call Proceeding
Alerting
Connect

12 : Call Setup Signaling Messages
```
3.3 互 メ メ メ (H.245)

- ゲートキーパールード キャルルラー シンセシング
  Direct H.245 Control
  Gatekeeper Routed H.245 Control

3.3.1 Capability Exchange

3.3.2 Master-Slave Termination

3.3.3 Round-Trip Delay

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3.3.4 Logical Channel Signaling

Logical open/close

Open Logical Channel

Open Logical Channel ACK

Open Logical Channel

Open Logical Channel ACK

15: Logical Channel Signaling
3.4 Fast Connection

3.4.1 Call  

1. Open Logical Channel  
2. H.245  
3. H.245 Terminal Capability Set  
4. Master/Slave Determination  
5.  

Q.931 Setup

FastConnect Element w/ Open Logical Channel Info  
Q.931

FastConnect Element w/ Open Logical Channel Info  
Msg

16: Fast Connection

3.4.2 Call  

1. H.245  
2. Q.931 Release Complete  
3.  

Q.931
3.5 Voice Quality

3.5.1 End to End Speech Quality

Delay End- to- End Speech Quality [PSTN, VoIP Quality]. VoIP MOS [1-5]. VoIP [0.0-5].

Voice Quality [Voice Quality, PSQ, PSQM]. VoIP [0.0-5]. VoIP [0.0-5].

Mean- Option- Score(MOS) [Perceptual Speech Quality Measure(PSQM)].

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<td>12.2</td>
<td>1.6</td>
</tr>
</tbody>
</table>

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17 Voice Quality Test Network

Call Completion Rate, Call Setup, Delay, Speech Quality, Delay, Jitter, Loss, Echo, Silence suppression (VAD), DTMF, Speech Quality, Delay, Jitter, Loss, Echo, Silence suppression (VAD), DTMF, MOS, PSQM, PSQM+, PAMS, MOS, PSQM, PSQM+, PAMS, PESQ.
3.5.2 Delay
Delay[] Talker[] 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

3.5.4 Packet Loss
Non- real- time packet drop[] real- time voice window[] voice packet[] 5~10% loss[] voice quality[].

3.5.5 Echo
Echo[] Talker[] Talker[] Talker[] Talker[] Echo Level(Echo Return Loss, ERL)[] Echo Delay[] Echo Level[] (25~30ms) Echo Delay[] Echo C canceller[] single[] double talk[].
3.6 H.225.0 Annex G

18 System Reference Points

Border element A

Gatekeeper

Administrative Domain A

Border element B

Gatekeeper

Administrative Domain B

3.6.1 Exchange of Zone information

Border element A \(\leftrightarrow\) administrative domain \(A\) \(\leftrightarrow\) address template descriptor \(B\) \(\leftrightarrow\) administrative domain \(B\) \(\leftrightarrow\) address template descriptor \(A\) \(\leftrightarrow\) alias \(A\) \(\leftrightarrow\) routing \(A\) \(\leftrightarrow\) border element B.

Border element B \(\leftrightarrow\) administrative domain \(B\) \(\leftrightarrow\) address template descriptor ID \(A\) \(\leftrightarrow\) administrative domain \(A\) \(\leftrightarrow\) descriptor ID \(B\) \(\leftrightarrow\) administrative domain \(B\) \(\leftrightarrow\) descriptor ID \(A\) \(\leftrightarrow\) administrative domain \(A\) \(\leftrightarrow\) border element A.
19 Descriptor Exchange

3.6.2 Inter-zone

Placing a Call

endpoint[] endpoint[] gatekeeper zone LRQ border element[] gatekeeper zone descriptor[] descriptor[] 20 AccessRequest gateway[] gatekeeper endpoint[] setup zone LRQ/LCF
.border element 1, gatekeeper zone 1, descriptor exchange 1, gatekeeper 1, border element 1, LRQ 1, gatekeeper 1, gatekeeper 2, LRQ, ...

LRQ...
4 H.323 Call-Flows

4.1 ²³³³³ ¹

Endpoint 1  Gatekeeper  Endpoint 2

ARQ  ACF

Open TCP Channel For Q.931

Setup  Call Proceeding

ARQ  ACF

Alerting  Connect

Open TCP Channel For H.245

Terminal Capability Set

Terminal Capability Set ACK

Terminal Capability Set

Terminal Capability Set ACK

Exchange of Master-Slave Determination Messages

Exchange of Master-Slave Determination Messages ACK

Exchange of Master-Slave Determination Messages

Exchange of Master-Slave Determination Messages ACK

Open Logical Channel

Open Logical Channel ACK

Open Logical Channel

Open Logical Channel ACK

Media(RTP/RTCP)

Close Logical Channel

Close Logical Channel ACK

Release Complete

DRQ

DCF

DRQ

DCF

²³³³³  Direct Endpoint Signaling- Same Gatekeeper
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0.1

Endpoint 1  Gatekeeper  Endpoint 2

ARQ
ACF
Open TCP Channel For Q.931
Setup
Call Proceeding
ARQ
ACF
Alerting
Connect
Open TCP Channel For H.245
Terminal Capability Set
Terminal Capability Set ACK
Terminal Capability Set
Terminal Capability Set ACK
Exchange of Master-Slave Determination Messages
Exchange of Master-Slave Determination Messages ACK
Exchange of Master-Slave Determination Messages
Exchange of Master-Slave Determination Messages ACK
Open Logical Channel
Open Logical Channel ACK
Open Logical Channel
Open Logical Channel ACK
Media(RTP/RTCP)
Close Logical Channel
Close Logical Channel ACK
Release Complete
DRQ
DCF
DRQ
DCF

22  Gatekeeper- Routed Call signaling- Same Gatekeeper

11  gatekeeper  " " " " endpoint " " " " " "
H.225.0 call signaling (Q.931) " " " gatekeeper[]
endpoint " " " " " " Direct " " " Routed " "
Fast Connection[]
H.323 " " " " " " H.245 " " " " " "

23
Q.931  Setup  OpenLogicalChannel  

4.2  2

Gatekeeper 1

ARQ(1)
ACF(2)

Setup(3)
Call Proceeding(4)

Alerting(7)
Connect(8)

Gatekeeper 2

Endpoint 1 Gatekeeper 1 Gatekeeper 2 Endpoint 2

Alerting(8) Connect(10)

Connect(9)

Both endpoints registered – Both gatekeepers direct call signaling

ARQ(6)
ACF/ARJ(7)

Call Proceeding(5)

Call Proceeding(5)

Both endpoints registered – Routed/direct call signaling
Both endpoints registered - Direct/routed call signaling

- Inter-zone
- Intra-zone
- Fast Connection
- Faststart
- H.245
- Q.931
- OpenLogicalChannel
Both endpoints registered – Both Gatekeepers routing call signaling
5  1

5.1  1

**NETC VoIP Score Sheet**

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20° 1° VolP 1° 1° 1° 1° 1° 1° 1° 1° 1° 1° Call 1° 1° 1° 1° 1° 1° 1° 1° 1° 1° Gateway 1° 1° Gatekeeper 1° 1° 1° 1° 1° 1° 1° 1° 1° 1°.
### 5.2 27 Intra-Domain IOP Network

Intra-Domain IP Network includes Gatekeeper, Gateway, IP Phone, Web Phone, etc. Gatekeeper manages the End to End network, providing jitter, loss, delay, and reordering. The diagram illustrates the connectivity and flow of packets through the network.
5.3 28 Inter-Domain IOP Network

- Inter-Domain: Inter-Domain IOP Network. IP Network includes Gatekeeper, Zone, Gateway, IP Phone, Web Phone. Gatekeeper is responsible for managing Zones and Gateways. Gatekeeper is used for End-to-End inter-Domain communication.