Integration of Resource Management and Call Signaling for IP Telephony

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July 1999 IETF Presentation

Call Setup: Fundamental Requirements

- First INVITE MUST go through proxies for authorization/translation
- Resources must be available PRIOR to ringing far end phone
- ◆ Service Quality Requirements must be met
 - 100ms post-pickup delay maximum
 - » Terminating end-point's Hello should not be clipped
 - » Originating end-point's Hello should not be clipped
 - Conclusion: 200-OK (pickup) MUST go direct, not via proxies

Critical Messages and their Relationships



Single-stage Alternatives Examined

- ◆ Allocate resources in access prior to single traditional INVITE
 - RSVP? But don't know destination IP address of request
 - New protocol needed to do this
- ◆ Allocate resources after INVITE, before Ringing phone
 - E.g., Destination send 100 Trying in response to INVITE
 - » 100 Trying (via GC) must include SDP
 - » Caller does an end-end RSVP, Dest request RESV-ACK
 - » Callee also does and end-end RSVP exchange
 - » On RESV-ACK + RESV, send 180 Ringing (via proxies)
 - 200 OK on pickup routed via Proxies
 - » meanwhile, voice from destination is cut-through and may arrive at origin before 200 OK. User response is "clipped"

Conclusion: Need for Two-Stage INVITE

- First Stage INVITE but do not alert receiving customer
 - Sent via proxies to perform authorization, translation, etc.
 - Acknowledgement via proxies, with Contact: header
 - Call features invoked with first INVITE, e.g. Call Forwarding, etc.
- Second Stage INVITE with alerting
 - Sent direct end-to-end
 - Interim and Final responses sent direct, low-latency path

Tradeoff between post-pickup delay and No-Answer handling

- Call Forwarding No Answer becomes a transfer operation
 - » Use call-control services, Replace: and Also: headers
 - » Assistance from proxies likely

SIP Support needed for Resource Management

◆ Additional header in initial INVITE message

- No-Ring = "NoRing" ":"