Integration of Resource Management and Call Signaling for IP Telephony


AT&T, CableLabs, 3Com, Cisco, Com21, General Instrument, Lucent Cable, NetSpeak, Telcordia

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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

MTA₀ → ER₀ → GC₀ → GCₜ → ERₜ → MTAₜ

INVITE (AI, E.164ₜ, CP₀)

INVITE ($, CP₀, E.164ₜ, CI₀)

200 OK (IPₜₜ, CIₜ)

INVITE (GIDₜ, E.164ₜ, CP₀, [CI₀](GCₜ))

 INVITE (RING)
180 RINGING
200 OK
Starts ringback

Resource Reservation

Call In Progress

200 OK (GID₀, IPₜₜ, [CIₜ](GC₀))
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” “:”