Internet Emergency Preparedness in the IETF

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Outline

- Internet Emergency Preparedness (IEPREP) in the IETF
- Telephony Emergency Preparedness Systems (examples)
  - Government Telephone Preference Scheme (GTPS)
  - Government Emergency Telecommunications Service (GETS)
  - Multilevel Precedence and Preemption (MLPP)
- IEPREP Telephony Terminology
- Voice over IP (VoIP) Networks
- Session Initiation Protocol (SIP) Network Assumptions
- VoIP and IEPREP
- Next Steps and Conclusions

Internet Emergency Preparedness Charter

- IETF Transport Area Working Group
  - Chartered early 2002
    - » http://www.ietf.org/html.charters/ieprep-charter.html
  - Chairs: Kimberly King, Scott Bradner
- Produce Requirements document
  - Details IEPREP functions and technologies
  - Includes telephony specific requirements and other applications
    - » To be published as a RFC, the IETF publication series
- May produce Best Current Practices document(s)
  - Identifies mechanisms to provide behavior of applications
  - Identifies mechanisms for authorization and authentication
  - Recommendations for application design using existing protocols
    - » BCPs have technical approval of the IETF

Examples

Circuit-Switched Telephony

Emergency Preparedness Systems

Government Telephone Preference Scheme (GTPS)

- Problem
  - Loss of power to PSTN during disaster events was a concern during the 1950's
- Objective
  - Conserve power to increase the probability that critical emergency personnel can communicate
- Solved by
  - Creating 3 classes of lines
  - All lines may receive calls
  - Only certain lines can initiate calls during disasters
- Scope
  - Local loop lines at major U.K. public carriers

Government Emergency Telecommunications Service (GETS)

- Problem
  - PSTN resources are in high demand during emergencies
- Objective
  - Increase the probability that critical emergency personnel can communicate during emergencies over the PSTN
- Solved by
  - GETS calls receive preferential treatment by PSTN switches
    - Multiple paths to the destination
    - Calls queue for trunks (10-30 sec. max)
    - Exemption from Network Management Control
    - GETS call setup is less likely to be dropped in SS7 network
  - Preferential treatment triggered by content of SS7 message
- Scope
  - Local Exchange Carriers and IXCs--major U.S. public carriers
  - No pre-emption of existing calls

Multilevel Precedence and Preemption (MLPP)

- Problem
  - Military communications resources are in high demand during war or emergencies
- Objective
  - Increase the probability that critical personnel can communicate during emergencies on military network
- Solved by
  - User selects precedence level for call
  - Controlled access to resources is granted by preempting lower priority calls if necessary
  - Preferential treatment triggered by call signaling message
    - » MLPP Service ITU, Recommendation I.255.3
- Scope
  - In U.S. military telephony networks (not in public networks)

VoIP Networks

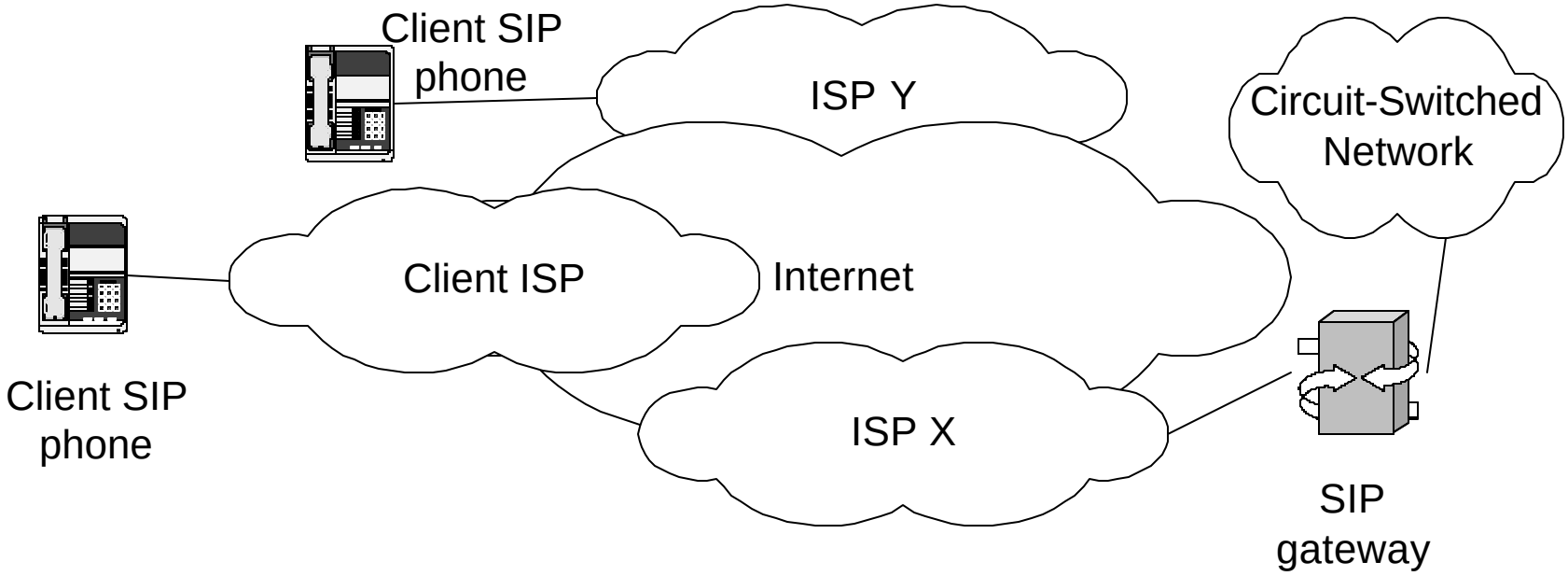
- VoIP
  - Using IP to carry voice signaling and media streams
    - » Enterprise IP networks & the Internet
- VoIP has many forms
  - Enterprises replacement of PBX with software based systems
  - Service provider class-4 (and eventually class-5) circuit-switch replacement by softswitches and gateways
  - Native IP services offered by cable companies
  - Mobile Switching Center replacements to provide mobility and media control for mobile telephones, etc.
- VoIP has many protocols
  - IETF Megaco\ITU H.248 is a gateway control protocol
  - Session Initiation Protocol (SIP) is the predominate IETF protocol for setting up, modifying and terminations sessions
- The Internet and its services (e.g. VoIP) is the IEPREP focus
  - IEPREP scope includes SIP although IEPREP is not limited to telephony

VoIP New Environment, New Analysis Required

- With circuit-switched networks
  - User demand during disasters causes network congestion
  - Call admission control determines admission to the service
  - Once admission is granted, bandwidth is guaranteed
  - Thus increasing the probability of admission ensures critical personal can communicate during emergencies
- In the Internet
  - User demand during disasters may cause congestion at certain end systems or tail circuits
    - e.g., gateways to the PSTN
  - Services are distributed (i.e., not centrally controlled)
  - The Internet has no call admission control
  - Signaling and media transport may follow different paths
  - Delivery is best effort (e.g., sound quality may vary)

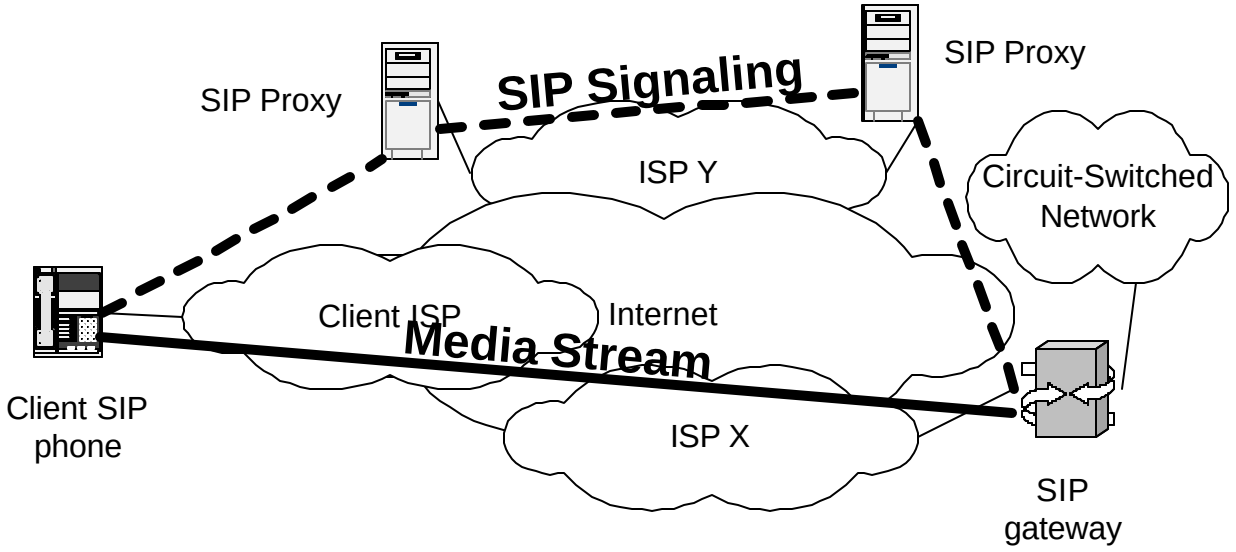
Assumptions for Internet SIP Networks

- ISPs provide access to the Internet
- ISPs generally can not know which services run over its network
- Service Networks may not be associated with client's ISP
  - E.g, Internet Telephony Gateway providers



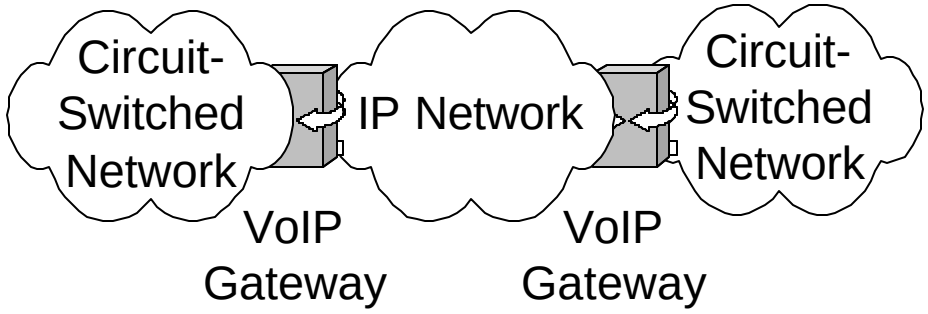
VoIP Signaling and Media Streams

- VoIP using SIP is comprised of
  - Call signaling (SIP)
  - Media streams (RTP)
- Signaling and media streams take different paths
  - So SIP alone can't reserve resources for clear sounding calls
  - Furthermore, no resource reservations over multiple ISPs
  - Yet, SIP could carry priority information for use at end systems

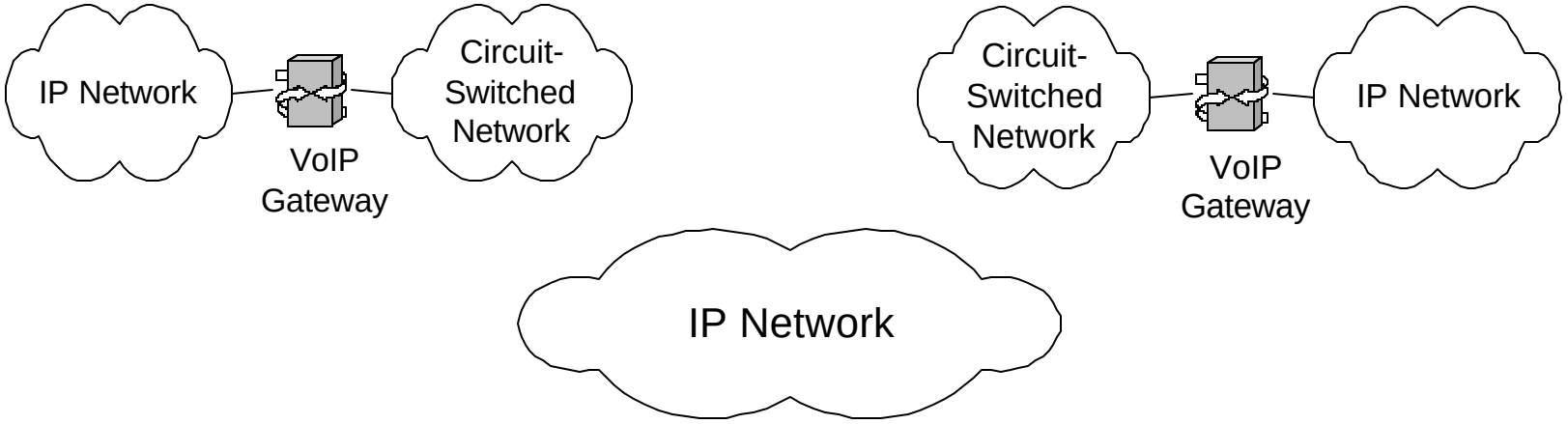


IEPREP and VoIP

- Preserve existing preferential schemes during IP bridging

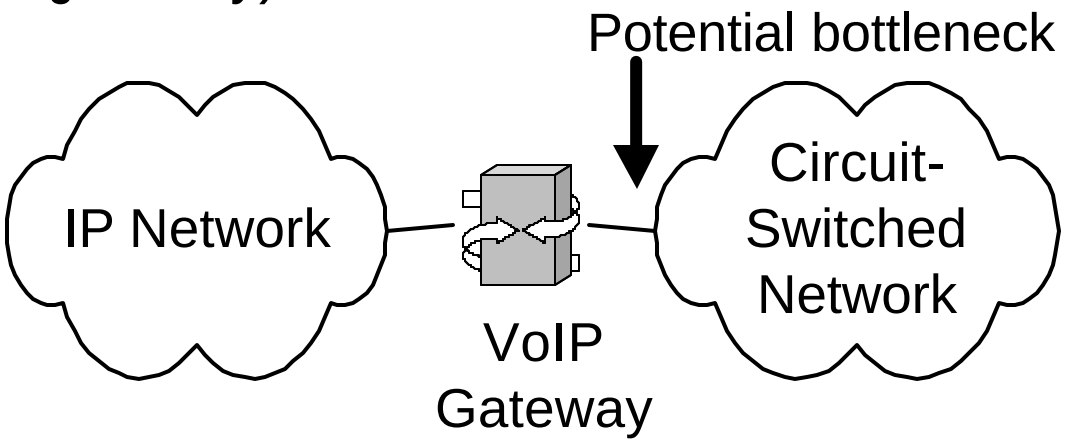


- Distinguish emergency calls using SIP signaling
  - In IP at the Start, End to End IP, and IP at the End cases



IEPREP and VoIP (2)

- Approved Jan 2003: Informational RFC
  - "Requirements for Resource Priority Mechanisms for the Session Initiation Protocol" by Henning Schulzrinne
    - Requirements for signaling priority (not data stream priority)
  - Next, the SIP working group will (hopefully) create a mechanism for SIP to convey emergency call status identification
- Thus, if network policy allows, calls labeled as emergency may be given preferential treatment for resources (e.g., an outgoing port on a gateway)



Next Steps and Conclusion

- Develop Best Current Practices Document
  - Standardize BCP for Internet Emergency Preparedness
- Investigate Quality of Service Mechanisms
  - For example, over a single administrative domain, Differential Services or RSVP may apply
- In conclusion,
  - Preserve existing circuit-switched telephony schemes
    - At gateways to circuit-switched networks
  - Allow identification of emergency calls via SIP signaling
  - Develop BCP of industry guidelines
  - Consider other applications where the default method fails to support emergency services

Thank You