



# **Tales from the Dark Side: SIP Operational Experiences**

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# overview

- About IntelePeer
- A brief history of SIP
- What keeps us up at night: current operational issues

# about IntelePeer

- Enhanced voice and application services provider
- Voice traffic exchange between applications and/or telephony devices over TDM or IP
- Wholesale focus

# A Brief History of... SIP

- The Session Initiation Protocol
  - originally designed by Henning Schulzrinne and Mark Handley starting in 1996
  - Current RFC is 3261
  - An application-layer protocol with a similar request/response transaction model to HTTP
  - Can use UDP, TCP, or SCTP for transport
  - Common ports
    - 5060 is typically used for non-encrypted signaling
    - 5061 is used for TLS-encrypted signaling

# A Brief History of... SIP (cont.)

## ■ SIP Network Elements

- Each resource identified by URI
  - sip[s]:username:password@host:port
- UA (user agent): end-point used to create and/or receive SIP messages, thereby managing a SIP session
- RFC 3261 defines three server elements:
  - Proxy, Registrar, Redirect
- SBC (session border controller): the “man in the middle” between UA and SIP server

# What keeps us up at night

- Current operational issues
  - “we don’t need no steenking standards”
  - Can you hear me now?
  - Moving on, moving up
  - Won’t you be my neighbor?

# Current operational issues:

**“we don’t need no steenking standards”**

- Variety of SIP implementations and “best practices”
  - Proprietary [codec|signaling|messaging|anything]
    - Good for vendors...you, not so much
    - Quality and compatibility issues
  - Multi-vendor is harder than it should be
    - Repeated trans-coding wastes resources and impacts quality

# Current operational issues:

**“we don’t need no steenking standards”  
(resolutions)**

- Agree to configuration details before turn-up
- Extensive inter-op testing
- Special/extra hardware resources are dedicated to trans-coding
  - Resource hogs are isolated when possible



# Current operational issues:

## can you hear me now?

- Monitoring is a hodgepodge of tools and methods
  - Homegrown tools work well...for the pieces that that tool focuses on
    - Various log and reporting formats (CDR == comma-separated-values of doom)
  - Correlation between an “IP event” and “voice quality” is a major challenge
    - Even with accepted quality standards, (mos, pesq, etc), complicated when measuring end-to-end
    - Vendor tools reach only as far as that vendor’s hardware

# Current operational issues:

## can you hear me now? (cont.)

- Monitoring is further complicated by realms of responsibility and understanding
- Lack of communication/understanding between voice and IP groups
  - Complicates and lengthens problem isolation and resolution
  - Who sets the priorities and what is truly important?
    - Example: intermittent packet loss amounting to  $<0.0001\%$ 
      - Eventually traced to default interface buffer sizes

# Current operational issues:

## can you hear me now? (resolutions)

- Work closely with vendors
  - Update tools for any log/reporting format changes  
\*before\* new hardware or software is rolled-out
- Ongoing projects to make monitoring and event correlation better
- Standardize reporting and alerting formats
- Document, document, document
- Educate
- Test... then test some more

# Current operational issues:

## Moving on, moving up

- Have outgrown the original cages/cabinets
- Can't move a site without some interruption:
  - Build and kill
    - Requires a lot of extra hardware/money/time
    - Things still break
  - Turn everything off and “carry” equipment down the stairs (avoiding building security)
    - Still some measure of build-and-kill
    - No matter how many times the circuits were tested, they still might not come up

# Current operational issues:

## Moving on, moving up (resolutions)

### before

- Inconsistent cabling standards and rack layouts
  - Hardware was added as needed, often where it fit
  - Too easy to pull the wrong cable or bump something else
- Inconsistent naming conventions

### after



# Current operational issues:

## Won't you be my neighbor?

- SIP is just an “application”, so why not peer with me?
  - Voice group: “What’s peering? Go talk to sales”
  - IP group: “Are you an ISP with 100,000,000 IPv4 subnets and 100K ASNs? No? Go talk to sales”  
(actual peering requirements lowered to protect the guilty)
  - Larger ISPs/Telecoms want to be paid for the minutes AND for the bits
- PSTN paradigm still largely pervades: everything is a “one-way” circuit, measured in number of DS0’s
  - Potential for wasted capacity

# Current operational issues:

## Won't you be my neighbor? (resolutions)

- Document our requirements before negotiations begin
- Educate internal groups
- Make sure that all of the necessary people are at the table
- Automated tools to help with the “translations” and capacity planning

# Thank You

- Questions?
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