A Short History of SIP

marcus evans SIP Conference
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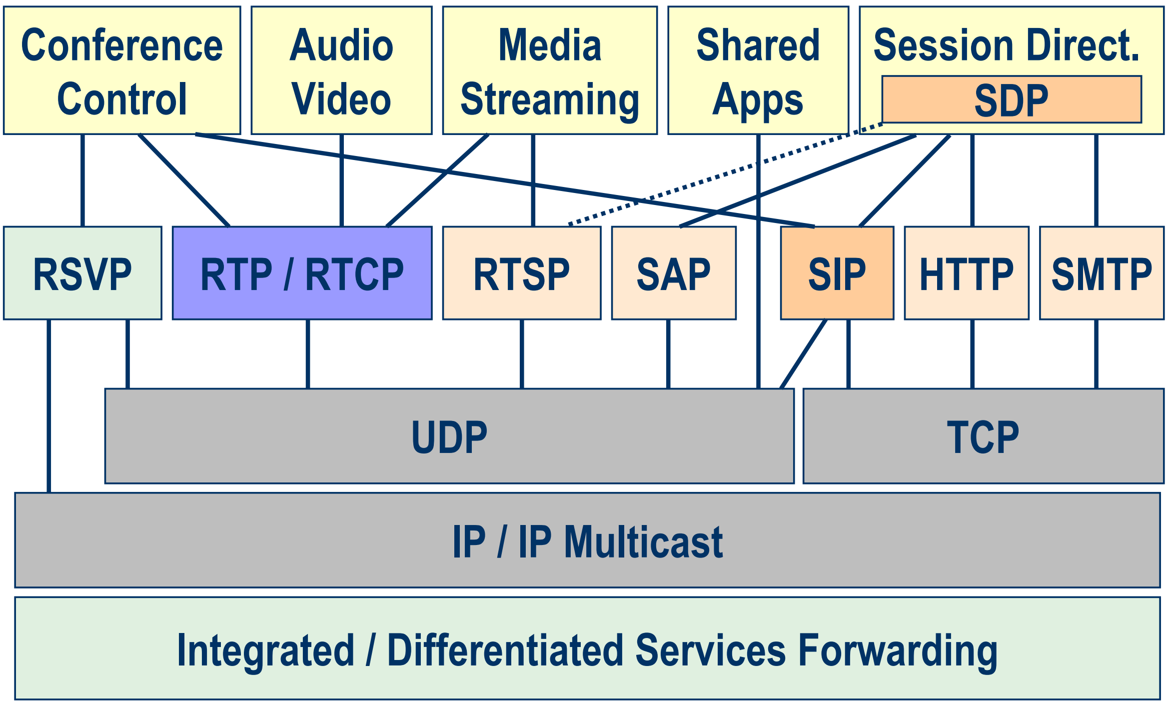
Overview

- IETF Multimedia Conferencing
- Key Features
- SIP Evolution
- SIPit: Interoperability Events
- Working Group(s) and Tasks
- Conclusion

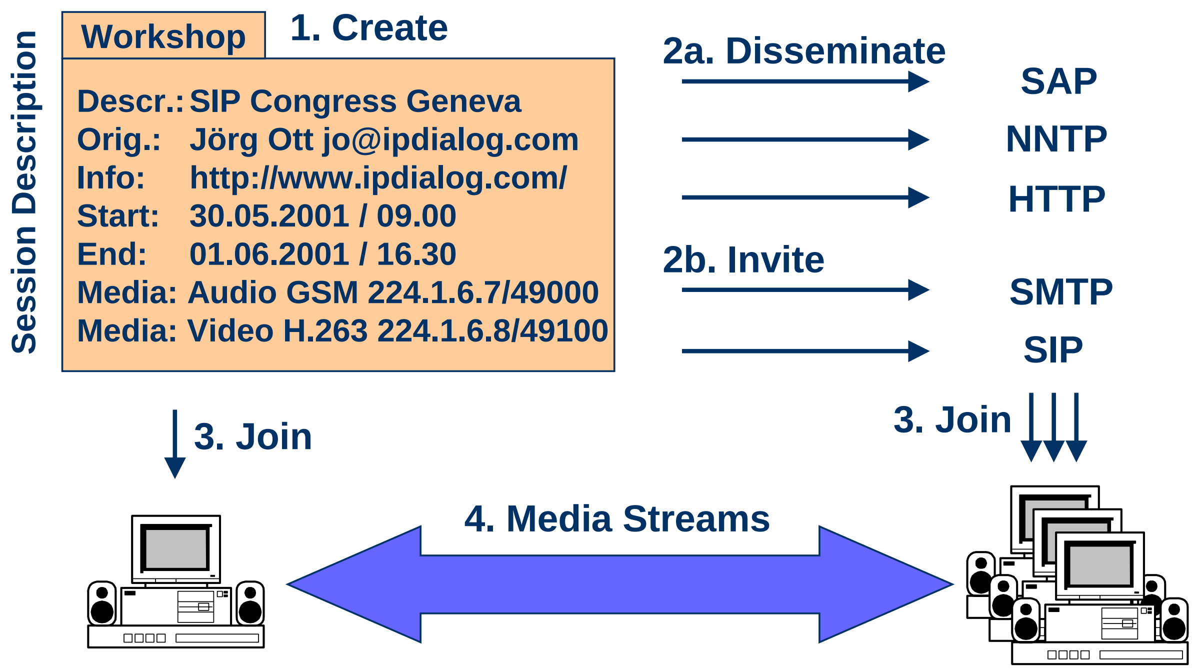
IETF Conferencing

- Packet multimedia experiments since 1980s
  - Audio/video tools + protocols for A/V over IP
  - Conference announcement and control protocols
- First IETF Audiocast (1992)
- Since then: IETF sessions on the Mbone
  - Audio + video (+ sometimes slides)
- Other uses of Mbone conferencing
  - Lectures, seminars, project meetings, …
  - Broadcasting NASA missions, concerts, …

IETF Conferencing Architecture



IETF Conferencing Model



SIP Functionality over Time…

- Origin: MMUSIC
  Multiparty Multimedia Session Control
- From Invitation… to initiation, modification, and termination
- From Multiparty… to point-to-point-focused
- From Multimedia… to voice-centric

The latter is not SIP — but it is the way SIP is looked at today in many cases.

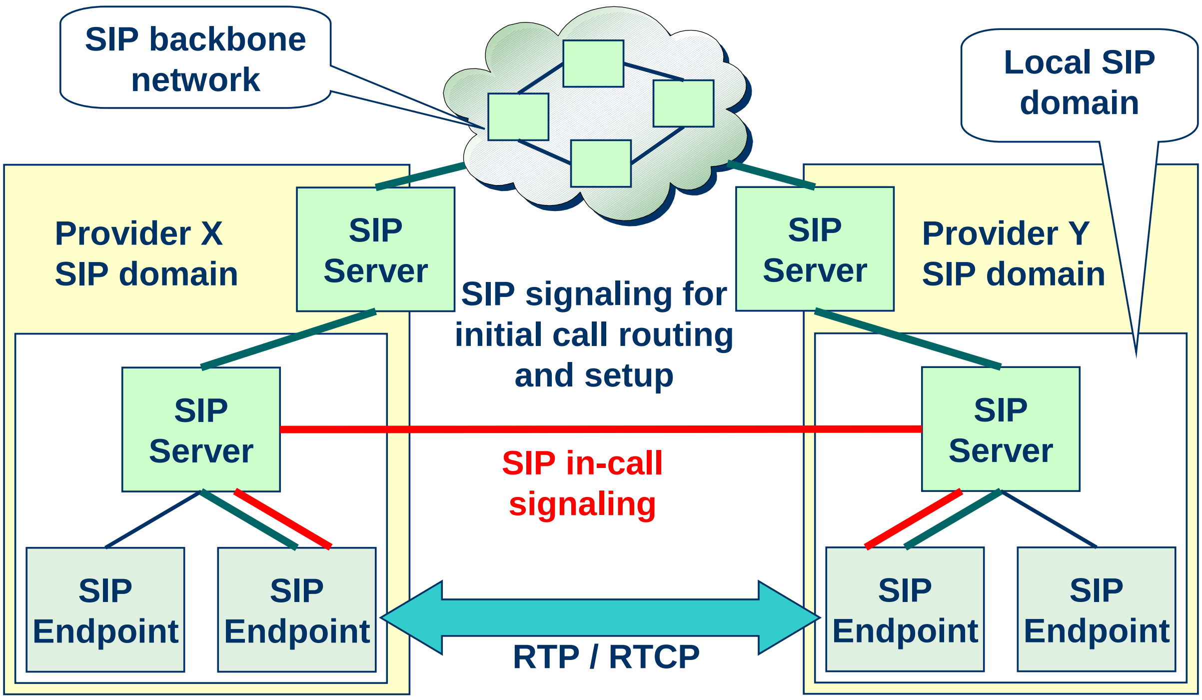
SIP Key Features...

Learning from and using other Internet protocols

- Clean, flexible, distributed architecture
- URL addressing scheme
- Well-defined logical functions
- User location, forking, redirection
- Media and session independent
- Text-based protocol syntax

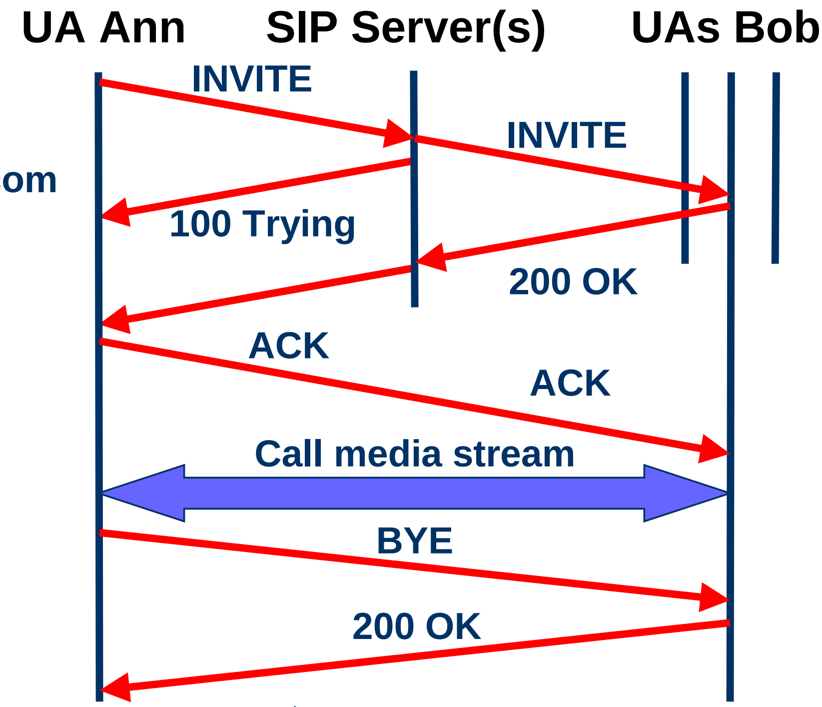
Openness: support from a broad community…

Sample SIP System Architecture



A Simple SIP Call

INVITE
sip:bob@
example.com



Timeline: 1996

Initial Internet Drafts:
Session Invitation Protocol (SIP) – M. Handley, E. Schooler
Simple Conference Invitation Protocol (SCIP) – H. Schulzrinne

22 Feb 1996

SIP: Setup +
Caps Negotiation

SCIP: Setup + Caps
Modify + Terminate

4-8 Mar 1996

Presentations
at 35th IETF,
Los Angeles

2 Dec 1996

Merged Draft:
SIP -01

Main Features set:
TCP/UDP, Forking,
Redirection, addrs
INVITE,CAPABILITY
From: To: Path:

Timeline: 1997

Draft SIP -02

Formal syntax
CAPABILITY → OPTIONS
Path: → Via:
Ideas for Alternates:

Draft SIP -03

SIP URL: sip://jo@…
CONNECTED, BYE, REGISTER
Call-ID: Sequence:
Allow: Expires:

Draft SIP -04

CONNECTED → ACK
UNREGISTER
Sequence: →CSeq:
Call-Disposition:
Require:

IETF Action: Split SIP into base spec and extensions

27 Mar 97 | 31 Jul 97 | 11 Nov 97 | Dec 97

Timeline: 1998

SIP -05

CANCEL
UNREGISTER → ∅
URL sip://jo → sip:jo
Record-Route:
IANA assignments
Security Cons. Sect.

SIP -06

SIP -07

SIP -08

Clarifications & fixes
Cleaning up the spec
Call-ID: MUST
tag parameter

SIP -09

Call Hold SDP

IETF Action: Last Call for Proposed

14 May | 17 Jun | 16 Jul | 8 Aug | 18 Sep | 28 Sep

Timeline: 1998/99

SIP -10
No more DNS MX URI: RFC 2396

SIP -11
Update on SDP part

SIP -12
DNS Lookup Tidying up

IETF Action: Approval for Proposed Standard

IETF Action: Published as RFC 2543

IETF Action: SIP WG formed

12 Nov 98 | 15 Dec 98 | 15 Jan 99 | 2 Feb 99 | 17 Mar 99 | Sep 99

Timeline: 2000/01

bis -00

bis -01

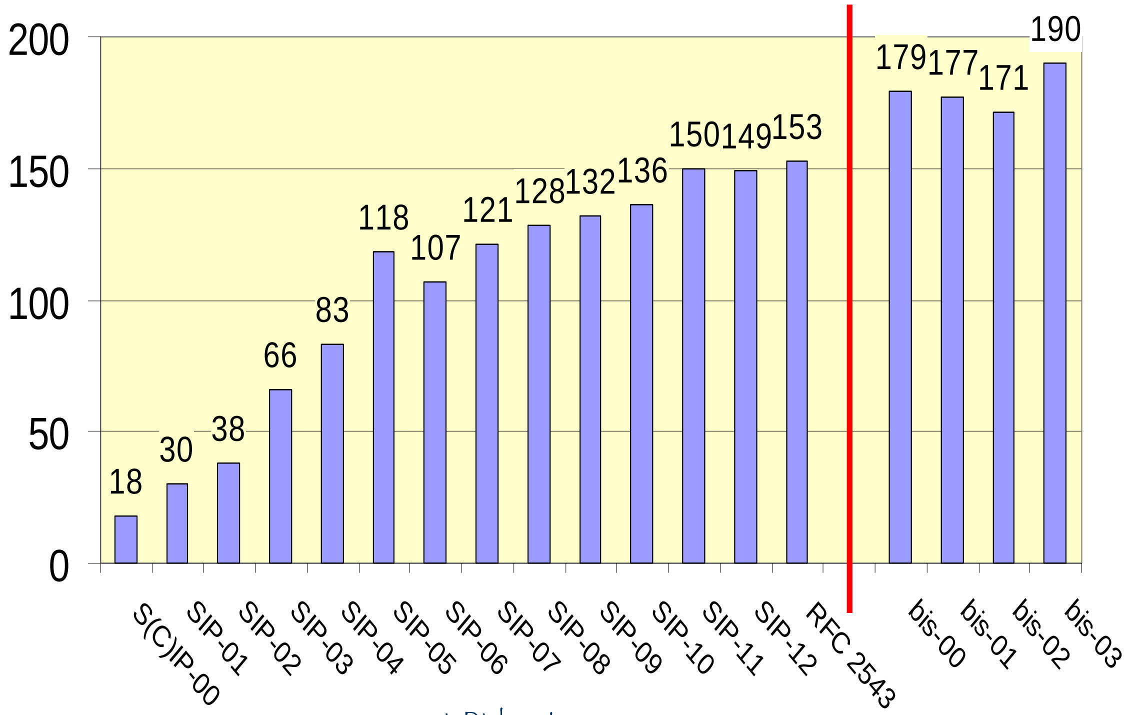
bis -02

bis -03

IETF Action: Formation of new SIPPING WG

13 Jul 00 | 6 Aug 00 | 24 Nov 00 | Spring 01 | 29 May 01

“Weight” of SIP Base Spec



SIP Functionality and Services

- Set up, modify, and terminate media sessions
- Registration, user location, mobility
- Hooks for policing (and user control/preferences)
- Web and media integration

- Flexible service creation platform — end-to-end

- Telephony, PBX functions, …

Has been / will be covered in other talks!

What comprises SIP today?

RFC 2327: Session Description Protocol (SDP)
RFC 2543: Session Initiation Protocol + bis-03
RFC 2824: Call Processing Language
RFC 2976: The SIP INFO Method
RFC 3050: SIP CGI
RFC 3087: SIP Request-URIs for Service Control

SIP MIB

SIP Guidelines
SIP Call Flows
Session Timer
Reliable provisional responses
Third Party Call Control
State Cookies

SIP DHCP Option
SIP Server Location
Caller preferences
Server Features
Call Framework + Transfer
SIP-T work

SiPit
SIP interoperability test event

SIP Interoperability Tests

- Term “Bake-off” banned because of lawsuit
- “Definition” of a SiPit event:
  - Informal gathering of engineers
  - To test interoperability and robustness
  - Of products and prototypes
  - With on-site debugging
- Goals: improve implementations and specs

SIP Interoperability Tests

- Tests
  - Peer to peer and in groups
- Test classification
  - Basic and Intermediate SIP capabilities for UAs
  - Advanced SIP capabilities for Proxies
  - Test scenarios
- Preparation
  - Documentation: Torture tests, call flows
  - Tools: Free / cheap implementations, servers, …

Interop Events

1	Apr 1999	Columbia University	16
2	Aug 1999	Pulver.com	15
3	Dec 1999	Ericsson	26
4	Apr 2000	3Com	36
5	Aug 2000	Pulver.com	44
6	Dec 2000	Sylantro/Sun	57
7	Mar 2001	ETSI	58
8	Aug 2001	Ubiquity	
9	Dec 2001	Nuera	

"Newer" Aspects for SIP

- (SIP for Telephony Interworking: SIP-T)
- SIP for Mobility (3G)
- SIP for QoS and Billing
  - Tough in the end-to-end world ("what to bill for?")
- SIP and Firewalls
- SIP and Conferencing?

- SIP for Instant Messaging, Personal Presence
- Proposal: SIP for Appliances?

SIP for Conferencing…?

- Multimedia Capability Signaling — YES
  - SDPng development
- Multiparty Conferenci… — YES
  - Invitation to Mbo…
  - Initiation, me… …ination
  - Distributi… …ip information
    - An…
- SIP for C… …ence Management? — NO

LIMITED INTEREST

SIP Working Group(s)

- MMUSIC
  - Developed SIP from Feb 1996 to Feb 1999
  - Still takes care of SDP and SDPng
- SIP
  - Initiated in Oslo (Sep 1999) for “load balancing”
  - Look after the base spec + core protocol extensions
- SIPPING
  - About to be approved by the IESG
  - Work on applications of SIP
  - and possibly feed requirements to SIP WG

SIP WG

- RFC 2543 bis
- SIP Call Control
- Caller preferences, server features
- Reliable provisional responses
- Session timers
- SIP MIB
- State Cookies
- Security and Privacy
- SIP Events
- NAT-friendly SIP

SIPPING WG (Draft Stage)

- SIP for Telephony (SIP-T)
- SIP Support for Hearing Impaired Users
- H.323 Interworking
- 3G Networks
- SIP Usage Guidelines
- Multiparty Conferencing
- SIP Application Components
- Call Control, Message Waiting, …
- Living w/ MIME, DNS, DHCP, ENUM, …
- …

SIP-related Groups

- PINT: origin of SUBSCRIBE/NOTIFY
- IPTEL: CPL and TRIP
- SIMPLE: SIP for Presence
- SPIRITS: SIP as “transport” mechanism

- PacketCable DCS
- 3GPP, 3GPP2
  - Using SIP for the next generation wireless networks
- ETSI Tiphon, IMTC: H.323 Interworking, Tests
- SIP Forum

Important: Keeping SIP "Clean"

- "Trendy" standards attract many contributors
  - well, sometimes too many contributors...
- Difficult to maintain architectural integrity
  - explosion of functions, fields, uses, interpretations, ...
- Sheer volume of contributions hard to co-ordinate
- When SIP is no longer used as SIP…
  - "We use SIP - but with the following changes…"
  - "SIP for everything - just because it's there…"
- Risks for durability and future evolution

Conclusion

- SIP has changed and expanded quite a bit
- Managed to keep its architectural integrity

Key components:

- Internet-style protocol for the Internet
- Developed and reviewed in an open process

But:

- Don't SIP everything!

Further Information

www.ietf.org/html.charters/sip-charter.html

www.softarmor.com/sipwg

www.cs.columbia.edu/~hgs/sip

www.cs.columbia.edu/~hgs/sip/sipit