



# SIP

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# Agenda

- **Grunnleggende SIP**
- **Funksjoner i SIP**
- **Signalering i SIP**
- **DNS og ENUM**





# Standarder

## Standarder:

- ✓ **SIP**      *Session Initiation Protocol, RFC-2543*
- ✓ **IAX**      *Inter Asterix eXchange, utvikklet av Asterisk*
- ✓ **G.711**    *Kodingen av tale ( $\mu$ -law = Amerika, a-law = Europa)*
- ✓ **G.729**    *Kodingen av tale med komprimering*





# Deler I et SIP system

## User Agents (UA)

- Kobblings endepunkt (PC, telefon, PDA, Gateway, ...)
- User Agent Client (UAC) Initierer samtaler
- User Agent Server (UAS) informerer brukeren om inkommende samtaler („Trying“ or „Ringing“)

## Registrar Servers

- Kontrollerer trafikken mellom bruker klienterne
- Lagrer SIP-address (sip:userID@domain“) og IP-address for UA's, registrerte brukere i “Location Service”
- Leverer informasjon om “online users”



# Deler i et SIP system

## Proxy Servers

- Sender forespørsler videre fra User Agents til den etterspurte IP-adressen (som den får fra Location Service).
- Muliggjør forespørsler mellom ulike domener.

## Redirect Servers

- Muliggjør for proxy servere å sende forespørsler videre til andre domener.



# SIP Status koder

RFC3261

## 1XX-2XX Informational

100	Trying
<u>180</u>	<u>Ringing</u>
181	Call Is Being Forwarded
182	Queued
183	Session Progress
200	OK
202	OK

## 3XX Redirection

300	Multiple Choices
301	Moved Permanently
303	See Other
305	Use Proxy
380	Alternative Service

## 4XX Client-Error

400	Bad Request
401	Unauthorized
<u>402</u>	<u>Payment Required</u>
403	Forbidden
404	Not Found
405	Method Not Allowed
406	Not Acceptable
407	Proxy Authentication Required
408	Request Timeout
409	Conflict
410	Gone
411	Length Required
413	Request Entity Too Large
414	Request-URI Too Large

415	Unsupported Media Type
420	Bad Extension
480	Temporarily not available
481	Call Leg/Transaction does not exist
482	Loop Detected
483	Too Many Hops
484	Address Incomplete
485	Ambiguous
486	Busy Here
487	Request Terminated
488	Not Acceptable Here
489	Bad Event
491	Request Pending
493	Undecipherable

## 5XX Server-Error

500	Internal Server Error
501	Not Implemented
502	Bad Gateway
503	Service Unavailable
504	Gateway Time-out
505	SIP Version not supported
513	Message Too Large
580	Precondition Failure

## 6XX Global-Failure

600	Busy Everywhere
603	Decline
604	Does Note Exist Anywhere
606	Not Acceptable



# Ulike prosesser

- **Registrerings prosess**
- **Oppkopplings prosess**
- **Nedkopplings prosess**



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# SIP registrering



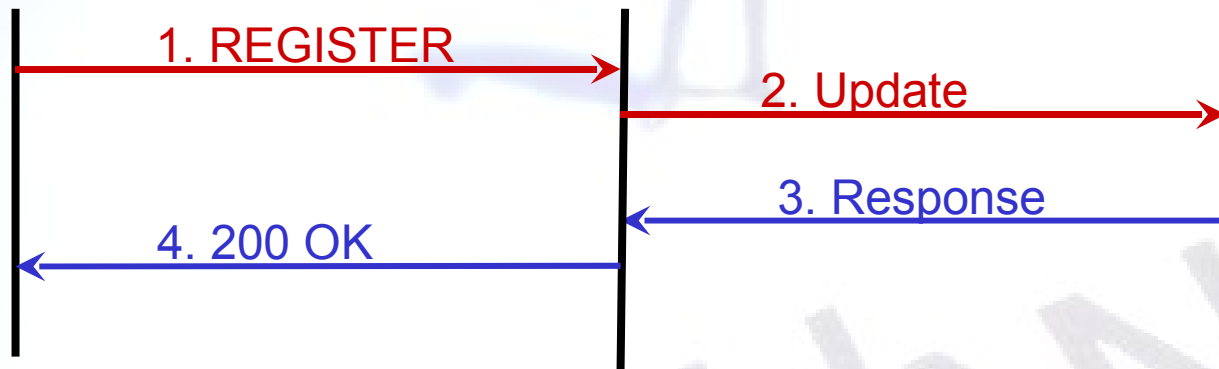
SIP User Agent **A**



Registrar server



Location server



# SIP oppkoppling



SIP User Agent A



SIP User Agent B



# SIP oppkoppling med Proxy



SIP User Agent A



Proxy server

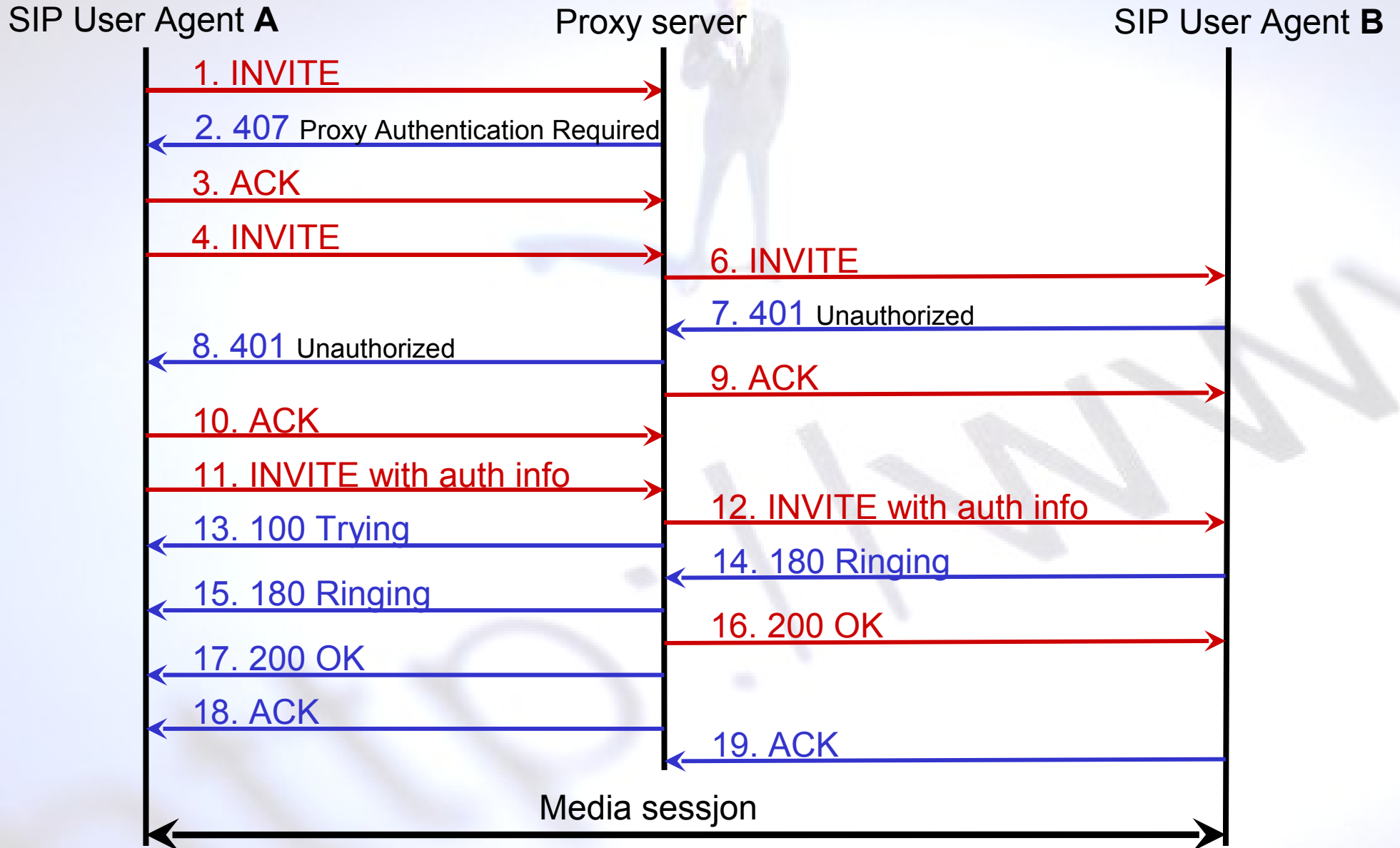


SIP User Agent B





# SIP oppkoppling med auth.

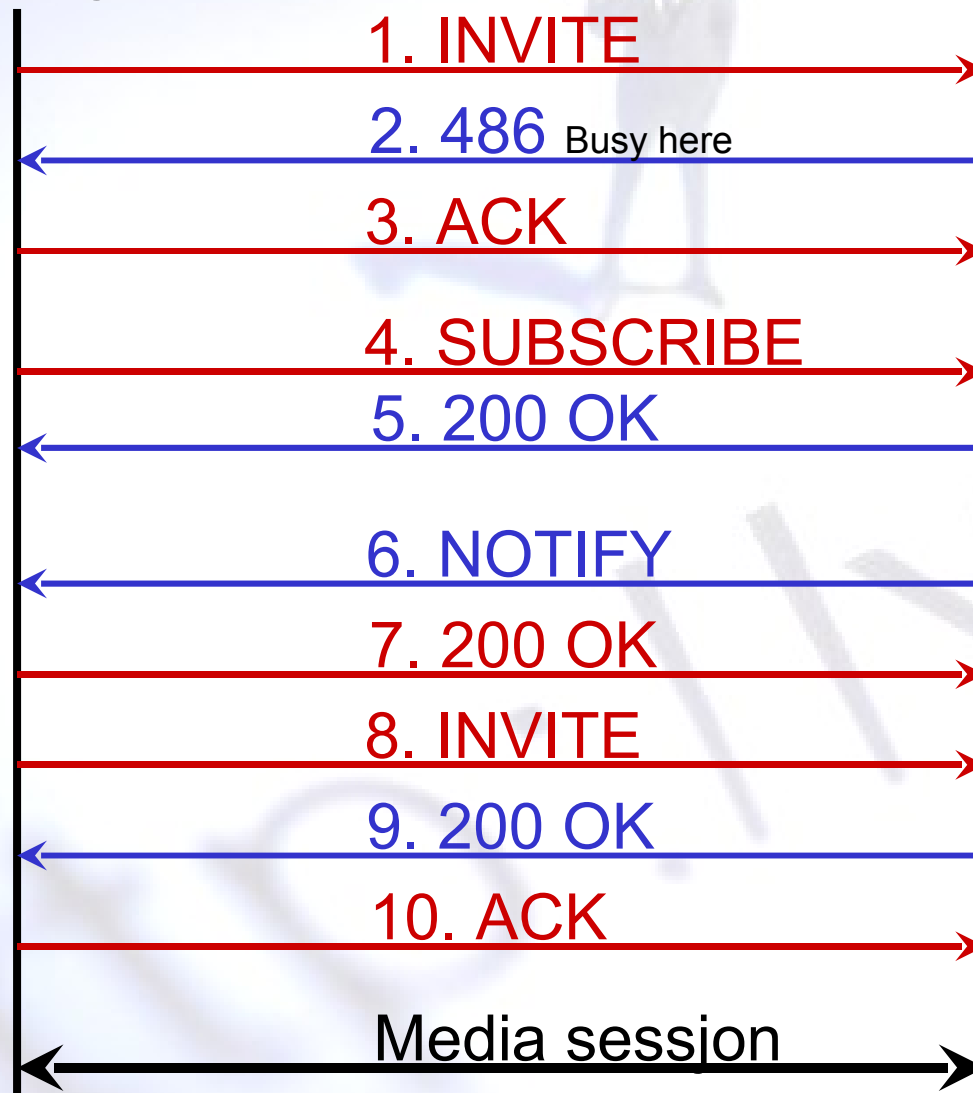




# SIP oppkoppling, opptatt

SIP User Agent A

SIP User Agent B





# SIP oppkoppling



SIP User Agent **A**



SIP User Agent **B**





# SIP oppkoppling

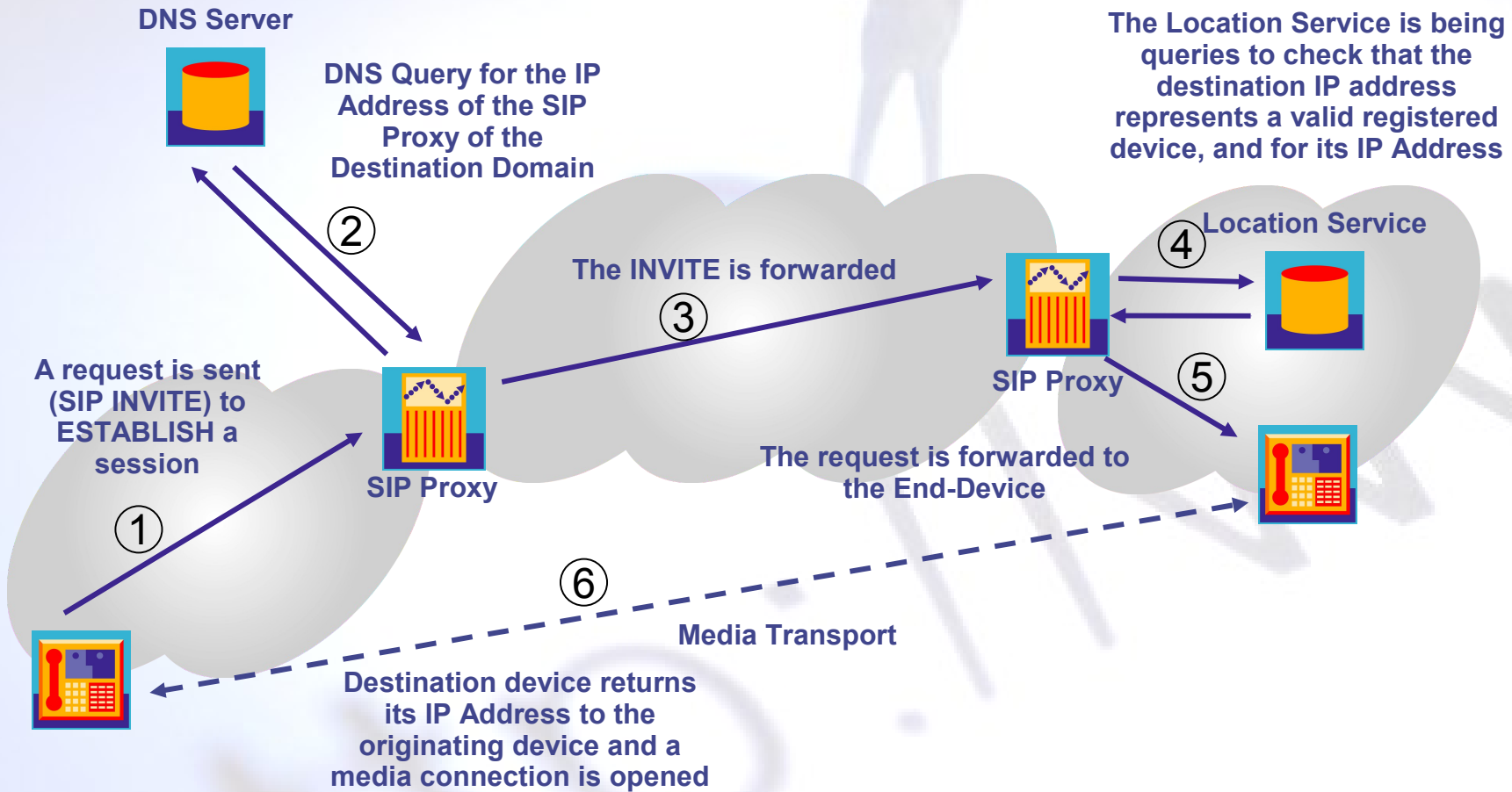
INVITE sip:14551@fwd.pulver.com SIP/2.0  
Via: SIP/2.0/UDP 64.81.202.47:5070  
From: Ed Guy <sip:19020@fwd.pulver.com:5070>  
;tag=791606717  
To: <sip:14551@fwd.pulver.com>  
Contact: <sip:19020@64.81.202.47:5070>  
Call-ID: 8071FDF0-F384-4260-8E53-  
824528212BFC@192.168.1.127  
CSeq: 19171 INVITE  
Content-Type: application/sdp  
Content-Length: 269

v=0  
o=19020 1090725218 1090725218 IN IP4 64.81.202.47  
s=xPhone  
c=IN IP4 64.81.202.47  
t=0 0  
m=audio 8000 RTP/AVP 4 0 8 3 101  
a=rtpmap:4 G723/8000  
a=rtpmap:0 pcmu/8000  
a=rtpmap:8 pcma/8000  
a=rtpmap:3 gsm/8000  
a=rtpmap:101 telephone-event/8000  
a=fmtp:101 0-15

IP/2.0 100 Trying  
Via: SIP/2.0/UDP 64.81.202.47:5070  
From: Ed Guy  
<sip:19020@fwd.pulver.com:5070>;tag=791606717  
To: <sip:14551@fwd.pulver.com:5060>  
Call-ID: 8071FDF0-F384-4260-8E53-  
824528212BFC@192.168.1.127  
CSeq: 19171 INVITE  
Content-Length: 0

SIP/2.0 180 Ringing  
Via: SIP/2.0/UDP 64.81.202.47:5070  
From: Ed Guy  
<sip:19020@fwd.pulver.com:5070>;tag=791606717  
To: <sip:14551@fwd.pulver.com:5060>;tag=846932532  
Call-ID: 8071FDF0-F384-4260-8E53-  
824528212BFC@192.168.1.127  
CSeq: 19171 INVITE  
Record-Route:  
<sip:14551@192.246.69.223:5060;maddr=192.246.6  
9.223>,<sip:14551@192.246.69.223:5060;maddr=1  
92.246.69.223>  
Contact: sip:63.175.28.50:5060  
User-Agent: eDial Server  
Content-Length: 0

# En typisk IP telefoni oppkoppling





# Katalog tjenester

## ENUM

- Ikke ferdigt enda
- Norid har fått ansv. Av Post og Teletilsynet for test/drift av +47

## DNS srv

- Ser ut som epost adr.
- Ingen sentral "katalog"



# DNS SRV Records

**SRV records (Standard RFC2782) har formatet:**

"\_Service.\_Proto.Name TTL Class SRV Priority Weight  
Port Target"

**Eksempel:**

"\_sip.\_udp.asterisk.no 43200 IN SRV 10 10 5060  
sip.asterisk.no."



# DNS zone fil eksempel

```
Asterisk.no IN SOA ns.asterisk.no. root.asterisk.no. (  
    2005110101  
    10800  
    3600  
    604800  
    86400 )
```

```
asterisk.no. 43200 IN NS ns.bigu.edu.
```

```
;
```

```
ns. asterisk.no. 43200 IN A 10.0.0.20
```

```
sip1. asterisk.no. 43200 IN A 10.0.0.21
```

```
sip2. asterisk.no. 43200 IN A 10.0.0.22
```

```
;
```

```
_sip._udp. asterisk.no. 43200 IN SRV 0 0 5060 sip1.asterisk.no.
```

```
_sip._udp. asterisk.no. 43200 IN SRV 1 0 5060 sip2.asterisk.no.
```

```
_sip._tcp. asterisk.no. 43200 IN SRV 0 4 5060 sip1.bigu.edu.
```

```
_sip._tcp. asterisk.no. 43200 IN SRV 0 2 5060 sip2.asterisk.no.
```

```
_sips._tcp. asterisk.no. 43200 IN SRV 0 0 5060 sip1.bigu.edu.
```

```
_sips._tcp. asterisk.no. 43200 IN SRV 0 0 5060 sip2.asterisk.no.
```



# Verktøy

- **Sipp**            [sipp.sourceforge.net](http://sipp.sourceforge.net)  
"Belastnings tester"
- **Sipsak**        [sipsak.org](http://sipsak.org)  
"SIP swiss army knife"