Session Description Protocol

- SDP is used for the description of the format of media streams
- For each media stream of a session, an SDP description is needed
- Note that SDP does not transport media: it is used only for their description
- SDP descriptions are carried in the body of SIP messages
Structure of SDP descriptions

• Session-level information
  – Protocol version
  – originator and session ID
  – Session Name
  – Session time

• Media description 1
  – Media name and transport
  – connection information

• Media description 2
  – Media name and transport
  – Connection information

• ...

Session Description Protocol

- SDP descriptions are a sequence of lines with the following format:
  - field=value
- Where field is a single character
- Compulsory fields are:
  - v=  
    - (version)
  - o=  
    - (session origin and session identifier)
  - s=  
    - (session name)
  - t=  
    - start e stop time della sessione, used in special cases
  - m=  
    - media type, transport protocol, port, payload type
Session Description Protocol

- Optional fields are:
  - u=
    - Specification of a URI
  - e=
    - email address
  - c=
    - Data about low-level network connection (IP)
  - b=
    - bandwidth
  - a=
    - Additional attributes
Session Description Protocol

• A field may have subfields
  – o= has 6 subfields
    • username
      – sip login identity of originator
    • session ID
      – unique ID of session
    • version
    • network type
      – - IN = Internet
    • address type
      – IP4 or IP6
    • address
Session Description Protocol

- **m=** has 4 subfields
  - media type
    - For example, audio
  - port
    - RTP port
  - transport
    - Type of transport used for the media: RTP
  - format
    - payload type
- **example**
  - m=audio 45678 rtp/avp 0 // (G.711)
  - Attributes could be
    - a=sendonly
    - a=rcvonly
    - a=orient:landscape
  - If multiple formats are available
    - a=rtpmap 2 G726-32/8000 (2 means priority 2)
    - a=rtpmap 4 G723/8000 (4 means priority 4)
Negotiation of media

• SDP descriptions are included in the INVITE message and in the following responses
SDP and SIP

Daniel@sip:collins.station1.work.com > boss@sip:manager.station2.work.com

INVITE sip:manager@station2.work.com SIP/2.0
FROM: Daniel@sip:collins.station1.work.com; tag = abcd1234
To: boss@sip:manager.station2.work.com
CSeq: 1 INVITE
Content-Length: 213
Content-Type: application/sdp
Content-Disposition: session

v=0
o=collins 123456 001 IN IP4 station1.work.com
s=station1.work.com
t=0 0
m=audio 4444 RTP/AVP 2
a=rtpmap 2 G726-32/8000
m=audio 4666 RTP/AVP 4
a=rtpmap 4 G723/8000
m=audio 4888 RTP/AVP 15
a=rtpmap 15 G728/8000

Daniel@sip:collins.station1.work.com > boss@sip:manager.station2.work.com

SIP/2.0 200 OK
FROM: Daniel@sip:collins.station1.work.com; tag = abcd1234
To: boss@sip:manager.station2.work.com; tag = xyz679
CSeq: 1 INVITE
Content-Length: 163
Content-Type: application/sdp
Content-Disposition: session

v=0
o=collins 45678 001 IP4 station2.work.com
s=station2.work.com
t=0 0
m=audio 0 RTP/AVP 2
a=rtpmap 0 96000
m=audio 0 RTP/AVP 4
a=rtpmap 4 96000
m=audio 6666 RTP/AVP 15
a=rtpmap 15 96000

ACK
SIP and resource management

• SIP can interact with signaling protocols for QoS negotiation and setup, such as RSVP
SIP and resource management

**SDP description in INVITE**

- v=0
- o=userA 45678 IN IP4 A.network.com
- s=
- c=IN IP4 A.network.com
- t=0 0
- m=audio 4444 rtp/avp 0
- a=curr: qos e2e none
- a=des: qos mandatory e2e sendrecv

**Curr:** current status  
**Des:** desired status

**e2e resource reservation**

1. INVITE
2. 183 SESSION IN PROGRESS (provisional)
3. PRACK (183 session in progress)
4. 200 OK (PRACK)
5. UPDATE
6. 200 OK (UPDATE)
7. 180 RINGING
8. PRACK (RINGING)
9. 200 OK (PRACK)
10. 200 OK (INVITE)
11. ACK

INVITE
SIP and resource management

SDP description in “session in progress”

V=0
O=userB 12345 IN IP4 stationB.network.com
S=
C=IN IP4 stationB.network.com
T=0 0
M=audio 6666 RTP/AVP 0
A=curr qos e2e none
A=des: qos mandatory e2e sendrecv
A=conf: qos e2e recv

Conf confirms that userB wants userA to reserve resources in the direction from userA to userB
SIP and resource management

SDP description in “update”

V=0
O=userA 45678 IN IP4
    stationA.network.com
S=
C=IN IP4 stationA.network.com
M=audio 444 RTP/AVP 0
A=curr: qos e2e send
A=des: qos mandatory e2e sendrecv
SIP and resource management

SDP description in “200 OK”
V=0
O=userB 12345 IN IP4
   stationB.network.com
S=
C=IN IP4 stationB.network.com
T=0 0
M=audio 666 RTP/AVP 0
A=curr: qos e2e sendrecv
A=des:qos mandatory e2e sendrecv