

SDP Capability Negotiation

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Flemming Andreasen (fandreas@cisco.com)

Background

- Media stream establishment can be divided into three areas:
 - Capabilities or Potential Configurations describing the set of media streams and associated parameters that can potentially be used
 - Actual configurations describing which media streams and associated parameters can actually be used at this point in time
 - Negotiation Process which takes the set of potential configurations from each media stream participant as input, determines common subset, and provides the actual configurations as output
- SDP was designed to address only one of these, namely describing actual configurations:
 - Suffices for session announcement, but not for general multiparty multimedia sessions (e.g., SIP)

Background

- RFC 2543 Appendix B defined use of SDP for SIP
- RFC 3264 defines the offer/answer negotiation model using existing SDP
 - Enables an offer to provide a list of media streams and associated codecs which the answerer can accept and/or subset.
 - Each media stream and codec contains an actual configuration which describes the transport address, transport protocol, media formats and associated parameters that can be used at this point in time

Background

- SDP and the offer/answer model cannot negotiate alternative RTP profiles
 - For example, an offerer supporting both RTP and Secure RTP cannot offer these as alternatives and have the answerer choose one
 - This presents a barrier to deployment of Secure RTP
 - In general, it is a problem for deployment of new RTP profiles (RTP/AVP, RTP/AVPF, RTP/SAVP, RTP/SAVPF, etc.)
- Other real-life limitations with SDP and the offer/answer model exist as well
 - For example, support of alternative media types (e.g. audio or image).

Background

- Need a solution to these problems
- SDP extensions addressing some of the limitations have been defined, e.g.
 - Grouping of Media Lines in SDP (RFC 3388) and related extensions (e.g. ANAT - RFC 4091)
 - SDP Simple Capability Declaration (RFC 3407)
- Other relevant work includes:
 - Session Description and Capability Negotiation (SDPng, work in progress)
 - MIME multipart/alternative
 - Sharing ports between "m=" lines
 - Opportunistic encryption with or without probing

Background

- Purpose of the document
 - Determine a set of requirements for SDP capability negotiation
 - Examine existing mechanisms for solution applicability
 - Define an actual solution satisfying the requirements
- Focus today's discussion on requirements
 - Need to agree on the scope of the problem we want to solve
 - Clearly, people want to support plain and secure RTP
 - However, as we've shown, there are other current limitations
 - Somewhere north of status quo and south of SDPng and H.245.

Requirements

- REQ-10: It **MUST** be possible to indicate and negotiate alternative [combinations of] media formats on a per media stream basis.
 - For example, many implementations support multiple codecs, but only one at a time. Changes between codecs cannot be done on-the-fly, e.g. when receiving a simple RTP payload type change.
 - For example, an entity may support PCMU and G.729 or PCMU and iLBC, but not G.729 and iLBC at the same time.

Requirements

- REQ-20: It MUST be possible to indicate and negotiate alternative attribute values ("a=") on a per media stream basis.
 - For example, T.38 defines new attributes that may need to be conveyed as part of a capability.

Requirements

- REQ-30: It MUST be possible to indicate and negotiate alternative media format parameter values ("a=fmtp") per media format on a per media stream basis.
 - For example, a media format (codec) indicated as an alternative capability may include fmtp parameters.

Requirements

- REQ-40: It MUST be possible to indicate and negotiate alternative transport protocols, e.g. different RTP profiles, on a per media stream basis.
 - For example, "RTP/AVP" and "RTP/SAVP" may be alternatives.

Requirements

- REQ-50: It **MUST** be possible to indicate and negotiate alternative media type and transport protocol combinations on a per media stream basis.
 - For example, an entity may support a fax call using either
 - T.38 fax relay ("m=image <port> udpt1 t38")
 - PCMU ("m=audio <port> RTP/AVP 0")

Requirements

- REQ-60: It **MUST** be possible to specify unicast and multicast addresses as alternatives.
 - [Editor's Note: This leads to some interesting issues with respect to the offer/answer model, where the set of parameters of relevance (or even defined) for a unicast stream differs from that of multicast streams. Also, some parameters have different meanings (e.g. direction attributes).]

Requirements

- REQ-70: It **MUST** be possible to specify IPv4 and IPv6 addresses as alternatives.
 - [Editor's note: This duplicates the RFC 4091 ANAT grouping semantics - is it needed here ?]

Requirements

- REQ-80: The mechanism **MUST** be backwards compatible for at least SIP and RTSP. Ideally, the mechanism should be completely transparent to entities that do not support it, without the need for any further signaling.

Requirements

- REQ-90: The mechanism **MUST** either be backwards compatible for Megaco and MGCP or it **MUST** be possible to interwork it with Megaco and MGCP without any additional signaling.
 - For example, if a media gateway controller (MGC) uses SIP to communicate with peers, and the MGC uses Megaco or MGCP to control a media gateway, it must be possible to translate between the mechanism and normal SDP. Avoiding interworking requirements in the MGC is desirable.

Requirements

- REQ-100: The mechanism **MUST** work within the context of the offer/answer model [RFC3264]. Specifically, it **MUST** be able to negotiate alternatives within a single round-trip.
 - [Editor's note: Should we limit scope to O/A only, or should we include RTSP as well ?]

Requirements

- REQ-110: The offer/answer model requires the offerer to be able to receive media for any media streams listed as either "recvonly" or "sendrecv" in an offer, as soon as that offer is generated. The mechanism **MUST** preserve this capability for all actual configurations included in an offer.
 - Potential configurations (capabilities) do not have such a requirement.

Requirements

- REQ-120: The mechanism **MUST** enable inclusion of potential configurations (alternative capabilities) in the offer - the answer would then indicate which, if any of these potential configurations were accepted. The offerer is not required to process media for a specific potential configuration until the offerer receives an answer showing that potential configuration was accepted.

Requirements

- REQ-130: The mechanism **MUST** work in the presence of SIP forking.

Requirements

- REQ-140: The mechanism SHOULD be reasonably efficient in terms of overall message size.
 - This is a relative requirement to evaluate alternative solutions as opposed to an absolute and quantifiable requirement

Requirements (new)

- REQ-150: It **MUST** be possible to specify valid combinations of media lines
 - For example, an entity may be able to support audio and video or audio and IM, but not IM and video (or all three).

Requirements (new)

- REQ-160: It **MUST** be possible to specify valid combinations of media formats between media streams
 - For example, there may be constraints on which combinations of audio and video codecs can be supported.

Non-Requirements in Current Document

- The following has been considered explicitly out-of-scope in the document:
 - Indication of mandatory and optional capabilities.
 - Constraints on combinations of configurations, e.g. inability to use a video codec together with a particular audio codec, parameter X values that can only be used with parameter Y values, etc.
 - List comments indicated a desire to do this though (new REQ-150 and REQ-160)

Next Steps

- Interest in the work ?
- WG item ?