

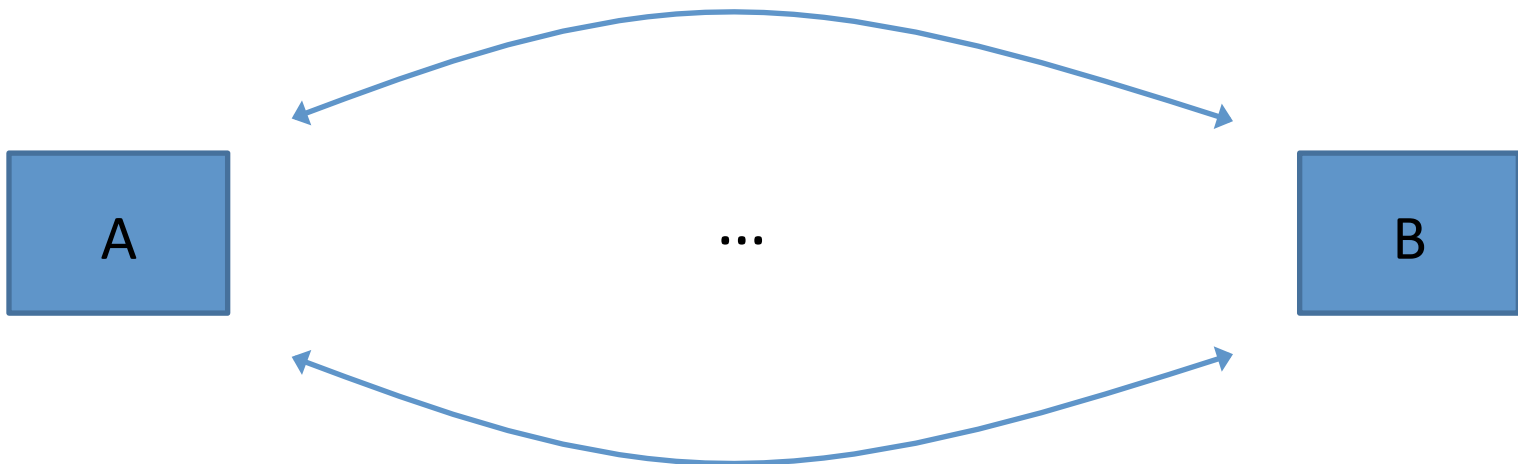
draft-singh-avtcore-mprtp-04

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Reminder

- Splitting an RTP session across multiple paths for load balancing and/or robustness
- Seemed to be an ok idea as per feedback from previous IETFs



Basic MPRTP Operation

- Learn about additional paths/interfaces
 - Advertise interface
 - Subflow have own identifier and sequence #
 - Subflow RTCP for reporting path characteristics
-
- RTP and RTCP are multiplexed on single port



Interface Advertisement

- Out-of-band: in SDP
- In-band: RTCP or suitable STUN extension
- Out-of-band signaling for session setup and initial interface negotiation
- In-band signaling to deal with frequent changes in interface state.
- The endpoint SHOULD always respond using the same mechanism
- If a mismatch in type of advertisements occurs then SDP MUST be used.

Interface advertisement in SDP

```
mprtp-interface = "interface" ":" counter SP unicast-address  
                  ":" rtp_port  
                  *(SP interface-description-extension)
```

Example

```
v=0  
o=alice 2890844526 2890844527 IN IP4 192.0.2.1  
s=  
c=IN IP4 192.0.2.1  
t=0 0  
m=video 49170 RTP/AVP 98  
a=rtpmap:98 H264/90000  
a=fmtp:98 profile-level-id=42A01E;  
a=extmap:1 urn:ietf:params:rtp-hdext:mprtp  
a=rtcp-mux  
a=mprtp interface:1 195.148.127.42:49170  
a=mprtp interface:2 130.233.154.105:51372
```

Clarify states of a path

- a=sendonly
- a=recvonly
- a=sendrecv
- a=inactive
 - These remain the same for the media level
 - A subflow cannot be sendonly and then receive media data
 - Corner case if something is sendrecv, then one flow could send and the other receive if n=2 paths

Subflow Announcements

- Fallback
 - Use {active} and {inactive} sets
 - Inactive MUST be used for fallback? By default?
- Error resilience
 - Preference to use one network for sending redundant packets
 - Advertiser uses local policy for making the decision
- Throughput
 - Each Interface defines its max-allowed,
 $\text{Sum}\{\text{all}\} \geq \text{max_media_rate}$

MPRTP using ICE

1. Advertise ICE candidates (initial offer): the endpoints run connectivity checks.
 2. Advertise MPRTP interfaces: When enough connectivity checks succeed.
- When adding an interface in mid-session, should the endpoints also send the ICE candidates for the connections in use?
 - What happens when an updated offer does not contain ICE candidates but MPRTP interfaces

ICE SDP Example

INITIAL OFFER:

```
m=video 49170 RTP/AVP 98
a=rtpmap:98 H264/90000
a=fmtp:98 profile-level-id=42A01E;
a=candidate:1 1 UDP 2130706431 195.148.127.42 49170 typ host
a=candidate:2 1 UDP 1694498815 130.233.154.105 51372 typ host
```

ANSWER:

```
m=video 4000 RTP/AVP 98
a=rtpmap:98 H264/90000
a=fmtp:98 profile-level-id=42A01E;
a=candidate:1 1 UDP 2130706431 195.148.127.36 4000 typ host
```

(after enough connectivity checks succeed)

UPDATED OFFER (with MPRTTP interfaces):

```
a=mprtp interface:1 195.148.127.42:49170
a=mprtp interface:2 130.233.154.105:51372
```

ANSWER:

```
a=mprtp interface:1 195.148.127.36:4000
```

Open Issues

- In-band vs Out-of-band
 - Both or do only one?
- Keep the basic SDP but move the complex cases to another document?
 - RTSP usage in another document
 - What about ICE etc?

Next Steps?