

Delayed Duplication Attribute in SDP

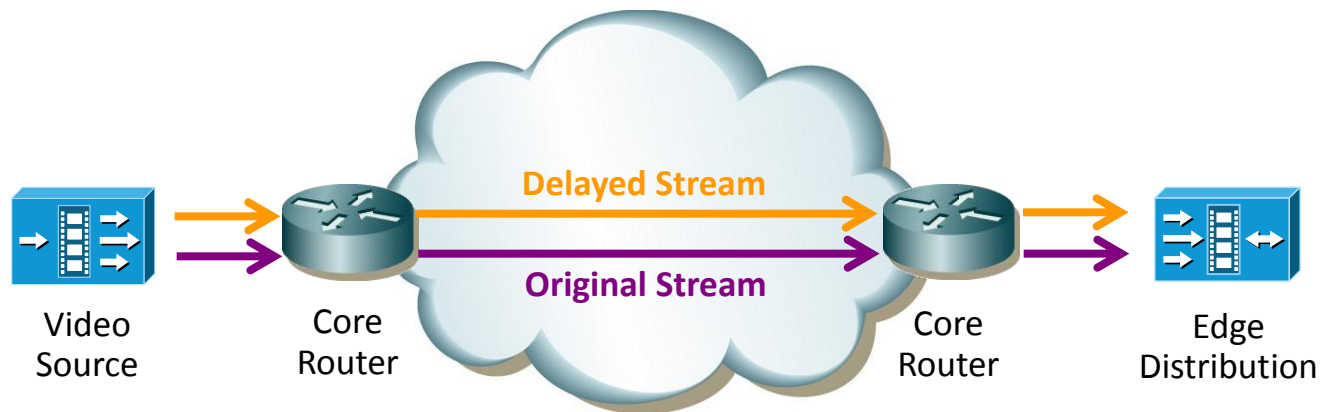
draft-begen-mmusic-temporal-interleaving-02

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Time-Shifted Redundancy (Delayed Duplication)



- Let Q denote the max outage duration that is intended to be repaired
- Packets are transmitted twice, each separated by Q time units
- Temporal diversity is hitless if loss/outage can be constrained to Q time units
- This introduces 100% overhead and a delay of Q time units

The 'duplication-delay' Attribute

- It is defined as both a media-level and session-level attribute and specifies the relative delay for each duplication in milliseconds (ms)

delaying-attribute = "a=duplication-delay:" periods CRLF
periods = period * (":" period)
period = 1 * DIGIT ; in milliseconds

- If used at media level, it MUST be used with the 'ssrc-group' attribute and "DUP" grouping semantics
- If used at session level, it MUST be used with 'group' attribute and "DUP" grouping semantics

Example 1

- The multicast stream is duplicated with a duplication delay of 100 ms

```
v=0
o=ali 1122334455 1122334466 IN IP4 dup.example.com
s=Delayed Duplication
t=0 0
m=video 30000 RTP/AVP 100 101
c=IN IP4 233.252.0.1/127
a=source-filter:incl IN IP4 233.252.0.1 198.51.100.1
a=rtpmap:100 MP2T/90000
a=rtpmap:101 MP2T/90000
a=ssrc:1000 cname:ch1@example.com
a=ssrc:1010 cname:ch1@example.com
a=ssrc-group:DUP 1000 1010
a=duplication-delay:100
a=mid:Group1
```

Example 2

- The multicast stream is duplicated twice:
 - 50 ms after the original transmission, the first duplicate is transmitted
 - 100 ms after that, the second duplicate is transmitted

```
v=0
o=ali 1122334455 1122334466 IN IP4 dup.example.com
s=Delayed Duplication
t=0 0
m=video 30000 RTP/AVP 100 101 102
c=IN IP4 233.252.0.1/127
a=source-filter:incl IN IP4 233.252.0.1 198.51.100.1
a=rtpmap:100 MP2T/90000
a=rtpmap:101 MP2T/90000
a=rtpmap:102 MP2T/90000
a=ssrc:1000 cname:ch1@example.com
a=ssrc:1010 cname:ch1@example.com
a=ssrc:1020 cname:ch1@example.com
a=ssrc-group:DUP 1000 1010 1020
a=duplication-delay:50:100
a=mid:Group1
```

Example 3

- The multicast UDP stream is duplicated with a duplication delay of 50 ms

```
v=0
o=ali 1122334455 1122334466 IN IP4 dup.example.com
s=Delayed Duplication
t=0 0
a=group:DUP S1a S1b
a=duplication-delay:50
m=audio 30000 udp mp4
c=IN IP4 233.252.0.1/127
a=source-filter:incl IN IP4 233.252.0.1 198.51.100.1
a=mid:S1a
m=audio 40000 udp mp4
c=IN IP4 233.252.0.2/127
a=source-filter:incl IN IP4 233.252.0.1 198.51.100.1
a=mid:S1b
```

Next Steps

- Opinions, comments, questions?