P802.1CM SIMULATION RESULTS FOR *PROFILES A & B*

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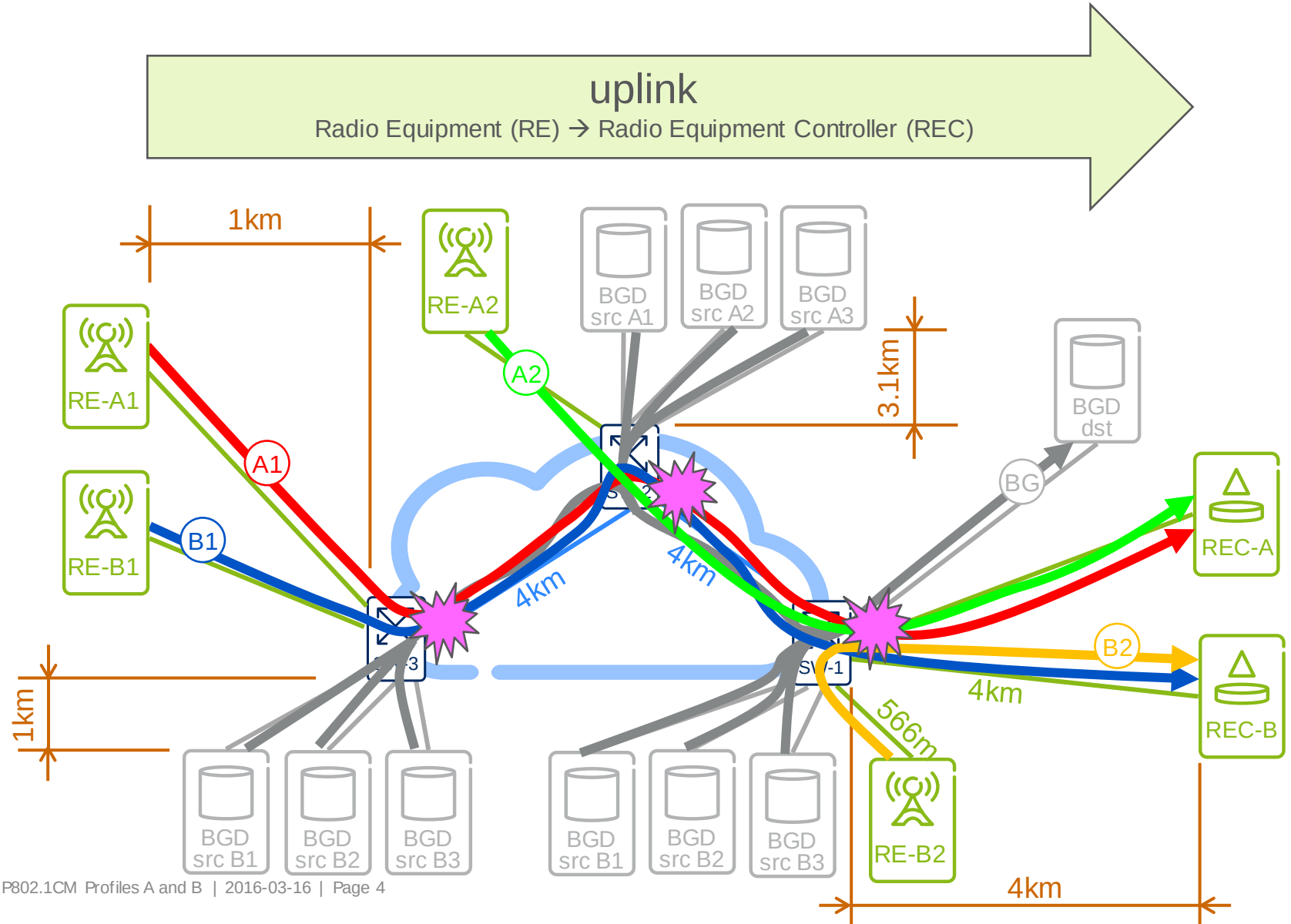
D0.2 PROFILES FOR CPRI FUNCTIONAL DECOMPOSITION

- Profile A
  - Strict priority queuing
  - No specific TSN features
  - A frame carrying CPRI traffic may need to wait 1500 Bytes of non-CPRI traffic at each hop
- Profile B
  - Strict priority queueing
  - Frame preemption
  - No further TSN features
  - A frame carrying CPRI traffic may need to wait 64-Byte fragment or 64 … 123 Bytes frame of non-CPRI traffic at a hop

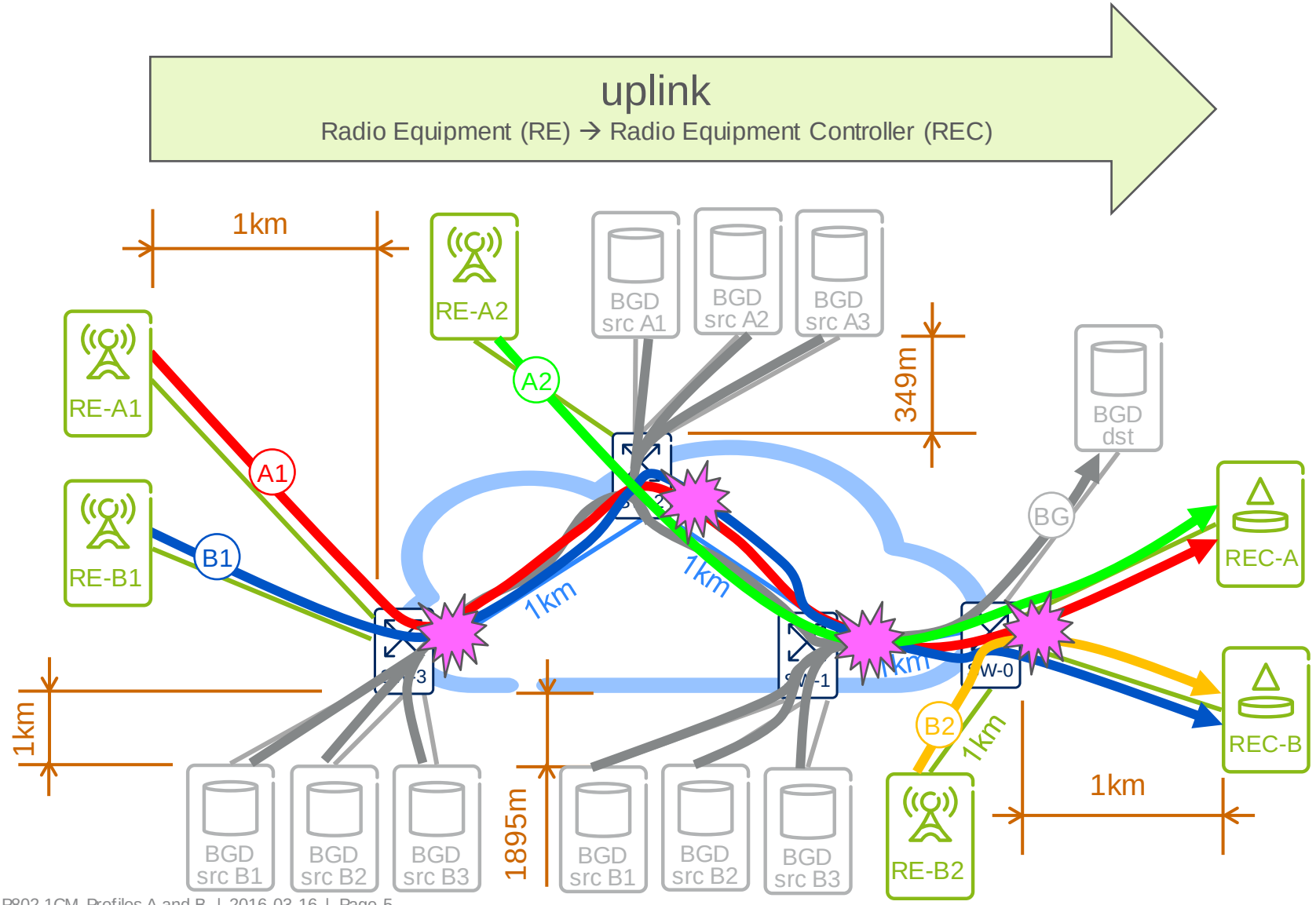
EVALUATED SCENARIOS

- Tree topologies comprising 10 Gbps links
- Bridge delay: uniform distribution in the range of [1495ns .. 1505ns], i.e., bridge delay variation = 10ns
- Traffic characteristics
  - CPRI IQ data (CBR)
    - Payload: 1500 Bytes or 300 Bytes
    - Nominal CPRI rate: 1.228 Gbps
    - 8b/10b coding removed, therefore, rate: 1.007286 Gbps
  - VBR background
    - Payload: 1500 Bytes
    - Mean rate: 1.127867 Gbps
- Traffic source timing inaccuracy: ± 20 ns
- Topologies are designed for frame racing (collision)

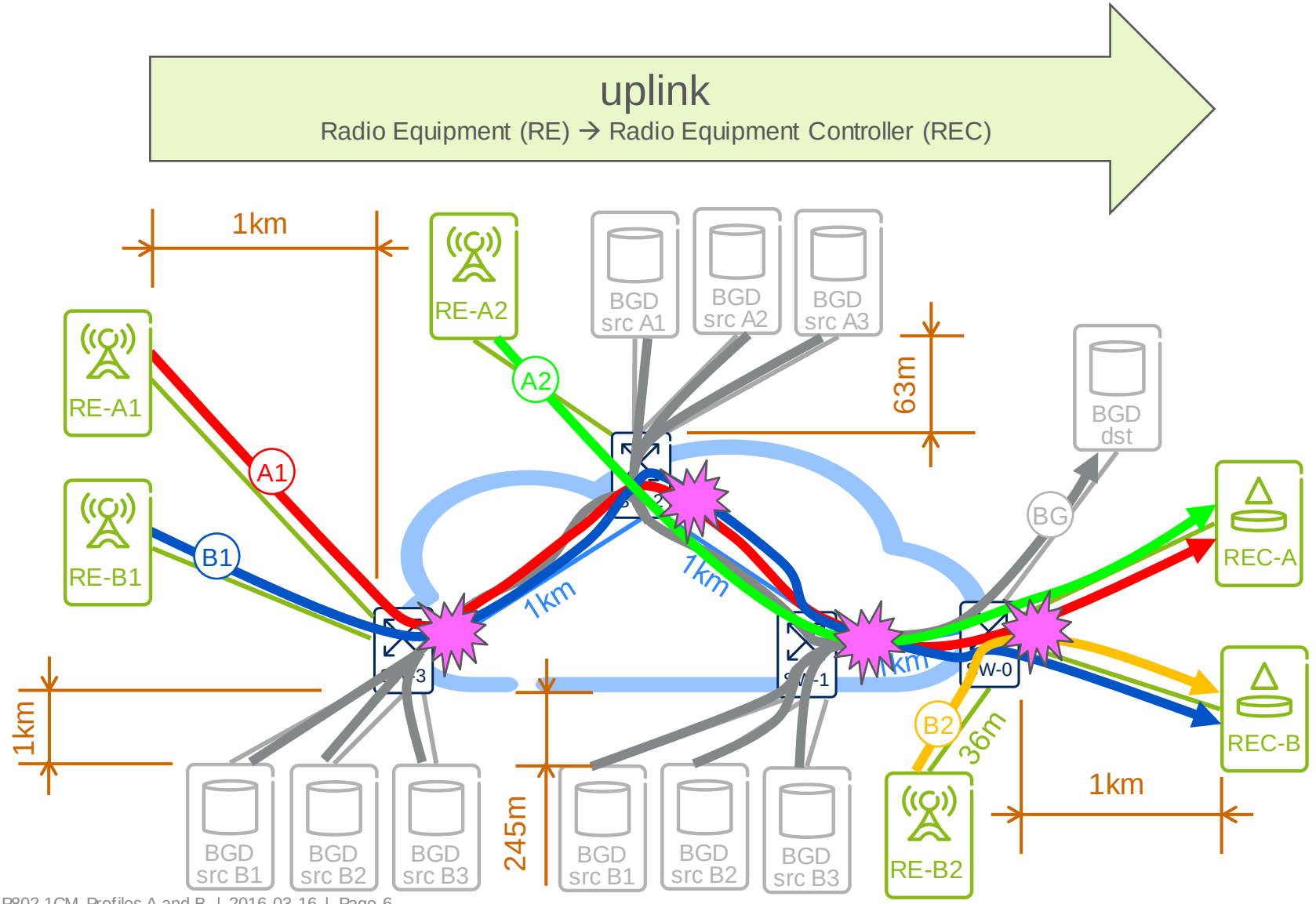
SCENARIO 1: TOPOLOGY 1 & 1500-BYTE CPRI



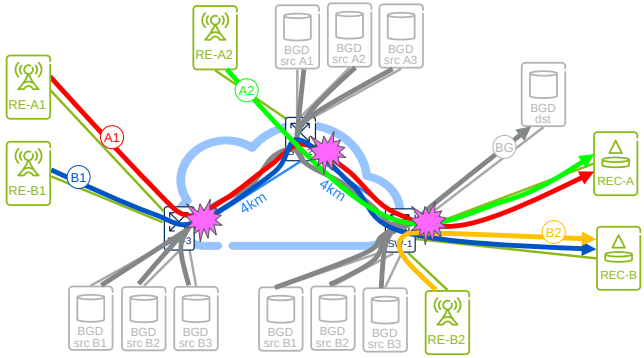
SCENARIO 2: TOPOLOGY 2 & 1500-BYTE CPRI



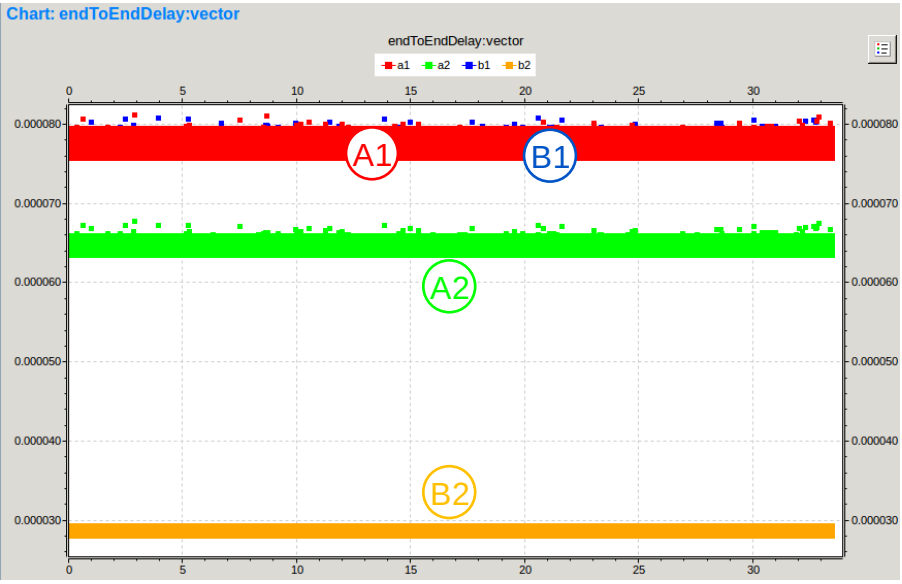
SCENARIO 3
TOPOLOGY 2 & 300-BYTE CPRI



SCENARIO 1 RESULTS
TOPOLOGY 1 & 1500-BYTE CPRI

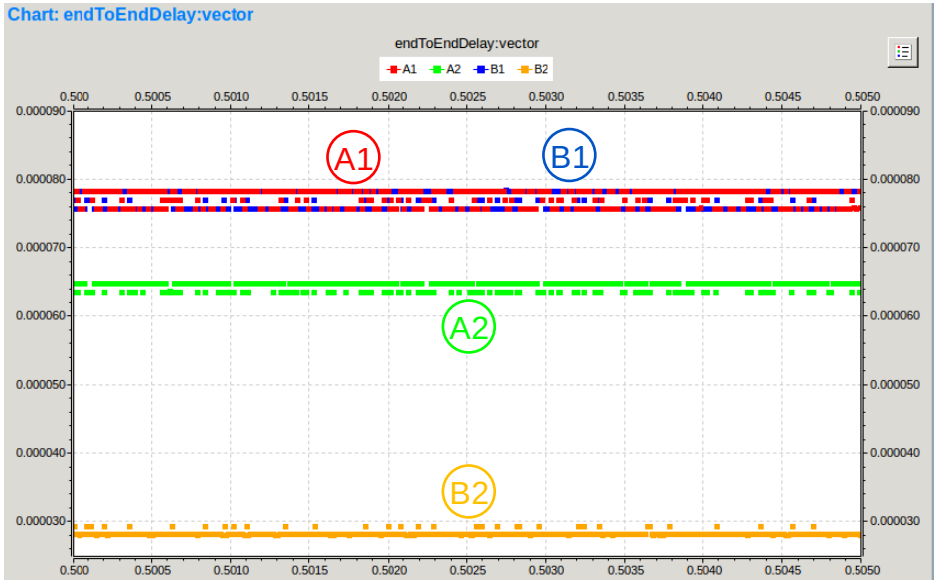


› Profile A



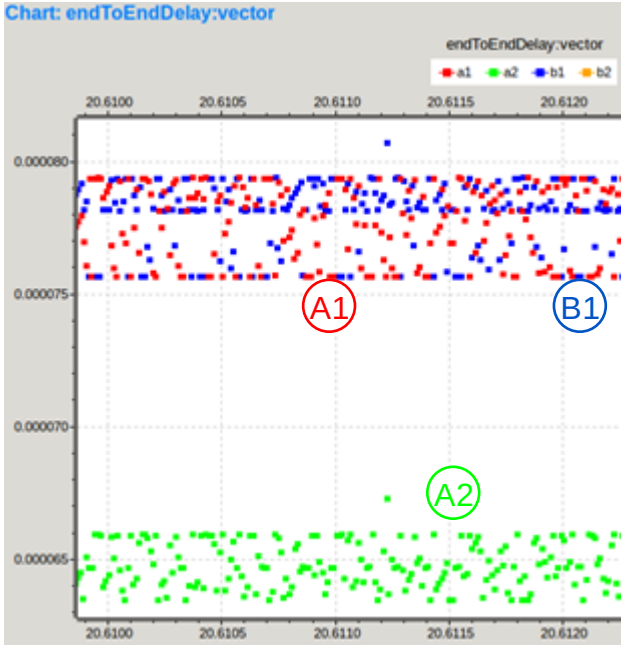
Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	75639.3	81148.9	5509.6
B1	75640.1	80716.9	5076.8
A2	63438.9	67691.2	4252.3
B2	28038.6	29329.6	1291.0

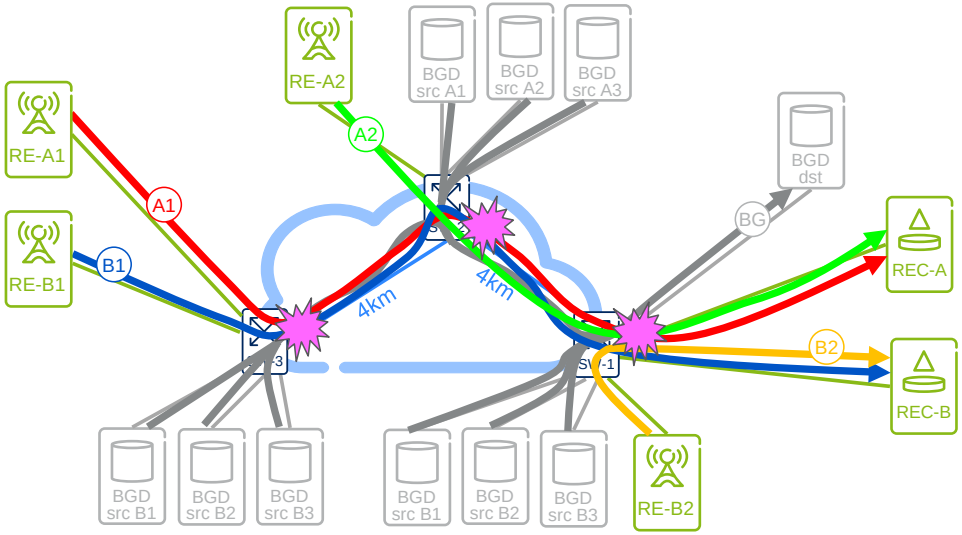
› Profile B (preemption)



Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	75640.1	78289.5	2649.4
B1	75640.1	78291.5	2651.4
A2	63438.9	64789.3	1350.4
B2	28038.6	29329.6	1291.0

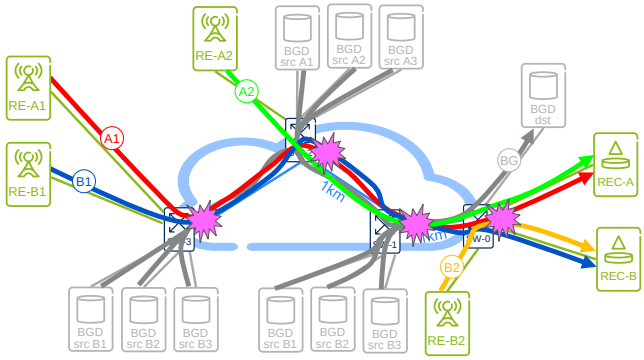
SCENARIO 1 RESULTS PROFILE A – ZOOM-IN



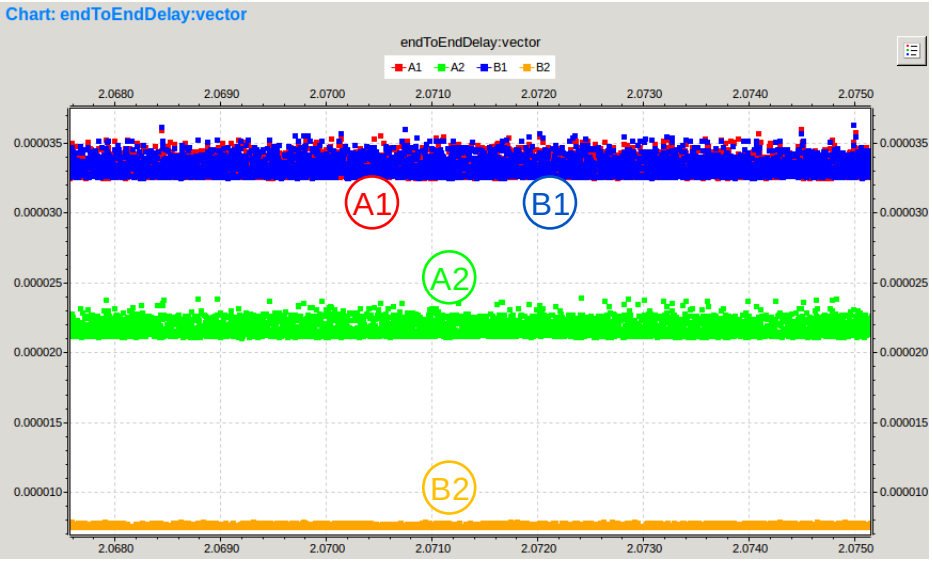


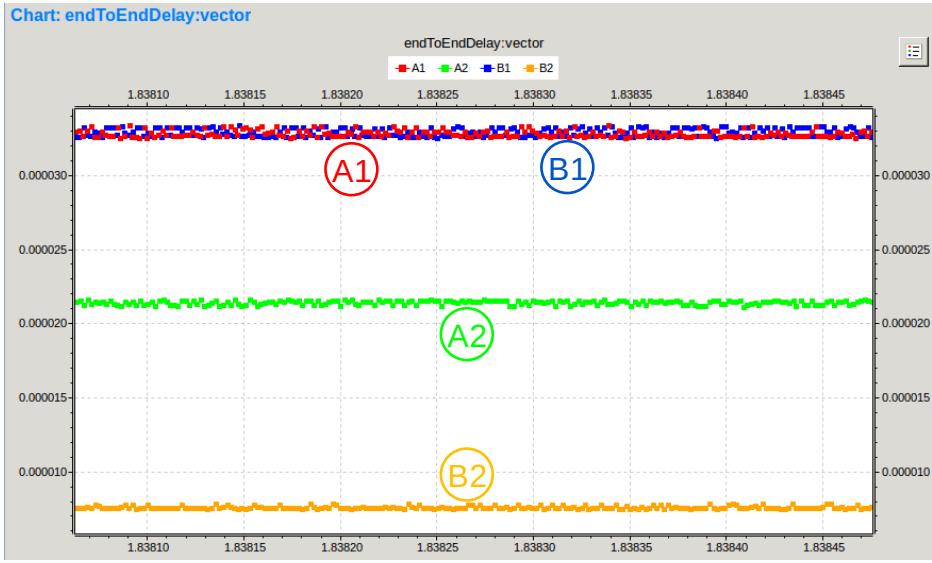
Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	75639.3	81148.9	5509.6
B1	75640.1	80716.9	5076.8
A2	63438.9	67691.2	4252.3

SCENARIO 3 RESULTS
TOPOLOGY 2 & 300-BYTE CPRI



- Bridge delay variation = 100ns
- Profile A
- Profile B (preemption)





Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	32428.8	36573.1	4144.3
B1	32422.1	36603.4	4181.3
A2	21026.6	24022.4	2995.8
B2	7462.3	7944.9	482.6

Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	32429.4	33478.6	1049.2
B1	32429.2	33491.3	1062.1
A2	21034.9	21747.9	713.0
B2	7462.2	7870.5	408.3

SCENARIO 2 VS SCENARIO 3
1500 VS 300 BYTES CPRI

› Profile A

1500 Bytes

Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	38358.0	44535.4	6177.4
A2	27397.1	31135.7	3738.6

300 Bytes

Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	32621.7	36475.2	3853.5
A2	21189.0	23922.0	2733.0

› Profile B (preemption)

1500 Bytes

Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	38362.4	41035.8	2673.4
A2	27397.2	28795.1	1397.9

300 Bytes

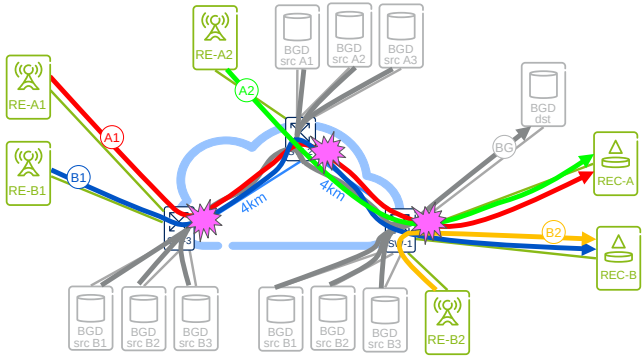
Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	32612.9	33329.1	716.2
A2	21169.2	21592.5	423.3

– **CPRI racing avoided by Delay function**

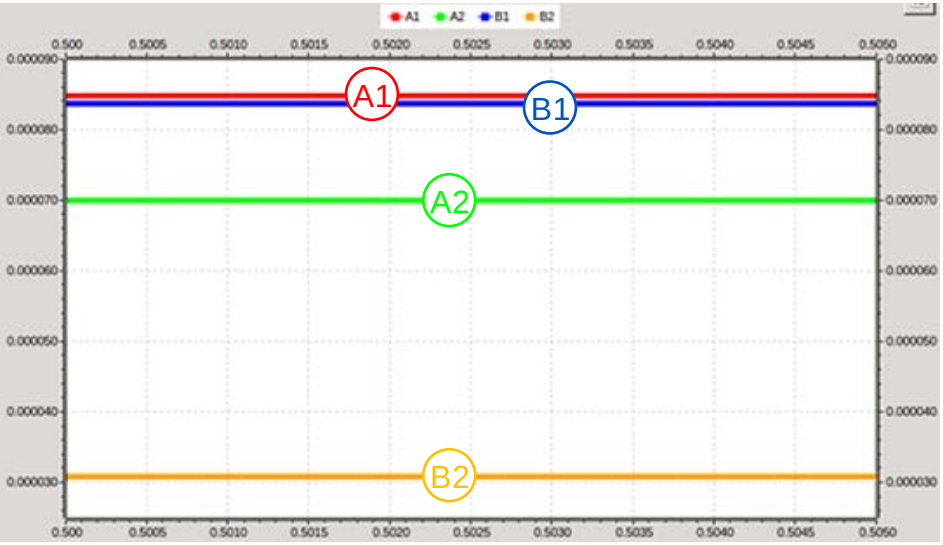
300 Bytes

Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	32611.0	32805.6	194.6
A2	21165.9	21331.5	165.6

SCENARIO 1 PLAYOUT BUFFER

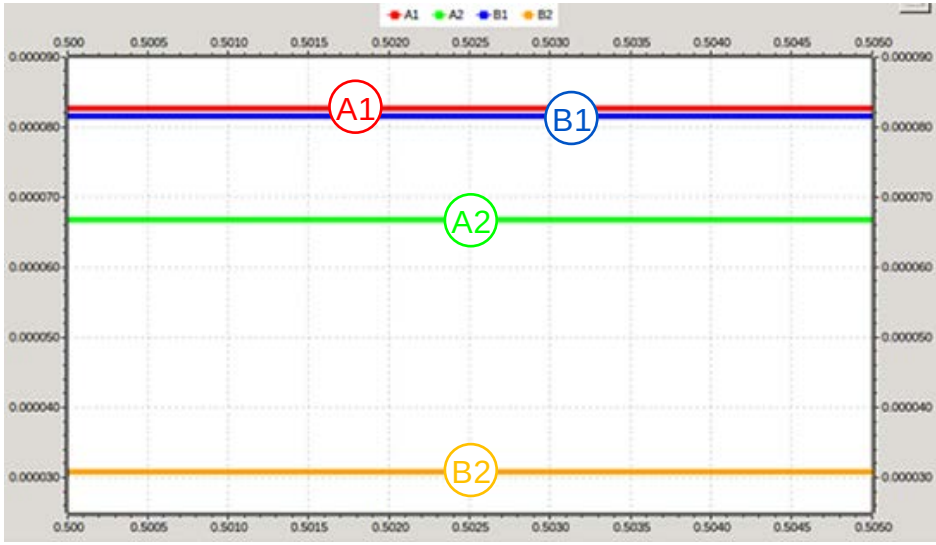


› Profile A



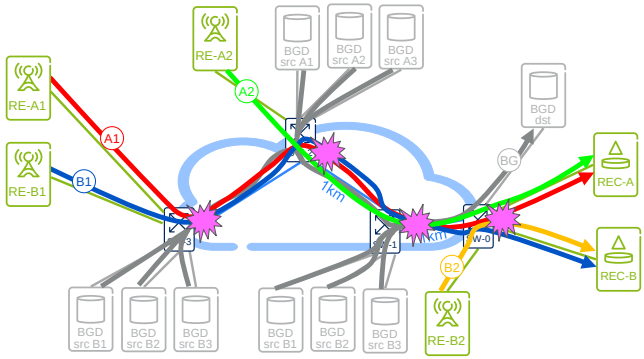
Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	85440.3	85440.3	0
B1	83440.3	83440.3	0
A2	69440.3	69440.3	0
B2	30940.3	30940.3	0

› Profile B (preemption)



Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	82940.3	82940.3	0
B1	80940.3	80940.3	0
A2	66940.3	66940.3	0
B2	30940.3	30940.3	0

PLAYOUT BUFFER SCENARIO 3 – 300 BYTES



› Profile A

Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	39239.3	39239.3	0
B1	39239.3	39239.3	0
A2	26439.3	26439.3	0
B2	10639.3	10639.3	0

› Profile B (preemption)

Flow	Min delay [ns]	Max delay [ns]	FDV [ns]
A1	36239.3	36239.3	0
B1	36239.3	36239.3	0
A2	24139.3	24139.3	0
B2	10639.3	10639.3	0

SUMMARY

- High priority queue for CPRI
  - Maximum a single background frame is served before CPRI in each hop
- Frame preemption
  - Decreases FDV
    - Serialization delay of an 1500-Byte frame per hop
  - Allows longer reach
- Smaller packet size
  - Smaller serialization delay per hop
    - Longer reach in case of store-and-forward
    - Smaller FDV caused by colliding/racing CPRI packets
  - Decreases FLR (http://www.ieee802.org/1/files/public/docs2016/cm-varga-CPRI-packetloss-considerations-0116-v02.pdf)

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