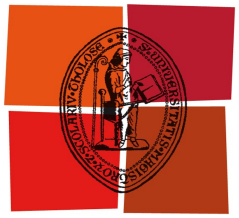

Towards Quality of Service Provision with Avionics Full Duplex Switching

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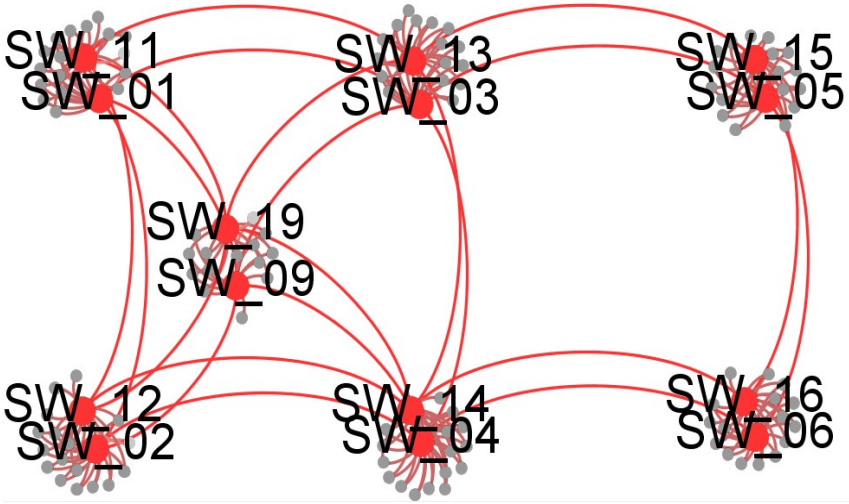
AFDX – Avionics Full Duplex Switched Ethernet

- Time-critical flows with real-time constraints of avionics
- VL, BAG(Bandwidth Allocation Gap), minimum and maximum frame length
- Static routing configuration
- Bounds WCTT and certification with Network Calculus and Trajectory approach
  - No buffer overflow and no frame loss
- Utilization of a **small amount** of the network bandwidth



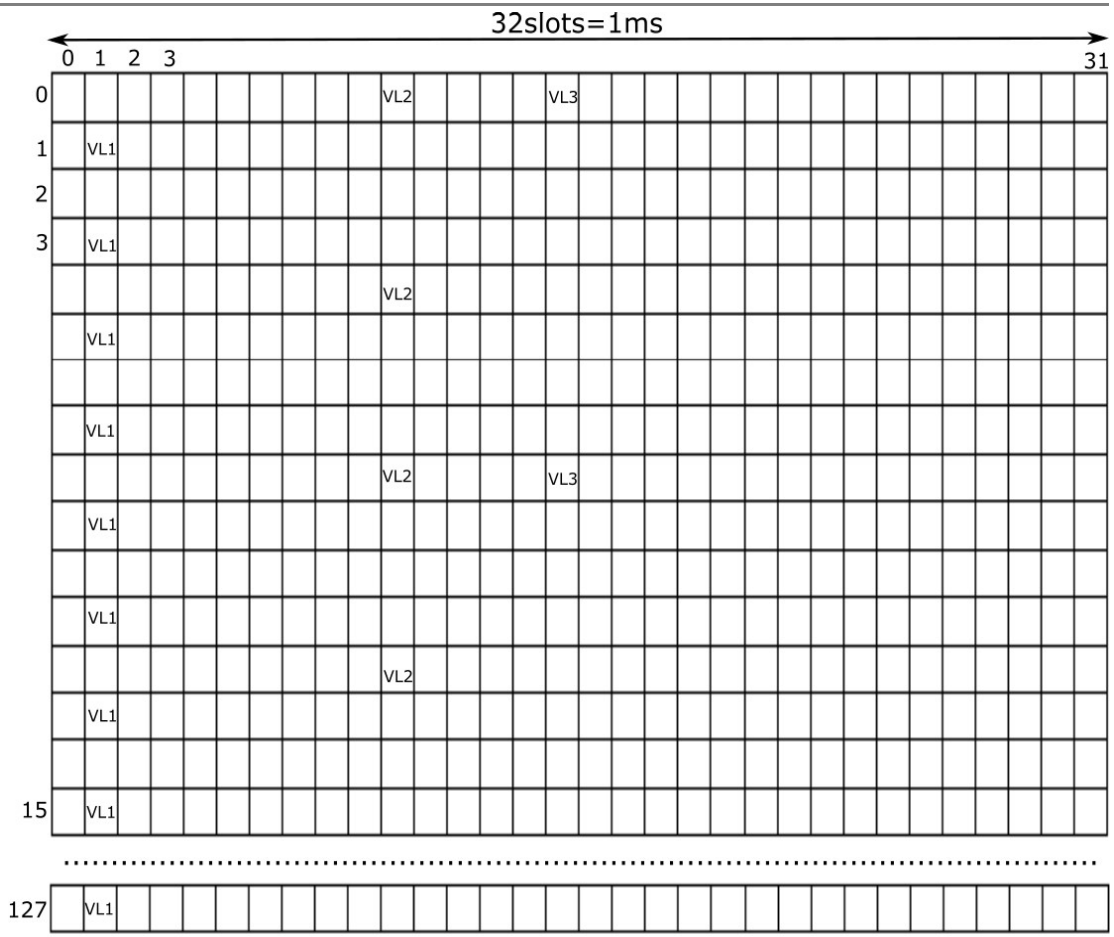
A350 network topology with 126 end systems, 14 switches, and 1106 VLs

Leverage spare bandwidth

- More efficient use of the bandwidth
- Additional Ethernet flows on different levels of QoS
  - Live video from airplane cameras
  - Voice over IP (VoIP)
- Goal:
  - Limited impact on the real-time flows: WCTT analysis still holds
  - Provide QoS to Ethernet flows

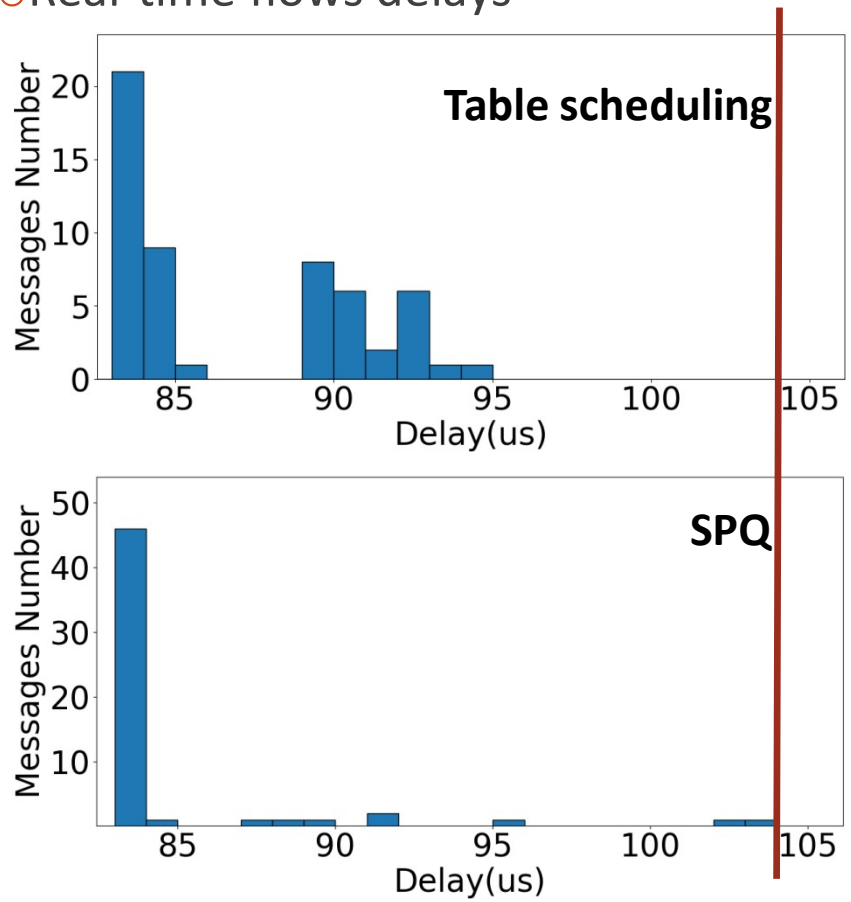
One solution: table scheduling

- Table scheduling for time-critical flows at ES level + SPQ scheduling at switch level
- Simulation comparison with 2 baseline solutions
  - SPQ scheduling with 2-levels priority queuing at both ES and switch level
  - FIFO queuing at ES and switch level



Preliminary results

- Real-time flows delays



- Ethernet flows delays

Delay(us)	Table	SPQ	FIFO
≥300	10000	10000	10000
≥400	5004	5231	5026
≥500	2189	2299	2183
≥600	952	956	922
≥700	404	413	392
≥800	185	190	174
≥900	82	89	85
≥1000	**35**	**39**	**37**
≥1100	**11**	**20**	**19**
≥1200	**4**	**8**	**7**
≥1300	**2**	**4**	**3**
≥1400	**0**	**1**	**1**

For further details, come to see my poster!