



Space
Technology
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University of Dundee

SpaceFibre Demonstration



Demo

- Basics
 - Lane initialization
 - Broadcast frames and FCTs
 - Virtual channel data frames and precedence
 - SpW over SpaceFibre

- Quality of service
 - BW allocation
 - Priorities
 - Scheduling

- Retry layer
 - Bit flips error injection
 - Disconnections injection
 - Cable plug/unplug



LED colour scheme



WAIT



LINK START

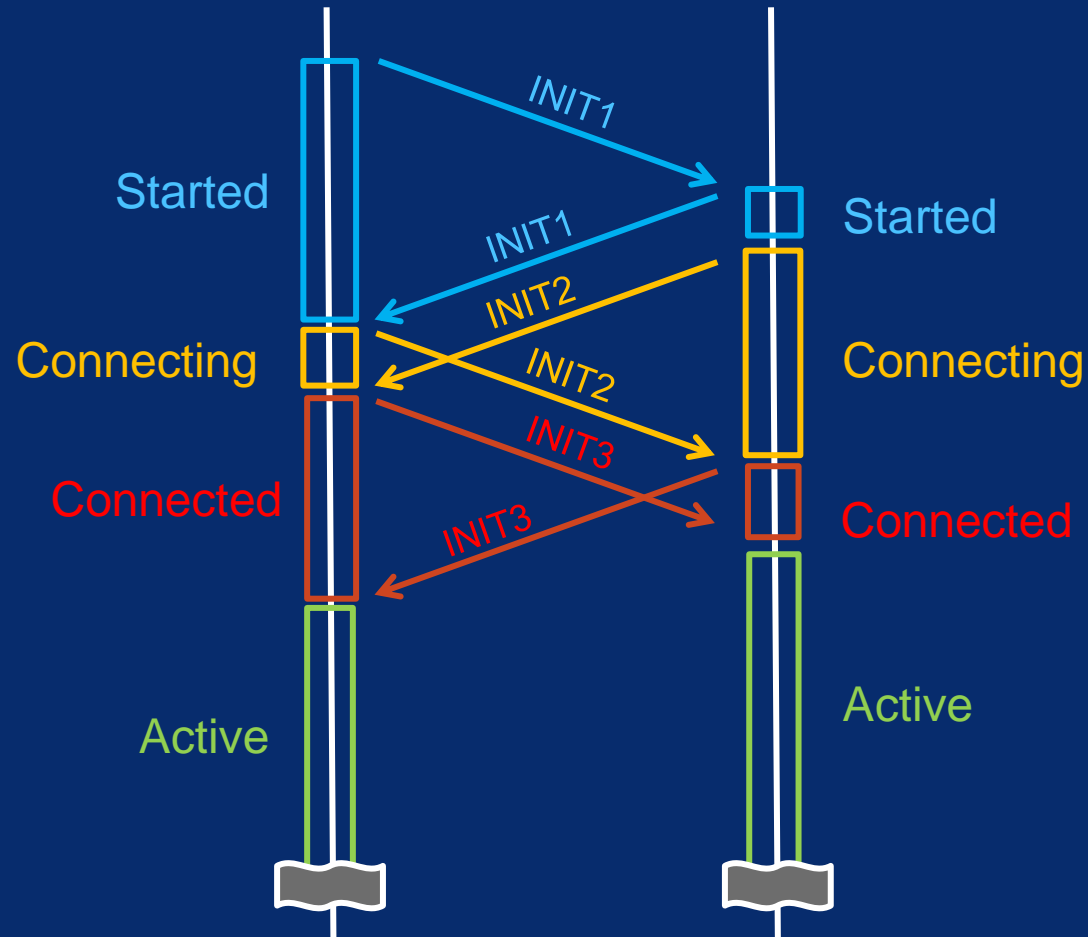


LINK ACTIVE



TX / RX DATA

Link Initialisation - Handshaking





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Control Words & Frames

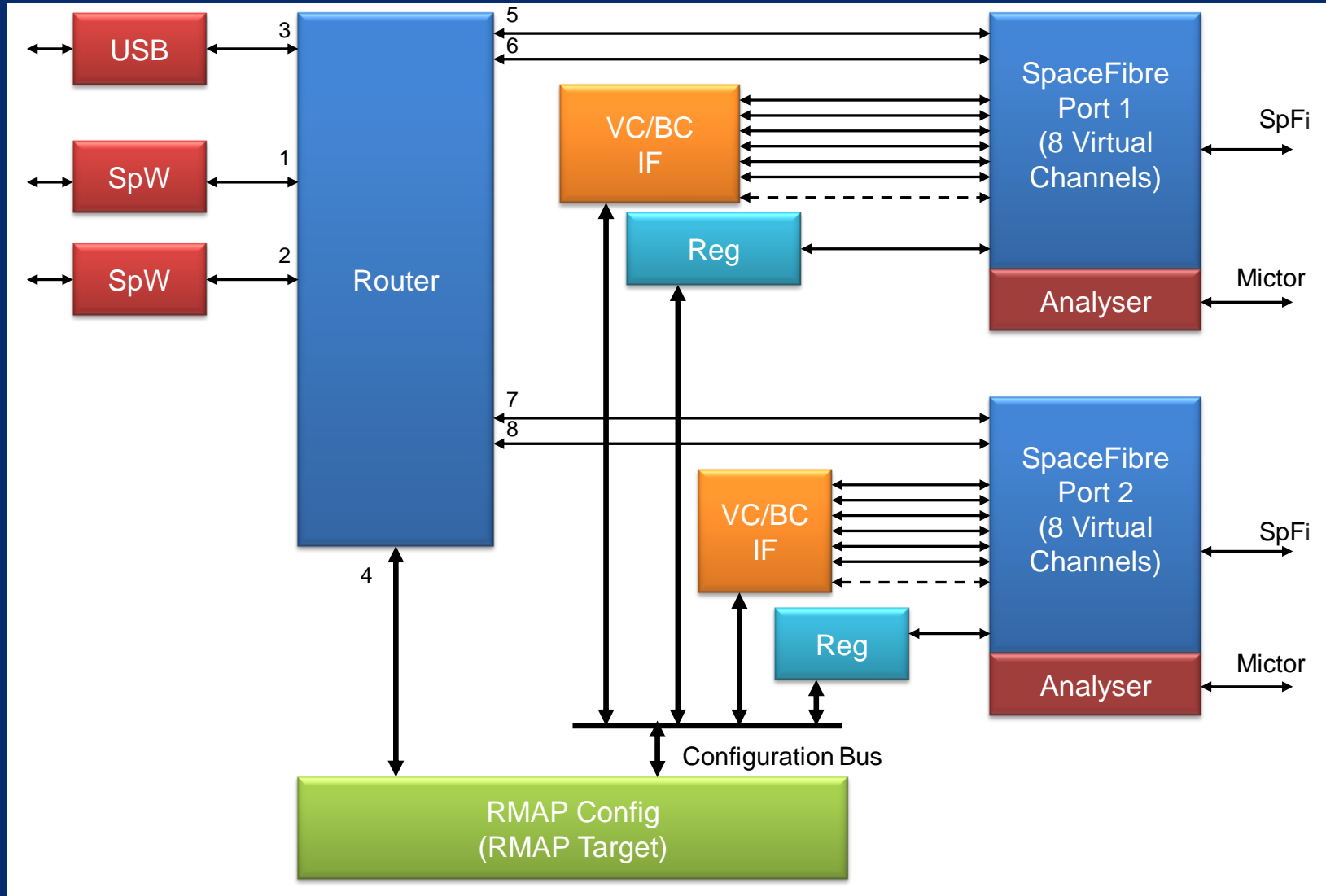
- FCTs
 - Control of the RX Buffer empty space
- ACKs
 - Confirmation of the reception of frames
- Idle Frames
 - Keep the link active with low EMI



Control Words & Frames

- Data Frames
 - Encapsulate user data into independent virtual channels with the requested quality of service
- Broadcast Frames
 - Highest priority to distribute critical information through the network

SpW over SpFi



Quality of Service - Bandwidth Reservation

Virtual channel	Source data rate	Bw Allocated	Bw Measured
2	45 %	50 %	45 %
3	45 %	50 %	45 %



Virtual channel	Source data rate	Bw Allocated	Bw Measured
2	45 %	50 %	45 %
3	100 %	50 %	55 %

Quality of Service – Priority of Service



Virtual channel	Priority	Source data rate	Bw Allocated	Bw Measured
2	High	45 %	50 %	45 %
3	High	100 %	50 %	55 %



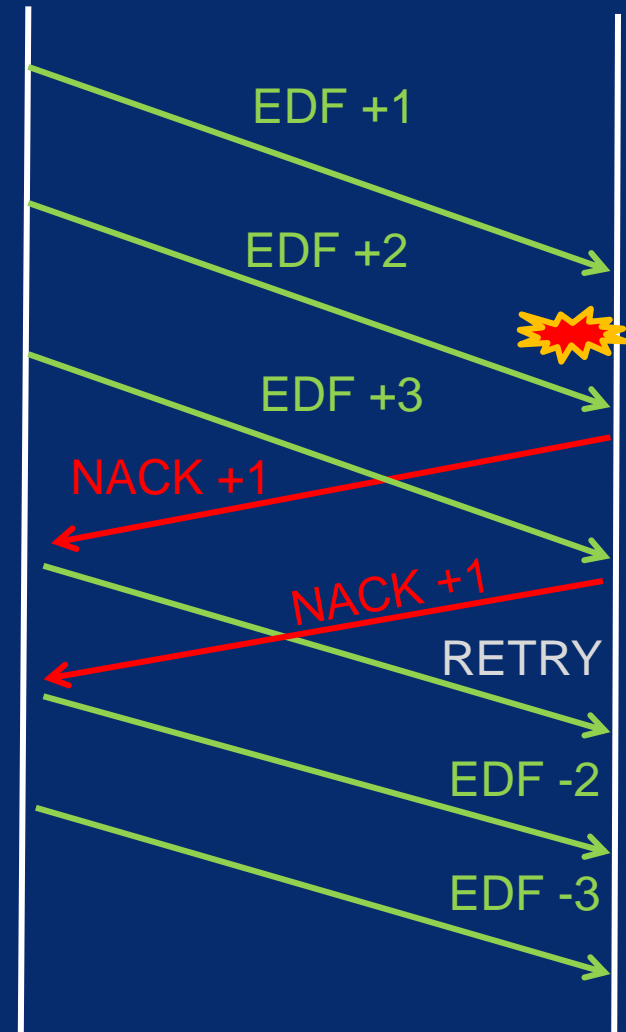
Virtual channel	Priority	Source data rate	Bw Allocated	Bw Measured
2	Low	45 %	50 %	0 %
3	High	100 %	50 %	100 %

Quality of Service – Scheduling

Allowed Time-Slots	Bw Allocated	Bw Measured
ALL	100 %	~ 100 %
Even	100 %	~ 50 %
1 in 32	100 %	~ 3 %

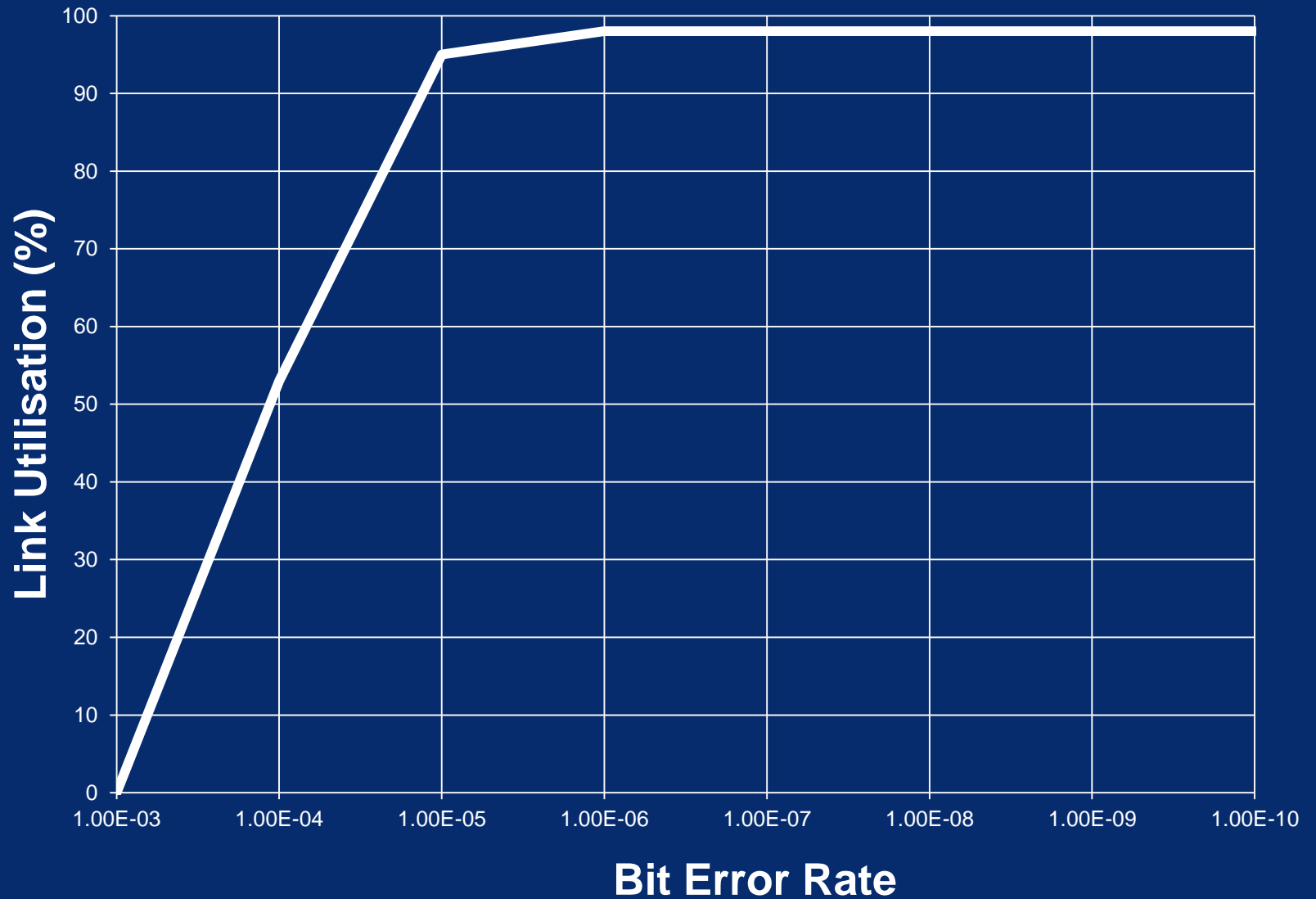
Error event

- Introducing bit flips in RX





Data Rate vs Error Rate





Disconnections

- Automatic lane disconnections
- Plug & Unplug the cable



End of the demonstration