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A Deeper Look into the Inner Workings and Hidden Mechanisms of FICON Performance

- David Lytle, BCAF
- Brocade Communications Inc.

- Thursday February 7, 2013 -- 9:30am to 10:30am

- Session Number - 13009

QR Code

SHARE in San Francisco 2013

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A deeper look into the Inner Workings and Hidden Mechanisms of FICON Performance

This technical session goes into a fairly deep discussion on some of the design considerations of a FICON infrastructure.

- Among the topics this session will focus on is:
  - Congestion and Backpressure in FC fabrics
  - How Buffer Credits get initialized
  - How FICON utilizes buffer credits
  - Oversubscription and Slow Draining Devices
  - Determining Buffer Credit Requirements
  - FICON RMF Reporting

NOTE: Please check for the most recent copy of this presentation at the SHARE website as I make frequent updates.

This Section

- Congestion and Backpressure Overview

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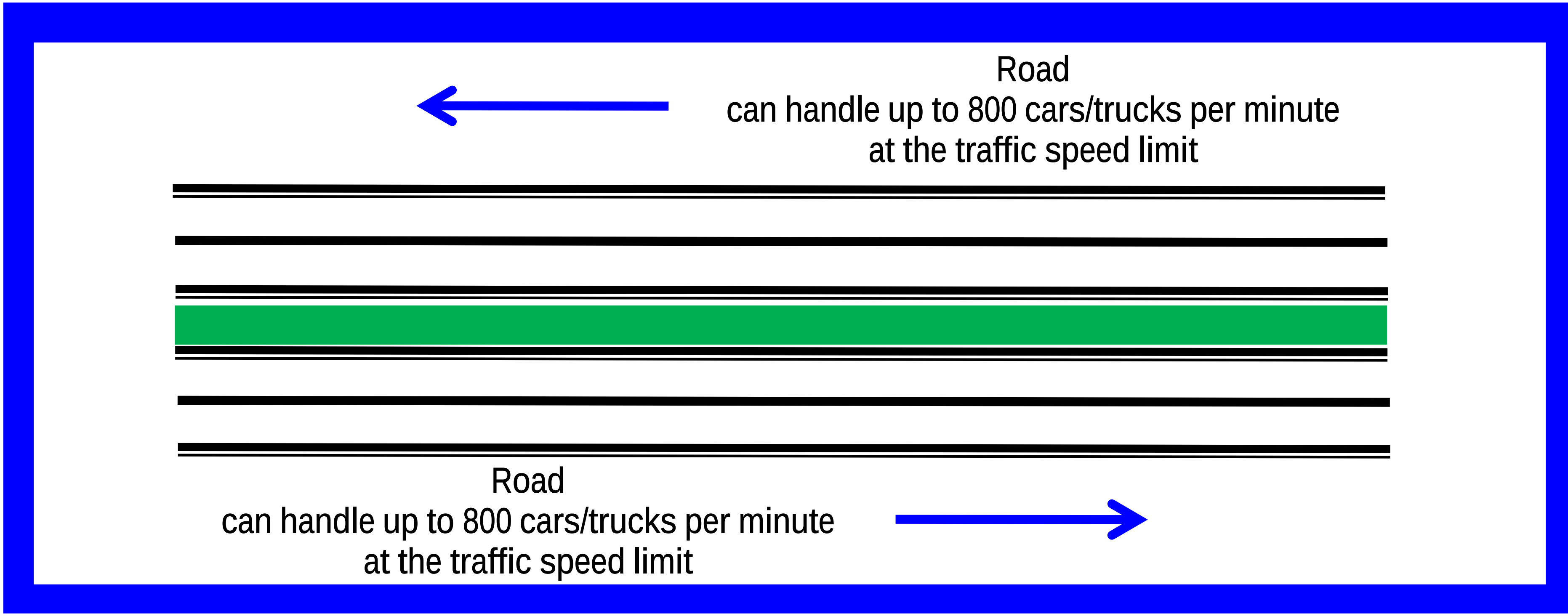
Congestion and Backpressure Overview
These two conditions are not the same thing

- **Congestion** occurs at the point of restriction
- **Backpressure** is the effect felt by the environment leading up to the point of restriction

I will use an Interstate highway example to demonstrate these concepts



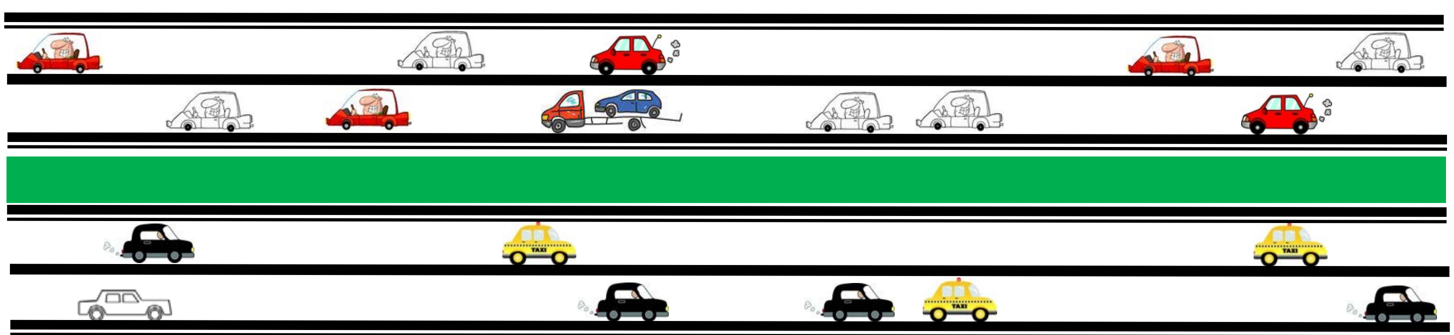
Congestion and Backpressure Overview

- **No Congestion and No Backpressure**
  - The highway handles up to 800 cars/trucks per minute and **less than** 800 cars/trucks per min are arriving
- Time spent in queue (behind slower traffic) is minimal
  - Cut-through routing (zipping along from point A to point B) works well

No Congestion and No Backpressure

10am – 3pm

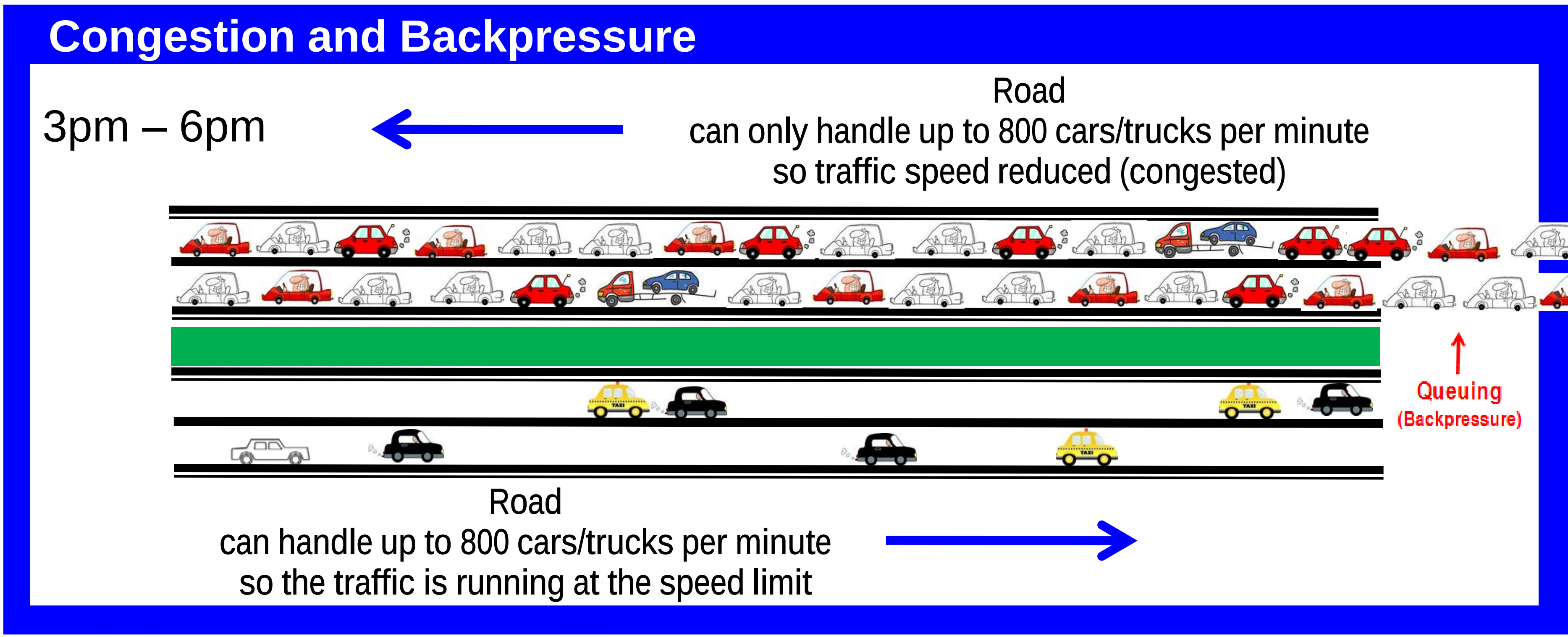
Road
can handle up to 800 cars/trucks per minute
so the traffic can run up to the speed limit



Road
can handle up to 800 cars/trucks per minute
so the traffic can run up to the speed limit

Congestion and Backpressure Overview

- **Congestion**
  - The highway handles up to 800 cars/trucks per minute and **more than** 800 cars/trucks per min are arriving
- Latency time and buffer credit space consumed increases
  - Cut-through routing cannot decrease the problem
- **Backpressure** is experienced by cars slowing down and queuing up



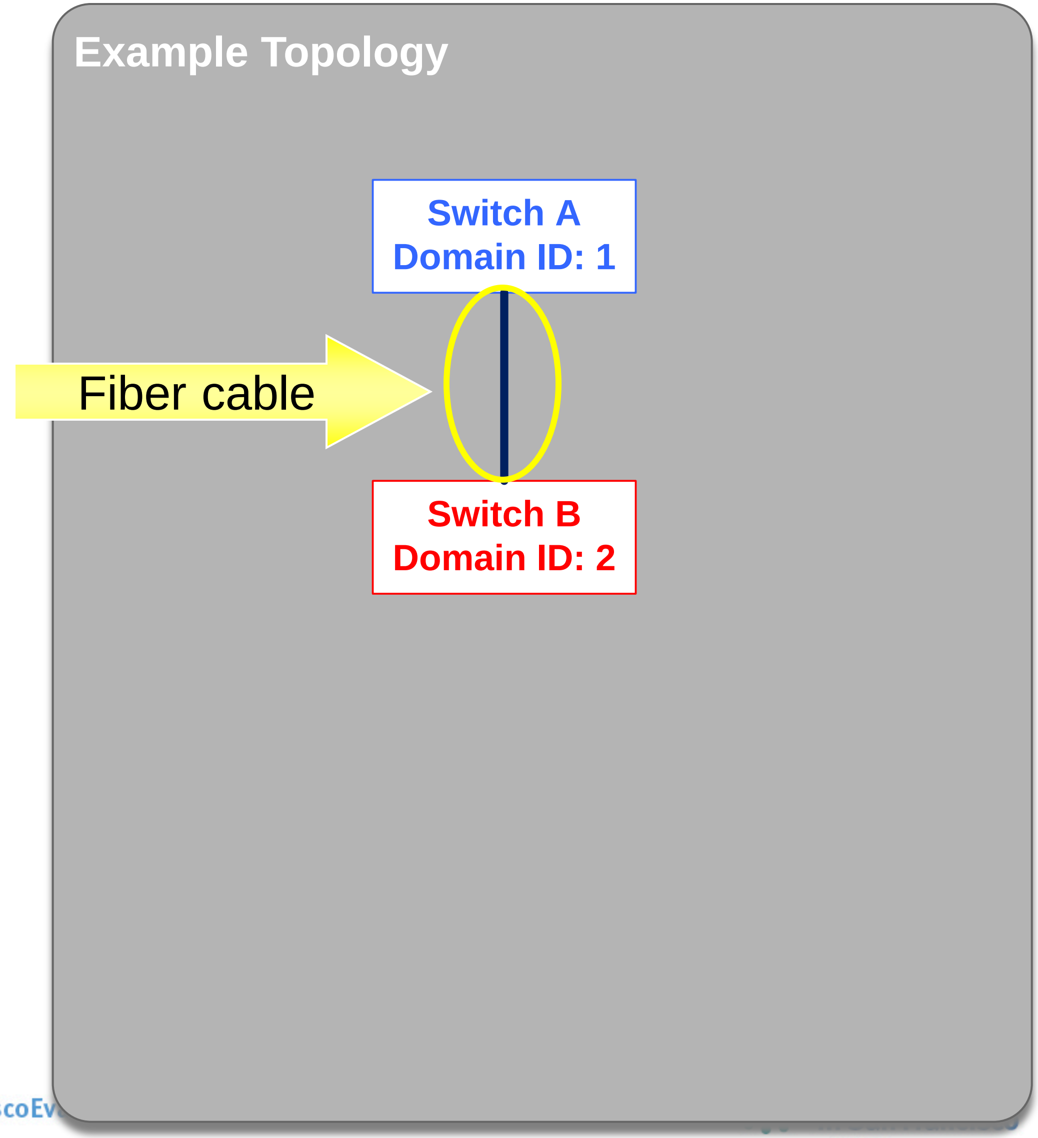
This Section

- Very basic flow for the Build Fabric process and how Buffer Credits get initialized

Build Fabric Process

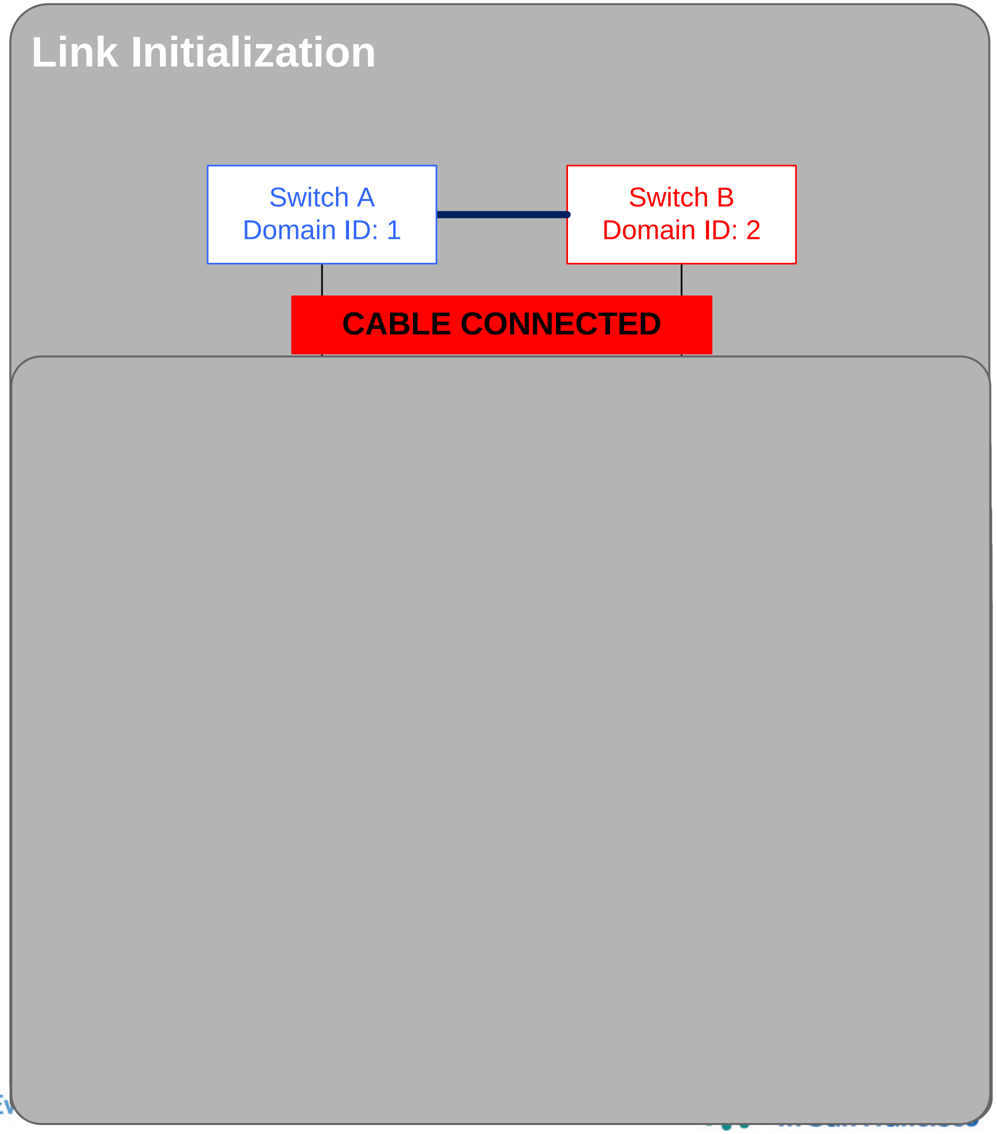
Assume

- A fiber cable will be attached between switch A and B
- This will create an ISL (E_Port) between these two devices



Build Fabric Process

- **Cable connected**
- **Link Speed Auto-Negotiation**
- **Link is now in an Active state**
- **One credit is granted by default to allow the port logins to occur**
- **Exchange Link Parms (ELP)**
  - Contains the “requested” buffer credit information for the sender
  - Assume 8 credits are being granted for this example
- **Responder Accepts – then does its own ELP**
  - Contains the “requested” buffer credit information for the responder
  - Assume 8 credits are being granted for this example
- **Link becomes an E_Port**
- **Send Link Resets (LR)**
  - Initializes Sender credit values
- **Link Reset Response (LRR)**
  - Initializes Responder credit values



Build Fabric Process

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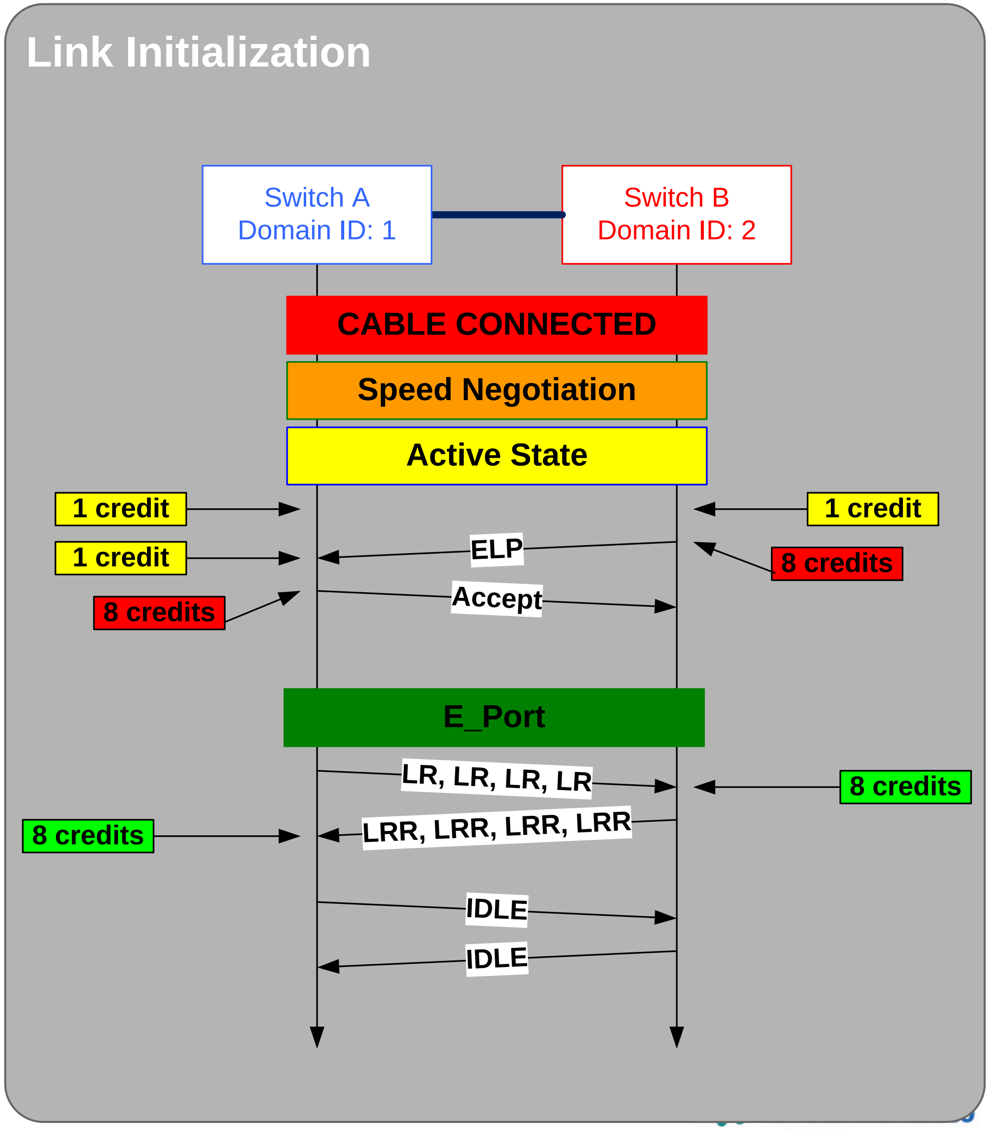
- **Link becomes an E_Port**
- **Send Link Resets (LR)**
  - Initializes Sender credit values
- **Link Reset Response (LRR)**
  - Initializes Responder credit values
- **Ready for I/O to start flowing**



This Section

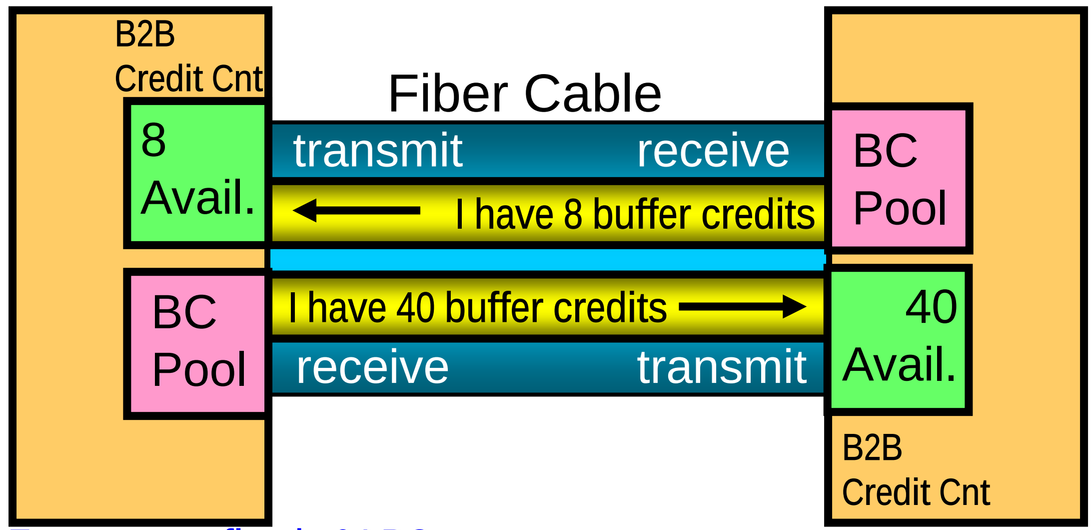
- How FICON uses Buffer-to-Buffer Credits
- Data Encoding
- Forward Error Correction (FEC)

How Buffer Credits Work

- A Fiber channel link is a PAIR of paths
- A path from "this" transmitter to the "other" receiver and a path from the "other" transmitter to "this“ receiver
- The "buffer" resides on each receiver, and that receiver tells the linked transmitter how many BB_Credits are available
- Sending a frame through the transmitter decrements the B2B Credit Counter
- Receiving an R-Rdy or VC-Rdy through the receiver increments the B2B Credit Counter
- DCX family has a buffer credit recovery capability

System z FICON X8/8S CHPID

Brocade Dir. Port



Express = fixed 64 BC
Express2 = fixed 107 BC
Express4 = fixed 200 BC
Express8 = fixed 40 BC
Express8S = fixed 40 BC

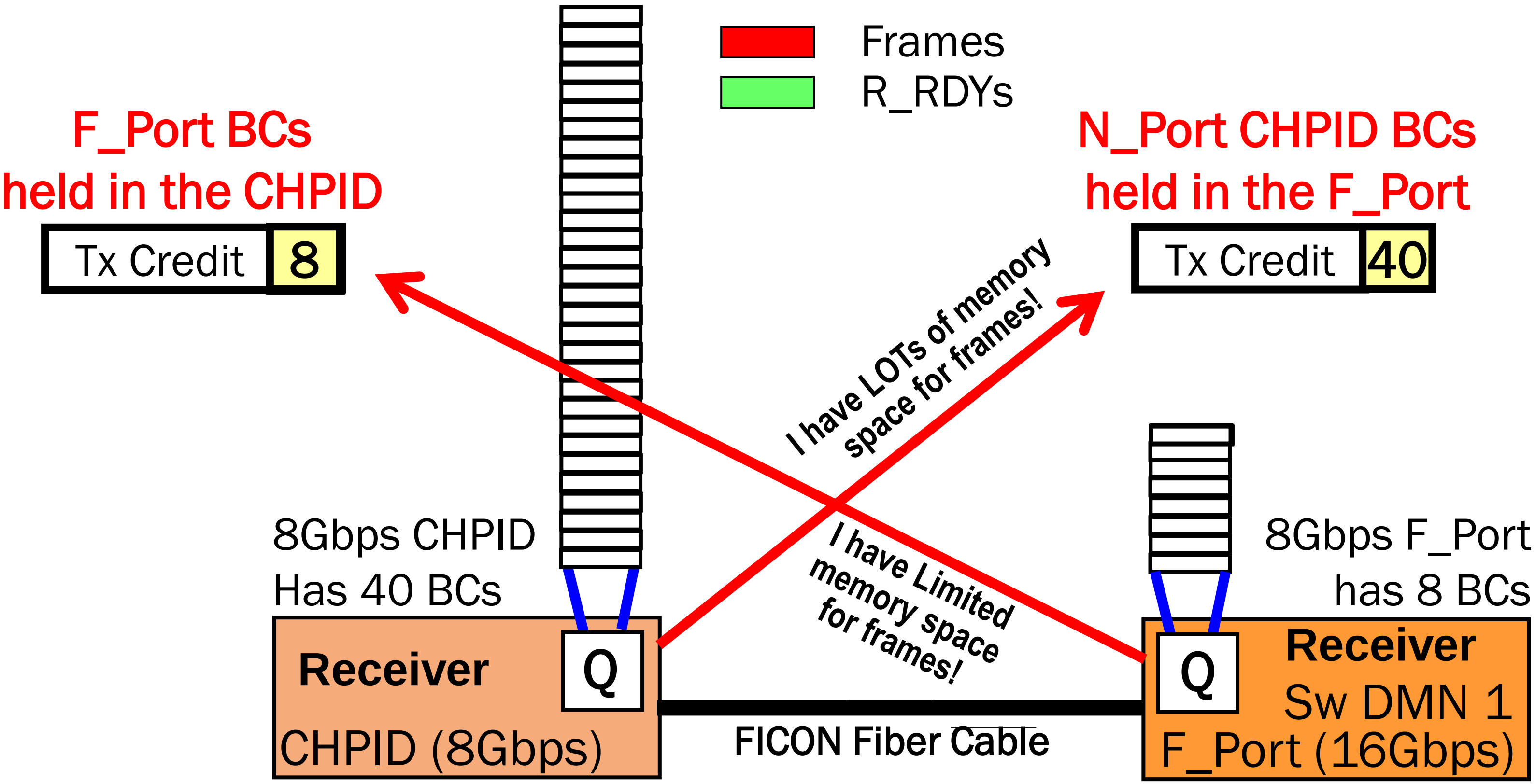
- Switch has variable BCs
- DASD has fixed BCs
- Old Tape had variable BCs

Each receiver on the fiber cable can state a different value!

Once established, it is transmit (write) connections that will typically run out of buffer credits

Buffer-to-Buffer Credits
Buffer-to-Buffer flow control

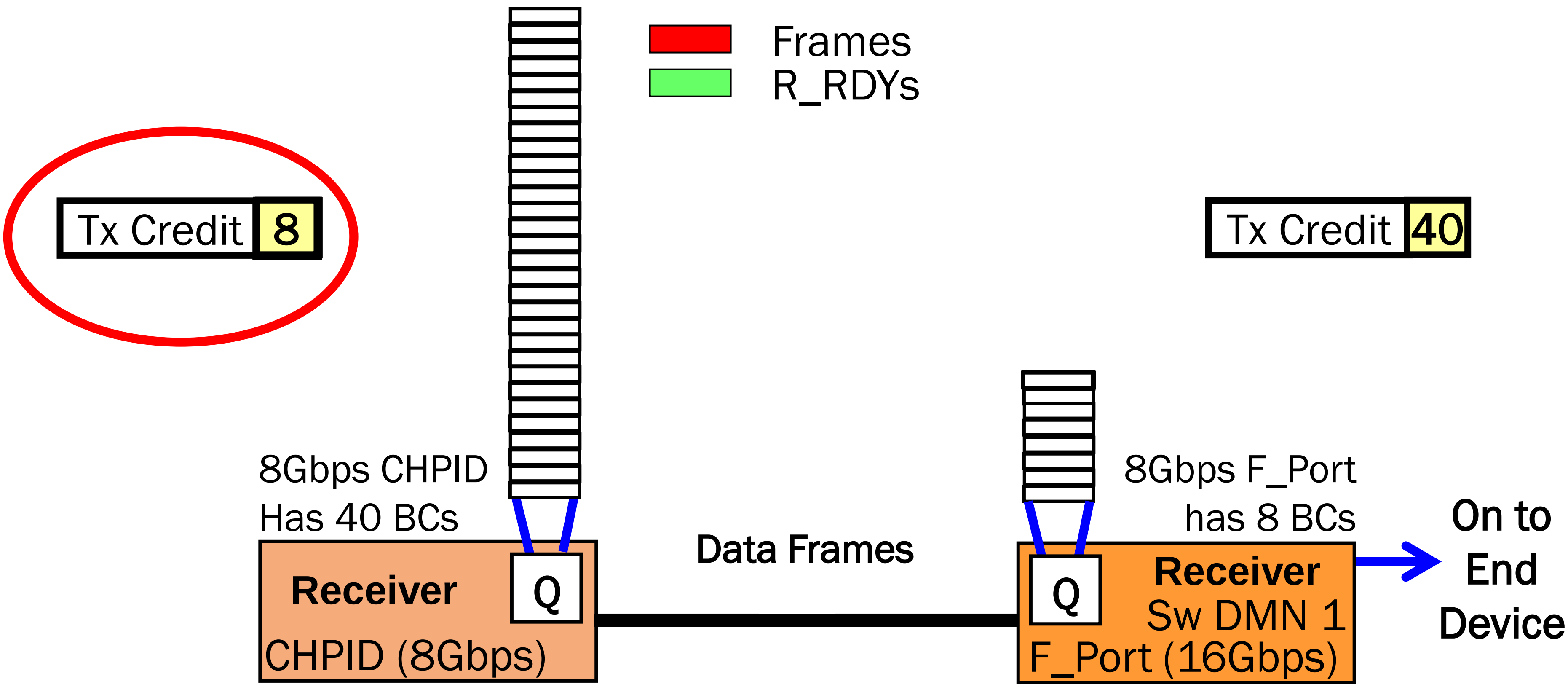
- After initialization, each port knows how many buffers are available in the queue **at the other end of the link**
  - This value is known as Transmit (Tx) Credit



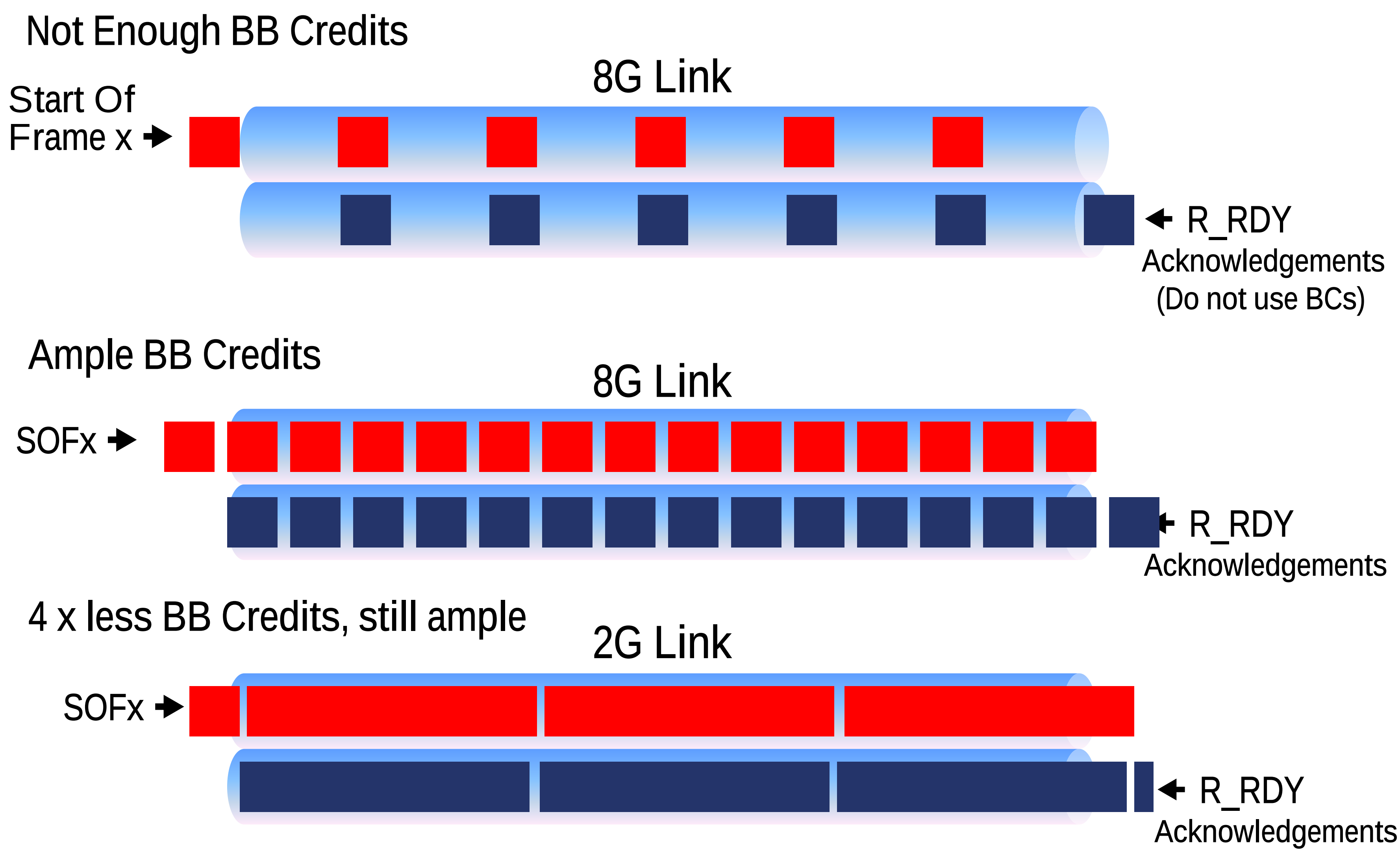
Buffer-to-Buffer Credits

Buffer-to-Buffer flow control Example

- Tx Credit is **decremented** by one for every frame sent from the CHPID
- No frames may be transmitted after Tx Credit reaches zero
- Tx Credit is **incremented** by one for each R_RDY received from F_Port



BB Credit Droop



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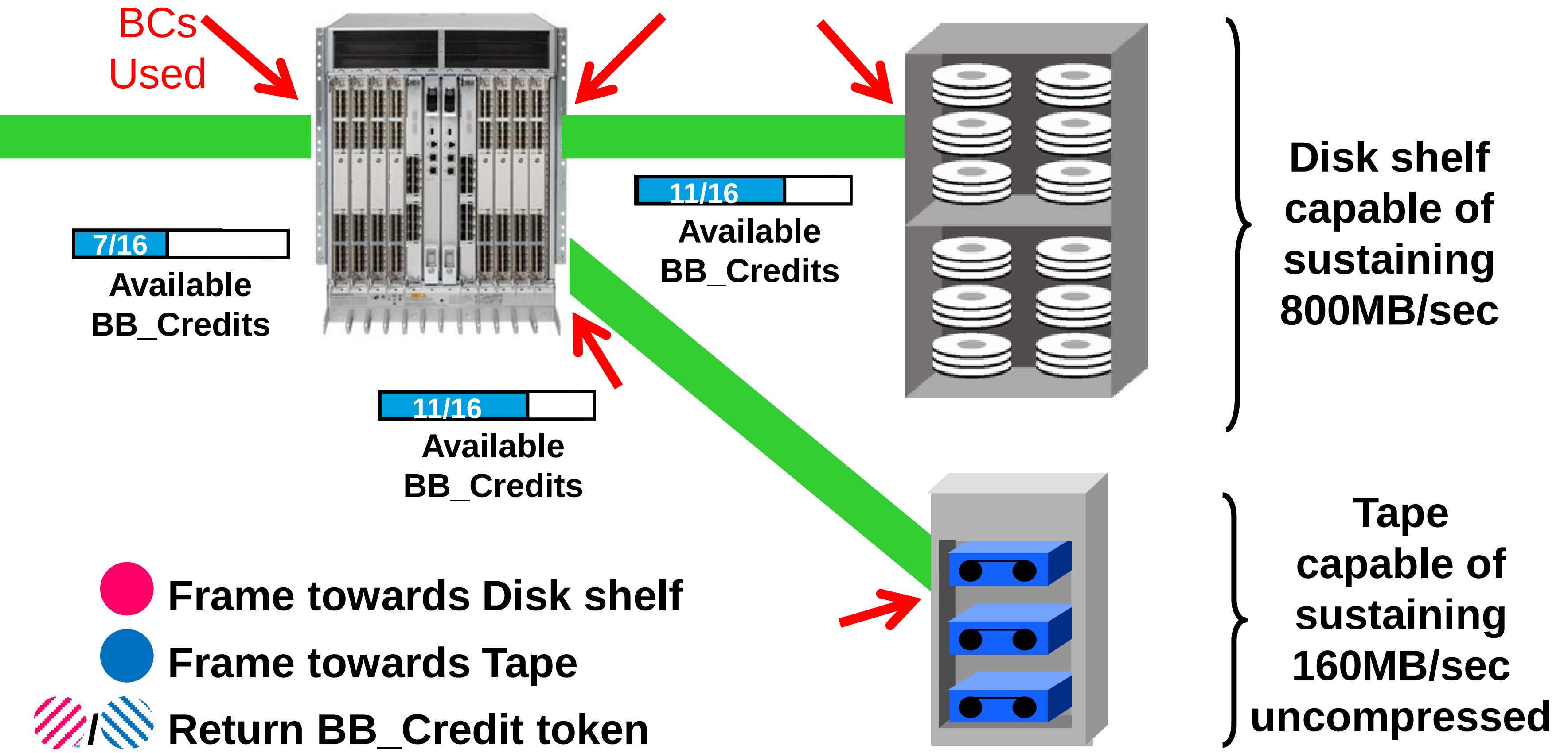
Buffer Credits Working Ideally

Buffer Credits are a “Flow Control” mechanism to assure that frames are sent correctly (engineers call this “Frame Pacing”)

In an ideal FC network all devices can process frames at the same rate and negotiate equal levels of BB_Credits)



Data Encoding – Patented by IBM

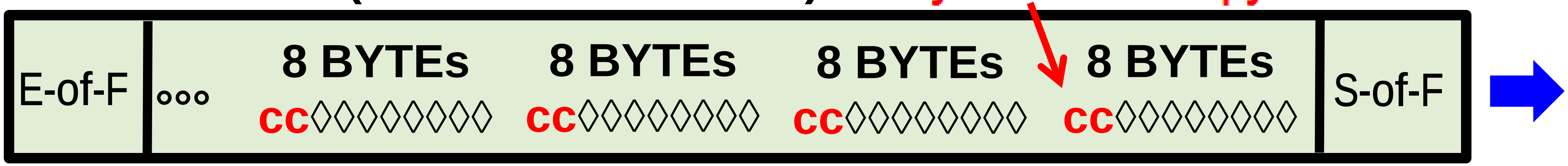
8b/10b compared to 64b/66b

8b/10b (since 1950s but patented in 1983)

Payload Area of Frame – up to 2112 bytes of data

8b/10b: Each 8 bit Byte becomes a 10 bit Byte – 20% overhead

64b/66b (available since 2003) Sync Header – copy/save hi-order bit



Payload Area of Frame – up to 2112 bytes of data

64b/66b: Two check bits are added after every 8 Bytes – 3% overhead

- **At the end of every 32, eight byte groups, we have collected 32 hi-order ck bits**
- **This is a 32 bit check sum to enable Forward Error Correction to clean up links**

- 1/2/4 and 8Gbps will always use 8b/10b data encoding
- 10Gbps and 16Gbps will always use 64b/66b data encoding

FICON Cascading

Forward Error Correction (FEC) and Proactive Transmission Error Correction

- ASIC-based functionality that is enabled by default on Brocade 16G ports and allows them to fix bit errors in a 10G or 16Gbps data stream
  - FEC is a standard 16Gbps mechanism
  - Enabled via the 64b/66b data encoding process
  - Available on Brocade 16Gbps Gen5 switches
  - Works on Frames and on Primitives
  - Corrects up to 11 bit errors per each 2,112 bits in a payload transmission
    - *11 bit corrections per 264 bytes of payload*
- Used on E_Ports that are 16G-to-16G ASIC connections
  - Not for F_ports or N_Ports
  - Does slightly increase frame latency by ~400 nanoseconds per frame
- Significantly enhances reliability of frame transmissions across an I/O network

Some of my favorite photos

In Technical Sessions, Your Brain Should Be Allowed To Take A Break!

Bryce Canyon, USA

Big Sur - California

Lock Lomond Scotland from Lock Lomond Castle

Alesund, Norway

Brain Interlude Is Over….

Back to Work!

This Section

- ISL Oversubscription

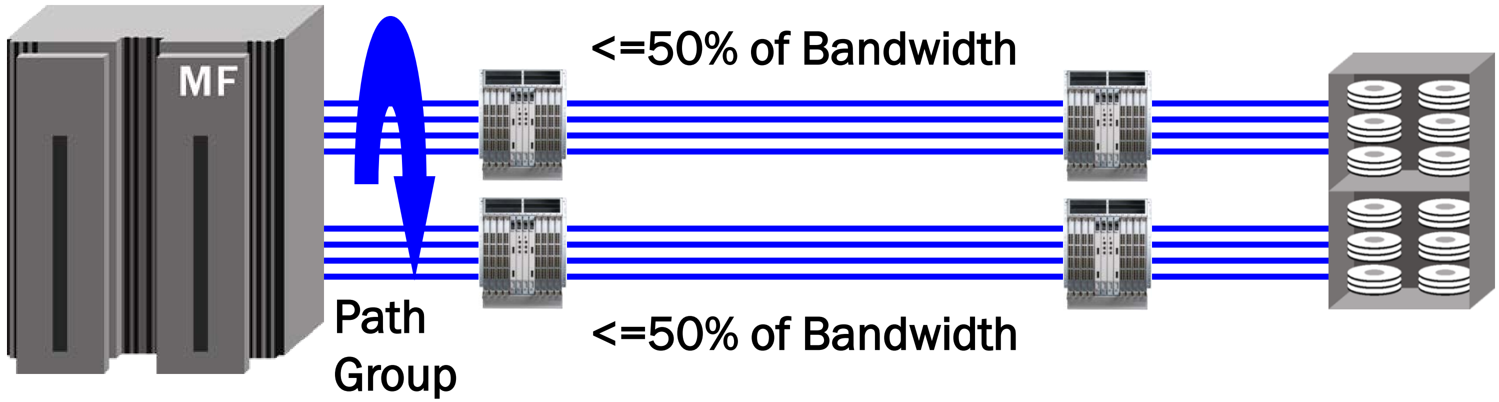
NOTE:

There is also fabric oversubscription and link oversubscription.

In this session I think that **ISL Oversubscription** will demonstrate how serious a concern that oversubscription really can be to the enterprise.

ISL Oversubscription – Design Architecture

Provides a potential five-9's of availability environment



But each fabric really needs to run at no more than 45% busy so that if a failover occurs then the remaining fabric can pickup and handle the full workload

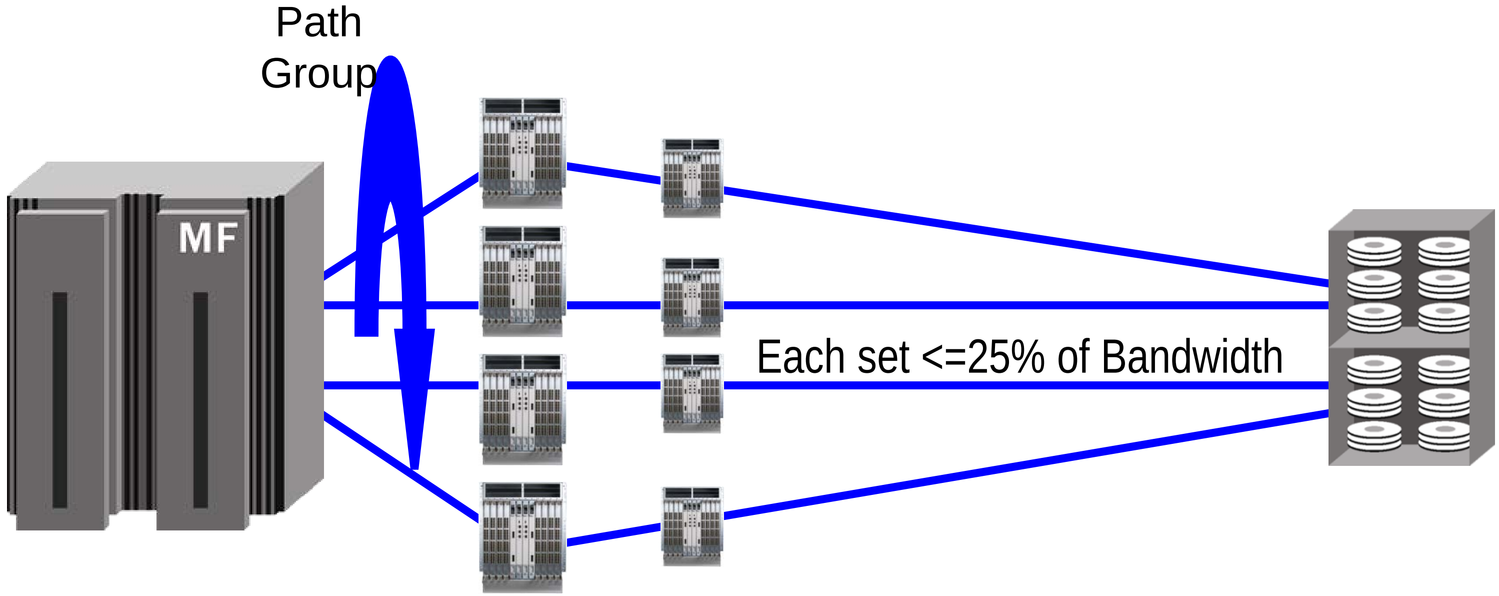
z/OS's IOS automatically load balances the FICON I/O across all of the paths in a Path Group (up to 8 channels in a PG)

- Although this *potentially* provides a five-9s environment, when a fabric does fail how devastating will it be to you in the event that another event occurs and the remaining fabric also fails ?
- Especially when humans get involved, multiple failures too often do occur!

ISL Oversubscription – Design Architecture

Having 4 fabrics
servicing a Path Group protects
your enterprise's I/O availability!

Provides a five-9's of availability environment



A little consideration needs to be given to how busy all of the fabrics are but the remaining fabrics should easily pickup and handle the full workload

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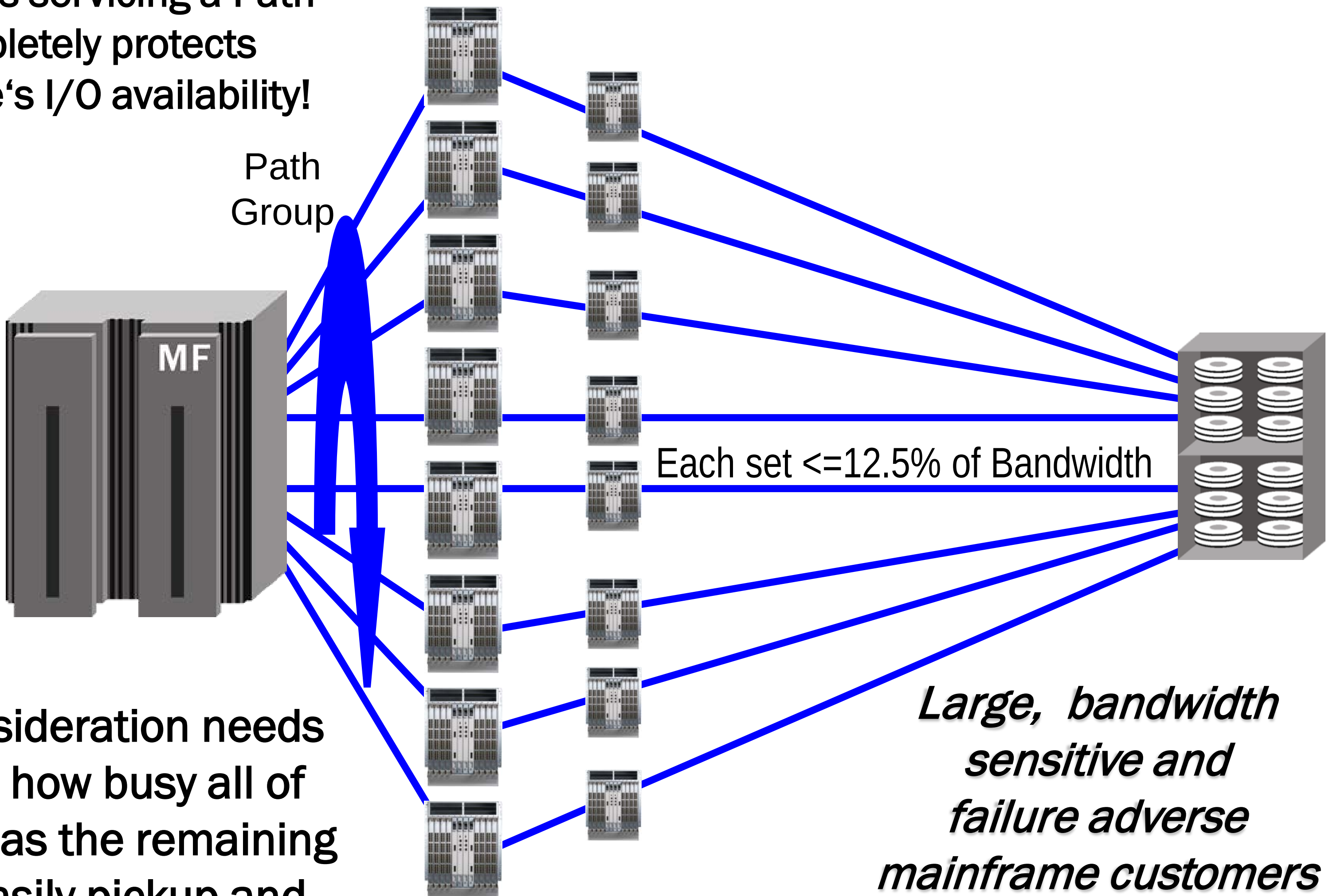
ISL Oversubscription – Design Architecture

Having 8 fabrics servicing a Path Group completely protects your enterprise's I/O availability!

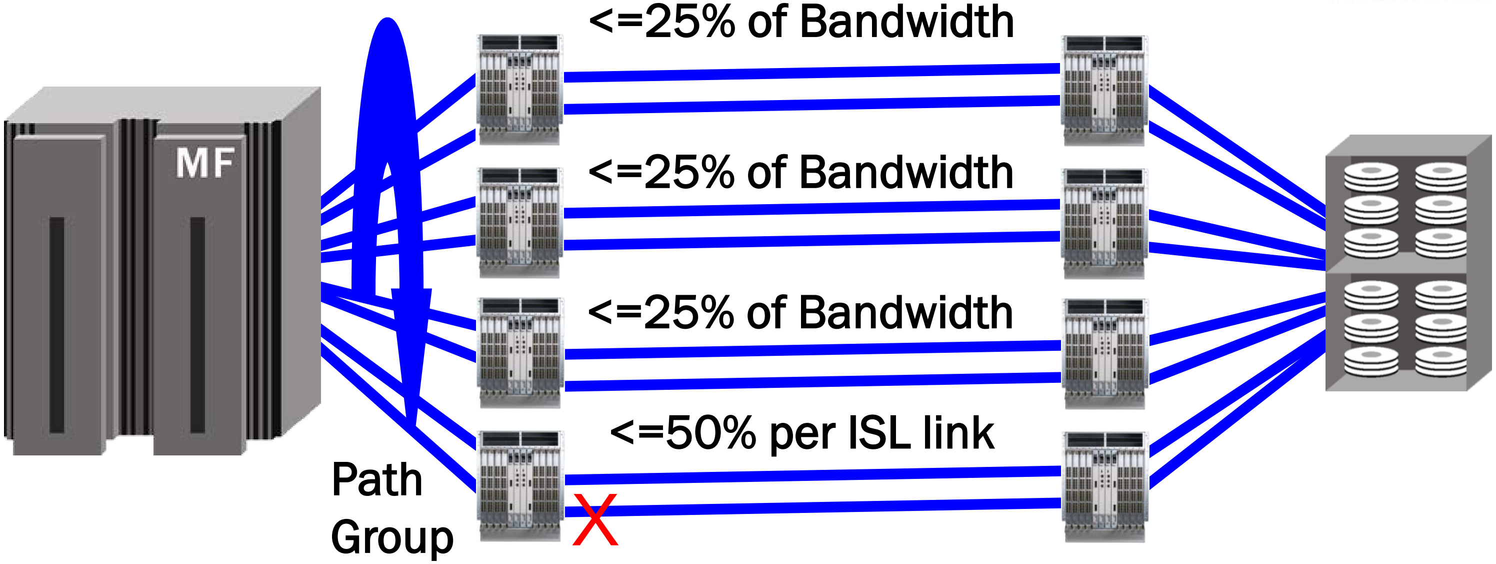


Provides a five-9's of availability environment

Not much consideration needs to be given to how busy all of the fabrics are as the remaining fabrics can easily pickup and handle the full workload

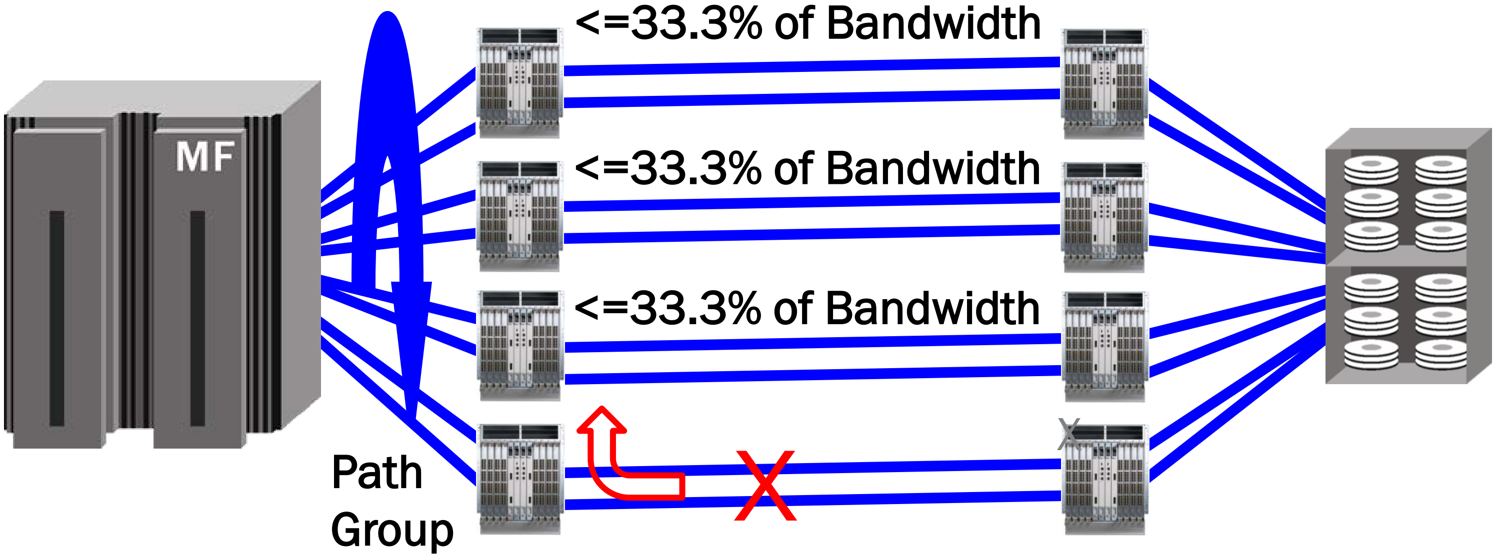
Large, bandwidth sensitive and failure adverse mainframe customers might benefit from configurations like this!

ISL Oversubscription – Design Architecture



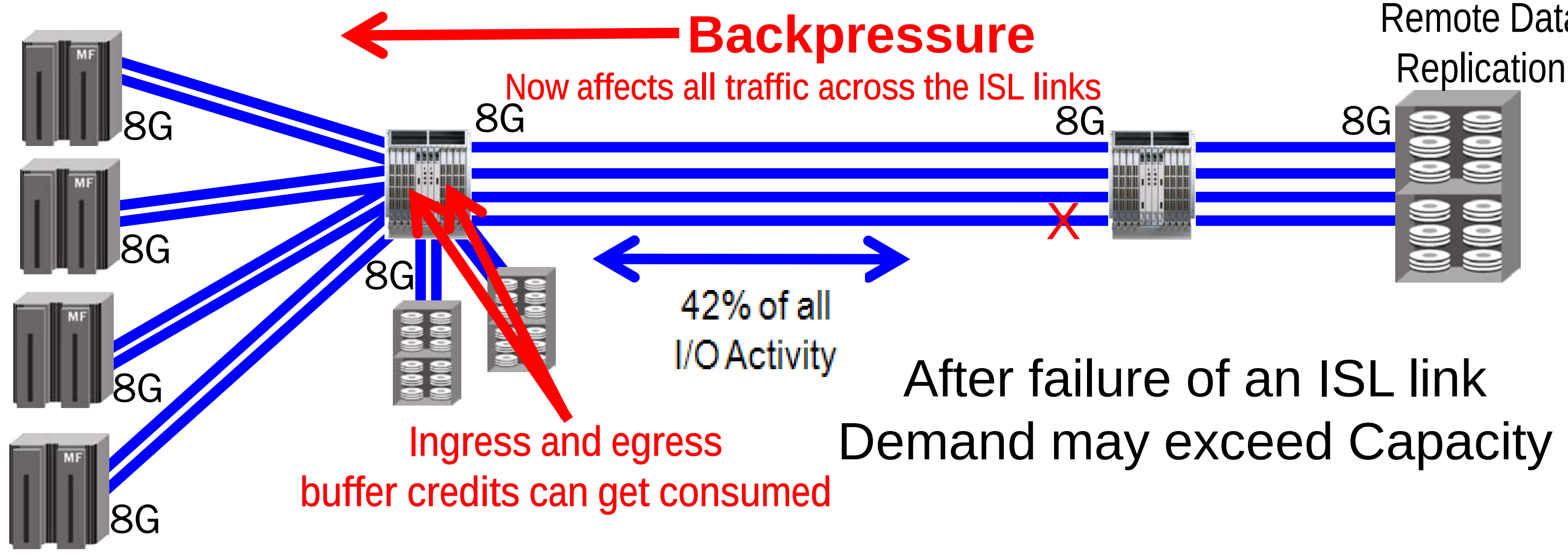
- Risk of Loss of Bandwidth is the motivator for deploying FICON fabrics like this
- In this case, 2 paths from an 8 path Path Group are deployed across four FICON fabrics to limit bandwidth loss to no more than 25% if a FICON fabric were to fail
- Each fabric needs to run at no more than ~50-60% busy so that if a failover occurs then the remaining fabrics can pickup and handle the full workload without over-utilization and with some extra utilization to spare per fabric
- If an ISL link in a single fabric fails then that fabric runs at only 50% capability

ISL Oversubscription – After a Failure
Demand may exceed capacity



- In this case if a switching device fails …or… if the long distance links in a fabric fails then the frame traffic that was traveling across the now broken links will be rerouted through the other fabrics to reach the storage device
- Those remaining fabrics must have enough reserve capacity in order to pick up all of the rerouted traffic while maintaining performance
- Congestion and potential back pressure could occur if all fabrics are running at high utilization levels – again, probably above 50% or 60% utilization
- Customers should manage their fabrics to allow for rerouted traffic

ISL Oversubscription
Creating Backpressure Problems on an ISL



- In This Example:
  - Each 8G CHPID / ISL is capable of 760MBps send/receive (800 * .95=760)
  - Two CHPIDs per mainframe (1520MBps) and 4 mainframes (6080MBps)
  - About 42% of I/O activity is across the ISLs and requires **2550MBps**
  - Four ISLs provides 3040MBps – (760MBps * 4) – and a little extra
  - Then one ISL fails leaving only **2280MBps** – (760MBps * 3) – not enough redundancy
  - 2280MBps / 2550MBps = 89% of what is required (**Congestion Will Occur**)
  - Each CHPID experiences backpressure as the remaining 3 ISLs become congested and unable to handle all of the I/O traffic

This Section

- Slow Draining Devices

Slow Draining Devices

- Slow draining devices are **receiving ports** that have more data flowing to them than they can consume.
  - This causes external frame flow mechanisms to back up their frame queues and potentially deplete their buffer credits.
- A slow draining device can exist at any link utilization level
- It's very important to note that it can spread into the fabric and can slow down unrelated flows in the fabric.
- **What causes slow draining devices?**
- The most common cause is within the storage device or the server itself. That happens often because a target port has a slower link rate then the I/O source ports(s) or the Fan-In from the rest of the environment overwhelms the target port.

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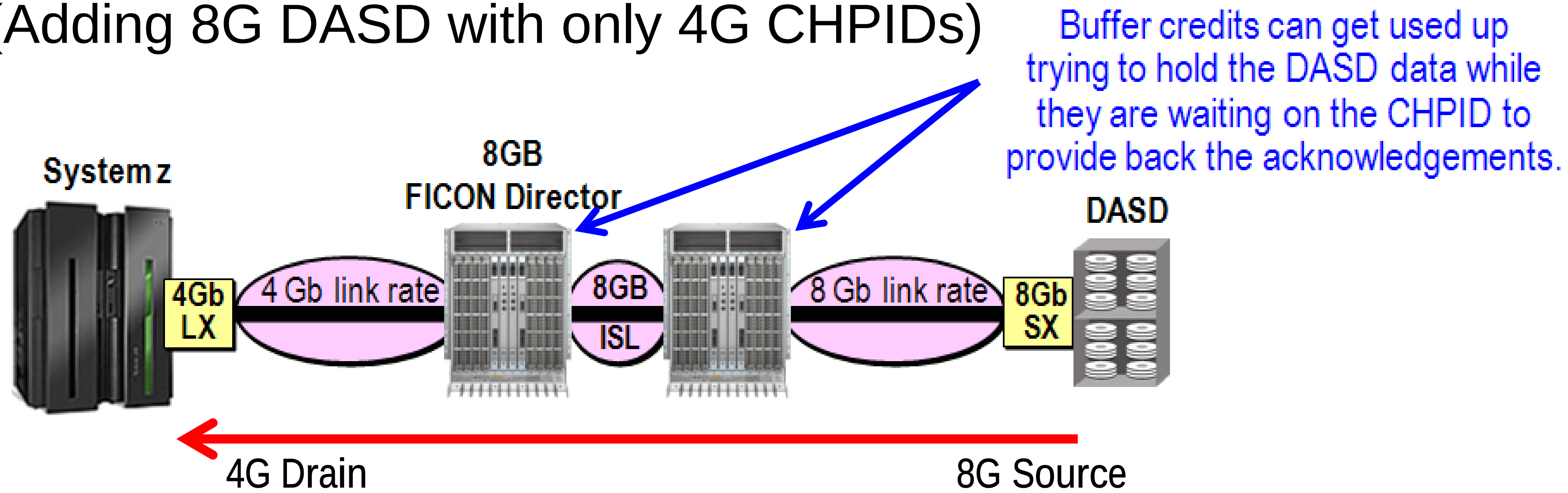
Slow Draining Devices – DASD

(Revisited from Session 13010)
(Adding 8G DASD with only 4G CHPIDs)

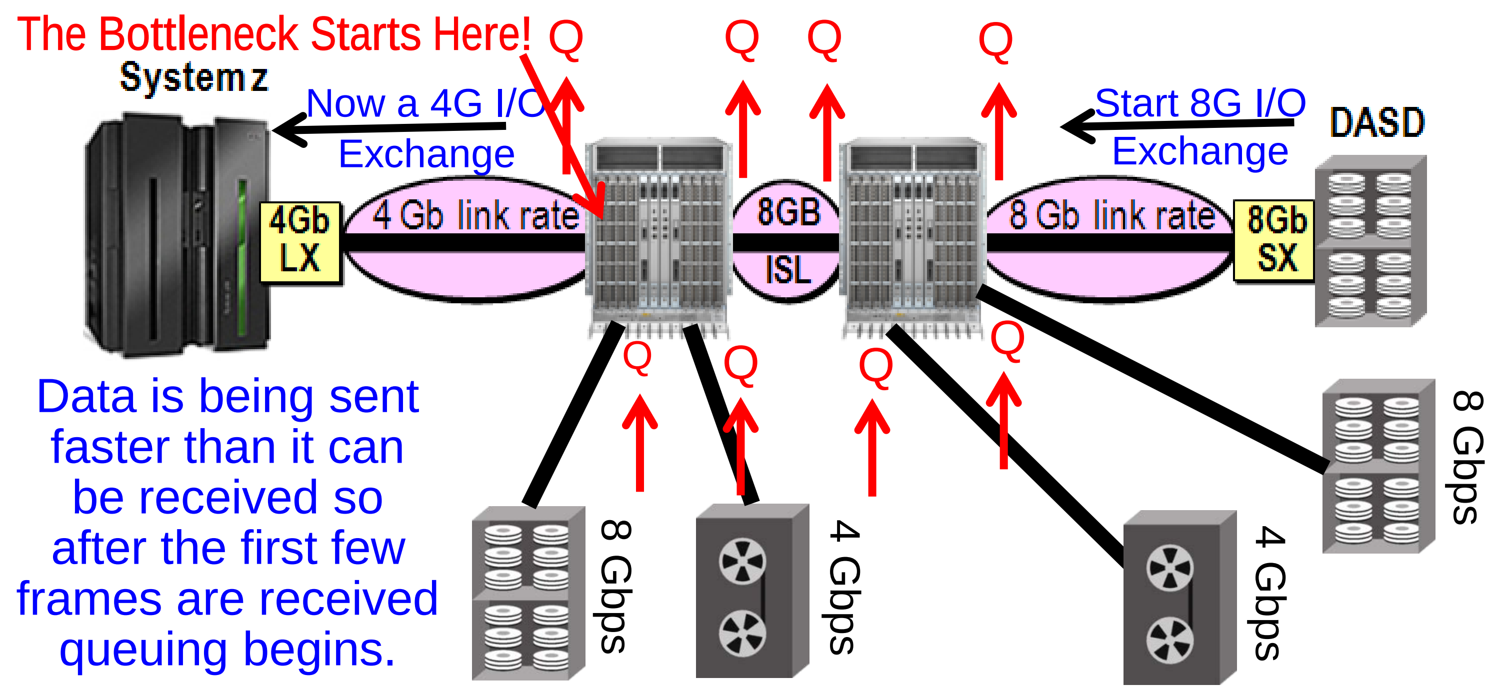


- This is potentially a very poor performing, infrastructure!
- DASD is about 90% read, 10% write. So, in this case the "drain" of the pipe is the 4Gb CHPID and the "source" of the pipe is the 8Gb storage port.
- The Source can out perform the Drain!
- This can cause congestion and back pressure towards the CHPID. The switch port leading to the CHPID becomes a slow draining device.

The Affects Of Link Rates (watch out for ISLs!)

Drain ← Source

Once an ISL begins ingress port queuing then quite a bit more backpressure can build up in the fabric because of multi-exchange congestion building up on the ISL link(s)

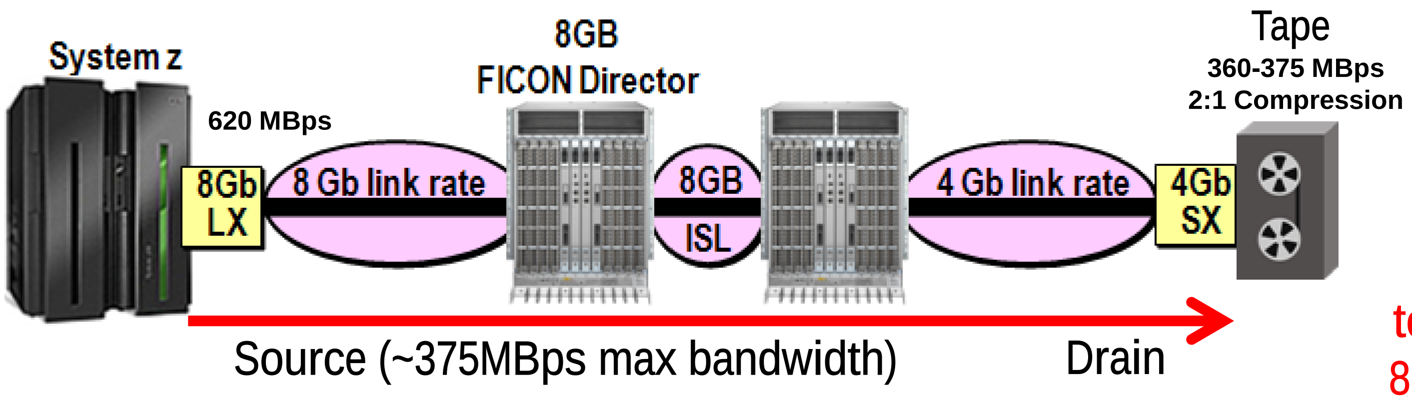


Q ↑ Buffer Credit queuing will create back-pressure on the channel paths.

This example assumes that all of the I/O traffic is going to the one CHPID or replication of data is going across the ISL

- The is a simple representation of a single CHPID connection
- Of course that won't be true in a real configuration and the results could be much worse and more dire for configuration performance

Slow Draining Devices – Real Tape



BUT…
If 8G Tape runs
at 375MBps (2X)
it will take 750MBps
to feed it and the best
8G CHPID <=620MBps

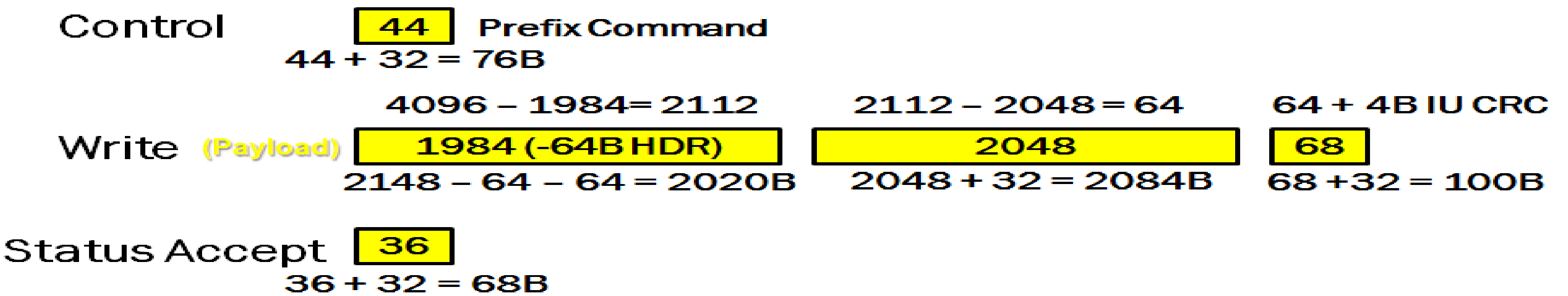
- For 4G tape this is OK – Tape is about 90% write and 10% read on average
- The maximum bandwidth a tape can accept and compress (@ 2:1 compression) is about 360MBps for Oracle (T1000C) and about 375MBps for IBM (TS1140)
- A FICON Express8S CHPID in Command Mode FICON can do about 620MBps
- A 4G Tape channel can carry about 380MBps (400 * .95 = 380MBps)
- So a single CHPID attached to a 4G tape interface:
  - Can run a single IBM tape drive (620 / 375 = 1.65)
  - Can run a single Oracle (STK) tape drive (620 / 360 = 1.72)

This Section

- Determining Buffer Credits Required
- RMF Reports for Switched-FICON
- Brocade's Buffer Credit Calculation Spreadsheet

Buffer Credits
Why FICON Never Averages a Full Frame Size

- There are three things that are required to determine the number of buffer credits required across a long distance link
  - The speed of the link
  - The cable distance of the link
  - The average frame size
- Average frame size is the hardest to obtain
  - Use the RMF 74-7 records report “FICON Director Activity Report”
  - You will find that FICON just never averages full frame size
  - Below is a simple FICON 4K write that demonstrates average frame size



4K will not fit into 2 BCs because of headers for FC as well as SB3 protocol that is used and the 64 byte FICON header that is placed into the 1st frame of every FICON exchange.

Average = (76+2020+2084+100+68) / 5 = 870 Bytes

Buffer Credits for Long Distance
The Impact of Average Frame Size on Buffer Credits

A distance of 20KM with 100% link utilization				2Gbps	4Gbps	8Gbps	10Gbps	16Gbps
SOF, Header, CRC, EOF	Payload	Total Frame Bytes	Smaller than full frame by xx%	Buffer Credis Required 8b10b	Buffer Credis Required 8b10b	Buffer Credis Required 8b10b	Buffer Credis Required 64b66b	Buffer Credis Required 64b66b
36	2112	2148	0.00%	20	40	80	99	159
36	1966	2002	6.80%	22	43	85	107	170
36	1824	1860	13.41%	23	46	92	115	183
36	1682	1718	20.02%	25	50	99	124	198
36	1540	1576	26.63%	27	54	108	135	216
36	1398	1434	33.24%	30	60	119	149	238
36	1256	1292	39.85%	33	66	132	165	264
36	1114	1150	46.46%	37	74	148	185	296
36	972	1008	53.07%	43	85	169	211	338
36	830	866	59.68%	50	99	197	246	393
36	688	724	66.29%	59	118	225	294	470
36	546	582	72.91%	74	147	293	366	585
36	404	440	79.52%	97	194	387	484	773
36	262	298	86.13%	143	286	571	714	1142
36	120	156	92.74%	273	545	1090	1363	2180
36	36	72	96.65%	591	1181	2362	2952	4724

Created by using Brocades Buffer Credit Calculator

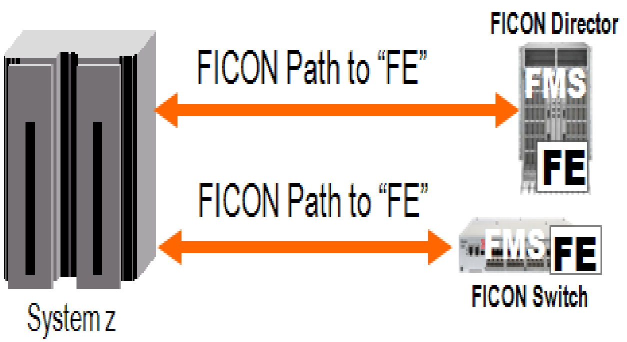
Buffer Credit Starvation
Why not just saturate each port with BCs?

- If a malfunction occurs in the fabric ….. or….
- If a CHPID or device is having a problem…
- It is certainly possible that some or all of the I/O will time out
- If ANY I/O does time out then:
  - All frames and buffers for that I/O (buffer credits) must be discarded
  - All frames and buffers for subsequently issued I/Os (frames and buffer credits) in that exchange must be discarded
    - Remember queued I/O will often drive exchanges ahead of time
  - The failing I/O must be re-driven
  - Subsequent I/O must be re-driven
- The recovery effort for the timed out I/O gets more and more complex – and more prone to also failing – when an over abundance of buffer credits are used on ports

Buffer Credit Starvation
Detecting Problems with FICON BCs

Produce the FICON Director Activity Report by creating the RMF 74-7 records – but this is only available when utilizing switched-FICON!

- A FICON Management Server (FMS) license per switching device enables the switch's Control Unit Port (CUP) – always FE – to provide information back to RMF at its request



- Analyze the column labeled AVG FRAME PACING for non-zero numbers. Each of these represents the number of times a frame was waiting for 2.5 microseconds or longer but BC count was at zero so the frame could not be sent

```
                         F I C O N   D I R E C T O R   A C T I V I T Y
                                                                                        PAGE    1
         z/OS V1R8                  SYSTEM ID PRD1            START 04/12/2009-04.30.00  INTERVAL 000.15.00
                                    RPT VERSION V1R8 RMF      END   04/12/2009-04.45.00  CYCLE 1.000 SECONDS
IODF = A2   CR-DATE: 03/27/2009   CR-TIME: 16.43.51     ACT: ACTIVATE
SWITCH DEVICE: 032B  SWITCH ID: 2B    TYPE: 006140  MODEL: 001   MAN: MCD   PLANT: 01   SERIAL: 00000131656G
PORT    -CONNECTION-   AVG FRAME    AVG FRAME SIZE     PORT BANDWIDTH (MB/SEC)     ERROR
ADDR    UNIT      ID     PACING     READ   WRITE      -- READ --  -- WRITE --      COUNT
 05     CHP       05          0      849    1436            8.63        17.34          0
 07     CHP-H     6B          0     1681    1395            0.87         0.32          0
 09     CHP       15          7      833    1429           11.96        20.49          0
 0C     CHP-H     64          0      939    1099            0.39         0.50          0
 0D     CHP       6B          1     1328    1823            3.56        12.73          0
 0F     CHP-H     66          0     1496    1675            1.85         2.61          0
 10     CHP       64          0      644    1380            0.03         0.13          0
 13     CHP-H     19          0      907     885            0.58         0.45          0
 16     CHP       12          0     1241    1738            0.97         1.72          0
 17     CHP       0B          0      685    1688            0.10         0.82          0
 1A     CHP       15          0     1144    1664            0.65         1.18          0
 1B     CHP       0D          0      510    1759            0.12         1.72          0
 1E     CHP-H     05          0      918     894            0.59         0.45          0
 1F     CHP       21          0     1243    1736            0.97         1.70          0
 20     CU      E900          0     1429     849           17.66         8.85          0
        CU      E800
        CU      E700
 22     CHP       10          0      923    1753            0.55         2.78          0
 23     CHP       54          0     1805      69            0.80         0.00          0
 24     CHP       64          0       89    1345            0.00         0.00          0
 27     CHP       6B          0     1619      82            0.01         0.00          0
 28     CHP       95         27      918    1589           10.32        30.56          0
 2B     CHP       70          0       69    2022            0.00         0.71          0
```

Complete your sessions evaluation online at SHARE.org/SanFranciscoEval

FICON Director Activity Report With Frame Delay

Using Buffer Credits is how FC does Flow Control, also called "Frame Pacing"

F I C O N   D I R E C T O R   A C T I V I T Y

PAGE 1

z/OS V1R8 | SYSTEM ID ABCD | START 04/12/2009-04.30.00 | INTERVAL 000.15.00
RPT VERSION V1R8 RMF | END 04/12/2009-04.45.00 | CYCLE 1.000 SECONDS

IODF = A2   CR-DATE: 03/27/2009   CR-TIME: 18.43.51   ACT: ACTIVATE

SWITCH DEVICE: 032B   SWITCH ID: 2B   TYPE: 006140   MODEL: 001   MAN: MCD   PLANT: 01   SERIAL: 0000HIJKLMN

PORT ADDR	-CONNECTION- UNIT	ID	AVG FRAME PACING	AVG FRAME SIZE READ	WRITE	PORT BANDWIDTH (MB/SEC) -- READ --	-- WRITE --	ERROR COUNT
05	CHP-H	05	0	849	1436	8.63	17.34	0
07	CHP	6B	1	1681	1395	50.87	10.32	0
09	CHP	15	0	833	1429	11.96	20.49	0
0C	CHP-H	64	0	939	1099	0.39	0.50	0
0D	CHP	6B	0	1328	1823	3.56	12.73	0
0F	CHP-H	66	0	1496	1675	1.85	2.61	0
10	CHP	64	0	644	1380	0.03	0.13	0
13	CHP-H	19	0	907	885	0.58	0.45	0
16	CU	C800	0	1241	738	20.97	5.72	0
	CU	CA00				70.10	3.82	0
1A	CHP	15	0	1144	1664	0.65	1.18	0
1B	CHP	0D	0	510	1759	0.12	1.72	0
1E	CHP-H	05	0	918	894	0.59	0.45	0
1F	CHP	21	0	1243	1736	0.97	1.70	0
20	CU	E900	0	1429	849	17.66	8.85	0
	CU	E800						
	CU	E700						
22	CHP	10	0	923	1753	0.55	2.78	0
23	CHP	54	0	1805	69	20.80	7.30	0
24	CHP	64	0	89	1345	0.00	0.00	0
27	CHP	6B	0	1619	82	0.01	0.00	0
28	SWITCH	95	270	[illegible]	789	50.32	10.56	0
2B	CHP	70	0	69	2022	0.00	0.71	0

In the last 15 minutes

This port had a frame to send but did not have any Buffer Credits left to use to send them.

And this happened 270 times during the interval.

And this is an ISL Link!

Indicators of Buffer Credit Starvation

Fabric with zHPF Enabled

SHARE in San Francisco 2013

We have a BC Calculator that you can use!

Brocade's Buffer Credit Calculation for Fibre Channel (FICON and/or SAN)

		Link Speed								
		1 Gbps	2 Gbps	4 Gbps	8 Gbps	10 Gbps	16 Gbps	32 Gbps	40 Gbps	100 Gbps
		1.0625E-09	2.1250E-09	4.2500E-09	8.5000E-09	1.0625E-08	3.4000E-08	1.3600E-07	3.4000E-07	1.0625E-06
Parameter										
Velocity of light in fibre	200000km/s	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06
Nano seconds per byte		9.41E-09	4.71E-09	2.35E-09	1.18E-09	9.41E-10	5.88E-10	2.94E-10	2.35E-10	9.41E-11
Framelength in seconds (dependent on cell i19)		8.05E-06	4.02E-06	2.01E-06	1.01E-06	8.05E-07	5.03E-07	2.51E-07	2.01E-07	8.05E-08
Framelength in km (dependent on cell i19)		1.61	0.80	0.40	0.20	0.16	0.10	0.05	0.04	0.02

10 Gig has 64b/66B en/decoding and therefore a better performance

Buffer Credit Calculation

To determine kilometers from miles, type miles into cell D15:
(1 mile = 1.609344 kilometer)

15 Miles Equals **24** Kilometers rounded to the nearest integer

To Calculate the proper number of buffer credits that you will need to keep the ISL link 100% utilized - especially over long distances:

Type in the frame "Payload" size in Bytes (in cell D19)=======> **819** Payload bytes and 36 overhead bytes equals a total frame size of **855** Bytes

Type in the total kilometers of the wire run (in cell D20)=====>
(Use the calculated kilometers from cell F15 if required) **24** Kilometers

Description	1 Gbps	2 Gbps	4 Gbps	8 Gbps	10 Gbps	16 Gbps	32 Gbps	40 Gbps	100 Gbps
Framelength takes up this many kilometers on the wire (calculated from frame size in cell I19)	1.61	0.80	0.40	0.20	0.16	0.10	0.05	0.04	0.02
Buffercredits @ 100% B/W Utilization raw calculation.	29.83	59.66	119.32	238.64	298.30	477.28	954.56	1193.21	2983.02
Buffercredits @ 100% B/W Utilization rounded up.	**30**	**60**	**120**	**239**	**299**	**478**	**955**	**1194**	**2984**

Brocade Communications Systems, Inc.

Splash | B2B Calcuator

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Brocade Certified Architect for FICON

- Certification for Brocade Mainframe-centric Customers
- Available since September 2008
- Updated for 8Gbps in June 2010
- Updated for 16Gbps in November 2012
- This certification tests the attendee's ability to understand IBM System z I/O concepts, and demonstrate knowledge of Brocade FICON Director and switching infrastructure components
- ***Brocade would be glad to provide a free 2-day BCAF certification class for Your Company or in Your City!***
- Ask me how to make that happen for you!

SHARE in San Francisco 2013

SAN Sessions at SHARE this week

Thursday:

<u>Time-Session</u>

1300 – 13012: Buzz Fibrechannel - To 16G and Beyond

Mainframe Resources For You To Use

Visit Brocade's Mainframe Blog Page at:

http://community.brocade.com/community/brocadeblogs/mainframe

Also Visit Brocade's Mainframe Communities Page at:

http://community.brocade.com/community/forums/products_and_solutions/mainframe_solutions

You can also find us on Facebook at:

https://www.facebook.com/groups/330901833600458/

Please Fill Out Your Evaluation Forms!!

This was session:

13009

Thank You For Attending Today!

5 = "Aw shucks. Thanks!"
4 = "Mighty kind of you!"
3 = "Glad you enjoyed this!"
2 = "A Few Good Nuggets!"
1 = "You Got a nice nap!"

And Please Indicate On Those Forms If There Are Other Presentations You Would Like To See In This Track At SHARE.

QR Code