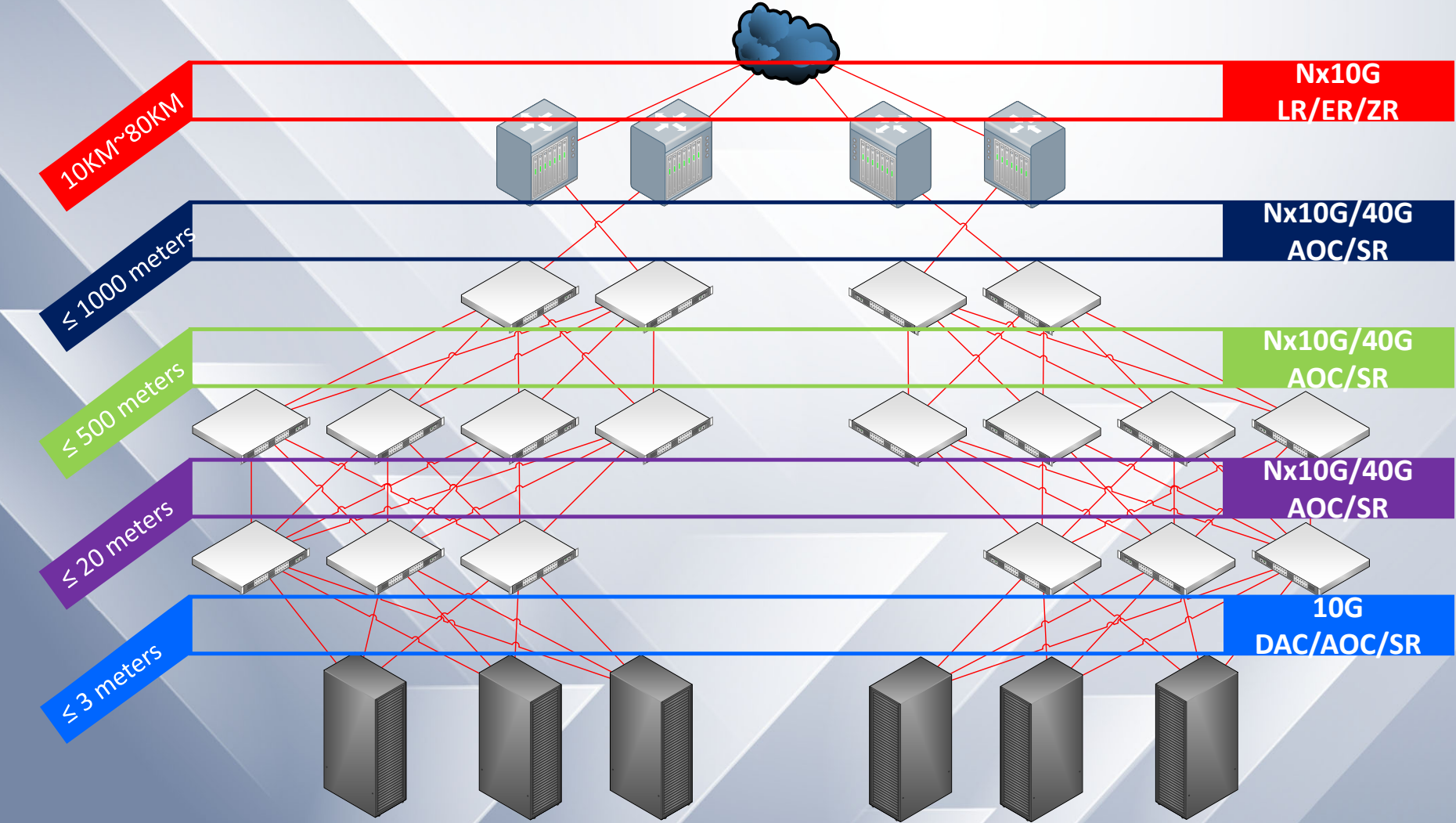


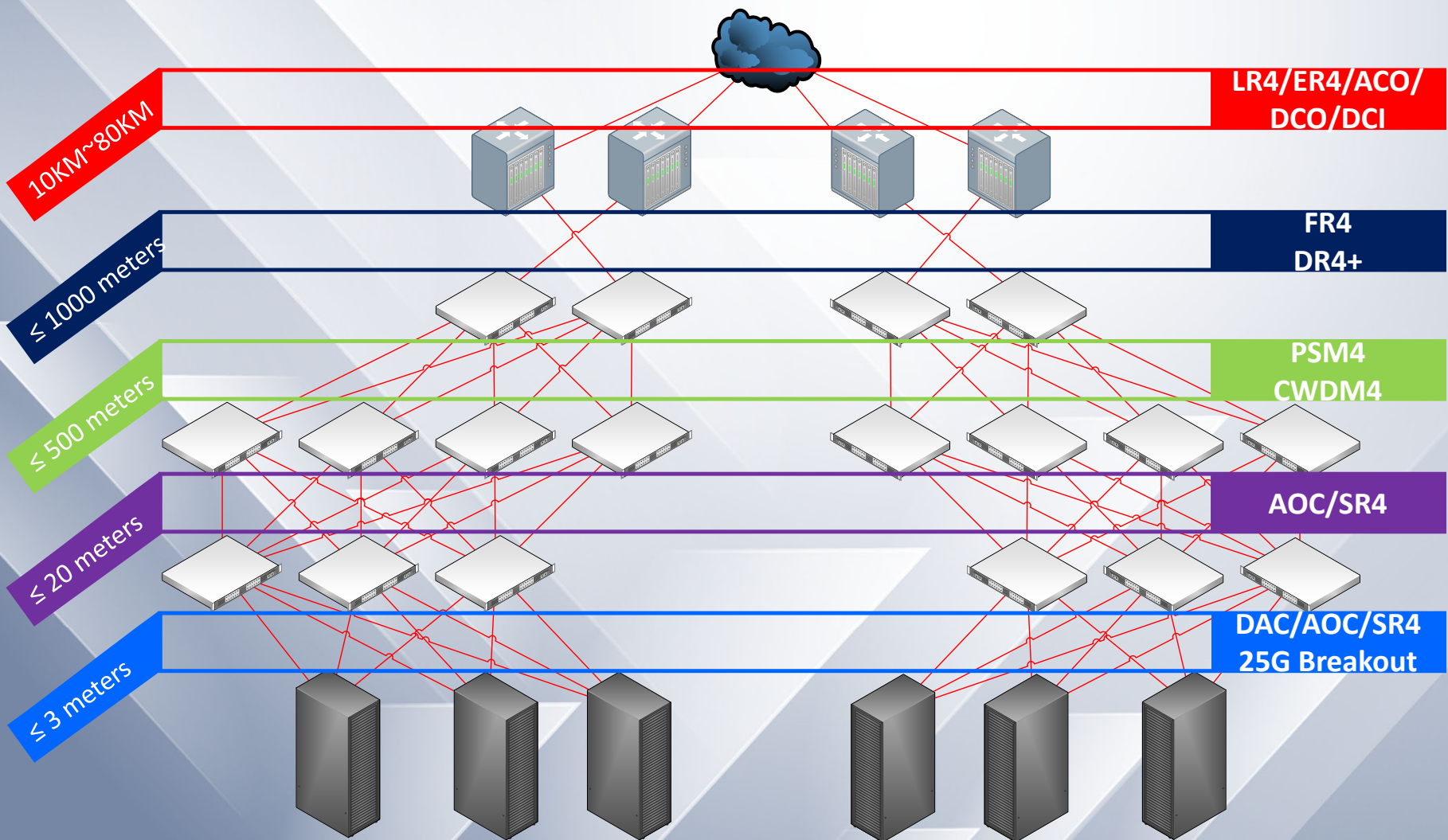


**UPGRADE PATHS FROM 10G UP TO 800G
IN DATACENTER, LAST MILE AND DCI**

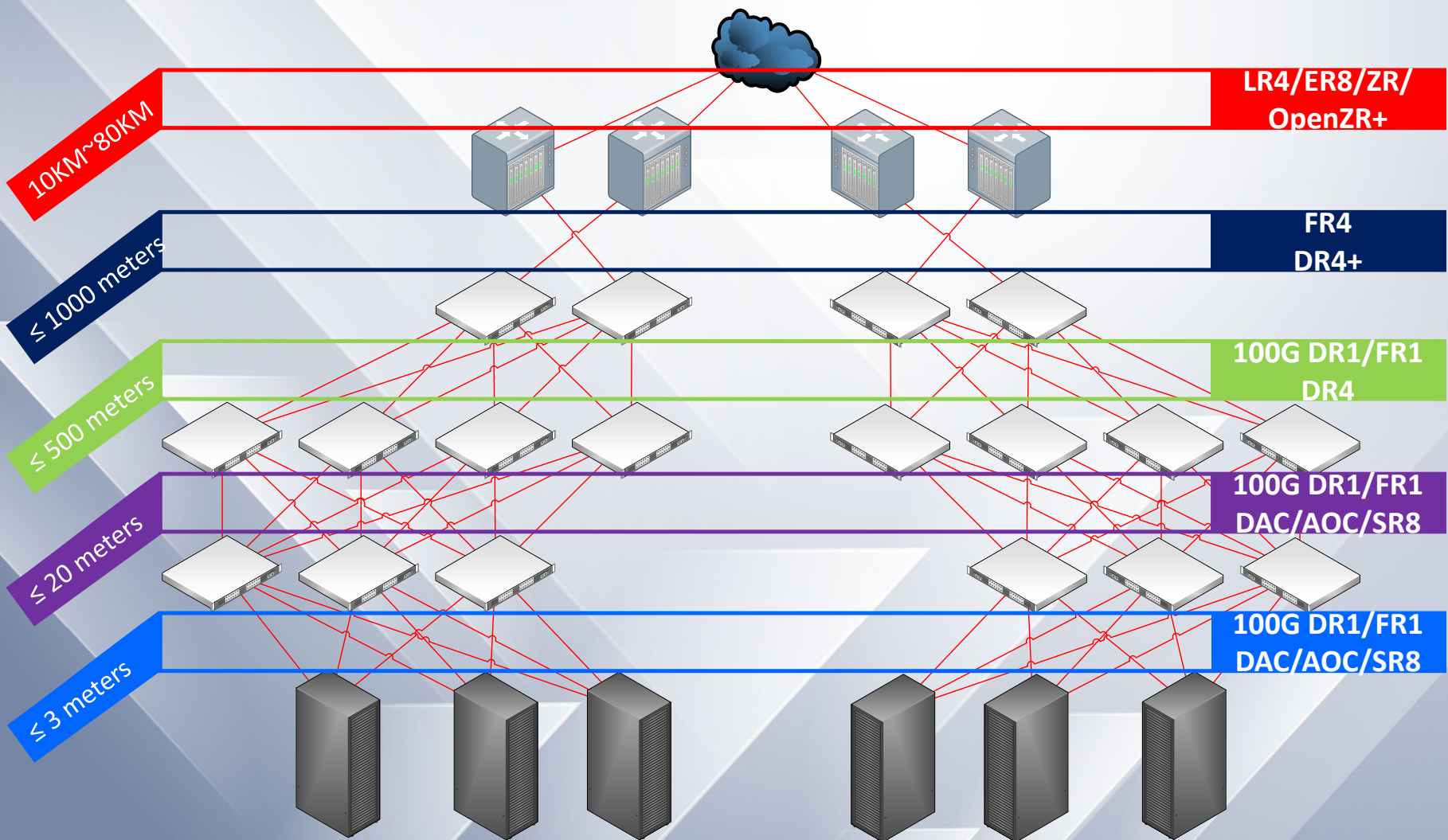
10G Infrastructure



10G >>>100G Infrastructure



100G >>>400G Infrastructure



400G >>>800G Infrastructure



10KM~80KM **ZR/OpenZR+**

≤ 1000 meters **8xFR1**

≤ 500 meters **8xFR1/2xFR4 DR8**

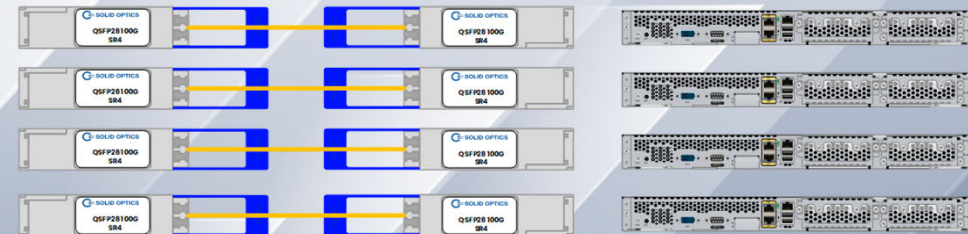
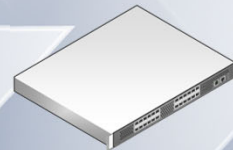
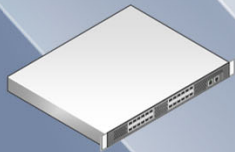
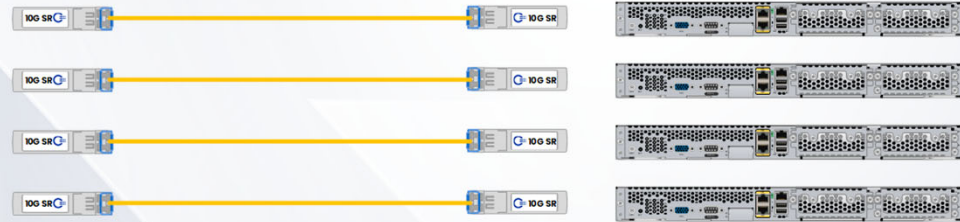
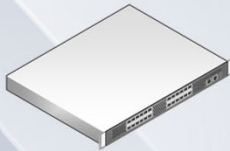
≤ 20 meters **8xFR1/2xFR4 DR8/AOC**

≤ 3 meters **AOC/FR4/DR8**

Datacenter Top Of Rack 10G to 100G Upgrade

Higher density and Speed
Provided by 100G to 4x25G AOC or DAC

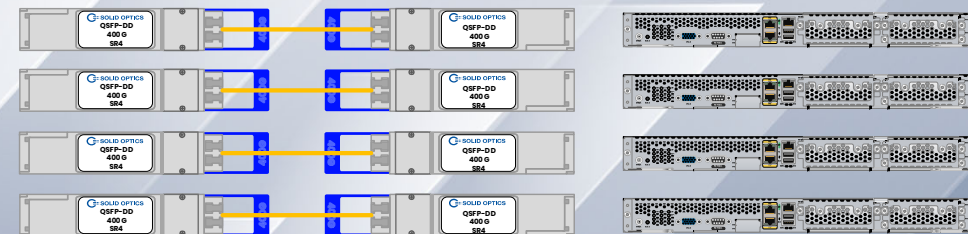
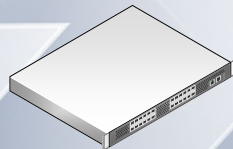
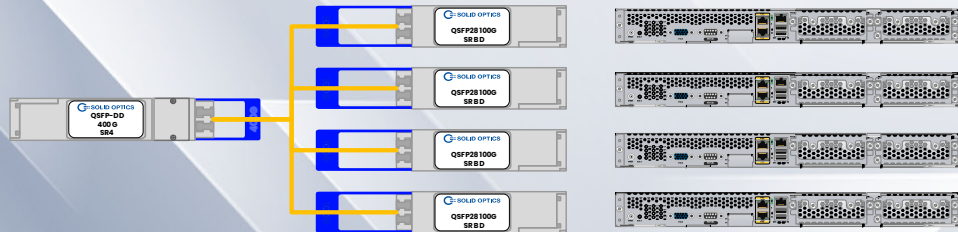
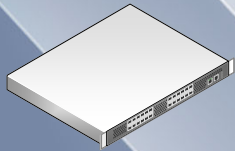
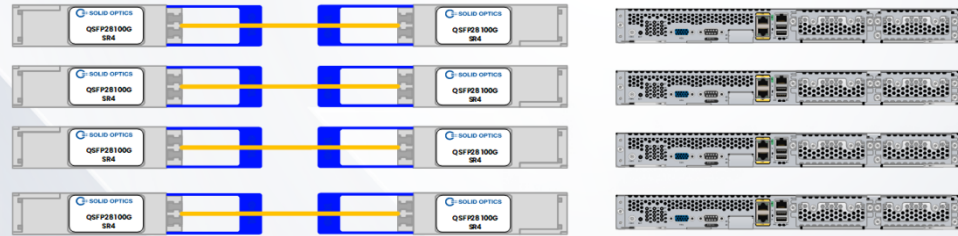
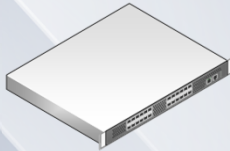
Highest Speed Provided by
100G SR4, AOC or DAC



Datacenter Top Of Rack 100G to 400G Upgrade

**Higher density and Speed
Provided by 400G to 4x100G AOC, DAC
or 4x100G 2x100G Breakouts**

**Highest Speed Provided by
400G SR4, AOC or DAC**



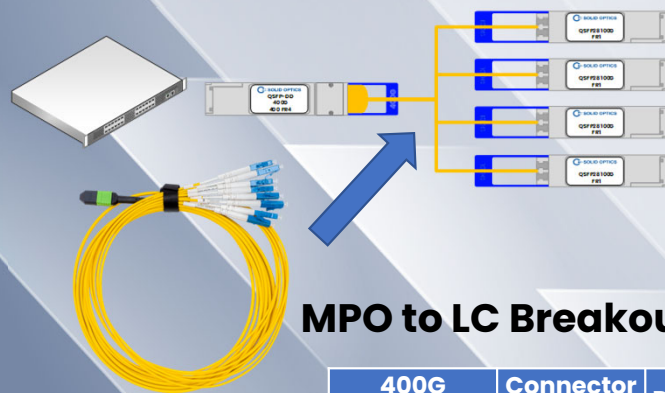
Datacenter Top Of Rack 100G to 400G Upgrade Breakouts

400G to 4x100G breakout architectures require thoughtful planning across the physical layer

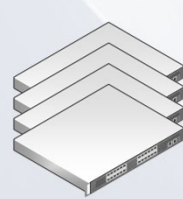
- Interoperability
 - Deployed 100G CWDM4 and LR4 (NRZ modulation) not interoperable with PAM4 400G interfaces.
- Fiber Cabling Considerations
 - New connectors (SN and MPO-16)

• 200G to 2x100 breakouts offer backwards interoperability

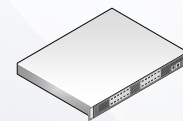
- NRZ Modulation ~ LR4, CWDM4
- Fiber Cabling Considerations
 - New Duplex CS connector to infrastructure – conversion media required.



MPO to LC Breakout



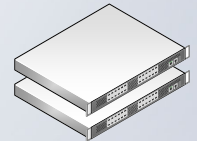
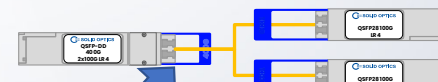
Duplex SN



Duplex CS

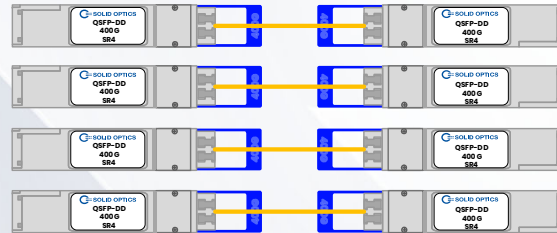
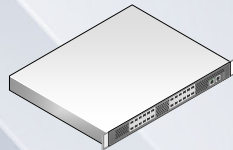


Duplex LS

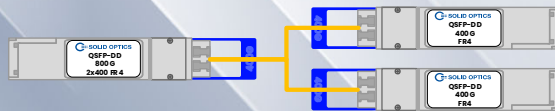
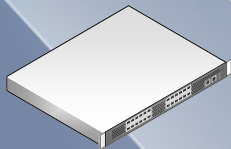


400G Interface	Connector 400G	Data Rate	Media	Max Distance	100G Interface	Connector 100G	Optical Signaling	Optical Type
SR4.2	MPO-12	400G	MMF	100M	SRI.2	Duplex LC	PAM4	850-910 BiDi
DR4	MPO-12	400G	SMF	500M	DR1	Duplex LC	PAM4	100G Lambda
FR4	MPO-12	400G	SMF	2KM	FR1	Duplex LC	PAM4	100G Lambda
LR4	MPO-12	400G	SMF	10KM	LR1	Duplex LC	PAM4	100G Lambda
2xSR4	MPO-24	200G	MMF	100M	SR4	Duplex LC	NRZ	Parallel
2xCWDM4	Duplex CS	200G	SMF	2KM	CWDM4	Duplex LC	NRZ	CWDM4
2xLR4	Duplex CS	200G	SMF	10KM	LR4	Duplex LC	NRZ	LAN-WDM
2x4WDM-10	Duplex CS	200G	SMF	10KM	4WDM-10	Duplex LC	NRZ	LAN-WDM
4xFR	Duplex SN	400G	SMF	2KM	FR1	Duplex LC	PAM4	100G Lambda
4xLR	Duplex SN	400G	SMF	10KM	LR1	Duplex LC	PAM4	100G Lambda

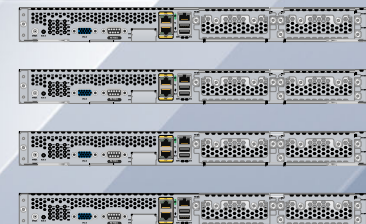
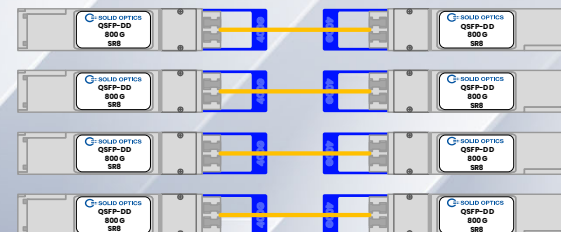
Datacenter Top Of Rack 400G to 800G Upgrade



**Higher density and Speed
Provided by 800G to 8x100G or 2 x400G
AOC, DAC or Breakout**



**Highest Speed Provided by
800G SR8, AOC or DAC**



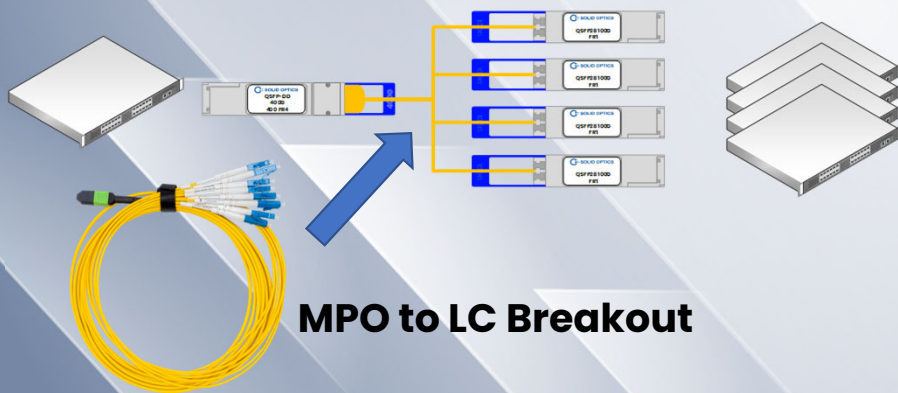
Datacenter Top Of Rack 400G to 800G Upgrade Breakouts

800G to 8x100G breakout architectures require thoughtful planning across the physical layer

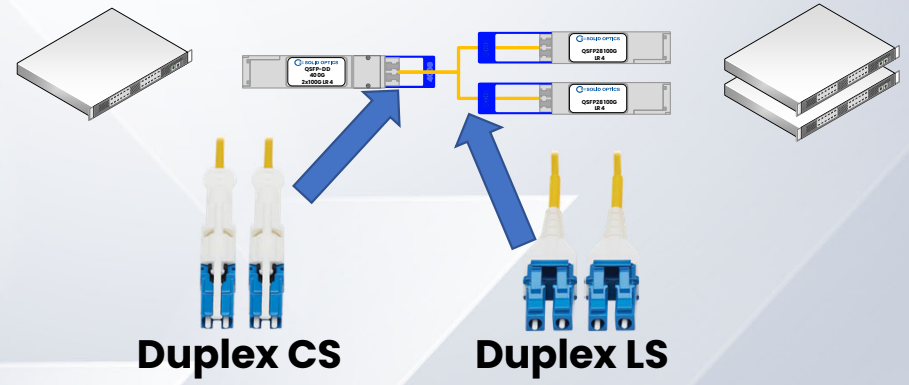
- 8x100G breaks into Single Lambda transceivers
- Fiber Cabling Considerations
 - New connectors (CS and MPO-16)

800G to 2x400G breakouts Higher Speed

- Fiber Cabling Considerations
 - New Duplex CS connector to infrastructure – conversion media required.



MPO to LC Breakout

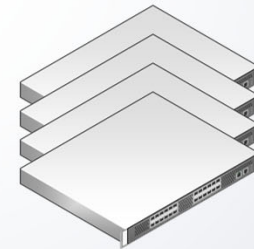
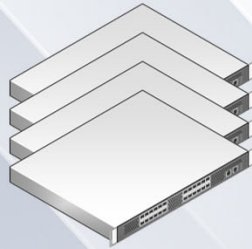


Duplex CS

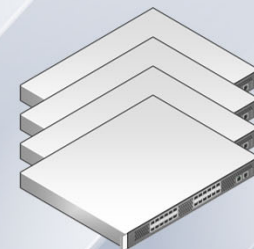
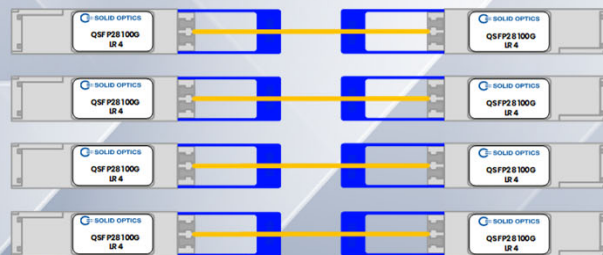
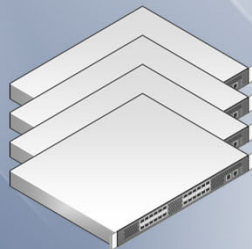
Duplex LS

800G Interface	Connector 800G	Data Rate	Media	Max Distance	100G/400G Interface	Connector 100G/400G	Optical Signaling	Optical Type
8x100G DR	MPO-16	800G	SMF	500M	FR1	Duplex LC	PAM4	100G Lambda
8x100G FR	MPO-16	800G	SMF	2KM	FR1	Duplex LC	PAM4	100G Lambda
8x100G LR	MPO-16	800G	SMF	10KM	FR1	Duplex LC	PAM4	100G Lambda
2x400G FR4	Duplex CS	800G	SMF	2KM	FR4	Duplex LC	PAM4	CWDM4
2x400G LR4	Duplex CS	800G	SMF	10KM	LR4	Duplex LC	PAM4	CWDM4

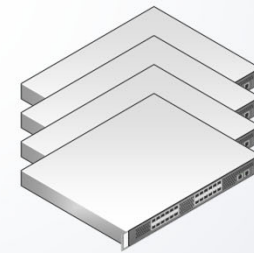
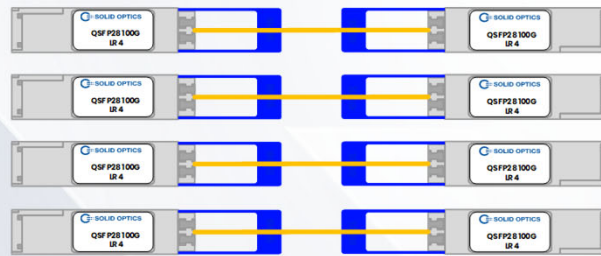
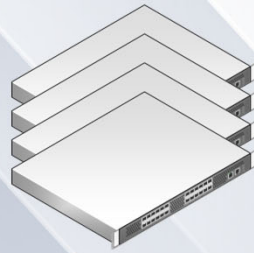
Last Mile 10G to 100G Upgrade



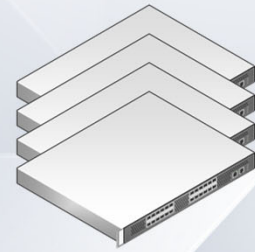
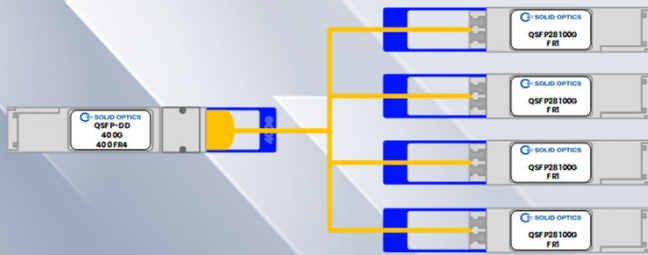
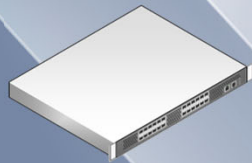
Highest Speed Provided by 100G
FR1,DR1,LR1,LR4 and LR1 BiDi



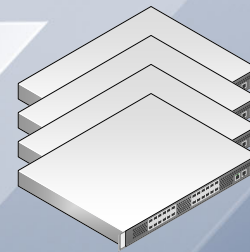
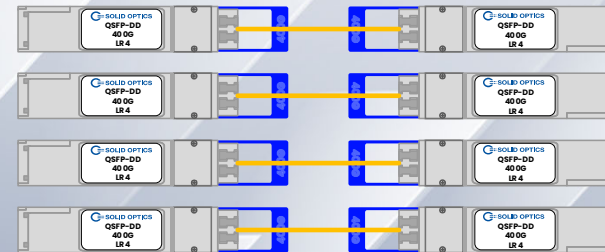
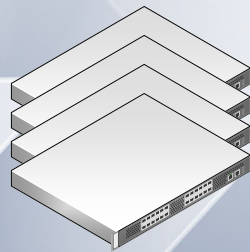
Last Mile 100G to 400G Upgrade



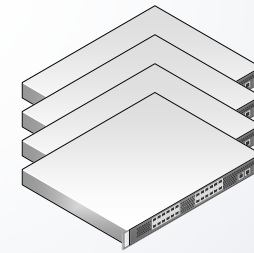
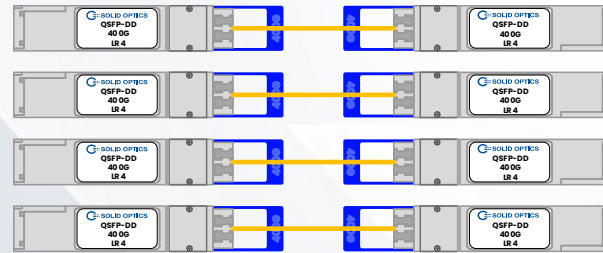
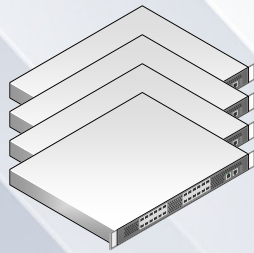
**Higher density and Speed
Provided by 400G to 4x100G DR4,FR4
and LR4 to single lambda**



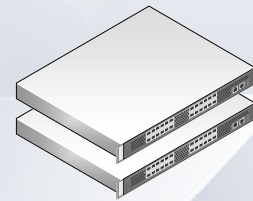
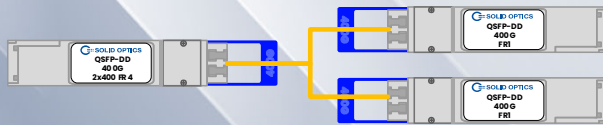
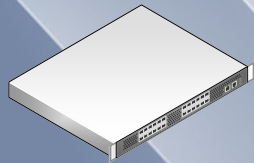
**Highest Speed Provided by
400G DR4, FR4 and LR4**



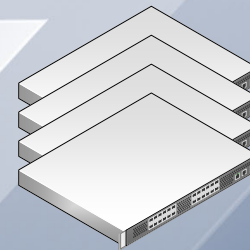
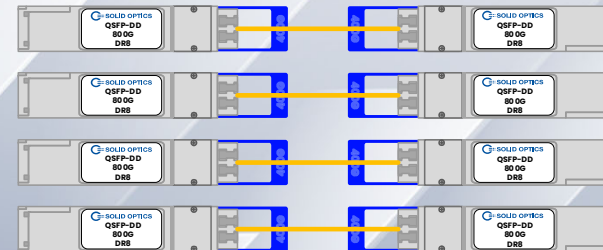
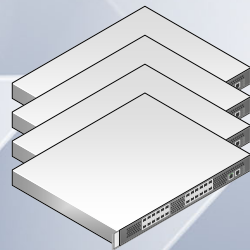
Last Mile 400G to 800G Upgrade



Higher density Provided by 800G to 8x100G or 2 x400G FR and LR Breakout



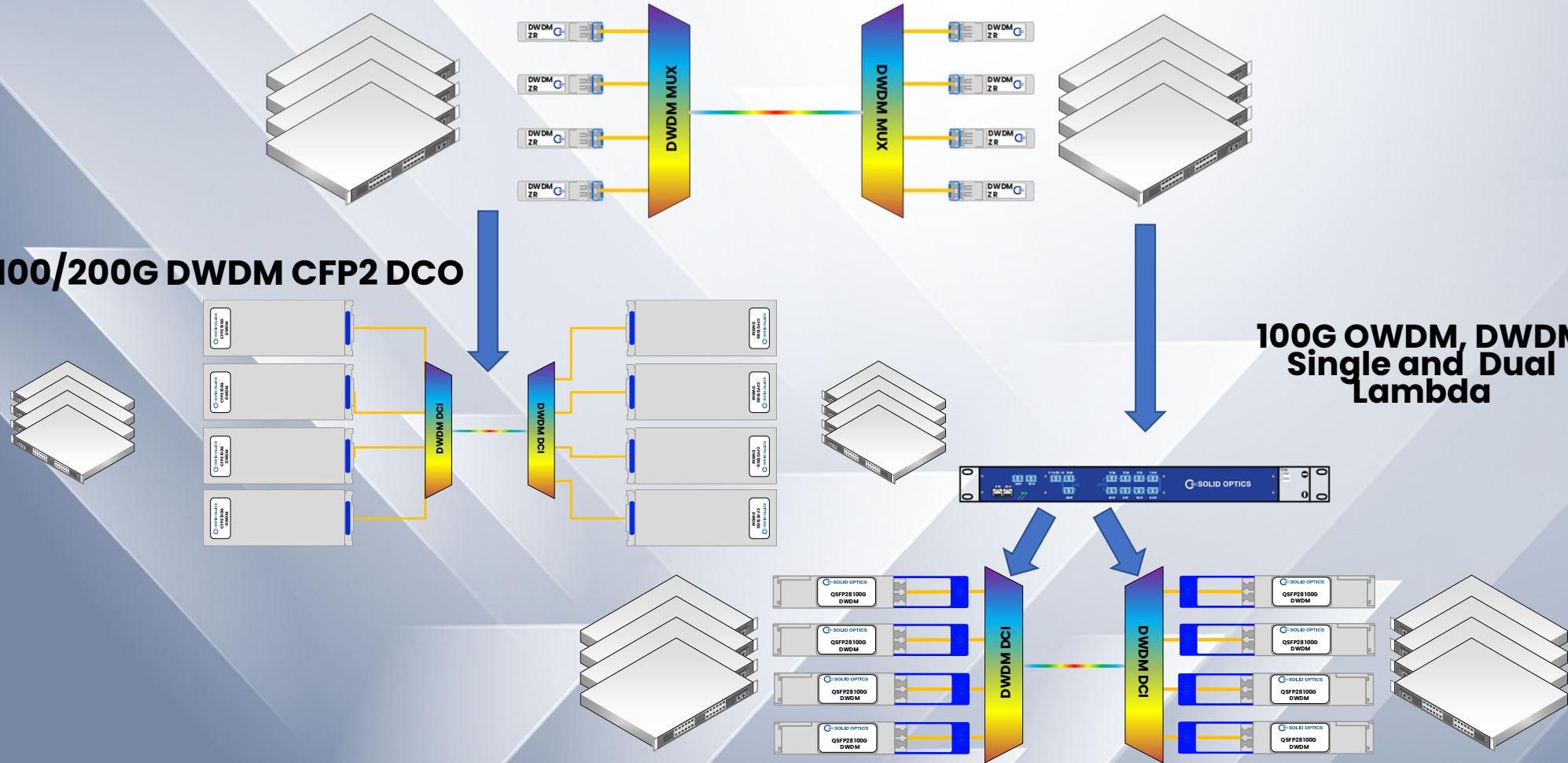
**Highest Speed Provided by
800G DR8,LR8**



DCI 10G to 100G Upgrade

100/200G DWDM CFP2 DCO

100G OWM, DWDM
Single and Dual
Lambda



DCI

10G to 100G Upgrade

100/200G DWDM CFP2 DCO

- Requires specific network hardware to run
- Requires EDFAs
- High Power Consumption
- Up to 2000Km (depends on the version)
- Fixed and Tunable Wavelengths versions

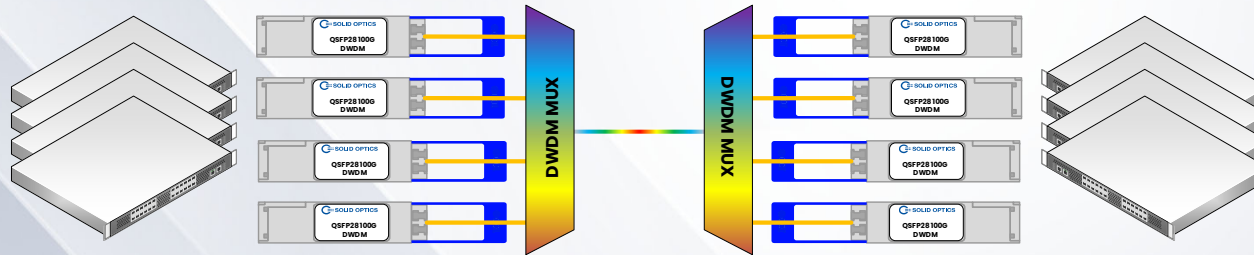
100G DWDM Single and Dual Lambda

- Works on Standard network hardware
- Requires EDFAs and Dispersion Compensator
- Normal Power Consumption
- Up to 120Km
- Fixed Wavelengths only

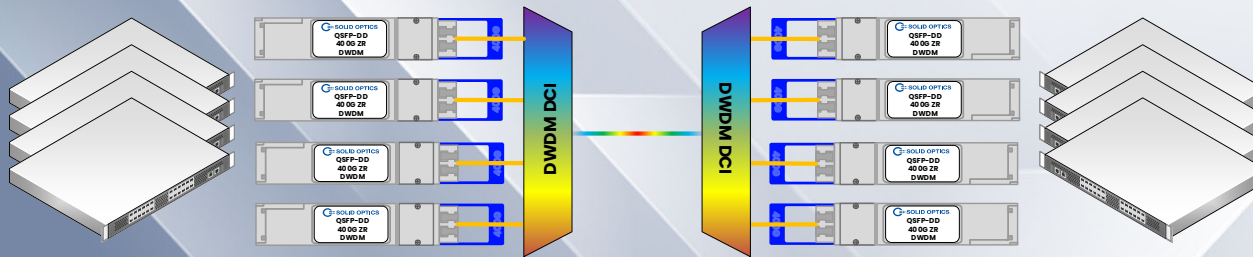
100G OWDM

- Works on Standard network hardware
- Totally passive (no EDFAs or Dispersion Compensator needed)
- Normal Power Consumption
- Up to 20Km (with MUX)
- Fixed Wavelengths only

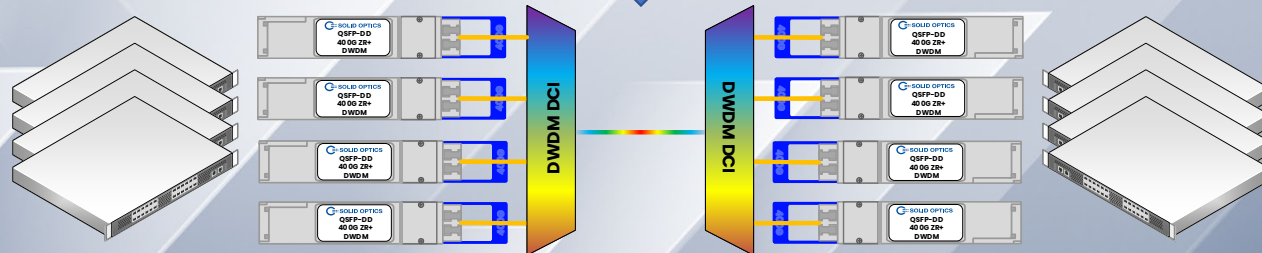
DCI 100G to 400G Upgrade



ZR DCI up to 120Km



OpenZR+ Long Haul up to 600Km



DCI

100G to 400G Upgrade

400G DWDM ZR

- Requires specific network hardware to run
- Requires EDFAs
- Moderate Power Consumption
- Up to 120Km
- Tunable Wavelength

• 400G DWDM OpenZR+

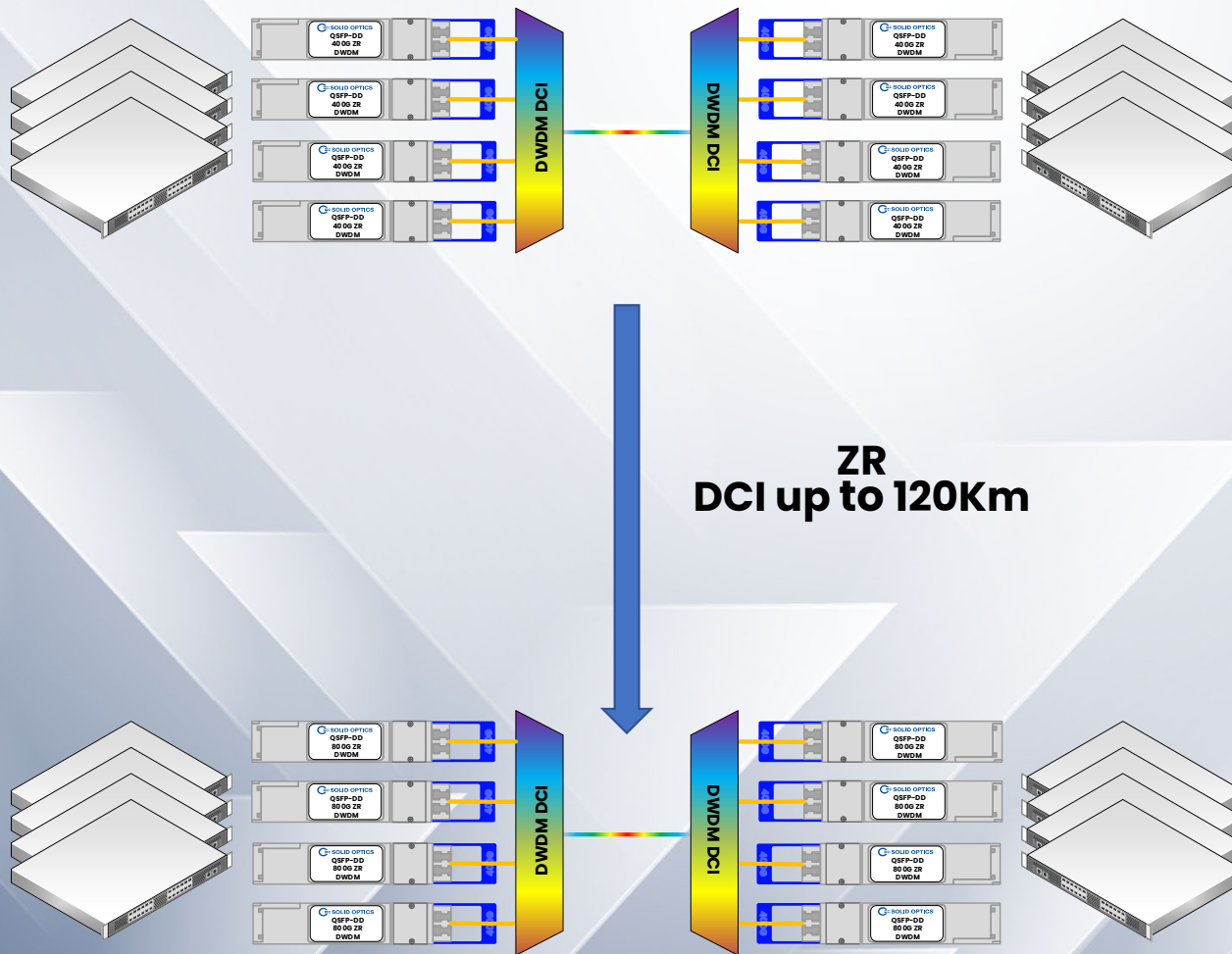
- Requires specific network hardware to run
- Requires EDFAs
- High Power Consumption
- Up to 600Km
- Tunable Wavelength

• 400G DWDM ZR 0dB Tx

- Requires specific network hardware to run
- Requires EDFAs
- High Power Consumption
- Up to 600Km
- Tunable Wavelength
- To be used in ROADMs

DCI

400G to 800G Upgrade



Thank you for attending