

# FORCE 10™

## **PMD Objectives: 10KM to 40KM PMD**

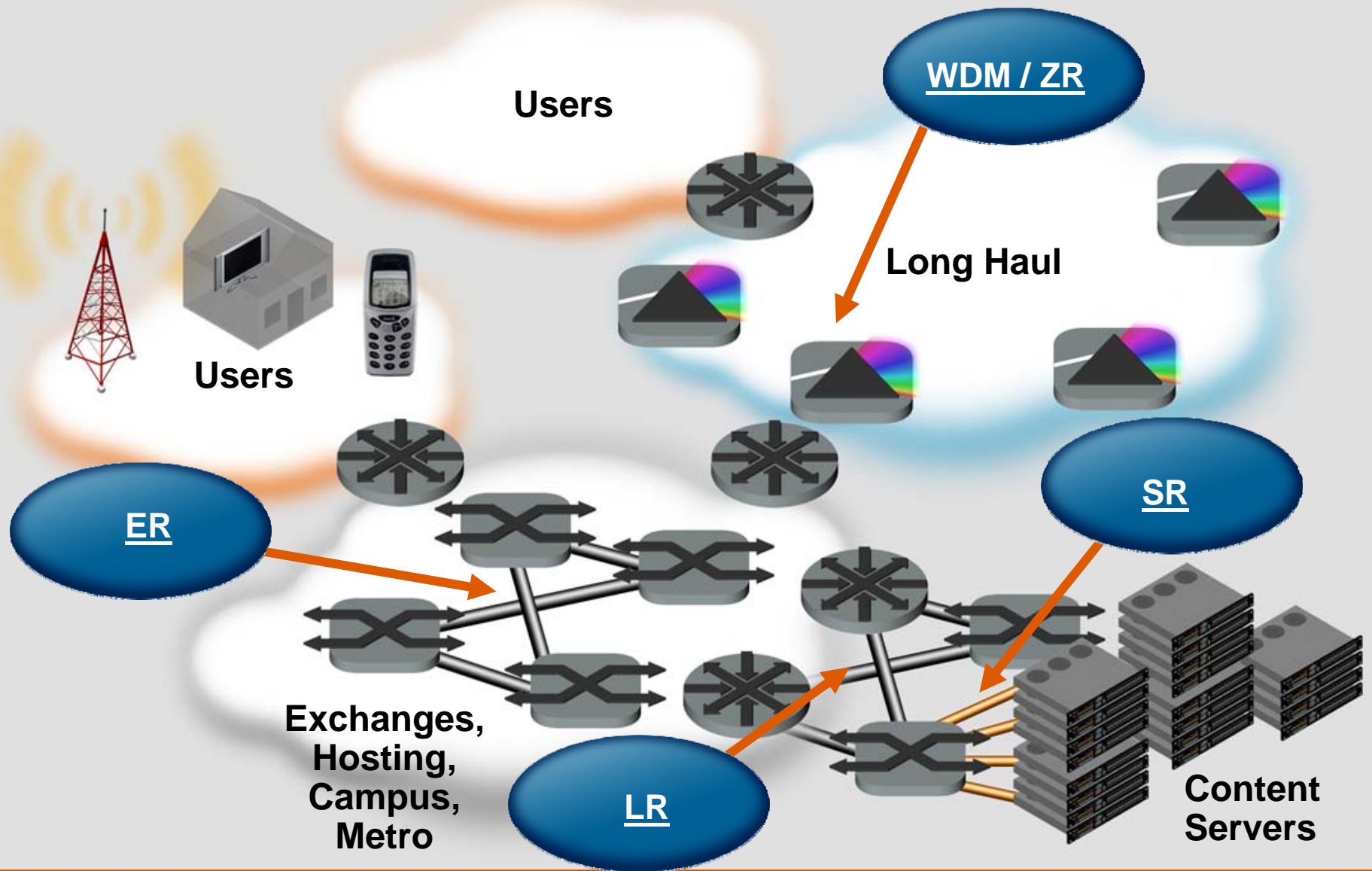
***Joel Goergen  
Chief Scientist  
November 14-16, 2006***



- Dave Aldering, Aldering ICT
- Adam Bechtel, Yahoo-Inc
- Michael Bennett, LBNL
- Joe Lawrence, Level 3
- Henk Steenman, AMS-IX

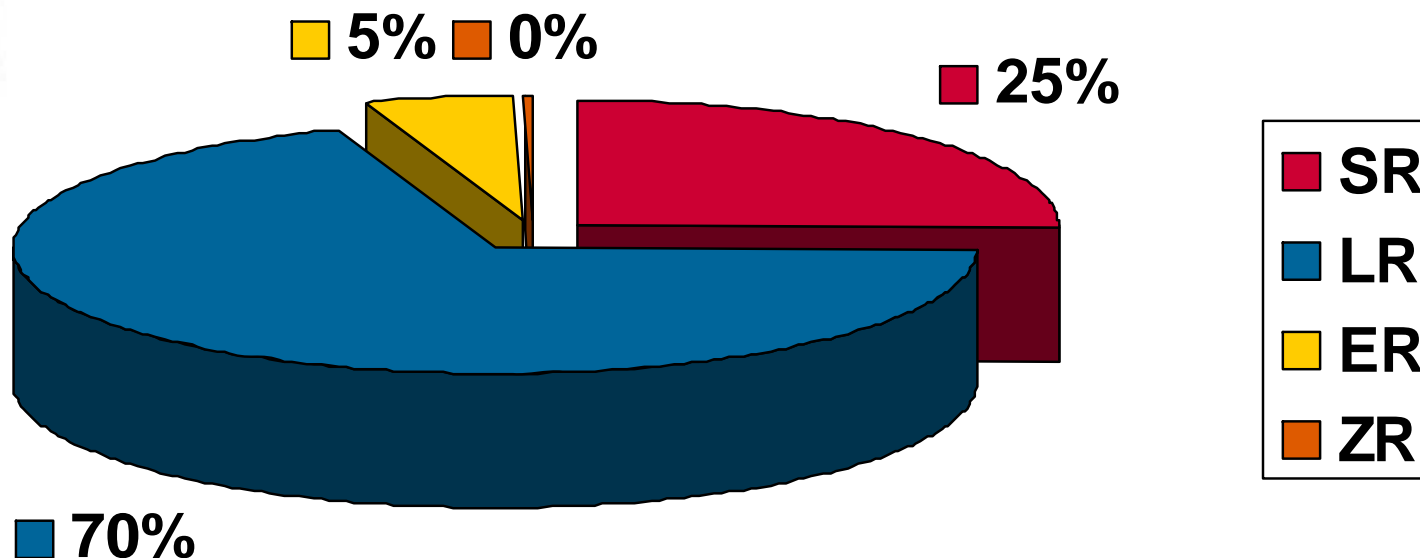
- “I’d say probably 80% of our metro 10GE links today are between 5km and 40km.”
- “10km to 40km ... This covers 25% of our interconnects.”
- “in example 10 gig core aggregation within the metro area. If you have a look at the AMS-IX topology map, you can see that they aggregate the 10 gig member ports to the core through the Glimmerglass photonic switches. With the diverse fiber routes and growth of the city, 10km plus optics could be necessary, if not demanded, for some member connections now and in the future.”
- “Interfaces in the range of 10 to 40 km are typically 1/2 of the number of customer interfaces.”
- “It would be the same as 10GE for us which I think is <10%. What is more important for us and would be higher volume would be interfaces compatible with wdm systems.”

# View from the Clouds



- Internet Exchange
- Campus Backbone
- Campus to Campus or Metro

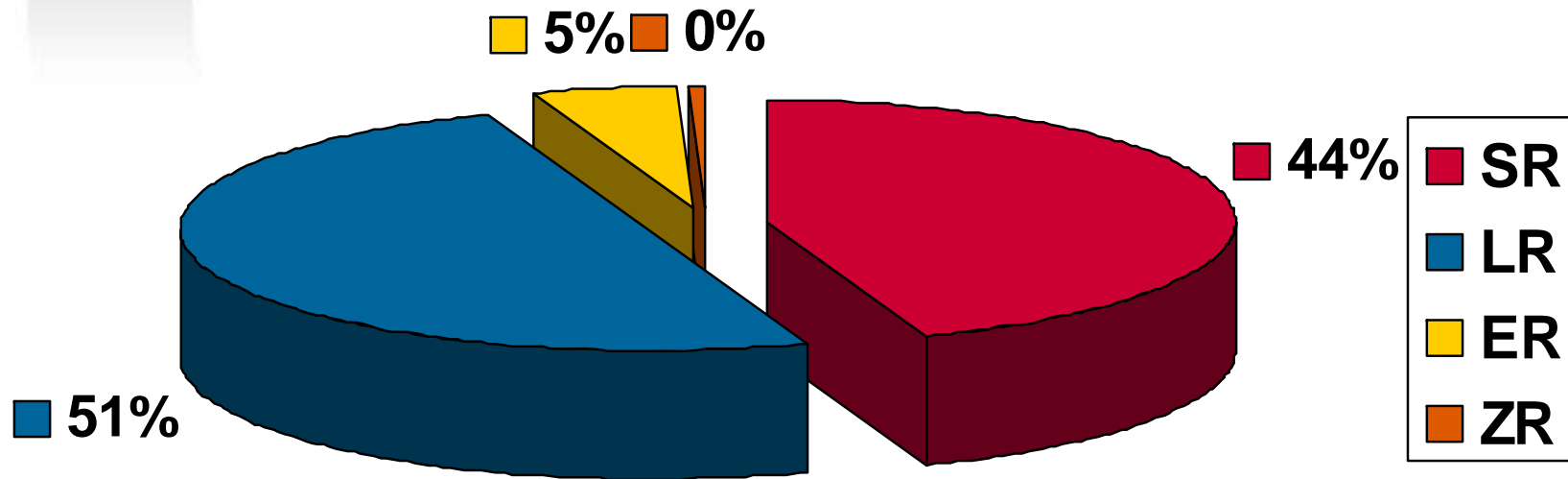
# 2005 Deployment Trends: 10GE Port Types



- SR: 2m to 300m
- LR: 2m to 10km
- ER: 2m to 40km
- ZR: 80km++

Force10 Customer Survey  
Percent of Volume

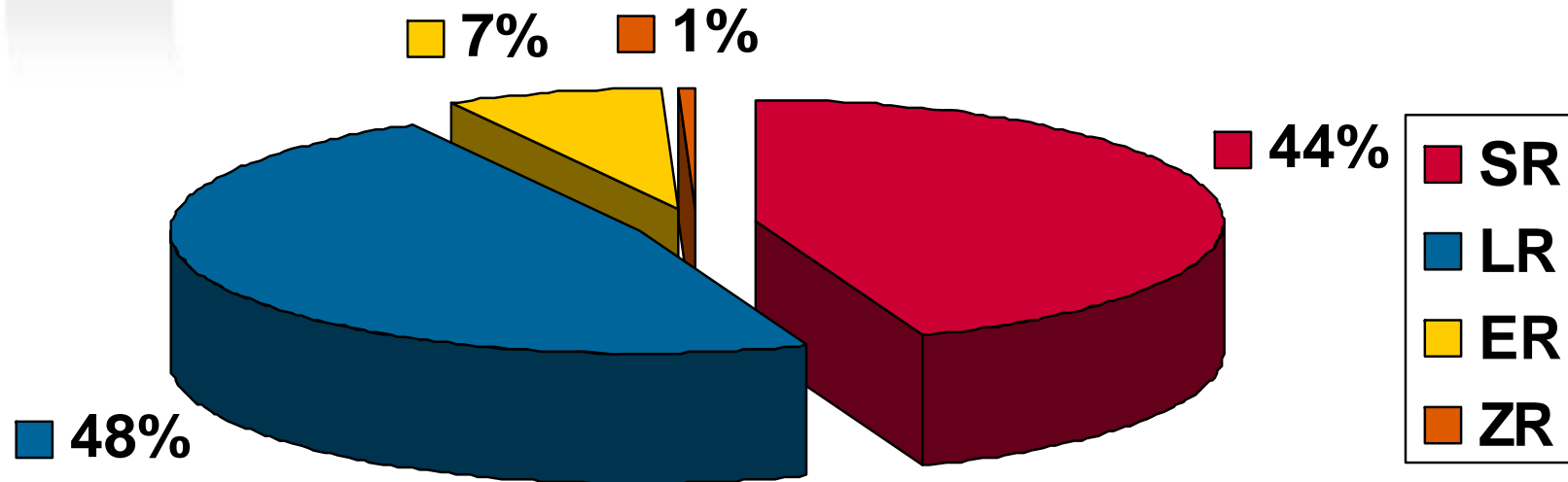
# 2006 Deployment Trends: 10GE Port Types



- SR: 2m to 300m
- LR: 2m to 10km
- ER: 2m to 40km
- ZR: 80km++

Force10 Customer Survey  
Percent of Volume

# 2007 Deployment Trends: 10GE Port Types



- SR: 2m to 300m
- LR: 2m to 10km
- ER: 2m to 40km
- ZR: 80km++

Force10 Customer Survey  
Percent of Volume



- Customers have stated time and again that the 10 GE percentages will map into HSSG percentages.
- ER optics show a percent volume increase for 2007 over 2006.
- In 2008, customer data indicates ER optics will continue to gain percent volume share from LR optics, while SR optics should hold steady.
- What's misleading in today's LR application space is the number of LR optics used outside the 10km range.
- Should an ER PMD not be specified, will coding and signaling techniques provide an acceptable BER for HSSG at the 10km++ distance? In other words, will the HSSG LR optic be as effective in the 10km++ space as the 10 GE LR optic? If not, the demand for ER optics will be higher.

- Would have to be the same electrical and mechanical type as SR and LR optics.
- Would have to fall within the same cooling criteria as SR and LR optics.
- Would have to fall within a range of power requirements such that all types of optics could be mixed on a blade.

- HSSG optics deployment in 2010 is projected to follow today's 10 GE optics deployment, based on customer driven input.
- HSSG should include a 10km to 40km PMD reach objective.