

Higher Speed Ethernet

A telecom system vendors view

Arne Alping
Ericsson Research
Arne.Alping@ericsson.com

IEEE 802.3 HSSG, Plenary meeting
14-16 Nov. 2006, Dallas, TX, USA

ERICSSON 
TAKING YOU FORWARD

Outline

- **Broadband access – A bandwidth driver**
- **Telecom aggregation networks**
- **HSSG objectives**

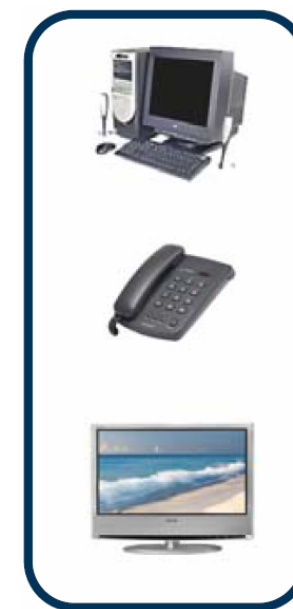
Broadband access

Bandwidth drivers – Triple play

The digital home



Triple play



Internet

Phone

TV/video

The data capacity required for 30 minutes of TV viewing is equivalent to 30 days of typical internet surfing

Broadband access

Bandwidth drivers – HDTV VoD



IPTV bandwidth evolution

- Basic SDTV
- Video-on-Demand (VoD)
- HDTV capacity
- Multi-stream
- Personalization (uni-cast)
- Interactivity
- Low-cost HDTV cameras
- Everyone a TV producer

Increased down-link BW

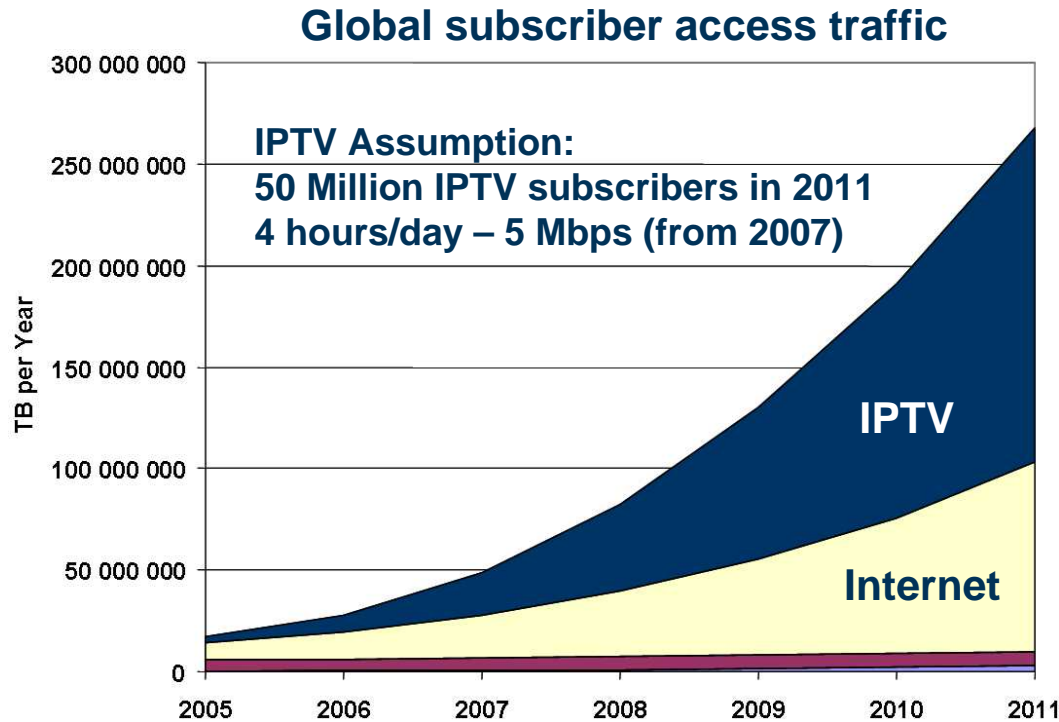
Increased up-link BW

Broadband access

Fixed access traffic growth

Access traffic growth through increased:

- broadband penetration
- bandwidth demanding services



Service	Bandwidth
VoIP	100 kbps
IMS/Video conf	0.7 - 1.5 Mbps
Internet	0.2 - 5.0 Mbps
Gaming	0.2 - 0.5 Mbps
SDTV (MPEG-2)	6 Mbps
SDTV (MPEG-4)	3 Mbps
HDTV (MPEG-2)	20 Mbps
HDTV (MPEG-4)	10 Mbps

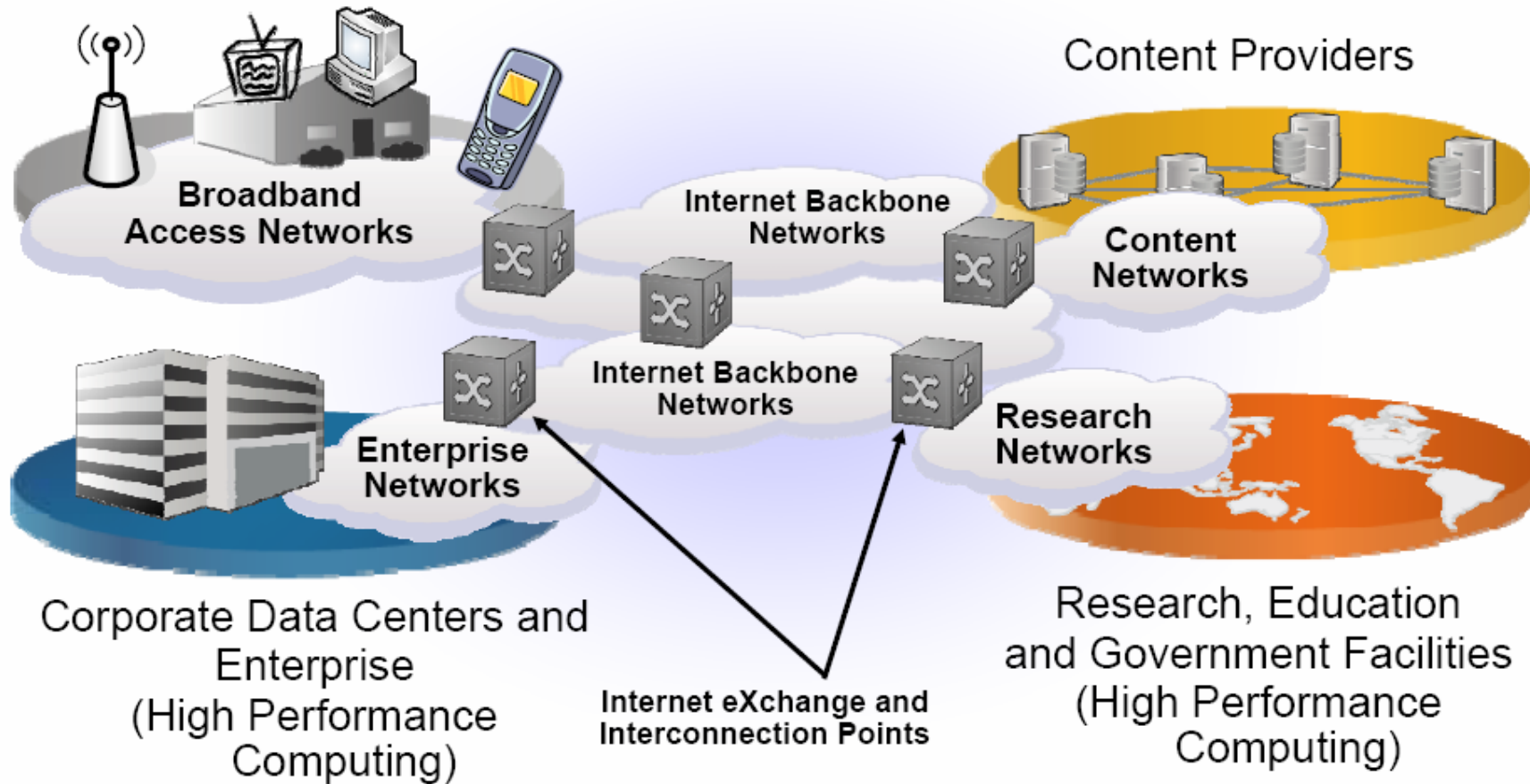
Typical service portfolio (2010):

1 HDTV, 2 SDTV, gaming, voice, high-speed internet → 25 – 30 Mbps (MPEG-4)

Ethernet ecosystem

Ericsson – HSE market/application areas

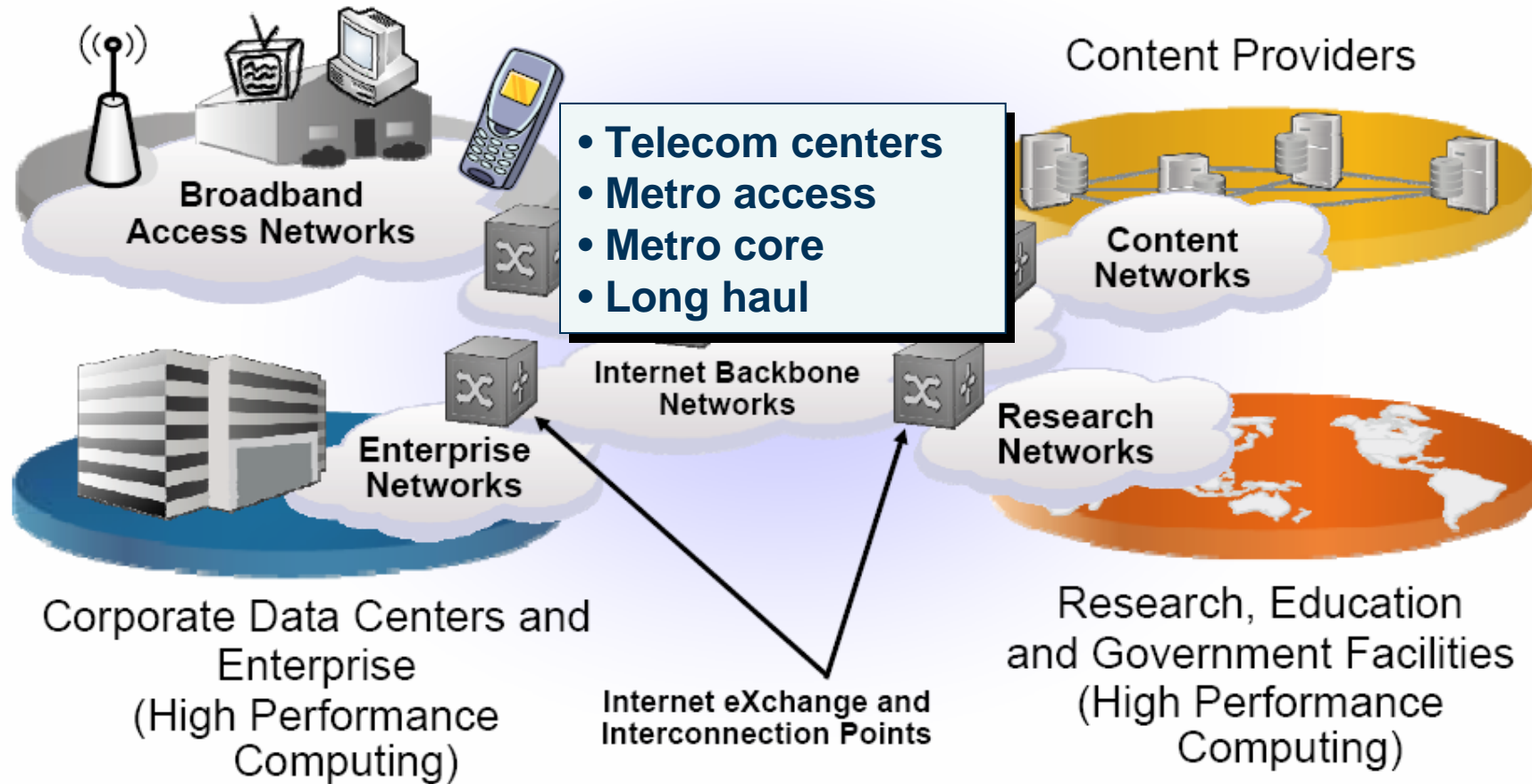
Consumer Broadband Access



Ethernet ecosystem

Ericsson – HSE market/application areas

Consumer Broadband Access



10 Gigabit Ethernet

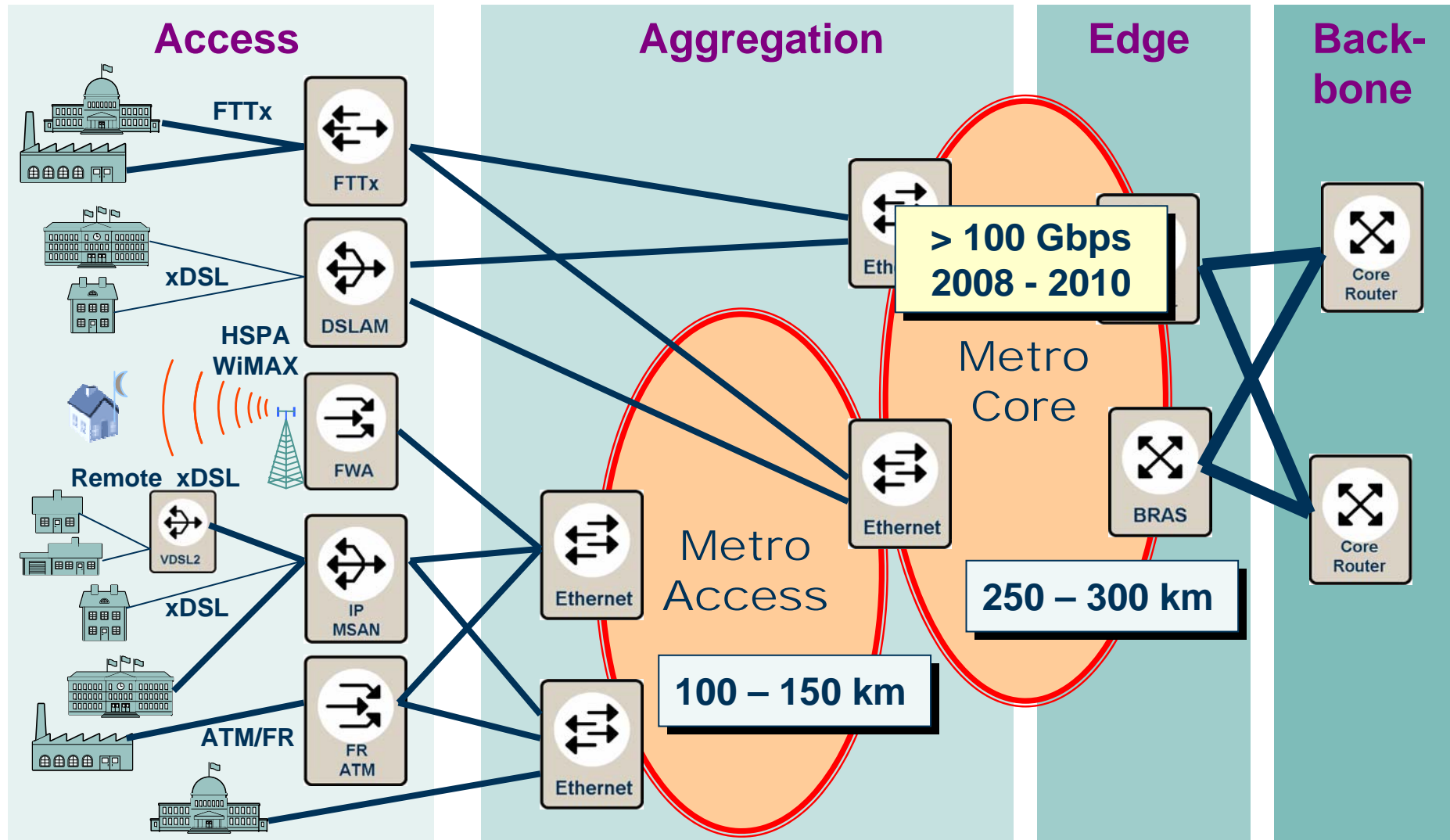
Ericsson's present implementations

- **Backplanes** **XAUI** (→ 10GBASE-KX4 → 10GBASE-KR)
- **Inter-rack** **10GBASE-CX4** (Twinax) < 15 m
- **Inter-office** **10GBASE-SR/SW** (850nm MMF) < 300 m
- **Metro transport** **10GBASE-LR/SW** (1300nm SMF) < 10 km
10GBASE-ER/EW (1550nm SMF) < 40 km
10GBASE-ZR/ZW (1550nm SMF) < 80 km

(both LAN (R) and WAN (W) PHY is supported, but mainly the LAN PHY is used)

Broadband networks

Reference architecture



HSSG objectives

Requirements

- **Optical transport network (ITU-T/OTN - G.709) compliance**
(rate, WDM grid, ...)
- **At least 80 Gbps MAC data rate is needed**
 - Single MAC data rate
 - 120 Gbps (3x 40Gbps) might offer a good opportunity for alignment
- **Reach:**
 - Telecom centers: < 300 meters
 - Metro transport: 40 km, 80 km
- **Support enhanced link aggregation**
 - e.g., APL re-using VCAT/LCAS (ITU-T) mechanisms¹⁾

APL = Aggregation at Physical Level
VCAT = Virtual Concatenation
LCAS = Link Capacity Adjustment Scheme

Note: ¹⁾ See Steve Trowbridge presentation at
HSSG September meeting - *trowbridge_01_0906.pdf*

Summary

- **Interactive HD VoD is expected to be the main driver for metro aggregation networks**
- **In metro core >100 Gbps may be needed in 2008-2010**
- **Compliance with OTN – G.709 (rate, WDM grid, ...)**
- **Single MAC data rate (120 Gbps is proposed)**
- **Link aggregation should re-use VCAT/LCAS mechanisms**