

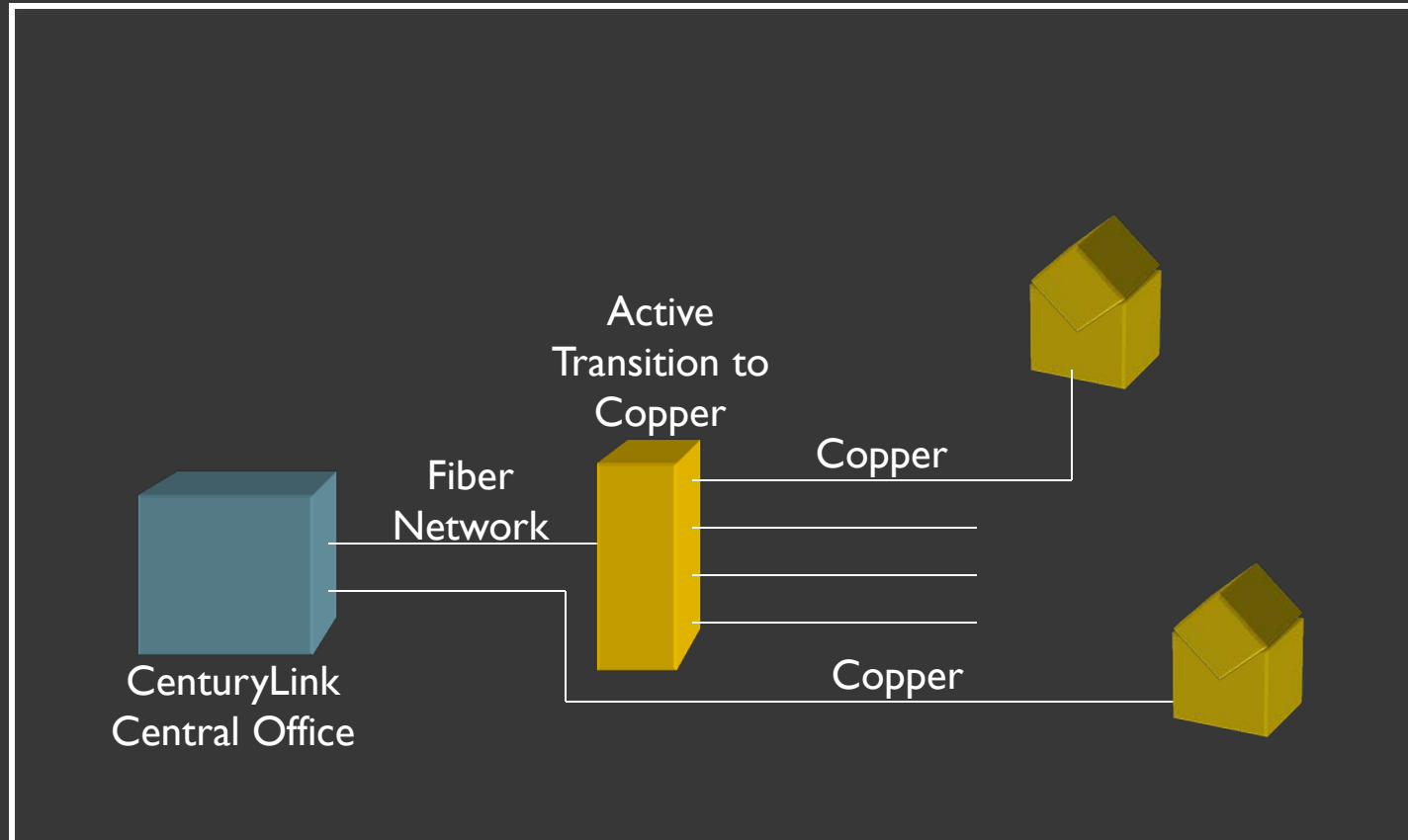
LANDLINE BROADBAND ACCESS NETWORKS

Presentation to CTTAB

Tony Perez

October 10, 2011

CenturyLink

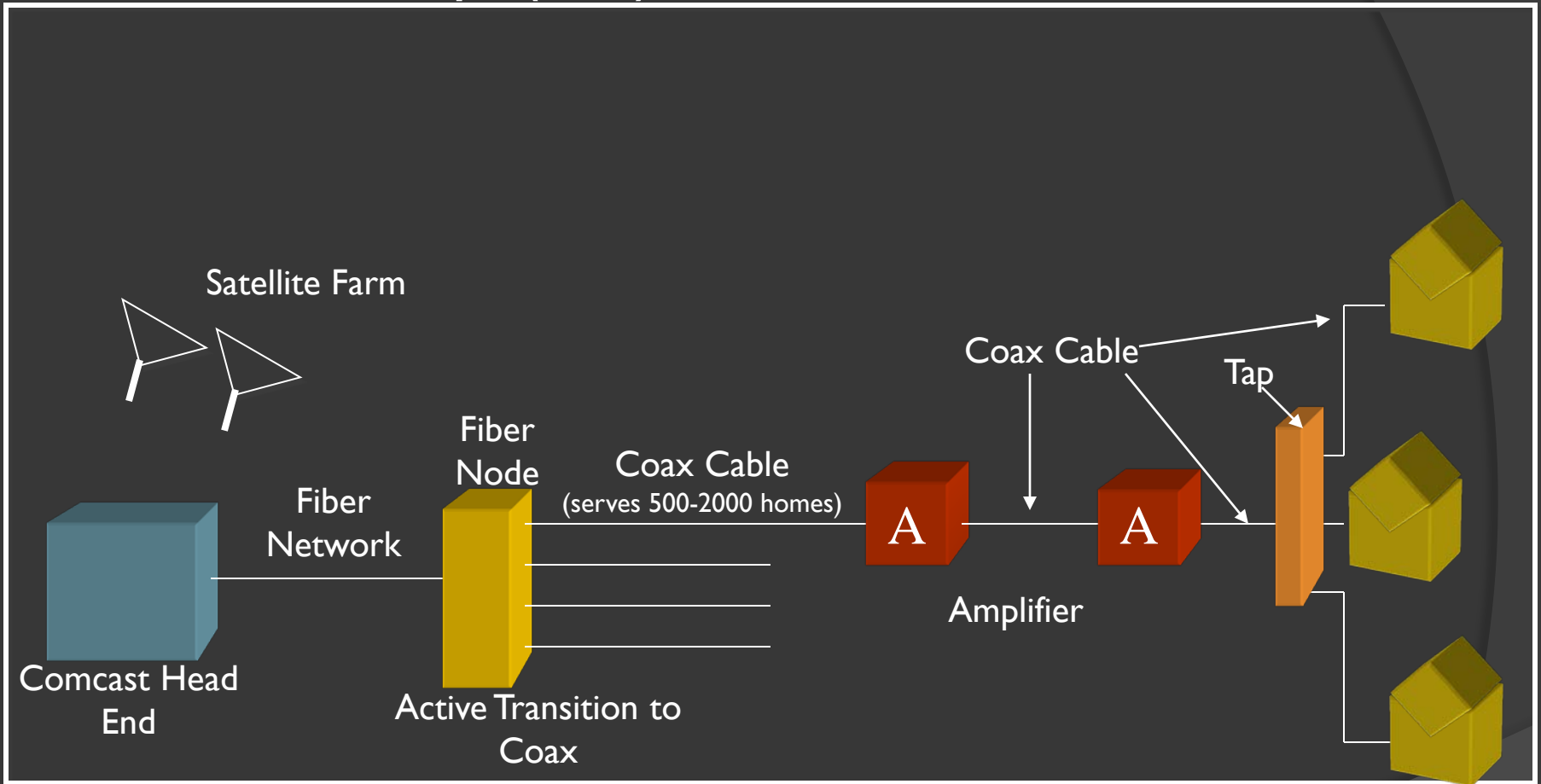


DSL 1- 7 Mbps Down per user

Can expand to Fiber to the node (FTTN) 12-24 Mbps depending on Distance.

Possibility of up to 40 Mbps w/ bonded twisted pair.

Comcast, Broadstripe (HFC) Several Tiers



DOCSIS 3.0 bonds multiple channels, 160/120 Mbps per segment

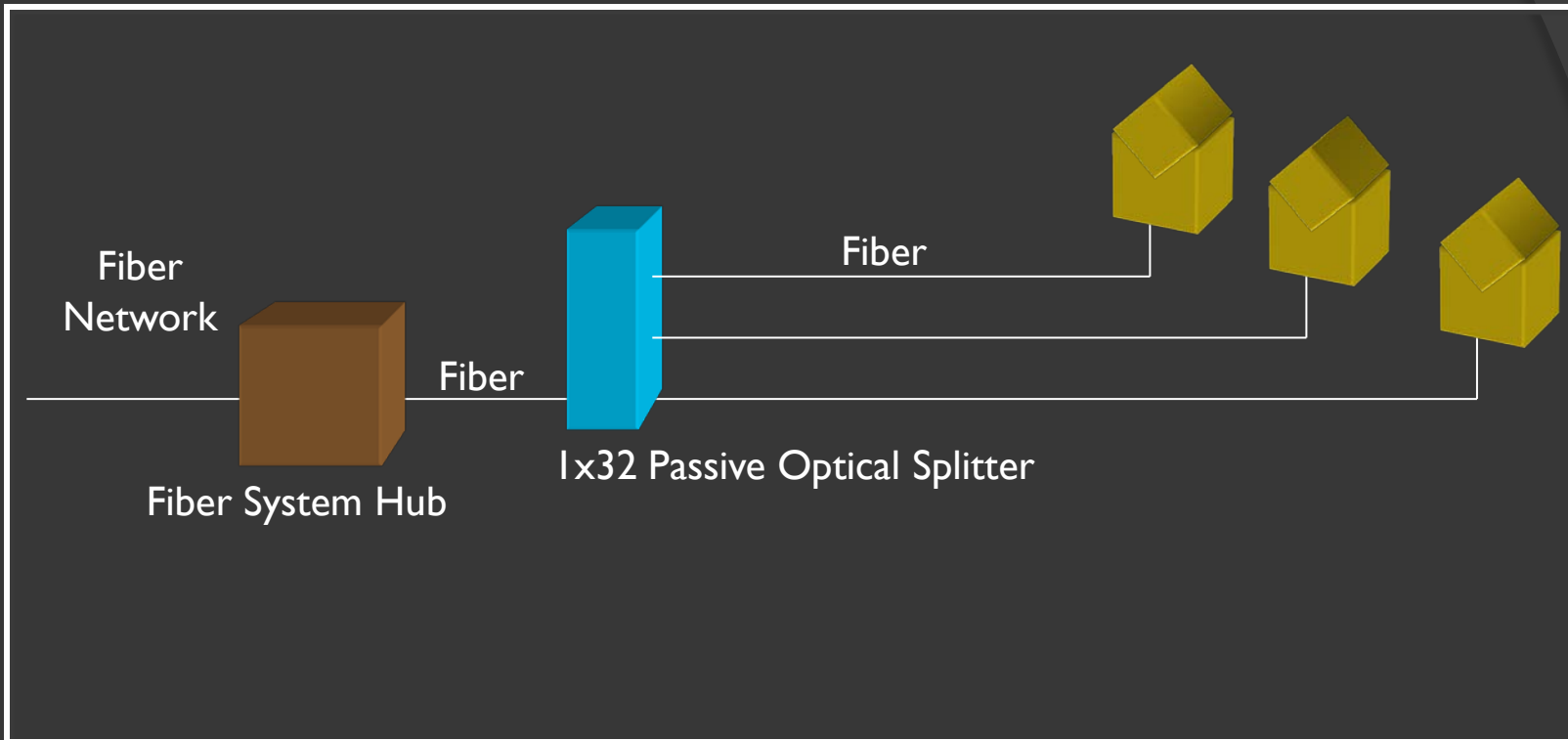
Bandwidth shared among users

About 1000 homes per node average

Bigger pipe than phone lines (factor of 20+)

Future Potential 60 Mbps per customer guaranteed, few hundred Mbps average per customer “burst”

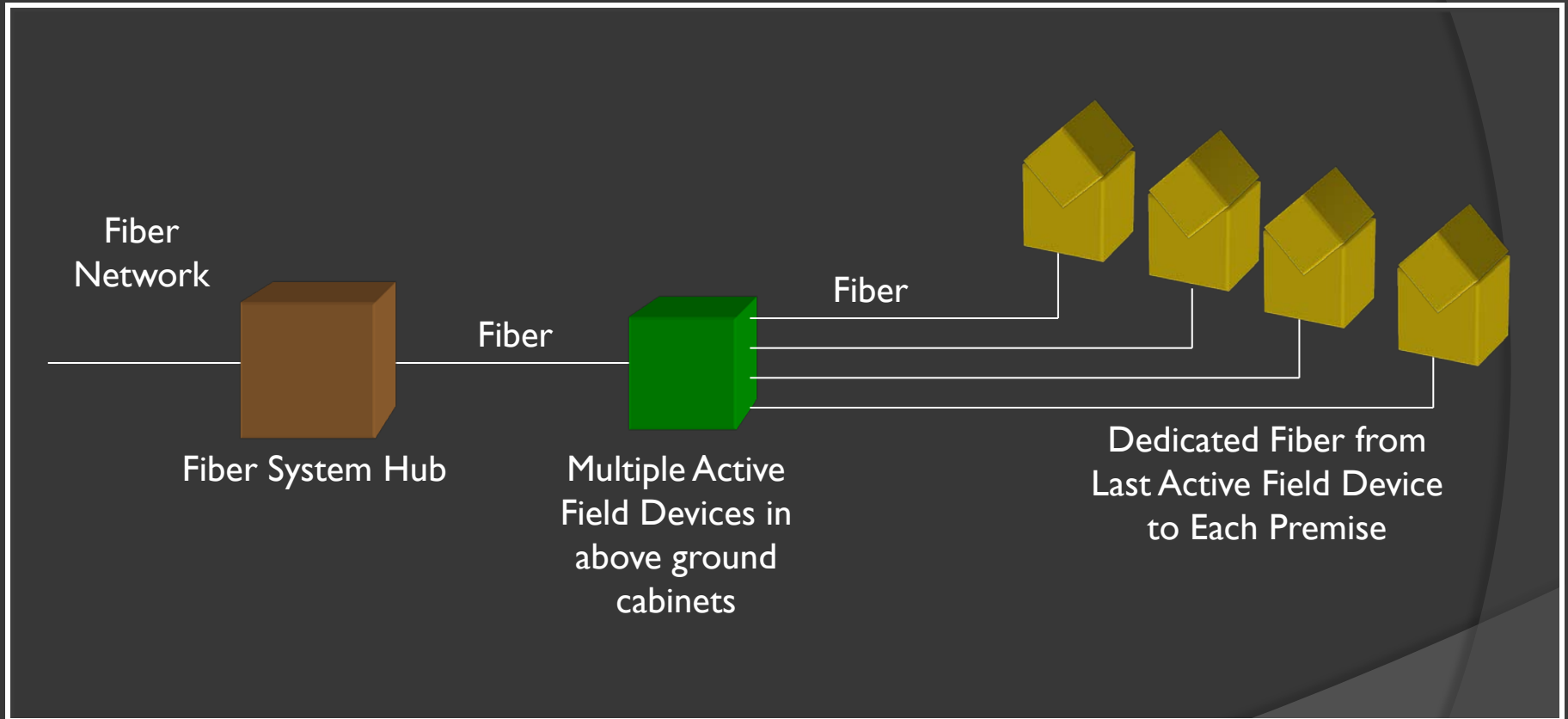
Passive Optical Network (PON)



Up to 32 homes share 2.4 Gbps down (2,488 Mbps); 1.2 Gbps up (Verizon)
New 10GPON modems for upgraded customers over next two years

Active Optical Network (AON)

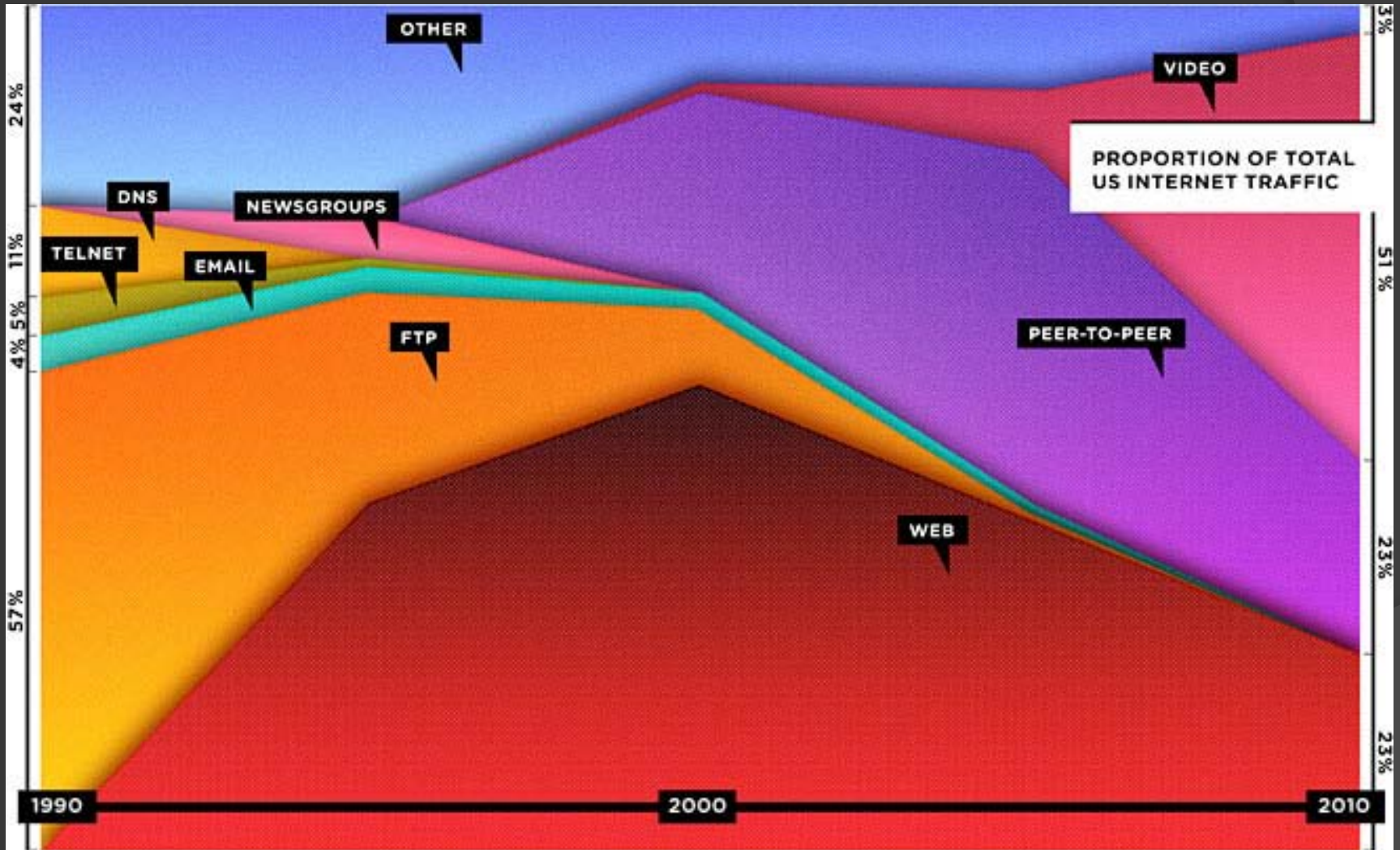
Capable of 1Gbps symmetrical per user and more



Future Issues w/ Copper

- Laws of physics – limited “spectrum” in a cable
- 2 MHz in twisted-pair (phone) line (DSL, uVerse)
- 1000 MHz in coaxial cable
- XXXXXXXXX+ MHz in fiber optic cable
- (Research increasing upper limit)

Growth of IP Video



Broadband Capacity Comparisons

Singapore

Dial-up

64 Kbps Phone Line

128 Kbps ISDN

768 Kbps

Wireless

1.544 Mbps T1

DSL

LTE: 7 Mbps

Cable

10 Mbps Ethernet

CenturyLink
(6-10)

Verizon,
Comcast
(5-50)

FTTN

12-24 Mbps

FTTH

100 Mbps Ethernet

=> ∞

85% Japan, much of S. Korea, Paris, Oslo, Amsterdam, Stockholm, NYC by 2014,

3 Mbps Low Level Video

10-20 Mbps HDTV Quality Video Stream

Complex Work at home, Advanced Educational & Medical Applications

Hong Kong

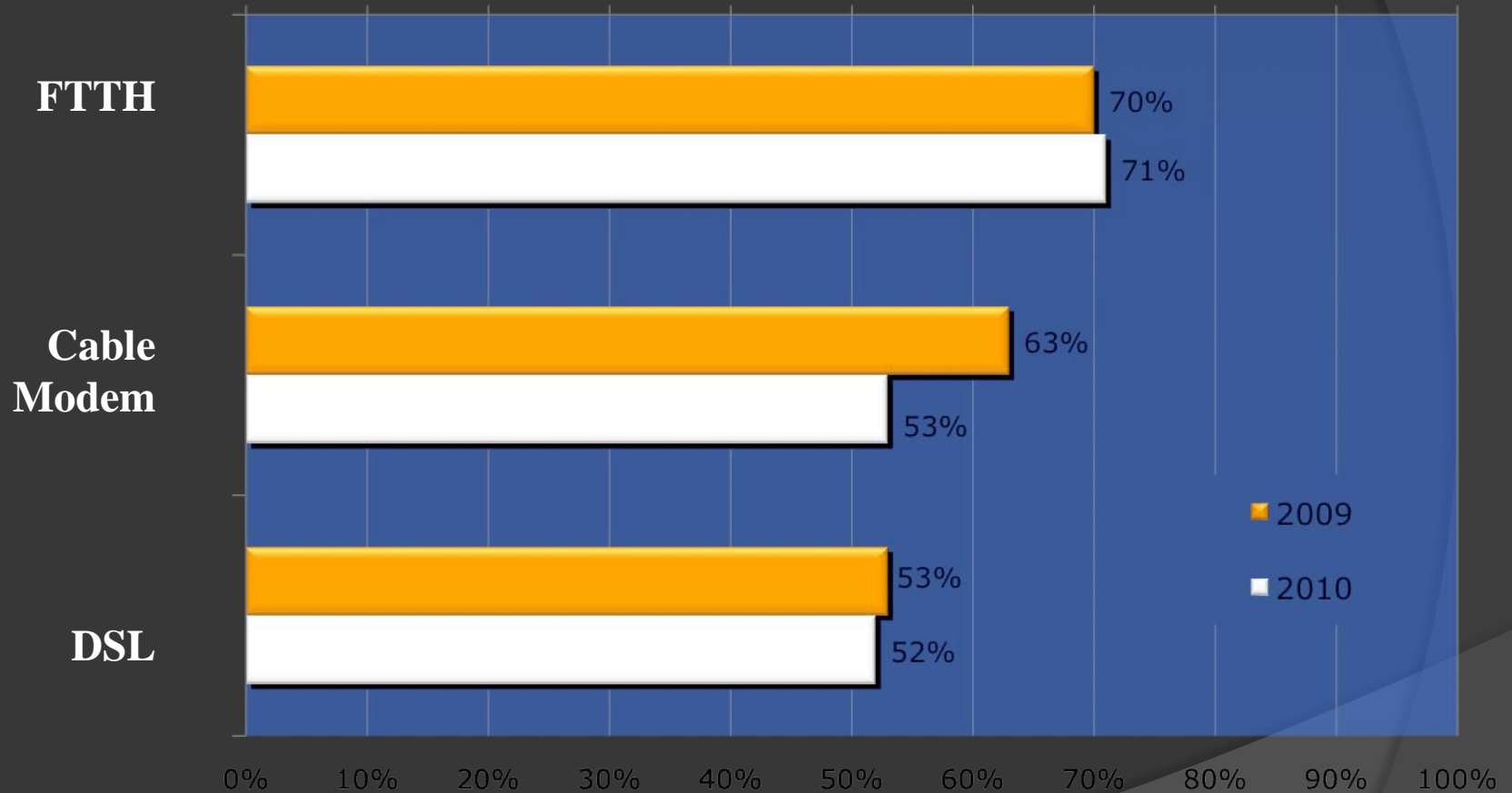
Gig-E

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Gig-E

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Consumer Satisfaction Levels



Source: RVA LLC