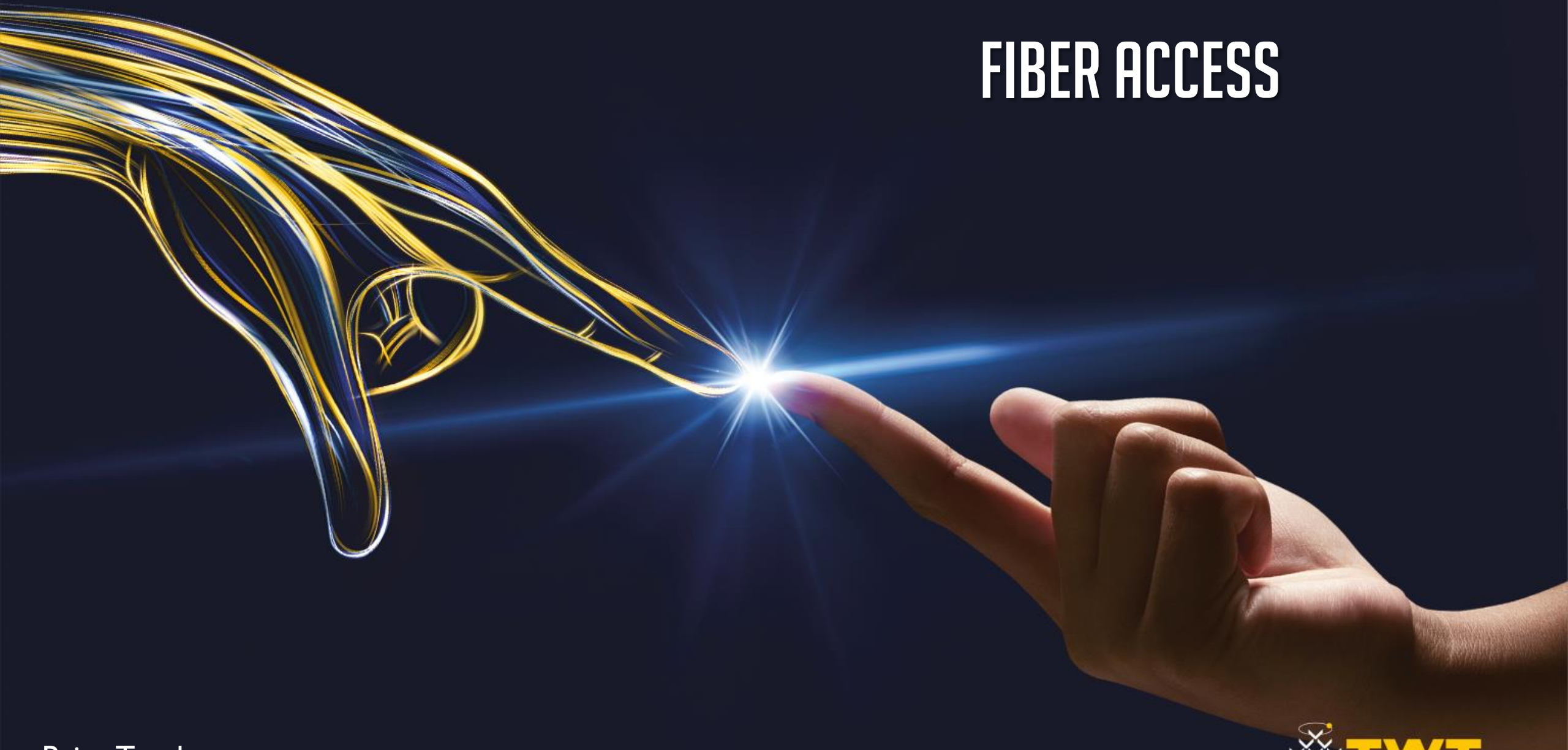


FIBER ACCESS



Brian Turnbow



FIBER OR FIBRE? THAT IS THE QUESTION

FTTx

FTTC

FTTM

FTTP

FTTF

FTTO

FTTH

FTTE

FTTW

FTTD

FTTR

FIBER + COPPER OR ALL FIBER?



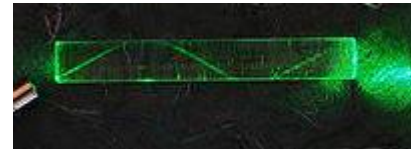
**SHOW
ME THE
BANWIDTH!**

How fast is fiber?

$C \sim 300\text{km/s}$
Fiber refraction 1.468

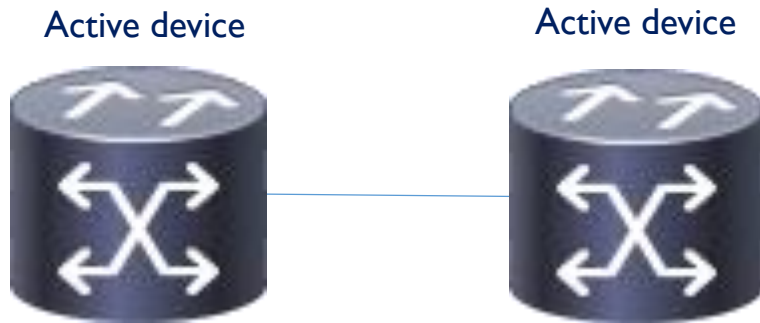
$300/1.468$
About 204km/s

So RTT 1 ms about
100km
In a straight line
No devices splices etc



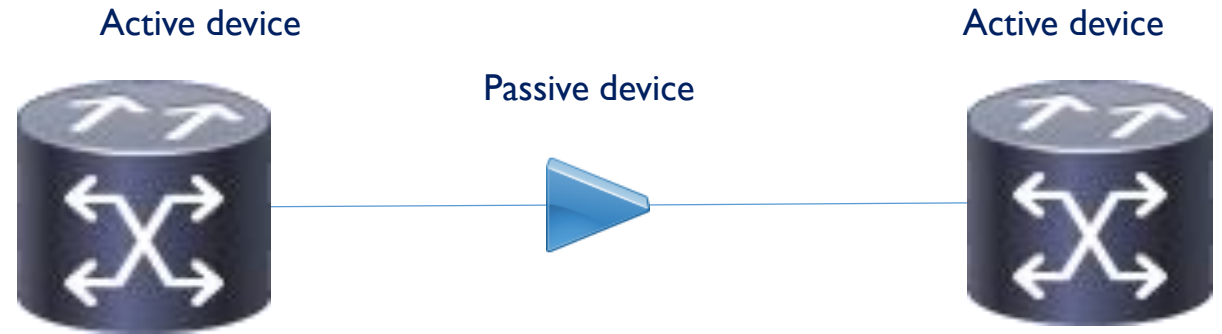
PASSIVE OR ACTIVE

But wait fiber is Passive??



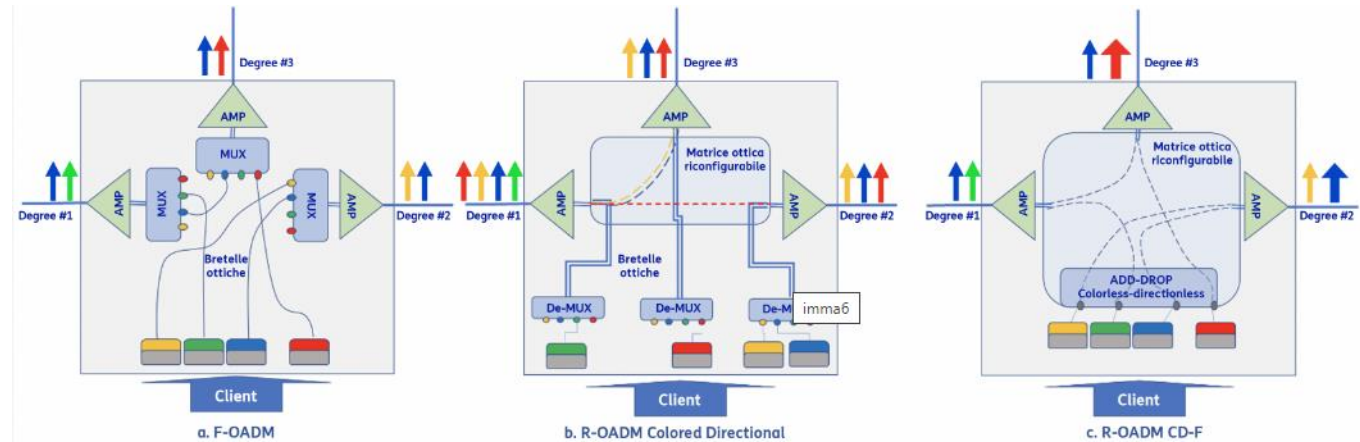
AON – Each customer has dedicated fiber line connected between optical terminator and cpe. Think switch in a cabinet or c/o

All services are Active??



PON – uses passive devices like splitters or passive multiplexers (or both) between optical terminator and cpe and customers share a fiber

ACTIVE - MOSTLY ETHERNET BUT ALSO DWDM



Single Fiber (bidi) or pair to customer
Typical 1G or above (10G 100G)
Symmetrical Bandwidth
Long Reach AON ZR/dwdm goes along way...

INIT 7 – THE NERD ISP IN SWITZERLAND - 25GBPS ACTIVE ETHERNET

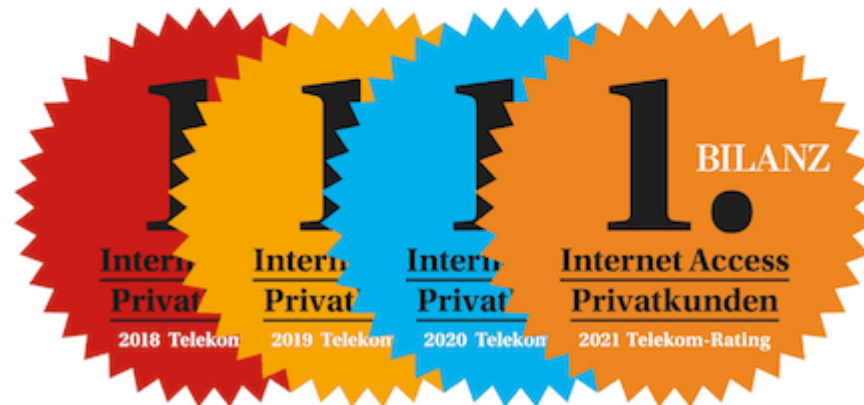
Init7 Fiber optic internet

Fiber7-X2 is an unlimited high-performance (upload and download) internet package for both private and business customers: 25 Gbit/sec download and 25 Gbit/sec upload. All our services include TV7 with 200 channels, 85 of which in HD, at no extra cost. Use our MaxFix checker to find out what speed we offer at your address.

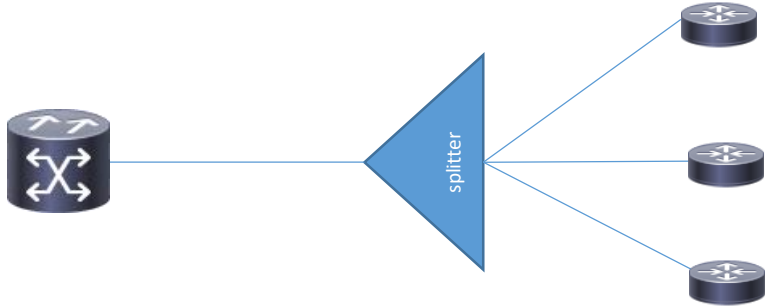
Fiber7-X2

- Fibre-optic Internet with TV package included
- 25/25 Gbit/sec (download/upload)
- Constant performance, even at prime time
- No artificially reduced marketing packages
- Free choice of router
- CHF 64.75/month with annual billing (CHF 777.-/year)

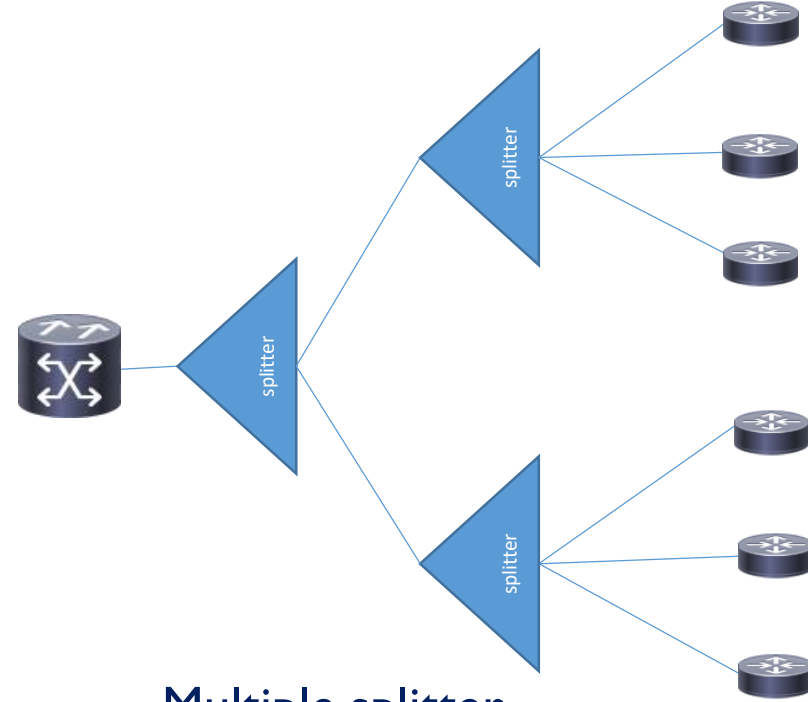
We are thrilled to have won our fourth gold medal in a row as best internet provider for private customers in the BILANZ Telekom-Rating 2021!



PASSIVE



Single splitter



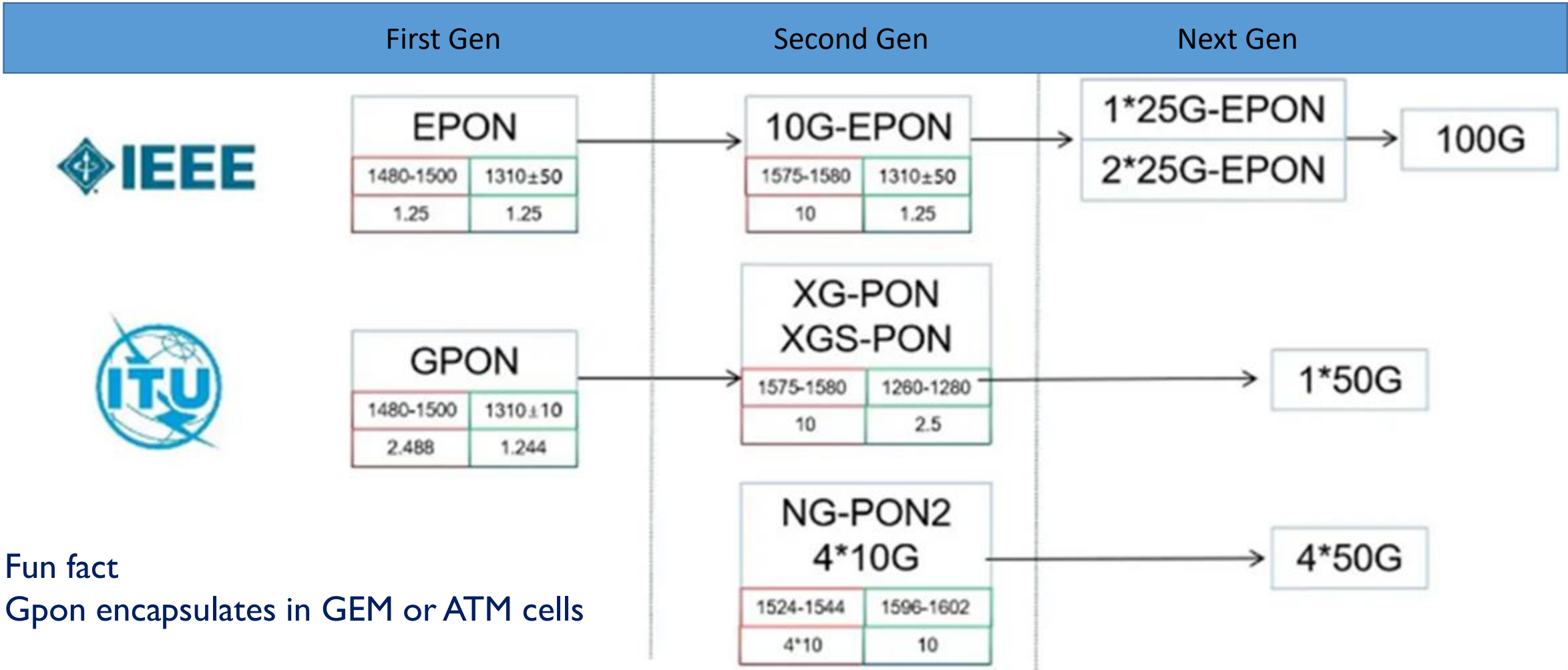
Multiple splitter



(C/D)WDM

Reduce Fiber use
Can be point to point or multipoint
Lots of users from single device

xPON



Fun fact
Gpon encapsulates in GEM or ATM cells

TIM AND OPENFIBER

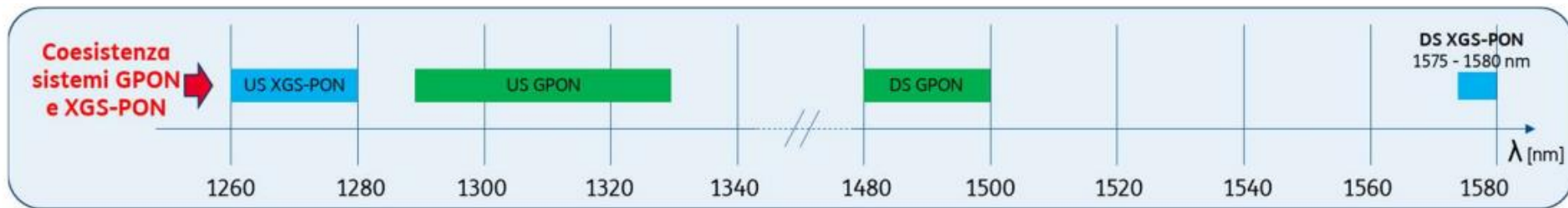


Figura 1 – Bande spettrali GPON e XGS-PON

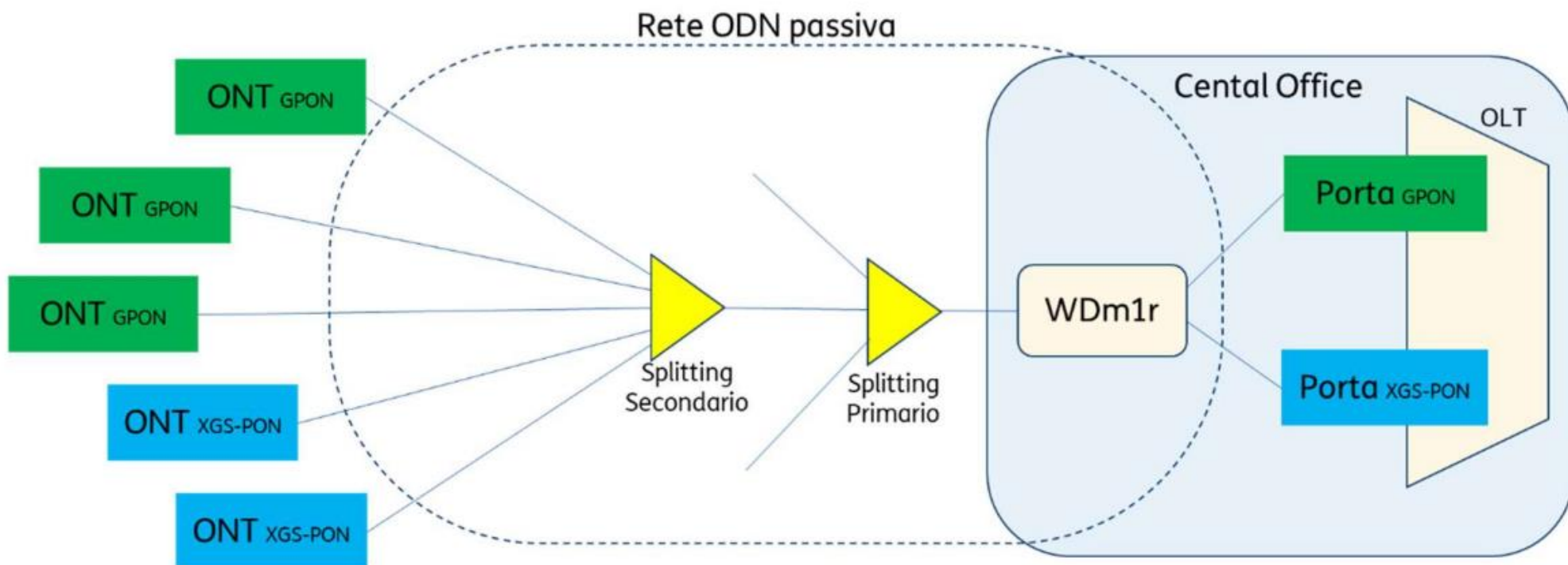
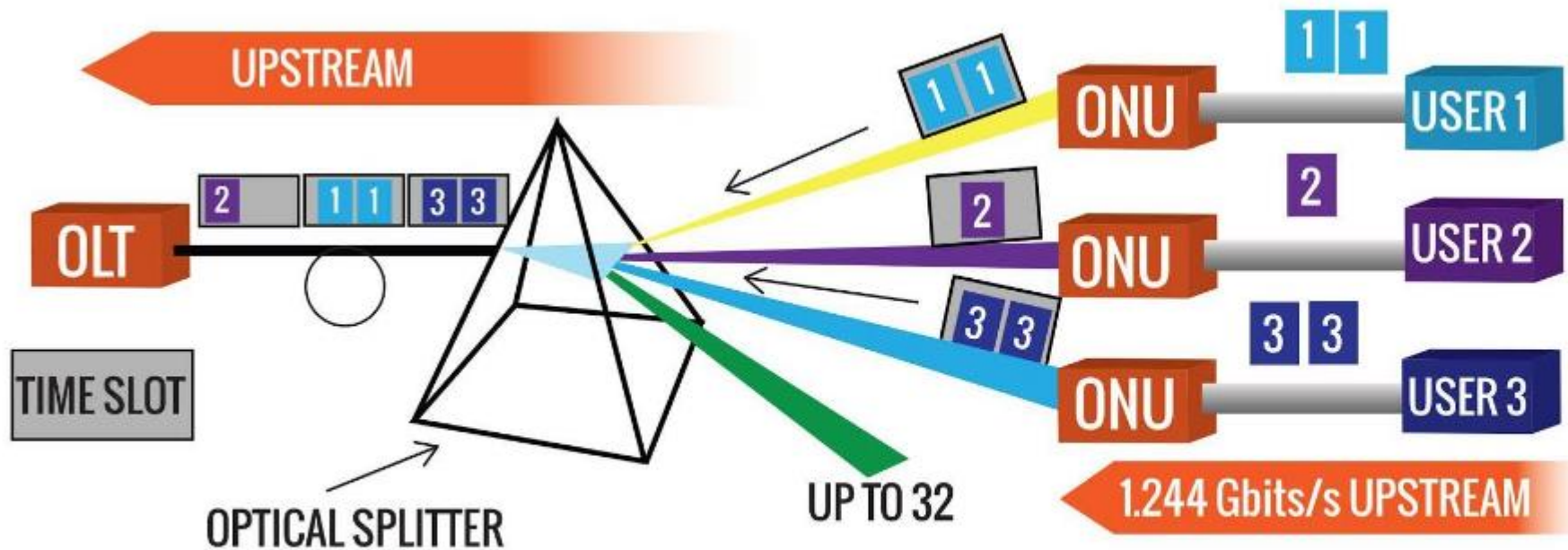


Figura 2 – Coesistenza sistemi GPON e XGS-PON su stesso albero PON

Fonte TIM

<http://www.gpon.com/how-gpon-works>



UPSTREAM

- Each user is given a time slot on which data can be transmitted (TDM)
- Upstream traffic is not continuous, but composed of bursts

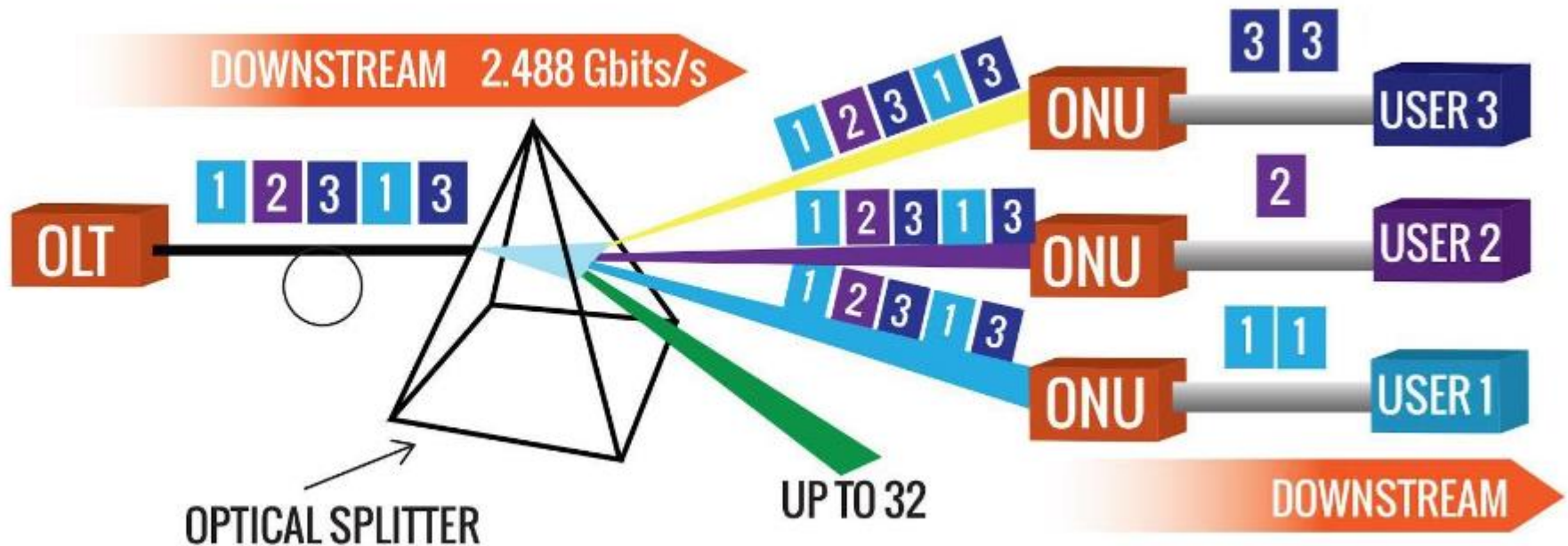
In a GPON Optical network, users are allocated time slots. During these times, they can transmit their data from remote terminals.

<http://www.gpon.com/how-gpon-works>

With GPON transmitting downstream in a broadcast manner and upstream in a TDMA (time division multiple access) manner, different bit rates are possible with 1.2 Gbit/s in upstream and 2.4 Gbit/s in downstream is most common.

DOWNSTREAM

- OLT Sends frames of data to splitter continuously
- Splitter sends same set of frames to each ONU
- ONU Filters out only frames specific to a user and discards all other frames





THANKS!



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