KT Giga Wire Project

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KT Corporation | 2015.05

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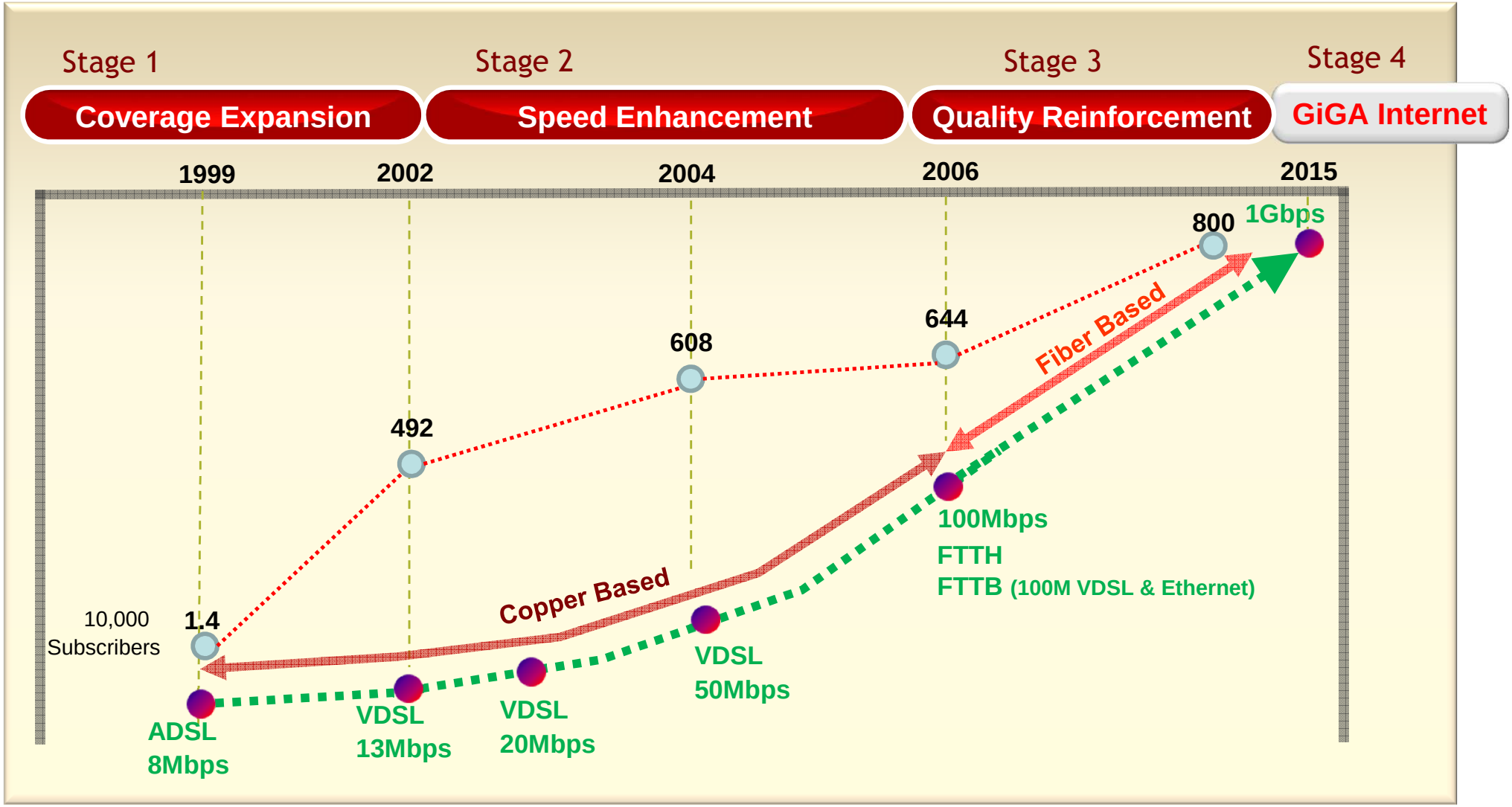
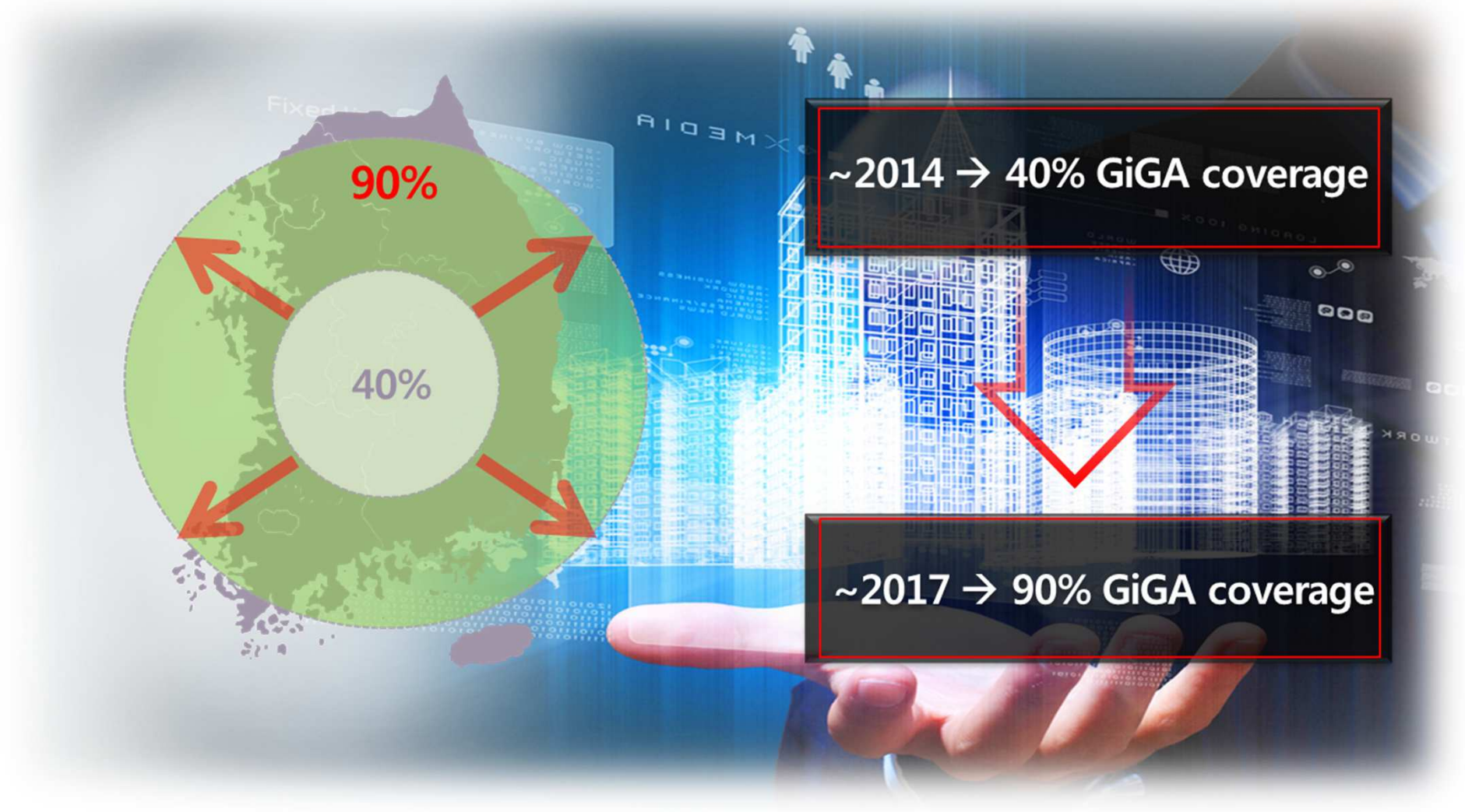
KT Broadband access network evolution



Giga internet coverage

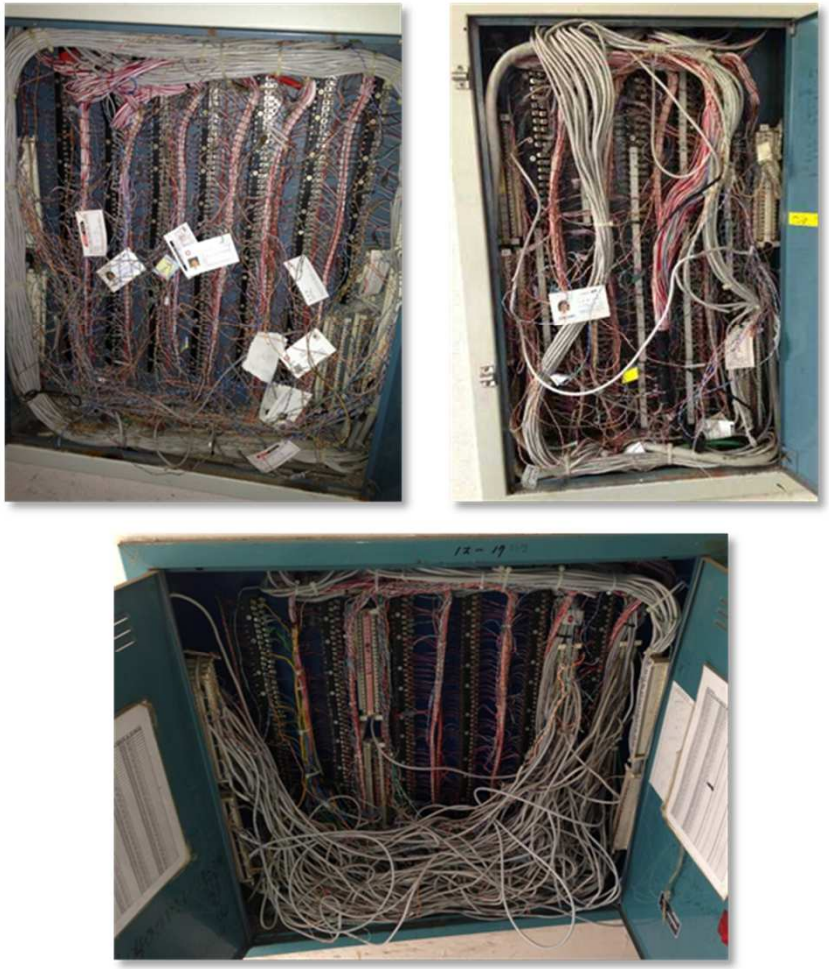
KT is aiming to reach 90% of GiGA Internet coverage by 2017



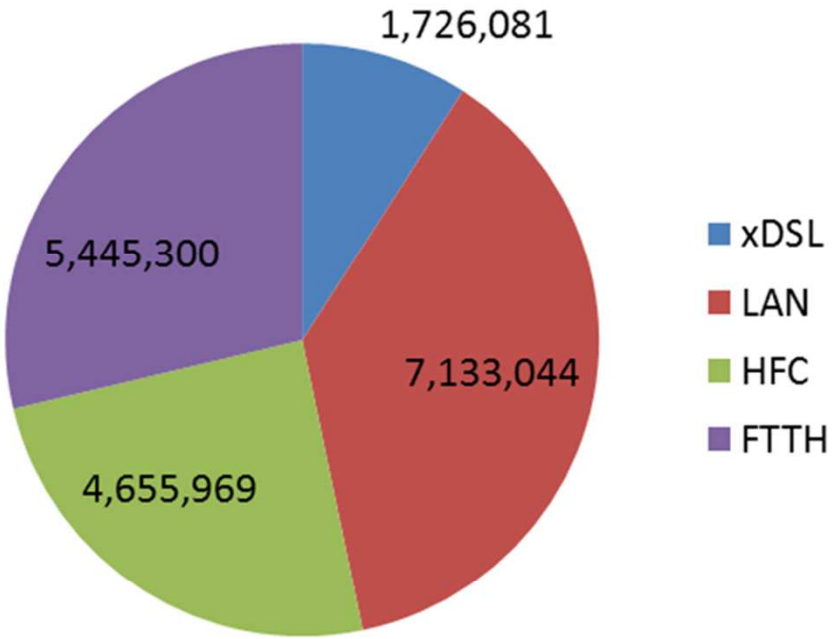
GiGA connectivity challenge

Challenge in GiGA accessing old premise where deploying the GiGA connectivity is difficult

IDF in old premise



Subscribers per technologies

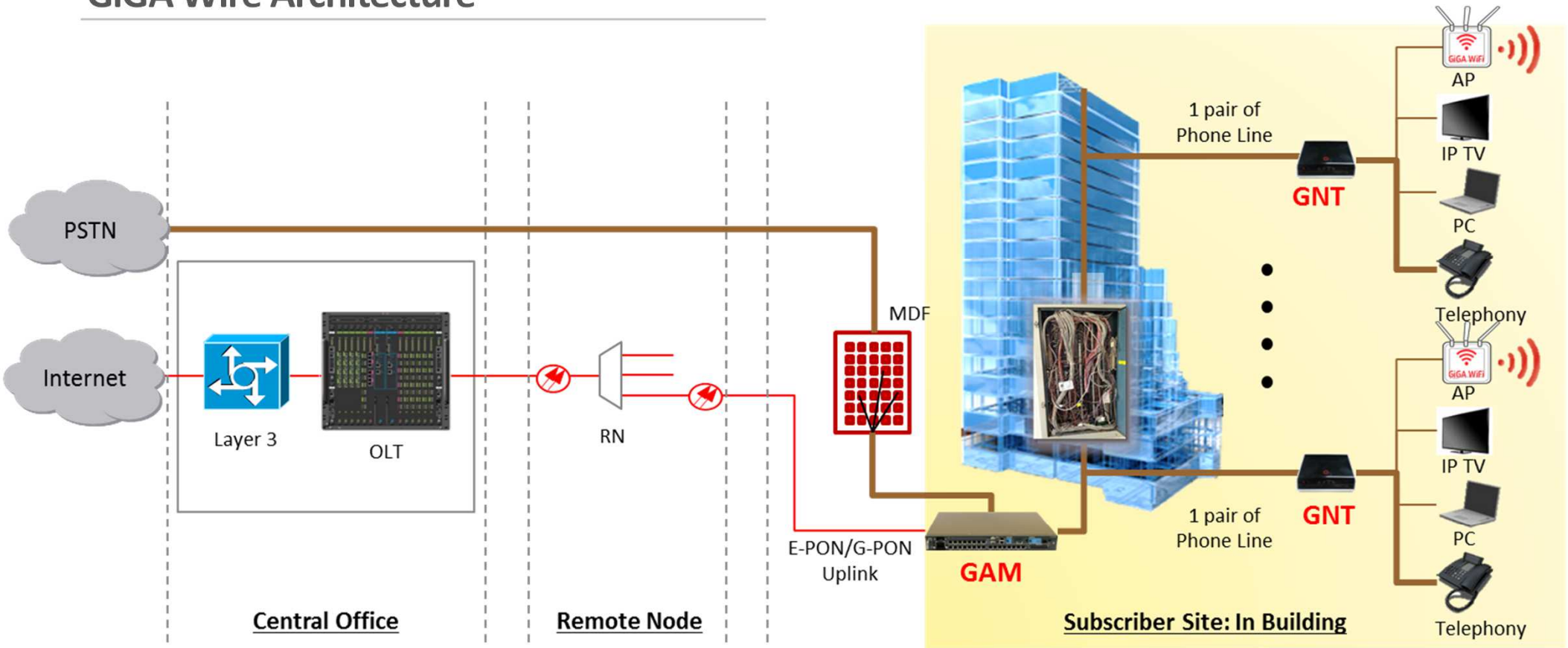


※ Total broadband subscriber in Korea (2015.Q1)

GiGA Wire: In-Building copper based high speed internet solution

Quick deployment of high speed internet connection through the existing copper-line network

GiGA Wire Architecture



: Fiber Optic Cable
: Copper Cable
: UTP Cable

OLT: Optical Line Terminal
RN: Remote Node
MDF: Main Distribution Frame
GAM : G.hn Access Multiplexer, GNT : G.hn Network Terminal

GiGA Wire technology

Application of G.hn technology adapting to the premise copper environment

OFDM+QAM modulation

Adaptive bit-loading

100MHz Band Plan

QC-LDPC FEC

G.hn

Premise Copper Adaptation

GiGA Wire

High-speed copper technology

- Max. 600Mbps* payload rate via 1 pair of phone line or UTP
- Service distance within 300m**
- Providing over the double performance of VDSL2

* Up&Down Aggregate
** Copper from GAM ~ GNT

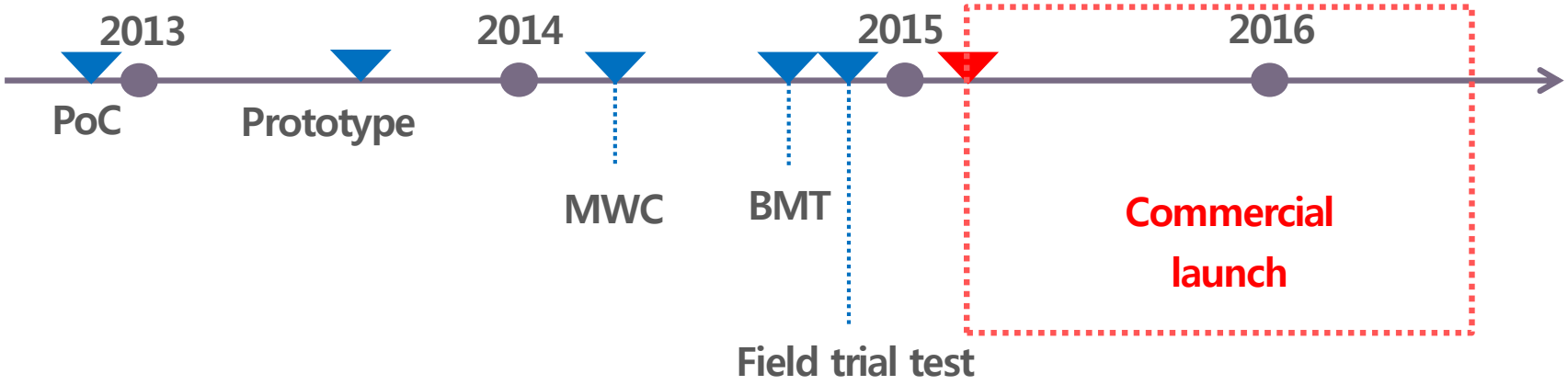
Technical Features

Provides 600Mbps (down & up aggregate in maximum), fast reconnection for In-Building solution

Items	G.hn	VDSL2
Standard	ITU-T G.9960/G.9961 (2011)	ITU-T G.993.2 (2011)
Service Speed	Max. 600Mbps (300/300Mbps)	Max. 200Mbs (100/100 Mbps)
The bandwidth ratio of Downstream and upstream	Configurable (5:5, 6:4, 7:3, 8:2)	Fixed (5 : 5)
The performance @ 24 ports bundle & 100m	> 200/200Mbps @ F/S 0.4mm 24 ports bundle	< 80/80Mbps @ F/S 0.4mm 24 ports bundle
Modulation Methods	OFDM	DMT
Frequency used	2MHz ~ 100MHz	25kHz ~ 30MHz
Output power	4 dBm	20.5 dBm
Error Correcion	LDPC FEC, Retransmission	FEC
The link reconnection time	3 seconds	30~40 seconds

Commercialization progress

Commercially ready after the completion of the Field trial service & BMT(2014.Q4)



PoC Prototype Commercial

GiGA Wire System

Solution enabling an easy bandwidth enhancement through the existing copper in the premise

GAM (G.hn Aggregate Multiplexer)

④ ⑤

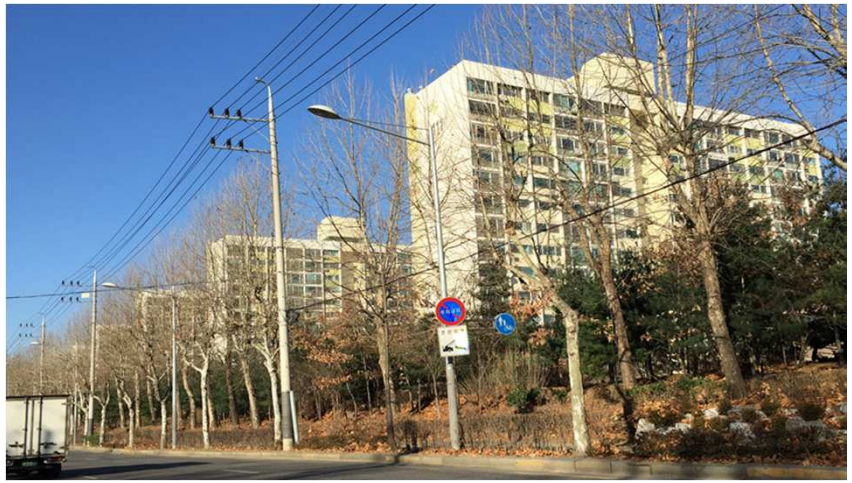
GNT (G.hn Network Terminal)

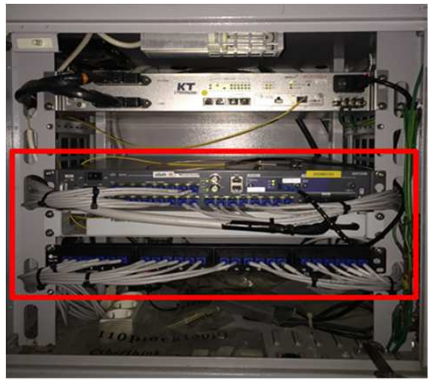
		Specifications
Copper Cable type		UTP, coaxial cable, F/S, CPEV, S/H, TIV
GAM	Uplink I/F ①	GbE(1G/10G), 1G-EPON, 10G-EPON
	UNI I/F ②	RJ45 x 24 ports
	O&M	SNMP based NMS, CLI
	Up/Down speed	Configurable (5:5, 3:7, 2:8, free)
	Global clock	50Hz clock synchronization (Master/Slave) ③
GNT	UNI I/F	RJ11 x 2ports (G.hn, voice ④), RJ45 (1000B-T ⑤)

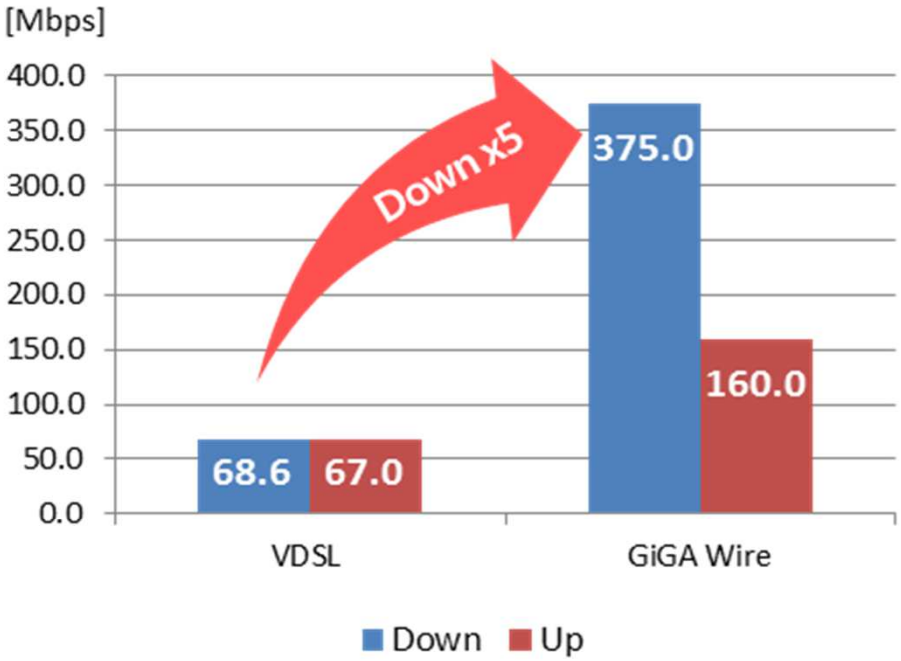
Deployment results(1)

Internet speed improved to more than 3 times faster

Old apartment located in the center of Seoul :







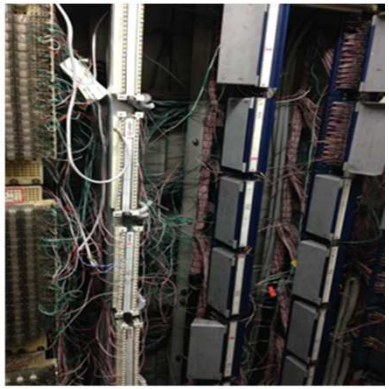
<Down 9.8, Up 11.3>

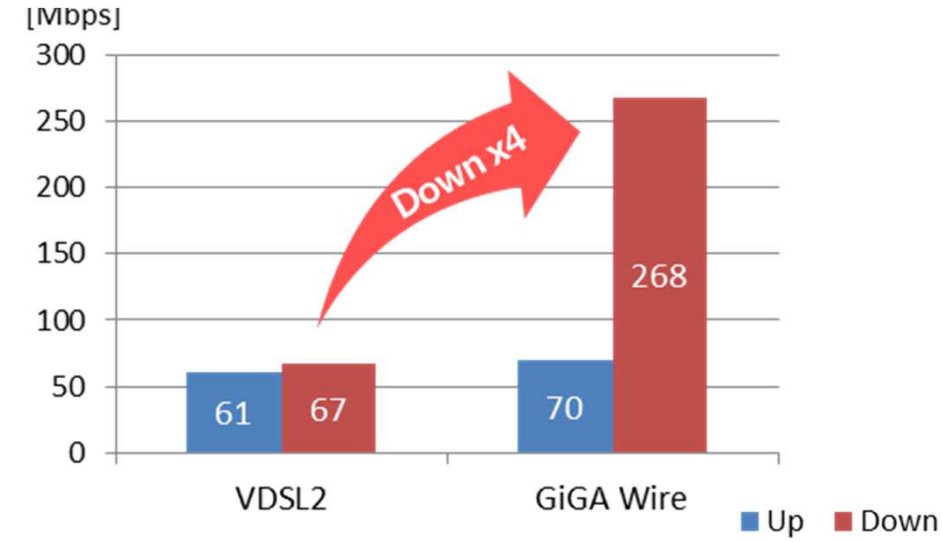
<Down 347.8, Up 168>

Deployment results(2)

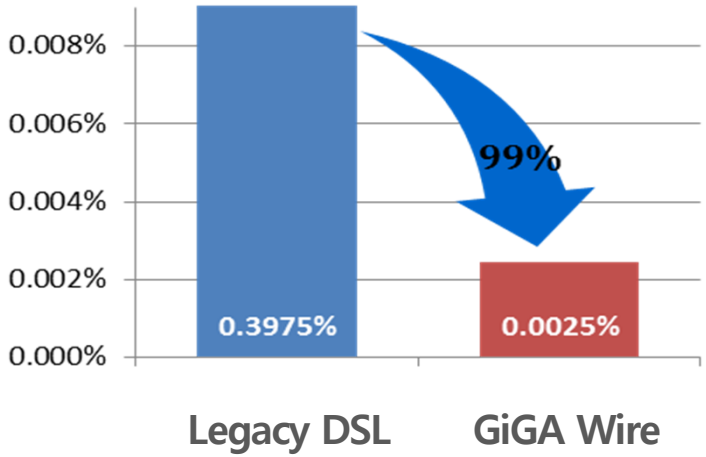
No VoC (Voice of Customers) related with the internet service, IPTV quality improvement

Old apartment located in the center of Seoul :





RTP loss

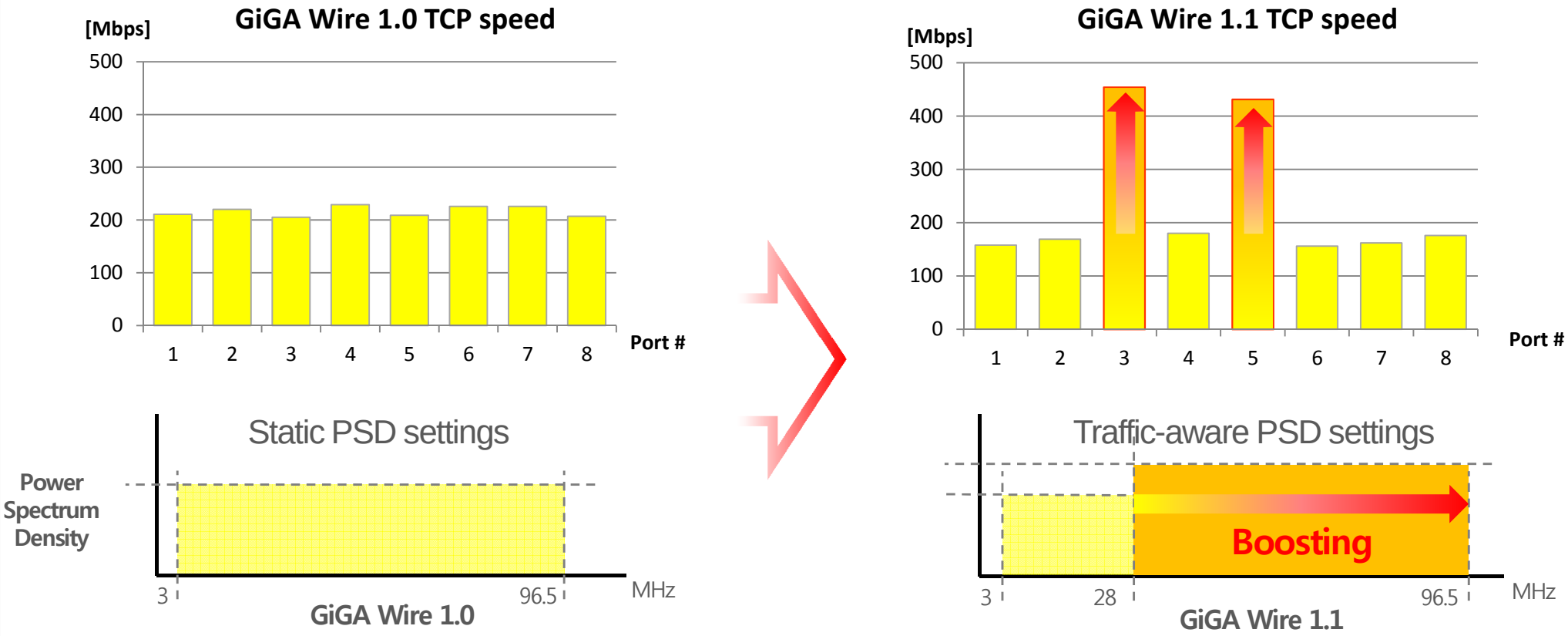


Sharing experience with the industry

- During development of Giga Wire platform, KT identified many areas of improvement on top of basic G.hn technology, mostly focused on
  - Removing NEXT
  - Ensuring FEXT is predictable, to facilitate reliable channel adaptation
  - Using traffic-aware real-time Dynamic Spectrum Management for FEXT removal
- Many of the technical improvements identified by KT are being shared with the industry, through contributions to ITU-T
  - To encourage more silicon vendors and more system vendors to add these technical improvements on top of their existing G.hn implementations
  - To help other service providers that want to deploy networks similar to KT's Giga Wire.
  - To achieve synergies (ie, cost reduction via combined volume) between access and home-networking silicon
- These contributions are reflected in an "Technical Paper" currently being developed at ITU-T SG15

Further speed enhancement(1)

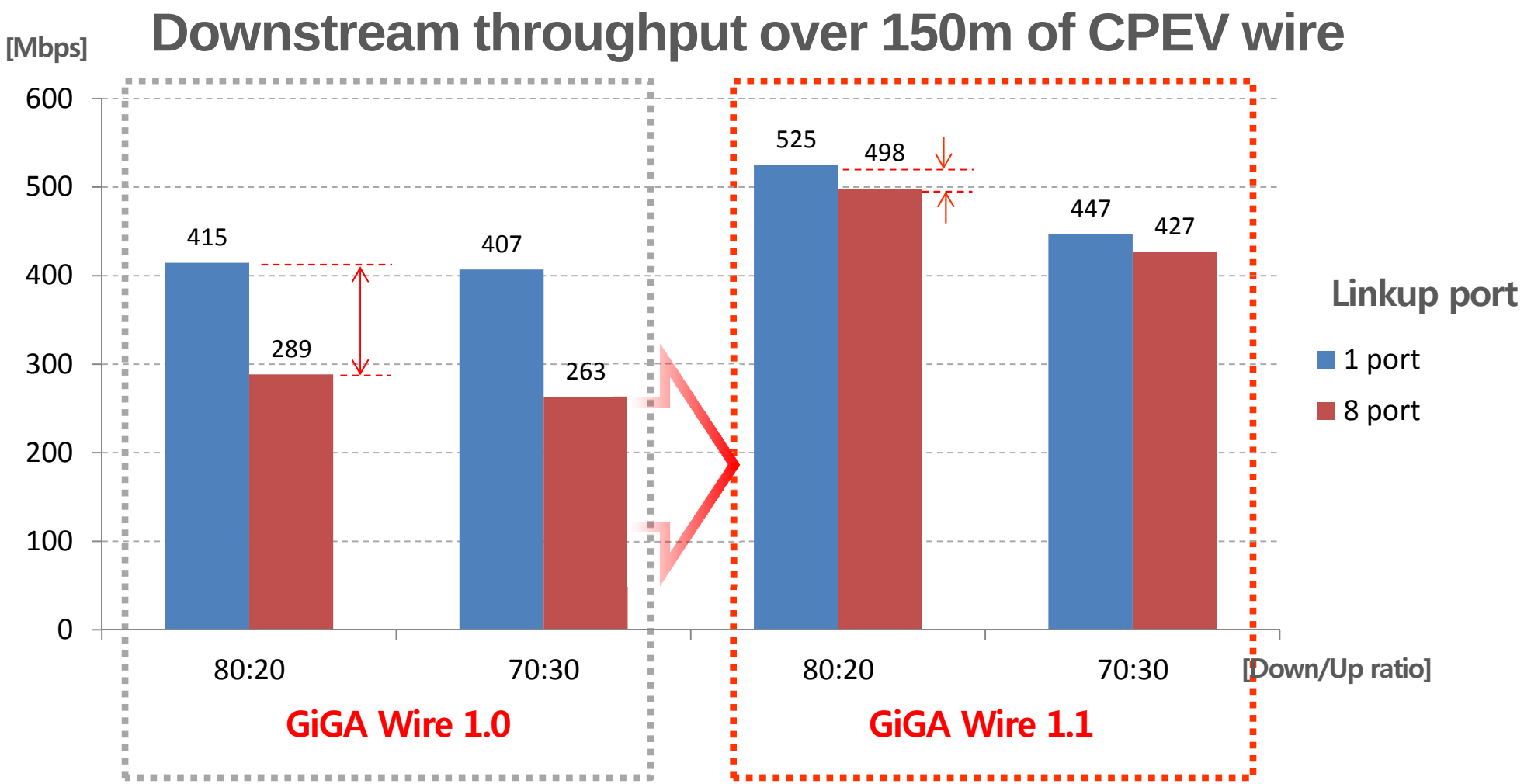
Speed enhancement using the crosstalk optimization according to the amount of the traffic per user



- Fore more info on some of the techniques used in Giga Wire 1.1, see: “A Novel Approach to Dynamic Spectrum Management in FTTdp Networks”, Chano Gomez, G.fast Summit 2015

Further speed enhancement(2)

More stable and higher speed enabled by crosstalk effect minimization



olleh
고객센터
자주하는 질문/상담
매장/고객센터 안내
A/S신청
속도 테스트
고객센터 > 서비스 이용안내 > 인터넷 속도측정
DATE : 2015.06.04
속도 테스트
1 2 3 4
측정이 완료되었습니다.
502.1
Mbps
최고속도
516.9 Mbps
139.0
Mbps
최고속도
148.1 Mbps
다운로드
업로드
10
50
100
300
500
700
1G
1G
700
500
300
100
50
10
경로추적(Trace Route)

Fiber deployment cost in the premise

In many cases, installing fiber in the old building demands very high cost

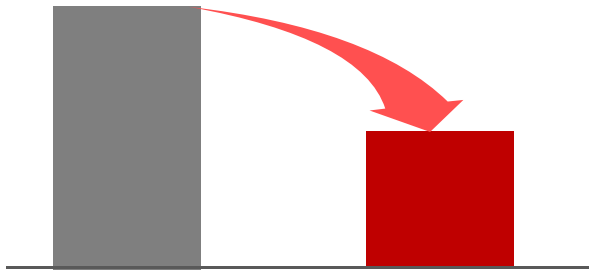
Section	Classify Expense	All-optic based	Copper-based
Drop FOC/In-house FOC	Supplies	=	
	Construction		
Installing fiber optical cable between buildings (including installation of closure for RN)	Supplies	>	
	Construction		
(optical cable) Suspension Wire (Vertical)	Supplies	-	-
	Construction	>	0
Horizontal (Installing in-house fiber optic cable)	Supplies	-	-
	Construction	>	0

If the cost of reusing copper in the premise much cheaper than running fiber, then business makes sense

Business impacts

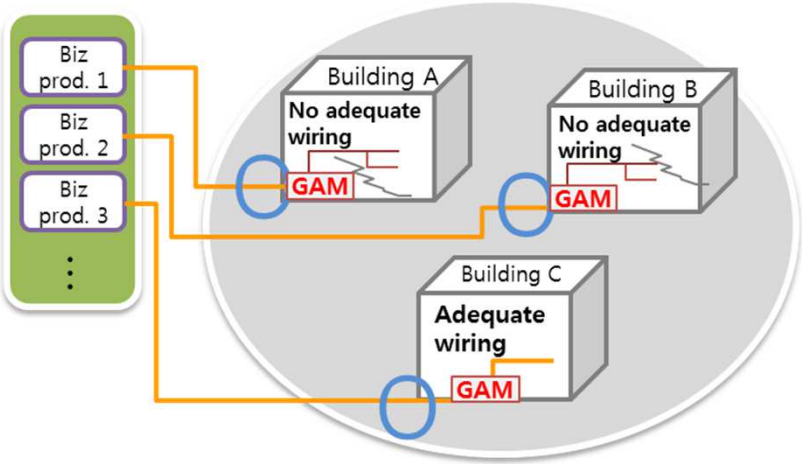
Reusing premise copper can benefit many business fields

CAPEX savings: cost effective GiGA internet

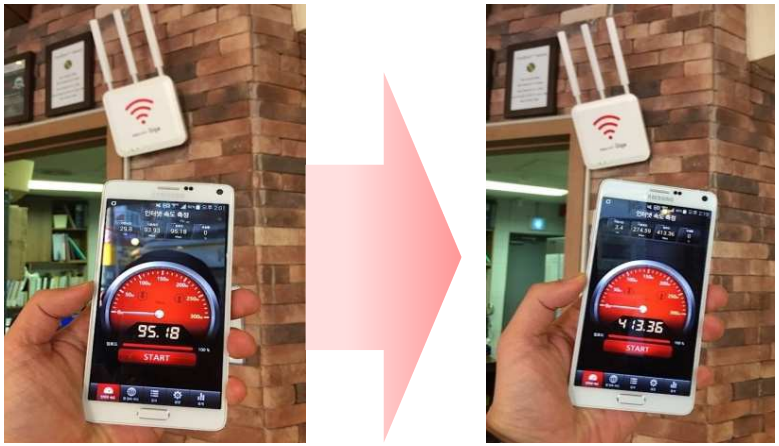


New IP based service enabling

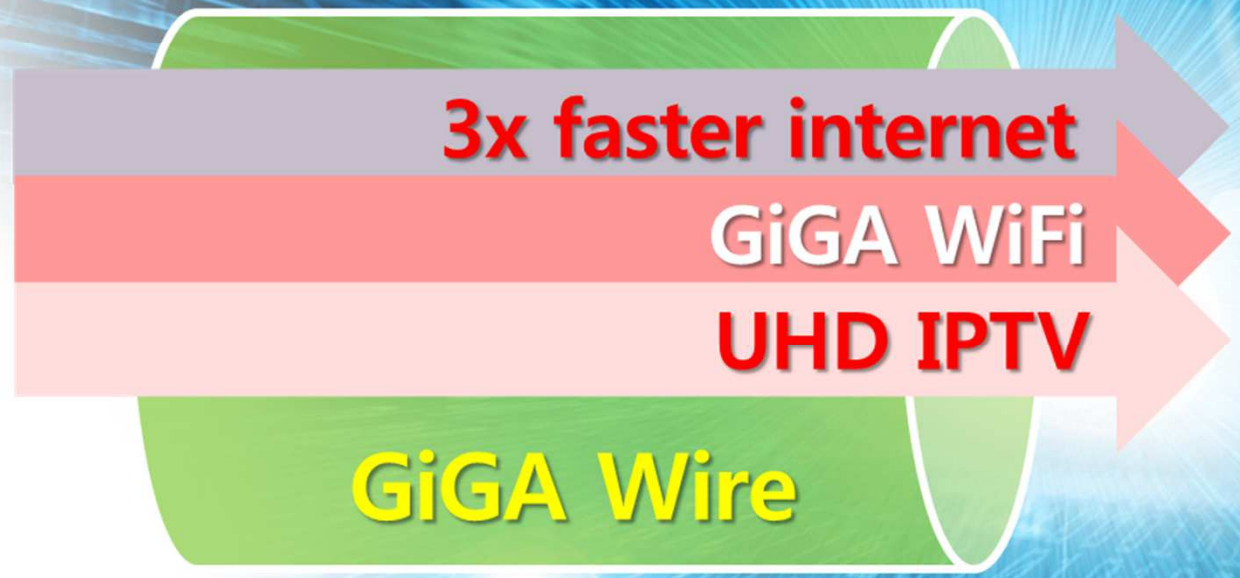
Business boundary expansion



Maximizing Giga connectivity in fixed & wireless network



Wrap-up



Delivering new value to the customer
by meeting the challenge in the premise wireline

Thank you