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## Virtuelle Segmentierung - Ethernet Dienste über Koax-Kabel

# Agenda

- Introduction to Technetix Virtual Segmentation™
- Virtual Segmentation™ architecture
- Virtual Segmentation™ deployment scenarios
- Virtual Segmentation™ case study and business case
- Summary



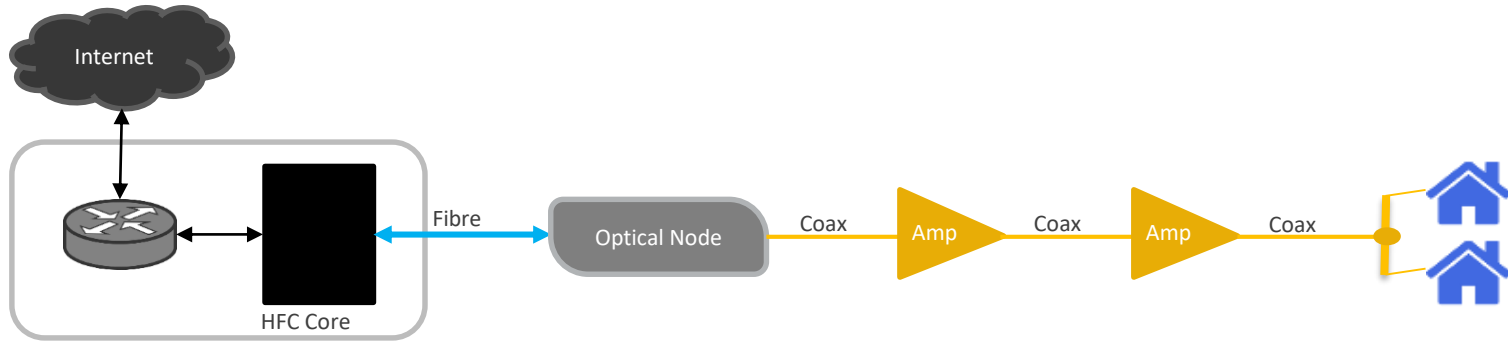
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# Introduction to Technetix Virtual Segmentation™



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# HFC networks today

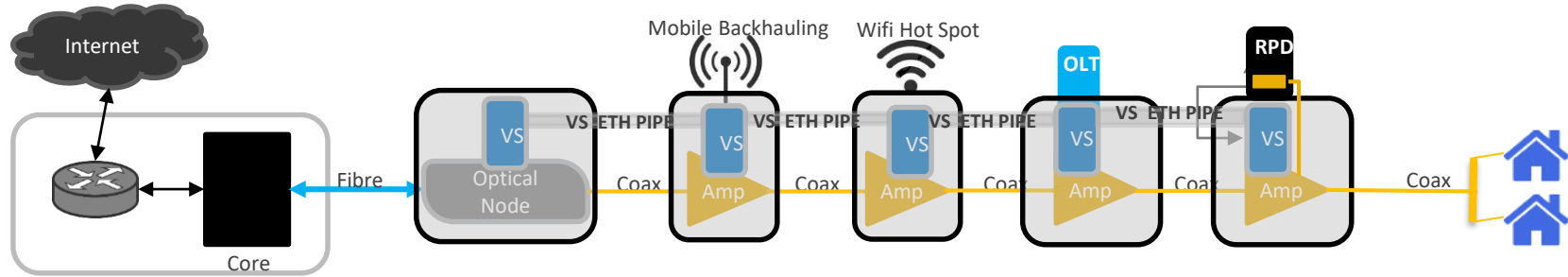


- Large clusters with insufficient capacity to cope with the exponential increase in bandwidth demand
- Demand for diverse services requires a rapid upgrade of the network (mobile backhaul, Wifi hot spots, business customers)

Today's HFC networks struggle to provide the diverse services and bandwidth required = fibre deployment

- Fibre needs to go deeper, but this means:
  - High costs
  - Long time to deploy/market
  - Obtaining civic/government permits

# Solution for today: Virtual Segmentation™



- Deploy virtual fibre to the desired location within your HFC network
- Create extra bandwidth for any Ethernet based deployment scenario (RPD, OLT, MBH, Wifi, Symmetrical)
- Virtual Segmentation takes LESS TIME and COSTS LESS to deploy compared with fibre
- Existing infrastructure remains intact - add on to existing cabinets/mounts
- Roadmap for further capacity and bandwidth growth



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# Virtual Segmentation™ architecture



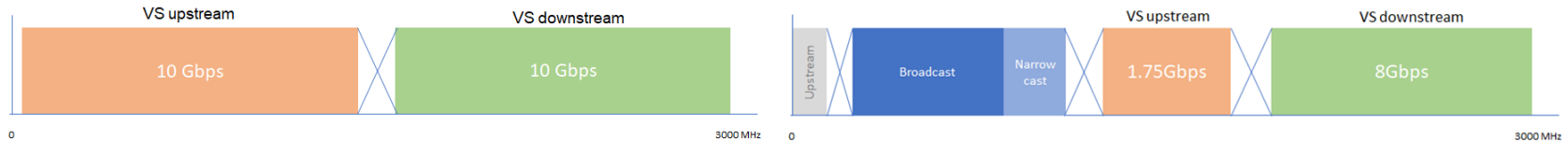
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# Virtual Segmentation™ system architecture

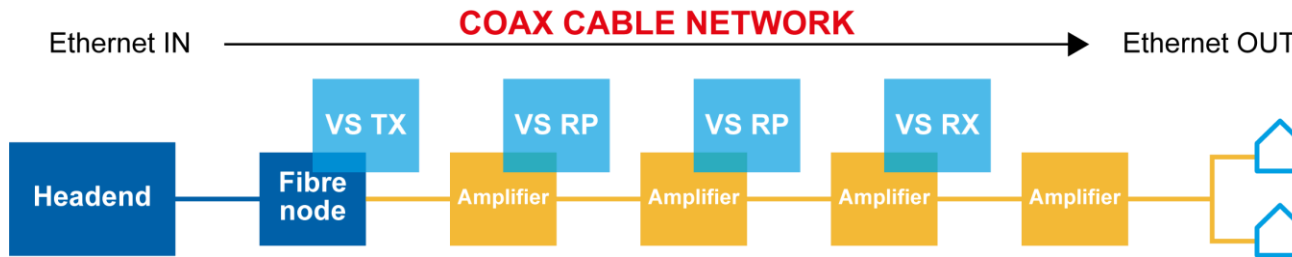
- A transparent ~ 10 Gbps Ethernet pipe over your existing coax network



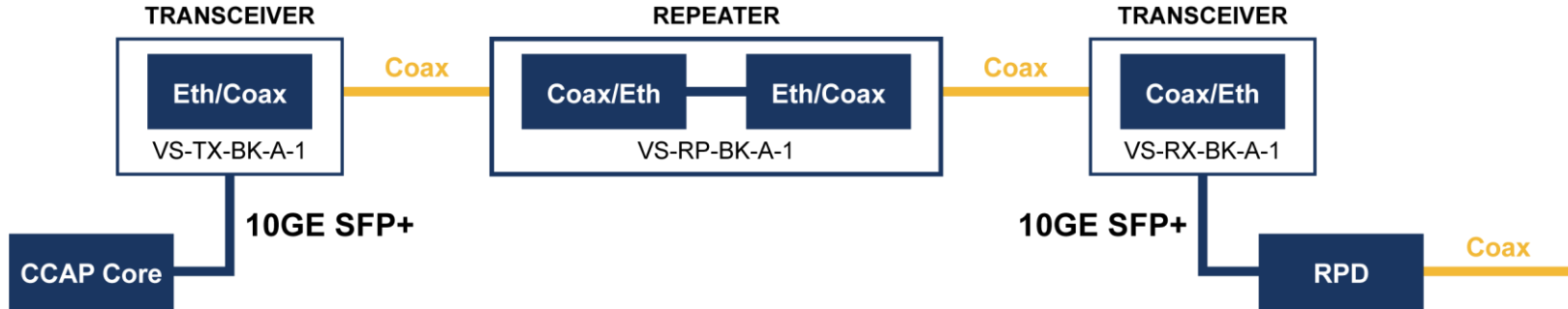
- Virtual Segmentation creates the pipe between two devices and those devices operate as if they are on a fibre network and connected to each other with 10 Gbps SFP+ Ethernet interfaces
- Utilises the high frequency spectrum over coax (up to 3 GHz to carry the Ethernet data)



- Virtual Segmentation is deployed on the existing amplifier locations within the HFC network as an add-on



# Virtual Segmentation™ logical architecture



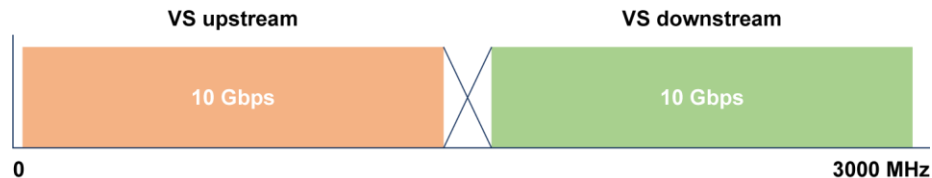
- Transparent pipe headend to end-device:
  - Ethernet: SFP+ with 10 GE
  - Ultra-low latency (less than 1ms on a link with 10 repeaters)
  - IEEE 1588v2 PtP support



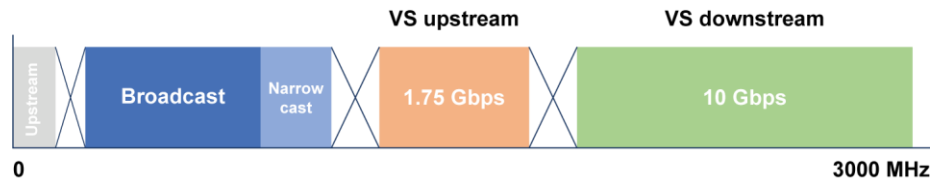


# Spectrum deployment options

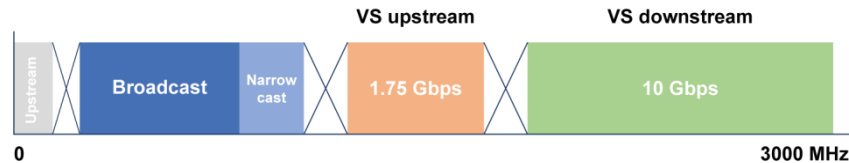
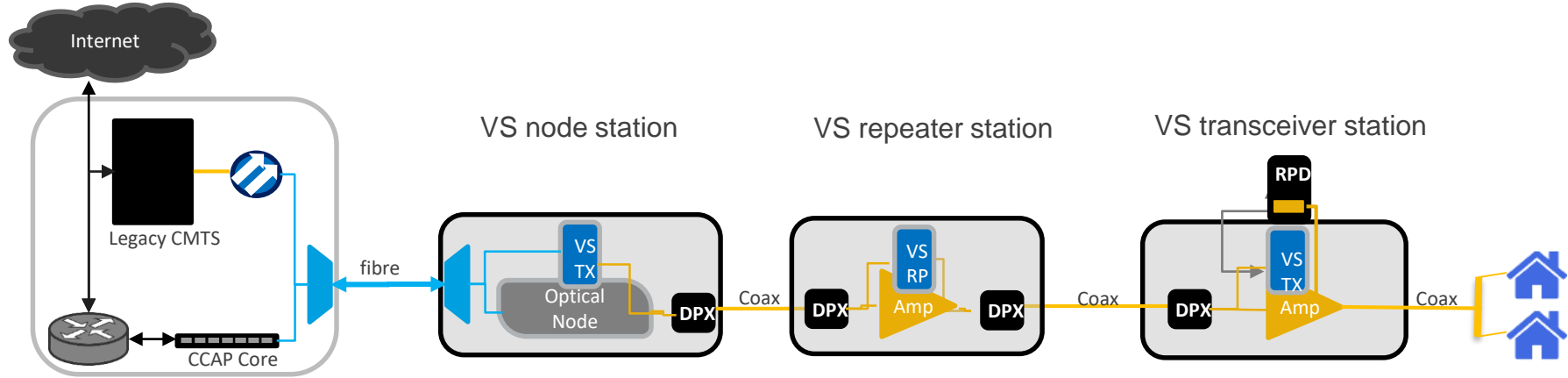
- Full replacement of legacy spectrum



- Hybrid deployment scenario with existing broadcast in place (in conjunction with diplex filter)

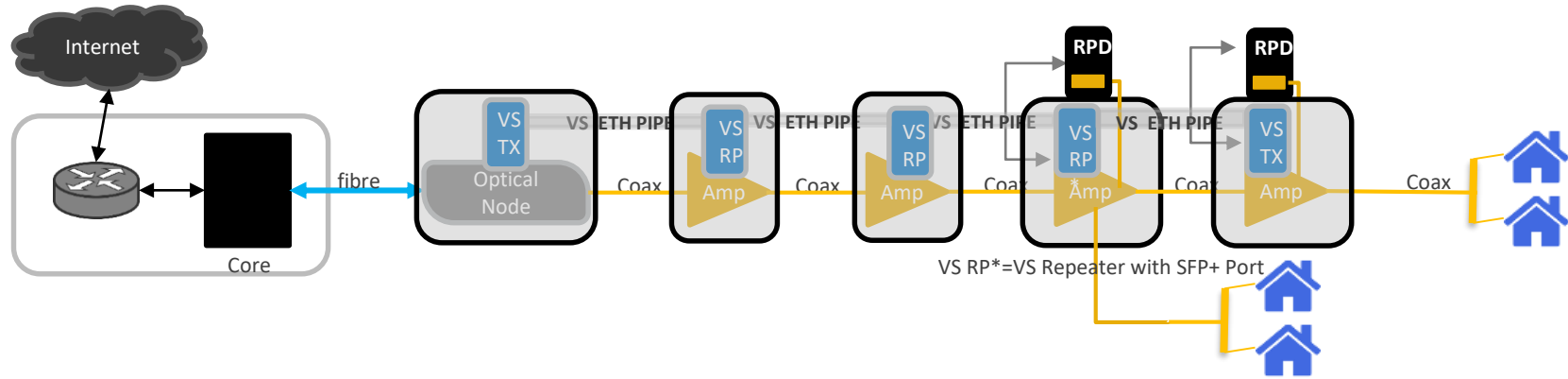


# Virtual Segmentation™ - hybrid deployment



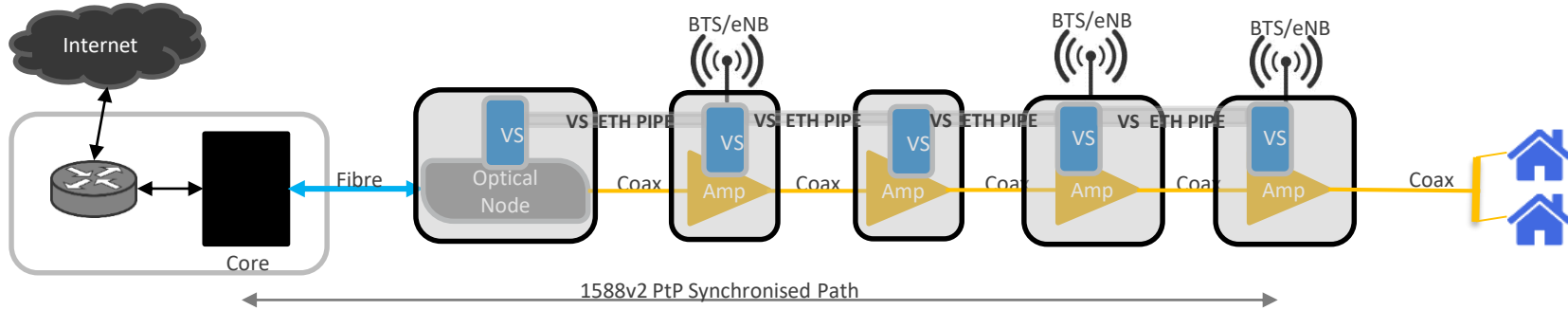
# Virtual Segmentation™ deployment scenarios

# Virtual Segmentation™ and Remote PHY



- Deploy Remote PHY over the coax network via Virtual Segmentation
- Possible to create a cascade of Remote PHY devices (RPDs) and share the available overlay bandwidth

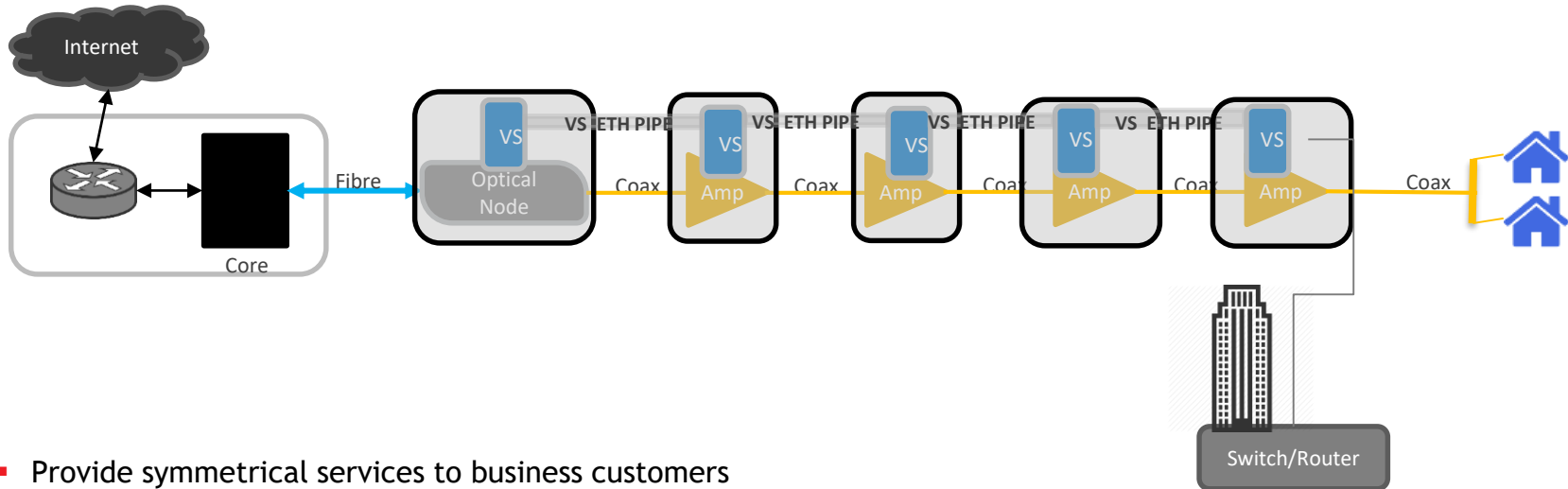
# Virtual Segmentation™ and mobile backhaul



- Provide a mobile backhaul link over the HFC network
- 1588v2 PtP transparent clock feature enables seamless synchronisation



# Virtual Segmentation™ and business services



- Provide symmetrical services to business customers



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# Virtual Segmentation™ case study and business case

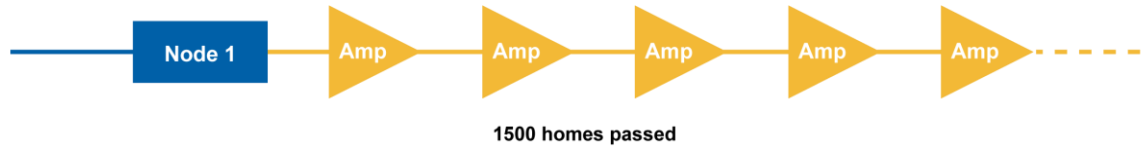


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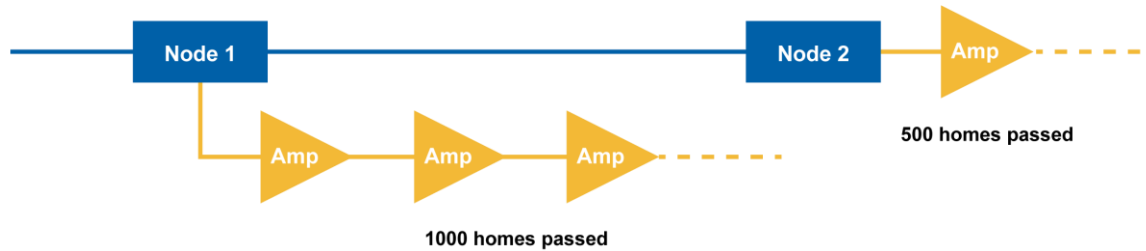


# MSO X - network upgrade options

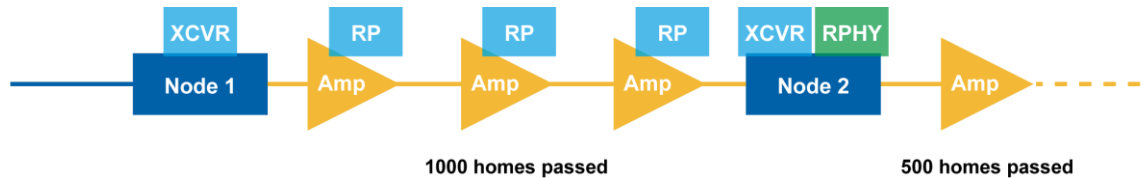
## Current deployment



## Target architecture



## VS with same net bandwidth addition



# MSO X - A real-life scenario

## Node 2: Fibre deployment

Segmentation of node 1 and 2	
Existing node	Node1
New node	Node2
# of Amps to pass	3
Required Fibre	
Overhead	860 m
Underground	520 m

Cost	
Overhead/Prep.	\$9,000
fibre construction	\$88,000
Materials	\$13,000
fibre splicing	\$2,000
<b>Total</b>	<b>\$112,000</b>
Time	
Power comp. permit	~ 4 months
ROW permit	2 weeks
Traffic control	2 weeks
<b>Total</b>	<b>~ 120 days</b>

## Scope:

- New node 2 to reduce 500 HP from node 1 (currently at 1500 HP)
- Approximately 860m fibre overhead required
- Approximately 520m fibre underground trench/bore

## Timing:

- Node 2 power company permit - 4 months
- Node 2 ROW permit - 2 weeks
- 2 weeks of extensive traffic control

## Expenses:

- Overhead/preparation
- Fibre construction estimate
- Materials
- Fibre splicing

**Node 2 project deployment cost total: \$112,000**

# MSO - a sample network

## Required quantity per product for virtual node split

	Node 1	AMP1	AMP2	AMP3	Node 2
Transceiver	1	-	-	-	1
Repeater	-	1	1	1	-
Triplexer	1	2	2	2	1

## Extended cost for deployment of VS

Total Deployment Cost for VS	
Virtual Segmentation Scenario	Quantity
Transceiver	2
Repeater	3
Triplexer/filter	8
Service locations	5
<b>Time</b>	<b>1-2 days</b>
<b>Cost</b>	<b>\$35,000</b>

## Deployment option comparisons

Deployment Tech	Cost	Time
Virtual Segmentation	\$35,000	1-2 days
Fibre deployment	\$112,000	~ 4 months
<b>70% Savings</b>		



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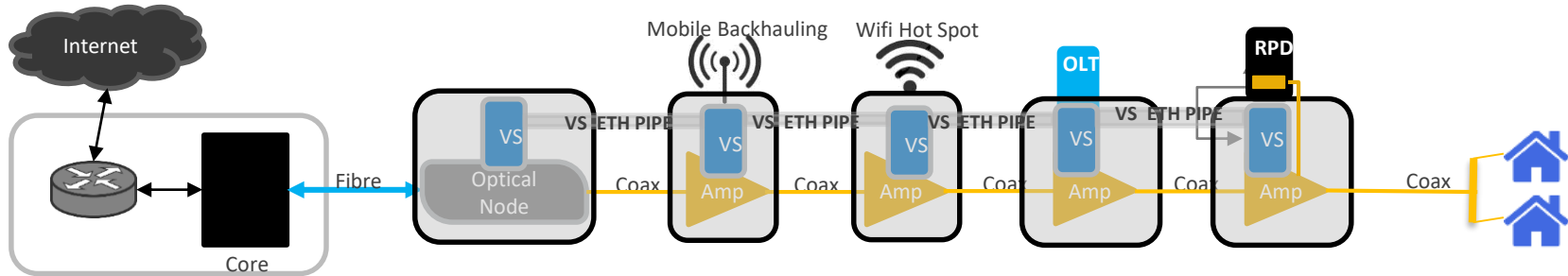
# Summary



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# Virtual Segmentation™ - what you need to know

- Deployment scenarios that are enabled by Virtual Segmentation™ WITHOUT the need for fibre!
  - R-PHY/R-MACPHY deployment
  - Mobile backhaul
  - Symmetrical/business services
  - Wi-fi hotspot
  - Any other scenario that requires high bandwidth at low latency in your network
- Great CAPEX reduction (up to 80%)
- Deployment time is reduced from months to days
- It all works on your existing coax network and does not interfere with current services



# Virtual Segmentation™ delivers



- We help you save millions in CAPEX investment



- Virtual Segmentation enables DOCSIS 3.1 Gigabit to the home NOW



- Plug-and-play, smart, transparent, power-efficient solution



- Ethernet in every cabinet to enable new reven B2B, 5G, mobile backhaul, etc.





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# Vielen Dank



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