

The background of the slide is a close-up, low-angle shot of a dense bundle of fiber optic cables. The cables are illuminated from below, creating a warm, golden-orange glow. The light from the fibers creates a bokeh effect, with many out-of-focus circular highlights in the foreground and background. The overall atmosphere is technological and high-tech.

Australia's Academic & Research Network

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How do AARNet's NBN Services Work?

Agenda

Fibre

– How does NBNCo's Fibre product work

Wireless

– How does NBNCo's Fibre product work

Satellite

– How does NBNCo's ISS product work

Multicast

– How does NBNCo's Multicast product work

Pictures

– What do installations look like?

IPoE vs PPPoE

– Which to use? Option 82 vs Radius Auth...

QoS

– VoIP/Video Conferencing QoS

Questions?



Fibre

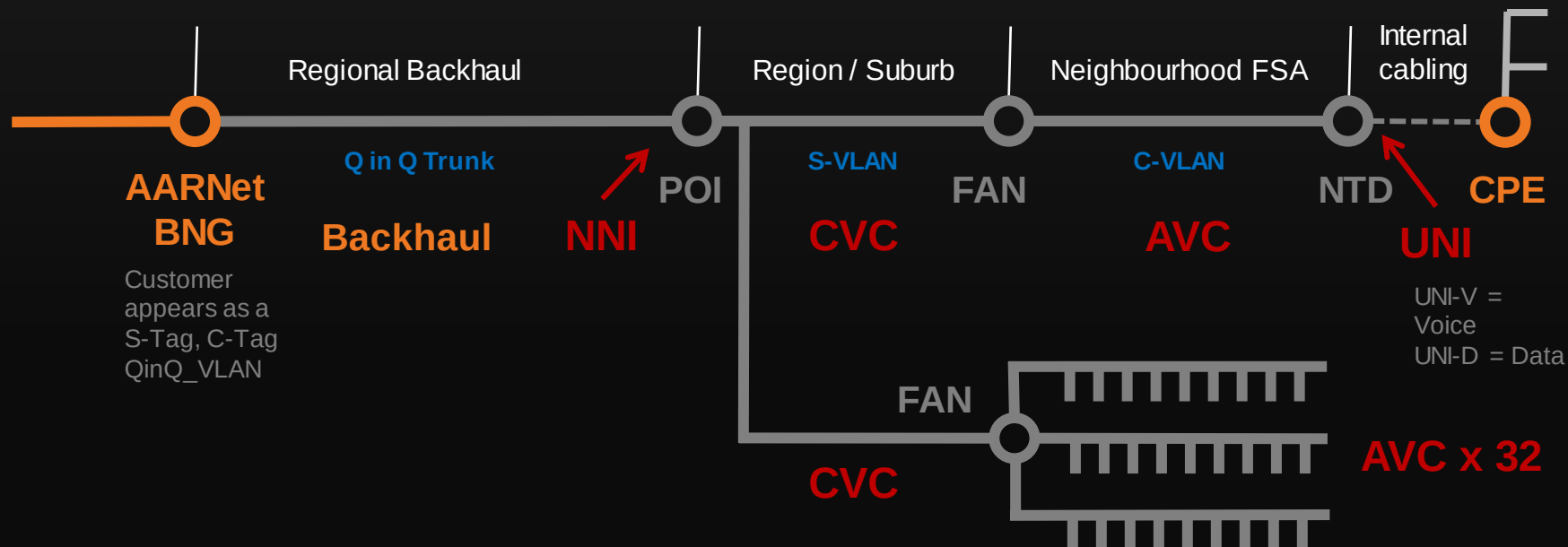
Fibre

UNI = User Network Interface

AVC = Access Virtual Circuit (GPON)

CVC = Connectivity Virtual Circuit (Ethernet)

NNI = Network to Network Interface (Ethernet)



Fibre

Speed Options: (Download/Upload)

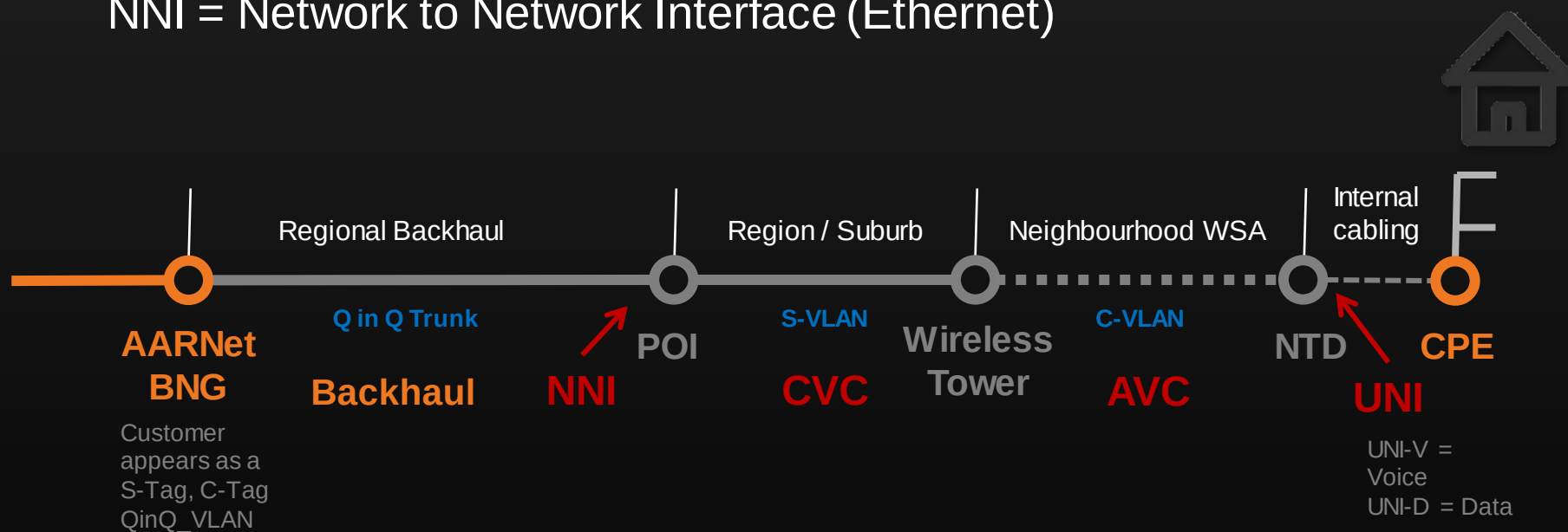
- 12Mb/1Mb
- 25Mb/5Mb
- 25Mb/10Mb
- 50Mb/20Mb
- 100Mb/40Mb



Wireless

Wireless

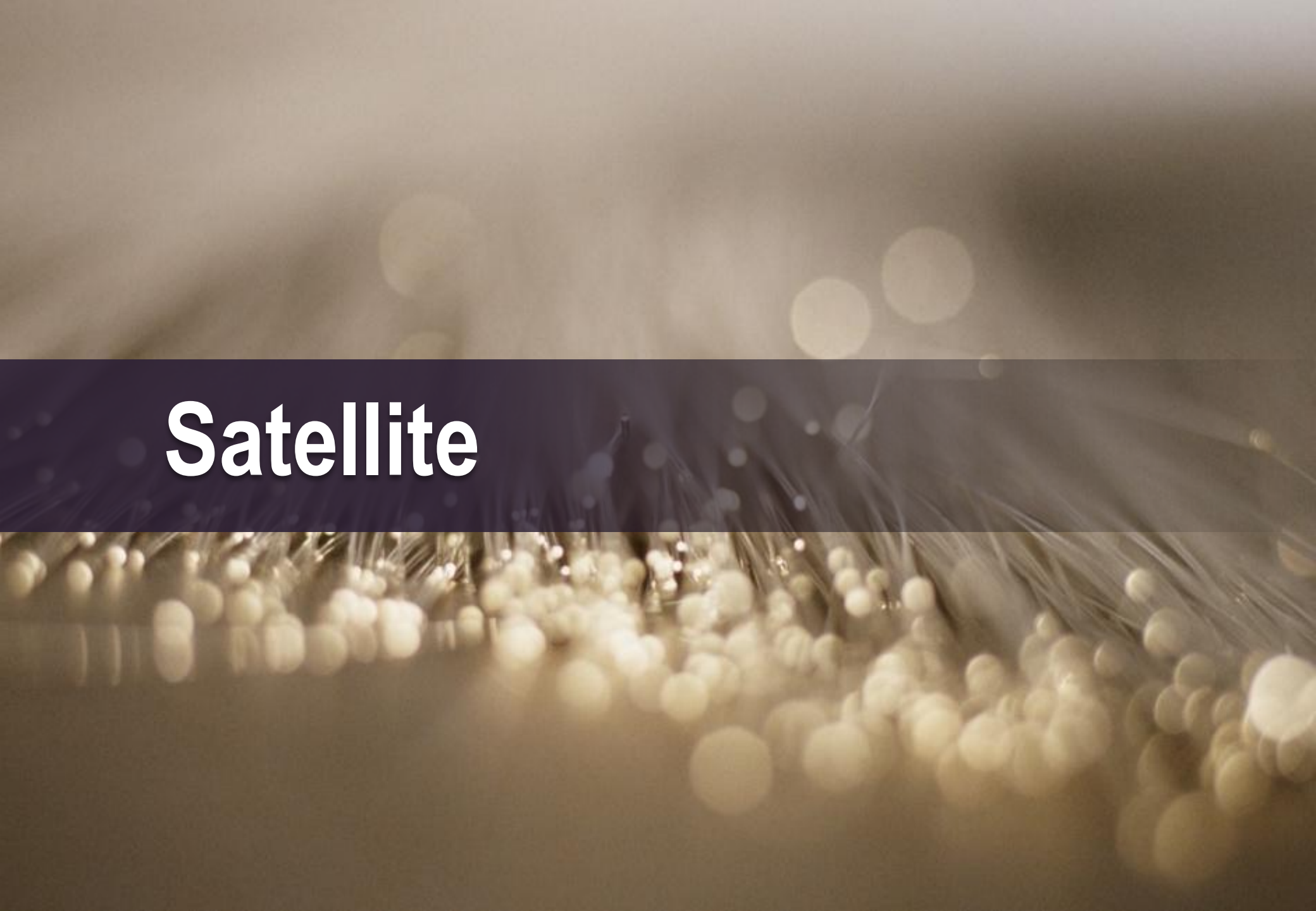
UNI = User Network Interface
 AVC = Access Virtual Circuit
 CVC = Connectivity Virtual Circuit (Ethernet)
 NNI = Network to Network Interface (Ethernet)



Wireless

Speed Options: (Download/Upload)

- 12Mb/1Mb
- 25Mb/5Mb



Satellite

Satellite

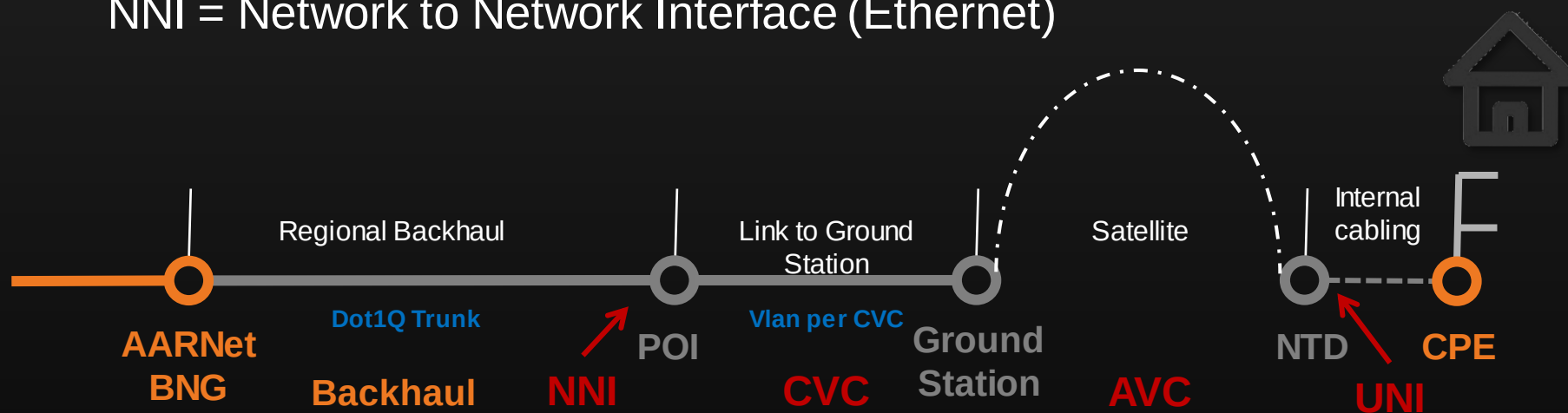
Satellite

UNI = User Network Interface

AVC = Access Virtual Circuit

CVC = Connectivity Virtual Circuit

NNI = Network to Network Interface (Ethernet)



Customer are simply
routed to NBNetCo's
ground station equipment

Satellite

Satellite

Speeds Available: (Download/Upload)

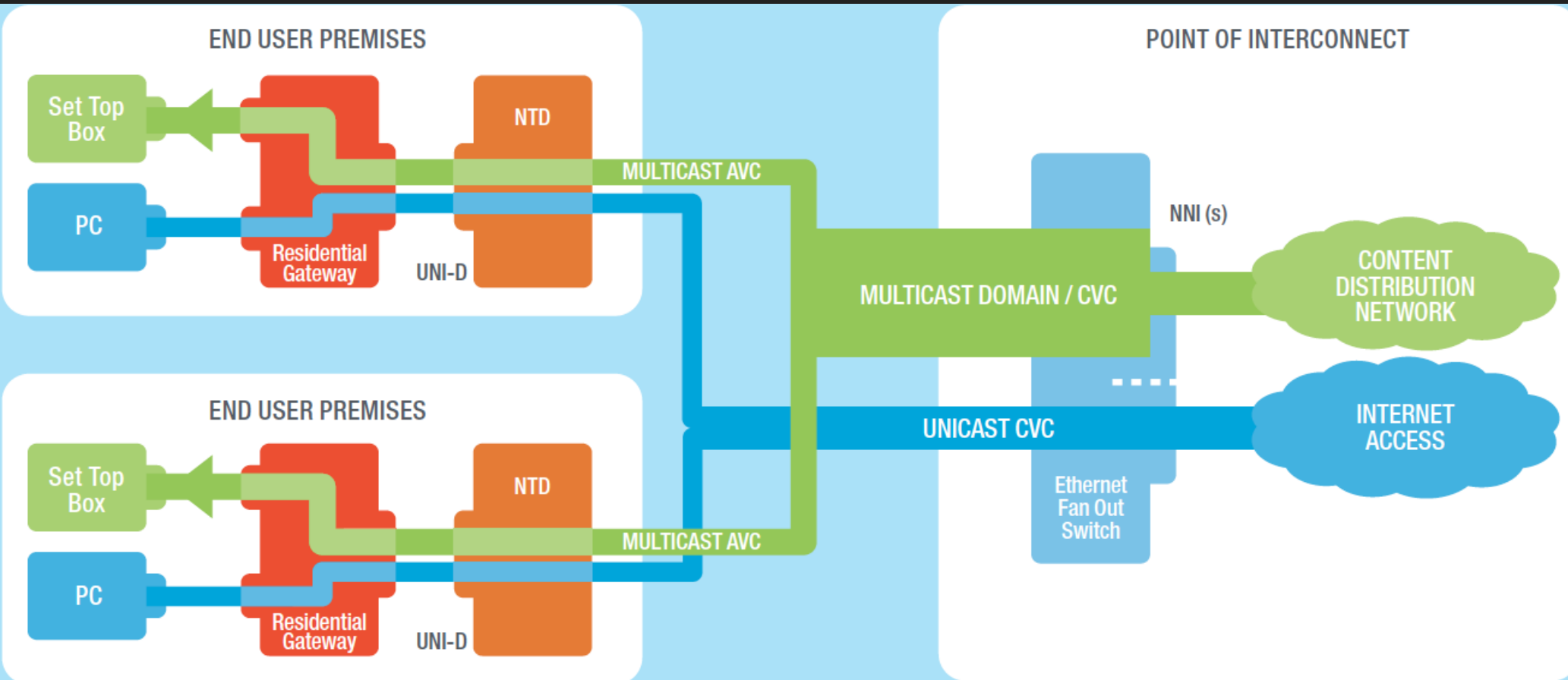
- 6Mb/1Mb

Note: Once NBNCo's own Satellite's are deployed in 2015, the expected speeds of satellite services will be increased to 12Mb/1Mb.

Multicast

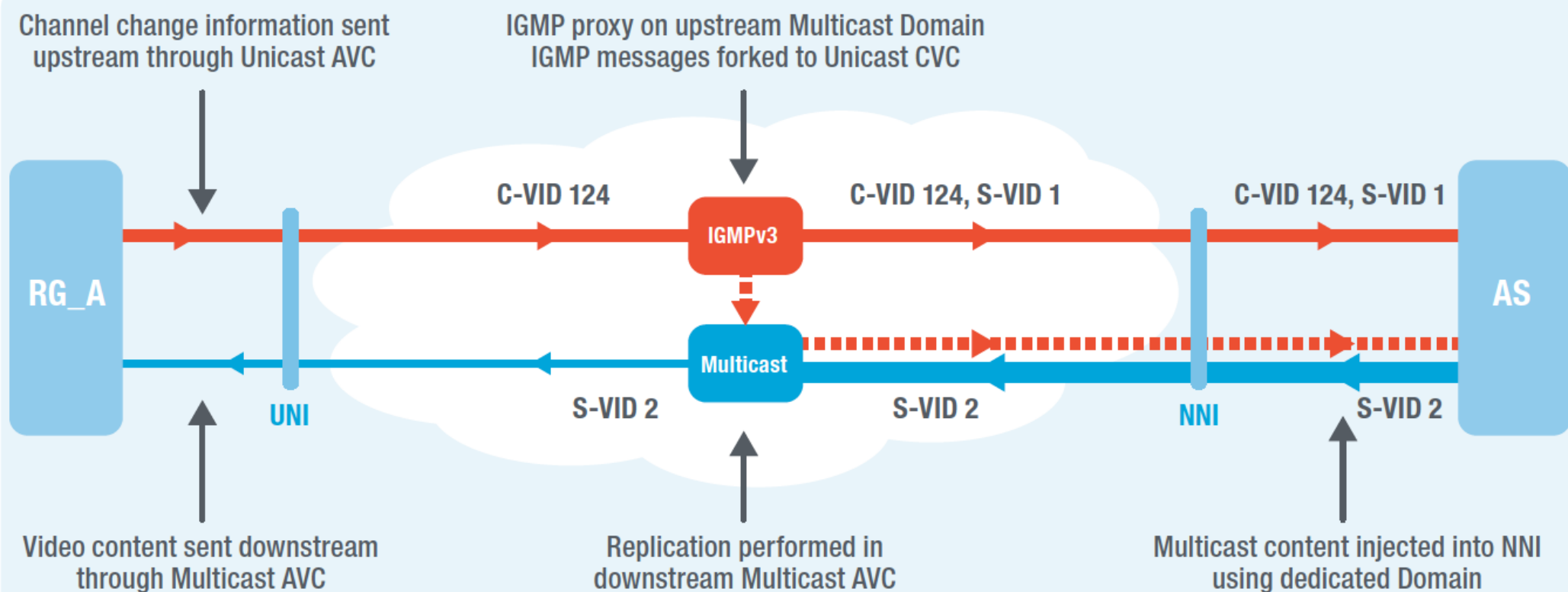


Multicast



Multicast

Multicast



Multicast

Multicast

Currently AARNet is working with NICTA and NBNCo as part of the NICTA Social TV Trial.

See: <http://www.nicta.com.au/research/projects/socialtv> for more details

Multicast

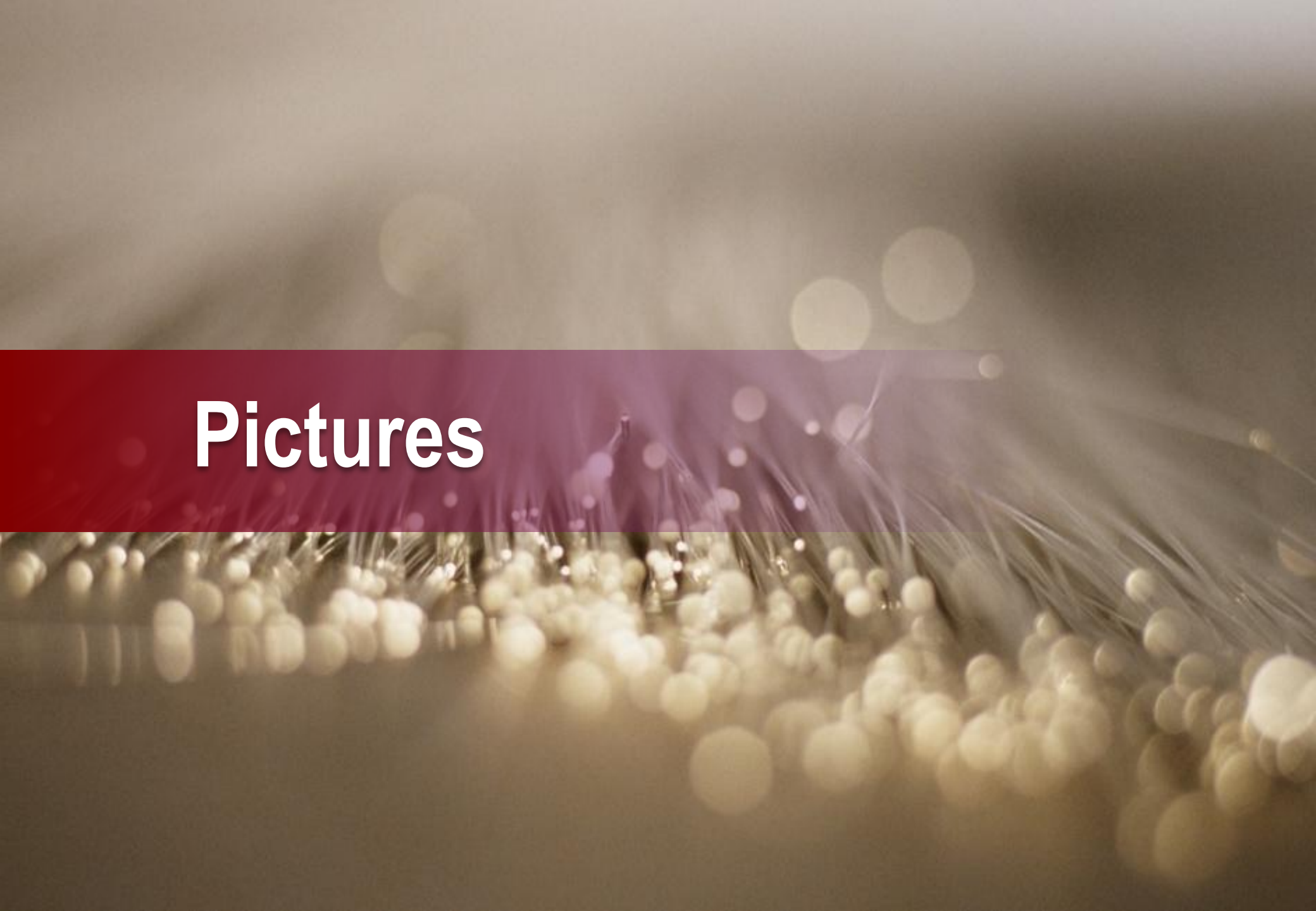
Multicast



Multicast

Multicast





Pictures

Pictures



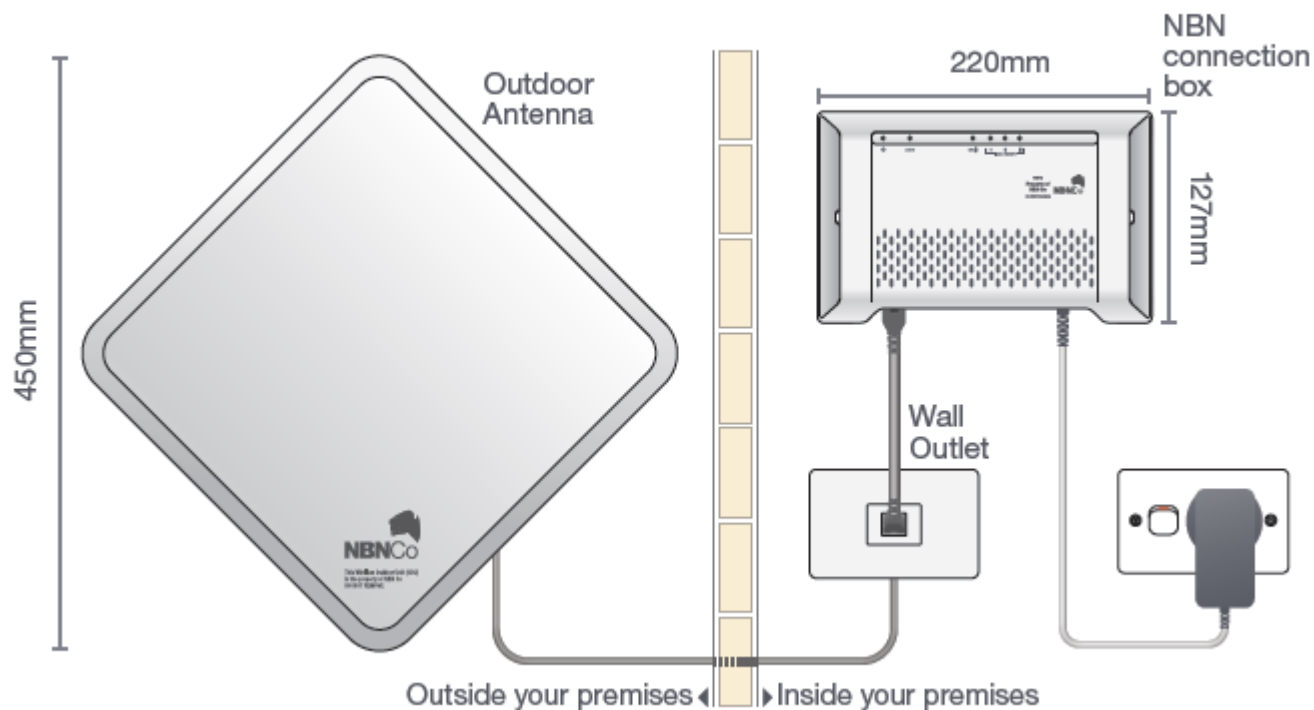
Pictures



Pictures

Pictures

Fixed wireless equipment



Pictures

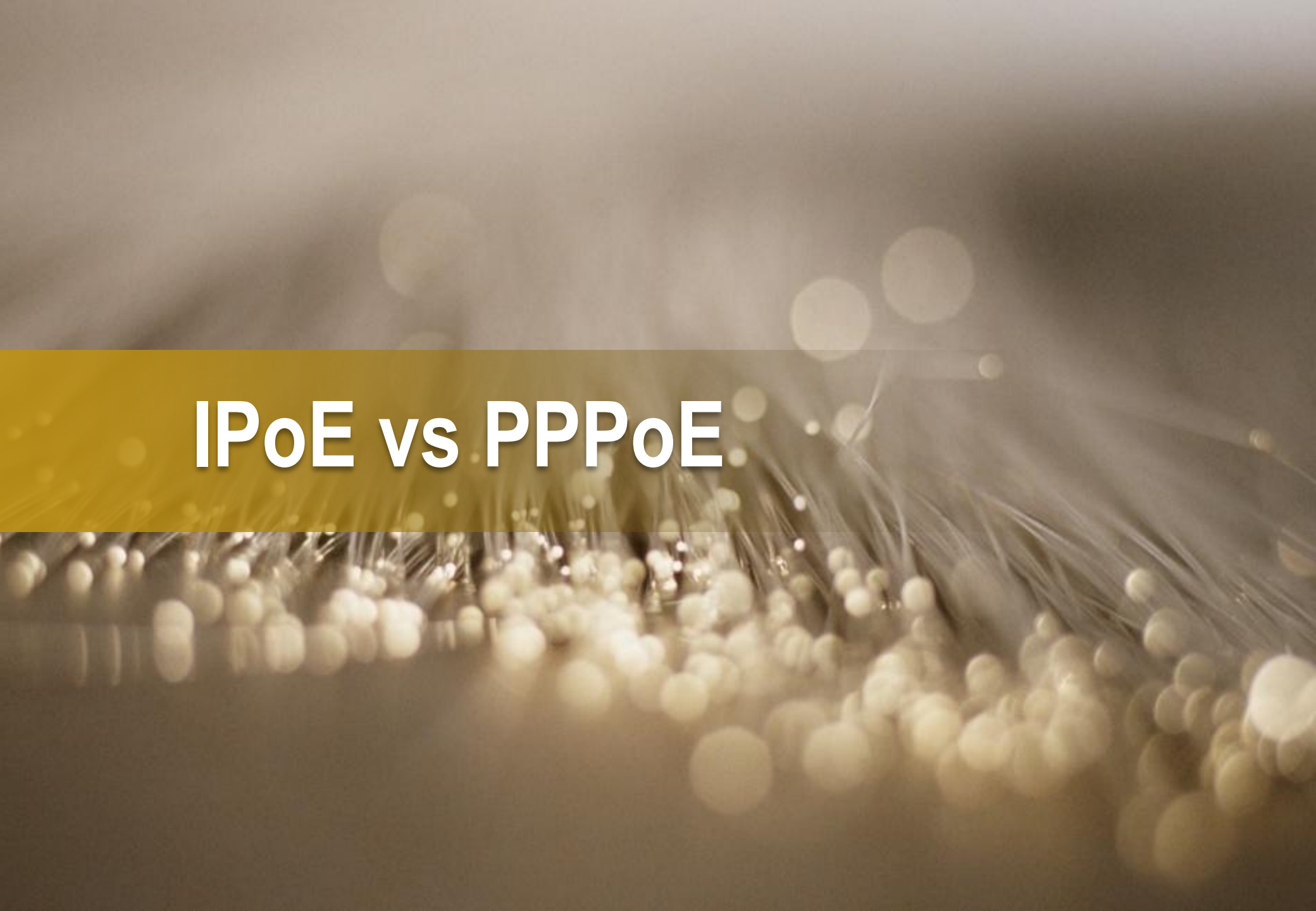
Pictures



Pictures

Pictures



The background of the slide features a close-up, shallow depth-of-field photograph of a bundle of fiber optic cables. The cables are densely packed, and their glass cores are visible, creating a complex web of light and shadow. The lighting is warm and golden, with many out-of-focus points of light (bokeh) scattered throughout the scene, particularly in the foreground and background. A semi-transparent yellow horizontal band is positioned across the middle of the image, serving as a backdrop for the title text.

IPoE vs PPPoE

IPOE vs PPPoE

Originally when NBNCo first launched their fibre and wireless product, they could not support IPv6 DHCPv6 or SLAAC, due to limitations with their vendors firmware.

They did however support statically configured IPv6 services.

This meant that if AARNet wished to provide dynamic IPv6 services to a customer we had to do so via PPPoE.

However late last year, NBNCo deployed a firmware update which allowed AARNet to utilise IPOE with both IPv4 and IPv6 running natively.

Currently we are awaiting NBNCo to allow IPv6 over the wireless products later this year.

IPoE vs PPPoE

We use DHCPv6 and DHCPv4 to perform service authentication and authorisation.

We then have the DHCPv4/v6 function issue a radius request to our authentication/authorisation and accounting servers which allow the service onto the network and record it's billing information based on the Option 82 string NBNC0 inject into the DHCPv4/v6 requests.

IPoE vs PPPoE

Radius Access Request Packet for IPoE

Wed Jul 3 04:57:09 2013

Packet-Type = Access-Request

User-Name = "DHCP-v6"

Service-Type = Framed-User

Chargeable-User-Identity = ""

Acct-Session-Id = "52348"

ERX-Dhcp-Options =

"\000\010\000\002\377\377\000\001\000\n\000\003\000\001D+\003\242L\300\000\006\000\004\000\027\000\030\000\003\000\014\000\004\000\001\000\000\000\000\000\000\000"

ERX-Dhcp-Mac-Addr = "442b.03a2.4cc0"

NAS-Identifier = "mel-off-bng1"

NAS-Port = 276824515

NAS-Port-Id = "ge-1/1/2.1073741830:3101-451"

NAS-Port-Type = Ethernet

ADSL-Agent-Circuit-Id = "AVC9999990001519"

NAS-IP-Address = 192.168.2.1

IPoE vs PPPoE

Radius Access-Accept Packet for IPoE

Wed Jul 3 04:57:09 2013

Packet-Type = Access-Accept

Framed-IPv6-Pool = "pool-v6"

This is what we see on our BNG router upon a successful session establishment.

```
wdm@mel-off-bng1> show subscribers
```

Interface	IP Address/VLAN ID	User Name	LS:RI
ge-1/1/2.1073741824	0x8100.3101 0x8100.451		default:default
ge-1/1/2.1073741824	182.255.126.10	DHCP	default:default
ge-1/1/2.1073741824	2001:388:a060:aaa::3	DHCP-v6	default:default



QoS

QoS

NBNCo Currently support the following QoS definitions.

Default Mapped Service – Has no QoS applied.

DSCP Mapped Service – Selectable Traffic Classes and speeds that you select when ordering the service.

QoS

TC1 is the NBNCo Voice Class. Packets need to be marked with DSCP EF (RFC4594)

When ordering a DSCP mapped service we can select none, 150kbps, 300kbps, 500kbps, 1Mbps, 2Mbps or 5Mbps.

Some options are not available depending on what total speed of the fibre service is ordered.

TC4 is what NBNCo describe as the Best Effort Class. Packets need to be marked with DSCP DF (RFC4594)



Questions?

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Thank You