Status Report

NBN Connect #4

Tuesday, 9nd February 2010

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Topics to be Covered Today

- NBN Co objectives and market positioning
- Technology choices for NBN Co’s fibre network
- Developing our product specifications for NBN Co’s fibre network
- Next steps

NBN Co Objectives

Coverage

- Provide a wholesale service that enables competition and innovation by service providers throughout Australia

Competition

- Offer open access and equivalence, creating a level competitive playing field for retail service providers
- Facilitate any to any connectivity
- Promote maximum end-user choice in terms of both services and providers

Cost Effective

- Simplicity
- Focus on uncontested infrastructure

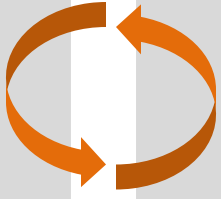
Customer Care

- Deliver appropriate network reliability, resilience and security
- Allow secure simultaneous delivery of multiple applications with predictable levels of quality

NBN Co Supports and Complements Commercial Drivers of Retail Service Providers (RSPs)

Retail Service Providers (RSPs)

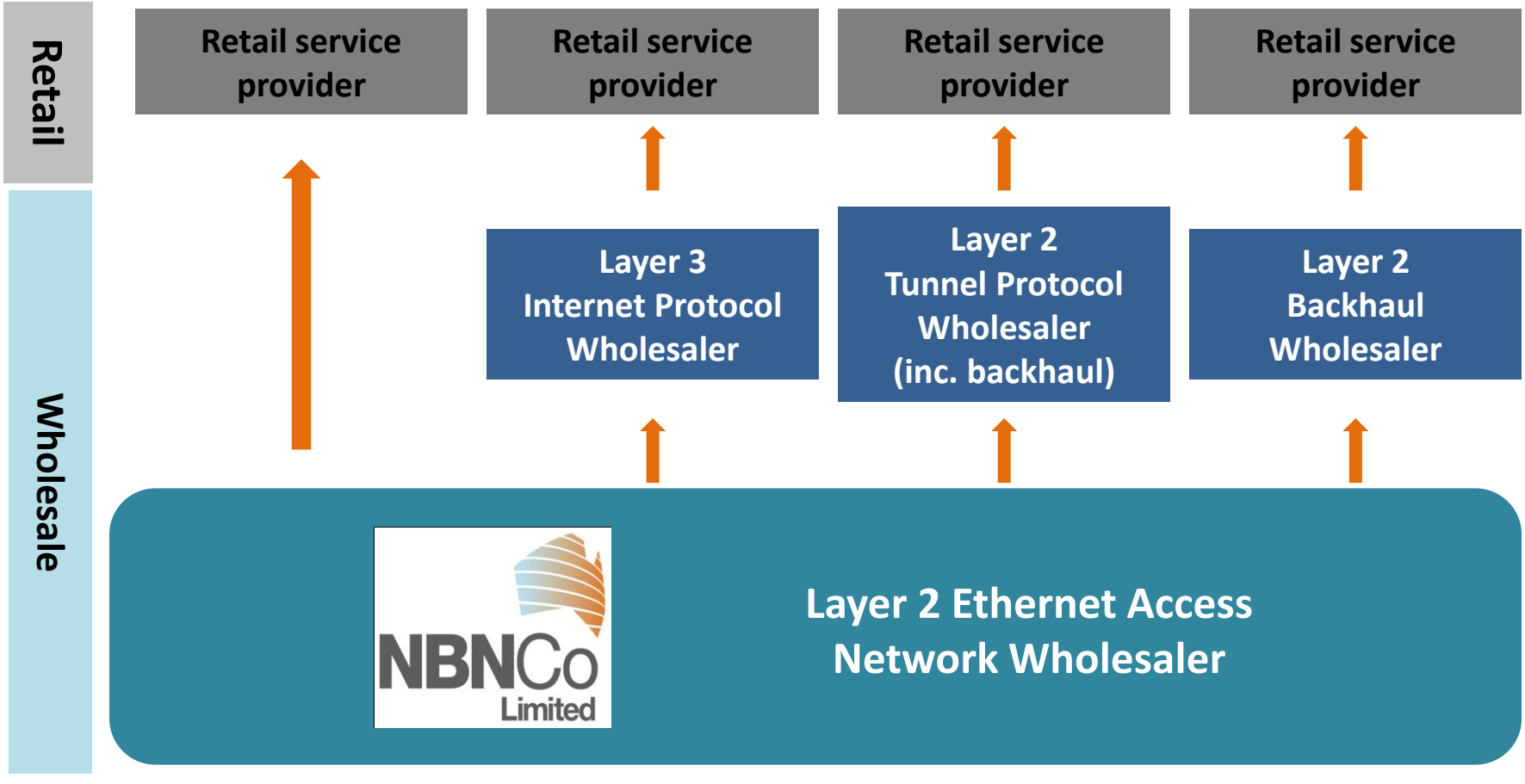
- Driven by innovation
- Differentiation is key
- Diverse product set
- End user segmentation
- Deliver value to end users



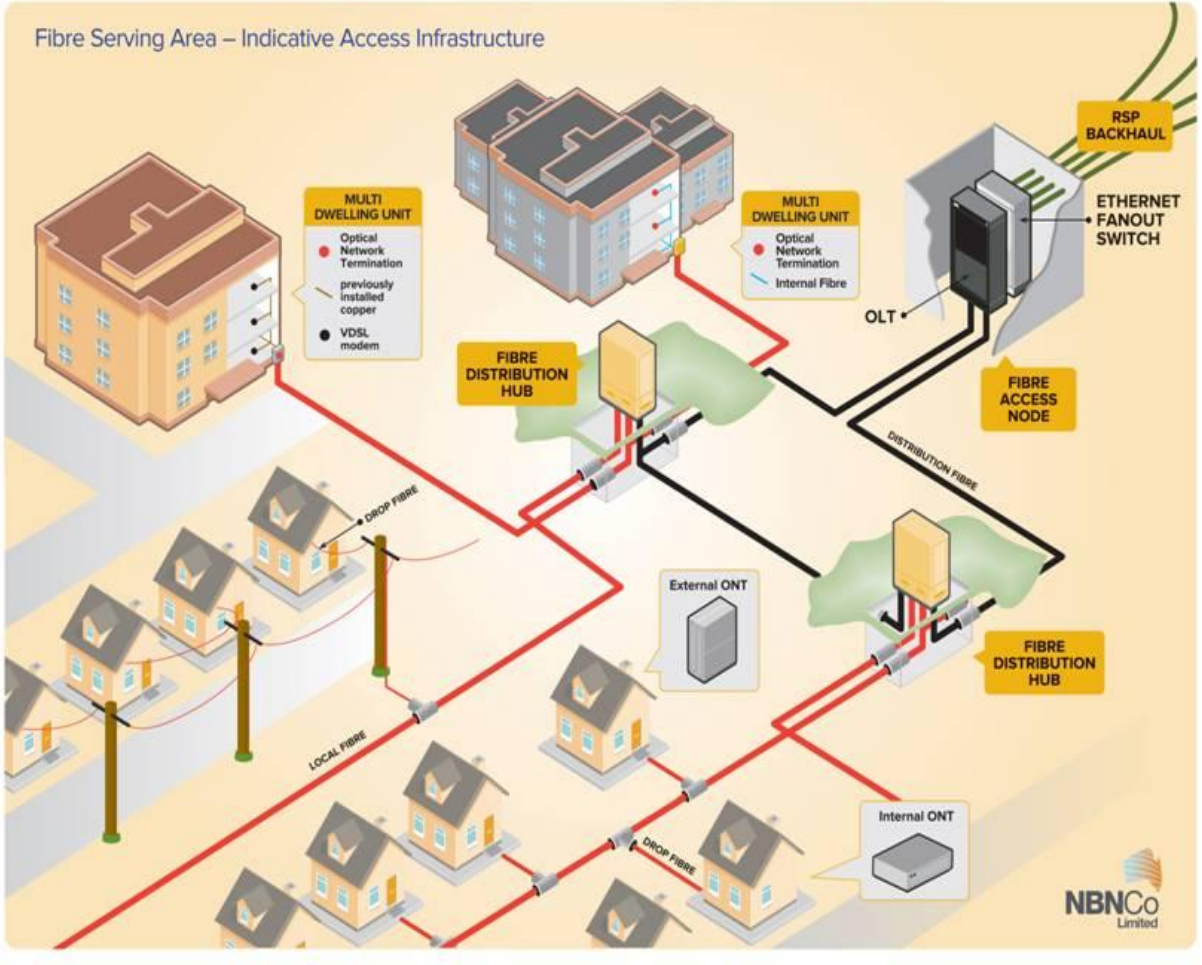
NBN Co Limited

- Simple products
- Wide coverage
- Effective B2B interface
- Cost effective
- Support diversity of RSP business models

NBN Co Positioned to Allow for a Diversity of Wholesale and Retail Business Models



High Level Access Architecture



Next Generation Consultation

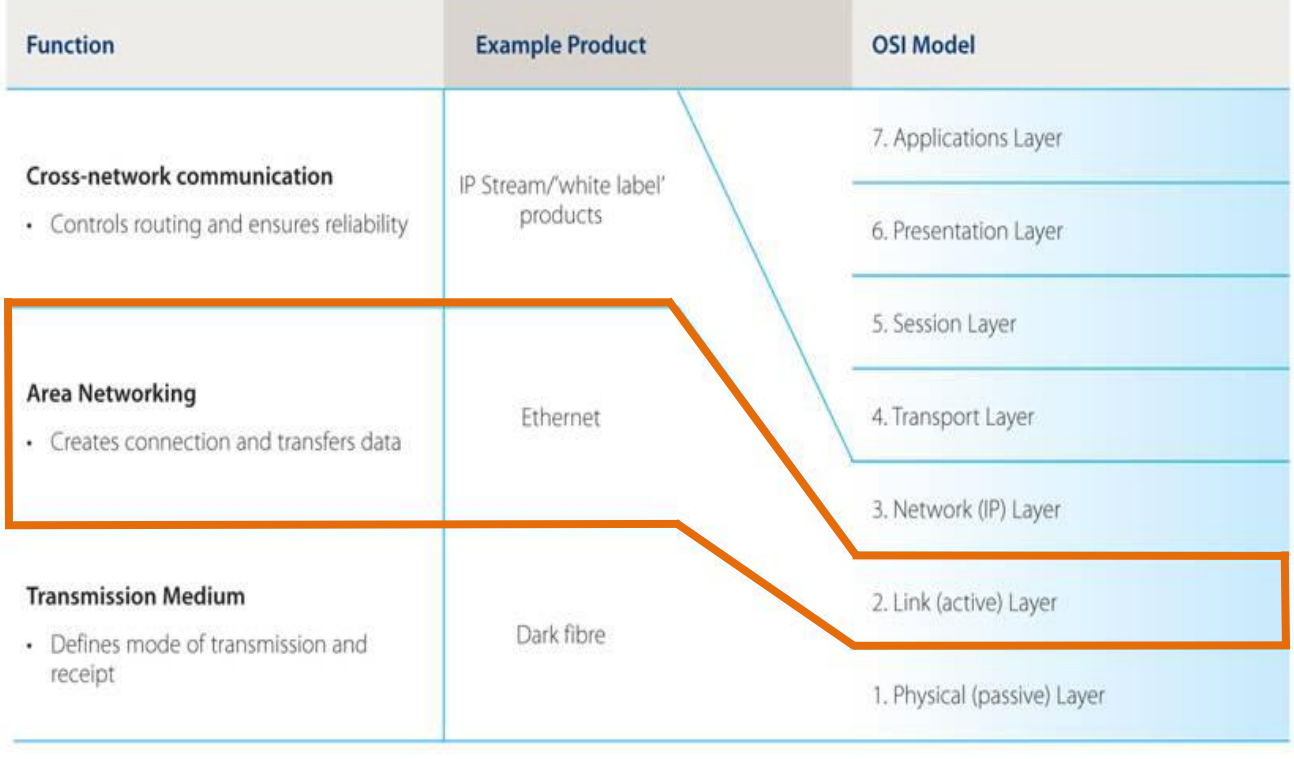
- Consultation paper released 21 December 2009: www.nbnco.com.au
- Written submissions due 12 February 2010
- After assessing submissions NBN Co will undertake further targeted industry consultation
- Plan to release a detailed product specification and offer construct 2nd Quarter 2010

Latest technology thinking

- Layer 2 with security, QoS, multi-cast features
- Ethernet based
- PON based architecture—most likely GPON
- Pro-competition positioning of Points of Interconnect

Technology Layer

As a wholesale-only provider, at what layer of the technology stack should NBN Co participate?



Technology Layer

Rating of options against objectives and other considerations

Coverage

Level competitive playing field

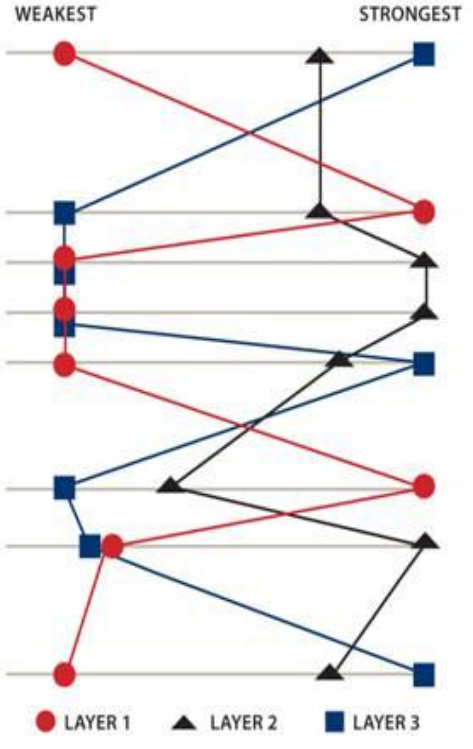
- Support for differentiation/innovation
- Healthy competition
- Maximum end-user choice
- Multiple applications

Cost Management

- Simplicity
- Focus on uncontested infrastructure

Performance

- Reliability and Security



Rationale for Ethernet

- RSP service differentiation – neutrality to higher layers
- Competition and choice:
  - multiple services on the same physical interface
  - multiple RSPs on the same physical interface
- Flexible and potentially substantial bandwidth
- Security and grades of Quality of Service
- Transparency to identify and manage faults by NBN Co and RSPs independently
- Competitive equipment pricing

Rationale for PON (Passive Optical Network)

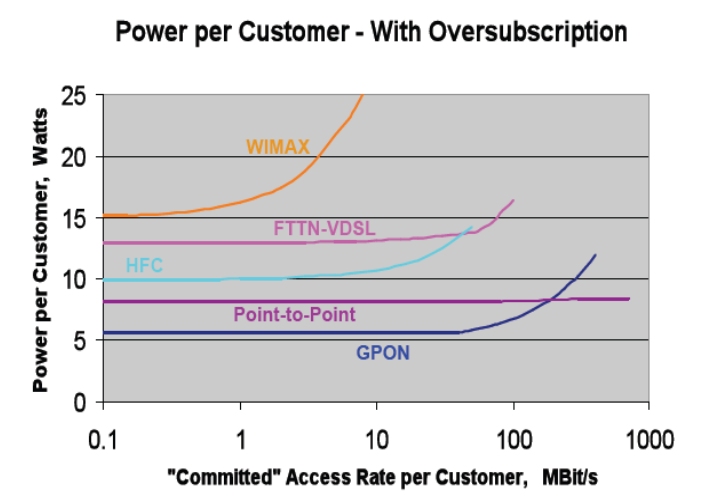
Passive Optical Network:

- Service flexibility and simplicity
- More economical than point-to-point for residential
  lower fibre costs and power consumption
- Consistent with asymmetric bandwidth needs for residential

Capability to support point to point for
very high bandwidth applications

GPON:

- Speed
- 'Carrier' feature support
- Global industry adoption



Source: Cubin

Points of Interconnect

- NBN Co will locate Points of Interconnect where there is contestable backhaul

- We expect that there will be between 100 and 200 NBN Co Points of Interconnect (POIs) throughout Australia and their location needs very careful consideration

- Where we place these POIs may have an impact on industry structure so we will be consulting with the industry and holding discussions with the Government and the ACCC to ensure we get this placement correct

Development of NBN Co's Product Specification

In this section we will:

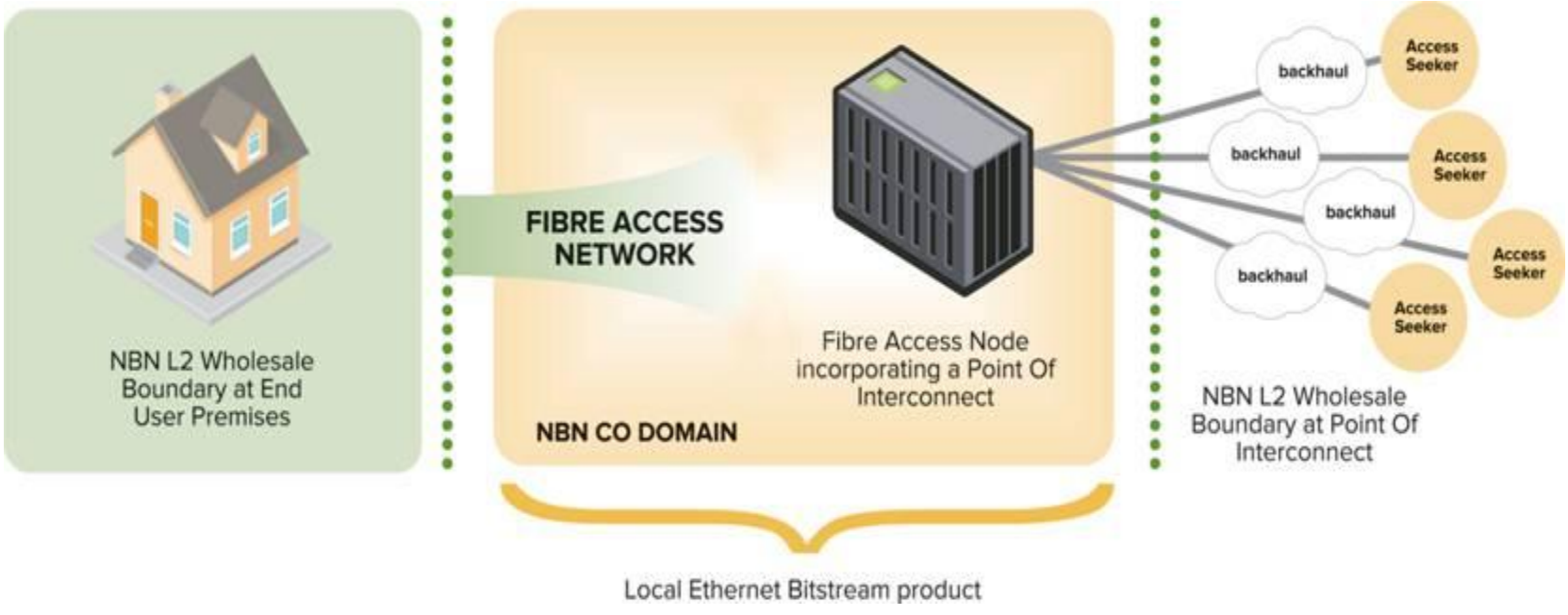
- Describe the two product bundles NBN Co proposes to offer our customers

- Discuss a number of key elements of these products:
  - Bandwidth rates
  - Optical Network Termination (ONT) units
  - Key active service features
    - Security
    - Traffic Management & Prioritisation
    - IP-TV and Multicasting capability

Design Criteria

- Minimise product complexity
- Deliver equivalence of opportunity for our customers
- Support a diversity of RSP business models
- Support differentiation and innovation
- Cost effectiveness

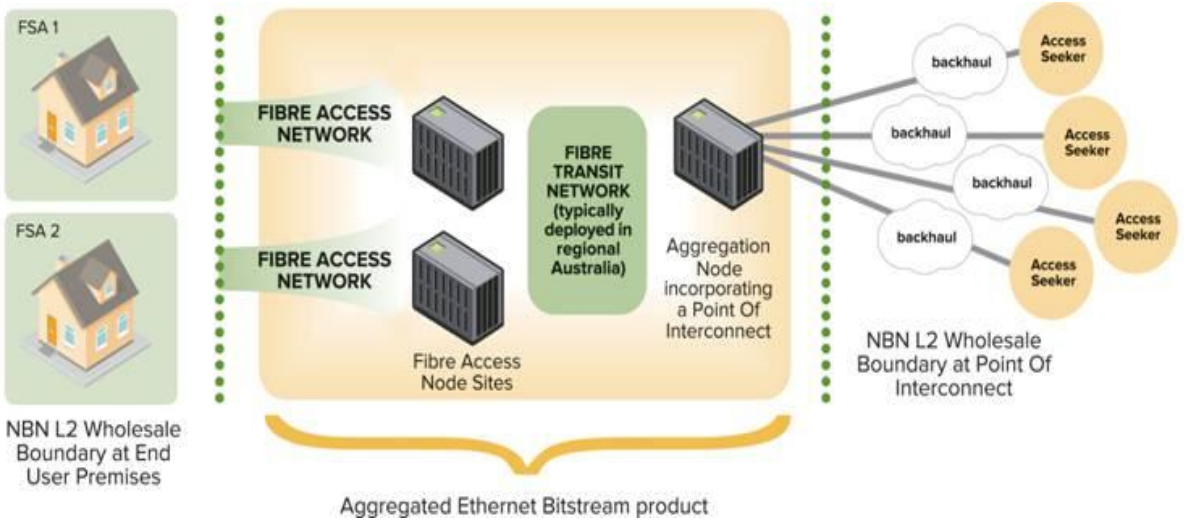
Local Ethernet Bitstream (LEB)



Consists of two main components:

1. LEB Access Link: provides a designated connection between the ONT at the end-user premises and the Fibre Access Node
2. LEB Connectivity Link: connects LEB Access Links to the RSP's network via a PoI

Aggregated Ethernet Bitstream (AEB)



The AEB product bundle consists of three components:

1. AEB Access Link. provides a designated connection between the ONT at the end-user premises and the Fibre Access Node
2. AEB Transit Link. A fibre transit circuit that links the AEB Access Link to the AEB Connectivity Link
3. AEB Connectivity Link: connects AEB Access Links to the RSP's network via a PoI

To promote a level playing field the LEB will not be available in a Fibre Serving Area that are serviced via the AEB product.

Bandwidth Rates

Access Circuit Rate Offerings

- Each LEB/AEB Access Link will have a Peak Information Rate (PIR) and Committed Information Rate (CIR) for downstream and upstream speeds from the Fibre Access Node to the end-user premises

We are seeking comments on how speed options of both PIR and CIR should be presented to our customers

Connectivity Link Rate Offerings

- It is envisaged that the LEB /AEB Connectivity Links will have a Gigabit Ethernet optical interface, operating in multiples of 1 Gbps
- The minimum required capacity that will need to be purchased will be a function of the number of OLTs served within the respective FSA.

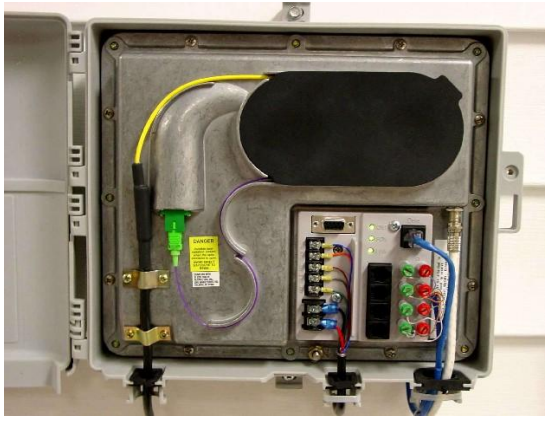
What are the key requirements of RSPs for dimensioning connectivity links?

Optical Network Termination (ONT) Units

It is proposed that ONT will:

- contain multiple service ports
- support a range of CPE and network user interfaces

To support the transition of legacy telephony services, it is proposed that an Analogue Telephone Adapter (ATA) will be integrated within the Optical Network Termination (ONT)



Seeking Comment

- Preference for indoor / outdoor installation of the ONT
- Minimum / maximum quantity of Ethernet ports
- Does the legacy voice solution approach meet the needs of RSPs?

Security and Separation

- Security of RSP traffic is a critical design component of the NBN Co network design
- Using the IEEE 802.1ad VLAN scheme, each LEB Access Link and AEB Access Link will be supplied as a separate virtual data stream within the NBN Co network
- To ensure maximum network security it will not be possible for customers to connect directly to the fibre in the end user's premises

Seeking Comment

- What are the key security features that RSPs and other stakeholders want from the NBN Co network?

Traffic Management & Prioritisation: 4 Classes of Service Proposed

'Best effort'

- No performance guarantees
- Suitable for high speed internet.
- The lowest priority traffic and anticipated to carry high volumes of data with varying levels of performance according to instantaneous congestion

'Expedited'

- Assurances for the levels of jitter and packet loss
- Suitable for video / VOD, including multicast services
- This class provides a second highest priority of traffic

'Priority'

- Provides a higher level of assurance than the best effort class, with lower probability of delay, jitter and congestion
- Suitable for commercial data services, business grade data services

'Critical'

- Provides guaranteed low levels of delay and jitter
- Suitable for voice and other communicative services. This is the highest priority traffic

Seeking Comment

- We would like to understand the needs and priorities of our customers in this area.

TV and Multicasting Capability

- Video transmission is a high bandwidth product and so will require careful network design.

- Multi-casting reduces the bandwidth requirements for RSPs. It is NBN Co's intention to deliver a multicast capability. The details of multicast implementation are still under consideration.

Seeking Comment

- Should the NBN Co manage multicast signalling scalability on behalf of the access seekers, or would this unacceptably limit the kinds of multicast services that are being contemplated?
- What are the benefits and disadvantages of integrating Pay TV capabilities into the ONT?
- What are the benefits and disadvantages of an RF Overlay approach towards Pay TV versus an IP multicast approach?

Next steps: Listening to our stakeholders

- NBN Co would welcome written submissions on the Consultation Paper. Submissions can be lodged via email on: feedback@nbnco.net.au until 12 February 2010
- We will assess the submissions and undertake targeted consultations with stakeholders
- Operational and network architecture forum planned
- Product specification and offer structure planned to be released in the second quarter of this year
- Cost modelling and pricing structure under development