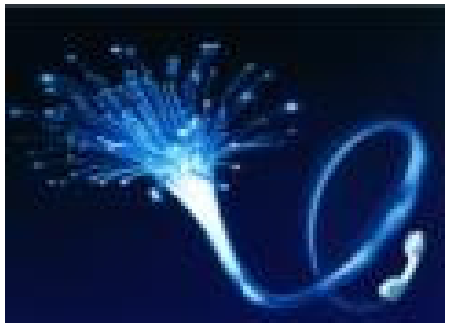



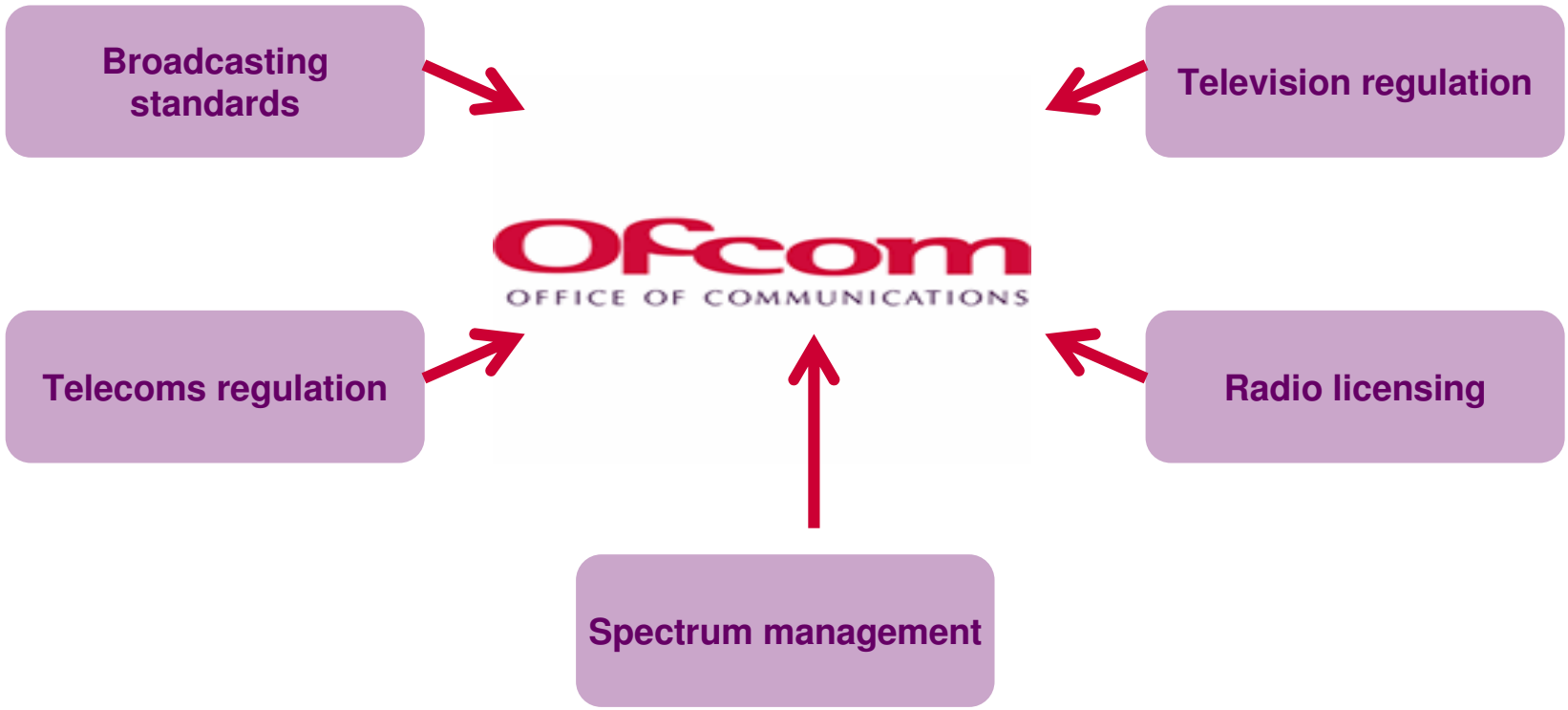
Convergence and NGNs : TAL Regional Seminar

18 February 2008

Vince Affleck, Head of International Telecoms Policy, Ofcom

Contents

Ofcom = converged regulator



Convergence is happening

- **Platform level convergence**
  - Analogue to digital – VOIP
  - Fixed and wireless combinations
- **Service level convergence**
  - TV over broadband
  - Fixed and mobile
- **Device convergence**
  - Single fixed and mobile telephone handsets
  - PCs providing voice as well as internet
  - Mobile TV
- **Industry convergence**
  - Consolidation within / across segments

Previously adjacent markets are competing

terrestrial analogue broadcasting

web streamed and on demand – DSL and fibre

digital satellite, cable, terrestrial

Mobile TV

Wireless increasing in importance: Wide range of different uses of the radio spectrum

Radio

Cellular (2G, 3G)

TV (terrestrial & satellite)

Aeronautical and maritime

Defence & security

Emergency services

Astronomy

Business radio

Satellites

Electronic Communications markets transforming

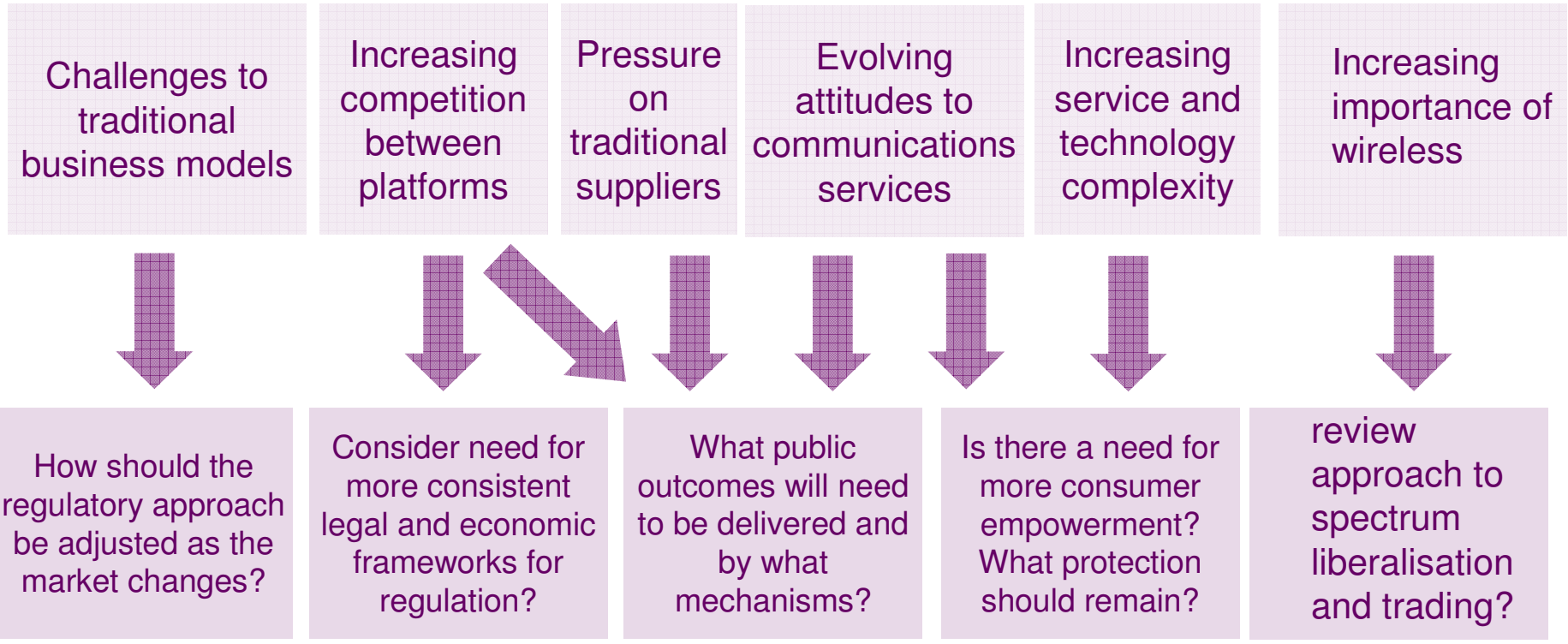
Industry

- Wide range of new entrants from many different industries
- Traditional business models coming under pressure
- Growing importance of content aggregation and navigation
- Convergence of telecommunications and broadcasting industries

Consumer

- Explosion in choice
- Fragmenting consumption
- Greater control and convenience
- Content suppliers as well as consumers

Questions prompted by new generation of telecomms/ ICTs



Convergence : Questions

- **Platform and service substitution**

  - **Different approaches across platforms**
  - **Platform specific interventions used to deliver social outcomes**
  - **Challenges in customer migration and potential for consumer confusion**

- **Changes in business models**

  - **Need to balance ensuring incentives for efficient investment with protecting consumers/ competition**
  - **New sources of market power may emerge, associated with convergence**
  - **Trend towards globalisation of service provision requires an international perspective**

Convergence: Future policy challenges

- Definitions of public service broadcasting, business and funding models come under competitive pressure as convergence increases.
- Universal service obligations currently apply to narrowband, fixed telephony – need to reconsider?
- Extend ‘broadcast-type’ regulation to other media – eg Video on Demand
- Economic regulation of platforms will change as inter-platform competition increases

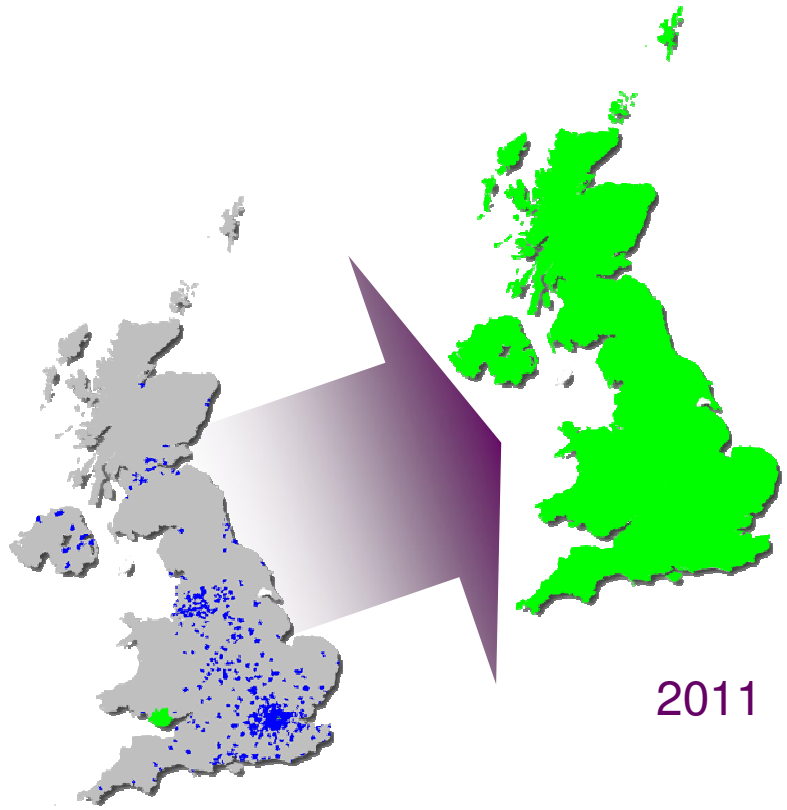
Contents

Globally, operators are undertaking next generation upgrades in both the access and the core, but for different reasons

- **NGA**
- **New revenue opportunities from higher bandwidth services e.g. IPTV or average revenue per customer premiums**
- **Cost savings: exchange building removal, network operation and maintenance costs**
- **NGN**
- **Reduced total network cost (capex and opex), combined with increased traffic, may lead to reduced unit costs**
- **Economies of scale from new network design benefiting larger CPs**
- **Economics of scope as multiple services delivered over a single network**
- **Increased network efficiency**

UK NGN Investment

- BT planning to invest £10billion ($20 billion) in development of Next Generation Core Network: 21CN



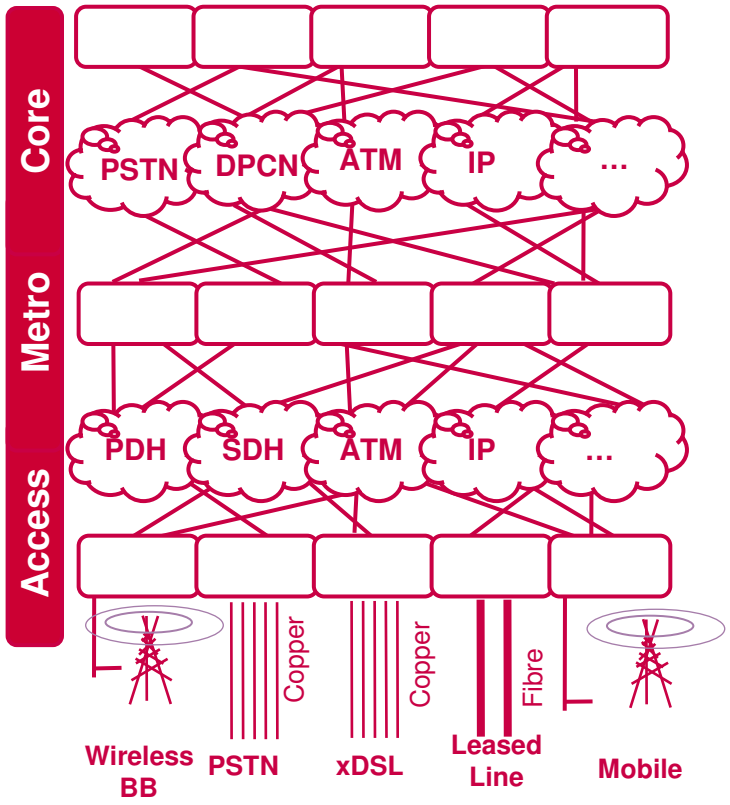
Customer migration to BT's NGN, 21CN

Broadband **PSTN** **Both**

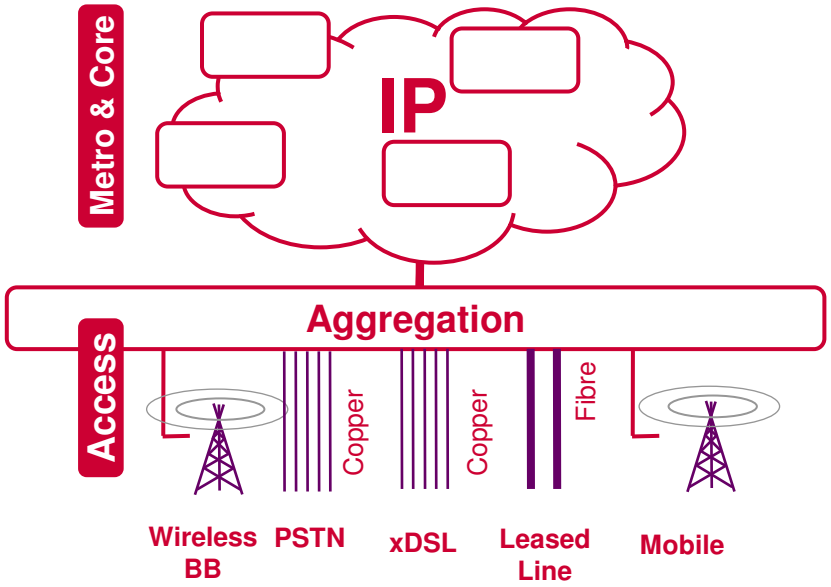
BT NGN Features

- Important features of BT's NGN network are:
  - Single IP-based core network handling an operator's full range of telecoms services, whether fixed or mobile
  - Support for multiple access network technologies
  - Seamless interworking with legacy networks
  - Distributed rather than centralised switching, routing and network intelligence

Today's Telecom Networks

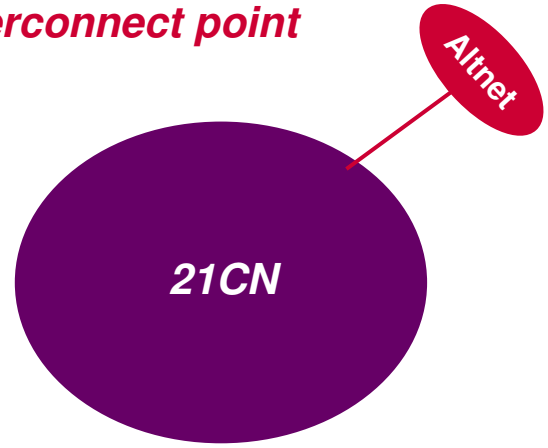


Next Generation Networks

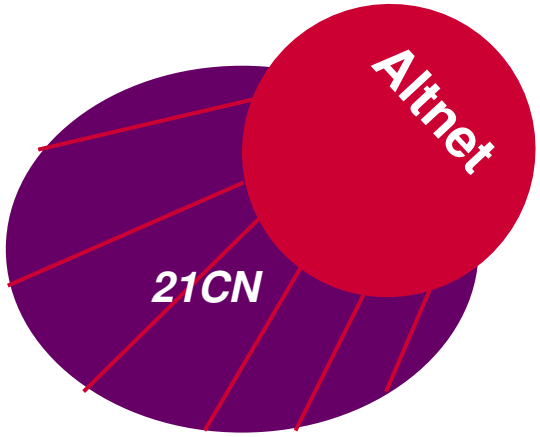


There are a number of scenarios on how upgrades may affect competition, both for core NGNs…

One interconnect point



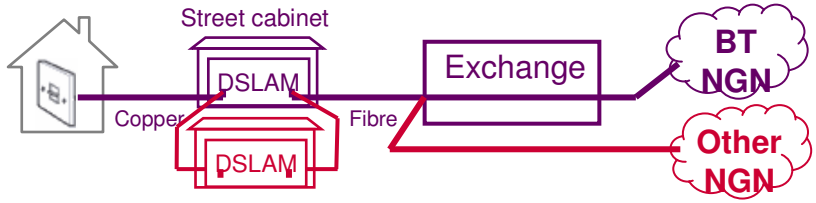
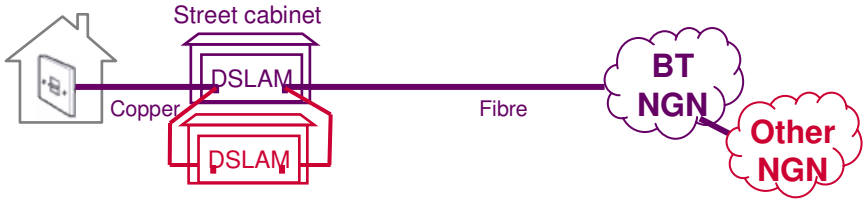
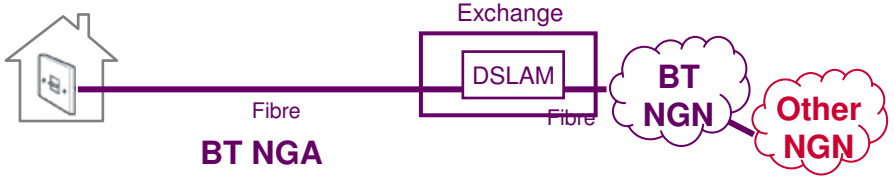
Many interconnect points



- In NGN, we may see one 'efficient' core network with few interconnect points and therefore little infrastructure competition
- Or significant competitive build-out to interconnect at many different points.
- Outcome will be determined by number of interconnect points, transit charging and the interconnect product
- The level of interconnect (application, control, transport) may also determine the level of innovation
- Currently, NGNuk is discussing having about 25 interconnect points, compared with about120 for PSTN voice

… and for NGA upgrades

In NGA, the level and location of competition will be highly dependent on the technology choices made by BT

Scenario	Implications
FTTC: Local access remains a BT owned bottleneck 	• With fibre-to-the-cabinet (FTTC), we may see LLU exchange based 'island of investment' move to the cabinet • It remains uncertain what the economics of sub-loop unbundling look like… • … as is the question of whether the market distortion (static cost) from promoting competition at this level is acceptable
FTTC: exchange removal 	• Removing the exchanges creates additional cost saving for incumbents • This removes the option for competitors to site equipment here or use the exchange as a point of presence • Interconnection therefore could occur deeper in the network
FTTH: No local access infrastructure competition 	• With some fibre-to-the-home (FTTH) technologies it may be no access infrastructure competition can be supported • In this scenario, the only option may be to promote competition using a bitstream product • This product may be more configurable than current bitstream to allow greater innovation by service providers

BT Group Other CP

Ofcom currently promotes competition though a range of mechanisms, focussing on infrastructure competition

ACCESS

- Ofcom considers that local loop unbundling is the deepest level of sustainable / effective infrastructure based competition
- Ofcom maintains a margin between IP Stream and LLU to ensure the viability of LLU
- But we recognise it is not viable in smaller exchanges

CORE

- We require interconnect to enable competitors to use BT infrastructure where it makes sense
- And their own where it is cheaper to do so (the build/buy decision)
- By setting prices based on average cost we encourage CPs to build out their own infrastructure in high density areas

- In both cases we encourage infrastructure based competition (as opposed to bitstream):
  - More innovation
  - Competitive pressure over more of the value chain
  - Better outcomes for consumer

In a next generation world, the inherent value of infrastructure competition may change…

- Ofcom assesses the trade off between:
  - Dynamic consumer benefits arising from infrastructure competition
  - Static costs of market distortion (fragmentation) arising from promoting competition

- Because next generation networks separate the control layer from the transmission layer, it may be possible to innovate more with service-based competition

- At the same time, the economics of next generation networks will change – and could increase – the static costs of promoting competition through duplicated infrastructure

- We are currently considering examples of innovations that may be possible or not at different points in the network

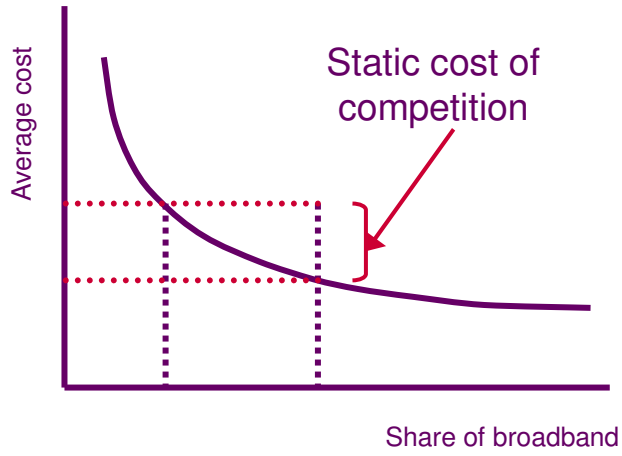
Example Local Loop Unbundling (LLU):

Costs of infrastructure competition

- Duplicated investment and fragmentation
- Regulatory distortion of managing IPStream LLU margin causing end prices to be higher
- Additional cost of requiring Equivalence of Input

Benefits

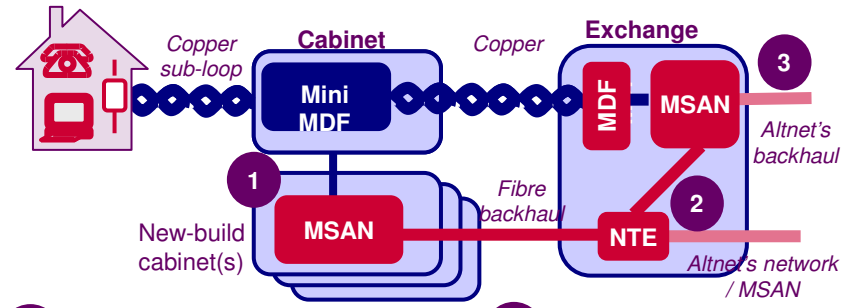
- Innovation – for example LLU operators:
  - entered the market with faster transmission speeds than BT
  - could offer different contention ratios, traffic shaping policies
- Strong price competition



… as could the point at which it can be supported

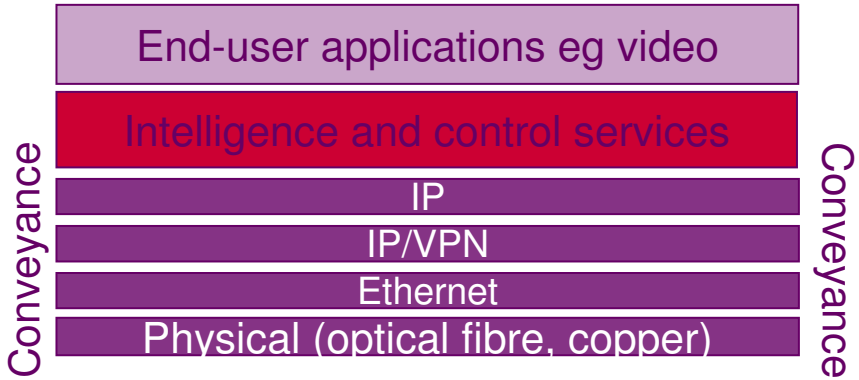
- Ofcom strategy is based on promoting infrastructure competition at the deepest level that is effective and sustainable
- The location or form of competition may change following next generation upgrades given the technology, economics, or practicality
- Where competition occurs can be thought of in two ways:
  - 'horizontal' – location where competition can be supported e.g. cabinet, local exchange, metro node, core node
  - 'vertical' - layer in the network where competition can be supported e.g. physical media (copper, fibre), Ethernet, IP
- NGNuk is currently debating how many points of interconnection are required for 21CN. For NGA, we are considering the economics of sub-loop unbundling

'Horizontal' locations for NGA



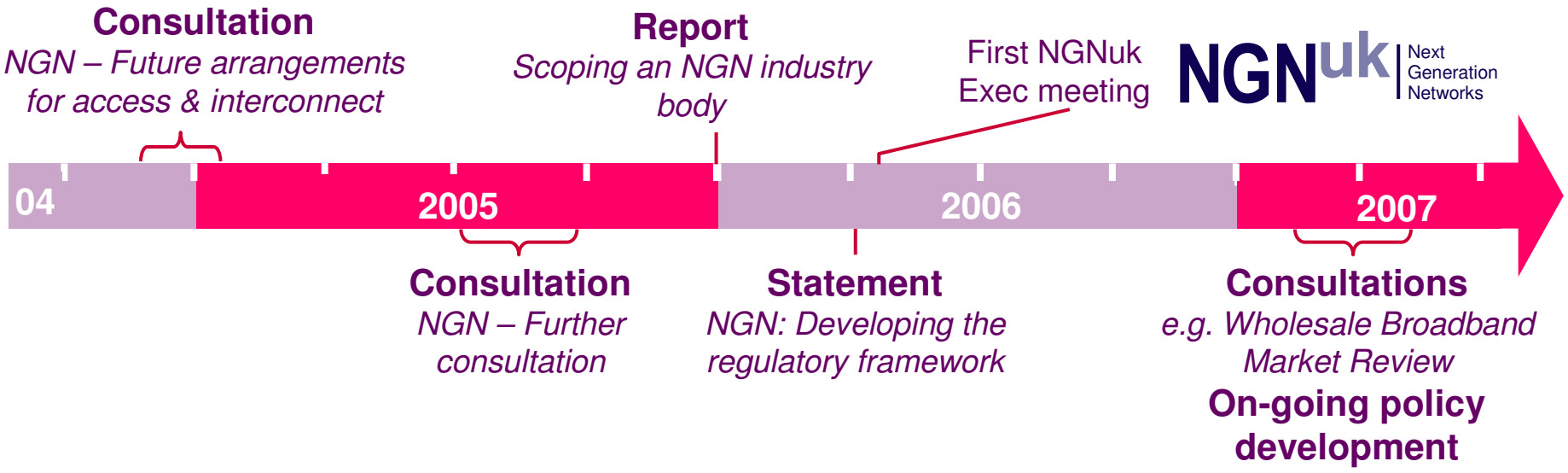
1. Sub-loop unbundling, own electronics owned and located at the cabinet by BTW and altnets
2. Ethernet bitstream product, before MSAN
3. Bitstream product, after BT's MSAN

'Vertical' layers for NGN

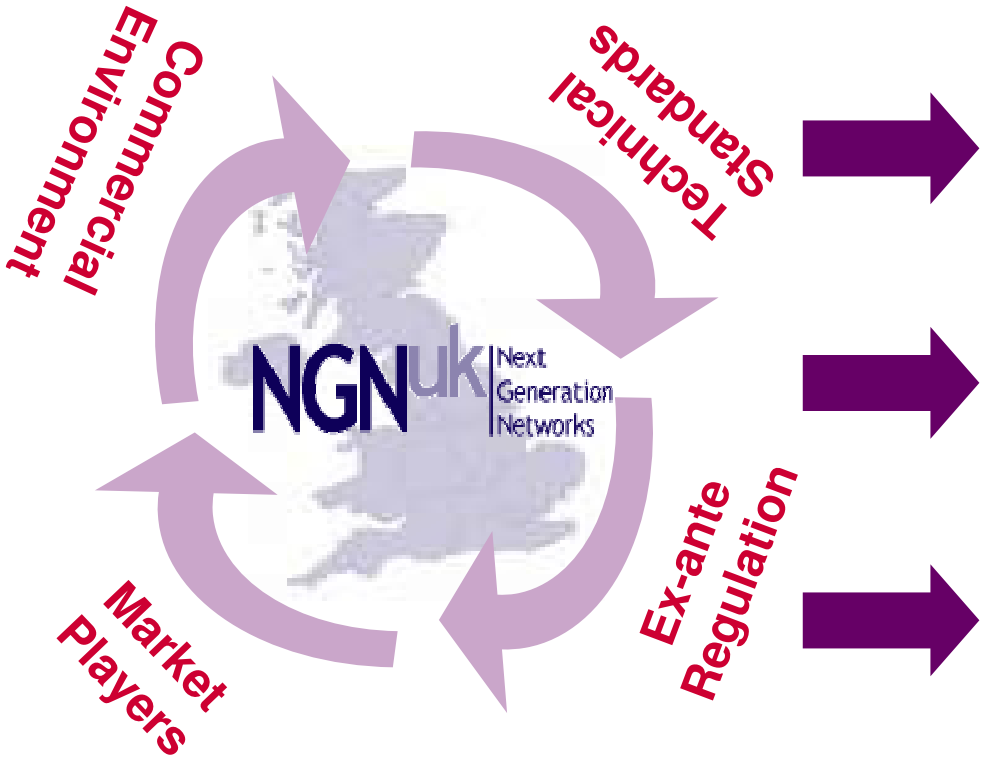


Regulatory impacts of NGNs are many

- With BT's announcement of 21CN, Ofcom recognised it would have profound implications for telecoms industry and beyond
- Much of the current regulatory framework in telecoms is based on technical features of the networks BT owns, most of which will no longer apply
- A number of consultations and statements have been issued, but much of the policy development is necessarily at an early stage, tracking the technology and BT's often changing plans



NGNuk- making NGNs a commercial reality



Priorities and Scope

Reference Architecture for IP Interconnection
- Service characteristics
- Interoperability standards

IP Interconnect Commercial Model
- Commercial principles e.g. distance, grades of service
- Contractual terms and conditions

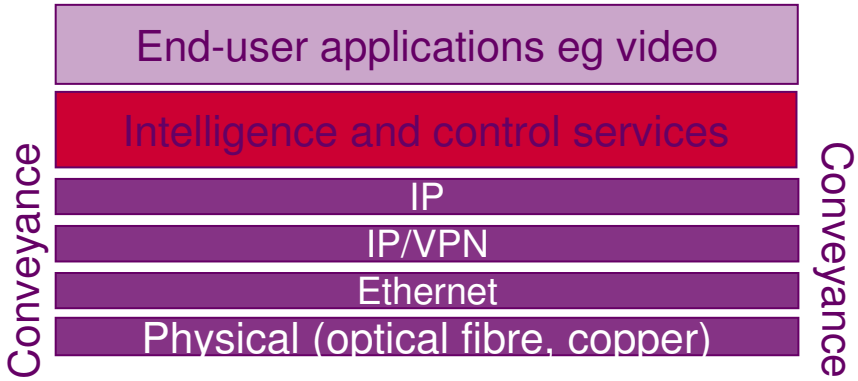
Network Intelligence interoperability
- Defining types of network intelligence
- Commercial basis for exchange
- Technical interoperability

http://www.ngnuk.org.uk/

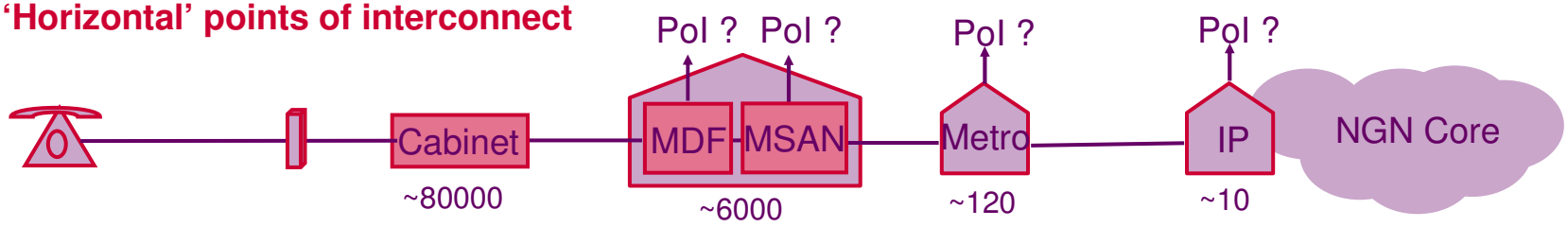
NGN interconnect

- Where competition occurs can be thought of in two ways:
  - 'vertical' - layer in the network where competition can be supported e.g. physical media (copper, fibre), Ethernet, IP
  - 'horizontal' – location where competition can be supported e.g. cabinet, local exchange, metro node, core node
- NGNuk is currently debating how many points of interconnection are required for 21CN.
- The commercial dimension must cover
  - Who pays
  - How much
  - How…

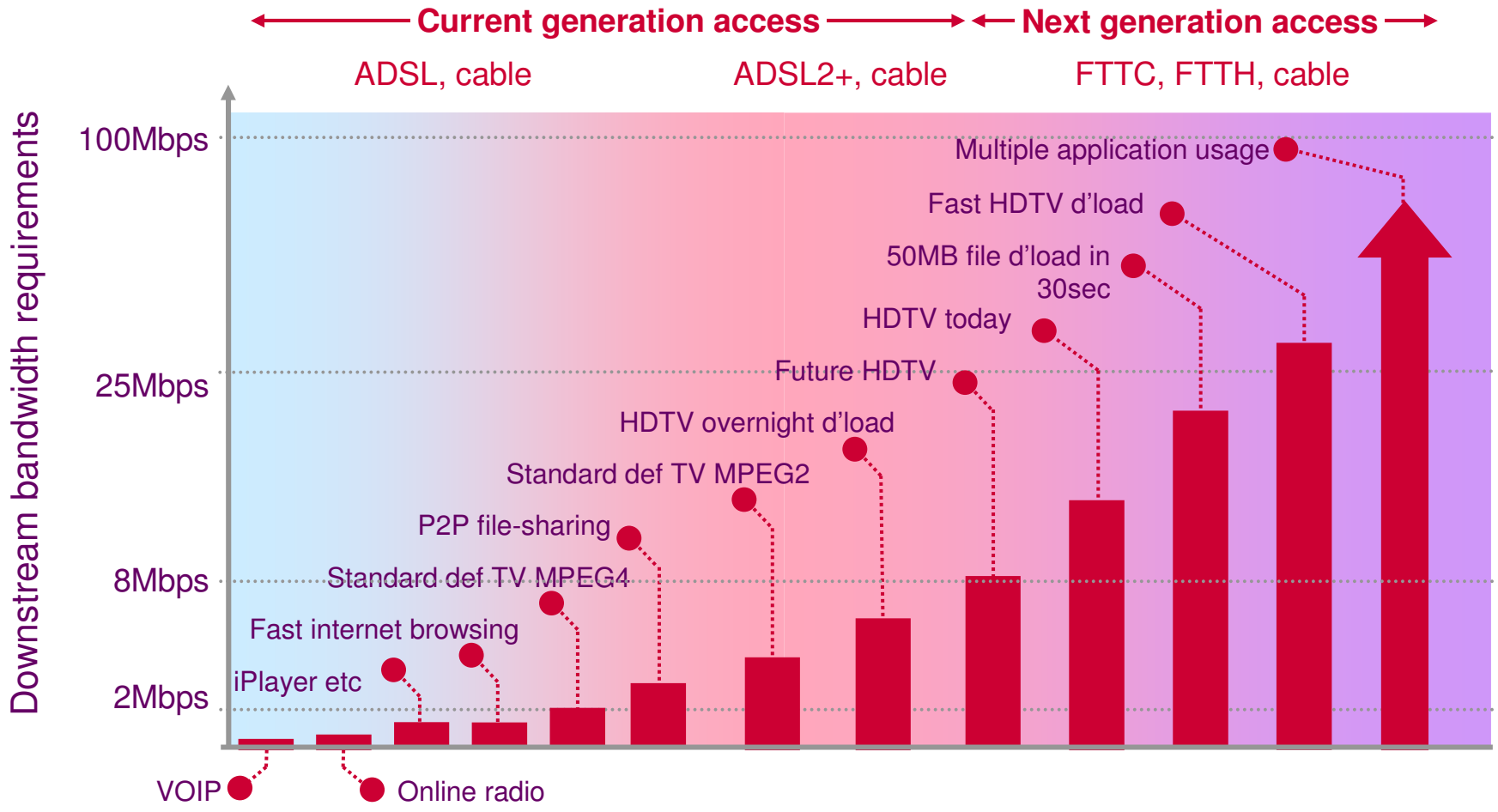
'Vertical' layers of interconnect



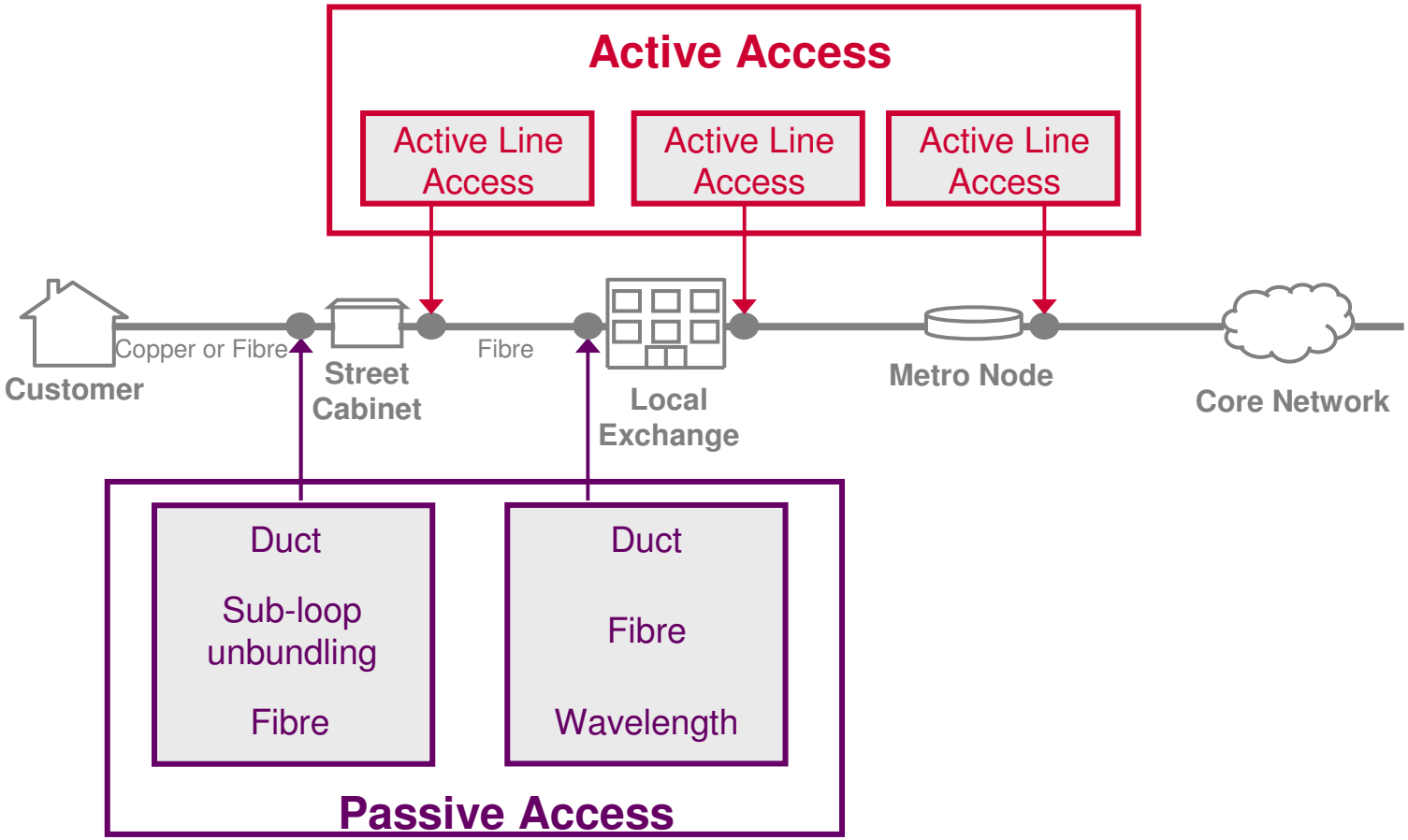
'Horizontal' points of interconnect



There will come a time when existing access networks can no longer meet increasing customer expectations



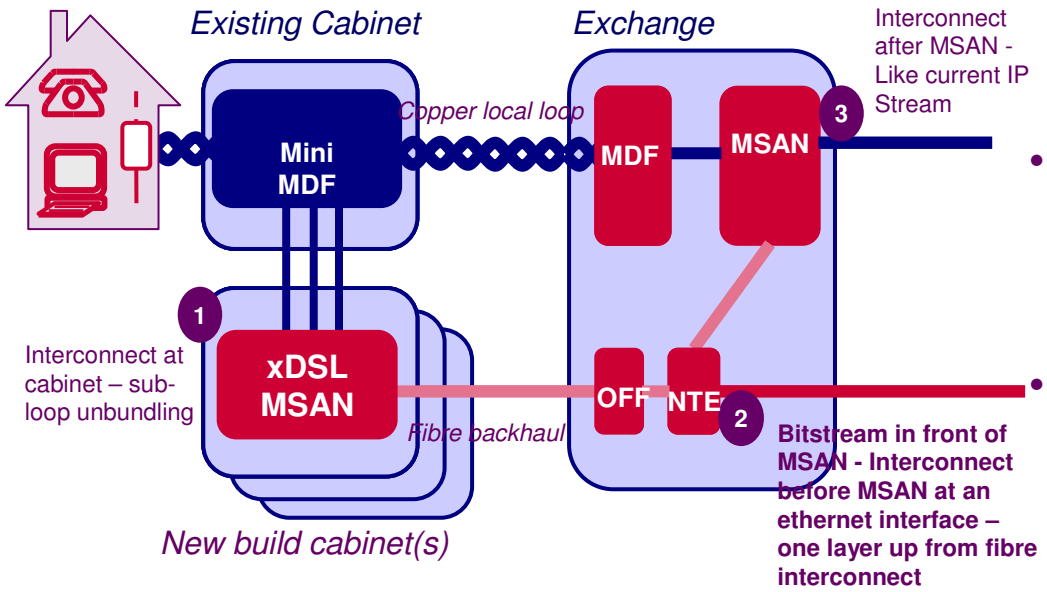
Two points at which to promote competition



With FTTC and exchanges retained, BT is proposing a bitstream product at the exchange, in front of the MSAN

Competition could be supported at several levels

(Numbers indicate possible points of competition)



- BT considers point 2 on the diagram is the deepest point that effective and sustainable competition can be supported for FTTC
- However, this would require all operators to take the same product – a bitstream product – based on BT's choice of electronics
- Greater degrees of innovation and consumer benefit may accrue from allowing third parties to invest in their own sub-loop equipment (point 1)
- The threat of sub-loop unbundling, even if not take up, may also incentivise BT to deploy its own electronics in the sub-loop sooner in order to be first
- We feel it is likely to be inappropriate to remove SLU, but will require a bitstream product in certain geographic areas

Incentives for efficient investment in NGAs

Within the Telecoms Review, the three most relevant principles were:

- *Contestable investments* – to ensure everyone can compete by making their own investments in their own time
- *Optimise the scope for innovation* to maximise consumer and business benefits from these new services; and
- *Require equivalence* where operators with market power must make their network infrastructure available to their competitors on the same basis.

These continue to be appropriate, plus two new principles specific to next generation access

- *Reflect investment risk in regulated access terms* to ensure investment is not disincentivised
- *Provide regulatory clarity* to allow investors to make fully informed decisions

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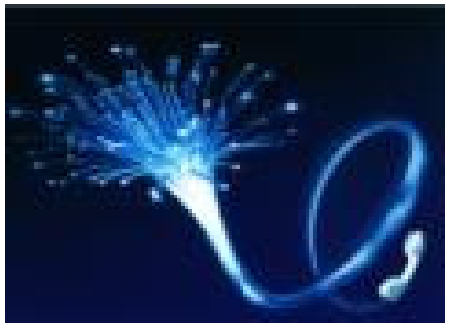

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