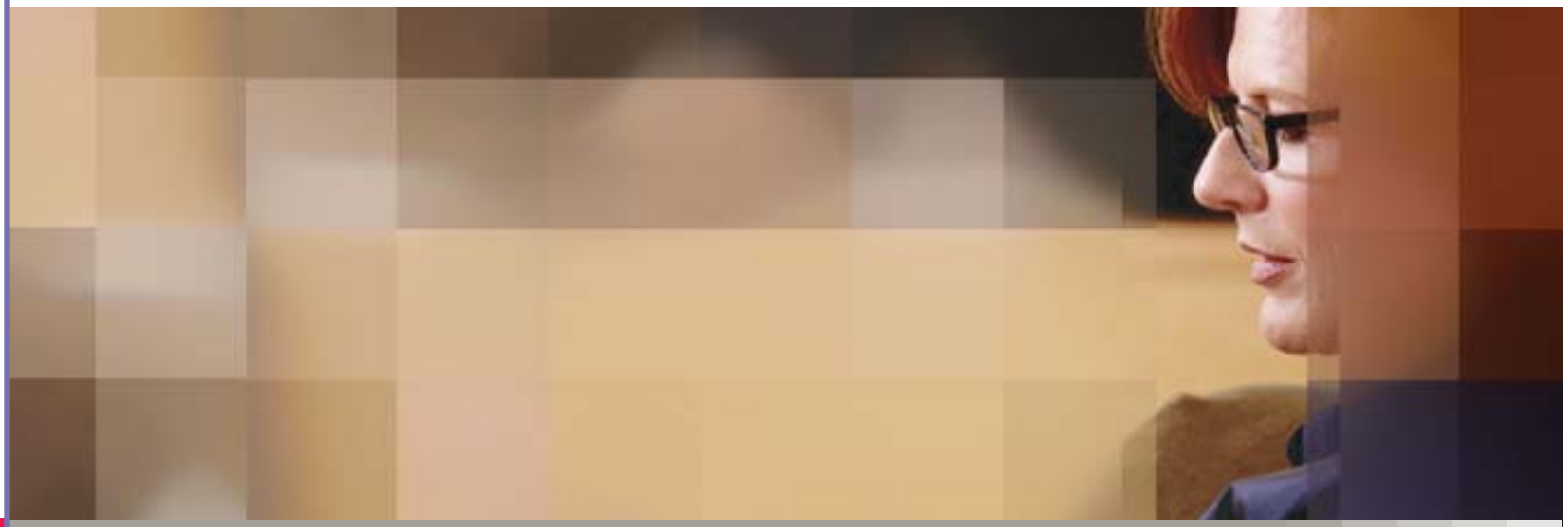


# Understanding key trends in NGN deployment

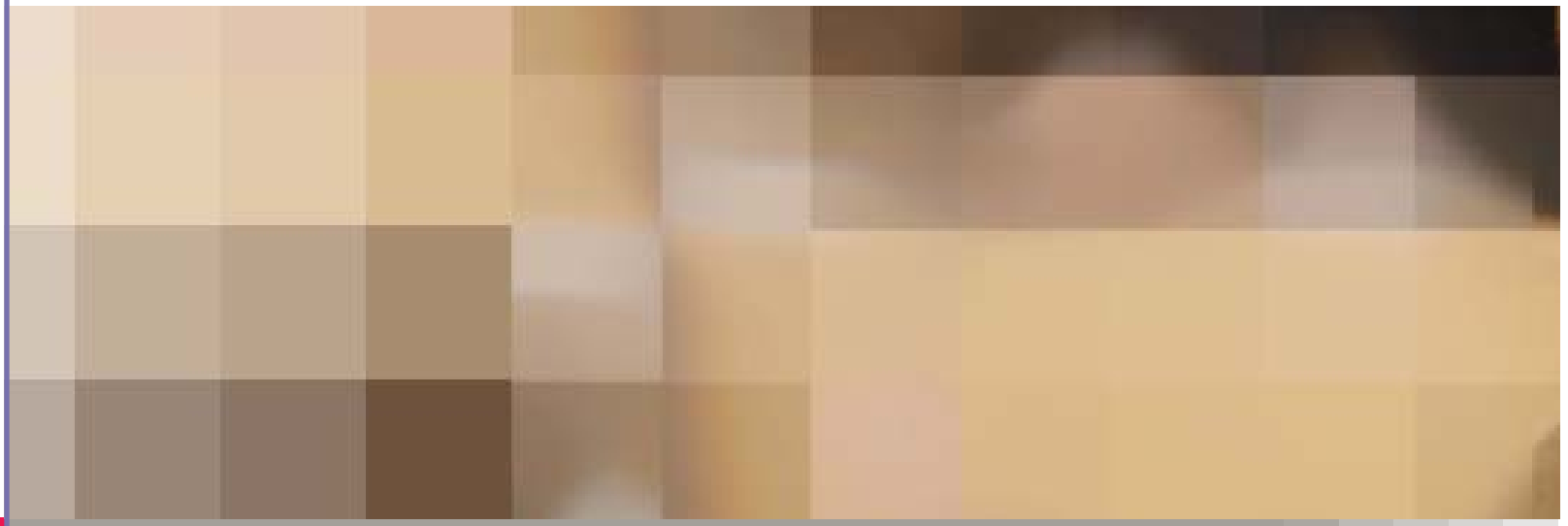
**David Rogerson**

*Director, Telecom Policy & Regulation Practice, Ovum*

**Dublin, 8 March 2007**

# Agenda

- NGN definition and overview
- Business drivers for implementing NGNs
- Strategies being adopted internationally
- Challenges in the implementation
- Conclusions



# NGN definition and overview

# NGN definition

***There is no single, established, authoritative definition of Next Generation Networks - but there is a lot of coherence around key characteristics***

- NGN definitions refer to core, access and/or services:
  - **Core:** core IP network and is characterised by replacement of legacy transmission and switching equipment with IP technology in the core, or backbone network. Involves changing telephony switches and installing routers and VoIP equipment.
  - **Access:** Access technology (Fibre, copper or wireless) and its deployment in the local loop. Typically characterised by higher bandwidth and greater symmetry.
  - **Services:** Service delivery in a NGN environment. These have often already been implemented over existing networks, eg VoIP and converged voice/video/internet/mobile products.

# NGNs – a working definition

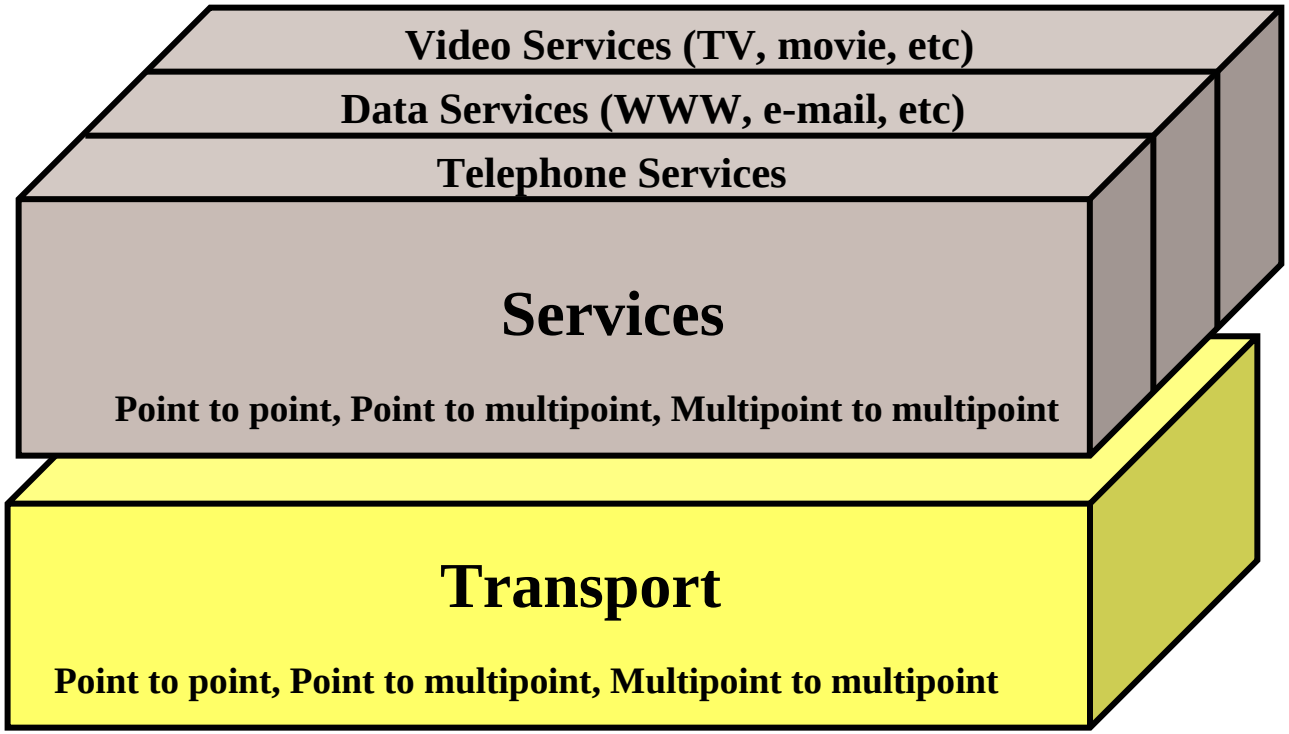
A Next Generation Network (NGN) is:

- a packet-based network able to provide services including Telecommunication Services,
- able to make use of multiple broadband, QoS-enabled transport technologies,
- in which service-related functions are independent from underlying transport-related technologies.
- offers unrestricted access by users to different service providers.
- supports generalised mobility which will allow consistent and ubiquitous provision of services to users.

Source: ITU (http://www.itu.int/ITU-T/studygroups/com13/ngn2004/working_definition.html)

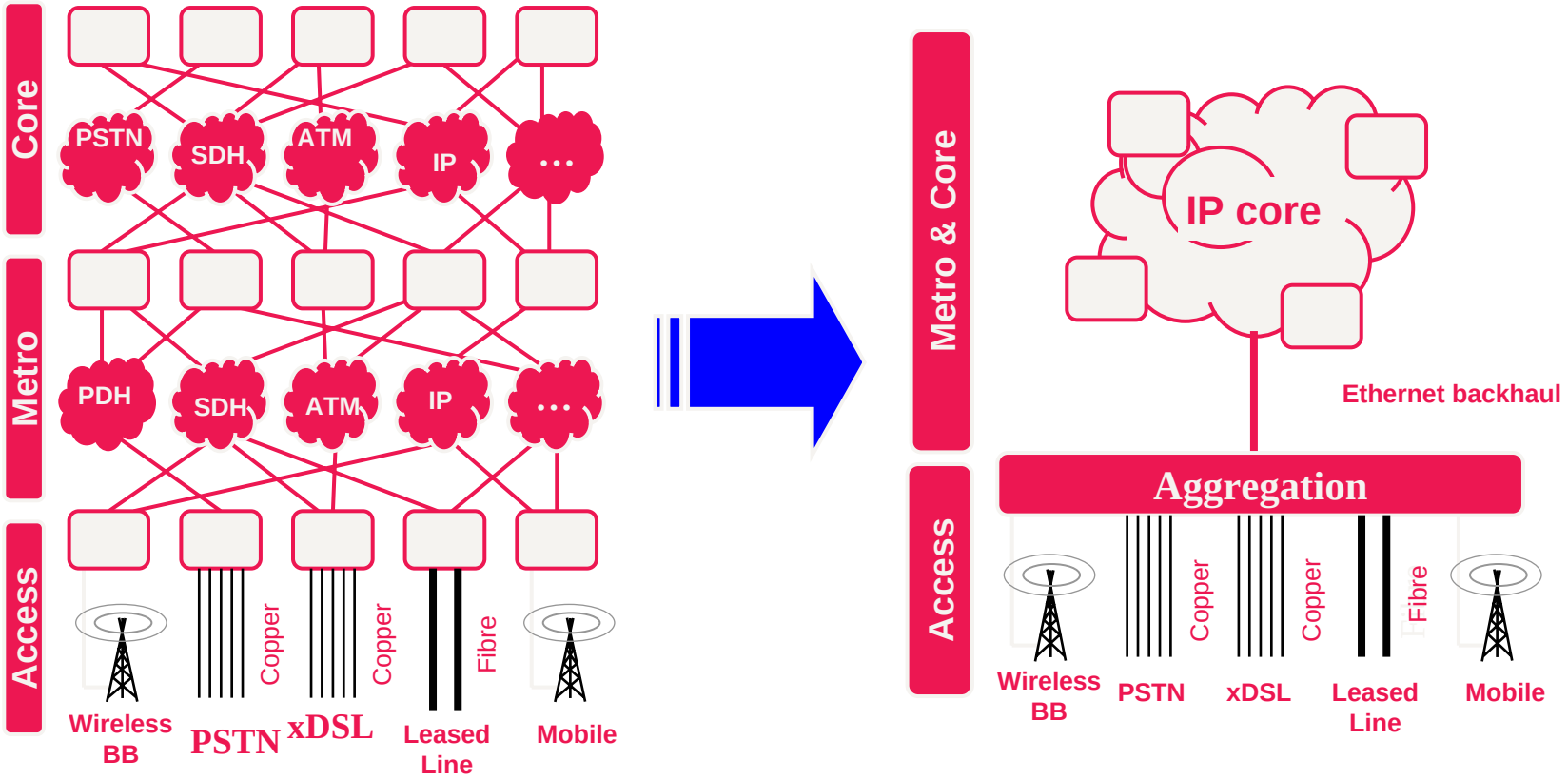
# NGN is predicated on:

….service-related functions are independent from underlying transport-related technologies

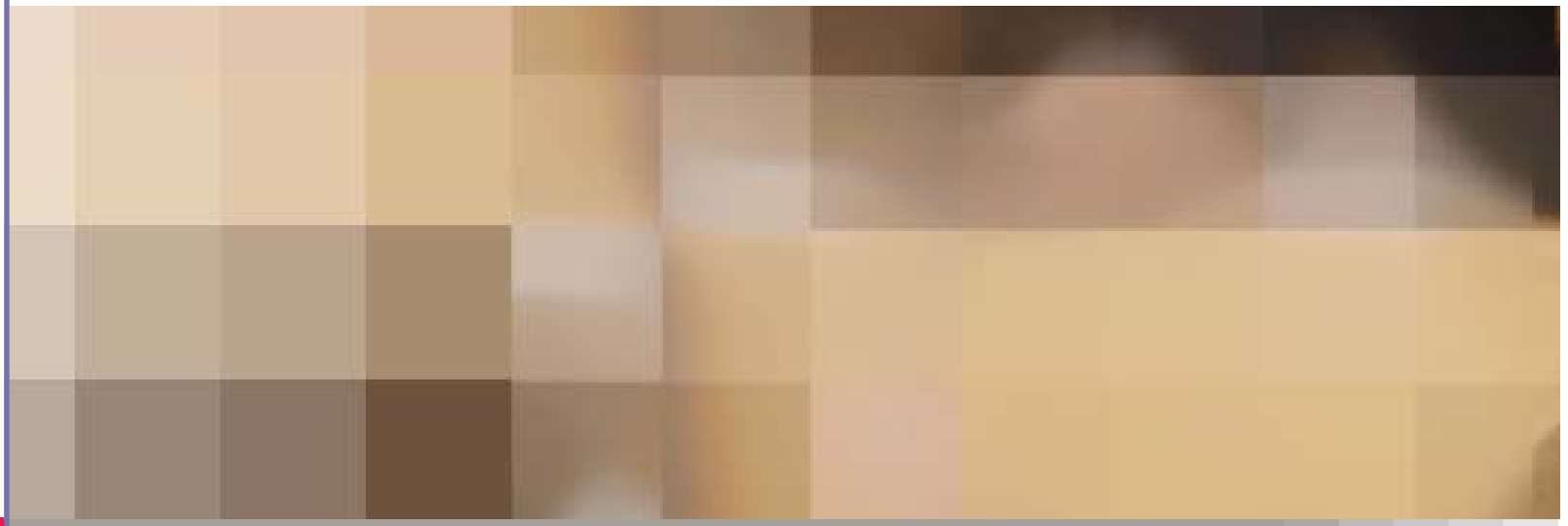



Source: ITU, NGN and Emerging Markets - Investment, Infrastructure and Innovation

# The migration from circuit switched networks to NGN




**Source: Ofcom**



# Business drivers for implementing NGNs

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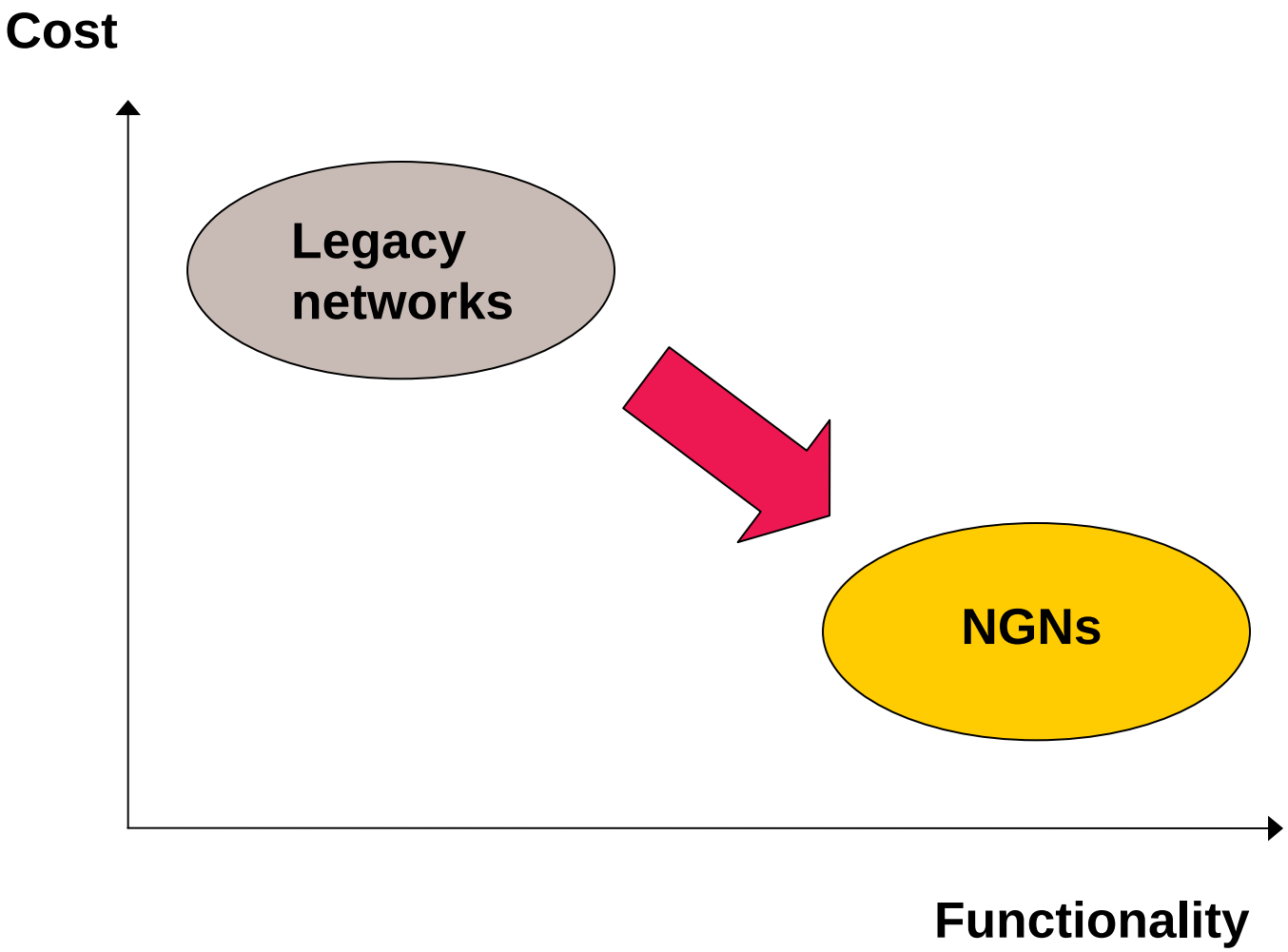
# Key features of NGNs

- Multi-service access node (MSAN) – economies of scale and scope compared with circuit switched networks
- Application level network support – increased flexibility as services not embedded in the infrastructure;
- Easier integration of new applications - common interfaces and simpler architecture
- Network design/configuration becomes easier to manage - simpler and therefore less costly to manage
- Network reach becomes ubiquitous - IP reduces complexity and becomes the basis for all service offerings
- Fewer physical assets and resources required - web-based, online tools for control and monitoring

# NGN service benefits

- Services will include those currently available but with improved functionality and quality, and also more cheaply
- New services can be developed and rapidly deployed at incremental cost. The market will determine the combination of features required in these yet-to-be designed services
- New service development can be undertaken by third parties independently of the transport network - distributed innovation
- NGN will enhance ability to provide triple-play
  - From discounting (bundling) to proper service integration
  - Triple play can be delivered using legacy networks but delivery using NGN improves performance at lower cost.

# Price-performance improvements



# Drivers for NGN

## Imperatives

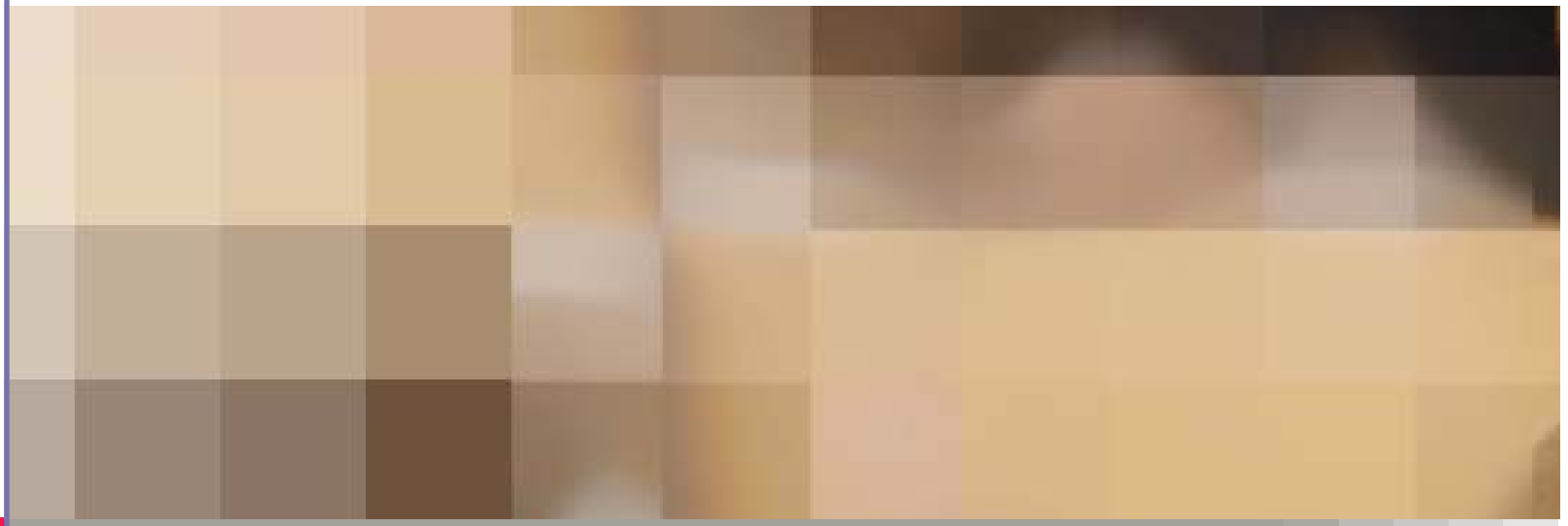
- Cost reduction - delivering services over a single network allows greater economies of scale and scope
- Ongoing network replacement cycle
- FMS - driving traffic away from fixed networks. Fixed operators have to react.

## Opportunities

- Revenue creation and new revenue structures offered by new services
- Reducing (or addressing) competition, regaining lost customers
- Faster time to market

# Different drivers for core and access

- Core network:
  - Cost savings through greater efficiencies - fewer nodes and simpler structures
  - Increased revenues are not the main consideration
  - Continuity of existing services is key
  - Investment risks: implementation, suppliers
- Access network
  - Can support multiple access networks with a common core network
  - Rationalisation of access networks is possible through high capacity (fibre) transmission
  - Providing faster speeds, enabling richer content services
  - Triple/Quadruple play
  - Investment risk: demand and willingness to pay

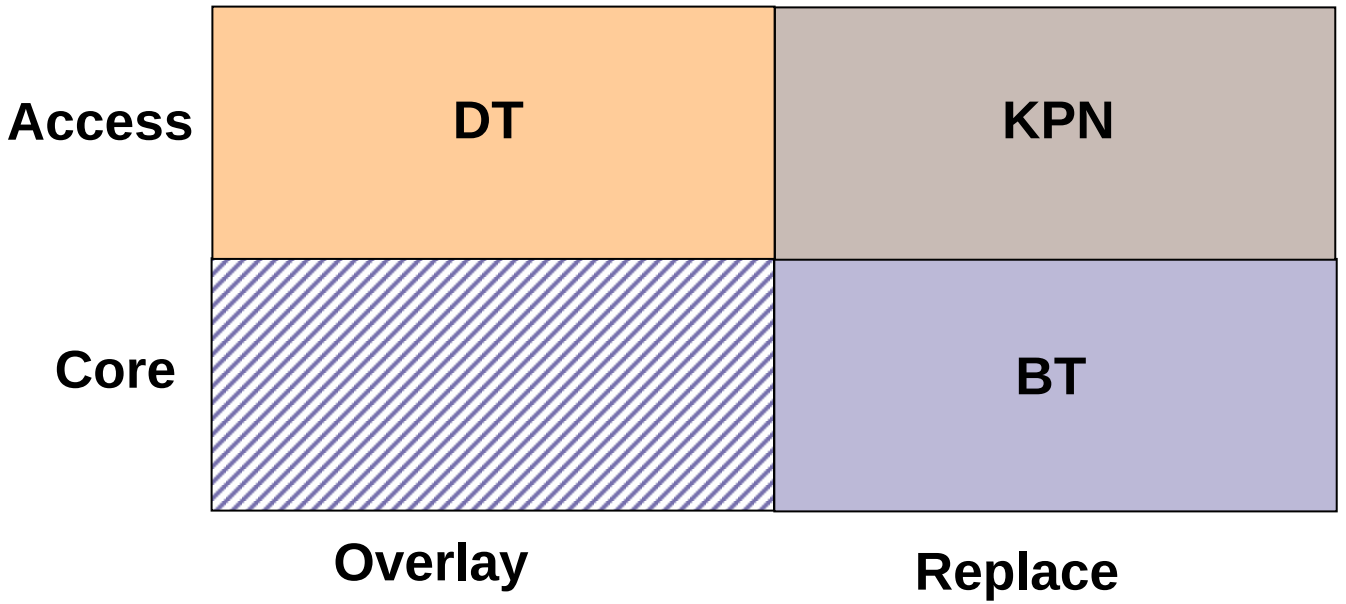


# Strategies being adopted internationally

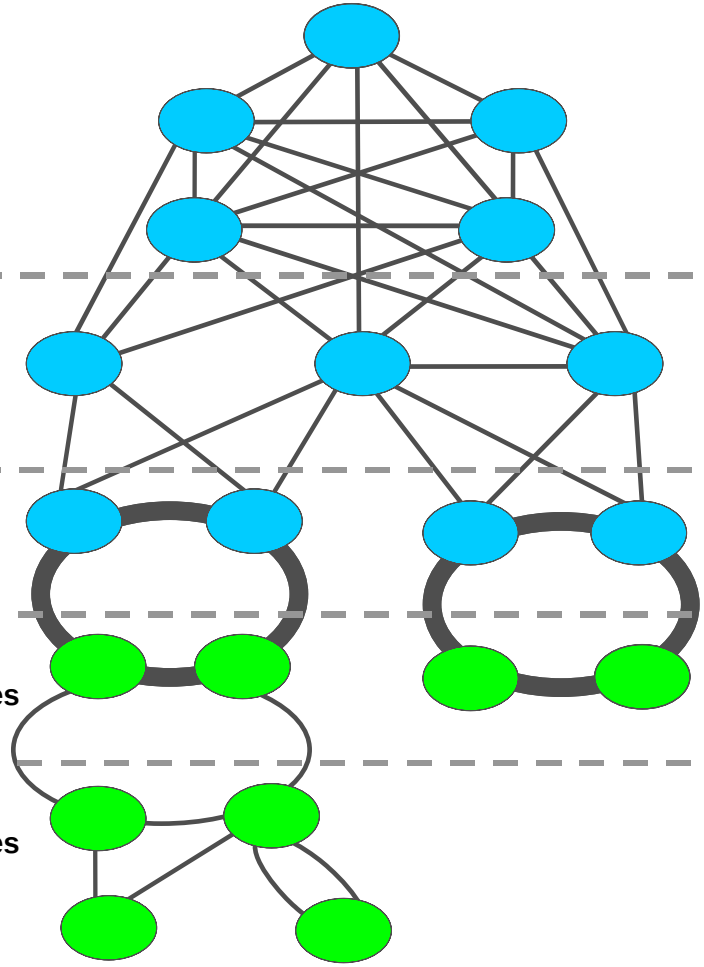
# NGN migration strategies

- Operators will follow different strategies, depending on resource and market factors, write-off of current network assets, the size of the network
- Strategy 1: Rapid deployment of core network NGN
  - Replace core PSTN network as soon as possible.
  - Example: BT expects 50% PSTN migration in 2007.
- Strategy 2: Rapid deployment of all-IP network.
  - Replace copper access with fibre as soon and as widely as possible.
  - Example: KPN
- Strategy 3: Overlay.
  - Keep NGN and PSTN running side-by-side as long as possible.
  - Example: DT plans overlay NGN with PSTN substitution in 2012

# Strategies are dependent on investment priorities



# Core network NGN replacement - BT



**Inner Core Sites**

- Circa 8 sites.
- Fully meshed - 10Gbit/s links
- Transmission layer resilience
- Full service functionality

**Outer Core Sites**

- Circa 12 Sites
- At least triple parented off Inner Core - 10Gbit/s links
- Some sideways links
- Transmission layer resilience
- Full service functionality at most sites

**Metro Sites**

- Circa 86 sites
- Dual-parented off core - 10 & 2.5Gbit/s links
- Resilience via IP MPLS fast re-route

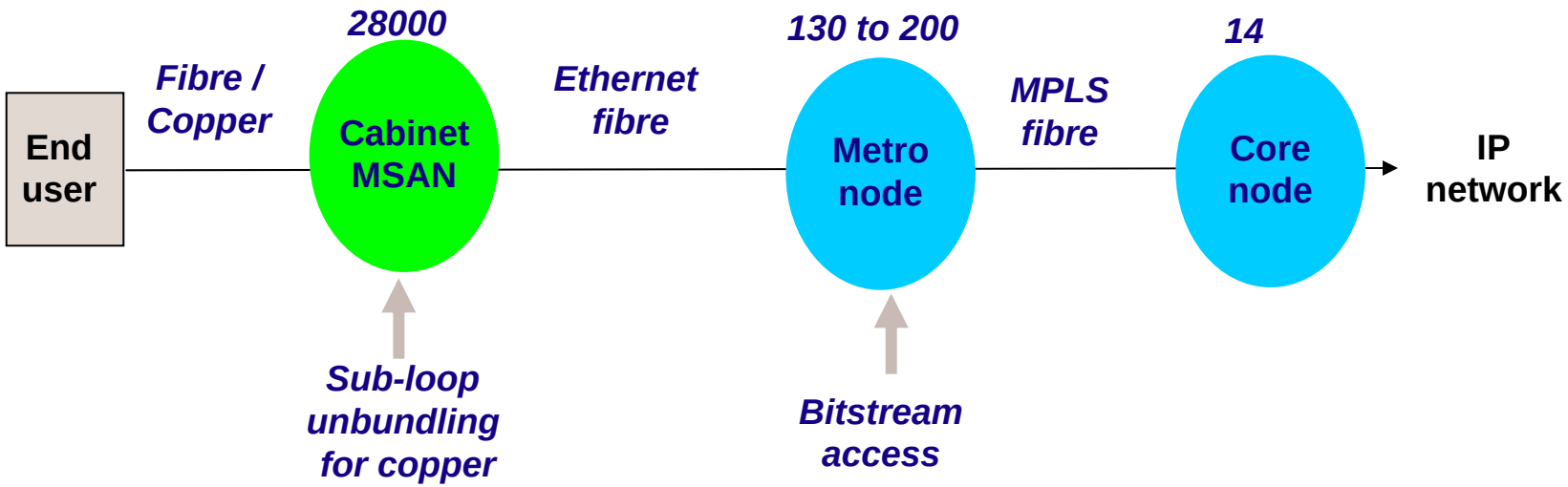
**Tier 1 MSAN Sites**

- Circa 1100 sites
- Ethernet carried directly over high capacity fibre optic links

**Tier 2 MSAN Sites**

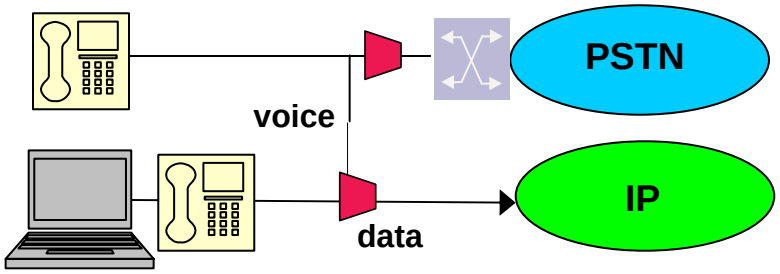
- Circa 4400 sites
- Ethernet carried over GFP/SDH
- Single-parenting is allowed when it is not practical/possible to have dual-homed routes

# Access network replacement - KPN



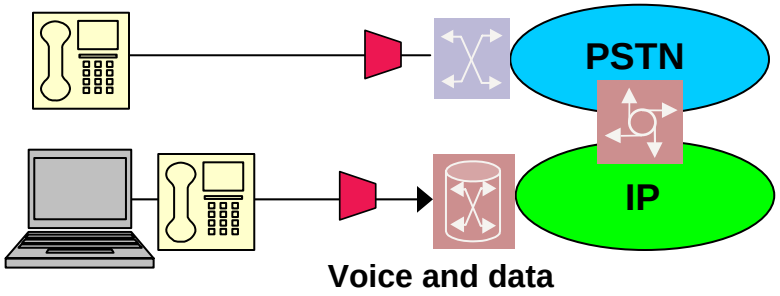

- KPN to roll out all IP network by 2010. NGA for whole of Netherlands. All MDFs to be phased out.
- FTTH where possible; otherwise FTTN using xDSL. New cabinets required.

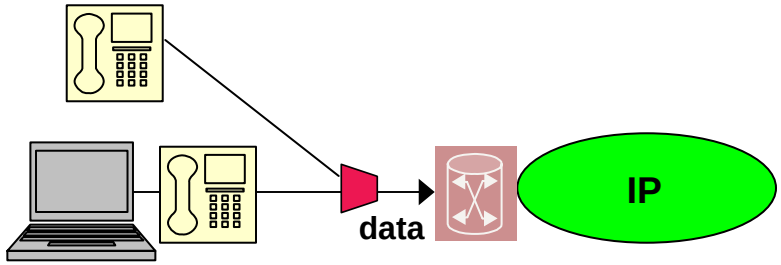
# Access network overlay - DT




**Stage 1: voice traffic split at MSAN and passed to PSTN switch**

**Stage 2: voice and data handled by softswitch in IP network; interworking with PSTN through media gateway.**

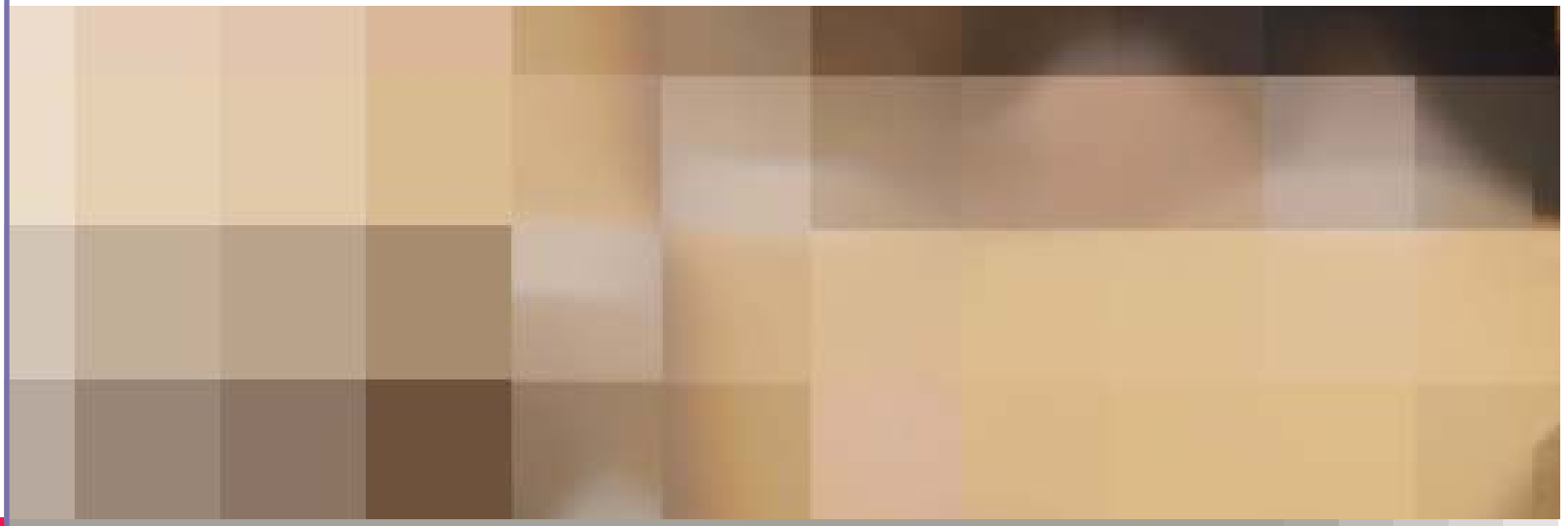



**Stage 3: all voice and data handled by softswitch in IP network with access via MSAN.**

# NGN migration issues to consider

- Cost savings alone will not justify migrating to a voice only next-generation network (NGN)
- The main savings are in on-going opex costs
- Building an NGN will incur higher initial capex costs
- The TDM voice network will not last forever
- Vendors are getting ready to withdraw their old voice switching product lines
- New revenue generation can help the business case
- Broadband is the key enabler for new services



# Implementation challenges

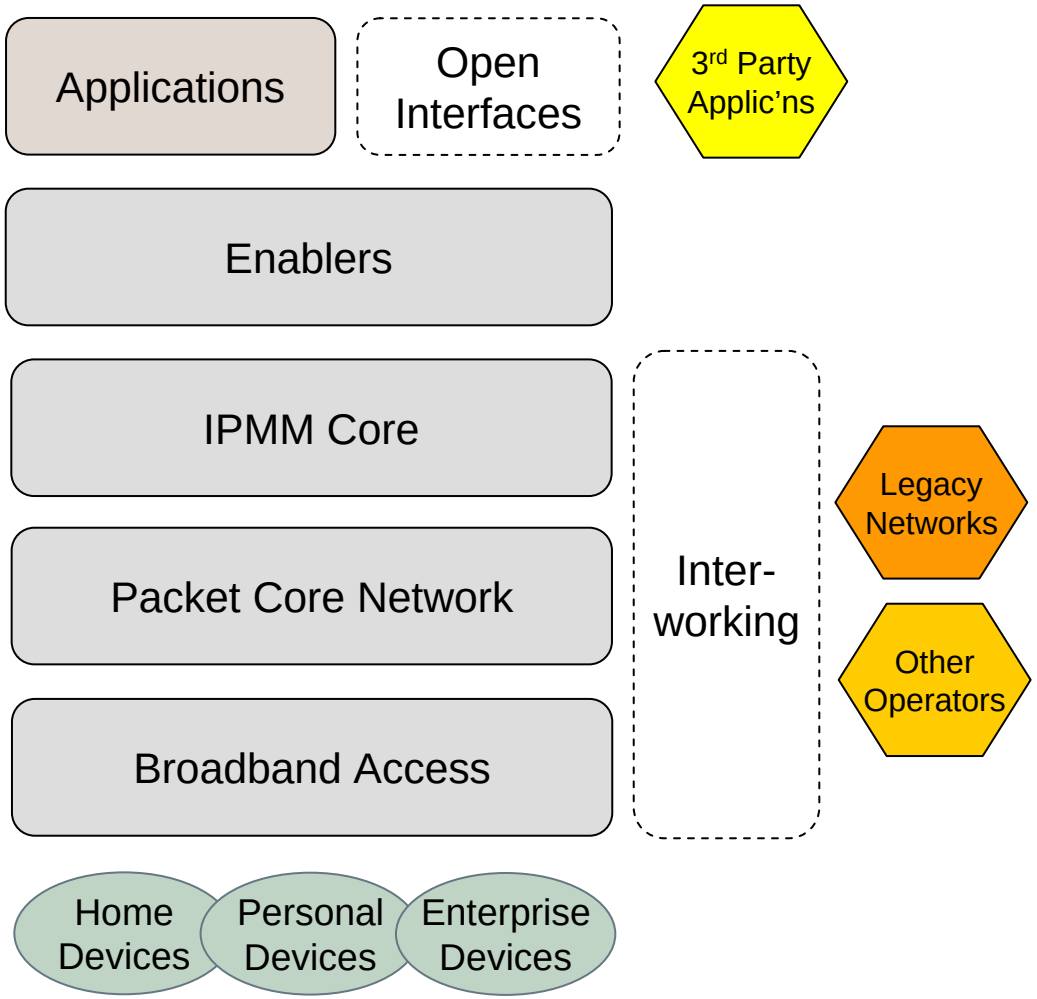
# Technical challenges

## Network performance

- Latency
  - The time taken for a packet to traverse between two points on a network.
- Jitter
  - Variations in latency over time
- Packet loss
  - Traditionally Internet applications were designed to withstand packet loss.
  - Real-time applications, such as VoIP, will notice dropped packets.
- Availability
  - Availability of the network and network elements
  - CPE, computer equipment, local area networks, electrical power supply

# Commercial Challenges

- **Rollout Challenge**
  Some operators going for a phased approach
- **Organisational Challenges**
  Technical capabilities
  Conflicts within marketing and distribution
  Relation with 3rd party content and application providers
- **Business Challenges**
  Migration to new services
  Development of new business models
- **Interconnect and Interworking**
  as NGNs evolve so do decision points for interconnect




This is complex – it is not a simple network upgrade

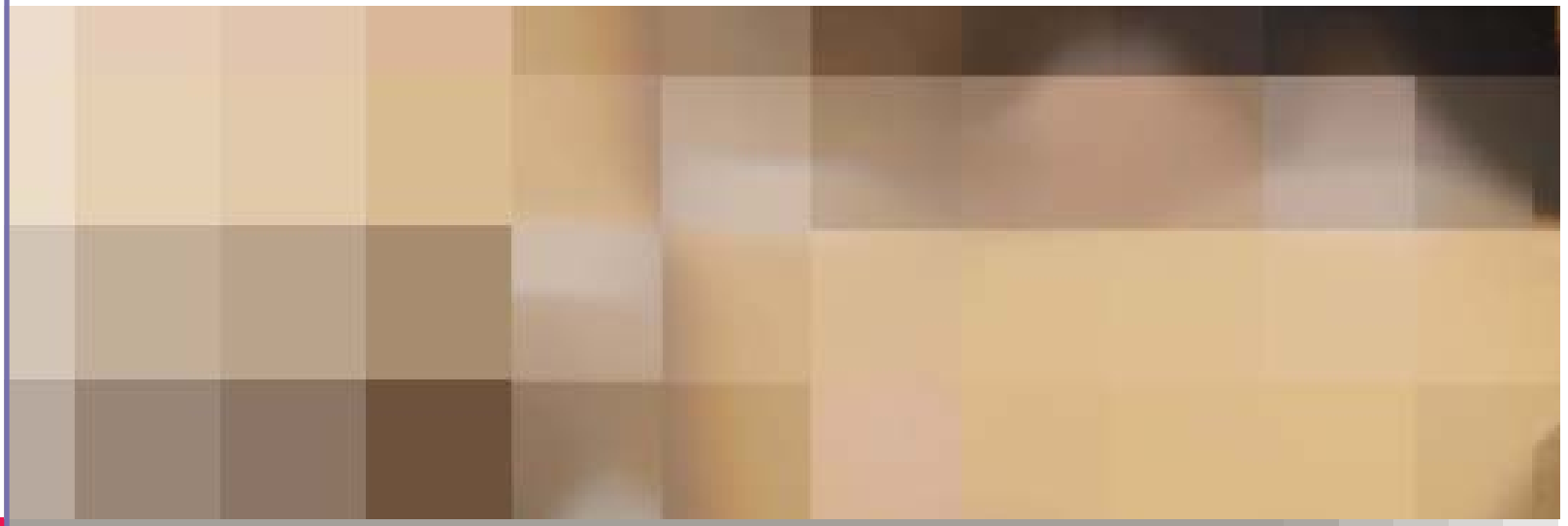
# Regulatory challenges

- Regulating access to the NGN
  - Should encourage innovation and investment, but “regulatory holidays” not acceptable in the EU
- Regulating interconnection charges during NGN migration
  - Network costs may rise in short term as additional capex is incurred but opex improvements not yet experienced
  - But interconnection charges based on LRIC unlikely to rise.
- Regulation of service bundles
  - As triple- and quadruple-play becomes the norm, regulation based on replicability is key to wholesale regulation (e.g. equivalence and margin squeeze tests)

# Other regulatory issues

- Notice periods on changes to network design
- Recompense for other operators' stranded assets
- Interconnection charging structure
- Equivalence of inputs
- Criteria for withdrawal of existing SMP products
- Criteria for regulating NGN SMP products
- QoS and consumer protection issues

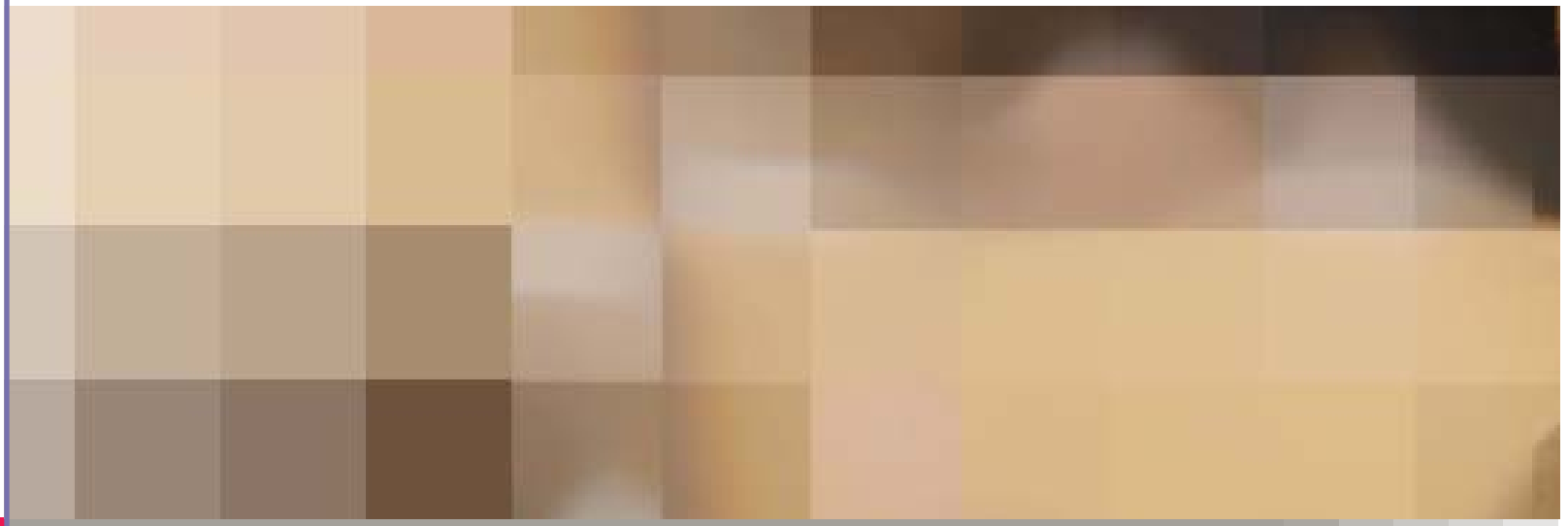
These issues will be dealt with by my colleagues later on, specifically for the Irish market situation.



# Conclusions

# Key impacts of NGN on the industry

- New economies of scale and scope
  - Driven by convergence
- Fewer alternative network infrastructures sustainable
  - Greater industry concentration at the network level
- Lower barriers to new service entry
  - more niche demand can be pursued
  - service providers can expand service menu and coverage
- Regulatory challenges are increased:
  - Competitive supply of infrastructure becomes more precarious
  - Innovation and investment incentives become more critical.



# Thank you



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