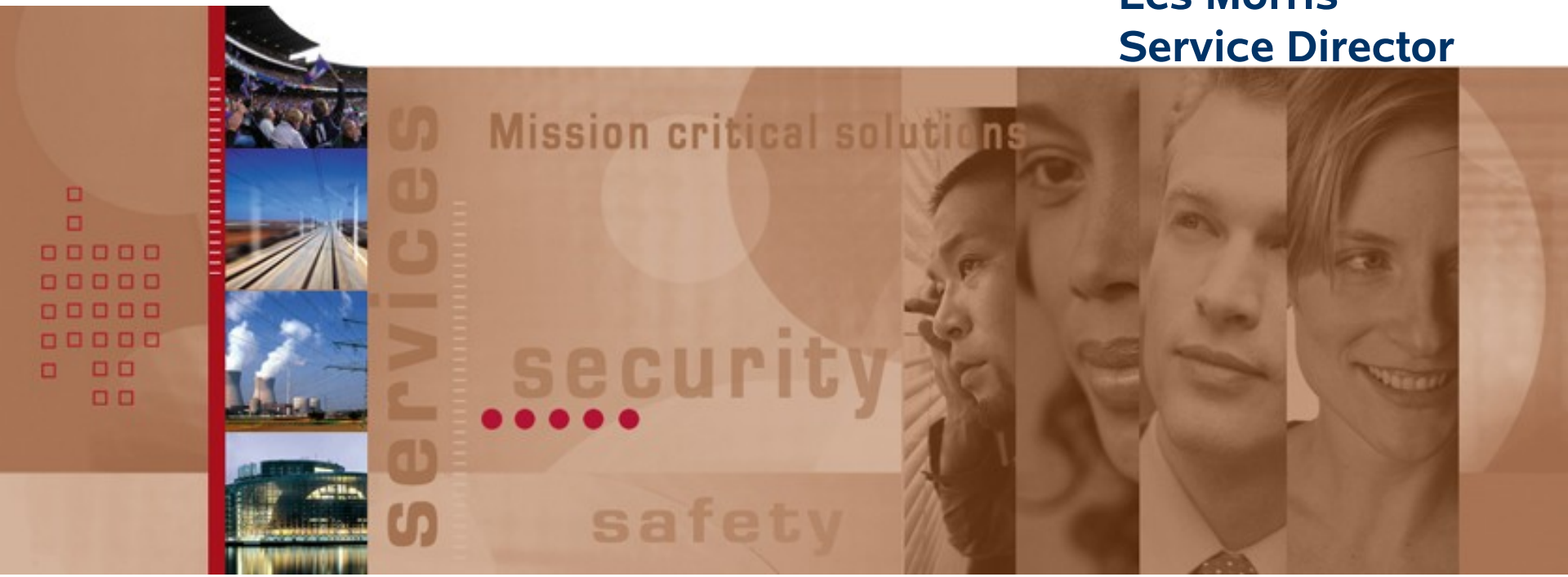
THALES

Les Morris
Service Director



South Yorkshire Digital Region

Supported by Yorkshire Forward The Region's Development Agency

Project Part-Financed by the European Union European Regional Development Fund

Digitally Transforming South Yorkshire www.digitalregion.co.uk

digital region south yorkshire

Security Solutions & Services

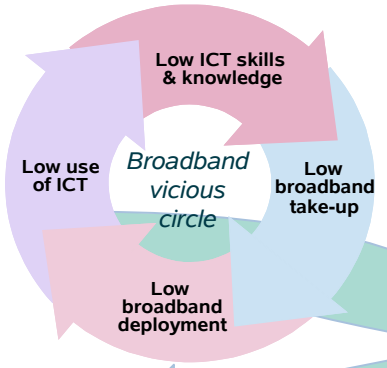
The South Yorkshire Region

Four Council areas

- Sheffield City Council
- Barnsley Metropolitan Council
- Doncaster MBC
- Rotherham MBC

- 1.2 million people
- 500,000 homes
- 40,000 businesses
- National average unemployment
- low value, low skilled jobs
- Politically – majority Labour
- Economically weak by national standards

Strategic reviews
E-Government and Gershon Efficiencies
Flexible learning; Virtual School; Learning Grid; etc.
Sustainable Economic Development; Social Inclusion
Quality of Life: Leisure; Environment



Regional Transformation

Objectives

To establish South Yorkshire as the leading digital region in the EU

To support Economic Development, Social Inclusion and the efficient delivery of public sector services in the region

Provide a next generation broadband network capable of delivering HD TV, TV, Broadband, VoIP, Gaming, VoD, e & t-government, online business services in partnership with Digital Region Ltd

Attracting existing and new service providers, and new services and applications alongside new business models

Establish SYDR as a wholesale provider of services to service providers

Digitally Transforming South Yorkshire in Partnership with Digital Region

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Why Next Generation Broadband?

- Current Generation Broadband is a reasonable endeavours service which is restricted by distance and incapable of offering any sort of agreed service level
  - It is a commodity service that continues to be undermined by claims of higher speeds and lack of delivery
  - The development of real time applications, services, content and solutions are severely restricted by the quality of current generation broadband
  - The internet itself is still largely "text and picture" based due to restrictions on bandwidth – not able to take advantage of virtual environments or new technology
  - Cannot adequately support live TV, Multiple Channels or Virtual environments
- Satellite and Cable offerings also have limitations
- Social Networking is transforming the end user experience putting more pressure on upload speeds

Next Generation Broadband is the future, it has been successfully deployed in other parts of the world but not yet on the scale of South Yorkshire in the EU

South Yorkshire Digital Region-The Future is here

Next Generation Broadband Network

- Carrier Class Network and NOC
- Fibre To The Cabinet (kerb)
- VDSL2+
- Guaranteed Bandwidth
- Quality of Service controls to support real-time applications, business services and traditional broadband services
- Enable multiple CP's to provide service to the same end user
- Reduced barriers to market entry for CP's
  - Single interconnect enables access to 500,000 premises
  - Industry standard B2B O&M interface further reduces barrier to entry
- Wholesale Business model

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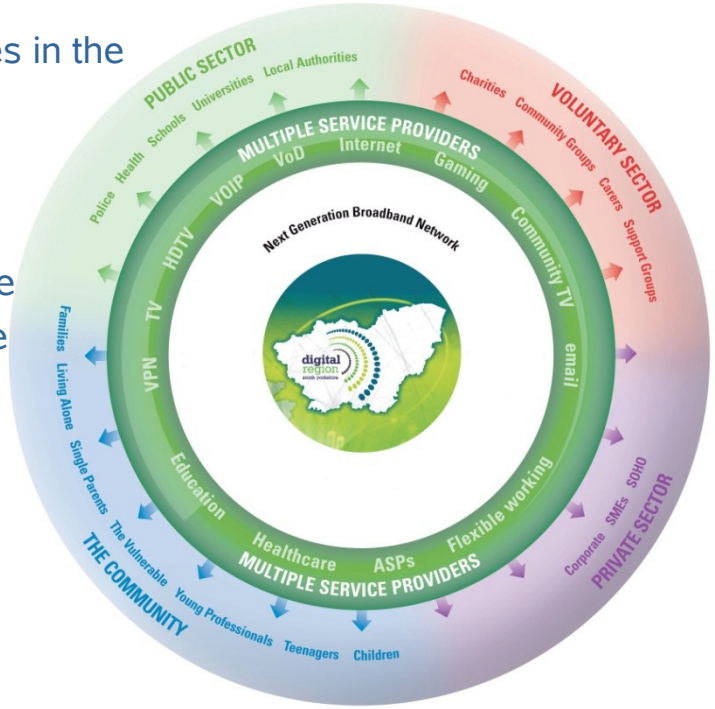
The impact on South Yorkshire

- Economic Development > higher skilled, higher value jobs
  - Pilots and Trials in the region for new products, solutions, applications and services
  - Inward investment by service providers and IT companies
  - Local Businesses developing new business models to exploit the opportunity and export these solutions to other regions across the UK
  - Retail Companies, Banks etc developing new services in the region for export
- Social Inclusion
  - Improved public services in Education and Healthcare
  - Improved opportunities for carers, disabled and those restricted by families
  - Improved access to training
- Environmental impact
  - Supports working from home
  - Supports transport initiatives

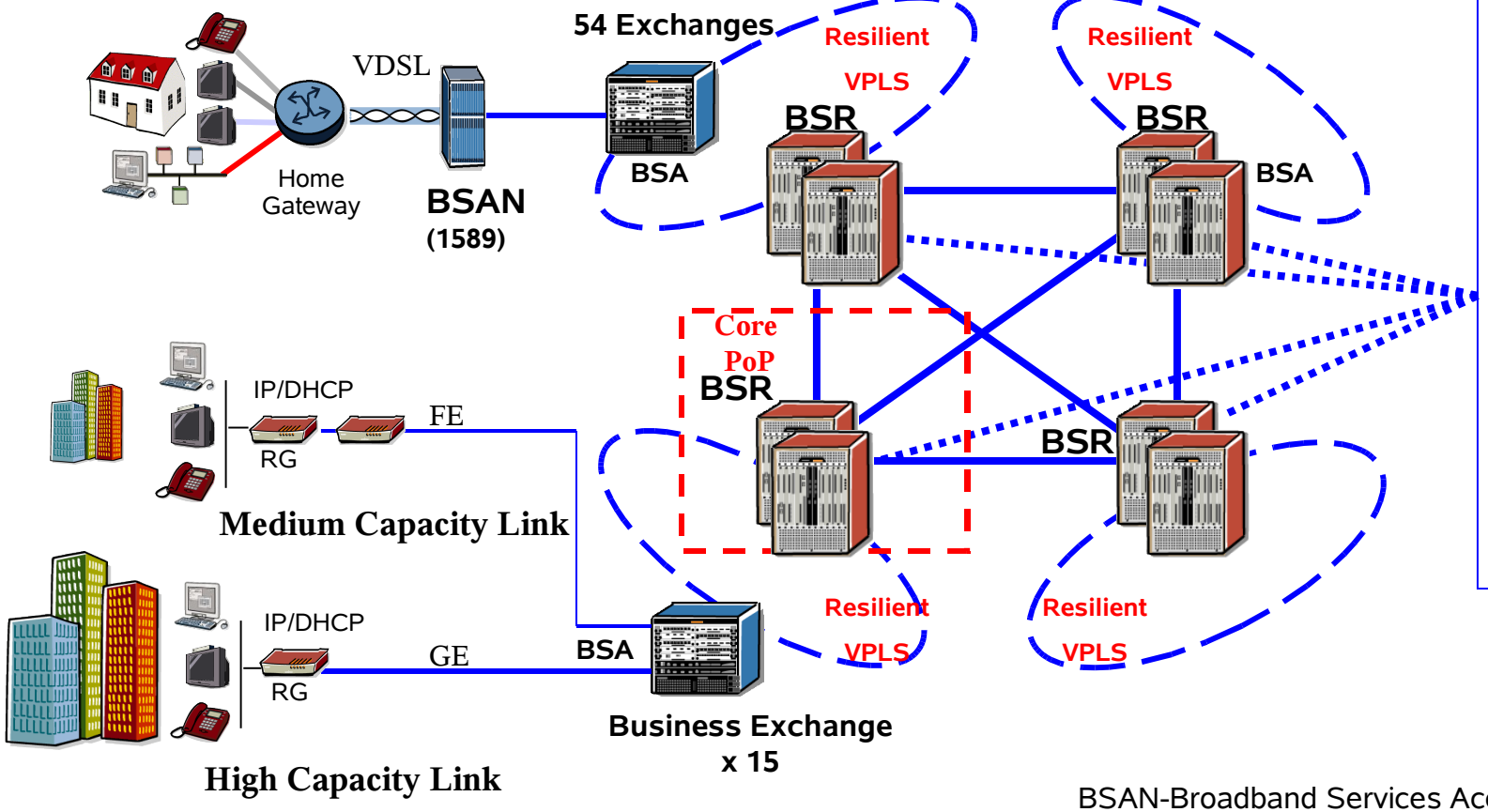


Lead by Digital Region Ltd and Thales the largest deployment of Next Generation Broadband in the EU will place South Yorkshire at the centre of the digital map

The Network

- **Key Network Locations**
  - 54 Exchanges in the region to house equipment for both VDSL and ADSL
  - 15 Designated Business Exchanges for Fast and Gigabit Ethernet
  - NOC located in Thales' facility in Doncaster
- **Network Dimensions**
  - Total network length across all layers is 1,200Km with circa 700Km of new build
  - Thales will install 1589 new BSAN's (street cabinets)
  - Provide 97% regional coverage
- **Proven Technology**
  - IP routers and ethernet switches
  - VDSL2+
- **Build programme**
  - 3 Year rollout
  - Simultaneous rollout across all 4 councils
  - Core live – November 2009
  - 1st group of BSAN's live November 2009

SYDR Network Architecture



BSAN-Broadband Services Access Node
BSA-Broadband Services Aggregator
BSR-Broadband Services Router

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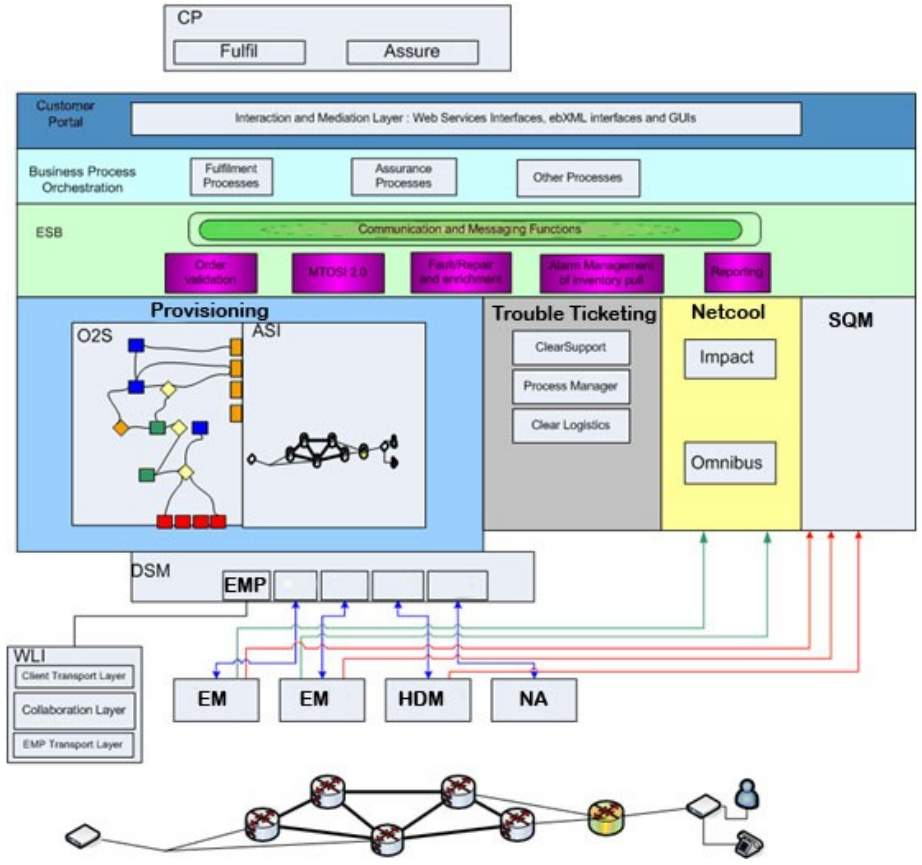
The Customer Portal services

- Web Services and will hold the UDDI registry in order to facilitate communications with the SPs.

- The web services interfaces will be used to provide functionalities such as Service availability, fulfilment and assurance etc.

- Support for ebXML conversation for transactional communications between large SP's and Thales.

- The portal will be the preferred layer to expose user web interface that will allow interaction with the OSS underneath for functionalities such as:
  - Front-end for the Thales Web Services
  - Front-end for the Fault/Trouble Ticketing Management
  - Front-end for the Performance Management
  - Front-end for the Alarm Management
  - Front-end for Reporting
  - Interface for ebXML transactions/conversation
  - Download of billing data



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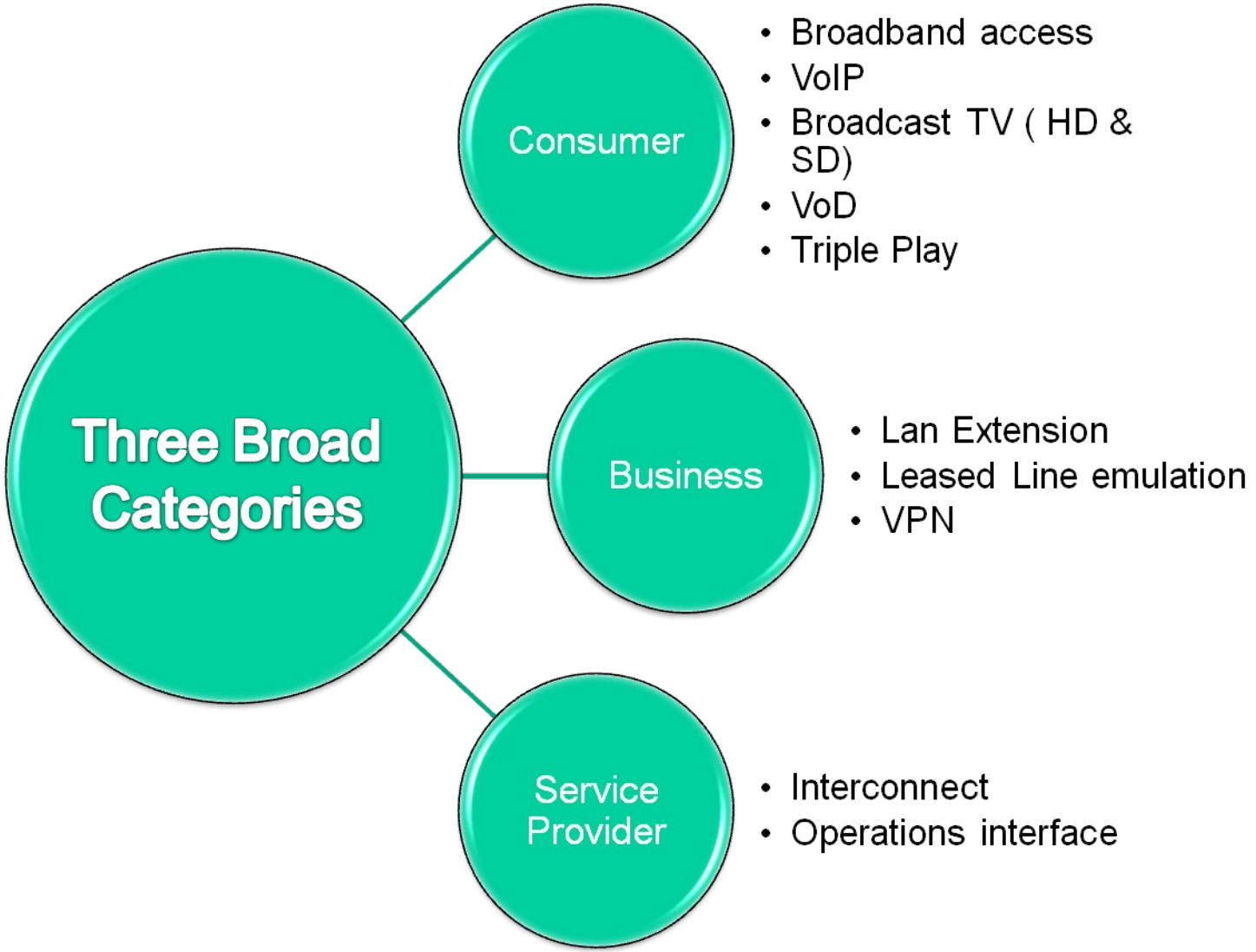
Services



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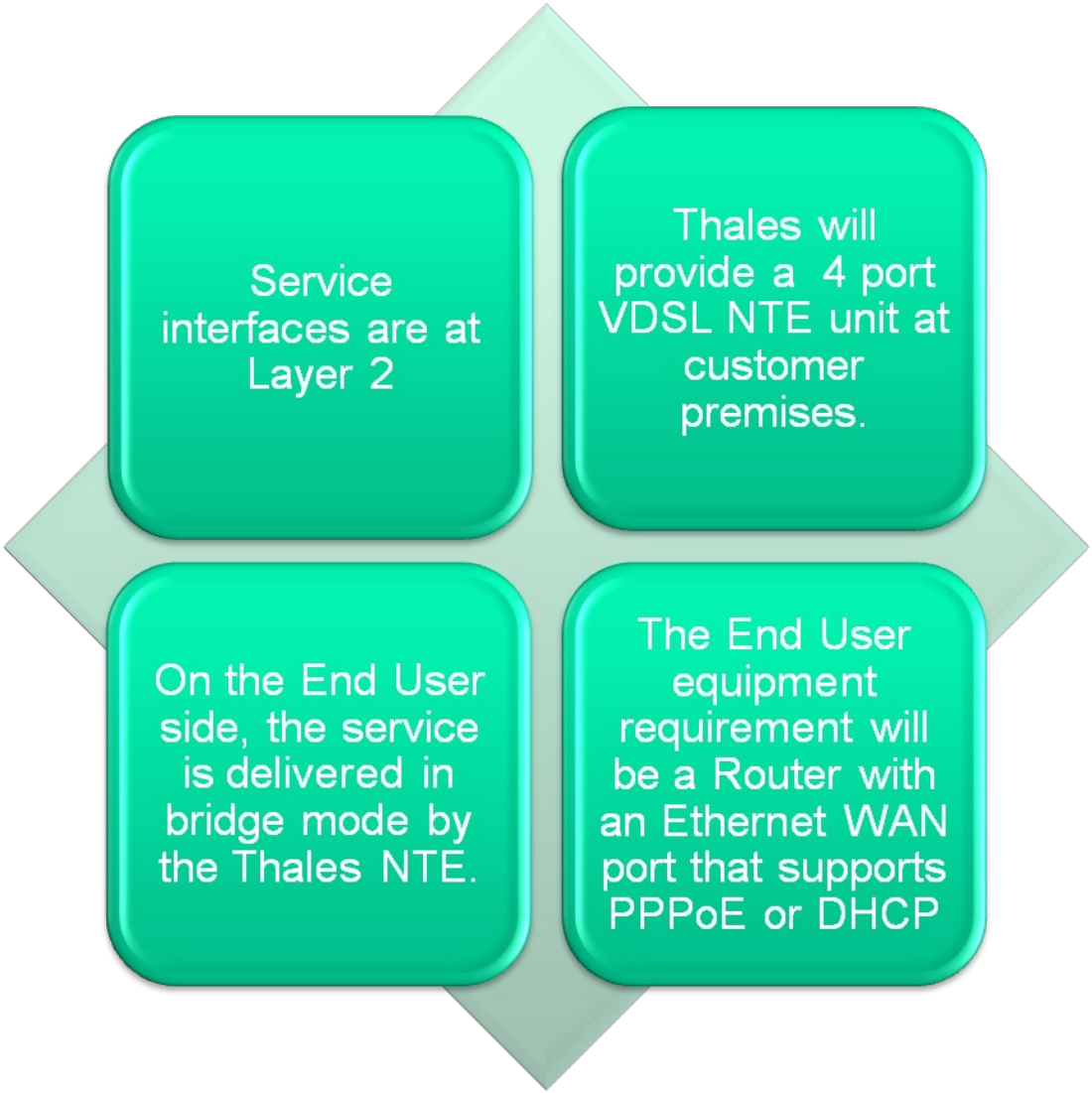
The Basics



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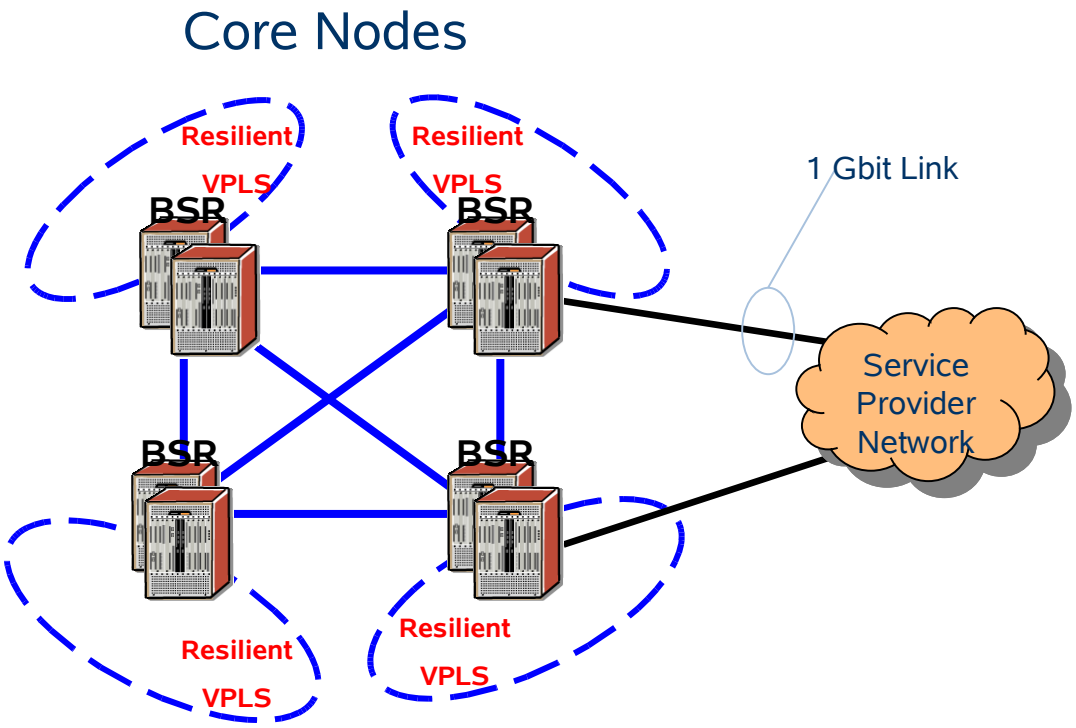
Service Provider Interface

- Single or resilient 1Gbit interface
- SP to provide fibre to core nodes
- Multiple discrete physical and or logical connections supported
- Rate limited 1Gbit interface supported
- Unicast Services supported via layer 2 Ethernet. Tagged or untagged service specific VLANs supported
- Multicast
  - Layer 2 interconnect supported via discrete connection.
  - Layer 3 using public AS number.
  - Resiliency supported via main and standby connection.
  - Support for IGMP V2 & V3
  - PIM – sm
  - PIM -ssm



Single point of interconnection to access an entire population

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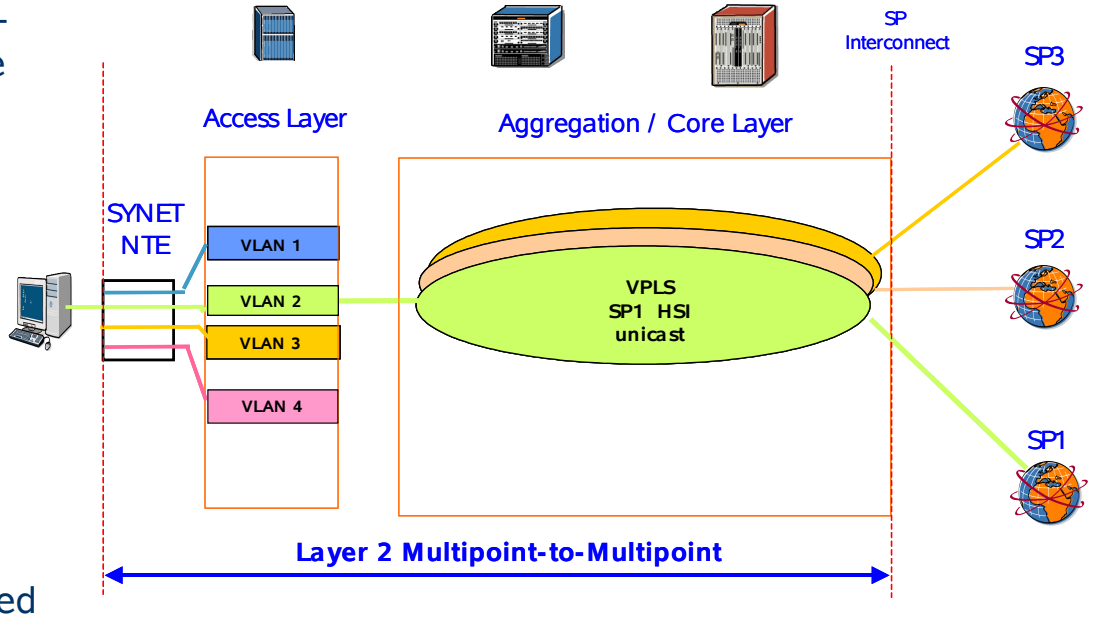
Example Service offers

Service	PIR (Downstream)	PIR (Upstream)	CIR (down)	CIR (up)	Jitter	Delay
2M	2 Mbbs	1 Mbps	200 Kbps	200 kbps	No guarantee	No guarantee
8M	8 Mbbs	2 Mbps	200 Kbps	200 kbps	No guarantee	No guarantee
25M	25Mbbs	12Mbps	200 Kbps	200 kbps	No guarantee	No guarantee

- Separate VPLS Layer 2 Multipoint-to- Multipoint instance per Service Provider
- Each VPLS service has an independent FIB. MAC FIB Size Limits will be configured to specify the maximum number of MAC FIB entries as appropriate.
- Three options are available for VLAN tagging of Ethernet traffic
- 1. Null – Tags are treated as customer data, transparent to the network
- 2. Dot1Q – The service is delineated by VLAN tag
- 3. Q-in-Q – The service is delineated by two VLAN tags (QinQ)



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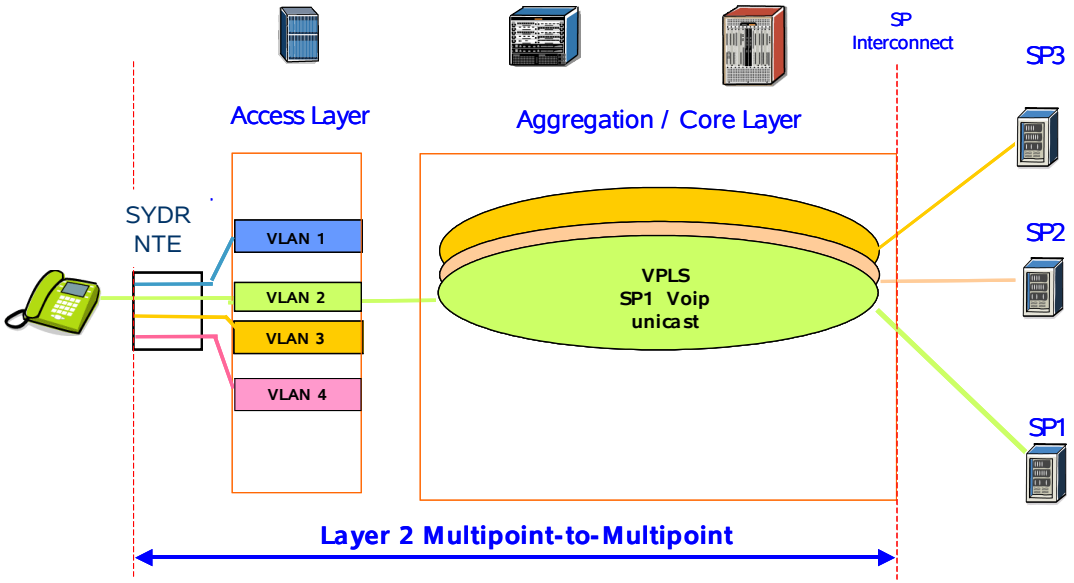
Service	BW (Downstream)	BW (Upstream)	Packet Loss	Jitter	Delay
64 kbps	64 kbps	64 kbps	<0.1%	<25ms	<100ms
Nx64 kbps	Nx64 kbps	Nx64 kbps	<0.1%	<25ms	<100ms

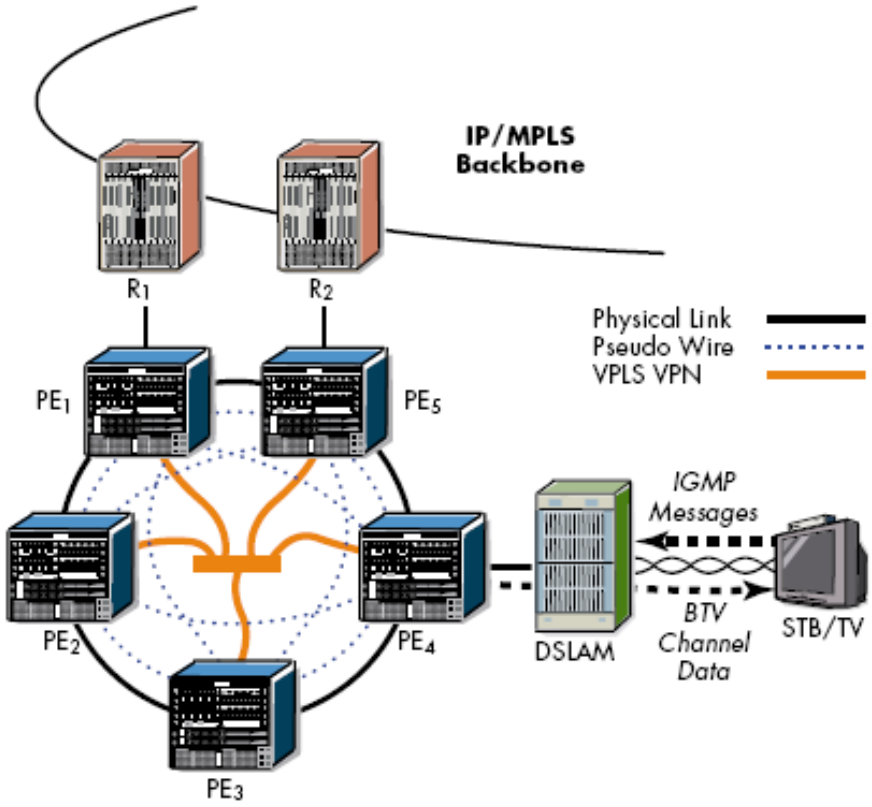
- End User or Service Provider will provide the VoIP equipment with an Ethernet interface.
- The Network will mark transport and/or tunnel labels (such as dot1p or MPLS EXP bits).
- The Network will not mark/re-mark IP layer CoS settings (such as Diffserv or IP ToS).



Broadcast TV

Service	Bandwidth (Down)	Bandwidth (Up)	Packet Loss	Jitter	Delay
SDTV	2Mbps	*	<0.1%	<25ms	150 to 400ms
HDTV	8Mbps	*	<0.1%	<25ms	150 to 400ms

- Layer 2 and Layer 3 handoff supported
- The IP multicast group address is used to identify all traffic associated with a Service Providers TV channel.
- For dual homed connections from the Service provider to the SYDR network, an active/standby connection controlled by PIM is assumed
- Hierarchical VPLS is deployed in the aggregation layer.
- Support for upto 200 Channels
- For a Layer 2 handoff the H-VPLS instance per Content provider is delivered directly to the Service Provider Interconnect port via a single physical connection or loop free resilient connection.
- For a Layer-2 handoff we support a redundant Service Provider Interface. SP must operate in active/standby mode
- Set-top box must have an Ethernet connection



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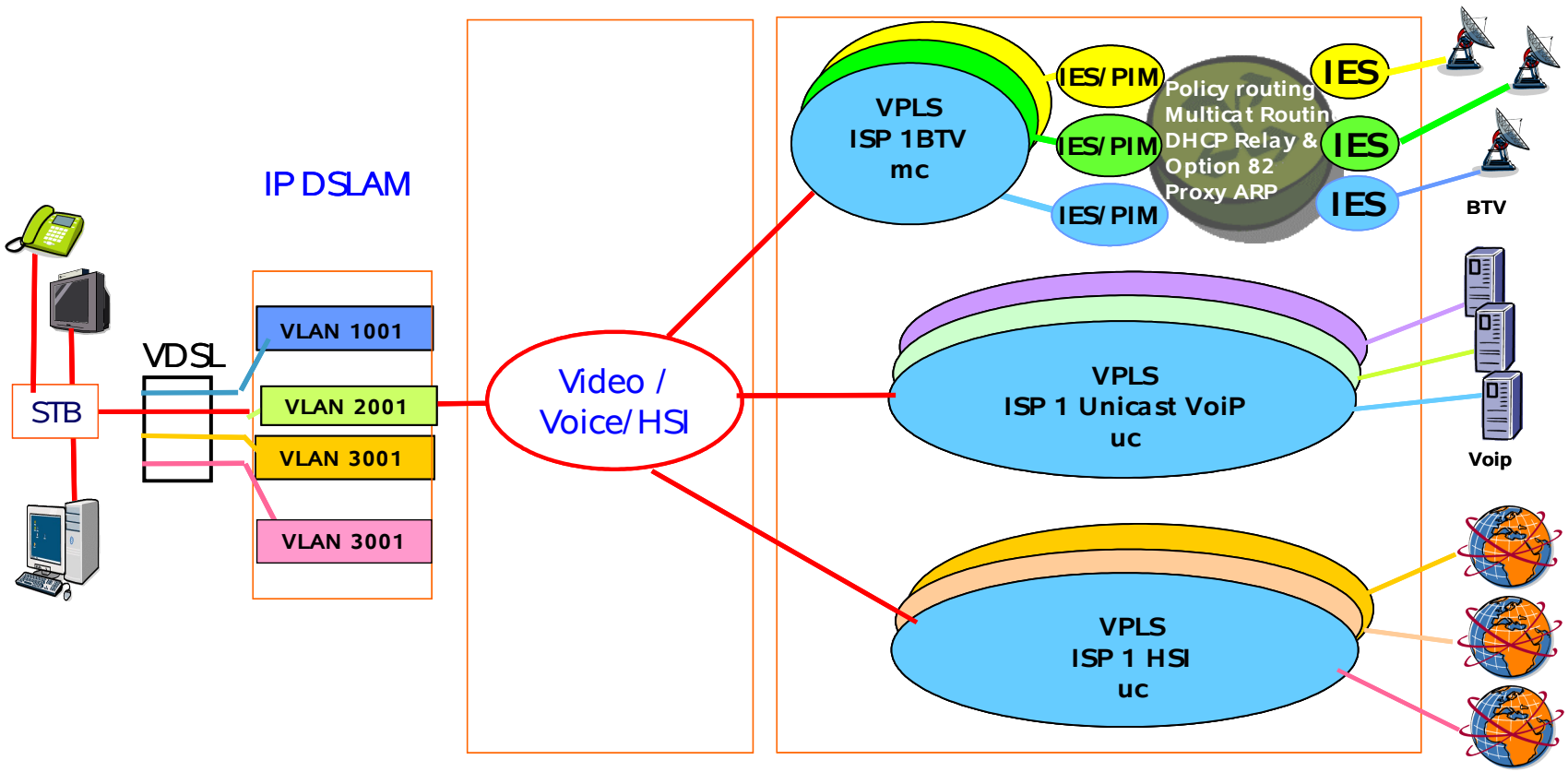
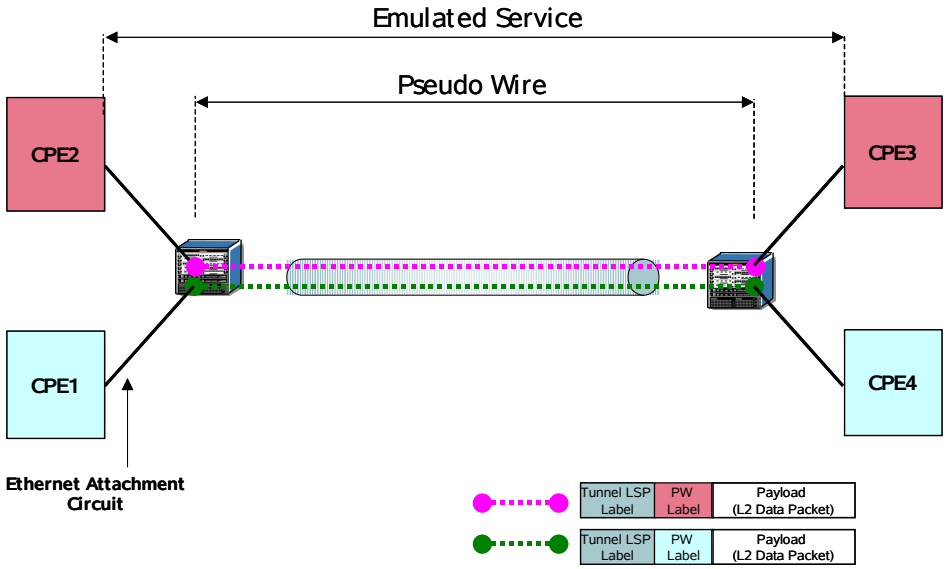
Treated as a bundle of other services



Business Services

Service	Bandwidth (Down)	Bandwidth (Up)	Packet Loss	Jitter	Delay
2M	2Mbps	2Mbps	N/A	N/A	50 to 250ms
4M	4Mbps	4Mbps	N/A	N/A	50 to 250ms
10M	10Mbps	10Mbps	N/A	N/A	50 to 250ms
50M	50Mbps	50Mbps	N/A	N/A	50 to 250ms
100M	100Mbps	100Mbps	N/A	N/A	50 to 250ms
1G	1Gbps	1Gbps	N/A	N/A	50 to 250ms

- Support for Layer 2 services including point to point, point to multipoint, multipoint services and Extension to Layer 3 VPN services
- VPN services :-
  - LAN extension
  - Pseudo leased lines
  - Multi point services



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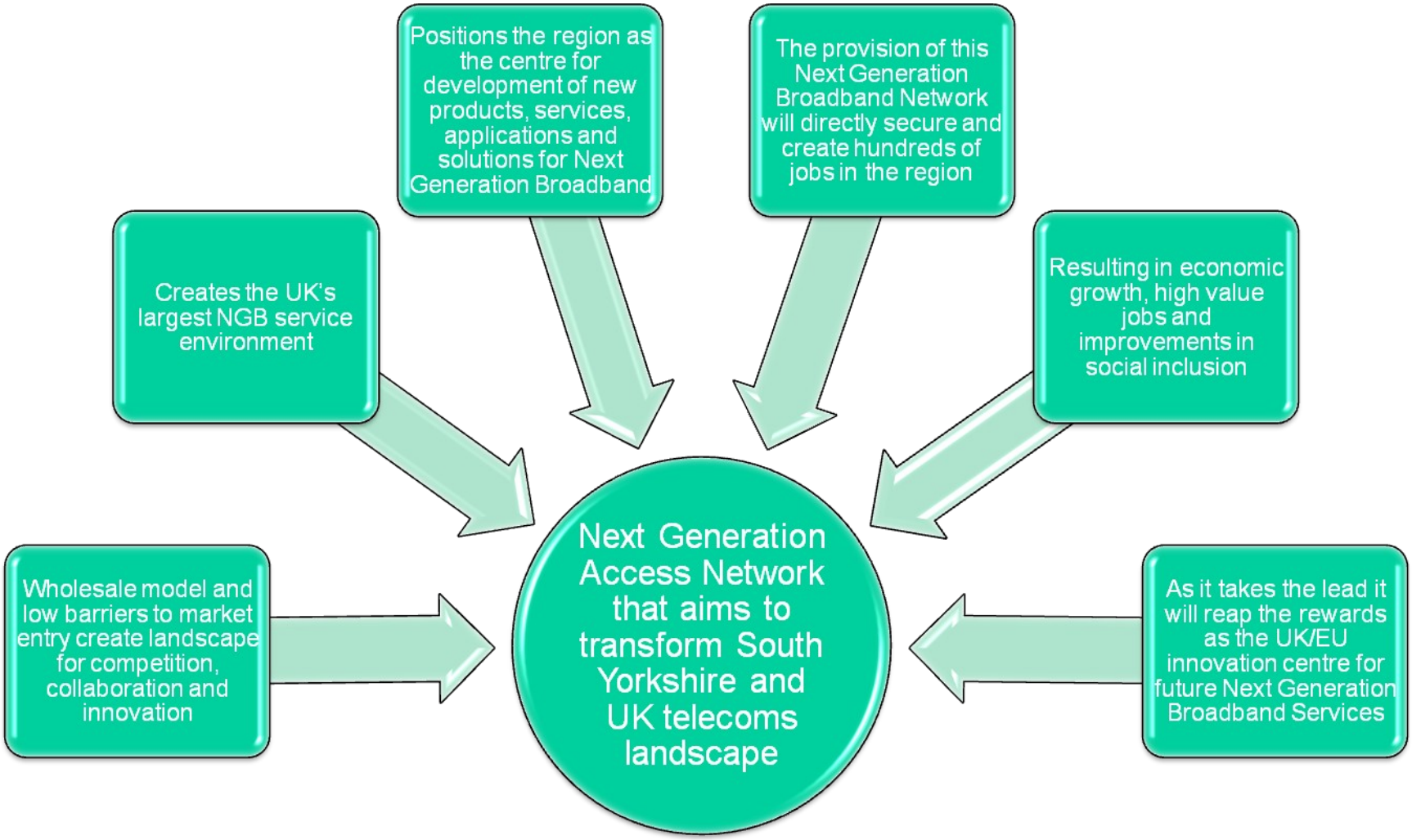
Summary



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Q & A

About

- A global company with over 70,000 employees with €10 billion annual turnover. Focusing on delivering high value technology based solutions and services in defence, aerospace and the civil environment
- Delivering solutions for Healthcare, Education, Retail, ID cards and Banking
- Builds, manages and maintains telecoms networks across the UK includes London Underground, Channel Tunnel amongst others, all from the national service centre in Doncaster
- Thales UK employs 9,000 staff based at more than 50 locations. In 2008 Thales UK's revenues were over £1.4 bn.
- Global Research centre for Telecoms and Communications is based in Reading