

# BT's Fibre Optic Network - Outstation Testing

**Meeting Name** Imbalance Settlement Group

**Meeting Date** 20 December 2011

**Purpose of paper** For Decision

**Summary** BT Openreach is rolling out a new fibre optic based network in preference to the BT21st Century Network offering over copper wires. The rollout may impact the ability for the Central Data Collection Agent (CDCA) to collect metered data from CVA Outstations. We recommend that testing is carried out at BT's test facility in Milton Keynes to ensure that common CVA Outstations/modems can still function properly on this type of network. We invite the ISG to agree to us facilitating this testing. We will also seek agreement from the SVG to test common SVA Outstation/modem combinations.

## 1. Background

- 1.1 We have recently found out that BT Openreach is no longer rolling out the BT 21<sup>st</sup> Century Network (BT21CN) offering over existing copper wires but is now planning to rollout a fibre optic based network in order to provide much higher connection speeds to customers' premises (Attachment A). BT Openreach is expecting to provide access to this fibre optic based network to at least 66% of premises by 2015.
- 1.2 New premises will be connected directly to the fibre optic network (Fibre To The Premises (FTTP)) with data download connection speeds of up to 100Mbps (Mega bits per second). Voice calls will be provided as another application over the fibre optic cable.
- 1.3 Existing premises will be able to connect to a local fibre optic connected street cabinet (Fibre To The Cabinet (FTTC)) via the existing street cabinet, using existing copper wires, to achieve data download speeds up to 40Mbps. Voice calls will be provided over the copper wire network as at present.
- 1.4 With the rollout of another product by BT Openreach (Fibre Voice Access (FVA)), BT Retail and other Communications Providers will also be able to offer customers voice access over the fibre optic based network from existing premises.
- 1.5 BT expects the rollout of FVA to begin happening in March/April 2012 and consider it prudent to test equipment that uses voice-band data (VBD). We have been offered access to BT Openreach's testing facilities in Milton Keynes to carry out testing.

## 2. ELEXON View

- 2.1 We recommend that we take up BT's offer and that we facilitate the testing of common CVA (and SVA) Outstation/modem combinations in Milton Keynes.
- 2.2 We suggest using a similar approach to that used for testing common CVA (and SVA) Outstation/modem combinations on the simulated BT21CN network and that we put out a request for similar Metering Equipment.
- 2.3 We propose to secure assistance from the CDCA to drive the instation data collection software and will aim to book a two day test slot (or two, one day tests slots) with BT Openreach in Milton Keynes.
- 2.4 We estimate that the effort required for the testing should equate to between 9 and 15 man days (4 man days for CDCA resources and between 5 and 10 man days for ELEXON resources).
- 2.5 We will then report back to the ISG (and SVG) with the results of the tests once they have been completed.

## 3. Recommendations

- 3.1 We invite you to:
  - a) **NOTE** BT Openreach are rolling out a new fibre optic cable based network and are providing facilities in Milton Keynes for testing equipment;
  - b) **NOTE** that we recommend that similar common CVA (and SVA) Outstation/modem combinations are tested on this new type of network;
  - c) **AGREE** that we facilitate the testing on common CVA Outstation/modem combinations and allocate the necessary CDCA and ELEXON resources to do this; and
  - d) **NOTE** that we will report back to the ISG (and SVG) with the results of the tests once completed.

### Attachment:

Attachment A – BT Retail Presentation

### For more information, please contact:

Mike Smith, Metering Analyst  
[mike.smith@elexon.co.uk](mailto:mike.smith@elexon.co.uk)  
020 7380 4033



# BT Retail Voice over FTTP

Single Briefing v1.1 (14th September 2011)

# Introduction

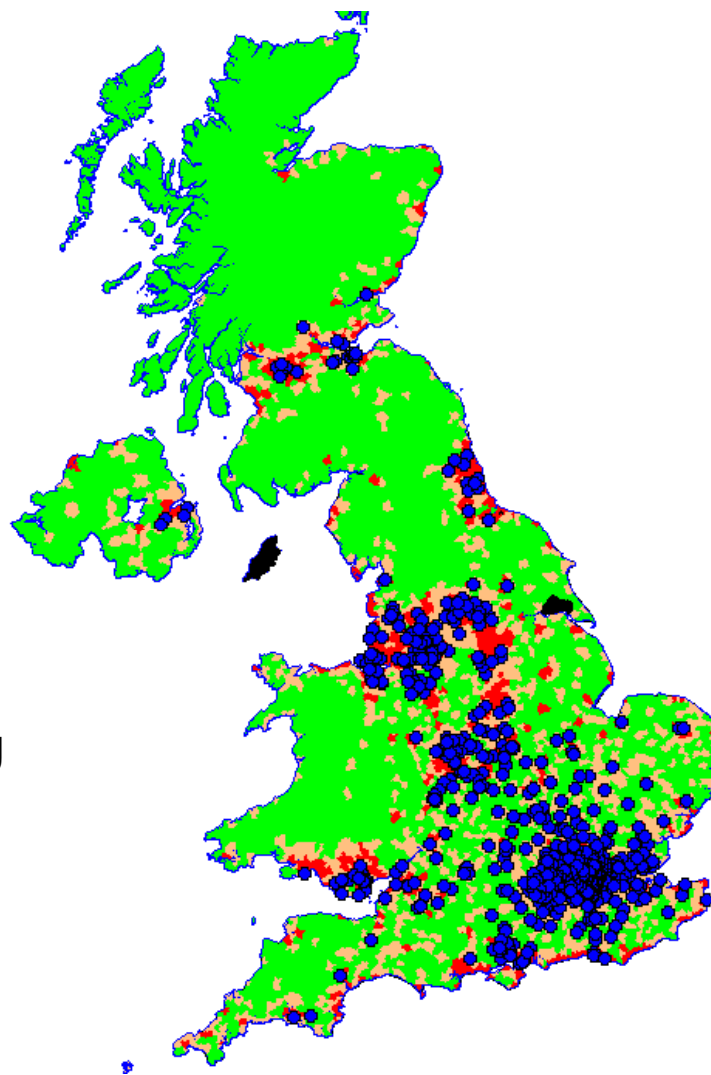
- BT Retail Voice over FTTP is a planned new service to provide POTs like telephony for consumer customers who have fibre installed to the home.
- It is expected to launch during 2012.
- This briefing is aimed at giving CPE suppliers forewarning and the opportunity to prepare.
- The service is reliant on the roll-out of two Openreach access products:
  - Super-fast Fibre Access
  - Fibre Voice Access
- It is expected that other Communication Providers (CPs) will enter this market.
- BT Retail will be a major player.

# Openreach - Super-fast Fibre Access

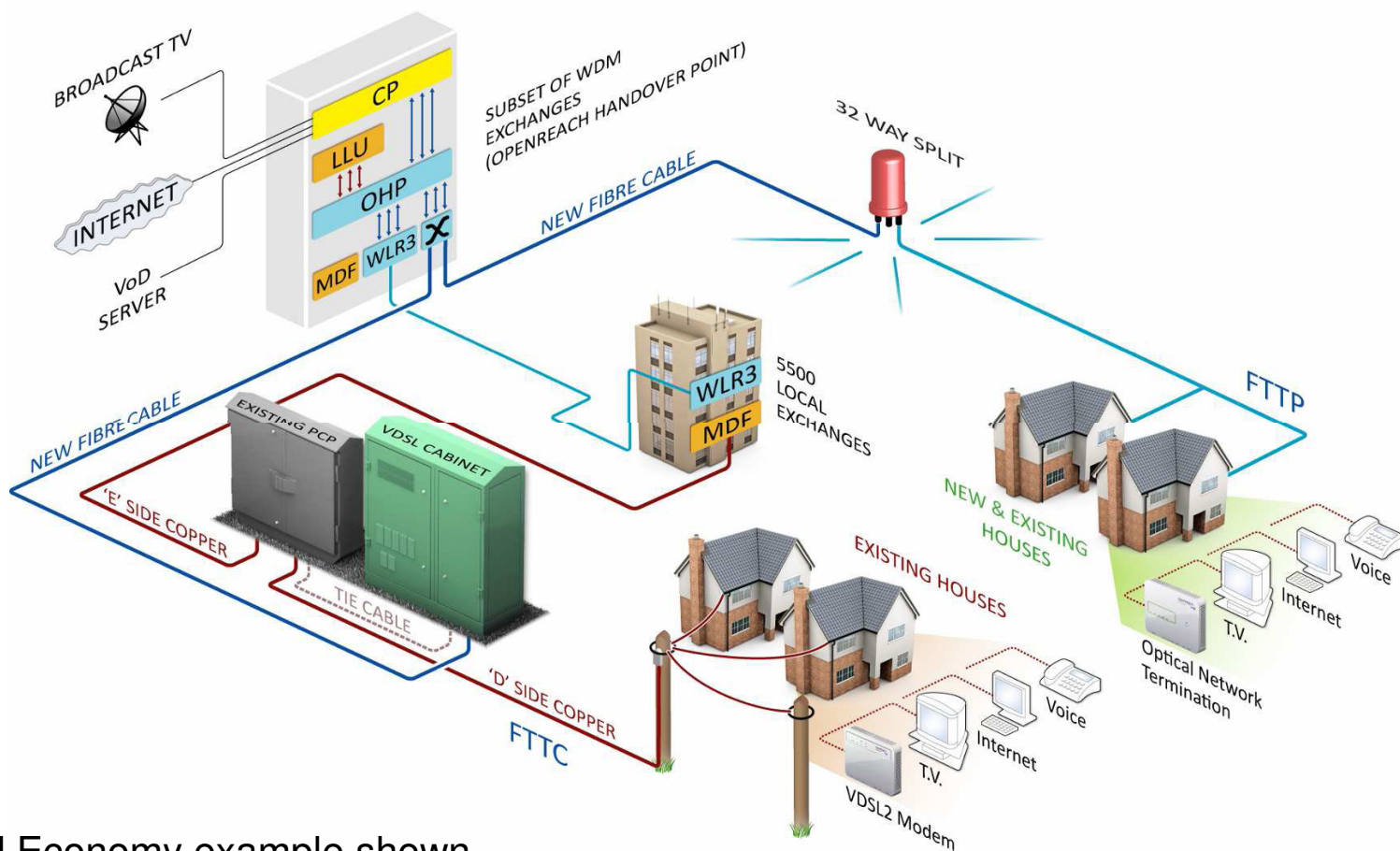
- Also known as Next Generation Access (NGA).
- £2.5 billion infrastructure investment.
- Target to pass 66% of premises by 2015 (16 million in total).
- Two variants:
  - Fibre to the Cabinet (FTTC) offering downloads at up to 40Mbits/s and uploads at up to 15Mbits/s.
  - Fibre to the Premises (FTTP) offering downloads at up to 100Mbits/s and uploads at up to 30Mbits/s.

- Telephone Exchange Areas Phase 1 -6 (not to scale)
- Urban Area
- Suburban Area
- Rural Area

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# Openreach – Local Infrastructure

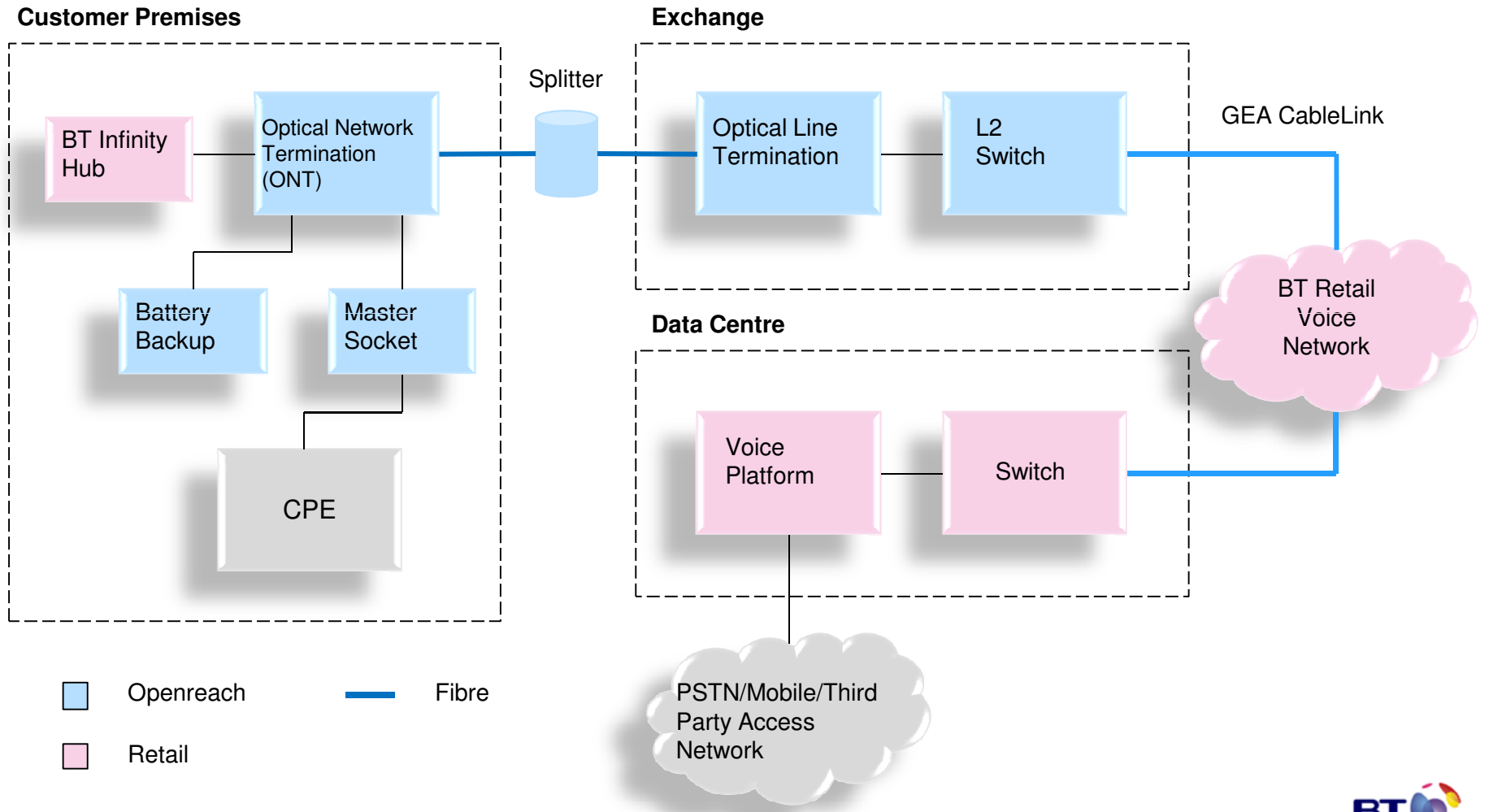


Mixed Economy example shown

# Openreach – Fibre Voice Access

- FTTC customers will receive voice services over copper pairs as at present.
  - FTTP customers will require voice to be carried as just another application over the fibre network.
  - Openreach will launch a product called Fibre Voice Access (FVA). This provides:
    - An Analogue Terminal Adapter (ATA) embedded within the Optical Network Termination (ONT) supporting up to 2 telephony lines which can be integrated with existing extension wiring.
    - Access for CPs to connect a SIP call server to support existing network and calling features.
- <http://www.openreach.co.uk/orpg/home/products/super-fastfibreaccess/fibrevoiceaccess/fibrevoiceaccess.do>
- Openreach invited CPs (including BT Retail) to begin testing FVA early in 2011.
  - Indicative launch dates of FVA from Openreach currently propose Mar/April 2012.

# Retail Voice over FTTP





# Installation

- There are two deployment models:
  - Greenfield Sites (e.g. new build properties)
  - Brownfield Sites (where there is an existing copper POTS connection)
- Installation in the home:
  - Openreach aims to install the Optical Network Termination (ONT) where the customer requires it. Without guidance this will be within 1.5m of the fibre entry to the premises.
  - A standard install will place the ONT within 20m of the Customer Splice Point (CSP) however the option exists to extend this by a further 10m.
  - The CSP must be at ground floor level to permit fibre jointing to take place.
  - Fibre may be routed externally from the CSP to the entry point e.g. to locate the ONT on an upper floor.
  - The ONT needs to be within 1m of a power socket.
- For Greenfield Sites the voice port will be wired to a new NTE5.
- For Brownfield Sites Openreach will wire the ONT voice port to an interstitial plate added to the existing NTE5. This includes a switch to manually select either the legacy copper connection or the connection from the ONT. Once Retail has provisioned Voice over FTTP the customer will be instructed to switch over.

# Optical Network Termination Devices

- There are two models of Openreach ONT built to the same specification:



Huawei



ECI

- Within a given exchange area ONTs will be sourced from the same vendor.

## Voice Port Interface

- The ATA voice port interface is designed to be compliant with the relevant parts of SIN 350, 351 (<http://www.btwebworld.com/sinet/>).
- The voice ports will be powered by a back-up battery in the case of mains failure. It is expected that:
  - Battery back-up will be installed with the ONT in every case.
  - The back-up period will be 1 hour with a talk-time slightly less than this.
  - Battery state/health will be indicated via LEDs on the battery pack.
  - Battery replacement will be completed by the customer using readily available rechargeable cells.

## Network Performance

- The end to end network performance is designed to be compliant with the NICC NGN standards (<http://www.niccstandards.org.uk/>). For this presentation ND1431, ND 1701, ND 1704 are particularly relevant.

# Voice over FTTP Differences

- Moving to a fibre based voice solution presents different characteristics to PSTN. Based upon previous experience of industry wide testing on the 21CN managed voice network from Openreach:
  - End to end delay increases compared with PSTN.  
Any Voice Band Data (VBD) equipment that makes a PSTN call and transfers information but fails to allow for sufficient end to end delay may fail to operate correctly.
  - Audio path discontinuities occur when jitter buffers adapt.  
When jitter buffers resize either padding data is inserted or data is discarded. This may cause problems for modems or protocols that do not use error correction or are intolerant to errors.
  - Echo cancellation will be used by default for all voice calls.  
Echo cancellation will be switched off when high speed modems (V.32 and above) are detected.
  - Maximum off-hook loop current reduced compared with legacy PSTN  
40mA available on the majority of PSTN lines with a minimum of 25mA. For FVA a minimum of 25mA will be available for all lines.
  - Balanced ringing will be used compared with legacy PSTN which is predominantly unbalanced.  
All Modern CPE should be compatible with balanced ringing however some older CPE may not be.
- As a VBD equipment supplier it would be prudent to test your equipment against the Retail Voice over FTTP service.

# Supplier VBD Compatibility Testing

- We will involve VBD suppliers in the Retail Voice over FTTP test programme.
- We will make available test facilities to allow VBD suppliers to test their equipment prior to launch of the service.
- Technical support will be provided to help suppliers investigate network compatibility issues.
- There is no intention to operate a certification programme or to publish test results.
- Tests results will be specific to Retail Voice over FTTP.

# Test Facilities

- These are located at Phoenix House, 202 Elder Gate, Station Square, Milton Keynes, MK9 1BE.



- GPS Coordinates Lat: 52.03523, Long: -.77427

# Test Facilities

- Phoenix House is a secure facility. A doorman will admit you and you will be escorted whilst on site.
- We will provide contact details for your host nearer the time.
- There is a loading bay at the front of the building. Heavy items may optionally be unloaded at the rear of the building on request to the doorman.
- There is ample pay and display parking nearby. Details are available at [www.mkweb.co.uk/parkingmap](http://www.mkweb.co.uk/parkingmap)
- Food and drink are available from nearby shops (M&S, Costa, Subway).
- Within the building a tea room is available for making tea/coffee and consuming food.

# What we will provide

- Two test stations will be provided each comprising:
  - One Optical Network Termination unit (ONT) provisioned with Fibre Voice Access and BT Retail Voice over FTTP. A single voice port will be enabled.
  - One conventional PSTN line.
  - Internet access via the Ethernet ports on the BT Home/Business hub connected to the ONT.
- At least 6 available mains power outlets will be available.
- Limited lockable storage for use overnight (at your risk).
- Itrinegy INE and DSP Genie (for simulating network delay/jitter) supported by a technician familiar with their use.
- PSTN dial through delay facility for use before, during and after a visit to the test facility.

**Note: The room contains a large number of Wifi access points and this may cause problems for equipment using Wifi or Bluetooth.**



# What to bring

- The CPE you wish to test.
- Any test equipment and tools you require.
- Telephone cables to connect your CPE to either the ONT or PSTN.
- CAT 5 Ethernet cables if you require Internet access.
- A trolley if you have heavy equipment. Note however, the building lifts are small.
- Additional mains distribution boards.

# Booking Test Slots

- Each test slot will be two days in duration, either Mon-Tue or Wed-Thurs.
- You will be expected to complete your testing within a single test slot.
- Tests slots will be booked on a first come first served basis.
- For operational reasons we will only be able to publish availability of slots a month or two in advance.
- For details of currently available tests slots and to make a booking please contact us by phone or by email ([vbd.test@bt.com](mailto:vbd.test@bt.com)).
- We will agree arrival times with you once a booking has been made.
- We are happy to hold an optional pre visit audio call with you to discuss test approach e.g. what is and isn't going to be possible.

# Follow-up

- Whilst at the test facility we would find it useful if you could complete a short follow-up questionnaire to provide feedback on your experiences and a brief summary of the testing performed.
- We will arrange a follow-up call after you have completed your testing to discuss any issues found.
- Issue resolution may be via:
  1. Consultation with our network specialists for further investigation. If appropriate a visit to our facilities at Adastral Park, Ipswich can be arranged.
  2. Changes made by you to your equipment.
  3. Feedback into the BT Retail and/or Openreach design processes.
- A second test slot for regression test purposes may be arranged following issue resolution.

# Briefing Pack Contents

- The briefing pack comprises:
  - This presentation
  - NDA
  - Terms and Conditions
  - Example test plans
  - Follow up questionnaire

## Next Steps

- Contact us by phone or by email ([vbd.test@bt.com](mailto:vbd.test@bt.com)) for details of currently available tests slots and to make a booking.
- Please return signed paper copies of the NDA and Terms and Conditions to us.