British Computer Society
Cumbria North branch
25 September 2019

Jonathan Harris
Senior Programme Manager, Digital Infrastructure

Version 1.0

Agenda

- About Connecting Cumbria
- UK Government policy
- Digital Borderlands
- Community fibre partnerships and voucher schemes
- Mobile (4G and 5G)
- AOB and further questions

Connecting Cumbria - background

- The strategy of Connecting Cumbria is to provide superfast broadband infrastructure to as many residents, businesses and visitors to Cumbria, as quickly as possible within the available funds.

- Commercial coverage in Cumbria now provides circa 45% of premises with superfast infrastructure >24Mbps.

- The programme was initiated in 2013 with the aim of providing superfast infrastructure to 95% of premises in Cumbria.

- £39m of state aid has been invested in Cumbria (not including BT's contribution) and has delivered superfast infrastructure to over 125,000 premises equating to 93.8% coverage of which 4.7% is full fibre to the premise (FTTP)
    - The UK average coverage is 96.3% with 8.9% FTTP
    - There are large regional variations with Eden District being circa 10% lower than the county average and Barrow-in-Furness circa 5% higher
    - Buttermere is the last exchange in Cumbria without fibre – a £420k change request is with Openreach.

Connecting Cumbria – forward look

- Deployment is harder, slower and more expensive as we move into ever increasingly rural areas because of the need for more civil engineering works, the need for wayleaves and road closures, and the dispersed topography of the remaining rural premises.

- The last fibre cabinet in Hincaster from the Sedgwick exchange will be delivered next month. All deployment after that will utilise full fibre to the premise structures (gigabit capable) in line with UK government policy.

- £3.9m of contract 1 cost efficiencies have been added to contract 2 to deploy more full fibre and get Cumbria above 94% coverage.

- 95% superfast coverage – the UK wide target delivered in 2017 - is not achievable in Cumbria without more funding.
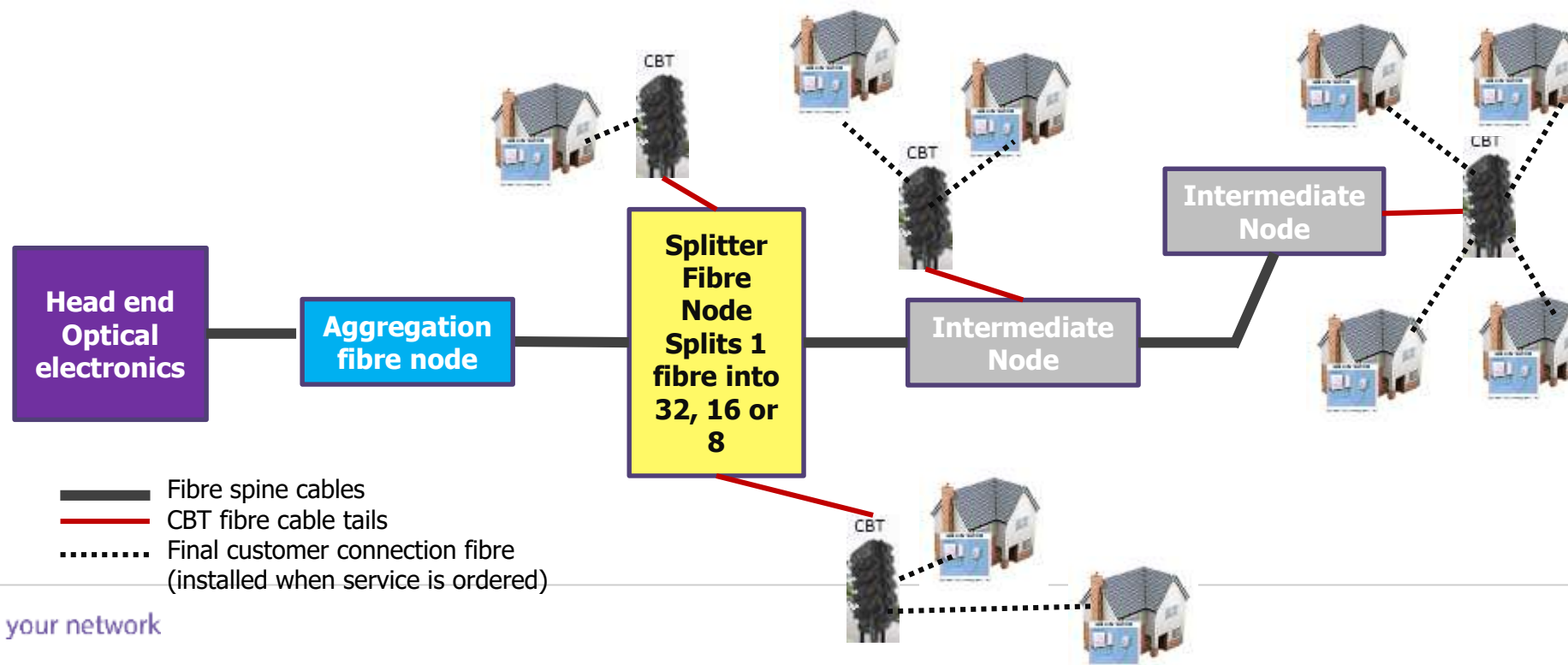
UK Government policy

- The UK government policy was set out in the Future Telecoms Infrastructure Review (FTIR) published in July 2018.
- 15m premises with access to full fibre by 2025 and coverage across all parts of the country by 2033
  - This has been accelerated by the new government to deliver full fibre across all parts of the country by 2025. Is this deliverable?
- The government accepts that circa 10% of premises are unlikely to be covered commercially with full fibre and that additional funding of "some description" will be required.
- The 'outside in' approach means that gigabit capable connectivity across all areas of the UK will be available "at the same time".
- The additional funding required is likely to be £3bn to £5bn across the UK.
- UKG policy is not to fund 4G beyond the commercial availability of the Emergency Services Network and as they negotiate with the MNOs on the Shared Rural Network
  - The Scottish Government has the opposite policy!
- The majority of the population to have 5G coverage by 2027
  - 4G infill will need to be addressed if 5G is to be available in rural areas.
- FTTP, 4G and 5G all need more fibre and the technologies are converging.

Department for Culture Media & Sport

Cumbria County Council

openreach

CONNECTING CUMBRIA

The FTTP network comprises the following

openreach

- A **"Head End"** Optical equipment at an Exchange or Cabinet – within 60Km of the farthest property to be served
- **Fibre spine-** This comprises one or more fibre cables that run from the Head End into the areas where FTTP is required
- An **Aggregation Node-** A fibre connection node where multiple FTTP Networks converge to connect to a Head End
- **Splitter Nodes (1 or more)-** this splits one fibre, which routes back to the Head End, into up to 32 fibres. Each of the 32 fibres can connect a customers property
- **Intermediate nodes-** these allow connection of CBT's to the spine and provide future spine access capability
- **Connectorised Block terminals; (CBT)-** These allow a simple final connection of service when the customer orders Broadband from a Communications provider- CBT's are located within 150m of the properties they serve. They can connect between 1 and 12 properties up to the splitter- e.g. a 4 port CBT can connect 4 properties and has 4 fibres back to the splitter and so uses up 4 of the 32 splitter capacity
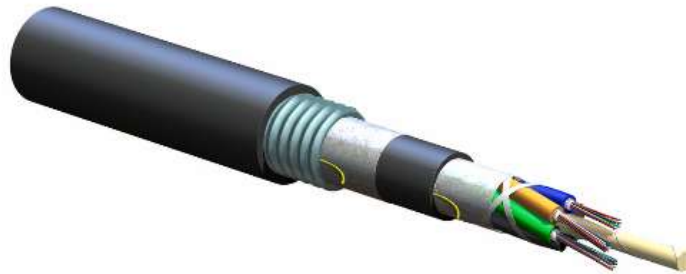
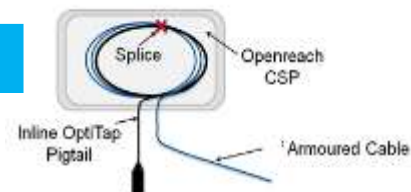**Fibre optic components used to provide an FTTP Network.**

openreach

Fibre spine- In the rural environment where no existing duct network exists we typically use a 36 fibre armoured cable which is directly buried to a minimum depth of 250mm in a verge (deeper depending on specific circumstances). In addition optical splitters, typically 32 way, are used to increase the capacity and number of customer who can be connected up

Fibre spine access points (Nodes)- Typically 400mm X 150mm X 100mm This are fitted in ground chambers/boxes or on poles. They contain trays where fibres get spliced together. One of these will also contain up to two 32 way splitters

Connectorised Block terminals- CBT's- These come in 4, 8 and 12 port options. Number of ports reflect the number of customer services that can be connected

A 4 port is 274 mm x 66 mm x 73 mm. The 12 port is 381 mm x 101 mm x 147 mm. These are fitted within 150m of the customers property. Either on a pole, or in a small box. Occasionally they can be mounted on customer properties such as flats or terraces

Single CBT- Optitap- Armour Fibre taken to house, then spliced to an Optitap connector using a Customer splice Point box. Mounted near ground level on the outside wall of the property (150mm X 80mm X 20mm)
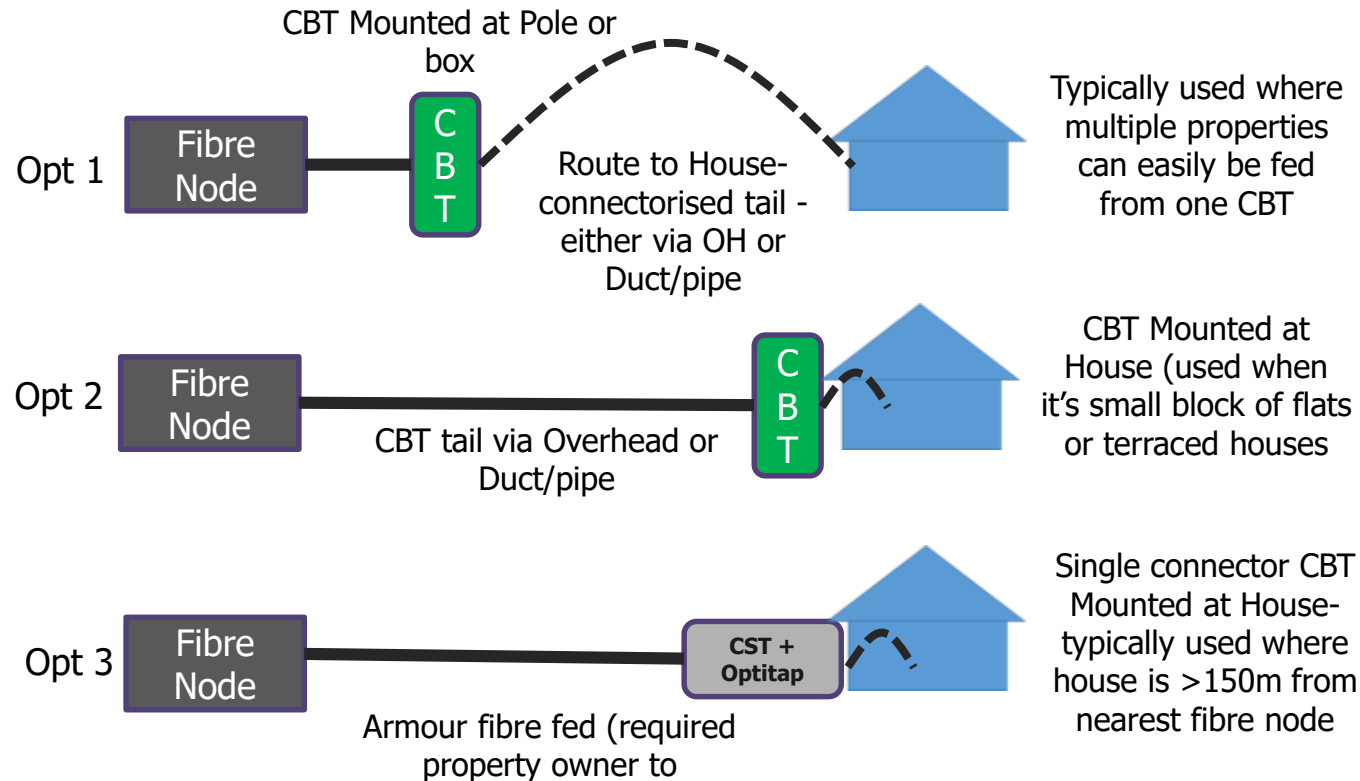
Splice

Openreach CSP

Inline OptiTap Pigtail

Armoured Cable

There are 3 basic options that allow customers service to be provided from the Connectorised Block terminal (CBT) when service is ordered from a communications provider.

openreach

Opt 1

Fibre Node — C B T

CBT Mounted at Pole or box

Route to House-connectorised tail - either via OH or Duct/pipe

Typically used where multiple properties can easily be fed from one CBT

Opt 2

Fibre Node — C B T

CBT tail via Overhead or Duct/pipe

CBT Mounted at House (used when it's small block of flats or terraced houses

Opt 3

Fibre Node — CST + Optitap

Armour fibre fed (required property owner to

Single connector CBT Mounted at House- typically used where house is >150m from nearest fibre node

Dig Your own (DYO)

Where customers are not currently served by a pole and have no existing duct to their property; then either armoured cable, duct or a small 25mm pipe must be buried to the customers property- Openreach will supply the cable/duct/pipe for the customer to bury across their land. Advice on depth and route options etc. will be given
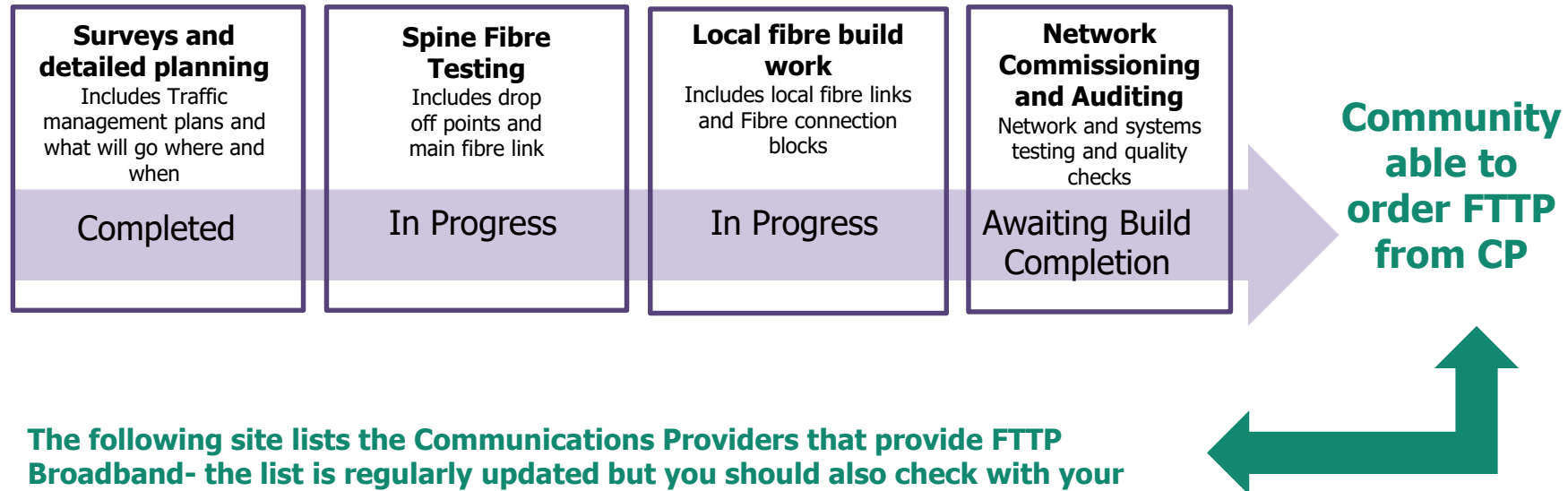*(To minimise costs of the CFP FTTP Network- the quote assumes DYO on peoples own properties)*

This is the final fibre connection which is done when a broadband service is ordered- Inside the property it connects to an ONT which requires a 13 amp socket to be nearby (Note for opt 1 where it is not via a pole, then a duct/pipe route must already have been provided as part of "Dig Your Own")

End User Premises

GPON ONT

Baseband Voice over copper or FVA

Connecting you to your network

Fibre To The Premise Network - Top level build process

openreach

Openreach build the FTTP Network then customers order service from a communications provider (Note – Openreach does not provide the end broadband service as part of the build)

High Level FTTP Network Build Activities

Surveys and detailed planning Includes Traffic management plans and what will go where and when	**Spine Fibre Testing** Includes drop off points and main fibre link	**Local fibre build work** Includes local fibre links and Fibre connection blocks	**Network Commissioning and Auditing** Network and systems testing and quality checks
Completed	In Progress	In Progress	Awaiting Build Completion

Community able to order FTTP from CP

The following site lists the Communications Providers that provide FTTP Broadband- the list is regularly updated but you should also check with your current provider if they do FTTP

It also has a link where you can input your phone number or postcode to see if you are able to order service yet

https://www.homeandbusiness.openreach.co.uk/fibre-broadband/ultrafast-broadband/ultrafast-fibre-buy-it-now

Connecting you to your network

Digital Borderlands

- Mobile:
  - 5G masts on an 'outside-in' basis i.e. targeting 4G not-spots
  - 5G coverage would be more localised than 4G
  - 4G/5G masts would provide a fibre access point for further fixed line connections
  - DCMS policy remains not to fund 4G
  - DCMS and MNOs are talking about a Shared Rural Network (SRN).
- Rural Gigabit Connectivity (RGC) voucher top up scheme for superfast not-spots in Cumbria and Northumberland
  - Full fibre for SMEs and/or residential users in community projects.
- Feedback from UK and Scottish Government is positive, particularly for RGC voucher top up.
- Heads of Terms agreed on 01 July 2019 with overall funding of £350m for all Borderlands projects (not just digital!).
- Voucher top up detailed business case now being prepared
  - Aim to have funding for community projects from April 2020.
- £200m was included in the budget for RGC vouchers and rural public sector hub sites
  - UK Government targeting schools, health sites and libraries as rural hub sites in the first instance.
  - Business case submitted to DCMS asking them to enable village halls to be funded hub sites.

Department for Culture Media & Sport

Cumbria County Council

openreach

CONNECTING CUMBRIA

Digital Borderlands - Mobile

- Funding request for 4G infill including 30 masts in Cumbria.

- However, UK government policy is now not to fund 4G
  - Focus of policy is on 5G
  - The failure of the Mobile Infrastructure Project makes DCMS wary
  - The Emergency Services Network will extend commercial coverage (but not everywhere)
  - The Shared Rural Network is designed to achieve 95% geographic 4G coverage by 2022, but discussions between DCMS, Ofcom and the MNOs have not yet concluded.

- Some 4G not-spots will remain in rural Cumbria.

- Digital Borderlands is being repositioned (subject to approval) into a 5G project
  - 'Outside-in' approach i.e. targeting 4G not-spots
  - 4G and 5G equipment on all masts (5G coverage will be more localised).

- 5G technology is developing rapidly with EE, Vodafone and Three all live in some cities and O2 expected to launch next month.

1G to 4G Evolution

Mobile communications: from 1G to 4G

Mobile network operators have continually upgraded their networks to satisfy their customer's increased data demands.

4G to 5G Evolution

5G networks will need to connect people, devices and sensors where ubiquitous seamless coverage will become a growing expectation.

Digital Borderlands – Full Fibre Vouchers

- Funding request for full fibre voucher scheme.

- Following RGC voucher scheme launch in May 2019 the Borderlands scheme will follow a top-up model already in place elsewhere.

- DCMS have provided positive feedback on our proposals.

- Cumbria and Northumberland only with the Scottish Borders and Dumfries and Galloway included in the Scottish R100 programme.

- Detailed business case to be submitted to UK Government later this year.

- Projects expected to be up and running by April 2020.

- Community based approach.
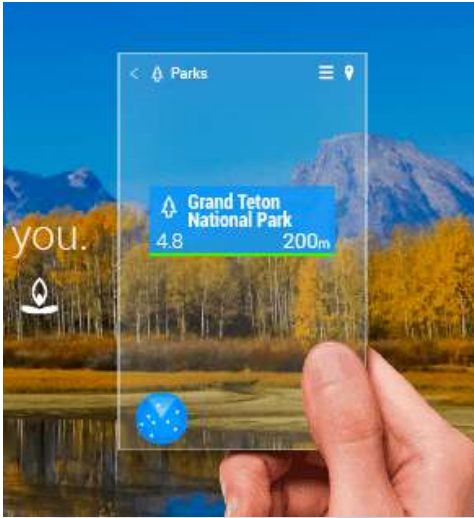
Community Fibre Partnerships

- Probably the only fibre option for the last 5% of Cumbria.

- Openreach and B4RN are active in the region.

- Rural Gigabit Connectivity Voucher Scheme launched in May this year.
  - Available in rural postcodes (<10,000 population) with <30Mbps
  - 30Mbps minimum service contract requirement
  - SME between £500 and £3,500; residential between £500 and £1,500
  - Resident only projects are allowed, but there must be a minimum of 2 beneficiaries
  - Suppler led and administered by Building Digital UK (BDUK – part of DCMS).

- Connecting Cumbria does not currently have any separate funding for community schemes
  - Digital Borderlands is an opportunity, but not until 2020
    - DB ask includes funding to top-up the RGC voucher scheme where necessary.

Mobile (4G and 5G)

- Connecting Cumbria is now responsible for mobile in the county, but a funded programme does not yet exist.

- Digital Borderlands is seeking funding to create that programme.

- Home Office 4G masts will be available commercially if they have a fibre backhaul.

- 4G solutions will count as satisfying the USO.

- Ofcom publishes detailed maps of 4G coverage:
    - https://checker.ofcom.org.uk/mobile-coverage

- 5G trials are taking place in Alston, but have struggled with the 700Mhz spectrum tests.

- 5G technology is evolving with city services now launched by EE, Vodafone and Three.

- Competitive bid process for a rural 5G trial was launched last month.
    - DCMS funding of £3m to £5m but with a 1:1 match requirement primarily from the private sector.

- Digital Borderlands mobile repositioned as 'outside-in' 5G.

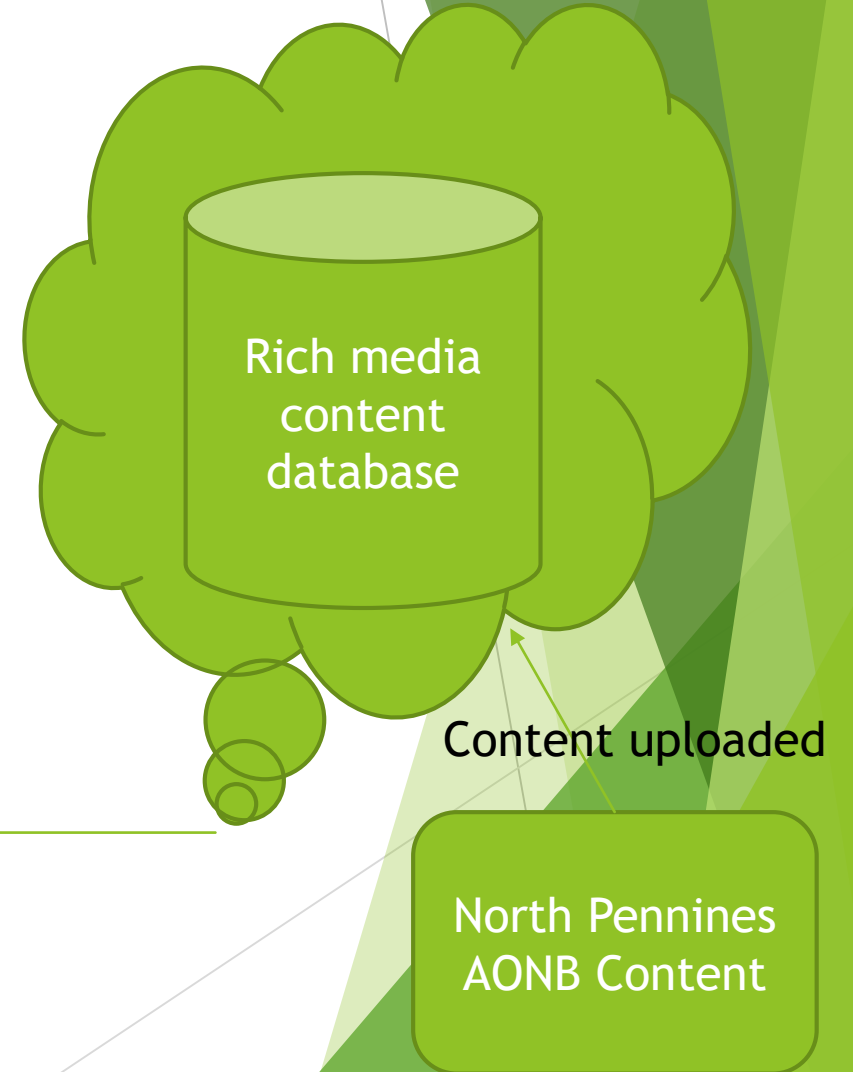# Tourism Augmented Reality

Delivered to 5G mast

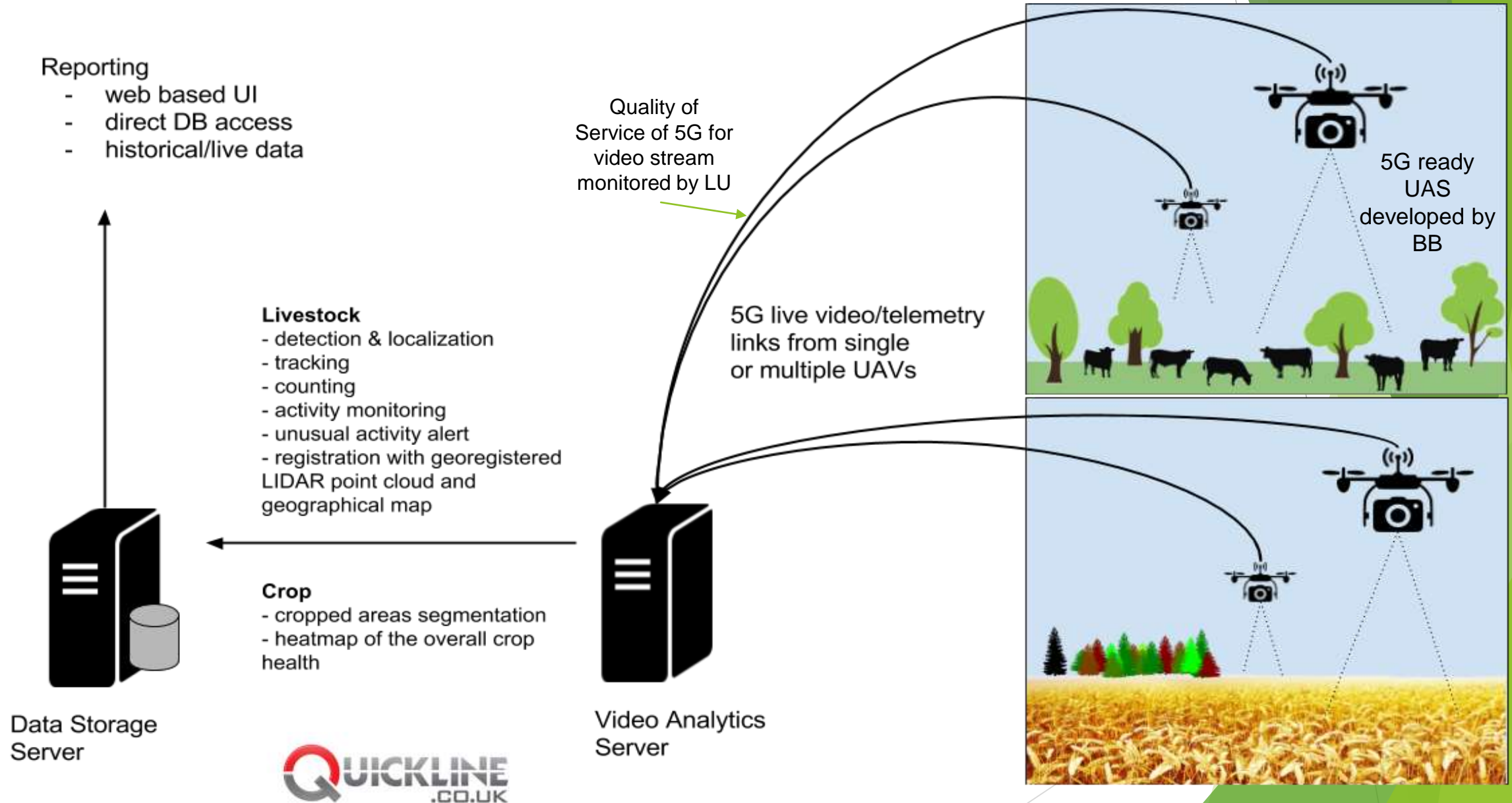Visitors to Epiacum access rich media content via WAM phone app

5G sent to local WiFi Hotspot @ Epiacum Roman Fort

Hotspot

Rich media content database

Content uploaded

North Pennines AONB Content

Precision Farming / Video Recognition

Reporting
- web based UI
- direct DB access
- historical/live data

Quality of Service of 5G for video stream monitored by LU

5G ready UAS developed by BB

Livestock
- detection & localization
- tracking
- counting
- activity monitoring
- unusual activity alert
- registration with georegistered LIDAR point cloud and geographical map

5G live video/telemetry links from single or multiple UAVs

Crop
- cropped areas segmentation
- heatmap of the overall crop health

Data Storage Server

Video Analytics Server

QUICKLINE
.CO.UK

AOB and further questions?

- thinkbroadband percentage coverage:

https://labs.thinkbroadband.com/local/councils

- BT broadband availability checker:

https://www.dslchecker.bt.com/