NI4CB – North Isles for Community Broadband

Update May 2014

The collaboration project between the North Isles, Northmavine and Skerries community groups to provide a broadband service that will deliver at a minimum next generation speeds (30 Mbps) continues to gain strength and make progress.

A technical options appraisal has been undertaken by Shetland Broadband, with funding for this accessed from Community Broadband Scotland. The report is being finalised and will be available for public viewing soon. Three technical options have emerged: an all fibre optic solution, an all wireless radiowave solution and hybrid option using fibre and radiowave technologies.

The partnership must now decide on the best long term option to offer a sustainable superfast broadband service to all residents across the target areas. Factors being considered are: cost effectiveness, reliability, installation, management, maintenance and durability.

Alongside our project it is essential to understand the progress of the Government's national Step Change programme that is being delivered by BT and the challenges that our project faces.

In the north of Scotland, the national programme is being managed by Highlands and Islands Enterprise through the Digital Highlands and Islands action plan, working with BT, and the aim is to deliver NGA (next generation access) to 84% of premises across the region by 2016 and 95% of properties by 2019. However the aspirations for Shetland are lower at 76% by 2016, although until surveys have been done this surely can at best be guesswork.

Currently, our project target areas contain the following exchanges that BT have identified for upgrading in 2015 and 2016: Hillswick, Ollaberry, Burravoe, Mid Yell and Gutcher. Some properties connected to these upgraded exchanges will receive NGA i.e. speeds 24Mbps or higher. Not all properties will be able to receive these speeds due to the limitations of the technology to work over distances greater than 1.5km from the exchange. Therefore, despite a property having a connection to an upgraded exchange, faster broadband speeds may not be available.

However, locations for the fibre rollout will only be announced when BT engineers carry out detailed local surveys and finalise plans. Shetland is not due to be surveyed until 2015. So, we have a problem therefore in trying to identify the areas in which properties will be able to receive superfast broadband speeds via the BT programme and those that will not. We anticipate our project moving ahead before these BT timescales and this would cause a greater divide in those connected to our service and those waiting for the BT service.

This causes great complications for our project as we are not able to offer our proposed broadband service to properties already connected to an upgraded exchange who receive next generation speeds. This is an issue relating to State Aid funding as properties can only accept one next generation broadband connection. But until BT confirm what postcodes will be provided for under their scheme, we cannot identify an accurate customer base for our project. This makes it very difficult to establish in a business plan, the viability of our project, especially as the exchanges that are due to be upgraded have the larger areas of population.

The wider context and our technical options

The ambition for better broadband provision is being driven at both European and National levels. The current EU targets for broadband provision for 2020 are for 50% of premises to be getting Next Generation Access (NGA), which they define as speeds of at least 30Mbps, by 2020. The target for the other 50% of properties by the same 2020 date, is for them to get speeds of 100Mbps or higher. In the UK the BDUK program is the main programme. At a local level in the Highlands and Islands of Scotland the programme is being delivered by Step Change, who bid for funding from BDUK.

The Step Change programme which is being managed by Highlands & Islands Enterprise (HIE) and delivered by BT is an approximately £150 million pound project. Its aims are to connect as many properties as possible to Next Generation Broadband, not to address the issues of those who have no or very poor broadband. There will of course be some inroads made in addressing some areas with poor or no broadband, but in general it currently falls to Community Broadband Scotland (CBS) to fill in the gaps, of which there are many. CBS supports the Step Change programme and aims to tackle the last 5% of hardest to reach communities.

These gaps in broadband provision were recognised at the recent North Isles Digital Forum meeting in Lerwick, where it was suggested by a number of people that any future funding should primarily target the people with no or very poor broadband. Tavish Scott MSP has recently written to the Scottish Executive to make this point.

The way the Step Change programme is set up, BT effectively have the first chance at delivering broadband to any area, irrespective of how many properties they can connect to NGA. There is however a maximum connection cost per property, which is substantial, and which they cannot exceed without HIE's approval.

To be allowed to provide a service to everyone in these areas we would have to apply to have the area/s "de-scoped" officially from the HIE/BT contract. This would mean that BT would not be able to bring grant funded upgrades to that exchange, however they could do so commercially, but we think that would be unlikely. However, existing ADSL services would still be available. While a request can be made to de-scope an area, BT do not have to agree to this. It would also be something which would require broad community support through extensive community engagement exercises.

Otherwise as State Aid rules preclude, properties receiving a service paid for by State Aid funding, twice. We will effectively have to wait until BT have upgraded the areas they want and then we can address any areas they have been unable to provide a service to. In most rural exchanges it is likely that our project would have to pick up at least half of the properties within an exchange area due to the distance of many properties from an exchange/cabinet.

The current estimates for the number of properties which Step Change / BT will be able to deliver Next Generation Access to, in each of our exchange areas, is shown in the table below. Please note the HIE definition of NGA is speeds of at least 24Mb, which is less than the 30Mb target set by the EU.

Exchange area	Current status	Planned upgrade date	No of properties getting NGA through Step Change*
Skerries	Exchange activate	No upgrades planned	0
Fetlar	ADSL 8Mb	No upgrades planned	0
Burravoe	ADSL 8Mb	July - December 2016	50%
Mid Yell	ADSL 8Mb	July - December 2016	5 properties
West Sandwick	Exchange activate	No upgrades planned	0
Gutcher	ADSL 8 Mb	July - December 2016	40%
Uyeasound	Exchange activate	No upgrades planned	0
Baltasound	ADSL 8Mb	No upgrades planned	0
Brae	ADSL 8Mb	July - December 2015	65%
Hillswick	ADSL 8Mb	July - December 2015	53%
Ollaberry	ADSL 8Mb	July - December 2015	54%
North Roe	Exchange activate	2015/2016?	25%

* Based on latest estimates but this is subject to survey and numbers may change.

Technology
In most of the planned upgrades, BT will be providing a Fibre to the Cabinet (FTTC) solution. In a few areas, such as Brae, BT may be providing Fibre to the Home (FTTH) option, this is also sometimes referred to as Fibre to the Premises (FTTP), they are both the same thing. It is unlikely that BT will, at least in the short to medium term, offer an FTTH option outside urban areas.

The FTTC model uses existing copper wires to deliver the service to your home. The service is deployed from cabinets which are connected to a fibre backhaul. These cabinets will often be near exchanges but may be located elsewhere so as to reach as many properties as possible. However the fact that they have to tap into the existing copper network to enable a service to each user, can put limits on their location. BT's current FTTC solution can offer speeds up to 80Mbps, but only to properties very close to the cabinet. By the time you are 1.5km wire length from a cabinet you are unlikely to see any advantage over existing services and speeds. FTTH means that a fibre connection goes from a cabinet to your home. This technology from BT can offer speeds up to 330Mbps and distance is much less of an issue. BT uses passive GPON technology to deliver FTTH.

The technology ni4cb are looking at installing will either be an all fibre system offering fibre to the home, a fully wireless system or a hybrid of the two. A hybrid system would probably have a fibre core with the connection to the end user probably done using wireless technologies.

The all fibre option would use active fibre technology and initially would offer at least 30Mbps but we aspire to have a system that can provide speeds of 100Mbps or higher. In the future, it would be very easily upgraded; the only practical limiting factor is the cost of the backhaul and the resulting charges to the customer. For example, the B4RN project in Lancashire have installed their own fibre network and offer their users a 1Gbps (1000Mbps) active fibre service. This is a community project led by volunteers that has connected thousands of properties to date.

If we opt for an all fibre system it would be active fibre which means each house gets a fibre pair. This has certain advantages over the GPON system used by BT. Feel free to Google active fibre verses GPON to see the technical and financial arguments.

If using the wireless option, a large network of masts would need be built to carry the core network with smaller mast handling delivery to the end user - and the realistic maximum speed would be 30Mbps. Higher speeds are currently not affordable with this technology as it would require very expensive equipment and substantial on-going maintenance costs could be add to this solution. The system would use a small external aerial on your house to receive the signal. Similar technology is currently being used in Fetlar and Vidlin. The downside other than speed is the life of radio equipment due to the salty air, requiring regular replacements. A positive is that the initial install costs are reasonable.

The hybrid system would still require nearly as many masts but they would generally not need to carry the core network so costs would be less. The same restrictions apply as in the wireless system. It would however allow the opportunity to connect in local access fibre at a later date when funds allowed.

Whichever system is chosen, links between islands will be provided by multiple Gigabit radios, to allow redundancy in case of equipment failure. The subsea cable option was considered to be very expensive to install and the time and costs of deploying ships to repair any breakages, given the lack of an alternate route, was found to be out-with acceptable parameters.

Our plans also include backup power supplies throughout the network, which would allow the system to operate for up to 24 hours, even in the event of a power failure.

Broadband Abbreviation table

Abbreviation	Name
ADSL	Asymmetric Digital Subscriber Line
BDUK	Broadband Delivery UK
CBS	Community Broadband Scotland
FTTP	Fibre To The Premises
FTTC	Fibre To The Cabinet
FTTH	Fibre To The Home
Gbps	Gigabits per second
GPON	Gigabit Passive Optical Network
HIE	Highlands & Islands Enterprise
ISP	Internet Service Provider
LAN	Local Area Network
Mbps	Megabits per second
NGA	Next Generation Access
NGB	Next Generation Broadband
OfCom	Office of Communications
VDSL	Very-high-speed Digital Subscriber Line
VoIP	Voice over Internet Protocol
WAN	Wide Area Network
WiFi	Wireless fidelity

Where do we go from here?

As you will appreciate from the information in the update, taking the project further has a number of challenges over and above what we were expecting. That said, we need to keep

the project on track, not least to help those in the position of having very poor or no broadband and no or little chance of improvement through the Step Change programme.

First steps:

- Technical Options Appraisal submitted to CBS
- We need further feedback from CBS on the postcodes that are available to our project
- Further meetings with MSP/MP and others
- Secure seed funding to move project forward (this will require a group to be established)
- Undertake a study visit to the B4RN project (Lancashire) to gather more information

Then:

- Engage with all the communities in the target area
- Set up a suitable organisation to take on the project probably a Community Interest Company or similar, including appointment of community Directors
- Get confirmation of what fibre (if any) Shetland Telecom can deploy
- Consider if the communities would support an application to "de-scope" some areas (even if the communities want to, BT still have to agree)
- A business plan needs to be prepared including information for prospective investors
- Consider sourcing funding for a temporary Project Officer
- Look at options for premises for staff/technical equipment
- Assess what skill are available locally

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