



Least cost, fastest to deploy NGA networks



About us...



About us...

The company



- In our 14th year of operation
- Providing broadband service in over 130 villages in Essex and Suffolk
 - Domestic
 - Commercial Provision (SOHO, SME, Bluechip)
- Full project, turn-key solution
 - Community project communications
 - Network planning (topographic & technical)
 - Network build
 - End user installation service
 - In-house user support
- Progress & Development
 - Fully registered Internet Service Provider
 - Direct peering (BBC, Google, Akamai and many more)
 - IPV6 compliant network
 - Operate our own direct fibre routes to London – to be extended to WB

About us...

Local Company / National Recognition



Engagement

- Essex County Council
- EALC & RCCE, CLA, FSB
- BDUK & BIS
- House of Commons
- House of Lords
- Colchester Digital Partner
- Chelmsford Diocese

Recent Press

- BBC Look East
- Politics Show
- BBC Essex Radio
- Essex Chronicle, EADT, Telegraph
- Songs of Praise

About us...

Digital Partner Colchester Borough Council



Selected Partner:

Competitive tender supported by an external assessment panel covering:

- Technology
- Financial wellbeing
- Customer support capability
- Community engagement





Equity Stakeholder in Joint Venture Company

Passing the following criteria:

- Ethical business
- Community centric
- Supporting Church mission to outreach and support rural communities



About us...

European Funding



Funded through the Rural Development Programme for England



About us...

NGA Compliant (Phase 2)



Department
for Culture
Media & Sport

Broadband Delivery UK



Not how... but why?



Not how, but why?

The drivers – is FAST, fast enough?



- Low-cost telephony (VoIP) – but telephony uses almost NO DATA
- Unlimited use of multiple devices (Games consoles, PCs, Laptops, phones, IPTv, cloud storage etc)

Well... yes... but...

Not how, but why?

The drivers – is FAST, fast enough?



- Future applications will drive greater use
 - **Cloud based computing**
 - Robotic and Symbiotic collaboration is the next step in computing/evolution
 - **Telehealth / Home diagnostics**
 - The NHS is NOT broken... it's just "old fashioned"
 - **Domestic consumption**
 - 5 years ago the majority of data consumption was corporate, its now domestic
 - 4k TV... 8k TV... How about Holographic TV?
 - CCTV/Security/remote monitoring
 - Smart Homes, Smart cars - Everything talking!
 - **Change in Culture**
 - Real-time services (streaming, gaming etc)
 - Software-as-a-service

And a host of applications and uses requiring ever more bandwidth

that we have yet to even imagine

Understanding the technologies (The differences)





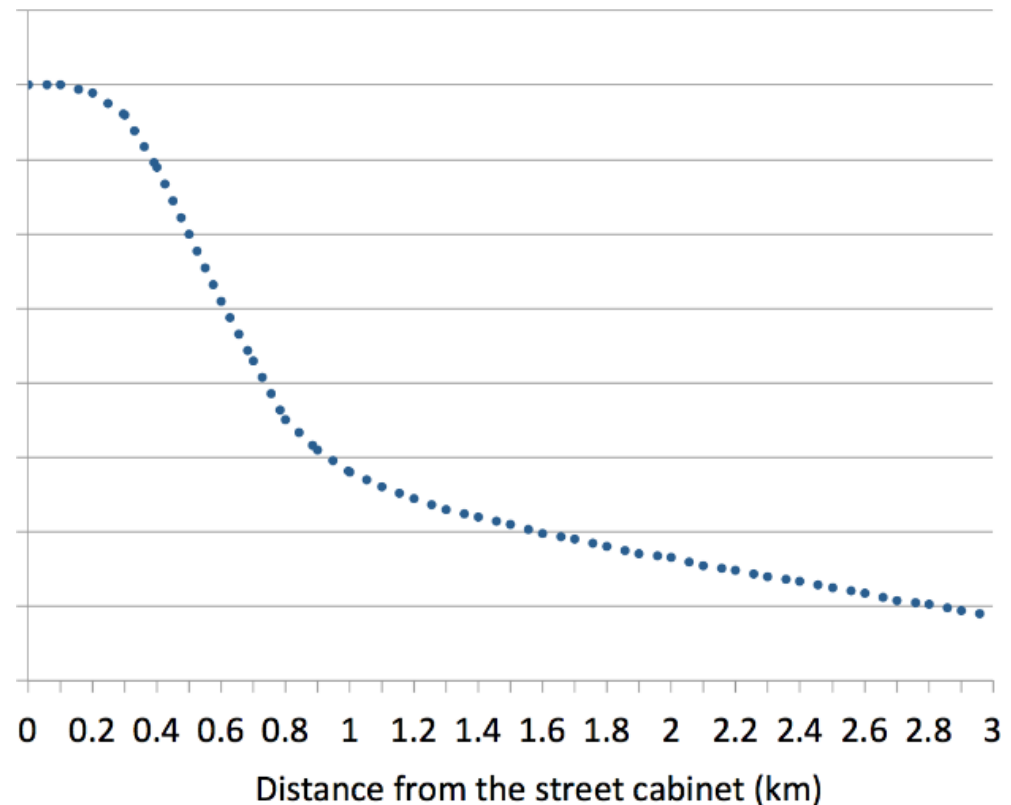
- Copper
- Fibre to the Cabinet (FTTC)
- G-Fast FTTC
- Satelite
- Wireless
- Hybrid - Fibre to the Air (FTTA / Wireless)
- Fibre to the Home (FTTH)
 - GPON
 - Point to Point

Understanding the technologies

The problems with copper

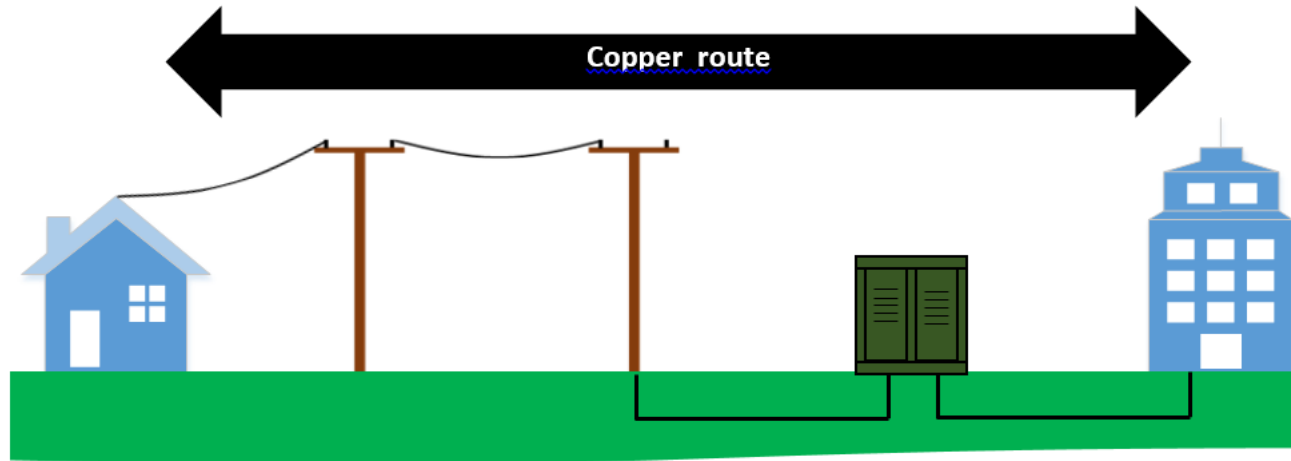


- Broadband doesn't "like" travelling down copper wire
- Loses speed rapidly over even small distances on copper
- Asymmetrical service
- Copper lines have degraded
- 50+ year old technology
- It can go "missing"!



Understanding the technologies

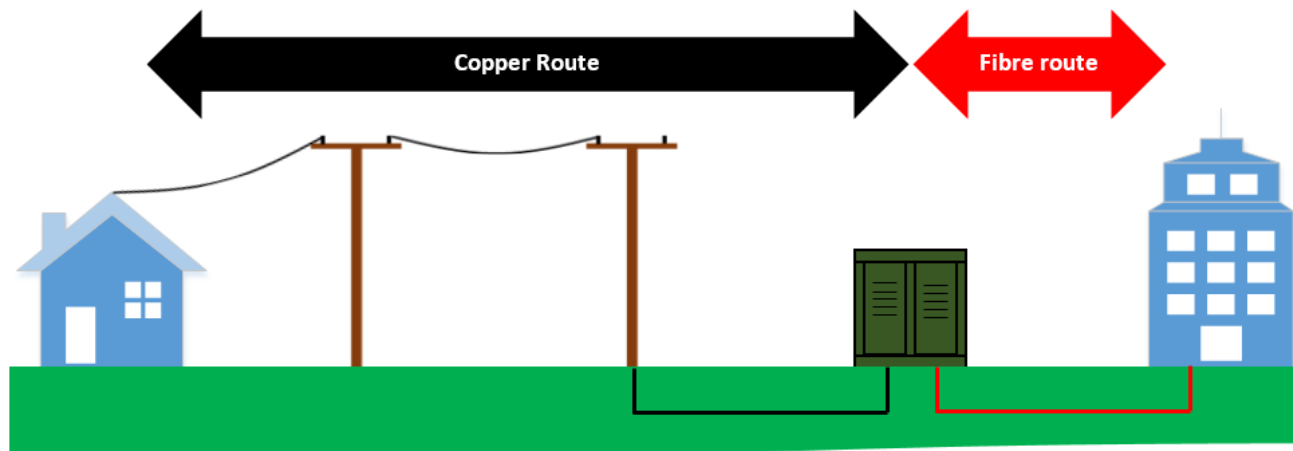
ADSL - Copper



- Copper from exchange to the home
- Slower with distance (attenuation)
- Max (up to) speed (24Mbps) = FINITE
- Asymmetrical service
- Still uses 50+ year old copper network

Understanding the technologies

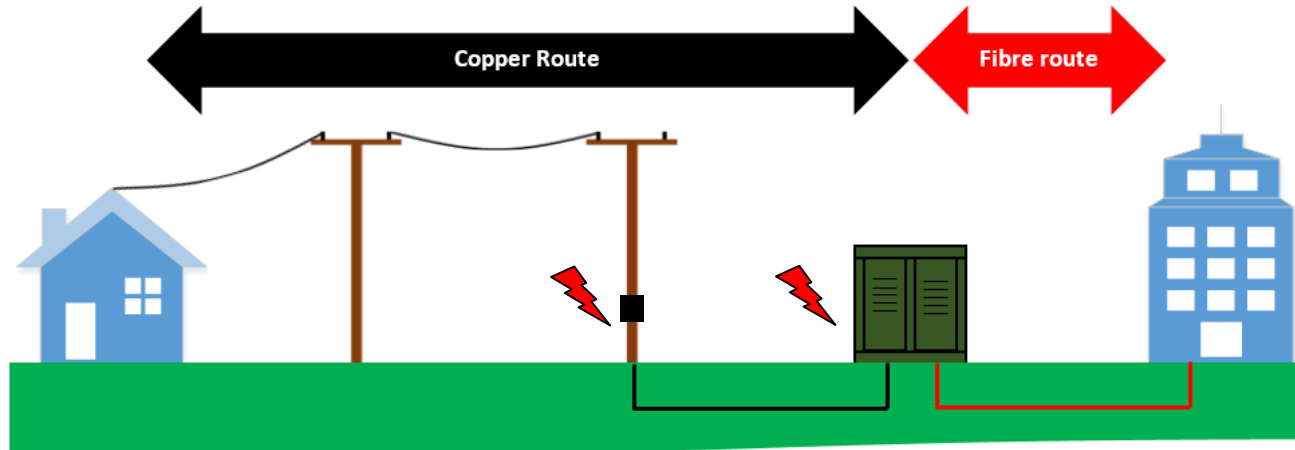
FTTC – Fibre & Copper



- Fibre to the cabinet only – this is NOT fibre broadband!
- Slower with distance (attenuation)
- Max (up to) speed (80Mbps) = FINATE
- Asymmetrical service
- Still uses 50+ year old copper lines

Understanding the technologies

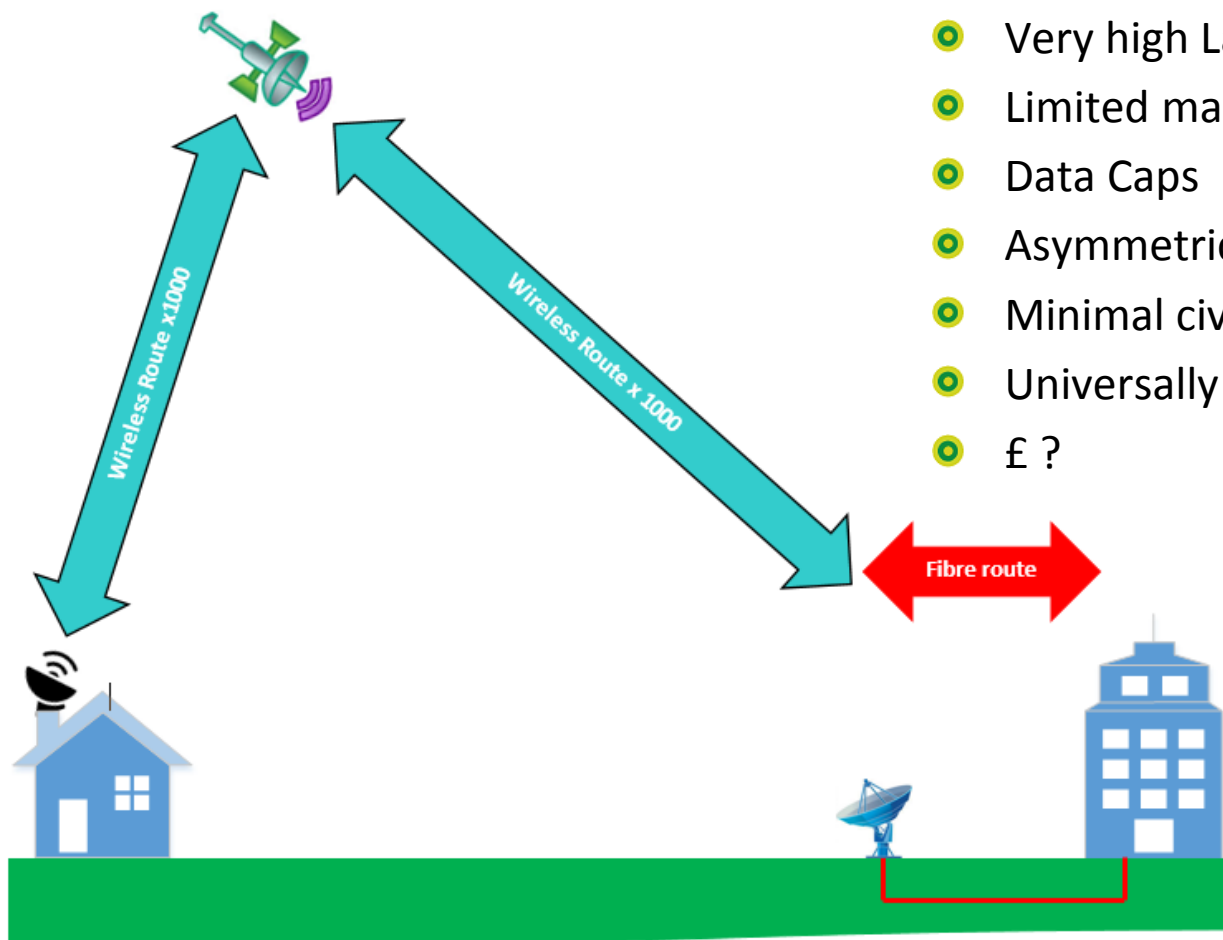
G-Fast – Fibre & Copper



- Requires electricity to the pole
- Fibre to the cabinet only
- Interference due to amplification
- Max (up to) speed (15Mbps to 1Gbps) = FINATE
- Slower with distance (dramatic attenuation after just 300 yards!)
- Asymmetrical service
- Still in trials/development
- More money (lots), old tech: Still uses 50+ year old copper lines

Understanding the technologies

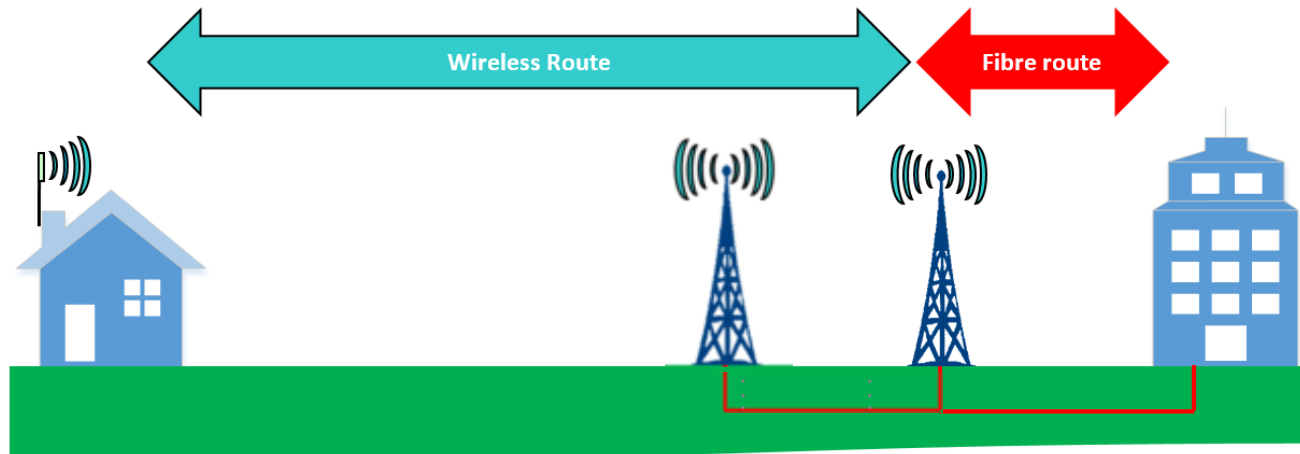
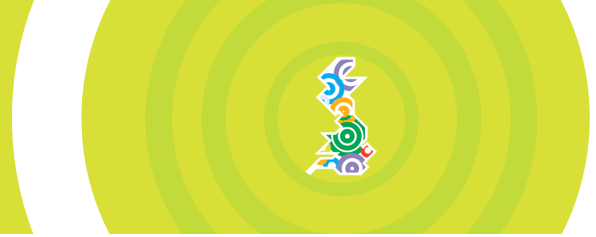
Satellite



- No Copper!!!
- Fibre to the transmission base
- Very high Latency
- Limited max speed (30Mbps) = FINATE
- Data Caps
- Asymmetrical
- Minimal civil works/environmental impact
- Universally available
- £ ?

Understanding the technologies

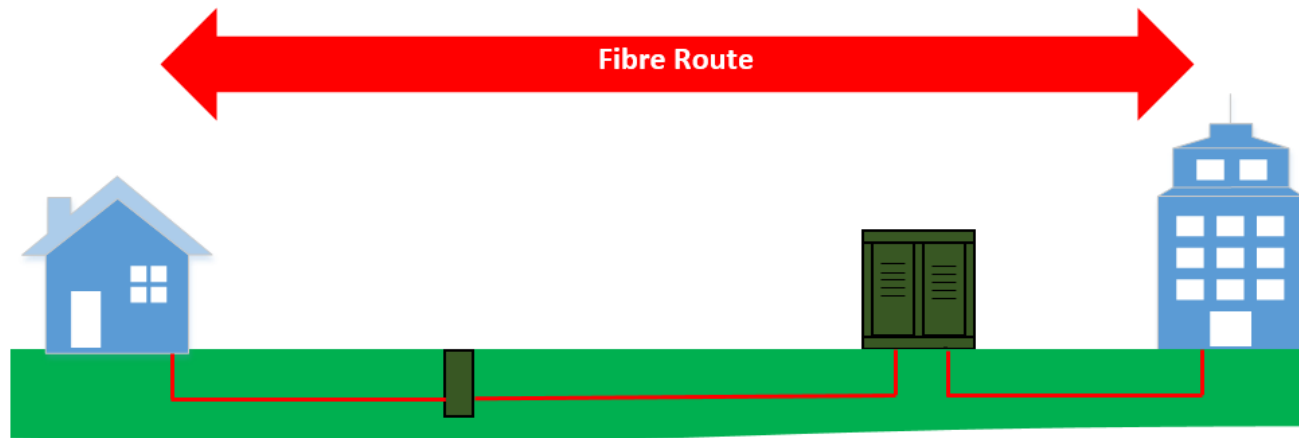
FTTA – Fibre and Wireless



- No Copper!!!
- Fibre to the tower
- Max speed 5Gbps + = FINATE
 - Point-to-Point (1-5 Gbps) Backhaul links into village/farm/business park
 - Point-to-Mult-Point (32Mbps currently, 100Mbps now being deployed)
- Symmetrical
- Rapid Deployment
- Minimal civil works/environmental impact
- Higher maintenance (multiple nodes)

Understanding the technologies

FTTH – Fibre



- Fibre to the home
- Max speed (1000Mbps, INFINITE... 5, 10, 100Gbps and beyond!)
- Symmetrical service
- Does not use any copper infrastructure (or require a telephone line)
- Overhead and underground variants according to terrain
- Low maintenance, high build cost
- Civil works required

How we
currently do it...
(FTTA)



How we currently do it

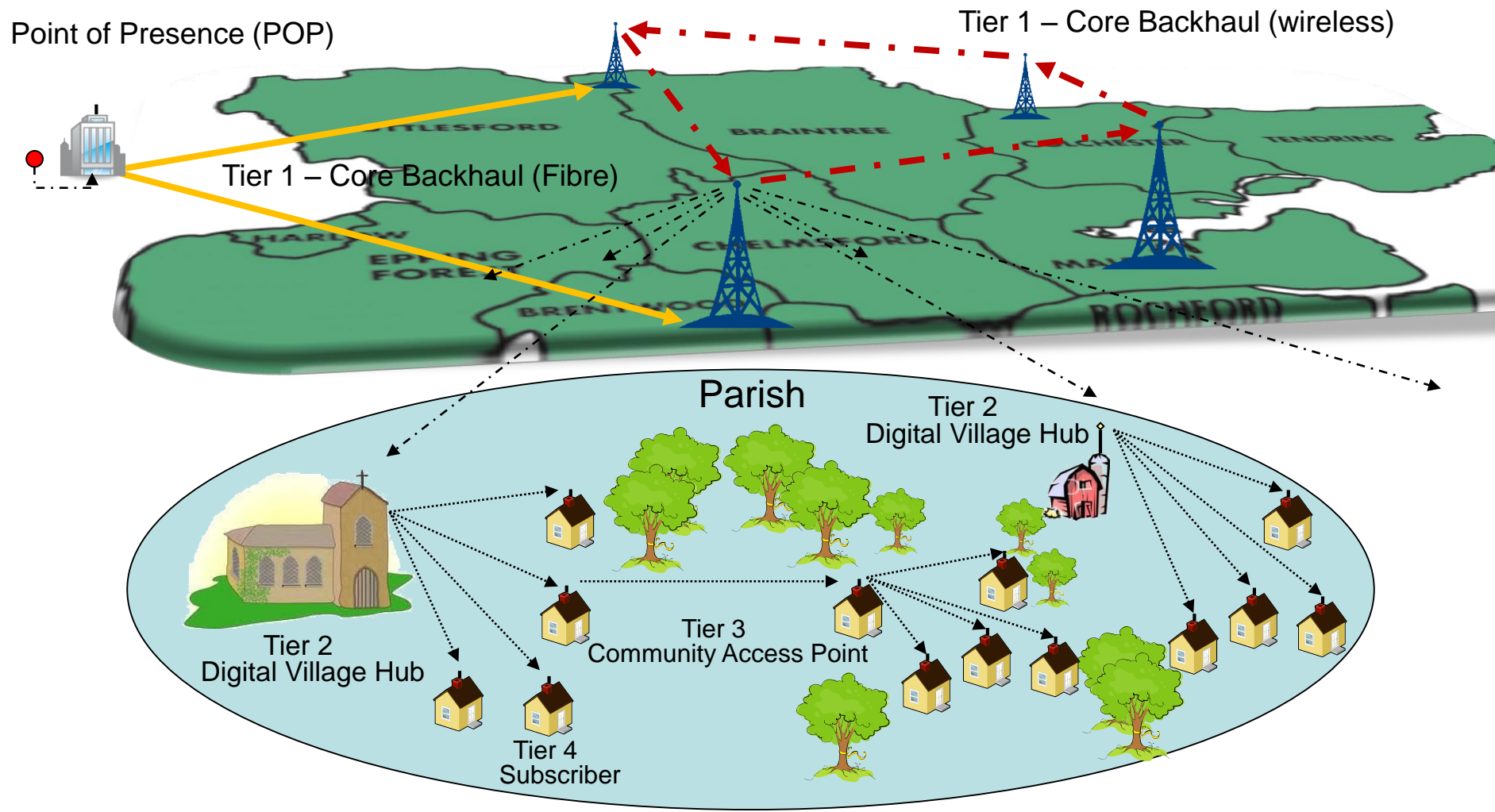
What it takes to provide broadband



- Ability to plan and build a network
 - Access to high-speed Backhaul
 - Mid-mile provision
 - Last-mile distribution
- Niche market attraction
- Viable business case

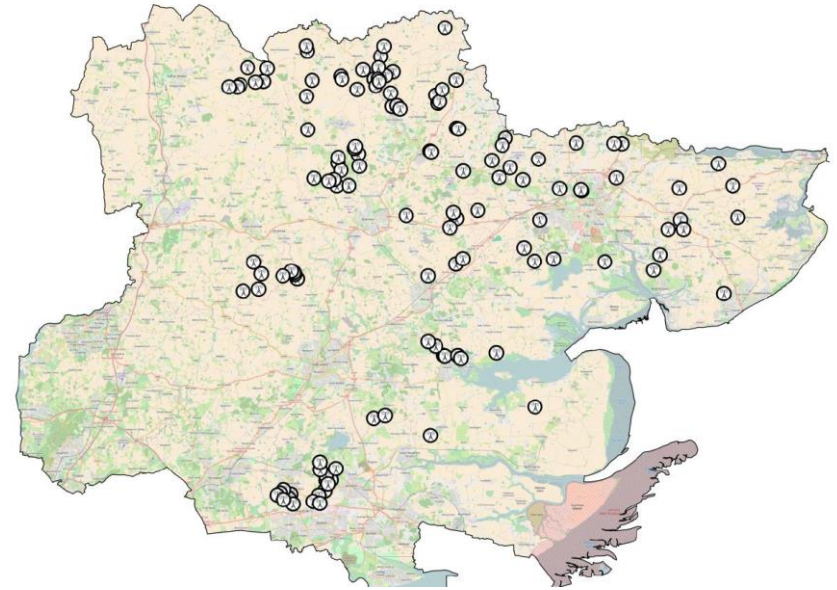
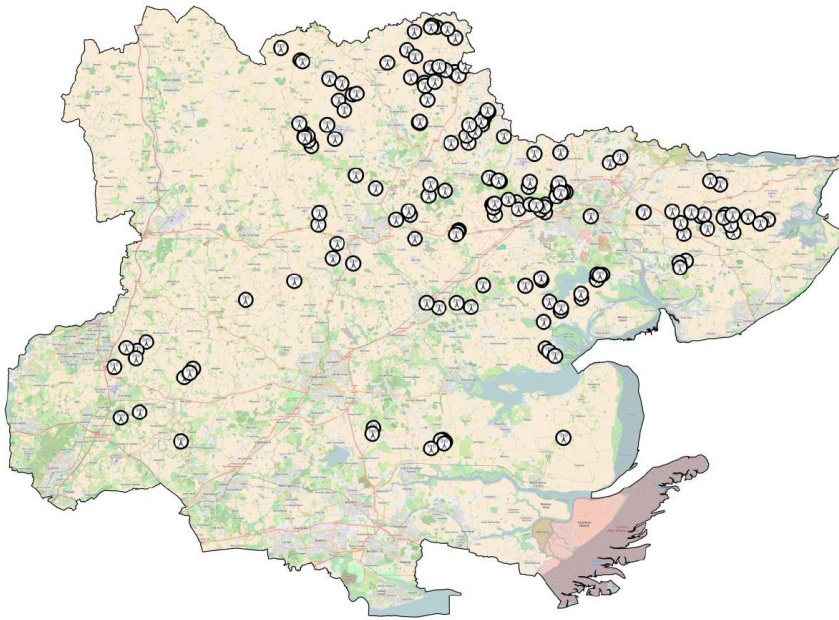
How we do it

Network Build – Fibre to the Air



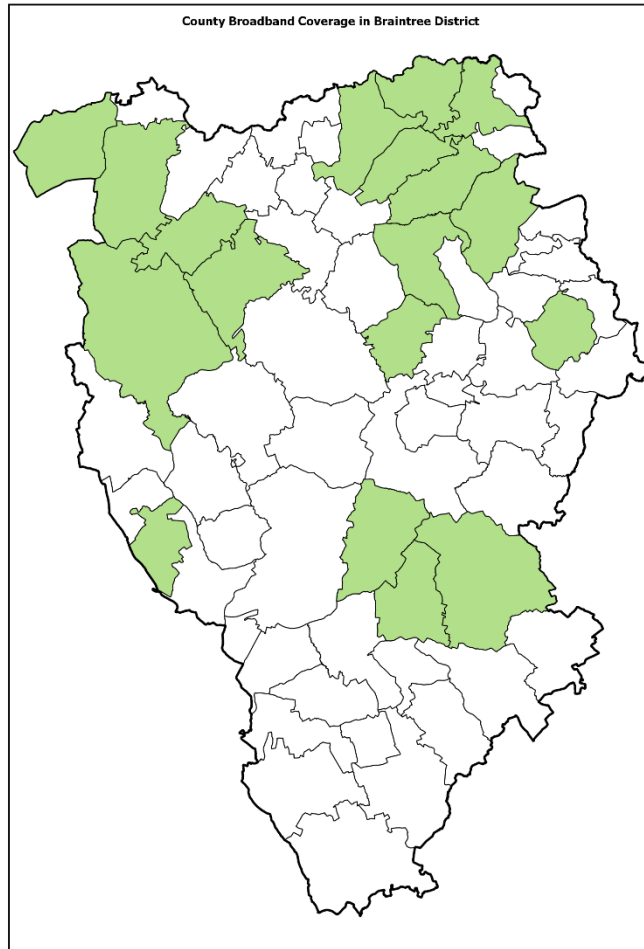
About us...

Existing “significant” village coverage in Essex



About us...

Existing “significant” coverage in Braintree



Alphamstone
Belchamp Otten
Belchamp St. Paul
Belchamp Walter
Bradwell
Bulmer
Coggeshall
Finchingfield
Foxearth
Gestingthorpe
Great Maplestead
Helions Bumpstead
Pentlow
Stambourne
Steeple Bumpstead
Stisted
Toppesfield

About us...

The technology



Point-to-Multi Point:

- Gen 1 = 2 Mbps
- Gen 2 = 8 Mbps
- Gen 3 = 32 Mbps
- Gen 4 = 100 Mbps (Symmetric) services
- Gen 5 = ??

Point-to-Point:

- Spectrum related, now up to 10Gbps (80GHz)

Building a FTTH Network



Building a FTTH Network

Essex Village



Building a FTTH Network

Essex Village



Balancing Topology with Capacity



Balancing Topology with Capacity

Some facts...



- 90-95% “wired Superfast FTTC” coverage = only **30% of landmass in rural areas**
- How much fibre can we practically deploy & how close to the home/device
- How many devices will connect by wire & by wireless, therefore:
How many wireless access points do we need & where
- 5G will require more than 10 x as many full tower sites
- 3G & 4G currently only account for 5% of the traffic...
- WiFi is still the default hand-off for data (45%-50% traffic)

- The key will be to run fibre out to the wireless node
- Depth of fibre penetration will get closer and closer to the end user/device over time

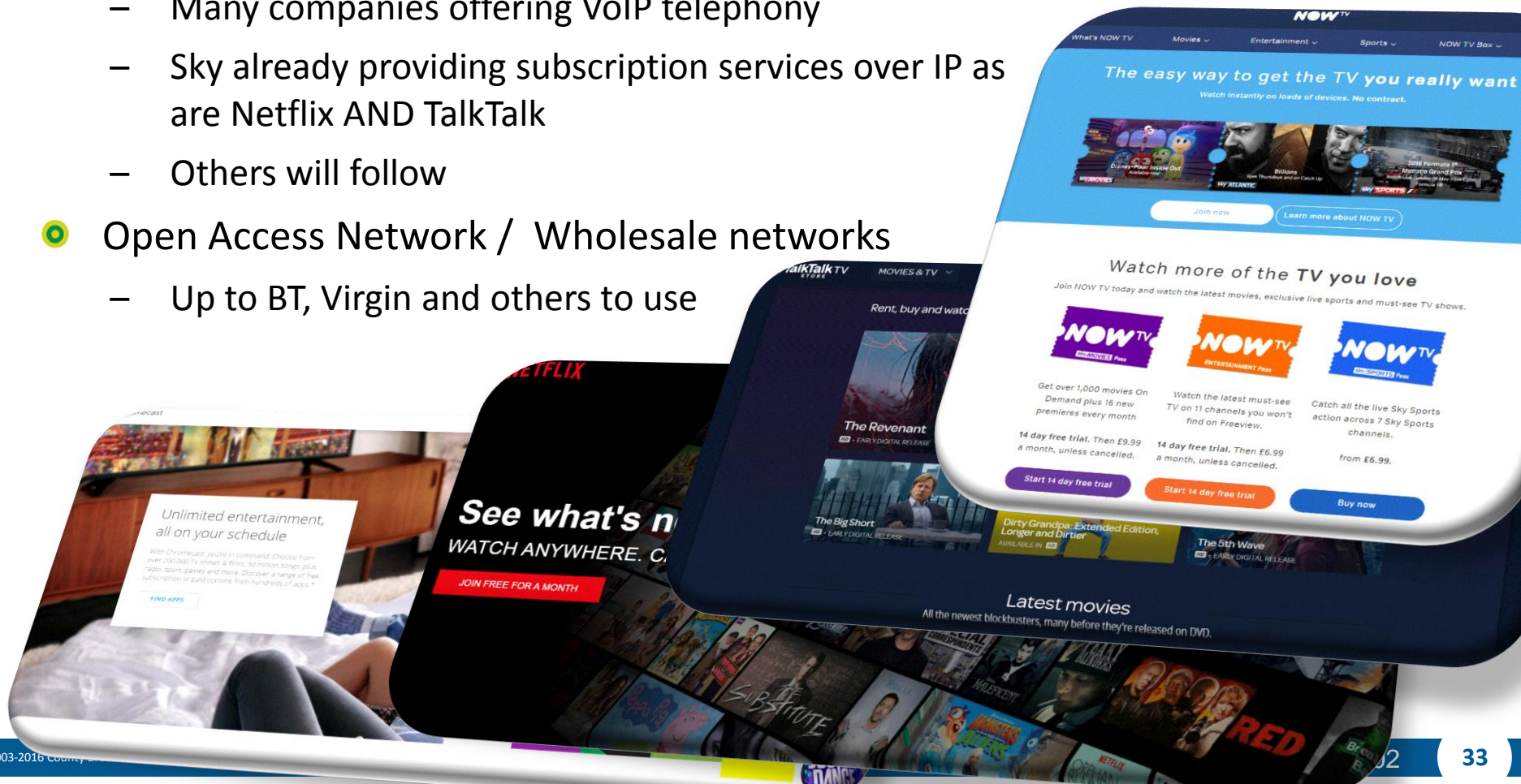
Can “Alternative Networks” compete?



Can “alternative networks” compete? Entertainment?



- Pricing? Yes
- Services? Yes
 - Many companies offering VoIP telephony
 - Sky already providing subscription services over IP as are Netflix AND TalkTalk
 - Others will follow
- Open Access Network / Wholesale networks
 - Up to BT, Virgin and others to use



Can “alternative networks” compete?

It's all “IP”



- IP is a “common standard”
- Not using copper means:
 - Distance between “exchanges” now 10 x further
 - Amount of switching equipment now 10 x less
- In the future:
Content should not be linked to the Network provider
You don't need to buy your television set or your internet service from the BBC to watch it!



Thank you



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The Church of England
in Essex and East London
Diocese of Chelmsford



Colchester Digital Partner



The European Agricultural Fund
for Rural Development:
Europe investing in rural areas



Department
for Environment
Food & Rural Affairs