



## RTT TECHNOLOGY TOPIC July 2011

### The Pole Tax Repurposed

This month's technology topic is nominally about telegraph poles also known as utility poles but telegraph poles are in effect a proxy for regulatory and competition policy so the discussion will be broader.

Have a look outside your window at the nearest telegraph pole. Have a look at what is on it, probably either power lines or twisted pair then consider how long the pole has been there, who owns the pole, maintains the pole and makes money out of the pole and then consider other uses for the pole, what else the pole could profitably be used for. It might also be useful to have a look at some of the other street furniture including telecommunication street cabinets, lamp posts and camera installations and to consider what goes on beneath our feet as well.

It does not take long to come to the conclusion that the way 'stuff' is delivered is not particularly efficient or effective. This is nothing new and before we grapple with those poles let's take a short journey underground and take a look not at telecommunications but at the sewage system.

In the 1840's parliament ruled that all houses in London should drain into sewers which then ultimately ended up in the Thames which became too contaminated to drink. There were several outbreaks of cholera and in 1858 the smell of the Thames (The Great Stink) caused Parliament to go into recess. As a result Sir Joseph Bazalgette was commissioned to turn 318 million bricks into the sewer system that still (just about) evacuates London today, a process started in 1859. Bazalgette constructed wide sewer tunnels replacing the narrow bore pipes used before. This allowed the system to cope with subsequent increases in volume. By 1866 most of London was connected to the network.

The supply side (water mains) also needed a major redesign and rebuild.

This resulted in a sewage infrastructure that is still more or less serviceable 150 years later albeit in urgent need of a £4 billion upgrade. On the supply side more than half of the water mains are more than 100 years old. About a third of our water in London is lost through leaking pipes before it gets to our home. This is inconvenient. London gets less annual rainfall than Istanbul or Rome and we are profligate in the way we use water. Many people in the world exist on 10 liters of water per day. We use this in one flush of the toilet. Nevertheless we owe a debt of gratitude to Mr Bazalgette for ensuring a reliable supply of clean drinking water and for providing a sewage system that works, most of the time.

Some general points.

This was a massive undertaking but resulted in an infrastructure that has remained serviceable for 150 years. This was only possible because it was massively over dimensioned and paid for from government funds. A 50 year return might be considered acceptable to a pension fund, a 150 year return might be considered over long but the longer the infrastructure lasts the greater the social and economic return. There are still Roman aqueducts in use today.

These are two way delivery system and therefore conceptually similar to telecommunications. The 360,000 miles of sewer in the UK have become host to fiber systems over the past ten years but not all of the private sector initiatives have gone according to plan either in the UK or Australia where as at 2011 legal disputes are in process. This is almost inevitable considering the short term investment horizon that the private sector has to work to or chooses to work to and the implicit long term return of this sort of investment including a social return, in this case health, that cannot be reflected in a profit and loss account or corporate balance sheet.

## What does this have to do with telegraph poles?

The first public telegraph service in the world began in 1839, with two Cooke and Wheatstone machines either end of a 13 mile stretch of cable running 13 miles (21 km) alongside the Great Western Railway from London Paddington to West Drayton. In parallel Samuel Morse developed his system of dots and dashes used in the first telegraph from Baltimore to Washington in 1843. The initial idea was to bury the cable under ground but this proved unreliable and the telegraph pole was invented.

The extension of the telegraph system across the US and subsequently in other big places like the Australian outback was dependent on finding sources of local timber for telegraph poles, preferably Douglas fir or Pine, hard to find in desert areas. The wood then needed to be pressure treated against rot and insect and woodpecker attack. Such mundane material considerations had and still have a direct impact on ongoing operational costs (the replacement cycle of telegraph poles) and cost per bit or in this example cost per dot and dash.

Fast forward 150 years. In March 2010, Virgin Media, a company started by Richard Branson announced plans to trial a 50 Mbps fibre service over telegraph poles to a remote Berkshire village. This followed a long battle with BT to get access to BT duct space and poles. The arguments for and against illustrate the ongoing dilemma posed by the question as to who really owns those poles. The answer at least morally if not legally is that we do.

BT can accurately claim to be the world's oldest telecommunications company with origins that can be traced back to the Electric Telegraph Company founded in 1846. The companies and early private investors in the telegraph system mostly ran out of money in a process closely parallel to the railway boom and replicated more recently when the channel tunnel was built with private finance. With the telegraph companies, the public sector had to take over the failed telegraph businesses and became by default a competitor to the surviving private sector companies. The take over 'vehicle' as it would be described today was the General Post Office, after all this was just another two way communication service. The GPO was run as a government department.

In 1912 the GPO became the monopoly supplier of telephone services in the UK. A few local authority services survived for a while though the only long term competitor proved to be the city telephone department in Kingston upon Hull, a town that has managed to successfully defy commercial logic both in telecommunications and bridge building but not in fish. In 1932 the idea was put forward that the GPO should become a nationalised industry but no progress was made on this until 1965 when the corporation was split into two divisions: Post and Telecommunications, ratified in the Post Office Act of 1969 which then became two individual corporations with Post Office Telecommunications becoming British Telecom in 1980.

And then everything started changing again. The British Telecommunications Act of 1981 introduced the concept of competition, empowering the Secretary of State to license other operators to run telecommunications systems and accept user equipment supplied by other third parties provided the products complied with performance and quality benchmarks set by the British Standards Institute, a process described then and now as liberalisation. In 1982, Cable & Wireless were licensed to run a public telecommunications network through a subsidiary, Mercury Communications and the government announced its intention to privatise British Telecom, a decision ratified by the Telecommunications Act of 1984.

Two years earlier the UK had awarded two cellular licenses to consortia led by BT and Racal Millicom. The £25K license fee was considered to be expensive by the financial analyst community and Racal's prediction of 250,000 UK cell phone users by 1989, over three times more than the estimates of rival bidders was considered dangerously optimistic. By 1999 Racal (Vodafone) and BT (Cellnet) together had 1.1 million customers. Early business plans were predicated on high priced mobile or transportable handsets, low penetration (under 2%) and low network cost to achieve profitability. BT and Securicor invested £4 million each in the original business plan.

In July 1999 British Telecom bought Securicor's 40% stake in Cellnet for £3.15bn making the mobile phone operator its wholly-owned subsidiary. Cellnet had made £118 million profit the previous year. The business, by then re branded as O<sub>2</sub>, was sold to Telefonica in 2005 for £18 billion.

In that sense liberalization was good for BT and to all intents and purposes for the government who sold all remaining shares in the business in July 1993 raising £5 billion for the Treasury and introducing 750,000 new shareholders to the company.

In parallel in 1991 the government had announced the end of the BT/Mercury duopoly of wire line provision. Independent 'retail' companies were permitted to bulk-buy telecommunications capacity and sell it in packages to business and domestic users. Feeling squeezed in its local market, BT set off on a series of foreign adventures.

In June 1994, BT and MCI Communication Corporation, the second largest carrier of long distance telecommunications services in the US, launched a \$1 billion joint venture company providing advanced business services. BT subsequently acquired a 20 per cent holding in MCI which was then sold to Worldcom for \$7 billion, a profit of more than \$2 billion on its original investment.

In July 1998 a 50:50 joint venture with AT and T was announced but wound down when the market turned down in 2002. AT and T has subsequently been modest in its international ambitions.

In December 2000 BT was forced to offer local loop unbundling (LLU) to other telecommunications operators, enabling them to use BT's copper local loops. By the end of August 2005, 105,055 lines had been unbundled but ten years on this remains an uneasy innovation with some hard to resolve technical problems (Addressed in last month's technology topic).

In July 2003 The Communications Act introduced a new regulator, the Office of Communications (Ofcom) and a new regulatory framework in which companies could be given a general authorization to provide telecommunications services subject to general and specific conditions including for example universal service obligations.

In the summer of 2004, BT launched an industry consultation for BT's 21st century network (21CN) programme. Billed as the world's most ambitious and radical next generation network, it promised to transform the communication infrastructure of the UK by 2010 *'Using internet protocol technology, 21CN will replace the existing networks and enable converged multimedia communications - from any device such as mobile phone, PC, PDA or home phone, to any other device'*

A business called Open reach was set up to manage the UK's telecommunications infrastructure, treating the rest of BT on an equal basis as other operators. It was one of four businesses within the BT Group alongside BT Retail, BT Wholesale and BT Global Services and was presented by BT as signifying its final transformation from 'a traditional telecoms company to a leading provider of converged networked services'.

So did the UK tax payer get a good deal and has the process of liberalisation generated additional value and if so who owns that value? Well the transformation of the UK's telecommunications infrastructure did not happen and it is still unclear how BT can finance this and still live with a Universal Service Obligation that includes the requirement to deliver broadband to remote rural areas.

The solution might of course be technology innovation or commercial innovation or ideally a combination of both.

In 1968 The Post Office bought a disused airfield in Martlesham as a new home for what had previously been the Dollis Hill Research Centre (in Dollis Hill in North West London). BT Martlesham built on the Dollis Hill legacy to create one of the largest and arguably best telecommunication research centres in the world. In 2006 BT was still able to claim a world leadership position in R and D and was able to claim second position to NTT in terms of absolute spend though with this equating to 3.7% of BT's turnover and 2.9% of NTT's turnover. The R and D spend had doubled from a 2001 level of £361 million.

To quote the 2006 DTI/BT joint Press release

BT director of research and venturing Mike Carr said: *"Our increased R&D spend is a clear indication of our success in transforming BT from a traditional telco to a networked IT services company through innovation. Mike said there were three reasons why BT has invested more in R&D: the increasing level of networked IT business it performs; the massive investment in the 21st century network; and the new*

*products and services it develops - such as the digital TV service BT Vision, the wholesale mobile entertainment service BT Movio and the ground-breaking fixed-to-mobile service BT Fusion'.*

These statements are always a hostage to fortune.

BT Movio and BT Fusion both turned out to be a poor use of R and D resources. BT Vision has however been a success and combined with a return to financial health of the global services business explains BT's profit recovery. In June 2011 BT Vision started providing access to BBC iPlayer as an IPTV service providing access to 400 hours of BBC TV and 1000 hours of radio programmes. This suits all parties reasonably well. The BBC gets a wider audience and another distribution channel which they don't need to pay for. A bigger audience helps make the case for a continuation of public service funding but also helps create income opportunities for BBC Enterprise. BT Vision sells more subscriptions at a higher value.

### **The impact of technical and commercial innovation on delivery economics**

The economics of broadband delivery are dependent on delivery innovation which in turn is dependent on research and development. It is the technology innovation that provides the basis or should provide the basis for commercial innovation. Regulatory and competition policy should facilitate rather than frustrate this process. BT's research and development spending has at least in part been sustained by the profits made from a monopoly and then duopoly position in which the incumbent (BT) retained legacy advantage.

This advantage was then translated into a gain to the treasury through the privatisation process though most of this money was then absorbed into higher priority spending including defence. A similar fate befell the income from the UK spectral auctions.

The grand plans to transform the fixed line infrastructure by 2010 have slipped five years to 2015 and the government's exhortation that BT should deliver broadband to rural areas has minimal collateral given that the company's first duty is now to its shareholders who have no direct reason to want to undertake a loss making venture. The only way the government could provide incentives to BT to bridge this 'digital divide' would be to trade a relaxation of competition policy against an extended broadband universal service obligation.

And that is where telegraph poles may come into play as enablers.

Installing fibre optic on telegraph poles requires specific changes to existing planning laws and will then require significant investment which BT is unlikely to want to make if forced to facility share with other third parties. To re use the well worn motivated donkey aphorism, regulatory and competition policy is therefore the carrot and the stick in a new world of liberalised telecommunications provision.

Its effectiveness is yet to be established.

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**00 44 208 744 3163**