



## RTT TECHNOLOGY TOPIC May 2013

### Spice Routes and Silk Routes and the economics of long distance fibre

#### Spice Routes and Silk Routes – the 4000 year perspective

Trade routes were first established by Neolithic tribes around 10,000 BC. Trade routes are pipelines along which commodities are moved. The commodities that dominated the early trade routes, for example spice, precious stones and silk, increased in value as a function of distance and time.

The importance of the spice routes and silk routes has been much analysed by historians. By 3000 BC, Egypt, Arabia, India and Greece were interconnected by the Red Sea and overland routes providing the basis for trading profits that in turn determined the distribution of economic and political power.

Profits increased as transport became more efficient. The Phoenicians, the Greeks and Egyptians (though interestingly not the Romans) became expert ship builders. The supremacy of Venice as a gateway to Western European markets between the 8<sup>th</sup> and 15<sup>th</sup> century was a direct product of maritime strength. At its peak in the 13<sup>th</sup> century 36,000 Venetian sailors operated 3,300 Venetian ships.

In the mid-15<sup>th</sup> century the rise of the Ottoman Empire resulted in taxes being imposed on western merchandise being moved overland. This resulted in the discovery, or more accurately rediscovery of the sea route around Africa in 1497 by Vasco Da Gama – the basis for the expansion of Portugal as a trading nation. In the 16<sup>th</sup> century Columbus and Magellan established the westward trade route to the Philippines, discovering America on the way and circumnavigating the world (in 1522).

Several thousand years of well documented history provide us with a detailed understanding of the interrelationship of transport cost, transport time (speed) and trading profit, the direction in which material value flows and how and why value ownership changes over time. Trade routes also yield information value – the dark art of espionage, communication value and cultural assimilation.

#### Telecommunications Trade Routes – submarine cable and fibre

For 60 years from 1850 to the First World War, British submarine cables, the telecommunications equivalent to a trade route, dominated the world's most important markets connected by the North Atlantic ocean. By 1892 British companies owned and operated two thirds of the world's long distance cables connecting India, Australia and New Zealand.

The first Trans Pacific cables were completed in 1902 providing alternative routes from the US via Hawaii and Guam in the Philippines.

The strategic importance of submarine cables was highlighted in the First World War when the UK cut the five cables connecting Germany and the US, forcing Germany to rely on wireless communications which were then intercepted.

The first transatlantic telephone cable was opened in 1956 (36 telephone lines) and the first transatlantic optical fibre went live in 1988.

#### The boom and bust years

Up until 1997 these cable/fibre roll outs were financed by operator consortia. Between 1999 and 2001 there was a gold rush of private sector investment of the order of \$22 billion dollars followed by a wave of bankruptcies.

Owning a trade route is not a guarantee of financial viability and the basic rules of supply and demand apply.

The merchant traders of the Middle Ages made money from their knowledge and understanding of the markets that they served. They managed supply and demand but also had access to the capital needed to cover shipment and expedition costs.

The British had similar supply and demand side advantages in the 19<sup>th</sup> Century, combining an ability to raise capital with the demand potential of a huge geographically diverse colonial empire.

Cable and Wireless and British Telecom were long term beneficiaries of that dominance as were STC and other parts of the telecommunications supply chain. This is a long term game that rewards deep pockets and patient investors.

### **Revaluing capacity**

But looking at the market today it is hard not to come to the conclusion that those long distance optical trade routes snaking their way underneath the oceans of the world might be ready for some revaluation.

This is partly due to aggregated traffic growth, a consequence of national broadband network investment and wireless infrastructure investment in developed and developing economies and the growth of the internet and World Wide Web.

### **Revaluing speed (end to end latency)**

It is also due to an increased demand for low latency trans-Atlantic and trans-Pacific connectivity.

Present examples include a new 6000 km fibre connection between the East Coast of the US and London with sub 60 millisecond latency. This is five milliseconds better than existing turn of the century (year 2000) fibre. Given that a millisecond can be worth millions of dollars a year in trading profits for a large hedge fund or trading institution, the economics of this look positive. Mind you it also means they can lose your money faster as well.

The latency gain is achieved partly through the use of low latency fibre and repeater technology and partly by more accurate adherence to the Great Circle Route which shaves about 500 kilometres from other routes. Landfall is in Somerset rather than Cornwall. A British ship is laying the cable... carefully. <http://www.hiberniaqfn.com/>

Plans to provide enhanced connectivity between Ireland and the US East Coast are based on similar assumptions with less distance to cover shore to shore.

<http://www.pipiperinfrastructure.com/2011-the-year-ireland-became-home-of-the-cloud/>

### **The satellite model revisited**

It can be argued that the economics of long distance trans-Atlantic and trans-Pacific fibre is following the trajectory (figuratively speaking) of the low earth orbit satellite sector, also marketed on the basis of low end to end latency. These networks enjoyed an initial rush of investment followed by bankruptcy followed by a transition to sustained profitability. Given our global reliance on these hidden assets this is a positive transition and highlights an area where telecoms technology is delivering significant economic and social value on a global scale.

### **Nutmeg and numbers – the same but different**

Whether it is nutmeg or numbers being moved, the financial mechanics of trade routes are essentially the same with one important difference.

Nutmeg, as one example of a traded spice on the spice route, has a finite supply and demand – there is a limit to the amount of nutmeg we could or would want to eat and could we do without it?

The supply and demand for numbers, the basic commodity moved along long distance fibre is however infinite with sufficient addiction and dependency in the demand model to ensure long term fiscal gain.

## Resources

The inter relationship of transport cost, storage cost and information value is discussed in RTT's fourth book '[Making Telecoms Work- from technical innovation to commercial success](#)' available from the [RTT book shop](#).

Also in the Book shop is the new (second) edition of [LTE and the Evolution to 4G Wireless](#) published by John Wiley and Agilent Technologies and edited by Moray Rumney.

This takes you through the practicalities of Release 10 and Release 11 through 15 and includes insights on the test and measurement implications of each Release for conformance testing and manufacturing test.

Order via this link

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