

What is the best kept secret in telecoms?

Bandwidth, convergence, LTE, quad-play, mobile-internet, video streaming, social networking. Just some of the telecoms buzz words that excite us as sources of future revenues. However there is a problem that stands between us and these profits!

In the last edition of Wireless Business Review, Peter Purton its editor touched on this secret in his article “Covering your backhaul”. It is the state of sync provision and distribution in modern networks.

Synchronisation is to telecommunication networks what the distributor or Engine Control Unit is to a car. It is just one small component, but without it the car is nothing more than a tonne of scrap metal. It is one of those things you just assume is there and works.

This is no longer the case with sync, which has increasingly struggled as network complexity and capacity have inexorably increased. It has hit a crunch point as operators want to reduce costs and increase capacity by using an ethernet based transport solution.

So why are we in this predicament? As the first communication networks were created, the need to keep all the nodes synchronised to each other became vital. The expensive cesium clock was used as a single central frequency source to which all the nodes could be joined.

Networks have grown and nodes have multiplied, but the economics have never allowed for a precision clock in every node. This has led to a complex separate network to distribute frequency; cascading it from a precision source to lower cost, lower precision clocks that need regularly re-synchronising.

To date, a “just good enough” strategy of adding to the existing synchronisation infrastructure as each new network demand comes along has worked. However the move to ethernet causes a major problem. These networks are asynchronous, which is not an issue for data files, however synchronous data such as voice and video must be sent and arrive in a deterministic fashion or the user experience is destroyed.

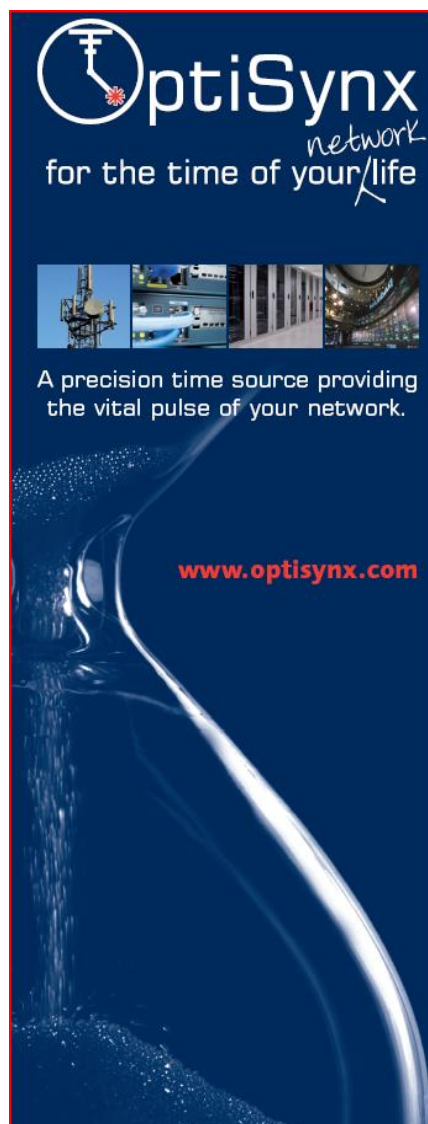
Of course, there is a synchronisation industry and they are fully aware of these problems. If networks were designed afresh today, the architects would ask for one simple thing – for all nodes to have the same frequency, phase and time of day. Technically, the closest you can get to this would be to have precision clocks in every node that all tracked with one another. Existing clock technologies are either too expensive or not high enough precision.

Synchronous Ethernet is one potential fix. It is an additional physical layer on an ethernet network to transmit time from one node to the next. This could work for backhaul requiring replacement of all the routers with the inclusion of precision clocks at each node. Economically this is not likely to work for the last-mile and access network.

This is where IEEE1588v2 comes in. Similar to how NTP updates your computer clock, it approximates time by averaging the round trip delay between nodes. It also requires hardware at each node. Its performance is entirely non-deterministic, varying massively depending on network loading. The cost and timescale to model and implement 1588 can therefore be considerable with no guarantee that it can maintain the performance required. One way of maximising the performance is minimise number of hops and place precise clock close to the edge of the network.

The common thread is that there is a need, no matter what solution or fix used, for a high precision, low cost, local clock source. A need that OptiSynx, who are developing the first new fundamental clock technology in decades is happy to meet.

Dominic Mikulin is CEO at Optisynx Ltd.



The advertisement features a dark blue background with a glowing fiber optic cable. At the top left is the OptiSynx logo, which consists of a stylized 'F' inside a circle. To the right of the logo, the text 'OptiSynx network' is written in a white, sans-serif font, with 'network' in a smaller, lighter font. Below the logo and text, there is a horizontal strip of four small images: a satellite dish, a server rack, a network switch, and a close-up of a fiber optic connector. Underneath these images, the text reads: 'A precision time source providing the vital pulse of your network.' At the bottom of the advertisement, the website address 'www.optisynx.com' is displayed in a red, sans-serif font.