Node-H enables indoor self-optimising networks

Interoperable solution powers multiple partners and use cases

Mike Cronin, CEO, Node-H

How do we enable a heterogenous network layer for 4G and 5G? Affordability, interoperability and flexibility when it comes to business models will all prove critical in driving small cell rollouts to volume, as exemplified by the four million small cells rolled out by Free Mobile in France, enabled by software licensed from Node-H. TowerXchange spoke with Node-H CEO Mike Cronin to learn more about how his company enables self-optimising networks, both indoors and in future outdoors, and where he sees opportunities for neutral hosts such as towercos to deploy capex, aggregate and lease indoor capacity.

Keywords: 4G, 5G, Active Equipment, Capacity Enhancements, Densification, Europe News, Free Mobile, IBS, Infrastructure Sharing, Insights, LTE, Multi-Region, Node-H, RANsharing, Self-Optimising Networks, Small Cells, TFN, The Future Network

Read this article to learn:

- Business models and routes to market for SON enabling solutions
- How Node-H are enabling SON at a price point digestible in South and Southeast Asia
- Why interoperability is so important
- Why challenges using VoLTE have made the widespread deployment of small cells problematic
- Opportunities for neutral hosts to deploy capex into indoor coverage solutions, aggregating and leasing capacity to carriers

The Future Network: Please introduce Node-H.

Mike Cronin, CEO, Node-H: Node-H is a specialist software company focused on the small cells and femtocells market. The team consists of experts with many years of experience in LTE, UMTS and GSM software development. The heritage of the company dates back to Optimay, a Munich-based start up with deep competence in portable wireless software for UMTS and GSM.

Node-H has established a reputation as the experts in standards-based small cells, capable of interworking with the widest variety of infrastructure from other vendors, including Tier One network equipment vendors. The Node-H team has unique capability in the area of simulation and test, which is crucial to being able to develop and maintain high quality, sophisticated software in a cost-effective way.

Node-H works closely with semiconductor vendors and OEMs and ODMs, along with H(e)MS and H(e) NBGW vendors to ensure that the end-to-end system provides a high-quality experience for end-users, at a price that is attractive to operators to go into mass deployment.

The Future Network: Please tell us a bit more about your software and the technologies and products it supports.

Mike Cronin, CEO, Node-H: We provide enterprise class software that runs on the Qualcomm small cell chipset. This means that the software is dual-mode, supporting both Universal Mobile

Telecommunications Service (UMTS) and LTE technologies. What we provide, combined with what Qualcomm provides, comprises the complete software for the product, including self-optimising network (SON) and the management system.

Because we don't make the hardware, we partner with ODMs to be able to offer a complete hardware and software solution. Askey is a key ODM, and together we have a portfolio of exciting new products, but we also work closely with other partners such as MitraStar, Arcadyan and Gemtek.

The Future Network: How are these partnerships coordinated? Who typically takes the lead on developing a new product? Could you please talk us through where you sit in the the value / supply chain? Who do you sell your solutions to?

Mike Cronin, CEO, Node-H: We have three very different business models.

The first is that we can license our software directly to operators. In this case we are also a key player in performing the integration of the technology onto a selected hardware, but also in making the end-to-end solution work. We also become a key advisor to the operator in the way that the hardware will fit into their overall solution. There are ways in which you can save money by making small adaptations to the software. For example, by reusing a management system that is already in place for modems or set-top boxes, you can avoid adding additional infrastructure and reuse what already works.

Mike Cronin has many years of experience in software, hardware, telecoms and test. He co-founded Node-H to build upon many years of experience at Optimay where he was Vice President for Product Development. Optimay developed wireless handset software from the early days of GSM up to UMTS, until it was acquired by Lucent Microelectronics in 1998. As CEO of Node-H, Mike has lead the company through the development of the complex UMTS and LTE small cell software, and established a track record of company profitability in a challenging market environment. Node-H has over the years developed close partnerships with much larger companies across the spectrum of the supply chain from silicon vendors, ODMs and OEMs, as well as with tier one and tier two operators ■

The second type of business model is that we can jointly offer products together with the OEM/ODM. In this case we work with the OEM/ODM to have well integrated software on the small cell, and participate in the end-to-end integration with the operator's selected infrastructure.

The third business model is where we work closely with system integrators so that they can offer a complete end-to-end solution to operators. Our products are incorporated in the end-to-end solution, and our interface is to the system integrator, who in turn fronts the solution to the operators. This helps in the scalability of this business model.

We can be very flexible in how we work across the value chain. In our largest deployment, which is with Free Mobile in France, the operator licensed the software from Node-H and then they separately sourced the hardware, and together we did the integration. That has gone on to become the world's largest small cell deployment, with about four million small cells.

We also have commercial relationships with system integrators who are sourcing their hardware from Node-H partners, such as Askey. In South and Southeast Asia, where the price points are expected to be very aggressive, we, along with our partners have spoken to the operators and promoted our dual mode products to them. The operators can choose either an end-to-end approach, where they source the whole solution from a system integrator, or they can purchase the small cell, including the software, and we can work with them to integrate it with their chosen infrastructure provider. We do not have a preference - we want to enable the operator to choose the approach that works best for them. It will always be the case that Node-H will provide the deepest level support for these products, so complex issues will be dealt with by Node-H. However, the software is well proven and is deployed in zero touch deployments. The self optimising network (SON) is smart enough to adapt the software to the particulars of the environment that the cell is deployed in, and it automatically selects its configuration parameters and adapts itself to the local network conditions.

The economics of this model are compelling, as it costs very little to guarantee years of robust coverage. It's cheaper to deploy more cells and let the SON take care of things, than to spend time on site surveys that go beyond a simple rule-of-thumb metric.

The Future Network: Once a contract has been signed and your software has been incorporated into the hardware, who takes responsibility for managing the network?

Mike Cronin, CEO, Node-H: It can be the operator, if they have an active engineering team, or it could be an OEM working with us, or it could be a system integrator. Again, it is a layered approach, we want to be able to offer different business models.

The issue with these different business models is that they get increasingly expensive, so if you have an ecosystem vendor with an end-to-end solution then Node-H may not be visibly involved with the operator, and the ecosystem vendor would front the whole relationship using their resources around the world and provide the support for the operators, but that comes at a price. This approach is fine for many operators, especially in Europe or the Middle East, but in South or Southeast Asia, where the costs need to be lower, it may be more expensive than the operator wants. They may choose instead to work directly with us, and we can provide more sophisticated support, with them taking responsibility for the first level support.

The Future Network: Have you noticed a change in focus or appetite from your MNO or ODM customers recently?

Mike Cronin, CEO, Node-H: On the part of the operators, there is a slow realisation that Voice over LTE (VoLTE) has made things increasingly difficult for them in terms of the deployment of small cells. The expectation had been that they would be able to deploy 4G small cells. Wide-scale 4G small cell deployment is now looking problematic, because you may have coverage, but not be reachable for a phone call, which will upset customers. An exception is perhaps in the U.S. where the handsets are controlled by the operators. This means that the MNOs can ensure that the right software that is compatible with their VoLTE infrastructure is installed on their handsets. In most countries you have a 'bring your own device' on to the network approach, and what we are hearing is that less than 50% of handsets are enabled with the VoLTE software that will work with the operators' choice of infrastructure. This is because of the complexity of the VoLTE infrastructure.

The Future Network: Could you please clarify what the main issues and challenges around VoLTE are?

Mike Cronin, CEO, Node-H: For starters, you won't actually have VoLTE enabled in handsets unless this is negotiated with the handset vendors. For an operator about to deploy VoLTE, this means that the handsets that are on your network right now simply won't work, and this will take a long time to correct.

The second aspect is that when the VoLTE is enabled, 'out of the box' it is quite unlikely to work because of the fact that there are so many different network elements involved. Depending on who you're buying the solutions from, and how much capital you have for the project, it can be incredibly complicated. A wealthy operator could buy a complete end to end solution and then simply plug it in, but more often than not what we are seeing is operators buying individual elements from multiple suppliers and then trying to connect them all up, which is fraught with difficulty.

The Future Network: Are you working with towercos or other neutral hosts to deploy distributed networks?

Mike Cronin, CEO, Node-H: Because of where we are in the value chain, those discussions are at an early stage. The towercos tend to have relationships with the large vendors and OEMs, but as partners of ours start to roll out devices in the 'mini macro' space (5W/10W), then I think our technology will become more interesting to them.

Also, some towercos are looking at the indoor, enterprise environment, and our partners can supply them with solutions that enable much more wide-scale deployments. It seems a natural progression that the towercos should aggregate cheaper solutions and then package them for the operators. The operators have monetised their access sites by selling them off to the towercos, so they have accepted that the physical locations will be shared, and they now face the dilemma

of whether they are willing to share the network itself. In some cases the barrier is regulatory. Node-H offers Multi-Operator Core Network (MOCN) support, which allows the operators to share a single physical base station, leading to the lowest cost deployment. MOCN is a feature that the operators are telling us that they want to be ready for, but the decision to actually use the feature has not yet been made.

On the neutral host side, we see that private networks are in the vanguard of such technology. We have units deployed in private networks in the Netherlands. There is 5MHz in Band 3 available for use there, and our partner has successfully deployed private networks there.

Regardless of what the big operators do, there is still a place for private networks, and with the advent of CAT-M1 and NB-IoT we will increasingly see industrial giants like GE or Siemens or mining companies using private LTE networks on their sites to replace Wi-Fi. That said, until there is significant spectrum available for private networks, private network demand will be constrained. The coming of CBRS spectrum in the U.S. will show how much pent-up demand there is for private networks.

The Future Network: Is there a particular geographical region that you are focussing on currently? Where do you see the greatest opportunity?

Mike Cronin, CEO, Node-H: We certainly think there are big opportunities in South and Southeast Asia because of VoLTE. I think there is a difference between new market entrants like Reliance Jio and the established or incumbent players. If you are the new market entrant it doesn't matter too much if you don't do a great job in offering voice calls over the cellular network, because essentially what you're offering is data and people are happy to adapt to a new way of using their handsets because it is so much cheaper than the historical alternative.

But if you are the incumbent, you have a track record of perhaps twenty years of running a good network where the ability to deliver a voice call was one of the key measures of the quality of your network. It's quite a stretch to go from that to just providing data connectivity, and saying, too bad, you are no longer reachable for calls because we don't have 2G/3G coverage in this location, and your phone doesn't fit with our VoLTE infrastructure.

In Europe, we expect that our system integrator partners will address the operator need. We will support them as necessary, especially if there is a particular feature required for a particular operator. They certainly have the marketing reach to penetrate new operators and to upgrade existing operators.

The Future Network: Node-H are very active in the indoor, enterprise market, do you have any plans to expand into outdoor small cell applications?

Mike Cronin, CEO, Node-H: Currently we are most active in the indoor sector, but the power of the Qualcomm chip is such that we are now exploring scenarios to use the same technology in an outdoor solution for rural applications. The existing product is fine for rural locations, and with SON enhancements it can be part of a HetNet in urban areas. The focus on rural locations over urban right now is because there are no concerns relating to the SON or the macro network, and it is also where the pressure to have a low cost device is greatest, due to the lower utilisation of such devices.

The Future Network: You are involved in the Small Cell Forum, could you please talk to us a little bit about the work you are doing with them and why you see them as an important partner?

Mike Cronin, CEO, Node-H: We are members of the Board of Directors of the Small Cell Forum. This is a bit unusual because board level membership predominantly comes from the large vendors, but we sit alongside Qualcomm, Huawei, Nokia and Ericsson, along with a number of the senior operators and the tower companies.

We received an Interoperability award in 2016 from the Forum. This came about due to the leadership we have shown in pursuing interoperability within the Forum and outside of it. The larger vendors often only focus on interoperability between their own products, but for us, as a company which is dependent upon interworking with others, it has been crucial for a number of years that we only work

on interoperability with the products of other equipment providers. The Chairman of the Small Cell Forum wanted to acknowledge that by giving Node-H the Chairman's Award.

The Future Network: And finally, how do you see the future of cellular networks evolving?

Mike Cronin, CEO, Node-H: First, I would say that coverage finally has to move indoors. Operators are being forced into providing unlimited data tariffs, so the growth in data traffic is reaching 100% again, which is putting further pressure on the networks, and the average connection speeds are declining. This is made worse by the ever increasing use of cellular data indoors. The headline figure of 80% of cellular use being indoors suggests that having base stations nearly exclusively outdoors is a mistake, but the real figure is that 95% of resource blocks - the smallest units of traffic - are spent reaching devices which are located indoors. The opportunity is there for the operators to move that traffic off the macro network, but they have been slow to take advantage of it.

It's no secret that the leading operators tend to be quite conservative. They need to work in a different way to take advantage of the much cheaper technology that is available, and making that change is a challenge. Operators have processes and procedures that were developed for six-figure base station investments, and they need to rethink these for three-figure base station investments. Essentially they need to embrace plug'n'play, and let the SON take care of bringing the cell up. Right now the operators should be sending enterprise small cells to any business that will plug them in. Coffee shops would be a good place to start.

"they need to embrace plug'n'play, and let the SON take care of bringing the cell up. Right now the operators should be sending enterprise small cells to any business that will plug them in"

Secondly, the radius of cells must reduce to increase the capacity of the network. Outdoor cells need to be put closer to the users, so that means populating street furniture with low-cost cells. Again, the move from six-figure investments to four-figure investments means that society has expectations of taxes and site fees that are out by a couple of orders of magnitude, and this challenge will take time to be resolved.

A specific narrow use case here is eMBB for 5G, to replace the last sub-kilometer of fiber to the home. The use case is so compelling that I think it will overcome objections.

Thirdly, operators have dabbled in network sharing over the years, and occasionally they share the coverage in a stadium or other common infrastructure, but the real network sharing has been a tiny fraction of their coverage. Many operators have divested themselves of their cell locations over the past few years, turning them over to tower companies in a leasing arrangement. Essentially the tower companies are providing a bank-like service to the operators, mortgaging the infrastructure and giving capital to the operators.

Now the tower companies have an interest to increase the value of what they offer by taking an active role in providing network coverage to all operators. The opportunities for this will vary across the world, but the obvious use case is to take something that is underdeveloped, such as indoor or street furniture coverage, and offer to finance that development, amortising the cost over multiple operators. There's no real technical barrier, provided the operators want it. They need to choose an approach, such as MOCN, but that is already proven. The operators need to decide whether they want to finance these developments for competitive reasons, or whether they can allow a third party to provide the finance. The answer will be different from country to country. It's certainly an opportunity for the tower companies ■