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J.Robson, Small Cell Forum



Back to Backhaul

Small Cell backhaul has been through its hype cycle. It's had its 'peak of over-inflated expectations' followed by the inevitable 'trough of disillusionment', as forecasted sales volumes were postponed. Then it all went a bit quiet... And now it's back with a vengeance, as operators demand affordable gigabit backhaul to meet next generation capacity requirements everywhere.

Of course small cell backhaul never really went away. Everyone agrees future networks will need to be densified with small cells, and they will need connectivity. While the industry limelight has been shining on other technology areas, the backhaul industry has been quietly getting on with it, working through the challenges and refining their offerings, both technically and commercially.

The principle market for small cell backhaul is urban densification. Initially we saw relatively small deployments as operators used them tactically as a precision tool to fix isolated problem areas in their network. Operators are now urgently scaling up deployments to become part of their densification strategy. And this is where backhaul is needed. Backhaul connections for urban small cells are set to multiply by 20 times between 2016 and 2020, driving cumulative spending of \$6.4bn in the same period [IHS Technology]

At a recent Small Cell Forum webinar, operators didn't mince words when describing the challenges they're facing, and how they'd like things to change. There were calls to unify planning which differs from city to city, let alone country to country. As we see in another article, there is great interest in using higher frequency spectrum for 5G access. However, this places uncertainty around the microwave and millimeter wave backhaul solutions which currently use these bands.

A central theme for our recent Release 7 on HetNet and SON, is the essential role of automation in deploying and operating dense HetNets. SON today is largely RAN centric – automating cell ID and

neighbor list allocations. In future, operators need to automate all aspects of end to end service delivery, including backhaul. Operators need small cells *and* backhaul to be plug, play and forget to avoid high and unexpected O&M costs.

Virtualization of small cells also changing the game for backhaul. The forum has now published its nFAPI interface which enables C-RAN benefits over packet Ethernet type connections, unlike CPRI based C-RAN which generally needs fiber. Other so-called 'functional splits' of the small cell are possible, each providing a different tradeoff between the benefits of centralization and the required backhaul performance. In the longer term, virtualized functions can be moved around according to transport performance, allowing operators to squeeze the most from their deployed assets. Guidelines on transport performance requirements for different splits are currently being developed for our next release 8 on virtualization in November.

So after the hype and the disillusionment, small cell backhaul is re-asserting its place as an essential ingredient in the future HetNet. And together with simplified site acquisition and automated deployment, is back on the Forum's agenda.

Julius Robson, Steering Committee, Small Cell Forum



Julius Robson leads the Small Cell Forum's Steering Committee, coordinating across work groups to deliver cohesive outputs on its objectives of *Enabling Digitized Enterprise* and *Deploying HyperDense Networks*. Julius has chaired a number of groups within industry forums including the NGMN alliance and the LTE/SAE Trial Initiative (LSTI). The key output of these groups has been papers representing industry consensus on issues including the maturity of LTE technology, backhaul capacity provisioning, operator requirements for small cells, and small cell backhaul technologies. His background is in wireless technology research and standardisation, and was Nortel's delegate to 3GPP RAN during the development of LTE. He now works as an independent wireless expert for clients with requirements ranging from the deeply technical IPR analysis through to the commercial development of business value propositions. He holds a BEng in Electronic Engineering and an MSc in Microwave and Optoelectronics.