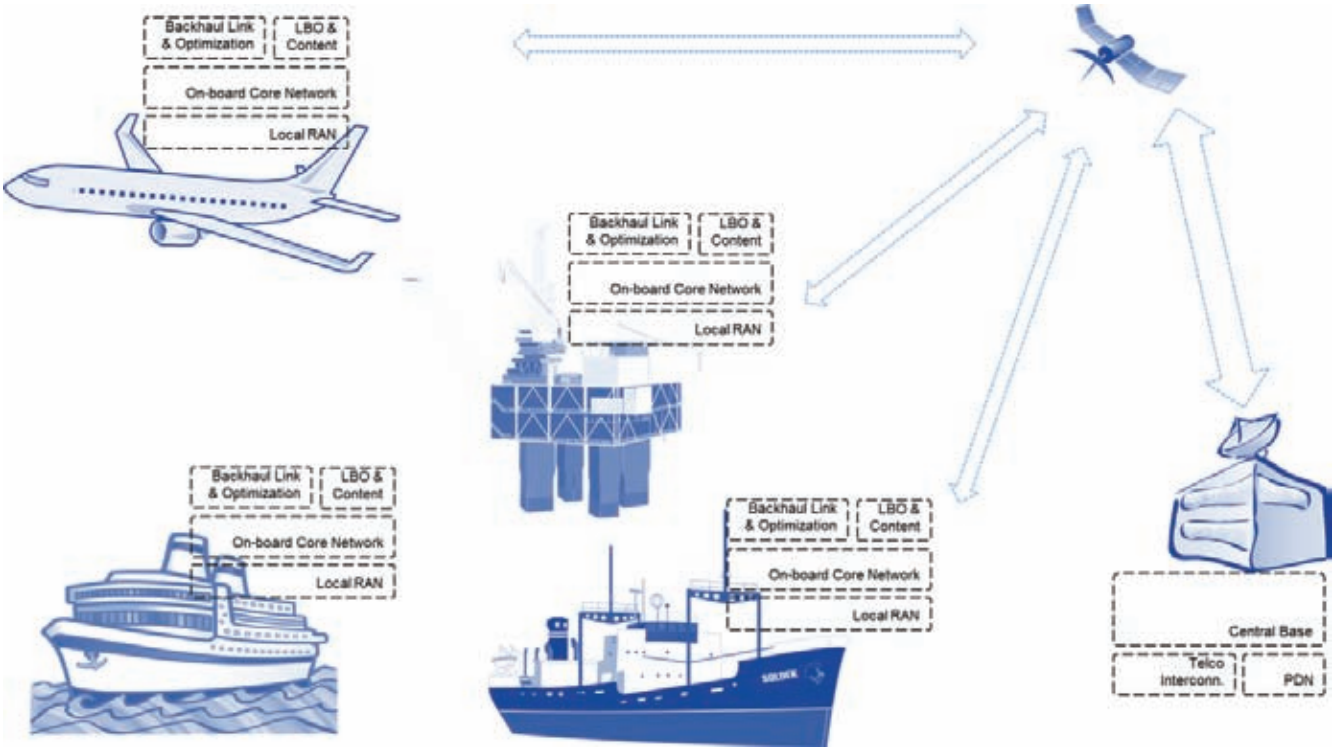


Not so remote: Shaking satellite based solutions to the core

Satellite has long been used as a solution for both long-distance and local remote communications systems. However, for local communications, traditional satellite networks aren't necessarily the most efficient or cost-effective. Carsten Brinkschulte, CEO at Core Network Dynamics, outlines how Mobile Edge Computing (MEC) can be used to keep local communications local, reducing costs and increasing efficiencies.

It goes without saying that for anyone living and working in remote areas, the need to stay in touch is paramount. But when it comes to delivering vital telecoms and Internet connectivity to locations a significant distance away from traditional terrestrial links, the options to date have been expensive and limited. Satellite-based solutions such as VSAT, combined with a centrally deployed core network architecture, have offered fresh opportunities for a variety of remote communications scenarios - from remote construction sites and ships to offshore oil and gas rigs.

But these satellite based communications are not without their issues, which include high latency, high costs and bottlenecks. When, for example, two engineers working on the same remote construction site need to call each other, all the required signaling and traffic is relayed by local base stations back and forth over the narrow, expensive and notoriously slow satellite link to the central core network. As a result, it can take a long time to establish a call, as well as generating considerable cost, even for local communications.

Keeping local communications local

We need to take the strain off the satellite network. Fortunately, there is an alternative approach. Mobile Edge Computing (MEC) is a new concept, which provides an IT service environment and cloud-computing capabilities at the edge of the network, close to or even right at the base station. MEC aims to apply the Internet topology - a decentralised mesh network combined with a star-of-stars topology - to the architecture of a mobile network. Instead of deploying a single core network with the Evolved Packet Core (EPC) located at a central location and backhauling all signaling and traffic over satellite to the central network, MEC enables decentralised core networks providing connectivity and computing at the edge, running applications and even the EPC close to the devices.

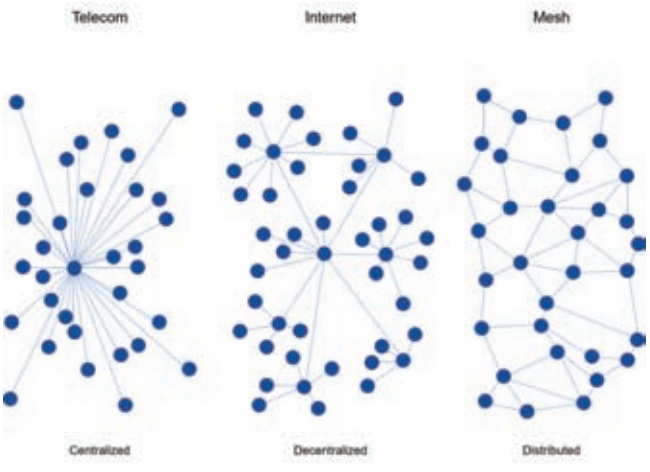
By using the satellite network for off-net traffic only, local

Carsten Brinkschulte, CEO at Core Network Dynamics

voice and data communications can remain local, avoiding backhaul wherever possible, offering greater resilience and more reliable connectivity. Now, when the two remote construction site engineers call each other, all signalling and voice traffic will be handled by the local EPC – no backhaul is required. As a result, calls are established faster due to the radically reduced network latency, and the expensive backhaul traffic is avoided completely.

Taking advantage of MEC to enhance and extend networks might at first sound revolutionary, but in fact it's more of an evolutionary approach. Carriers have already started embracing Internet technology by using new network technologies like Network Functions Virtualization (NFV) and Software Defined Networks (SDNs). With NFV and SDN, carriers no longer need to use expensive dedicated hardware for separate service functions, but can virtualize services using software running on simple, inexpensive commodity hardware. As a result, cellular networks will become more flexible and cost-effective.

By adopting a decentralised and virtualized approach, all the functionality of a core LTE network – the EPC – is implemented in software running on standard Linux hardware located at, or even integrated into, small cells and base



> "We need to take the strain off the satellite network. Fortunately, there is an alternative approach. Mobile Edge Computing (MEC) is a new concept, which provides an IT service environment and cloud-computing capabilities at the edge of the network, close to or even right at the base station."

stations. For increased reliability, as required in public safety use-cases, the EPCs at the cells interconnect to each other using a local mesh network, creating a group of autonomous, fully functioning mobile networks. Depending on the use case, these small, yet fully functioning, mobile networks can even be mobile themselves – deployed in a vehicle, for example.

In practice, this model would involve deploying an EPC such as OpenEPC on Linux hardware and attaching this to a local LTE base station or small cell, and to a satellite dish for backhaul communications. Even further optimization can be achieved by running the EPC on the small cells themselves (using the processor and memory of the small cell), effectively eliminating the need for additional hardware to operate the core network.

With this approach, satellite backhaul need only be used for non–local communications. By keeping local communications local, backhaul traffic volumes can be dramatically reduced and the considerable latency problems associated with satellite backhaul are mostly eliminated. At the same time, the distributed core network also greatly improves resilience as the autonomous local networks can continue to provide local communications, even if the satellite link has dropped.

Focusing on other remote communication scenarios, a distributed core network could also be used to great effect in the airline industry. Instead of - or in addition to - offering Wi-Fi whilst on board, airlines could offer passengers a choice of on-demand video and music served from a local breakout (LBO) over a local LTE network installed in the plane. Rather than having to authenticate or login to access these Wi-Fi based services, authentication would be handled based on the passenger's SIM cards and the existing operator billing relationships would be used to charge the user for these on-board services. Passengers would enjoy a seamless experience and be spared the inconvenience of entering their credit card details.

Changing remote communications for the better

In summary, Mobile Edge Computing – with a distributed core EPC as a critical component – offers a new approach for the mobile industry to transform their remote communications infrastructure, to radically reduce their deployment and operational costs and to offer greatly improved services that provide a competitive edge. Like many other disruptive approaches, it is based on existing standards-based technologies. Using the satellite network for out and inbound traffic only and offloading signalling to the edge will change remote communications for the better.