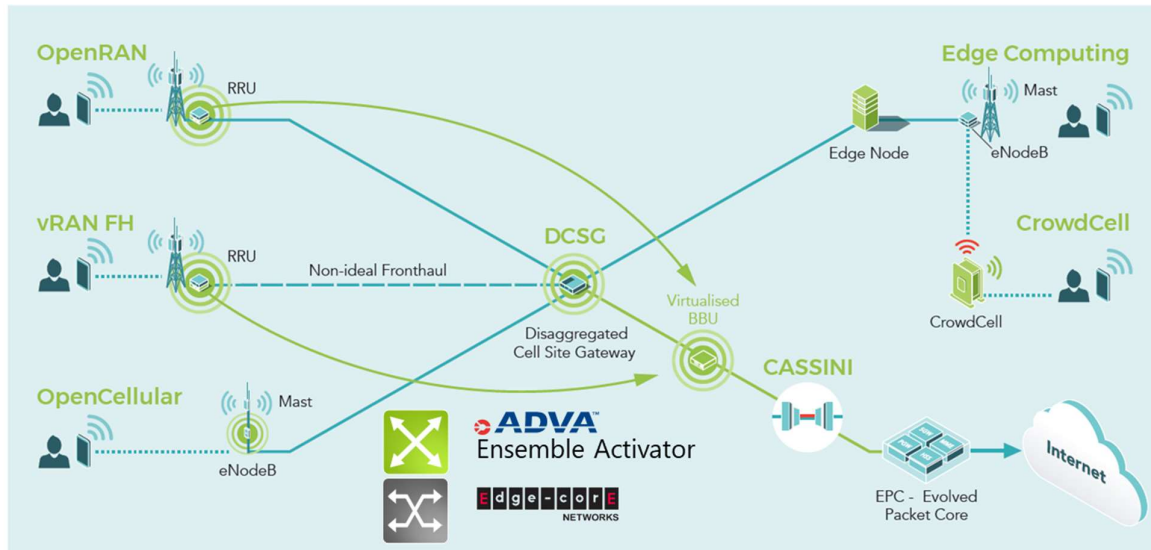# Distributed cell site gateway from ADVA and Edgecore
Open and disaggregated path to 5G infrastructure

As innovation and growth in packet and wireless networks continues to accelerate, communication service providers (CSPs) and mobile network operators (MNOs) no longer have time to wait for their vendors to come up with higher capacity devices that meet the latest requirements. Now there's a new way to grow networks that combines the agility of software-based feature development with the performance and economics of bare-metal switches. Building a network for 5G access is now as simple as selecting a hardware component with higher capacity and installing the network operating system (NOS). And to help, ADVA and Edgecore have combined forces to deliver a disaggregated cell site gateway (DCSG) solution that provides the required features in an open and multivendor fashion.

Meeting the bandwidth demand in 5G

Access speeds will increase dramatically for 5G networks, and base stations will move from 1GbE to 10GbE and 25GbE uplink interfaces. Backhaul networks must rapidly grow to 100Gbit/s aggregated capacity. MNOs need to design and operate these higher-speed networks with proven technologies and established processes. At the same time, MNOs need to make their networks much more agile to unleash the power of 5G new radio (NR). They need to move from hardware-centric, static networks to software-defined architectures. With the latest software-defined networking (SDN) and network functions virtualization (NFV) network technologies, disaggregated radio architectures and networking
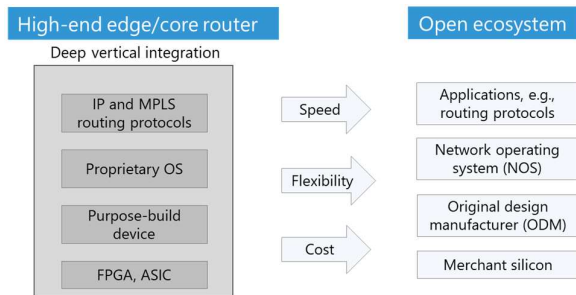
are paving the way for open, agile, and efficient mobile ecosystems.

Moving from closed to open

MNOs and CSPs want to break open single-vendor silos to increase competition and reduce cost. That has led to increasing interest in disaggregated networking with packet network devices implemented as white box switches and open network operating systems. That's why the Telecom Infra Project (TIP) defined the DCSG as well as OpenRAN. Both are essential to supporting the move to next-generation radio architectures.

According to TIP's DCSG Technical Specification, the DCSG is "an open and disaggregated platform based on commercial off-the-shelf components and

open software that can replace traditional cell site solutions – such as proprietary routing appliance and Microwave IDU – reducing deployment and operational costs while providing the scalability required for last mile evolution." The diagram below compares today's closed and proprietary routers with the DCSG architecture.

Carrier class is required

White box switches got their start in data centers. As they move into the public networks, these switches must meet the operational requirements of CSPs and MNOs. An ideal approach is to base the system on merchant silicon in the white box switches and augment that capability with features in a powerful and carrier-grade NOS.
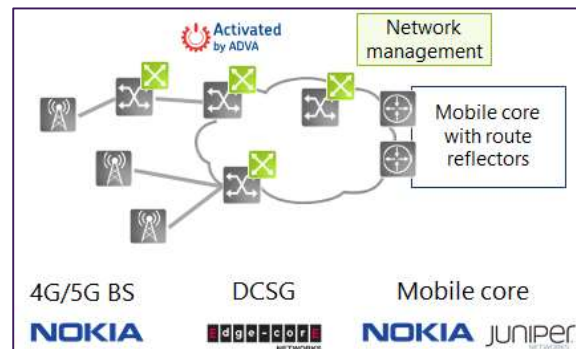
ADVA and Edgecore are actively supporting the TIP DCSG project with their products, showcasing a fully integrated solution at demos and trials of major service providers. Ensemble Activator is the first carrier-grade NOS specifically designed for mobile backhaul networks. It includes a feature-rich control plane to support Layer 2 and 3 networking and service assurance, and data plane functionality based on long experience with the underlying silicon. It also includes support for SyncE and PTP, which are needed for 5G networks.

And the Edgecore DCSG product family provides features like extended temperature operation and resilience for power and cooling as well as support for precision synchronization and timing.

Dynamic connectivity

Up to now, mobile transport networks have provided largely static connections from a cell site to one or two edge sites of the mobile core network. In future, the mobile backhaul network will need to be operated in a much more agile way. Point-to-point backhaul connections will be

replaced by VPN-style networks, creating connectivity among neighboring cell sites as well as multiple packet network gateways at the edge of the mobile core.

Taken together, these drivers for dynamic connectivity mean moving away from static circuits and complex MPLS VPNs. Instead, MNOs and CSPs need simple Layer 2 and 3 packet-based protocols to provide efficient and responsive capacity to meet the needs of 5G.

Emphasis on automation

Disaggregation brings many benefits but may introduce system complexity. How do we control a system built from disparate elements? We open interfaces that are optimized for machine-to-machine communication. That means supporting protocols such as using NETCONF/YANG and OpenConfig for configuration and gRPC/gNMI for telemetry.
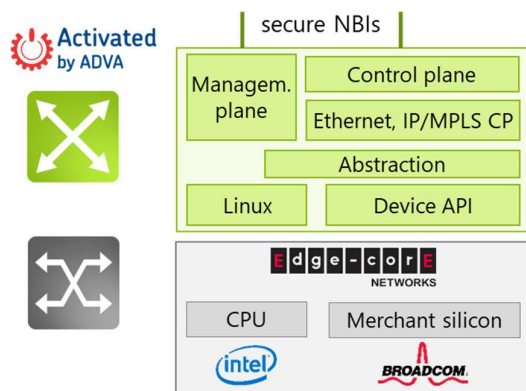
Service provider proof points

Sounds great. But does it work? The answer is an emphatic yes. ADVA and Edgecore have worked with TIP and other partners to create working systems. For example, the diagram below represents a recent service provider field trial.

ADVA™

As shown, multiple suppliers cooperated to provide a complete 5G solution, with the ADVA/Edgecore implementation of DCSG at its heart.

DCSG implementation

Let's take a closer look at the DCSG implementation from ADVA and Edgecore. The diagram below shows how ADVA and Edgecore deliver a complete solution.

ADVA's Activator provides the software part of the solution. This includes the management and control planes running on top of a Linux kernel. Together they power the sophisticated Layer 2 and 3 networking in the DCSG, along with service assurance.

Edgecore's DCSG product family is a best-of-breed routing platform. The product family features a hardened design, a wide operational temperature ranging from -40C to 65C, and redundant and hot-swappable power modules and fans on some models, all in a compact form factor. These features ensure high availability and hassle-free maintenance for mission-critical applications, making the hardware an ideal choice for current LTE and emerging 5G mobile backhaul network solutions.

The table below shows a summary of the features of the components in the DCSG solution from ADVA and Edgecore.

ADVA Activator	Edgecore DCSG product family
• Initially optimized for Broadcom carrier-grade DNX family • MEF 3.0-compliant Ethernet services, L2/L3 VPNs, EVPN • Routing protocols: IPv4/v6, ISIS, OSPF, BGP, SR • Hierarchical QoS (HQoS) • Resilience with LAG, VRRP and G.8032 rings • Standard SDN using NETCONF/YANG and OpenConfig • gRPC/gNMI for telemetry • Supporting ONIE, zero-touch provisioning • Synchronization with SyncE and IEEE 1588 PTP • Integration with Mobile RUs with BNM/CSF	• 64Gbit/s and 300Gbit/s • AS7316-26XB: 1RU, 16x 10GbE, 8x 25GbE, 2x 100GbE • AS7315-27X: 1RU, 20x 10GbE, 4x25GbE, 3x100GbE • AS5915-18X: 1RU, 4x 1GbE RJ45, 8x 1GbE, 6x 10GbE • -40°C to 70°C operation • SyncE, IEEE 1588, ToD, BITS, GPS • Redundant PSU, 4+1 fan modules • ONIE, ONL-compatible • OCP and TIP-accepted designs

ADVA and Edgecore – your partners for DCSG success

You need trusted partners to help make the transition from closed appliances to open, scalable, and multi-vendor implementations of DCSG. ADVA and Edgecore have the expertise you need. ADVA brings long experience providing carrier-class products to CSPs and MNOs. Edgecore supplies advanced solutions based on the latest components. Together, ADVA and Edgecore bring a track record of success to DCSG. Let us know how we can help you. For more information:

- ADVA URL: https://www.adva.com/en/products/disaggregated-networking/ensemble-activator
- Edgecore contact/URL: sales@edge-core.com / www.edge-core.com