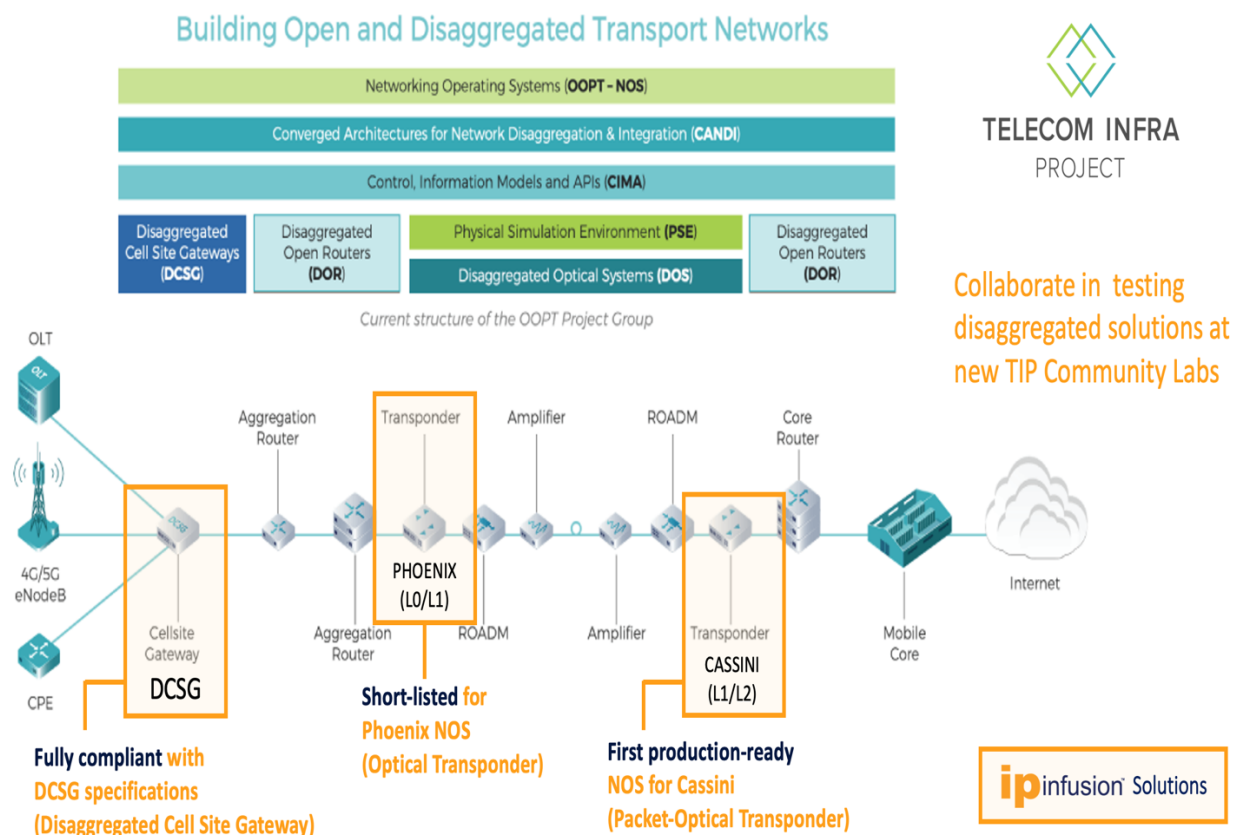


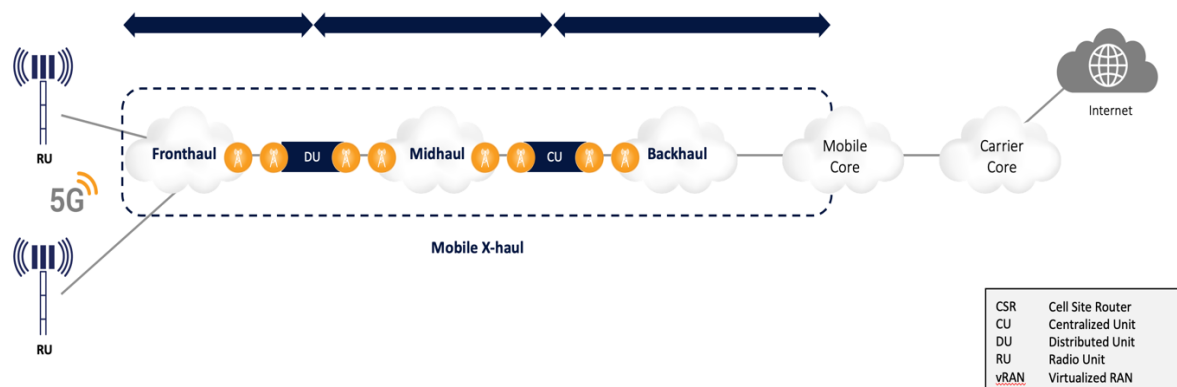
IP Infusion Solutions within TIP Framework

IP Infusion has been an active member of the TIP community, contributing to innovations within the OOPT group on multiple projects like Disaggregated Cell Site Gateway (DCSG), Cassini (open packet/optical transponder), Phoenix (open white-box transponder), and others.



In compliance with the TIP/OCP framework OcNOS provides the 5G Mobile Transport Solution supporting Multi-protocol and X-haul use-cases.

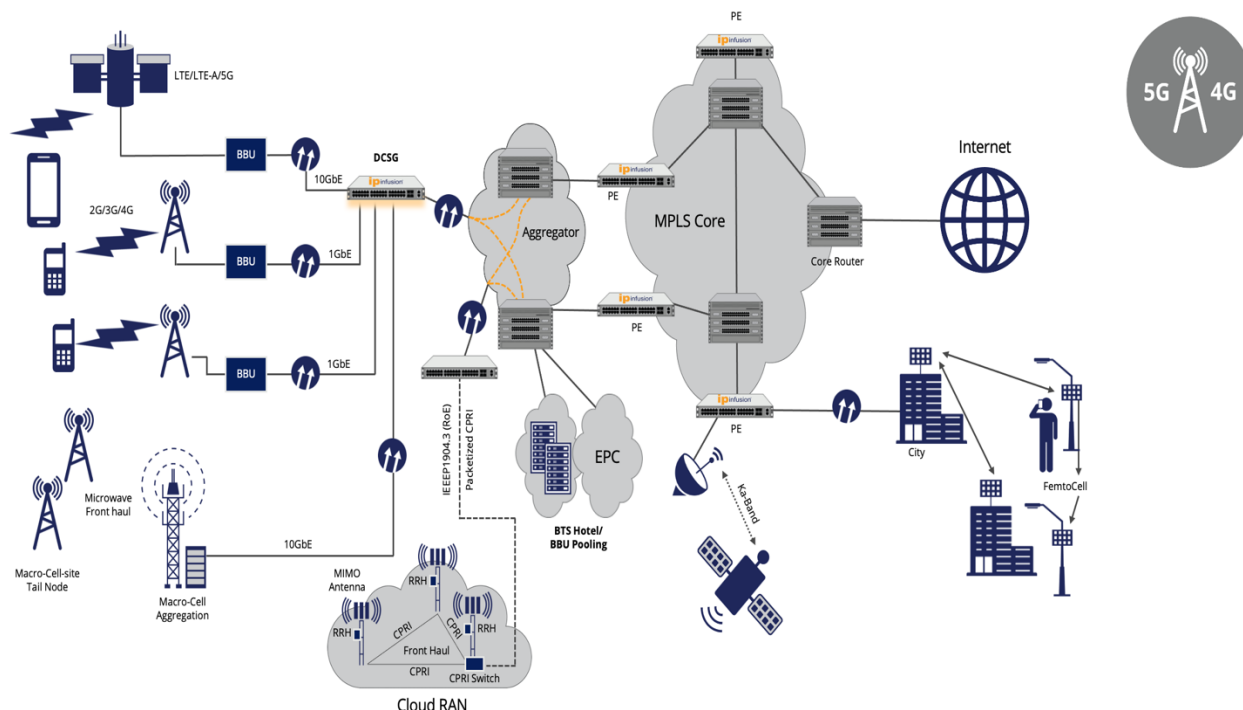
Reach:	< 10 G km	< 40 km	< 200 km
Latency:	< 200 μ s	< 5 ms	< 20 ms
Bandwidth:	10 – 100 G	100 G+	> 100 G
L2:	Ethernet	Ethernet	Ethernet
L3:	Mgmt. only	IP/MPLS, EVPN, SR	IP/MPLS, EVPN, SR



Further details regarding IP Infusion's Solutions in compliance with the TIP framework are available at - <https://www.ipinfusion.com/accelerating-network-disaggregation-with-tip-oopt-dcgs-cassini/#ft>

Disaggregated Cell Site Gateway (DCSG)

The DCSG project, which is under Open Optical and Packet Transport (OOPT) group, has recommended a cell site router deployment model which simplifies design and operation of carrier networks. IP Infusion's OcNOS-SP-CSR is a complete carrier class, Cell Site Router (CSR) solution, aligning with TIP's DCSG technical specification. The technical specification provides detailed requirements for CSR device that operators can deploy in current and future generations of wireless transport networks.



The OcNOS-SP-CSR solution is a smart converged integrated access platform which enables service providers to deliver next-level business and entertainment experiences and it comprises of the following core components:

- Multi-vendor CSR hardware platform: An Open Compute Project (OCP)2 and TIP DCSG Compliant ODM smart integrated access device platform supporting 300Gbps capacity.
- OcNOS full-featured network OS for White Box. Its features include advanced capabilities, such as extensive switching and routing protocol support, MPLS (Multiprotocol Label Switching), and SDN (software defined networking). OcNOS features hybrid, centralized or distribute network support; scalable, modular high-performance network; and a robust data plane built on merchant silicon.
- IP Infusion Advanced Network Services: Comprehensive network design, installation, commissioning, monitoring and technical support services.

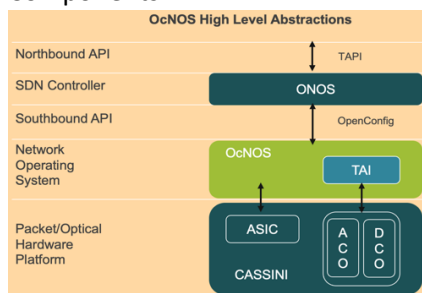
Further details regarding IP Infusion's DCSG Solution are available at –

<https://www.ipinfusion.com/products/csr-dcsg/>

Cassini

The Cassini packet transponder is a fully open source hardware design, as Edgecore has contributed the full design to TIP. Cassini is a 1.5RU form factor with system throughput of 3.2Tbps. Cassini has sixteen fixed 100 Gigabit Ethernet QSFP28 ports, plus eight line card slots to incorporate a flexible mix of additional 100GbE ports or ACO/DCO optical ports based on coherent DSP and optical transceivers from leading optical technology partners. The following line cards are available, providing the network operator with a scalable pay-as-you-grow platform.

- 100GbE Line Card: 2 x 100GbE QSFP28 with MACsec
- DCO Line Card: 1 x 100G/200G CFP2 with MACsec, supporting DCO pluggable transceivers including the Acacia AC200 CFP2-DCO Module
- ACO Line Card: 1 x 100G/200G CFP2 with NTT Electronics ExaSPEED 200 DSP, supporting CFP2- ACO Coherent Optical Transceiver modules from Finisar and Fujitsu Optical Components



The OcNOS Optical Transport Network (OTN) Solution addresses the following use-cases –

- Data Center Interconnect
- Backhaul of Access Edge Services
- Metro Ethernet Services
- Longhaul using ACO with appropriate DSP

Following are the key features supported as part of the OcNOS OTN Solution –

Description	Features
Form factor	<ul style="list-style-type: none"> • Modular chassis with Coherent pluggable cards. • Choice of ACO or DCO optics. • 200G or 100G DWDM (400G roadmap)
Distances	Metro to Longhaul (100Km to 1000Km+)
Feature Overview	<ul style="list-style-type: none"> • L1 Cross-connect for Transponder use-case • L2/L3 Switch for Packet Transponder Applications • Configuration, Monitoring and Debugging of Optical Line • Open API and Management Interfaces
Monitoring	<ul style="list-style-type: none"> • Current pre-FEC BER (bps), current post-FEC (bps) • Current input power (dBm), current output power (dBm) • Current frequency (Hz) • Chromatic Dispersion and DGD counter on the OTN side • Current OSNR Estimate • Current Q-Margin • Modulation Format
Debug and Alarms	<ul style="list-style-type: none"> • PRBS – generator and checker • Loopback – hostif and networkif • PM Counters
Management and Automation	<ul style="list-style-type: none"> • ZTP, • Netconf/Openconfig, • Telemetry
Supported CFP2 vendors	Lumentum, Fujitsu, Acacia

Further details on IP Infusion's OTN Solution are available at -

<https://www.ipinfusion.com/products/ocnos/?3#otn>