DANOS-Vyatta edition

For Disaggregated Cell Site Gateways

The service provider mobile and wireline network of the future will not just need to provide exponentially higher bandwidth at lower operating costs, but will also have to be capable of enabling new applications such as pervasive mobile broadband, IoT/sensor networks, autonomous vehicles and smart consumer wireless devices. Network operators are actively seeking cost-effective solutions to accommodate the mass rollout of broadband services to meet increased traffic demands. Open network solutions reduce costs, expand the vendor ecosystem and leverage automation so they are more agile in introducing new services.

A key concept that will enable next generation transport networks is disaggregation, whereby networking software is decoupled from the switching or routing hardware and decomposed for more efficient operation. Disaggregation offers network programmability, automation, and agility, while driving down both CapEx and OpEx as well.

Carriers need a new approach for network platform development and procurement to enable:

- Faster introduction of technologies, designs, and features by means of a collaborative ecosystem of hardware and software component vendors

- Flexibility in network design and service deployment via plug-and-play hardware and software components that can cost-effectively scale up and down

- Unit-cost reduction through use of standard hardware, merchant silicon, and software technology components with very large economies-of-scale.

DANOS-Vyatta edition NOS Overview and Architecture

DANOS-Vyatta edition (DVE) Software is the industry first commercially available disaggregated Network Operating System (NOS) for both wireless and wireline use cases. It is designed with programmability, application awareness, network visibility, and automation built-in to offer operational efficiency and service agility. DANOS-Vyatta edition is deployed today in AT&T's production network.

DANOS-Vyatta edition is offered as a commercial solution backed by IP Infusion's decades of experience as the leader in embedded NOS technologies.
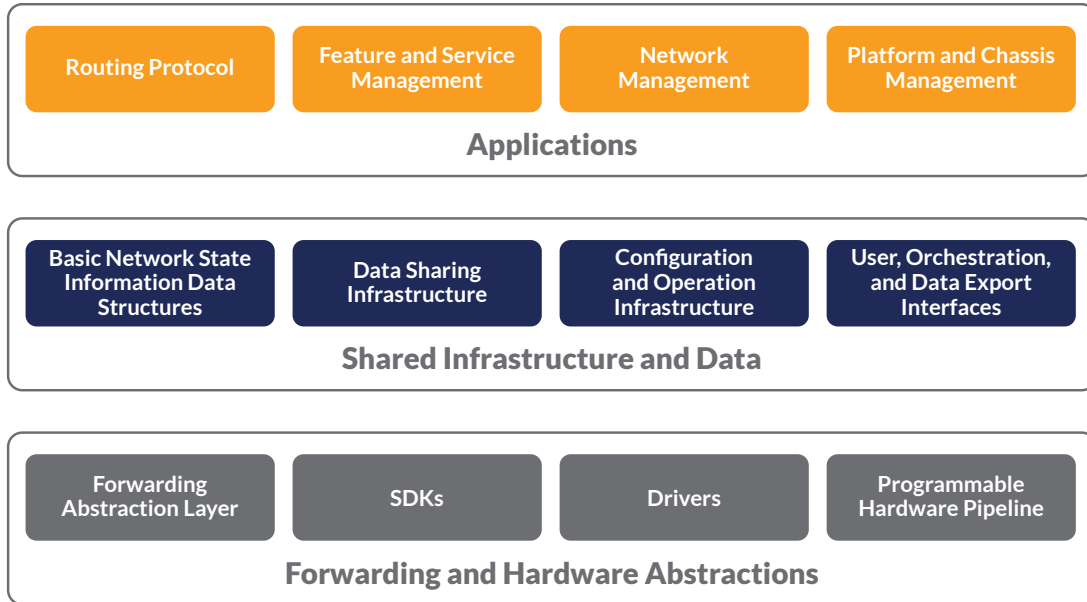
Figure 1: DANOS-Vyatta edition NOS Architecture

Network operator friendly
- Ease of installation and designed to be readily automated and orchestrated
- Support for standard APIs and data models
- Familiar CLI interface
- Multiple simultaneously installed images
- Image rollback, global config file, etc.

Modular and hardware agnostic architecture
- Well defined interfaces between modules
- Custom packaging for different diverse deployments
- APIs enable 3rd-party developer support
- Forwarding Abstraction Layer enables seamless support for variety of ODMs
- Efficient IPC between feature modules enables scalability and feature velocity

Virtualization ready
- Bare-metal and private/public clouds capable
- Capable of both container and VM virtualization

Linux at the core
- Supports native Linux networking APIs, daemons and tools
- DevOps ready, scripting API support

DANOS Open Source NOS

DANOS (Disaggregated Network Operating System) is an open source project hosted by the Linux Foundation that offers an open Network Operating System (NOS) for disaggregated white box networking devices. AT&T contributed the DANOS code base, which is the core NOS adopted by the DANOS-Vyatta edition commercial distribution. DANOS facilitates rapid evaluation, demonstrations, and DANOS applications qualification. Any updates to the core NOS adopted by DANOS-Vyatta edition will be up-streamed to the DANOS code base.

DANOS-Vyatta edition DCSG Use Cases

The first shipping version of DANOS-Vyatta edition is for the Cell Site Router use case. This version aligns with the Telecom Infra Project's (TIP) Disaggregated Cell Site Gateway (DCSG) IP Base software profile* to deliver current and future services including 5G with high bandwidth and low latencies.
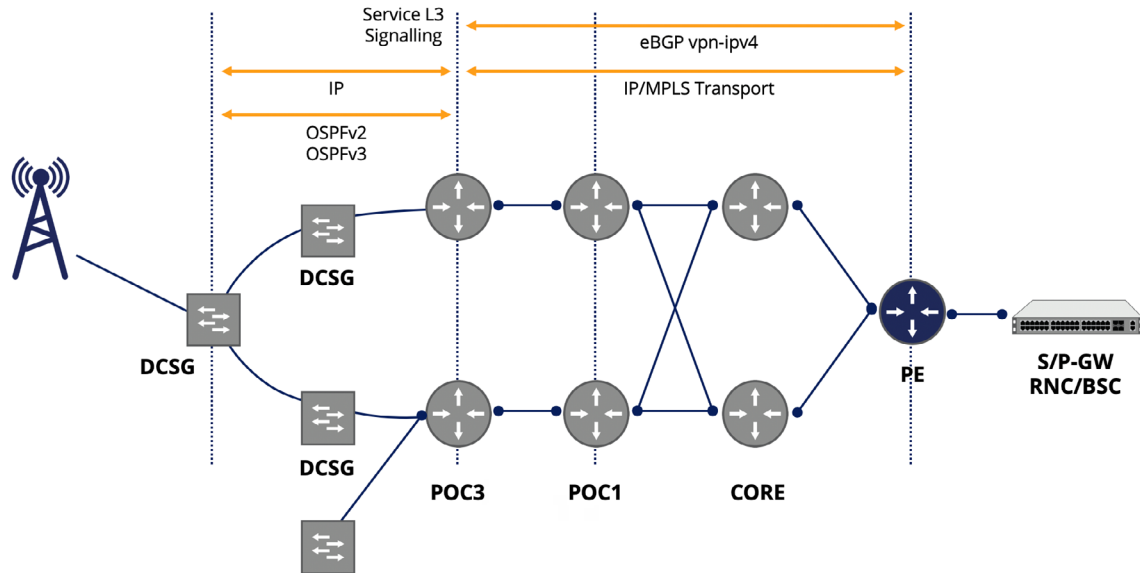

Figure 2: TIP DCSG reference network

DANOS-Vyatta edition can be deployed in both current architectures as well as evolving distributed deployment models such as O-RAN* for 5G.

This DCSG IP base solution supports connectivity to enterprise Mobile Edge Cloud (MEC) as well as RAN Intelligent Controller, which allows a carrier to transition from its existing network to next generation RAN architectures.

*DCSG project is part of Open Optical and Packet Transport group of TIP.
  https://telecominfraproject.com/wp-content/uploads/TIP_OOPT_DCSG_Technical_Specification_v1.1_FINALAPPROVED.pdf

* https://www.o-ran.org/

DANOS-Vyatta edition feature Summary

DANOS-VYATTA EDITION FEATURE	SPECIFICATION
Layer 2 Switching	IEEE 802.1Q VLANs and Q-in-Q Ethernet Link Aggregation Group (LAG) Jumbo frames on all ports
Layer 3 Routing	IPv4 and IPv6 unicast routing Open Shortest Path First (OSPFv2, OSPFv3) Multiprotocol Border Gateway Protocol (MP-BGP) Equal-Cost Multipath (ECMP) Bidirectional Forwarding Detection (BFD) Virtual Router Redundancy Protocol (VRRP) Dynamic Host Control Protocol (DHCP)
Quality of Service (QoS)	Hierarchical QoS Virtual Output Queuing (VOQ) Classification and remarking based on DSCP Priority Queuing (PQ), Shaping Weighted Random Early Detection (WRED)
Security	Storm Control Secure Shell TACACS+ Authentication, Authorization and Accounting
OAM	Two-way Active Measurement Protocol (TWAMP)
Manageability	CLI SNMP MIB NETCONF Zero Touch Provisioning (ZTP) Network Time Protocol (NTP)

DANOS-Vyatta edition SKU

SKU	DESCRIPTION
DVE-CSR-IPBASE	DANOS-Vyatta edition license aligning with TIP DSCG-BSW profile. License is perpetual and locked to an ODM device.

IP Infusion Advanced Network Services

IP Infusion offers a wide range of network services to help accelerate your success in deploying and optimizing the IP Infusion Cell Site Router solution. The Advanced Network Services offerings are delivered through a unique combination of people, processes, tools, and global system integration partners, and focused on increasing operating efficiency and improving network operation. IP Infusion Advanced Network Services uses an architecture-led approach to align your data center infrastructure with business goals to achieve long-term value.

IP Infusion Advanced Network Services resolve mission-critical problems with direct access at any time to IP Infusion network experts and award-winning resources. The Smart Call Home service offers proactive diagnostics and real-time alerts on your IP Infusion CSR solution. IP Infusion Advanced Network Services increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise throughout the entire network lifecycle.

ABOUT IP INFUSION

IP Infusion, the leader in disaggregated networking solutions, delivers enterprise and carrier-grade software solutions allowing network operators to reduce network costs, increase flexibility, and to deploy new features and services quickly. IP Infusion is headquartered in Santa Clara, Calif., and is a wholly owned and independently operated subsidiary of ACCESS CO., LTD. Additional information can be found at **http://www.ipinfusion.com**

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