Product Guide, 17.2.0

Contents

Copyright Statement

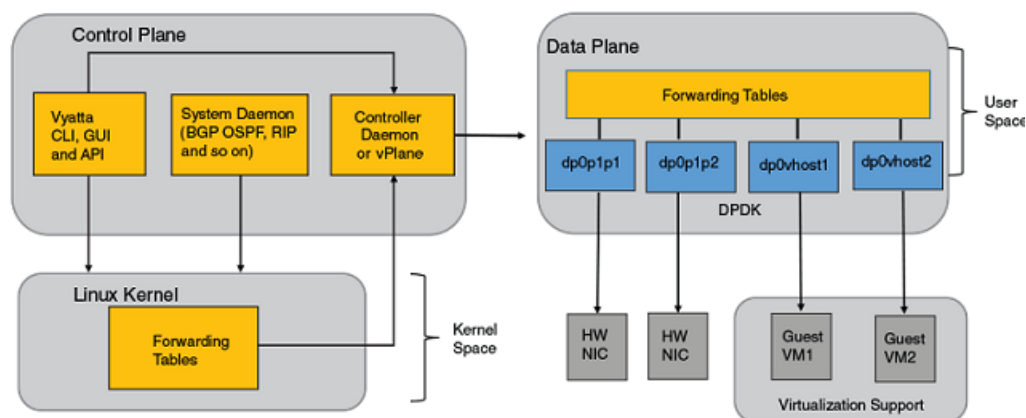# AT&T Vyatta Network Operating System

Overview

The AT&T Vyatta Network Operating System lays the foundation for a flexible, easy-to-use, and high-performance network services architecture capable of meeting current and future network demands. The AT&T Vyatta Network Operating System is deployed on the AT&T Vyatta vRouter, AT&T Services, and AT&T Distributed Services for use in cloud, virtual, physical, or on-premises environments. It also can be deployed as a co-resident on the hardware that houses the data planes, or centralized to manage a number of distributed data planes, depending on the requirements of an organization.

With the AT&T Vyatta Network Operating System, organizations can bridge the gap between traditional and new architectures, leverage existing investments, and maximize operational efficiencies when enabling new services. The AT&T vPlane technology comprises these main components:

- Control plane—Carries signaling traffic and manages configuration and protocol operations; it also serves the data plane. The control plane consists of the following components:
    - Vyatta CLI, API, and GUI—Provide the user interfaces to the router
    - System daemons—Provide control plane services, such as BGP, DHCP, OSPF, RIP, and SNMP
    - Controller daemon—Provides the data plane interface to the Linux kernel and CLI and manages the data plane

- Data plane—Forwards traffic between ports and passes local traffic to the controller. The data plane consists of the following components:
    - Data plane daemon—Provides packet forwarding, QoS, and firewall services
    - User space I/O drivers—Provide the network interface

- Linux kernel—Hosts the data plane and other processes for the user space.

The following figure illustrates the AT&T Vyatta Network Operating System Architecture diagram

Figure 1: AT&T Vyatta Network Operating System Architecture

# AT&T Vyatta Network Operating System Products

AT&T Vyatta vRouter

The AT&T Vyatta vRouter employs vPlane technology, which enables hardware-like routing performance in a software-based network appliance. The vPlane technology comprises these main components:

- Control plane: Carries signaling traffic and manages configuration and protocol operations; it also serves the data plane.
- Data plane—Forwards traffic between ports and passes local traffic to the controller.
- Linux kernel—Hosts the data plane and other processes for the user space.

The following figure illustrates the AT&T Vyatta vRouter in a single node instantiation.

Figure 2: Architecture of AT&T Vyatta Network Operating System in a vRouter deployment
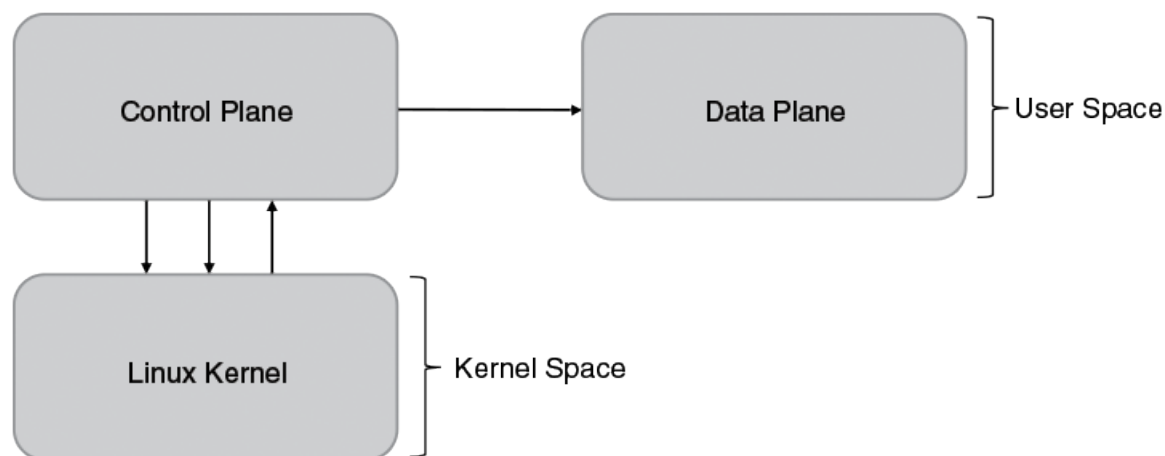
Customarily, packet processing in Linux runs in the kernel space. However, with the vPlane architecture, packet processing runs in the Linux user space. By using the vPlane architecture and leveraging the Intel Data Plane Development Kit (Intel DPDK), the AT&T Vyatta vRouter delivers breakthrough levels of performance. Depending on the configuration, one or two cores are dedicated to each interface. The core or cores are able to run at 100-percent efficiency when processing packets and support performance scaling.

AT&T Services platform

The AT&T Services platform supports foundation networking services and can eliminate the need for at least one virtual network function (VNF) in a multiservice design. This platform also eliminates manual provisioning by supporting zero-touch deployment for the on-premise Services platform, which automates configuration and software updates and allows service providers to scale services as needed. NETCONF supports the VNF life cycle, service chains, and further configuration.

The AT&T Services platform is based on the AT&T Vyatta Network Operating System of the AT&T Vyatta vRouter.

The Services platform allows the virtualization of the hardware that is required to run your business and provides a set of value-added services, including network connectivity. You can use the Services platform to run various VNF devices.

The following figure illustrates the Services platform architecture. You install the hypervisor image and then create guests for various VNF roles.

Figure 3: AT&T Services platform Architecture
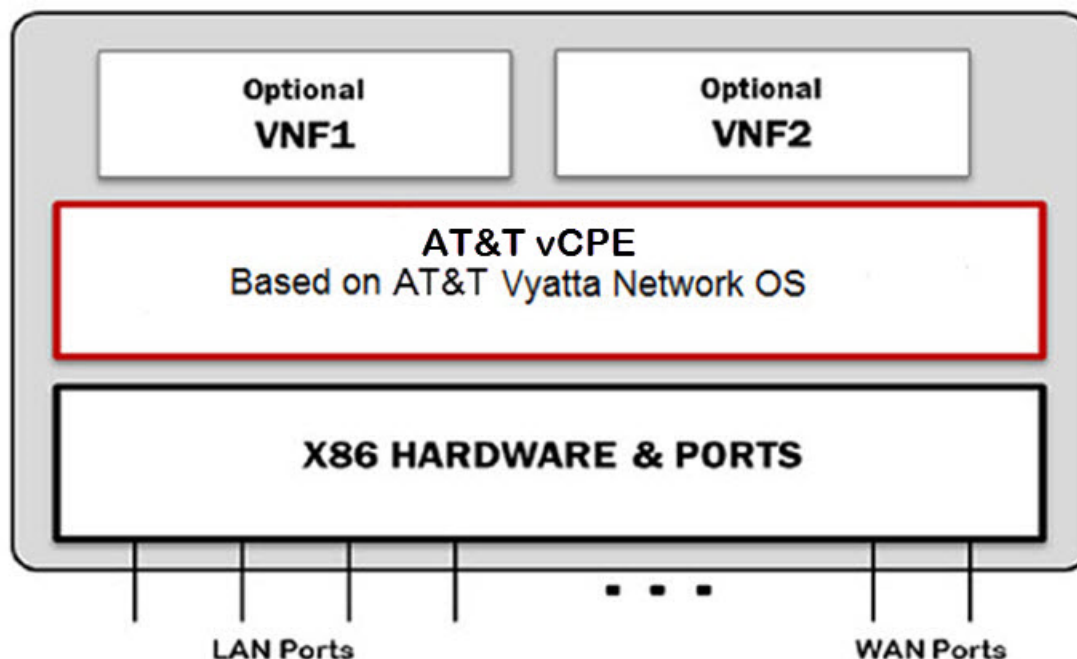
AT&T Distributed Services

AT&T Distributed Services is a large-scale distributed router consisting of a single Distributed Services controller and multiple virtual data planes (vPlanes) that operate together as a large distributed system across many hypervisors. Distributed Services provides the following:

- Horizontal scaling of VNFs, with numerous tenant-facing interfaces that are distributed across multiple vPlanes for Internet service providers.
- A Layer 2 virtual overlay network for cloud service providers.

The following figure provides a high-level view of the Distributed Services architecture, which is based on the following elements:

- Controller—Virtual machine (VM) that provides control and management functions for the Distributed Services infrastructure.
- vPlane—VM that forwards data as an instance of the data-forwarding plane. A single Distributed Services instance can include up to 32 vPlanes. Internal vPlanes connect to tenant servers, and gateway vPlanes connect to the external network.
- Control network—Network that provides control plane and status communications between the Services controller and vPlanes.
- Fabric network—Full mesh of VXLAN-GPE tunnels between all the vPlanes that is used to forward packets between vPlanes.

Figure 4: AT&T Distributed Services Architecture