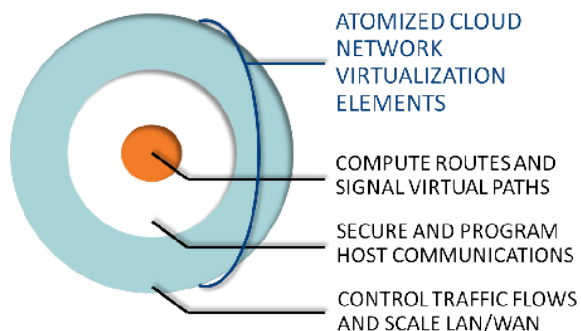# CLOUD NETWORK VIRTUALIZATION OVERVIEW

From massively scalable elastic clouds to the Internet of Things, the new global network is making a fresh set of demands on data center and internetworking infrastructures. The Metaswitch Cloud Network Virtualization solution encompasses a suite of atomized components, complete products and entire reference architectures that enable equipment providers, operators and enterprises to deliver evolutionary Software Defined Networks (SDNs) and dynamic compute environments supporting all manner of data processing and Network Functions Virtualization (NFV).

ATOMIZED CLOUD NETWORK VIRTUALIZATION ELEMENTS

COMPUTE ROUTES AND SIGNAL VIRTUAL PATHS

SECURE AND PROGRAM HOST COMMUNICATIONS

CONTROL TRAFFIC FLOWS AND SCALE LAN/WAN

• High-quality software components

• Hardened control plane protocols

• IP-centric virtual network infrastructure

• Massively scalable cloud deployments

With a reputation for quality software and superior integration support, our complete portfolio of Layer 2 and Layer 3 control plane protocol stacks have been employed by numerous equipment vendors to rapidly bring new products to market. Building on this expertise, Metaswitch is helping deliver programmable, virtualized, wide area network infrastructures supporting complex service function chains. This allows data center architects to scale their cloud interconnect architectures to support new OS virtualization techniques and the ever-increasing need for elastic compute resources.

The components, products and reference architectures that make up our Cloud Network Virtualization solution enable engineers and architects to:

• Compute granular routes and signal virtual paths
• Secure and program virtual machine or container communications links
• Control traffic flows
• Scale entire LAN and WAN internetworking infrastructures

PROJECT CALICO L3 DATA CENTERS

Calico's pure Layer 3 approach to data center networking integrates seamlessly with cloud orchestration systems, such as OpenStack, to enable highly secure IP communication between virtual machines, containers, or bare-metal workloads. Based on the same scalable IP network principles as the Internet, the Border Gateway Protocol (BGP) Calico implements a highly efficient, orchestrated, vRouter in each compute node that leverages the existing Linux kernel forwarding engine without the need for vSwitches.

Targeted at emerging elastic cloud data centers and supporting both enterprise compute along with carrier services delivered from increasingly virtualized network functions, Project Calico addresses the encapsulation inefficiencies of classic Layer 2 overlay approaches that burden core processors as traffic traverses host machines.

Calico reduces packet overhead, increasing pure performance by eliminating the CPU cycles needed to encapsulate and de- encapsulate payloads between the physical network infrastructure and each virtual machine. Carrying far less overhead, Calico also streamlines the troubleshooting process while making security easier to audit and permitting direct communication between virtual machines and any host endpoints that have connectivity to the cloud in either private or public IP address spaces.

By leveraging proven IP route discovery mechanisms, Calico-based data center architectures are naturally dynamic in nature, advertising, discovering and removing virtualized host instances as they are instantiated or taken out of service. These Layer 3 techniques, that include elements such as Route Reflectors, do not suffer from the same scaling limitations that plague classic Layer 2 data center implementations and protocols.

With plugins to popular cloud operating systems like OpenStack, Calico puts interconnect on a diet without having to give up the orchestration tools and interfaces you depend on. Moreover, Calico is the prefered SDN environment for Lightweight Linux Container (LXC) OS virtualization techniques and their associated abstraction layer implementations, such as Docker.
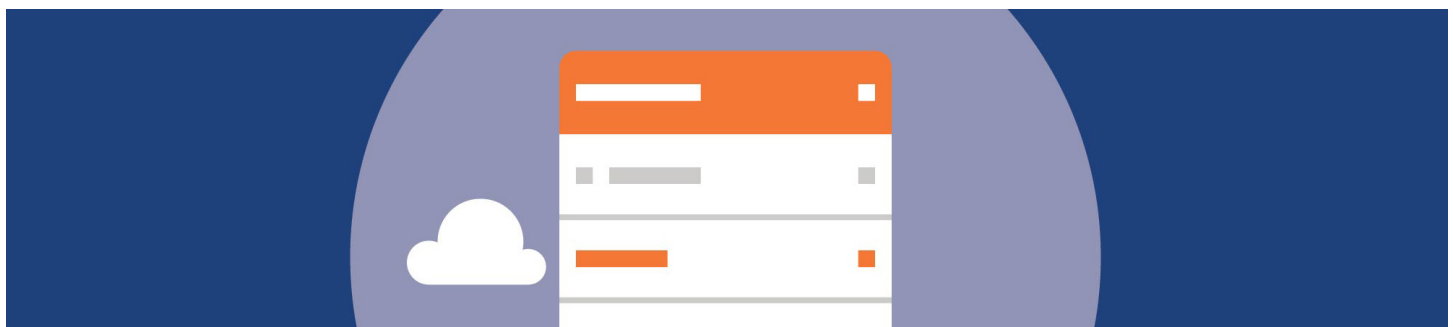
CONTROL PLANE COMPONENTS

Valuing our existing client base and reinforcing our position as leaders in portable networking protocol stacks, Metaswitch continues to invest heavily in this area. We take a long-term approach to our networking customers, creating strategic customer relationships and delivering future-proof product architectures.

Our portfolio includes complete Layer 2 Ethernet solutions, MPLS / GMPLS and RSVP control planes plus Layer 3 route discovery mechanisms, including IP multicast. Along with a suite of VoIP signaling solutions that facilitate voice network transformation, Metaswitch can deliver SDN elements that accelerate the adoption of centralized control plane products.

Metaswitch's Layer 2 Ethernet and OAM product suite provides a full range of protocols enabling OEMs to deliver solutions in Carrier Ethernet, mobile backhaul, and data center environments. The Layer 2 product suite can be used stand-alone with third-party software or as part of our Integrated Control Plane solution.

Targeted at SDN infrastructures, our Layer 3 route discovery and path computation elements are designed to make up the backbone of any network, large or small. Built from the ground-up for network functions virtualization but equally ideal for integration within dedicated hardware platforms, Metaswitch provides a full range of feature-rich, fully portable Layer 3 IPv4 and IPv6 routing software products. Whether developing a stand-alone network element, or making the move to separated or centralized routing and forwarding planes, Metaswitch Layer 3 offerings have been designed to support scalability and resiliency requirements of today's emerging network architectures.

SCALING AND PROGRAMMABILITY

With the unstoppable drive toward ever-increasing connected endpoints, elastic scalability and granular control of IP infrastructure have never been more important. Crafted for NFV and network services virtualization (NSV), the Metaswitch AX1000 virtualized route reflector (vRR) is designed to be a robust solution for internal BGP scaling and a central control plane component within virtualized infrastructures, hyper-scale Layer 3 data centers, and carrier SDN.

Representing the latest in strategic control plane technology, the Gulfstream SDN Controller from Metaswitch is delivering genuine solutions to today's networking bottlenecks and capex/opex pain points. Targeting networking issues prevalent in network access and emerging cloud compute data center infrastructures, Gulfstream leverages standardized SDN protocols like OpenFlow to extend network intelligence to localized switching platforms and commodity white boxes.

CLOUD NETWORK VIRTUALIZATION

With the burgeoning of NFV and NSV, the growing need for dynamic, programmable, network infrastructures, and the insatiable demand for highly elastic compute resources, any equipment vendor, data center architect, network operator, or systems integrator can benefit from Metaswitch cloud network virtualization solutions – to complement their current offerings or to re-engineer their infrastructures for the future.

Metaswitch Networks
THE BRAINS OF THE NEW GLOBAL NETWORK