CloudEOS™

Highlights

Cloud Grade Routing

Multi Cloud: routing optimized for public and private clouds and available in all major public and private cloud environments including Amazon AWS, Google Cloud Platform, Microsoft Azure

Transitive Routing: connects multiple Virtual Private Clouds (VPCs) together with a normalized connectivity pattern and the same proven Arista EOS® software used in all Arista networking platforms

Universal Cloud Network (UCN): standards-based network designs within and across public clouds; for leaf-and-spine and edge-to-edge connectivity through a standards-based BGP EVPN layer-3 and reliable leaf-and-spine routed topologies

Site-to-Site WAN interconnection: connect public clouds, data centers and campus sites with high speed IPsec encryption and dynamic path selection

## Key Features and Capabilities

Cloud Network Private Segments (CNPS): VXLAN and IPsec based Virtual Private Networks (VPNs) spanning cloud regions and providers, to enable a secure, global and consistent segmentation model

Dynamic Path Selection (DPS): with In-band Path Telemetry for cloud edge use cases providing reliability connectivity over diverse WAN segments

Network Address Translation (NAT): provide IP address flexibility in any VPC

Telemetry streaming: based on open source gNMI, gRPC, and OpenConfig standards delivering greatly improved network visibility and troubleshooting

CloudEOS™ is Arista's Multi Cloud networking solution, supporting autonomic opzeration, and delivering an enterprise-class, highly secure and reliable networking experience for the cloud.
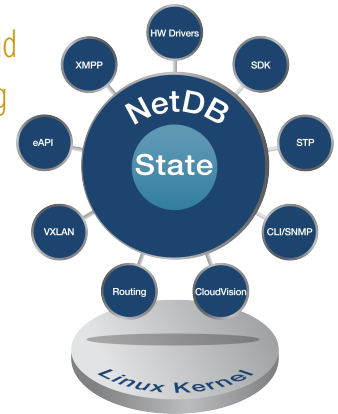
Autonomic Cloud Operations

Elastic: Pay-As-You-Go (PAYG) consumption through Public Cloud Marketplaces and Service Catalogs

All Inclusive: includes CloudVision with Terraform integrations, all EOS routing and telemetry features, and A-care software support

Consistent operational model: Arista EOS® and CloudVision® complemented with DevOps and CloudOps toolchain integrations like Terraform

Open Programmability: programmable via JSON API (eAPI) or EOS SDK, with support for Python, Go, Ansible, NetConf, and OpenConfig

Performance and Reliability

Cloud High Availability (HA): utilizing Bi-directional Forwarding Detection (BFD) and multi-path routing (ECMP) for fast recovery and continuous operation

High Performance Data Plane (DPDK/SR-IOV): increases throughput while reducing latency, jitter, and CPU utilization to deliver the ultimate performance in any cloud or hardware platform

Latest Cloud Architecture: utilizing Microsoft Azure Accelerated Networking and Amazon AWS Enhanced Networking for efficient resource utilization in public cloud instances

Why CloudEOS?

Multi Cloud Customer Challenge

Cloud applications need the agility to scale-up and down elastically based on real-time demand, and thus execute far more cost-effectively in public clouds than on fixed enterprise infrastructures due to the elastic nature of the public clouds and their shared global infrastructures. Elastic scaling and pricing can result in significant OpEx reductions while providing an organization with the freedom to deploy workloads instantly.

Multi cloud deployments enable application and platform teams to place workloads across multiple public clouds, thus providing greater agility through the ability to consume any application across any qualified cloud platform. However, creating and maintaining a multi-cloud infrastructure, as well as a hybrid distribution of application stacks and data across multiple public and private clouds, can result in a highly complex networking and security environments, requiring additional specialized expertise, and increasing operating costs.

Figure 1: Universal Cloud Network - Consistent in every Place in the Cloud
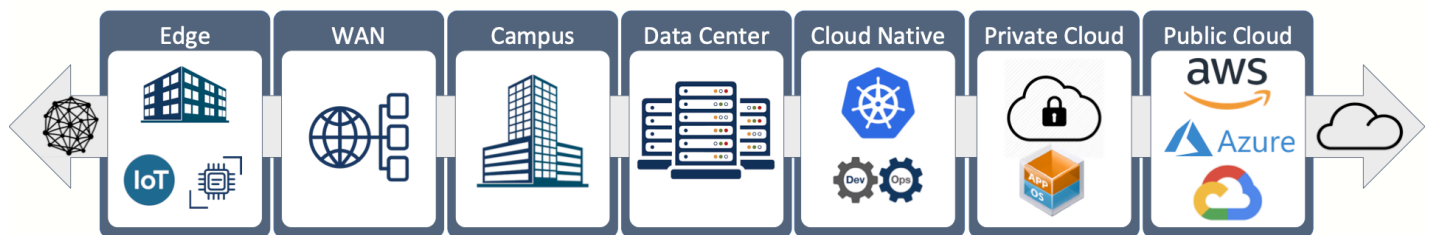
Can the Cloud benefit from a consistent Universal Cloud Network Design?

Arista's cloud networking strategy pivots on a foundational architecture for network reliability and scale, extending the Universal Cloud Network Design approaches that we pioneered in high-performance enterprise and cloud data centers into public and private clouds using elastic provisioning of the networking infrastructure as code.

Figure 2: Universal Cloud Network Designs
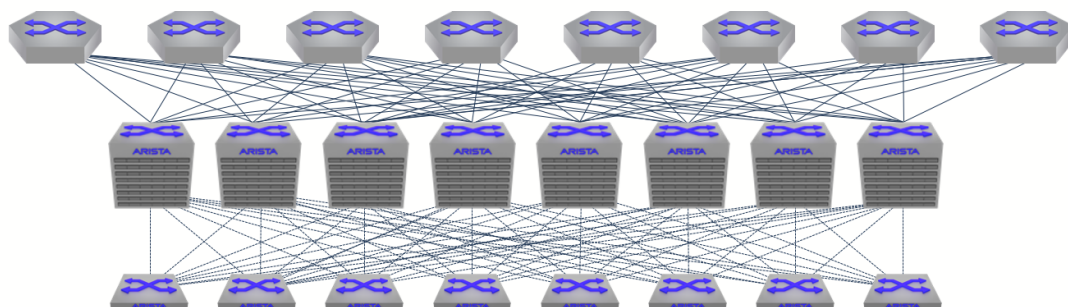
In fact, the foundation of all Arista Universal Cloud Network Designs (Figure 2.) is based on the capabilities and features of Arista's Extensible Operating Systems (EOS), the world's most advanced network operating system software. Arista EOS is purpose-built for next-generation cloud data centers. It consists of a highly modular software design based on a unique multi-process state sharing architecture that separates networking state from processing and enables fault recovery and incremental software updates on very granular level, all without affecting the state of the system.

Introducing CloudEOS - Cloud Networking Infrastructure as Code

CloudEOS is Arista's multi-cloud networking solution supporting autonomic operation and delivering an enterprise-class, highly-secure and reliable networking experience for any cloud. As part of the Arista EOS® and CloudVision® product family, it delivers consistent segmentation, automation, telemetry, provisioning and troubleshooting for the enterprise edge, WAN, campus, data center and multiple public and private clouds.

CloudEOS is based on the same network operating system already proven in the most demanding public cloud, government and enterprise infrastructures, and it utilizes the exact same binary image and release trains as all Arista EOS platforms. At its core, Arista EOS provides an extremely robust, stable and resilient network-operating environment for the cloud while delivering on the need for openness, software modularity and extensibility. This unique combination offers the opportunity to significantly improve functionality and efficiency as a part of the evolution of every public and private cloud.

Arista CloudEOS extends the Arista EOS platform from Arista's award-winning physical switching and routing platforms into the virtualized environment with a powerful and elastic automated deployment model. This approach ensures that the CloudEOS platform will always support the latest EOS features, with the same high quality and platform compatibility as the entire Arista networking portfolio.

Figure 3: Multi Cloud Networking with Cloud Network Private Segment
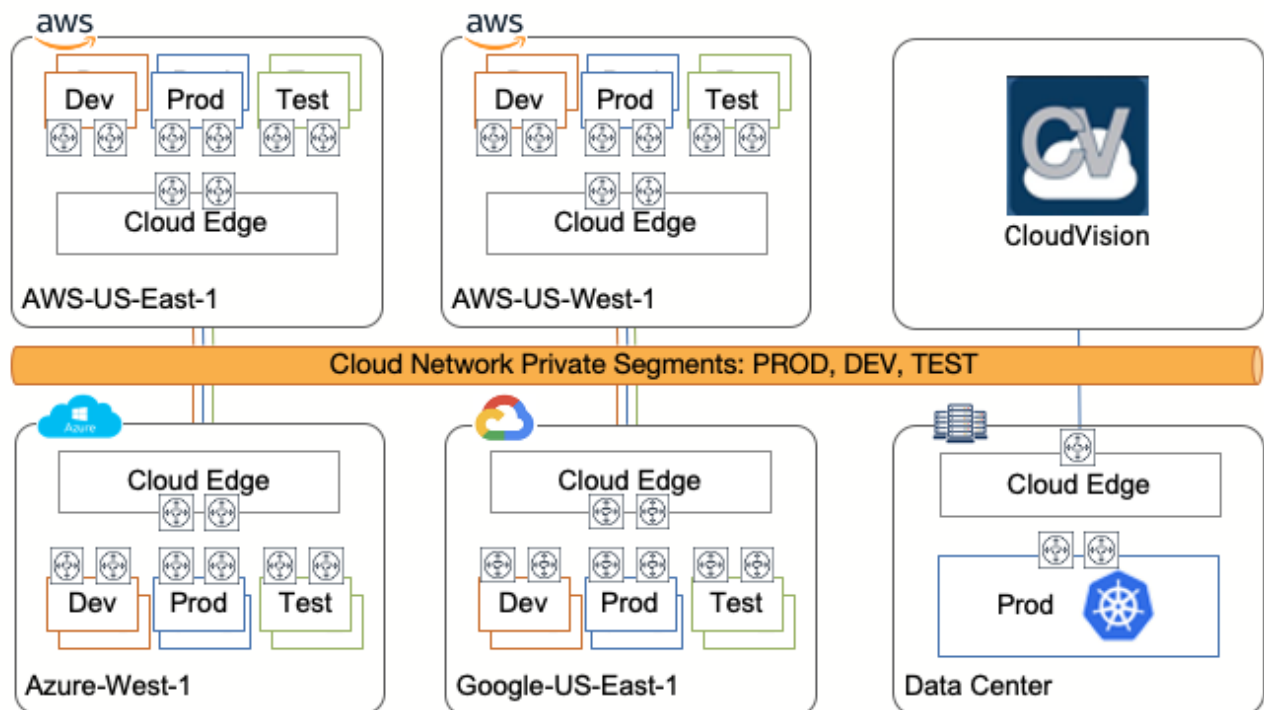
A foundational network construct to enabling our vision of highly reliable cloud operations and concurrent isolation for sensitive workloads is the delivery of Cloud Networking Private Segments (CNPS) over a universal leaf-and-spine topology (figure 3.). The CNPS is a standards-based multi cloud network segmentation method that provides several key capabilities in the increasingly complex enterprise environment for segmentation within and across public and private clouds using a BGP based EVPN.

To provide a scalable and automated network experience, CloudEOS fully integrates its automated operational features with Arista CloudVision® to simplify the operators experience of interconnecting and managing multi-cloud, cloud-native and on-premises enterprise networks. Leveraging a network-wide approach for workload orchestration and workflow automation, together with advanced network telemetry and standards-based programmability, CloudEOS and CloudVision provide a seamless and universal approach to multi-cloud networking.

CloudEOS with Universal Cloud Network Design provides the vital missing element required for building multi-cloud connectivity with consistent isolation across the entire enterprise environment. It delivers high-performance virtual-machine of EOS software that simplify network operations with declarative cloud provisioning tool chains like Terraform, Ansible and other popular CloudOps and DevOps solutions that are used to deploy the entire application stack.

CloudEOS Deployment Experience

CloudEOS enables the integrated delivery of a fully software-defined infrastructure as code by combining the power of network automation with the cloud consumption and elastic scaling features of public clouds, private cloud platforms, using HashiCorp Terraform and cloud provider toolsets such as AWS CloudFormation or Microsoft Azure Resource Manager templates to deploy directly from public cloud provider marketplaces.

CloudEOS supports fully elastic pay-as-you-go consumption and scaling in the public cloud, with automatic deployment and provisioning based on real-time application demand. In addition it provides the key features required to achieve integration of network operations with the dynamic cloud operational models required to sustain the benefits of a multi cloud infrastructure, while minimizing operating costs.

With CloudEOS, customers can take full advantage of their multi-cloud investments without compromising on the network reliability, security and predictability that they expect from Arista.

Arista CloudEOS Router - Summary of Key Capabilities

Declarative Cloud Provisioning - using the popular Terraform application a platform engineering team can stand up virtual private cloud instances in multiple public cloud providers and with a single additional line of code per VPC. Terraform will automatically deploy an Arista CloudEOS leaf router, or a high availability pair of routers, and establish secure connectivity to a CNPS for each connected VPC.

Multi Cloud Reachability and Scale - any resource elastically scales up/down within the public cloud its instantiation and real-time addressing are maintained coherently across the entire CNPS segment.

Elastic Scaling and Consumption - for cloud delivered functions like segment control points, edge transit routers, and cloud spine nodes the architecture is designed to enable these nodes to be procured in and through the public cloud providers and billed based on the actual consumption in a Pay-as-You-Go model.

Enhanced Visibility and Analytics - each networking node within the CNPS streams telemetry data back to Arista CloudVision which can be deployed in the public cloud in a VPC or on-premises. This enables a digital replica of the network state to be available for analytics or as training data for supervised machine learning models.

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