VMware NSX® Advanced Load Balancer™ (by Avi Networks)

Multi-Cloud Application Services: Load Balancing, Application Security, Container Ingress and Analytics

KEY BENEFITS

- 97% Faster Service Provisioning
- Rapid Problem Resolution in seconds through app health scores, application analytics, security, and client insights
- 30% Reduction in TCO through on-demand application scaling and support for any bare metal server, VM, or container on-premises or in the cloud

WHAT'S INCLUDED

A single platform that provides

- L4-L7 load balancing
- Web application firewall (WAF)
- Container ingress
- Global server load balancing (GSLB)
- Real-time application analytics
- On-demand application autoscaling

APPLICATION SERVICES ACCELERATE BUSINESS AGILITY

Enabling remote work while ensuring security with unprecedented speed has dramatically increased the need for applications to be available across different environments, regardless of time zones and peak usage conditions. Legacy infrastructure lacks the elasticity, flexibility, and agility needed to deliver applications securely and reliably. The rise of containers, APIs, and observability needs presents an opportunity for infrastructure to become composable, automated, and intelligent without the limitations of the appliance-based approach. Modern enterprises need an on-demand, fast-to-deploy, easy-to-use app delivery solution that facilitates multi-cloud consistency across on-premises and cloud environments.

SOFTWARE LOAD BALANCER

VMware NSX Advanced Load Balancer (Avi Networks) uses a software-defined architecture that separates the central control plane (Avi Controller) from the distributed data plane (Avi Service Engines). Avi is 100% REST API based, making it fully automatable and seamless with the CI/CD pipeline for application delivery. The Avi Controller is the "brain" of the entire system and acts as a single point of intelligence, management, and control across a distributed fabric of enterprise-grade load balancers, application security, container ingress and analytics. The Avi Controller provides decision automation based on closed-loop telemetries and presents actionable insights based on based on application monitoring, end-to-end timing, searchable traffic logs, security insights, log insights, client insights, and more. See Figure 1.

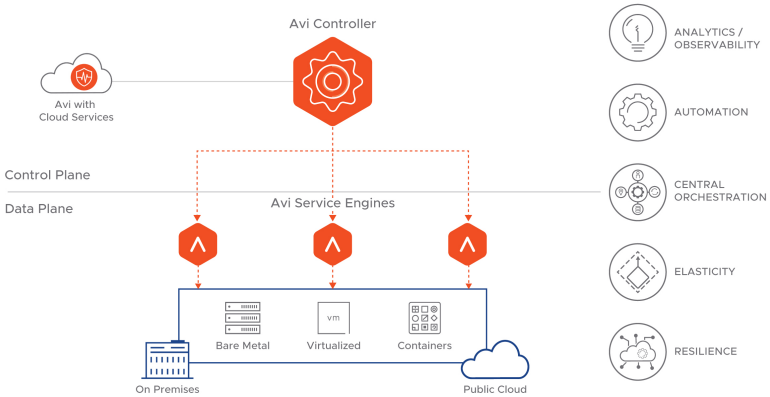

FIGURE 1: High-level Architecture

WAF APP SECURITY WITH WAF

For security, Avi features an web application firewall (WAF) with distributed web application security fabric to enforce security through closed-loop analytics and application learning mode that covers OWASP CRS protection, support for compliance regulations such as PCI DSS, HIPAA, and GDPR, and signature-based detection. WAF provides an optimized security pipeline with a positive security model to maximize the efficiency of resource-intensive operations. Avi with Cloud Services provides live feeds of new threat updates including IP reputation, bot detection, signatures, and more, and automatically minimize false positives with advanced security analytics, detection, and enforcement modes. With real-time app security insights and analytics provide actionable insights on performance, end-users and security events in a single dashboard with end-to-end visibility. See Figure 2.

KEY FEATURES

- Point-and-click simplicity for security policies with central control
- Elastic scale with high performing, load based automatic scale-out architecture
- Granular security insights on traffic flows and rule matches for precise policies
- Automated threat updates through Avi with Cloud Services
- Real-time app security insights and analytics
- Protects applications from DDoS attacks and OWASP Top 10 threats

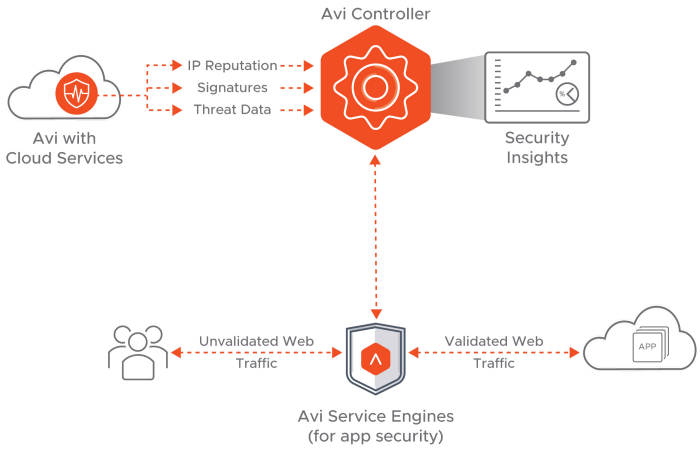

FIGURE 2: Security Insights for Web Applications

KUBERNETES INGRESS SERVICES

Modern application architectures based on microservices have made appliance-based load balancing solutions obsolete. Containerized applications deployed in Kubernetes clusters need a scalable and enterprise-class solution for load balancing, global and local traffic management, service discovery, monitoring/analytics, and security. However, not in a disparate way with siloed DIY products to be stitched all by the platform teams. Enterprises adopting Kubernetes need a cloud-native approach for traffic management and application networking services. For modern container-based applications, Avi offers a consolidated set of container services including cloud-native, scalable, enterprise-class container ingress traffic management, dynamic service discovery, and security. See Figure 3

KEY FEATURES

Traffic Management & Service Discovery

- Local and global load balancing
- DNS / IPAM / Circuit Breaking
- Health Monitoring
- TLS termination, Cert management / automation
- CI/CD and Blue-Green / Canary deployments

Security & Observability

- WAF
- Authentication
- Allowlist / Denylist
- Rate Limiting
- DOS detection / mitigation
- Application and infra performance metrics
- Transaction tracing & fine-grained logging

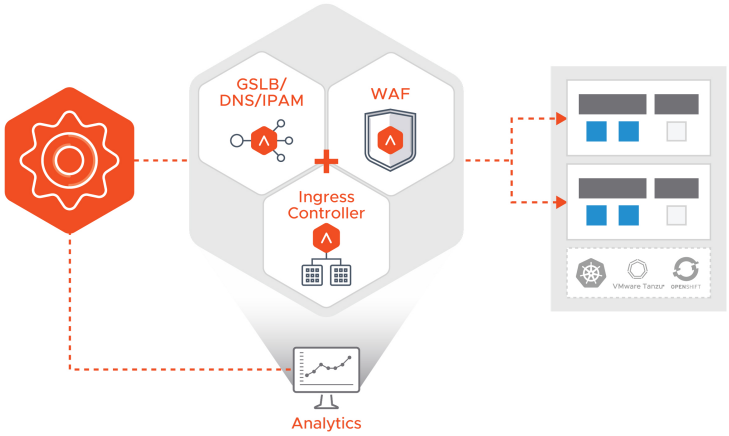

FIGURE 3: Avi Kubernetes Ingress Services

AGILITY FROM AUTOMATED PROVISIONING AND SELF-SERVICE

Automated virtual service provisioning with per-app load balancing services

- Virtual IP (VIP) provisioning in seconds
- Full automation with REST APIs to support faster application rollout in Blue/Green and Canary deployments and enable DevOps teams with self-service portals
- Simplified operations with centralized policies
- Full lifecycle management through application delivery automation
- No manual per appliance configurations

LOWER COST WITH SIMPLIFIED OPERATIONS

Elastic load balancing and just-right-size capacity without overprovisioning

- No overprovisioned capacity and continuous refresh, upgrades and maintenance of individual hardware appliances
- Flexible, subscription- based licensing model that eliminates static capacity
- Reduced OpEx through simplified operations of central management
- No custom active-standby hardware needed with software-defined load balancing on high-performance Intel x86 servers
- Consistent application services across multi-cloud environments without reconfiguration

RAPID RESOLUTION IN SECONDS

Google-search like visibility into network transactions to troubleshoot quickly

- Application health score for a quick snapshot of network posture
- End-to-end round-trip times with latencies between each network hop
- Real-time logging, recording and replaying traffic events
- Granular insights into performance, security, and end user experience
- Point-and-click application troubleshooting – no black box

ELASTIC AUTOSCALING AND HIGH PERFORMANCE

On-demand scale up or down using analytics-driven automation based on real-time traffic

- Self-service provisioning for continuous application delivery
- CI/CD support On-demand load balancing and application autoscaling
- Service Engine failure auto recovery
- Automatically programs network, cloud, and app environments
- Full support for multi cloud - On-Premises mixed with Azure, AWS, Google Cloud Platform

1. *IDC Business Value Study of VMware NSX Advanced Load Balancer: A Study of Enterprises Using Next-Generation Application Delivery*
2. *VMware Data Integrated Customer Engagement (DICE) Tool*
3. *Load Balancing Benchmark Report by Principled Technologies*

SUPPORTED PLATFORMS	
VMware	vCenter, VMware NSX, VMware Horizon, VMware Cloud on AWS, Google Cloud VMware Engine, Azure VMware Solution
OpenStack	Queens, Rocky, Stein, RH OSP, Keystone v3
Bare Metal	RHEL, CentOS, Ubuntu, Oracle Enterprise Linux, Cisco CSP (NFV appliance)
Containers	Kubernetes, VMware Tanzu, OpenShift, Amazon EKS, AKS, GKE
Public Cloud	Microsoft Azure, Amazon Web Services (AWS), Google Cloud Platform (GCP), IBM Cloud, Oracle Cloud
SDN	VMware NSX, Nuage VSP, Nutanix Acropolis, Juniper Contrail
IPAM / DNS	Avi DNS, Azure DNS, Azure DNS Private Zones, AWS Route 53, Infoblox, Custom DNS integration
Automation	Ansible, Terraform, Swagger, Python SDK, Go SDK, vRealize Orchestrator (vRO), vRealize Automation (vRA), REST API
Monitoring	Splunk, Cisco Tetration, Cisco AppDynamics, Graphite, Datadog, Logstash, Elasticsearch, InfluxDB, Syslog, Prometheus, Zabbix, vRealize Log Insight, VMware Wavefront

SYSTEM PERFORMANCE AND SCALE	
Max System Throughput	10 Tbps
Max Connections	100 million per second
Max Concurrent Connections	10 billion
Max HTTP Requests	200 million per second
Max SSL TPS (2k RSA)	10 million
Max SSL TPS (SEC256r1 ECC)	30 million
Max tenants (shared data plane)	Unlimited
Max tenants (isolated data plane)	200
Max Avi Service Engines	200

FEATURE	DESCRIPTION
Enterprise-class load balancing	TLS 1.3 support, SSL termination, default gateway, GSLB, DNS, wildcard VIP and other L4-L7 services
Multi-cloud load balancing	Intelligent traffic routing across multiple sites and across private or public clouds, global server load balancing supported with Canary upgrades of leader and follower sites
Application performance monitoring	Monitor performance and record and replay network events with granular logging
Predictive autoscaling	Application and load balancer scaling based on real-time traffic patterns
Cloud connectors	VMware, SDN controllers, OpenStack, AWS, GCP, Azure, Linux Server Cloud, VMware Cloud on AWS, Google Cloud VMware Engine, Azure VMware Solution (customer-managed)
Distributed application security fabric	Granular app insights from distributed service proxies to secure web apps in real time
Application security	Bot management (tech preview), Positive security model and learning mode for WAF
SSO / Client Authentication	SAML 2.0 authentication and authorization for back-end HTTP applications
Automation and programmability	REST API based solution for accelerated application delivery, extending automation from networking to developers with self-service portal enabled
Application analytics	Real-time telemetry from a distributed load balancing fabric that delivers millions of data points in real time
Centralized management and upgrade	Policy-based management and ability to selectively upgrade data plane with Flexible Upgrade
Networking protocols support	BGP, RHI and ECMP, BFD, IPv6, VLAN & trunking, VRF awareness, Radius and SIP
Consolidated container services	Kubernetes Services including ingress, WAF, GSLB, DNS/IPAM on a scalable platform with support for multi-cluster, multi-site and multi-AZ container clusters

VMware, Inc. 3401 Hillview Avenue Palo Alto CA 94304 USA Tel 877-486-9273 Fax 650-427-5001 www.vmware.com.