

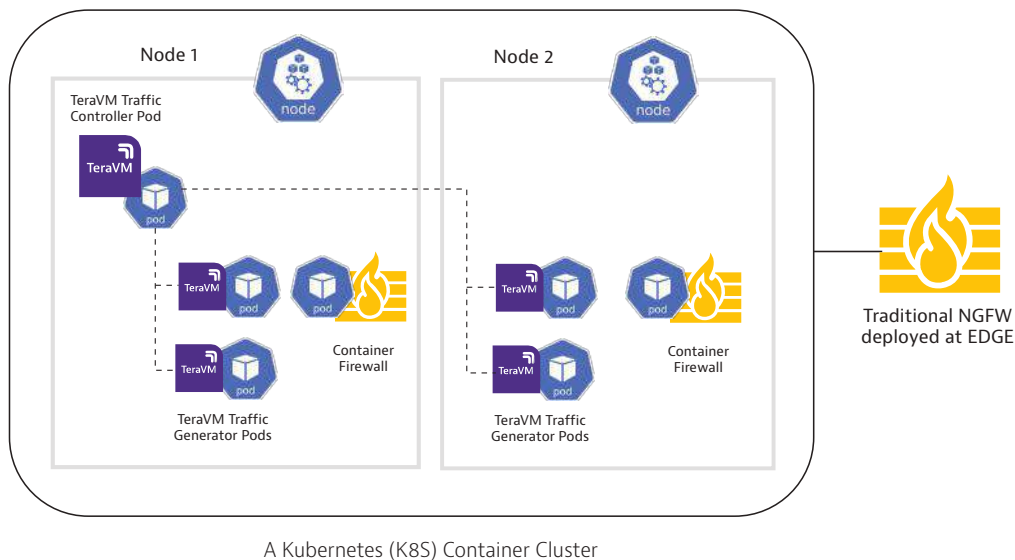
# VIAVI

## Containerized TeraVM Security Test Solution

Validates Container Security Solutions deployed in Google GKE and Amazon EKS Kubernetes services

### Overview

With Next Generation Firewalls (NGFWs) evolving to be deployed in container clusters, there is a need to validate these new container based firewalls for performance and efficacy before deployment. Conventional Test Tools are designed for testing firewalls deployed at EDGE of network. But to test container firewalls, the test solution is required to be inside the container environment as these firewalls have to focus on securing east-west traffic flowing between Kubernetes namespaces in addition to securing inbound and outbound traffic.



The TeraVM Classic product by VIAVI is the industry’s first commercial tool that offers a cloud native testing solution natively integrated with Kubernetes. Available from TeraVM v15.1 release since June 2020, containerized TeraVM is deployable in public cloud managed Kubernetes services such as Google Kubernetes Engine (GKE) and Amazon Elastic Kubernetes Service (EKS) and also on Kubernetes on bare-metal on-prem servers.

### TeraVM Classic in Container Form Factor

A TeraVM test bed is a group of TeraVM components that generate IP test traffic with customizable traffic profiles. In a Containerized TeraVM deployment the test bed is containerized and consists of a number of Pods that are deployed over an available number of Nodes. The setup consists of TeraVM Controller Pod that acts as a management entry-point and Test Module pod pairs that act as worker. The traffic can be easily scaled by adding more Test Module Pod pairs.

Customers can easily deploy TeraVM Classic tool to specific namespaces in Kubernetes environments hosted on-prem or in public clouds and with major public cloud managed Kubernetes services such as GKE and EKS. The deployment is made seamless in different environments using Kubernetes package manager Helm and the deployment is parameterized with helm custom values. The Containerized TeraVM works with default CNI plugins in EKS and GKE. TeraVM also support other third party CNI plugins as Calico and Flannel if the cluster requires so.

The IP address and networking configuration required for the tests are automatically populated by the individual Traffic pods. In additional TeraVM also offers the ability to generate traffic towards service IP's instead of the Pod IPs, thereby emulating realistic kubernetes cluster traffic behaviour.

TeraVM Classic supports a wide variety of voice video and data traffic Profiles to be emulated in the container network including HTTP(S), FTP(S), SMTP(S), POP3(S), VOIP, TCP Playback, UDP playback. All Traffic Profiles support customizable TLS settings with selection of TLS 1.2,1.3, Ciphers, signature hash algorithms, SNI extension, custom X.509 certificates, configurable key size, Common Names, TLS Record Size to name a few.

## Use Cases – Containerized TeraVM

**URL Filtering.** Containerized TeraVM can be used to generate HTTP/HTTPS traffic with million URLs for exercising container firewall's URL filtering policies, validating the ability of the firewall to block blacklisted sites.

**Kubernetes metadata based policy testing.** Containerized TeraVM's traffic pods allow annotations that makes it possible to test metadata based policy on the containerized firewalls.

**Application Traffic and TLS inspection.** Containerized TeraVM can generate various L7 application traffic that allows to test the firewall for Content inspection and TLS decryption capabilities.

Performance and Recommended specification for TeraVM Traffic Pod		
K8s Service provider	System Characteristics	Performance per TeraVM Traffic Generator Pod Pairs
Amazon Cloud - EKS	Machine type: c5.2xlarge CNI: Amazon VPC CNI plugin	<p>HTTP Throughput Performance Per TeraVM Traffic Generator Pod (2 vCPU/1 CPU):</p> <ul style="list-style-type: none"> <li>• 1.7 Gbps (single k8s node)</li> <li>• 1.6 Gbps (across two k8s node)</li> </ul> <p><b>Total Resources used by a Pair of TeraVM Traffic Generator Pods</b>            Number of vCPU: 2            Number of CPU: 1            Memory: 4 GB (2 GB per TeraVM Traffic Generator Pod)            Disk: 2 GB</p>
Google Cloud - GKE	Machine type: c2-standard-8 CNI: Kubenet (Default)	<p>HTTP Throughput Performance Per TeraVM Traffic Generator Pod (2 vCPU/ 1 CPU):</p> <ul style="list-style-type: none"> <li>• 2.7 Gbps (single k8s node)</li> <li>• 2.7 Gbps (across two k8s node)</li> </ul> <p><b>Total Resources used by a Pair of TeraVM Traffic Generator Pods</b>            Number of vCPU: 2 (1 vCPU per TeraVM Traffic Generator Pod)            Number of CPU: 1            Memory: 4 GB (2 GB per TeraVM Traffic Generator Pod)            Disk: 2 GB</p>



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