



# ENTERPRISE-GRADE ELASTIC APPLICATION DELIVERY IN CONTAINER ENVIRONMENT

## A10 INGRESS CONTROLLER FOR KUBERNETES

Containers and Kubernetes increasingly serve as the basis of modern and agile apps. Kubernetes requires a collection of rules to allow inbound connections to reach its cluster services; these are called Ingress. Ingress can be configured to expose services and perform load balancing through A10 vThunder® and A10 Lightning™ Application Delivery Services.

A10 Ingress Controller for Kubernetes<sup>1</sup> extends the support on Kubernetes label routing and east-west microsegmentation for enterprise-grade delivery services for Kubernetes applications at scale. When integrated with A10 Harmony™ Controller, A10 Ingress Controller for Kubernetes seamlessly synchronizes and manages A10 Lightning ADC instances within any Kubernetes cluster node. The solution helps auto-provision and auto-scale Lightning ADC instances across any container cluster and improves the resilience of deployed applications. The result is applications that are available and can respond more quickly to increased demand.

### THE CHALLENGE

Microservices and distributed containers pose new challenges for application service delivery. Typically, a variety of container models are incorporated into the DevOps environment, which complicates the workload.

Simple container applications are not sufficient to automate application traffic configuration in a Kubernetes cluster. When an external load balancer, like IP Virtual Server (IPVS), is deployed to manage container traffic using L2 Direct Server Return (DSR), the external load balancer can become the single point of failure. When a microservices-based architecture is involved, latency can creep in. Lastly, native tools are not capable of configuring the advanced settings necessary to get the best performance from traffic within the Kubernetes node.

<sup>1</sup>Download A10 Ingress Controller for Kubernetes at DockerHub.

### CHALLENGE

Application load balancing is critical to support dynamic deployments and configure traffic across a clustered container orchestrator at scale. The lack of centralized app access policy configuration and real-time ingress resources over tens of thousand nodes introduce inevitable performance bottlenecks.

### SOLUTION

A10 Ingress Controller ties directly into the Kubernetes lifecycle. As applications are deployed and new services are created, A10 Harmony Controller automatically live-configures ADCs to serve traffic to these services targeting both east-west and north-south.

### BENEFITS

- Customize traffic with Ingress flexibility and scalability
- Adapt and configure application load balancers automatically as app services are added
- Fast troubleshooting and operational intelligence via centralized visibility with aggregated analytics
- Rapidly manage and deploy traffic using purpose-built configuration templates for L4-L7

The A10 Ingress Controller enables organizations to deploy applications anywhere across a Kubernetes cluster and automatically scale a load balancer to access the application stack. Content-based routing, resilience, multiple protocols, and authentication are supported in the real-world ingress inside Kubernetes.

## THE A10 INGRESS CONTROLLER FOR KUBERNETES SOLUTION

The A10 Ingress Controller for Kubernetes provides production-grade container application delivery services with auto-provisioning of A10 Lightning ADC in the multi-cloud environment.

Enterprises with complex multi-cloud container workloads that require professional ADC functionalities benefit from this highly scalable integration can meet the most stringent requirements in modern distributed applications of any kind.

## SOFTWARE-DEFINED DATA, CONTROL, AND MANAGEMENT PLANE

The distributed architecture uses containerized Lightning ADC as data plane elements next to app services. Control and management plane functionalities are handled through A10 Harmony Controller for centralized application configuration, traffic rules, and security policies along with real-time updates from Ingress Controller.

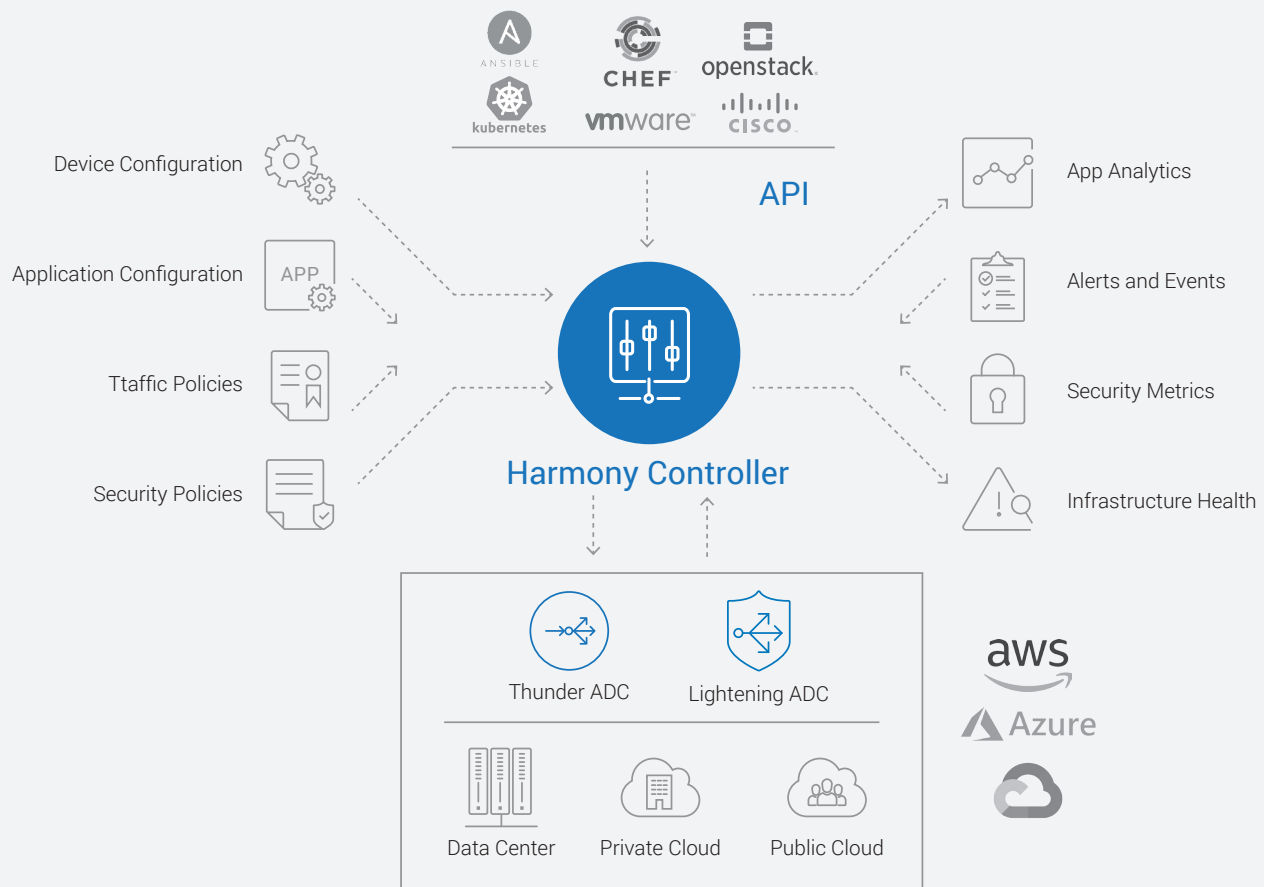
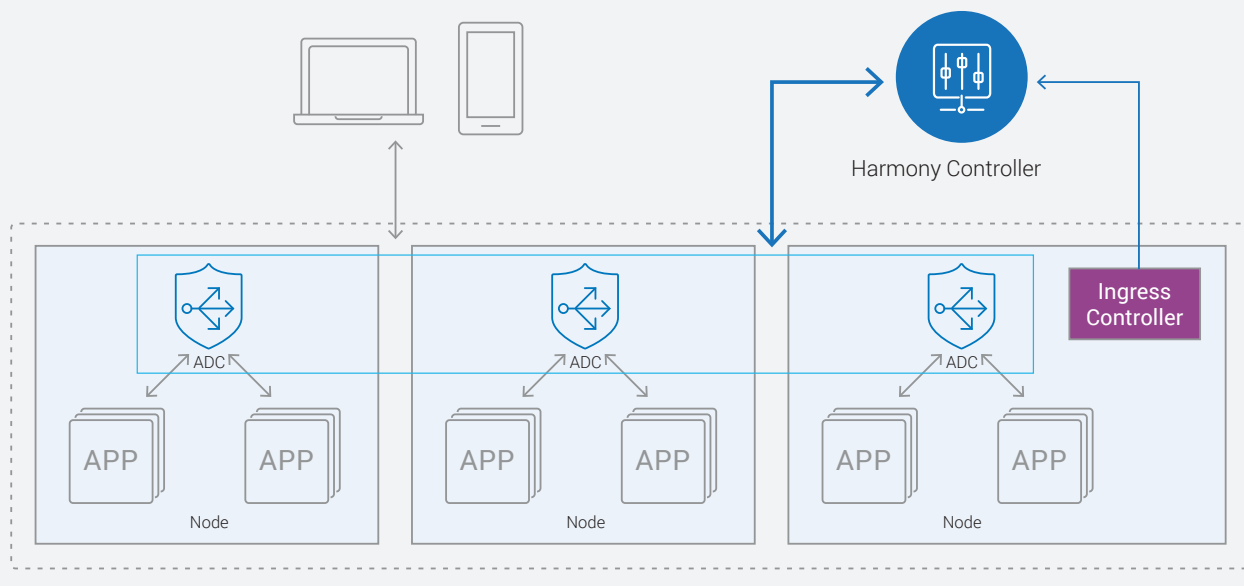


Figure 1: A10 Harmony Controller architecture overview



**Figure 2:** Scaling of Application Services with A10 Ingress Controller integration with Harmony Controller

## SINGLE PANE OF MANAGEMENT FOR APPLICATION VISIBILITY AND ANALYTICS

Harmony Controller has a strong analytics engine and brings per-app as well as per transaction analytics of traffic passing through the ADCs to access end-to-end container-based application performance and intelligence for fast container traffic diagnoses.

As a Kubernetes application service resource scales up or down, a trigger is sent to the A10 Ingress Controller, and the Lightning ADC configuration is automatically updated using Harmony APIs.

Running Lightning ADC as DaemonSet ensures every node of the Kubernetes cluster automatically runs an instance of Lightning ADC. A10 provides the Docker image of Lightning ADC, as well as the configuration template YAML file required to connect Lightning ADC to the Harmony Controller.

Only a single instance of the A10 Ingress Controller is required to run in the entire cluster. Ingress resources from any namespace can work with the Ingress Controller and configure Lightning ADC accordingly.

## FEATURES AND BENEFITS

### DELIVER END TO END CONTROL AND VISIBILITY FOR MICROSERVICES AND CONTAINER TRAFFIC

The Kubernetes Ingress Controller supports the reconfiguration of the A10 Harmony Controller to ensure that the A10 Lightning ADC are always running the latest topology and application configuration.

### ENABLE CONTAINER PLATFORM-AGNOSTIC APPLICATION SERVICES

The A10 Lightning ADC supports the common SDN requirements of context-switching, full L7 proxy, body and header rewrites, and application security in a container environment, as well as advanced elastic load-balancing and analytics for container applications.

Container integrations including Kubernetes, Docker, CoreOS, Red Hat OpenShift, Cisco Cloud Center, and Pivotal Cloud Foundry, as well as public cloud container orchestration platforms, are supported.

## SOLUTION COMPONENTS

When deploying applications into a container environment, A10 Ingress Controller integrates into the cloud-native application management and orchestration system with Harmony Controller. The solution includes:

- A10 Harmony Controller 4.0 and up
- A10 Lightning ADC
- A10 Thunder® ADC
- Docker image of Lightning ADC – In Docker registry
- Docker image of Ingress Controller – In Docker registry
- Configuration template YAML file for deploying Lightning ADC as DaemonSet
- Configuration template YAML file for deploying Ingress Controller
- Configuration template YAML file for creating Ingress Resource

## SUMMARY

A10 Ingress Controller along with cloud-native A10 Lightning ADC and Harmony Controller makes the best ADC solution for container applications deployed in a Kubernetes environment. The solution offers detailed visibility and analytics of application traffic flowing through the Lightning ADC via Harmony Controller. Harmony Controller also provides actionable insights and great troubleshooting capabilities to reduce overall time spent in the application delivery administration process.

## NEXT STEPS

For more information about A10 Harmony Controller, please visit our website at [www.a10networks.com/products/harmony-application-management-analytics](http://www.a10networks.com/products/harmony-application-management-analytics).

## ABOUT A10 NETWORKS

A10 Networks (NYSE: ATEN) provides Reliable Security Always™ through a range of high-performance solutions that enable intelligent automation with deep machine learning to ensure business critical applications are protected, reliable and always available. Founded in 2004, A10 Networks is based in San Jose, Calif., and serves customers globally with offices worldwide.

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