aCLOUD SERVICES ARCHITECTURE

Delivers dynamic L4-7 tenant services while improving agility and reducing total cost of ownership

Challenge:

Traditional data center infrastructure does not provide the agility and scalability needed to cost-effectively meet cloud IaaS demands. Manual service provisioning and managing a broad range of compute, storage and network infrastructure is time-consuming and requires significant process overhead.

Solution:

The aCloud Services Architecture is a portfolio of products and features that integrate with SDN network fabrics and cloud orchestration platforms, dynamically delivering application and security services and policies per tenant for public, private or hybrid cloud IaaS deployments.

Benefits:

The aCloud Services Architecture ensures that tenant policies are enforced with significant improvements in provisioning speed and scale, while reducing TCO. The comprehensive portfolio of products and features can be used to deliver consistent security and policy enforcement for all cloud IaaS consumption models.

Instant gratification benchmark established by Amazon Web Services (AWS), the attractive OPEX-based model prevalent in the public cloud combined with the need for always-on reliability resulting from mobility and BYOD trends, are driving data center operators towards cloud delivery models. Traditional data center infrastructure does not provide the agility and scalability needed to cost-effectively meet these demanding data center needs. The challenge lies in manual service provisioning and managing a broad range of compute, storage and network infrastructure is time-consuming and requires significant process overhead. As a result, the ability of data center administrators to react to change is adversely impacted.

To respond to these challenges, IT organizations are adopting emerging cloud delivery models. At one end of the spectrum, cloud adoption is made possible through hosted applications otherwise known as software-as-a-service (SaaS), which allow users to consume software typically through a web browser. On the other end of the spectrum, hosted infrastructure-as-a-service (IaaS) architectures enable private and public data center operators to deliver virtualized infrastructure services in multi-tenant environments. With IaaS, users can now leverage the public and private cloud infrastructure to quickly adapt to change using an elastic and cost-effective environment.

Cloud IaaS delivers vastly greater business agility, service provisioning times, and economics. Cloud IaaS requires that underlying infrastructure be automated and scalable to build an on-demand delivery model providing dynamic and consistent services in a shared, multi-tenant environment. In order to do so, it is critically important that a seamless integration of application networking services with other data center infrastructure is needed to deliver dynamic L4-7 services and automated policy enforcement for service-level agreements (SLAs) and compliance in a shared, multi-tenant environment.

The A10 Networks® aCloud™ Services Architecture enables cloud IaaS data center operators to deliver advanced L4-7 tenant services while improving agility and reducing total cost of ownership. It includes a portfolio of products and features that integrate with SDN network fabrics and cloud orchestration platforms, dynamically delivering application and security services and policies per tenant for public, private or hybrid cloud deployments.

aCloud Services Architecture

A10's aCloud Service Architecture offers:

- Portfolio of products with a choice of form factors, including physical, hybrid and virtual appliances provides flexibility for of all cloud IaaS deployment models.
- An on-demand licensing model allows cloud IaaS operators to offer and deliver advanced L4-7 and networking tenant services with automated metering, reporting, billing and license management. The licensing model enables cloud IaaS operators to offer on-demand application networking services to their customers (internal or external) on a subscription basis, similar to the way they offer compute and storage services.
- Integration with leading SDN and cloud orchestration platforms ensures that network and security policies are applied on any A10's appliances for automated L4-7 services provisioning.

Following are the major architectural elements of A10's aCloud Services Architecture:

aCloud Services Architecture Elements	Value	Technology Enablers
High-Performance Hardware Appliances	Perform resource-intensive L4-7 services perimeter functions	• Thunder Series and Thunder SPE hardware appliances (including intensive SSL offload, DDoS protection, WAF and network virtualization protocol (VXLAN/NVGRE) support • ACOS architecture delivers highest performance and efficient appliances
Virtualized and Hybrid Appliances	Flexible distributed scale-out design per tenant (spawn instances on-demand)	• vThunder virtual appliances or hybrid Thunder HVA • Consistent ACOS features with all inclusive licensing
On-Demand Licensing	Pay-as-you-go pricing model and automated billing	• vThunder pay-as-you-go with rental and utility billing models • vThunder Amazon Machine Image (AMI) on AWS Marketplace
SDN Integration	Overlay and SDN Fabric Integration; Automated provisioning of network segmentation and security policies	• IBM SDN-VE, Cisco APIC*, VMware NSX* • RESTful aXAPIs, Smart templates for seamless integration • VXLAN and NVGRE
Cloud Orchestration Integrations	Policy integration with cloud orchestration platforms	• Microsoft SCVMM, OpenStack, VMware vCloud Director • RESTful aXAPIs, Smart templates for seamless integration • aGalaxy management solution

High-performance Hardware Appliances:

- A10 Thunder™ Series and Thunder SPE hardware appliances perform resource-intensive perimeter functions. For example services such as VXLAN and NVGRE tunnel encapsulation or decapsulation, SSL offload, and volumetric DDoS attack prevention at the data center service edge.

Virtualized and Hybrid Appliances:

- vThunder virtual and Thunder hybrid virtual appliances (HVA) provide advanced L4-7 services with comprehensive feature sets. The vThunder virtual appliances offer full range of features and functionality in a software-based appliance that can run on leading hypervisors.
- Thunder HVA provides the flexibility of virtual appliances with the high performance of hardware, allowing customers to run multiple vThunder strongly isolated hypervisor-based instances at high multi-tenant densities.

On-Demand Licensing:

- vThunder™ pay-as-you-go licensing enables cloud IaaS operators to provide application networking and security subscription services with pricing models, at a monthly or usage level, consistent with their other compute and storage services. vThunder pay-as-you-go licensing offers a rental billing model (RBM, a fixed bandwidth license per month) and utility billing model (UBM, licensed per byte used). Furthermore, the licensing model enables a cost-effective approach to deploying services with reduced OPEX and no upfront CAPEX.
- In addition to the pay-as-you-go licensing, vThunder is available as an Amazon Machine Image (AMI), offering a comprehensive feature of advanced L4-7 services on Amazon Web Services (AWS) infrastructure. Enterprises can leverage choice of deterministic billing with fixed hourly rates to enable rapid provisioning and on-demand access to the computing resources with minimal management efforts on AWS EC2 or VPC cloud. Unifying vThunder with the AWS infrastructure ensures feature parity across your physical, virtual and cloud computing environments.

SDN Integration:

- Integration with leading SDN solutions such as Cisco ACI*, VMware NSX*, IBM SDN-VE ensure that network segmentation and security policies are enforced consistently whenever a new flow enters the network.
- Support for SDN fabric and overlay-tunneling protocols (including VXLAN and NVGRE) also ensures that appropriate network tagging is consistently applied.

Cloud Orchestration Integrations:

- Software plug-ins for leading cloud orchestration platforms, including OpenStack, VMware vCloud Director and Microsoft System Center Virtual Machine Manager (SCVMM), ensure that centralized tenant provisioning and policy information is automatically applied as new workloads and application services are created and existing services are managed.

All A10 appliances run the innovative Advanced Core Operating System (ACOS®). The comprehensive features and flexibility combined with an architecture that allows the system to maximize utilization of CPU resources, makes A10 products ideal for cloud scale and performance requirements. Following are few benefits of ACOS platform:

- ACOS features and configurations are identical and transferable across all form factors. In conjunction with an all-inclusive licensing this facilitates dynamic provisioning of services.
- Application Delivery Partition (ADP) delivers high performance multi-tenancy solution that allows the usage of overlapping IP addresses.

*In planning phase

- The RESTful approach ensures quicker integration and can be used for flexible resource provisioning and dynamic traffic control in a cloud environment.
- A10 Networks' aFleX® scripting provides organizations with a critical tool to adjust traffic flowing to applications as needed in a shared multi-tenant environment.
- Smart templates speed up service provisioning and provide rapid scale up and scale down capabilities.
- Moreover, a flexible and software-based ACOS makes it possible to constantly evolve and expand the feature set to address new market needs.

Benefits

Overall, the aCloud Services Architecture ensures that tenant policies are enforced with significant improvements in provisioning speed and scale, while reducing TCO. The benefits of aCloud Services Architecture are:

Agility:

- **Choice of form factors for dynamic L4-7 services**: Leveraging a choice of A10 appliance form factors, cloud IaaS operators can enable their tenants to spawn new instances on demand, and support dynamic L4-7 service insertion according to tenant-defined or provider-defined policies. The cloud operators can now effectively address their operational needs by providing consistent services in a shared, multi-tenant environment to meet the SLA, compliance and security requirements.
- **RESTful aXAPI deliver automated provisioning and management driving down service provisioning time:** Integration with centralized orchestration systems with flexible RESTful APIs ensure accurate and unified configuration of network application services reducing manual configuration tasks and speeding time to implementation.
- **High-Performance Thunder Series platforms as gateway or tunnel end points:** VXLAN and NVGRE support enable operators to deploy and extend virtual layer 2 domains as well as provide server load balancing functionalities both for underlay networks and virtual overlay networks.

Automation:

- **Automated provisioning of network segmentation and security policies:** Benefit from integration provided by A10 plug-in service modules with leading SDN controller platforms, including Cisco ACI*, IBM SDN-VE and VMware NSX*, and the support for data plane tunneling protocols like VXLAN and NVGRE to provide automated enforcement of network segmentation policies. When new flows arrive at the network, the appropriate policy information will be assigned and the flow will be automatically mapped to the appropriate network segment and security policy.
- **Cloud orchestration ensures that centralized tenant provisioning and policy information is automatically applied:** The A10 aCloud Services Architecture enables operators to build an automatically provisioned application networking infrastructure

by integrating plug-in service modules that support leading cloud orchestration platforms such as OpenStack, Microsoft SCVMM and VMware vCloud Director*. Using these plug-in service modules to the central cloud policy orchestration platform, customers can benefit from automated policy inheritance that will automatically implement load balancing, security and other L4-7 application networking services.

- **Virtual appliances and dynamic service chaining per tenant:** Leveraging vThunder virtual appliances and hybrid Thunder HVA appliances, cloud IaaS operators can enable their tenants to spawn new instances on demand, and support dynamic L4-7 service insertion according to tenant-defined or provider-defined policies.

Lower TCO

A10 aCloud Services Architecture reduces total cost of ownership through a variety of means.

- **Automated service provisioning eliminates manual provision overhead, time and costs:** ACOS features and configurations are identical and transferable across all appliance form factors. In conjunction with an all-inclusive licensing and RESTful API approach ensures quicker integration and facilitates dynamic provisioning of services in a shared multi-tenant environment.
- **On Demand Licensing eliminates CAPEX:** Flexible licensing model enables cloud IaaS providers to provision virtual appliances up or down on demand, and offer a broader array of subscription services to their customers. On-demand vThunder pay-as-you-go licensing models allow the service providers to eliminate CAPEX, and only pay for the services as they are consumed.
- **Reduce operational costs by avoiding manual configuration:** Integration with SDN and cloud orchestration platforms provides automated enforcement of network segmentation policies thus reducing operational costs by avoiding incremental manual configuration and by reducing implementation times.

Solutions

The cloud IaaS deployment models can be broadly classified based on the deployment and ownership types. We have private cloud at one end of the spectrum and public cloud at the other end. The A10 aCloud Services Architecture delivers comprehensive portfolio of products and features to provide consistent security and policy enforcement for all cloud IaaS deployment models.

- **Private Cloud:** Enterprises are deploying private cloud to address needs of agility and on demand consumption. Enterprises will have to deploy a self-serve model while ensuring security and compliance in an increasingly shared infrastructure. A10's aCloud Services Architecture integrates with leading SDN and cloud platforms allowing enterprises to rapidly scale up or down services in a shared infrastructure. A10 also delivers choice of ADC appliance form factors (physical, virtual and hybrid) and on demand licensing for deployment flexibility. A10's aCloud Services Architecture can be leveraged to dynamically provision application services and to ensure SLAs and security requirements are met consistently.

*In planning phase

- **Public Cloud:** Public cloud environments need a robust multi-tenant solution along with metered consumption to provide tenants a fast and cost-effective application deployment environment. Public cloud IaaS providers require integration with SDN fabrics and Orchestration platforms along with policy enforcement per tenant rules. The aCloud Services Architecture enables a solution for the public cloud providers through integration with SDN and cloud platforms driving utilization in shared environment. The pay-as-you-go licensing model coupled with Dynamic L4-L7 services provides a cost-effective and agile application delivery. Public IaaS operators can leverage the aCloud architecture to enforce tenant policies with significant improvements in provisioning speed while optimizing resource utilization in a multi-tenant shared environment.

- **Hybrid Cloud:** Enterprises are turning to the public cloud for disaster recovery and cloud bursting needs. To support a hybrid model, rapid provisioning of services along consistent application performance across a securely connected private and public cloud is required. A10's GSLB solution coupled with a choice of form factors can be leveraged to create a flexible solution that provides an automated and rapid policy enforcement in public domain. Furthermore, SDN and cloud Integration along with application delivery partitions (ADP) ensure SLA and compliance requirements are addressed in a multi-tenant shared environment. aCloud Services Architecture thus provides automated policy enforcement for consistent application performance and rapid service provisioning in hybrid cloud.

- **Managed Hosting Providers:** As managed hosting providers adopt cloud IaaS, interoperability with legacy hosting is a critical need for optimizing resource overhead for differentiated services delivery. The IaaS infrastructure in Managed environment thus requires uniform management along with seamless service deployment. The aCloud Services Architecture provides common management plane and seamless service deployment for all appliances in a shared environment through integration with SDN and cloud Orchestration platforms. Also, resource allocation via ADP coupled with pay-as-you-go per tenant enables tiered services. aCloud Services Architecture can be leveraged to optimize resource efficiencies and to deliver competitive, differentiated services.

- **Carrier NFV:** Carriers today are focused on optimizing operations overhead to create a cost effective and agile service delivery model to address fluctuating traffic volume. To address these needs, an open and standards based eco-system support is required as Carriers seek to virtualize and automate network functions on commodity hardware. The aCloud Services Architecture's support for open platforms such as OpenStack along with virtualized appliances can be directly leveraged for deploying virtualized services on commodity hardware. Additionally, the pay-as-you-go o licensing model in conjunction dynamic services insertion enables the implementation of elastic, tiered services. Carriers can deploy the aCloud Services Architecture to provide virtualized services with reduced TCO and increased agility.

Summary

With A10 Networks aCloud Services Architecture, cloud IaaS operators can create a seamless integration of application networking services with the other data center infrastructure to ensure appropriate SLAs and compliance. High performance appliances provide the requisite capacity so that the key infrastructure services can scale to meet elastic demands while a choice of form factor gives customers the flexibility to create a tailored offering in a high-density multi-tenant environment. Integration with SDN networks and cloud orchestration platforms enables automatic provisioning of advanced application networking and security services on a per tenant basis. aCloud Services Architecture enables a dynamic enforcement of centralized policy as new workloads and services are created with significant increase in provisioning speed, business agility and reduced costs.

About A10 Networks

A10 Networks is a leader in application networking, providing a range of high-performance application networking solutions that help organizations ensure that their data center applications and networks remain highly available, accelerated and secure. Founded in 2004, A10 Networks is based in San Jose, California, and serves customers globally with offices worldwide. For more information, visit: **www.a10networks.com**

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