Solution Overview

Cisco ACI and Apprenda: Build a Secure Application-centric Platform as a Service (PaaS)
The Challenge
As businesses consider how to respond to the threats and opportunities arising from digitization, they understand the importance of delivering applications at the speed of ideas. To quickly and flexibly offer the services that best equip a modern workforce, organizations are turning to an application-centric approach: using software to strengthen their traditional business offerings, create new revenues streams, and optimize business processes. As software becomes the competitive currency of the enterprise, organizations are investing in solutions to embrace new distributed cloud applications, implement cloud platforms, and automate infrastructure provisioning. However, IT organizations are facing many challenges in delivering high-quality, agile applications that keep up with the increasing pace of change:

- Regulatory compliance and security management are the top two barriers to enterprise hybrid cloud adoption.
- Application software architecture standards are shifting to microservices and containers.
- Organizations must maintain service-level agreements (SLAs) without compromising agility and efficiency.
- Hyperdistributed applications need to be isolated across bare-metal servers, virtual machines, and containers.
- Organizations are seeking ways to empower developers and embrace DevOps.

The Solution
The Cisco® Application Centric Infrastructure (Cisco ACI™) platform uses a group-based policy model that abstracts the infrastructure details from the application requirements of the network, declaratively configuring the underlying infrastructure based on application policy requirements. Apprenda provides an enterprise platform-as-a-service (PaaS) software layer that transforms any infrastructure into a policy-based hybrid cloud application platform. Apprenda’s container-based PaaS software integrated with the Cisco ACI open policy interfaces frees developers and operators from the manual constraints of network configuration and achieves strict isolation of application tiers, data, and network resources without the need for dedicated infrastructure.

Apprenda placement of workloads is based on policy information collected from the application and the developer. Cisco ACI segments the network based on that same policy information. The mapping of these two policy frameworks forms the integration between Apprenda and Cisco ACI (Figure 1).

While this solution brief focuses on Apprenda and Cisco ACI integration, by introducing the Cisco Cloud Center to the stack, enterprises can further automate on-demand deployment and configuration of full applications stacks to any datacenter or hybrid cloud environments.

Figure 1. Apprenda PaaS and Cisco ACI Integration

The result is dynamic application isolation achieved through a policy-based secure hybrid cloud application platform. This platform allows developers to run their existing N-tier applications and new cloud-native applications in a self-service environment without requiring networking or infrastructure management expertise. Moreover, the platform allows you to inherently cloud enable your traditional Java or .NET applications, enabling you to run them across your data center and multicloud and hybrid clouds environments (Figure 2).
This combined solution provides an excellent way for application-centric enterprises to achieve governance, security, rapid development, and reliability, with greatly reduced operating and capital expenses.

**Benefits**

The Apprenda and Cisco ACI solution offers these benefits:

- **Resource utilization:** We believe that infrastructure utilization levels should not be sacrificed to achieve security and reliability. Our platform’s container-based model, combined with the power of dynamic network-based microsegmentation, allows you to increase application density and reduce virtual machine sprawl. Enterprises can achieve up to a 70 percent increase in utilization levels while saving on OS and virtual machine licensing costs.

- **Invisible security:** Run applications securely on a shared infrastructure, whether it is on your premises or in the hybrid cloud. Our solution’s dynamic application isolation capabilities reduce the spread of attack vectors from one application to another, and the solution’s access controls and integration with identity management tools manage access across your application portfolio with ease.

- **Disaster recovery:** Our solution is specifically built for high availability and instant disaster recovery, helping ensure zero downtime for your applications. If a particular infrastructure component fails, the platform repopulates instances of the application in the affected region on healthy resources. Most important, Apprenda and Cisco ACI controllers themselves are highly available.

- **Compliance and governance:** Our policy-based workload placement and complete application isolation, including isolation of data and network resources, automates compliance and corporate governance, lowering the risk profile and reducing operating costs. For instance, regulations require investment banks to keep “buy-side” applications separate from “sell-side” applications. Our solution can automate workload placement to help ensure that buy-side workloads are always isolated from sell-side applications.

- **Service quality and high performance:** The application segmentation, load balancing, and automated elastic scaling offered by our solution help ensure a high level of service for business-critical applications. For instance, for a retailer, the performance of its e-commerce portal must not be affected by performance tests being conducted on applications in development. Our solution helps achieve this goal. It also automatically elastically scales applications up or down based on demand.

- **Single-pane self-service:** Now developers can focus on their core competency—programming—without depending on IT or any knowledge of the underlying network or infrastructure architecture. Developers can use the self-service portal (Figure 3) to deploy their applications in minutes, and IT operations staff can use the portal to manage resources and define governance policies. Additionally, the newly released Apprenda Cloud Network Portal (CNP) allows organizations to perform network health checks and manage Cisco ACI endpoint groups (EPGs) without any help from network engineers.
**DevOps experience:** Our developer workflows, operation controls, and strong integration capabilities, with continuous integration and continuous deployment (CI/CD) and integrated development environment (IDE) tools, enable a true DevOps environment: with rapid development, instantaneous deployment, and continuous operations. Our solution delivers a “No-Ops” experience for developers, and “No-Dev” experience for IT operations organizations. Both development and operations teams work independently without friction.

**Next Steps**

- If you are interested in a joint Cisco ACI and Apprenda solution, please contact a representative:
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  - Adam Ozkan at Cisco: adaozkan@cisco.com
- For more information about Apprenda, visit https://apprenda.com/cisco.
- For more information about Cisco ACI, visit http://www.cisco.com/go/aci.