Security of the Arista WiFi Cloud

Introduction

Across enterprises and public sectors alike, migrating in-house data processing to the cloud has become an accepted strategy among IT departments. This often raises eyebrows within the security department because data security controls that were traditionally managed in-house now move into the hands of third parties. Cloud-managed WiFi is no exception to this dogma. Hence, Arista has taken proactive steps to build a robust security program for the cloud that strengthens its WiFi access and security solution. The Arista cloud security program comprises multiple pillars as described throughout this paper.

Local data plane and cloud management plane

The Arista Wifi Cloud architecture separates the logical function of the wireless network into three planes, the data-plane (A), management plane (B) and control plane (C). Control and Data planes exist locally within the enterprise perimeter, with only the management plane (B) operating from the cloud. Hence, the wireless data transacted through Arista access points (APs) does not flow to the Arista WiFi Cloud; rather it is routed locally on the enterprise network based on the enterprise's routing controls. This also facilitates local enforcement of data security controls such as content filtering and forensic logging. The authentication and authorization functions of the data plane are also kept local to the enterprise network.

The management console used to configure and monitor the wireless network is provided from the Arista WiFi Cloud. This console also provides security monitoring of the WiFi environment at the enterprise to detect and contain any undesirable activity in that air space. The control plane operates locally in the enterprise network among APs (C). This plane implements inter-AP messaging for handoffs, load balancing, RF optimization, etc. and does not require constant input from the management plane past its initial configuration.

Data collected by cloud management plane

The cloud management plane collects and stores MAC and IP addresses of devices in the enterprise network that are seen by APs deployed within the network. It also collects metadata about devices such as their layer 2 wireless activity (probing, associations), OS, hostnames, applications usage, locations to the level of proximity to APs, and 802.1x login identities that are transmitted over the air in order to connect to the WiFi network.

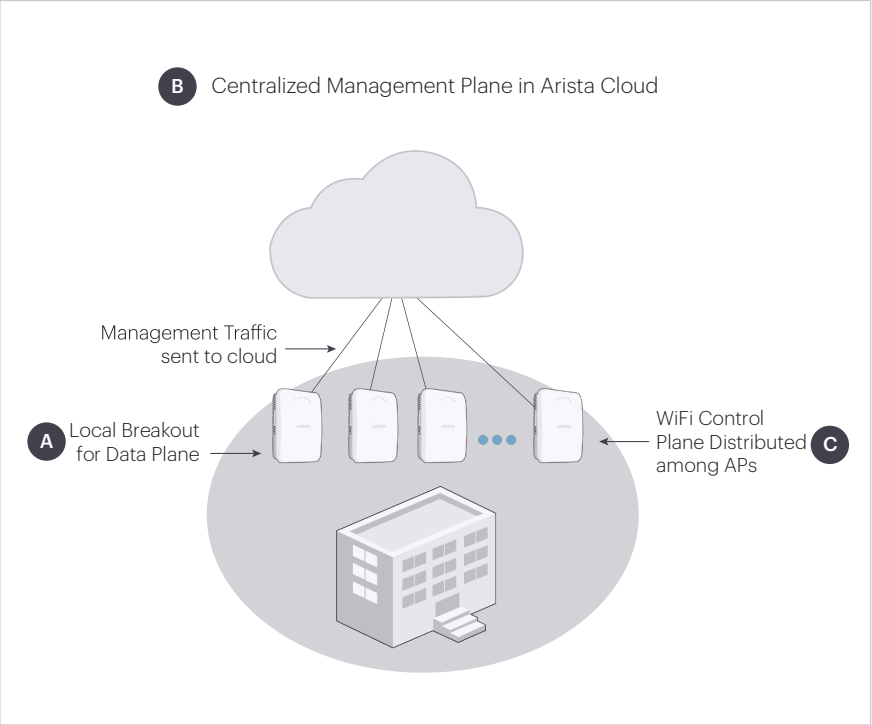

Figure 1: Arista Cloud WiFi Architecture

It's important to note that employee passwords used for 802.1x authentication are not collected or stored in the cloud, as they are validated from the local enterprise RADIUS servers. 802.1x user passwords are also not readable by the APs as these are only passed directly between the client and the authentication servers over encrypted tunnels. For Guest WiFi, the cloud management plane also collects and stores identities of guest users used during WiFi authentication, to facilitate security audits of guest visitors. Enterprises can, if they wish, implement a Guest WiFi network with anonymous login as well.

AP-to-Cloud Communication

There are three security measures in place to ensure proper protection for AP-to-Cloud communication.

Mutual authentication: This occurs anytime an AP initiates a connection with the cloud. This is always an inside-out request, and both the AP and cloud authenticate to one another in the process. This verifies the identity of both parties.

Per message authentication: This uses an HMAC authentication code for every message sent from an AP to the cloud. This ensures the integrity of the communication by confirming the message is sent by the correct entity and is not changed in transit.

AES encryption: This is used throughout AP-to-cloud communication. This ensures the messages remain confidential and cannot be intercepted.

Cloud environment

The Arista WiFi cloud is deployed as a virtual private cloud (VPC) within market leading cloud provider platforms. In the VPC architecture, the Arista WiFi cloud environment is logically isolated from other environments with physical and environmental security for the VPC is provided by the cloud provider.

Each cloud instance that Arista deploys has a host-based firewall that is configured to only allow protocols required for corresponding applications in and out of the server. The Arista applications that run on these cloud instances themselves are port hardened to ensure that unwarranted services and ports are not accessible.

The Arista WiFi cloud is deployed in Amazon Web Services (AWS) and Google Cloud Platform (GCP) data centers located around the globe expanding elastically to meet the demands of Arista's global customers.

Vulnerability scanning

Arista regularly performs four types of vulnerability scans on the cloud-hosted applications as follows.

Port scans: As compute instances are launched in different parts of the data center, it is essential to validate that the access to them is restricted to only those ports that are essential for accessing the application functionality. This reduces the attack surface considerably. Arista performs regular port scans on its cloud environment.

WAS (Web Application Security) scans: WAS scans focus on finding vulnerabilities at the web application level. Since the cloud application is accessible over HTTPS (port 443) and thus the Internet at large, the objective of a WAS scan is to ensure that there are no exploitable vulnerabilities if an unauthorized user attempts to access the application. Another important objective is to prevent an authorized (authenticated) user from breaching application security controls, such as injection attacks, privilege levels, multi-tenancy, and so on. Arista deploys 24x7 automated WAS scanning.

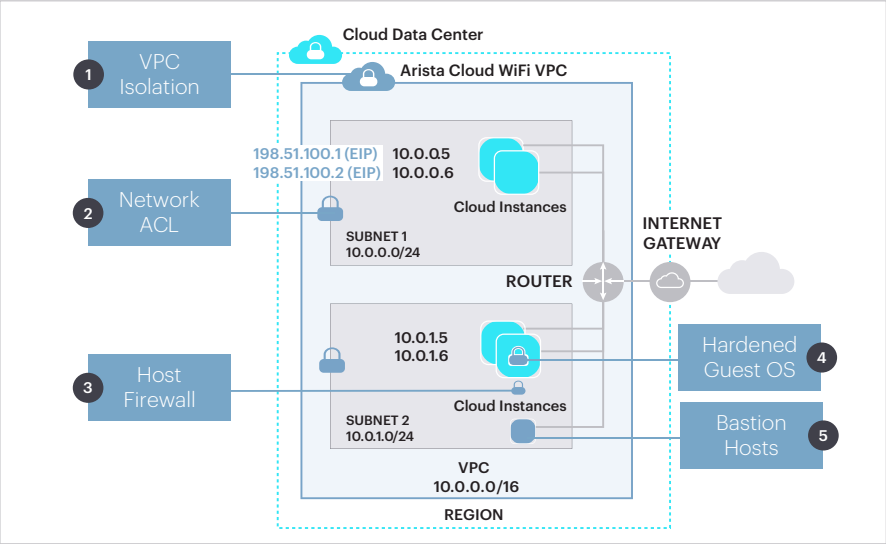

Figure 2: Arista WiFi Cloud VPC in Cloud Data Center

Penetration Tests

Arista signs up third parties to perform penetration testing on the external-facing interface of the cloud. Penetration tests are performed by external and internal security experts using multiple toolsets to try to find exploitable weaknesses in the system's workflow, configuration, and implementation.

Software components scans: These scans are performed to audit software modules in the application for any missing security patches, stale versions, and misconfigurations. Arista performs software component scans on all its cloud applications at least once per quarter using the Nessus Enterprise tool.

Data encryption

Arista encrypts data in transit using AES. This includes management GUI (HTTPS), communication between the Arista APs and the cloud and all interactions between different Arista servers and applications that make up the back end service (HTTPS).

AES encryption is also applied to data at rest. Database backups of Arista applications in the cloud are stored in storage buckets that are also AES encrypted. The live database of Arista Wireless Manager, the flagship application that provides the wireless management console, resides on the disk and is also AES encrypted.

Access control

Arista personnel need to access cloud applications for provisioning, maintenance, and resolving trouble tickets. Arista implements access control mechanisms to limit Arista personnel access to customer accounts to a basic minimum. Privilege escalation for any task that requires a higher level of access is subject to the customer's permission and available for a temporary period of time. Employees who might work with such privileges must pass background screening first.

Maintenance access to any cloud instance is via bastion hosts. Login into the bastion hosts requires SSH and is allowed only from specific IP addresses. Bastion hosts implement strong access control and auditing functions to prevent unauthorized maintenance access.

All the accessible interfaces to the cloud require two-factor authentication and enforce strong password policies.

SOC 2 Attestation Assessment Reports

The shared responsibility model for cloud security requires both IaaS security and SaaS security. In other words, data center SOC 2 Type 2 attestation report by itself isn't adequate to guarantee comprehensive cloud security for the customers because it only covers IaaS practices such as physical security, environmental protection, and logical security (cybersecurity) up to the server boundary.

Arista Networks has the SOC 2 Type 1 and Type 2 attestation assessment reports for security, availability, and confidentiality of the Arista Cloud-managed WiFi solution. This establishes Arista as the first and only cloud WiFi vendor to achieve such attestation for practices in cloud-based WiFi management (SaaS).

SOC 2 TYPE II

ATTESTED

AWS IaaS, GCP IaaS and Arista WiFi Cloud SaaS

- ✓ **Highest-level Cloud Security Standards**
- ✓ **Cloud Data Centres - SOC 2 Type 2 Attested, ISO 27001:2013 Certified and with Most of the Major Security Certifications.**
- ✓ **Arista Cloud WiFi Solution – SOC 2 Type 2 Attested.**

Of course, the AWS and GCP data centers (IaaS) where Arista applications are hosted also regularly conduct SOC 1 Type 2 and SOC 2 Type 2 attestation assessments via third-party auditing firms, and we review their SOC 2 type 2 reports semi-annually. There are several cloud operations that are handled by SaaS providers that are beyond the scope of SOC 2 Type 2 attestation assessment of the data center itself such as vulnerability scans, change management, access control, disaster recovery preparedness, and change control management. The Arista cloud WiFi SOC 2 Type 2 attestation covers all the SaaS components implemented in all Cloud Data Centers.

EU GDPR

Arista Networks provides General Data Protection Regulation (GDPR) compliant Arista Cloud WiFi to its partners, resellers, and customers in the European Union. The Arista WiFi cloud acts as a GDPR Processor of personal data, whereas Arista's customers are the Controllers.

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