Arista NetDB Streaming Telemetry and Analytics: A High-Precision Alternative to Polling Technologies

Arista Switches Can Stream Real-Time Telemetry and Analytics

As part of its new NetDB stack of advanced software features built upon its Extensible Operating System (EOS), Arista Networks has added a streaming telemetry and analytics feature that allows its switches to push data to network management systems in real time. This streaming telemetry feature gives network managers more granular and real-time insight into the state of their network than the traditional polling mechanisms used for collecting device metrics. In addition to streaming analytics, NetDB also includes improved routing scalability, hybrid cloud visibility and management features, and container visibility. EOS will also now host containers, where network operators can host applications.

Streaming Data on Every Change to the State of the Network

Arista Networks announced a number of enhancements to the core of its Extensible Operating System (EOS) switch operating system. Together, Arista is marketing this suite of software enhancements as NetDB. The suite includes a new API for programming EOS via the Go programming language and EOS support for OpenConfig, an emerging open technology for intent-based network configuration management and streaming telemetry based on YANG data modeling. NetDB is the EOS software infrastructure on which the CloudVision platform is based. CloudVision was previously released software that collects network state information from every Arista switch and becomes a central point of integration and management for Arista-based networks. Moreover, NetDB offers network managers a streaming telemetry and analytics capability that delivers granular, real-time insight into the current state of the network, as well as a rich repository of historic network state data for capacity planning, forensic analysis, and other use cases.

Arista NetDB is able to stream this data by leveraging the SysDB technology inside Arista's Linux-based EOS. SysDB is a publish-and-subscribe mechanism that assembles a distributed database of network state information for EOS switches. Every state change on Arista switches is collected and published, allowing processes in an EOS-based switch to use the latest state information to determine which actions it should take.

With SysDB, Arista maintains an in-memory, distributed database of the entire state of an EOS switch. When combined with CloudVision, SysDB enables NetDB to maintain a network-wide database of network state. And NetDB can extend the utility of that data by streaming it to network management systems. Every time the state of the network changes, NetDB can stream data about the change. For instance, if an interface counter starts recording packet drops or a temperature sensor on a switch detects rising temperatures, that event can be streamed instantly to a monitoring platform.

The result is a stream of monitoring data that is more real-time and granular than that which can be collected by a polling mechanism like Simple Network Management Protocol (SNMP). SNMP polling tools collect data at set intervals. Many events that result in network state changes can occur between those polling intervals, which means these monitoring tools may be slow to detect issues or may even miss them entirely. While network engineers can configure SNMP traps on network devices to alert network management tools on specific conditions, a streaming telemetry mechanism like NetDB will detect and stream data on events in real time and detect everything that happens, regardless of whether a trap is configured to catch those events.

EMA

Arista is providing open application programming interfaces (APIs) for the collection of this data. It will work with partners in the infrastructure management industry to ensure that network operations teams have the tools they need to perform analytics and event correlation on this streaming data. Furthermore, Arista is developing its own applications within its CloudVision suite that will leverage this streaming data for network operations.

In addition to the streaming telemetry and analytics capability, Arista has introduced several other innovations with NetDB. First, NetDB improves the overall routing scalability of Arista switches. Arista devices will now be able to handle more than one million routes and 100,000 tunnels with millisecond convergence. NetDB also includes several hybrid cloud components for improved operations. It leverages Arista's suite of EOS tracers (such as VMtracer, sFlow, and LAN) to provide improved visibility into the network. It can push that visibility into network state to cloud management systems like OpenStack, which can use algorithms to determine ideal workload placement based on network conditions.

Arista also added some enhancements based on container technology. It will now support the placement of Docker containers on EOS, which will allow network operators to run monitoring applications locally on Arista switches. The company also introduced a new EOS tracer, Container Tracer, which will specialize in providing visibility into the containers that are connected to ports via specific hosts. This feature will allow, for instance, an Arista switch to assign network policies to specific containers on the network.

EMA Perspective

A growing number of mechanisms are emerging for extracting real-time device metrics from network infrastructure, whether through SDN controllers that maintain a stateful view of a network or through new streaming technologies built within traditional network infrastructure devices. There is clearly an appetite among network operators for real-time modeling and analytics of network state that cannot be sated by prevailing polling mechanisms such as SNMP. For instance, Google, Facebook, AT&T, Verizon, and several other major network operators have created the OpenConfig project, which aims to create a vendor-neutral model for configuring networks and collecting streaming telemetry from network devices. Google has stated that it plans to eliminate SNMP from its network by the end of 2017.

When networks can stream telemetry directly to network management systems, network operations can react more quickly to events. The trick, however, is to avoid being overwhelmed with too much information. Arista's NetDB streams telemetry on every state change. Network management platforms that receive this data will need to apply robust event correlation and analysis to ensure that network operators aren't overwhelmed with tens of thousands of alerts on minute temperature fluctuations or individual processes that failed and restarted on their own. By promising to partner with network management vendors and sharing plans to develop its own applications for analyzing its streaming telemetry data, Arista shows that it understands that network operators not only need this data but also require technology that can leverage it.

In research and in interactions with the industry, EMA has found that polling technologies like SNMP have some limitations. Users complain about its lack of scale, its reliance on vendor-proprietary MIBs and its lack of extensibility. While SNMP is a dependable mechanism for extracting device metrics that can help determine the health and performance of a network, the technology also has gaps in its visibility. It pulls data from the network at set intervals, and these intervals can be wide enough to create blind spots in network visibility. Streaming data flow technologies like Arista NetDB allow network devices to push metrics to network management platforms as events happen, which ensures that network operators can see every change to the state of a network as it happens. With NetDB's streaming telemetry and analytics feature, Arista is addressing an emerging requirement for network operators, a requirement that will become essential to organizations whose networks are critical to business success.