AppFormix Network Monitoring and Analytics with Streaming Telemetry

Product Overview

AppFormix enables network infrastructure to be self-driving by automating operations with real-time visibility, predictive analysis, and event-driven orchestration and optimization capabilities.

Working in conjunction with Junos Telemetry Interface (JTI) or OpenConfig, which implements a "push" model to deliver data asynchronously and at high resolution, AppFormix addresses the challenges associated with massive, dynamic, and highly elastic workloads, delivering a scalable and easy-to-use solution.

Product Description

Juniper® AppFormix® leverages big data analytics and machine learning as part of a distributed analysis platform, making the power of a self-driving infrastructure available at the network core. AppFormix redefines state-of-the-art telemetry and management across physical and virtual network and infrastructure layers, delivering real-time and historic monitoring, performance visibility, and dynamic optimization features that improve network performance, resilience, security, scalability, economics, and responsiveness.

AppFormix can be easily and nondisruptively deployed in both greenfield and brownfield environments in just minutes, where it immediately and automatically starts discovering, monitoring, and analyzing networks and their associated physical and virtual infrastructure and application components. AppFormix provides comprehensive visualization and smart analytics that automatically learn the network topology and device performance profiles, detect faults, and facilitate troubleshooting and preventative remediation in real time at scale.

Based on a distributed policy and streaming analytics architecture, AppFormix seamlessly collects and analyzes fine-grain telemetry in real time from the network as well as devices that support streaming telemetry technology such as Junos Telemetry Interface (JTI) or OpenConfig. AppFormix then generates events and alert notifications that provide actionable insights to the operator. For devices that do not support streaming telemetry, AppFormix can be configured to collect telemetry data from these platforms via SNMP. Both Juniper and third-party devices are supported.
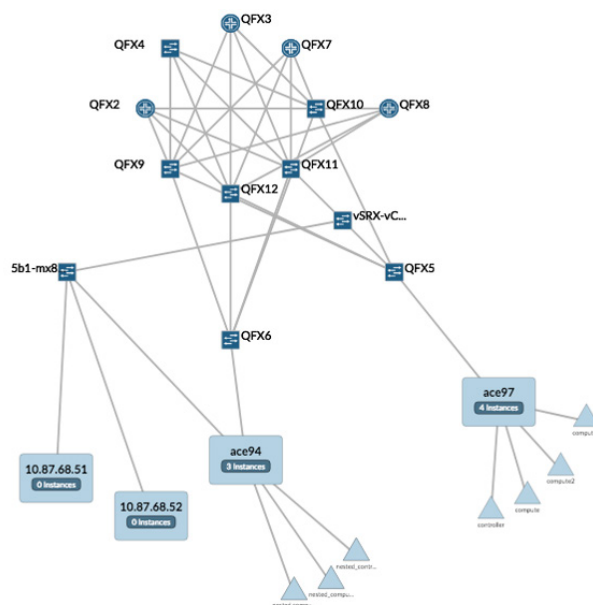

Figure 1: AppFormix network and infrastructure topology

AppFormix gives operators of software-defined networks and data centers a comprehensive toolset that provides visibility into operational performance and network infrastructure resources.
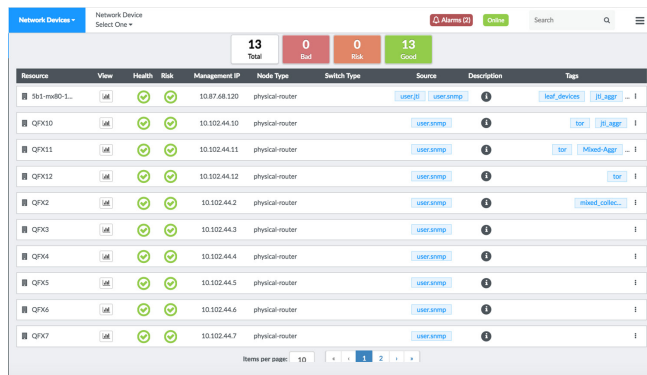

Figure 2: AppFormix network device dashboard

AppFormix analyzes and correlates metrics in real time across all aspects of the infrastructure—network, compute, and storage. Operators use AppFormix to control and visualize how infrastructure elements and resources are utilized in order to plan for and provide adequate capacity to ensure smooth application performance.
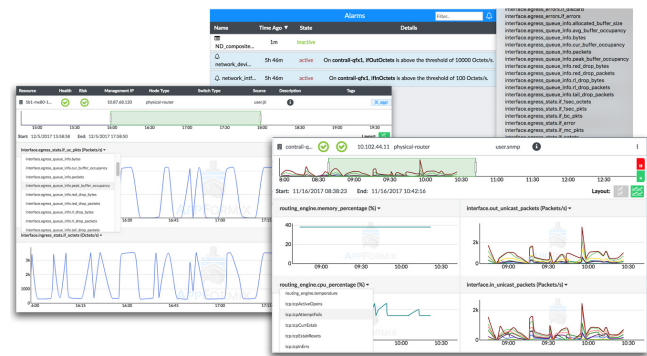

Figure 3: AppFormix network telemetry charts and alarms

Architecture and Key Components

AppFormix provides resource control and visibility for network devices, hosts, and virtual workloads in any network and cloud infrastructure. The AppFormix software consists of multiple components:

- A smart agent to monitor and analyze resource usage on infrastructure devices (compute, network, and storage).

- A platform controller that offers REST APIs to configure the system, distributes and stores data from multiple agents, and provides analytics modules that correlate and analyze events across the infrastructure.

- A dashboard that provides a web-based user interface.

- Adapters that interact with various orchestrators and controllers to automatically discover, monitor, and contextually analyze associated network and infrastructure services and resources (e.g., adapters for SDN controllers such as Juniper® Contrail® Enterprise Multicloud, Contrail Service Orchestration, and Juniper Networks NorthStar Controller, as well as cloud orchestration systems such as OpenStack, VMware vCenter, Amazon EC2, Microsoft Azure, and Google Cloud Platform).

- Agents that run both on and off infrastructure devices that provide the compute, network, and storage resources required to execute and connect application workloads. The network resource devices can be physical or virtual. A compute node may be a bare-metal host or a virtual machine (VM).

- AppFormix Agent, a built-in distributed analytics engine that processes and analyzes raw telemetry data on-the-fly, right at the source, before sending useful signals to the rest of the system. Such advanced technology and distributed architecture ensure the timeliness of operational data, as well as the scalability of the deployment.

- A device called the AppFormix platform host where the AppFormix platform components operate; this platform can be a physical server or a VM.
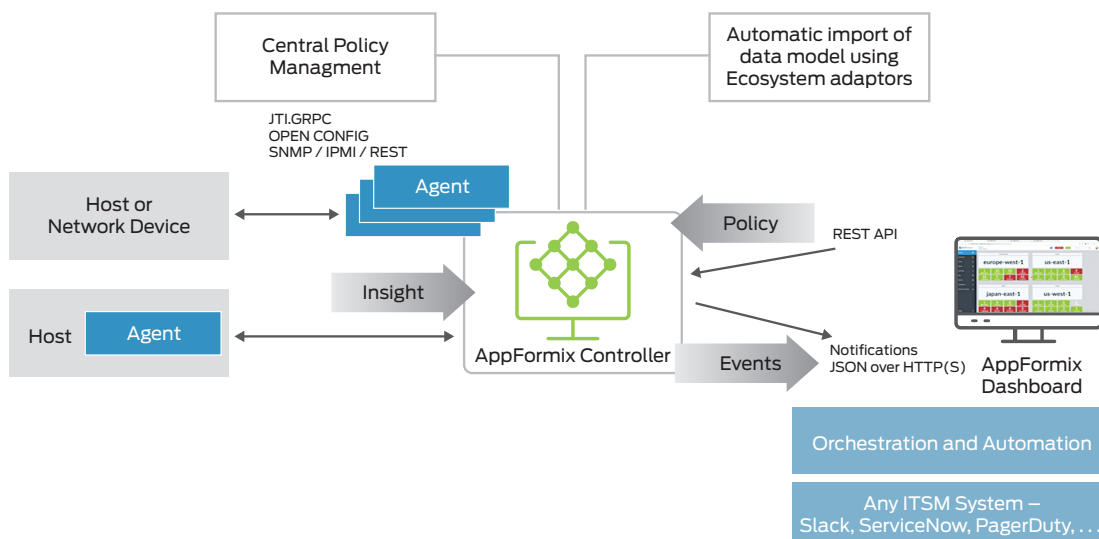

Figure 4: AppFormix architecture

Features and Benefits

Network Topology and Heat Map

AppFormix determines network topology through both automatic discovery and user-defined input. Based on that information, AppFormix builds a holistic, correlated network performance and resource heat map on top of the network topology for any collected and analyzed network telemetry metric. This heat map reports a variety of conditions, including network device status and utilization, network and link throughput, and interface or buffer errors and drops, to help operators quickly identify and pinpoint network traffic congestion, hot spots, and resource constraints, among other things.
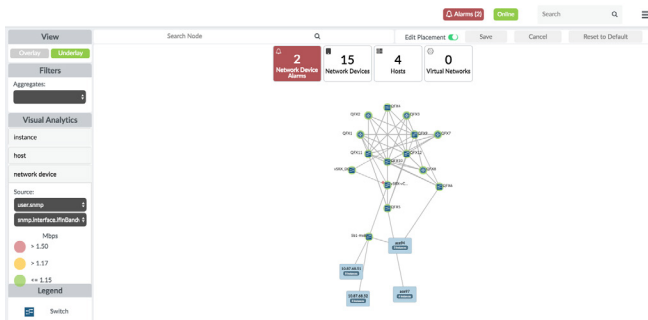

Figure 5: AppFormix network topology and heat map

Real-Time Metrics and Alarms

A "metric" is a measured value for an element in the infrastructure, providing operators with essential visibility into all facets of a network. AppFormix Agent collects and calculates comprehensive metrics in real time, for network devices as well as for hosts and instances, storage, services, and other elements, displaying the collected data as real-time charts and reports in the AppFormix Dashboard. For network telemetry, users can configure the streaming telemetry sensors, JTI native sensors, and OpenConfig/gRPC sensors for a given network device, instructing them to collect data and stream it to AppFormix. Similarly, users can also configure the SNMP MIBs for a selected network device.

With AppFormix, an operator can also configure alarms against values or conditions of metrics or groups of metrics within the network. Whenever these thresholds are crossed, alarms notify the operator in real time. AppFormix software also plots these alarms on charts in both real time and historically, giving the operator a holistic view of current status as well as past trends.
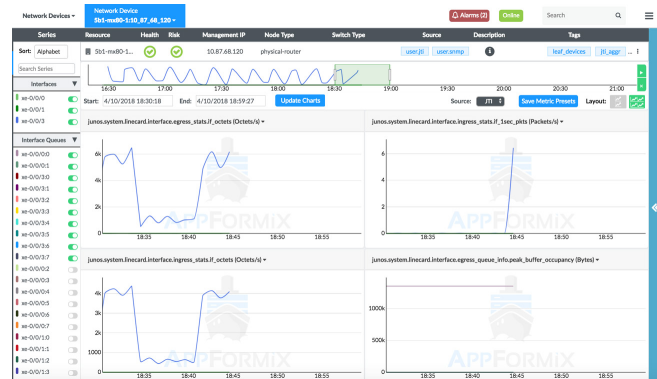

Figure 6: AppFormix real-time metrics and charts

Machine Learning

AppFormix applies machine learning to dynamically discover and baseline the performance of applications, network, and infrastructure elements while they operate, generating alarms when real-time metrics deviate from historical trends that exceed a user-configured threshold. The result is a monitoring policy that is aware of the dynamic nature of workloads and network traffic making varying levels of resource demands over time. Operators can also use this machine learning capability to monitor application, network, and infrastructure elements when the performance profile and operational boundaries are still unknown.

Figure 7: AppFormix dynamic adaptive alarms

SLA Monitor

The AppFormix Dashboard provides operators with a quick and intuitive overview of the health and projected risk of the network infrastructure and its workloads. Health status indicates whether a resource is currently operating outside a user-specified performance policy, while risk uses historical data to determine whether a resource may be unhealthy in the future.

For example, if the AppFormix Platform Controller is not receiving heartbeats from a network device or host, then the network device or the host and all of its instances will be marked as unhealthy with a condition called "missed heartbeat."

While AppFormix supplies a set of default service-level agreement (SLA) health and risk profiles, users may also create customized profiles to suit their unique environments.
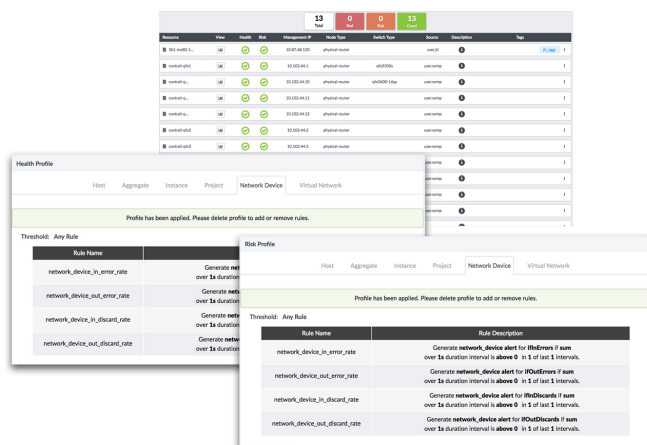
Figure 8: AppFormix SLA monitor and profiles

Notifications

When events and alarms are triggered, in addition to the visual notification on the dashboard UI, AppFormix gives users the ability to notify external systems of the event and alarms to initiate corresponding fault mitigation or performance optimization actions.

For each event and alarm, AppFormix can post a structured description of an event as a JavaScript Object Notification (JSON) payload to an external HTTP endpoint. These notifications can initiate any action or workflow, whether it is corrective, preventive, or otherwise, to keep the network infrastructure and its workloads operating in their optimal state.

For operators' convenience, AppFormix comes pre-integrated with popular incident management platforms such as PagerDuty and ServiceNow, as well as collaboration platforms such as Slack.

Reports

AppFormix reports allow users to analyze how the network and infrastructure are performing and how resources were consumed over time. Reports may be generated over a specified time period and organized by categories such as network device, host, instance, project, and so on. In each case, the report shows performance statistics and resource utilization for the specified scopes. The dashboard displays reports in both graphical and tabular formats. Users may also download report data as an HTML-formatted report, raw comma-separated values (CSV) file, or JSON-formatted data for further analysis.
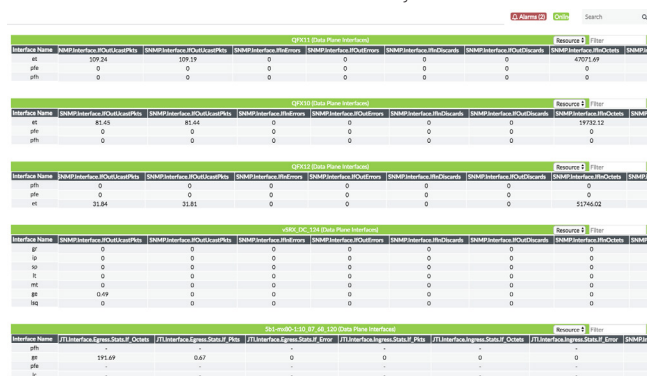

Figure 9: AppFormix network device reports

Specifications

AppFormix components can operate on any physical or virtual compute resources. For the most up-to-date AppFormix installation and resource requirements, please refer to the AppFormix product installation guide.

The AppFormix Platform Controller node has the following minimum requirements:

- CPU: 8 cores (virtual or physical)
- Memory: 16 GB
- Storage: 100 GB (recommended)

Ordering Information

This product adheres to the Juniper Care Software Advantage pricing model; therefore, the following items constitute an order:

- Select a software license based on the number of sockets required. The license is either a subscription (fixed term) or perpetual (unlimited term).
  - A subscription software license includes Juniper Care Software Advantage, entitling the purchaser to software updates and upgrades, 24x7 remote technical support, and online support.
  - A perpetual software license excludes Juniper Care Software Advantage; the latter must be purchased.
- If the order includes a hardware product/platform, select a hardware license based on the networking, connectivity, and/or security requirements (e.g., interface options, I/O, services). You may need to purchase additional licenses in support of the base hardware license (e.g., power cables, network interface cards).
- If this is a virtual appliance/software product, you would not buy any hardware license from Juniper, but instead would procure the hardware elsewhere. For information on supported hypervisor(s) and VM requirements, please refer to the technical documentation for this product at www.juniper.net/customers/support.

Juniper products are sold directly as well as through Juniper partners and resellers. For information on how to buy, please visit www.juniper.net/us/en/how-to-buy/index.

About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

Corporate and Sales Headquarters

Juniper Networks, Inc.

1133 Innovation Way

Sunnyvale, CA 94089 USA

Phone: 888.JUNIPER (888.586.4737)

or +1.408.745.2000

Fax: +1.408.745.2100

www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.

Boeing Avenue 240

1119 PZ Schiphol-Rijk

Amsterdam, The Netherlands

Phone: +31.0.207.125.700

Fax: +31.0.207.125.701

EXPLORE JUNIPER
Get the App.

JUNIPER
1ON1

Download on the App Store

ANDROID APP ON Google Play

1000638-001-EN Apr 2018

JUNIPER
NETWORKS