Fabric Analytics

Deeper Visibility & Telemetry in Big Cloud Fabric

Starting with **Big Cloud Fabric (BCF) Release 2.5**, Big Switch Networks is integrating Fabric Analytics capability into its bare metal SDN-based fabric solution. Fabric Analytics serves as a platform that provides fabric wide visibility, filtering and correlation for a variety of network events and conditions. It dramatically reduces the time to issue identification and resolution compared to the traditional physical box-by-box management approach, without the need for expensive third-party analytics tools or repositories.

Why Fabric Analytics?

In today's data center, the number of application workloads (physical + virtual) are increasing dramatically, especially with broader adoption of new workloads for cloud infrastructures, Big Data, and virtual desktop. Application performance and response time become even more critical for these dense infrastructure environments as is the ability to root cause issues quickly. Network operations team – which is typically the first point of escalation for most performance and response time related issues – often find it very challenging to identify the issues rapidly due to complexity of legacy box-by-box networks. In many cases, a simple ability to quickly answer "it is not the network" can be tremendously beneficial and reduce overall operational costs.

Unfortunately, it is tremendously complex to conduct network trouble shooting across multiple switches and routers, sift through multiple protocols events, coalesce statistics across multiple links and interfaces to be able to construct a logical dashboard in order to pinpoint the root cause. Deep network-centric visibility has been a major customer ask that has been mostly unmet by legacy networking designs. In some cases, network operators have no choice but to purchase expensive 3rd party tools that provide multi-box event analytics and log correlations for critical applications, but are unable to afford such luxury for all application workloads.

Big Cloud Fabric's Fabric Analytics

Big Cloud Fabric – industry's only bare metal SDN fabric for building leaf/spine (Clos) fabrics – has now integrated the Fabric Analytics module in its Controller GUI. An important operational benefit of software-defined networking is the increased network visibility that is possible with the adoption of an abstracted and centralized control plane. Big Cloud Fabric delivers on this promise with Fabric Analytics.

Switches within BCF (up to 16 racks or 38 leaf/spine switches) generate logs and statistics that are collected by the controller. The Fabric Analytics module processes the data to generate variety of analytics and trends. It also provides extensive search and filtering capabilities – powered by open-source ElasticSearch engine. Through a convenient web-based interface of the controller GUI, Fabric Analytics provides centralized visibility for the entire fabric that is extremely easy to use by network operations team. Also, Fabric Analytics module is architected to consume controller hardware resources opportunistically such that analytics processing does not impact normal BCF controller operations.

Fabric Analytics Capabilities and Workflows

Fabric Analytics provides a set of preconfigured dashboards that are divided into two categories: Physical and Logical.

Physical Dashboard	Logical Dashboard
▪ Logs by Device, Errors and Warnings, Errors by Process, Correlate Logs ▪ CLI Change, CLI Commands, All Config Changes, Login/Logout ▪ Switch CPU and Memory API Connection Info, REST API Calls	▪ Tenant, Tenant Traffic Statistics, Segment ▪ All Endpoint Changes, Endpoint by MAC Address ▪ Endpoint by IP Address, Endpoint by Name

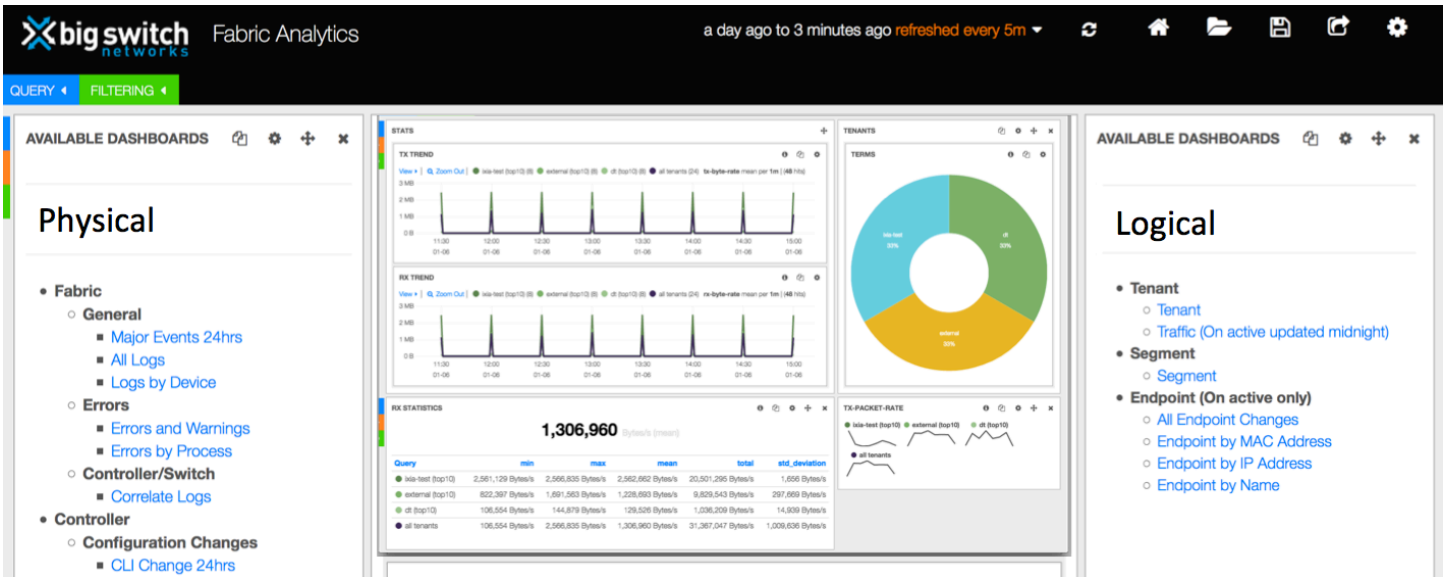

Figure 1: Big Cloud Fabric - Analytics Dashboard

The physical dashboards filter and display information about physical devices on the network, such as the controller nodes and switches. The logical dashboards provide information about the logical components in the Big Cloud Fabric, such as tenants and segments.

These preconfigured dashboards provide a quick access to all the necessary information to the network administrator so that they can perform day-to-day management of their infrastructure. Network team can leverage the fine-grained search built into Fabric Analytics and check event status, which can provide details for any event. This search then can be extended using a time series window to get more fine grained information. Dashboards typically display a line or bar graph in one panel and a pie chart in the other panel (as shown in the figure). In addition, a table is typically displayed to highlight specific events occurring within the selected time duration. Finer grained filters can be applied to drill down on specific events that may have occurred in the fabric. Graphs and tables are updated periodically to reflect restrictive filters. Dashboard can be customized as well by selecting the best-fit dashboard and then applying appropriate filters.

Change management is an important use case where Fabric Analytics come in really handy. When expanding fabric capacity (with additional switches and/or links), adding more tenants, or changing a device due to failure. All of these cause configuration changes in the network. When mis-configuration occurs, preconfigured dashboards can very quickly identify what/when about configuration changes and the source (User, CLI, GUI or REST) of the change, making any change management related troubleshooting very easy. This capability also helps identify any inappropriate behavior that might have taken place.

Fabric Analytics maintains a single database for the full network with timestamps and device relevant information. Using this centralized management a network admin can very easily perform event correlation of sequence of events on all of the relevant devices making troubleshooting for entire fabric very easy. No longer one has to conduct time consuming box-by-box searching of logs across multiple network devices to pinpoint a network or application performance issue.

Summary

With Fabric Analytics, Network operations teams can now rapidly troubleshoot network issues and failure conditions throughout the fabric. Fabric-wide configuration changes (via CLI, GUI, or REST API) are visible directly in the controller to identify inappropriate access and/or root cause issues occurring due to network misconfiguration. Fabric Analytics serves as a platform for advanced analytics and correlations. It dramatically reduces time to issue identification and resolution compared to the traditional physical box-by-box management approach, without the need for expensive third-party analytics tools or repositories.