

WHO?

(What's Happening with OpenNMS)
UKNOF – Edinburgh, Scotland – 11 Sep 2018

Tarus Balog

tarus@opennms.org

<https://adventuresinoss.com>

I am not a vendor

“paradigm shifting”

“synergy building”

“market leader”

“k8s!”

“disruption”

“blockchain”



OpenNMS is the **world's first**
carrier-grade network
management **application**
platform developed under the
open source model.

world's first

- NetSaint 2000-01-10 1323
- OpenNMS 2000-03-30 4141
- Zabbix 2001-03-23 23494
- Nagios 2001-05-03 26589
- RRDTool 2003-01-13 71544
- Groundwork 2006-02-21 160654
- ZenOSS 2006-03-20 163126
- Hyperic 2006-07-17 172556

carrier-grade

OpenNMS was designed from Day One to monitor tens if not hundreds of thousands of devices. Current work is focused on removing those constraints to allow for millions of devices and billions of metrics.

That scalability comes in a number of forms:

- Discreet devices (hundreds of thousands)
- Performance metrics (billions)
- Events per second (tens of thousands)
- Remote monitors (thousands)

application platform

While OpenNMS works “out of the box”, it really starts to shine when you customize it. It is highly configurable and offers a myriad of ways to integrate with other systems.

- Full-featured ReST Interface for both configuration and queries, forms the basis for OpenNMS Compass
- Device and event information stored in a database
- Notification system can execute arbitrary commands
- Built-in integration includes
 - RANCID configuration management
 - DNS for provisioning
 - Trouble Ticketing API (RT, Jira, OTRS, Remedy, etc.)

open source

Fully 100% of the OpenNMS source code is available under an Open Source license (as defined by the Open Source Initiative).

The main application is published under the AGPLv3, with various subsystems such as Newts published under more permissive licenses such as the Apache License.

the road to scalability

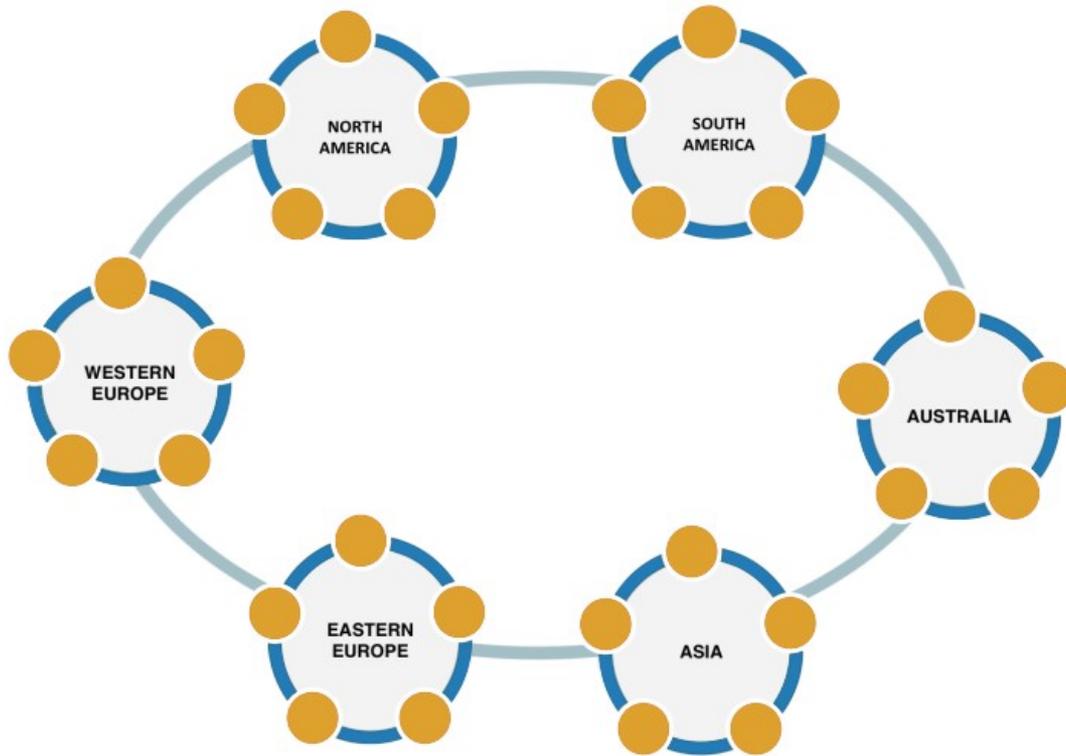
- **Newts**
New Time Series Database
- **Minion**
Distributed Monitoring
- **OpenNMS Drift (telemetryd)**
Collecting Flow Data

newts (new time series)

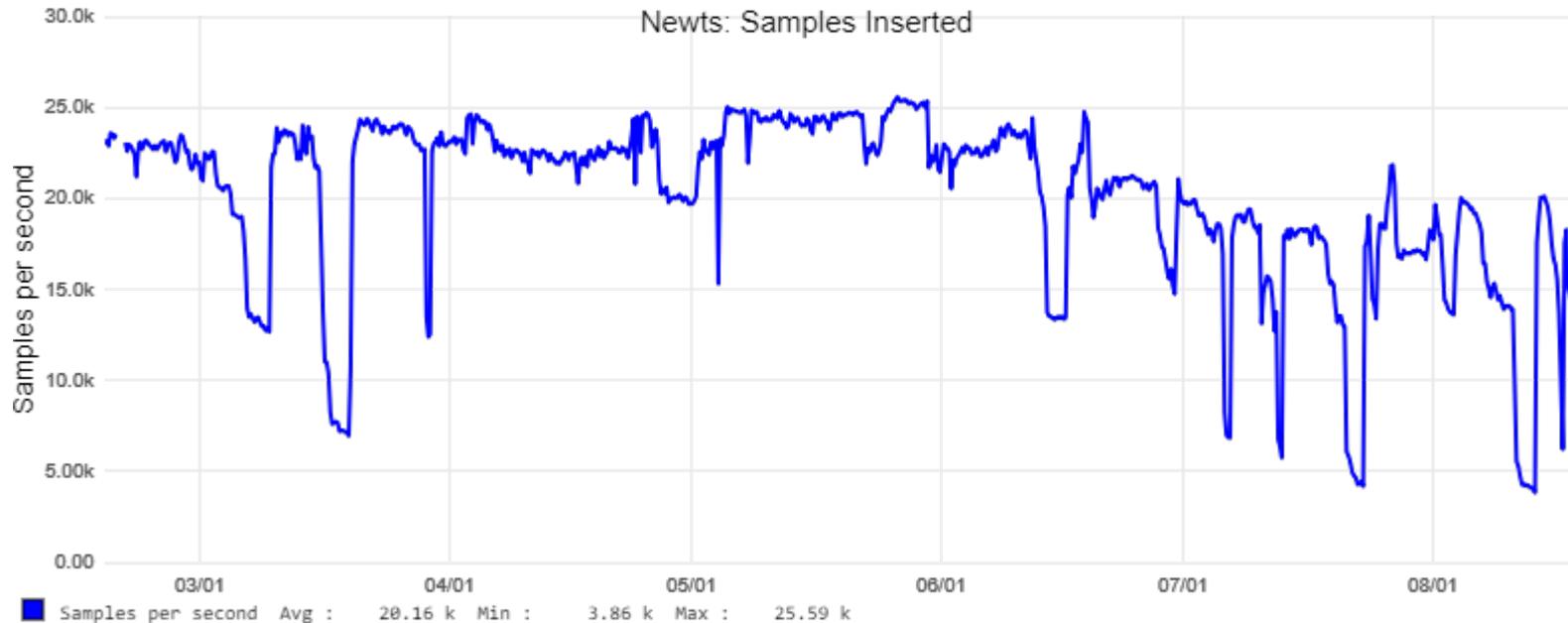
<https://newts.io>



apache cassandra

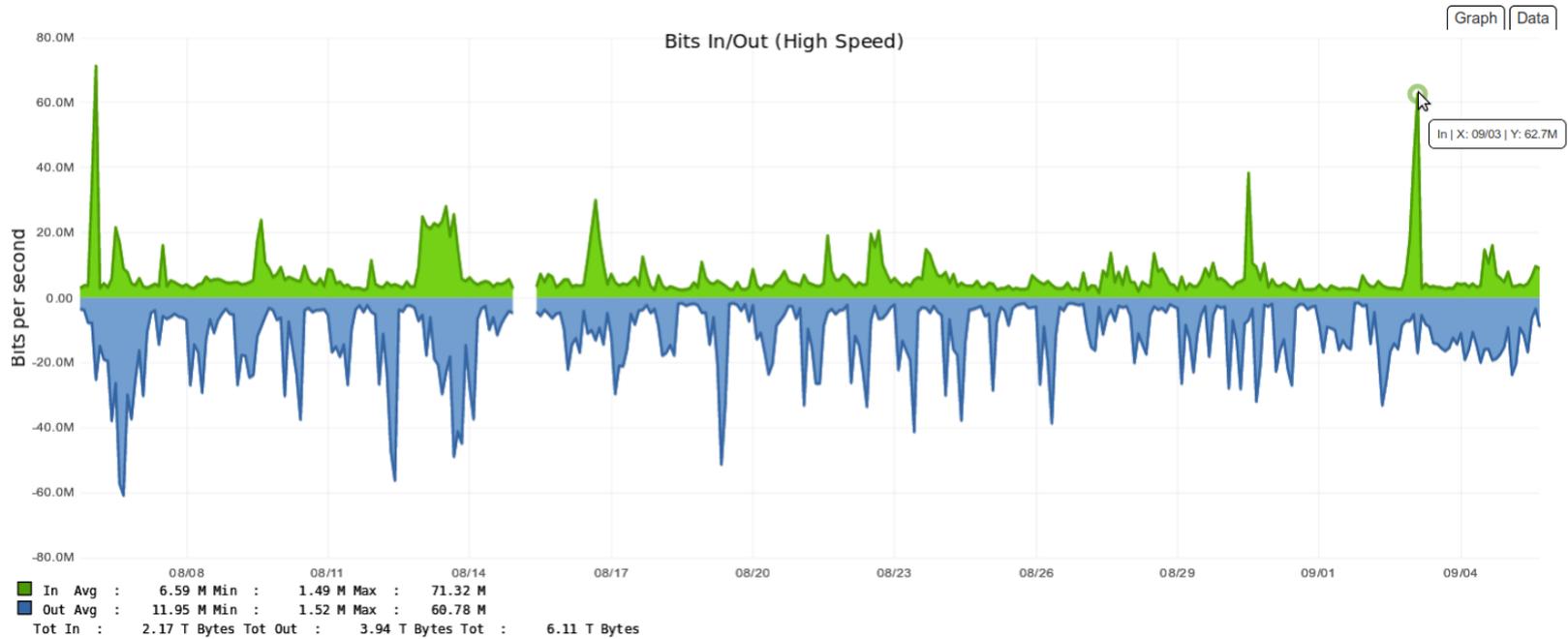


six month sample rate



20,000 inserts/sec = 1.73B inserts/day

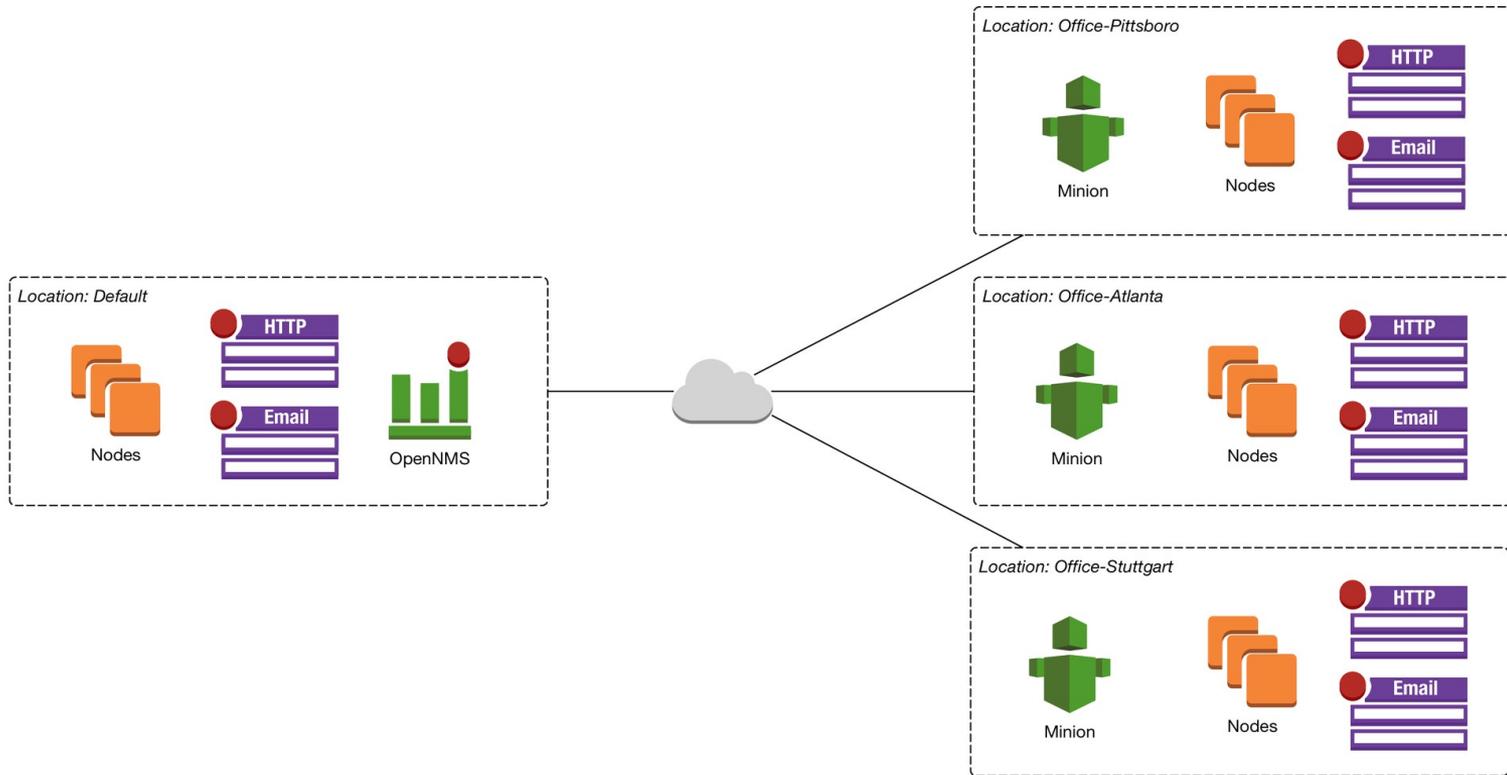
backshift





opennms minion

distributed functionality



minion setup

Each Minion Requires Five Attributes:

- USERNAME="minion"
- PASSWORD="minion"
- OPENNMS="http://opennms.example.com:8980"
- BROKER="tcp://opennms.example.com:61616"
- LOCATION="Edinburgh"

broker choices

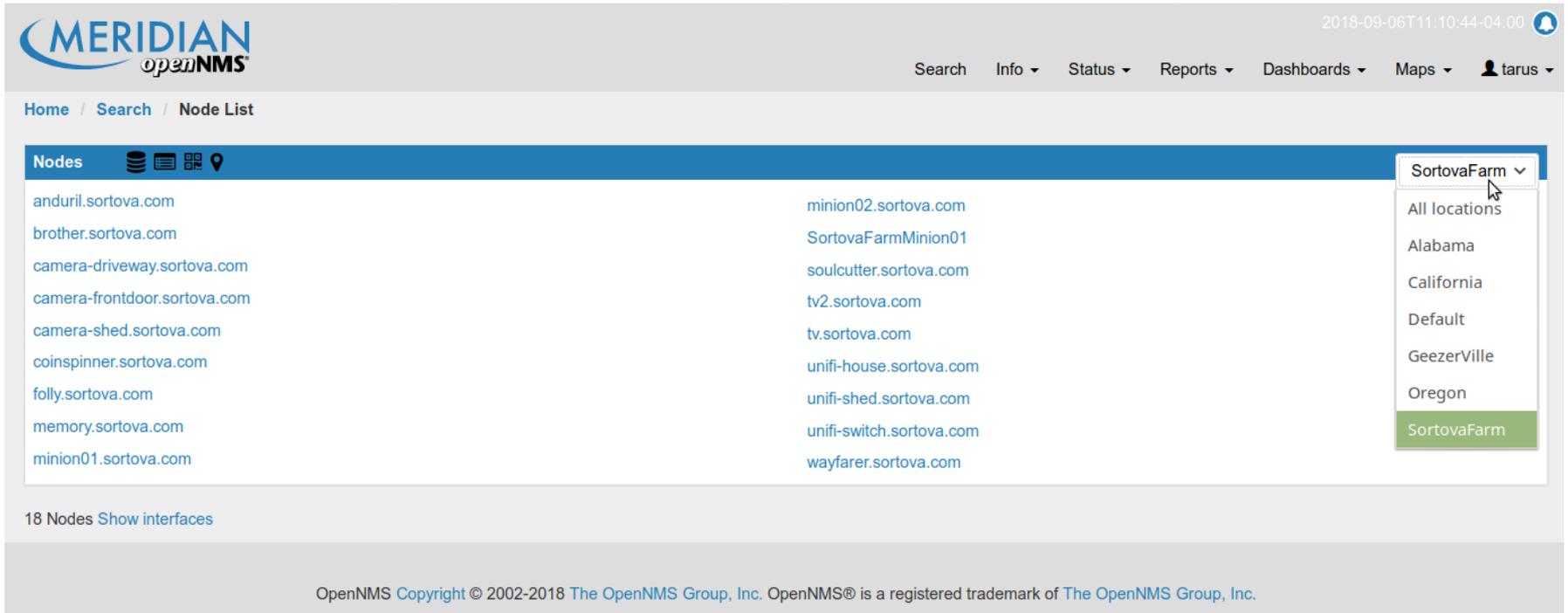
ActiveMQ

- Built-in
- Good for high latency situations
- Extra steps to secure

Kafka

- External
- Very scalable
- Easier to consume data

sort by location



The screenshot shows the Meridian OpenNMS web interface. At the top left is the logo "MERIDIAN openNMS". The top right shows the date and time "2018-09-06T11:10:44-04:00" and a user profile icon for "tarus". A navigation menu includes "Search", "Info", "Status", "Reports", "Dashboards", and "Maps". Below the navigation is a breadcrumb trail: "Home / Search / Node List".

The main content area is titled "Nodes" and features a list of nodes. A dropdown menu is open on the right side of the node list, showing a filter for "SortovaFarm". The dropdown menu options are: "SortovaFarm", "All locations", "Alabama", "California", "Default", "GeezerVille", "Oregon", and "SortovaFarm" (highlighted in green).

Node Name	Node Name
anduril.sortova.com	minion02.sortova.com
brother.sortova.com	SortovaFarmMinion01
camera-driveway.sortova.com	soulcutter.sortova.com
camera-frontdoor.sortova.com	tv2.sortova.com
camera-shed.sortova.com	tv.sortova.com
coinspinner.sortova.com	unifi-house.sortova.com
folly.sortova.com	unifi-shed.sortova.com
memory.sortova.com	unifi-switch.sortova.com
minion01.sortova.com	wayfarer.sortova.com

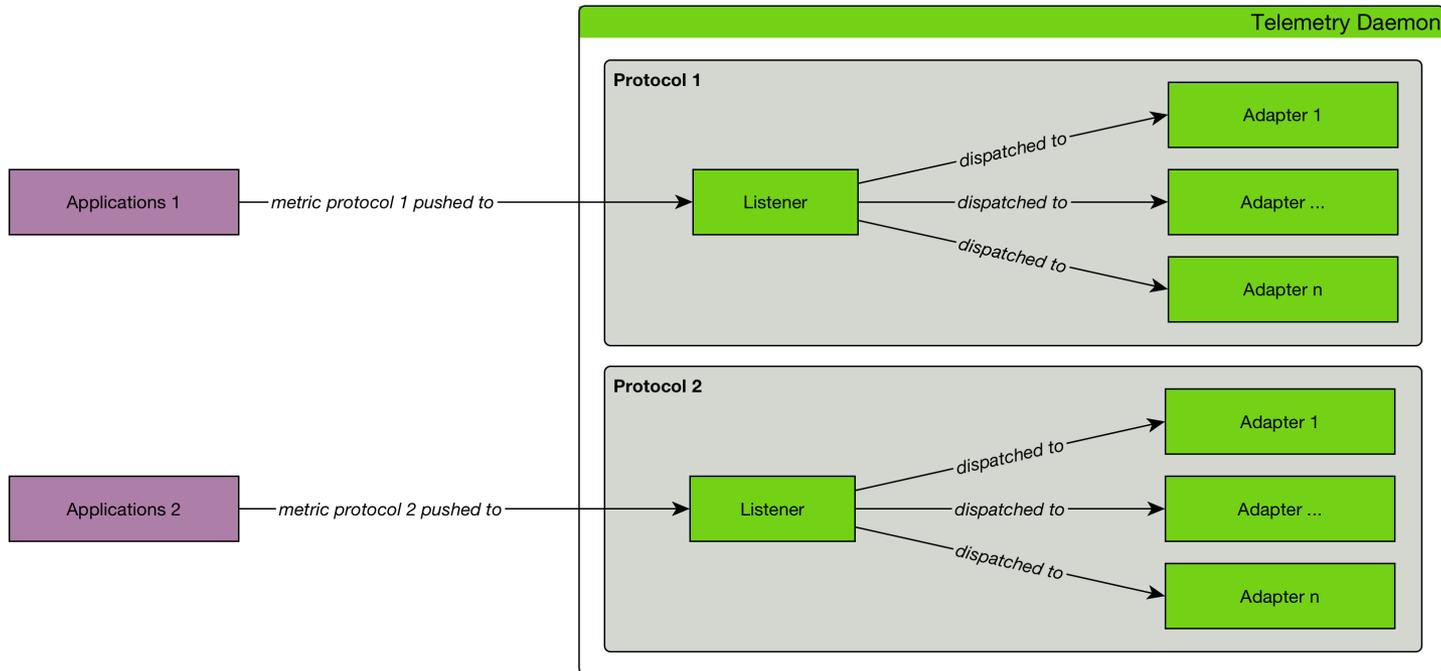
18 Nodes [Show interfaces](#)

OpenNMS Copyright © 2002-2018 The OpenNMS Group, Inc. OpenNMS® is a registered trademark of The OpenNMS Group, Inc.

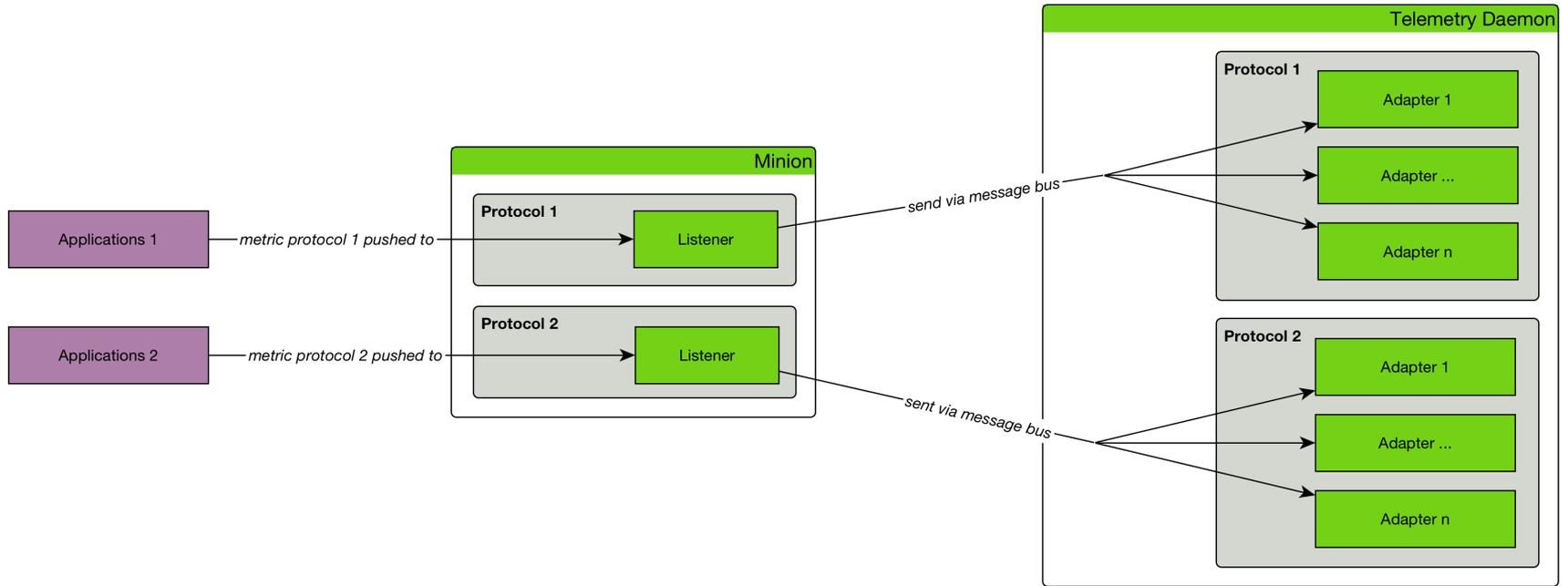


opennms drift

telemetryd



minion support for listener



data sources

Performance Metrics

- Junos Telemetry Interface (JTI)
- Cisco NX-OS

Flow Data

- IPFIX
- Netflow v5
- Netflow v9
- sFlow

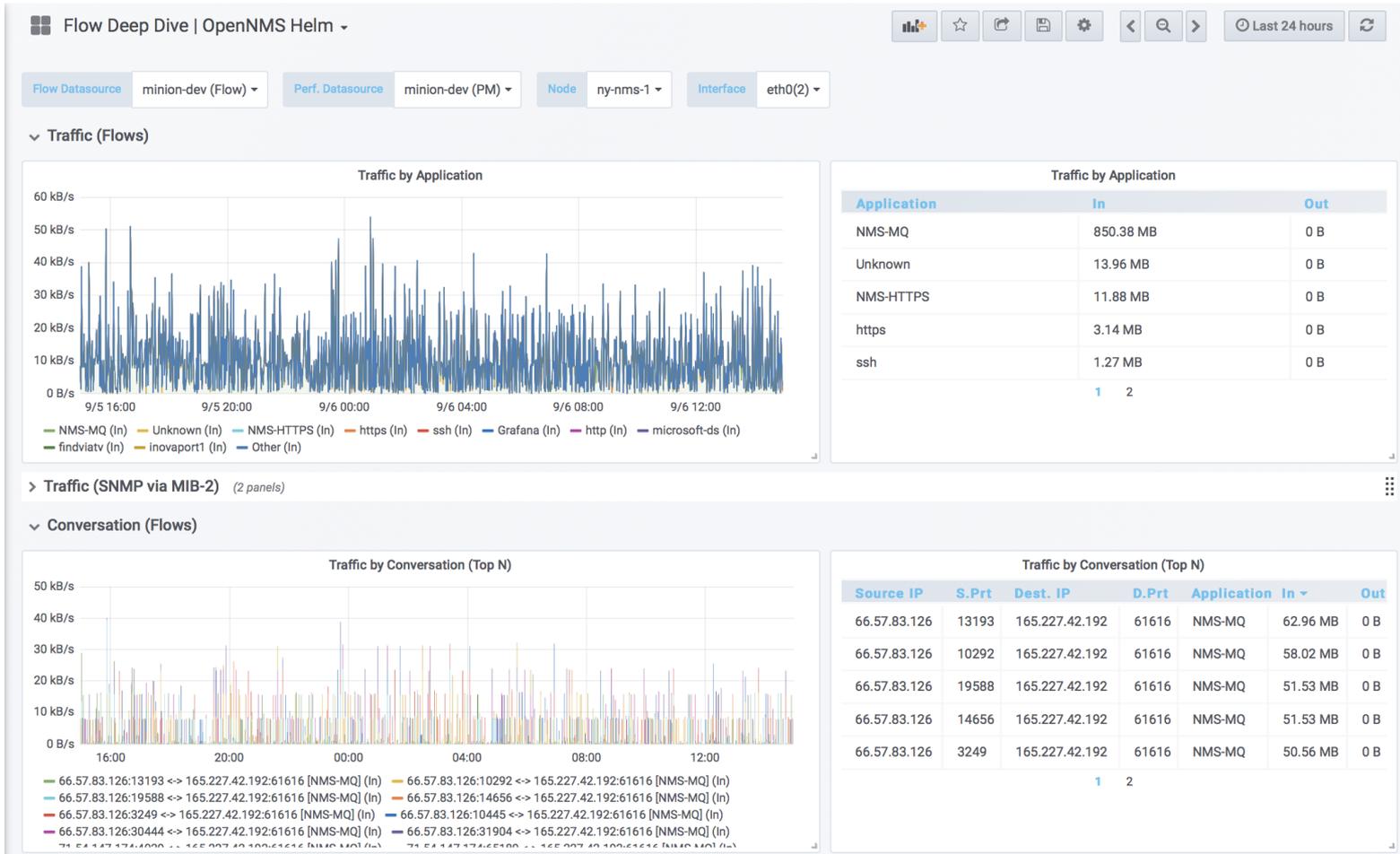
flow document

Field	Description
@timestamp	Timestamp in milliseconds at which the flow was sent by the exporter.
location	Monitoring location at which the flow was received. This will be Default unless you are using Minion.
netflow.bytes	Number of bytes transferred in the flow.
netflow.last_switched	Timestamp in milliseconds at which the last packet of the flow was transferred.
netflow.direction	ingress or egress
netflow.first_switched	Timestamp in milliseconds at which the first packet of the flow was transferred.
netflow.last_switched	Timestamp in milliseconds at which the last packet of the flow was transferred.
netflow.input_snmp	SNMP interface index on which packets related to this flow were received.
netflow.output_snmp	SNMP interface index on which packets related to this flow were forwarded.

how it works

- telemetryd is used to receive and decode flows.
- The telemetryd adapters convert the flows to a canonical flow model and dispatch these to the *flow repository*.
- The *flow repository* enriches the flows and persists them to *Elasticsearch*
 - Flows are tagged with an application name via the *Classification Engine*.
 - Metadata related to associated nodes such as ids and categories are also added to the flows.
- The REST API supports generating both summaries and time series data from the flows stored in the flow repository.
- *OpenNMS Helm* is used to visualize the flow data using the flow datasource that interfaces with the OpenNMS REST API.

opennms helm





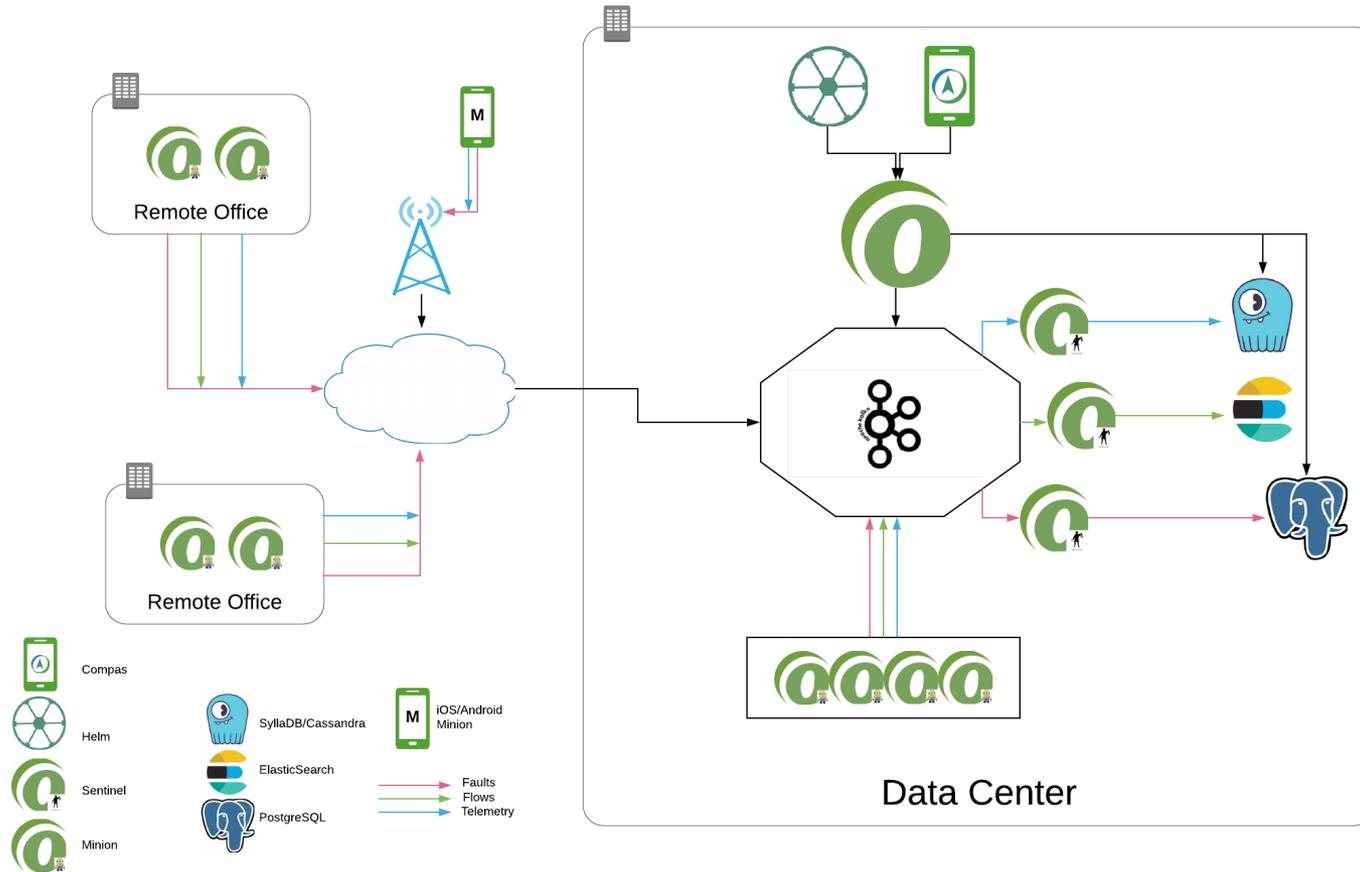
opennms futures

opennms sextant

Advanced alarms correlation

- Alarms can be grouped into objects called “situations”.
- NOC can focus on high level issues
- Currently implements spatial/temporal correlation, ML features planned

opennms sentinel



resources and q&a

The OpenNMS Project:

website: <https://www.opennms.org>

wiki: <https://wiki.opennms.org>

demo: <https://demo.opennms.org>

videos: <https://www.youtube.com/user/opennms>

chat: <https://chat.opennms.com>

forum: <http://ask.opennms.eu>