





Who am I

Ronny Trommer

Ausbildung Fachinformatiker - Systembetreuung

Studium Hochschule Fulda - Schwerpunkt Telekommunikation

Angestellter bei einem ISP in Fulda mit Schwerpunkt “Monitoring as a Service”

Ehrenamtliche Mitarbeit im Projekt OpenNMS

Mitgründer OpenNMS Foundation Europe e.V.

Seit 2011 für OpenNMS Group tätig

Office in Stuttgart / Zuffenhausen

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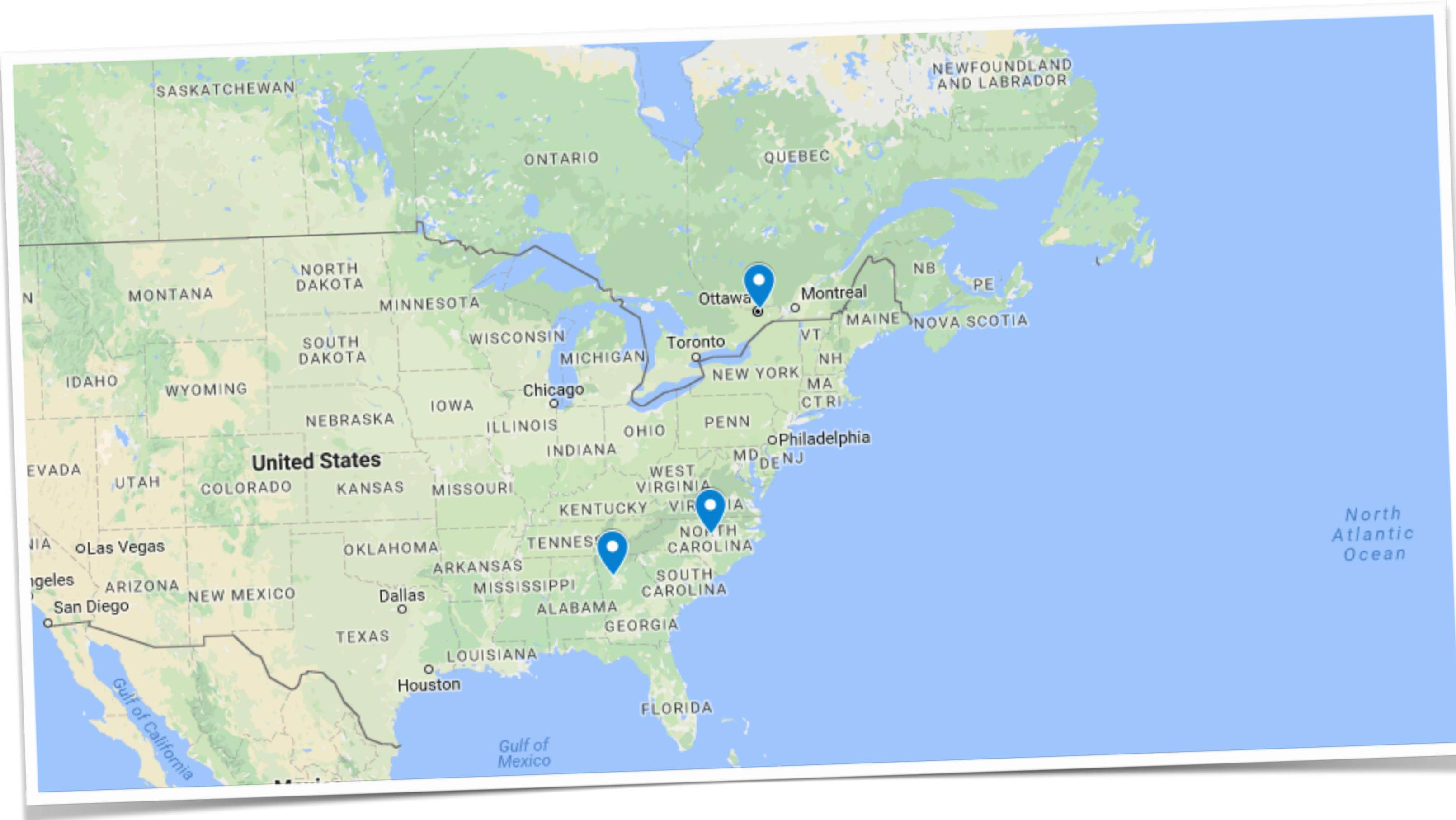
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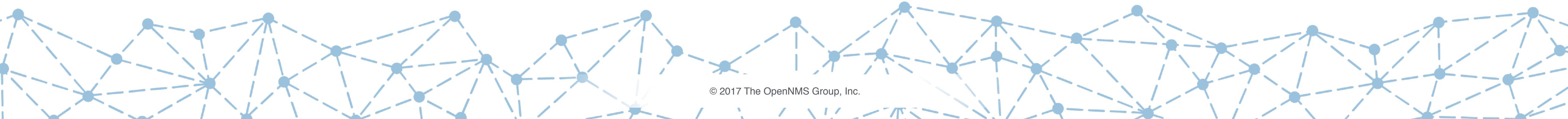
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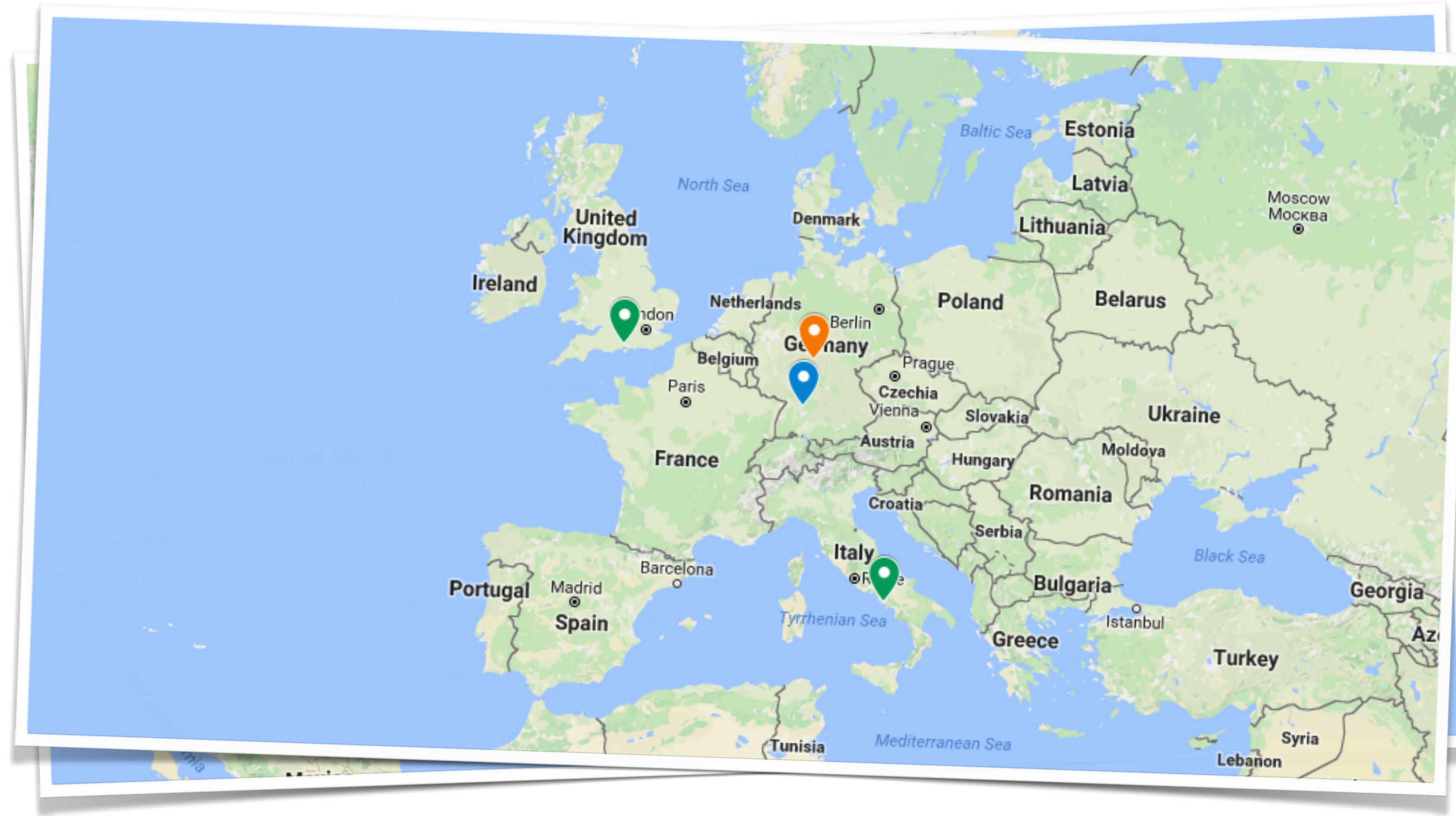
The OpenNMS Group (TOG)



HQ in Raleigh Durham Area
Offices in Atlanta and Ottawa



The OpenNMS Group (TOG)



OpenNMS Office in Stuttgart

Partner

entimOSS in UK

ARS Informatica Italy

Dienstleister

NETHINKS GmbH in Fulda

Open Source und Business

- Veröffentlichung von zwei Distributionen Horizon und Meridian
- Entwicklung neuer Features für unsere Kunden unter AGPLv3 Lizenz in Horizon
- Support für den Betrieb in Kommerziellen Umgebungen
- Training und Schulungen
- Professional Services
- Meridian als Long Term Support version ist als Subscription erhältlich

Open Source und Business



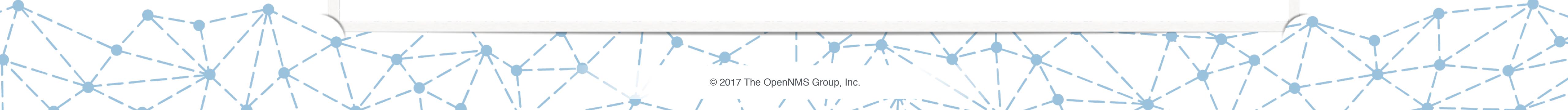
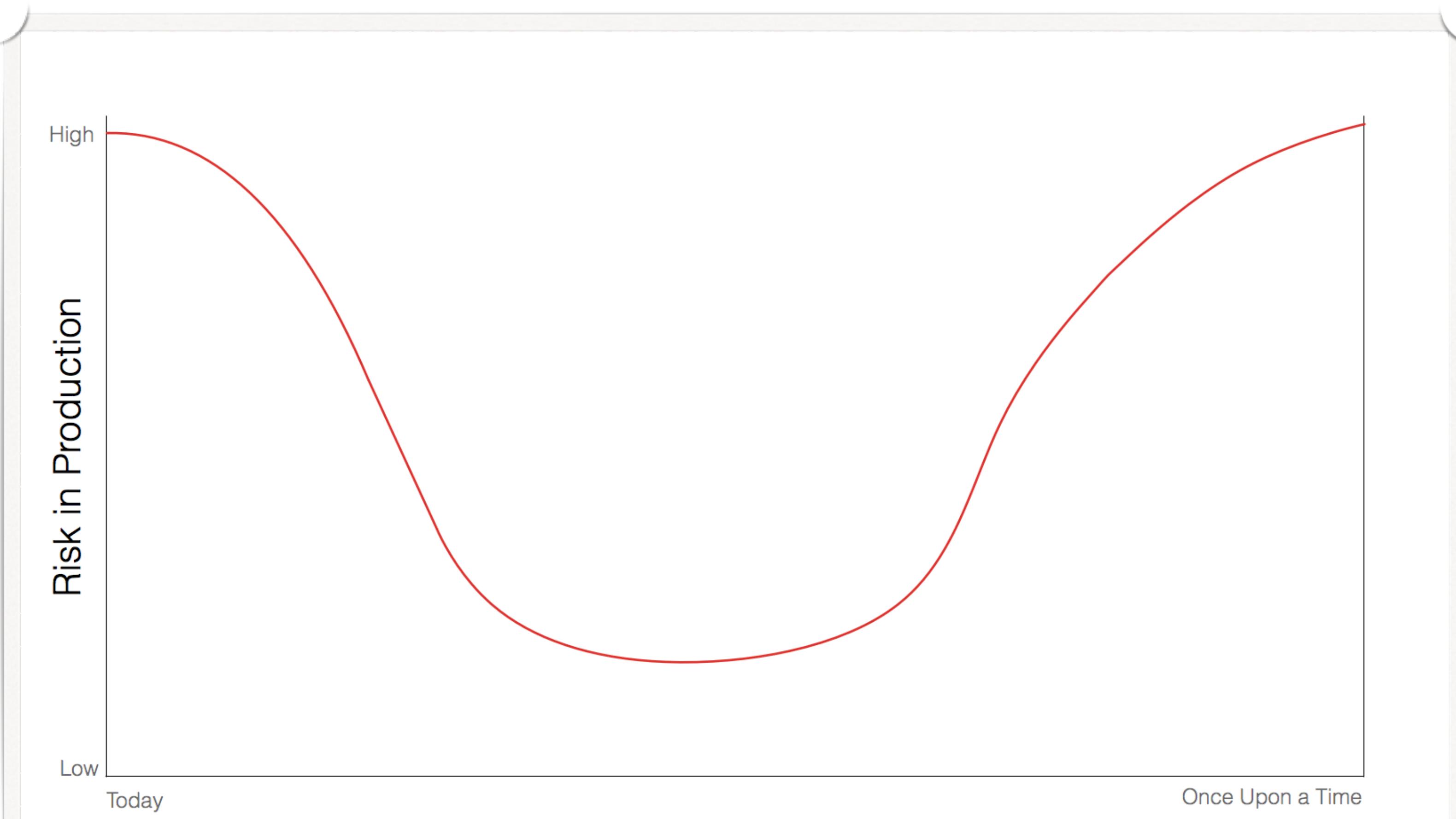
- 100% Open Source - AGPLv3
- Software Innovation
- “Release Early, Release Often”
- Contribution License Agreement
- ~ 3 - 6 Monate Major Release
- vergleichbar mit “Fedora”
- Hat mehr und neuere Features als Meridian



- 100% Open Source - AGPLv3
- Proprietäre Lizenz möglich
- Long Term Support
- Packages erhältlich als jährliche Subscription
- ~ 12 Monate Major Release
- von Features in Meridian sind eine **echte Teilmenge** der Features von Horizon

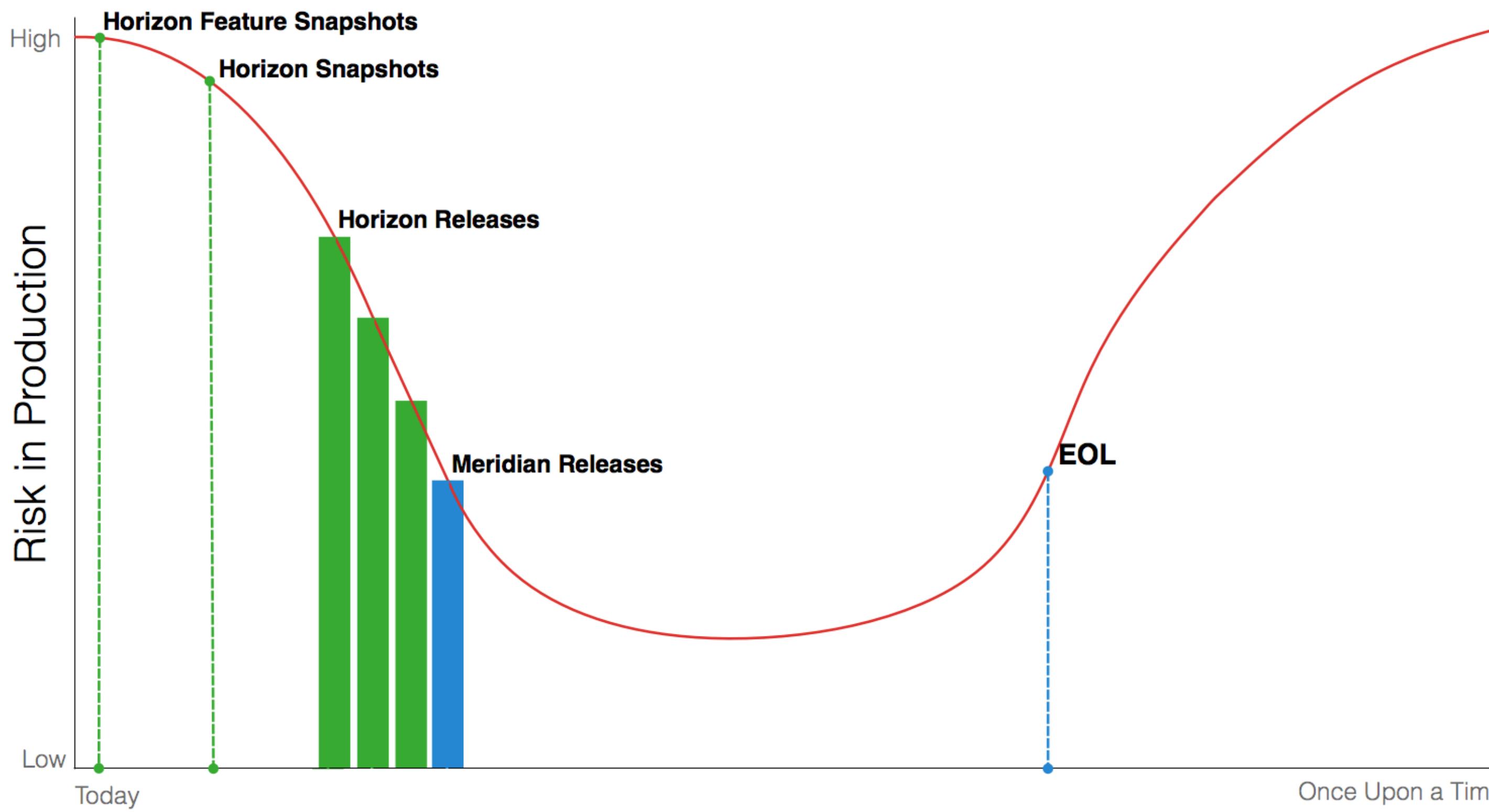


vs.



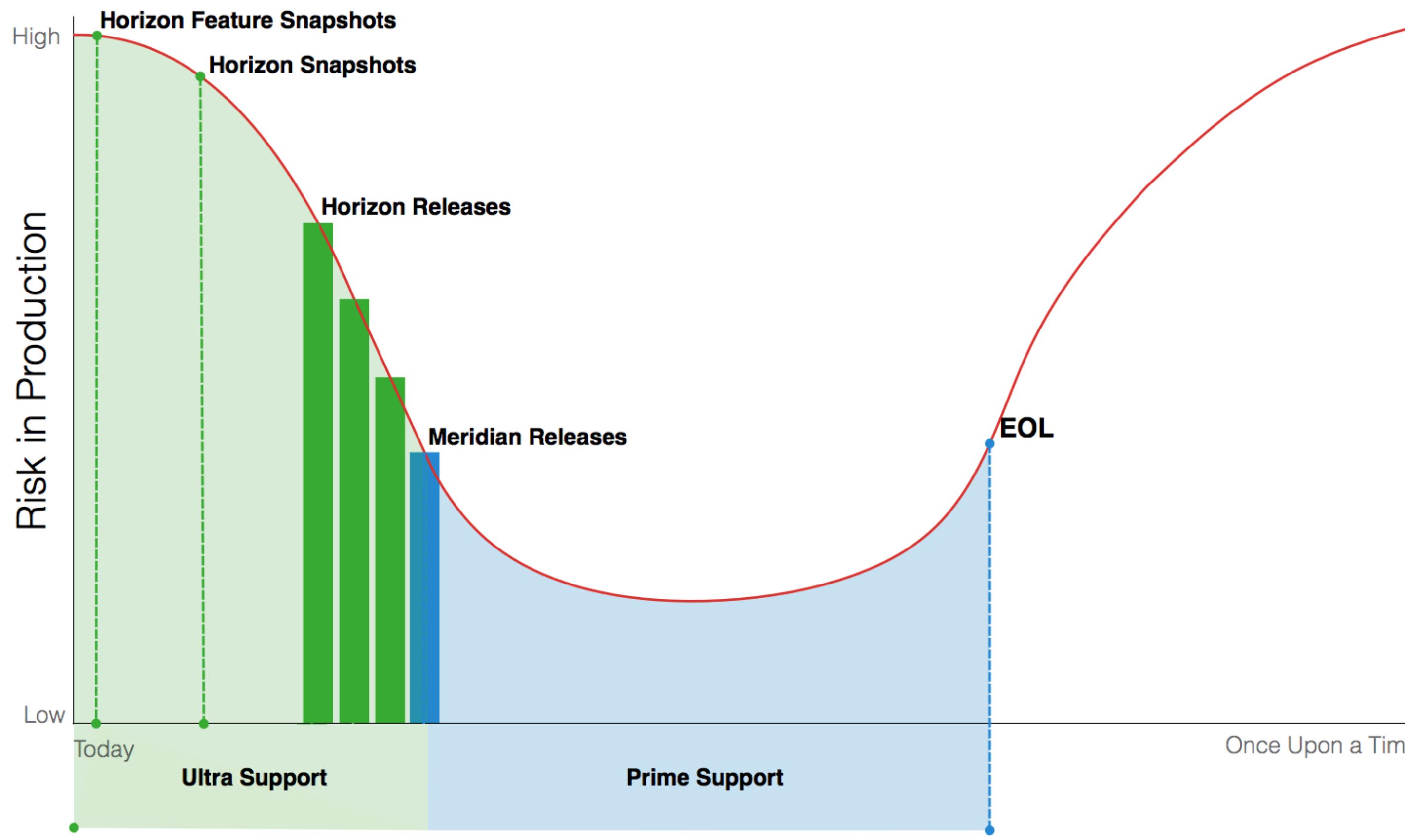


vs.





vs.





vs.



Horizon 14

Horizon 15

Horizon 16

Horizon 17

Horizon 18

Horizon 19

Horizon 20

Horizon 21

11/2014

01/2015

03/2015

05/2015

12/2015

05/2016

06/2016

02/2017

06/2017

9/2017

10/2017

Meridian 2015

Meridian 2016

Meridian 2017

ULTRA Support

- Antwortzeit: 24 h
- Dringend: 4 hrs
- Anwendungsausfall: 4 hrs
- 24/7 ist Optional
- Unbegrenzte Anzahl Tickets
- OpenNMS consultant
- Entwicklersupport



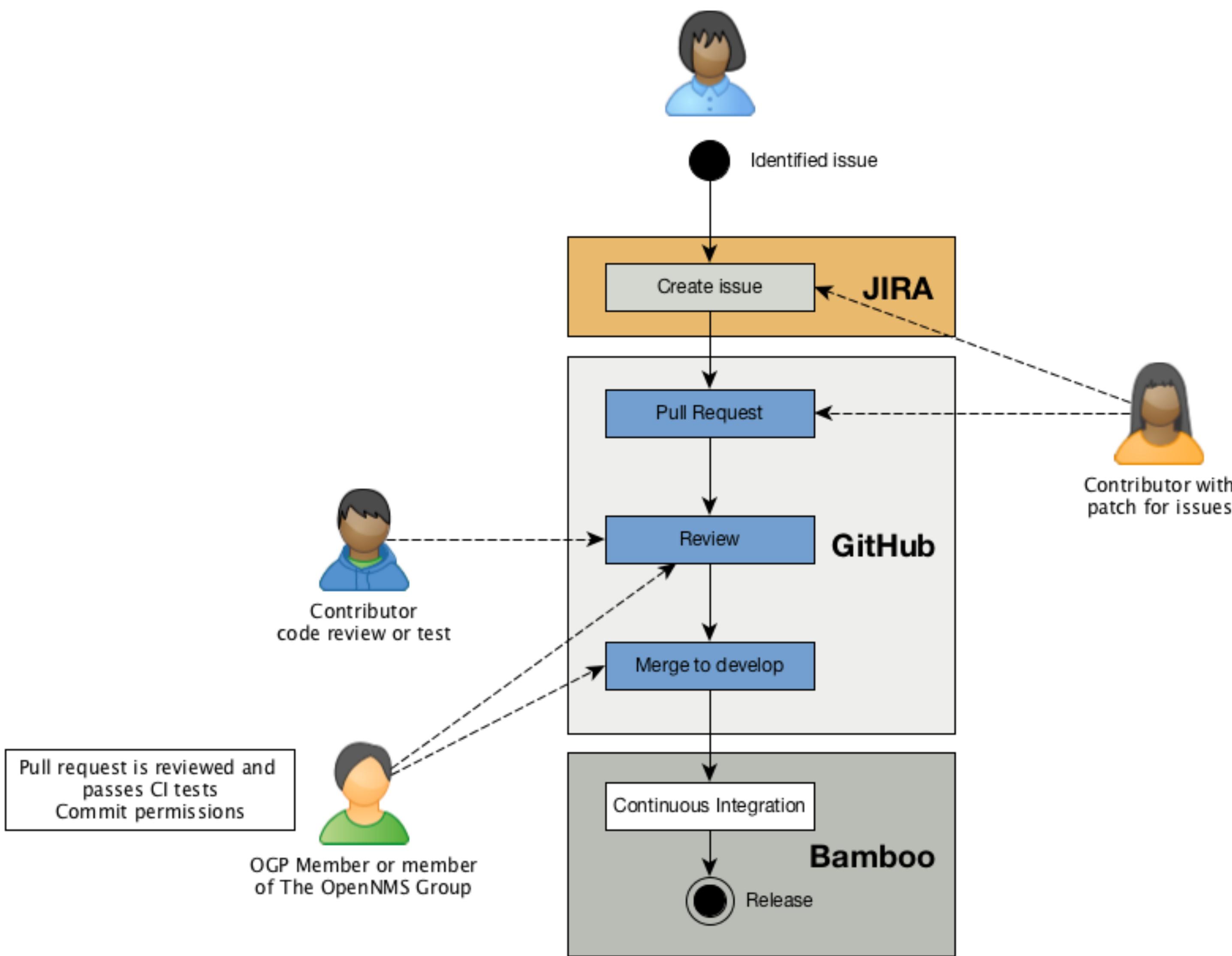
PRIME Support

- Antwortzeit: 24 h
- Dringend: 4 hrs
- Anwendungsausfall: 4 hrs
- 24/7 ist Optional
- Unbegrenzte Anzahl Tickets
- Self-Support connect.opennms.com



Über das Projekt

- Registriert am 29.03.2000 auf SourceForge
- Netsaint später umbenannt nach Nagios wurde am 10.01.2000 registriert
- Lizenz wurde von GPL 2 auf AGPLv3
- Entwicklung öffentlich auf GitHub und managed in JIRA
- 65 nehmen an der Entwicklung aktiv teil
- > 1600 closed Pull Requests
- > 39.000 Commits



<https://issues.opennms.org>

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

<https://bamboo.opennms.org>

Dokumentation

Screenshot of the OpenNMS documentation website (<https://docs.opennms.org>) showing the "Business Service Monitoring" section.

The page includes a sidebar with a Table of Contents and the main content area titled "4. Business Service Monitoring".

The main content describes the Business Service Monitoring (BSM) feature, which allows monitoring and modeling high-level Business Services (BS). It explains how BSM components help quickly identify critical problems affecting these services. The BSM feature is used to model a high-level BS context around technical Service Monitors provided in OpenNMS. To indicate which BS is affected, an *Operational Status* is calculated.

An example scenario for a web shop is provided, showing a hierarchy of services:

```
graph TD; Login --> PSM_Login[PSM :: Login]; Shop --> PSM_Shop[PSM :: Shop]; Payment --> PSM_Payment[PSM :: Payment]; PSM_Login --> WebServer[Web Server]; PSM_Shop --> WebServer; PSM_Payment --> WebServer; WebServer --> web01[web01 :: HTTP]; WebServer --> web02[web02 :: HTTP]; WebServer --> web03[web03 :: HTTP]; WebServer --> Database[Database]; Database --> db01[db01 :: SQL]; Database --> db02[db02 :: SQL];
```

Customer interaction points to the Login, Shop, and Payment services, which then point to a central Web Server. The Web Server connects to three HTTP servers (web01, web02, web03) and a Database, which further connects to two SQL databases (db01, db02).

Screenshot of the OpenNMS wiki (<https://wiki.opennms.org>) showing the "Main Page".

The page features a navigation bar with links for "Main page", "Discussion", "Read", "View source", "View history", and "Search OpenNMS".

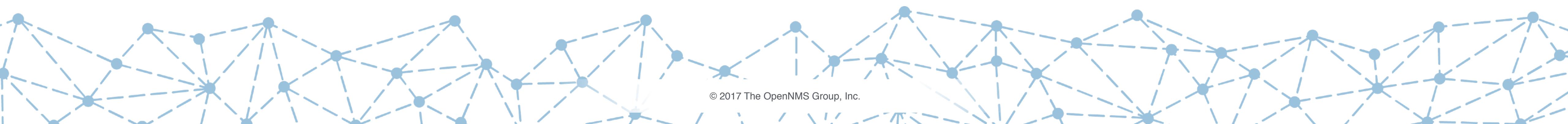
The main content area is titled "Welcome to the OpenNMS Wiki!" and includes sections for "Community Welcome Guide", "Getting Started", and various categories like "Installation & Upgrades", "Tutorials", "Documentation", "Community", "Monitoring Applications", "Monitoring Devices", "Tools", and "Lab".

On the left, there is a sidebar with links for "Main Page", "Releases", "Other Downloads", "SourceForge Project", "Upcoming Events", "Get Help", "Get Involved", "Get to Know Us", and "Tools".

At the bottom, there is footer information including copyright details and links to "Index", "About using this wiki", and "Privacy policy".

<https://docs.opennms.org>

<https://wiki.opennms.org>



Kommunikation

The screenshot shows a web-based chat interface for the 'OpenNMS Discussion' channel. The left sidebar lists various public and private channels. The main pane displays a conversation between multiple users, including 'trazomtg', 'indigo', 'pioto', 'mfuhrmann', 'dino2gnt', and others. Topics discussed include the availability of OpenNMS source code on GitHub and configuration issues related to AMQP and SNMP.

<https://chat.opennms.com>

irc://irc.freenode.net/#opennms

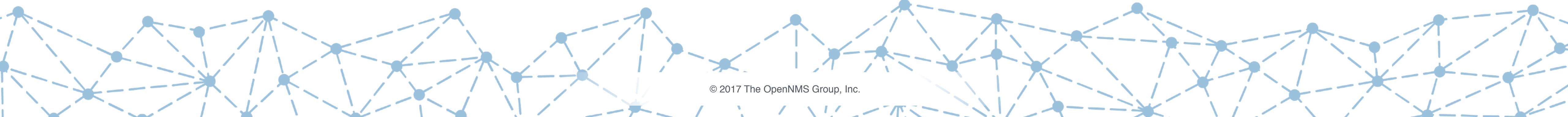
The screenshot shows a web-based mailing list interface for the 'opennms-discuss' list. The left sidebar shows navigation options like Mailboxes, VIPs, and Inbox. The main pane displays a thread with messages from users like 'Paul & Marcel', 'Dominic & Chris', 'Michael & Ronny', 'JohnD Blackburn', 'Seth & paisano', 'Paul & Jesse', 'ZAdmin, Ronald & Seth', 'Ronald Roskens, Showers, Willia...', 'Ronny & Marcel', and 'EmptySet, Dean & Ronald'. The messages cover topics such as Cassandra experience, network topology, and RRD retention times.

https://wiki.opennms.org/wiki/Mailing_lists

Events



- Unconference
- 5 Tage
- Workshops
- Entwicklung
- Ideenaustausch
- Veranstalter:
Sponsoren + OpenNMS Group



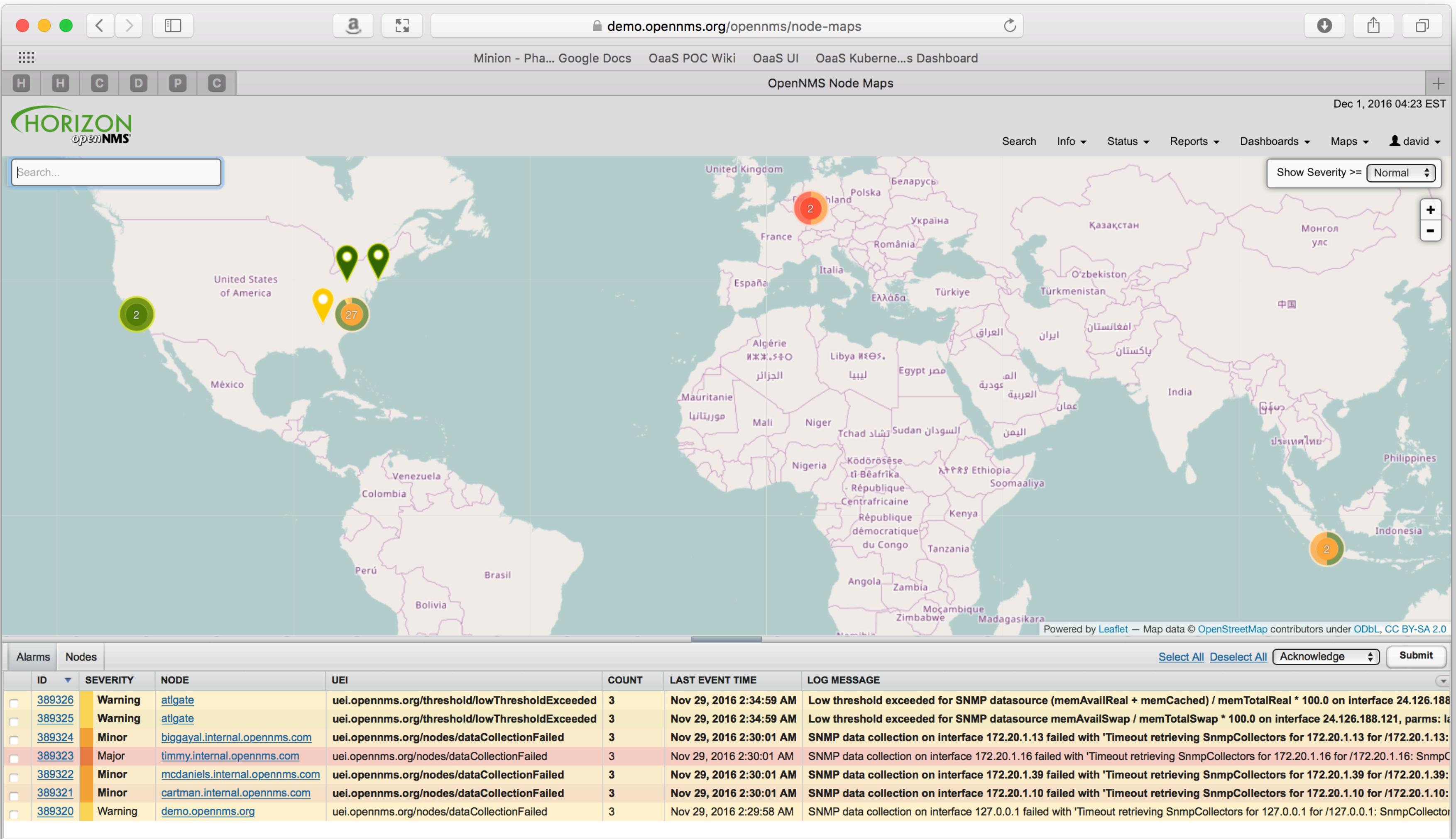
Events

The screenshot shows the homepage of the OUCE 2016 website. At the top, there's a navigation bar with links to Home, Venue, Sponsor, CfP, FAQ, and Recordings. Below the navigation is a banner featuring several circular monitoring dashboards displaying network data. The central part of the page has a large title "OUCE 2016" with the subtitle "13th - 15th September, Europe, University in Fulda". A prominent yellow button labeled "Call for Paper" is visible. Below the banner, a descriptive text block explains the purpose of the conference. At the bottom, there are three main sections: "SCHEDULE" (with a calendar icon), "VENUE" (with a location pin icon), and "GET TOGETHER" (with a star icon). Each section contains detailed information and links to further details.

- User Conference Europe
- 2 - 3 Tage
- Workshops
- Vorträge rund um OpenNMS
- Veranstalter:
Sponsoren + OpenNMS Foundation

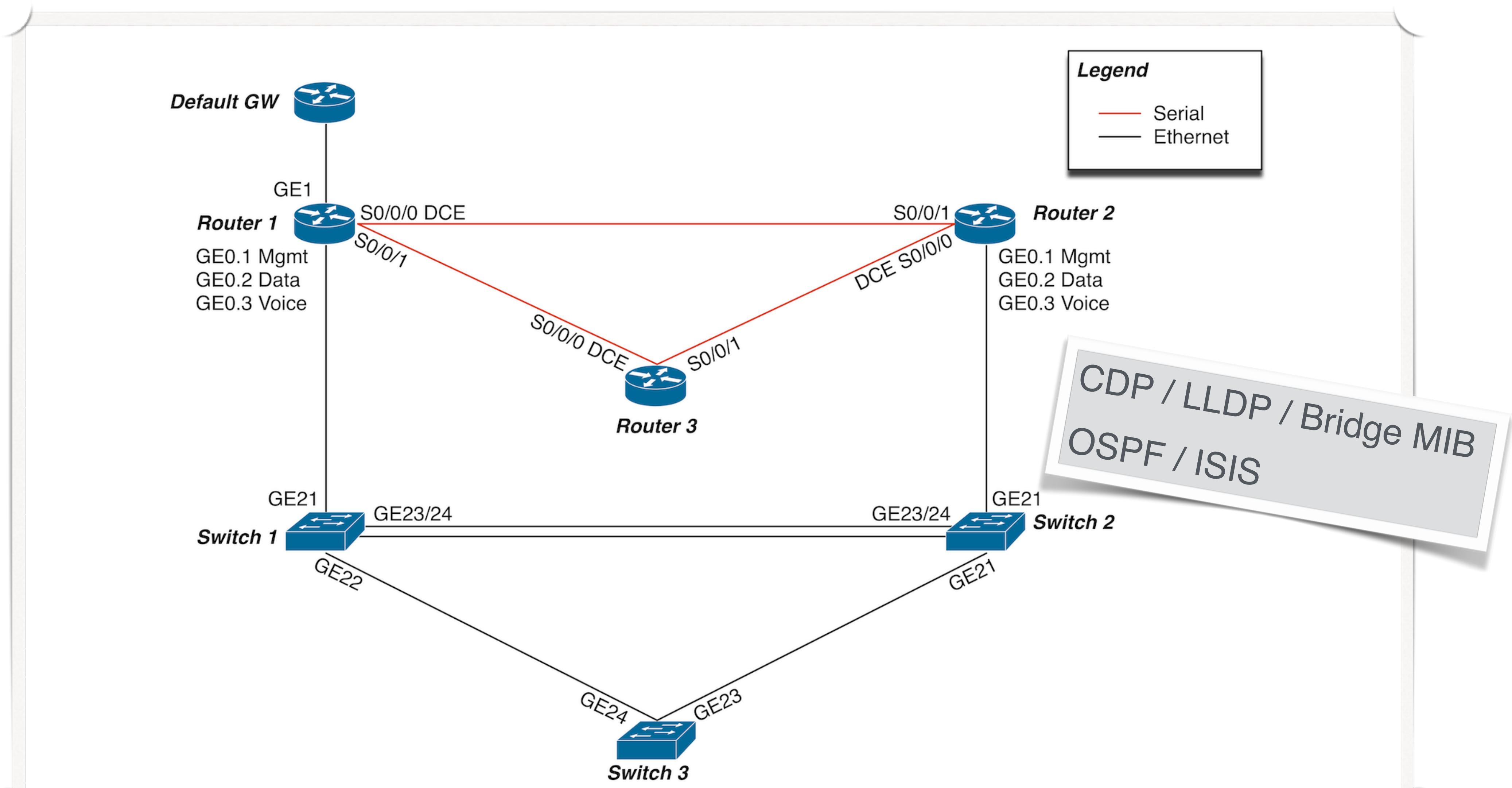
Road Map

Horizon 14



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Horizon 14



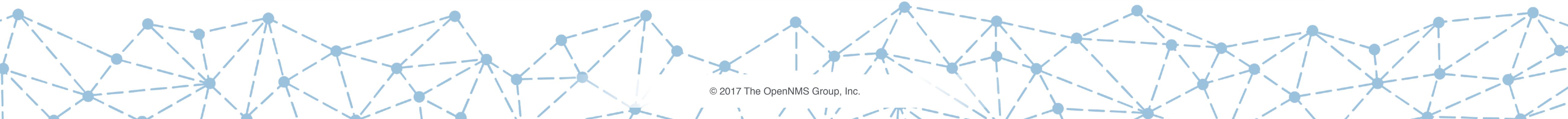
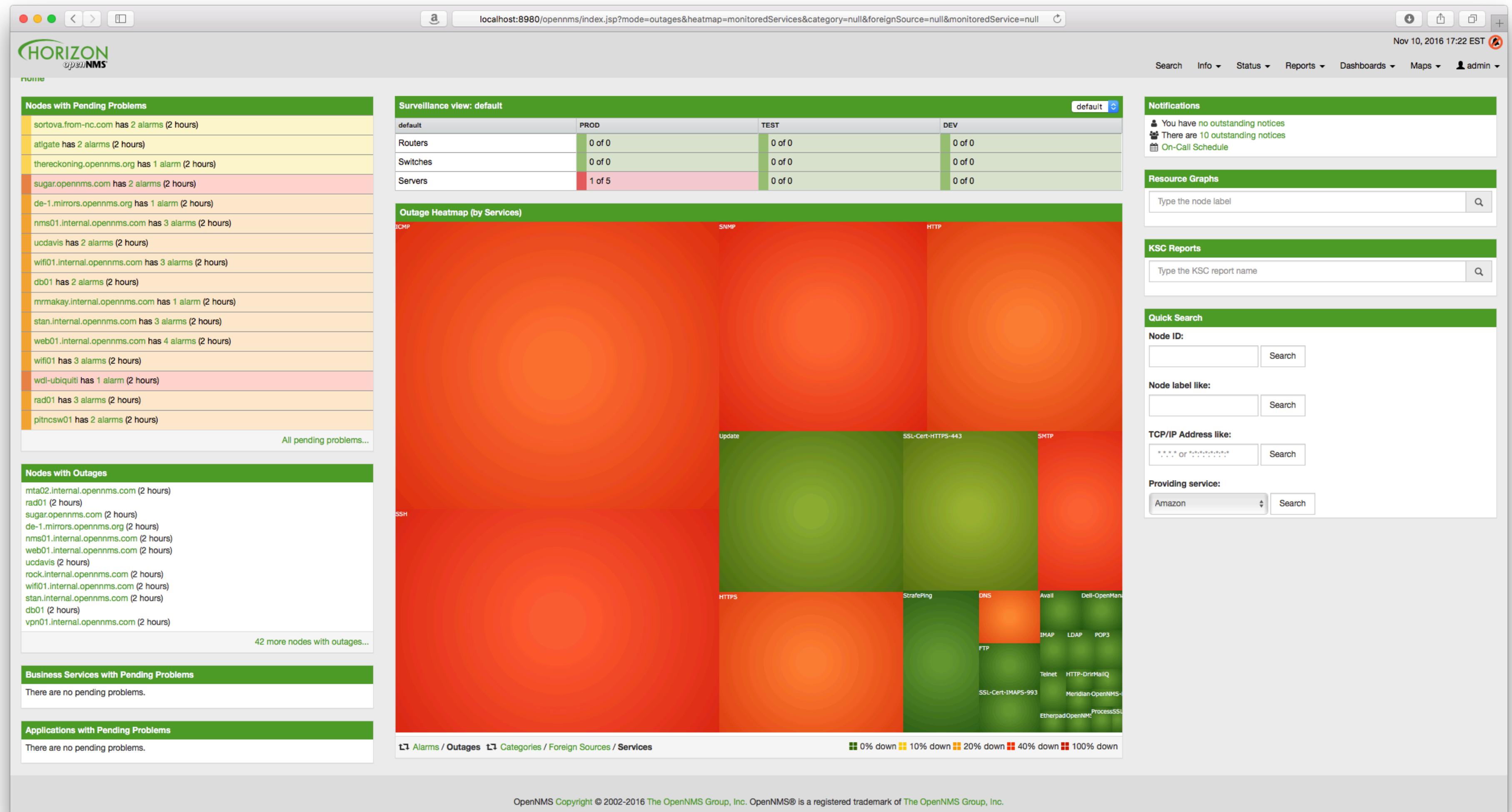
Horizon 15

- Jetty 8
- Bootstrap Theming in Web UI

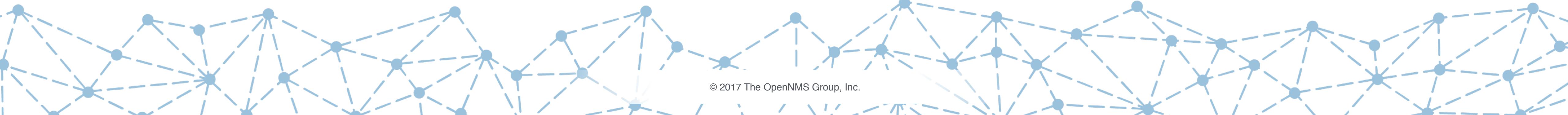
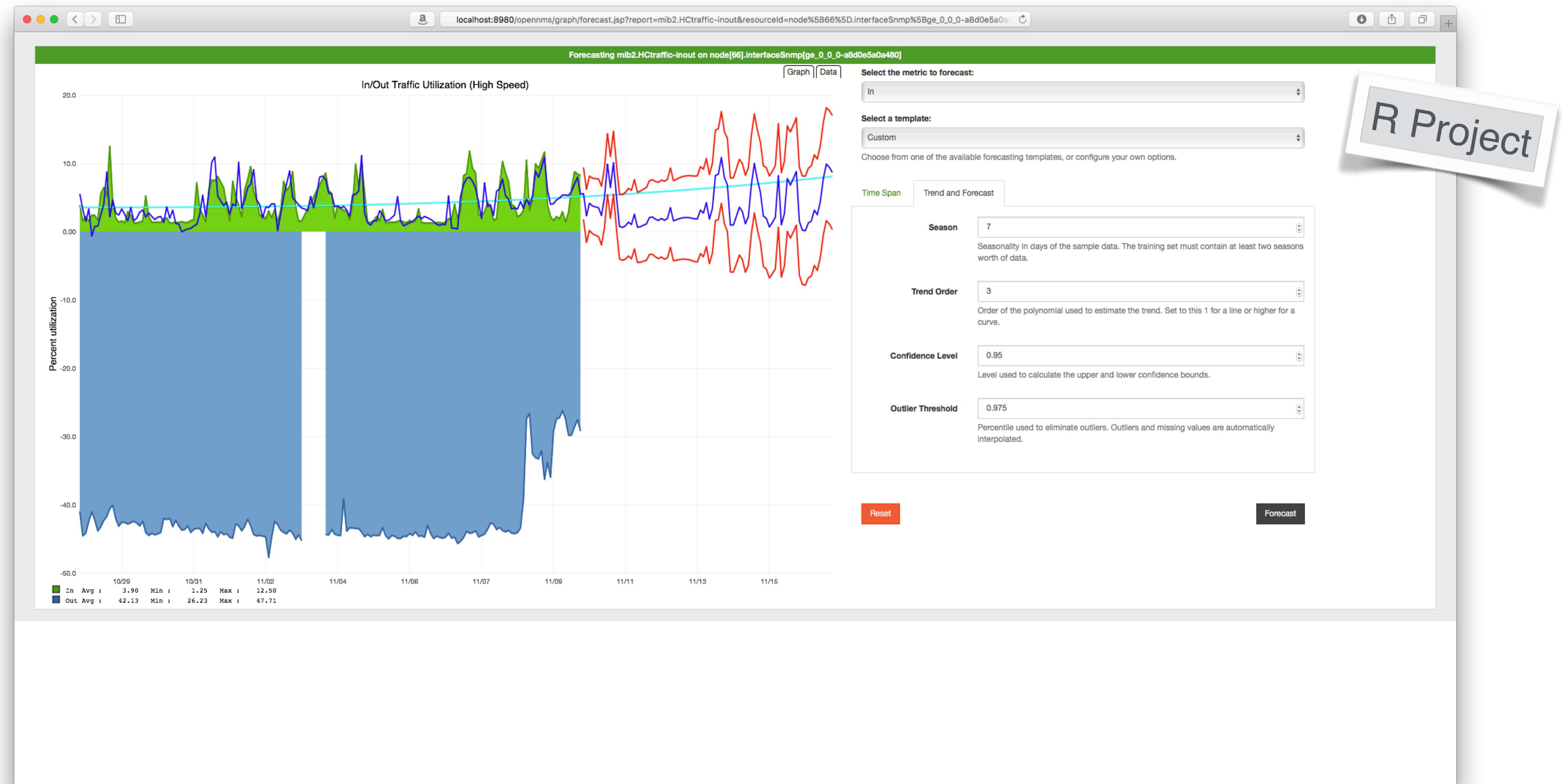
Horizon 16



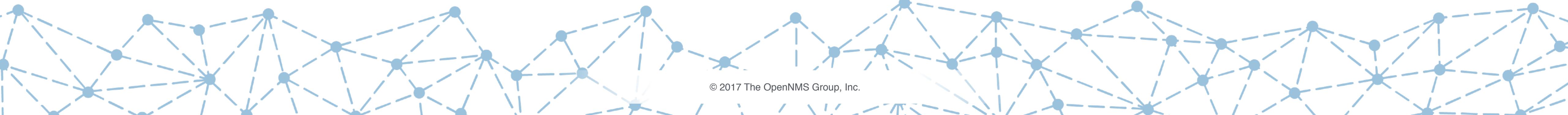
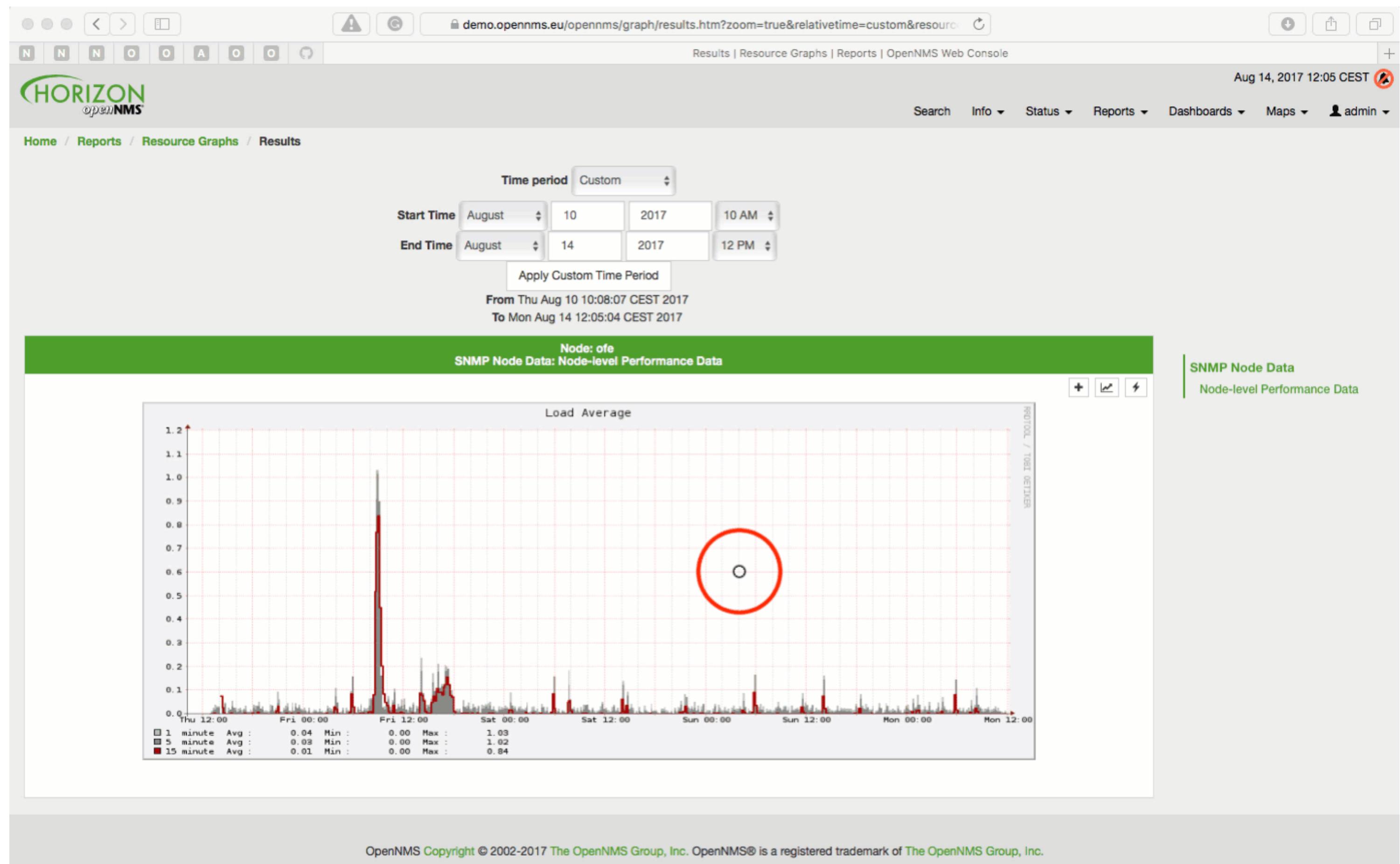
Horizon 17



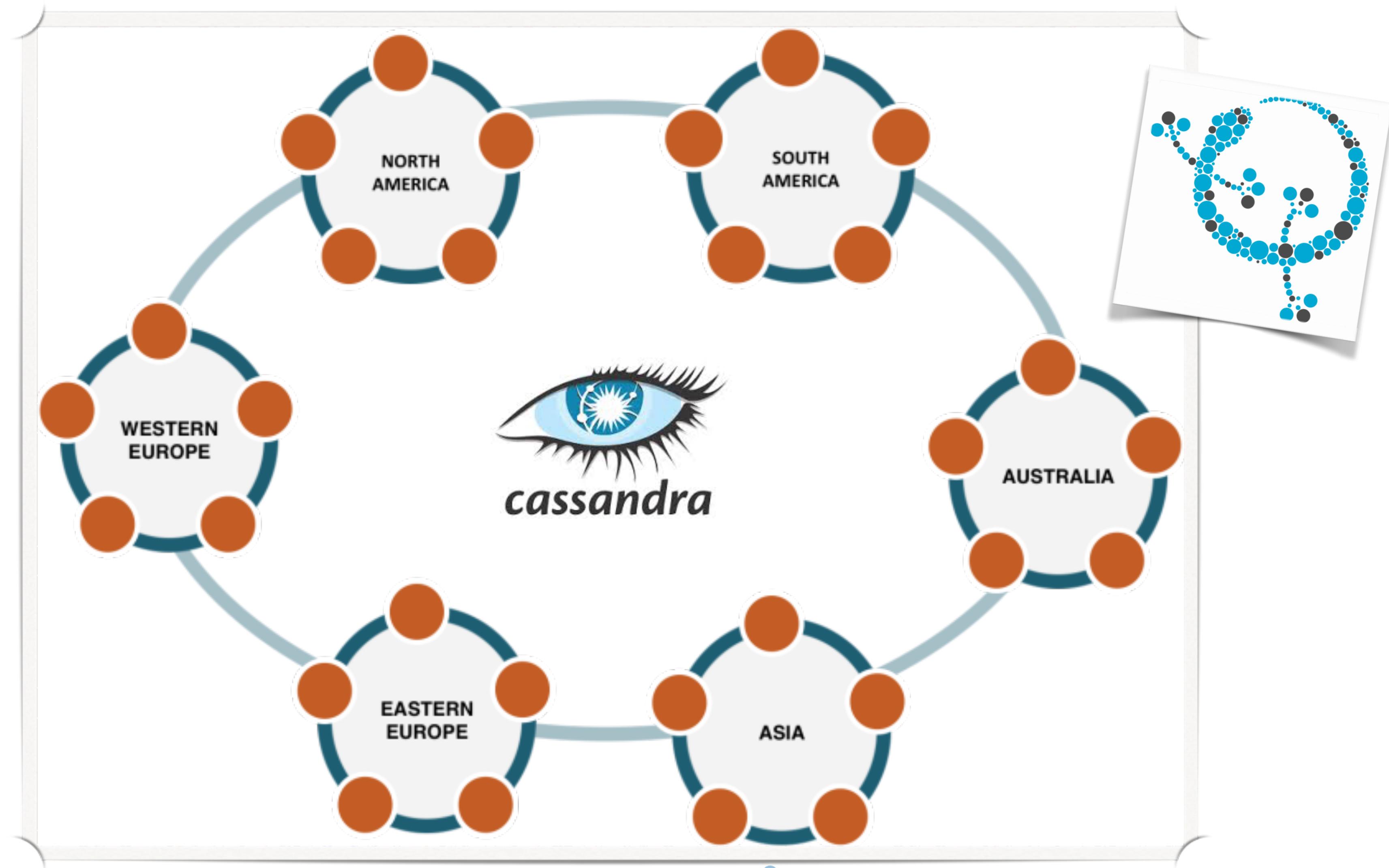
Horizon 17



Horizon 17



Horizon 17



Horizon 17

The screenshot shows a web browser window displaying the 'Users Guide' for OpenNMS Horizon 20.0.1. The URL is docs.opennms.org/opennms/releases/20.0.1/guide-user/guide-user.html. The page includes a 'Table of Contents' on the left and the main 'Users Guide' content on the right. The main content discusses Service Assurance, OpenNMS Horizon Surveillance View, Dashboard components, Business Service Monitoring, and Alarms. A callout box in the top right corner says 'AsciiDoc Text based document generation'. At the bottom of the page is a network graph visualization.

Users Guide

Copyright (c) 2014-2016 The OpenNMS Group, Inc. – OpenNMS Horizon 20.0.1, Last updated 2017-07-10 10:24:54 EDT

1. Service Assurance

This section will cover the basic functionalities how *OpenNMS* monitors availability and latency from applications or management agents. To change the behavior of how *OpenNMS* monitors applications or status information from management agents please see the *Administration Guide*. To extend the *Service Monitor* framework please see the *Development Guide*.

Measuring availability and latency of network services or applications is an important part in fault and performance management. In *OpenNMS* this task is provided by a *Service Monitor* framework. The main component is *Pollerd* which provides the following functionalities:

- Track the status of a management resource or an application for availability calculations
- Measure response times for service quality
- Correlation of node and interface outages based on a [Critical Service](#)

The following image shows the model and representation of availability and response time.

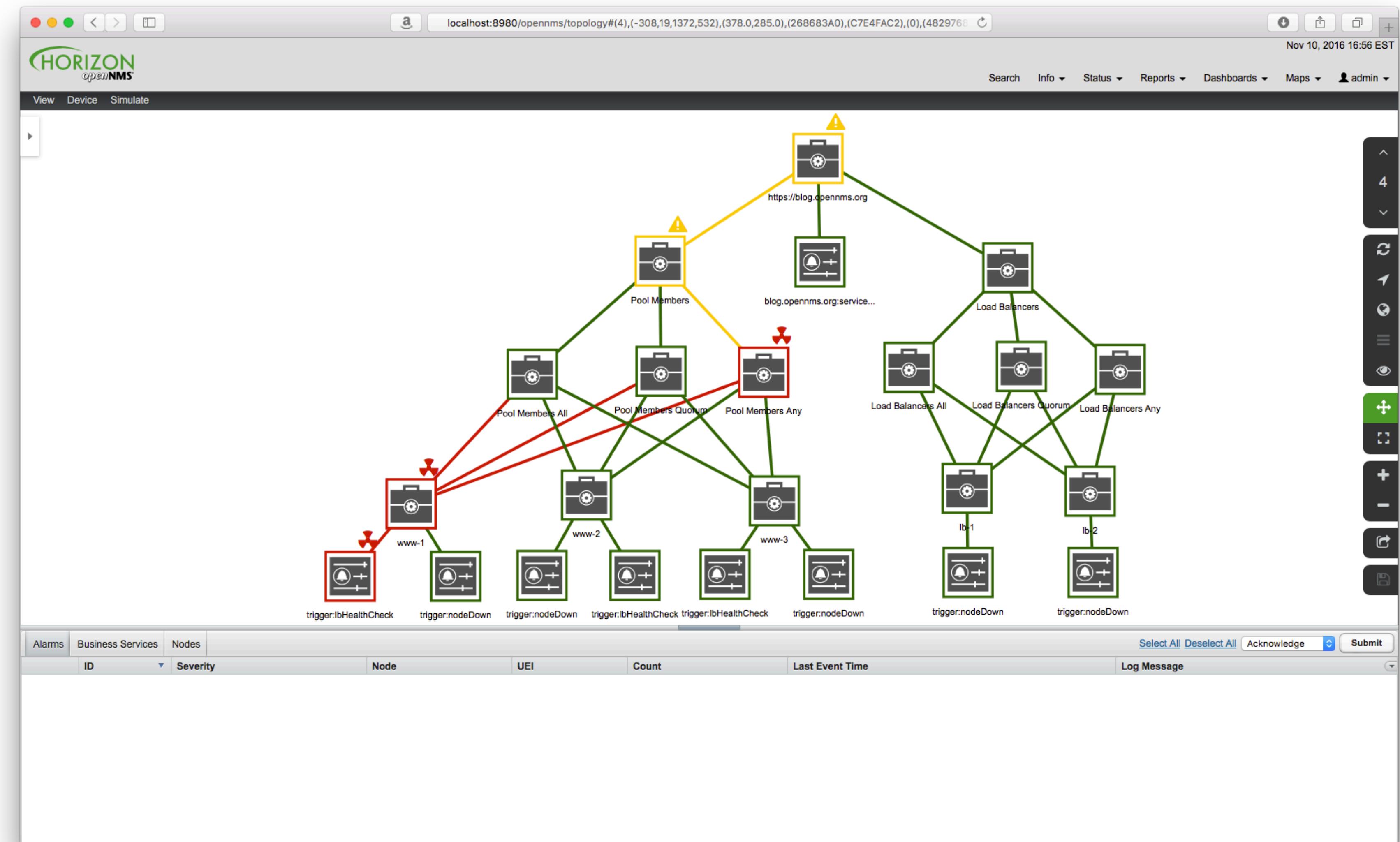
The diagram illustrates the network topology and monitoring data. It shows two nodes: 'Node' (IP-Interface 2 at 10.23.42.1) and '192.168.1.1' (IP-Interface 1). The 'Node' node contains three services: ICMP, SMTP, and HTTP. The '192.168.1.1' node contains ICMP and SNMP. To the right, there are two tables showing availability data and an ICMP Response Time chart.

Availability	
Availability (last 24 hours)	
10.23.42.1	0 17:00 20:00 23:00 02:00 05:00 08:00 11:00 14:0
HTTP	100.000%
ICMP	100.000%
SMTP	100.000%
192.168.1.1	0 17:00 20:00 23:00 02:00 05:00 08:00 11:00 14:0
ICMP	100.000%
SNMP	100.000%

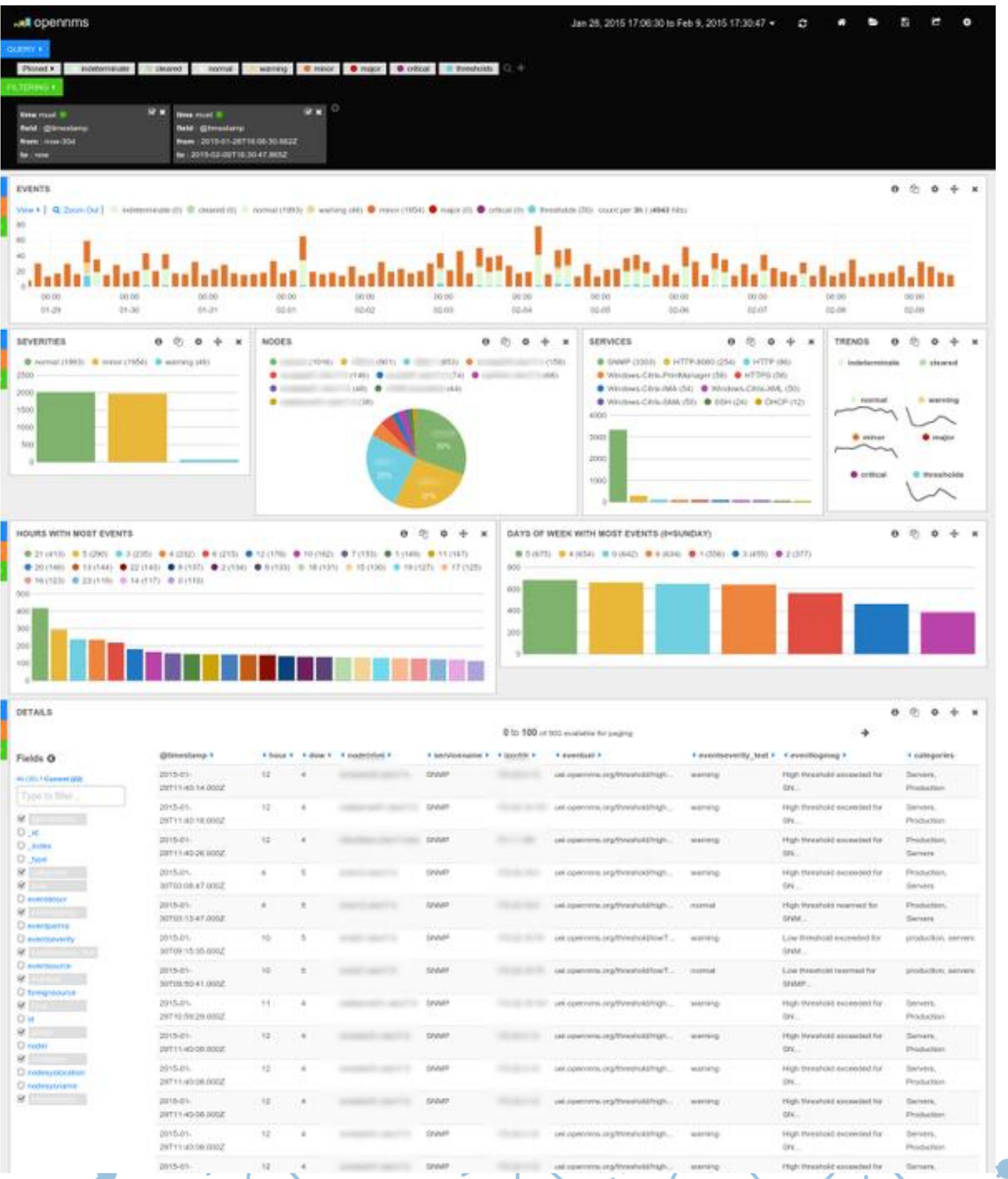
ICMP Response Time

50 m
40 m

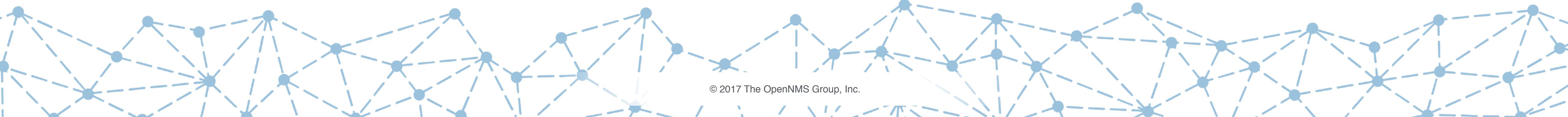
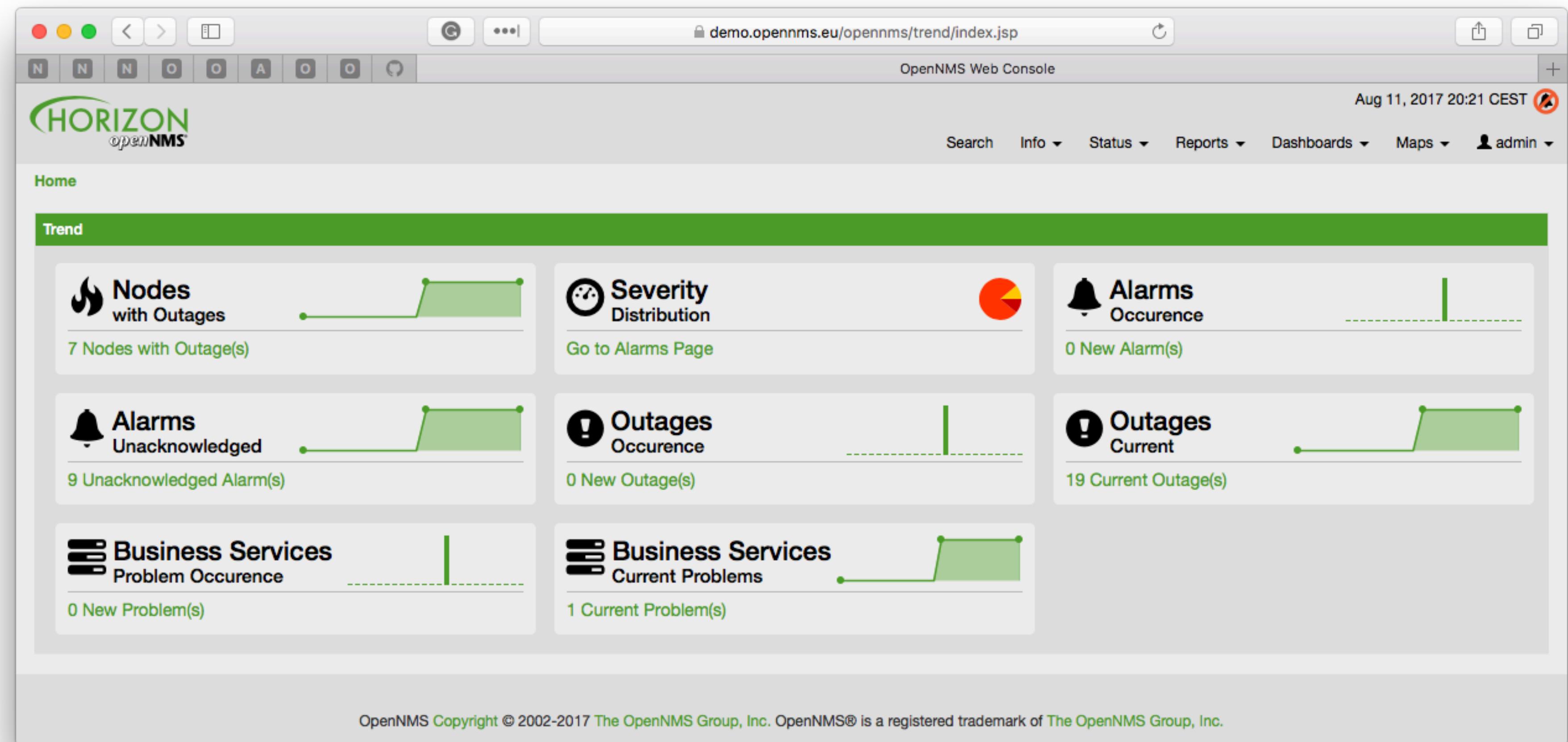
Horizon 18



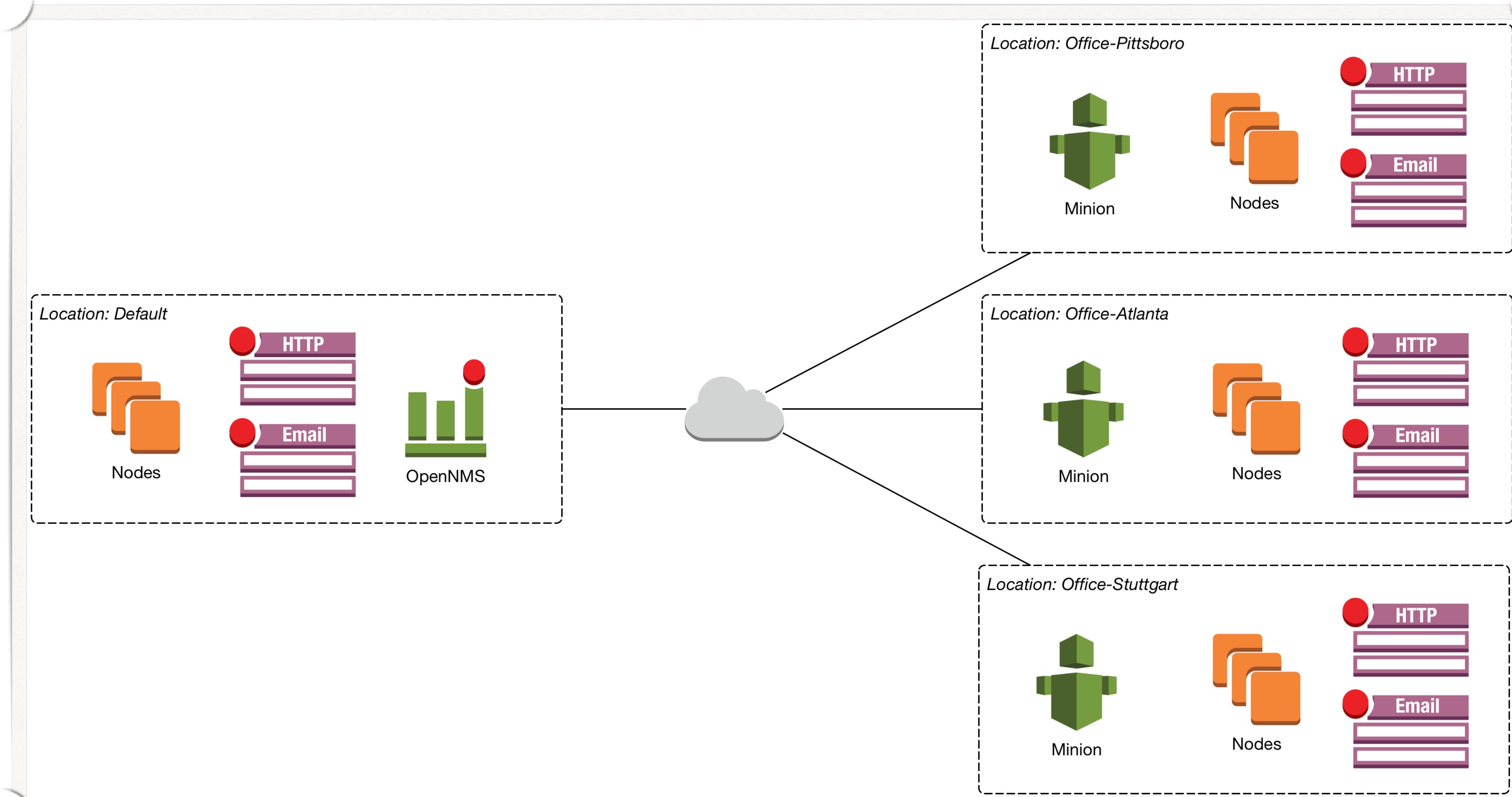
Horizon 18



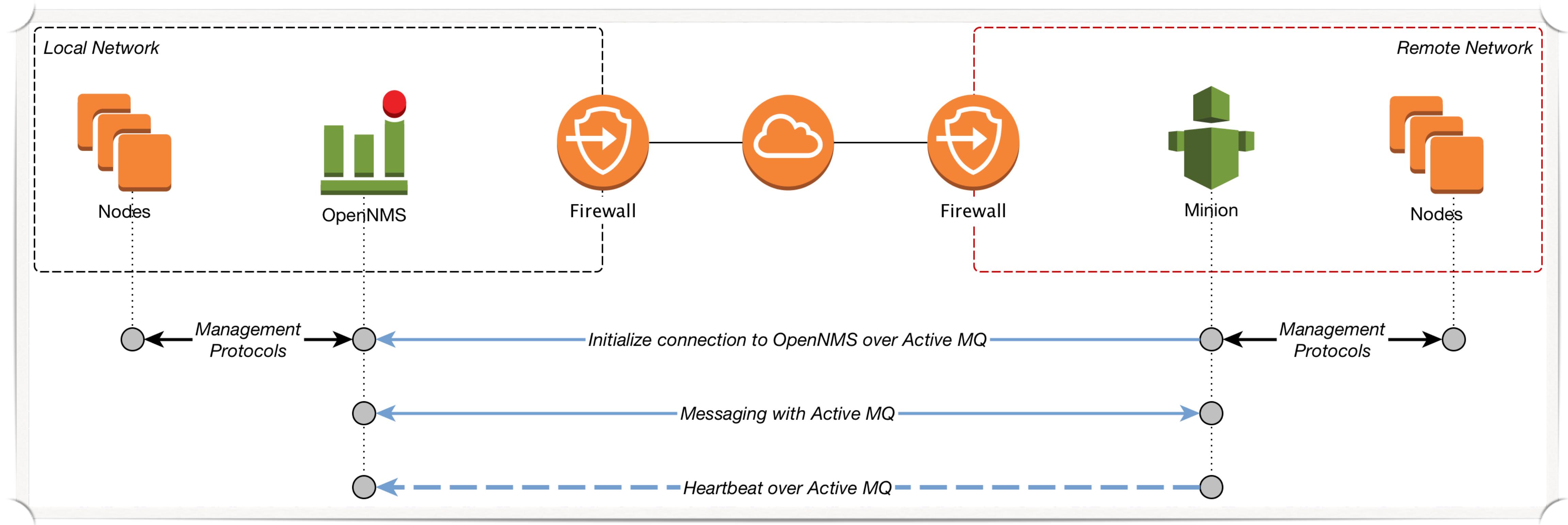
Horizon 19



Horizon 19



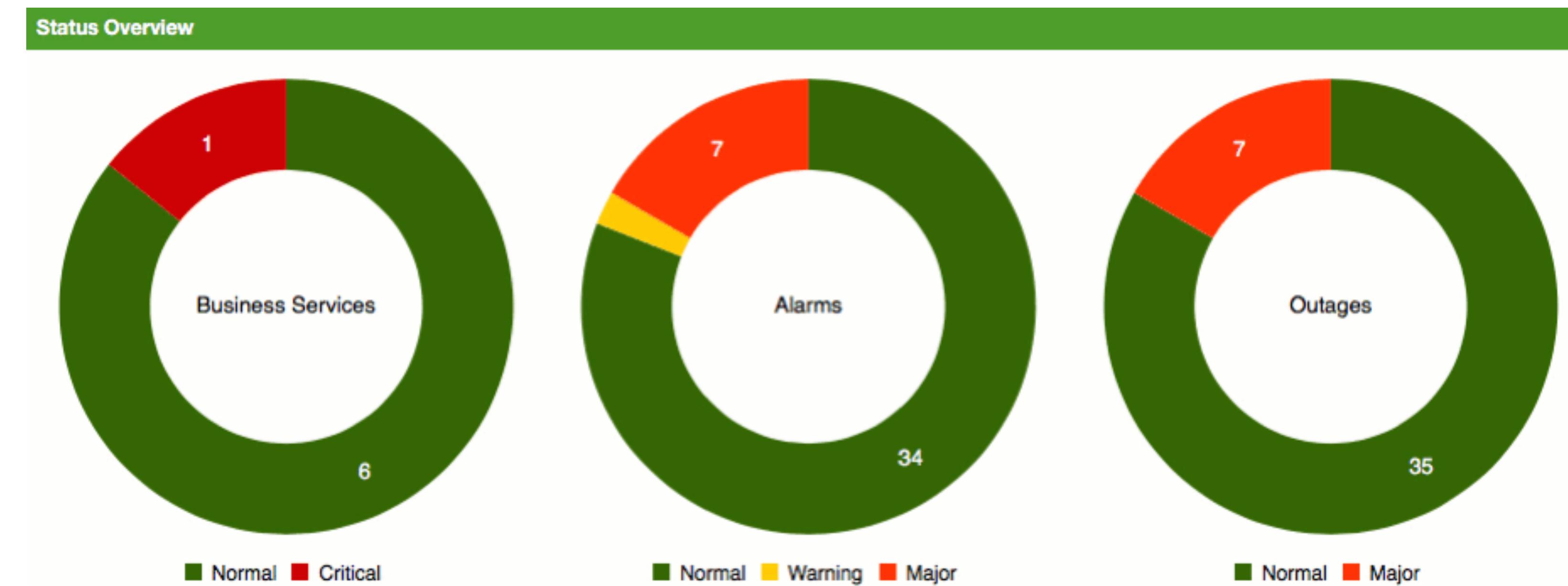
Horizon 19



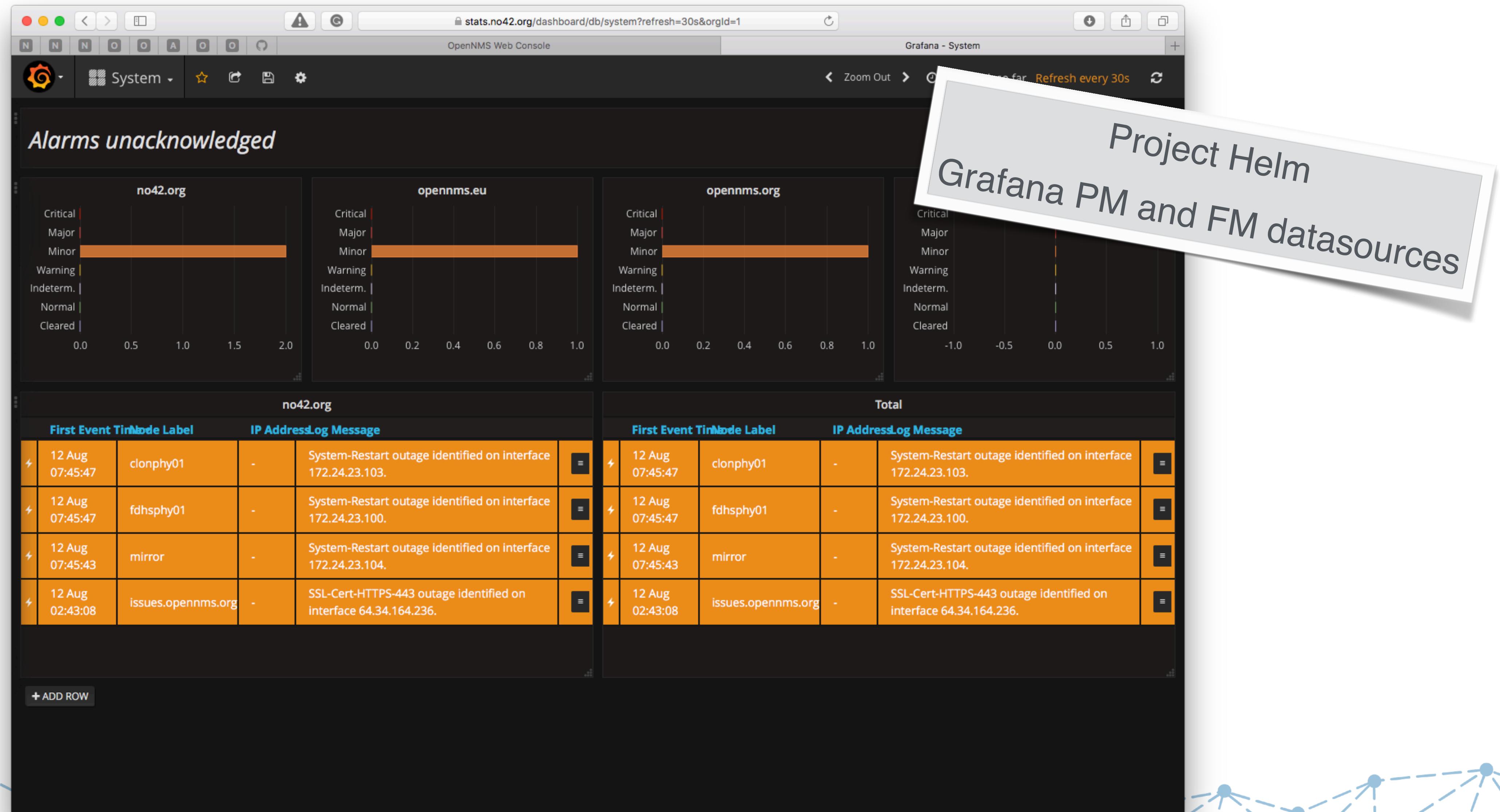
Horizon 20

- Alle Protokolle für Performance Data Collection für Minions verfügbar
- Auto-Provisioning für VMware durch Minions
- Optimierung Performance für Event-Verarbeitung mit Apache Kafka
- Bugfixes für Refactoring für Location support

Horizon 21



Horizon 21



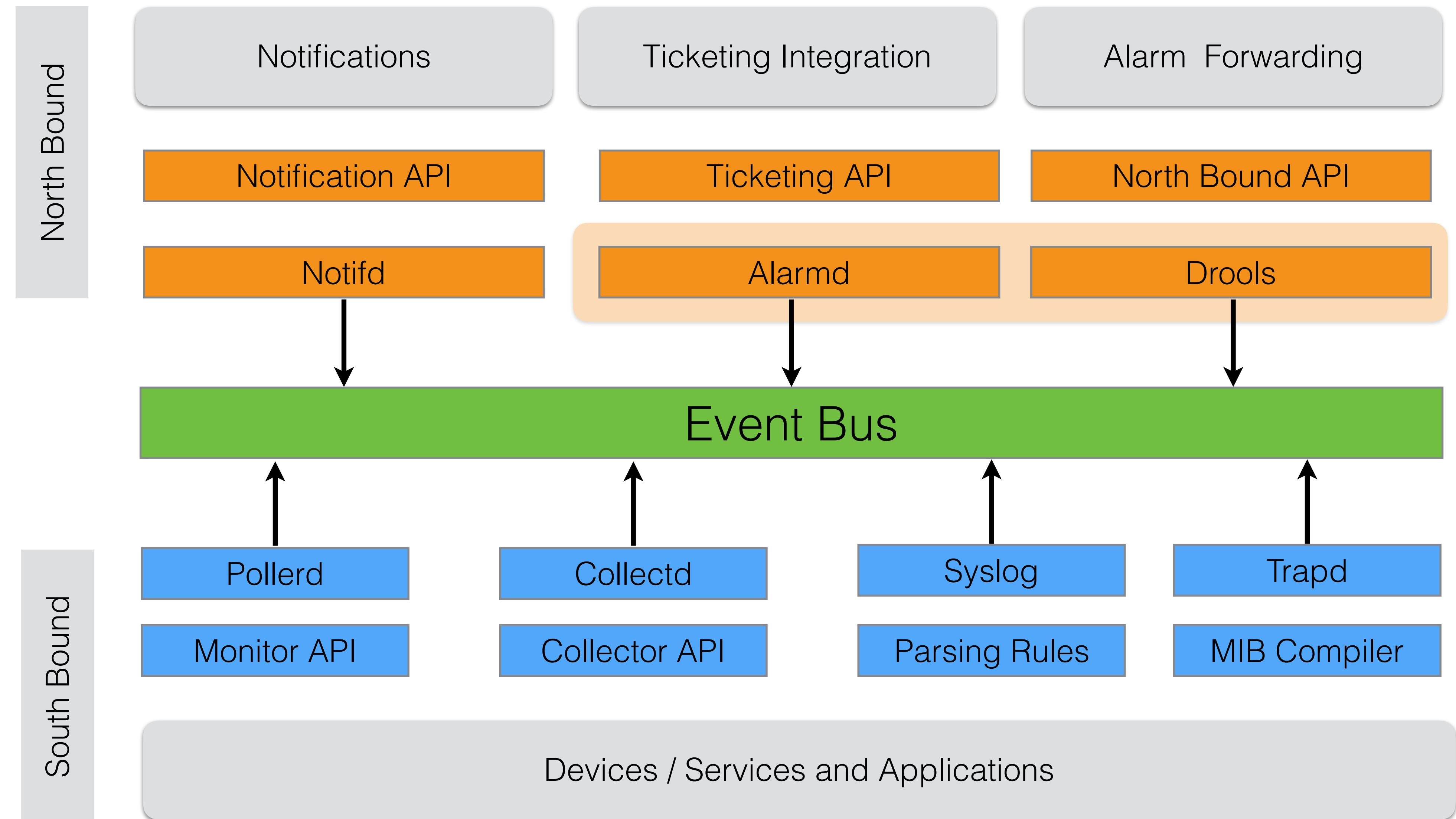
Horizon 22 ... 23

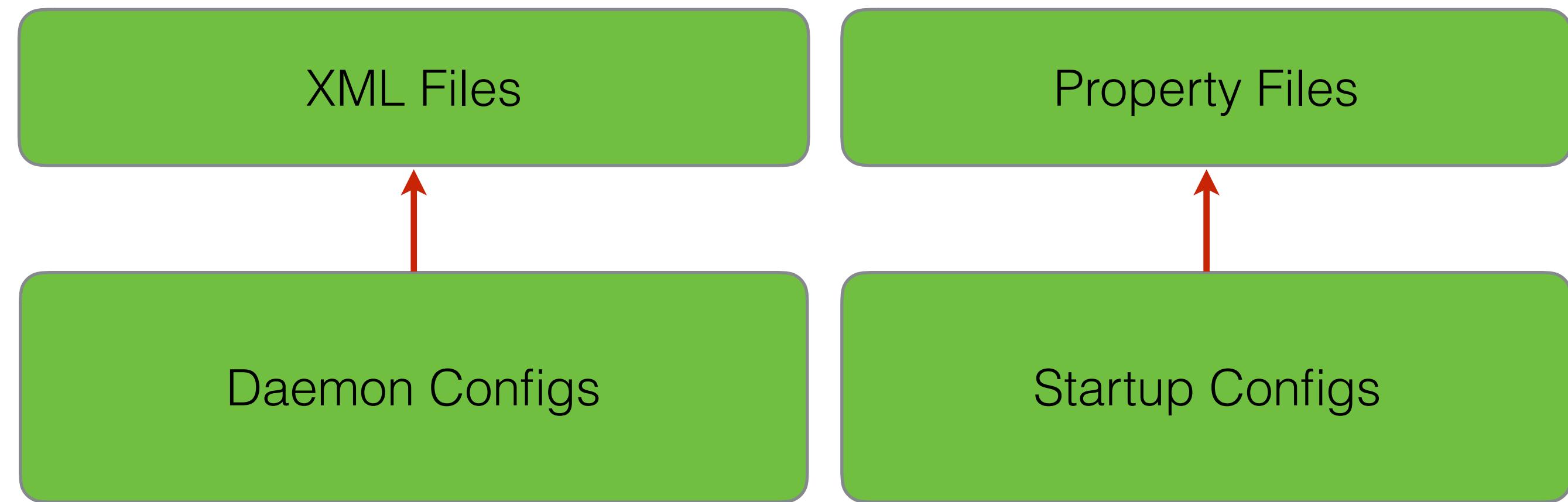
- Infrastructure to Support Streaming Telemetry push vs. poll
- Cisco NX-OS
- Junos Telemetry Interface (JTI)
- Netflow v5/v9 / J-Flow / S-Flow and IPFIX at scale
(3084 flow pkts/sec -> 92.520 flows/sec -> 100.000 fps)
- Verbesserung Helm

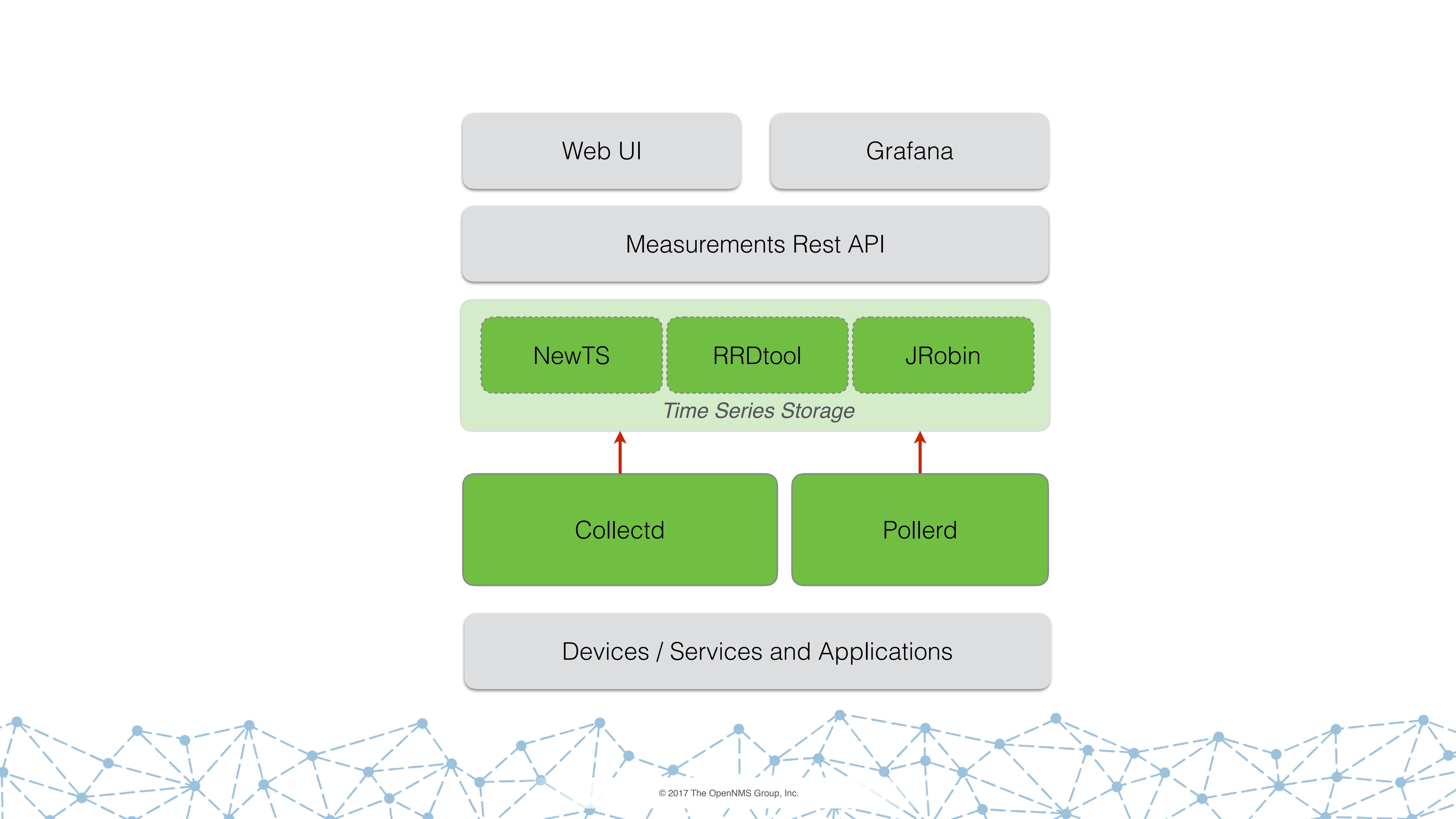
Horizon 23++

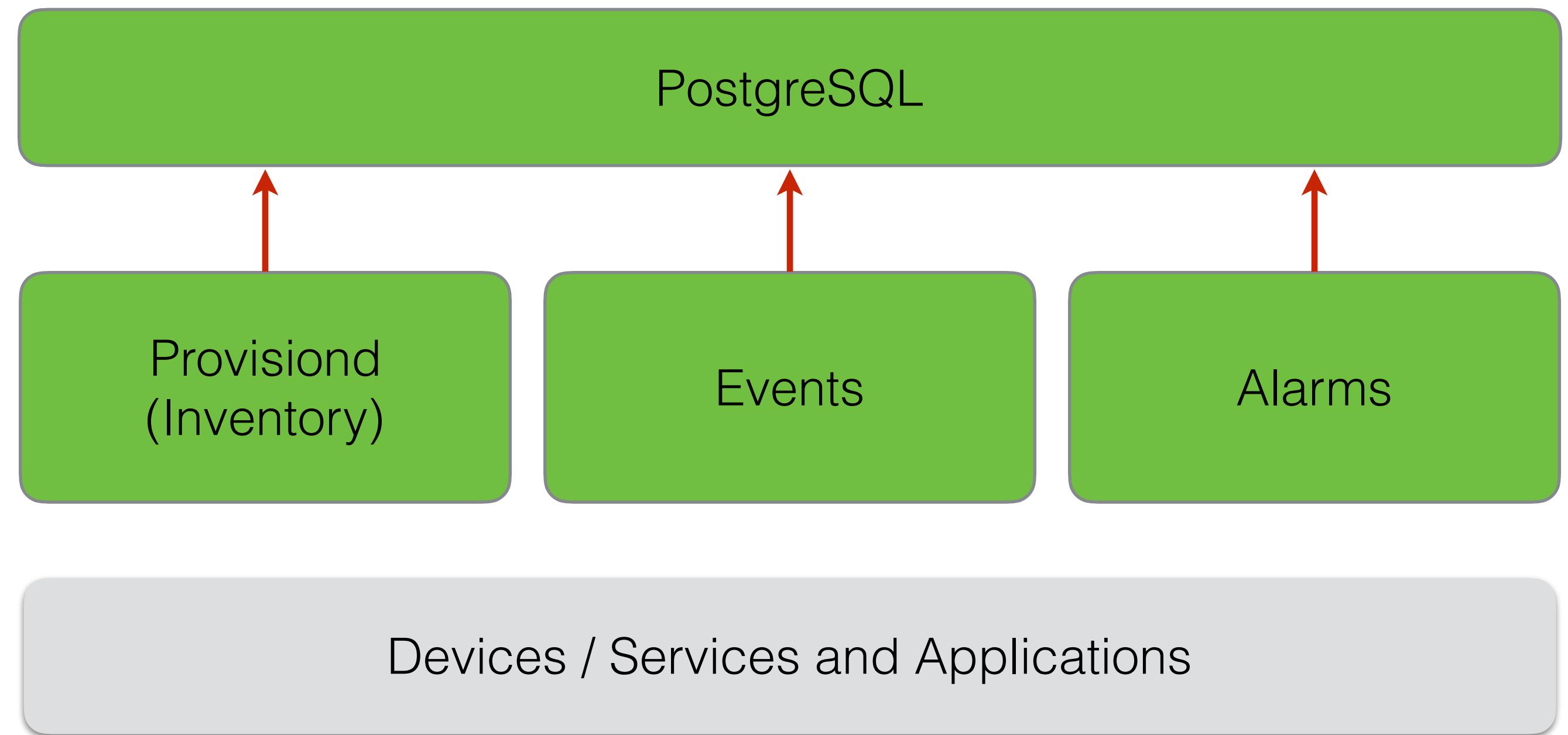
- Verteilte Scheduler in Minion für Pollerd and Collectors
- Verbesserung Event und Alarmanalyse mit ElasticSearch und Kibana
- Stabilisierung ReST API und Versionierung
- Eventd auf AMQP migrieren --> Skalierbarkeit und Ausfallsicherheit

Architektur









Skalierung Redundanz

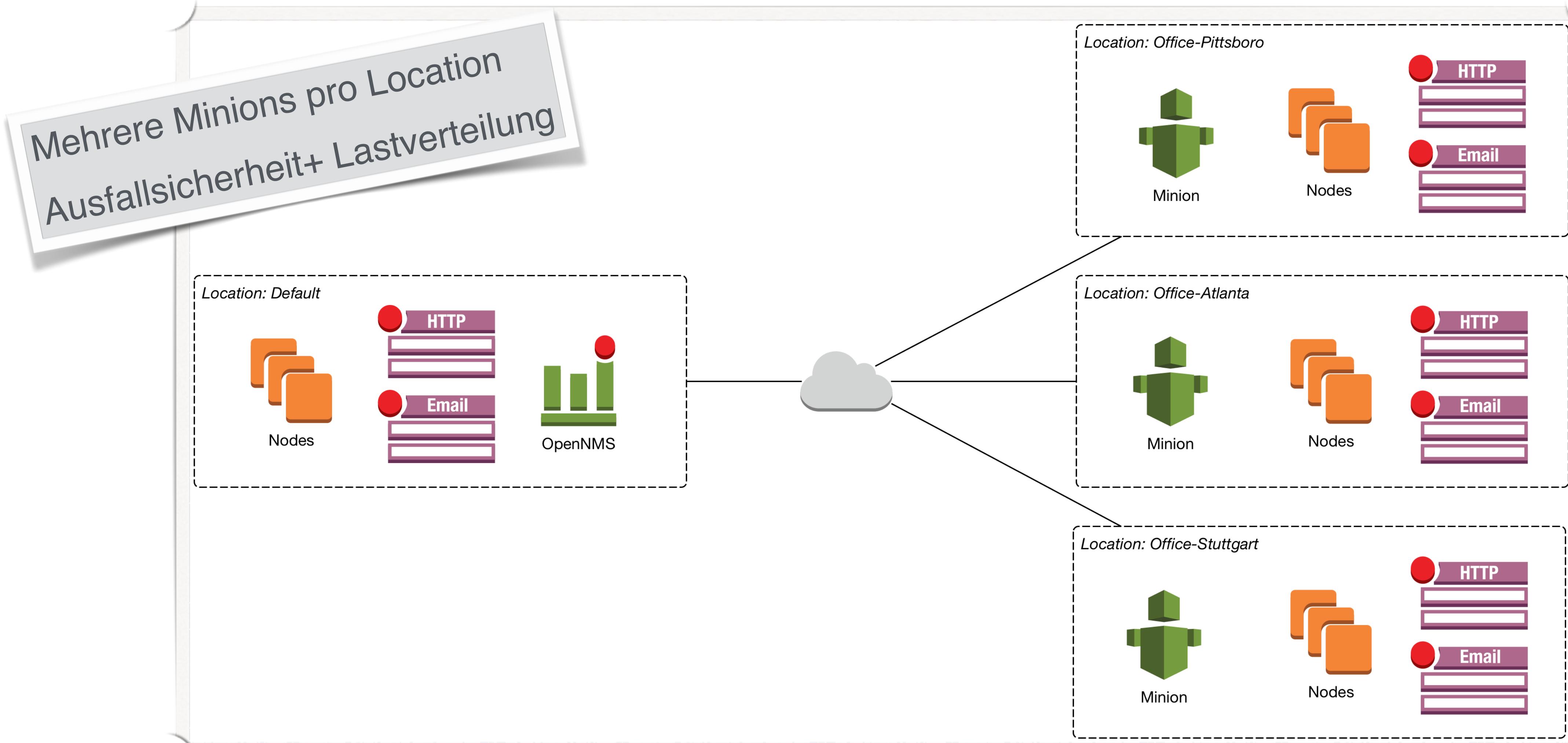
Datenbank

- Inventory
- Events
- Alarme
- Notifications
- PostgreSQL → ElasticSearch

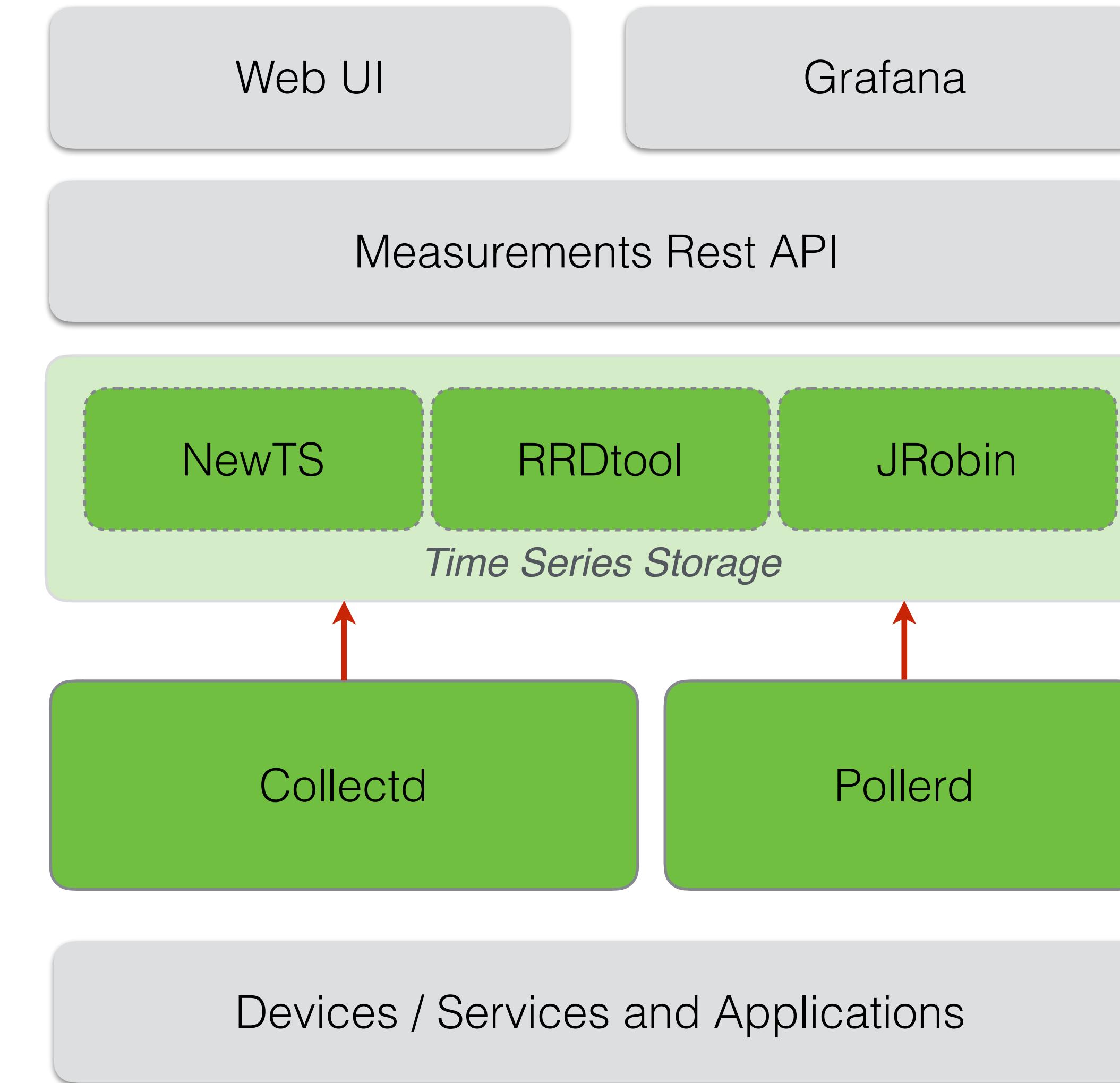
Time Series Storage

- JRobin und RRDtool liegen auf Filesystem
- NewTS → Cassandra Cluster

Minion bei mehreren Locations



Schwer zu skalieren



Provisioning

Network Discovery

The screenshot shows the 'Discovery | Admin | OpenNMS Web Console' interface. At the top, there are tabs for Search, Info, Status, Reports, Dashboards, Maps, and a user dropdown for 'admin'. The date 'Aug 14, 2017 15:18 CEST' is displayed. On the left, there's a sidebar with sections for 'Initial sleep time (seconds)', 'Restart sleep time (hours)', 'Timeout (milliseconds)', 'Retries', 'Foreign Source', and 'Location'. Under 'Advanced configuration', there's a 'Task chunk size' field set to 100. Below these are four green-sectioned panels: 'Specific Addresses' (No specifics found), 'Include URLs' (No include URLs found), 'Include Ranges' (No include ranges found), and 'Exclude Ranges' (No exclude ranges found). Each panel has an 'Add New' button. At the bottom, there's a 'Save and Restart Discovery' button and a copyright notice: 'OpenNMS Copyright © 2002-2017 The OpenNMS Group, Inc. OpenNMS® is a registered trademark of The OpenNMS Group, Inc.'

- Ping Sweep IPv4 / IPv6 Ranges
- Meist kleinere Umgebungen
- Kein Inventar oder Service Katalog vorhanden
- Service Discovery
- Include / Exclude Ranges

Provisioning

The screenshot shows the OpenNMS Admin interface with the URL `demo.opennms.eu/opennms/admin/ng-requisitions/index.jsp#/requisitions`. The page title is "Provisioning Requisitions | Admin | OpenNMS Web Co". The main content area displays a table titled "Requisitions (3)" with columns: Requisition Name, Last Update, Last Import, Nodes Defined, Nodes in Database, and Actions. The table contains three rows:

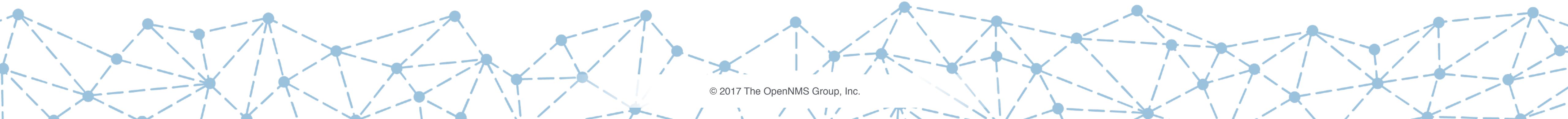
Requisition Name	Last Update	Last Import	Nodes Defined	Nodes in Database	Actions
Minions-Branch	10-08-17 01:56:19	10-08-17 01:56:19	1	1	
Server	11-08-17 09:18:13	11-08-17 09:18:13	11	11	
Websites	12-08-17 01:02:05	12-08-17 01:02:05	30	30	

Below the table, there is a search/filter bar with a magnifying glass icon and the placeholder "Search/Filter Requisition". Below the search bar are buttons for Refresh, Quick Add Node, Edit Default FS, Reset Default, and Add Requisition.

On the left side of the interface, the HORIZON openNMS logo is visible. At the bottom of the page, a copyright notice reads: "OpenNMS Copyright © 2002-2017 The OpenNMS Group, Inc. OpenNMS® is a registered trademark of The OpenNMS Group, Inc."

A callout box on the right side lists the following points:

- Requisitions
- Container für Nodes
- haben ähnliches Monitoring Profil



Provisioning

The screenshot shows the OpenNMS Web Console interface for provisioning. The top navigation bar includes links for Home, Admin, Provisioning Requisitions, Server, and dc.srv.01. The main content area is divided into several sections:

- Basic Information:** Fields for Foreign ID (dc.srv.01), Node Label (dc.srv.01), Minion Location, Building, and City.
- Path Outage:** Fields for Parent Foreign Source and Parent Foreign ID.
- IP Interfaces:** A table showing one interface: IP Address (172.29.0.32), Description (N/A), SNMP Primary (P), Services (SNMP, ICMP, StrafePing), and Actions (Edit, Delete).
- Assets:** A table showing asset details: Name (serialNumber) with Value (42) and modelNumber (Dedbox XC 2016 SSD). Actions for each row include Edit and Delete.
- Categories:** A table showing categories: type:server and threshold:bandwidth-out-high-100MiBs. Actions for each row include Edit and Delete.

- Node Definition
- IPv4 / IPv6 Interfaces
- Management Protokolle
- Monitore
- Kategorien
- Asset Information

Provisioning

The screenshot shows the OpenNMS Web Console interface for provisioning. It displays three main sections: IP Interfaces, Assets, and Categories.

- IP Interfaces:** Shows a single interface entry for IP Address 172.29.0.32 with Description N/A, SNMP Primary set to P, and Services including SNMP, ICMP, and StrafePing.
- Assets:** Lists various hardware and software assets with their values:
 - serialNumber: 42
 - modelNumber: Dedibox XC 2016 SSD
 - operatingSystem: Ubuntu 16.04 LTS
 - manufacturer: Online Labs
 - ram: 2 x 8 GB DDR3 1600 MHz
 - cpu: Intel(R) Atom(TM) CPU C2750@2.40GHz
 - zip: 75015
 - department: IT Operation
 - address1: Boulevard Lefebvre 58
 - city: Paris
 - building: OnlineNet Datacenter 1
- Categories:** Lists several categories assigned to the node:
 - type:server
 - threshold:bandwidth-out-high-100MiBs
 - organisation:opennms-eu
 - threshold:disk-high-80
 - threshold:cpu-high-95
 - category:infrastructure
 - threshold:bandwdth-in-high-100MiBs
 - threshold:memory-high-95
 - threshold:disk-high-95
 - environment:production

Node Definition

IPv4 / IPv6 Interfaces

Management Protokolle

Monitore

Kategorien

Asset Information

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Provisioning

The screenshot shows the OpenNMS Web Console interface for managing provisioning requisitions. The top navigation bar includes links for Home, Admin, Provisioning Requisitions, test, Foreign Source Definition, Search, Info, Status, Reports, and Dashboard. The date and time displayed are Aug 14, 2017 15:25 CEST.

The main content area displays a "Foreign Source Definition for Requisition test". It shows the last modified date as 14-08-17 03:32:16 and a scan interval of 1d. Below this, there are tabs for Detectors and Policies, with Policies being the active tab. A search/filter input field and an "Add Detector" button are also present.

A callout box on the right side lists the following items:

- Service Detectors
- Interval täglich
- Policies ...

The table below lists the available detectors:

Name	Class	Parameters	Actions
DNS	org.opennms.netmgt.provision.detector.datagram.DnsDetector	[No parameters]	
FTP	org.opennms.netmgt.provision.detector.simple.FtpDetector	[No parameters]	
HTTP	org.opennms.netmgt.provision.detector.simple.HttpDetector	[No parameters]	
HTTPS	org.opennms.netmgt.provision.detector.simple.HttpsDetector	[No parameters]	
ICMP	org.opennms.netmgt.provision.detector.icmp.IcmpDetector	[No parameters]	
IMAP	org.opennms.netmgt.provision.detector.simple.ImapDetector	[No parameters]	
LDAP	org.opennms.netmgt.provision.detector.simple.LdapDetector	[No parameters]	
NRPE	org.opennms.netmgt.provision.detector.simple.NrpeDetector	[No parameters]	
POP3	org.opennms.netmgt.provision.detector.simple.Pop3Detector	[No parameters]	
SMTP	org.opennms.netmgt.provision.detector.simple.SmtpDetector	[No parameters]	

At the bottom of the page, a footer note reads: © 2017 The OpenNMS Group, Inc.

Provisioning

The screenshot shows the OpenNMS Web Console interface for managing provisioning requisitions. The top navigation bar includes links for Home, Admin, Provisioning Requisitions, test, Foreign Source Definition, and various system status indicators. The main content area displays a 'Foreign Source Definition for Requisition test' page. It features sections for 'Last Modified' (14-08-17 03:32:16) and 'Scan Interval' (1d). Below these are tabs for 'Detectors' and 'Policies'. The 'Policies' tab is active, showing a table of current policies:

Name	Class	Parameters	Actions
Enable Data Collection	org.opennms.netmgt.provision.persist.policies.MatchingSnmpInterfacePolicy	action : ENABLE_COLLECTION matchBehavior : ALL_PARAMETERS ifOperStatus : 1	
Set Category	org.opennms.netmgt.provision.persist.policies.NodeCategorySettingPolicy	category : environment:prod matchBehavior : ALL_PARAMETERS label : ~*.prod.*	

At the bottom of the page, a copyright notice reads: OpenNMS Copyright © 2002-2017 The OpenNMS Group, Inc. OpenNMS® is a registered trademark of The OpenNMS Group, Inc.

A callout box on the right side lists three key components:

- Category
- Data Collection
- IP interface

ReST API

Provisioning

```
<model-import xmlns="http://xmlns.opennms.org/xsd/config/model-import">
    <node foreign-id="pris" node-label="pris">
        <interface ip-addr="172.29.0.8" snmp-primary="P">
            <monitored-service service-name="HTTP-8000"/>
            <monitored-service service-name="ICMP"/>
            <monitored-service service-name="StrafePing"/>
        </interface>
        <category name="type:server"/>
        <category name="threshold:bandwidth-out-high-100MiBs"/>
        <category name="organisation:opennms-eu"/>
        <category name="threshold:cpu-high-95"/>
        <category name="category:infrastructure"/>
        <category name="threshold:bandwdth-in-high-100MiBs"/>
        <category name="threshold:memory-high-95"/>
        <category name="threshold:disk-high-95"/>
        <category name="environment:production"/>
        <asset name="serialNumber" value="42"/>
        <asset name="modelNumber" value="Dedibox XC 2016 SSD"/>
        <asset name="operatingSystem" value="Ubuntu 16.04 LTS"/>
        <asset name="manufacturer" value="Online Labs"/>
        <asset name="ram" value="2 x 8 GB DDR3 1600 MHz"/>
        <asset name="cpu" value="Intel(R) Atom(TM) CPU C2750@2.40GHz"/>
        <asset name="zip" value="75015"/>
        <asset name="department" value="IT Operation"/>
        <asset name="address1" value="Boulevard Lefebvre 58"/>
        <asset name="city" value="Paris"/>
        <asset name="building" value="OnlineNet Datacenter 1"/>
    </node>
```

ReST API - Provisioning

```
curl -s -u ${OPENNMS_USER}:${OPENNMS_PASS} \
-X POST \
-H "Content-Type: application/xml" \
-H "Accept: application/xml" \
-d @demo-environment.xml \
http://${OPENNMS_HOST}:${OPENNMS_PORT}/opennms/rest/requisitions
```

- Rest API
- Detektoren und Policies
- Nodes mit Interfaces
- Assetinformationen
- Kategorien

JavaScript Library

The screenshot shows a GitHub repository page for 'OpenNMS / opennms-js'. The repository title is 'JavaScript interface to OpenNMS'. Key statistics displayed include 222 commits, 3 branches, 4 releases, 3 contributors, and an MIT license. The commit history lists recent changes by RangerRick, such as fixing API exports and updating documentation. The page also includes options to create new files, upload files, find files, and clone or download the repository.

OpenNMS / opennms-js

JavaScript interface to OpenNMS

222 commits 3 branches 4 releases 3 contributors MIT

RangerRick fix(api): add missing modules to API export

Latest commit 53fad98 4 days ago

dist build(webpack): remove dist files in develop 25 days ago

src fix(api): add missing modules to API export 4 days ago

test feat(dao): support dates in query parameters (JS-15) 5 days ago

typings build(cli): fix version display in "yarn cli" 7 days ago

.babelrc refactor(rest): clean up rest inheritance 2 months ago

.editorconfig chore(): initial scaffold and basic server and opennms object(s) 3 months ago

.gitignore feat(cli): make a cli bundle in dist/ 8 days ago

.npmignore build(yarn): add an NPM ignore file 25 days ago

CHANGELOG.md Update CHANGELOG.md 7 days ago

HOWTO.md docs(howto): update examples for TS and Node 24 days ago

LICENSE chore(): switch to yarn, update to webpack2 3 months ago

README.md docs(readme): add a note about the CLI 6 days ago

circle.yml ci(): set node version for circletci 3 months ago

ReST API - Alarms

- Developed with Helm in Grafana
- Versionierung mit OpenNMS
- NodeJS CLI tool

```
indigo@blinky ➤~ opennms alarms ✓ 10005 16:59:36
```

ID	Severity	Node	Count	Time	Log
282	MINOR	clonphy01	1	2017-08-12 07:47	System-Restart outage identified on interface 172...
281	MINOR	fdhsphy01	1	2017-08-12 07:47	System-Restart outage identified on interface 172...
280	MINOR	mirror	1	2017-08-12 07:43	System-Restart outage identified on interface 172...
273	MINOR	issues.opennms.org	1	2017-08-12 02:08	SSL-Cert-HTTPS-443 outage identified on interface...

ReST API - Measurements

```
indigo@blinky ➤ ~ ➤ curl -u rest:rest \
-H "Accept: application/json" \
-H "Content-Type: application/json" \
-d @report.json \
"https://demo.opennms.eu/opennms/rest/measurements" | jq
```

ReST API - Alarms

- Events
- Alarms
- Scheduled Outages
- Provisioning
- SNMP Konfiguration
- User / Groups /Roles
- Notifications
- Performance Measurements

Konfiguration

Konfiguration - Beispiel SNMP

Node: ofe

[View Events](#) [View Alarms](#) [View Outages](#) [Asset Info](#) [Hardware Info](#) [Availability](#) [Site Status](#) [SSH](#) [Resource Graphs](#) [Rescan](#) [Admin](#) [U](#)

SNMP Attributes	
Name	lvps91-250-116-222.dedicated.hosteurope.de
sysObjectID	.1.3.6.1.4.1.8072.3.2.10
Location	Host-Europe VPS
Contact	admin@opennms.eu
Description	Linux lvps91-250-116-222.dedicated.hosteurope.de 2.6.32-042stab123.9 #1 SMP Thu Jun 29 13:01:59 MSK 2017 x86_64

Konfiguration - Beispiel SNMP

Node: ofe		5	Server	ofe	Default
View Events View Alarms View Outages Asset Info Hardware Info Availability Site Status SSH Resource Graphs Rescan Admin U					
SNMP Attributes					
Name	lvps91-250-116-222.dedicated.hosteurope.de				
sysObjectID	.1.3.6.1.4.1.8072.3.2.10				
Location	Host-Europe VPS				
Contact	admin@opennms.eu				
Description	Linux lvps91-250-116-222.dedicated.hosteurope.de 2.6.32-042stab123.9 #1 SMP Thu Jun 29 13:01:59 MSK 2017 x86_64				

sysObjectID

.1.3.6.1.4.1.8072.3.2.10

Konfiguration - Beispiel SNMP

sysObjectID

.1.3.6.1.4.1.8072.3.2.10

```
<systemDef name="Enterprise">
  <sysoidMask>.1.3.6.1.4.1.</sysoidMask>
  <collect>
    <includeGroup>mib2-interfaces</includeGroup>
    <includeGroup>mib2-X-interfaces</includeGroup>
    <includeGroup>mib2-tcp</includeGroup>
    <includeGroup>mib2-powerethernet</includeGroup>
  </collect>
</systemDef>
```

```
<group name="mib2-X-interfaces" ifType="all">
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.1" instance="ifIndex" alias="ifName" type="string" />
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.15" instance="ifIndex" alias="ifHighSpeed" type="string" />
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.6" instance="ifIndex" alias="ifHCInOctets" type="Counter64" />
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.10" instance="ifIndex" alias="ifHCOutOctets" type="Counter64" />
</group>
```

Konfiguration - Beispiel SNMP

sysObjectID

.1.3.6.1.4.1.8072.3.2.10

```
<systemDef name="Net-SNMP">
    <sysoidMask>.1.3.6.1.4.1.8072.3.</sysoidMask>
    <collect>
        <includeGroup>net-snmp-disk</includeGroup>
        <includeGroup>net-snmp-disk-more</includeGroup>
        <includeGroup>net-snmp-disk-highlow</includeGroup>
        <includeGroup>ucd-loadavg</includeGroup>
        <includeGroup>ucd-memory</includeGroup>
        <uncd-sysstat></includeGroup>
        <includeGroup>ucd-sysstat-raw</includeGroup>
        <includeGroup>ucd-sysstat-raw-more</includeGroup>
        <includeGroup>lmsensors-temp</includeGroup>
        <includeGroup>lmsensors-fan</includeGroup>
        <includeGroup>lmsensors-volt</includeGroup>
    </collect>
    </systemDef>
    <s
        <group name="ucd-loadavg" ifType="ignore">
            <mibObj oid=".1.3.6.1.4.1.2021.10.1.5" instance="1" alias="loadavg1" type="integer" />
            <mibObj oid=".1.3.6.1.4.1.2021.10.1.5" instance="2" alias="loadavg5" type="integer" />
            <mibObj oid=".1.3.6.1.4.1.2021.10.1.5" instance="3" alias="loadavg15" type="integer" />
        </group>
```

Konfiguration - Beispiel SNMP

datacollection-group name="Net-SNMP"

```
<systemDef name="Enterprise">
  <sysoidMask>.1.3.6.1.4.1.</sysoidMask>
  <collect>
    <includeGroup>mib2-interfaces</includeGroup>
    <includeGroup>mib2-X-interfaces</includeGroup>
    <includeGroup>mib2-tcp</includeGroup>
    <includeGroup>mib2-powerethernet</includeGroup>
  </collect>
</systemDef>
```

```
<group name="mib2-X-interfaces" ifType="all">
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.1" instance="ifIndex" alias="ifName"
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.15" instance="ifIndex" alias="ifHighSpeed"
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.6" instance="ifIndex" alias="ifHCInOctets"
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.10" instance="ifIndex" alias="ifHCOutOctets"
</group>
```

Konfiguration - Beispiel SNMP

datacollection-group name="**Net-SNMP**"

```
<systemDef name="Enterprise">
  <sysoidMask>.1.3.6.1.4.1.</sysoidMask>
  <collect>
    <includeGroup>mib2-interfaces</includeGroup>
    <includeGroup>mib2-X-interfaces</includeGr
```

```
<group name="mib2-X-interfaces" ifType="all">
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.1" instance="ifIndex" alias="ifName">
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.15" instance="ifIndex" alias="ifHighSpeed">
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.6" instance="ifIndex" alias="ifHCInOctets">
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.12" instance="ifIndex" alias="ifHCOutOctets">
```

```
<snmp-collection name="default" snmpStorageFlag="select">
  <rrd step="30">
    <rra>RRA:AVERAGE:0.5:1:20160</rra>
    <rra>RRA:AVERAGE:0.5:12:14880</rra>
    <rra>RRA:AVERAGE:0.5:288:3660</rra>
    <rra>RRA:MAX:0.5:288:3660</rra>
    <rra>RRA:MIN:0.5:288:3660</rra>
  </rrd>

  <include-collection dataCollectionGroup="MIB2"/>
  <include-collection dataCollectionGroup="Net-SNMP"/>
  <include-collection dataCollectionGroup="PostgreSQL-JDBC"/>
</snmp-collection>
```

Konfiguration - Beispiel SNMP

datacollection-group name="Net-SNMP"

```
<systemDef name="Enterprise">
  <sysoidMask>.1.3.6.1.4.1.</sysoidMask>
  <collect>
    <includeGroup>mib2-interfaces</includeGroup>
    <includeGroup>mib2-X-interfaces</includeGr
    <includeGroup>mib2-tcp</includeGroup>
    <includeGroup>mib2-powerethernet</includeG
  </collect>
</systemDef>
```

```
<group name="mib2-X-interfaces" ifType="all">
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.1" instance="ifIndex" alias="ifName"
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.15" instance="ifIndex" alias="ifHighSpeed"
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.6" instance="ifIndex" alias="ifHCInOctets"
  <mibObj oid=".1.3.6.1.2.1.31.1.1.1.12" instance="ifIndex" alias="ifHCOutOctets"
<snmp-collection name="default" snmpStorageFlag="select">
  <rrd step="30">
    <rra>RRA:AVERAGE:0.5:1:20160</rra>
    <rra>RRA:AVERAGE:0.5:12:14880</rra>
    <rra>RRA:AVERAGE:0.5:288:3660</rra>
    <rra>RRA:MAX:0.5:288:3660</rra>
    <rra>RRA:MIN:0.5:288:3660</rra>
  </rrd>

  <include-collection dataCollectionGroup="MIB2"/>
  <include-collection dataCollectionGroup="Net-SNMP"/>
  <include-collection dataCollectionGroup="PostgreSQL-JDBC"/>
</snmp-collection>
```

Konfiguration - Beispiel SNMP

```
<snmp-collection name="default" snmpStorageFlag="select">
    <rrd step="30">
        <rra>RRA:AVERAGE:0.5:1:20160</rra>
        <rra>RRA:AVERAGE:0.5:12:14880</rra>
        <rra>RRA:AVERAGE:0.5:288:3660</rra>
        <rra>RRA:MAX:0.5:288:3660</rra>
        <rra>RRA:MIN:0.5:288:3660</rra>
    </rrd>

    <include-collection dataCollectionGroup="MIB2"/>
    <include-collection dataCollectionGroup="Net-SNMP"/>
    <include-collection dataCollectionGroup="PostgreSQL-JDBC"/>
</snmp-collection>
```

Konfiguration - Beispiel SNMP

```
<!DOCTYPE collectd>
<collectd-configuration
    threads="50">
<package name="default-datacollection-30">
    <filter>IPADDR != '0.0.0.0'</filter>
    <include-range begin="0.0.0.1" end="255.255.255.254"/>
    <include-range begin="::1" end="ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff"/>

    <service name="SNMP" interval="30000" user-defined="false" status="on">
        <parameter key="collection" value="default"/> (highlighted)
        <parameter key="thresholding-enabled" value="true"/>
    </service>

    <collector service="SNMP" class-name="org.opennms.netmgt.collectd.SnmpCollector"/> (highlighted)
        <rta>RRA:MAX:0.5:288:3660</rta>
        <rta>RRA:MIN:0.5:288:3660</rta>
    </rrd>

    <snmp-collection>
        <snmpStorageFlag="select">
            160</rra>
            4880</rra>
            3660</rra>
        <rta>RRA:MAX:0.5:288:3660</rta>
        <rta>RRA:MIN:0.5:288:3660</rta>
    </snmp-collection>
</package>
</collectd-configuration>
```

Konfiguration - Beispiel SNMP

```
<!castor class-name= "org.opennms.netmgt.collectd.collectdConfiguration">
<collectd-configuration
    threads="50">
<package name="default-datacollection-30">
    <filter>IPADDR != '0.0.0.0'</filter>
    <include-range begin="0.0.0.1" end="255.255.255.254"/>
    <include-range begin="::1" end="ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff"/>

    <service name="SNMP" interval="30000" user-defined="false" status="on">
        <parameter key="collection" value="default"/> Available Collectors
        <parameter key="thresholding-enabled" value="true"/>
    </service>

    <collector service="SNMP" class-name="org.opennms.netmgt.collectd.SnmpCollector"/>
        <rampUp>100</rampUp>
        <rra>RRA:MAX:0.5:288:3660</rra>
        <rra>RRA:MIN:0.5:288:3660</rra>
    </rrd>

    <include-collection dataCollectionGroup="MIB2"/>
    <include-collection dataCollectionGroup="Net-SNMP"/>
    <include-collection dataCollectionGroup="PostgreSQL-JDBC"/>
    <parameter key="snmpStorageFlag" value="select"/>
    <rra>160</rra>
    <rra>4880</rra>
    <rra>3660</rra>

```

Available Collectors

Konfiguration - Service Test

Konfiguration - Service Test



Konfiguration - Service Test

```
<service name="Process-Monitoring" interval="30000" user-defined="true" status="on">
    <parameter key="retry" value="2"/>
    <parameter key="timeout" value="2000"/>
</service>
```

```
<monitor service="Process-Monitoring" class-name="org.opennms.netmgt.poller.monitors.PrTableMonitor"/>
```

Konfiguration - Service Test

```
<service name="Process-Monitoring" interval="30000" user-defined="true" status="on">
    <parameter key="retry" value="2"/>
    <parameter key="timeout" value="2000"/>
</service>
```

```
<monitor service="Process-Monitoring" class-name="org.opennms.netmgt.poller.monitors.PrTableMonitor"/>
```

Available Service Monitors

Alarm Korrelation

Alarm Generation

```
<event>
  <uei>uei.opennms.org/nodes/nodeDown</uei>
  <event-label>OpenNMS-defined node event: nodeDown</event-label>
  <descr>
    ... some description ...
  </descr>
  <logmsg dest="logdisplay">
    Node %parm[nodelabel]% is down.
  </logmsg>
  <severity>Major</severity>
  <alarm-data reduction-key="%uei%:%dpname%:%nodeid%" alarm-type="1" auto-clean="false"/>
</event>
<event>
  <uei>uei.opennms.org/nodes/nodeUp</uei>
  <event-label>OpenNMS-defined node event: nodeUp</event-label>
  <descr>
    ... some description ...
  </descr>
  <logmsg dest="logdisplay">
    Node %parm[nodelabel]% is up.
  </logmsg>
  <severity>Normal</severity>
  <alarm-data reduction-key="%uei%:%dpname%:%nodeid%" alarm-type="2"
    clear-key="uei.opennms.org/nodes/nodeDown:%dpname%:%nodeid%" auto-clean="false"/>
</event>
```

Alarm Generation

```
<event>
  <uei>uei.opennms.org/nodes/nodeDown</uei>
  <event-label>OpenNMS-defined node event: nodeDown</event-label>
  <descr>
    ... some description ...
  </descr>
  <logmsg dest="logndisplay">
    Node %parm[nodelabel]% is down.
  </logmsg>
  <severity>Major</severity>
  <alarm-data reduction-key="%uei%:%dpname%:%nodeid%" alarm-type="1" auto-clean="false"/>
</event>
<event>
  <uei>uei.opennms.org/nodes/nodeUp</uei>
  <event-label>OpenNMS-defined node event: nodeUp</event-label>
  <descr>
    ... some description ...
  </descr>
  <logmsg dest="logndisplay">
    Node %parm[nodelabel]% is up.
  </logmsg>
  <severity>Normal</severity>
  <alarm-data reduction key="%uei%:%dpname%:%nodeid%" alarm-type="2"
    clear-key="uei.opennms.org/nodes/nodeDown:%dpname%:%nodeid%" auto-clean="false"/>
</event>
```

Alarm Generation

```
<event>
  <uei>uei.opennms.org/nodes/nodeDown</uei>
  <event-label>OpenNMS-defined node event: nodeDown</event-label>
  <descr>
    ... some description ...
  </descr>
  <logmsg dest="logndisplay">
    Node %parm[nodelabel]% is down.
  </logmsg>
  <severity>Major</severity>
  <alarm-data reduction-key="%uei%:%dpname%:%nodeid%" alarm-type="1" auto-clean="false"/>
</event>
<event>
  <uei>uei.opennms.org/nodes/nodeUp</uei>
  <event-label>OpenNMS-defined node event: nodeUp</event-label>
  <descr>
    ... some description ...
  </descr>
  <logmsg dest="logndisplay">
    Node %parm[nodelabel]% is up.
  </logmsg>
  <severity>Normal</severity>
  <alarm-data reduction-key="%uei%:%dpname%:%nodeid%" alarm-type="2"
    clear-key="uei.opennms.org/nodes/nodeDown:%dpname%:%nodeid%" auto-clean="false"/>
</event>
```

Alarm De-Duplikation

```
<event>
  <uei>uei.opennms.org/nodes/nodeDown</uei>
  <event-label>OpenNMS-defined node event: nodeDown</event-label>
  <descr>
    ... some description ...
  </descr>
  <logmsg dest="logndisplay">
    Node %parm[nodelabel]% is down.
  </logmsg>
  <severity>Major</severity>
  <alarm-data reduction-key="%uei%:%dpname%:%nodeid%" alarm-type="1" auto-clean="false"/>
</event>
<event>
  <uei>uei.opennms.org/nodes/nodeUp</uei>
  <event-label>OpenNMS-defined node event: nodeUp</event-label>
  <descr>
    ... some description ...
  </descr>
  <logmsg dest="logndisplay">
    Node %parm[nodelabel]% is up.
  </logmsg>
  <severity>Normal</severity>
  <alarm-data reduction-key="%uei%:%dpname%:%nodeid%" alarm-type="2"
    clear-key="uei.opennms.org/nodes/nodeDown:%dpname%:%nodeid%" auto-clean="false"/>
</event>
```

Alarm De-Duplikation

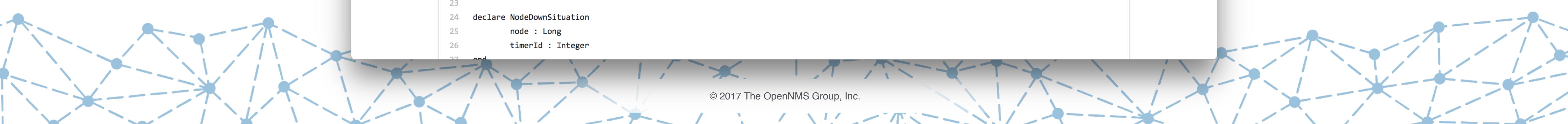
Screenshot of the OpenNMS Web Console interface showing alarm de-duplication results.

The interface includes the following sections:

- Nodes with Pending Problems:**
 - demo.opennms.eu has 1 alarm (2 days)
 - yum.opennms.eu has 1 alarm (2 days)
 - debian.opennms.eu has 1 alarm (2 days)
 - td.opennms.eu has 1 alarm (2 days)
 - bingo.opennms.eu has 1 alarm (2 days)
 - mirror.opennms.eu has 1 alarm (2 days)
 - ocacheck.opennms.eu has 1 alarm (2 days)
 - ofe has 1 alarm (2 days)
- Nodes with Outages:**
 - demo.opennms.eu (2 days)
 - yum.opennms.eu (2 days)
 - debian.opennms.eu (2 days)
 - td.opennms.eu (2 days)
 - bingo.opennms.eu (2 days)
 - mirror.opennms.eu (2 days)
 - ocacheck.opennms.eu (2 days)
- Business Services with Pending Problems:**
 - Demo System EU
- Applications with Pending Problems:**

There are no pending problems.
- Status Overview:** Three donut charts showing the distribution of Business Services, Alarms, and Outages across Normal, Warning, Major, and Critical levels.
 - Business Services:** 1 Critical, 6 Normal
 - Alarms:** 7 Major, 34 Normal
 - Outages:** 7 Major, 35 Normal
- Trend:** Real-time monitoring of various metrics.
 - Nodes with Outages:** 7 Nodes with Outage(s)
 - Severity Distribution:** Go to Alarms Page
 - Alarms Occurrence:** 0 New Alarm(s)
 - Alarms Unacknowledged:** 9 Unacknowledged Alarm(s)
 - Outages Occurrence:** (Graph showing current outages)
 - Outages Current:** (Graph showing current outages)
- Notifications:**
 - You have no outstanding notices
 - There are no outstanding notices
 - On-Call Schedule
- Resource Graphs:** Search bar for node labels.
- KSC Reports:** Search bar for KSC report names.
- Quick Search:** Fields for Node ID, Node label like, TCP/IP Address like, and Providing service (HTTP).

Complex Alarm Correlation - Drools



A screenshot of a GitHub repository page for `opennms-forge / opennms-drools-sample`. The page shows the file `opennms-drools-sample/src/test/opennms-home/etc/NodeDownRules.drl`. The commit `def4c1a` from `jeffgdotorg` on Dec 21, 2011, removes erroneous trailing dots in chained method invocations. The code listing shows a Drools rule for handling node down events.

```
1 package org.opennms.netmgt.correlation.drools;
2
3 import java.util.Date;
4
5 import org.opennms.core.utils.InetAddressUtils;
6 import org.opennms.netmgt.correlation.drools.DroolsCorrelationEngine;
7 import org.opennms.netmgt.xml.event.Event;
8 import org.opennms.netmgt.model.events.EventBuilder;
9 import org.opennms.netmgt.EventConstants;
10 import org.opennms.netmgt.capsd.EventUtils;
11
12 global org.opennms.netmgt.correlation.drools.DroolsCorrelationEngine engine;
13 global org.opennms.netmgt.correlation.drools.NodeService nodeService;
14 global java.lang.Integer NODE_DOWN_HOLDDOWN_TIME;
15
16 /*
17 * 11) (Action triggering) If Node down (any MFC)
18 * Then wait 30 seconds,
19 * If Trap is cancelled then Disregard
20 * Else generate 1 single critical alarm to be forwarded via SNMP to VizGems (IP address) and email to nmsadmin@att.com
21 */
22
23 declare NodeDownSituation
24     node : Long
25     timerId : Integer
26 end
```