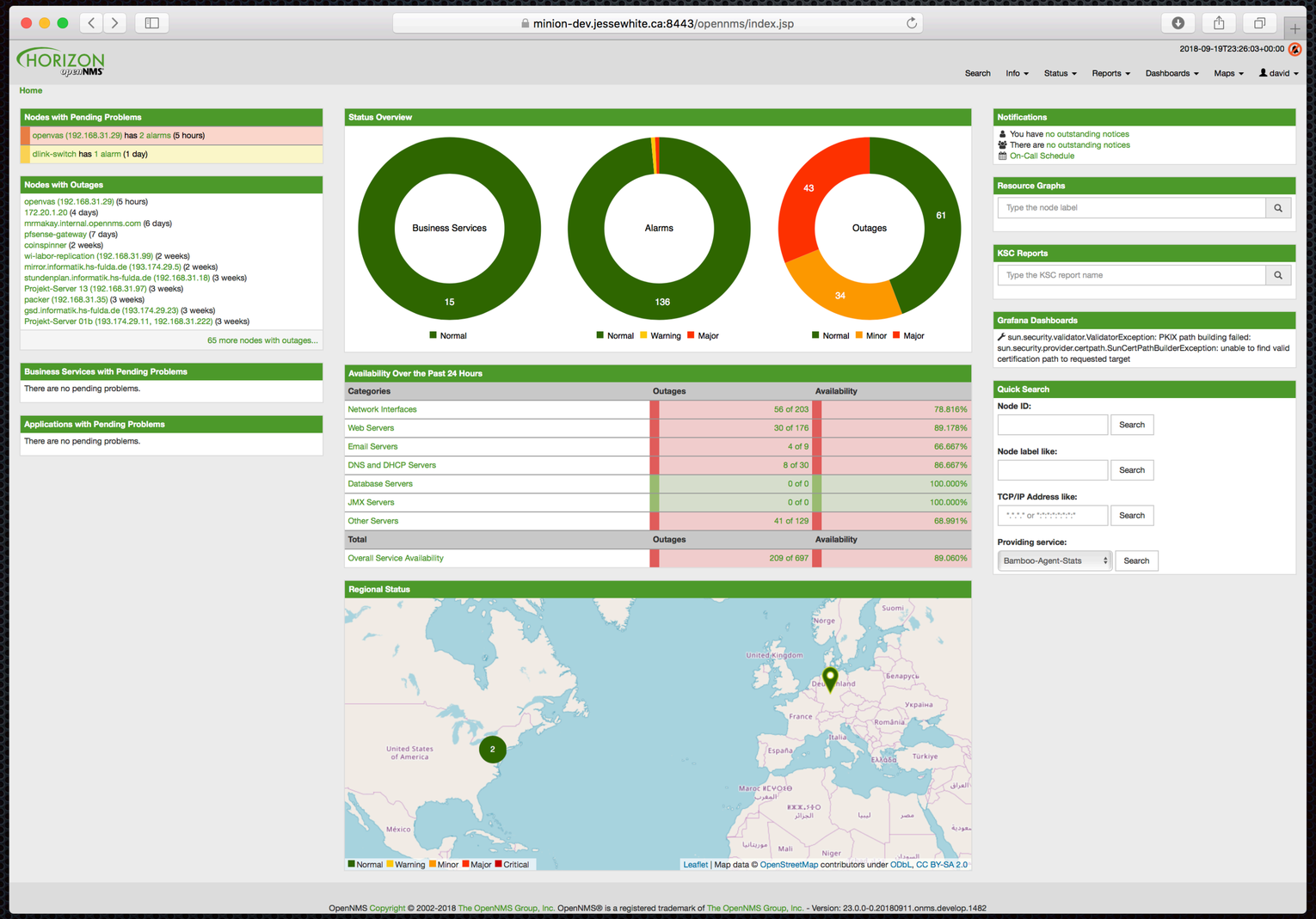
OUCE 2018

OpenNMS NOW & THE FUTURE

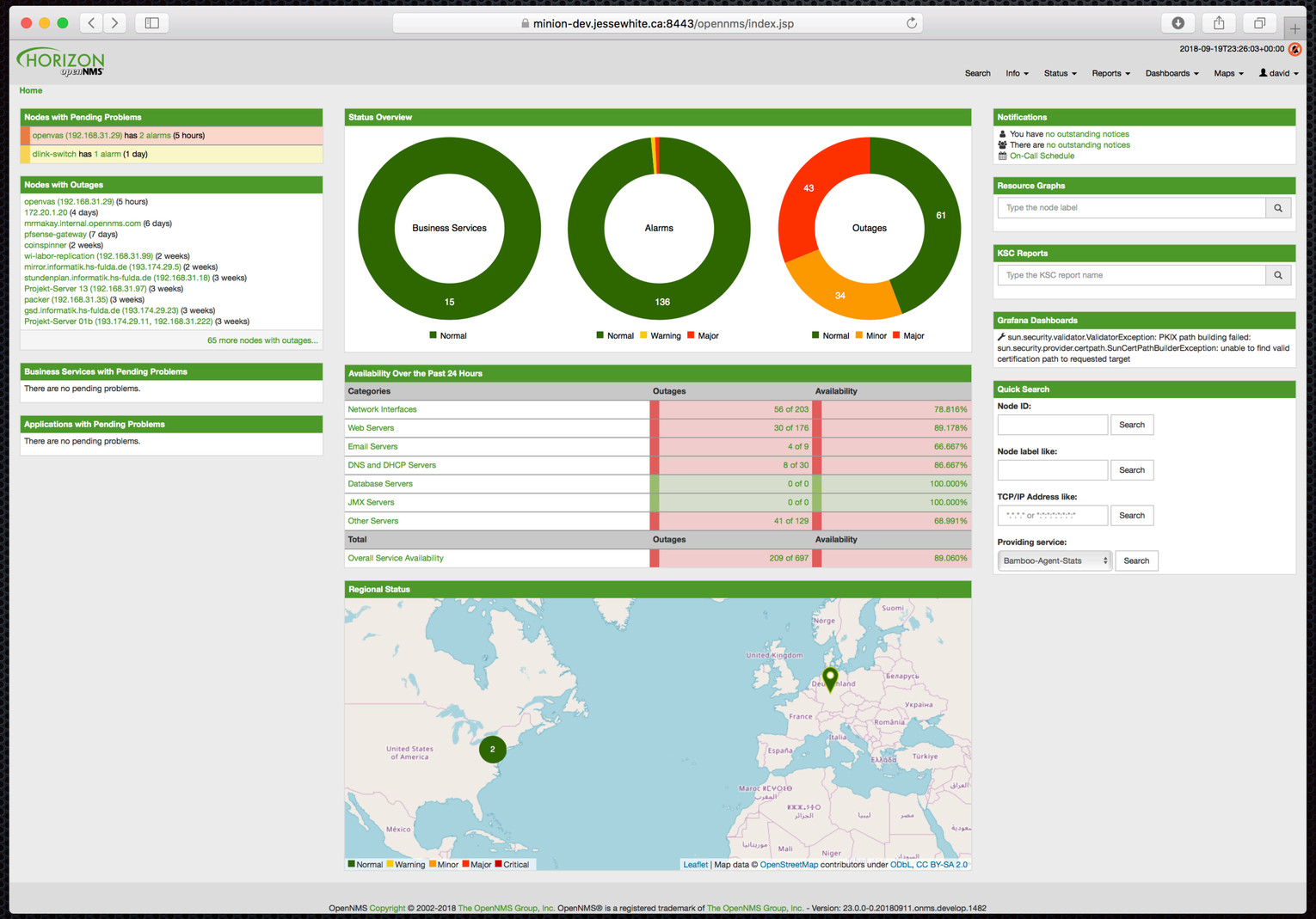
DAVID HUSTACE
PRESIDENT
THE OPENNMS GROUP, INC.

openNMS®

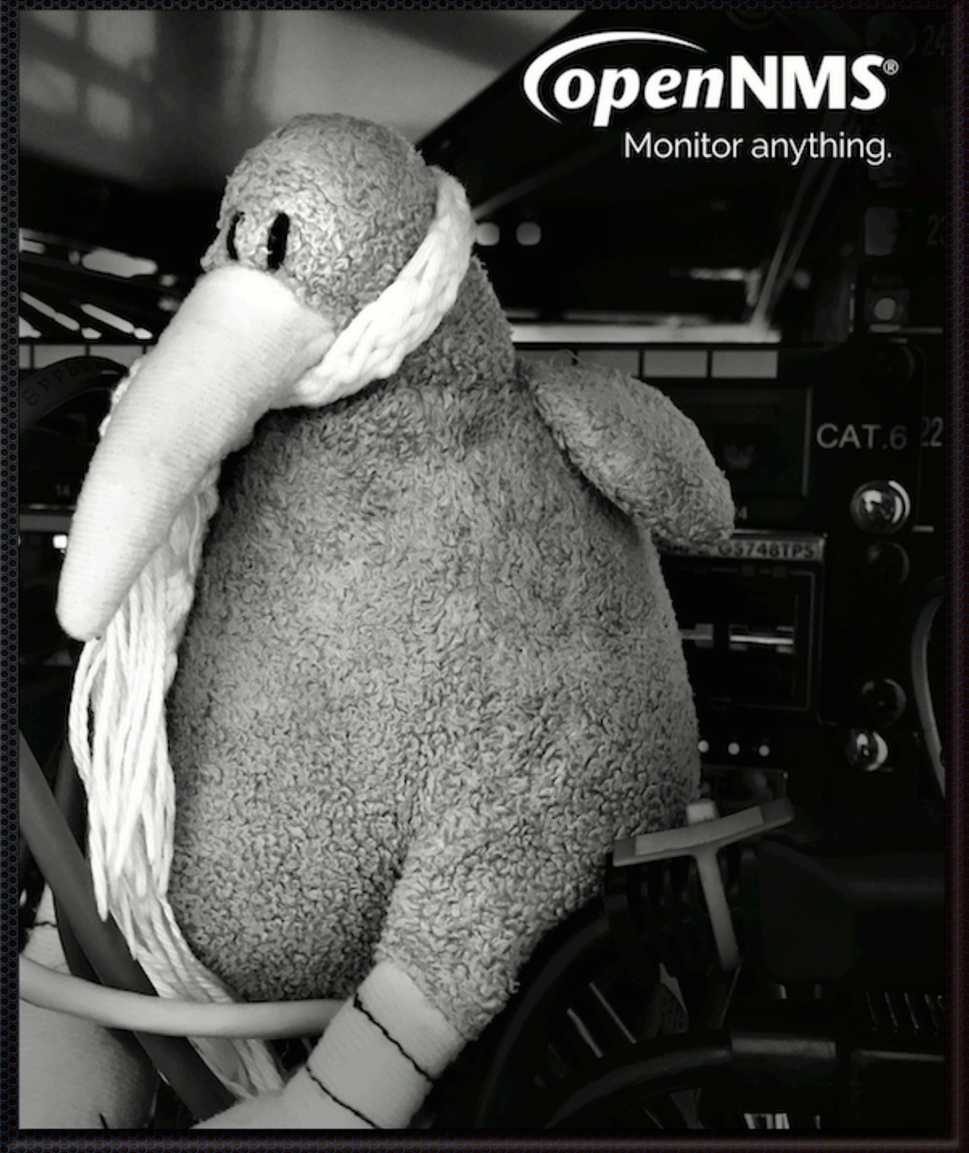
OpenNMS Today



OpenNMS Today

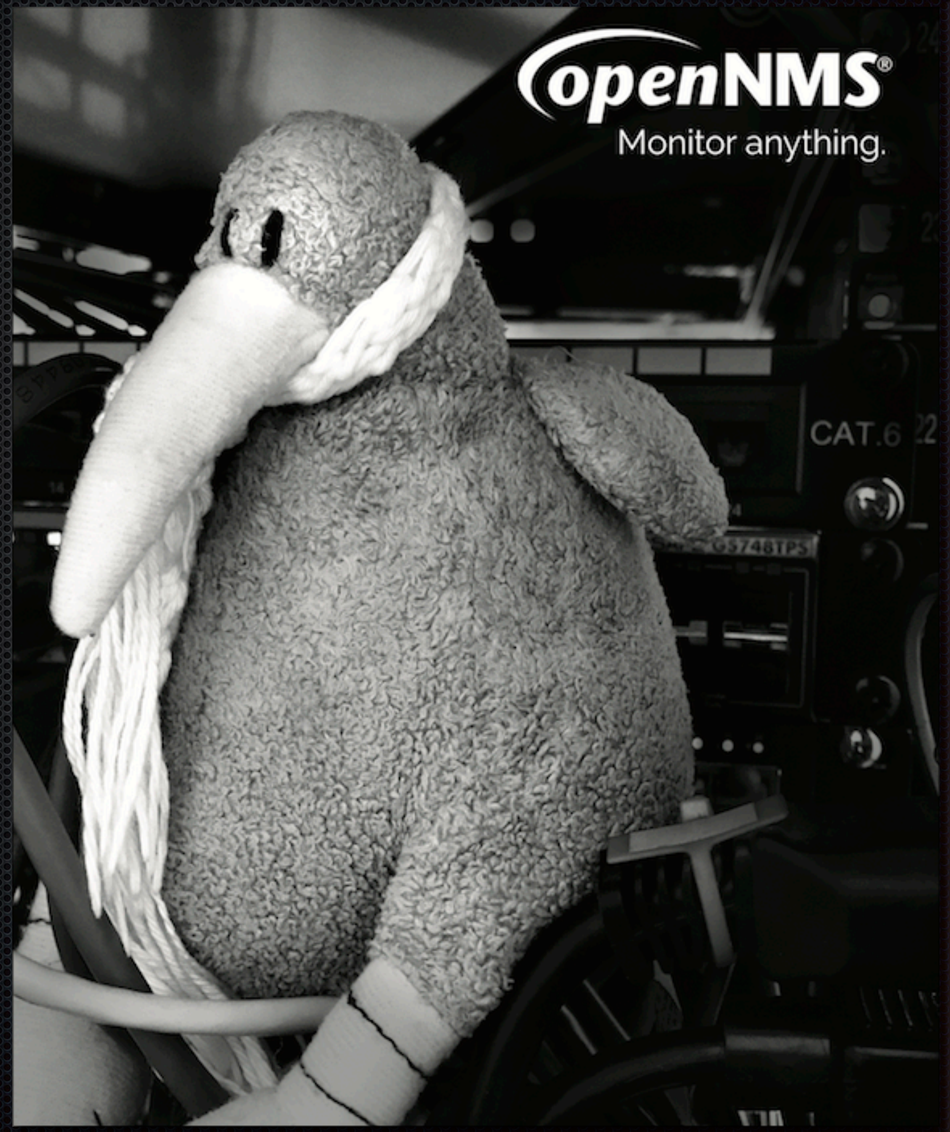


OpenNMS Distributions



OpenNMS Distributions

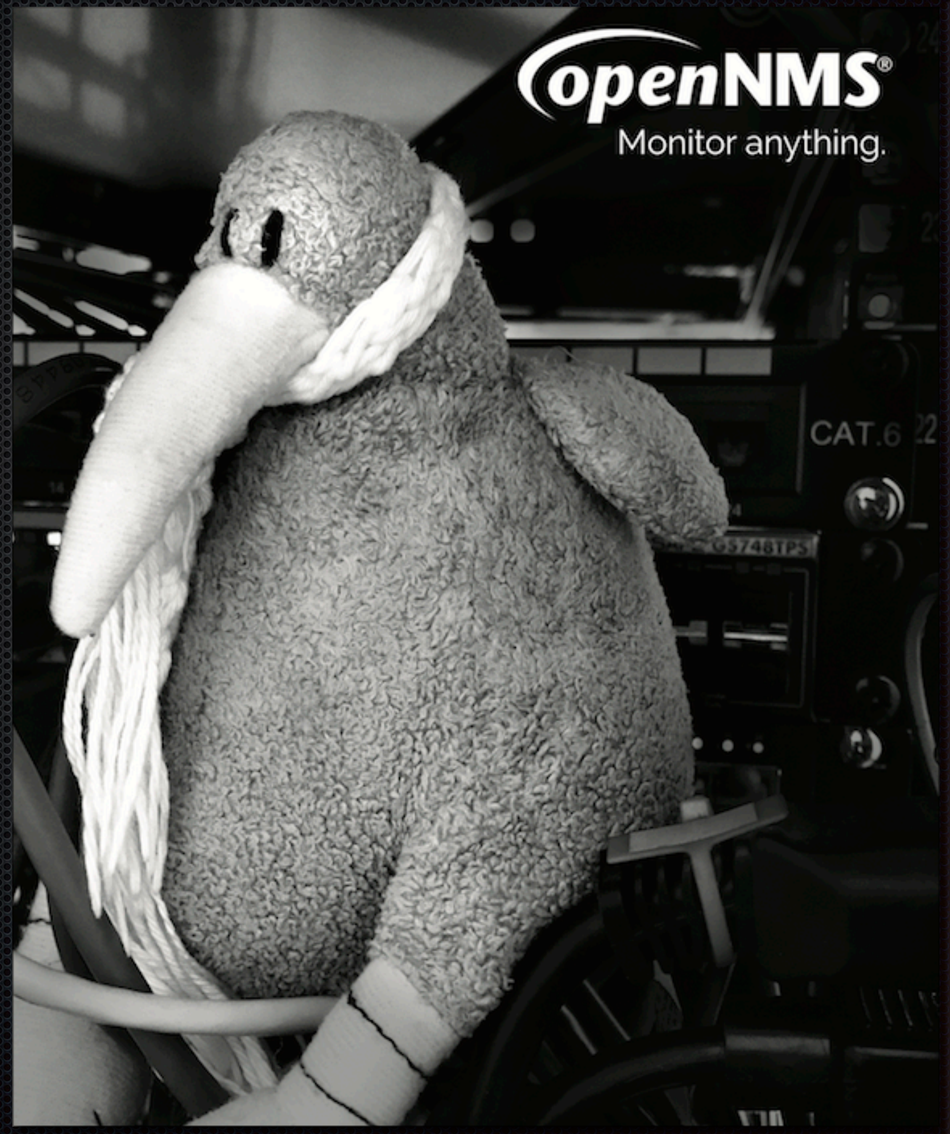
Horizon



OpenNMS Distributions

Horizon

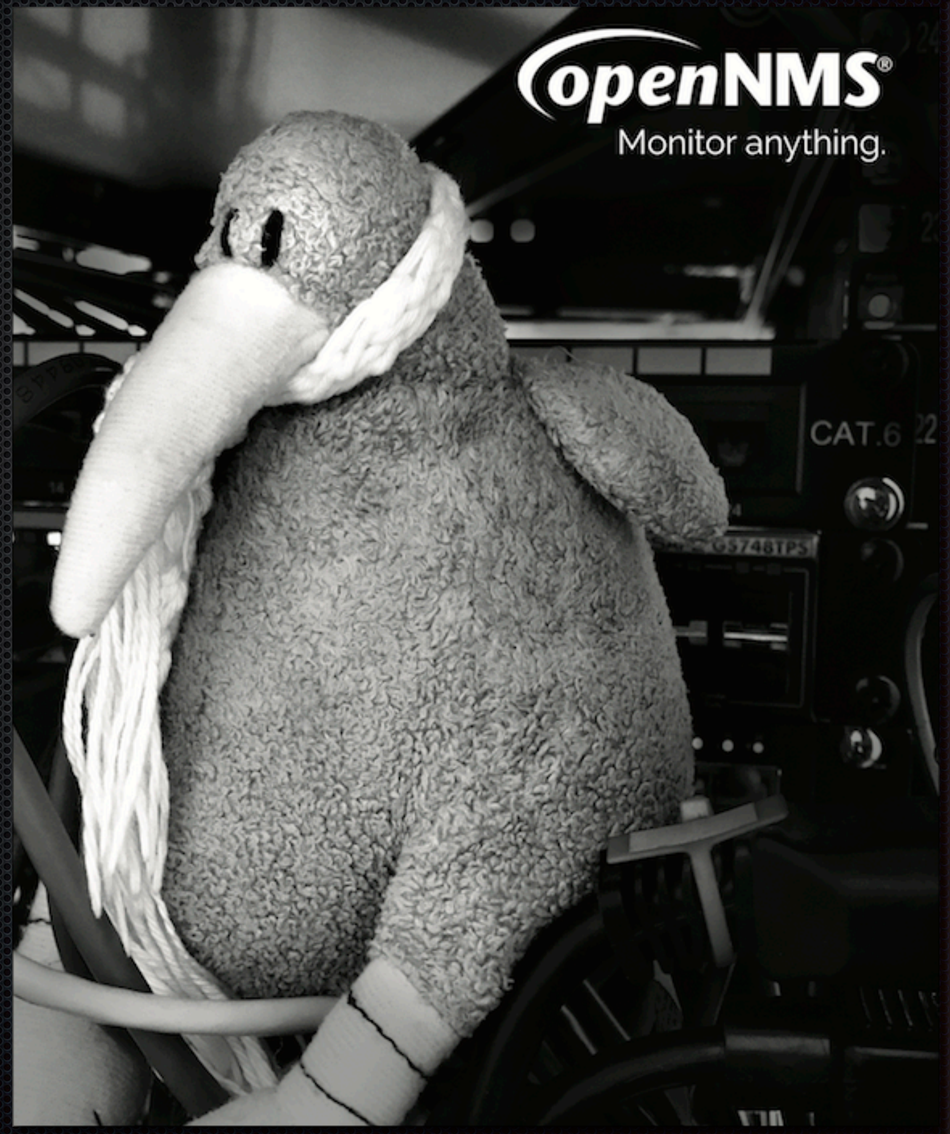
Meridian



OpenNMS Distributions

Horizon

Meridian



Horizon

Horizon

Version 23.0.0

Horizon

Version 23.0.0

Agile

Horizon

Version 23.0.0

Agile

Quarterly Release

Horizon

Version 23.0.0

Features + Schedule

Agile

Quarterly Release

Horizon

Version 23.0.0

Features + Schedule

Agile

Ultra Support

Quarterly Release

Horizon

Version 23.0.0

Features + Schedule

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Ultra Support

Quarterly Release

Sponsored Features

Horizon

Version 23.0.0

Features + Schedule

Agile

Ultra Support

Quarterly Release

Sponsored Features

Meridian

Meridian

Version 2018.0.1

Meridian

Version 2018.0.1

Agile

Meridian

Version 2018.0.1

Agile

Annual Release

Meridian

Version 2018.0.1

Features + Stability

Agile

Annual Release

Meridian

Version 2018.0.1

Features + Stability

Agile

Prime Support

Annual Release

Meridian

Version 2018.0.1

Features + Stability

Agile

Prime Support

Annual Release

OpenNMS Projects

Newts

OpenNMS Projects

Newts

Compass

OpenNMS Projects

Newts

Compass

Minion

OpenNMS Projects

Newts

Compass

Minion

Helm

OpenNMS Projects

Newts

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Drift

OpenNMS Projects

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Sentinel*

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*Future

OpenNMS Projects

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Sentinel*

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OpenNMS Projects

Newts

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Sentinel*

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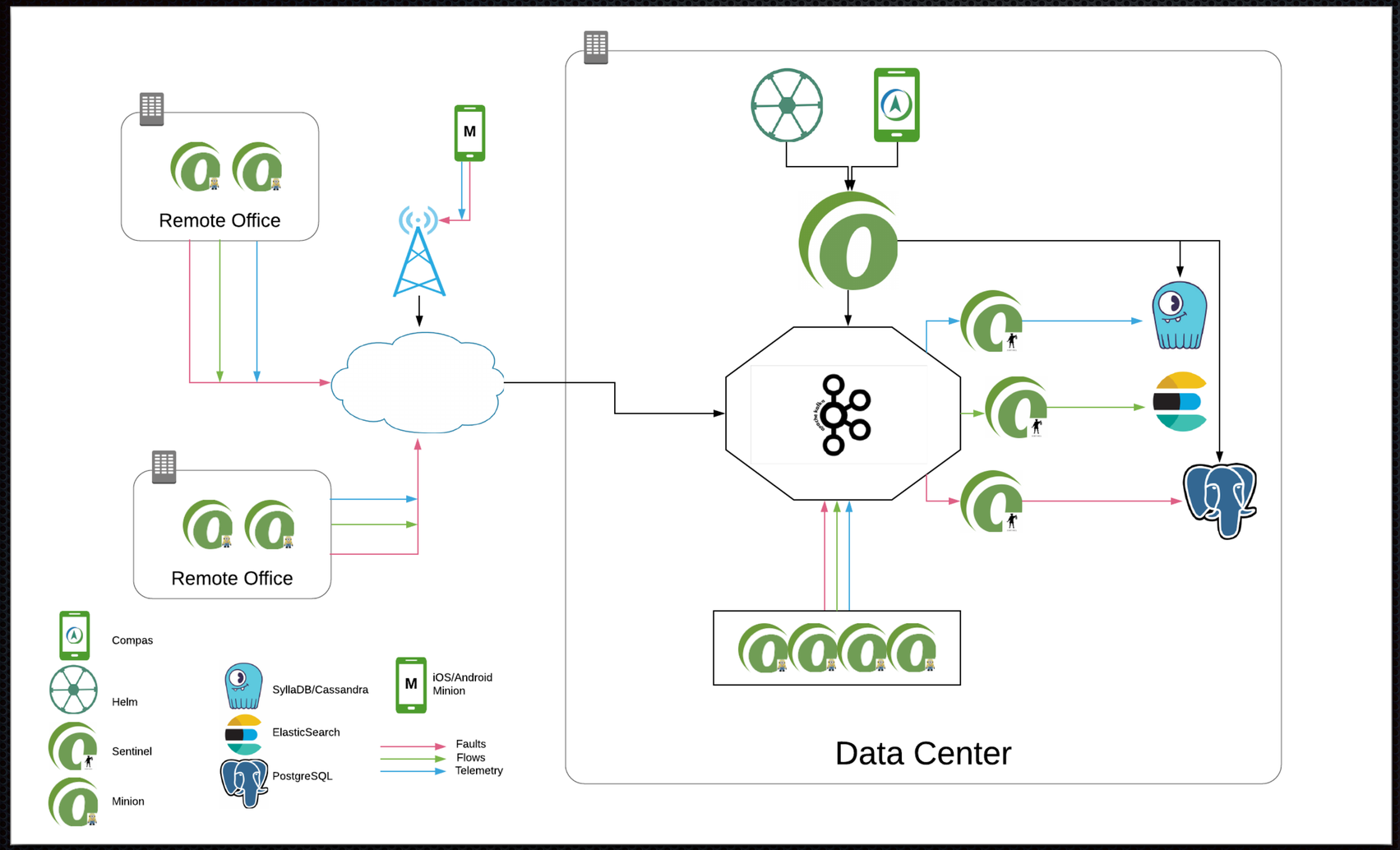
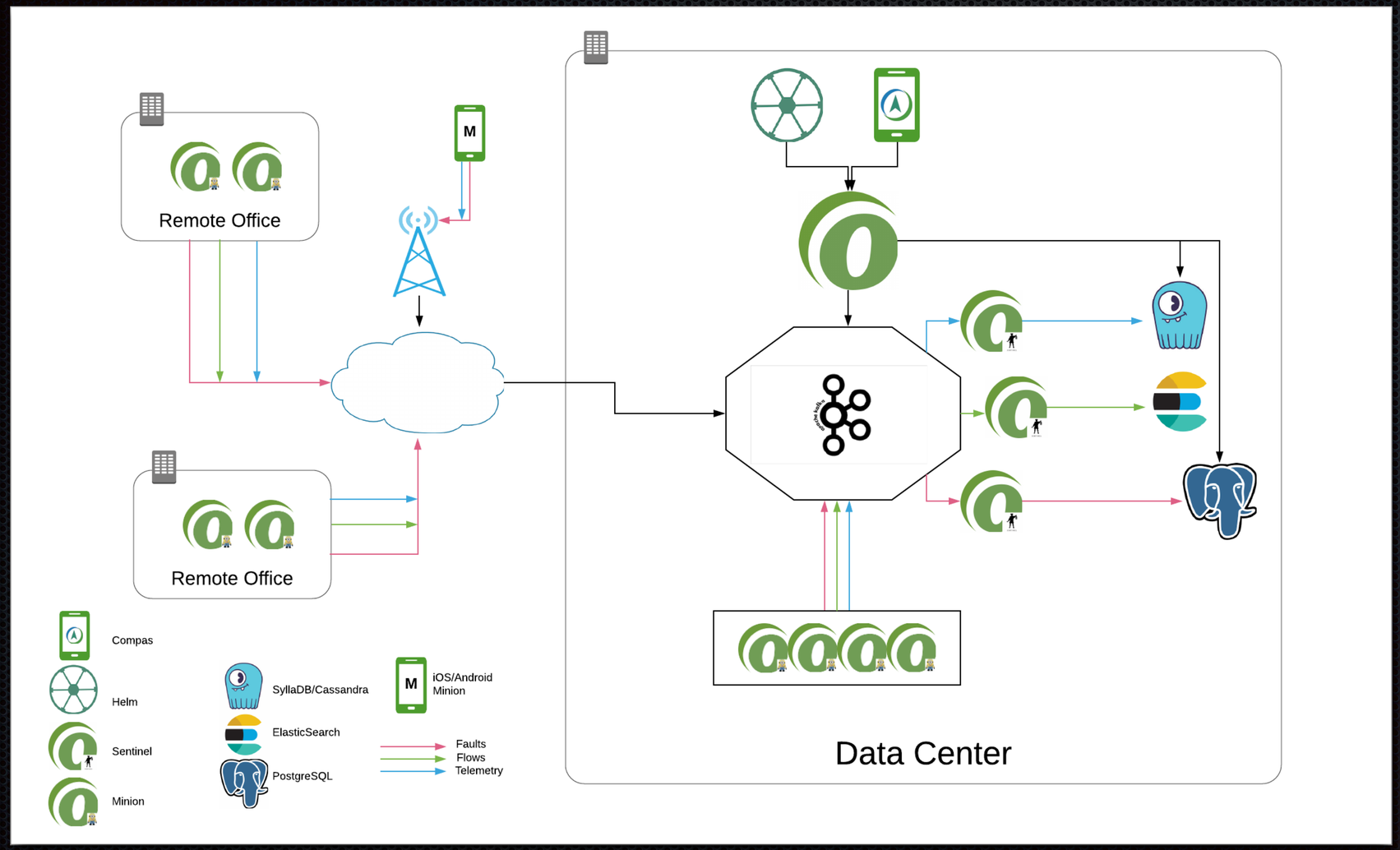
*Future

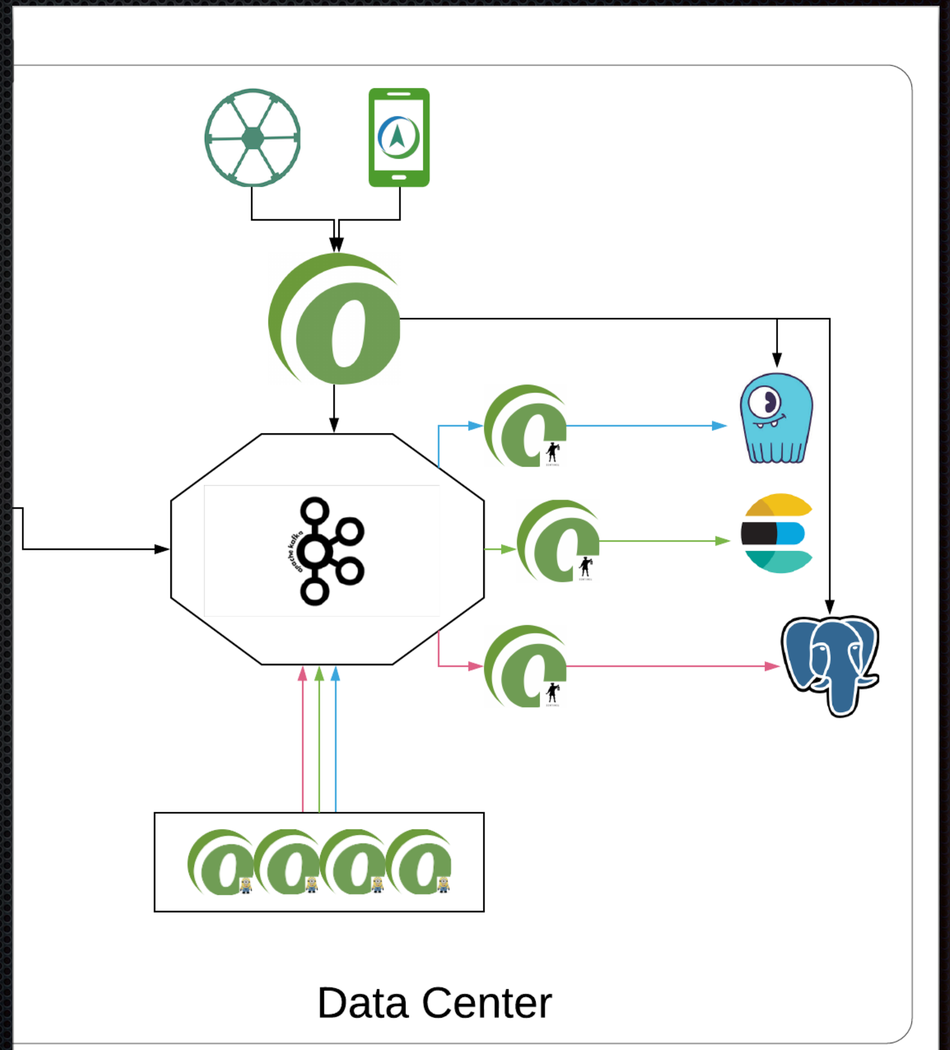
OpenNMS Projects



OpenNMS Projects

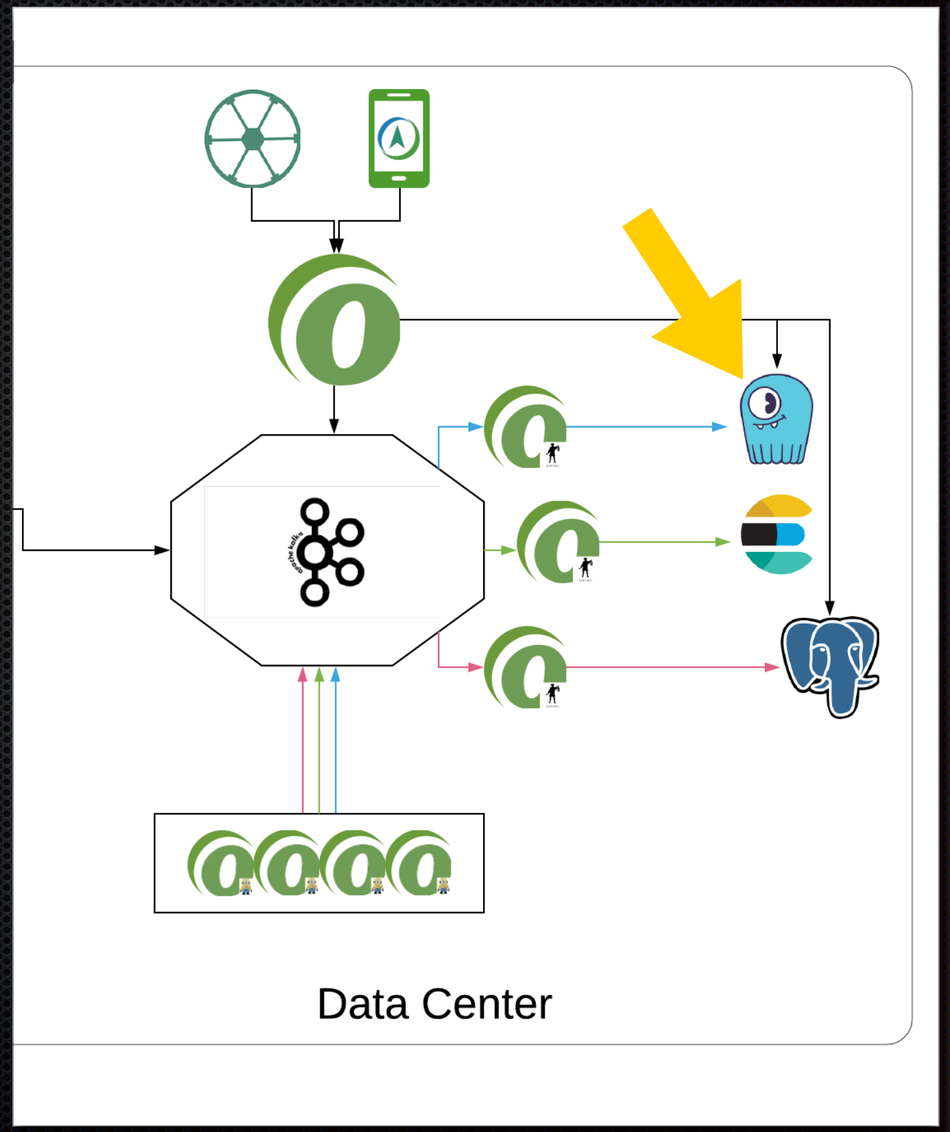


OpenNMS Newts



OpenNMS Newts

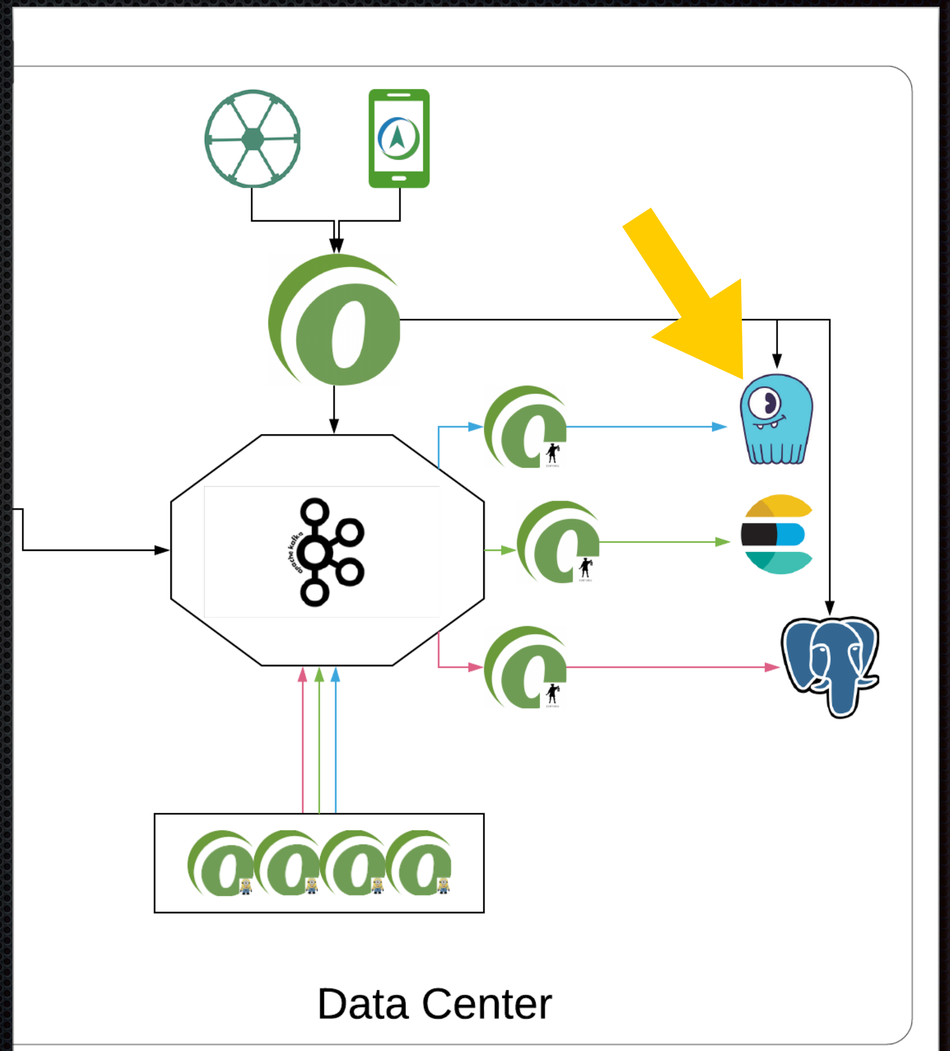
Replaces RRD



OpenNMS Newts

Replaces RRD

Abstracted API

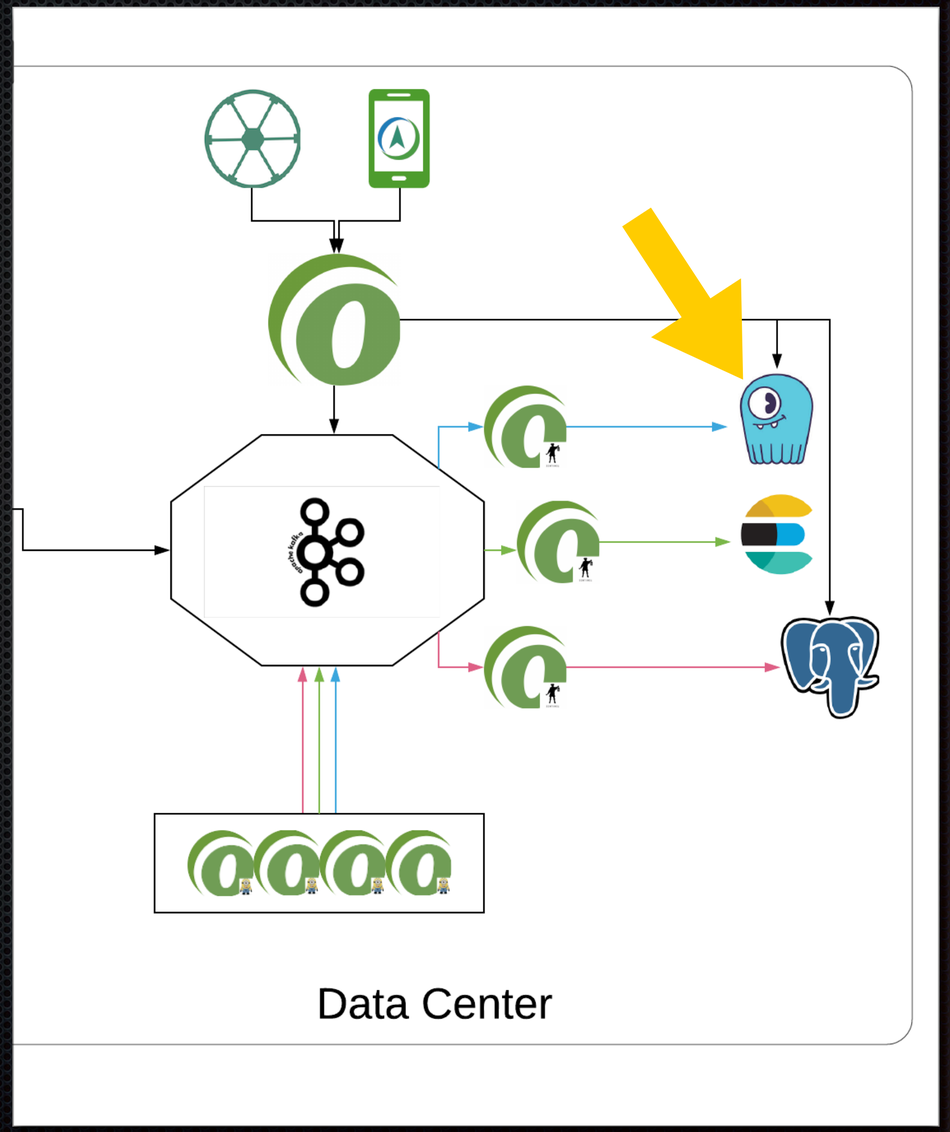


OpenNMS Newts

Replaces RRD

Abstracted API

Scales Horizontally



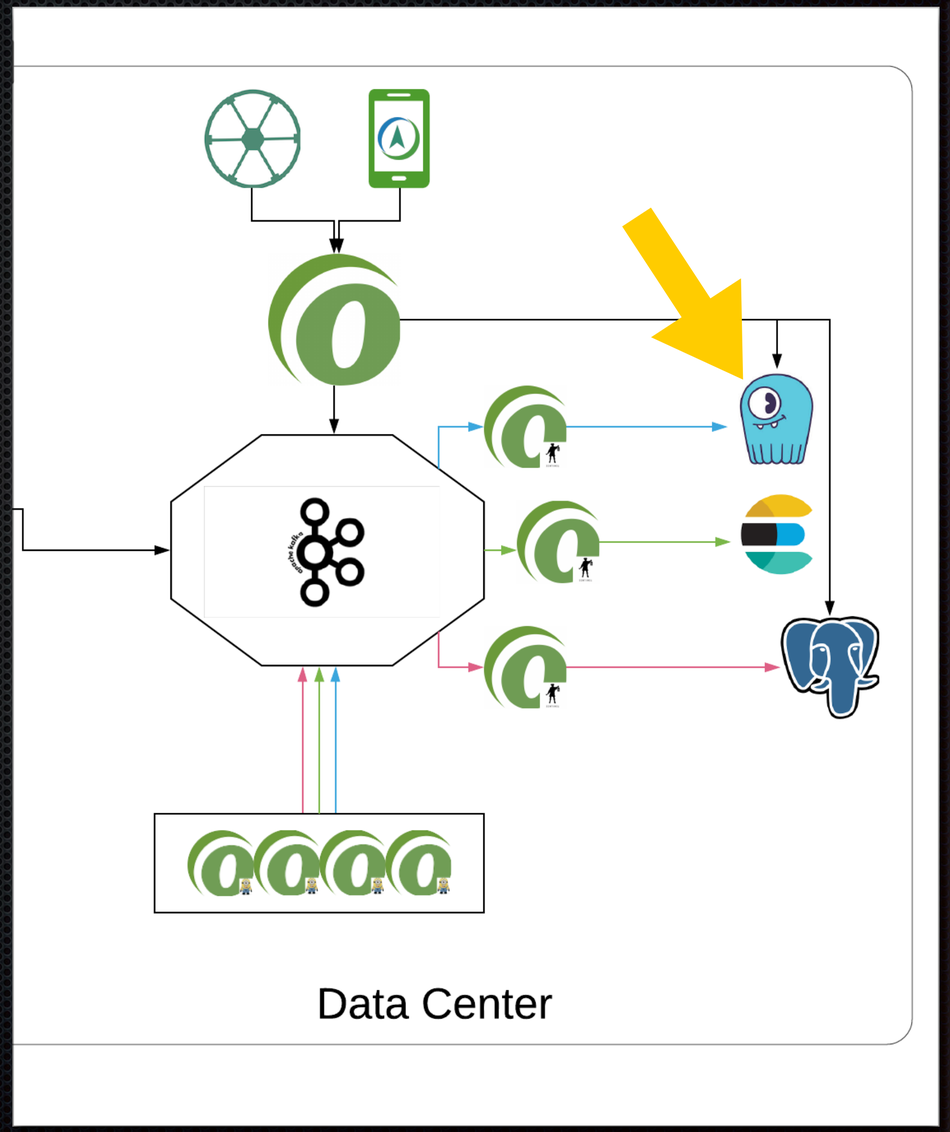
OpenNMS Newts

Replaces RRD

Abstracted API

Scales Horizontally

Cassandra/SyllaDB



OpenNMS Newts

Replaces RRD

Abstracted API

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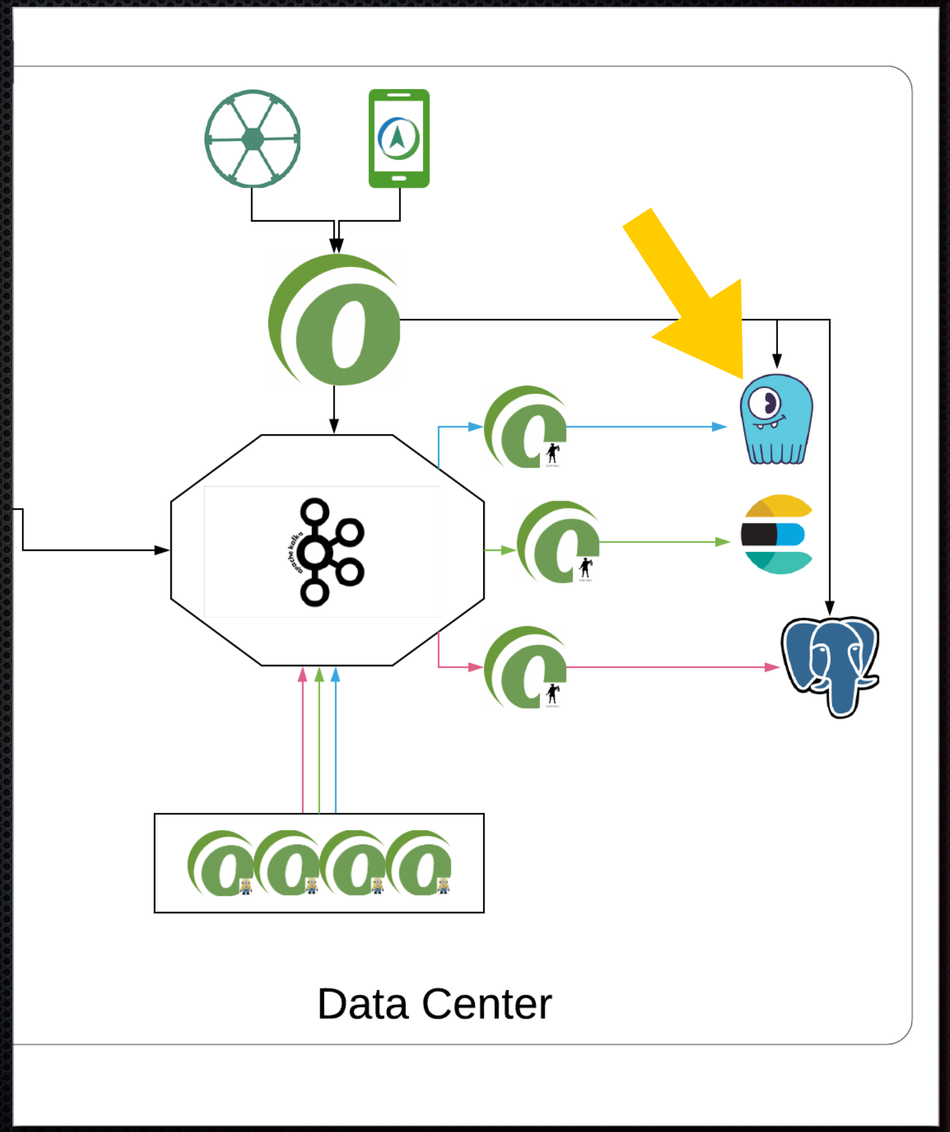
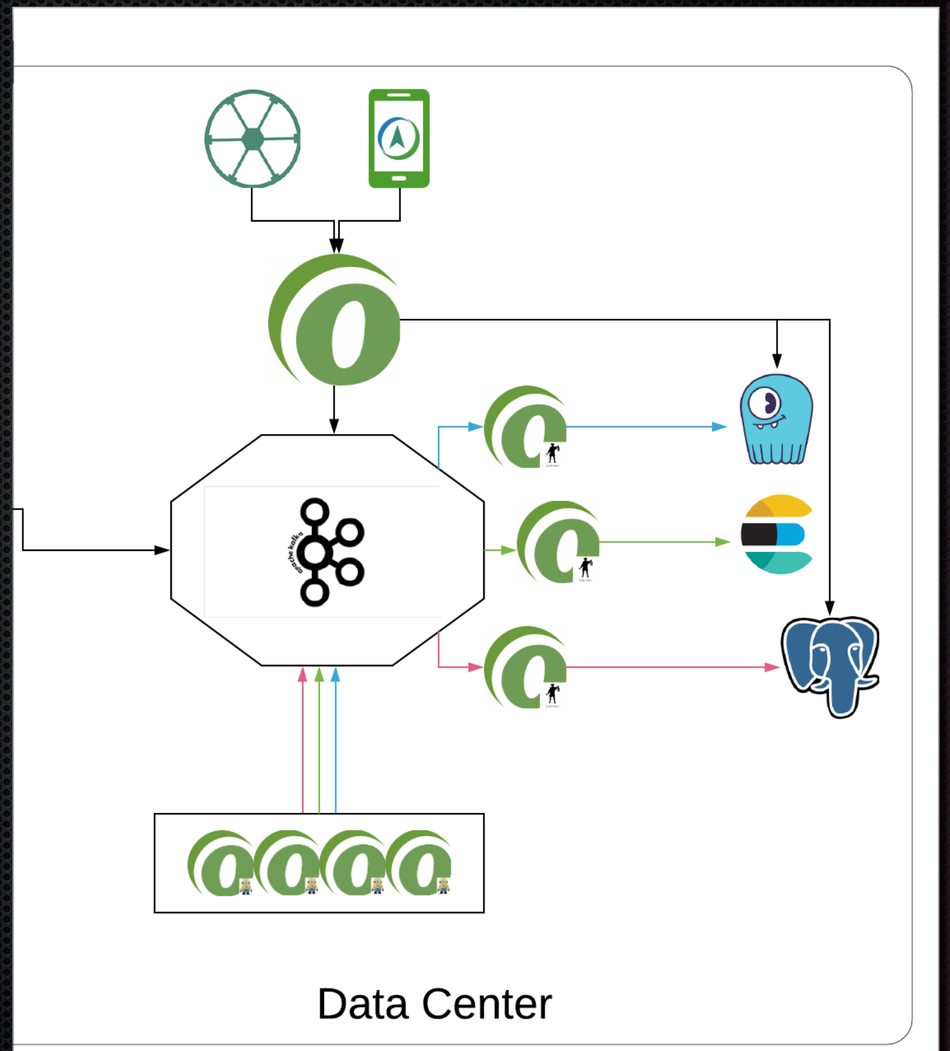
Cassandra/SyllaDB

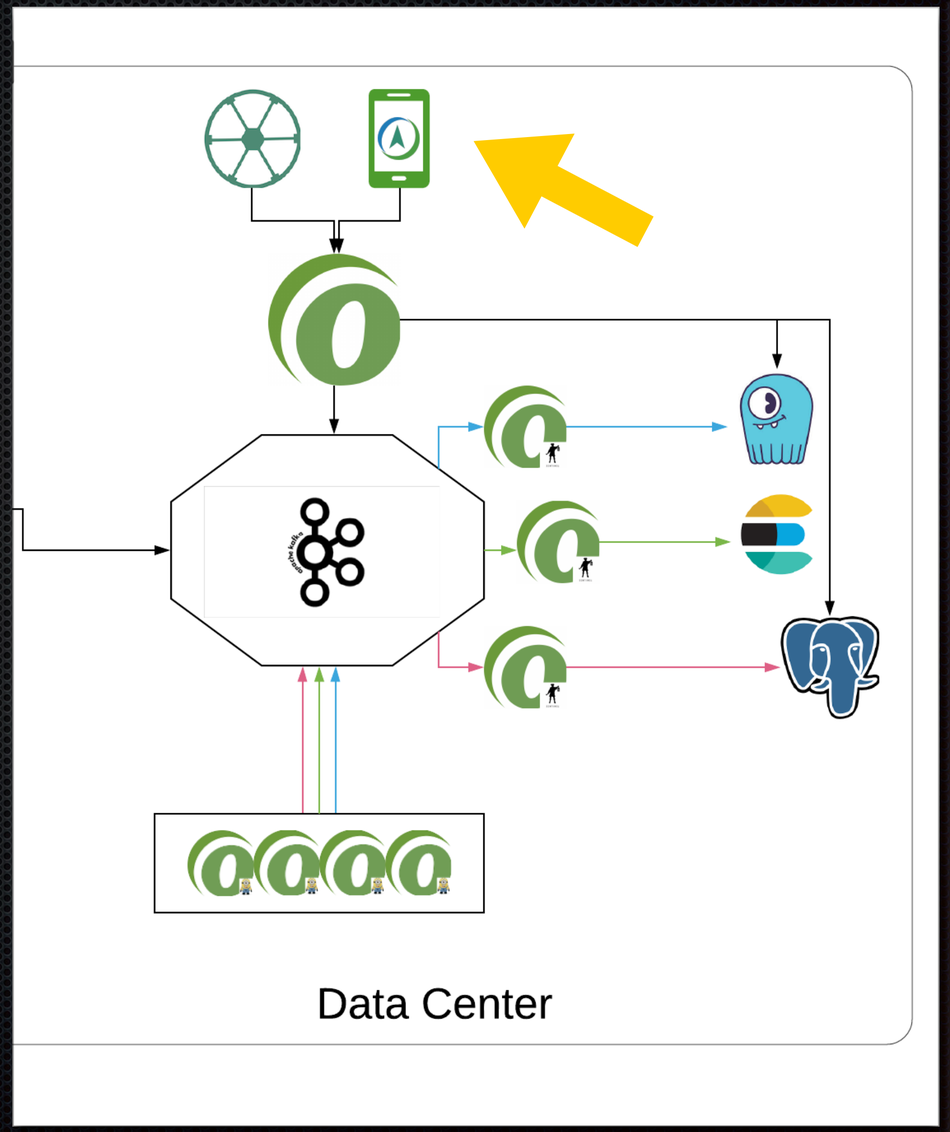


OpenNMS Compass



OpenNMS Compass

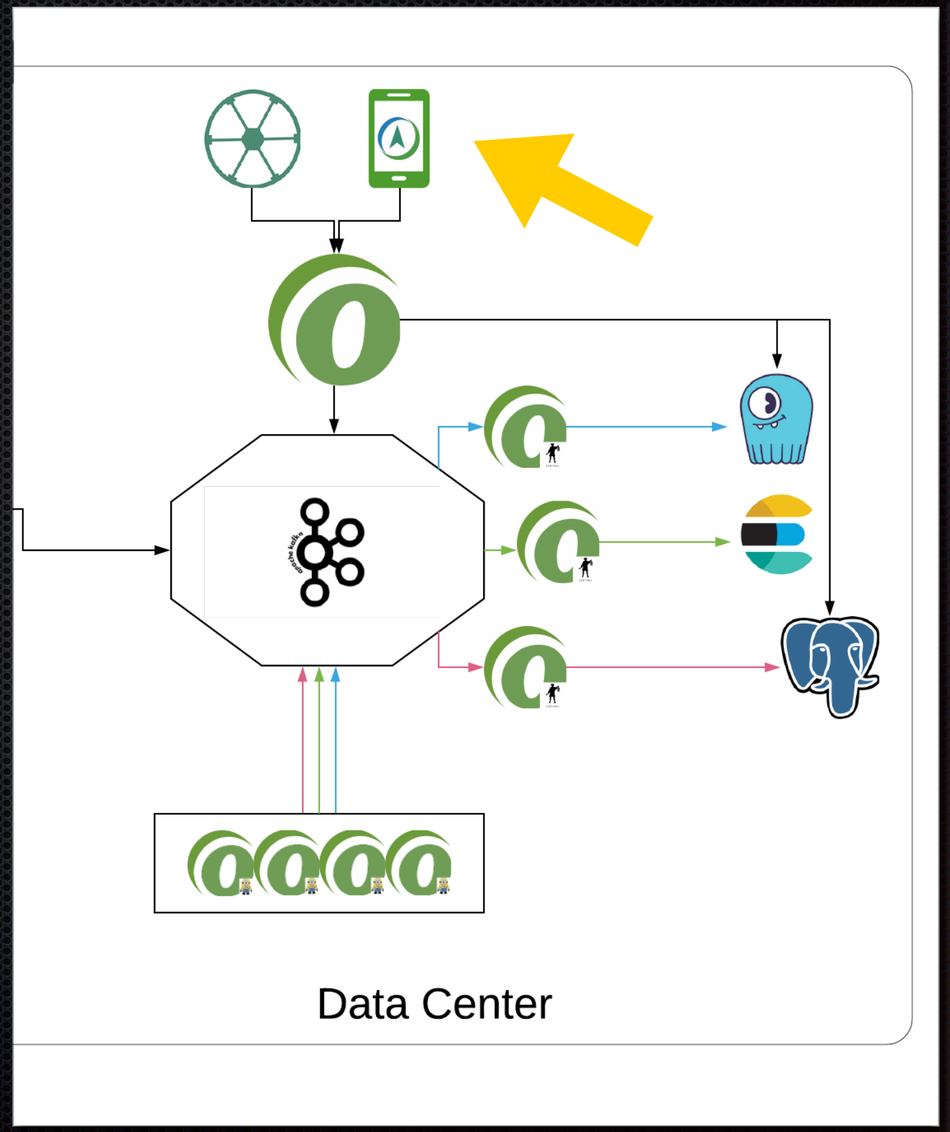
iOS



OpenNMS Compass

iOS

Android

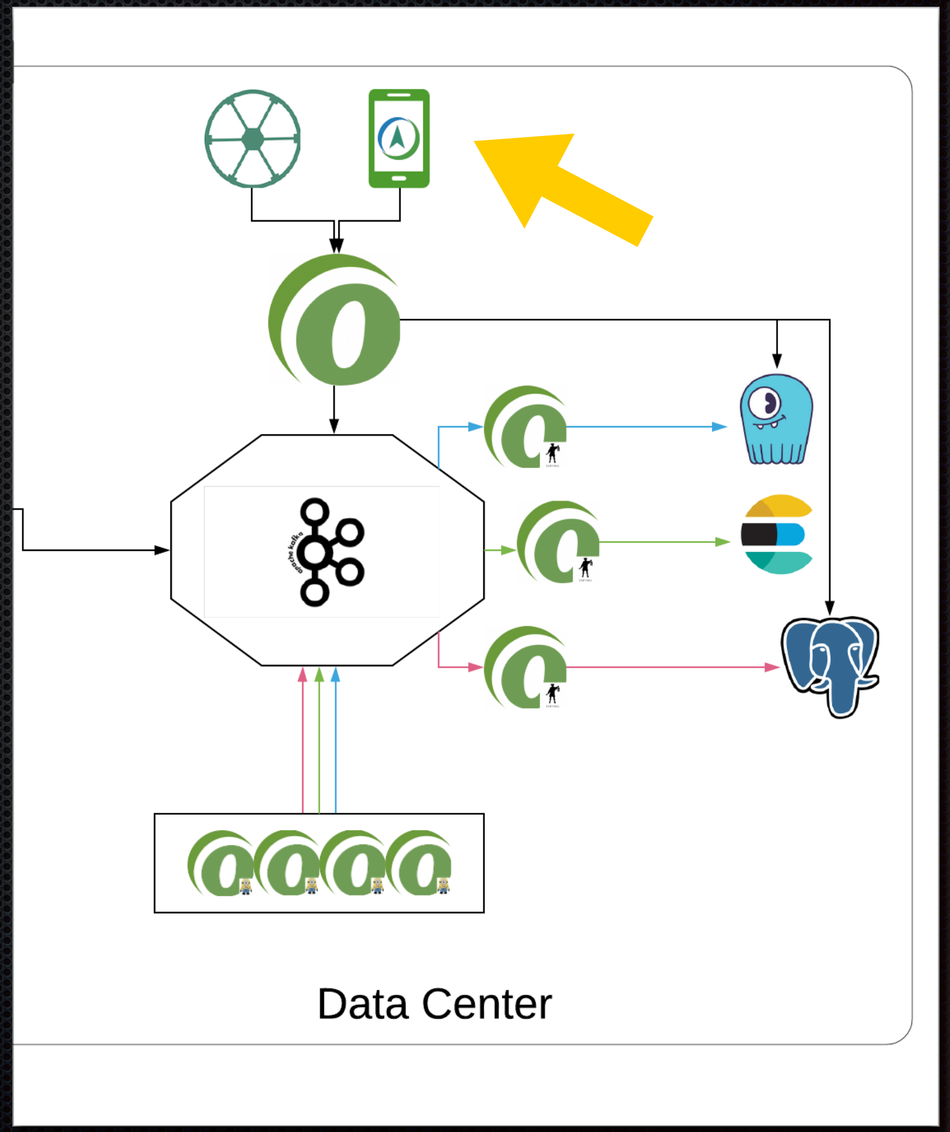


OpenNMS Compass

iOS

Android

Actions



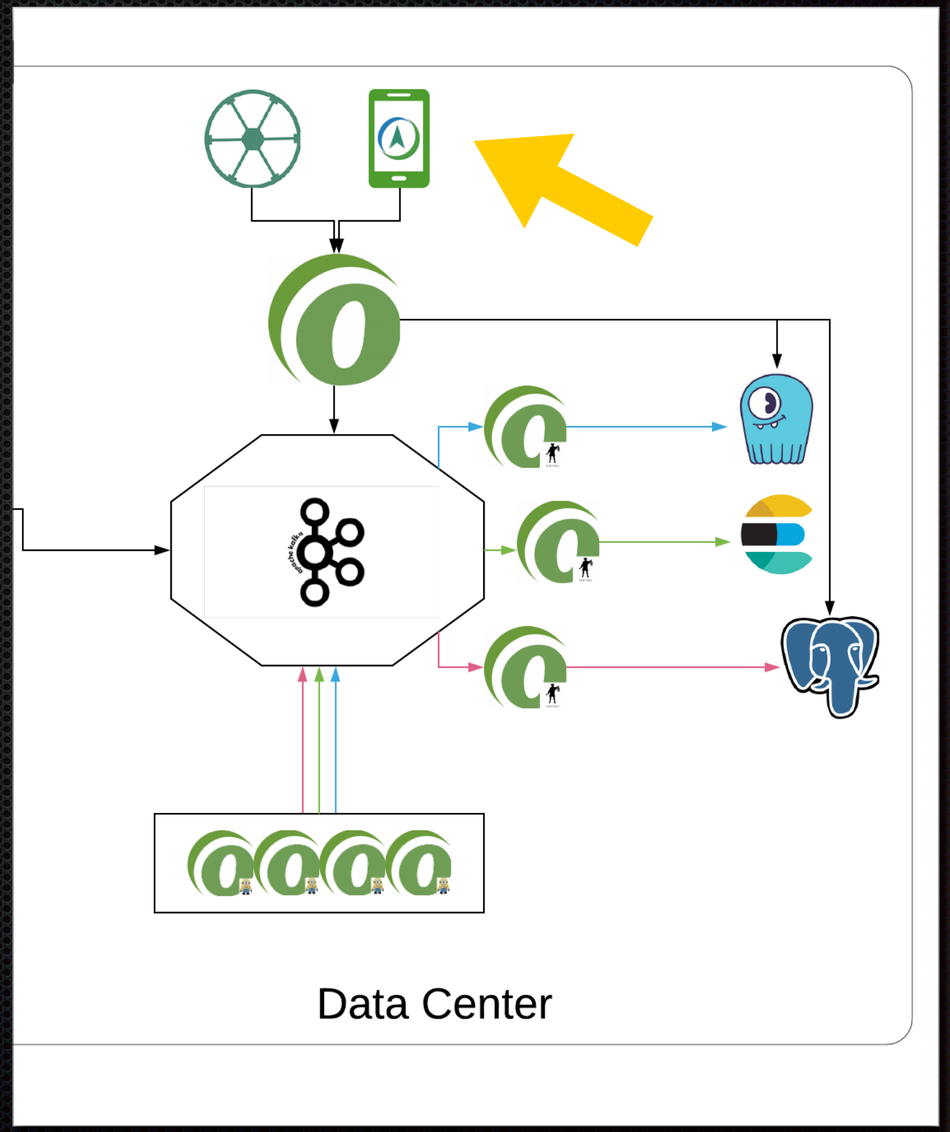
OpenNMS Compass

iOS

Android

Actions

Customizable



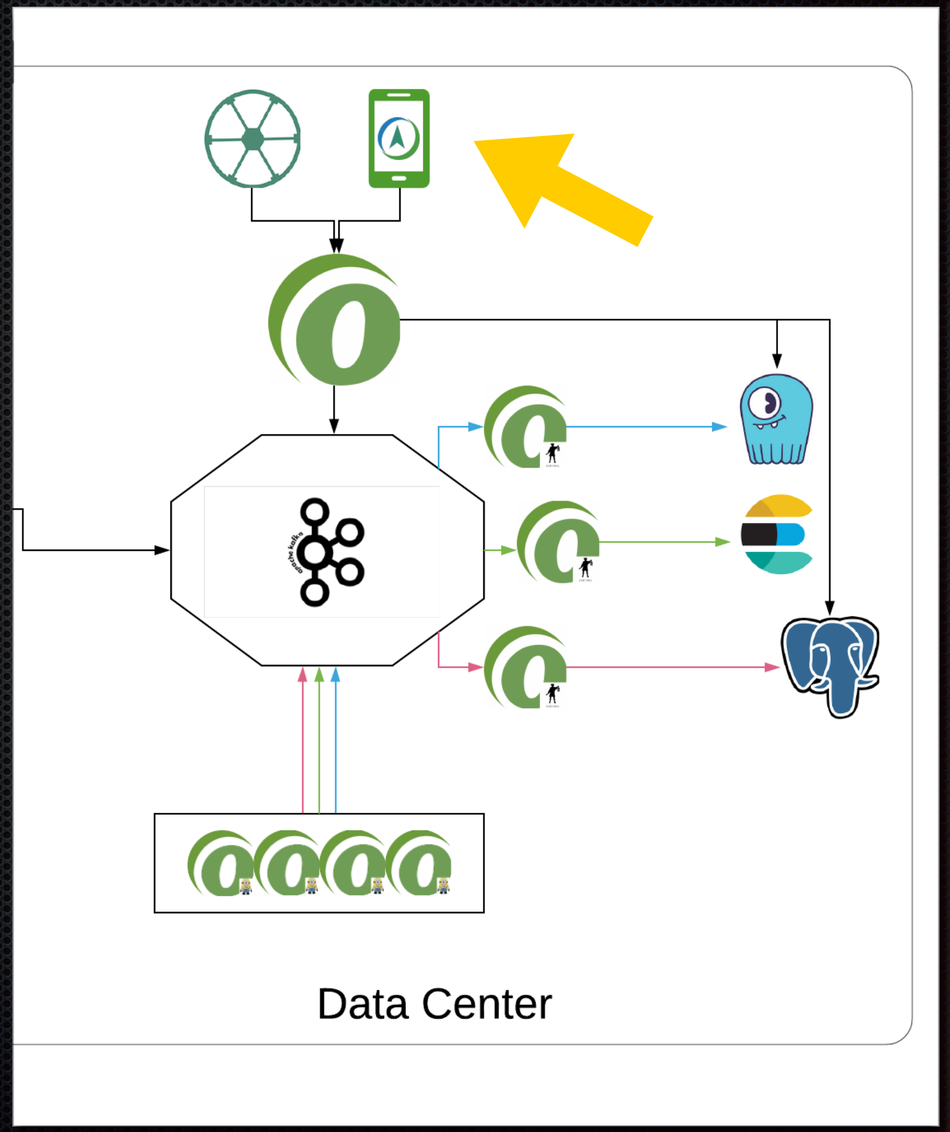
OpenNMS Compass

iOS

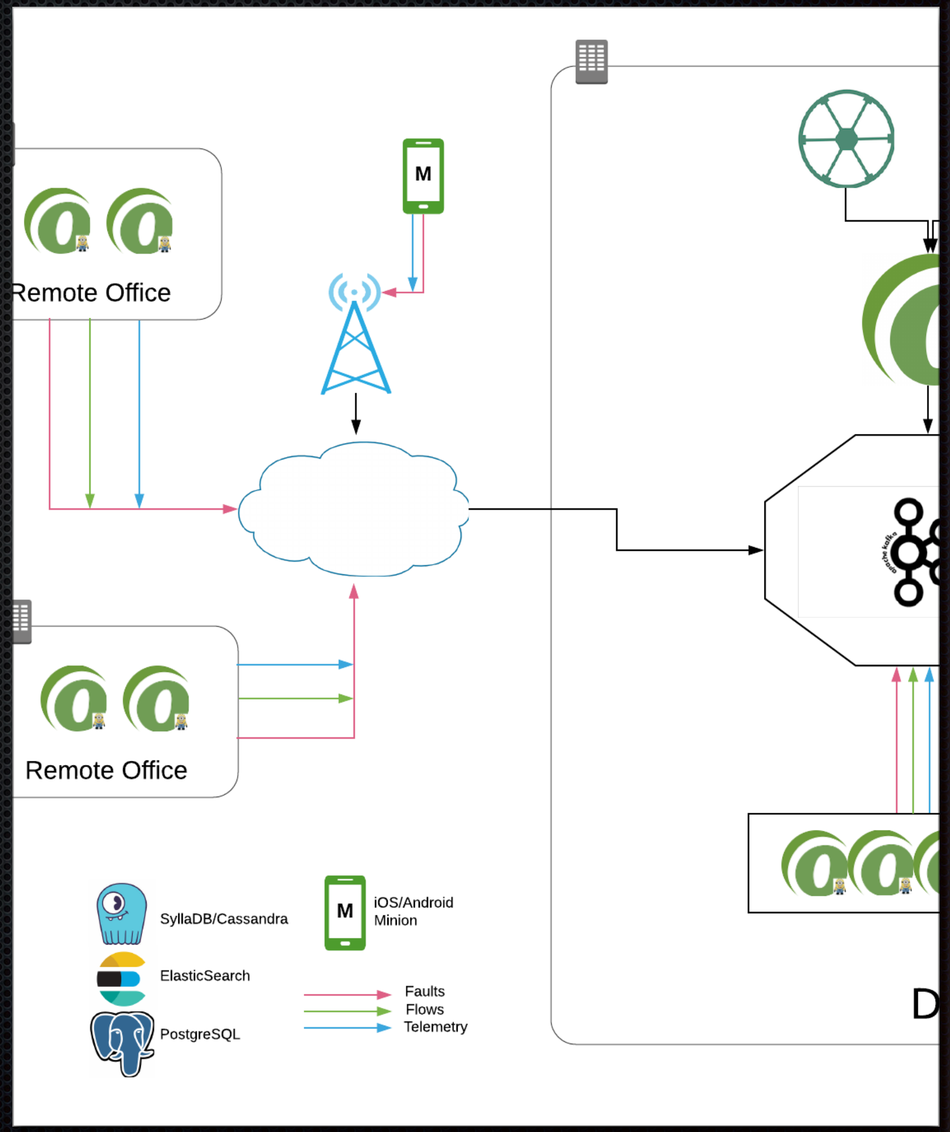
Android

Actions

Customizable

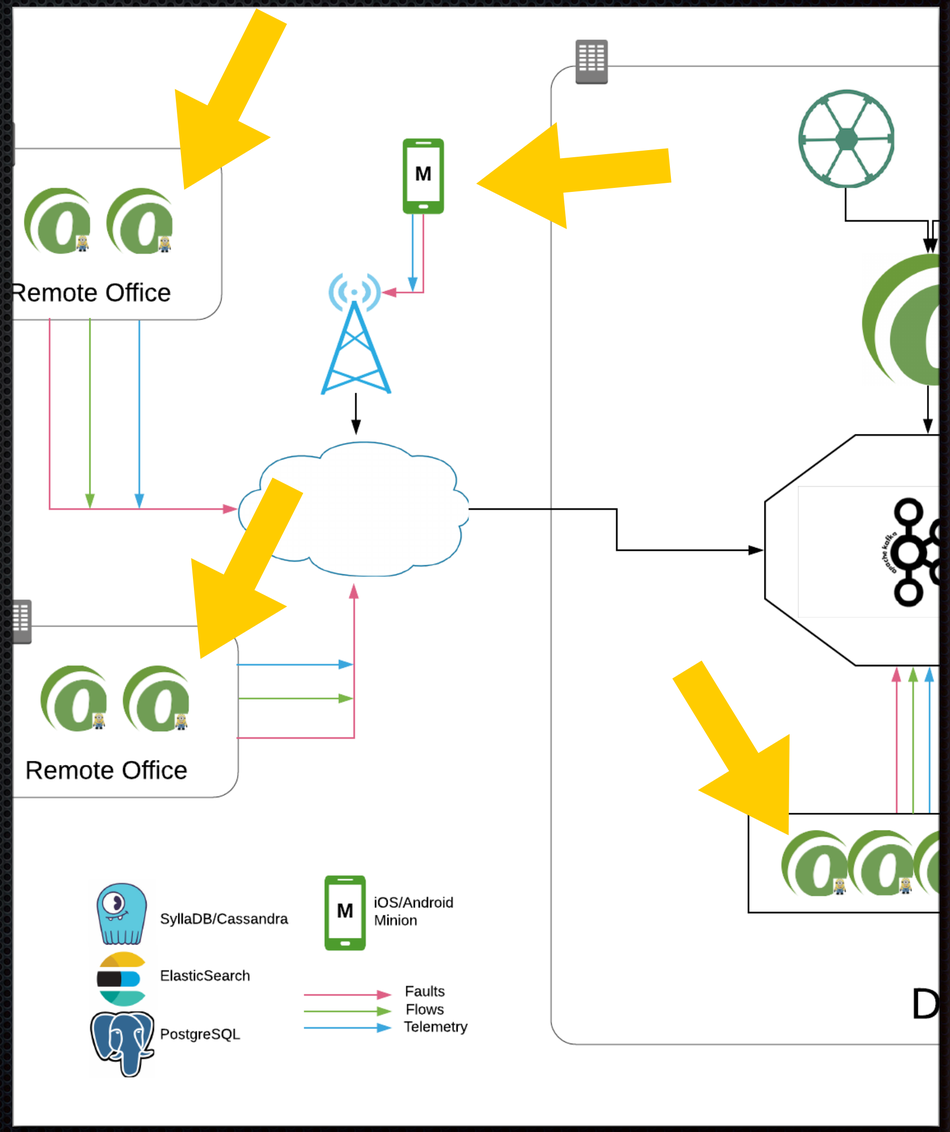


OpenNMS Minion



OpenNMS Minion

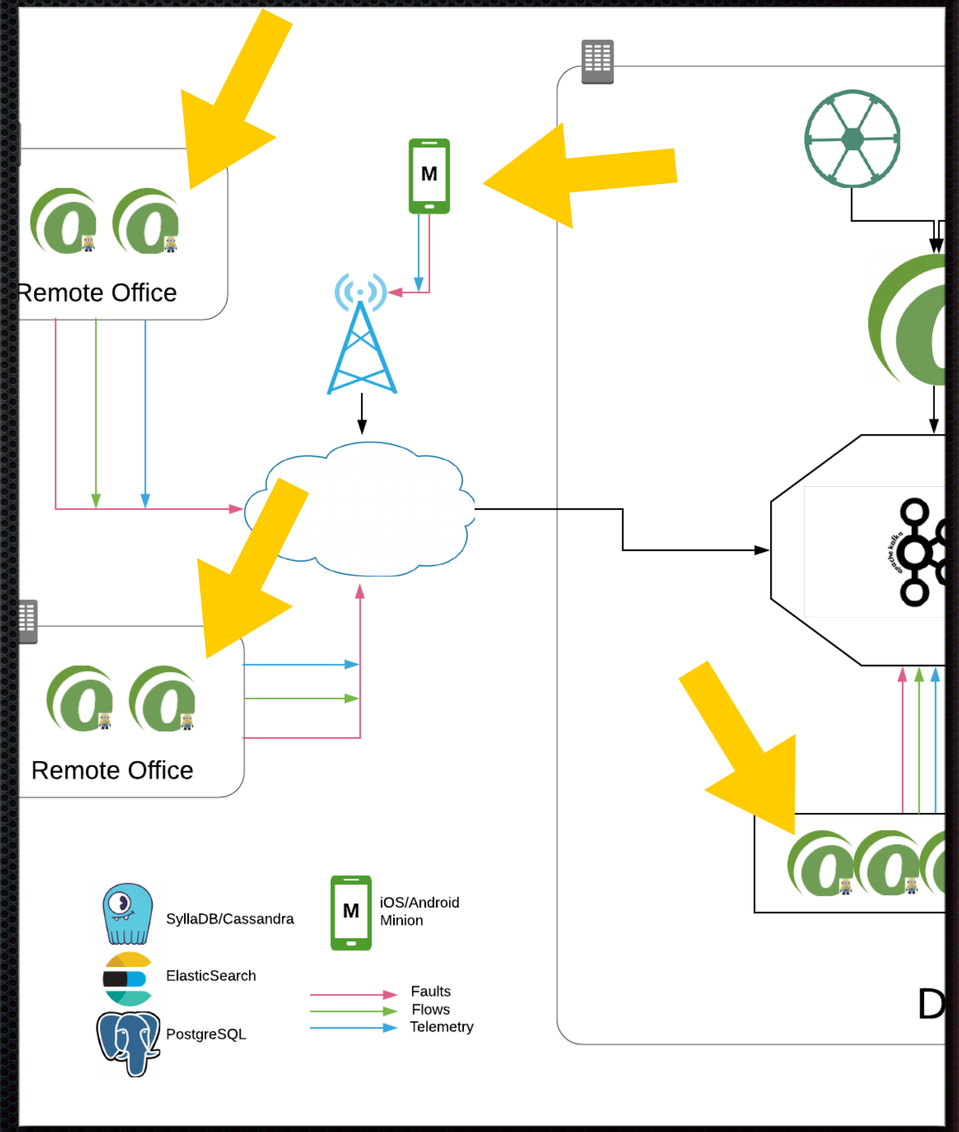
Stateless



OpenNMS Minion

Stateless

Proxy

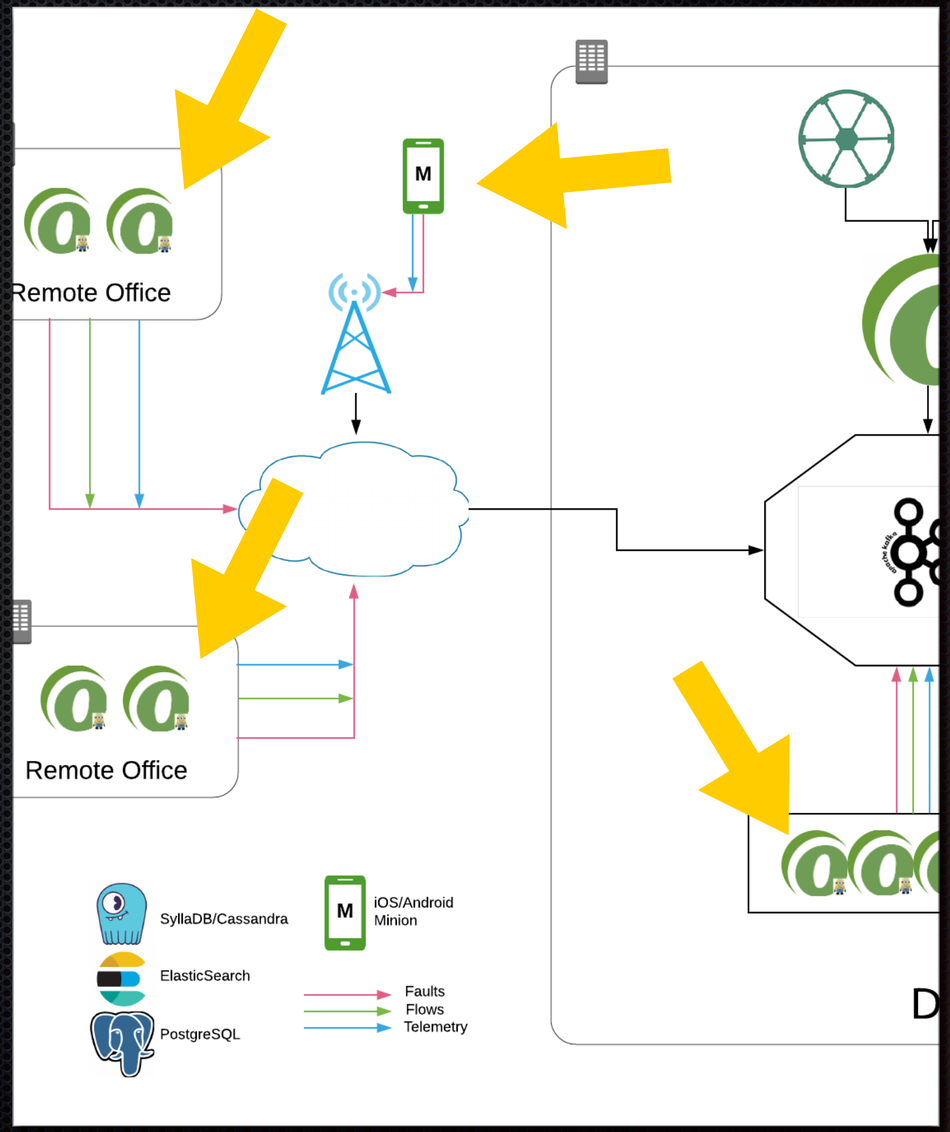


OpenNMS Minion

Stateless

Proxy

Cloud/DC Friendly

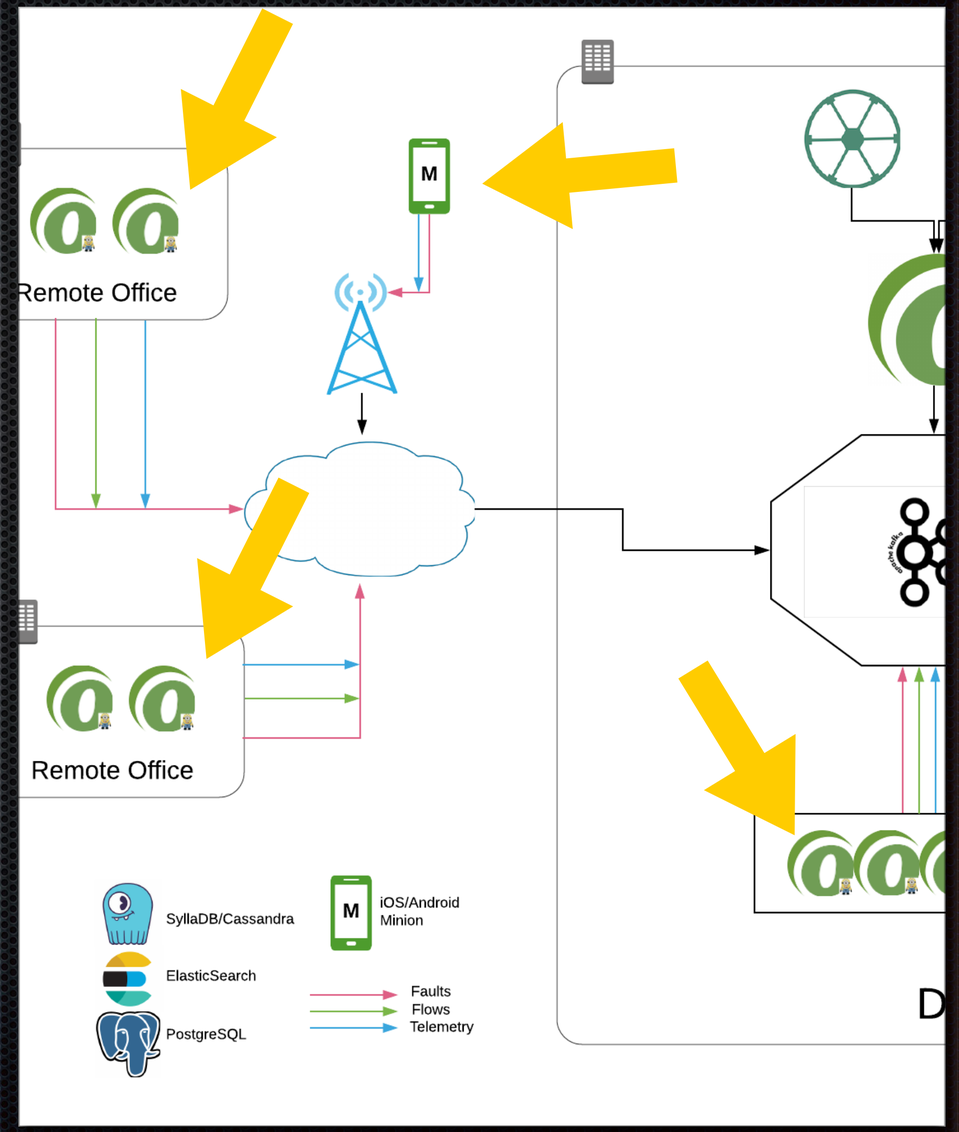


OpenNMS Minion

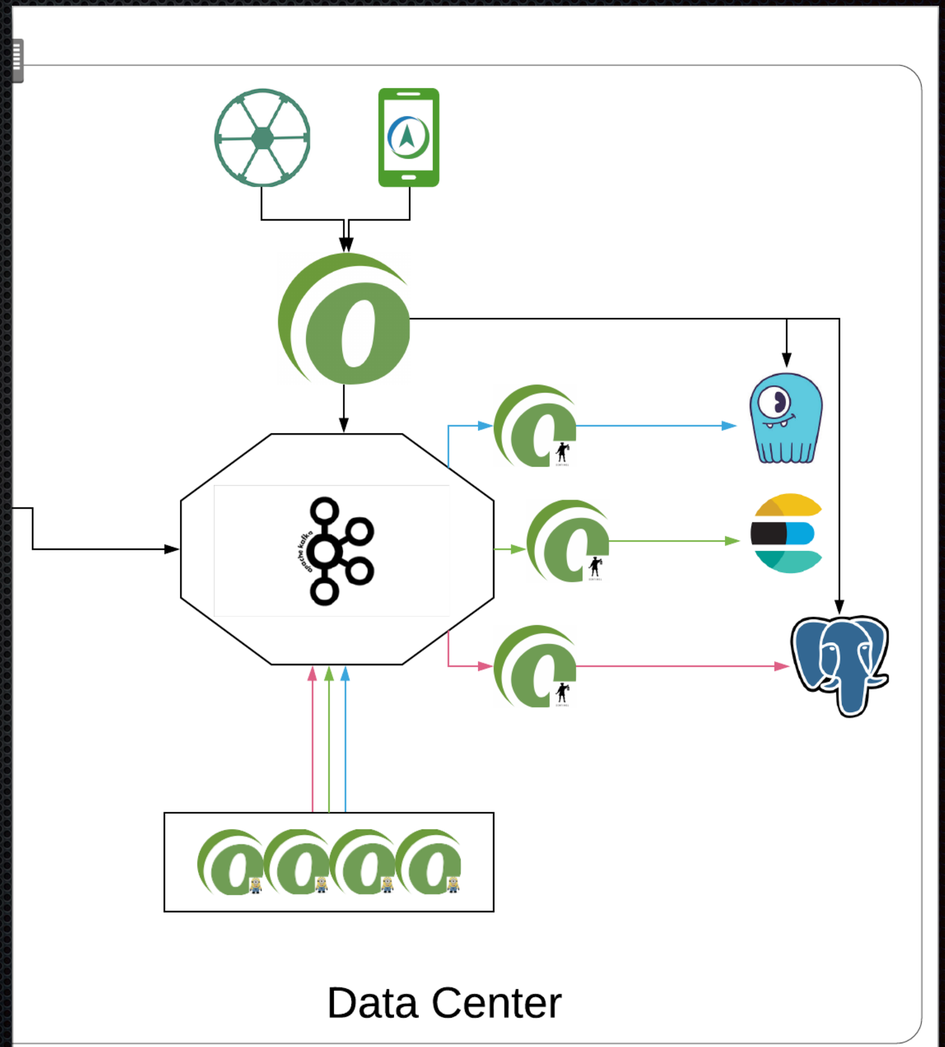
Stateless

Proxy

Cloud/DC Friendly

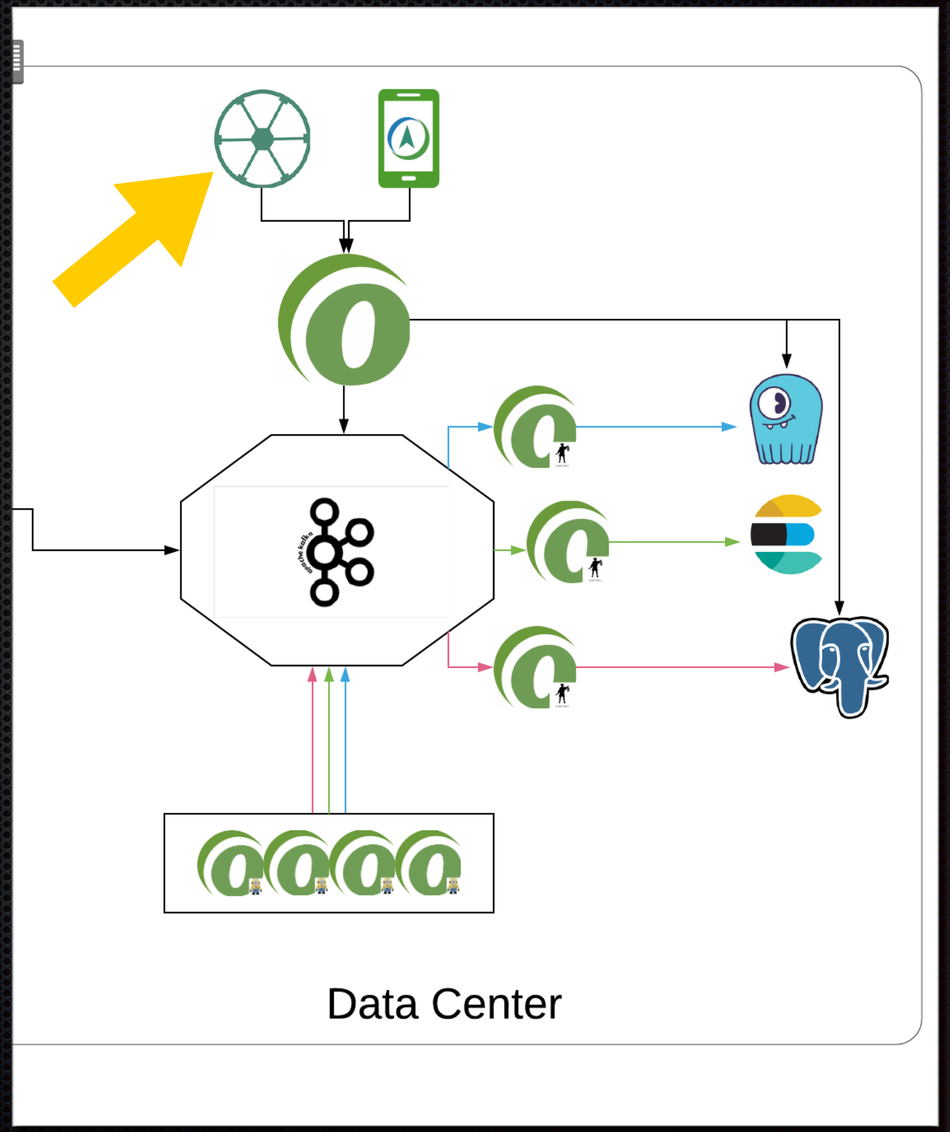


OpenNMS Helm



OpenNMS Helm

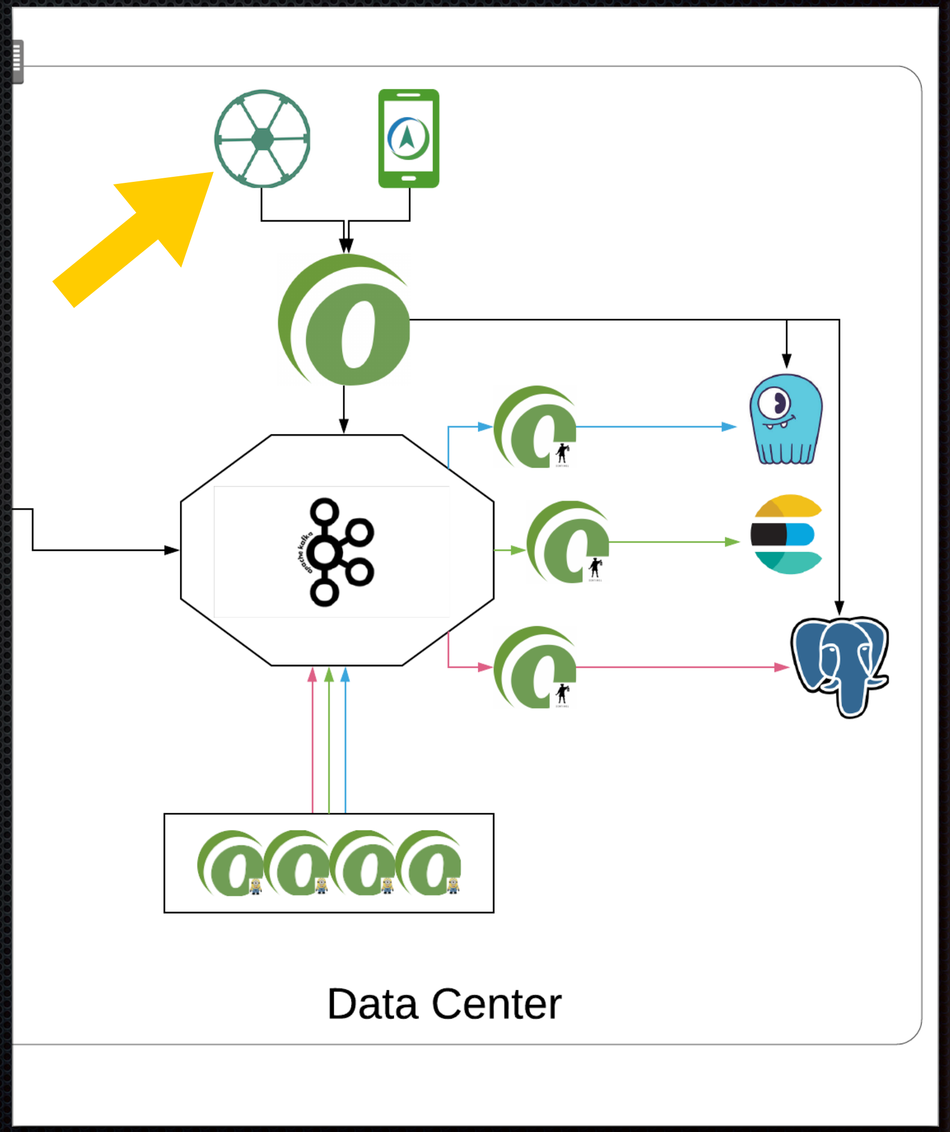
Grafana 5



OpenNMS Helm

Grafana 5

FM Data Source

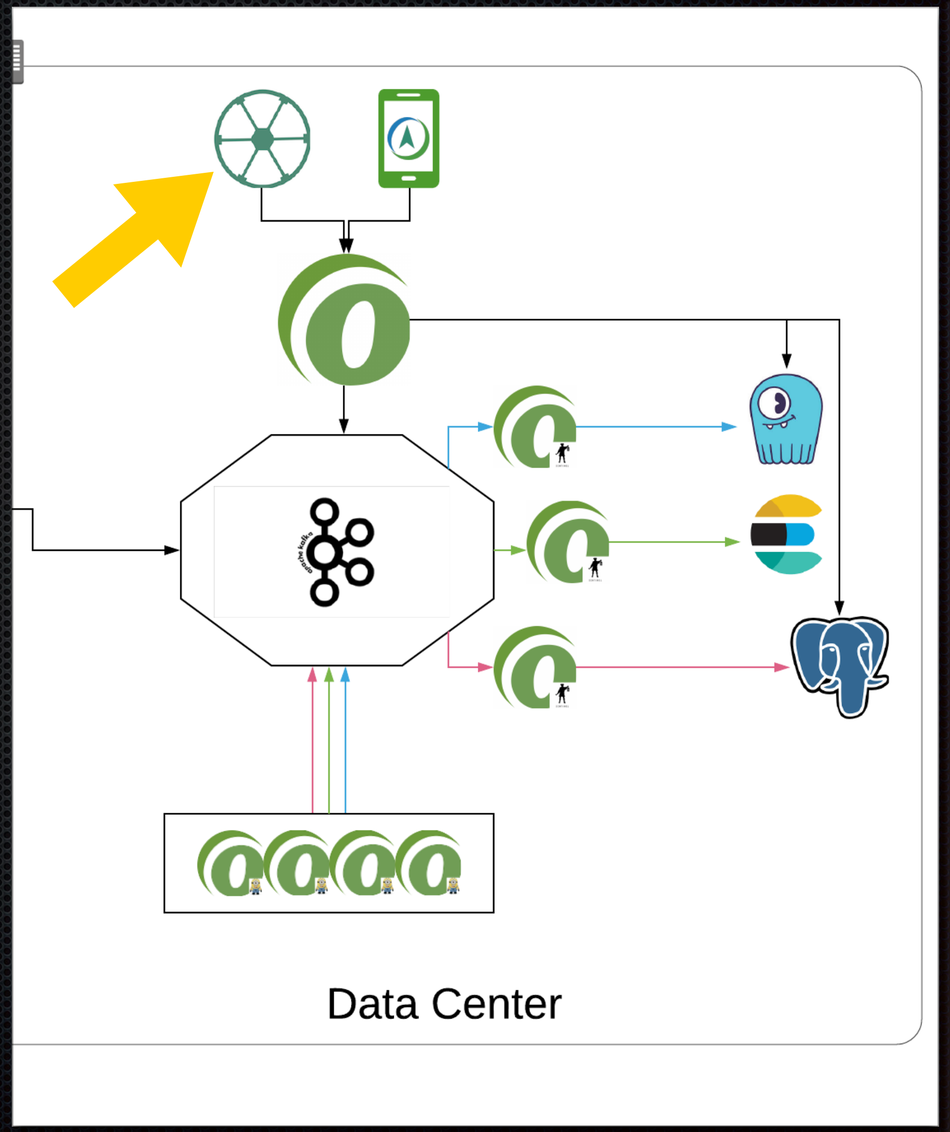


OpenNMS Helm

Grafana 5

FM Data Source

PM Data Source



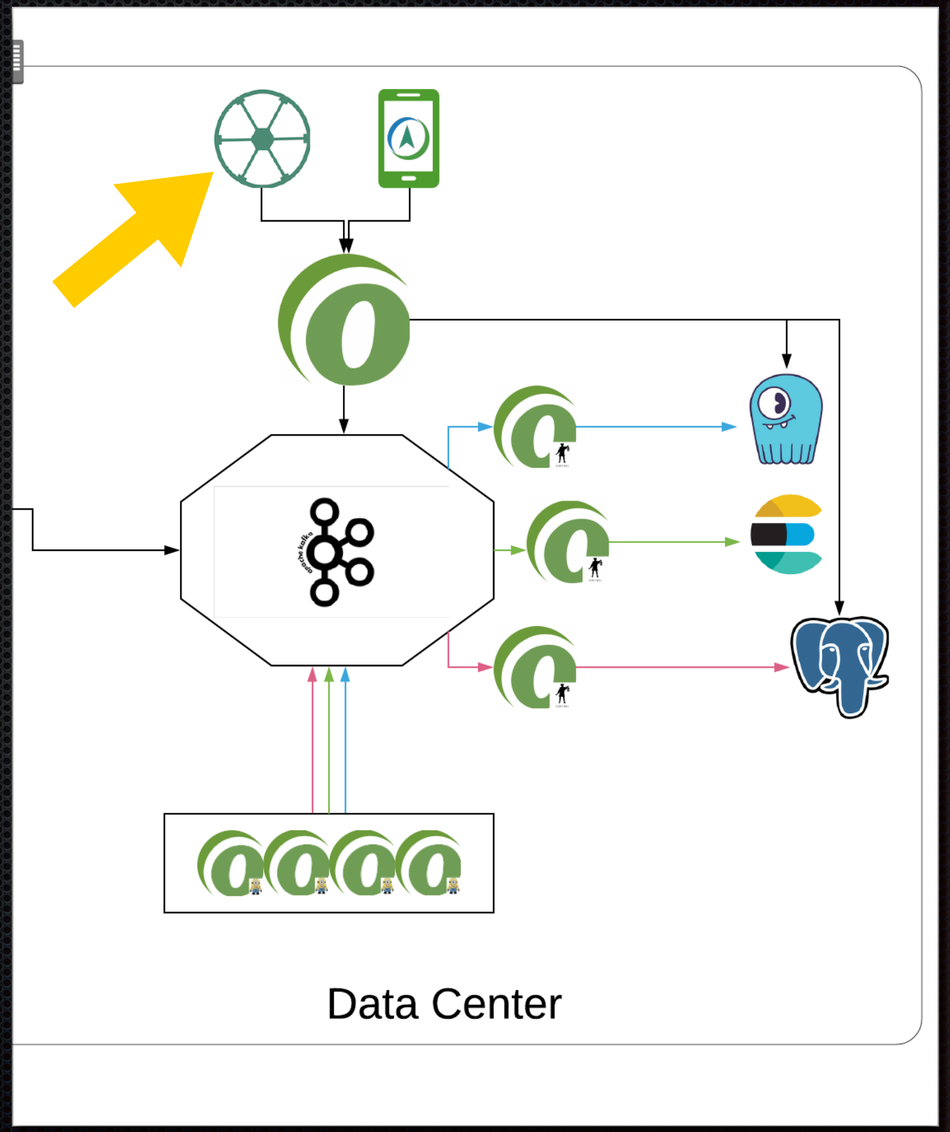
OpenNMS Helm

Grafana 5

FM Data Source

PM Data Source

Flow Data Source



OpenNMS Helm

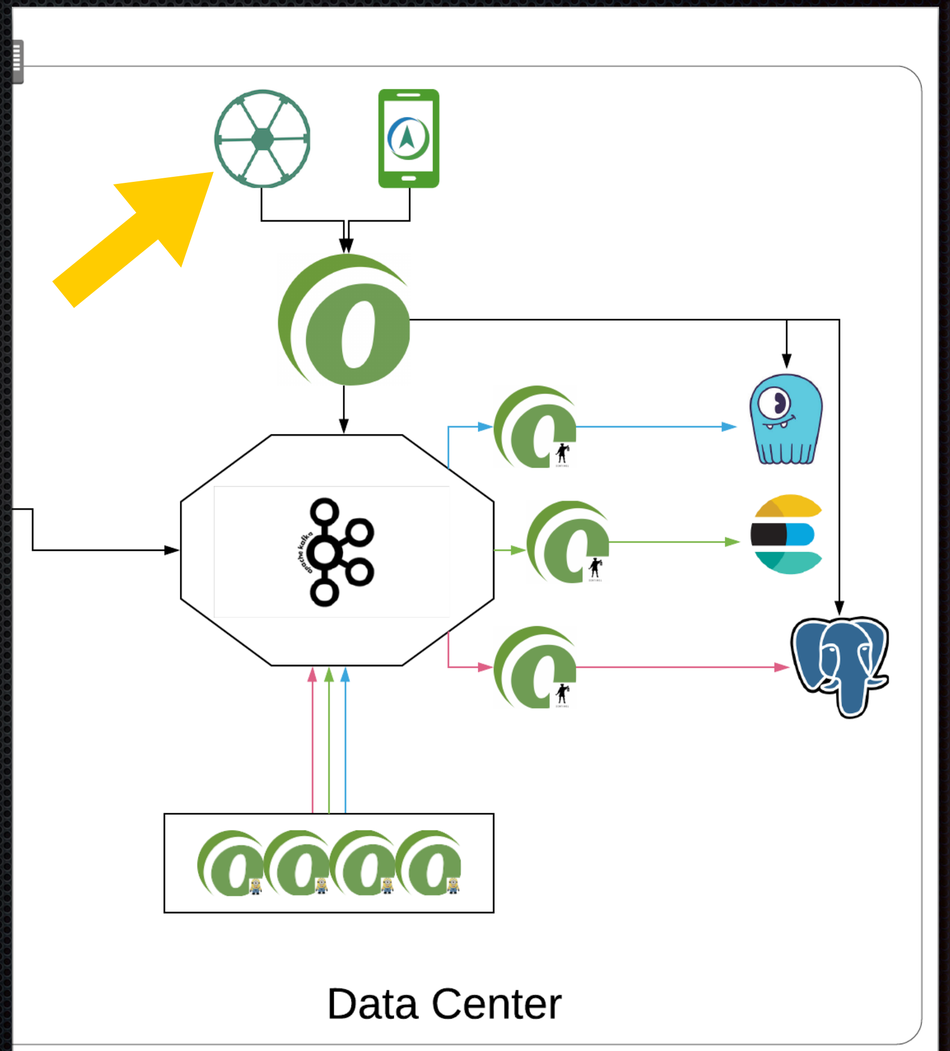
Grafana 5

FM Data Source

PM Data Source

Flow Data Source

Multi-OpenNMS



OpenNMS Helm

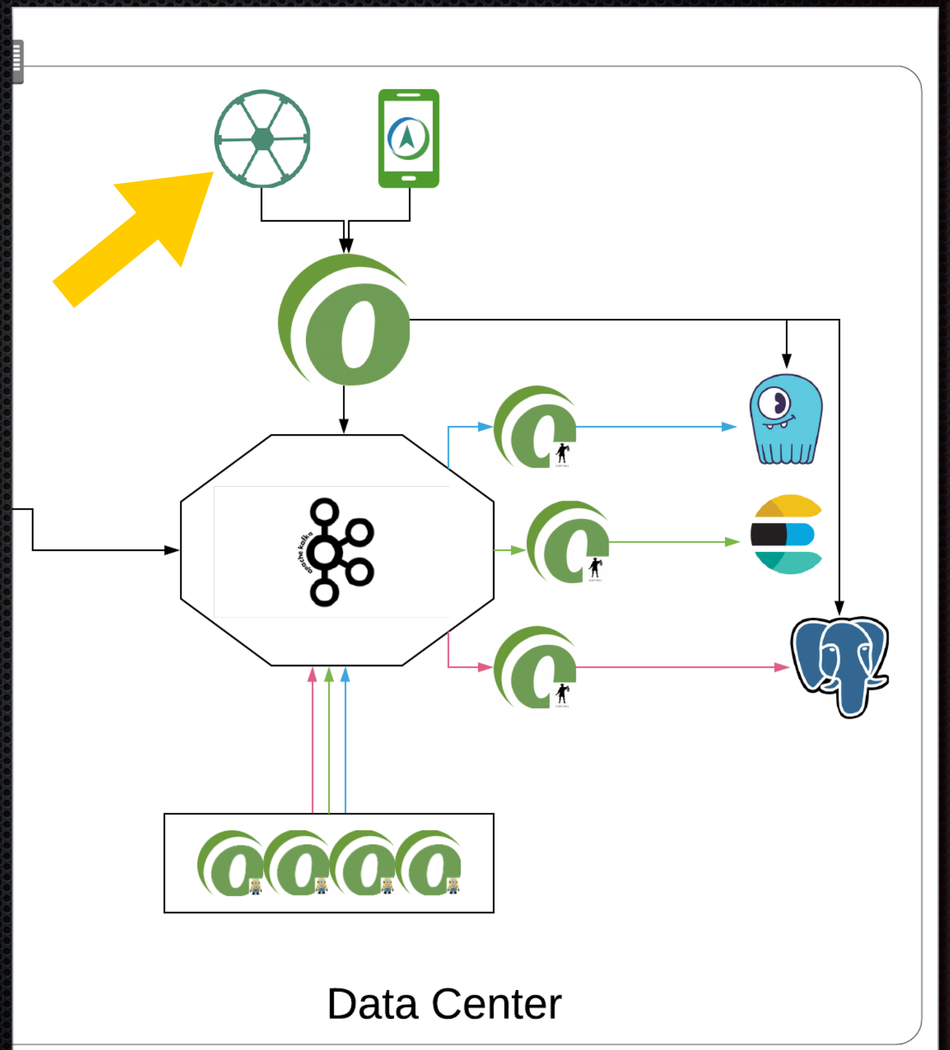
Grafana 5

FM Data Source

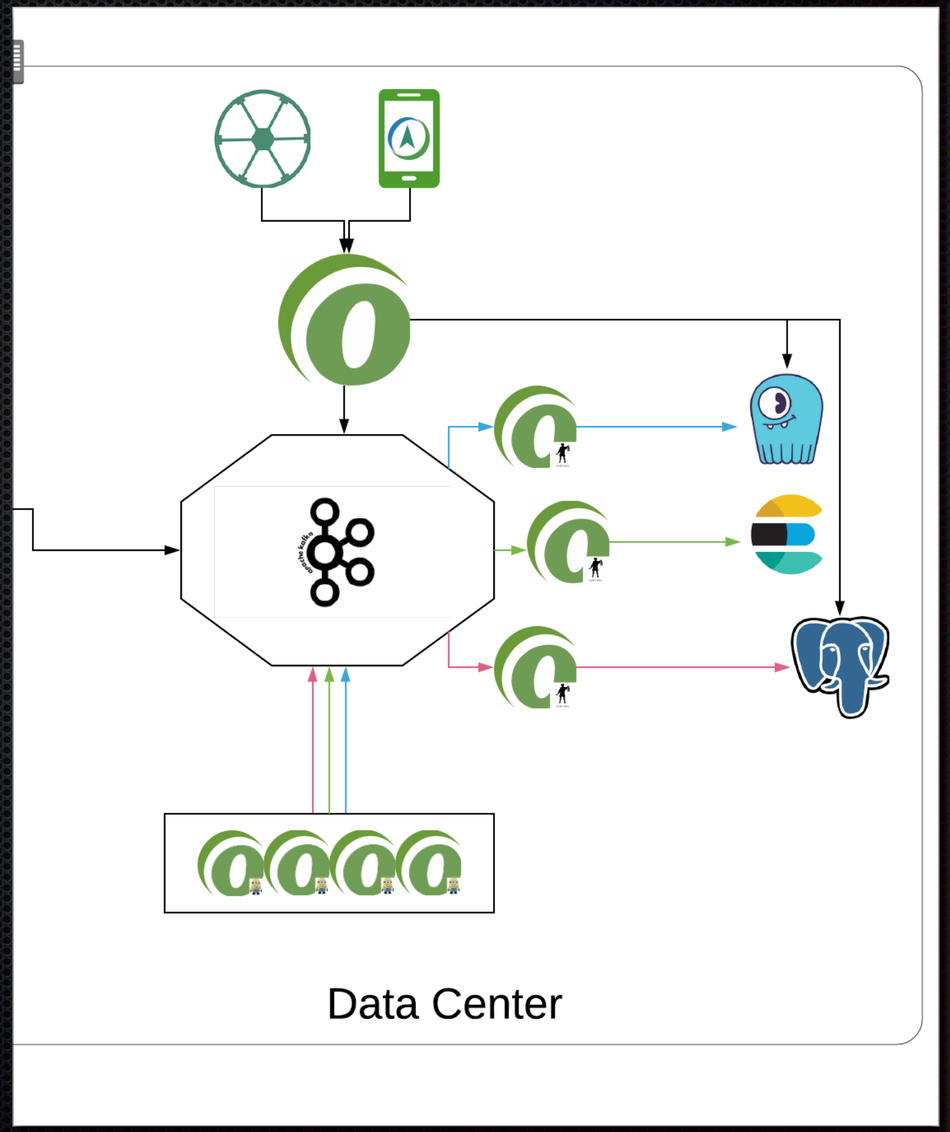
PM Data Source

Flow Data Source

Multi-OpenNMS

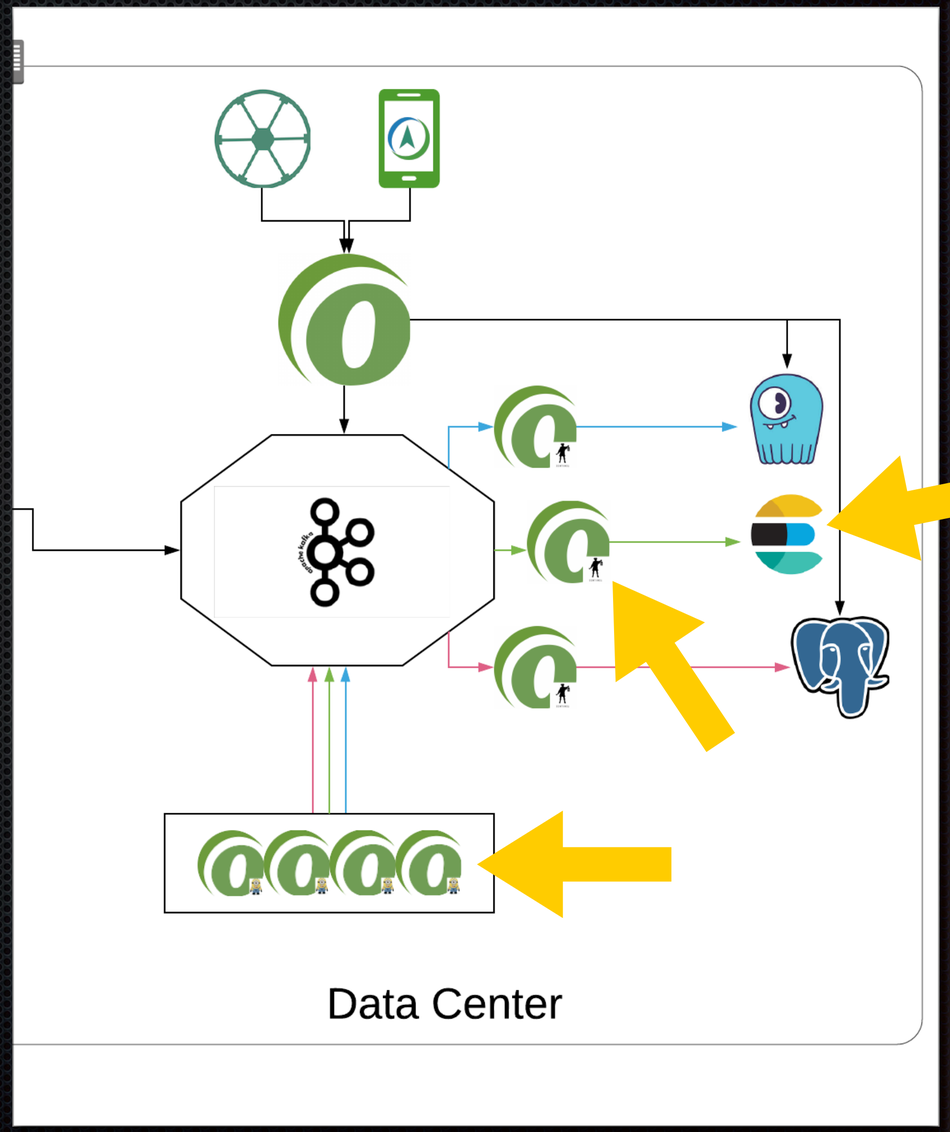


OpenNMS Drift



OpenNMS Drift

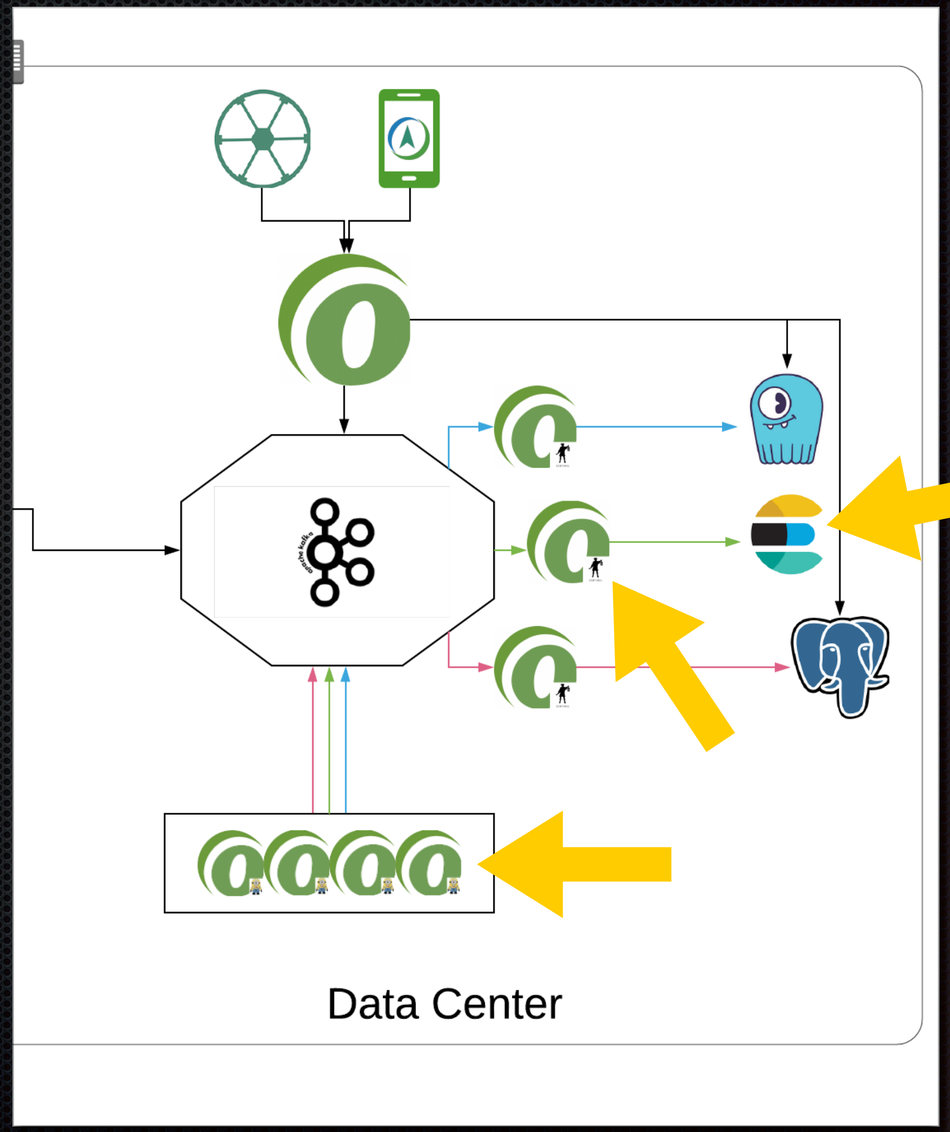
Network Flows



OpenNMS Drift

Network Flows

Helm

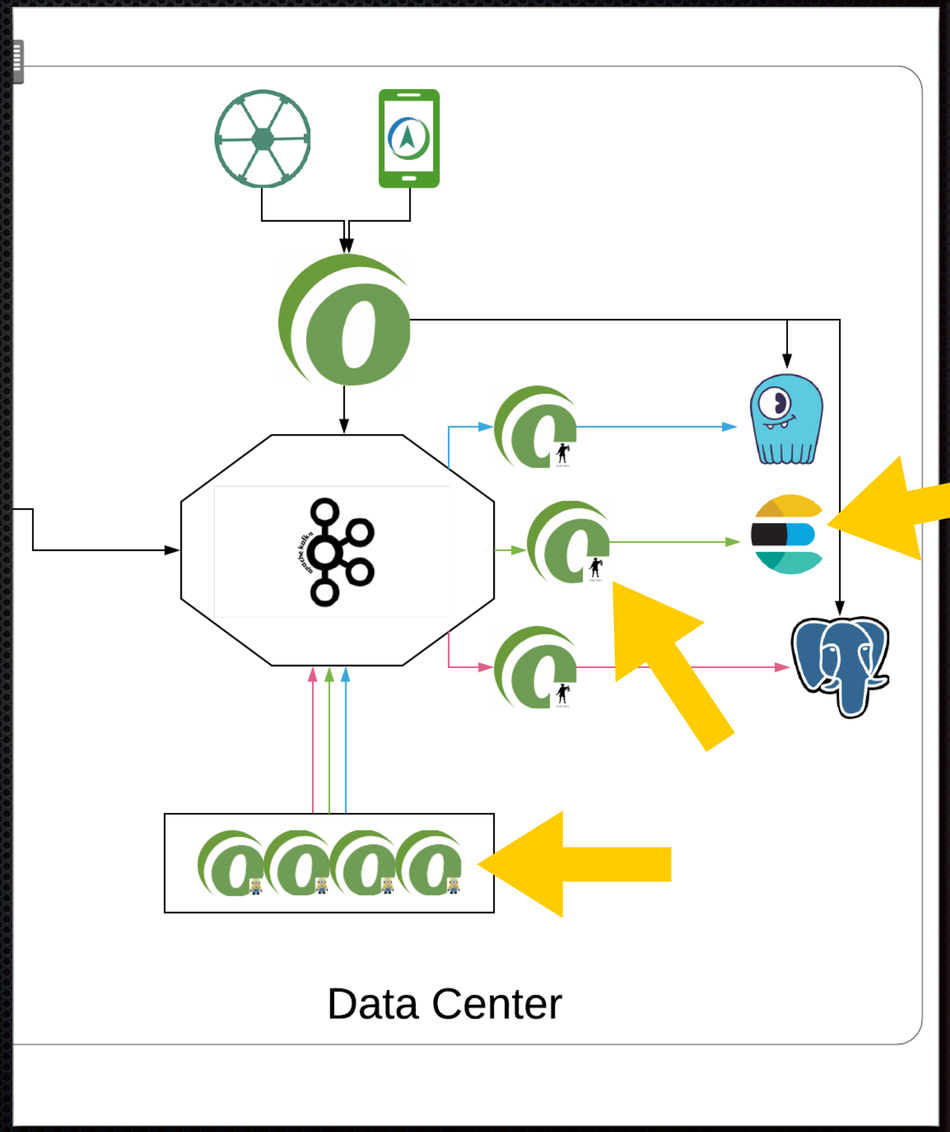


OpenNMS Drift

Network Flows

Helm

Minion



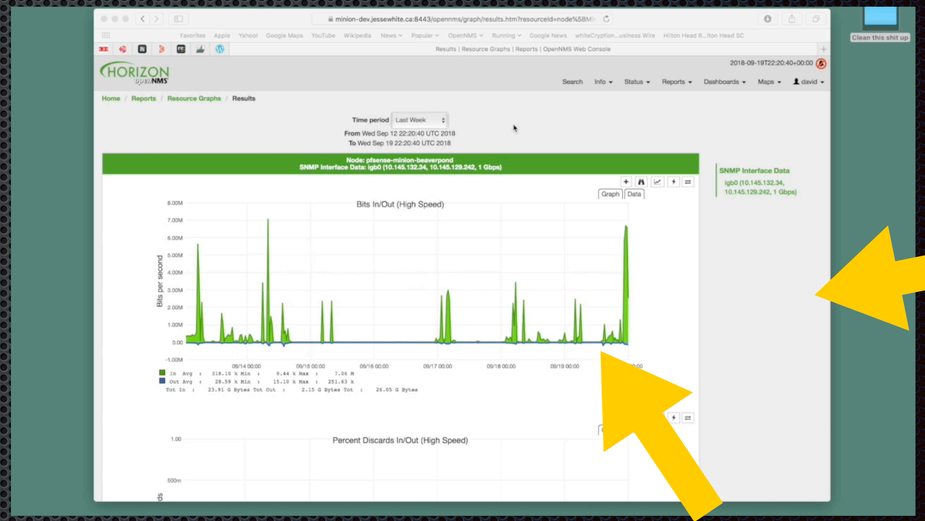
OpenNMS Drift

Network Flows

Helm

Minion

Sentinel



OpenNMS Drift

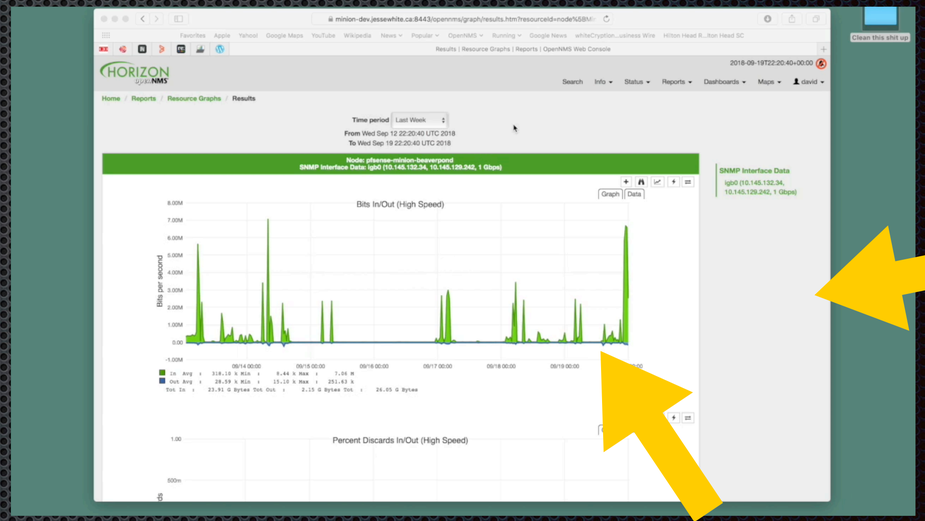
Network Flows

Helm

Minion

Sentinel

250k/sec



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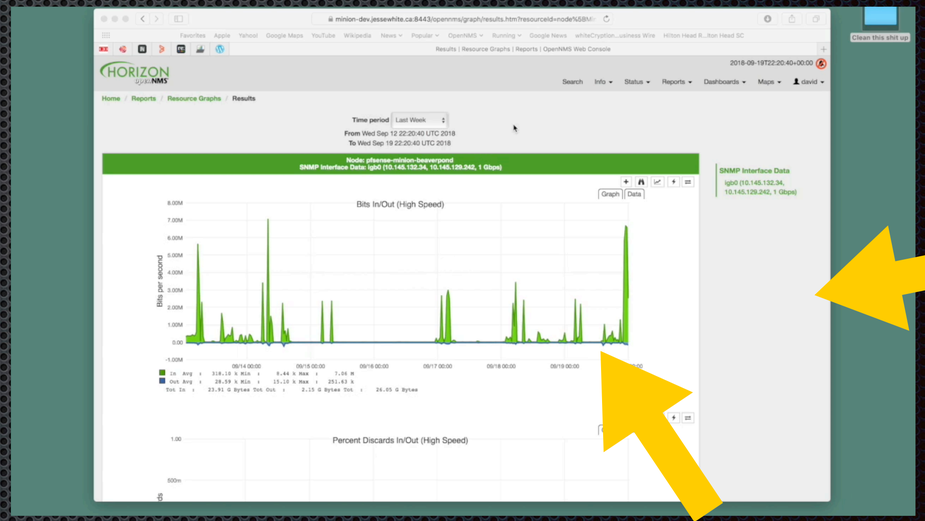
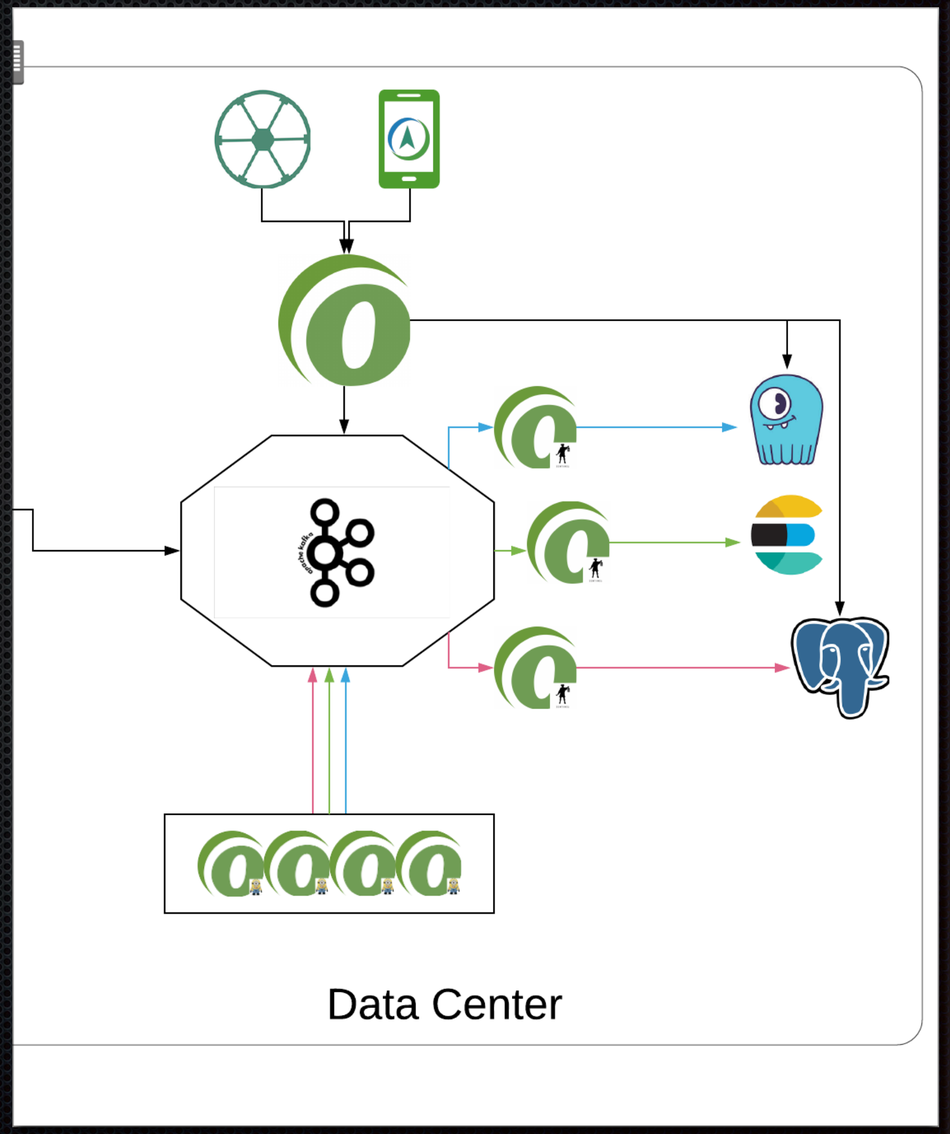
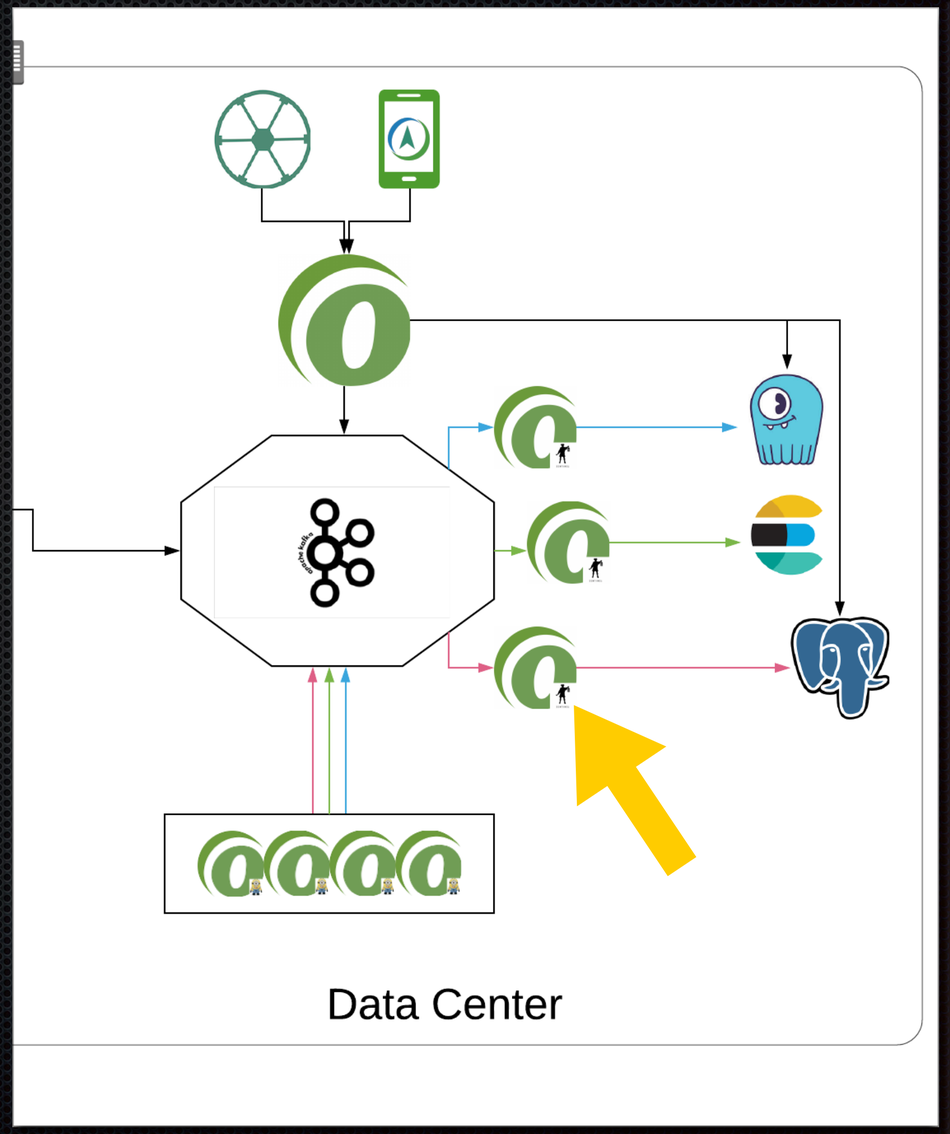


OpenNMS Sentinel



OpenNMS Sentinel

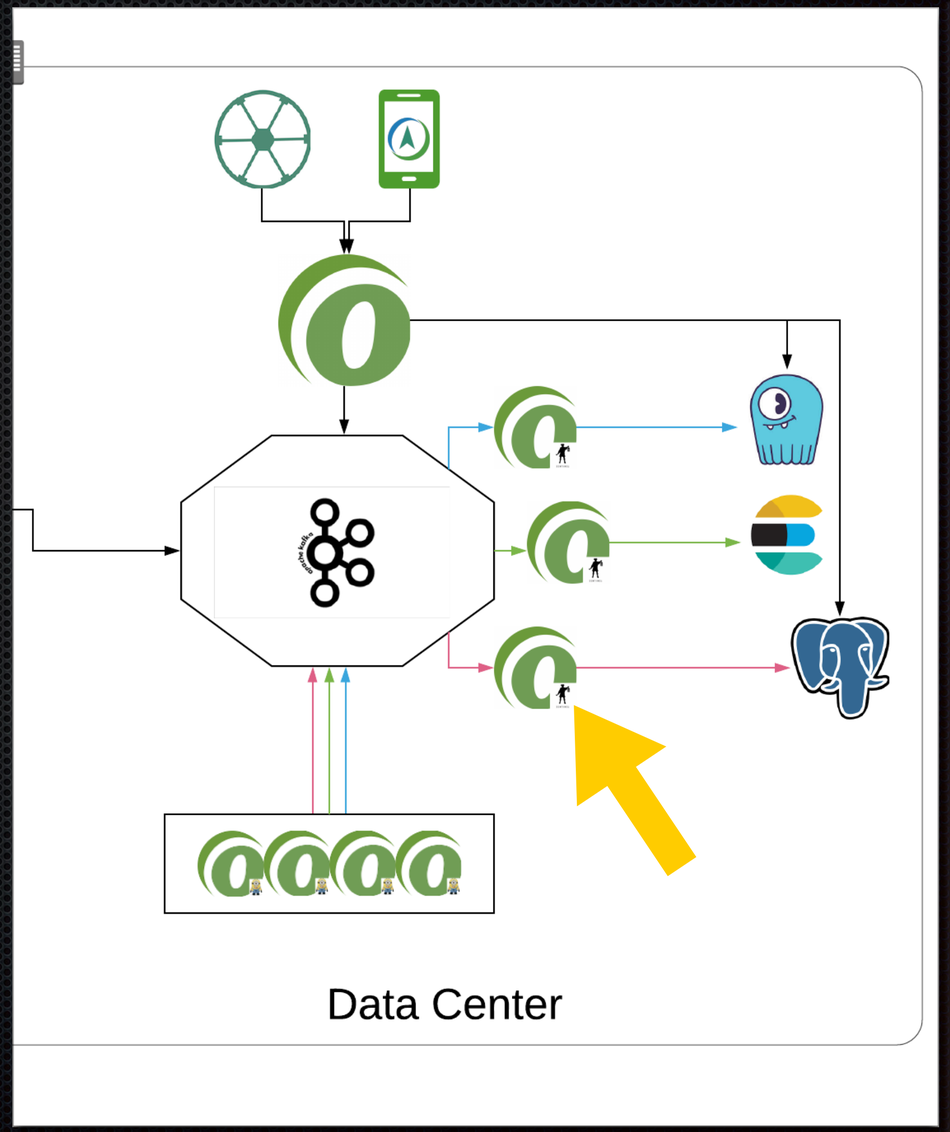
Containerized



OpenNMS Sentinel

Containerized

Horizontal Scale

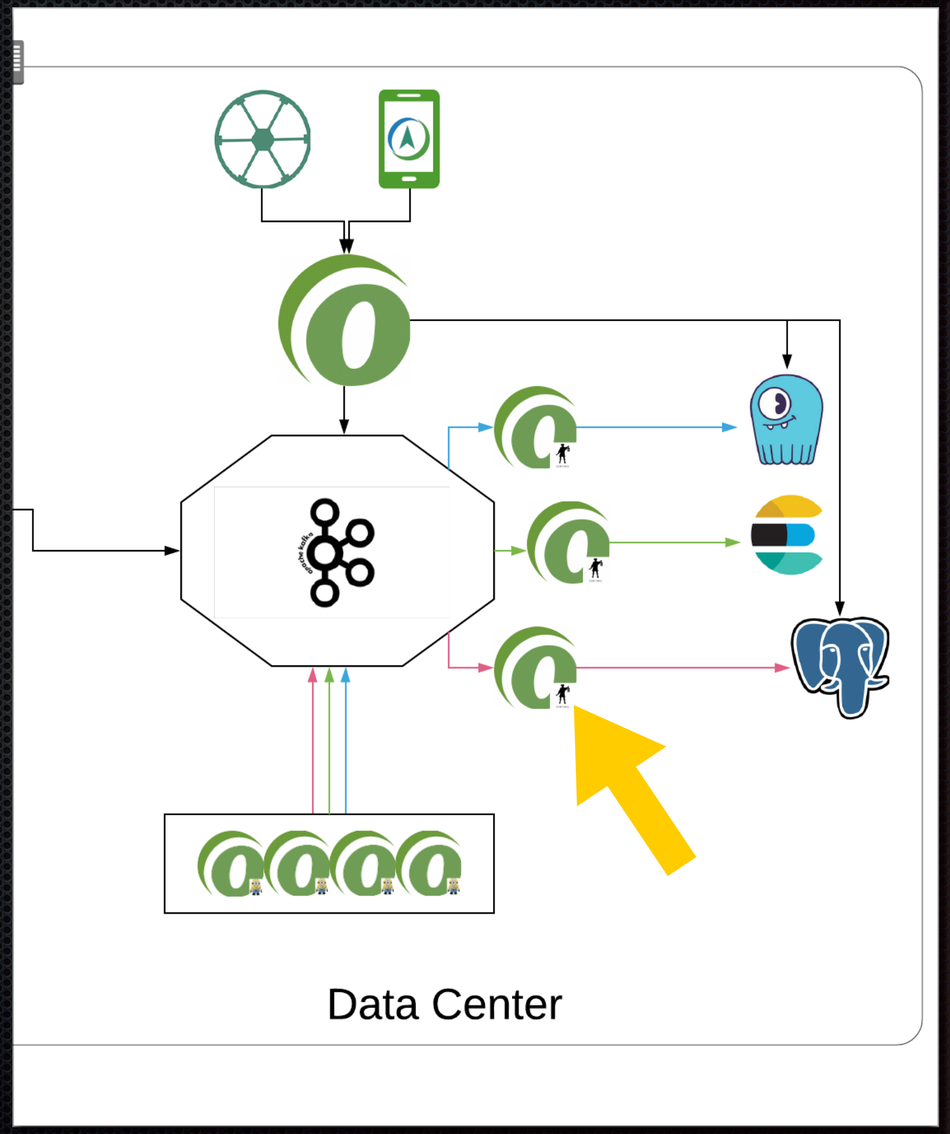


OpenNMS Sentinel

Containerized

Horizontal Scale

Stateless



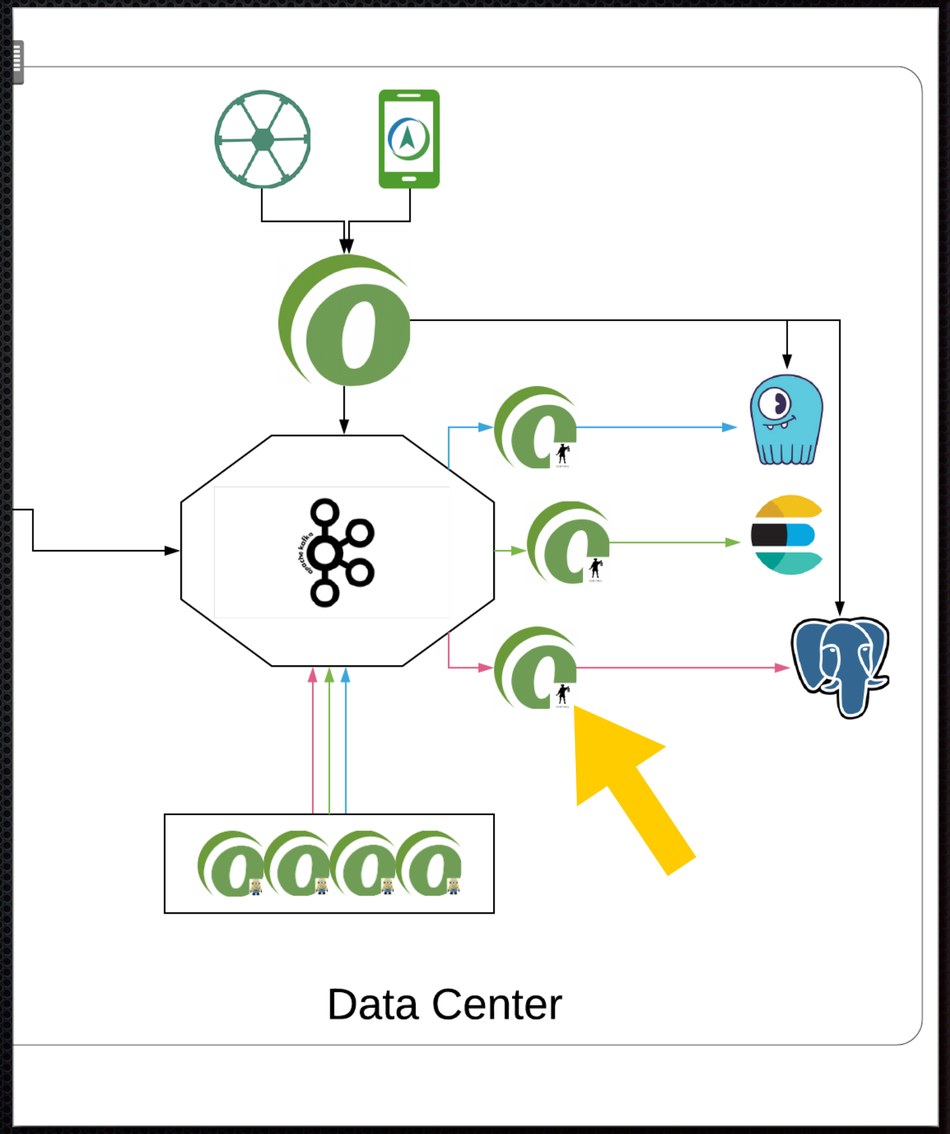
OpenNMS Sentinel

Containerized

Horizontal Scale

Stateless

HA



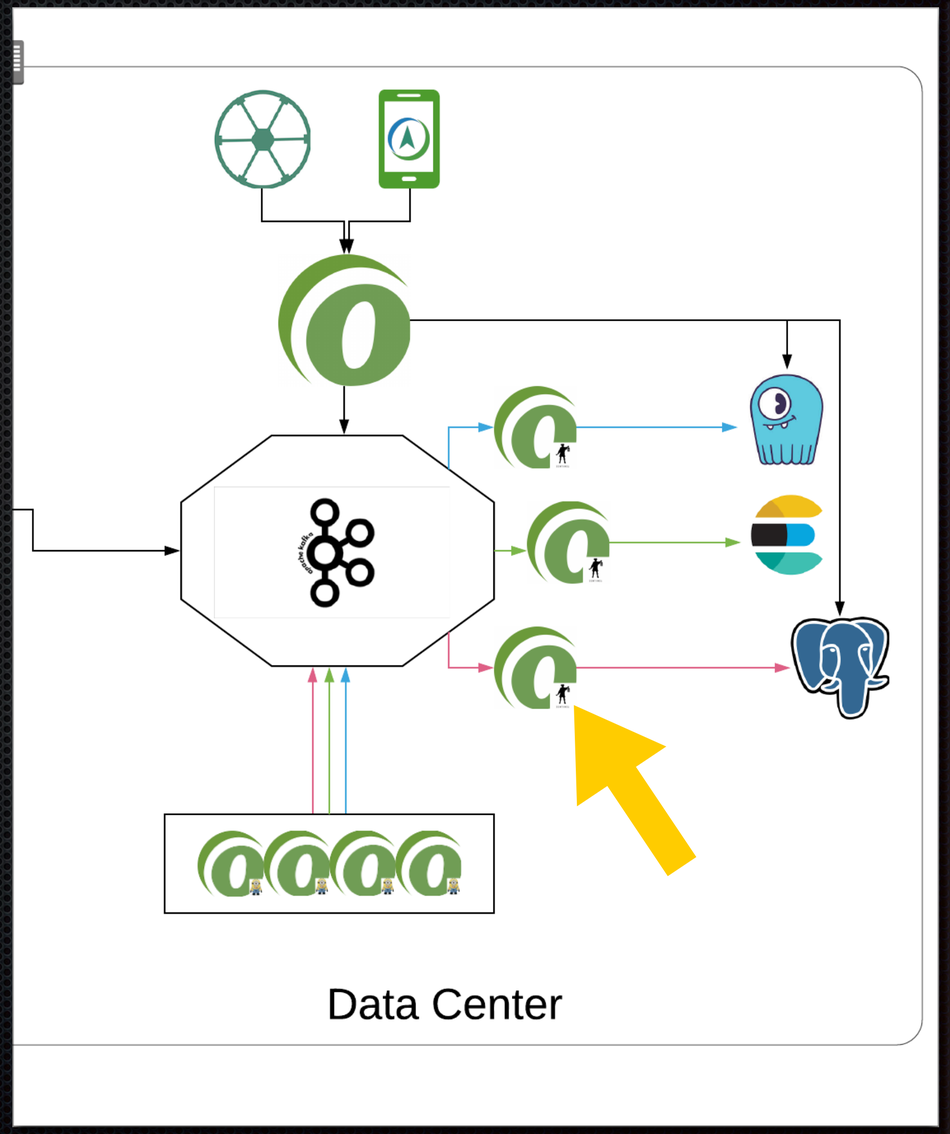
OpenNMS Sentinel

Containerized

Horizontal Scale

Stateless

HA



OpenNMS Sextant

OpenNMS Sextant

ML

OpenNMS Sextant

ML

Unsupervised

OpenNMS Sextant

ML

Unsupervised

Supervised*

*Future

OpenNMS Sextant

ML

AI*

Unsupervised

Supervised*

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OpenNMS Sextant

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AI*

Unsupervised

Anomaly Detection*

Supervised*

*Future

OpenNMS Sextant

ML

AI*

Unsupervised

Anomaly Detection*

Supervised*

Predictions*

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OpenNMS Sextant

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OpenNMS Future

OpenNMS Future

Closed Source in 2019.

OpenNMS Future

Closed Source in 2019.

😇

OpenNMS Future

Closed Source in 2019.

😇

OpenNMS Future

OpenNMS Future

Actually, let’s finally focus on the

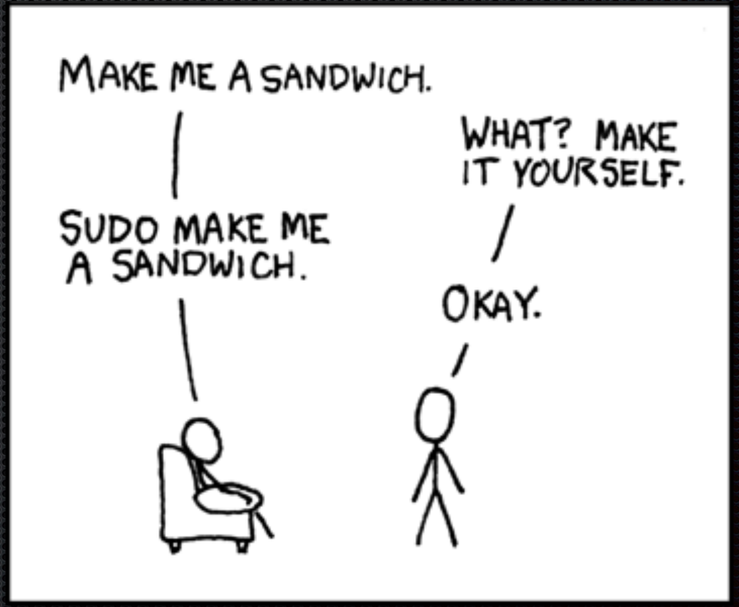
Actually, let's finally focus on the

Complexity!

Actually, let's finally focus on the

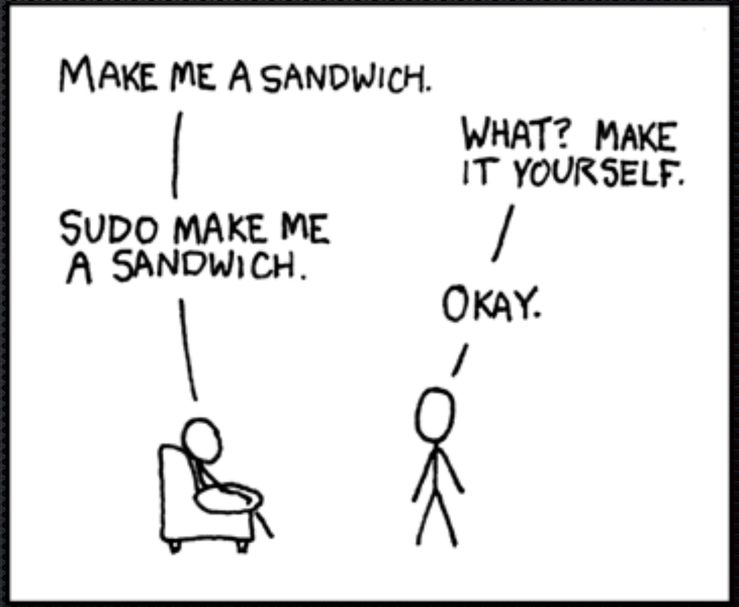
Complexity!

Multifaceted Complexity



Multifaceted Complexity

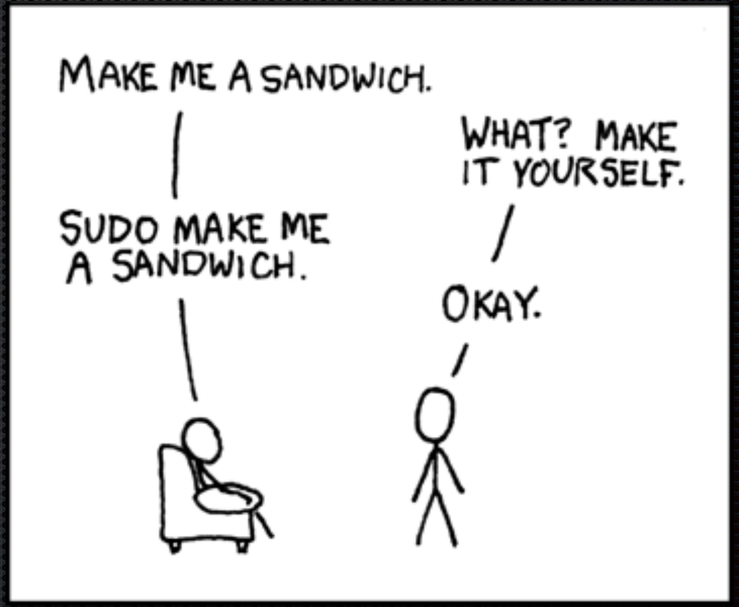
Infrastructure



Multifaceted Complexity

Infrastructure

Configuration

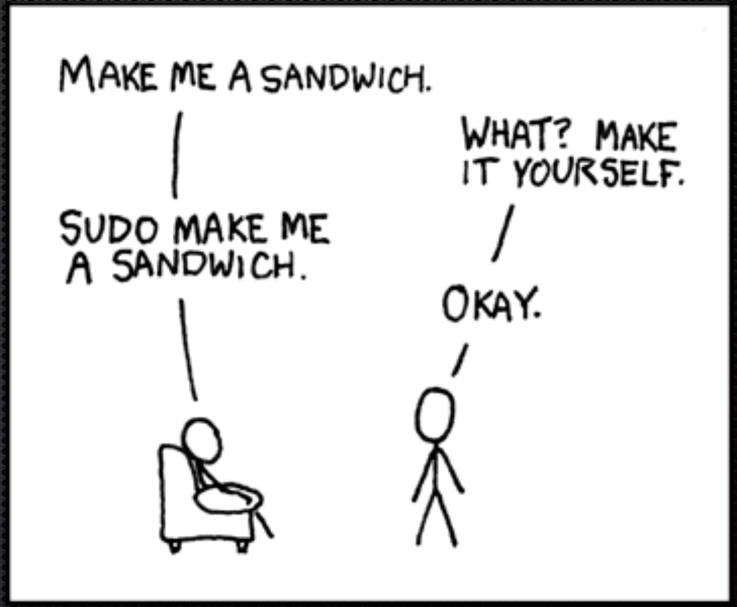


Multifaceted Complexity

Infrastructure

Configuration

Maintenance

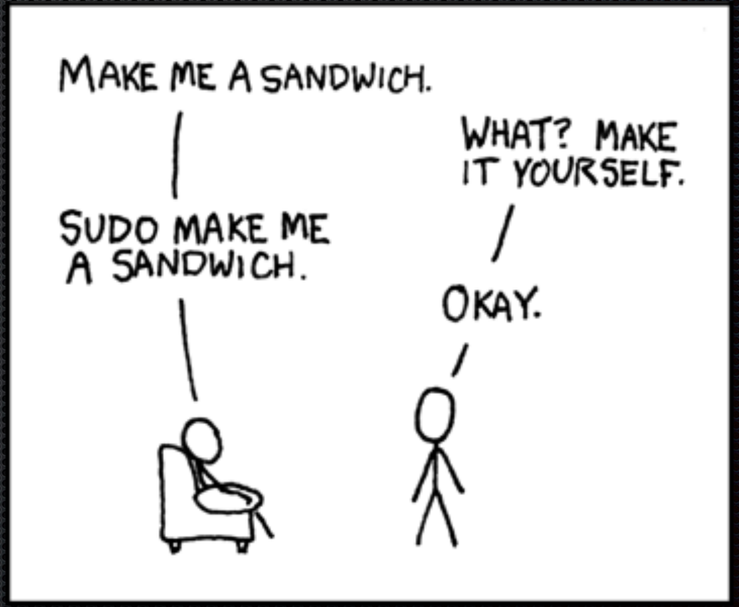


Multifaceted Complexity

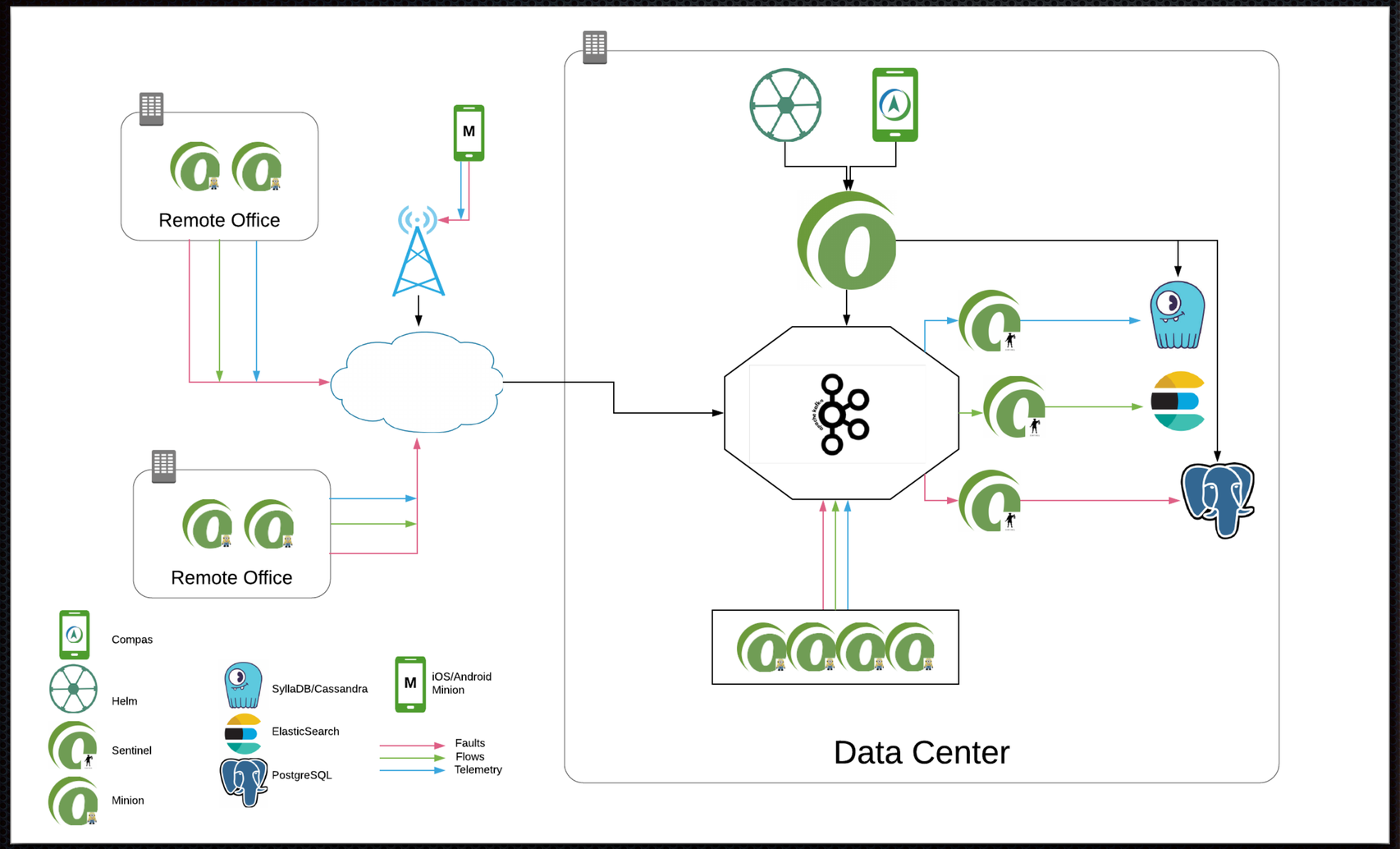
Infrastructure

Configuration

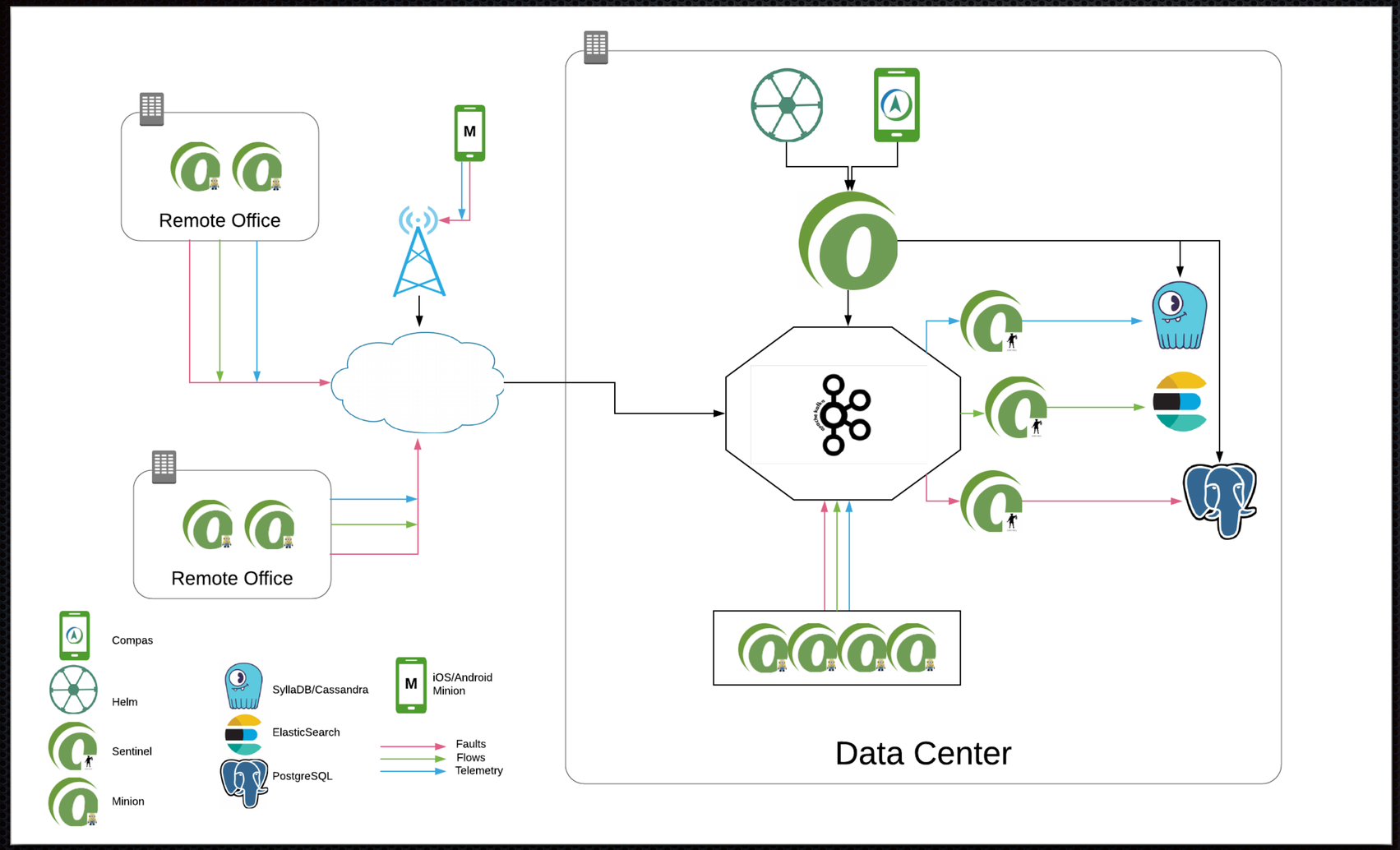
Maintenance



Infrastructure Complexity



Infrastructure Complexity



Cisco NX-OS

Configuration Complexity

```
<resourceType name="ciscoNXProcessIndex" label="Cisco Nexus System Resourses" resourceLabel="${entPhysicalName} (index ${index})">
   <persistenceSelectorStrategy class="org.opennms.netmgt.collectd.PersistRegexSelectorStrategy">
      <parameter key="match-expression" value="(#cpmCPUTotalPhysicalIndex != null)"/>
   </persistenceSelectorStrategy>
   <storageStrategy class="org.opennms.netmgt.collection.support.IndexStorageStrategy"/>
</resourceType>

<group name="cisco-nx-process-index" ifType="ignore">
   <mibObj oid=".1.3.6.1.4.1.9.9.109.1.1.1.1.8" instance="ciscoNXProcessIndex" alias="cpmCPUTotal5minRev" type="Gauge32"/>
   <mibObj oid=".1.3.6.1.4.1.9.9.109.1.1.1.1.12" instance="ciscoNXProcessIndex" alias="cpmCPUMemoryUsed" type="Gauge32"/>
   <mibObj oid=".1.3.6.1.4.1.9.9.109.1.1.1.1.13" instance="ciscoNXProcessIndex" alias="cpmCPUMemoryFree" type="Gauge32"/>
   <mibObj oid=".1.3.6.1.2.1.47.1.1.1.1.7" instance="ciscoNXProcessIndex" alias="entPhysicalName" type="string"/>
   <mibObj oid=".1.3.6.1.4.1.9.9.109.1.1.1.1.2" instance="ciscoNXProcessIndex" alias="cpmCPUTotalPhysicalIndex" type="string"/>
</group>

<!-- Nexus7000 4slot zonda n7k chassis N7K-C7004 -->
<systemDef name="Cisco Nexus 7004">
   <sysoid>.1.3.6.1.4.1.9.12.3.1.3.1147</sysoid>
   <collect>
      <includeGroup>cisco-nx-process-index</includeGroup>
      <includeGroup>cisco-nx-environmental</includeGroup>
   </collect>
</systemDef>
```

Get the data…

Cisco NX-OS

Configuration Complexity

```
<resourceType name="ciscoNXProcessIndex" label="Cisco Nexus System Resourses" resourceLabel="${entPhysicalName} (index ${index})">
   <persistenceSelectorStrategy class="org.opennms.netmgt.collectd.PersistRegexSelectorStrategy">
      <parameter key="match-expression" value="(#cpmCPUTotalPhysicalIndex != null)"/>
   </persistenceSelectorStrategy>
   <storageStrategy class="org.opennms.netmgt.collection.support.IndexStorageStrategy"/>
</resourceType>

<group name="cisco-nx-process-index" ifType="ignore">
   <mibObj oid=".1.3.6.1.4.1.9.9.109.1.1.1.1.8" instance="ciscoNXProcessIndex" alias="cpmCPUTotal5minRev" type="Gauge32"/>
   <mibObj oid=".1.3.6.1.4.1.9.9.109.1.1.1.1.12" instance="ciscoNXProcessIndex" alias="cpmCPUMemoryUsed" type="Gauge32"/>
   <mibObj oid=".1.3.6.1.4.1.9.9.109.1.1.1.1.13" instance="ciscoNXProcessIndex" alias="cpmCPUMemoryFree" type="Gauge32"/>
   <mibObj oid=".1.3.6.1.2.1.47.1.1.1.1.7" instance="ciscoNXProcessIndex" alias="entPhysicalName" type="string"/>
   <mibObj oid=".1.3.6.1.4.1.9.9.109.1.1.1.1.2" instance="ciscoNXProcessIndex" alias="cpmCPUTotalPhysicalIndex" type="string"/>
</group>

<!-- Nexus7000 4slot zonda n7k chassis N7K-C7004 -->
<systemDef name="Cisco Nexus 7004">
   <sysoid>.1.3.6.1.4.1.9.12.3.1.3.1147</sysoid>
   <collect>
      <includeGroup>cisco-nx-process-index</includeGroup>
      <includeGroup>cisco-nx-environmental</includeGroup>
   </collect>
</systemDef>
```

Get the data…

Cisco NX-OS

Configuration Complexity

```
report.cisco.nexus.cpu5rev.name=CPU Utilization (Cisco NX-OS)
report.cisco.nexus.cpu5rev.columns=cpmCPUTotal5minRev
report.cisco.nexus.cpu5rev.type=nodeSnmp
report.cisco.nexus.cpu5rev.suppress=cisco.pixcpu,cisco.pixcpurev
report.cisco.nexus.cpu5rev.command=--title="CPU Utilization (Cisco)" \
 --vertical-label="Percent Utilization" \
 --upper-limit 100 \
 DEF:avgBusy={rrd1}:cpmCPUTotal5minRev:AVERAGE \
 CDEF:dpercent10=0,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent20=10,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent30=20,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent40=30,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent50=40,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent60=50,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent70=60,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent80=70,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent90=80,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent100=90,avgBusy,GT,0,avgBusy,IF \
 COMMENT:"\\n" \
 COMMENT:"CPU average busy 5 min in %\\n" \
 AREA:dpercent10#5ca53f:"0-10% " \
 AREA:dpercent20#75b731:"11-20%" \
 AREA:dpercent30#90c22f:"21-30%" \
 AREA:dpercent40#b8d029:"31-40%" \
 AREA:dpercent50#e4e11e:"41-50%" \
 COMMENT:"\\n" \
 AREA:dpercent60#fee610:"51-60%" \
 AREA:dpercent70#f4bd1b:"61-70%" \
 AREA:dpercent80#eaa322:"71-80%" \
 AREA:dpercent90#de6822:"81-90%" \
 AREA:dpercent100#d94c20:"91-100%\\n" \
 COMMENT:"\\n" \
 LINE2:avgBusy#46683b:"CPU average busy 5 min in %" \
 GPRINT:avgBusy:AVERAGE:"Avg \\: %7.3lf%s" \
 GPRINT:avgBusy:MIN:"Min \\: %7.3lf%s" \
 GPRINT:avgBusy:MAX:"Max \\: %7.3lf%s\\n"
```

Graph the data…

Cisco NX-OS

Configuration Complexity

```
report.cisco.nexus.cpu5rev.name=CPU Utilization (Cisco NX-OS)
report.cisco.nexus.cpu5rev.columns=cpmCPUTotal5minRev
report.cisco.nexus.cpu5rev.type=nodeSnmp
report.cisco.nexus.cpu5rev.suppress=cisco.pixcpu,cisco.pixcpurev
report.cisco.nexus.cpu5rev.command=--title="CPU Utilization (Cisco)" \
 --vertical-label="Percent Utilization" \
 --upper-limit 100 \
 DEF:avgBusy={rrd1}:cpmCPUTotal5minRev:AVERAGE \
 CDEF:dpercent10=0,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent20=10,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent30=20,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent40=30,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent50=40,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent60=50,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent70=60,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent80=70,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent90=80,avgBusy,GT,0,avgBusy,IF \
 CDEF:dpercent100=90,avgBusy,GT,0,avgBusy,IF \
 COMMENT:"\\n" \
 COMMENT:"CPU average busy 5 min in %\\n" \
 AREA:dpercent10#5ca53f:"0-10% " \
 AREA:dpercent20#75b731:"11-20%" \
 AREA:dpercent30#90c22f:"21-30%" \
 AREA:dpercent40#b8d029:"31-40%" \
 AREA:dpercent50#e4e11e:"41-50%" \
 COMMENT:"\\n" \
 AREA:dpercent60#fee610:"51-60%" \
 AREA:dpercent70#f4bd1b:"61-70%" \
 AREA:dpercent80#eaa322:"71-80%" \
 AREA:dpercent90#de6822:"81-90%" \
 AREA:dpercent100#d94c20:"91-100%\\n" \
 COMMENT:"\\n" \
 LINE2:avgBusy#46683b:"CPU average busy 5 min in %" \
 GPRINT:avgBusy:AVERAGE:"Avg \\: %7.3lf%s" \
 GPRINT:avgBusy:MIN:"Min \\: %7.3lf%s" \
 GPRINT:avgBusy:MAX:"Max \\: %7.3lf%s\\n"
```

Graph the data…

Cisco NX-OS

Configuration Complexity

```
<package name="cisco">
   <filter>IPADDR != '0.0.0.0' &amp; nodeSysOID LIKE '.1.3.6.1.4.1.9.%'</filter>
   <include-range begin="1.1.1.1" end="254.254.254.254"/>
   <include-range begin="::1" end="ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff"/>
   <service name="SNMP" interval="300000" user-defined="false" status="on">
      <parameter key="thresholding-group" value="cisco"/>
   </service>
</package>
```

Measure the data…

```
<group name="cisco" rrdRepository="/opt/opennms/share/rrd/snmp/">
   <threshold description="Trigger an alert when the five minute exponentially-decayed moving average of the CPU busy percentage
metric on a Cisco device reaches or goes above 80% for three measurement intervals" type="high" ds-type="node" value="80.0"
rearm="50.0" trigger="3" filterOperator="OR" ds-name="cpmCPUTotal5minRev"/>
```

Cisco NX-OS

Configuration Complexity

```
<package name="cisco">
   <filter>IPADDR != '0.0.0.0' &amp; nodeSysOID LIKE '.1.3.6.1.4.1.9.%'</filter>
   <include-range begin="1.1.1.1" end="254.254.254.254"/>
   <include-range begin="::1" end="ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff"/>
   <service name="SNMP" interval="300000" user-defined="false" status="on">
      <parameter key="thresholding-group" value="cisco"/>
   </service>
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Measure the data…

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<group name="cisco" rrdRepository="/opt/opennms/share/rrd/snmp/">
   <threshold description="Trigger an alert when the five minute exponentially-decayed moving average of the CPU busy percentage
metric on a Cisco device reaches or goes above 80% for three measurement intervals" type="high" ds-type="node" value="80.0"
rearm="50.0" trigger="3" filterOperator="OR" ds-name="cpmCPUTotal5minRev"/>
```

Maintenance Complexity

Diagnostics

Maintenance Complexity

Diagnostics

Upgrades

Maintenance Complexity

Diagnostics

Upgrades

Backup/Restore/HA

Maintenance Complexity

Diagnostics

Upgrades

Backup/Restore/HA

Why our community bares with it?

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Open source

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Hyper Scalability

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Flexibility

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The buffet of NMSs

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What to do about the complexity?

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Cloud based SaaS

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Configuration Wizards w/UI

What to do about the complexity?

Cloud based SaaS

Configuration Wizards w/UI

More Instrumentation w/UI

What to do about the complexity?

Cloud based SaaS

Configuration Wizards w/UI

More Instrumentation w/UI

More Tooling w/UI

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