
# Old Meets New: Syslog and Kafka

## Aggregated Data Collection with Splunk Connect for Kafka

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# Forward-Looking Statements

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splunk> .conf18

# We Will Discuss:

1. Syslog/Splunk Best Practice Review
2. Rudiments of Splunk Connect for Kafka
3. New! Connect for Kafka and Syslog
4. Connect for Kafka Configuration
5. Wrap-up/Resources

# Syslog and Splunk: A Review

**Syslog lives on!**

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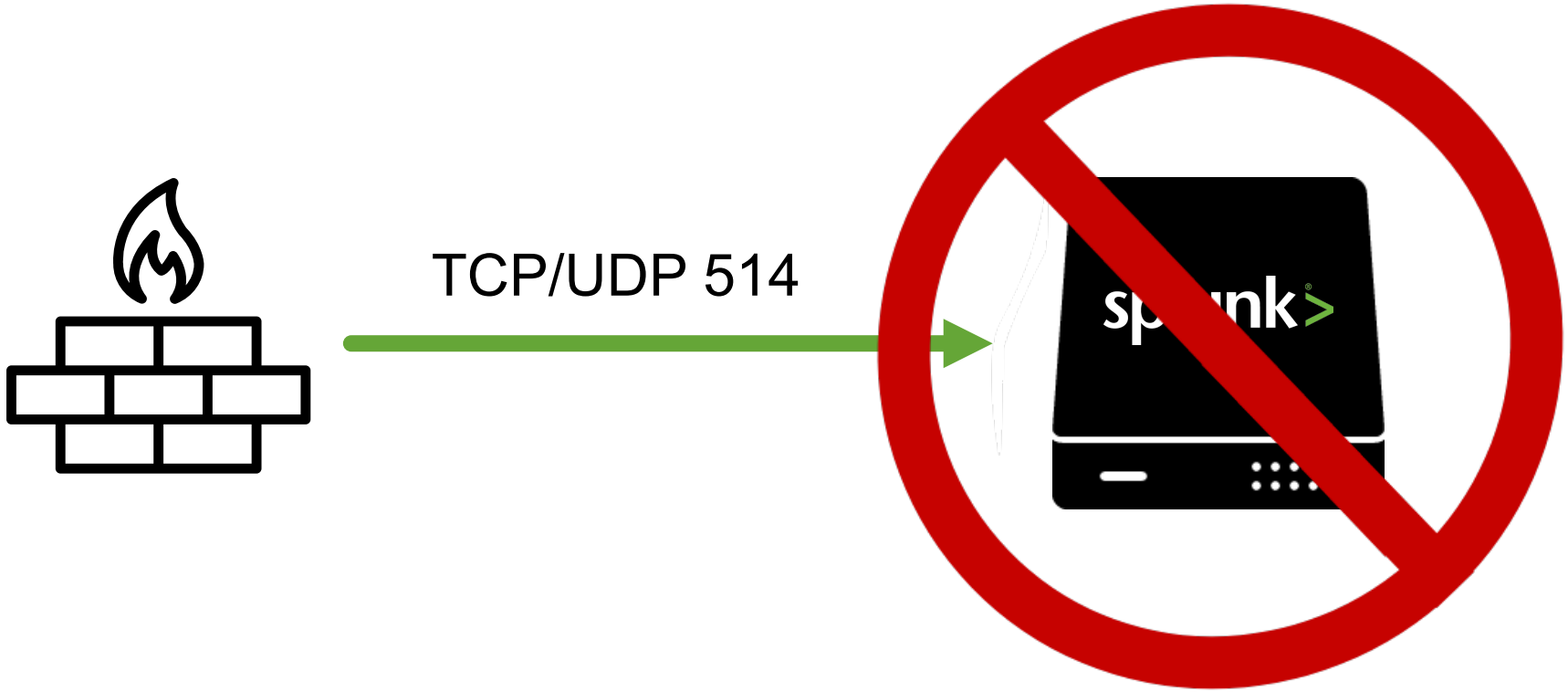
# Remember this from last year...

## Do *not* send syslog traffic (on any port) directly to Splunk indexers

(Except in the smallest of installations.  Or other corner cases.  There are *always* corner cases.)



# A Lot has Changed in a Year...

- Message buses have become more prevalent, particularly in Cloud installations
- Kafka has emerged as the de facto “on-prem” message bus
  - cf. Kinesis (AWS), EventHub (Azure), etc.
- There are now plenty of options for ingesting syslog-based data into Splunk
  - With and without message buses
  - With and without a traditional syslog server
- Other sessions will explore these options

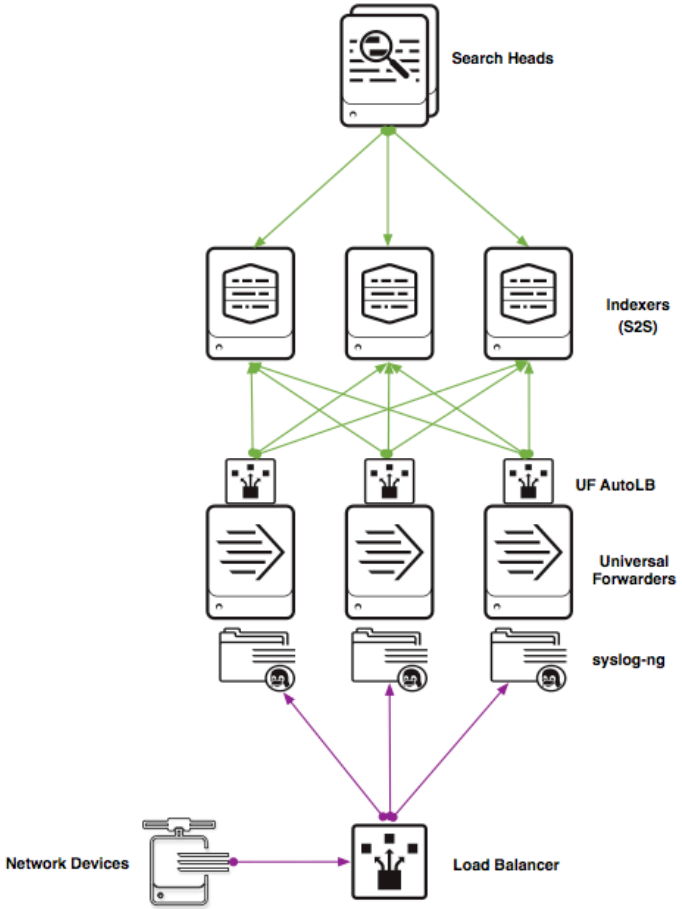
# ...And a Lot has Not

Syslog as popular as ever

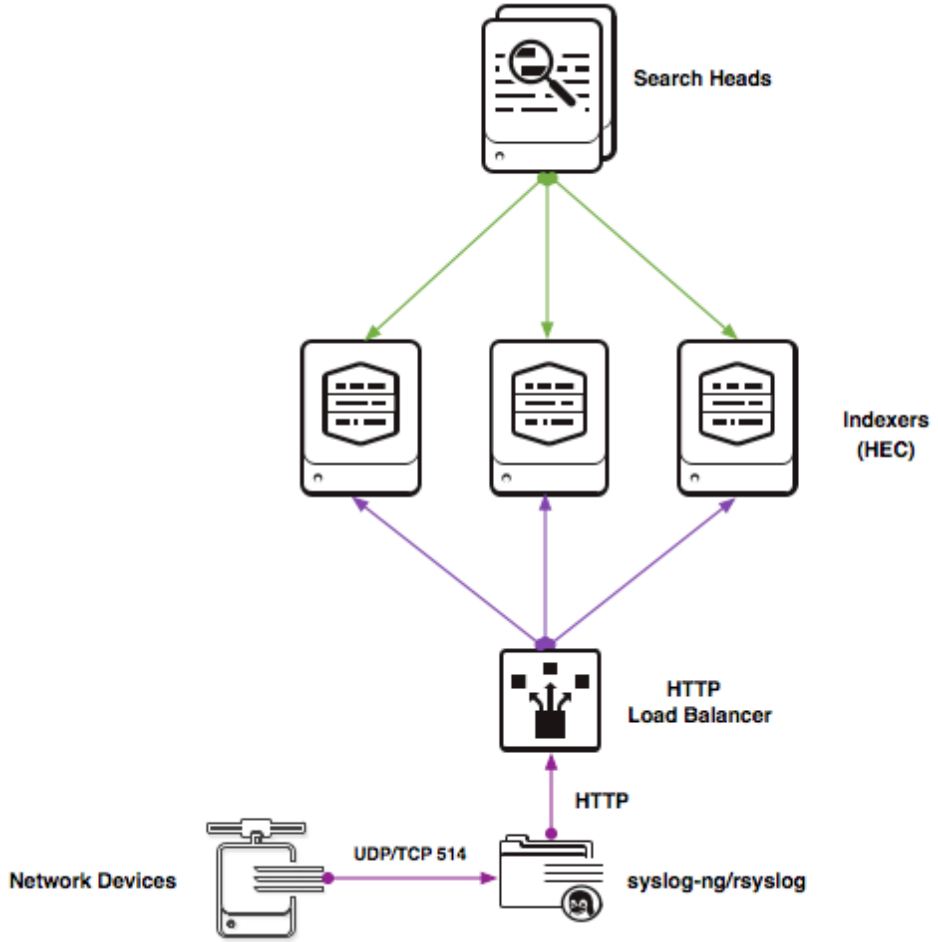
- Efficient and easy-to-implement protocol still popular with device vendors
- Syslog still the most common “sourcetype” ingested by our customers
- Most customers still ingesting syslog incorrectly
- Both syslog server flavors (syslog-ng and rsyslog) have stewardship issues
  - Recent versions may not be officially supported by distro vendors
  - Compiled binaries at times can be difficult to track down (recent links provided in wrap-up)

# syslog/HEC Introduced Last Year...

## UF




## HEC



# ...With Some Caveats

Along with some very successful deployments

- For highest scale, messages sent to HEC should be batched
- For this reason, a script (`omsplunkhec.py`) was developed to enable batching events from syslog servers to the HEC /raw endpoint
- Script only supports /raw endpoint in HEC
  - Cannot automatically create indexed fields
  - Originating host and other critical fields must be parsed out of the general payload
- Script cannot persist data to disk in case of infrastructure loss
- Though simple (less than one page of NCSS), and in production at many customer installations, it is not officially supported by Splunk
- Even so, still a viable architecture and remains a recommended option

# Scalable Data Collection from Kafka Introduced

## Introducing Splunk Connect for Kafka!

- Replaces a number of early TAs
- Significantly higher scale
- Sources (devices/syslog servers) and sink (Splunk) can be widely distributed
- Allows use of *both* /raw and /event HEC endpoints
  - And with some tricks, both at the same time
- Allows the option of omitting the syslog server (using syslog source connector)
  - More later on this...
- Supported by Splunk!

# Are syslog servers still necessary with Kafka?

Syslog protocol is (still) very rich

- Traditional servers decode traffic, at scale, using a very well-defined protocol
  - One of the earliest protocols developed in the heyday of BSD Unix
  - RFC 3164 (BSD) – latest revision documents behavior of earlier syslog implementations
  - RFC 5424 (IETF) – significant revision written in 2009; supersedes 3164
  - Many devices still (and especially by default) emit only BSD-style (3164) syslog
- Many customers have syslog servers in production today, and would like to continue to use them with Splunk.
- Syslog servers are very well documented; even the “NG” versions are now pushing 20 years old
- Stewardship still an issue

# Or Not?

Direct syslog ingest via kafka-connect-syslog or generic UDP/TCP Kafka connectors

- The new “hotness” is stream processing in Kafka/Kinesis/etc.
  - Significant work needed to replicate true syslog protocol decode
  - Significant props/transforms work may be necessary
- Omitting syslog servers can simplify architecture
- Can be adequate if separate ports can be used for each sourcetype
  - Very difficult to do in practice
  - See session (SEC1905, McKesson) for an example of this approach

# Rudiments of Splunk Connect for Kafka

## Scalable Splunk Data Collection from Kafka

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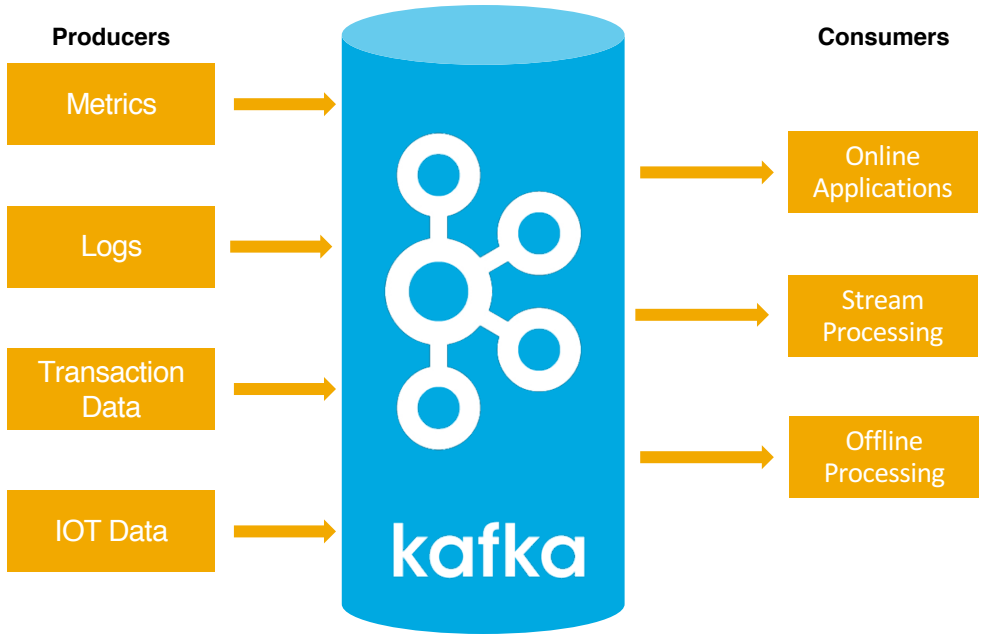
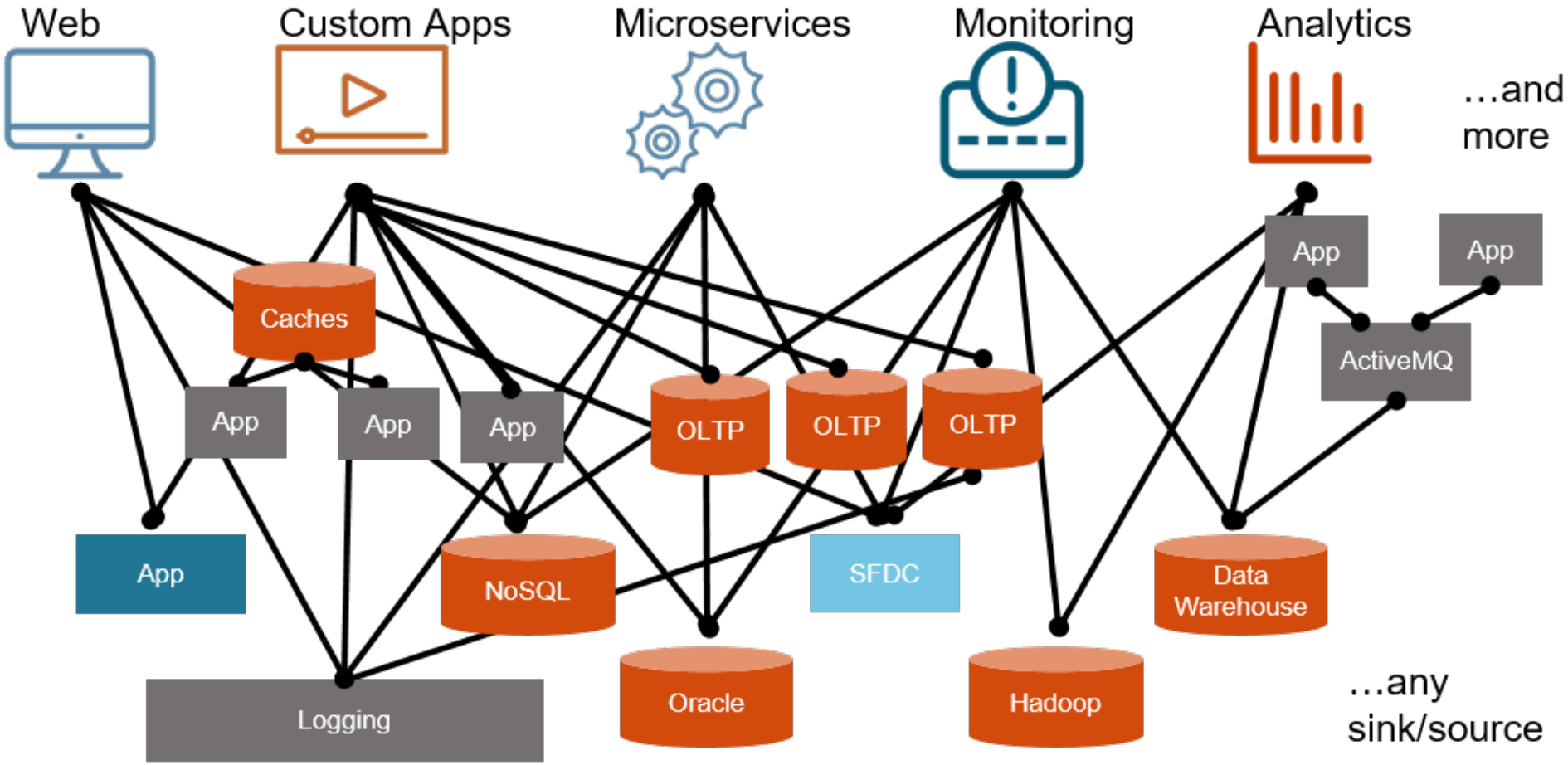
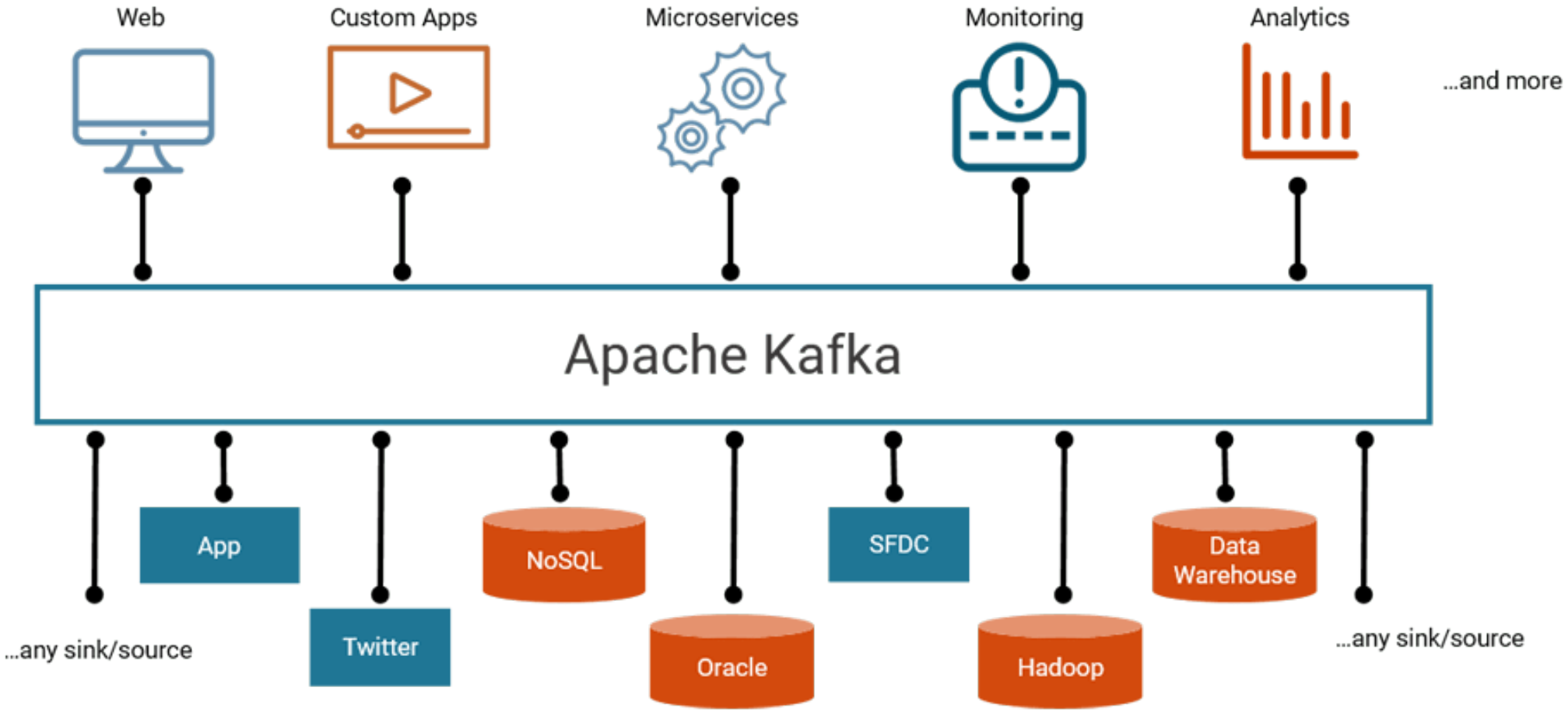
# What Is Kafka?




- Distributed
- Fault Tolerant
- Persistent
- Scalable
- Low Latency
- Secure
- Streaming
- Common API's
- It's a log!!!




Source: Confluent.io



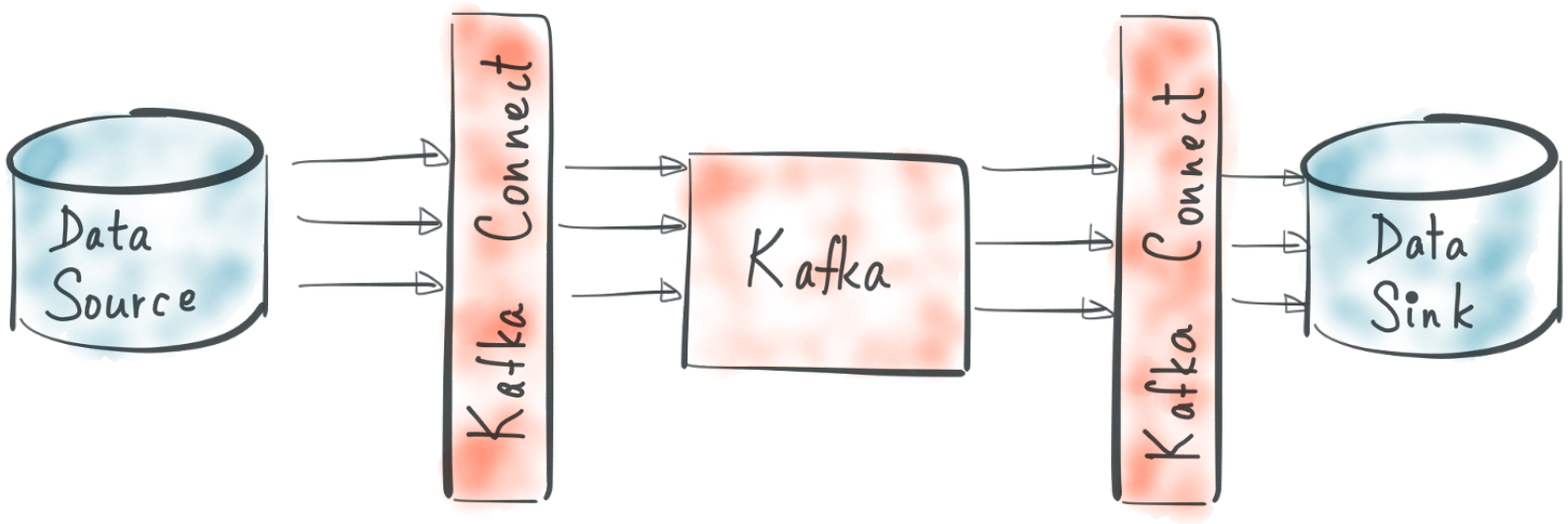

Source: Confluent.io

# Splunk Add-On for Kafka

**https://www.splunk.com/blog/2016/10/31/splunking-kafka-at-scale.html**

- Frequency based polling (modular input)
- Didn’t scale (simple consumer)
- Painful configuration
- Lacking fault tolerance
- Pre-built panels to operationally monitor Kafka (JMX)

# Kafka Connect



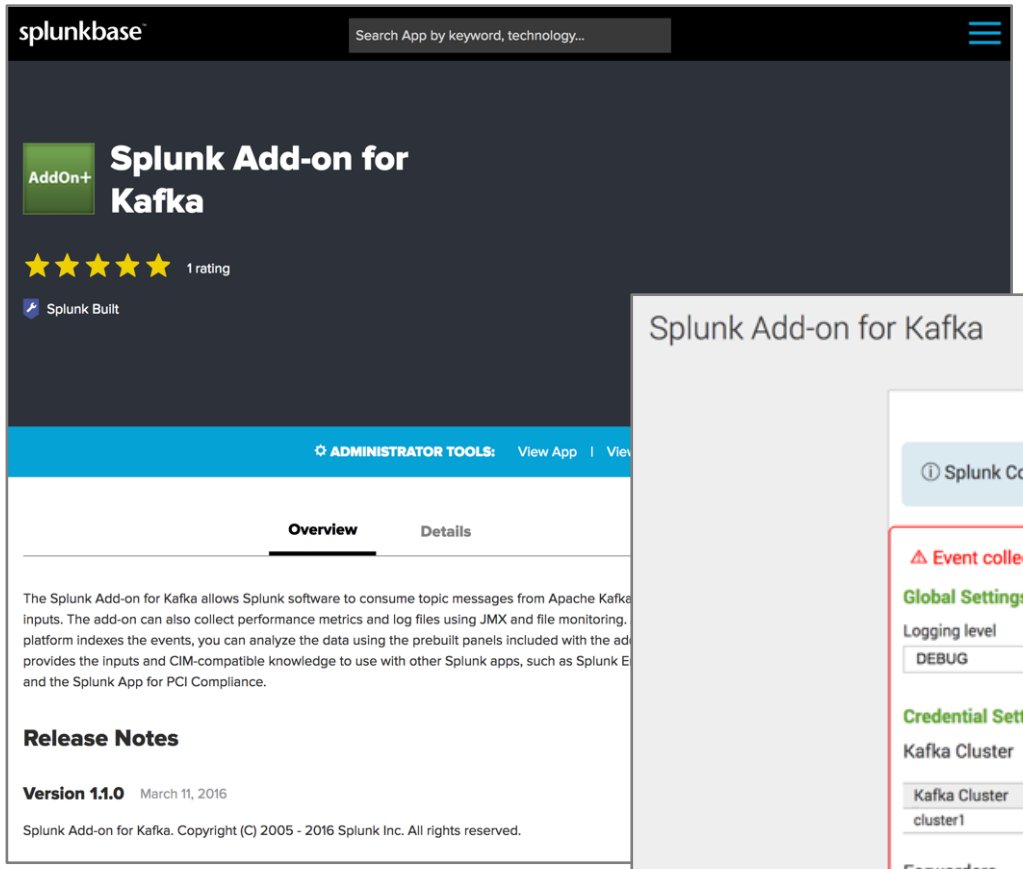

- Scalable & Reliable Data Streaming
- Tightly Coupled API
- Flexible Deployment
- Source & Sink Connectors
- Streaming & Batch
- Connectors, Workers, Tasks
- Management REST API

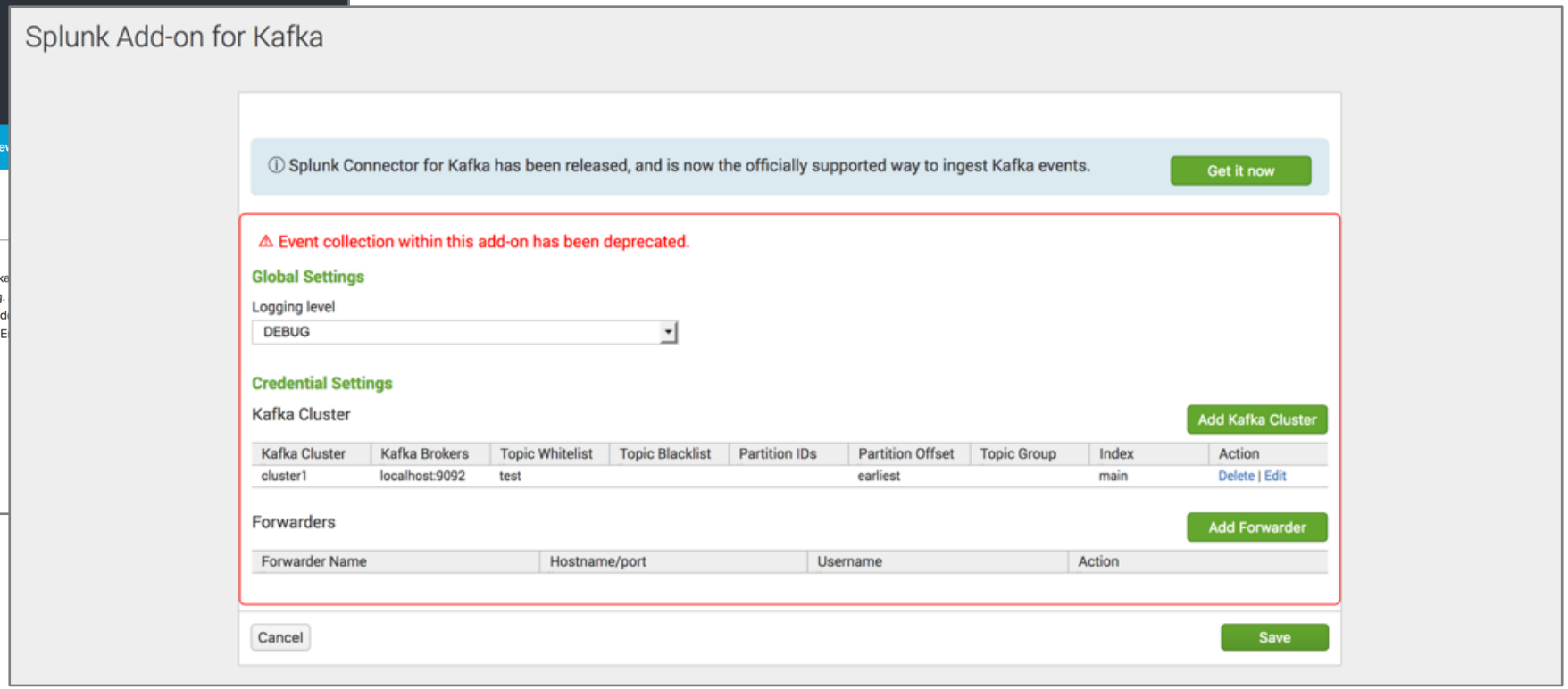
Source: Confluent.io

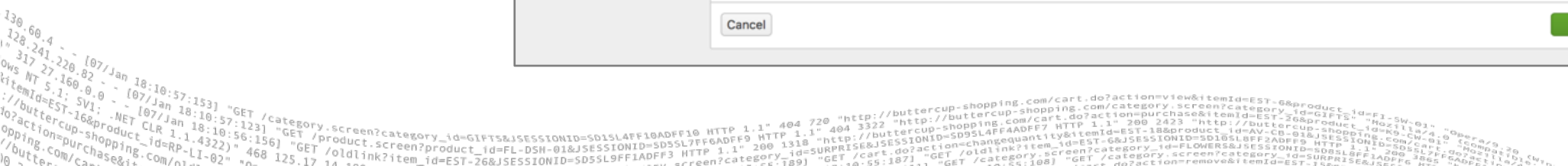
# Splunk Connect for Kafka

- Kafka Connect Sink Connector (distributed, fault tolerant, scalable)
- Java HEC client
- Load balancing – internal round robin or hardware/software LB
- Per topic/event routing
- Metrics Store – collectd ➡ /services/collector/raw [collectd_http]
- Indexer acknowledgement
- Splunk supported

# Legacy Splunk Add-on for Kafka



splunk> .conf18

# New! Splunk Connect for Kafka and Syslog

**Scalable, Performant, and Supported!**

splunk> .conf18

# What Drives the Need?

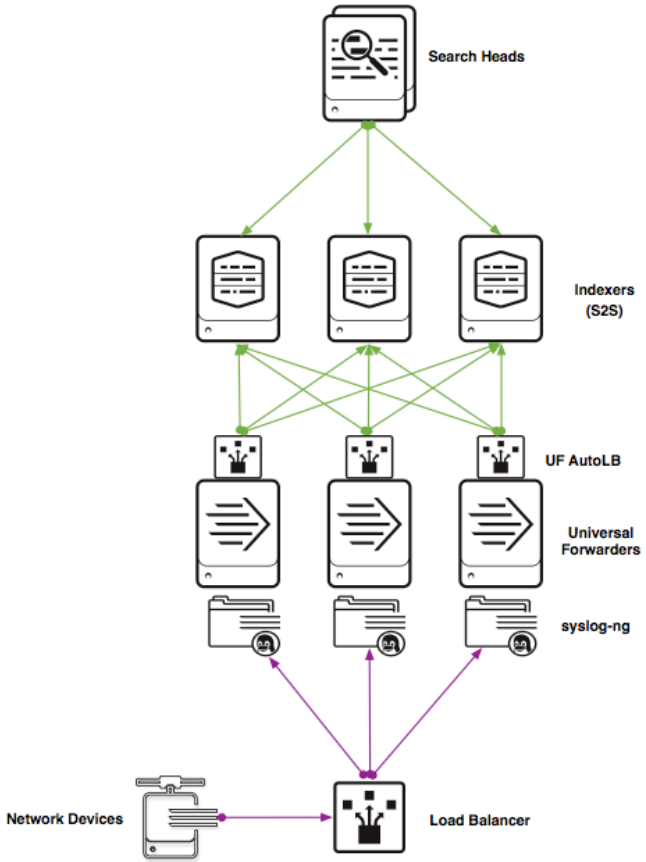
**This is where the subtitle goes**

- Scale requirements stretch UF limits
- Distributed Data Collection/Resiliency
- Improved HEC Compatibility
- Supportability
- Alignment with evolving customer needs

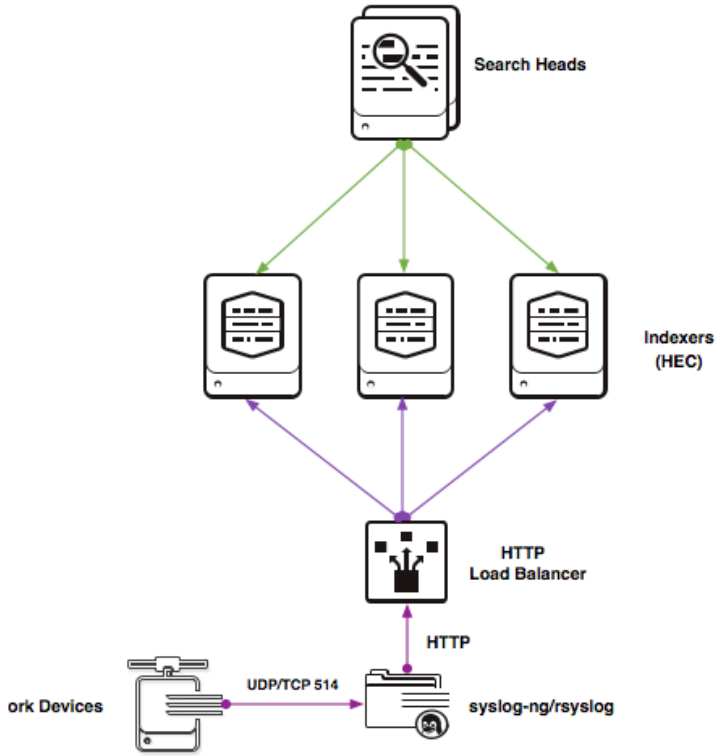
# New for 2018: Syslog with Splunk Connect for Kafka!

## An Extension of the HEC/Syslog Architecture

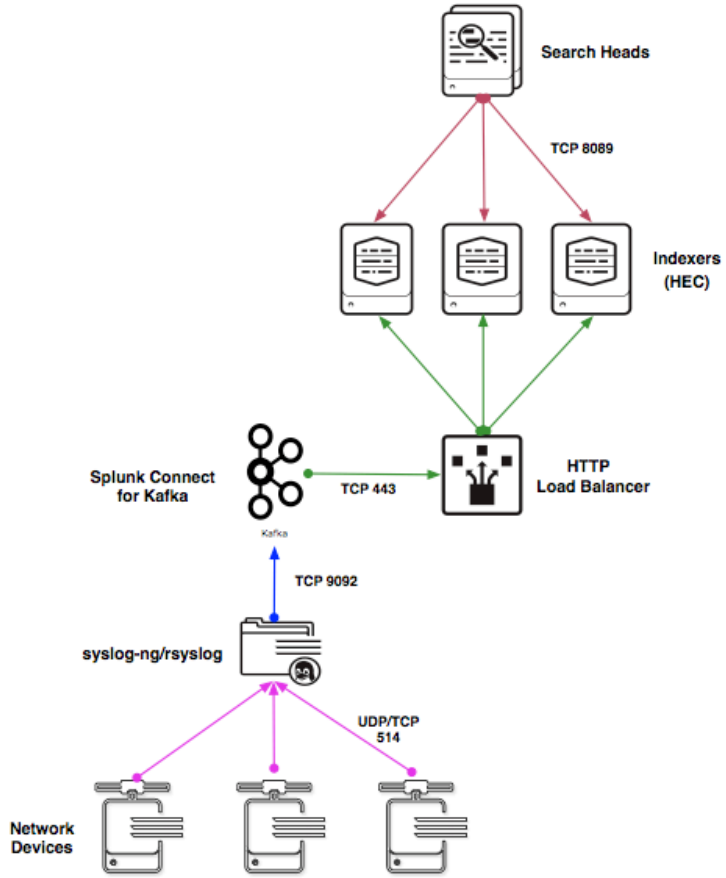
### UF




### HEC




### New! Kafka/HEC

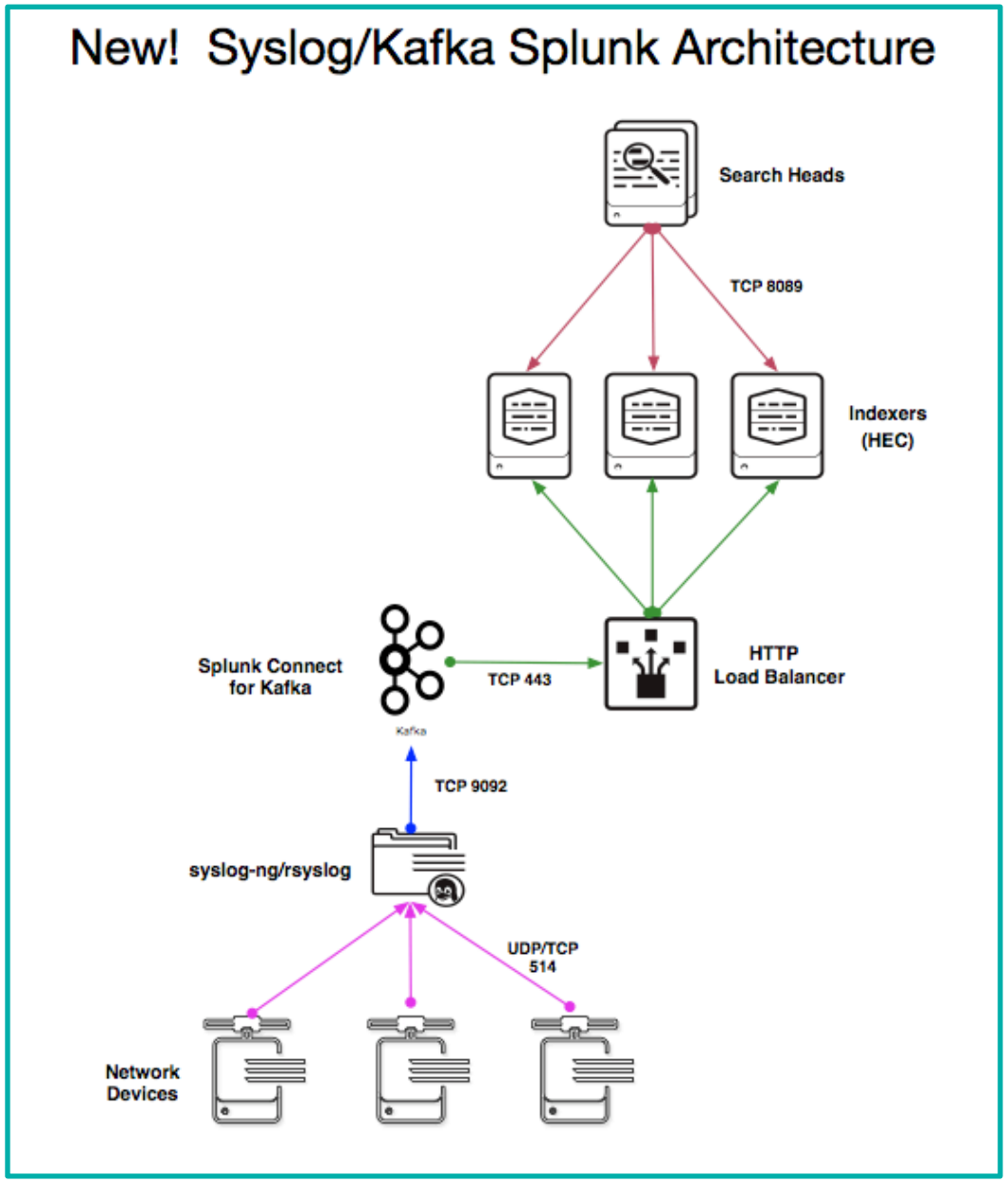



splunk> .conf18

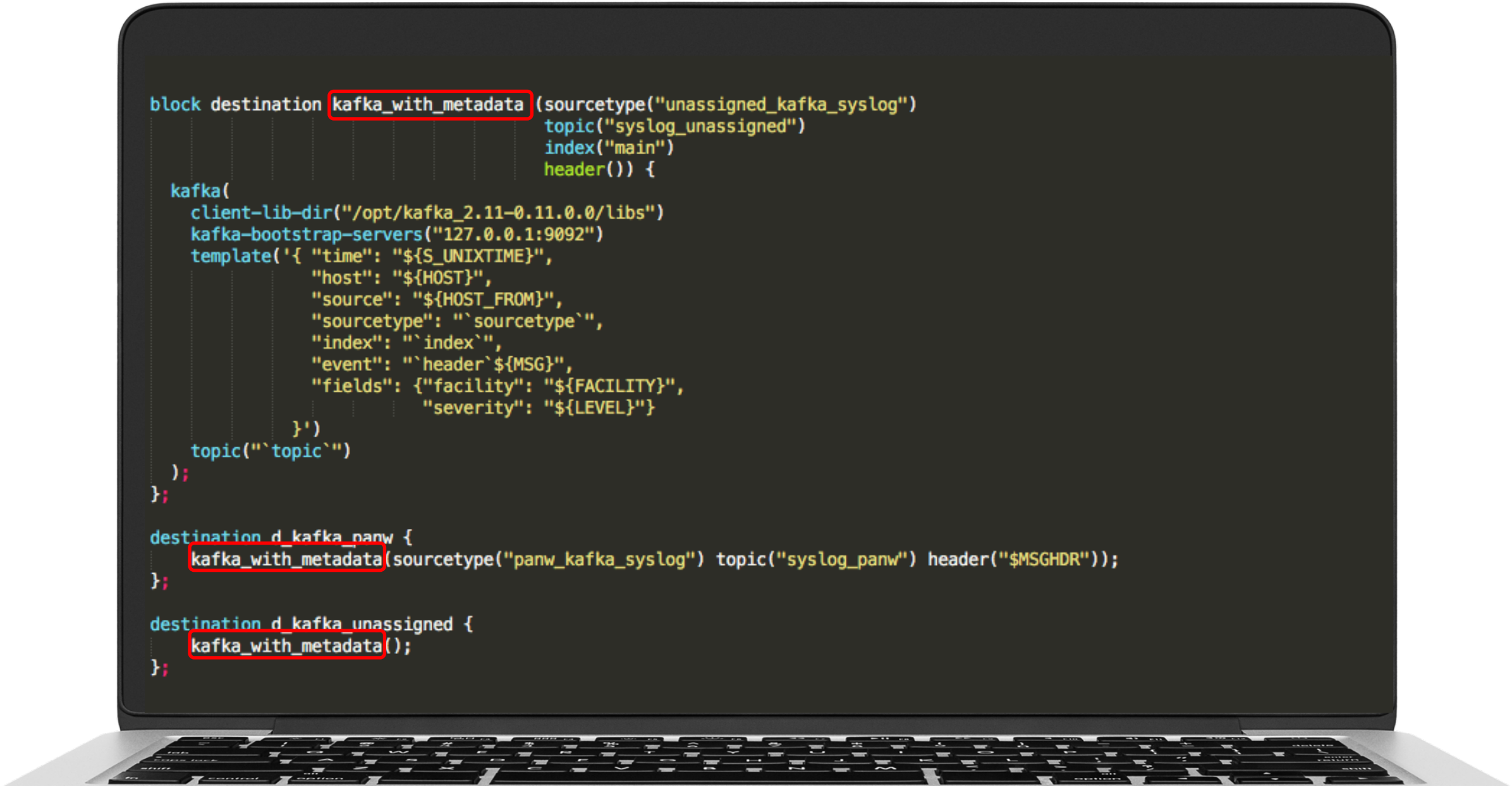
# Syslog/Kafka Architecture

The evolution of syslog/HEC

- Takes full advantage of Kafka
- Allows use of /event, /raw, and even a “hybrid” mode
- Full persistence to disk and distributed data availability
- Very simple configuration changes from original HEC syslog-ng/rsyslog configurations from last year
- Can be used without a syslog server in certain cases

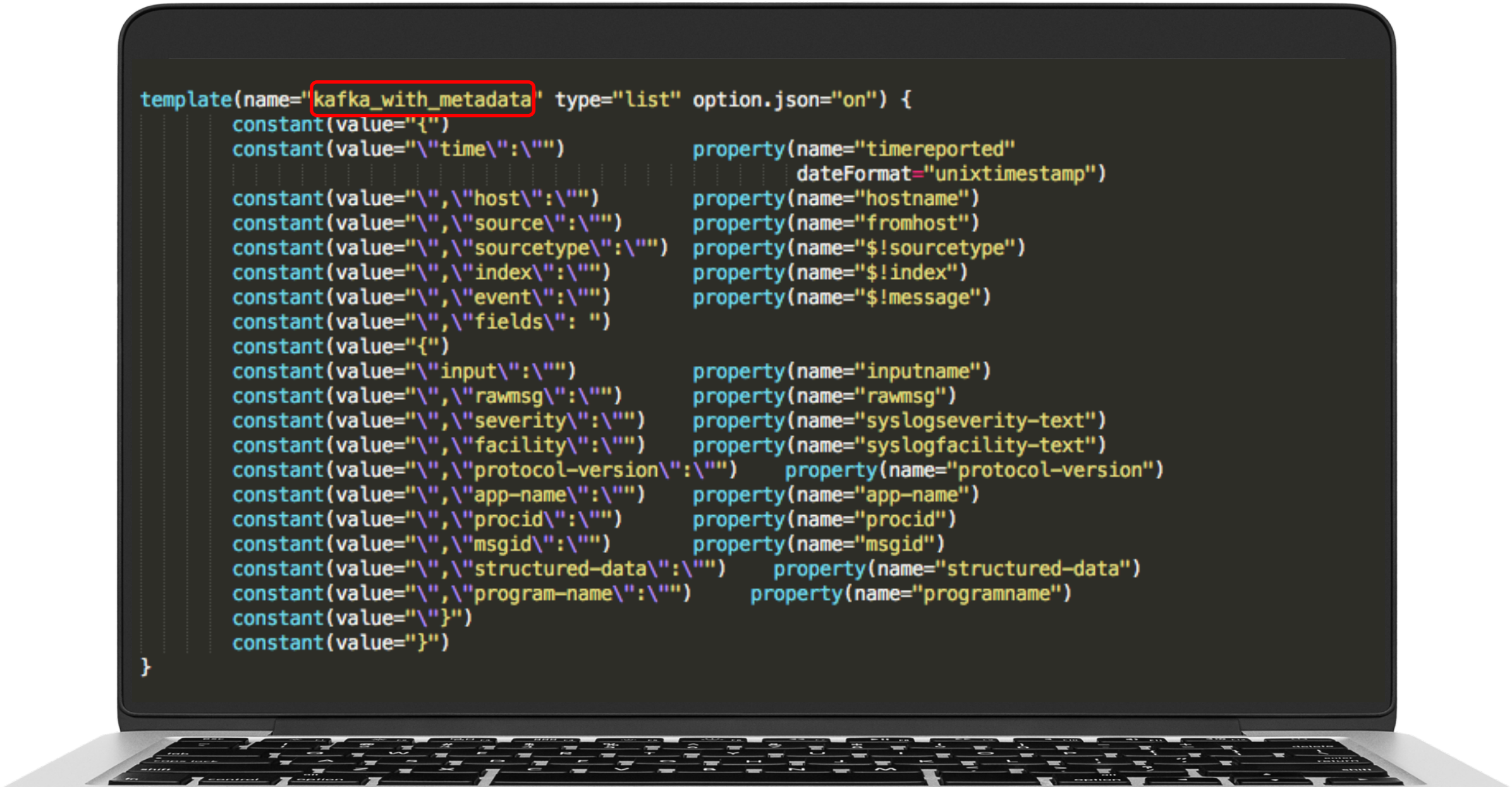


# Syslog-ng Destination Configuration for Kafka



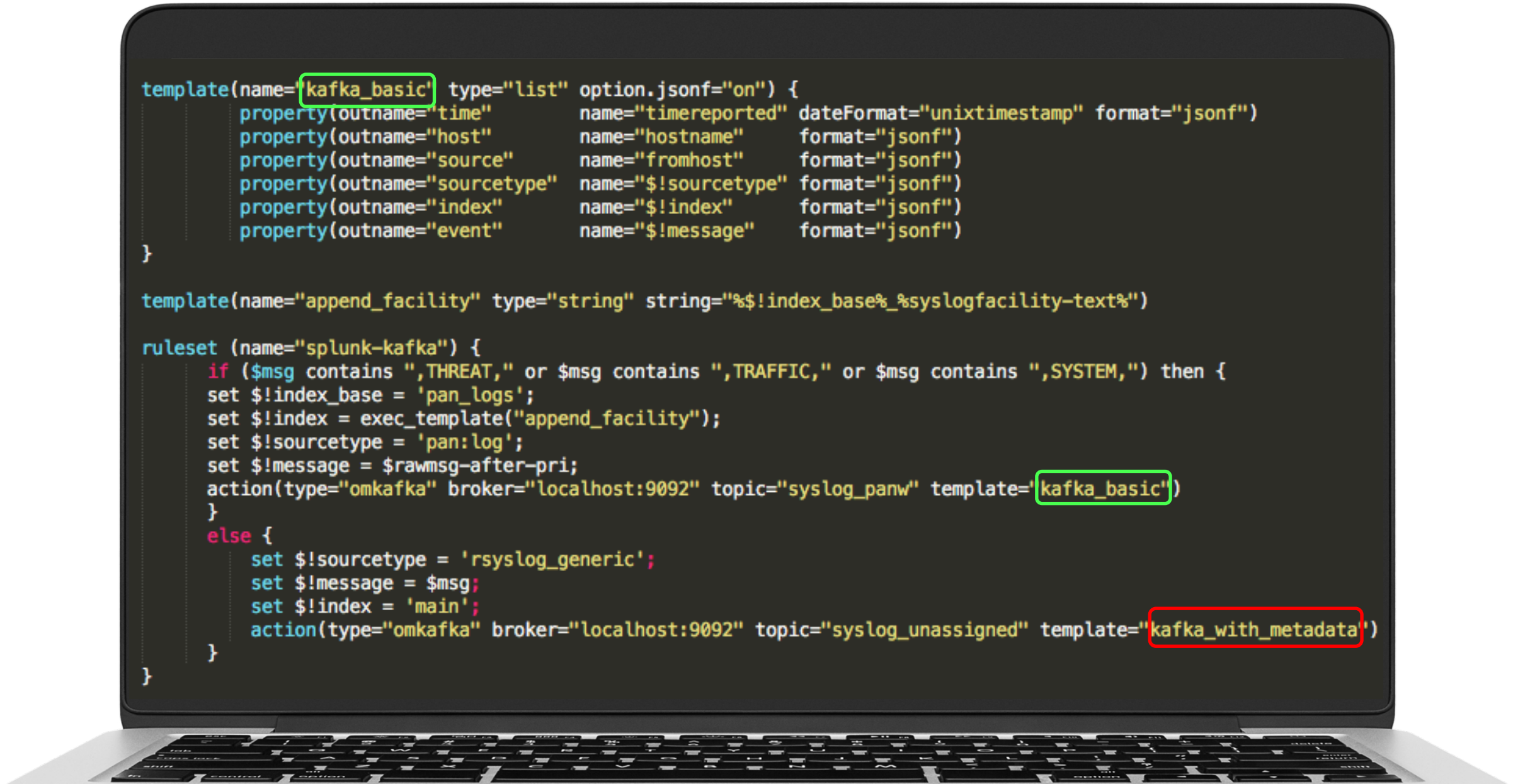
```
block destination kafka_with_metadata (sourcetype("unassigned_kafka_syslog")
                                       topic("syslog_unassigned")
                                       index("main")
                                       header()) {
  kafka(
    client-lib-dir("/opt/kafka_2.11-0.11.0.0/libs")
    kafka-bootstrap-servers("127.0.0.1:9092")
    template('{ "time": "${S_UNIXTIME}",
                "host": "${HOST}",
                "source": "${HOST_FROM}",
                "sourcetype": "`sourcetype`",
                "index": "`index`",
                "event": "`header`${MSG}",
                "fields": {"facility": "${FACILITY}",
                           "severity": "${LEVEL}"}
              }')
    topic("`topic`")
  );
};

destination d_kafka_panw {
    kafka_with_metadata(sourcetype("panw_kafka_syslog") topic("syslog_panw") header("$MSGHDR"));
};

destination d_kafka_unassigned {
    kafka_with_metadata();
};
```

# rsyslog Template Configuration for Kafka



```
template(name="kafka_with_metadata" type="list" option.json="on") {
        constant(value="{")
        constant(value="\"time\":\"")           property(name="timereported"
                                                         dateFormat="unixtimestamp")
        constant(value="\",\"host\":\"")        property(name="hostname")
        constant(value="\",\"source\":\"")      property(name="fromhost")
        constant(value="\",\"sourcetype\":\"")  property(name="$!sourcetype")
        constant(value="\",\"index\":\"")       property(name="$!index")
        constant(value="\",\"event\":\"")       property(name="$!message")
        constant(value="\",\"fields\": ")
        constant(value="{")
        constant(value="\"input\":\"")          property(name="inputname")
        constant(value="\",\"rawmsg\":\"")      property(name="rawmsg")
        constant(value="\",\"severity\":\"")    property(name="syslogseverity-text")
        constant(value="\",\"facility\":\"")    property(name="syslogfacility-text")
        constant(value="\",\"protocol-version\":\"")    property(name="protocol-version")
        constant(value="\",\"app-name\":\"")    property(name="app-name")
        constant(value="\",\"procid\":\"")      property(name="procid")
        constant(value="\",\"msgid\":\"")       property(name="msgid")
        constant(value="\",\"structured-data\":\"")    property(name="structured-data")
        constant(value="\",\"program-name\":\"")     property(name="programname")
        constant(value="\"}")
        constant(value="}")
}
```

# rsyslog Ruleset Configuration for Kafka



```
template(name="kafka_basic" type="list" option.jsonf="on") {
          property(outname="time"        name="timereported" dateFormat="unixtimestamp" format="jsonf")
          property(outname="host"        name="hostname"     format="jsonf")
          property(outname="source"      name="fromhost"     format="jsonf")
          property(outname="sourcetype"  name="$!sourcetype" format="jsonf")
          property(outname="index"       name="$!index"      format="jsonf")
          property(outname="event"       name="$!message"    format="jsonf")
}

template(name="append_facility" type="string" string="%$!index_base%_%syslogfacility-text%")

ruleset (name="splunk-kafka") {
      if ($msg contains ",THREAT," or $msg contains ",TRAFFIC," or $msg contains ",SYSTEM,") then {
      set $!index_base = 'pan_logs';
      set $!index = exec_template("append_facility");
      set $!sourcetype = 'pan:log';
      set $!message = $rawmsg-after-pri;
      action(type="omkafka" broker="localhost:9092" topic="syslog_panw" template="kafka_basic")
      }
      else {
          set $!sourcetype = 'rsyslog_generic';
          set $!message = $msg;
          set $!index = 'main';
          action(type="omkafka" broker="localhost:9092" topic="syslog_unassigned" template="kafka_with_metadata")
      }
}
```

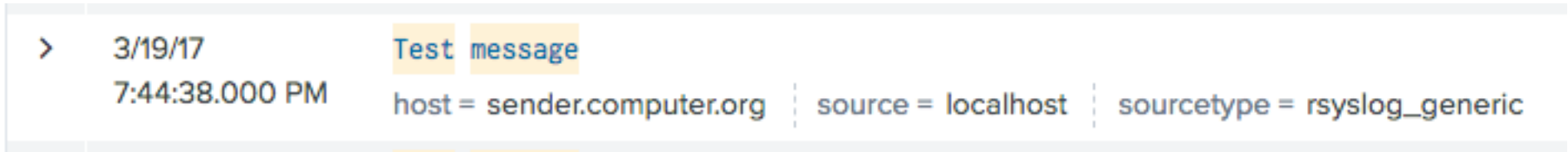
# What does all this look like in Splunk?

Using the prior configuration example

- A raw RFC 5424-compliant message:

```
<165>1 2017-03-19T23:44:38+00:00 sender.computer.org evententry - ID47 [example
iut="3" eventSource="Application" eventID="1011"] Test message
```

- Looks like this using the `splunk-kafka` rsyslog ruleset (/event HEC endpoint):




- This is great, but where's the rest of my stuff?

# What does all this look like in Splunk?

## The beauty of indexed fields in HEC!

| i | Time | Event |
|---|---|---|
| ⌄ | 3/19/17 7:44:38.000 PM | Test message |

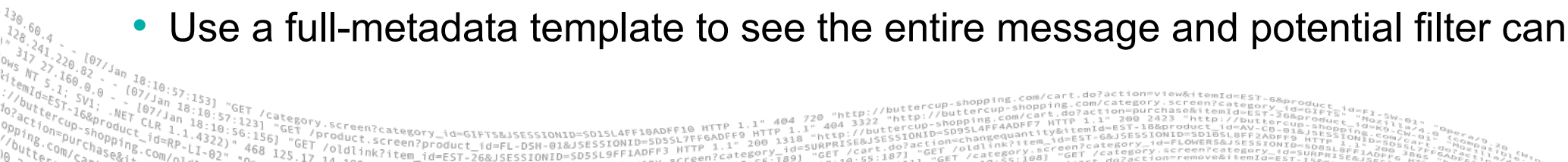
Event Actions ▾

| Type | Field | Value | Actions |
|---|---|---|---|
| Selected | host ▾ | sender.computer.org | ⌄ |
| | source ▾ | localhost | ⌄ |
| | sourcetype ▾ | rsyslog_generic | ⌄ |
| Event | app-name ▾ | evententry | ⌄ |
| | facility ▾ | local4 | ⌄ |
| | input ▾ | imudp | ⌄ |
| | msgid ▾ | ID47 | ⌄ |
| | procid ▾ | - | ⌄ |
| | program-name ▾ | evententry | ⌄ |
| | protocol-version ▾ | 1 | ⌄ |
| | rawmsg ▾ | <165>1 2017-03-19T23:44:38+00:00 sender.computer.org evententry - ID47 [example iut="3" eventSource="Application" eventID="1011"] Test message | ⌄ |
| | severity ▾ | notice | ⌄ |
| | structured-data ▾ | [example iut="3" eventSource="Application" eventID="1011"] | ⌄ |
| Time | _time ▾ | 2017-03-19T19:44:38.000-04:00 | |

# Tips for Managing Config Files

The ultimate goal is automation

- Use a good text editor! (e.g. Sublime with bash syntax)
  - Use good formatting technique; align/separate JSON grammar for readability
  - Color highlighting will make spotting formatting errors much easier!
- Build generic templates (i.e. functions) that can be called by the rulesets (rsyslog) or destinations (syslog-ng) specific to each technology.
  - This will significantly aid automation
- Change as little as possible in the syslog config files when adding a new data source.
  - The actual regex/property filter and the sourcetype/index should be all that needs to be changed for most installations.
- Use a “catch-all” filter to find rogue data sources.
  - Use a full-metadata template to see the entire message and potential filter candidates.



# Splunk Connect for Kafka Configuration

## With a look at Scale

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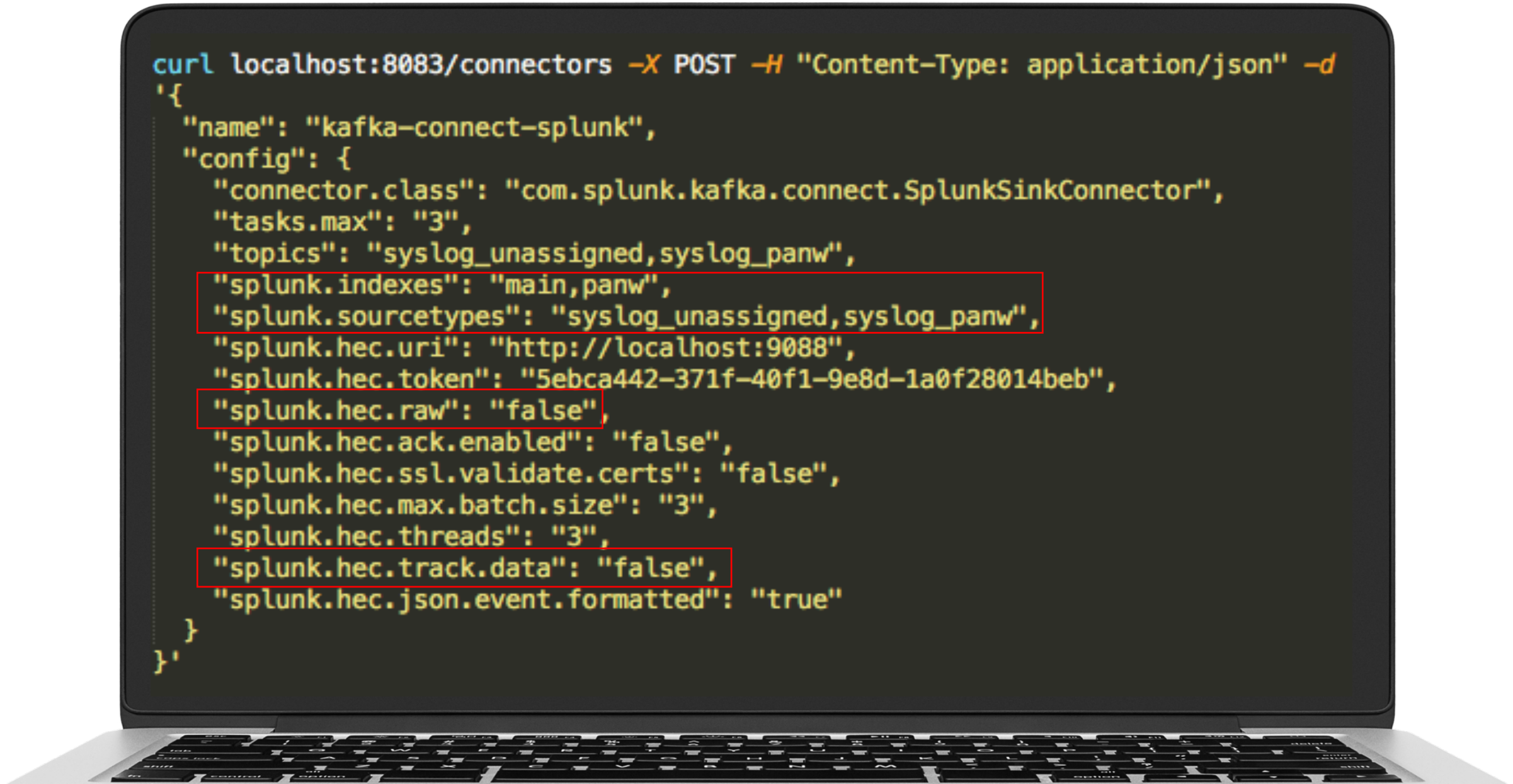
# Splunk Connect for Kafka Configuration



# A Look at Scale

- Syslog-ng:  Up to 78K EPS to Kafka
  - https://www.syslog-ng.com/community/b/blog/posts/testing-the-performance-of-log-streaming-to-kafka-with-syslog-ng
  - Key factors for syslog-ng scale to Kafka:
    - Kafka receipt acknowledgement (destroys scale, as expected)
    - Template complexity (use basic templates when syslog metadata from vendor is sparse)
- Rsyslog:
  - TrueCar Tests: https://www.drivenbycode.com/how-truecar-uses-kafka-for-high-volume-logging-part-2/
  - 1 VM rsyslog; 5 VM kafka cluster; 5 partitions; **100,000 EPS**
  - Librdkafka tests: https://github.com/edenhill/librdkafka/blob/master/INTRODUCTION.md
  - 2 brokers, 2 partitions, required.acks=2, 100 byte messages: **850,000 EPS**, **85 MB/s**
  - Several “nerd knobs” can be configured for queue sizes, buffering to disk, etc.
- Splunk Connect for Kafka
  - Single Connect Worker (16GB JVM, 16CPU) = 45.3 MB/s
  - 600 datagens on 12 servers, 20 Server Kafka Cluster, 20 Connect Workers, 600 tasks, 50 indexers
    - **1,350,000 EPS; 730 MB/s**

splunk> .conf18

# Wrap-up

## Additional Resources

splunk> .conf18

# Key Takeaways

**This is where the subtitle goes**

1. Use a syslog server! Do not send syslog traffic directly to Splunk.
2. Kafka provides data persistence, resiliency, and scale
3. Splunk Connect for Kafka provides a *supported* extension to the syslog/HEC architecture introduced last year
4. There are many helpful resources, both Splunk and open source

# Install/Prepare syslog servers for Kafka

Both require additional steps for Kafka integration

## Syslog-ng

- https://www.syslog-ng.com/products/open-source-log-management/3rd-party-binaries.aspx (All distros)
- Prepare Java (needed for Kafka destination support)
  - https://www.syslog-ng.com/technical-documents/doc/syslog-ng-open-source-edition/3.16/administration-guide/35#TOPIC-956517
  - https://www.syslog-ng.com/community/b/blog/posts/troubleshooting-java-support-syslog-ng
- There is a librdkafka implementation (C/C++ instead of Java)
  - Again, theoretically faster
  - Suffers from lack of formatting flexibility due to mod-python (syslog-ng-python) requirement
  - For more info: https://syslogng-kafka.readthedocs.io/en/latest/index.html

splunk> .conf18

# Install/Prepare syslog servers for Kafka

Both require additional steps for Kafka integration

## Rsyslog (CentOS/RHEL)

- https://www.rsyslog.com/ubuntu-repository (Ubuntu)
- https://www.rsyslog.com/rhelcentos-rpms (CentOS/RHEL)
- Don’t forget to also install rsyslog-kafka for either one
  - Required module for sending data to Kafka
  - Insert the the directive `$ModLoad omkafka` near top of rsyslog.conf file
  - Uses librdkafka; again could scale higher than syslog-ng Java implementation
    - https://github.com/edenhill/librdkafka/blob/master/INTRODUCTION.md

# Helpful Additional Resources

- Foundational syslog/HEC integration:
  - https://www.splunk.com/blog/2017/03/30/syslog-ng-and-hec-scalable-aggregated-data-collection-in-splunk.html (foundational blog introducing syslog/HEC)
- Additional Resources
  - https://www.splunk.com/blog/2016/05/05/high-performance-syslogging-for-splunk-using-syslog-ng-part-2.html (good overview of syslog-ng server configuration and optimization)
  - https://www.syslog-ng.com/technical-documents/doc/syslog-ng-open-source-edition/3.16/administration-guide (syslog-ng documentation)
  - http://www.rsyslog.com/rsyslog-configuration-builder/ (rsyslog configuration tool (beta))
  - http://www.rsyslog.com/doc/v8-stable/ (rsyslog documentation)

# Additional relevant sessions this week

**Don’t miss these!**

- SEC1905 - 159 Security Use Cases in Record Time With Splunk and Kafka
  - Wednesday, Oct 03, 3:15 p.m. - 4:00 p.m.
- FN1211 - Don't Miss the Bus — Splunking Kafka at Scale
  - Wednesday, Oct 03, 4:30 p.m. - 5:15 p.m.
- FN1616 - The Critical Tricks to Getting Syslog Into Splunk the Right Way
  - Thursday, Oct 04, 11:00 a.m. - 11:45 a.m.

# Q&A

**Mark Bonsack | Staff Sales Engineer**

**Scott Haskell | Principal Sales Engineer**

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# Thank You

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