Apache Metron

A Case Study of a Modern Streaming Architecture on Hadoop

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HORTONWORKS®

2017

Introduction

Hi, I'm Casey Stella!

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- Metron graduated to a top level project in April 2017

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- Data stored in HBase can be the source of enrichments

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    - Models can be deployed using Yarn, autodiscovered via Zookeeper and interrogated via Stellar functions

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Think of Stellar as Excel functions that we can run on streaming data.

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- The normalized data across all telemetries is written to an **enrichment** kafka topic

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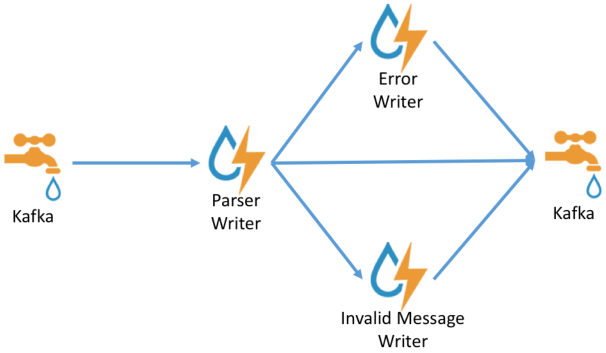

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- If messages are marked with an **is_alert** field, they can have a triage score computed via Stellar which defines their priority as threats

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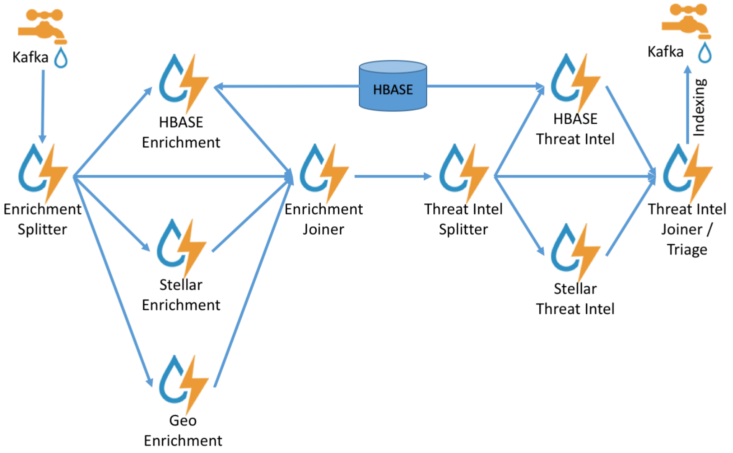
Kafka
HBASE Enrichment
HBASE
HBASE Threat Intel
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Indexing
Enrichment Splitter
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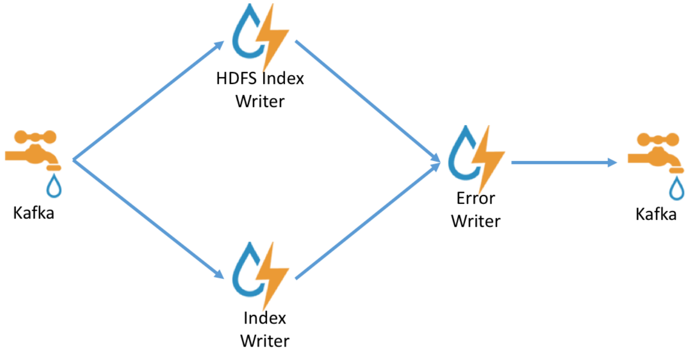

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- In cyber security, advanced actors wait for months, so you need data months back!

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  - Distributional Statistics: t-digests

Demo

- Los Alamos National Lab released an open data set representing 58 consecutive days of de-identified event data collected from five sources within Los Alamos National Laboratory's corporate, internal computer network.
- Among other telemetry sources, authentication logs and a set of well-defined red teaming events that present bad behavior within the 58 days are provided.
- We will look at the authentication logs around a breach and show how we can use Metron to pick out offending user's activity leading up to the event
    - Look for users who are attempting to authenticate to many distinct hosts more than 5 standard deviations from the median across all users.

```
"profile": "attempts_by_user",
"foreach": "user",
"onlyif": "source.type == 'auth'",
"init" : {
  "total" : "HLLP_INIT(5,6)"
         },
"update": {
  "total" : "HLLP_ADD(total, ip_dst_addr)"
          },
"result" : {
   "profile" : "total",
   "triage" : {
       "total_count" : "HLLP_CARDINALITY(total)"
              }
}
```

```
"profile": "auth_distribution",
"foreach": "'global'",
"onlyif": "source.type == 'profiler' && profile == 'attempts_by_user'",
"init" : {
  "s" : "STATS_INIT()"
         },
"update": {
  "s" : "STATS_ADD(s, total_count)"
          },
"result": "s"
```

```
window := PROFILE_WINDOW('...')
profile := PROFILE_GET('attempts_by_user', user, window)
distinct_auth_attempts := HLLP_CARDINALITY(GET_LAST(profile))
distribution_profile := PROFILE_GET('auth_distribution', 'global', window)
stats := STATS_MERGE(distribution_profile)
distinct_auth_attempts_median := STATS_PERCENTILE(stats, 0.5)
distinct_auth_attempts_stddev := STATS_SD(stats)
```

Questions

Thanks for your attention! Don't forget to come to the cybersecurity Bird of a Feather session Thursday.

- Find me at http://caseystella.com
- Twitter handle: @casey_stella
- Email address: cstella@hortonworks.com