Writing Actionable Alerts

While you get settled…

Download Latest Slides:

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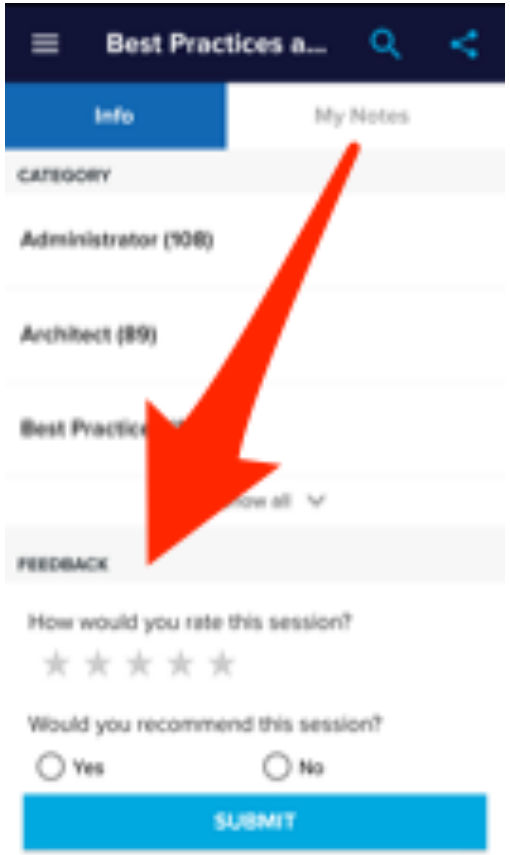
or ask a neighbor with flash drive

Load Feedback:



Related Blog:

Search: blogs.splunk.com writing actionable alerts

http://blogs.splunk.com/2016/01/29/writing-actionable-alerts

Writing Actionable Alerts

Burch

Sales Engineer @ Splunk

.conf2016

splunk>

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What's a Burch?

- Senior Sales Engineer in Boston
- Education
  - CS @ Boston University
  - MBA @ Northeastern University
- Splunk Customer
  - Middleware for 8 years (+splunk)
  - Splunk Admin for 1.5 years (splunk 4.3+)
- Certs: Knowledge, Admin, Architect
- @Splunk since Dec 14
- Splunkbase apps

About you

- Name
- User?
- Power User?
- Admin?
- Groupie?

Burch's Goal

From spam to glam with Splunk Alerts

eval Agenda = “Maturity Model”

- Stage 1: Message of Concern
- Stage 2: Thresholds
- Stage 3: Relative Percentages
- Stage 4: Average Errors
- Stage 5: Percentiles
- Bonus Stage 6: IT Service Intelligence
- Stage 7: Actionable Alerts

Stage 1

Message of Concern

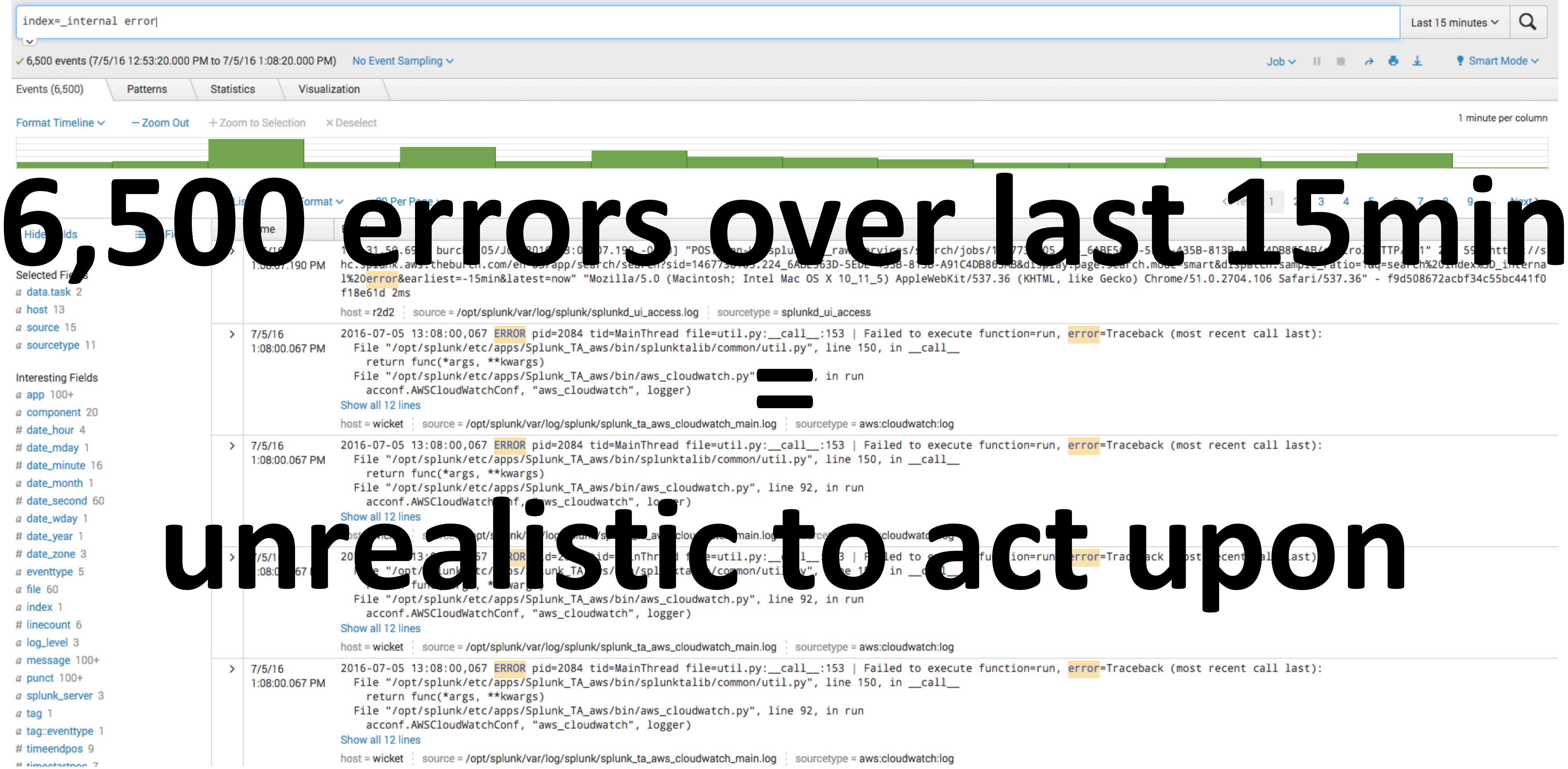
Attempted Solution

- Created spammy alert:

```
[Spam]
action.email = 1
action.email.priority = 1
action.email.to = welovespam@spam.com
counttype = number of events
cron_schedule = */15 * * * *
dispatch.earliest_time = -15min
dispatch.latest_time = now
enableSched = 1
quantity = 0
relation = greater than
search = index=_internal error
```

- Weak search definition

Result



```
index=_internal error
```

✓ 6,500 events (7/5/16 12:53:20.000 PM to 7/5/16 1:08:20.000 PM)

Selected Fields
- a data.task 2
- a host 13
- a source 15
- a sourcetype 11

Interesting Fields
- a app 100+
- a component 20
- # date_hour 4
- # date_mday 1
- # date_minute 16
- a date_month 1
- # date_second 60
- a date_wday 1
- # date_year 1
- # date_zone 3
- a eventtype 5
- a file 60
- a index 1
- # linecount 6
- a log_level 3
- a message 100+
- a punct 100+
- a splunk_server 3
- a tag 1
- a tag::eventtype 1
- # timeendpos 9

```
1%20error&earliest=-15min&latest=now" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_5) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/51.0.2704.106 Safari/537.36" - f9d508672acbf34c55bc441f0
f18e61d 2ms
host = r2d2   source = /opt/splunk/var/log/splunk/splunkd_ui_access.log   sourcetype = splunkd_ui_access

7/5/16 1:08:00.067 PM
2016-07-05 13:08:00,067 ERROR pid=2084 tid=MainThread file=util.py:__call__:153 | Failed to execute function=run, error=Traceback (most recent call last):
  File "/opt/splunk/etc/apps/Splunk_TA_aws/bin/splunktalib/common/util.py", line 150, in __call__
    return func(*args, **kwargs)
  File "/opt/splunk/etc/apps/Splunk_TA_aws/bin/aws_cloudwatch.py"  , in run
    acconf.AWSCloudWatchConf, "aws_cloudwatch", logger)
Show all 12 lines
host = wicket   source = /opt/splunk/var/log/splunk/splunk_ta_aws_cloudwatch_main.log   sourcetype = aws:cloudwatch:log

7/5/16 1:08:00.067 PM
2016-07-05 13:08:00,067 ERROR pid=2084 tid=MainThread file=util.py:__call__:153 | Failed to execute function=run, error=Traceback (most recent call last):
  File "/opt/splunk/etc/apps/Splunk_TA_aws/bin/splunktalib/common/util.py", line 150, in __call__
    return func(*args, **kwargs)
  File "/opt/splunk/etc/apps/Splunk_TA_aws/bin/aws_cloudwatch.py", line 92, in run
    acconf.AWSCloudWatchConf, "aws_cloudwatch", logger)
Show all 12 lines

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Show all 12 lines
host = wicket   source = /opt/splunk/var/log/splunk/splunk_ta_aws_cloudwatch_main.log   sourcetype = aws:cloudwatch:log
```

6,500 errors over last 15min

=

unrealistic to act upon

Obvious Improvements

- Scope of problem is large
  - Solution: indexed fields (index, source, sourcetype, and/or pattern)
- Problem: “error” matches more than desired
  - Solution: bind with fields like log_level=“error”
- Result: Stronger search ignores benign results
  -

```
index=_internal sourcetype=splunkd source!="*splunkforwarder*" log_level=ERROR
```

Stage 2

Thresholds

Attempted Solution

- Only alert if more than “arbitrary” # occurrences / time
  - Arbitrary = perception of healthy

```
index=_internal sourcetype=splunkd source!="*splunkforwarder*" log_level=ERROR
 | stats count
 | where count>20
```

or…

Alert

Condition

if number of events

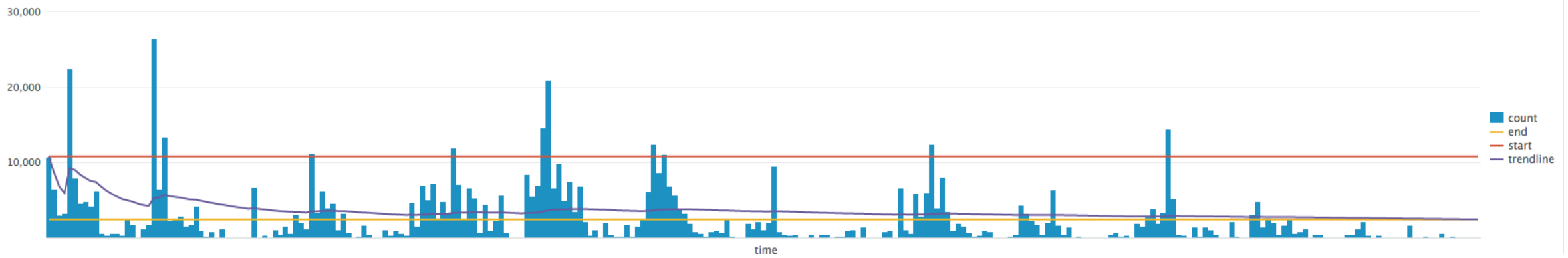
is greater than

20

Result & Obvious Improvements

- Ignores volume variances of different types of errors
  - Web errors rarely happen but server errors happen often

- Fluctuations relative to usage
  - Threshold too small or large during peak or minimal usage, respectively
  - Static thresholds not adjusting with business growth or decline



Stage 3

Relative Percentages

New Concept

eval goal_attacking = coalesce(spam, system)

SPAM

- Normalize against # of errors
- Ignore non error events
- log_level=ERROR

- Good for clean up
- Bad for permanent

SYSTEM

- Normalize to all events
- Include all error + non error events
- log_level=*

- Good for permanent
- Bad for clean up

Attempted Solution

```
index=_internal sourcetype=splunkd source!="*/splunkforwarder/*" log_level=*
 | stats count, count(eval(log_level=="ERROR")) AS error_count by component
 | where ( error_count / count ) > .50
```

Last 15 minutes

✓ 303,891 events (7/5/16 3:54:42.000 PM to 7/5/16 4:09:42.000 PM) No Event Sampling Job Smart Mode

Events | Patterns | Statistics (2) | Visualization

100 Per Page Format Preview

component	count	error_count
DeployedServerclass	936	936
ExecProcessor	488	486

Result & Obvious Improvements

- Huge improvement
  - Less spam
  - Adjusts because normalized to volume
- What if that's normal?
  - Then persistent alerts that should be ignored = spam + noise!
- Arbitrary static percentages

Stage 4

Average Errors

Attempted Solution

Current period vs historical average

```
index=_internal sourcetype=splunkd source!="*/splunkforwarder/*" log_level=ERROR
 | bin span=5min _time
 | stats count by _time, component
 | stats latest(count) as current_count, avg(count) as historical_count by component
 | where current_count > historical_count
```

Last 7 days

✓ 619,072 events (7/19/16 4:00:00.000 PM to 7/26/16 4:58:23.000 PM) No Event Sampling Job Smart Mode

Events | Patterns | Statistics (13) | Visualization

10 Per Page Format Preview < Prev 1 2 Next >

component	current_count	historical_count
AdminHandler:PersistMessages	16	8.500000
Application	30	10.000000
ApplicationUpdater	77	27.333333
ArchiveContext	6	4.666667

Result

- Adjusts with changes in environment!
- Slow
  - Summary Indexing?
  - Acceleration?
- How often alert?
  - Definition of average!

Hold Up!

Statistics Detour

Statistics Detour

Historical # of errors / 5 min period

11

87

5

56

31

19

67

54000

21

18

77

Statistics Detour

11

87

5

56

31

19

67

54000

21

18

77

0 to 10 | 11 to 20 | 21 to 29 | 30 to 39 | 40 to 49 | 50 to 59 | 60 to 69 | 70 to 79 | 80 to 89 | 90 to 99

Statistics Detour

At what value does this become actionable?

Min

Average

Max

18

19

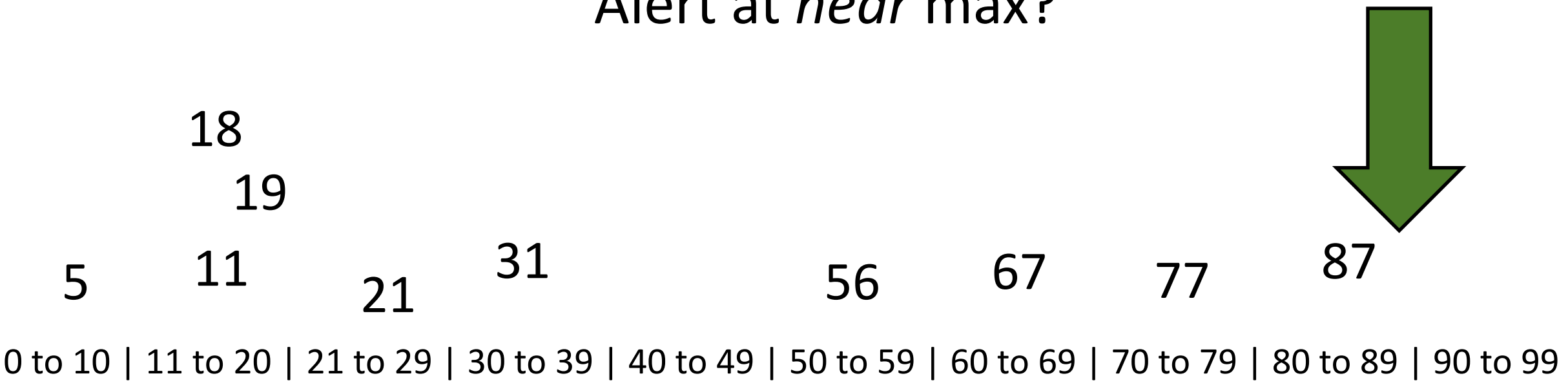
5 11 21 31 56 67 77 87

0 to 10 | 11 to 20 | 21 to 29 | 30 to 39 | 40 to 49 | 50 to 59 | 60 to 69 | 70 to 79 | 80 to 89 | 90 to 99

Statistics Detour

What if we could skim off outliers?

Alert at *near* max?



Statistics Detour

perc<X>(Y) = Returns the X-th percentile value of the numeric field Y, where X is an integer between 1 and 99. The percentile X-th function **sorts the values** of Y in an increasing order. Then, if you consider that 0% is the **lowest** and 100% the **highest**, the functions picks the **value that corresponds to the position** of the X% value.

18

19

5 11 21 31 56 67 77 87

0 to 10 | 11 to 20 | 21 to 29 | 30 to 39 | 40 to 49 | 50 to 59 | 60 to 69 | 70 to 79 | 80 to 89 | 90 to 99

Statistics Detour

perc90(this_result_set) = ?

0 to 10 | 11 to 20 | 21 to 29 | 30 to 39 | 40 to 49 | 50 to 59 | 60 to 69 | 70 to 79 | 80 to 89 | 90 to 99

Statistics Detour

```
| makeresults count=11
 | streamstats count
 | eval count = case( count == "11" , "18" , count == "1" , "5" , count == "2" , "11" , count == "3" ,
"19" , count == "4" , "21" , count == "5" , "31" , count == "6" , "56" , count == "7" , "77" , count
== "8" , "87" , count == "9" , "54000" , count == "10" , "67")
 | stats perc90(count)
```

Last 15 minutes

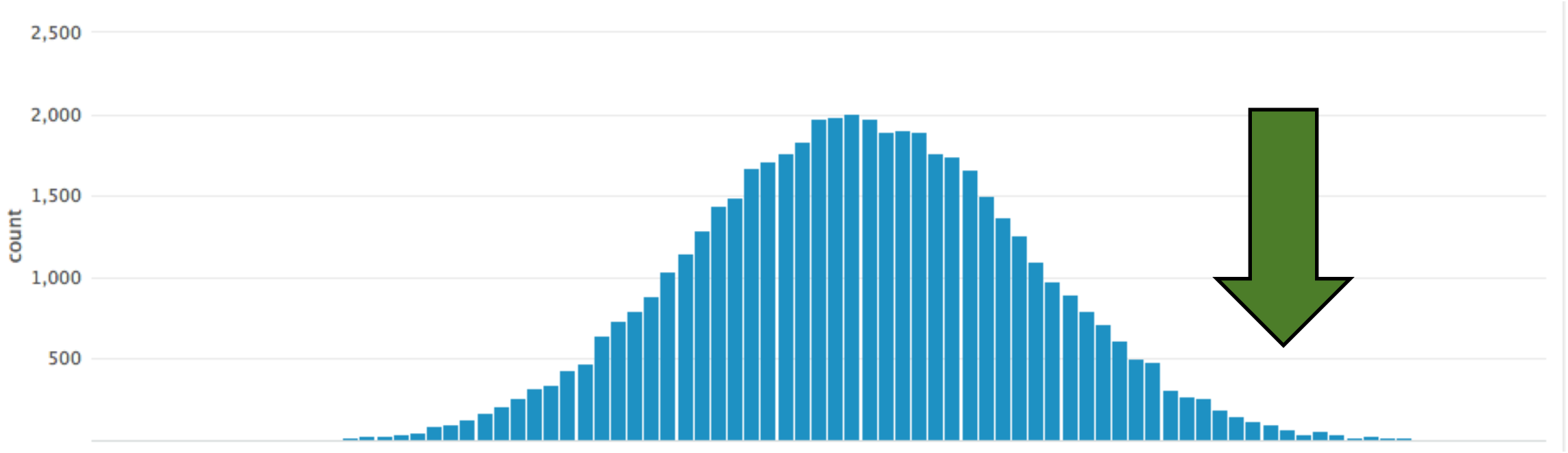
✓ 1 result (7/31/16 2:46:51.000 PM to 7/31/16 3:01:51.000 PM) No Event Sampling Job Smart Mode

Events | Patterns | Statistics (1) | Visualization

10 Per Page Format Preview

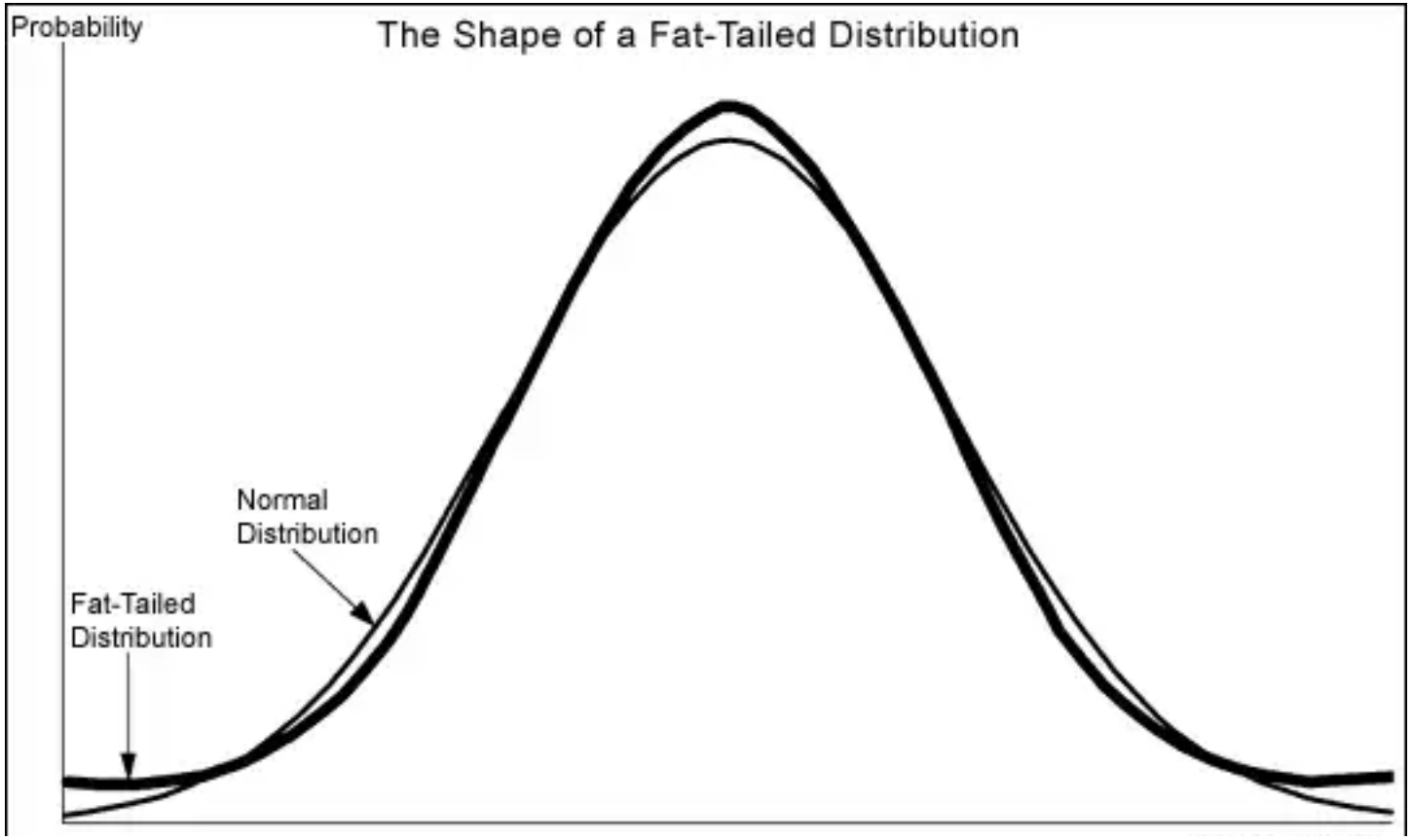
perc90(count)
87

Warning: Assumption



Shout out to Xander!

Warning: Heavy Tails

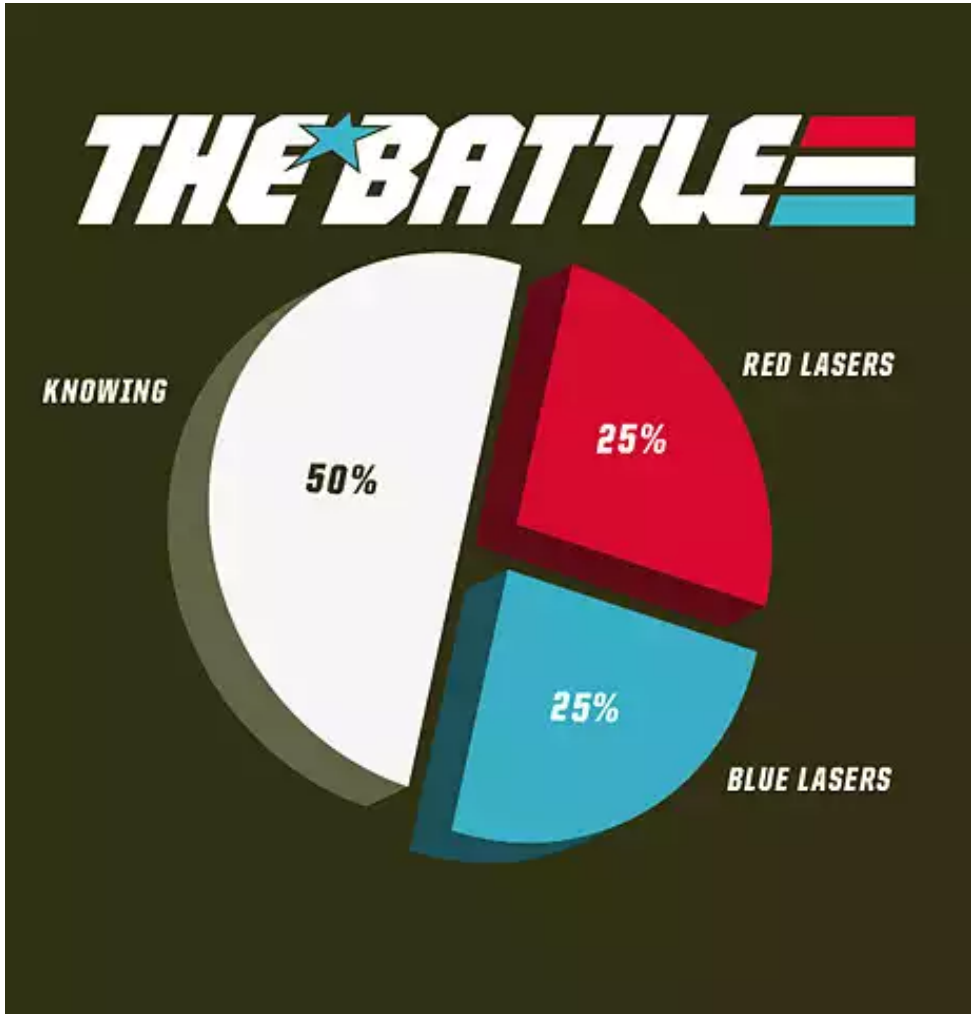


Warning: Reality

What percentile is appropriate given this distribution?

Know Thy Data

```
index=_internal sourcetype=splunkd
source!="*/splunkforwarder/*"
 | bin span=5min _time
 | stats count AS group by _time
 | bin span=1000 group
 | stats count by group
 | sort group
```



Stage 5

Percentiles

Attempted Solution

- Current period's error rate vs. historical error rate
  - by error category (component)

```
index=_internal sourcetype=splunkd source!="*/splunkforwarder/*"
log_level=ERROR
 | bin span=5min _time
 | stats count by _time, component
 | stats perc95(count) AS perc95_count, latest(count) AS
current_count by component
 | where current_count > perc95_count
```

- Performance?

Summary Indexing Solution

- **Generate** malleable historical data

```
index=_internal sourcetype=splunkd source!="*/splunkforwarder/*"
log_level=ERROR
 | bin span=5min _time
 | sistats count by _time, component
```

- **Alert** upon historical data

```
index=summary_internal sourcetype=stash source="my search name”
 | stats count by _time, component
 | stats perc95(count) AS perc95_count, latest(count) AS
current_count by component
```

The Lasso Approach

- Triage Strategy
- Perimeter around errors
- Tighten lasso by reducing percentile
- Rinse & repeat

Alternatives

- Address most common errors first
  - Start at 5th percentile and work up

- Normalization Frames:
  - Same errors
  - All errors
  - All events
  - Time windows (e.g. work hours)

Result

- Adjusts with changes in environment!

- Requires Maintenance
  - Power User skillz
  - Summary Indexing

- Not period time adjusted
  - Fluctuations in business day or period

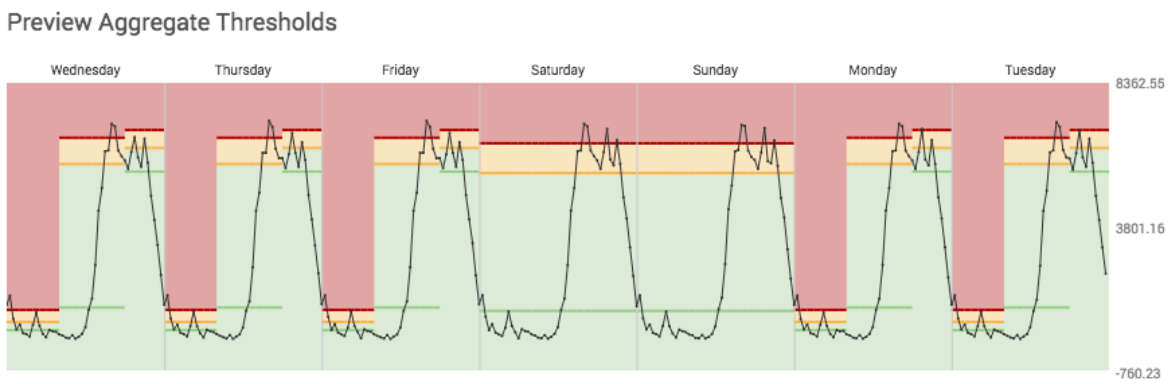
Bonus Stage 6

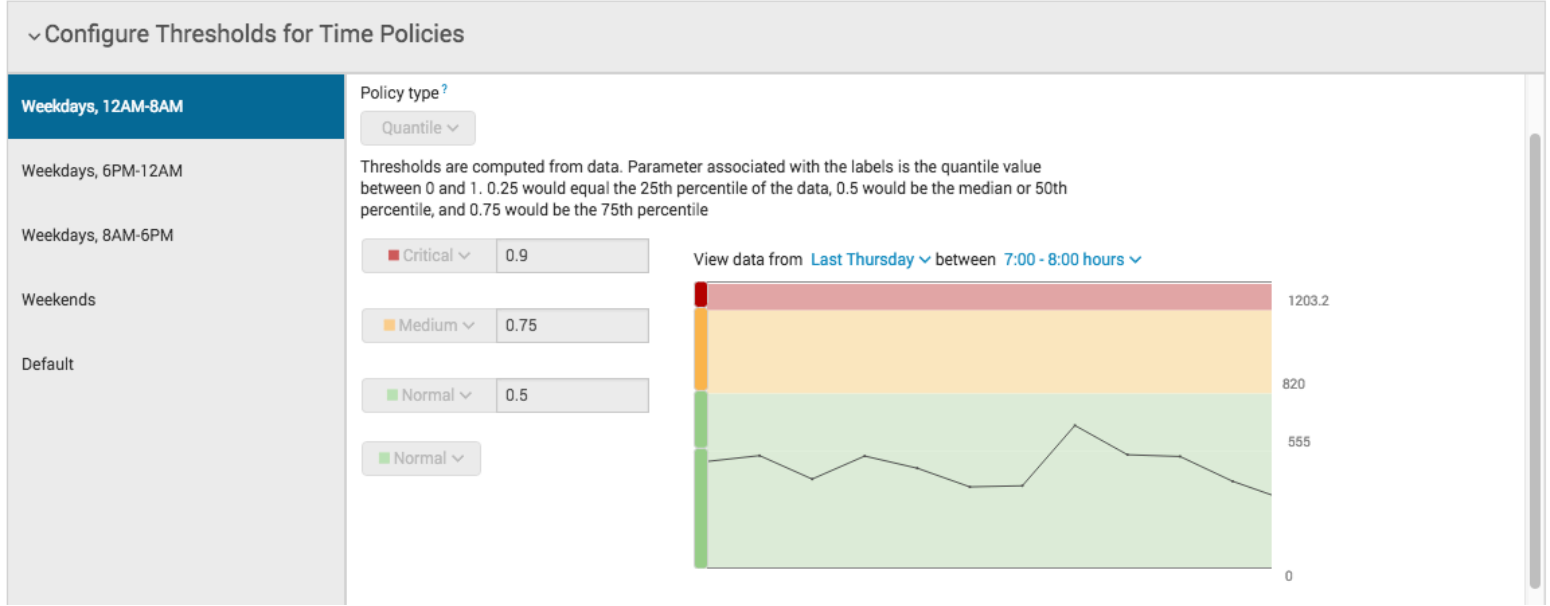
IT Service Intelligence

Why ITSI?

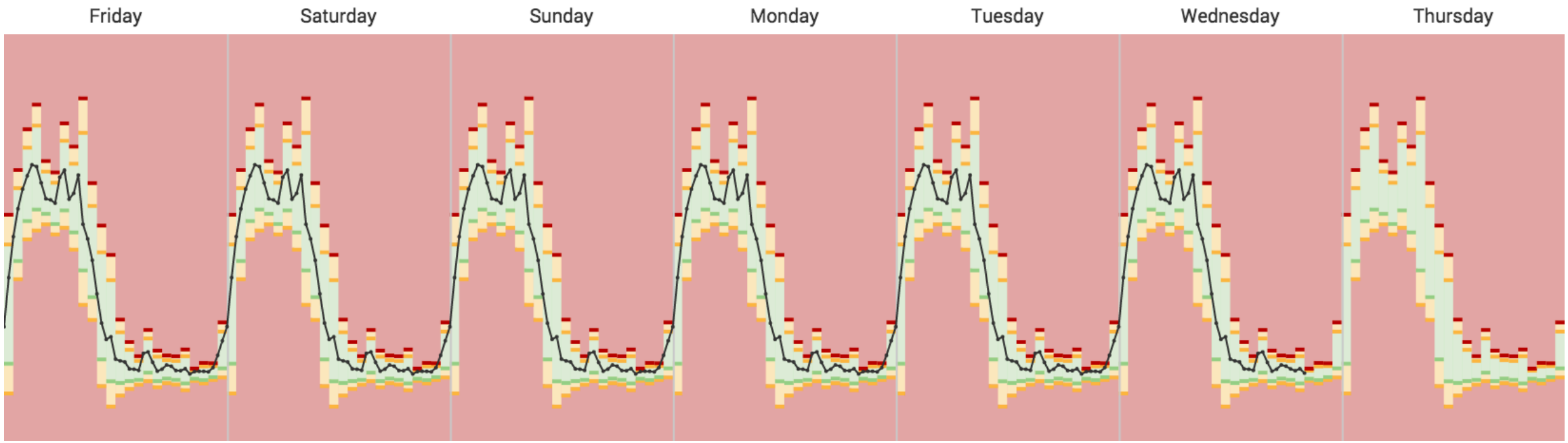
Make **alerting** accessible, usable and valuable to everyone!

Quantile, Range, and STDDEV. Oh my!

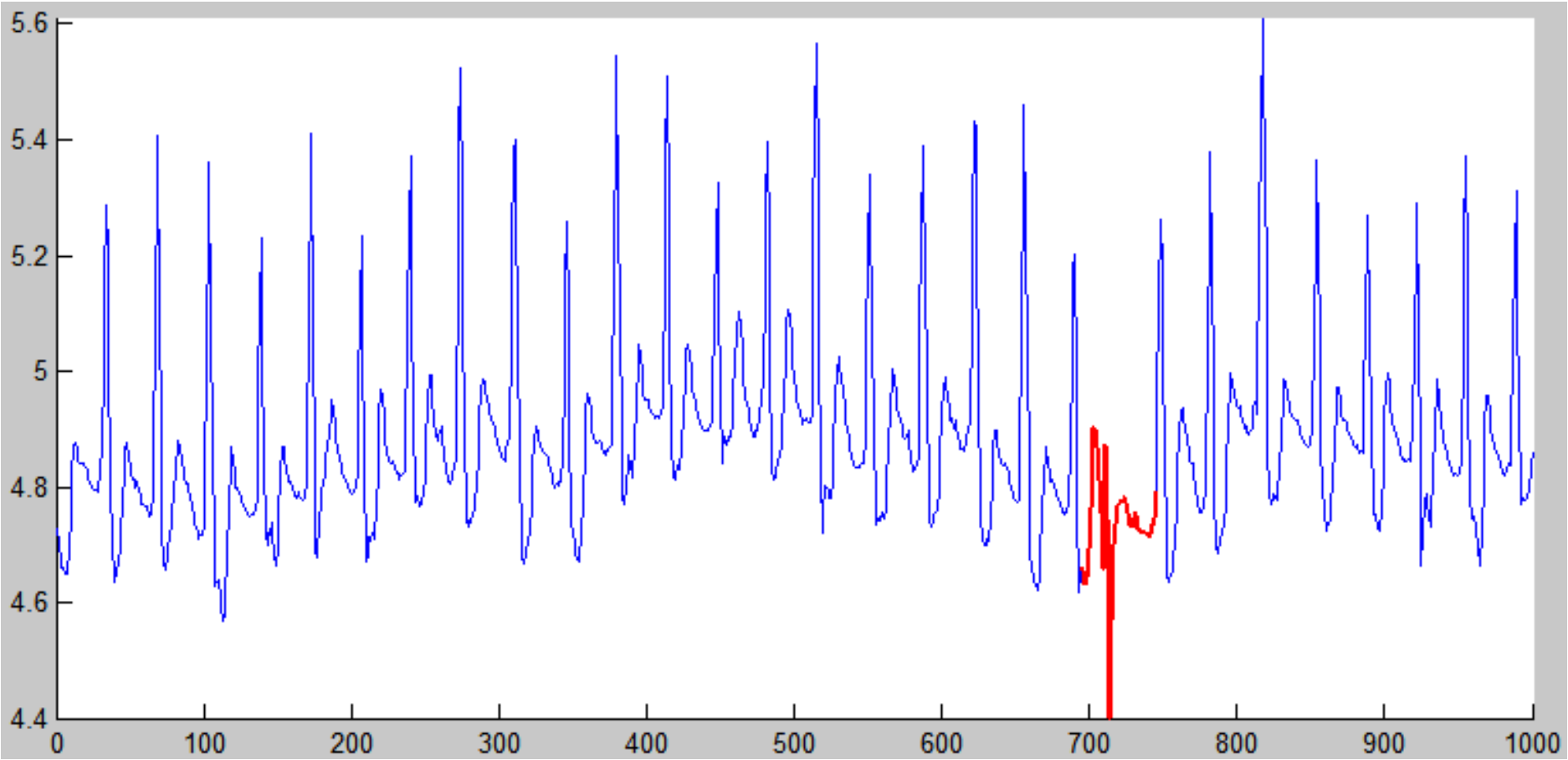




Adaptive Thresholds



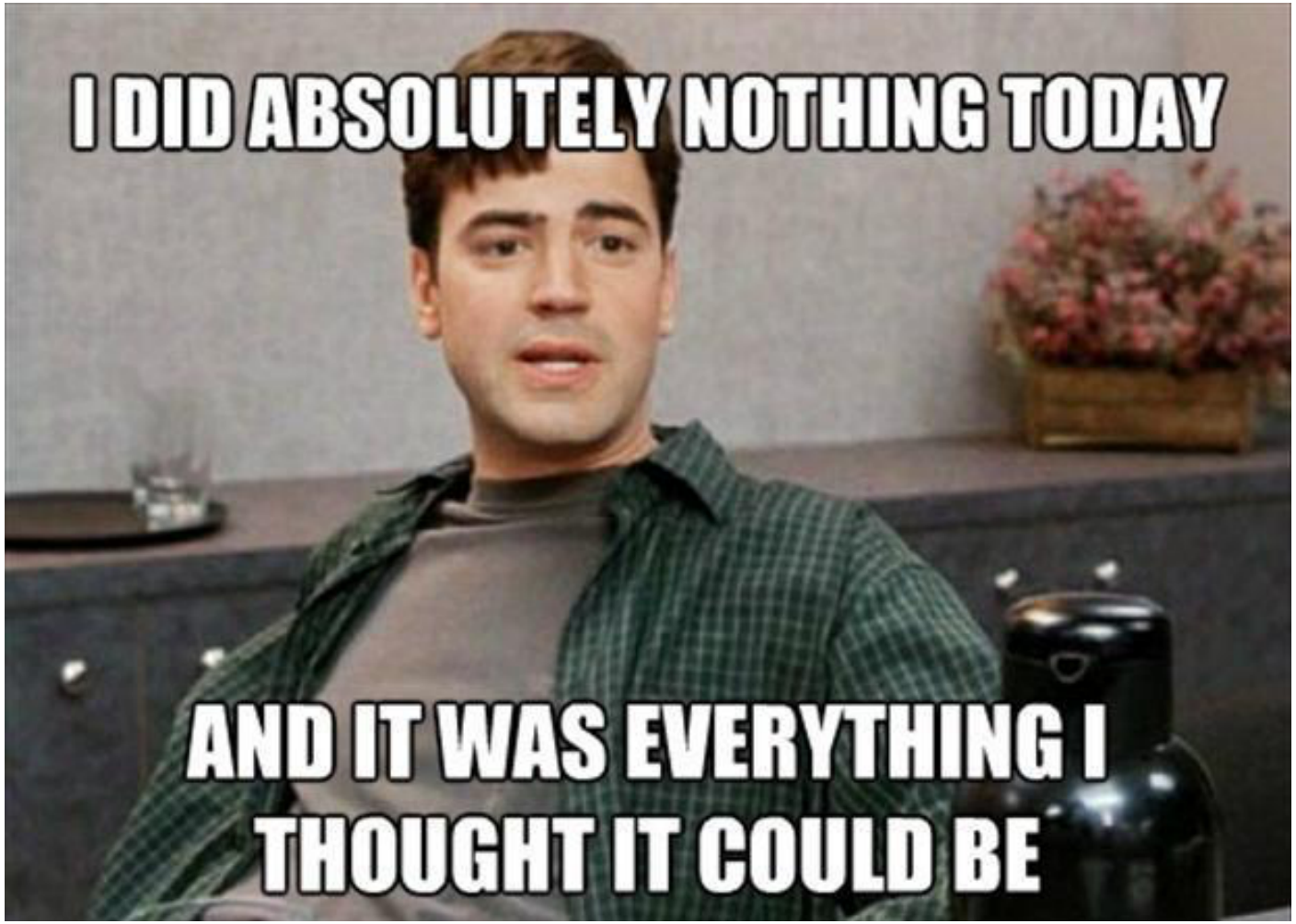
Anomaly Detection



Stage 7

Actionable Alerts

Actionable Alerts Made Easy



What Now?

Related breakout sessions and activities…

- Rate this! (be honest)
- More talks:
  - conf.splunk.com/speakers.html
  - Search for
    - Burch
    - Champagne
    - Optimization
    - Practices
    - tips
    - Worst

Free Discussion

Questions, ideas, experiences

...have you?

THANK YOU

splunk>