



Analytics: Conquering Perception With Data

A Story of Increased Customer Satisfaction

Hagop Hagopian | Sr Product Manager - Enrollment Applications, Charles Schwab & Co, Inc.

September 26, 2017 | Washington, DC

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Introduction

Stuff for business side of the house – dev's allowed, too

About Me

Hagop

- ▶ Hagop Hagopian
- ▶ Senior Product Manager | Charles Schwab & Co, Inc.
 - Digital Onboarding Solutions – Account Open & Enrollment Applications
- ▶ Not technical – part of the business
- ▶ Responsible for:
 - Retail Channel enrollment and account open
 - Schwab.com
 - Internal tools
 - Robo Advisor enrollment and account open
 - Schwab Intelligent Portfolios
 - Schwab Intelligent Advisor

About Schwab

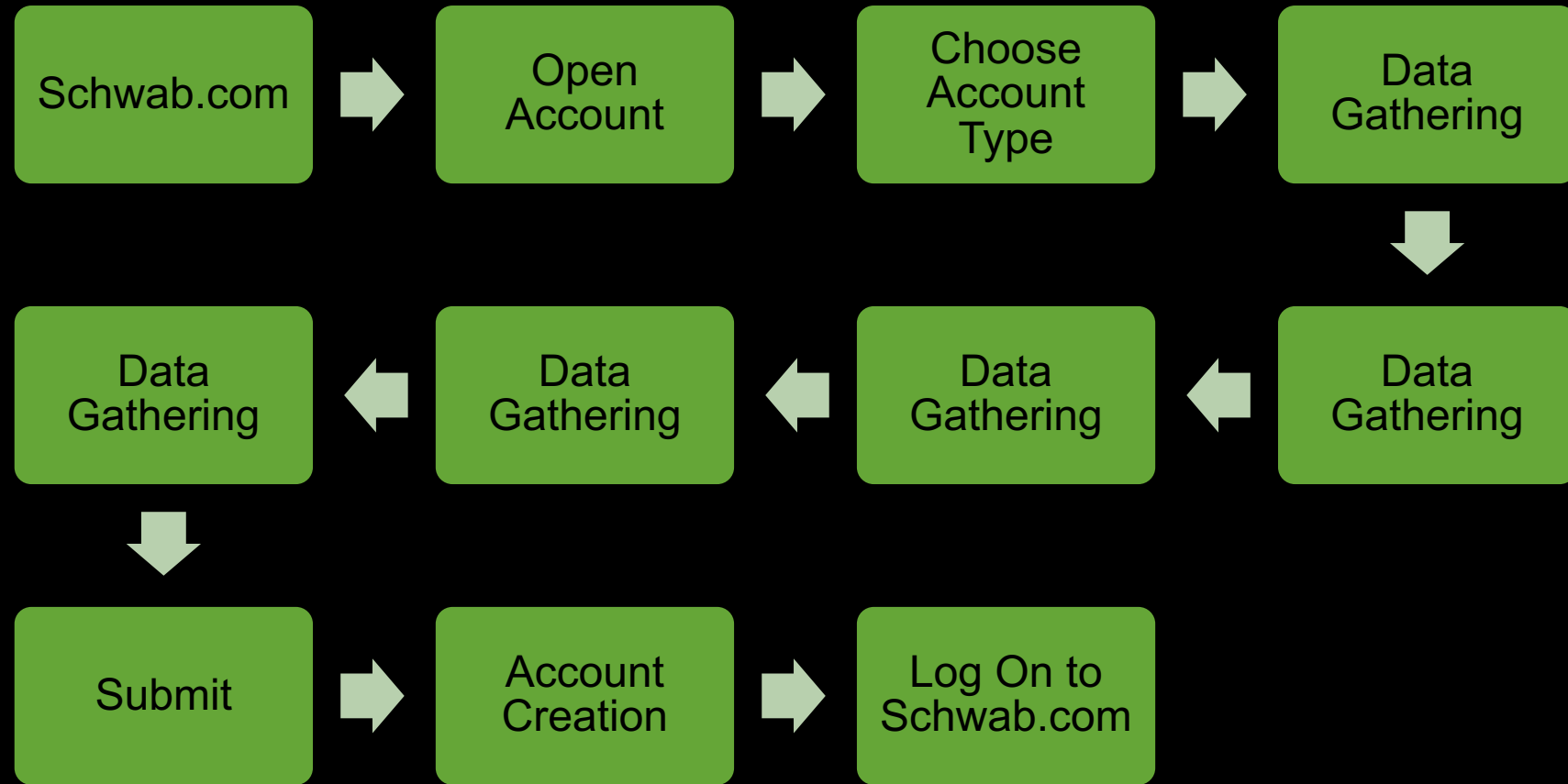
Who Do I Work For?

► Charles Schwab & Co, Inc.

- The Charles Schwab Corporation (NYSE: SCHW) is a leading provider of financial services, with more than 340 offices and 10.5 million active brokerage accounts, 1.5 million corporate retirement plan participants, 1.1 million banking accounts, and \$3.04 trillion in client assets as of June 30, 2017. Through its operating subsidiaries, the company provides a full range of wealth management, securities brokerage, banking, money management, custody, and financial advisory services to individual investors and independent investment advisors. Its broker-dealer subsidiary, Charles Schwab & Co., Inc. (member SIPC, <http://www.sipc.org>), and affiliates offer a complete range of investment services and products including an extensive selection of mutual funds; financial planning and investment advice; retirement plan and equity compensation plan services; referrals to independent fee-based investment advisors; and custodial, operational and trading support for independent, fee-based investment advisors through Schwab Advisor Services. Its banking subsidiary, Charles Schwab Bank (member FDIC and an Equal Housing Lender), provides banking and lending services and products. More information is available at www.schwab.com and www.aboutschwab.com.

Account Open Process Flow

1000ft Diagram of Process



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130.60.4 - - [07/Jan 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD1SLAFF10ADFF10 HTTP/1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FI-SW-01" "Opera/9.80
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Schwab's Splunk Instance

- ▶ Multi-TB User
- ▶ Use cases that extend from Security to App Development
- ▶ Many different types of users Developers/Prod Support/Development
- ▶ Recent increase in capacity by 3x
- ▶ 175 Teams

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130.60.4 - - [07/Jan 18:10:57:123] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD1SLAFF10ADFF10 HTTP/1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FL-SW-01" "Opera/9.80.20
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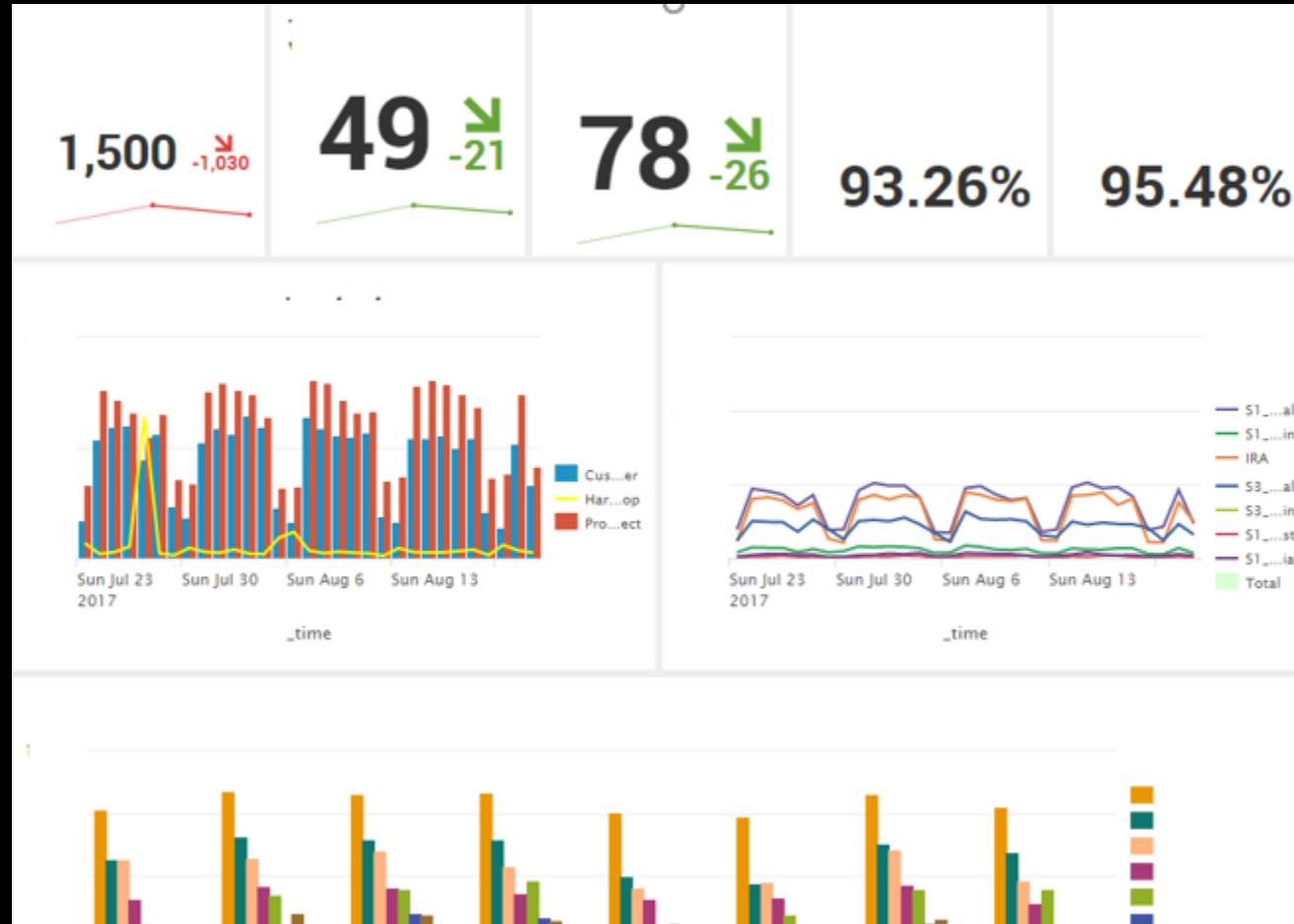
Areas Of Opportunity

Where can Splunk help me?

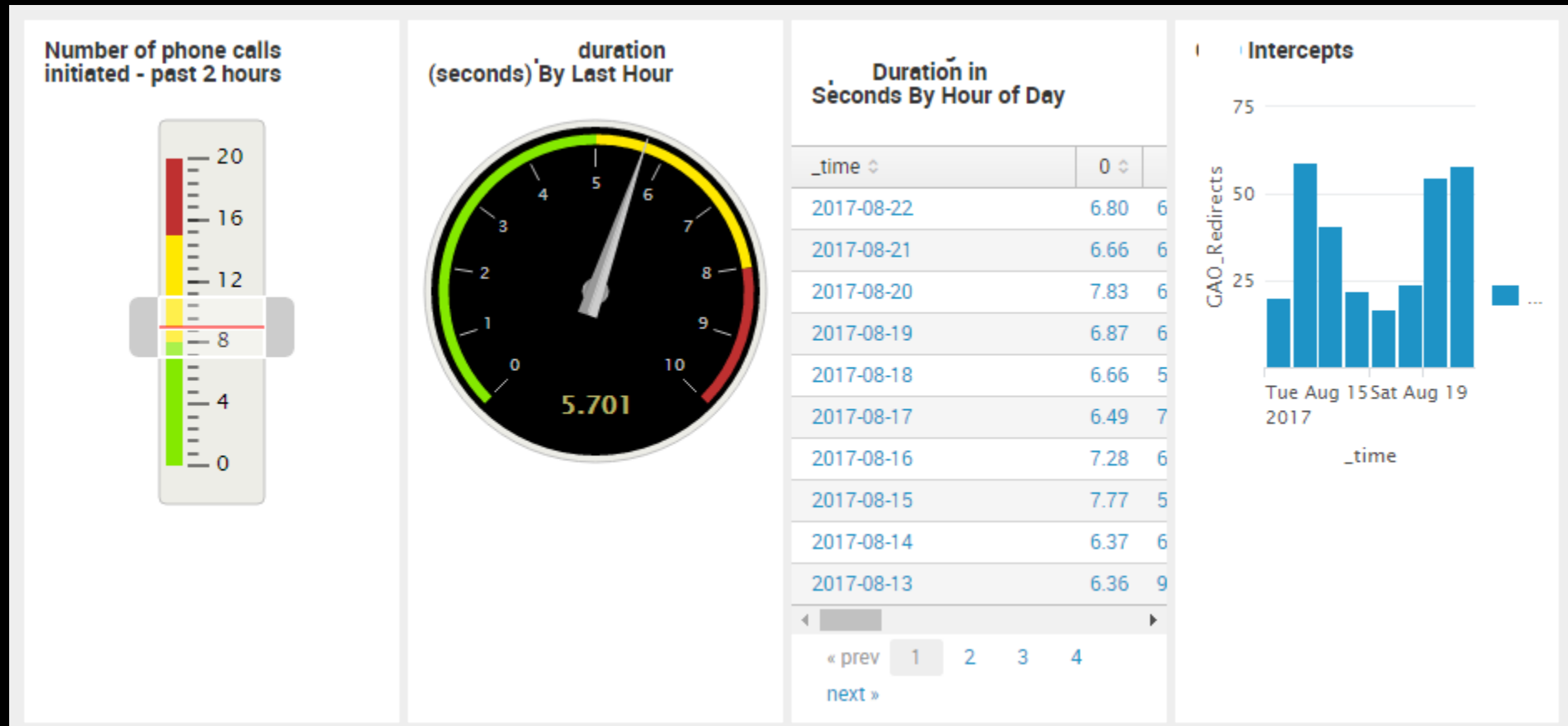
- ▶ Actionable intelligence from a reliable source
 - Prod Support
 - Improved MTTR
 - Binary
- ▶ On Demand analytics without needing to rely on a data warehouse
 - Business Support
 - Independence
 - Real-time
- ▶ Informed development priorities – fact based stats
 - Dev Support
 - Prioritization
 - Customer-focused

I want an easy to use, easy to share solution that will help me achieve various objectives using seemingly arbitrary insights

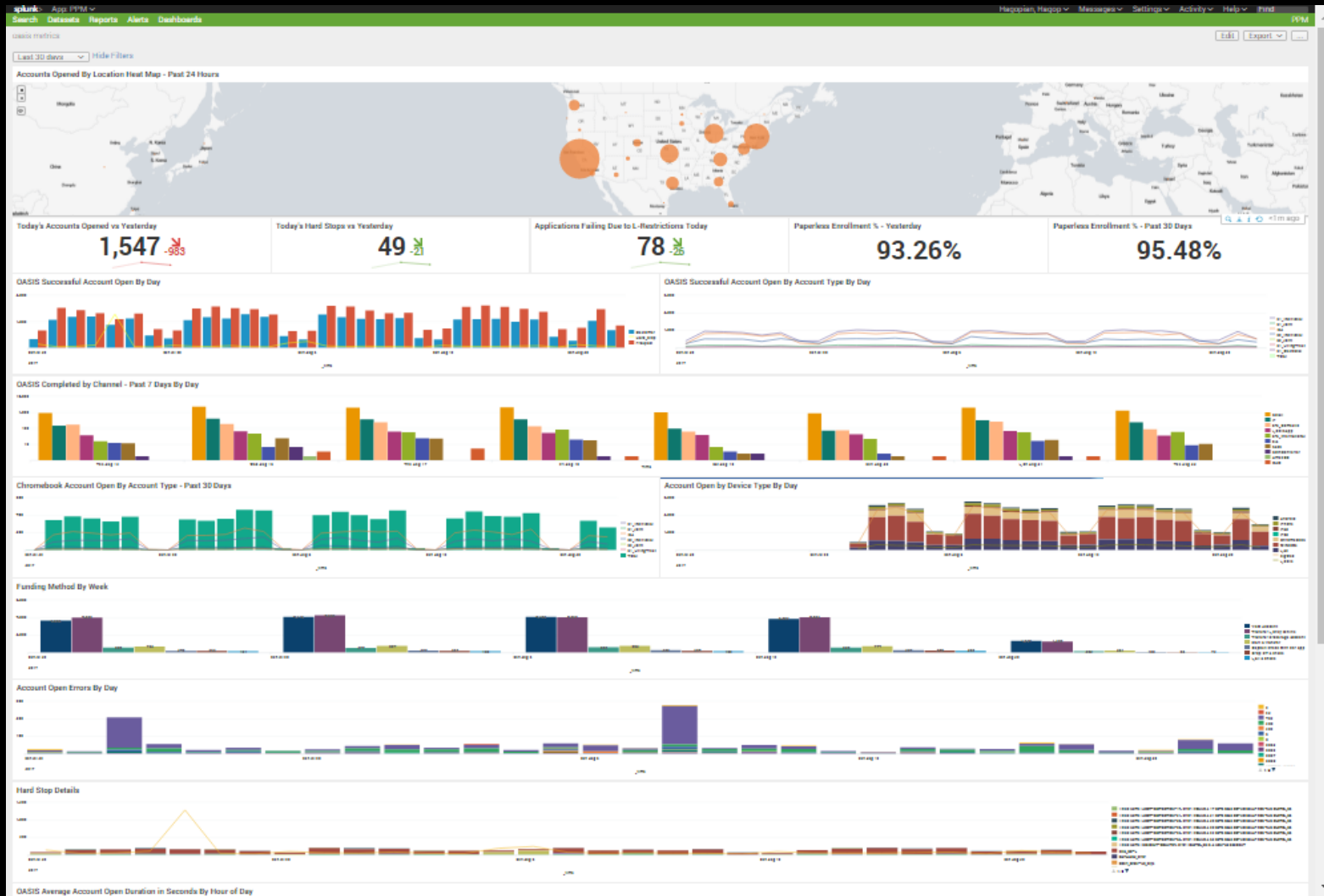
Actionable Intelligence From A Reliable Source



On Demand Analytics Without Needing To Rely On A Data Warehouse



Informed Development Priorities With Fact-based Statistics



Actionable Intelligence From A Reliable Source

Quantifying impact is difficult

“This happens ALL the time”

– *Phone team, probably.*

“Every single one of my clients experienced this”

– *Email team, likely.*

“People are complaining about this on social media”

– *Social Media team, yup.*

These are not real statements, but illustrative of the problem solving process

“I heard through the grapevine that an error scenario exists but **I have no reliable way to quantify impact**”

-me

Actionable Intelligence From A Reliable Source

What actionable intelligence can I use from an unbiased source?

splunk> App: wut ▾ Hagopian, Hagop ▾ Messages ▾ Settings ▾ Activity ▾ Help ▾ Find

Search Datasets Reports Alerts Dashboards wut

 Save As ▾ Close

index=bestindexever sourcetype=bestsourcetypeever event=besteventever | timechart span=1h count as Some_Logged_Event Last 30 days ▾

✓ 3 events (7/12/17 12:00:00.000 AM to 8/11/17 1:38:31.000 AM) No Event Sampling ▾ Job ▾ || ■ ↶ ⌵ 📄 Verbose Mode ▾

Events (3) Patterns Statistics (722) Visualization

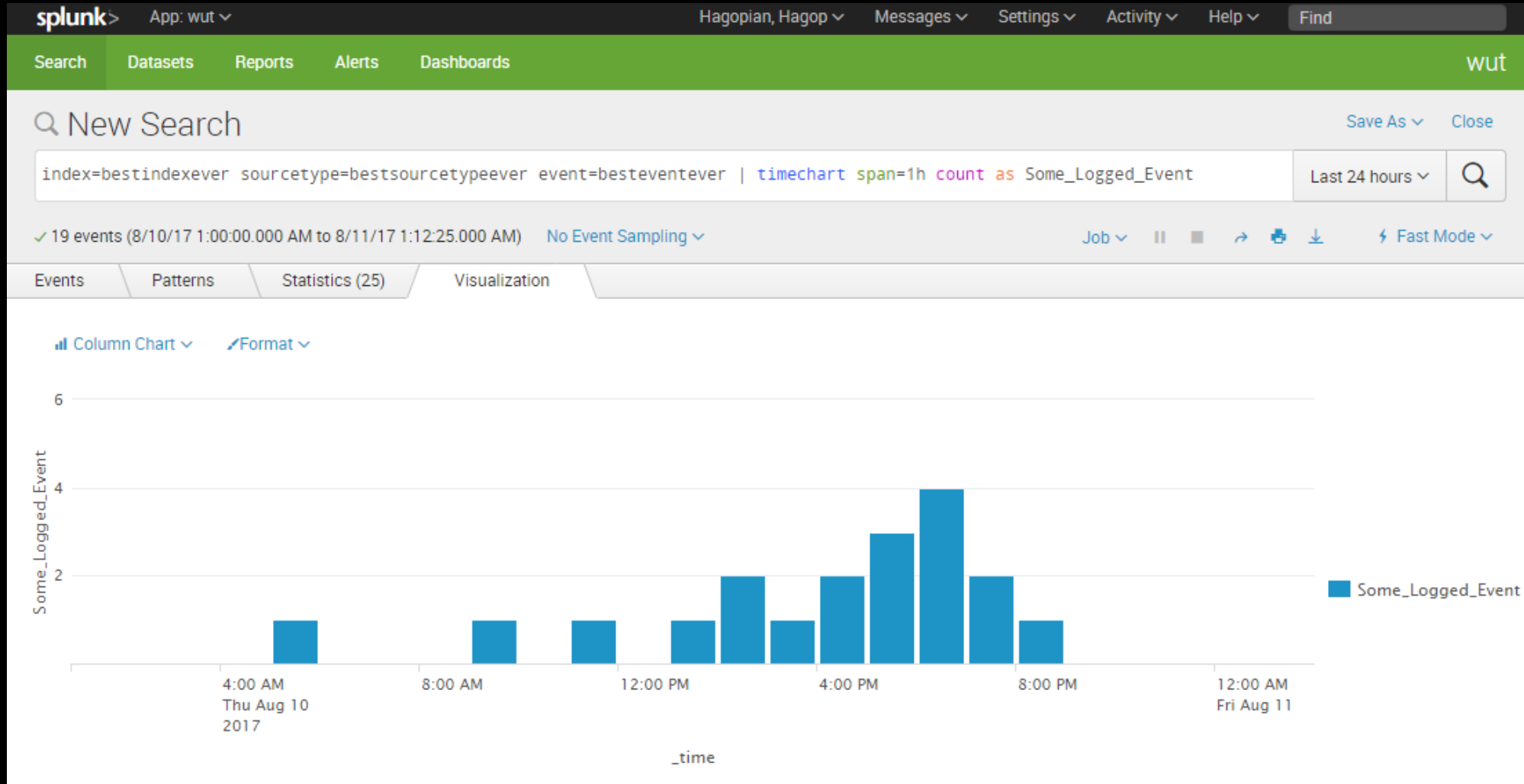
Column Chart ▾ Format ▾

_time	Some_Logged_Event
2017-07-24 12:00:00.000 AM	3

130.60.4 - [07/Jan 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD1SLAFF10ADFF10 HTTP 1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FL-SW-01" "Opera/9.80...
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317.27.160.0 - [07/Jan 18:10:56:156] "GET /oldlink?item_id=EST-26&JSESSIONID=SD5SL9FF1ADFF3 HTTP 1.1" 404 125.17.14.0 "http://buttercup-shopping.com/category.screen?category_id=FLOWERS&JSESSIONID=SD5SL9FF1ADFF3 HTTP 1.1" 200 3865 "http://buttercup-shopping.com/product.do?action=changequantity&itemId=EST-18&product_id=AV-CB-01&JSESSIONID=SD19SL9FF1ADFF9 HTTP 1.1" 200 1310 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-198" "0...
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Actionable Intelligence From A Reliable Source

A single event can yield the necessary intelligence



Real-time Analytics Without Needing To Rely On A Data Warehouse

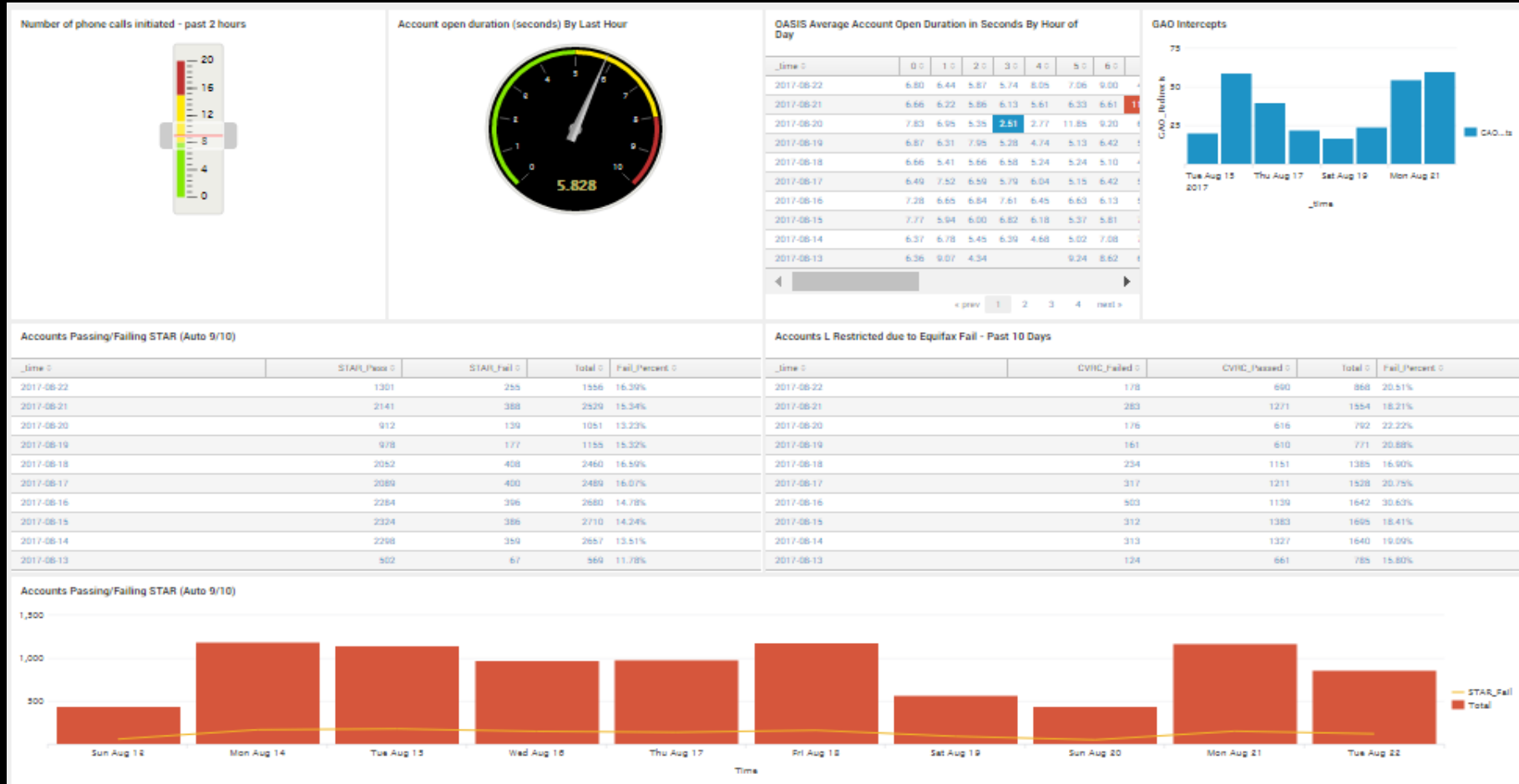
Query This?

- ▶ Date Warehousing
- ▶ Hadoop Hives
- ▶ Structured DB
- ▶ Unstructured DB
- ▶ Batch loads
- ▶ CSV
- ▶ Excel Spreadsheets
- ▶ Pivot Tables
- ▶ ~~Tableau TabNeau!~~



Real-time Analytics Without Needing To Rely On A Data Warehouse

Watch This



Informed Development Priorities With Fact-based Statistics.

Decide this

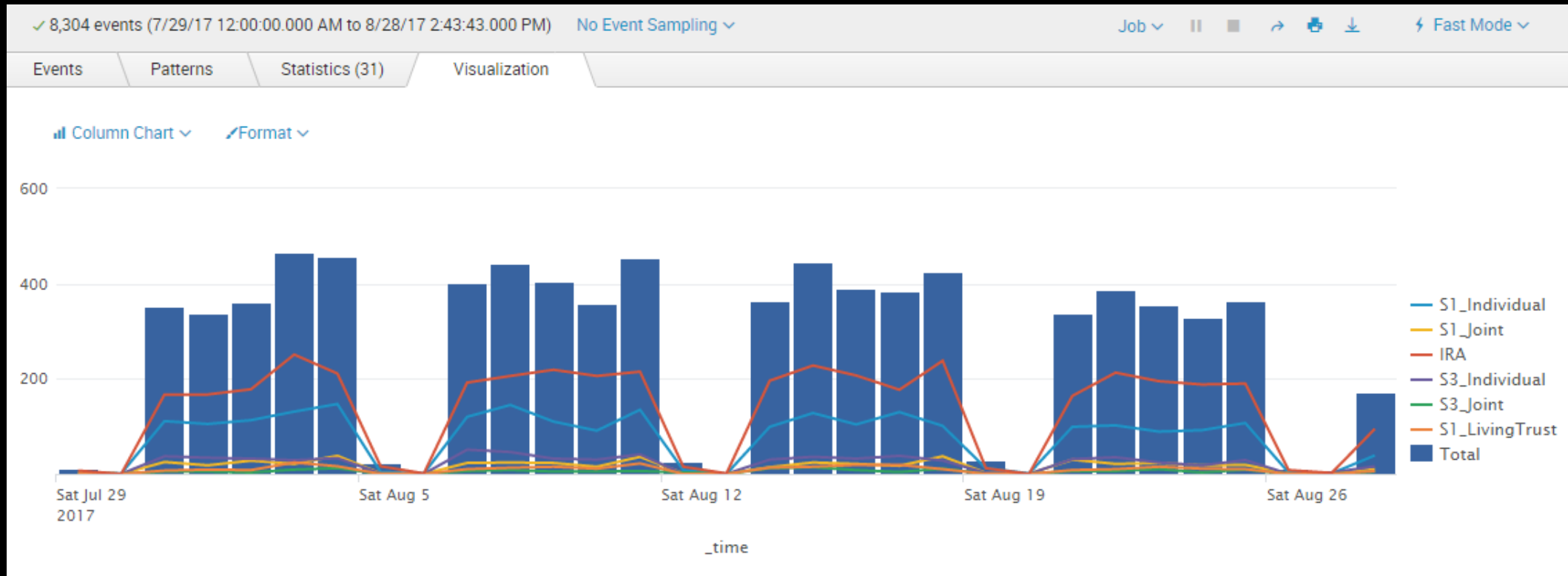
- ▶ Active backlog management
 - Confirm or dispel assumptions to focus on what's important
 - Dashboarding at a glance to confirm MVP

- ▶ Assist with prioritization of bugs, feature, new products
 - Immediate usage counts to assess impact and determine next steps

- ▶ Eliminates wasted resources to address 'perceived' issues
 - No more 'telephone game'. Messages are delivered with fact based stats

Informed Development Priorities With Fact-based Statistics.

Decide this



```
130.60.4 - [07/Jun 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD1SLAFF10ADFF10 HTTP 1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&item_id=EST-6&product_id=FL-SW-01" "Opera/9.80.2013.0; U.S. en-US; rv:1.9.2.13; Gecko/20100101; Firefox/17.0.2"
128.241.220.82 - [07/Jun 18:10:57:123] "GET /product.screen?product_id=FL-DSH-01&JSESSIONID=SD95L7FF6ADFF9 HTTP 1.1" 404 3322 "http://buttercup-shopping.com/cart.do?action=purchase&item_id=EST-26&product_id=MX-11-02" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_0; rv:53.0) Gecko/20100801 Firefox/53.0"
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10.255.189 - [07/Jun 18:10:55:187] "GET /category.screen?category_id=FLOWERS&JSESSIONID=SD6SL7FF6ADFF3 HTTP 1.1" 200 3865 "http://buttercup-shopping.com/cart.do?action=purchase&item_id=EST-26&product_id=MX-11-02" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_0; rv:53.0) Gecko/20100801 Firefox/53.0"
10.255.198 - [07/Jun 18:10:55:198] "GET /category.screen?category_id=FLOWERS&JSESSIONID=SD6SL7FF6ADFF3 HTTP 1.1" 200 3865 "http://buttercup-shopping.com/cart.do?action=purchase&item_id=EST-26&product_id=MX-11-02" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_0; rv:53.0) Gecko/20100801 Firefox/53.0"
```


Result Of Using Splunk @Schwab

- ▶ Noticed other users in the firm 'Liberating' dashboards created by AO&E
 - Shows a sharp interest in the abilities of the tool
- ▶ Decision making process has been vastly improved
 - Impact can be assessed in near real time
 - Single event can yield a tangible action item
- ▶ Easily identifiable areas of opportunity
 - Dashboarding allows for a clear concise overview
 - Unknown unknowns become known knowns
- ▶ Splunk COE
 - Sounding board for all things Splunk amongst like minded individuals
 - Easily and efficiently identify opportunities, solve complex issues, etc.

Future Plans...

Db Connect

The screenshot shows the Splunk DB Connect interface. On the left, there's a 'New Input' section with 'Set SQL Query' and 'Set Properties' buttons. Below that, 'Choose Table' is set to 'MySQL' and 'Catalog' is 'sakila'. A table of actors is displayed with columns: actor_id, first_name, last_name, last_update. The SQL Editor shows a query: `SELECT * FROM sakila.actor WHERE actor_id > 7 ORDER BY actor_id`. On the right, there are 'Settings' and 'Template' sections, and a 'Follow these steps' checklist.

MLTK

The screenshot shows the 'Predict Numeric Fields' interface. It includes a 'Field to predict' dropdown set to 'input_output_prediction_score'. Below, there are 'Actual vs. Predicted Scatter Plot' and 'Residuals Histogram' visualizations. A table of regression statistics is shown at the bottom, including 'R Squared' (0.70) and 'Mean Squared Error (MSE)' (5.11).

ITSI

The screenshot shows the IT Service Intelligence (ITSI) dashboard. It features a 'Health Map' for 'End to End Health (Medium)'. The map shows a flow from 'Website' to 'External APIs' to 'Middleware' to 'Database'. Key metrics include: Website (Revenue: 388.5, Checkouts: 11), External APIs (Health: 56.67), Mobile (Revenue: 1k, Checkouts: 13), Mobile Tier (Health: 56.67), and Database (Health: 35.38). The overall Health score is 70.7.

130.60.4 - [07/Jan 18:10:57:153] "GET /category/screen?category_id=GIFTS&JSESSIONID=SD1SLAFF10ADFF10 HTTP 1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FL-SW-01" Opera/9.80...
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Thank You

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