splunk> .conf2017

# 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



#### **Forward-Looking Statements**

During the course of this presentation, we may make forward-looking statements regarding future events or the expected performance of the company. We caution you that such statements reflect our current expectations and estimates based on factors currently known to us and that actual events or results could differ materially. For important factors that may cause actual results to differ from those contained in our forward-looking statements, please review our filings with the SEC.

The forward-looking statements made in this presentation are being made as of the time and date of its live presentation. If reviewed after its live presentation, this presentation may not contain current or accurate information. We do not assume any obligation to update any forward looking statements we may make. In addition, any information about our roadmap outlines our general product direction and is subject to change at any time without notice. It is for informational purposes only and shall not be incorporated into any contract or other commitment. Splunk undertakes no obligation either to develop the features or functionality described or to include any such feature or functionality in a future release.

Splunk, Splunk>, Listen to Your Data, The Engine for Machine Data, Splunk Cloud, Splunk Light and SPL are trademarks and registered trademarks of Splunk Inc. in the United States and other countries. All other brand names, product names, or trademarks belong to their respective owners. © 2017 Splunk Inc. All rights reserved.

.screen?product\_id=FL-DSH-01&JSE

# 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?

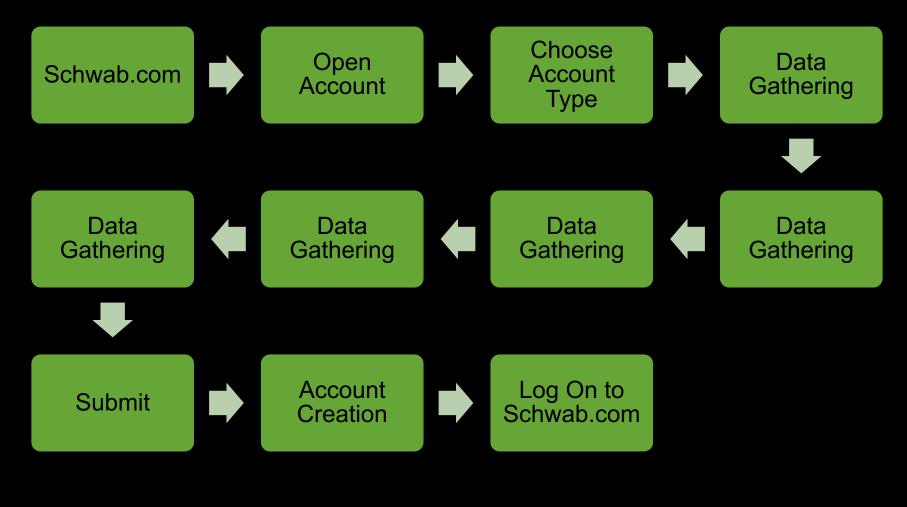
#### Charles Schwab & Co, Inc.

 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



URPRISE&JSES

:ET '/PrOduct.screen?category\_id=GIFTS&JSESSIONID=SDISLAFF10ADFF10 HTTP 1.1 "GET /Oldlink?item?product\_id=FL-DSH-01&JSESSIONID=SDSSI7FF6ADFF2000 1318 5.17 Jule: Total: To



## **About Account Open And Enrollment**

Importance of Account Open & Enrollment

- Why is Account Open & Enrollment important?
- First touch
  - You only get one chance to make a first impression
- Sets state for future interaction
  - Helps onboarding process, familiarizes users with Schwab
  - Smooth AO&E process builds trust with the firm
- Sets proper expectations
  - Clear concise interactions and messaging throughout process



splunk

**CONf**2017



- Needed a real-time system that could deliver immediate conclusions based on data
- ▶ Did not want to aggregate data from Warehouses, hives, clusters and other DB's
- Weblog data already existed at Schwab used by other groups
- We have many data points that are already being captured from multiple channels
- As our Splunk usage increased, we worked with our development team to build additional logging capabilities

splunk

.conf2017

#### 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

## Areas Of Opportunity

Where can Splunk help me?

 Actionable intelligence from a reliable source

- Prod Support
- Improved MTTR
- Binary

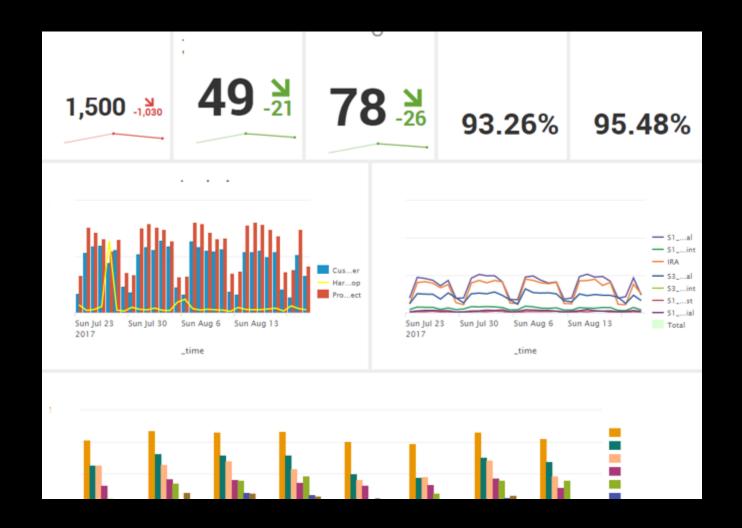
- On Demand analytics without needing to rely on a data warehouse
  - Business Support
  - Independence
  - Real-time

- 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

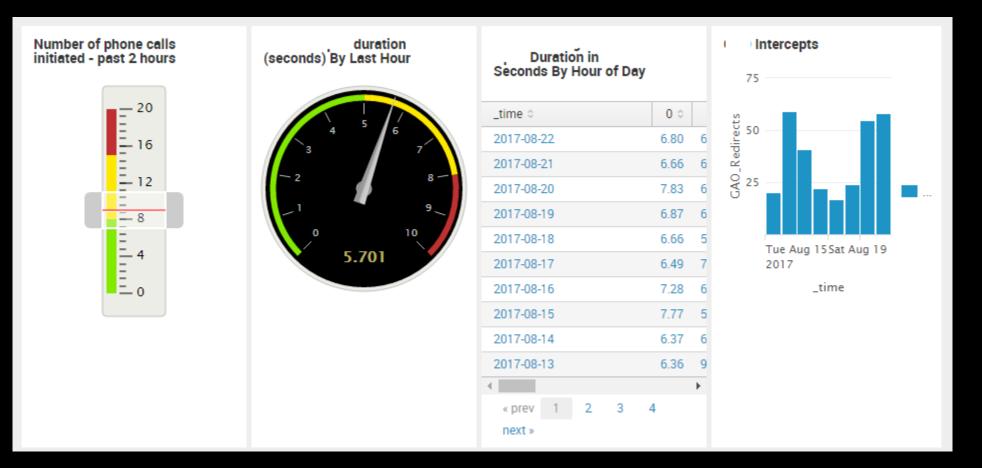


#### **Actionable Intelligence From A Reliable Source**





#### On Demand Analytics Without Needing To Rely On A Data Warehouse





#### Informed Development Priorities With Fact-based Statistics





#### Actionable Intelligence From A Reliable Source

Data gathering mission?

- Customer Feedback (challenges)
  - Phone calls
  - Email Support
  - Social Media
- Employee Feedback
  - Ideas Portal
  - Feedback box
  - Ad-hoc discussions
- QA Findings
  - Bugs
  - Bugs
  - Bugs





#### **Actionable Intelligence From A Reliable Source**

Quantifying impact is difficult

#### "Every single one "People are "This happens ALL of my clients complaining about this the time" on social media" experienced this" - Phone team, probably. - Email team, likely. – Social Media team, yup.

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



© 2017 SPLUNK INC.

# "I heard through the grapevine that an error scenario exists but I have no reliable way to quantify impact"

-me



.conf2017

#### **Actionable Intelligence From A Reliable Source**

What actionable intelligence can I use from an unbiased source?

splunk > App: wut >	×			Hagopiar	n, Hagop 🗸 🛛 Messag	es 🗸 🦷 Settings 🗸	Activity 🗸	Help 🗸	Find	
Search Datasets	Reports /	Alerts D	ashboards							wut
Rew Searc	h								Save As ∽	Close
index=bestindexeve	r sourcetype	=bestsour	cetypeever e	event=besteventever   t	imechart span=1h:	count as Some_l	Logged_Even	it	Last 30 days 🗸	Q
7 3 events (7/12/17 12:00	0:00.000 AM to 8	8/11/17 1:38	31.000 AM)	No Event Sampling $\backsim$		Job	~ II II	~ 🕹 🛓	Uerbose	Mode 🗸
vents (3) Patteri	ns \Stati	istics (722)	Visualiz	ation						
4 3 2 1 Wed Jul 12 2017	Tu	e Jul 18		Mon Jul 24	Sun Jul 30	Sat	Aug 5		Some_Log	gged_Event
				_time						
T /category.screen?catego 23] "GET /product.screen? [156] "GET /olatet.screen?	Fy_id=GIFTS&JSE5	SIONID=SD15L4	AFF10ADFF10 HTTP	1.1" 404 720 "http://buttercup 1.1" 404 720 "http://buttercup-sh F9 HTTP 1.1" 404 3322 "http:/buttercup-sh 7 200 1318 "http://buttercup-should	y-shopping.com/cart.do?au puttercup-shopping.com/c nopping.com/cart.do?acti. 2051.47FAADFF7 HTTP 1.1* 5051.47FAADFF7 HTTP 1.1* 5051.47FAADFF7 de55T-6& -changequantity&itemid= -changen?cate	ction=view&itemId=EsT ategory.screen?catego on=purchaso&itemId=ES 260 2423 "http://but EST-18&product_id=AV-( JSES510NID=SDISGEFE2)	T 200-01070000	FI-SW,01" "Obe Moz4111a/4 "Obe 8.com/cologe	S	olun

.conf2017

#### Actionable Intelligence From A Reliable Source

A single event can yield the necessary intelligence

splunk> App: wut	/			н	agopian, Hagop 🗸	Messages 🗸	Settings 🗸	Activity ∽	Help 🗸	Find	
Search Datasets	Reports	Alerts	Dashboards								wut
Q New Searc	h									Save As ∽	Close
index=bestindexeven	r sourcetype	e=bestsou	ircetypeever	event=besteventeve	er   timechart	span=1h count	t <mark>as</mark> Some_Log	gged_Event		Last 24 hours ~	Q
✓ 19 events (8/10/17 1:00	):00.000 AM to	8/11/17 1:	12:25.000 AM)	No Event Sampling $\sim$			oL	b∨ II I	- e	∳ <u>↓</u> ∮ Fast	Mode ~
Events Patterns	Statisti	cs (25)	Visualizatio	n							
2 Some_Logged_Event	✓Format ∨									Some_Lo	gged_Event
	4:00 AM Thu Aug 10 2017		8:00 AM	12:00 PM	4:00	D PM	8:00 PM		12:00 AM Fri Aug 1		
				_time	2						
1] "GET /category.screen?catego 157:123] "GET /product			A PERSONNEELO HTTP	1.1" 404 720 "http://bu	ttercup-shopping.com ttp://buttercup-sho rcup-shopping.com/c rcup-consid=FAADFF	m/cart.do?action=v1 pping.com/category. art.do?action=purch 7 HTTP 1.1" 200 242 BitemId=EST_188p	ew&itemId=EST-6& screen?category ase&itemId=EST-2 3 "http://butter/ roduct_id=Av-Cn_2	Product_1d=Fi_ 1d=GiFig: "Moz G&product_1d=K Gip:shoppi	SW.01. 11244 "D.	sp	lunk

splunk>

.conf2017

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

Query This?

- Date Warehousing
- Hadoop Hives
- Structured DB
- Unstructured DB

Screen?product id=FL-DSH-01&JSESSIONID=SD5>L

- Batch loads
- CSV
- Excel Spreadsheets
- Pivot Tables
- ▶ Tableau TabNeau!

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

Watch This

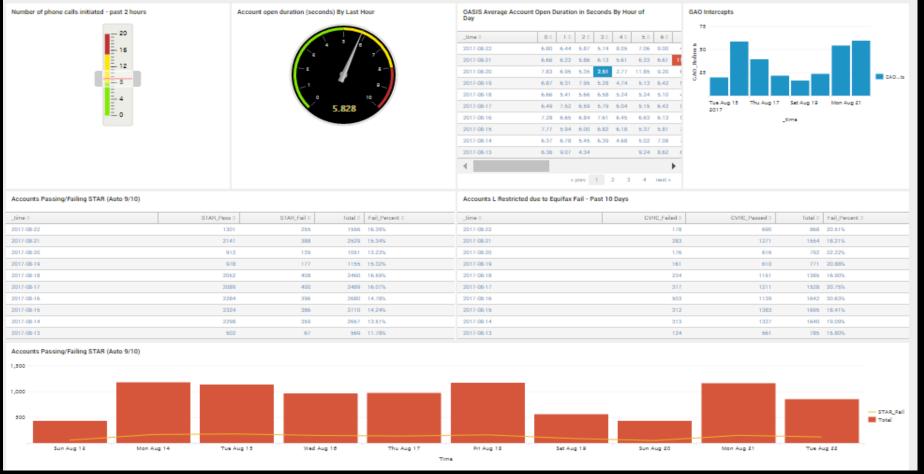
- Real-time/ instant ad-hoc reports
- Customizable and Shareable
- Built in Dashboarding

- Alerts
- Self service, self driven
- Allows Curiosities to run wild



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

#### Watch This



splunk>

.conf2017

shopping.com/cart.do?action=view&itemId=EST-6&pr

when //buttercup-shopping.com/category.screen?category.go

HTTP 1.1" 404 720 "http://butte.sorgup.shopping.com/calling.200 2423 "http://butte.com

-3Creen?category\_id=GIFTs&JSESSIONID=SDISLAFF10ADFF10 HTTP 1.1" 494 ;/DuttercuD\_sD95L4FFADPrity&itemId=E57-18&product\_id=Av=cs\_0\*1& aboot\_id=ka roduct\_Screen?product\_id=FL-DSH-01&JSESSIONID=SDSSL9FFADPF9 HTTP 1.1" 494 ;/DuttercuD\_sD95L4FFADPrity=Category\_ /Old/ink?item\_id=E57-26&JSESSIONID=SDSSL9FF1ADFF3 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=E57-26&JSESSIONID=sD85L9F1ADF53 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=E57-26&JSESSIONID=SD5SL9FF1ADF53 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=E57-26&JSESSIONID=SD5SL9F1ADF53 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=E57-26&JSESSIONID=SD5SL9F1ADF53 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=E57-26&JSESSIONID=SD5SL9F1ADF53 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=E57-26&JSESSIONID=SD5SL9F1ADF53 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=E57-26&JSESSIONID=SD553 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=E57-26&JSESSIONID=SD553 HTTP 1.1" 200 id=grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Category\_id=SURPRISECT\_/old/ink?item\_id=Grid=Cate

splunk

conf2017

# 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

√ 8,30	4 events (7/29/17 12:00:00.000 AM to 8	3/28/17 2:43:14.000 PM) No Eve	ent Sampling 🗸	Job ~ II	🔲 🤌 📥 🛓 🦩 🗲 Fast Mode 🗸
Events	Patterns Statistics (3	1) Visualization			
ы С 600	Column Chart 🗸 🛛 🖍 Format 🗸				Total
400 reto 200					
	Sat Jul 29 2017	Sat Aug 5	Sat Aug 12	Sat Aug 19	Sat Aug 26

\_time



#### Informed Development Priorities With Fact-based Statistics.

Decide this

✓ 8,304 events (7/29/17 12:00:00.000 AM t	to 8/28/17 2:43:43.000 PM) No Event	Sampling 🗸	Job∨ II 🔳	ir 👌 📥 🕴 🕴 Fast Mode 🗸
Events Patterns Statistics	(31) Visualization			
al Column Chart ∽				
600				
	Sat Aug E	Str Aug 12	Sat Aug 10	- S1_Individual - S1_Joint - IRA - S3_Individual - S3_Joint - S1_LivingTrust - Total
Sat Jul 29 2017	Sat Aug 5	Sat Aug 12	Sat Aug 19	Sat Aug 26

\_time



## 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.

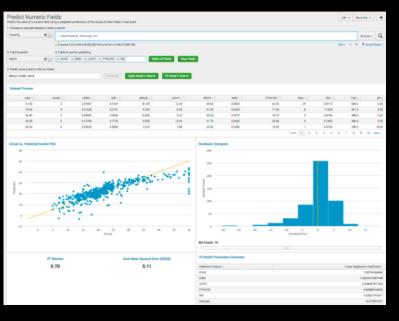


#### Future Plans...

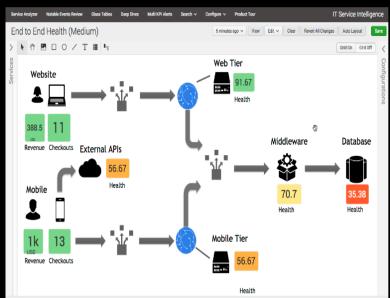
#### **Db** Connect

Data Lab Configuration Health ~	<ul> <li>Search</li> </ul>				Splunk DB Connec	
New Input	<b>ry</b> Set Propertie	12	Complete	Next Cancel		
Choose Table	SQL Editor			Format Execute SQL	Settings	
Connection				P Pormat Execute aqu	Template	
MySQL V	SELECT FROM Social	a`.`ector`			Select.	
	3 WERE actor					
Catalog	CRDER BY	ctor_1d			Input Type	
sakila 🗸					Batch Rising	
Schema					Follow these steps:	
Select v					<ul> <li>1. Choose a valid connection</li> </ul>	
m.11.		first name 0	last series 6	last_update =	✓ 2.Browse structure and type SQL or	
Table Search	actor_id =	KIRSTEN	PALTROW	2006-02-15-04:34:33.0	choose a template to explore your data	
search	2 22		MARX	2006-02-15 04:34:33.0	✓ 3.Pick a rising column and set the	
actor	3 23		KILMER	2006-02-15 04:34:33.0	<ul> <li>checkpoint value</li> <li>4Update your SQL to accept the</li> </ul>	
address	4 24		STREEP	2006-02-15 04:34:33.0	checkpoint value and make su	
big5	5 25		BLOOM	2006-02-15-04:34:33.0	works correctly.	
category	6 25		CRAWFORD	2006-02-15 04:34:33.0	To use a rising mode input, you need a WHERE statement upon the	
	7 27		MCDUEEN	2006-02-15-04:34:33.0	selected rising column and sort the results with CRDER BY.	
channel	8 28		HOFFMAN	2006-02-15 04:34:33.0	For example:	
city	9 29		WAYNE	2006-02-15-04:34:33.0		
country	10 30		PECK	2006-02-15 04:34:33 0	SELECT * FROM your_table WHERE actor_id > ?	
customer	11 31	SISSY	SOBIESKI	2006-02-15-04:34:33.0	ORDER BY actor_id ASC	
datatype_test	12 32	TIM	HACKMAN	2006-02-15-04:34:33.0	5. Click "Execute SQL" to review results	
	13 33	MILLA	PECK	2006-02-15-04:34:33.0		
dbx1746	14 34	AUDREY	OLIVIER	2006-02-15 04:34:33.0	Rising Column	
dbx_output	15 35	JUDY	DEAN	2006-02-15-04:34:33.0	actor_id ~	
film	16 36	BURT	DUKAKIS	2006-02-15 04:34:33.0	Checkpoint Value	
film_actor	17 37	VAL	BOLGER	2006-02-15-04:34:33.0	20	
	18 38	TOM	MCKEULEN	2006-02-15-04:34:33.0		
film_category	19 39	GOLDIE	BRODY	2006-02-15-04:34:33.0	Timestamp	
film_taxt	20 40	JOHNNY	CAGE	2006-02-15/04:34:33.0	Current Index Time Choose Column	
inventory	21 41	IODIE	DEGENERES	2006/02/15/04/34/33 0	Column	

#### MLTK



#### ITSI





"VET /category.screen?category\_id=GIFTS&JSESSIONID=SDISL4FF10ADFF10 HTTP 1.1" 404 720 "http://buttercup-shopping.com/category.screen?category.screen?category.id=GIFTS&JSESSIONID=SDISL4FF10ADFF10 HTTP 1.1" 404 7322 "http://buttercup-shopping.com/category.screen?category.id=GIFTS&JSESSIONID=SDISL4FF10ADFF10 HTTP 1.1" 404 7322 "http://buttercup-shopping.com/category.id=GIFTS&JSESSIONID=SDISL4FF10ADFF10 HTTP 1.1" 404 7322 "http://buttercup-shopping.com/category.id=GIFTS&JSESSIONID=SDISL4FF40ADFF10 HTTP 1.1" 404 7322 "http://buttercup-shopping.com/category.id=GIFTS&JSESSIONID=SDISL4FF40ADFF10 HTTP 1.1" 404 7322 "http://buttercup-shopping.com/category.id=GIFTS&JSESSIONID=SDISL4FF40ADFF10 HTTP 1.1" 404 7322 "http://buttercup-shopping.com/category.id=GIFTS&JSESSIONID=SDISL4FF40AFF10 HTTP 1.1" 405 7

# Thank You

# Don't forget to rate this session in the .conf2017 mobile app

