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# Where Mobile meets In-Store & Point of Sale: Data Collides

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# Agenda

- Speaker / Company Bios
- Why and How we utilize Splunk
- Solution Description
- Technical Execution with Splunk
- Demo
- Q&A





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## Introductions

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# Scott Hall

Sr. Technical Solution Manager - NCR



# Jon Thies

CTO - QWASI





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# QWASI

A unique Engagement and Data Management Platform that leverages real time data to curate unique user experiences.

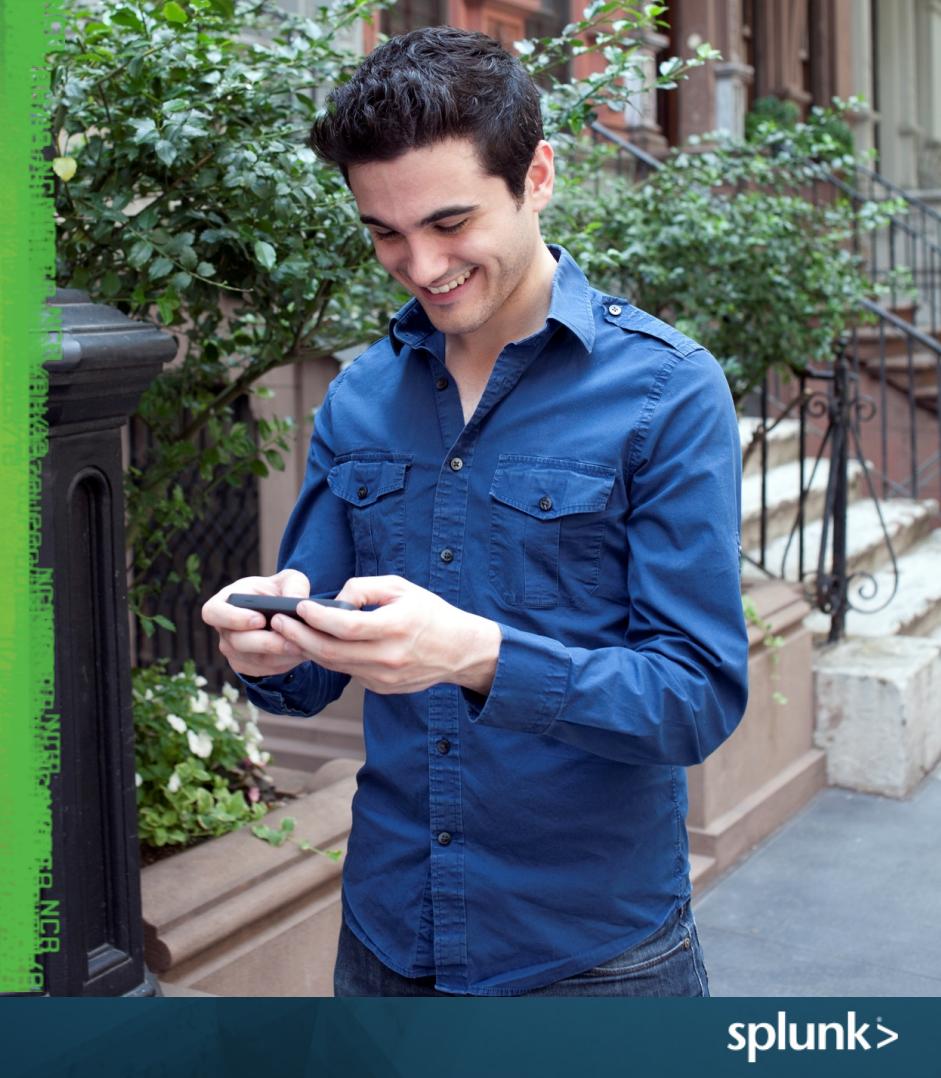
QWASI's consolidates first party behavioral data with CRM and Campaign Automation tools to create visibility into each individual's journey.

QWASI enables brands, agencies, and enterprises to determine Campaign Attribution, ROI, and manage predictive protocols across all touchpoints.



# How do we reach our customers?

- ⌚ Do I start with a CRM?
- ⌚ Geo-targeting
- ⌚ Data filtering
- ⌚ Real-time





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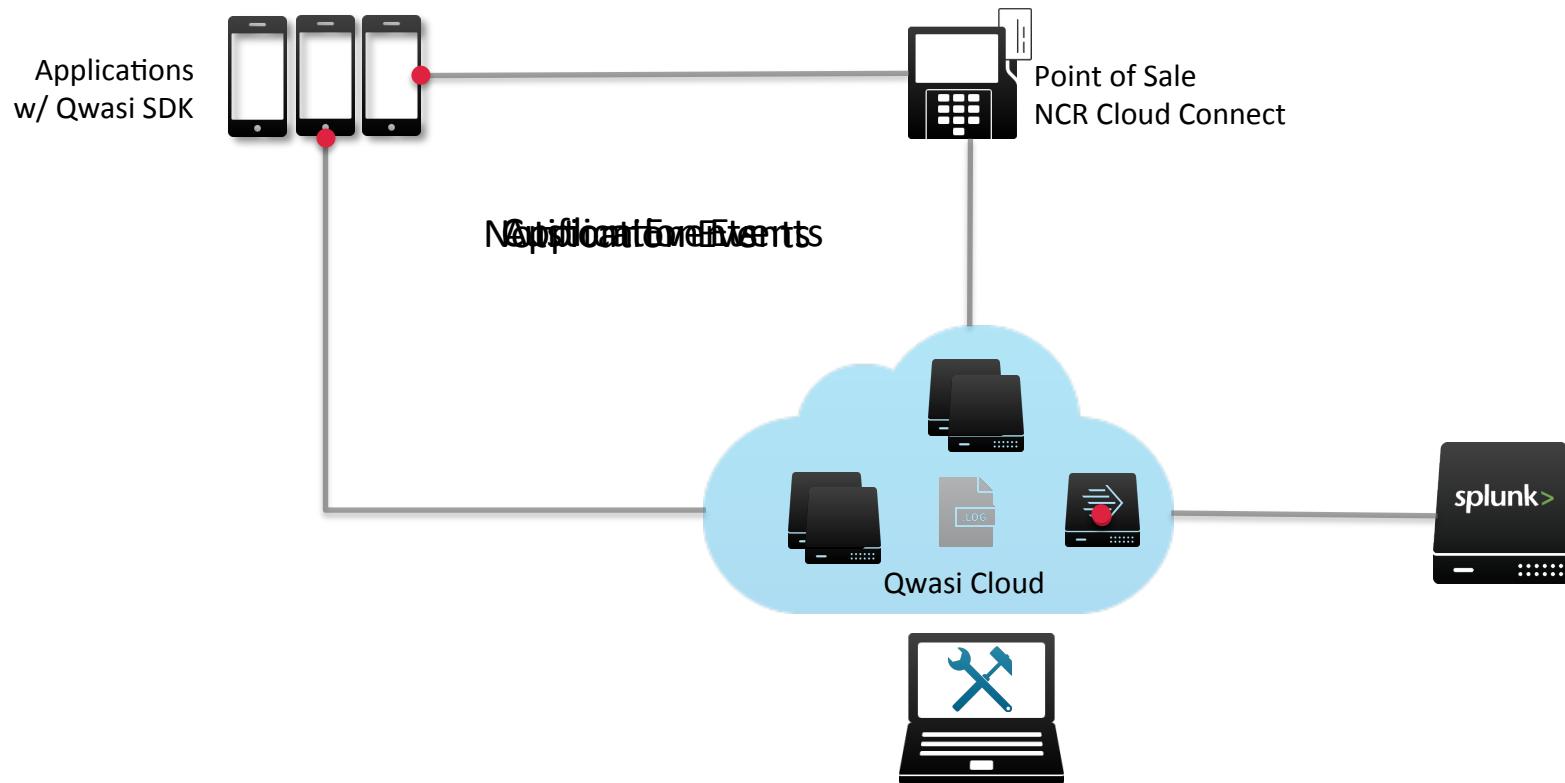
# Why Splunk?

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# Value of Splunk

- Splunk simplifies boring tasks
  - Monthly invoicing - It would take an entire day to review all the accounts
  - Troubleshooting Customer Issues
- Splunk increases our ability to detect system failures and errors before our customers do
- Splunk saved our bacon
  - Our platform was new, our biggest customer was ready to leave for a competitor. The biggest feature gap in our platform was reporting.
  - We created a Splunk App in two weeks that addressed every imaginable report they needed.

# Event Lifecycle



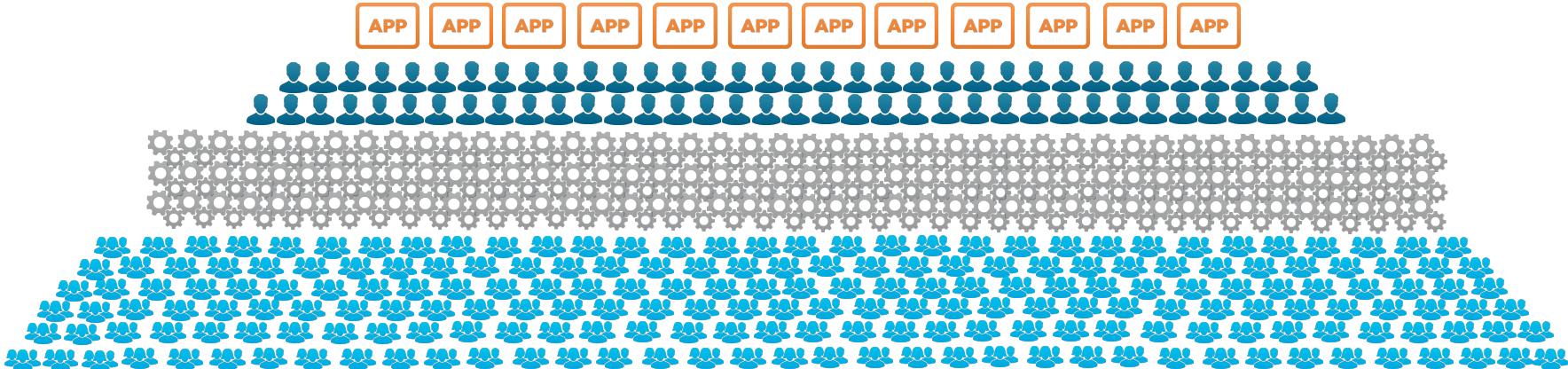
# Every Interaction is an Event

- **Application Events** – automatic events generated using our SDK or API
  - Application Install/Open/Close
  - User Registration
  - Location – Location Update, Geofence and Beacon Enter/Dwell/Exit
- **Custom Events** – events defined by Developers
  - For reporting and analytics purposes
  - For triggering a workflow
- **Notification Events** – events from QWASI to Application via SDK or SMS
  - Sent
  - Delivery Report : Accepted/Delivered/Read
  - Failed

# Why Splunk?

Because its all about Events

- Hundreds of clients
- Thousands of users
- Configuring over a hundred thousand campaigns
- Interacting with millions of subscribers
- Generating over a hundred million events monthly



# Why Splunk?

Because its all about events

Distributed event based platform - combination of dedicated servers, cloud instances, and Docker containers.

- Gain insight of usage at broad and granular levels
  - Passive monitoring across data centers and deployments
  - System Health and Usage Monitoring
- Historical Reporting and Analytics that will not impact runtime systems
- Embed a flexible Splunk Dashboard into our user interface using SplunkJS

# Every Event Needs Context

- Events are always tied to a device and member profile
- **NCR's Cloud Connect – Point of Sale Integration**
  - Customer Loyalty Data (profile)
  - Eligible Redemptions and Bonus Offers
  - Purchase History
- **Event Triggers** – workflows that fire as a result of a specific event within a predefined context.
- **Scheduled Triggers** – workflows that review the state of members profile and event history and initiate workflows based on a schedule



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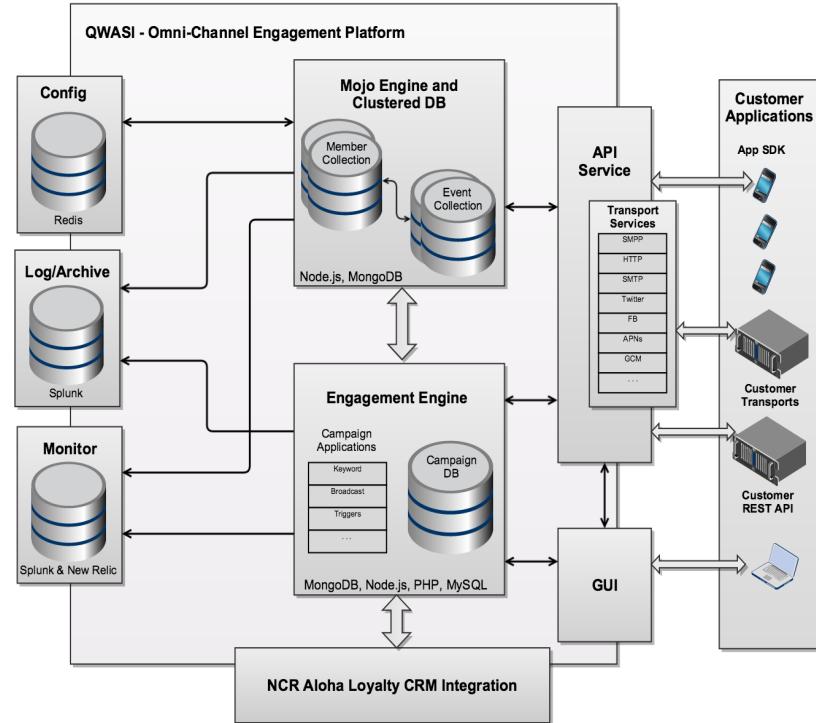
## Solution Description

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# How the Solution Utilizes Splunk

## Splunk Indexes:

- All Transport Traffic
  - GCM, APNs
  - SMS SMPP/HTTP
  - MMS MM7
  - ...
- All API Traffic
  - SDK
  - HTTP
  - Loyalty APIs
- Each Event
  - Member ID
  - Customer ID
  - Deployment ID
  - Event Data Fields



# How the Solution Utilizes Splunk

- Use of Scheduled Saved Searches
- IT and Operations Team login to Splunk Web for troubleshooting and support items daily.
- Provide Rich Analytics and Insight into Campaign Performance and Customer Engagement

**From:** no\_reply@qwasi.com [no\_reply@qwasi.com]  
**Sent:** Sunday, August 23, 2015 1:31 PM  
**To:** Client Serv'---  
**Subject:** High **From:** no\_reply@qwasi.com [no\_reply@qwasi.com]  
**Sent:** Friday, July 31, 2015 12:00 PM  
The alert created by reseller\_i  
**To:** Client Support  
**Subject:** Splunk Alert: MO Abuse

Alert: [Link](#) Saved search results.

---

Name: 'MO Abuse'  
[View result](#) Query Terms: 'MessageType=\"Receive SMS\"' | top FROM | search count > 500'  
Link to results: [https://splunk.qwasi.net/app/search/@go?sid=scheduler\\_admin\\_search\\_RMD549c490ccad9a4b66\\_at\\_1438358400\\_31295](https://splunk.qwasi.net/app/search/@go?sid=scheduler_admin_search_RMD549c490ccad9a4b66_at_1438358400_31295)  
reseller\_i  
17  
18

---

FROM	count	percent
13173748739	1114	50.567408

If you believe you received this message in error, please reply to this email.  
splunk > the engine for machine data

## ➤ BROWN

Hot963: You're in to win tickets to see Chris Brown. Stay by the phone Reply STOP BROWN to Cancel;  
HELP=Help; STOP=End; Msg&Data rates may apply

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## Demonstration

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## Technical Execution



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# The Data

- **Events Log :** /vol/aim\_events.log  
As each event occurs in the platform its written out to a log file as JSON.
- **Members Data –** contained in MongoDB for each deployment.

```
{  
    "_id" : ObjectId("55cfb01cbc99cac0258b49f6"),  
    "msisdn" : "+16150487341"  
    "optin_status": {  
        "mojo_id" : 1, "timestamp": "2015-08-23 20:11:13 -0500",  
        "creation_sourc  
        "user_flags" :  
        "uuid" : "34aa  
        "first_name" :  
        "creation_time  
        "mcKey" : "138  
        "mcCustomerID"  
        "mcMemberId" :  
        "email" : "Mom  
        "im2" : "",  
        "devices" : [  
            {  
                "name": "push-delivered-dlr",  
                "source": "KKHL_559ac8a31d9d3db749d3c7ec",  
                "device_id": "5532f47c545768426d1f8087",  
                "message": "",  
                "type": "delivered",  
                "campaignid": "30",  
                "mcMemberId": "1013024",  
                "campaigntype": "eventtrigger",  
                "payloadsize": "204",  
                "payloadtype": "text/html"  
            }  
        ]  
    },  
    "eventCount" :  
    "last_aloha_up" :  
    "__ts_last_alo  
    "welcome_sent_ :  
    "__ts_welcome_ :  
    "welcome_rewar  
    "total_welcome :  
    "total_activat  
    "last_assignme  
    "__ts_last_ass :  
    "last_name" :  
    "dob" : "1970-  
    "__ts_dob" : I  
    "loyalty_card" :  
    "zip" : 37216,  
    "birthday_rewa  
    "credits" : 99}  
    "last_assignme_ :  
    "last_assignment_store_id" : 62,  
    "last_assignment_store_name" : "0062 Madison, TN"  
}
```

# Member Lookup Table

- Automatic Lookup on source
- Saved Search
  - Extracts Hosts
  - Saves to CSV
  - Executes Shell Script
- Shell Script
  - Loads CSV of Hosts
  - Calls Web Service on each Host
  - Populates Lookup Table

The screenshot shows the Splunk web interface with two main windows.

**Saved Search (CreateMembersCSV):**

- Script:** A PHP script for reading hosts from a log file and writing them to a CSV file.
- Search:** A search definition for extracting hosts from the log file and saving them to a CSV file named "hosts.csv".
- Description:** "get the list of actively connected hosts"
- Time range:** Set to "-1d@d" (last day).
- Acceleration:** Accelerate this search is checked.
- Schedule and alert:** Schedule this search is checked.
- Schedule type:** Cron
- Cron schedule:** 0 \* \* \* \*

**Shell Script (create\_members\_csv.sh):**

- File name of shell script to run:** create\_members\_csv.sh
- Alert actions:** Send email is checked.
- Summary indexing:** Enabled summary indexing is checked.
- Save button:** A green "Save" button is visible at the bottom right.

# Member Lookup Table

- Adds Entire Member Profile to each event as fields
- Saves on license volume
- Lookup tables typically have pre-defined fields – we worked around that
- Lookup table becomes indexed

The screenshot shows the Splunk search interface with the following details:

- Search Bar:** source="/vol/aim\_events.log" | spath input=MemberData
- Results Table:** MemberData
- Summary:** 1 Value, 100% of events
- Reports:** Top values, Top values by time, Events with this field
- Values:** A table showing member\_id values and their counts.
- Raw Data:** A large block of JSON data representing the member profiles extracted from the log file.

member_id	Count	%
979693	26	100%

```
{ "member": { "_id": "55c3d31abc99ca68258b48aa", "msisdn": "+14233157635", "optin_status": 1, "mojo_id": 1, "creation_source": "device-register", "user_flags": 34, "uid": "7d5f9e45-39e0-4091-b7d5-918373a99c56", "first_name": "Jason", "creation_time": "2015-08-06T21:35:22.000Z", "email": "jasonleekilgore@aol.com", "devices": [ { "version": "4.4", "system": "Android KitKat", "model": "LGE LGL34C", "id": "55c3d2cc718a8060407ea8c8", "addedOn": "2015-08-06 16:35:23", "name": "casey.henry59" } ], "eventCount": 57, "welcome_sent_date": "2015-08-06 16:43:06", "total_activate_reminder_ssent": 1, "total_welcome_reminder_ssent": 1, "welcome_reward_eligible": true, "loyalty_card": "51437531597017", "zip": "32225" }}
```

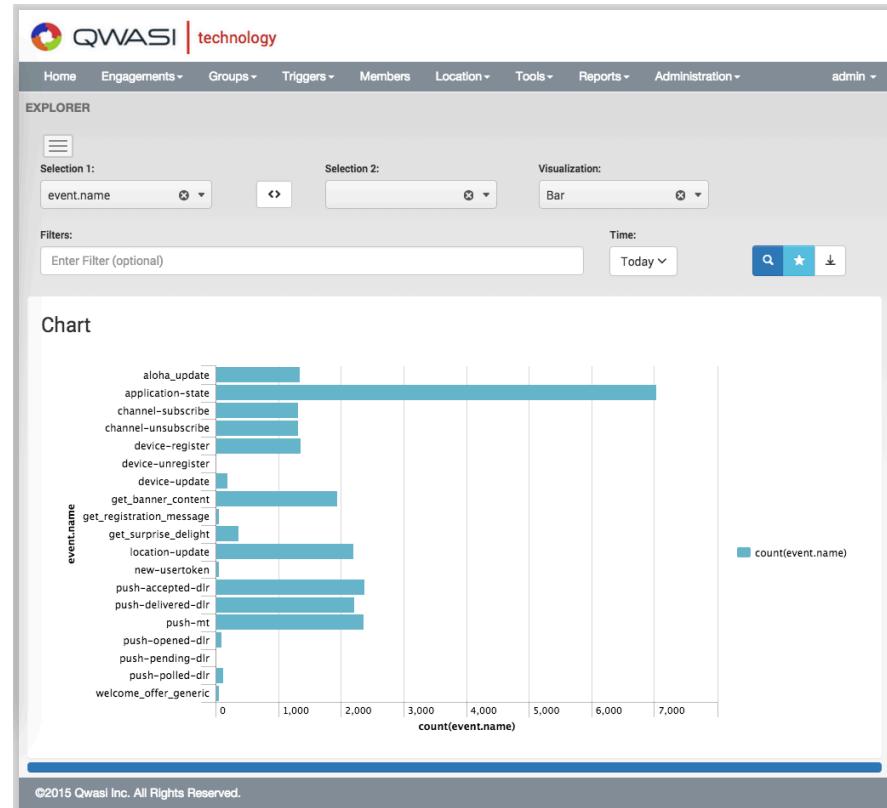
# Dynamic Reports Using SplunkJS

- Simple Dashboard containing :

- *TimeRangeView*
- *DropDownView*
- *SearchManager*
- *ChartView*
- *SplunkMapView*
- *TableView*
- *TextInputView*
- *CheckboxGroupView*

- SearchManager

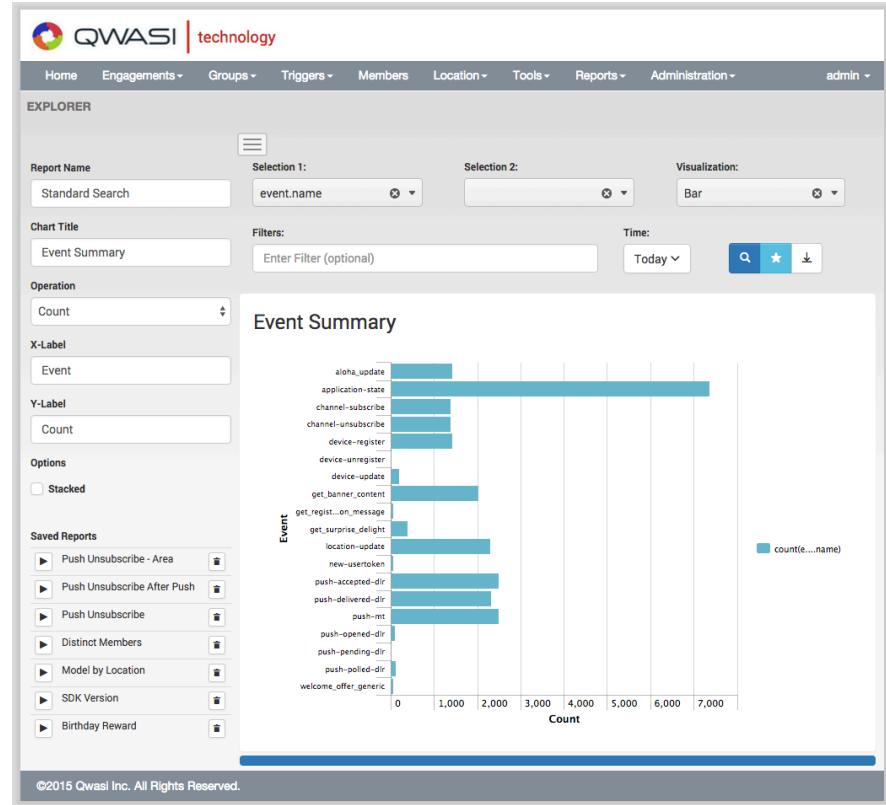
- Interesting Fields (Selection 1&2)
- Main Search – populates *ChartView*
- Map Search – populates *MapView*
- D3 Search – populates custom views



# Dynamic Reports Using SplunkJS

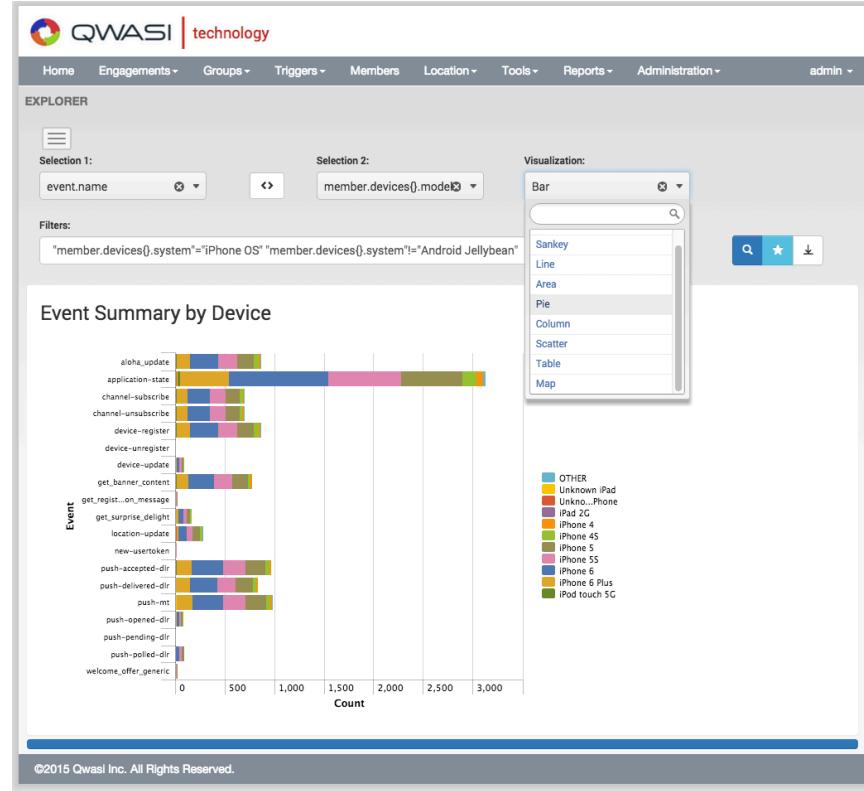
- **Customize the Report**

- Labels
- Operations
  - Count
  - Sum
  - Distinct Count
  - Average
  - Standard Deviation
- Graphing Options
  - Stacked for Bar and Area
  - Heat Map for Table



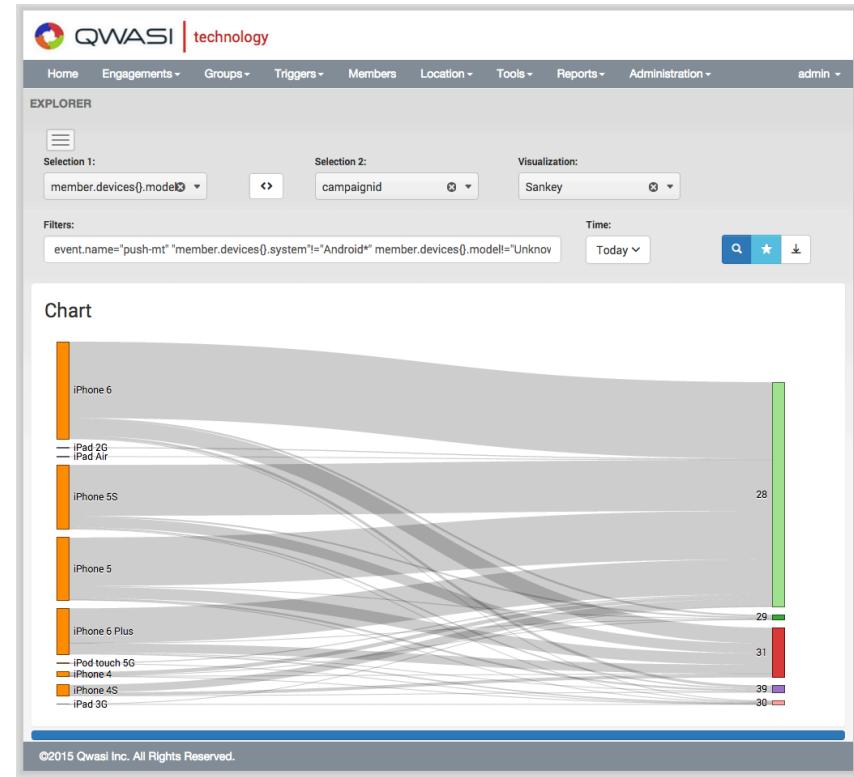
# Dynamic Reports Using SplunkJS

- Visualization to Choose From
  - **Bar**
  - **Sankey**
  - **Line**
  - **Area**
  - **Pie**
  - **Column**
  - **Scatter**
  - **Table**
  - **Map**



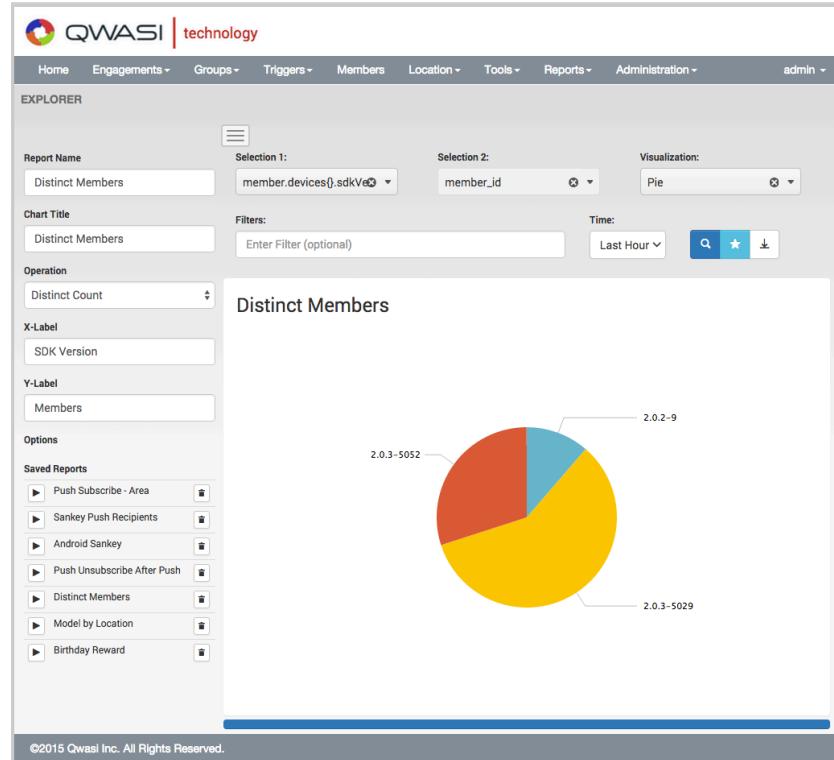
# Dynamic Reports Using SplunkJS

- Filters
  - Used for Drill Down
  - Customizes Splunk Search used



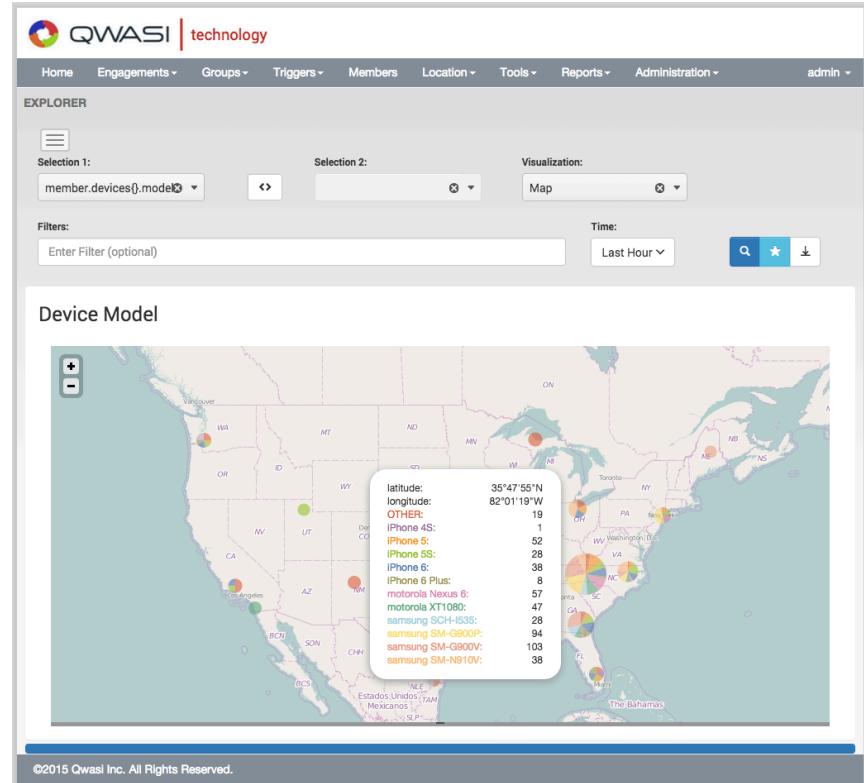
# Considerations Using SplunkJS

- Users ONLY get their events
  - Limits source, customer\_id within Splunk at search time
  - Limits concurrent searches
  - Created when the User is Created via Splunk Rest API
- Drilldown Behavior
  - Modifies field selection
  - Generates new search string
  - Difficult to manage
  - Most power feature
- Downloading Events
  - Is this something we want to do?



# Future Enhancements

- Add more D3 or HighCharts Visualizations
- Download Search Results
- Enabled Real Time Visualizations
  - ▶ This worked, but it leaked searches that would continue to run.
- Link from other Qwasi reports to the SplunkJS and prepopulate the Filters.



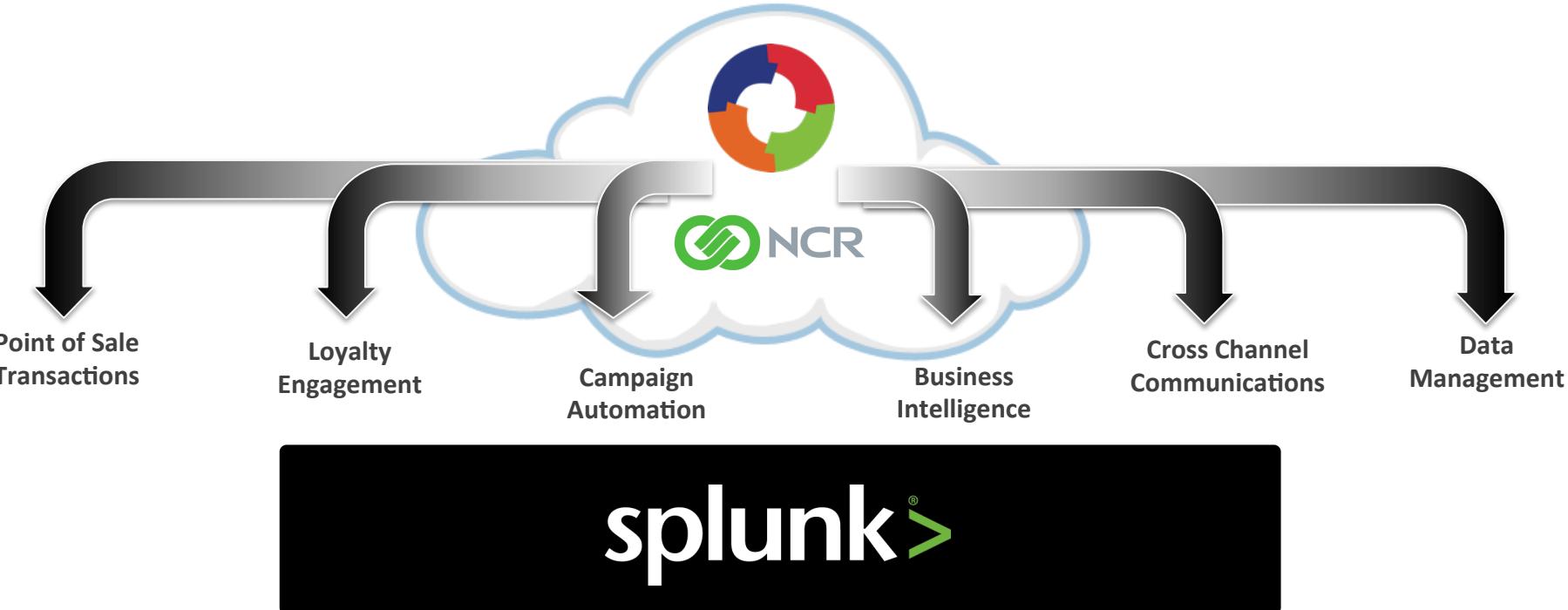


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## Summary

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# Summary





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# Questions?

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THANK YOU

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