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Predictive, Proactive, and Collaborative ML with IT Service Intelligence

Not a Science Project – Creating actionable events through Analytics

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Andrew Stein | Analytical Architect

Sept 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.

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Nate Smalley

- IT Operations Technologist (Reformed Security Guy)
- Former Technical Director of Security & Monitoring Tools Team – Apollo Group (University of Phoenix)
- Currently Splunk Staff Sales Engineer supporting Large Businesses in FinServ & Manufacturing
- Enjoy Long walks across SNMP and Candle light dinners while fighting Operational Outages

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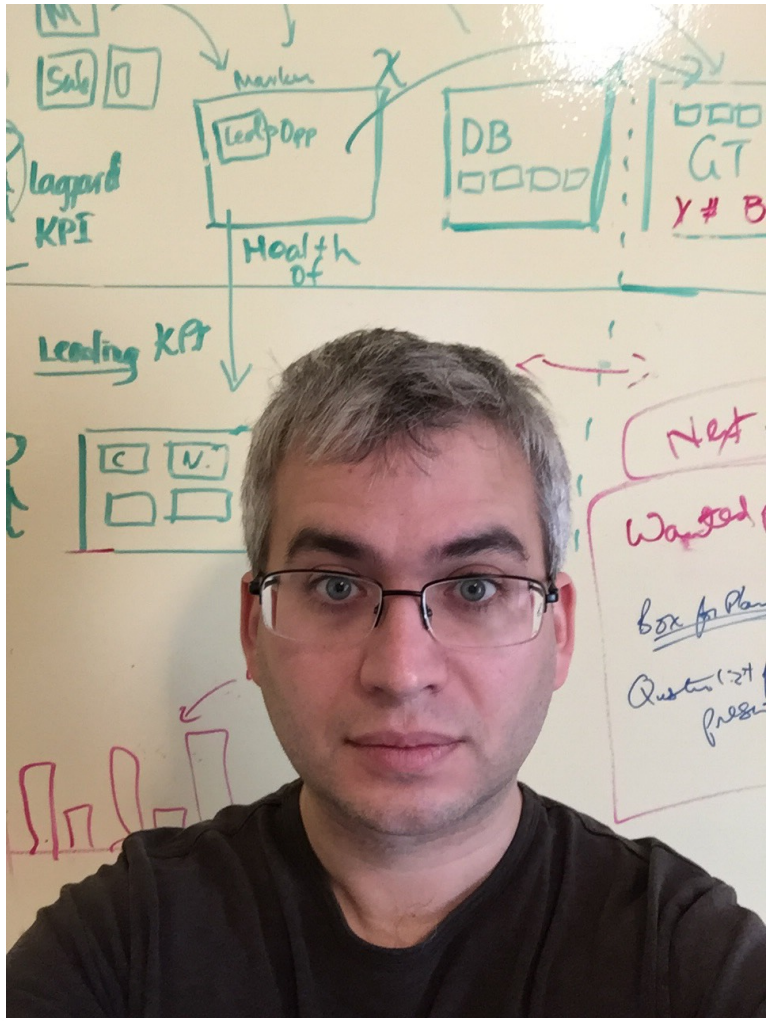
Andrew Stein



- Splunk Global Analytical Architect
- 17 years creating mathimatically modeled solutions
- I spend 80 percent of time spent preparing data and 20 percent of time complaining about the need to prepare data.

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Problem Statement

Operations Teams need more time between an alert and a failure that has Availability impacting ramifications. The introduction of Machine Learning is a have to have in order to predict these failures. These notable events must be able to pushed and collaborated on by via teams in various tools.

Agenda

- What data do we need
  - Indicators Matter
  - Data Where to Get it
  - Demo
- We Need Machine Learning
  - What can we use
- Real use case Example
- Let Dive into “How it works”
- Next Steps

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Indicators Matter

ITSI

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Indicators

- Key Performance Indicators that is
  - Defined - **metrics** that are used to evaluate the overall status of a service.

- Leading Indicators – Drivers of a Result
- Lagging Indicators – Outcome of the Result

- Example Scenario
  - DB Runs out of Space
  - KPI Storage value = 100% <- Leading Indicator
  - KPI User Response time value = 2000+ secs <- Lagging Indicator

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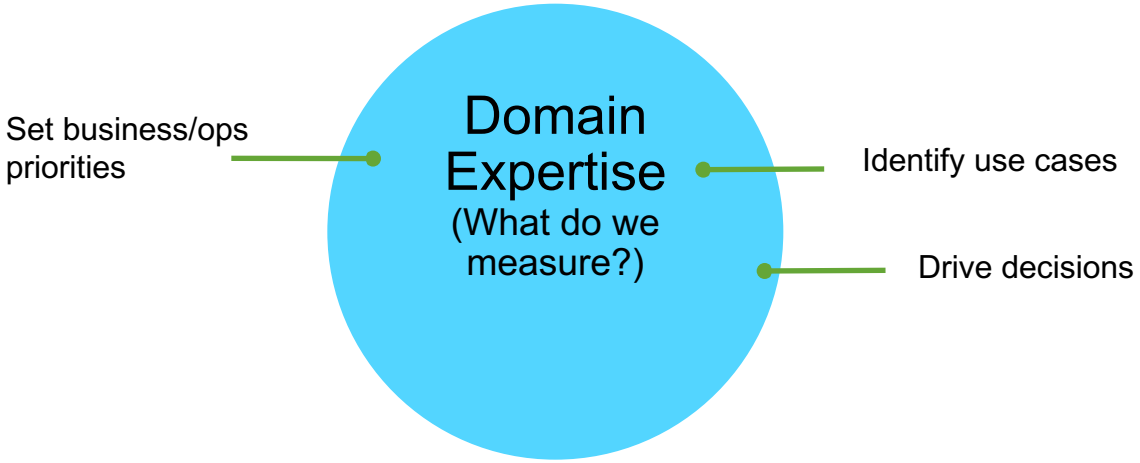
KPI's so what?

- Understanding the historical break out of Leading vs Lagging KPI's and the association to Services is critical in understanding how to predict a good outcome vs bad outcome.

- Understanding these key parts from the Service Experts is critical:
  - Business Priority
  - Use Case Data Needed
  - The "RIGHT" KPI's to measure
  - What decision happens when a Bad outcome Occurs



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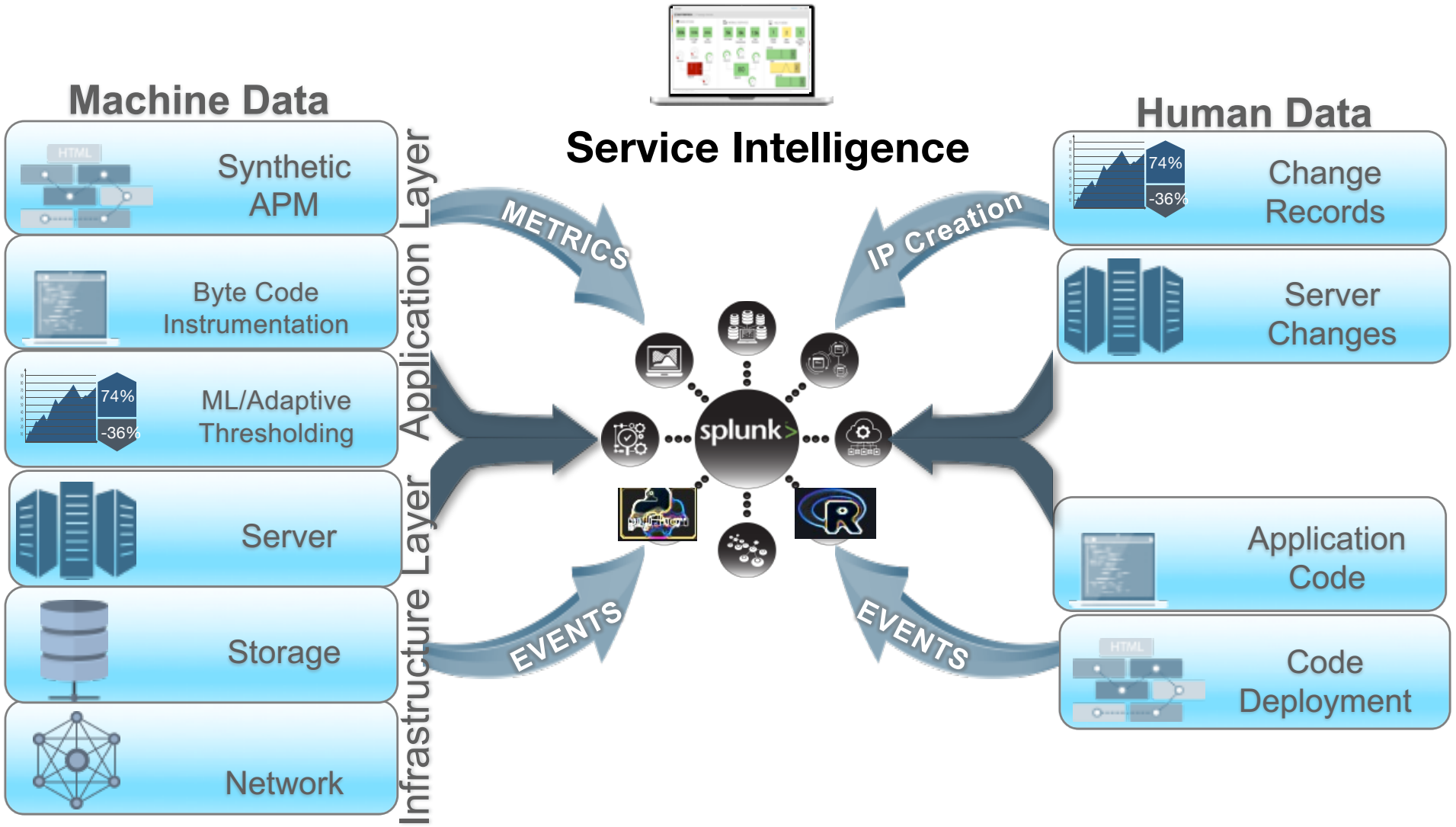
Data Where to Get it

I need it STAT

Where Does Data Come From?



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What Do I do with it Now?

- Use IT Service Intelligence
- Dynamic Service Structure
  - Provide Flexible Dependency Service mapping for interactions at Scale
- Build Key Performance Indicators
  - Leverage a Platform to build out KPI's
  - Ensure repeatability amongst Services for Consistency
  - Aggregation and Per Entity KPI Values
- Ease the burden of Cleaning Data (Schema at search time?)

"Data scientists spend 60% of their time on cleaning and organizing data. Collecting data sets comes second at 19% of their time, meaning data scientists spend around 80% of their time on preparing and managing data for analysis."

Real Use Case Example

Lets Get the data

We Need Machine Learning

Do you want to watch it or let it go?

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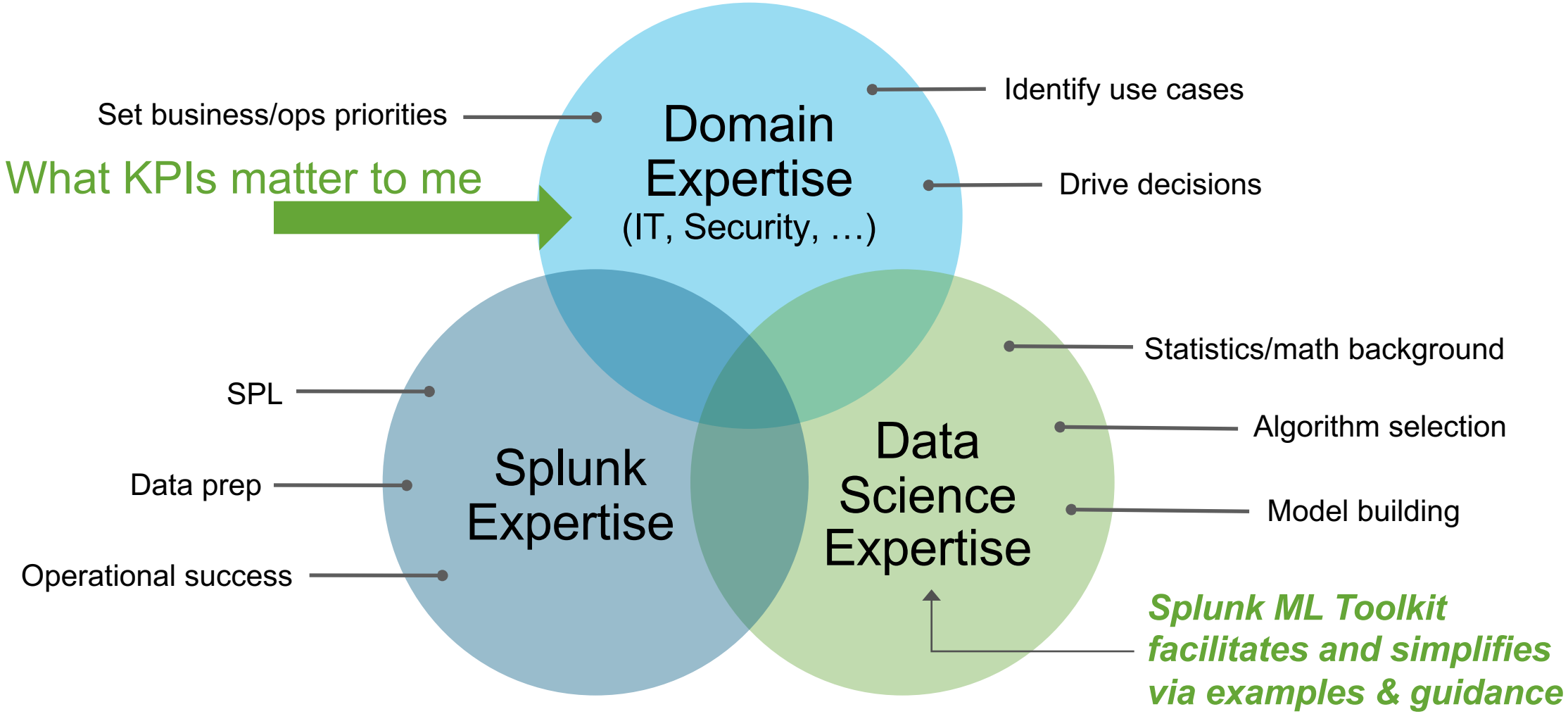
Custom Machine Learning – Success Formula



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Overview of ML at Splunk

CORE PLATFORM SEARCH

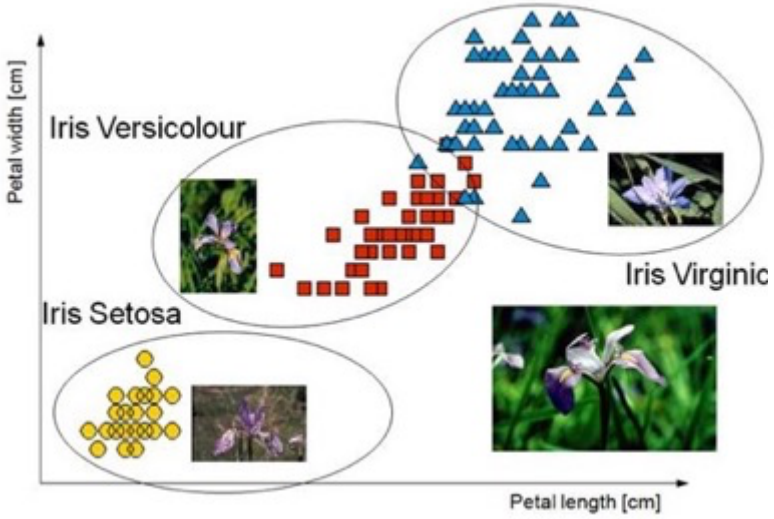
PACKAGED PREMIUM SOLUTIONS

MACHINE LEARNING TOOLKIT

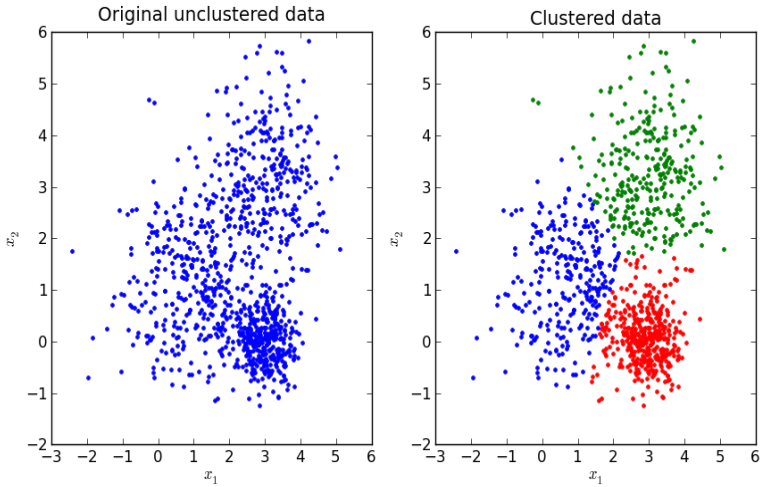
splunk> Platform for Operational Intelligence

Three Types Of Machine Learning

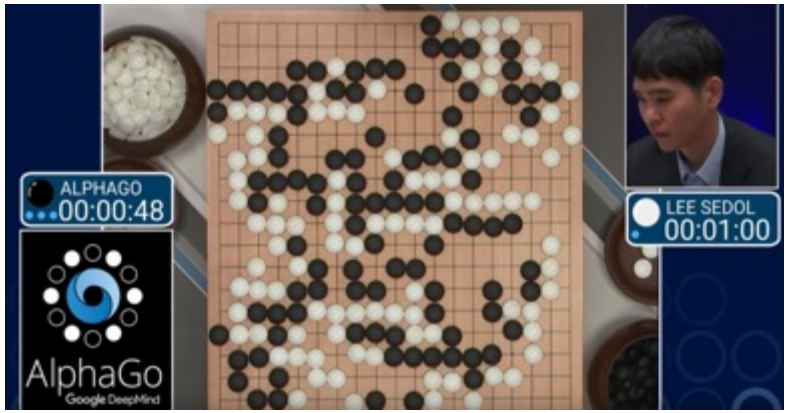
Supervised Learning:



Unsupervised Learning:

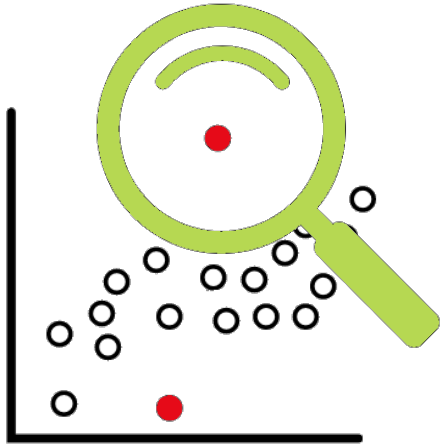


Reinforcement Learning:



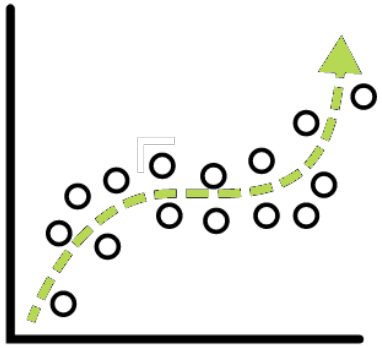
Splunk Customers Have ML Problems

Anomaly detection



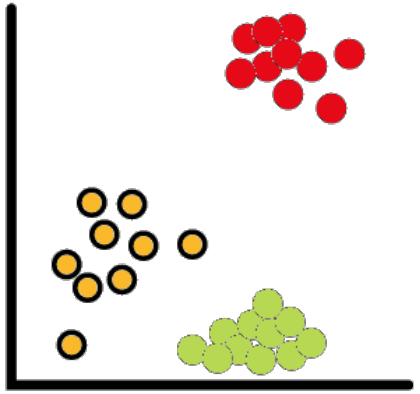
Deviation from past behavior
Deviation from peers
(aka Multivariate AD or Cohesive AD)
Unusual change in features
ITSI MAD Anomaly Detection

Predictive Analytics



Predict Service Health Score
Predicting Churn
Predicting Events
Trend Forecasting
Detecting influencing entities
Early warning of failure – predictive maintenance

Clustering



Identify peer groups
Event Correlation
Reduce alert noise
ITSI Event Analytics

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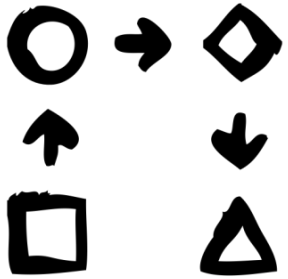
Splunk Machine Learning Toolkit

Created by Arthur Shlain
from Noun Project

Algorithms

25+ standard algorithms available
prepackaged with the toolkit



Created by Ralf Schmitzer
from Noun Project

Assistants

Guide model building, testing,
& deployment for common objectives

Created by Antony
from Noun Project

Showcase

Interactive examples for over 25 typical
IT, security, business, IoT use cases

New commands to
fit, test and operationalize model

Python for Scientific Computing Library
300+ open source algorithms available for use

MLib integration

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Real Use Case Example

Lets Use ML to get Predictive

Event Analytics

BUILT IN - IT Service Intelligence Machine Learning

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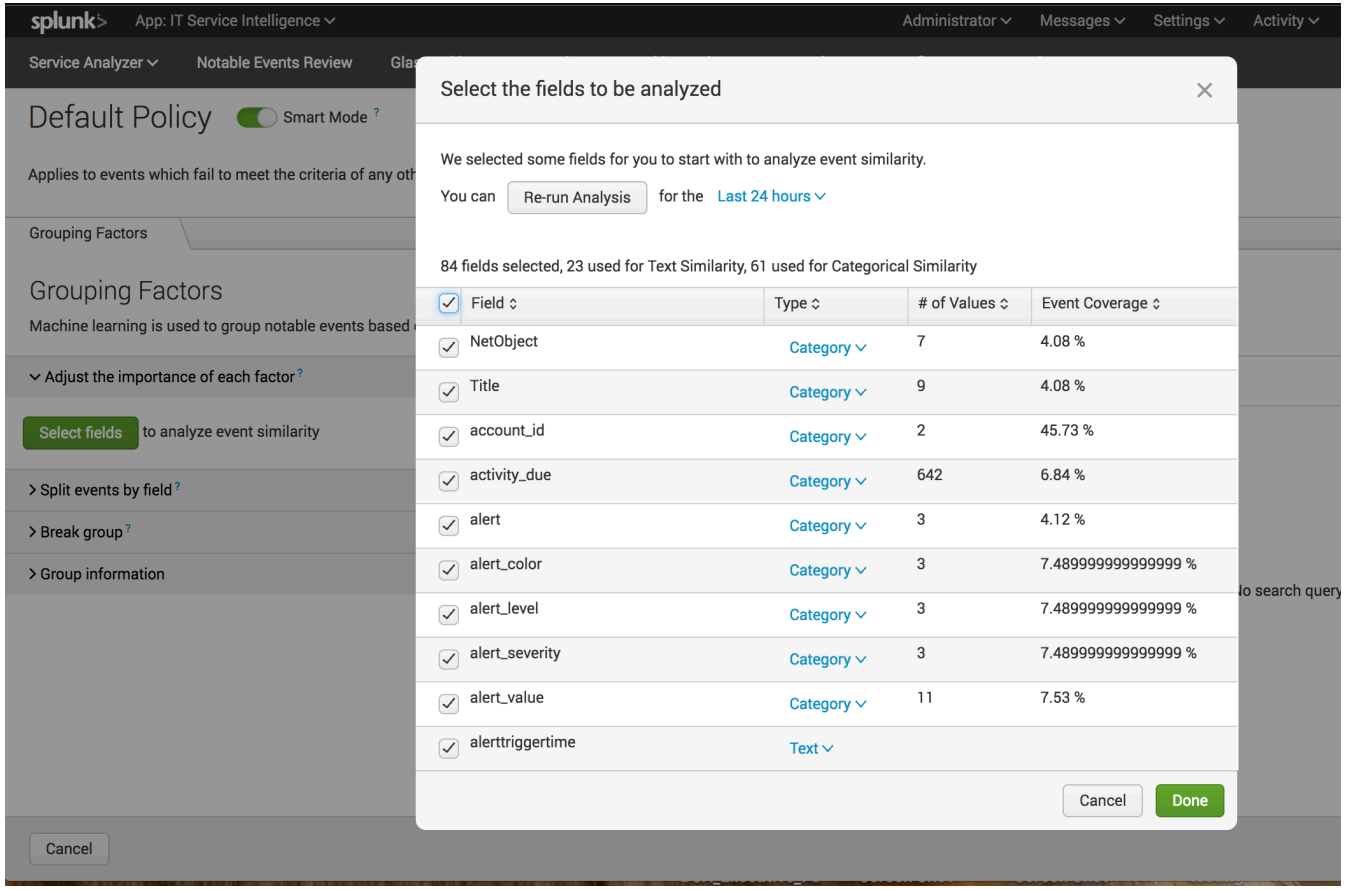
IT Service Intelligence Event Analytics

- Notable Events are key
  - We created a notable for Web Store Service – Called webstore_health_alert
  - Lets see how Splunk can cluster this with other events to show other Notable Events that are attributed
- Smart Mode is actually Smart
  - It use clustering to group events remember unsupervised ML at the beginning



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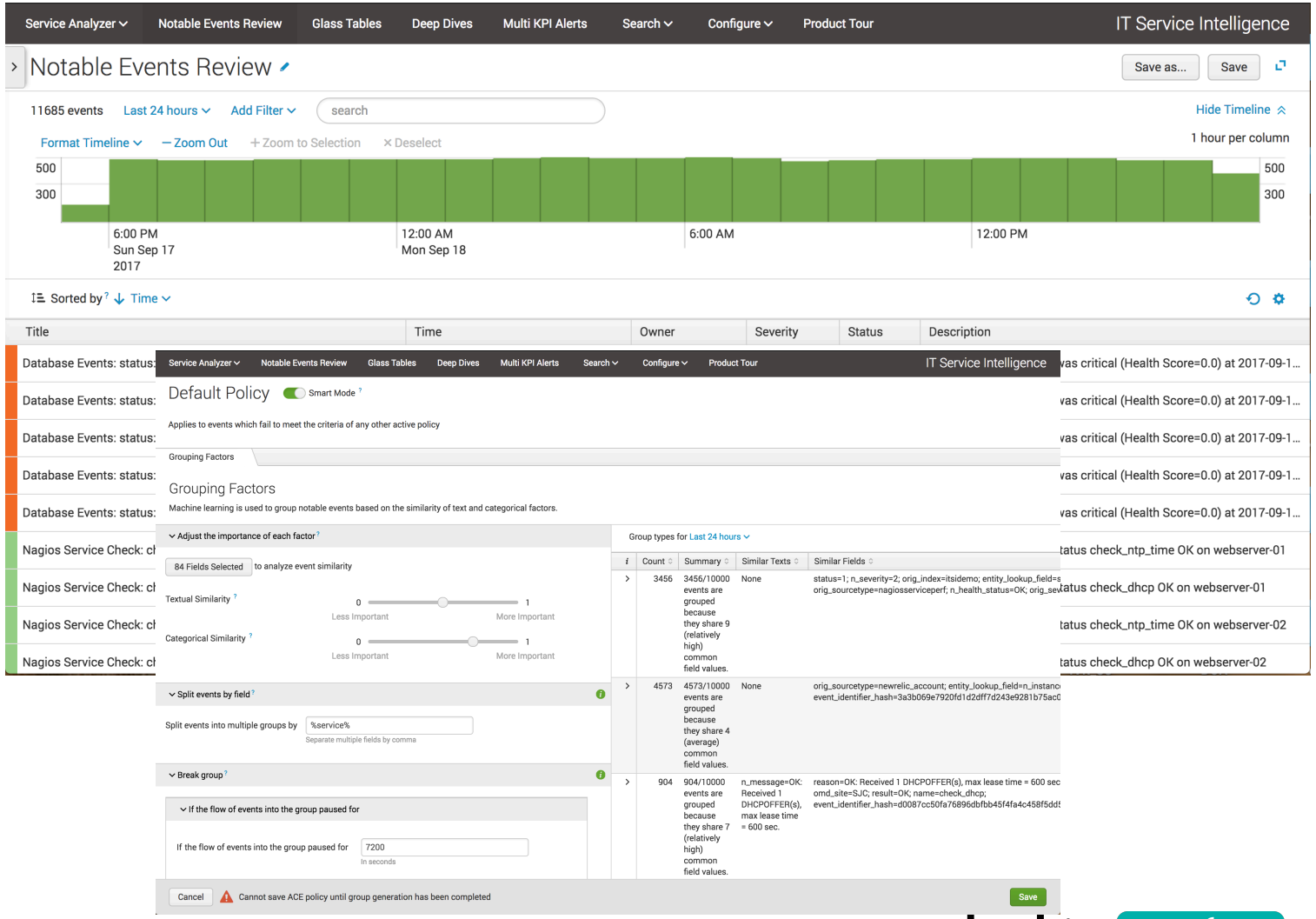
The Diamonds in the Rough

Clustering Events into actionable alerts

- Take 1000's or 100's of 1000's of alerts and connect them
- Use ML prediction to improve correlation
- Boil the events down to reasonable count of Actionable Events



Real Use Case Example

Predictive Analytics in Real-time

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Lets Get Others Involved

ChatOps - Anyone Slack?

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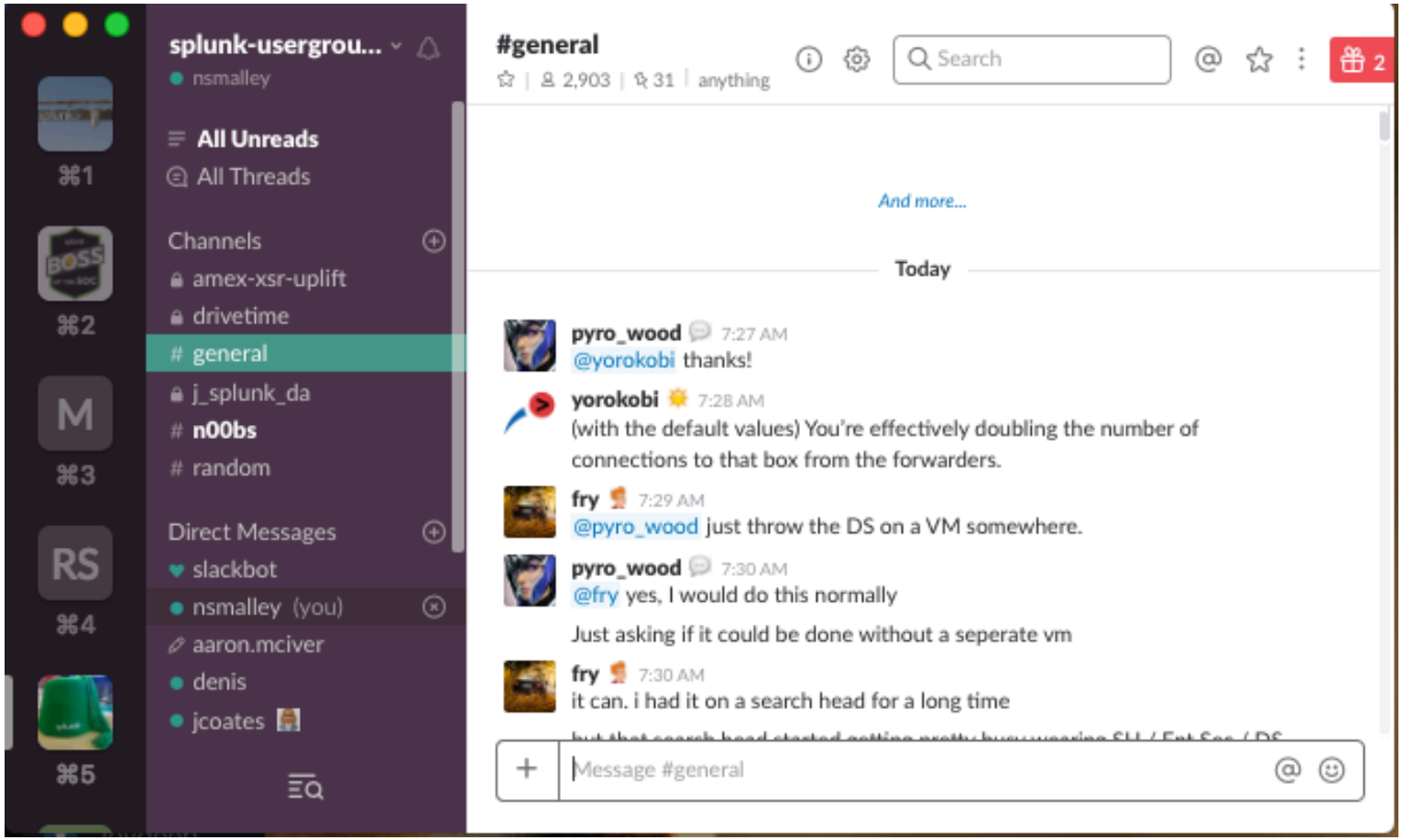
Slack

- Slack
  - Instant Message
  - Easy Channel Setup
  - Fast time to create incident working groups
  - Other Products just as easy HipChat, Skype etc…



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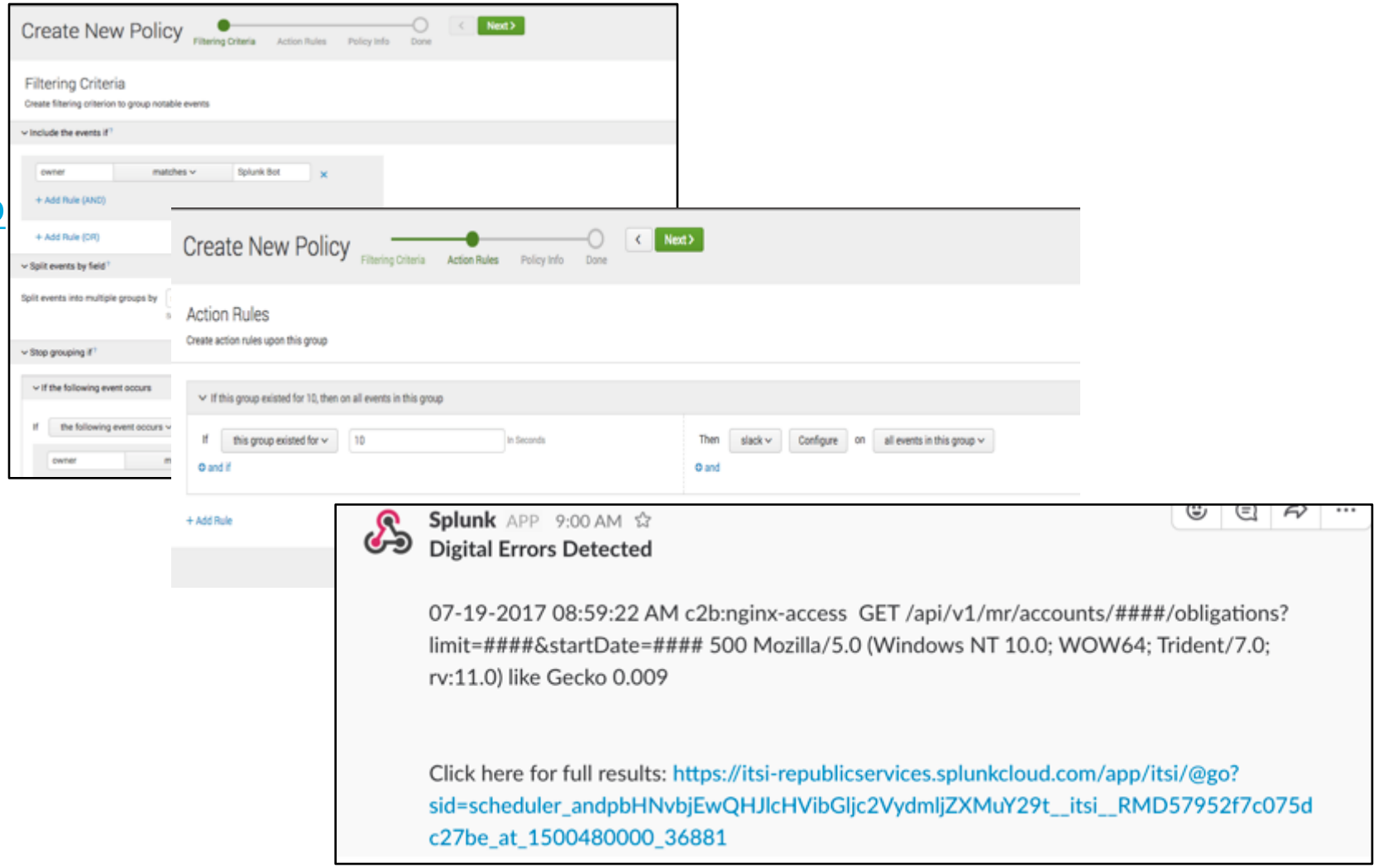
ChatOps = Splunk & Slack

- Slack Setup
  - Install the Alert Action
    - https://splunkbase.splunk.com/app/2878/
  - For Core Searches – Configure as alert action in Alerts
  - For ITSI
    - **Enable Slack in notable_event_actions.conf**
  - Lets add it to our to our Policy
    - Configure -> Notable Event Aggregation Policy –> Create New



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Real Use Case Example

Predictive Analytics in Real-time

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Wrap Up

- ITSI allows for Rapid Service, KPI, Entity creation and alerting
- Machine Learning through MLTK provides a repeatable ability to Predict Service Health
- IT Service Intelligence Event Analytics enables teams to cluster Notable events together to have 1 Actionable Alert
- Splunk IT Service Intelligence provides extendable capabilities to provide immediate notification to Chat Groups, Ticketing system and other communication platforms to improve the Mean Time to Remediate Availability Impacting Situations

I fell asleep. Where else can I read about this?

https://www.splunk.com/blog/2017/08/28/itsi-and-sophisticated-machine-learning.html

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Splunk Sites

Free Splunk

IT

ITSI and Sophisticated Machine Learning

Fellow Splunker Andrew Stein and I recently had a chance to work on a new machine learning project with a customer currently deploying the Splunk IT Service Intelligence (ITSI) solution. The customer asked us "How can we leverage machine learning to predict (find leading indicators) for an outage within our critical services with Splunk?"

So, we began the investigation into whether we could successfully apply machine learning to a Splunk ITSI deployment. Spoiler alert, we were successful.

We took the following steps along our journey:

1. Explored the qualities of key performance indicators (KPI) in ITSI.
2. Discovered the ITSI summary index.

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Go see these Talks!

This is where the subtitle goes

- David Vueve
  - Splunk Ninja Skills
  - 190+ slides of SPL and guidance.
- Xander and (fred?)
  - Deep dive into MLTK
  - MLTK API for importing algorithems
- Phillip Drieger
  - DGA Analysis
  - End to End MLTK example
- Making ML Solutions
  - Deep dive into ML process
  - Customer use cases explored

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Questions?

Please Feel Free

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Want to Learn More About ITSI at .conf2017?

Tuesday September 26th, 2017

- **Ready, Set, Go! Learn From Others - The First 30 Day Experiences of ITSI Customers:** Tuesday, September 26th, 201712:05 PM- 12:50 PM Room Salon C
- **Splunk ITSI Overview:** Tuesday, September 26th, 2017 1:10 PM-1:55 PM Room 147 AB
- **PWC: End-to-End Customer Experience:** Tuesday, September 26th, 2017 2:15 PM-3:00 PM Room 143ABC
- **RSI: Operational Intelligence: How to go From Engineering to Operationalizing IT Service Intelligence Where the Rubber Meets the Road:**

  Tuesday, September 26th, 2017 2:15 PM-3:00 PM Room147AB
- **Cardinal Health: Ensuring Customer Satisfaction Through End-To-End Business Process Monitoring Using Splunk ITSI:**

  Tuesday, September 26th, 20173:30 PM-4:15 PM Room143ABC
- **ITSI in the Wild - Why Micron Chose ITSI and Lessons Learned From Real World Experiences:** Tuesday, September 26th, 2017 4:35 PM- 5:20 PM Room Salon C

Wednesday September 27th, 2017

- **Event Management is Dead. Time Series Events are the Means to the End, not the End Itself. See How Event Analytics is Revolutionizing IT:**

  Wednesday, September 27th, 201711:00 AM-11:45 AM Ballroom C
- **Triggering Alerting (xMatters) and Automated Recovery Actions from ITSI:** Wednesday, September 27th, 2017 1:10 PM- 1:55 PM Room Salon C
- **Leidos - Our Journey to ITSI:** Wednesday, September 27th, 2017 2:15 PM-3:00 PM Room147AB
- **How Rabobank's Monitoring Team Got a Seat at the Business Table by Securing Sustainability on Competitive Business Services Build on Splunk's ITSI:**

  Wednesday, September 27th, 2:15-3:00pm Room 147AB
- **Here Comes the Renaissance: Digital Transformation of the IT Management Approach:** Wednesday, September 27th, 2017 3:30 PM-4:15 PM Room Salon C

Thursday September 28th, 2017

- **The ITSI 'Top 20' KPI's:** Thursday, September 28th, 2017 10:30 AM-11:15 AM Room Salon C
- **Automation of Event Correlation and Clustering with Machine Learning Algorithms – An ITSI Tool:**

  Thursday, September 28th, 2017 11:35 AM- 12:20 PM Room Salon C
- **Event Management is Dead. Time Series Events are the Means to the End, not the End Itself. See How Event Analytics is Revolutionizing IT:**

  Thursday, September 28th 11:35 AM - 12:20 PM in Ballroom B
- **IT Service Intelligence for When Your Service Spans Your Mainframe and Distributed ITSI:**

  Thursday, September 28th, 2017 1:20 PM-2:05 PM Room Salon C

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Hidden Gems

- Remember that the MLTK will see any numeric field as a number, not as an entity, so if we want to use date_hour (a number between 0 and 23) we need to change the value into a string (|eval date_hour_string= date_hour ."."."_t" for example
- Remember we are predicting the future, so we need to move the target of our regression through time.
- Remember that your data retention policy means you will lose past data at some point – consider making two models, one with partial_fit and one without and comparing the results.