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Know Your Insider

Unmasking Lateral Movement with Splunk UBA

Satheesh Joseph | Principal Data Scientist, Splunk

Sep 26 | Washington, DC

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About the Authors

Satheesh Joseph

sjoseph@splunk.com
Principal Data Scientist, Splunk

His work spans data science applications in security, big data, analytics and scalable data engineering.

Satheesh holds a Bachelors degree in computer science from University of Madras, India.

Stanislav Miskovic

smiskovic@splunk.com
Principal Data Scientist, Splunk

His work spans data science applications in privacy, security and network communications.

Stanislav holds a Ph.D. in electrical and computer engineering from Rice University, Houston, TX, and M.Sc. degree from the University of Belgrade, Serbia.

George Apostolopoulos

gapostolopoulos@splunk.com
Director of Engineering, Splunk

For the last few years he has been working on the intersection of security, big data and analytics, focusing on log analysis.

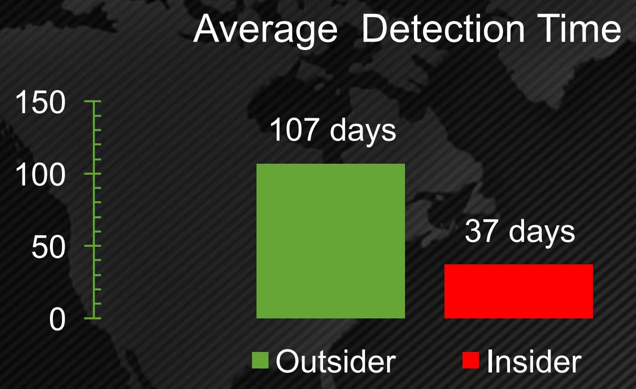
George holds a Ph.D. and M.Sc in computer science from the Univ. of Maryland in College Park and a B.Sc. in computer engineering from University of Patras, Greece.

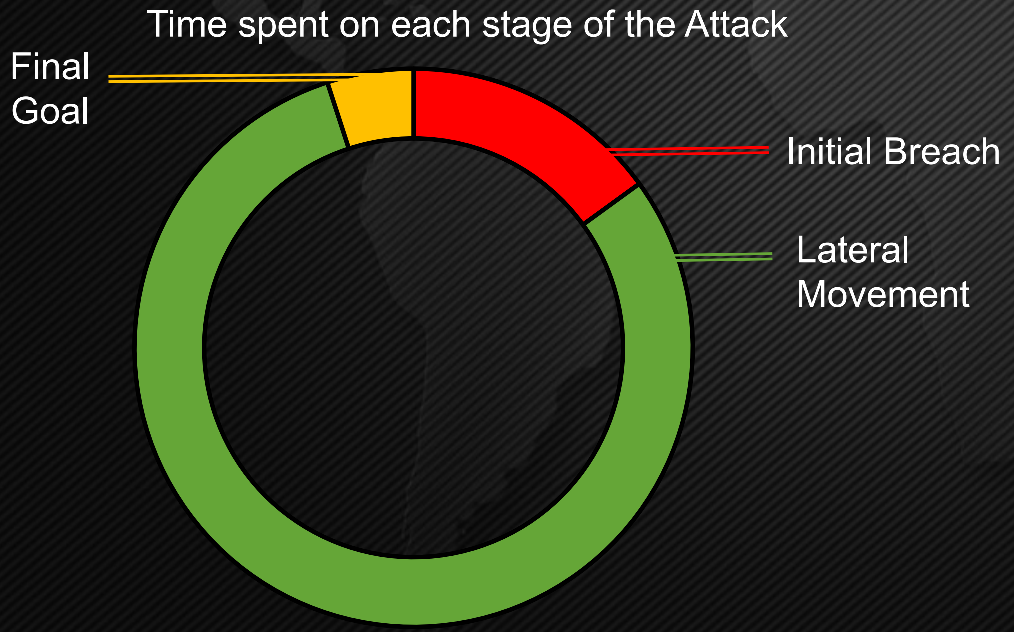
Agenda

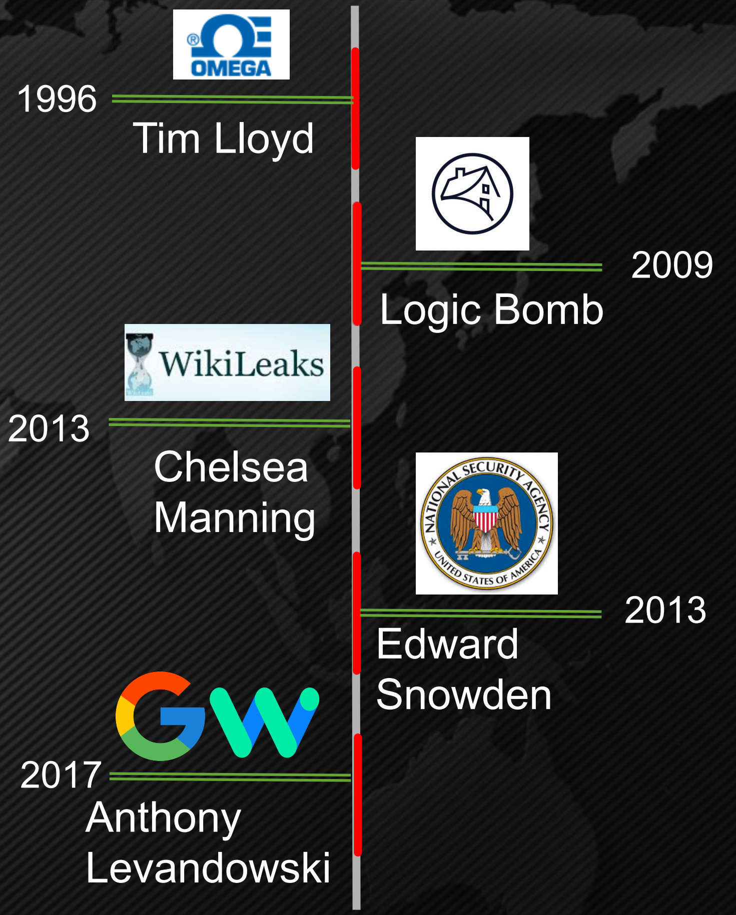
- ▶ Stats & Industry Challenges
- ▶ Insider Threat Stages
- ▶ Technical Challenges
- ▶ Lateral Movement in the Real World
- ▶ UBA Detects Lateral Movement
- ▶ Demo

Stats, History & Industry Challenges

Biggest Cybersecurity Threats Are Inside Your Company







1996 Tim Lloyd

2009 Logic Bomb

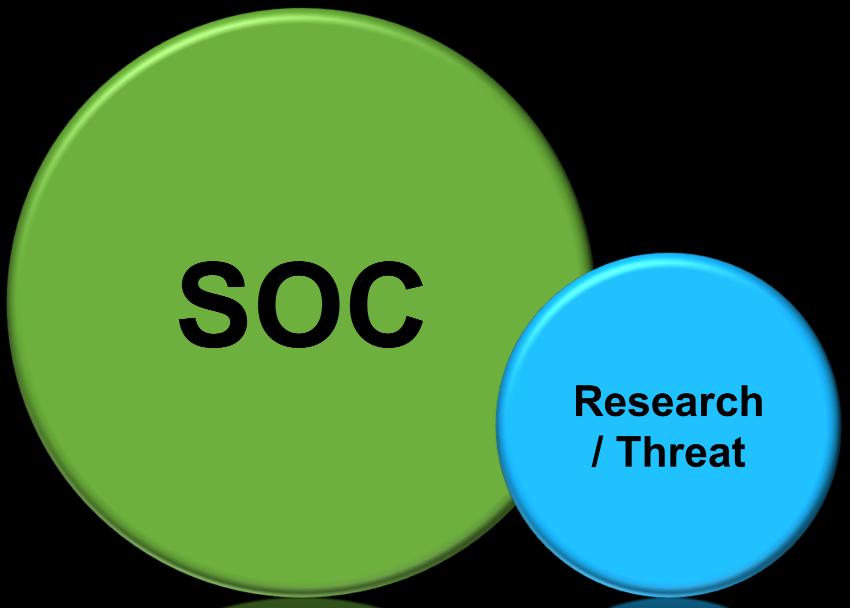
2013 Chelsea Manning

2013 Edward Snowden

2017 Anthony Levandowski

Source: M-Trends 2017

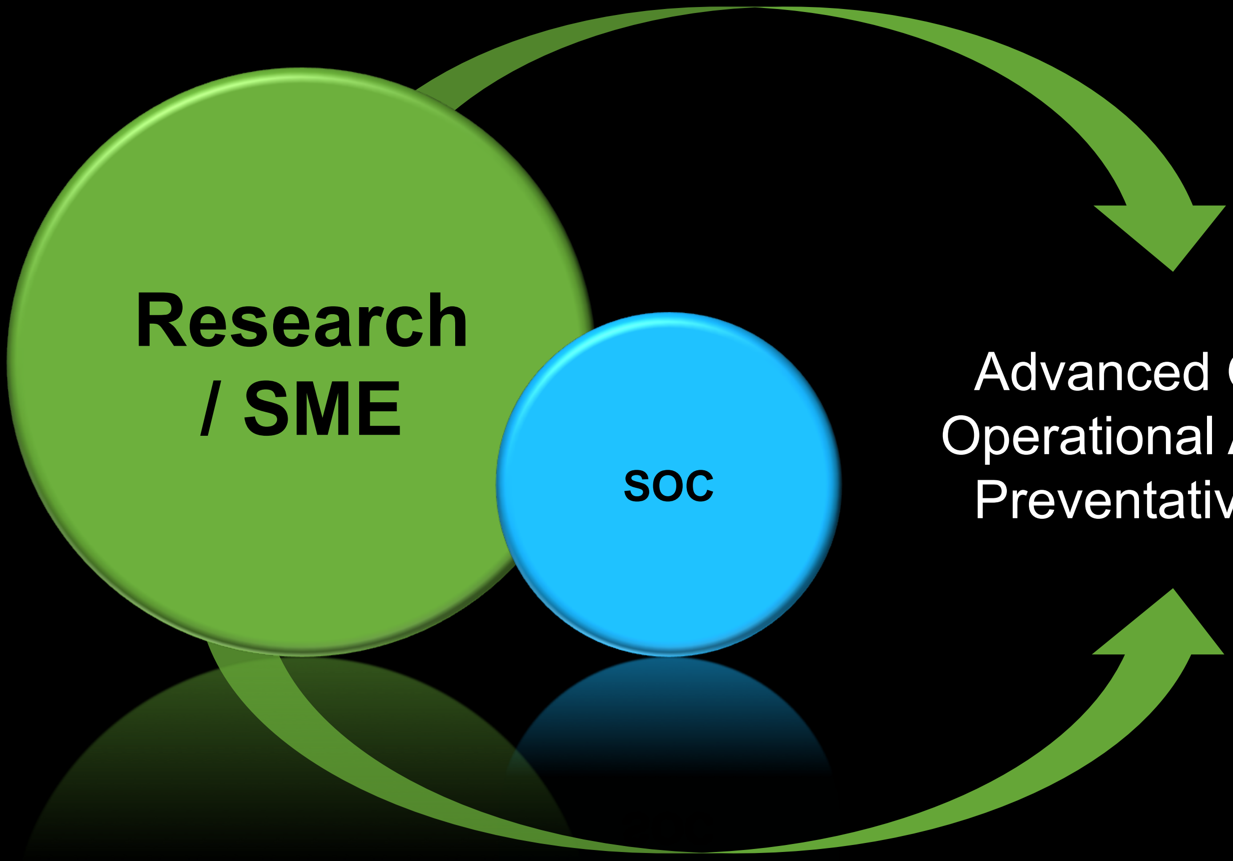
Industry Challenge: A Call To Action



Chronic Ailment – Not Enough Resources

- Research / Subject Matter Expertise
  - Techniques
  - Logs & specifically Active Directory
- Lack of orchestration
- Cost prohibitive for SMBs
- Creates 3rd and 4th party risk. Nobody is immune
- Security workforce shortage
- 0% unemployment, Huge unfilled requisitions

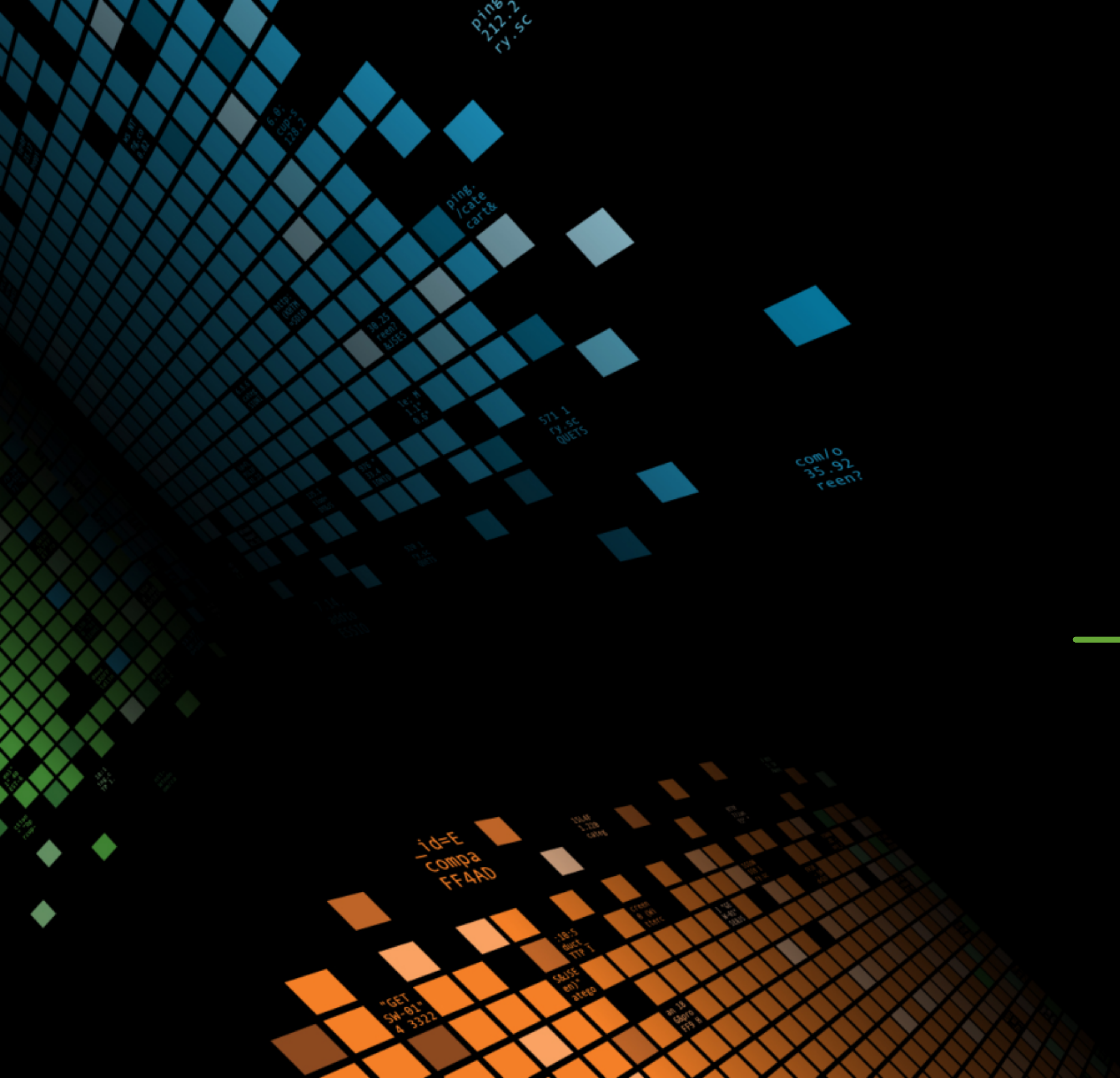
A Better Model For Today



Research / SME

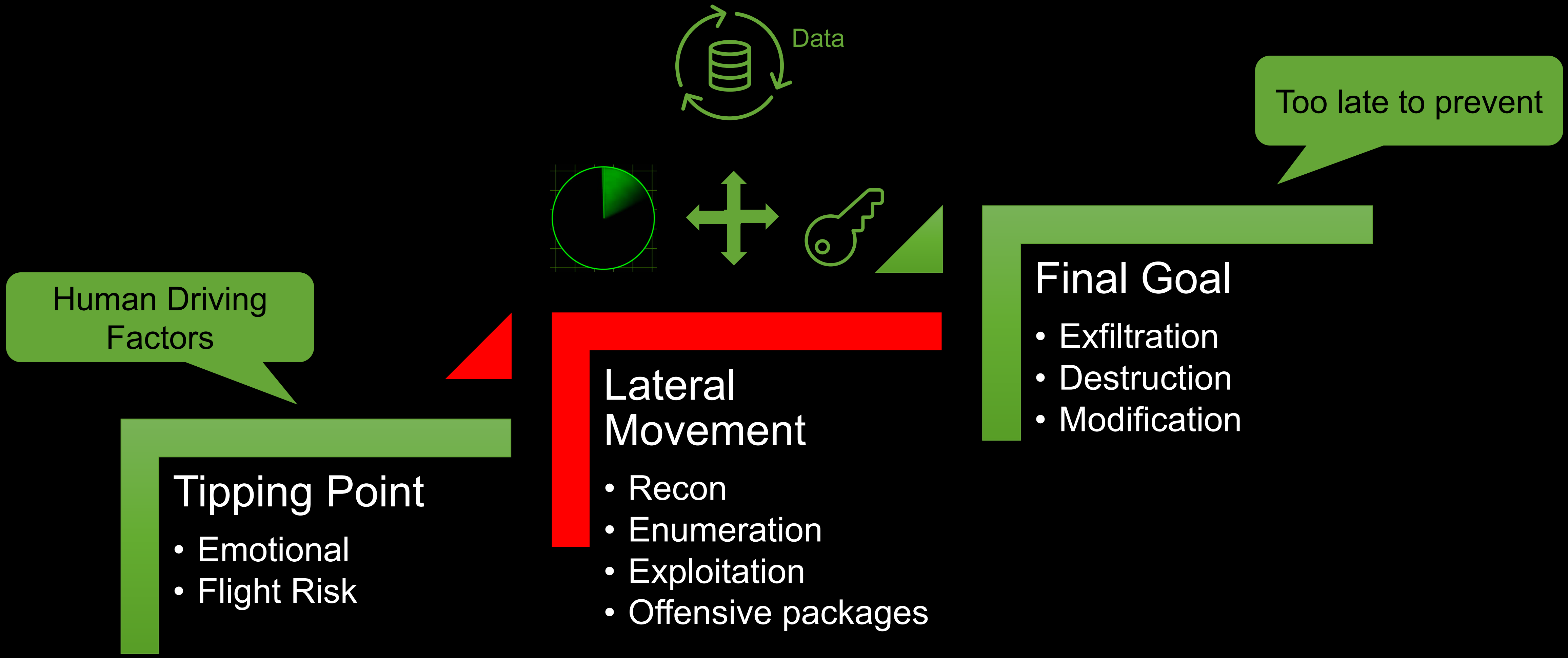
SOC

Advanced Orchestration, Operational Awareness and Preventative Capabilities



Insider Threat Kill Chain

Insider Threat Stages



Data

Too late to prevent

Human Driving Factors

Tipping Point

- Emotional
- Flight Risk

Lateral Movement

- Recon
- Enumeration
- Exploitation
- Offensive packages

Final Goal

- Exfiltration
- Destruction
- Modification

Technical challenges faced by the SOC Analyst

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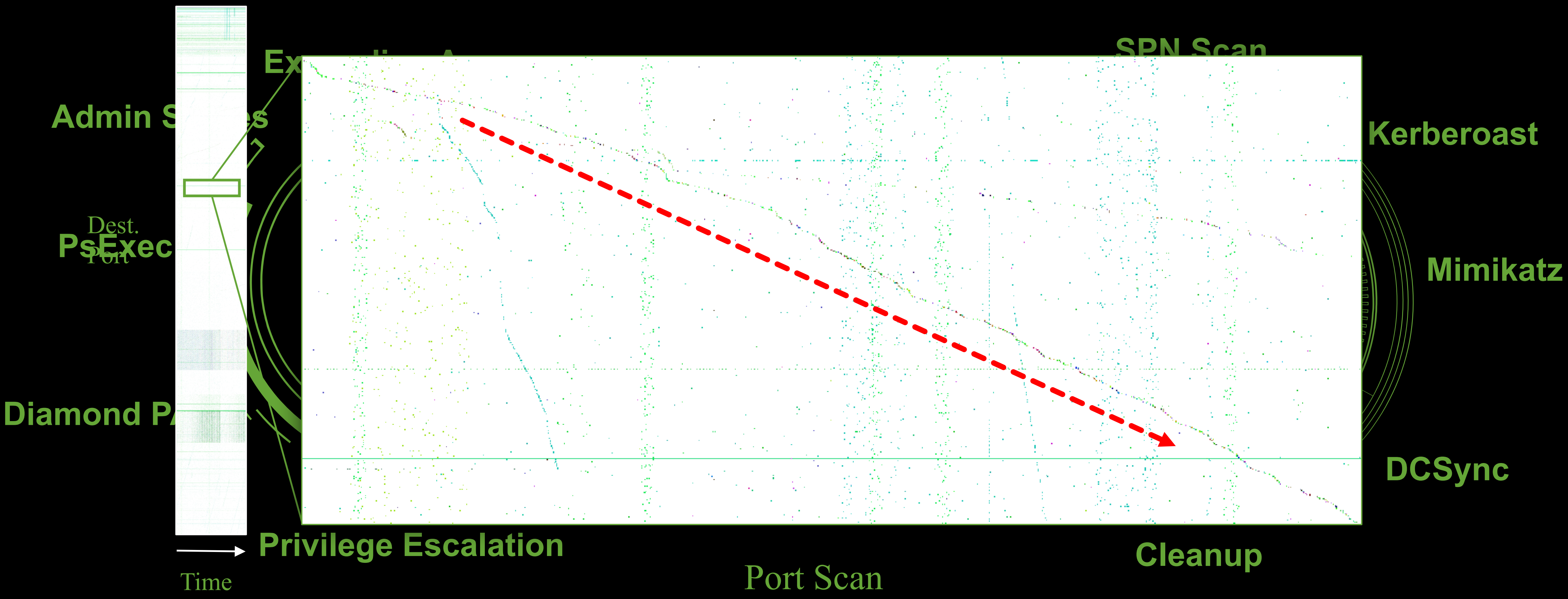
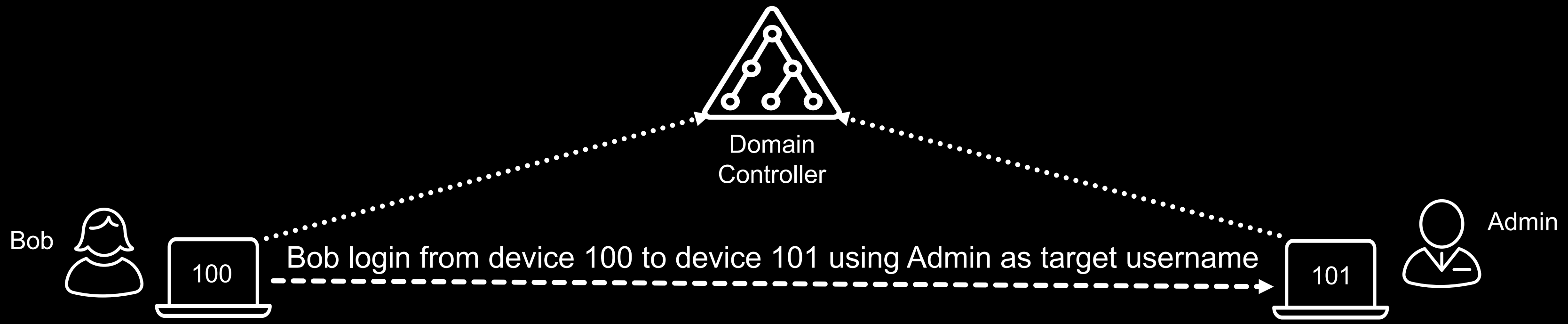
Techniques, Tactics & Procedures (TTPs)



A Login Activity from the Perspective of Active Directory Logs

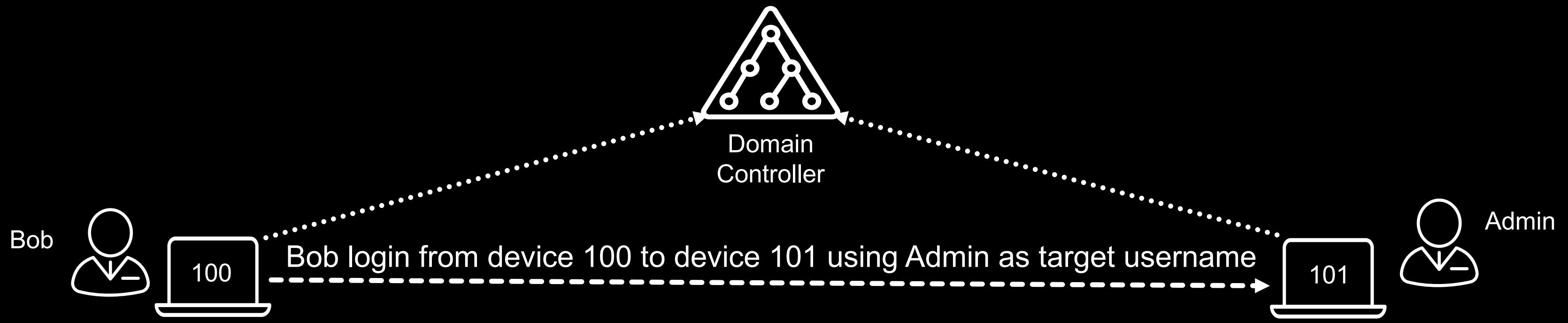

Domain Controller
Bob
100
Bob login from device 100 to device 101 using Admin as target username
101
Admin

- Lsass.exe
  - 2 login events (4648)
  - 1 Process Creation event (4688)
- Kerberos
  - 6+ login events (4624)
  - 2 Object Access events (4661)
  - 4+ privilege escalation 4672
  - Multiple Service Ticket requests
- Winlogon.exe
  - 2 login events (4624)
  - One 4648 event
  - 1 Special Privilege event
  - 2 process creation event
  - Multiple Object Access event

4624 => An account was successfully logged on
4648 => A logon was attempted using explicit credentials
4672 => Special privileges assigned to new logon
4661 => A handle to an object was requested
4769 => A Kerberos service ticket was requested

Active Directory Vantage Points

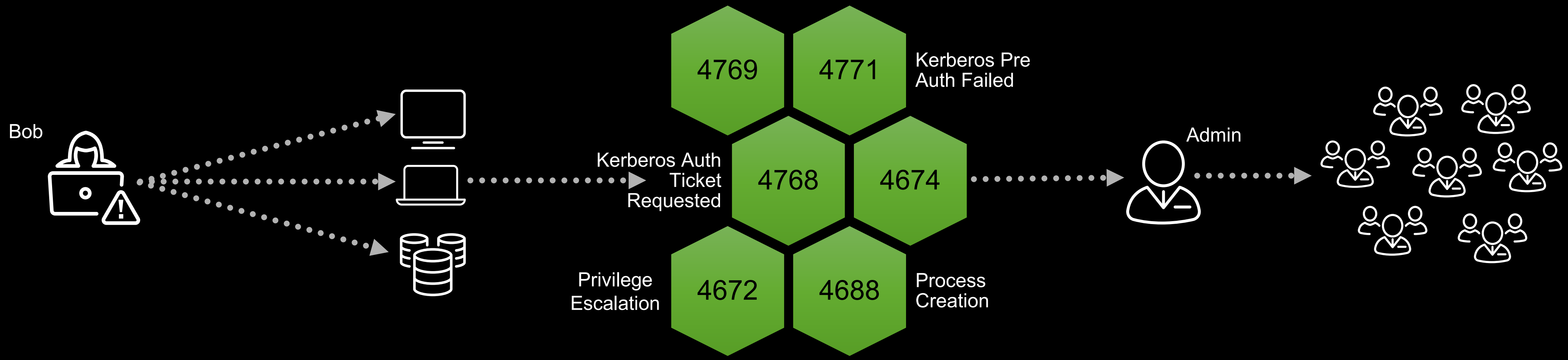
RDP login to a domain account, source and destination are domain members

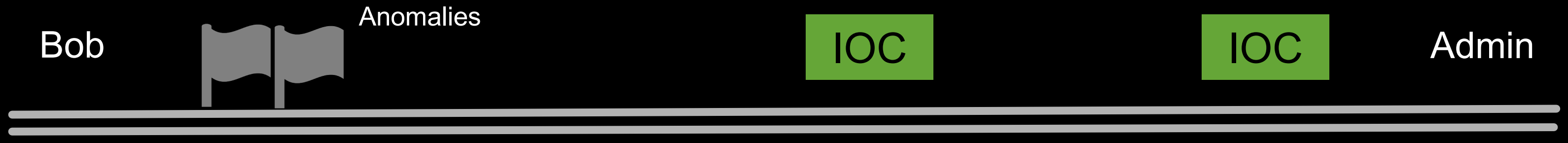

Domain Controller
Bob
100
Bob login from device 100 to device 101 using Admin as target username
101
Admin

- 10.141.38.100 (workstation1)
  - Bob logging in as Admin from 100 to 101
- Domain Controller
  - Admin asking service ticket for 100 and 101
  - Admin logging in to 101
- 10.141.38.101 (workstation2)
  - Admin logging in from 100 to 101

UBA Intelligence

Lateral Movement in the Real World





Anomalies

- Unusual Zone Access
- Unusual Machine Access
- Unusual Windows Sequence

Temporal Correlation

Connecting Rare Paths

Subtle IOC

- Increase in Auth Tickets
- Increase in process creation
- Unusual Registry Access

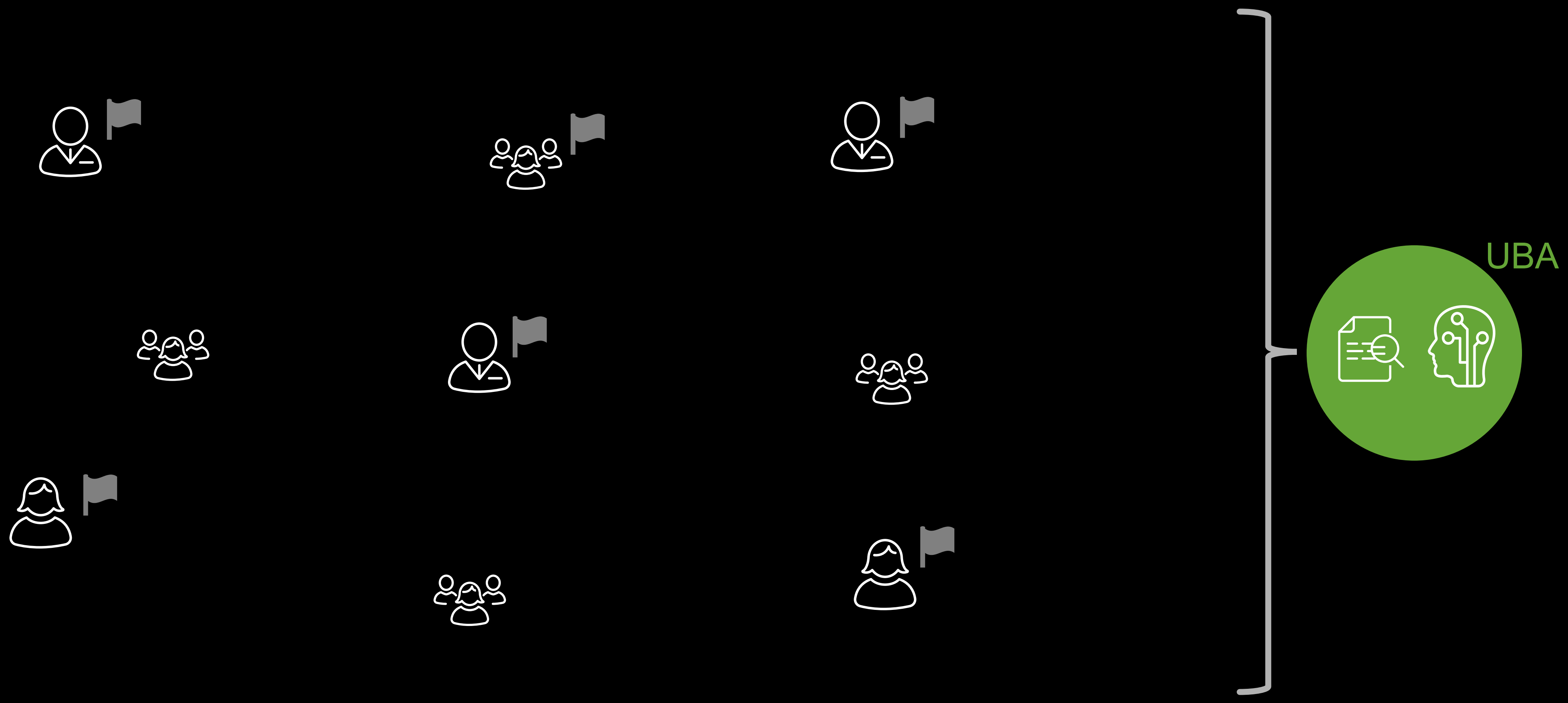
User Transition

- Suspicious Privilege Escalation
- Rare User Transition

UBA Detects Lateral Movement

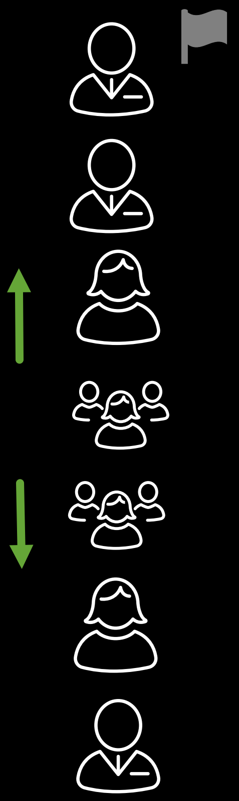
Users with Anomalies

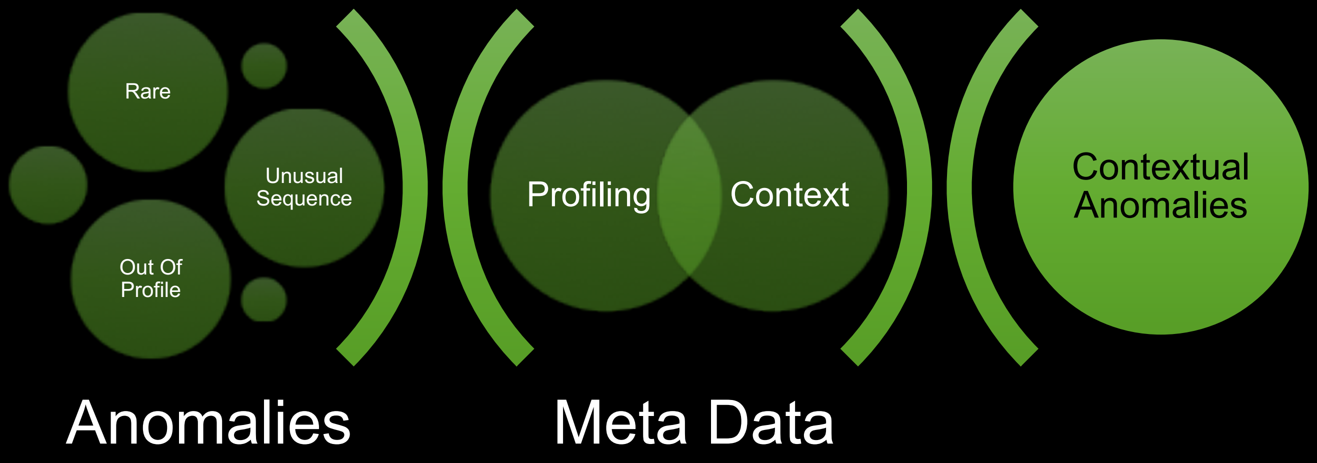
Users

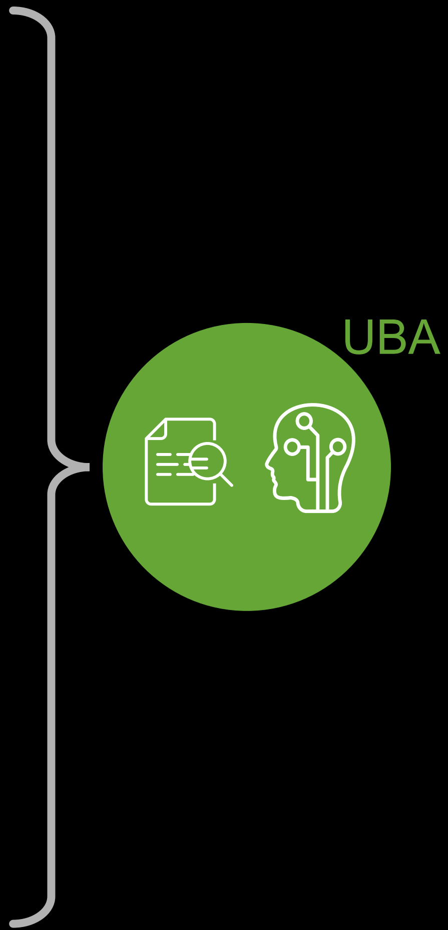


UBA Detects Lateral Movement

Mining Anomalies







Unusual Windows Sequence of Events

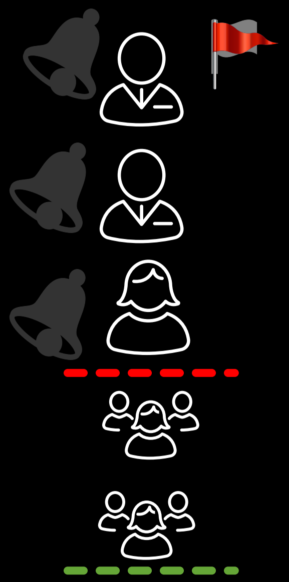
- Involves high deviation from baseline
- Involves new activities
- Involves out of peer group activities

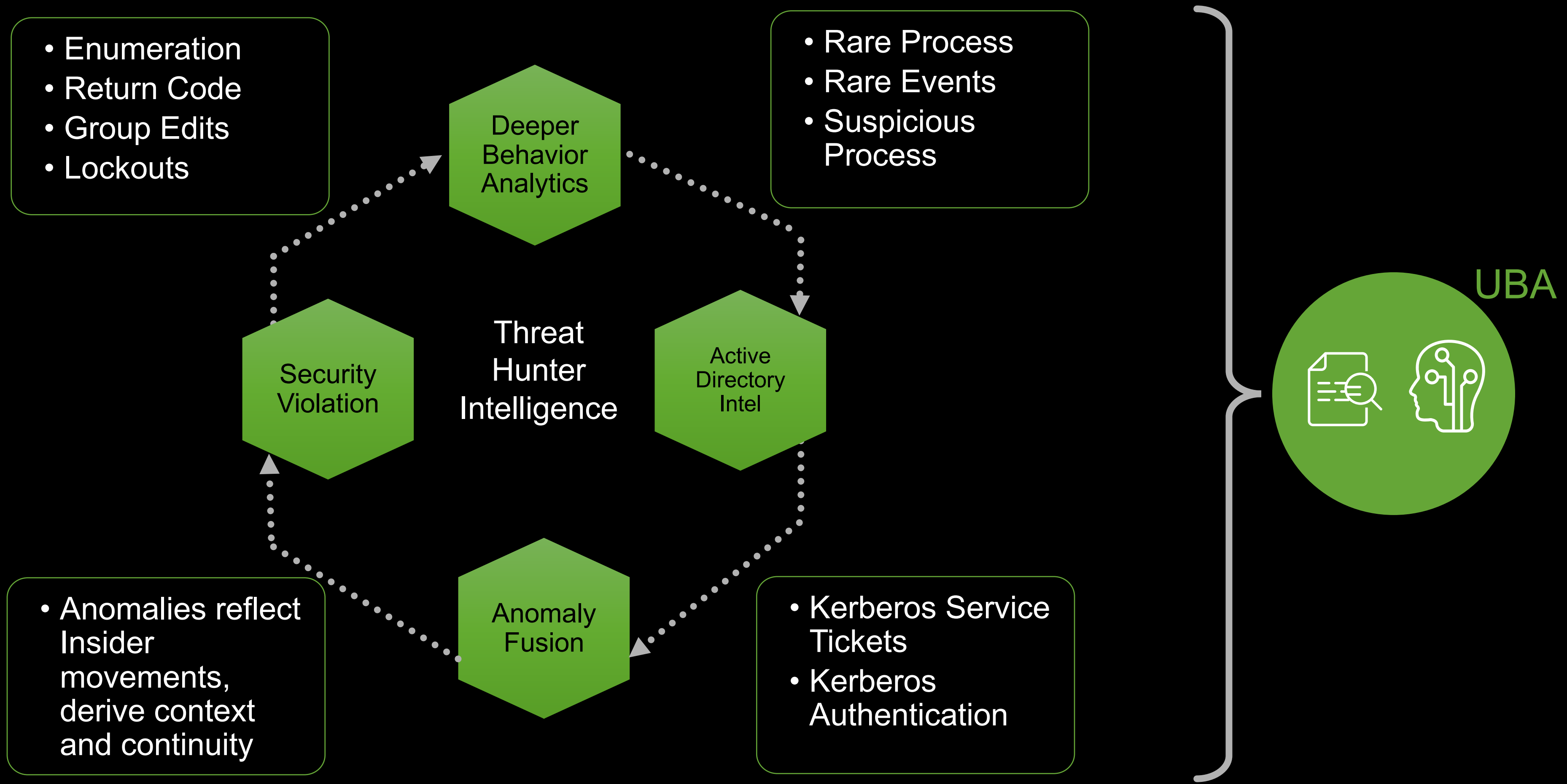
Rare Process or Events

- Enterprise or Peer Group

UBA Detects Lateral Movement

Higher Level - Indicators of Compromise





- Enumeration
- Return Code
- Group Edits
- Lockouts

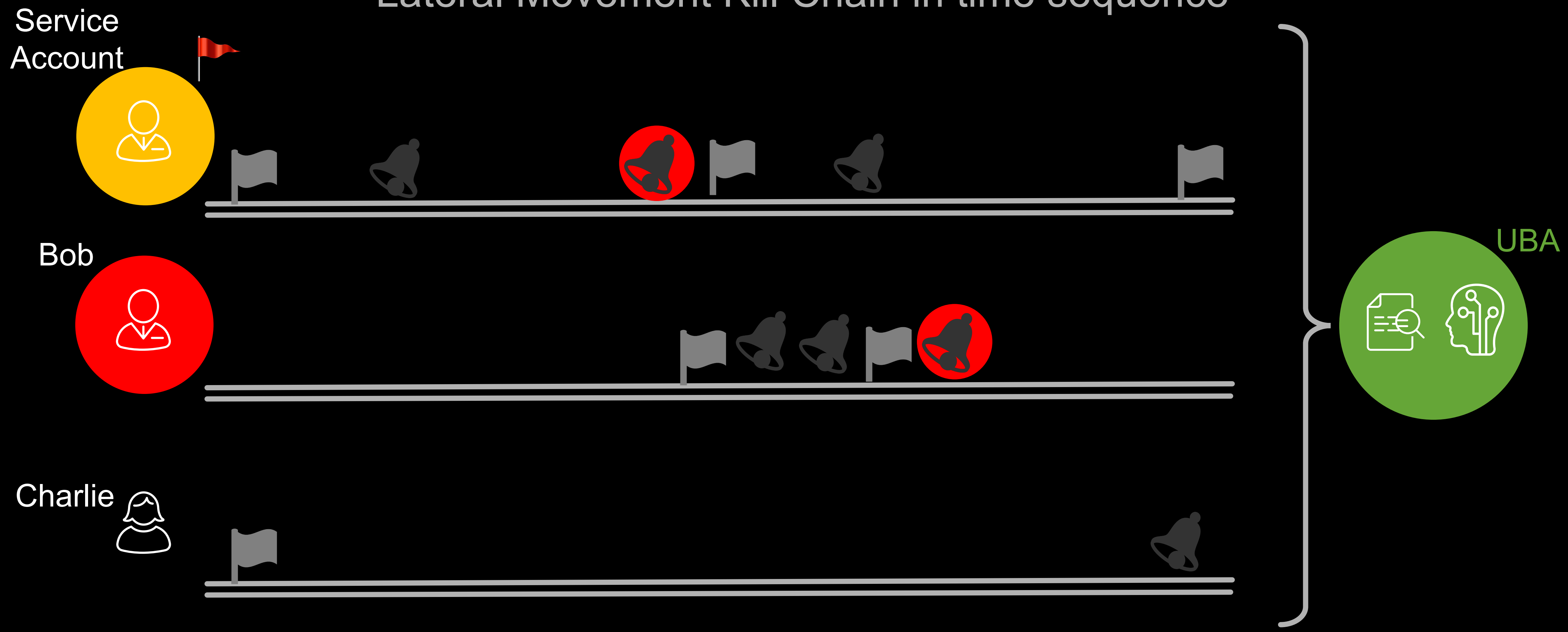
- Rare Process
- Rare Events
- Suspicious Process

- Anomalies reflect Insider movements, derive context and continuity

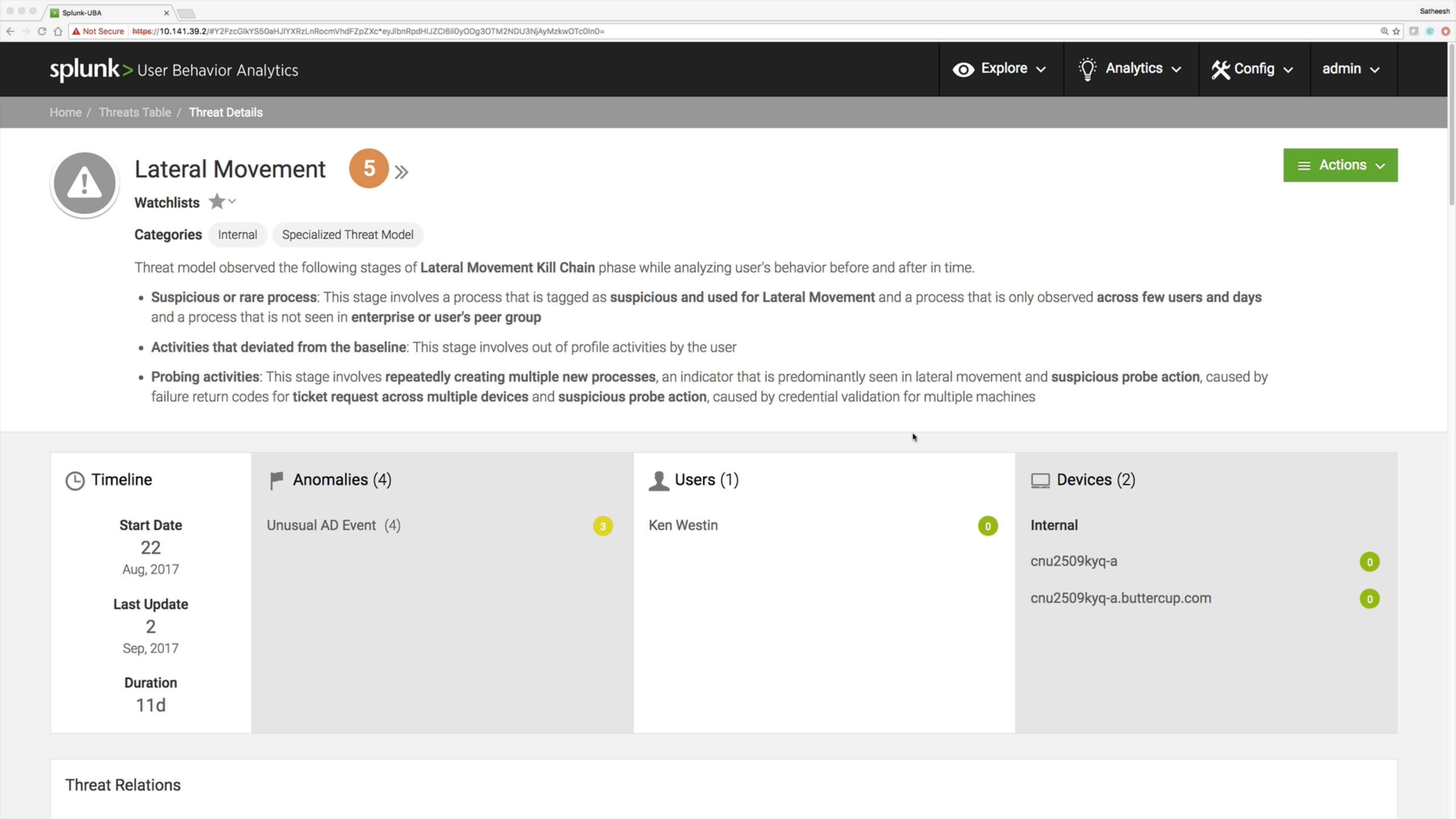
- Kerberos Service Tickets
- Kerberos Authentication

UBA Detects Lateral Movement

Lateral Movement Kill Chain in time sequence



Lateral Movement Demo


Splunk-UBA
Satheesh
Not Secure
https://10.141.39.2/#Y2FzcGlkYS50aHJlYXRzLnRocmVhdFZpZXc*eyJlbnRpdHlJZCI6Ii0yODg3OTM2NDU3NjAyMzkwOTc0In0=
splunk> User Behavior Analytics
Explore
Analytics
Config
admin
Home / Threats Table / Threat Details
Actions

Lateral Movement 5 »

Watchlists ☆

Categories Internal Specialized Threat Model

Threat model observed the following stages of **Lateral Movement Kill Chain** phase while analyzing user's behavior before and after in time.

- **Suspicious or rare process**: This stage involves a process that is tagged as **suspicious and used for Lateral Movement** and a process that is only observed **across few users and days** and a process that is not seen in **enterprise or user's peer group**
- **Activities that deviated from the baseline**: This stage involves out of profile activities by the user
- **Probing activities**: This stage involves **repeatedly creating multiple new processes**, an indicator that is predominantly seen in lateral movement and **suspicious probe action**, caused by failure return codes for **ticket request across multiple devices** and **suspicious probe action**, caused by credential validation for multiple machines

Timeline

Start Date
22
Aug, 2017

Last Update
2
Sep, 2017

Duration
11d

Anomalies (4)

Unusual AD Event (4) 3

Users (1)

Ken Westin 0

Devices (2)

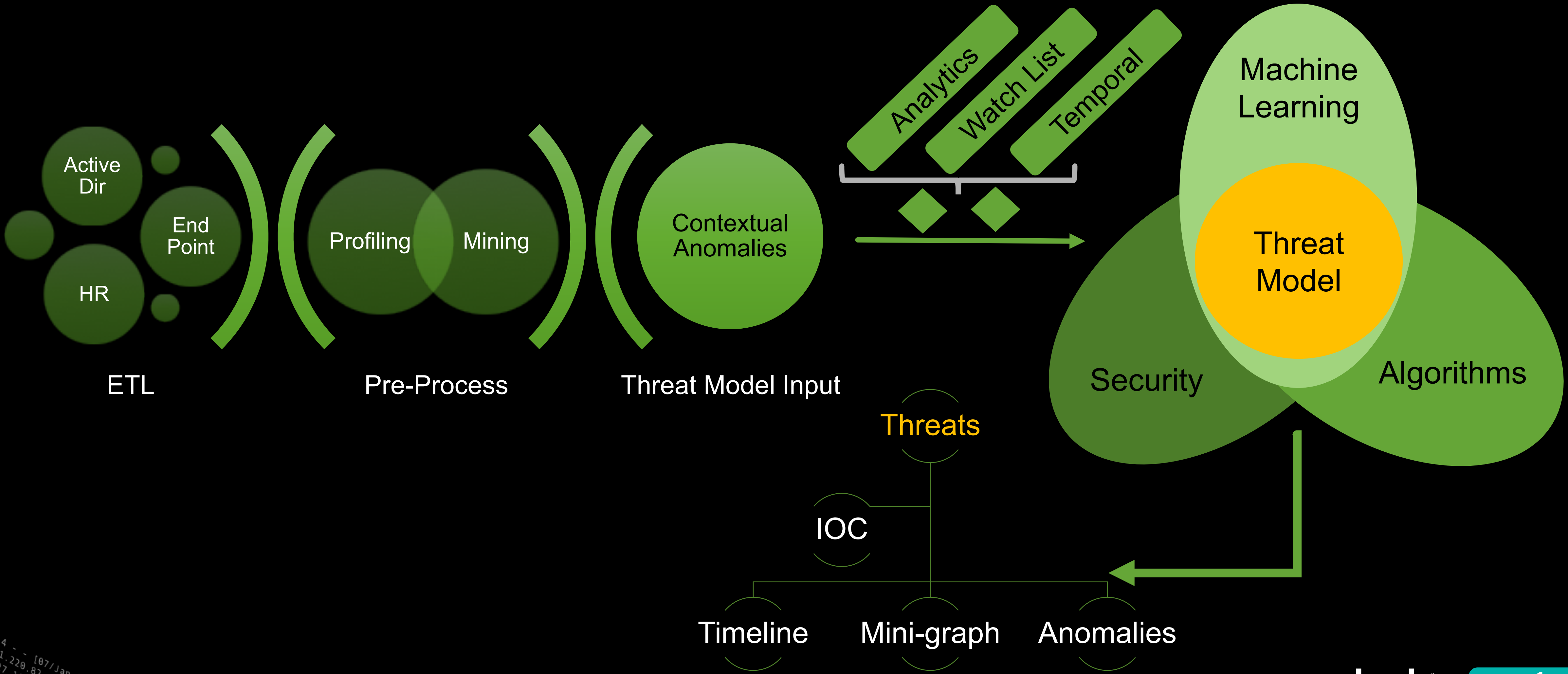
Internal

cnu2509kyq-a 0

cnu2509kyq-a.buttercup.com 0

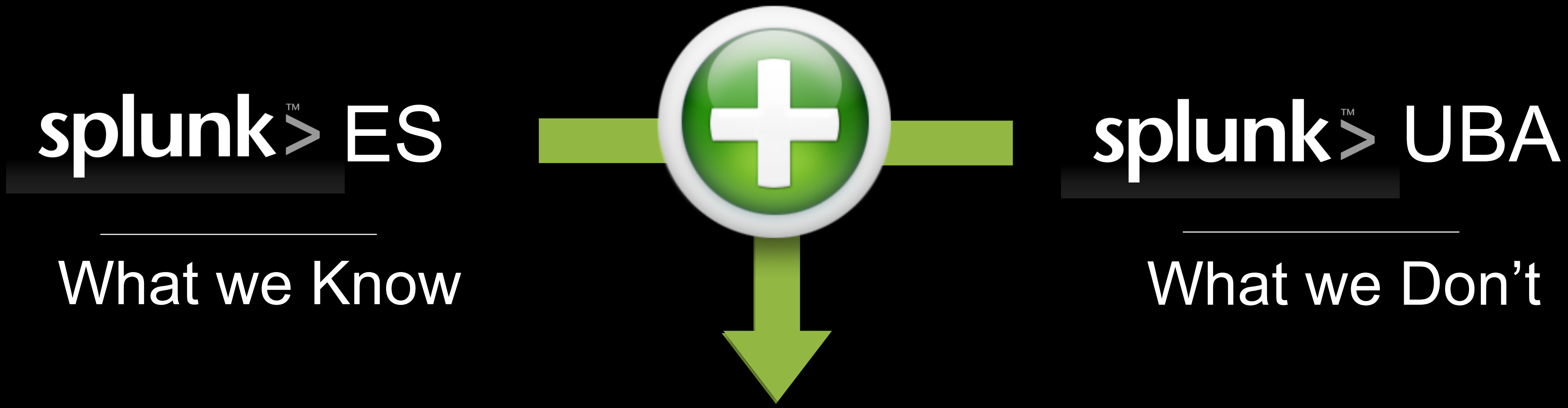
Threat Relations

UBA Threat Model - Implementation



Advanced Correlation and Analytics Layer

Deeper Insights With UBA to Detect Anomalies



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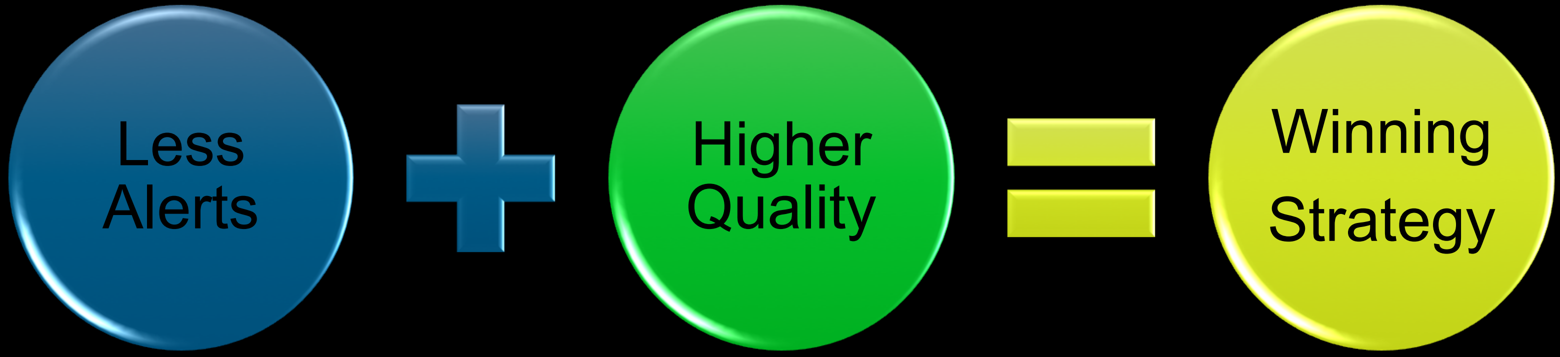
What we Know

splunk> UBA

What we Don’t

Truly *Adaptive* and *Holistic* Security

UBA Helps Change the Equation



- Improved quality of alerts means we can deprecate less effective/efficient correlations, reducing volume of alerts and time on dead ends.
- Investigation is accelerated due to the intuitive way a threat is visually portrayed in UBA.
- Allows us to invest more resources in engineering orchestration, developing operational awareness and threat prevention activities.

Key Takeaways

Know Your Insider

1. TTPs vary, vast, in-memory and gets less noisy
2. Consider Authentication & Service tickets along with Login events
3. Insider Threat is a continuous process
4. SME Knowledge + ML + Active Research

   or Buy Splunk UBA 4.0

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