Adversarial Threat Modelling: A Practical Approach to Purple Teaming in the Enterprise

NOVEMBER 2021

Sajid Nawaz Khan

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HELLO

WELCOME TO THE WORKSHOP

Thank you for joining my workshop today, it's a pleasure to be presenting at Becks JP.

whoami

- Sajid Nawaz Khan
- In finance sector 15+ years
- Senior Cyber Threat Intelligence Analyst, five years in security
- GIAC GREM, GDAT certified
- Mitre ATT&CK evangelist

/etc

Food, films, museums, science, origami and more.

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WORKSHOP AGENDA

OUR PLAN TODAY

1

Presentation · 1 HOUR

The problem, and our approach to intelligence-led Purple Teaming

2

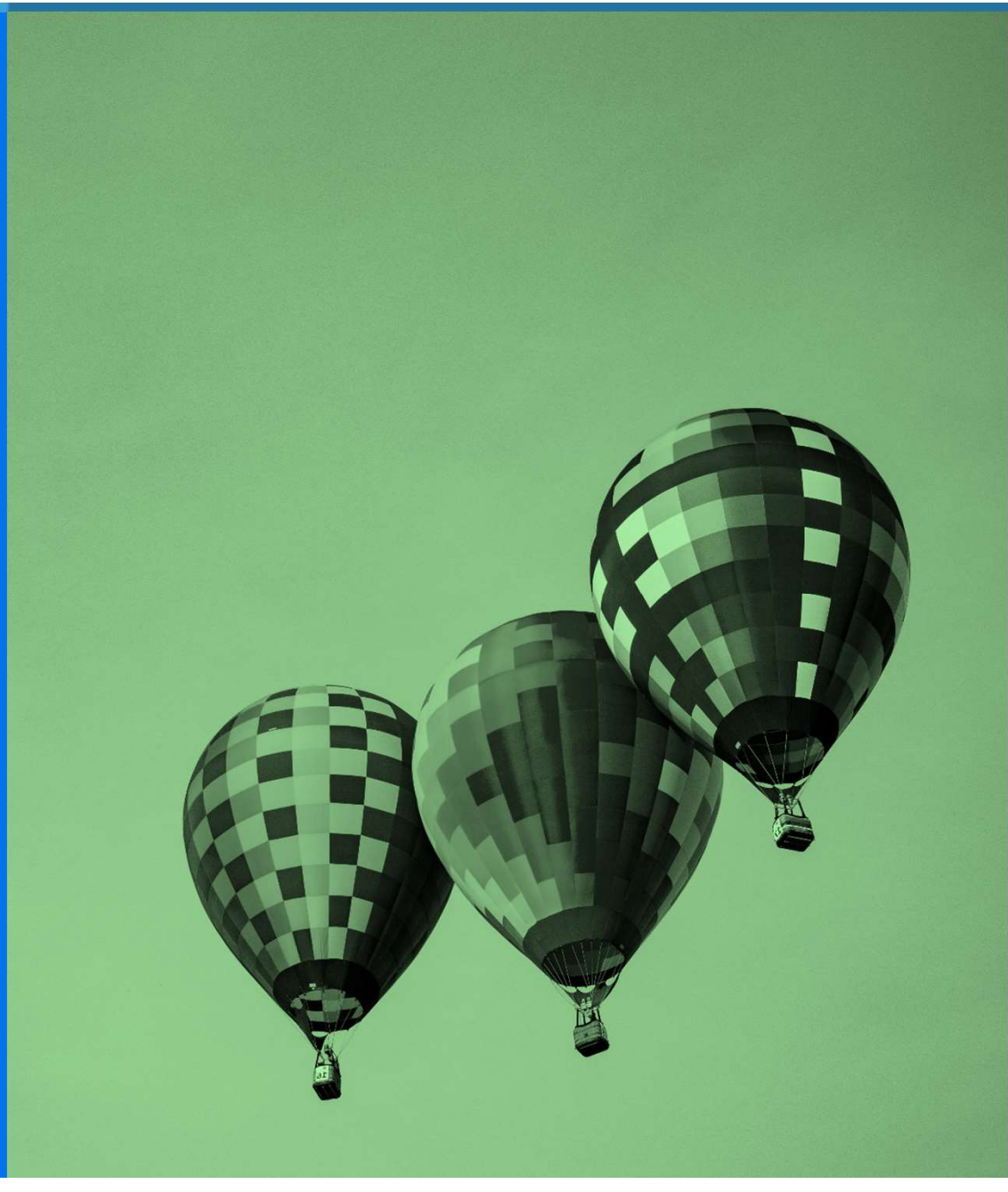
Demo · 15 MINS

A practical demonstration of VECTR; for analysts *and* managers

3

Questions · 15 MINS

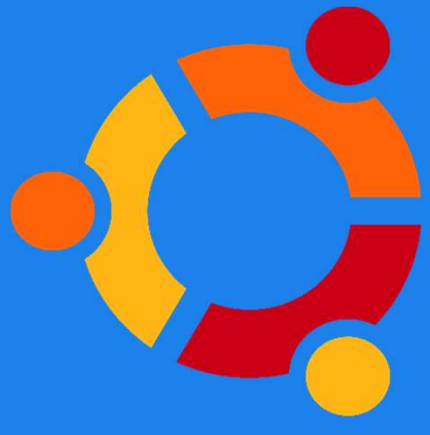
An opportunity to ask questions about our approach



REQUIREMENTS

PREPARING FOR SUCCESS

VirtualBox or equivalent, with Extension Pack, Guest Additions and fast internet connectivity



Ubuntu 20.04.1 LTS, with 4GB RAM, 20GB disk space and bi-directional clipboard and file sharing

VECTR, please follow the installation guide including dependencies at **docs.vectr.io**

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IT'S BEEN A BUSY YEAR

LITTLE REST FOR DEFENDERS

January

Hackers launch ransomware attacks against five major gaming and gambling countries, demanding over $100 million in ransom.

Unidentified hackers breached one of the data centers of New Zealand's central bank.

Hackers active since 2012 attack business and governments across South and East Asia, with a particular emphasis on military and government organizations in Pakistan, China, Nepal, and Afghanistan, and businesses involved in defence technology, scientific research, finance, energy, and mining.

North Korean government hackers engaged in a sophisticated social engineering campaign against cybersecurity researchers that used multiple fake twitter accounts and a fake blog to drive targets to infected sites or induce them to open infected attachments in emails asking the target to collaborate on a research project.

Hackers linked to Hezbollah breached telecom companies, internet service providers, and hosting providers in the US, UK, Egypt, Israel, Lebanon, Jordan, Saudi Arabia, the UAE, and the Palestinian Authority for intelligence gathering and data theft.

February

Two Iranian hacking groups conducted espionage campaigns against Iranian dissidents in sixteen countries in the Middle East, Europe, South Asia, and North America.

Unknown hackers attempted to raise levels of sodium hydroxide in the water supply of Oldsmar, Florida by a factor of 100 by exploiting a remote access system.

North Korean hackers attempted to break into the computer systems of pharmaceutical company Pfizer to gain information about vaccines and treatments for the COVID-19.

Source **Center for Strategic & International Studies (CSIS)**
www.csis.org/programs/technology-policy-program/significant-cyber-incidents

IT'S BEEN A BUSY YEAR

LITTLE REST FOR DEFENDERS

SOURCE: CSIS

March

Ukraine's State Security Service announced it had prevented a large-scale attack by Russian FSB hackers attempting to gain access to classified government data.

The head of U.S. Cyber Command testified that the organization had conducted more than two dozen operations to confront foreign threats ahead of the 2020 U.S. elections, including eleven forward hunt operations in nine different countries.

Suspected Russian hackers attempted to gain access to the personal email accounts of German parliamentarians in the run-up to Germany's national elections.

April

The European Commission announced that the EC and multiple other EU organizations were hit by a major cyberattack by unknown hackers.

MI5 warned that over 10,000 UK professional shave been targeted by hostile states over the past five years as part of spearphishing and social engineering campaigns on LinkedIn.

Two state-backed hacking groups exploit vulnerabilities in a VPN service to target organizations across the U.S. and Europe.

Malware triggered an outage for airline reservation systems that caused the networks of 20 low-cost airlines around the world to crash.

May

A large DDoS attack disabled the ISP used by Belgium's government, impacting more than 200 organizations causing the cancellation of multiple Parliamentary meetings.

On May 6, the Colonial Pipeline, the largest fuel pipeline in the United States, was the target of a ransomware attack. The energy company shut down the pipeline and later paid a $5 million ransom. The attack is attributed to DarkSide, a Russian speaking hacking group.

On May 24th, hackers gained access to Fujitsu's systems and stole files belonging to multiple Japanese government entities. So far four government agencies have been impacted.

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IT'S BEEN A BUSY YEAR

LITTLE REST FOR DEFENDERS

SOURCE: CSIS

June

A spreadsheet was leaked containing classified personal details of the 1,182 United Kingdom's Special Forces soldier.

Hackers linked to Russia's Foreign Intelligence Service installed malicious software on a Microsoft system that allowed hackers to gain access to accounts and contact information. The majority of the customers targeted were U.S. based, working for IT companies or the government.

The Iranian government launched a widescale disinformation campaign, targeting WhatsApp groups, Telegram channels and messaging apps used by Israeli activists. The campaign aimed to advance political unrest and distrust in Israel.

July

Russian hackers exploited a vulnerability in Kaseya's virtual systems/server administrator (VSA) software allowing them to deploy a ransomware attack on the network. The hack affected around 1,500 small and midsized businesses.

Several countries used Pegasus, surveillance software created by NSO Group that targets iPhone and Android operating systems, on devices belonging to activists, politicians, and journalists.

A cyberattack gained access to 1 terabyte of data from the Saudi Arabian Oil Company through a zero-day exploitation. Hackers are offering to delete the data in exchange for $50 million in cryptocurrency.

August

A cyberattack on the Covid-19 vaccine-scheduling website for the Italian region of Lazio forced the website to temporarily shut down. New vaccination appointments were unable to be scheduled for several days after the attack.

A cyber-espionage group linked to one of Russia's intelligence forces targeted the Slovak government from February to July 2021 through spear-fishing attempts.

A cyberattack on the government of Belarus compromised dozens of police and interior ministry databases. The hack claims to be a part of an attempt to overthrow President Alexander Lukashenko's regime.

IT'S BEEN A BUSY YEAR

LITTLE REST FOR DEFENDERS

SOURCE: CSIS

September

The Norwegian Government stated a series of cyberattacks against private and state IT infrastructure came from bad actors operating from China. Their investigation of the hacks claims the actors attempted to capture classified information relating to Norway's national defence and security intelligence.

Hackers obtained 15 TB of data from 8,000 organizations working with Israel-based company, Voicenter and offered the data online for $1.5 million. Some experts have stipulated the hackers have ties to Iran, but no link has been confirmed.

October

An American company announced that the Russian Foreign Intelligence Service (SVR) launched a campaign targeting resellers and other technology service providers that customize, deploy and manage cloud services.

A group with ties to Iran attempted to hack over 250 Office 365 accounts. All the targeted accounts were either U.S. and Israeli defence technology companies, had a focus on Persian Gulf ports of entry, or maritime transportation companies with a presence in the Middle East.

Hackers leaked data and photos from the Israeli Defence Ministry after gaining access to 165 servers and 254 websites, overall compiling around 11 terabytes of data.

November

An online stock trading platform has confirmed that hackers obtained personal information of more than seven million of its customers. Robinhood, which is available only to U.S. users, said in a blog that hackers "socially engineered" a customer support employee and obtained access to certain customer support systems.

A presentation by Mandiant at the Black Hat Europe conference reported a rise in cyber attacks targeting virtual private networks (VPNs). The rise corresponds with the increased use of VPNs for remote working.

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THREAT LANDSCAPE

UNDERSTANDING THE ADVERSARY

Increase in sophistication and resources

LONE WOLF · INSIDER

Often opportunistic. Tooling, capabilities and motivations vary

Ready Made Tools

HACKTIVISTS · TERRORISTS

Ideological activism; disruption of services or access. Often funded

DDoS | Propaganda

ORGANISED CRIMINALS

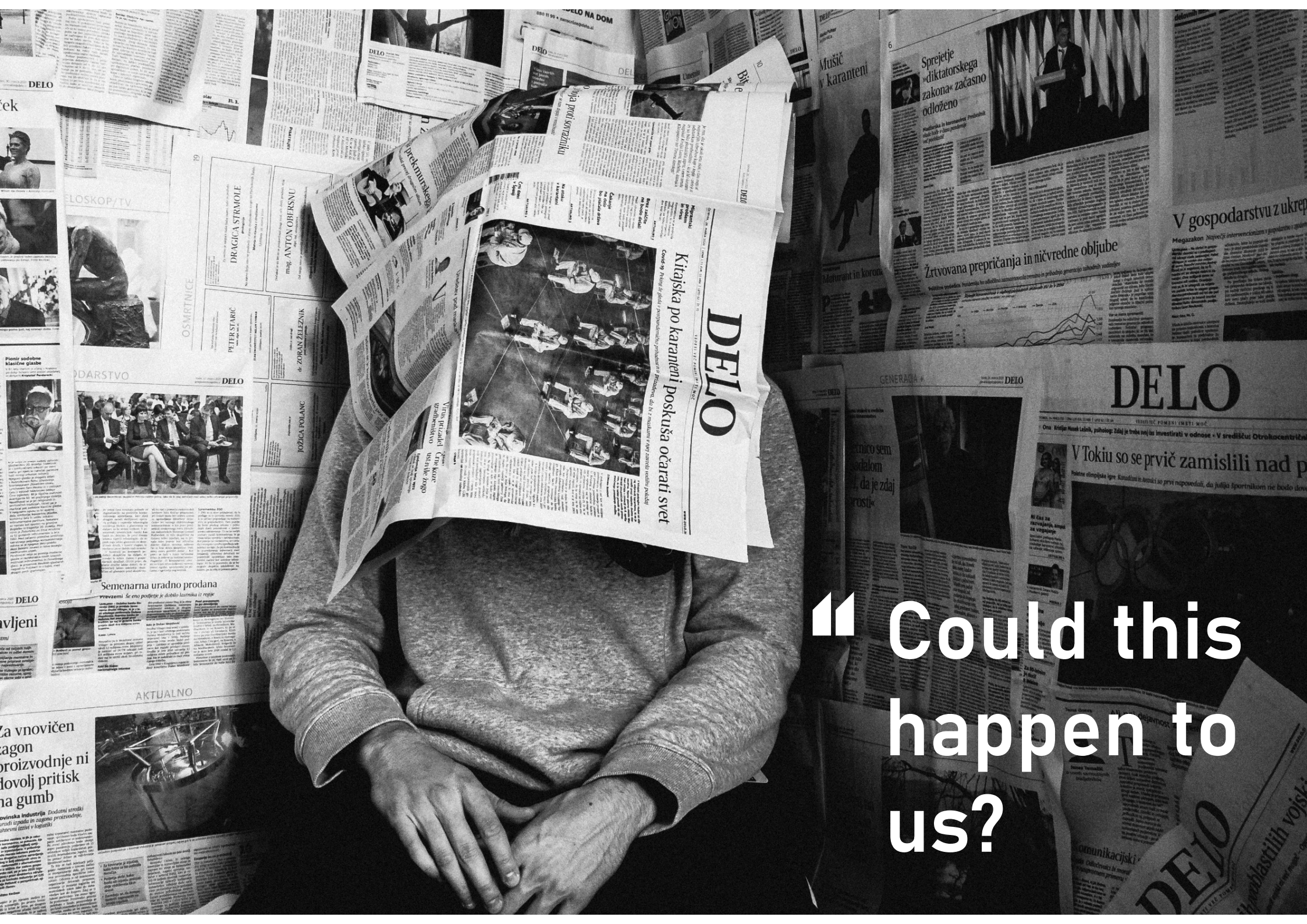
Financially motivated. Use of commodity malware, phishing etc

Social Engineering | Malware | Mules

NATION STATE · APTs

IP theft, cyber espionage. Very capable and well resourced threat actor

Zero Days | Custom Tooling | Patience | Supply Chain | Surveillance


DELO
Kitajska po karanteni poskuša očarati svet
Sprejetje »diktatorskega zakona« začasno odloženo
Žrtvovana prepričanja in ničvredne obljube
V gospodarstvu z ukrep
V Tokiu so se prvič zamislili nad p
Semenarna uradno prodana
AKTUALNO
Za vnovičen zagon proizvodnje ni dovolj pritisk na gumb
Could this happen to us?

“Could this happen to us?

BEFORE

“ … defence in depth

… indicators ingested

… industry-leading controls

… visibility via peers and industry trust groups

… couldn’t / wouldn’t happen to us

…

“Could this happen to us?

AFTER

“Threat Intelligence are aware of *7 Tier One actors*, including *Lazarus*, using *Techniques A, B, C* in a number of successful attacks within the sector.

We therefore *strongly recommend* developing and deploying *Control X* as a priority; to detect and mitigate any impact from this technique.

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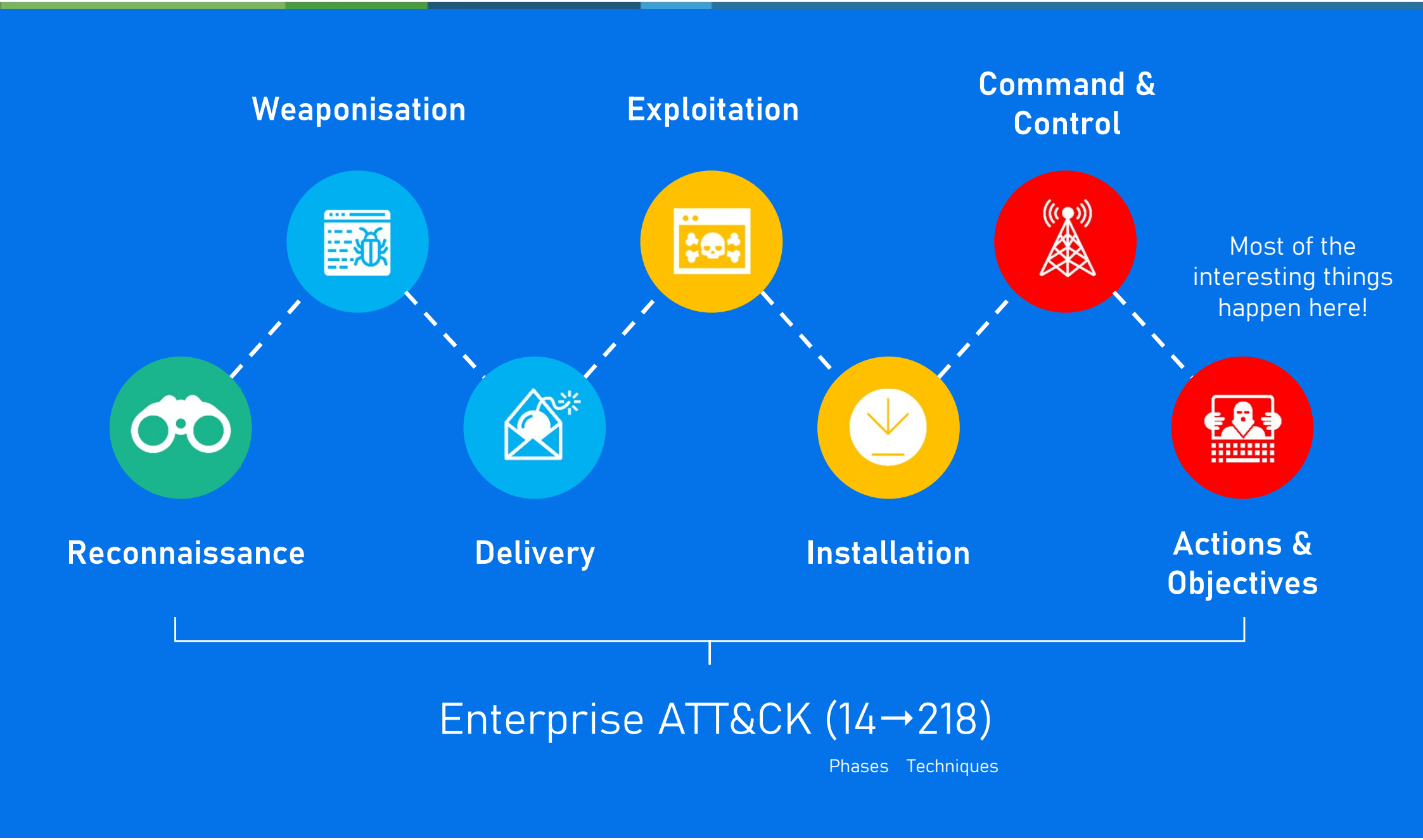
HOW DID WE GET HERE?

MOVING BEYOND THE LOCKHEED MARTIN KILL CHAIN



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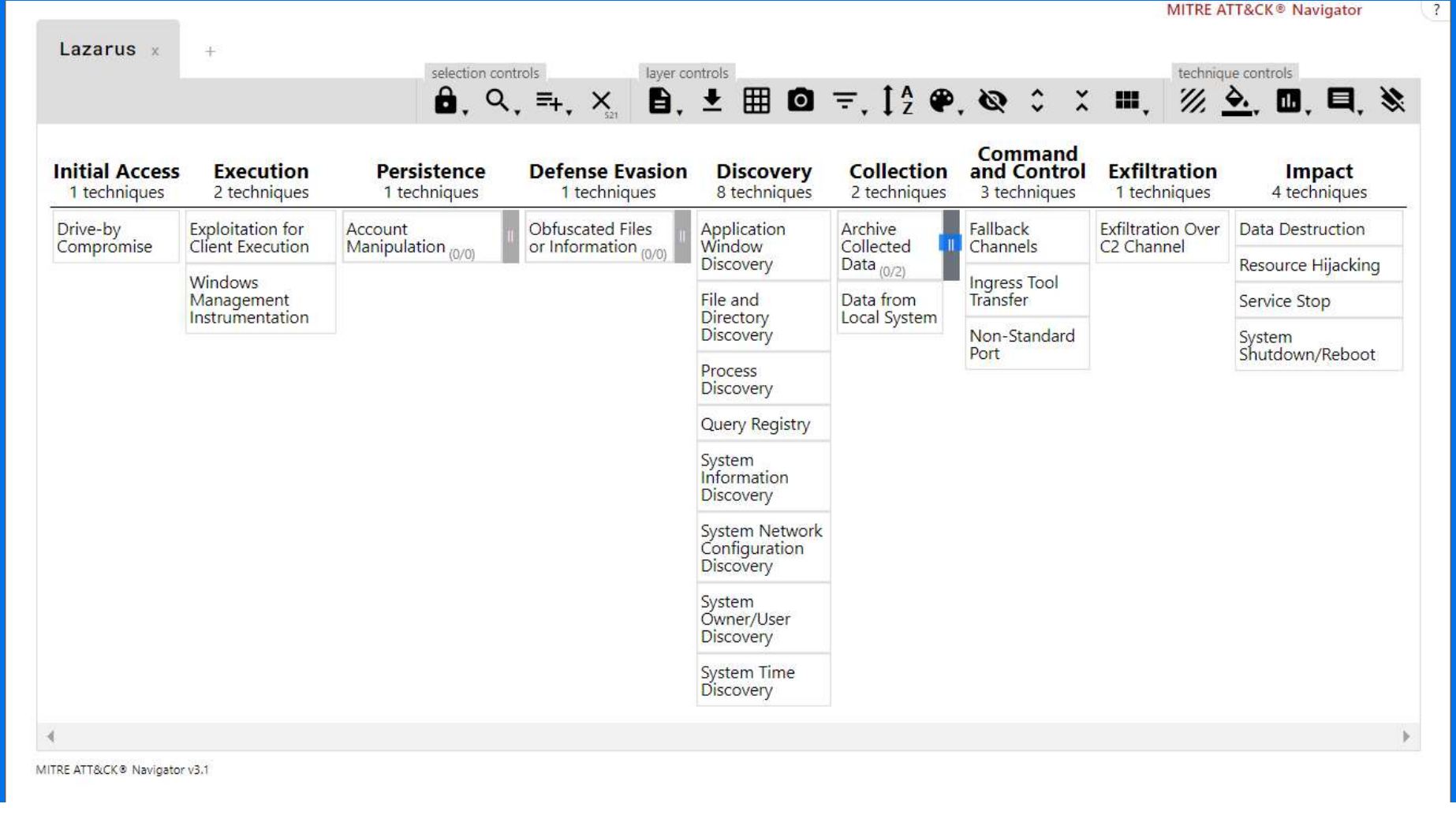
MITRE NAVIGATOR

VISUALISE THE ADVERSARY

The Mitre Navigator can be used to highlight techniques used by specific adversaries, create heat maps for heavily used techniques, or visualise your defensive coverage



IS MITRE ATT&CK ENOUGH?

MORE DETAIL == BETTER DECISIONS

Techniques & sub-techniques still don't often provide enough detail to replicate an attack †

Mitre knowledgebase is extensive, but only includes public information, which may not reflect reality

Techniques are not always distilled to individual toolkits or intrusions, so harder to identify trends

† GRANULAR PROCEDURE LEVEL INFORMATION IS IN THE MITRE ROADMAP

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PHISHING · T1566

HOW MANY WAYS CAN YOU THINK OF?

Macro
Cobalt Strike
Standard

Macro
Cobalt Strike
Standard as HREF

Macro
Cobalt Strike
as URL Rewrite

Macro
WScript
PowerShell

Macro
Wscript
leading to EXE

Macro
WScript
PowerShell XOR

Macro
MMG WMI
PowerShell

Macro LuckyStrike
PowerShell
CellEmbed

Macro
MSBuild

DDE
PowerShell

Macro
Remote
Template

Encrypted
Archive

Password
Protected
Office Doc

Link
Inside
PDF

Link
Inside Office
Document

File:
HTA

File:
EXE

File:
.BAT

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BECOMING THREAT-LED

AN ADVERSERIAL APPROACH TO PURPLE TEAMING

What We Wanted to Achieve

- List of threat actors, associated campaigns and TTPs of interest to Standard Chartered and the Financial Services industry
- Granular level understanding of TTPs, and how specifically these can be detected and blocked in our environment
- Remove control-efficacy ambiguity from TTPs, and provide confidence and assurance that controls are effective, through atomic level testing
- A library of TTPs aligned to the Mitre Enterprise framework, which would be actively maintained by Threat Intelligence and security teams

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BECOMING THREAT-LED

INTEGRATING INTELLIGENCE IN YOUR APPROACH

Using Threat Intelligence can bring focus to Purple Team initiatives, helping to prioritise those Threat Actors and TTPs that are likely to be the greatest threat to your organisation and technology stack. Your Cyber Threat Intelligence team will work with internal stakeholders, peers, trust groups and vendors to develop a detailed understanding of the threat landscape. Mitre's *Level 3* approach is detailed below:

ADVERSARY EMULATION PLAN

Gather
threat intelligence based on the threats to your organisation

Extract
techniques and map to your preferred framework

Analyse
,organise and diagram your analysis into an operational flow

Develop
tools and procedures to help teams replicate the attack

Emulate
the adversary, working closely with Blue Teams to identify gaps

Essential Reading
medium.com/mitre-attack/getting-started-with-attack-red-29f074ccf7e3
medium.com/mitre-attack/getting-started-with-attack-cti-4eb205be4b2f

OUR APPROACH

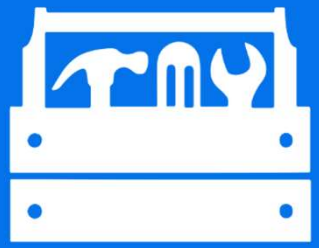
TTP CENTRIC, FOCUSSING ON SPECIFIC INTRUSIONS

THREAT- LED

Focus on TTPs
Our focus is on the top two tiers of the Pyramid of Pain

Threat Actor
Understanding which adversaries are the greatest risk

Cyber Attack
Prominent cyber attack or tool used by the adversary



Specific TTP
Specific way a tool was used by the adversary

Malpedia and the Thai CERT Threat Actor Encyclopedia are a great place to start:

- malpedia.caad.fkie.fraunhofer.de/actors
- apt.thaicert.or.th/cgi-bin/listgroups.cgi

LAZARUS	BANK OF BANGLADESH	TTP 1
	FAR EASTERN INTERNATIONAL BANK	TTP 2
	TROY OPERATION	TTP 3
	DARKSEOUL OPERATION	TTP 4
	SONY PICTURES	ETC

OUR APPROACH

OPERATIONALISING THREAT INTELLIGENCE

We wanted to industrialise the end-to-end pipeline between Threat Intelligence, Purple Teams, Detection Engineering, Threat Hunting and finally, Red/Blue teams for validation.

Threat Intelligence

Research
Understanding the Threat Landscape and attacks to the Finance sector

Map
Breaking down known TTPs to specific Mitre Intrusion Sets

Purple Team, Detection Engineering

Assess
Identifying how these TTPs might be detected via current controls

Enhance
Improving and prioritising detection capabilities

Red & Blue Teams

Validate
Testing efficacy of controls and TTP detection via Red Teaming

OUR APPROACH

SME THOUGHT PROCESS

Which specific threat actors (or intrusion sets) are the greatest threat to our business?

Do we have the telemetry (and capability) to develop detections for these techniques?

How do we respond to these alerts in "real-life" conditions (e.g., contextual awareness, time to detect etc)

Research **Map** **Assess** **Enhance** **Validate**

Which of these TTPs can be reliably tested and emulated in our environment?

Can we develop high-fidelity detection or mitigation strategies for these TTPs?

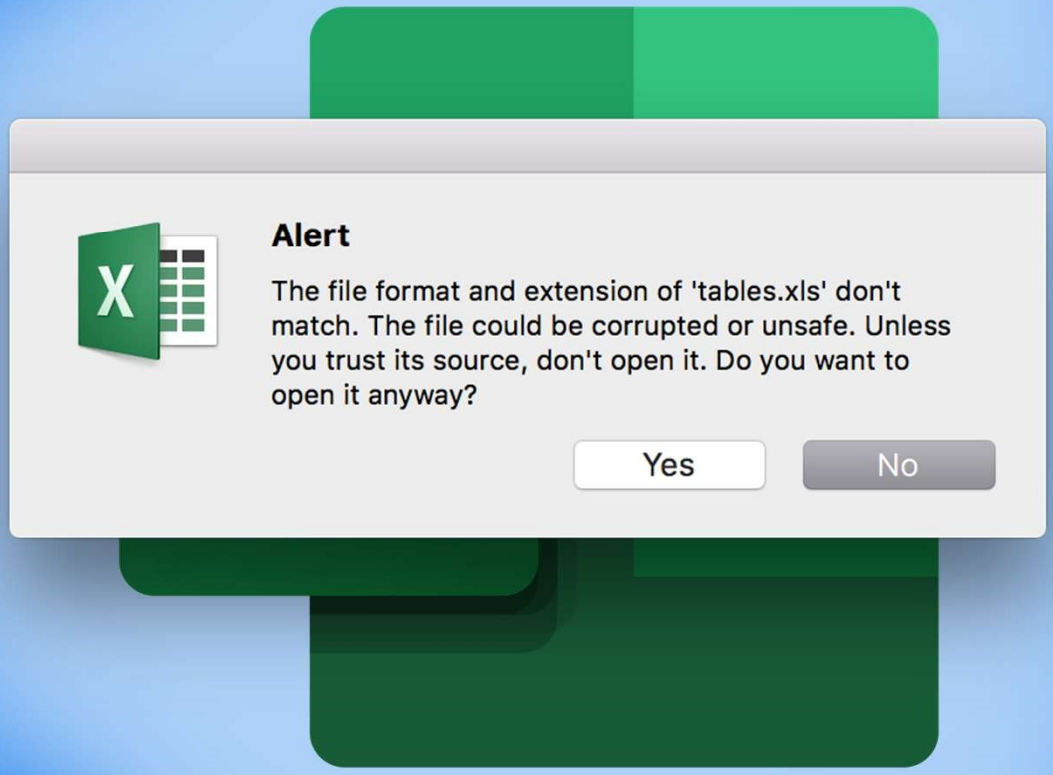

MISSION WINNOW
Lenovo
16
V-Power
8 eightcap
AMD
KASPERSKY
MAHLE
WEICHAI

OUR REQUIREMENTS

WHAT WE WANTED FROM A PLATFORM

To help fulfil our organisations' requirement to be threat-intelligence led, we wanted a platform that could help orchestrate teams across the security function. We needed:

Flexibility	▪ Framework / Kill Chain agnostic ▪ Could meet our current and future requirements
Standards Compliance	▪ STIX / TAXII compliant ▪ Easy to export data to re-use elsewhere
Detail Orientated	▪ Ability to capture rich detail, both from a Red and Blue team perspective
Encouraged Collaboration	▪ Encourage intra-business collaboration ▪ But also support sharing with peers and trust groups
Single Tool Across Security	▪ A tool for analysts *as well* as management ▪ One tool, with multiple use cases (not just for CTI)


Alert
The file format and extension of 'tables.xls' don't match. The file could be corrupted or unsafe. Unless you trust its source, don't open it. Do you want to open it anyway?
Yes
No

TOOL REVIEWS

WHY WE PICKED VECTR

	Benefits	Considerations
Excel *Unsuitable*	▪ No additional licensing required ▪ Can theoretically be built and customised to your specific use case	▪ Not optimised for multiple users ▪ Significant development time ▪ Excel not optimised for this task
Custom Tooling *Unsuitable*	▪ Can be customised to meet all your development and productivity needs ▪ Would be fully compliant with all your business / security requirements	▪ Cost / time for development ▪ Would require ongoing development, to maintain alignment with changes to the Mitre framework
Unfetter *Unsuitable*	▪ Free for all uses, including Enterprise ▪ Tool developed by the NSA, aiming to provide actor-centric security reviews ▪ STIX compliant	▪ Development ceased in 2018, and so Mitre alignment off-kilter ▪ Tool unstable and not very performant ▪ Tool not as extensive as VECTR
VECTR *Ideal*	▪ Free for all uses, including Enterprise ▪ Kill Chain / framework agnostic, but fully supports Mitre Enterprise ▪ Actively maintained ▪ STIX/TAXII compliant ▪ Potential to automate testing in future ▪ Facilitates collaboration between teams	▪ Not designed initially to be intel-led ▪ Tool development driven by tool developers, with reduced influence to prioritise Enterprise features (but developers very receptive to feedback) ▪ Self-hosted, technology stack may not be compatible with internal standards

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VECTR

CAMPAIGN AND ASSESSMENT TRACKER

VECTR is a platform designed to facilitate security teams through comprehensive threat simulation assessments. Attacks can be documented to gauge the effectiveness of defensive tools to help strengthen an organisations' security posture, and improve detection capabilities through historical performance tracking. Common campaigns and use cases include:

- Account abuse
- Spear phishing technical defences
- Malware detection and response
- Lateral movement and protected resources breach
- C2 and data exfiltration

- Ability to map prior attack methodologies in a consistent manner
- Measure progress across phases, campaign assessments, and outcomes
- Centralises Red Team and Blue Team techniques, allowing for control recommendations/tuning
- Ability to add custom test cases and target assets
- Produce summary and detailed reporting for campaign outcomes
- Provide historical trending of campaign exercises
- Rich management information; one tool for analysts and leaders

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VECTR

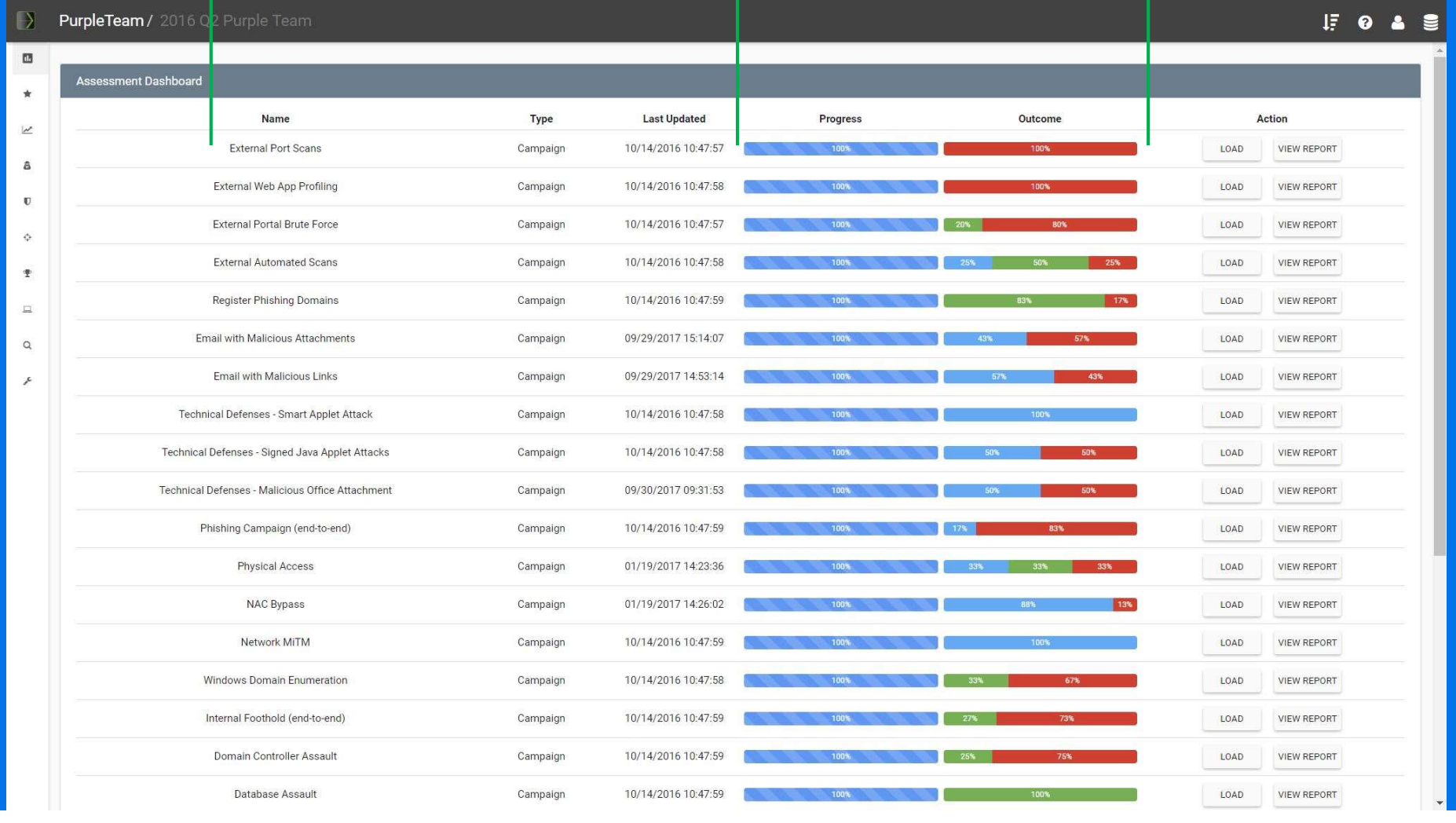
CAMPAIGN OVERVIEW

SAMPLE DATA

Each known cyber attack or attack type is loaded as a campaign

As TTPs are mapped and tested, the progress is updated

As a capability assessment is completed, the Outcome is updated



Name	Type	Last Updated	Progress	Outcome	Action
External Port Scans	Campaign	10/14/2016 10:47:57	100%	100%	LOAD VIEW REPORT
External Web App Profiling	Campaign	10/14/2016 10:47:58	100%	100%	LOAD VIEW REPORT
External Portal Brute Force	Campaign	10/14/2016 10:47:57	100%	20% 80%	LOAD VIEW REPORT
External Automated Scans	Campaign	10/14/2016 10:47:58	100%	25% 50% 25%	LOAD VIEW REPORT
Register Phishing Domains	Campaign	10/14/2016 10:47:59	100%	83% 17%	LOAD VIEW REPORT
Email with Malicious Attachments	Campaign	09/29/2017 15:14:07	100%	43% 57%	LOAD VIEW REPORT
Email with Malicious Links	Campaign	09/29/2017 14:53:14	100%	57% 43%	LOAD VIEW REPORT
Technical Defenses - Smart Applet Attack	Campaign	10/14/2016 10:47:58	100%	100%	LOAD VIEW REPORT
Technical Defenses - Signed Java Applet Attacks	Campaign	10/14/2016 10:47:58	100%	50% 50%	LOAD VIEW REPORT
Technical Defenses - Malicious Office Attachment	Campaign	09/30/2017 09:31:53	100%	50% 50%	LOAD VIEW REPORT
Phishing Campaign (end-to-end)	Campaign	10/14/2016 10:47:59	100%	17% 83%	LOAD VIEW REPORT
Physical Access	Campaign	01/19/2017 14:23:36	100%	33% 33% 33%	LOAD VIEW REPORT
NAC Bypass	Campaign	01/19/2017 14:26:02	100%	88% 13%	LOAD VIEW REPORT
Network MiTM	Campaign	10/14/2016 10:47:59	100%	100%	LOAD VIEW REPORT
Windows Domain Enumeration	Campaign	10/14/2016 10:47:58	100%	33% 67%	LOAD VIEW REPORT
Internal Foothold (end-to-end)	Campaign	10/14/2016 10:47:59	100%	27% 73%	LOAD VIEW REPORT
Domain Controller Assault	Campaign	10/14/2016 10:47:59	100%	25% 75%	LOAD VIEW REPORT
Database Assault	Campaign	10/14/2016 10:47:59	100%	100%	LOAD VIEW REPORT

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VECTR

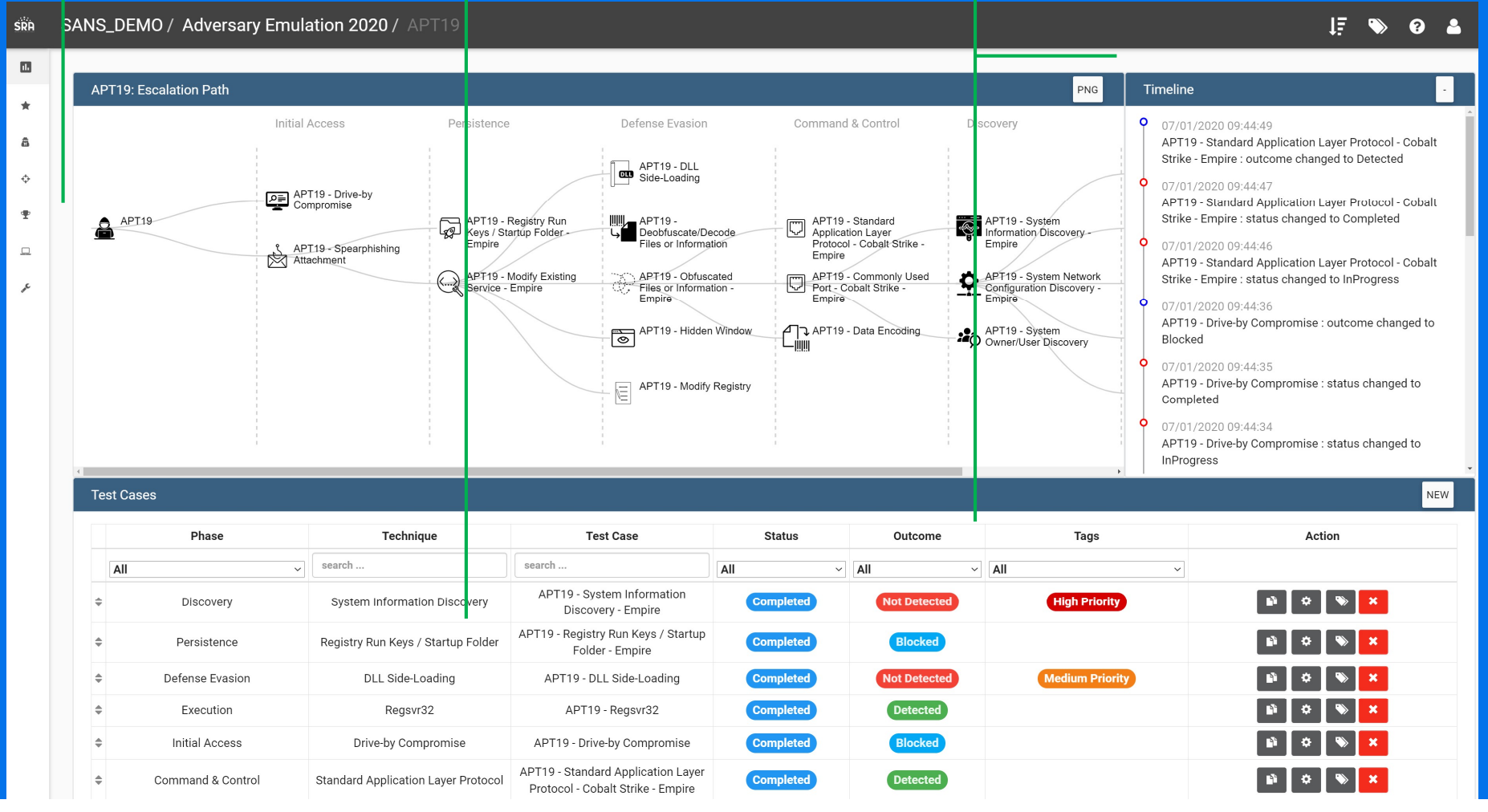
CAMPAIGN DETAIL VIEW

SAMPLE DATA

Swim lanes show an end-to-end view of an attack

Test Cases are specific implementations of a technique

Timeline and Outcome show the result of validation tests



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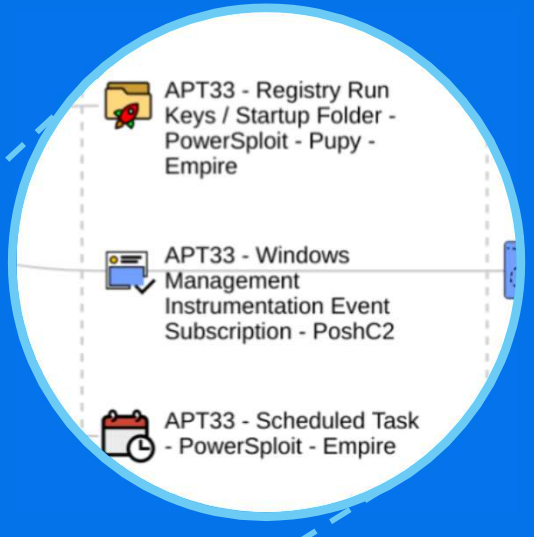
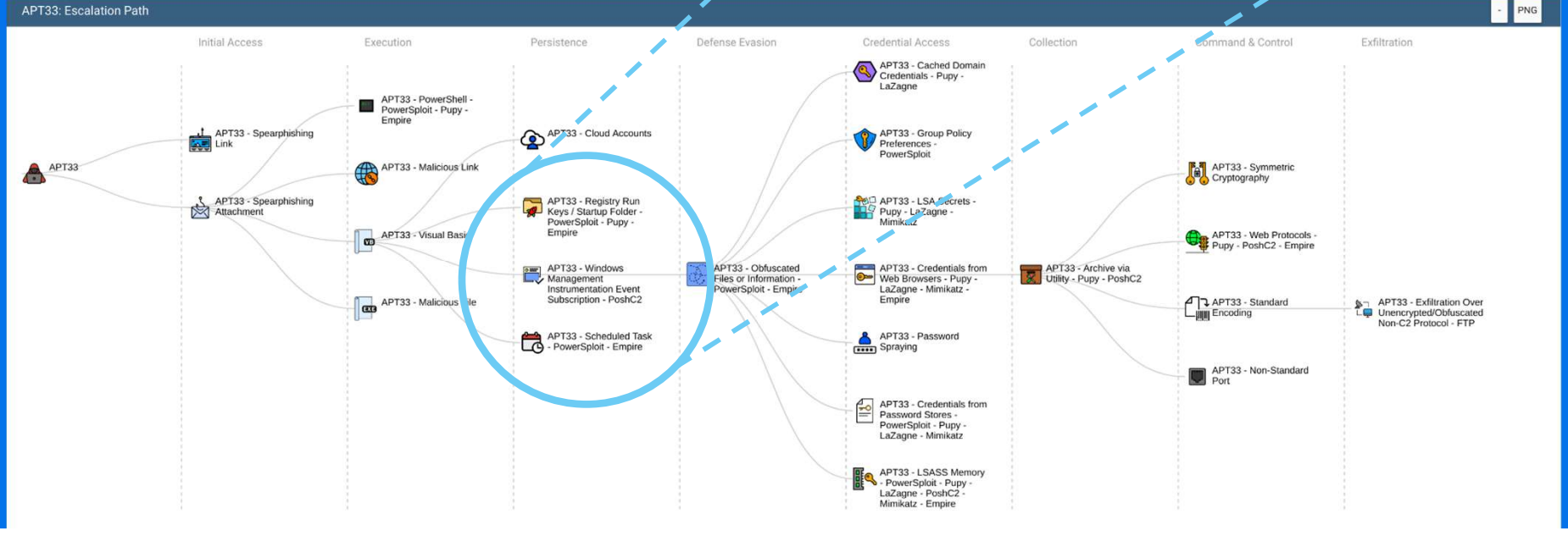
VECTR

ESCALATION PATH

A collection of Test Cases (TTPs) are used to illustrate an “Escalation Path”; which demonstrates the attacker’s movement across your preferred Kill Chain.

This is a simple, yet powerful way of summarising the adversary’s behaviour.





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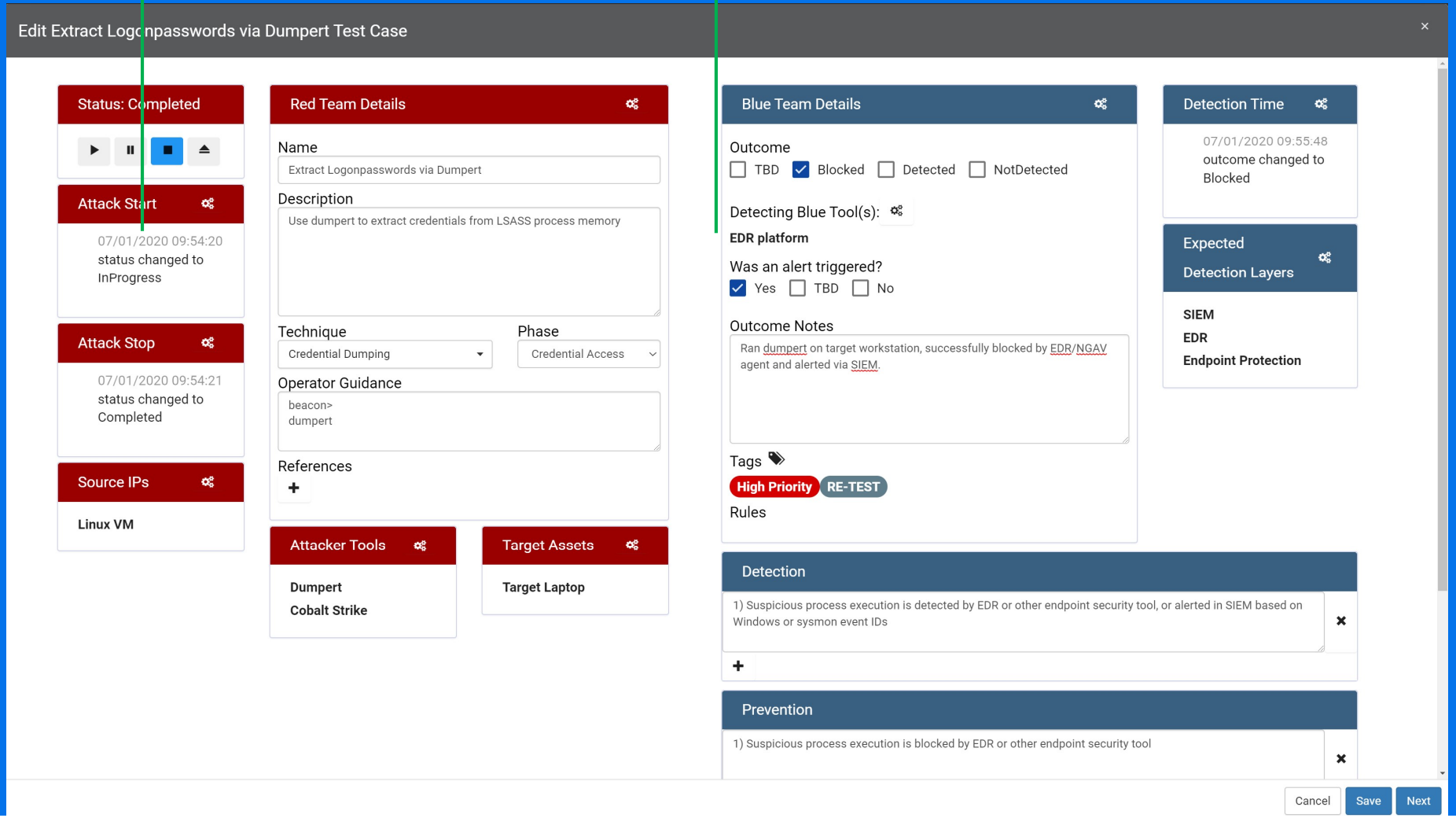
VECTR

RED AND BLUE TEAM VIEW

SAMPLE DATA

Red Team view shows specific offensive technique being tested

Blue Team view shows specific defensive technique deployed



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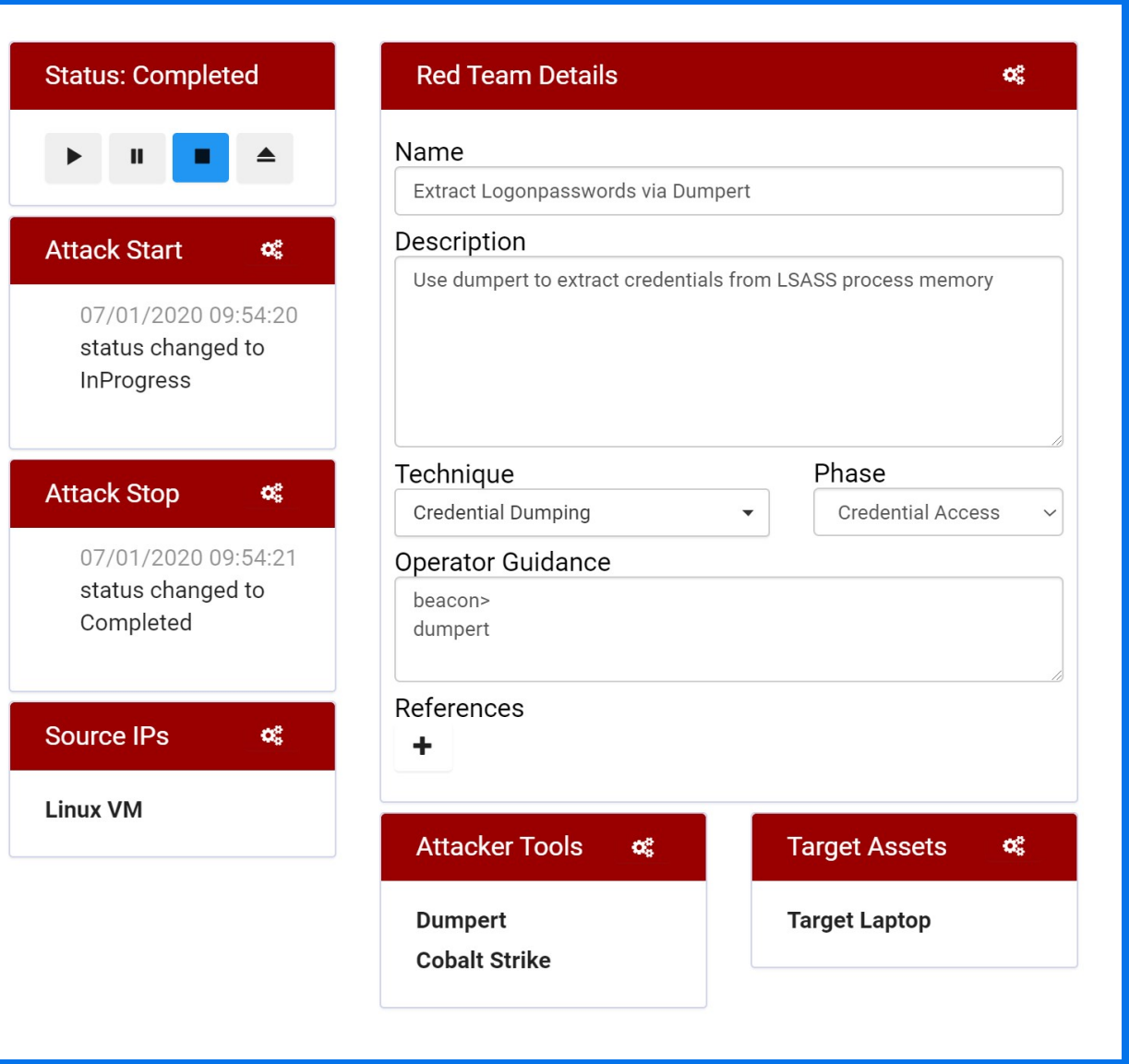
RED TEAM VIEW

ON THE OFFENSIVE

SAMPLE DATA



- TTP intent and description
- Map to Mitre (or your preferred framework or Kill Chain)
- Capture rich metadata
- Set TTP icon
- Add references
- Map to existing offensive toolkits
- Specify target/scope
- And more!

TIP

Consider adopting the Atomic Red Team YAML specification

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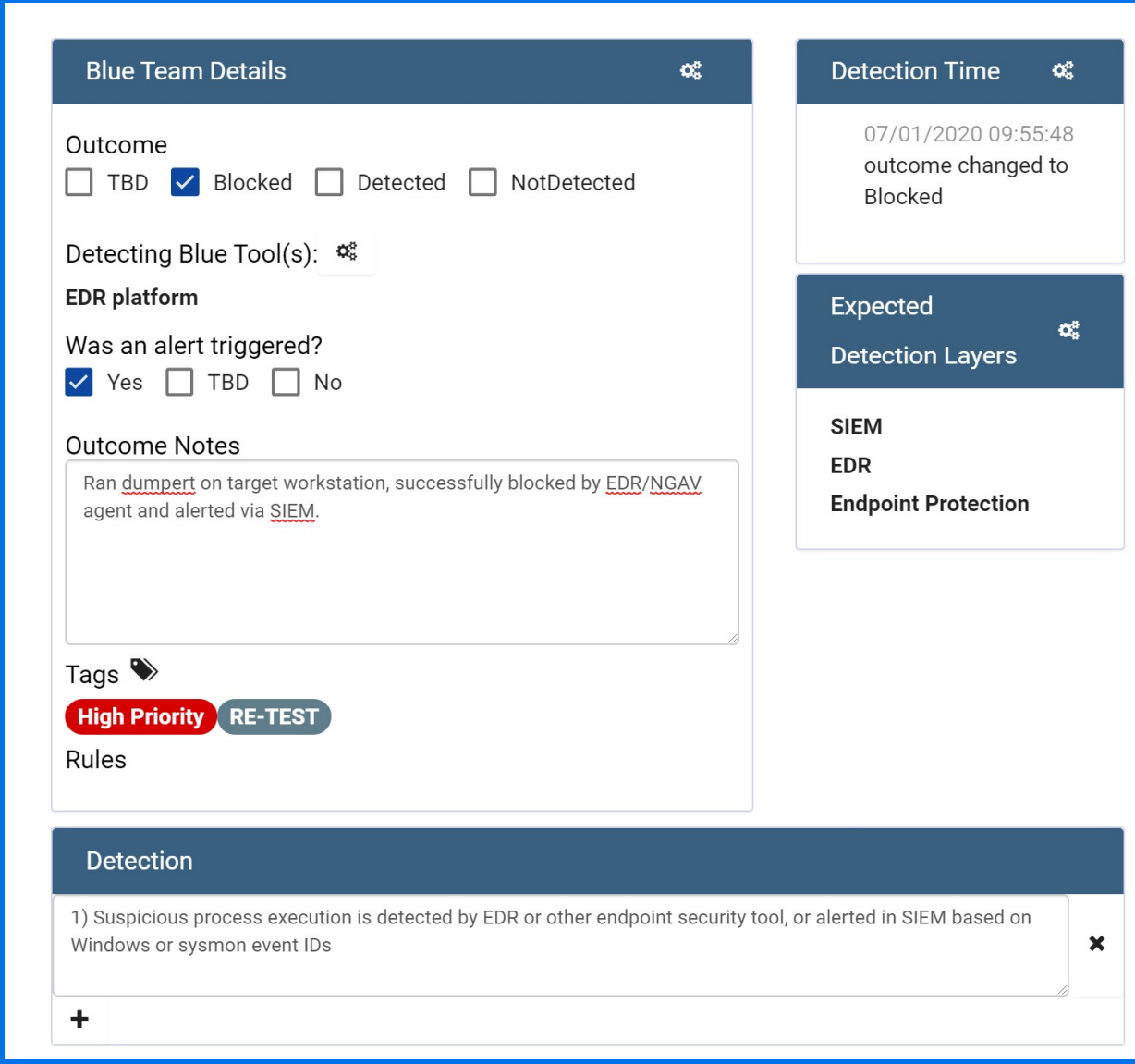
BLUE TEAM VIEW

CAPTURE THE DEFENCE

SAMPLE DATA

- Capture high level (vendor-agnostic) control
- TTP outcome
- Specific control responsible for detection or mitigation
- Add notes for defensive teams, including detection / prevention notes and corresponding evidence
- Map TTP directly to rules
- Tags to assist with work-flow
- And more!

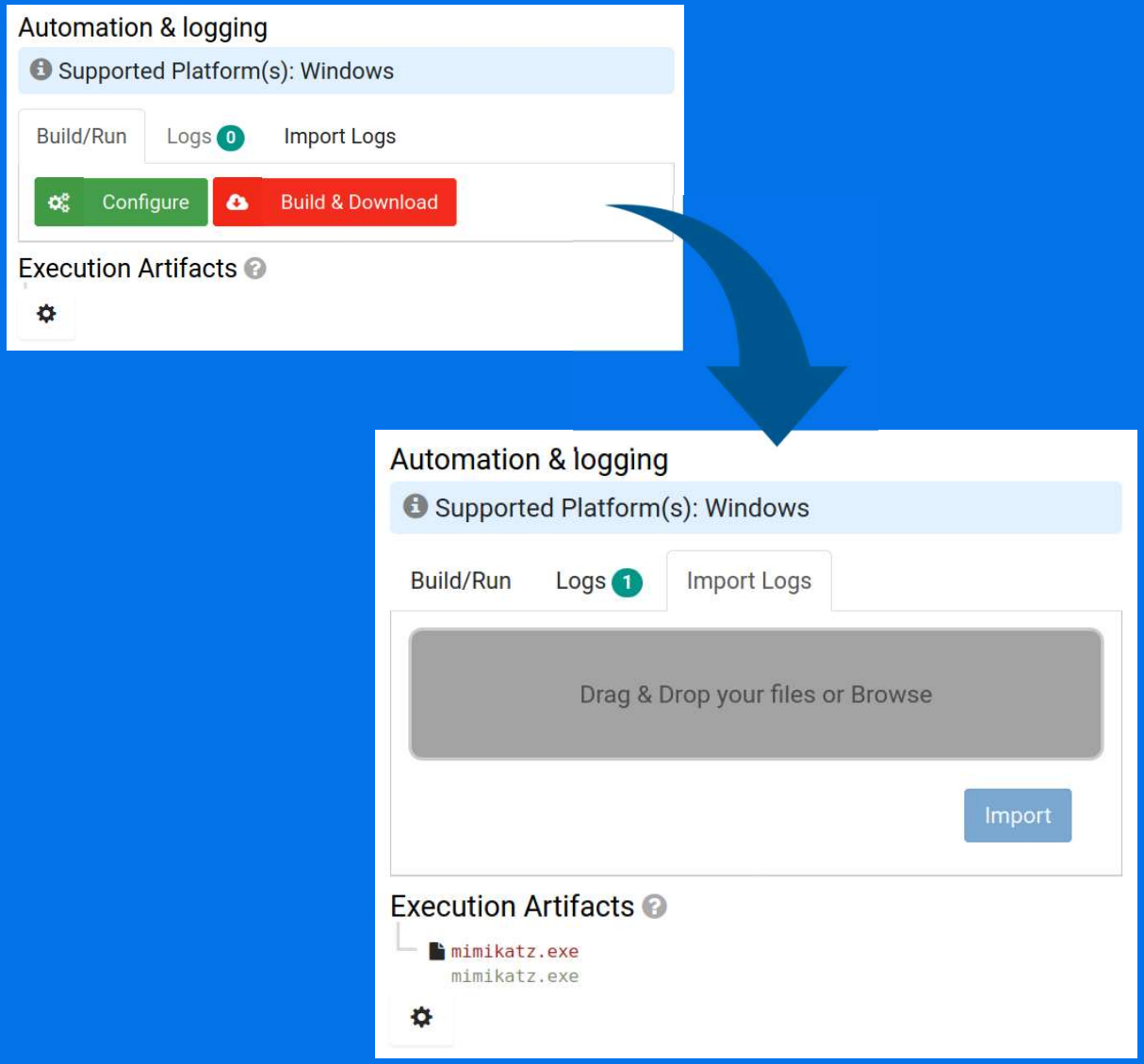
TIP Consider adopting the SIGMA specification



TTP RUNTIMES

ATOMIC TEST BINARY GENERATION

NEW!



VECTR allows the production of Windows PE binaries that can be used to automate individual test cases or even entire campaigns.

- Supports cmd, PowerShell, and Inline PowerShell
- Allows supporting toolkits ("Execution Artefacts") that can be dropped at runtime
- Can additionally clean-up after tests are executed
- Generates detailed logs which can be imported back into VECTR

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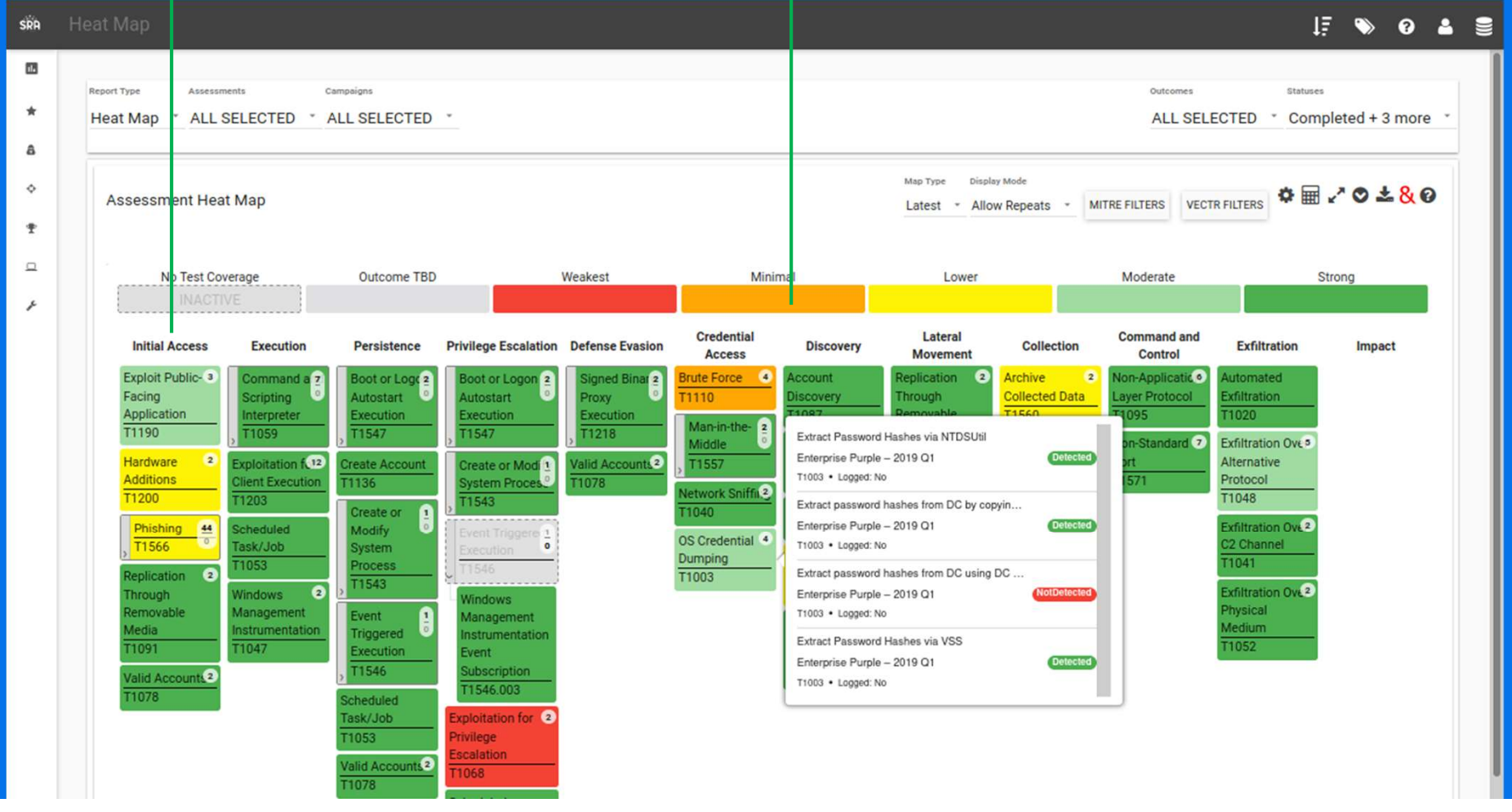
HEAT MAP

CONTROL EFFICACY HEATMAP VIEW

SAMPLE DATA

Heatmap view shows concentration of attacker TTPs grouped by tactic

Heatmap shows where controls are strongest, and opportunities for improvement



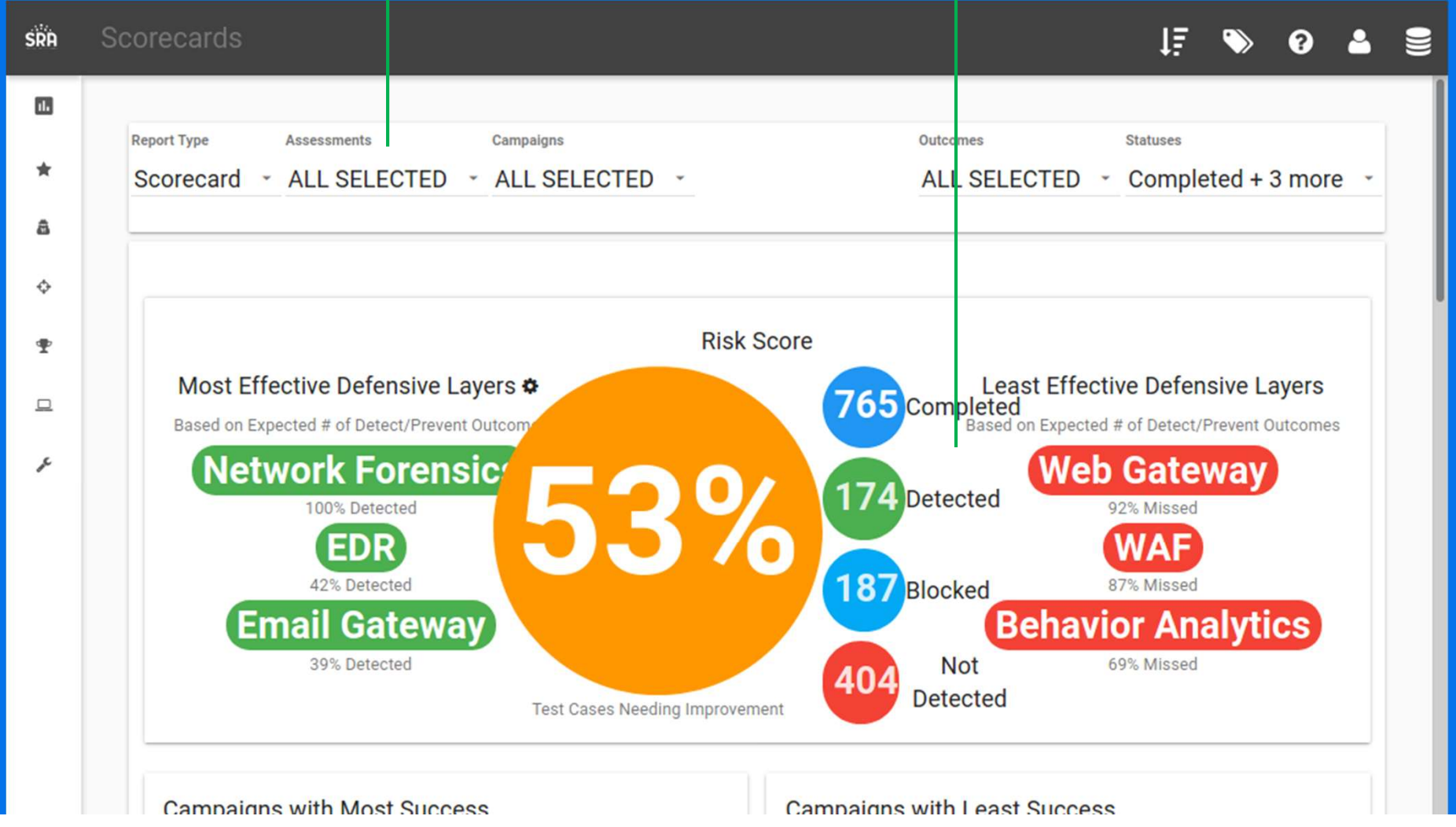
MANAGEMENT INFORMATION

CAMPAIGN ASSESSMENT DASHBOARD

SAMPLE DATA

Get a holistic view across all your tests, or specific campaigns

Campaign summary shows what you're good at, and what requires further development



PUBLIC

TOOLSET SUMMARY

CONTROL EFFICACY REPORTING

SAMPLE DATA

Quickly see which specific controls are effective

Also see high-level, vendor-agnostic views of control posture

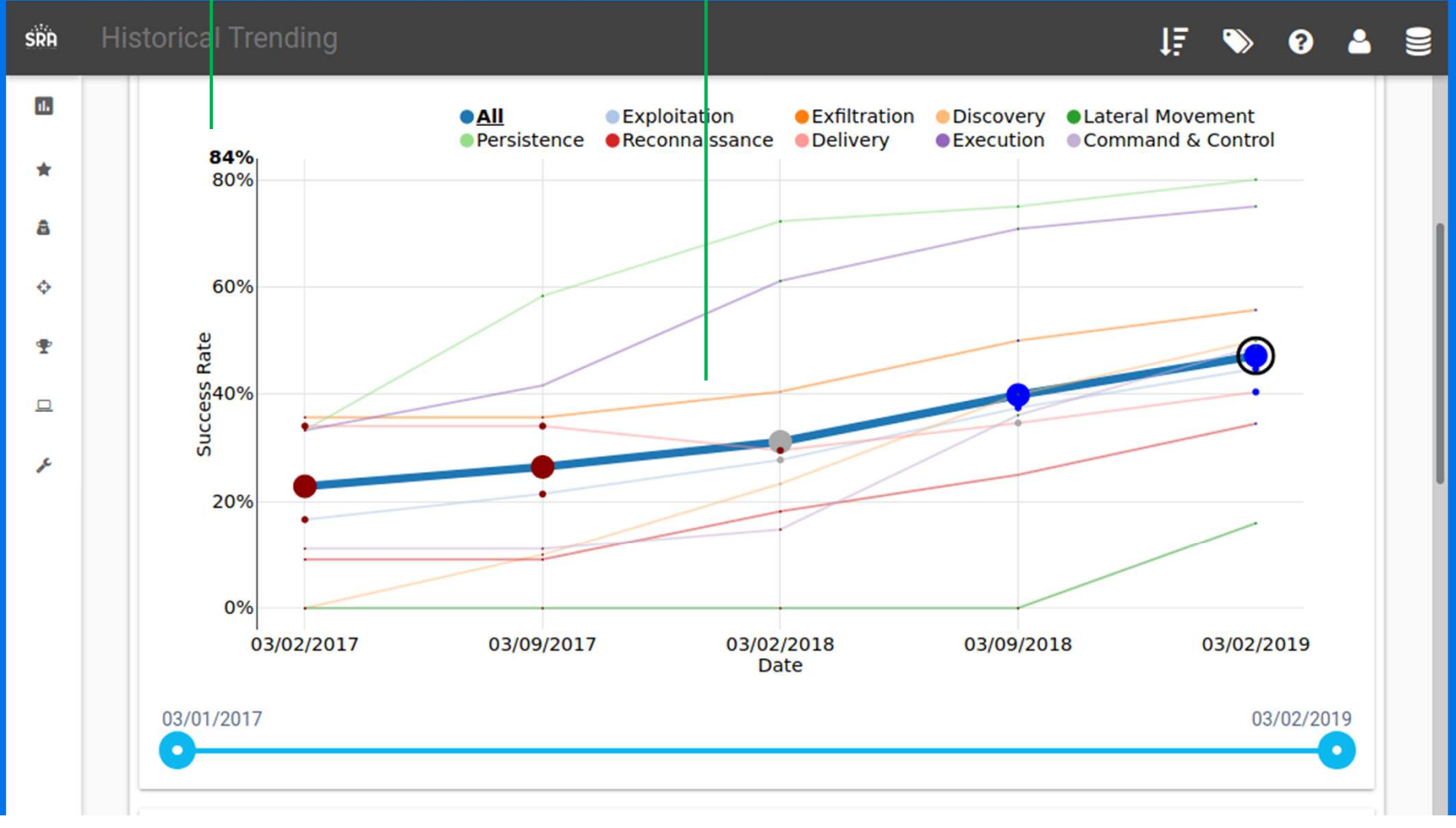
PROGRESS REPORTING

HISTORIC TRENDING VIEW

SAMPLE DATA

Over time, dashboards provide holistic view of improvements

Tactic view shows control efficacy by Kill Chain phase

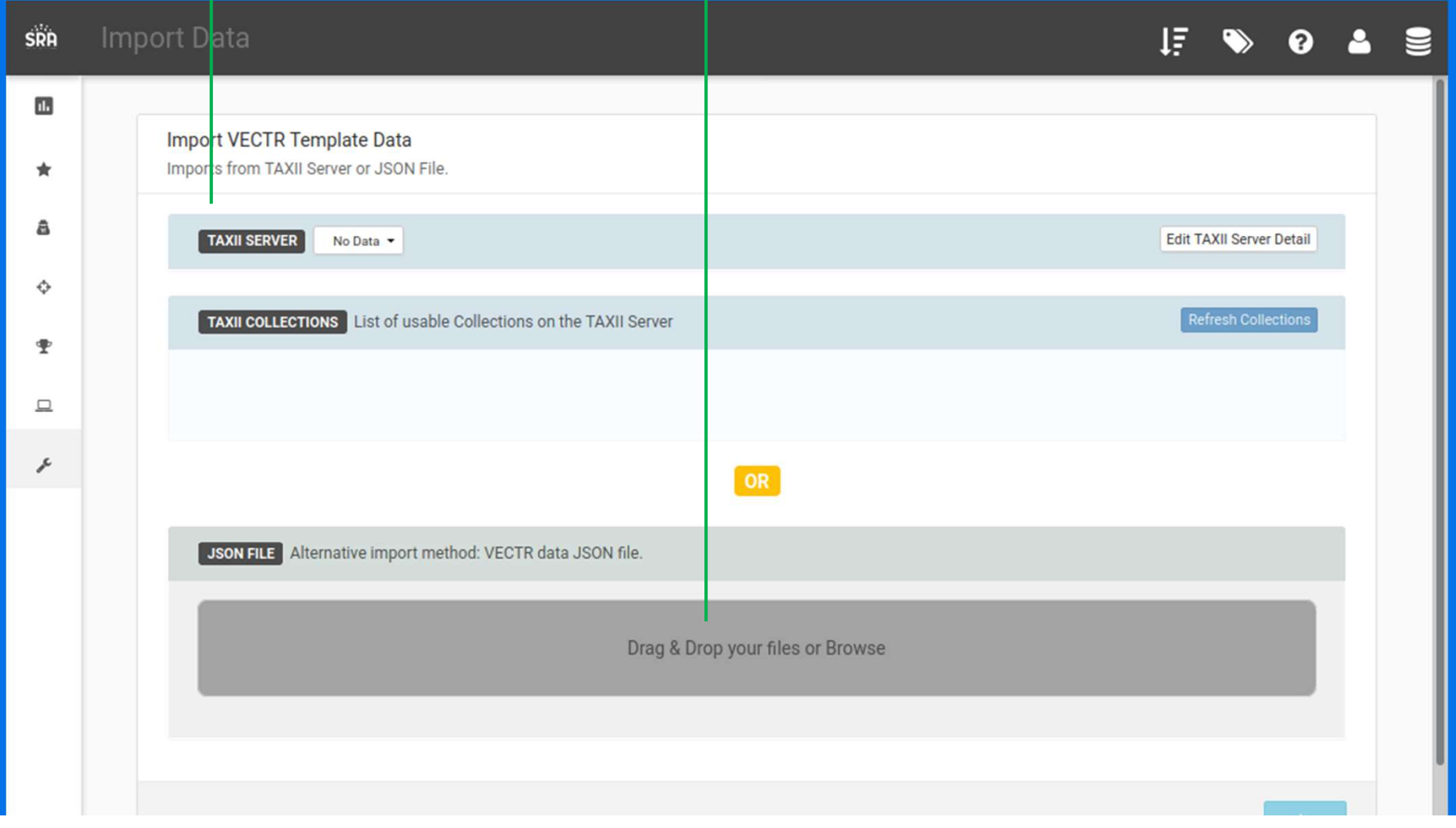


IMPORT

SUPPORTS YAML, JSON AND DIRECT IMPORT VIA TAXII SERVER

Supports importing directly from a STIX / TAXII server

Or manually, via YAML or JSON files

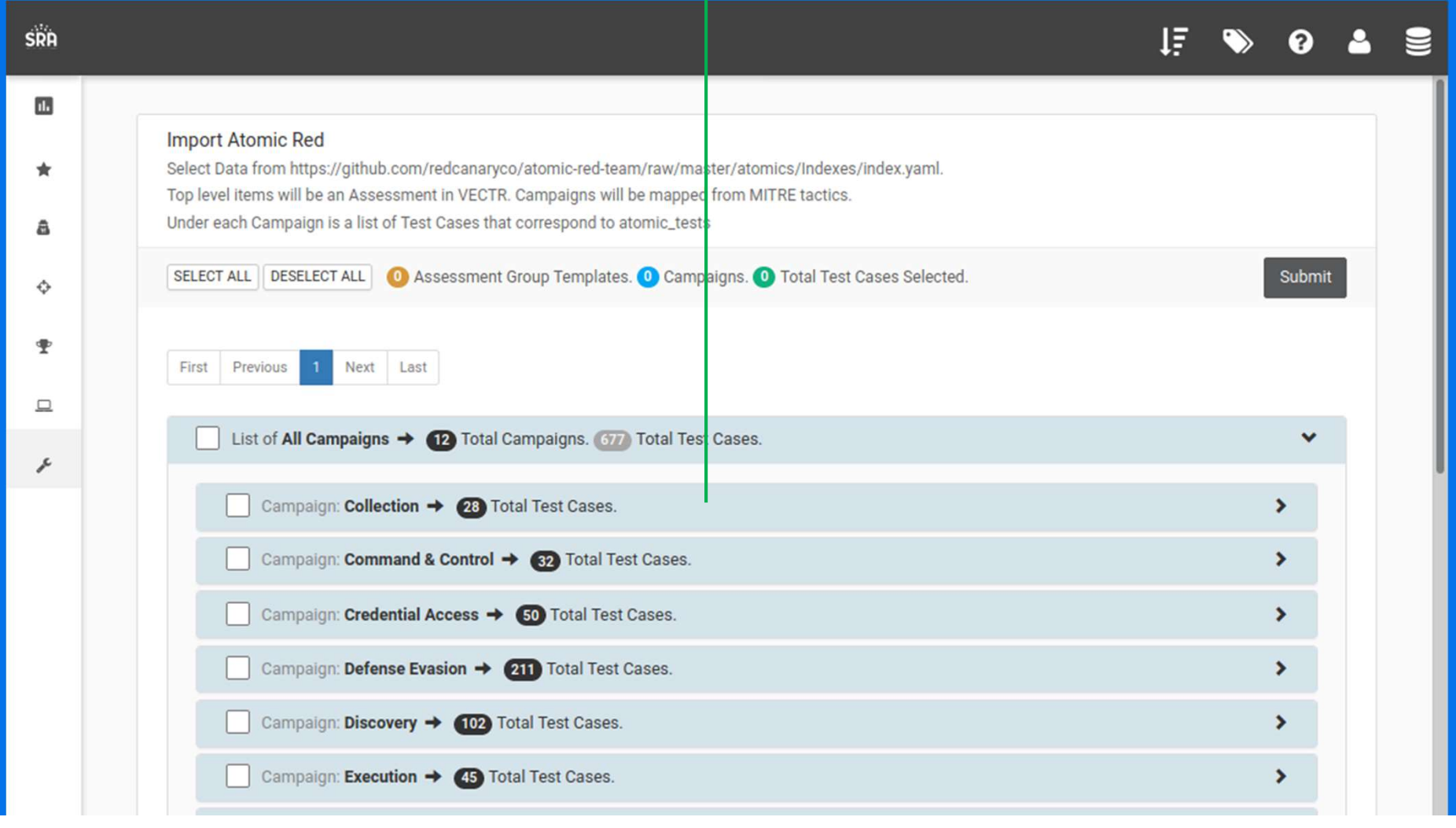


PUBLIC

IMPORT

ATOMIC RED TEAM

Flexibility to import one, some, or all intrusion sets

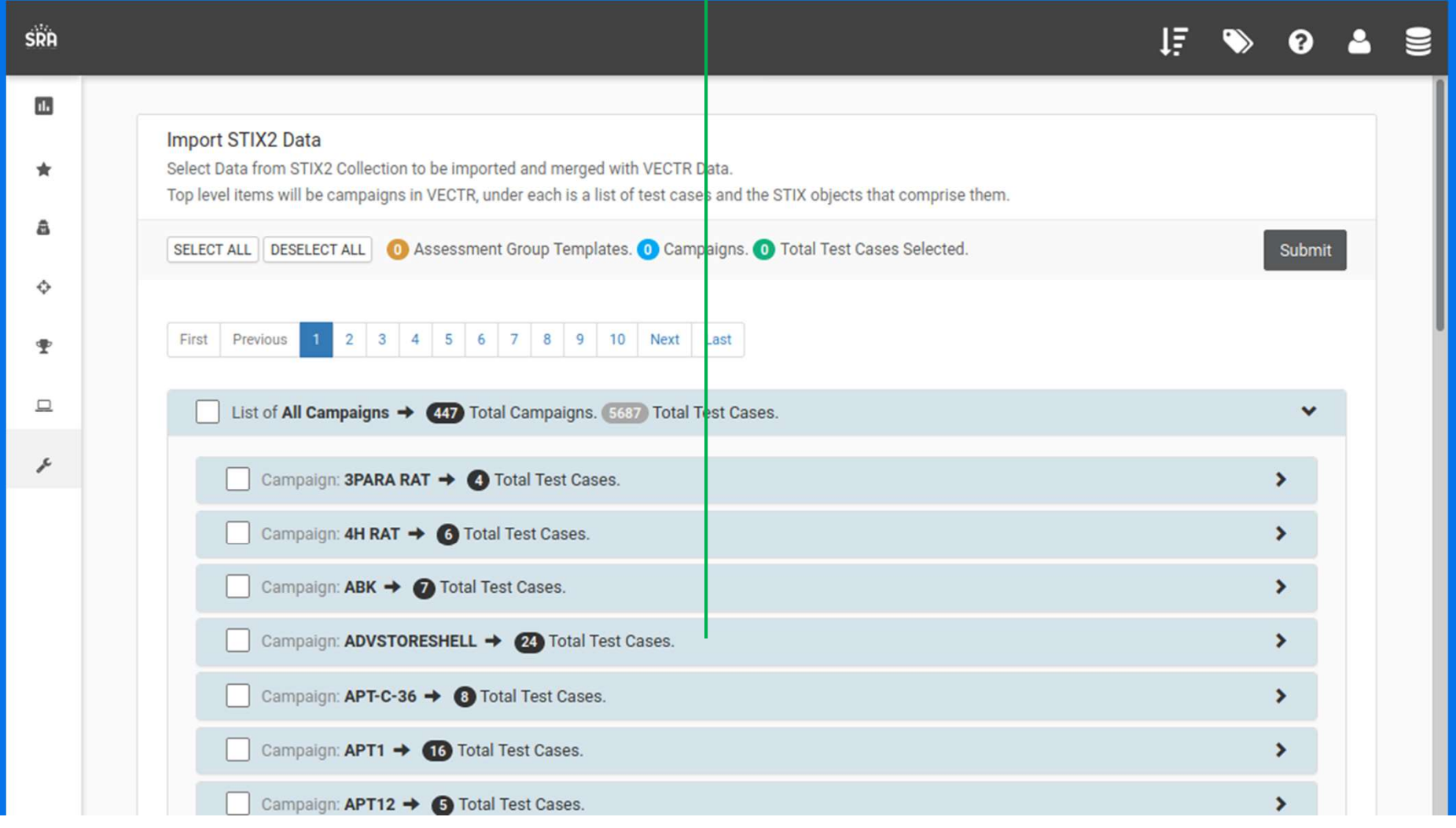


PUBLIC

IMPORT

MITRE CTI BUNDLE

Flexibility to import one, some, or all intrusion sets

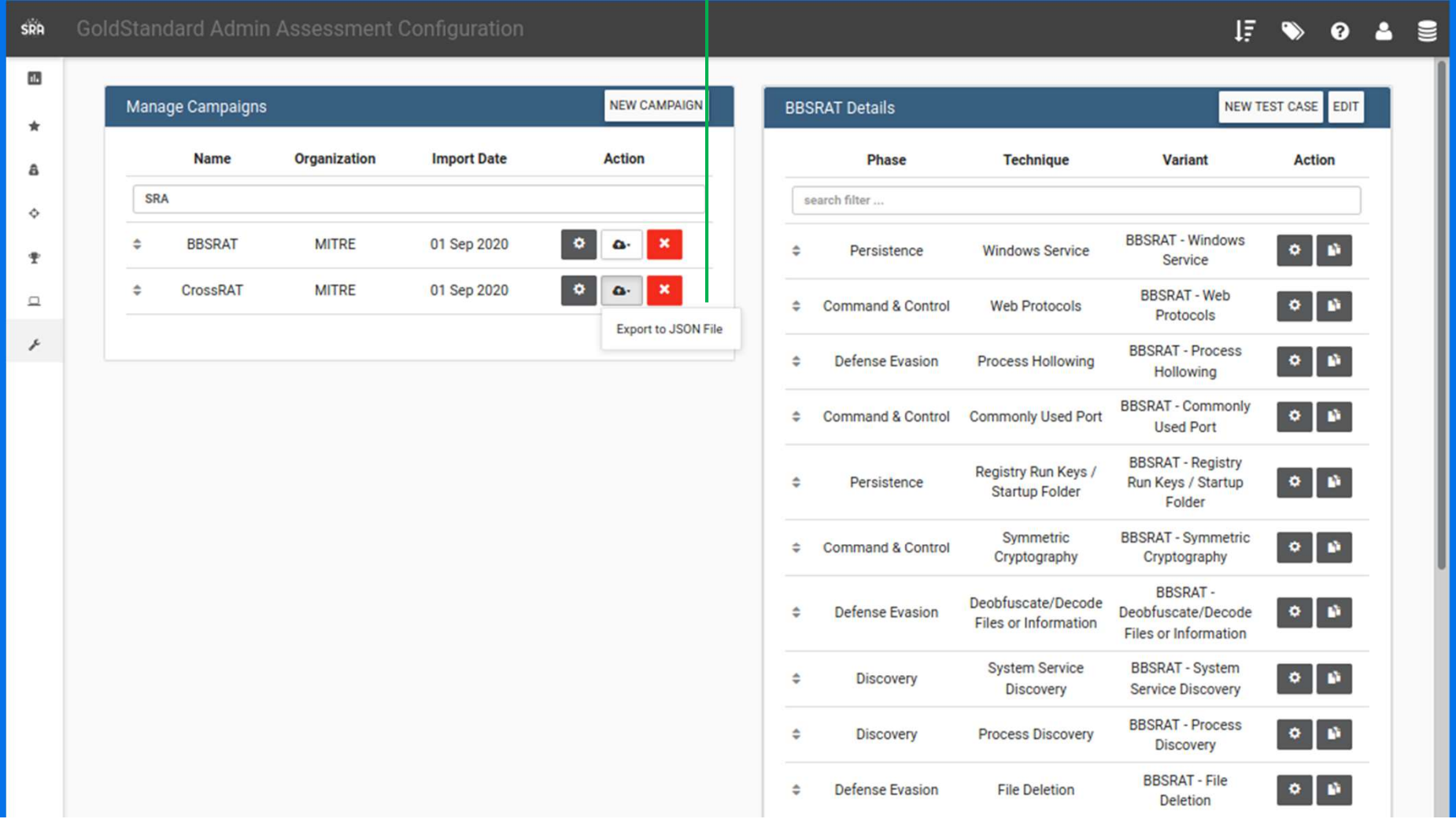


PUBLIC

COLLABORATE

ACCELERATE ANALYSIS WITH PEERS

Export full intrusion campaigns to share with peers

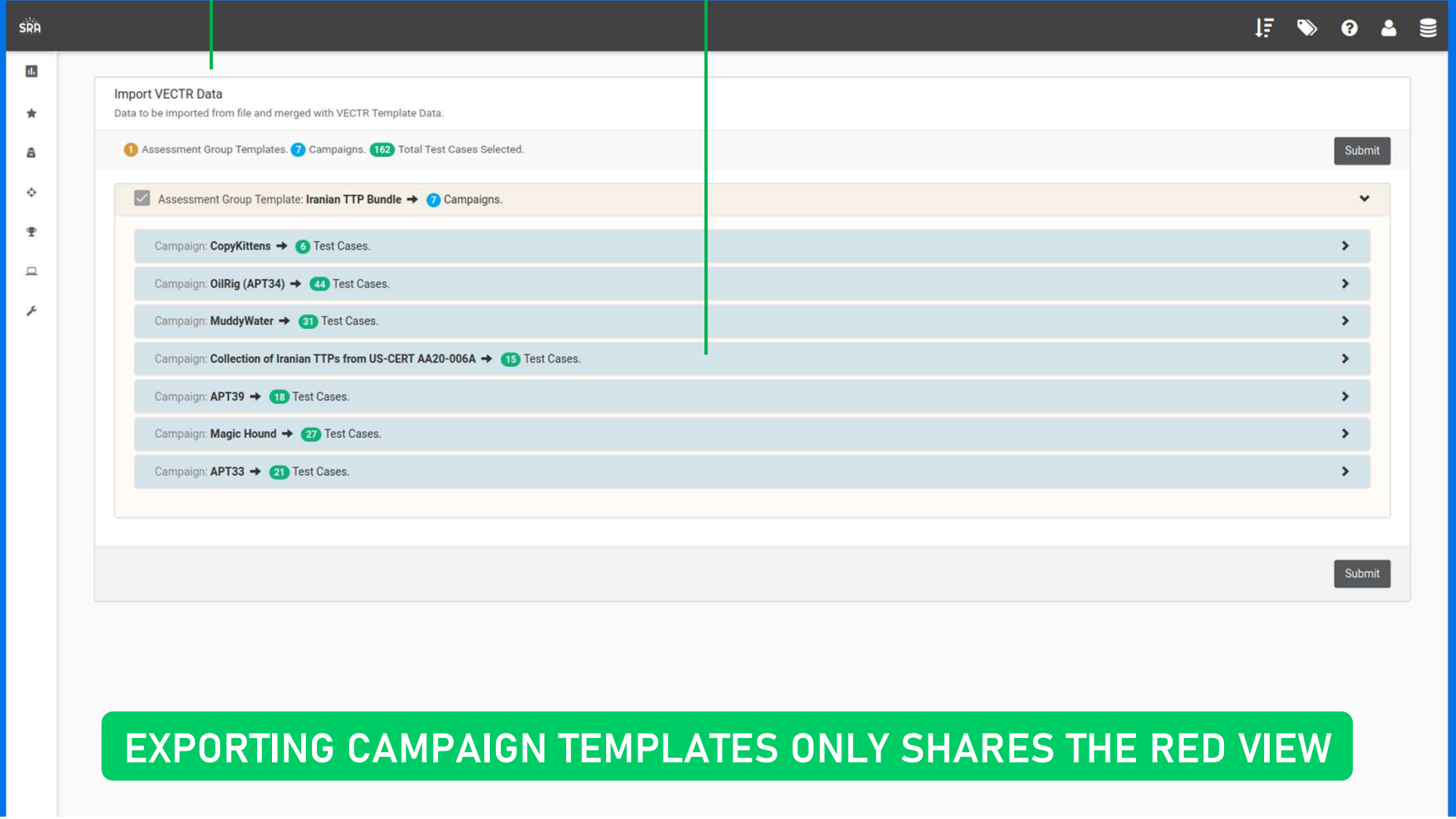


COLLABORATE

ACCELERATE ANALYSIS WITH PEERS

Supports importing directly from a STIX / TAXII server

Flexibility to import one, some, or all intrusion sets



EXPORTING CAMPAIGN TEMPLATES ONLY SHARES THE RED VIEW

PUBLIC

VECTR CONCEPTS

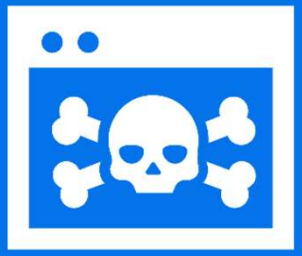
ADAPTING VECTR FOR ADVERSERIAL MODELLING

VECTR VISION

Database
For logical separation of assessments

Assessment
Typically after a period of time, such as Q1 2020

Campaign
Usually focussing around a specific TTP sprint



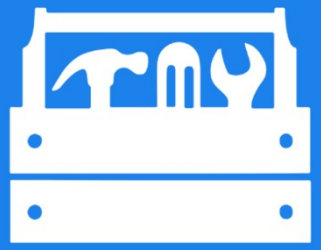
Test Case
A specific atomic test to be completed

OUR VISION

Team Use Case
One database per team within security

Threat Actor
To track specific threat actors of interest

Cyber Attack
Prominent cyber attack or tool used by the adversary



Specific Test
Specific way a tool was used by the adversary

PUBLIC

VECTR CONCEPTS

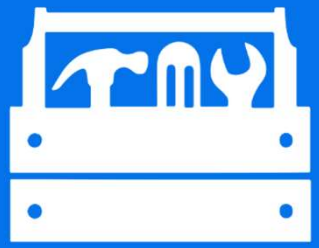
PREPARING FOR ADVERSARY EMULATION

THREAT- LED

Team Use Case
One database per team within security

Threat Actor
To track specific threat actors of interest

Cyber Attack
Prominent cyber attack or tool used by the adversary



Specific Test
Specific way a tool was used by the adversary

THREAT RESEARCH > LAZARUS > BANK OF BANGLADESH > TTP 1

FAR EASTERN INTERNATIONAL BANK — TTP 2

TROY OPERATION — TTP 3

DARKSEOUL OPERATION — TTP 4

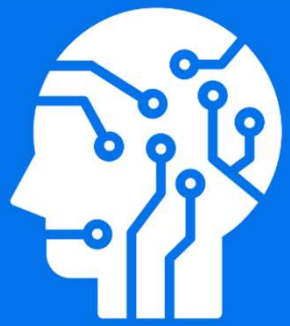
SONY PICTURES — ETC

Not sure which threat actors or events are relevant? Read Chapter 7 "*Threat Intelligence for Risk Analysis*" by Recorded Future (free):

go.recordedfuture.com/book

VECTR-FY EVERYTHING

VECTR HERE, VECTR THERE, VECTR EVERYWHERE!



Threat Intelligence

Threat Intelligence teams can use VECTR to collate and organise known truths about a threat actor and their TTPs

Internal Incidents

Incident Responders can log novel incidents such as Phishing campaigns into VECTR, and use its powerful reporting views

Formal Engagements

Formal engagements, such as Pen Tests, can be loaded and actioned within VECTR

AND MUCH, MUCH MORE!

DEMO

LESSONS LEARNT

PREPARING FOR SUCCESS

1 **Get Buy-In**
For best results, get support from your teams as early as possible

2 **Agree Responsibilities**
Define clearly the roles of each SME team, to help industrialise outcomes

3 **Create a Framework**
Develop your own framework detailing research standards

> The best preparation for tomorrow is doing your best today
>
> — H. Jackson Brown Jr

PUBLIC

FURTHER READING

AND HELPFUL RESOURCES

Purple Team Exercise Framework · SCYTHE
www.scythe.io/ptef ★

MITRE ATT&CK Defender — Fundamentals · Cybrary
www.cybrary.it/course/mitre-attack-defender-mad-attack-fundamentals

MITRE ATT&CK Defender — Cyber Threat Intelligence Certification · Cybrary
www.cybrary.it/course/mitre-attack-defender-mad-attack-for-cyber-threat-intelligence ★

MITRE ATT&CK — ATT&CK Evaluations · MITRE
attackevals.mitre-engenuity.org ★

TRAM · MITRE
github.com/center-for-threat-informed-defense/tram

Workbench · MITRE
ctid.mitre-engenuity.org/our-work/attack-workbench

CAPA · FireEye
github.com/mandiant/capa ★

PUBLIC

QUESTIONS?

HERE TO HELP

standard chartered

Thank You for Participating

Tweet me at **@snkhan**, or send a message via LinkedIn at linkedin.com/in/**sajidnawazkhan**.

Come Work for Us

www.sc.com/en/careers/jobseekers/

Getting Involved

SRA are currently developing a TTP Index for various industry sectors, including Finance. To get involved, and provide your input and expertise, please contact SRA at:

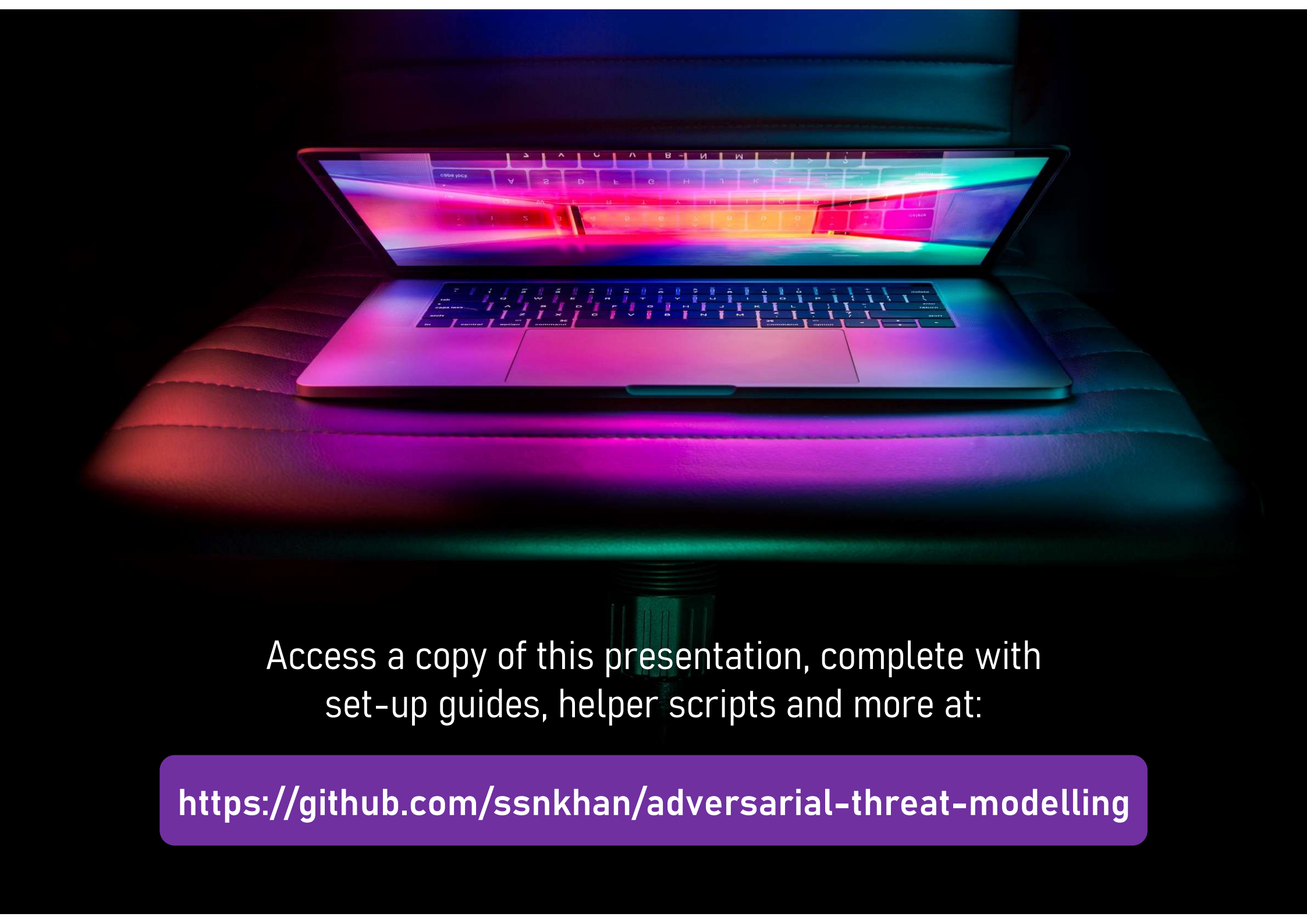
vectr@sra.io

PHOTOS FROM UNSPLASH

BREAK

After the break:
Hands-on workshop

HANDS-ON LAB



Access a copy of this presentation, complete with set-up guides, helper scripts and more at:

https://github.com/ssnkhan/adversarial-threat-modelling

INSTALLATION

PLEASE ACCEPT ALL DEFAULTS

TERMINAL

```
sudo mkdir -p /opt/vectr
cd /opt/vectr

sudo wget
https://github.com/SecurityRiskAdvisors/VECTR/releases/downl
oad/ce-8.0.5/sra-vectr-runtime-8.0.5-ce.zip -P /opt/vectr
sudo unzip sra-vectr-runtime-8.0.5-ce.zip

sudo nano .env                  // Can be left as they are
sudo nano /etc/hosts            // Add sravectr.internal
docker-compose up -d            // May take a few minutes
```

TIP

For demonstration purposes, please use default configuration options.
Installation can take some time, so please start the process now

LAUNCHING VECTR

HELPER SCRIPTS

TERMINAL

```
# Launch Vectr
cd /opt/vectr
sudo docker-compose up -d
sleep 30
firefox "https://sravectr.internal:8081/sra-purpletools-
webui/app/#"


# Shutdown Vectr
cd /opt/vectr
sudo docker-compose down
```

TIP

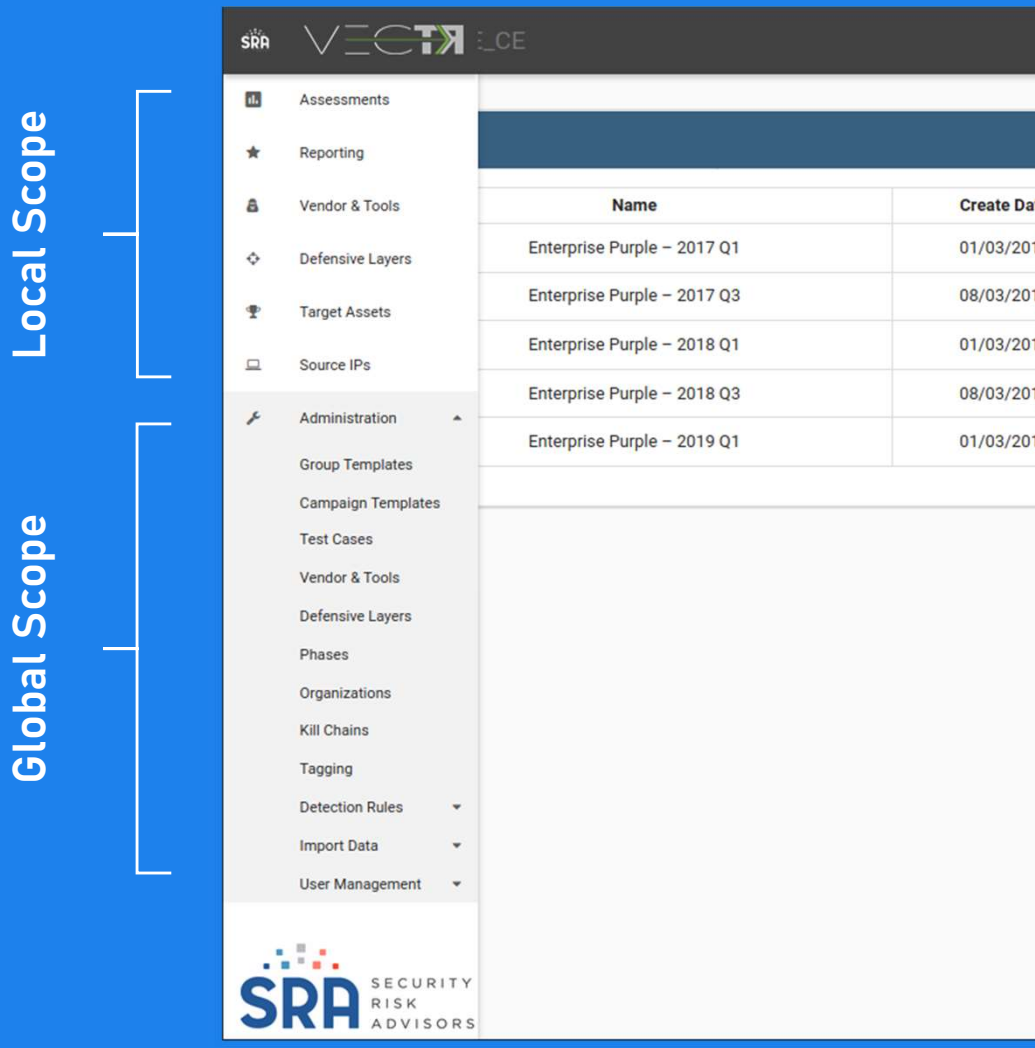
Save these as `start_vectr.sh` and `shutdown_vectr.sh` in your home folder to quickly launch and safely shutdown your VECTR instance. Remember to `chmod +x`

SET UP: UNDERSTANDING SCOPE

LOCAL VS GLOBAL SCOPE

Configuration of offensive and defensive tooling (Vendor & Tools) as well as specific controls (Defensive Layers) can be set either locally for the current database, or globally; where they become available across all databases.

- **Local Scope** – Use this when you do not wish to persist customisations (including Test Cases) across other databases (e.g., where each database might represent a specific client)
- **Global Scope** – Use this if you wish to make your changes available across all your databases. This is best if your VECTR instance will be used entirely by your organisation



SET UP: ORGANISATIONS

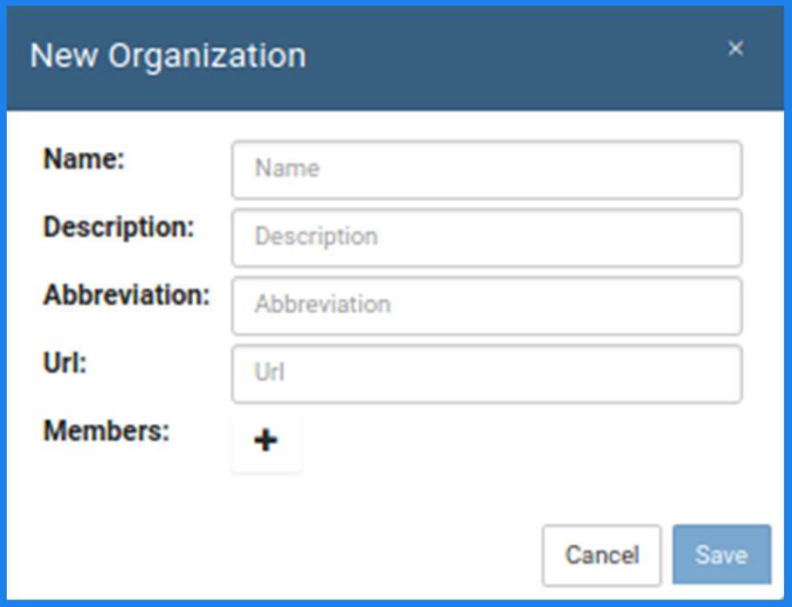
CONFIGURING VECTR

Organisations allow you to capture and attribute the source of research or analysis within VECTR. It is sensible to create a separate organisation for any key contributor, such as:

- Teams within your organisation (such as Threat Intelligence, your SOC or Red Teams)
- Specific Trust Groups
- Vendors, where analysis is made available in STIX / TAXII format

TIP If a business area has their own database, they should have their own organisation too

ADMINISTRATION > ORGANIZATIONS



SET UP: DATABASES

CONFIGURING VECTR

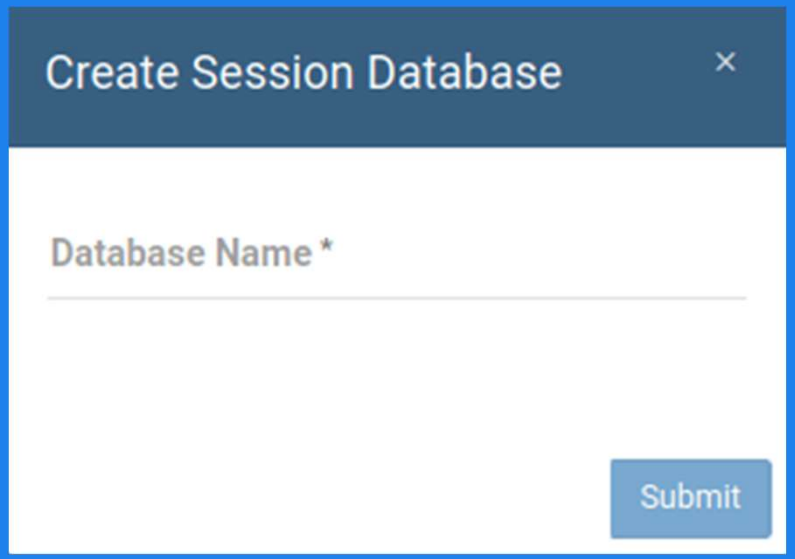
In VECTR, Session Databases are designed as a means of logically separating a collection of work or research.

For instance, you may wish to create individual databases for:

- Threat intelligence led research
- Internal security Incidents
- Formal Pen Test findings
- Red Team Wiki
- Trust Groups / Collaboration

TIP When considering a new database, think of the reporting implications

DB MENU > SELECT SESSION DATABASE



SET UP: PHASES

CONFIGURING VECTR

In VECTR, Phases are the term used to organise and configure specific frameworks that you may wish to use. Your chosen framework will then be accessible when capturing Test Cases, and for illustrating the Escalation Path. Good candidates include:

- Mitre ATT&CK
- Unified Kill Chain
- Lockheed Martin Kill Chain
- Your bespoke Kill Chain

TIP The order of Phases determines the way in which the Escalation Path is drawn

ADMINISTRATION > PHASES

Mitre ATT&CK

INITIAL ACCESS | EXECUTION | PERSISTENCE | PRIVILEDGE ESCALATION | DEFENSE EVASION | CREDENTIAL ACCESS | DISCOVERY | LATERAL MOVEMENT | COLLECTION | COMMAND AND CONTROL | EXFILTRATION | IMPACT

Lockheed Martin Kill Chain

RECONNAISANCE | WEAPONISATION | DELIVERY | EXPLOITATION | INSTALLATION | COMMAND AND CONTROL | ACTIONS ON OBJECTIVES

SET UP: TAGS

CONFIGURING VECTR

Tags are a powerful way of orchestrating actions within VECTR, and can serve as a helpful prompt to other teams within your organisation. For instance, you can use Tags to:

- Set the status of a piece of analysis
- Identify teams responsible for some output or analysis
- Set priorities for specific Test Cases
- Capture other internal metadata unique to your organisation or workflows

TIP Consider including Tags as part of your workflow standards documents

ASSESSMENTS > MENU > TAGGING

CAMPAIGN > MENU > TAGGING

TEST CASES > CONFIGURE TAGS

Suggestions

QUEUED FOR ANALYSIS | ANALYSING | COMPLETE | ARCHIVED

QUEUED FOR ANALYSIS | ANALYSING | ENHANCING | CONTROL REVIEW | VALIDATING | COMPLETE

CTI | SIEM TEAM | FORENSICS | MALWARE | ARCHITECTURE | NETWORKS | THREAT HUNTING

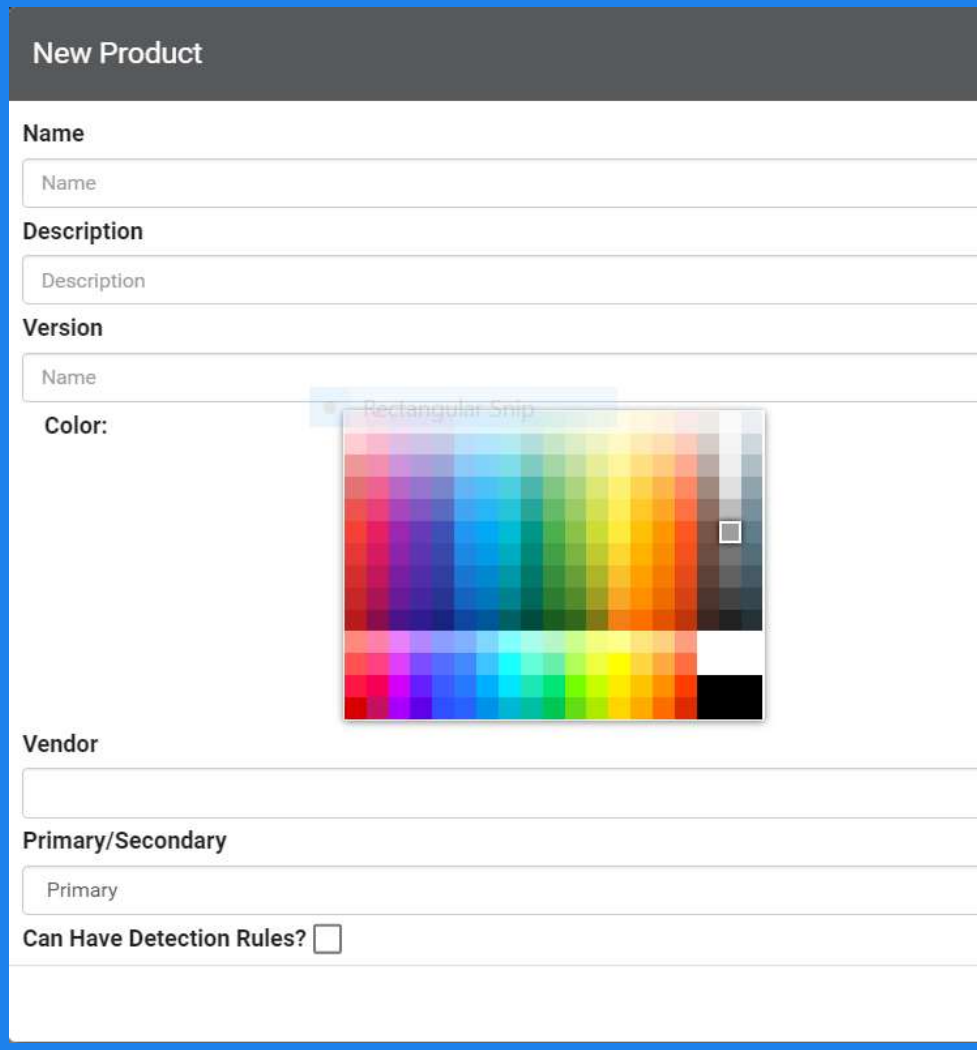
SET UP: VENDORS & TOOLS

CONFIGURING VECTR

A lot of the value in using VECTR is being able to understand which specific controls are responsible for detecting and blocking specific techniques. Setting these correctly ensures your controls receive the appropriate kudos.

- **Defensive Layers** – These should be high-level, vendor agnostic controls (e.g., Web Proxy)
- **Vendors & Tools** – These should represent the specific controls in your environment (e.g., FireEye EX)

TIP Remember to set your Vendor tool appropriately under “Can Have Detection Rules”



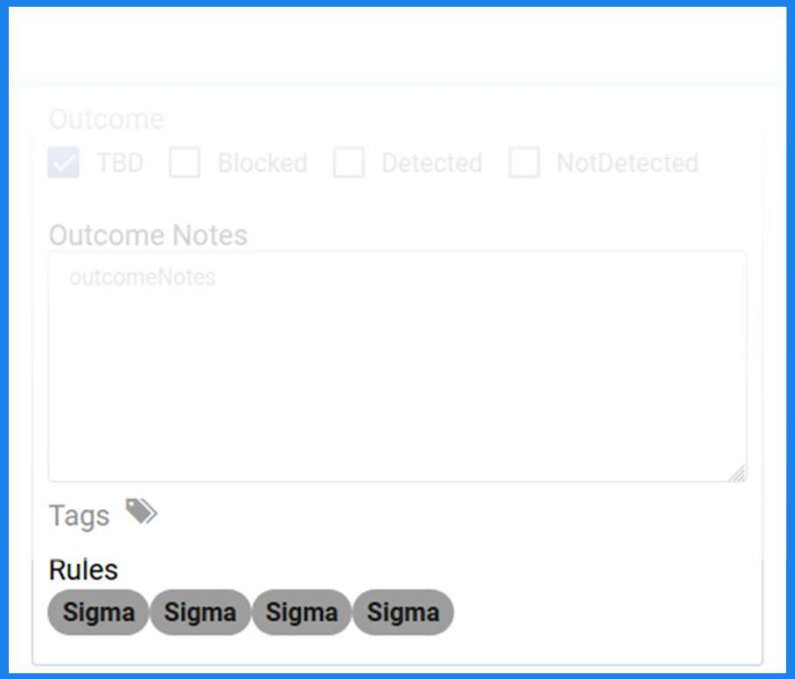
SET UP: DETECTION RULES

CONFIGURING VECTR

Detection rules allow signatures to be mapped to specific TTP Test Cases; to help continue developing a full view of the TTPs effect in your environment, and can support Threat Hunting initiatives.

- **Data Sources** – Reflect the various telemetry which underpins your ability to develop detections
- **Generic Sources** – Vendor agnostic, such as JA3, Sigma or YARA
- **Generic Rules** – The actual rules
- **Analysis Rules** – Vendor specific rules, such as Splunk, Tanium Signals
- **Behaviours** – Behaviours are the mechanism which link your rules to their corresponding TTPs

ADMINISTRATION > DETECTION RULES



The following video demonstrates the process: youtu.be/Xt2JsbNnUCA

TIPS & TRICKS

GET THE MOST OUT OF VECTR

Actor Naming

- Hidden Cobra, Lazarus, Bluenoroff, Labyrinth Chollima or …? Agree on a common naming taxonomy:

  APT38 · Lazarus · Hidden Cobra

Campaign Naming

- Consider prefixing all campaigns with date serialisation to quickly sort chronologically: **YYYYMMDD Campaign**:

  20160204 Bank of Bangladesh

Abort FYI Use Cases

- To prevent polluting your management information with "FYI" only Test Cases, abort them in the Red Team view:

  Assessment ⮑ Campaign ⮑ Test Case ⮑ ⏏

Key-Value Pairs

- In both Red and Blue team views, establish standardised key-value pairs to capture data:

  `md5:value sha1:value leadTester:staffID`

EXERCISES: IMPORT

PRACTICAL EXAMPLES TO GET YOU UP AND RUNNING

1

Mitre CTI Bundle

github.com/mitre/cti/blob/master/enterprise-attack/enterprise-attack.json

2

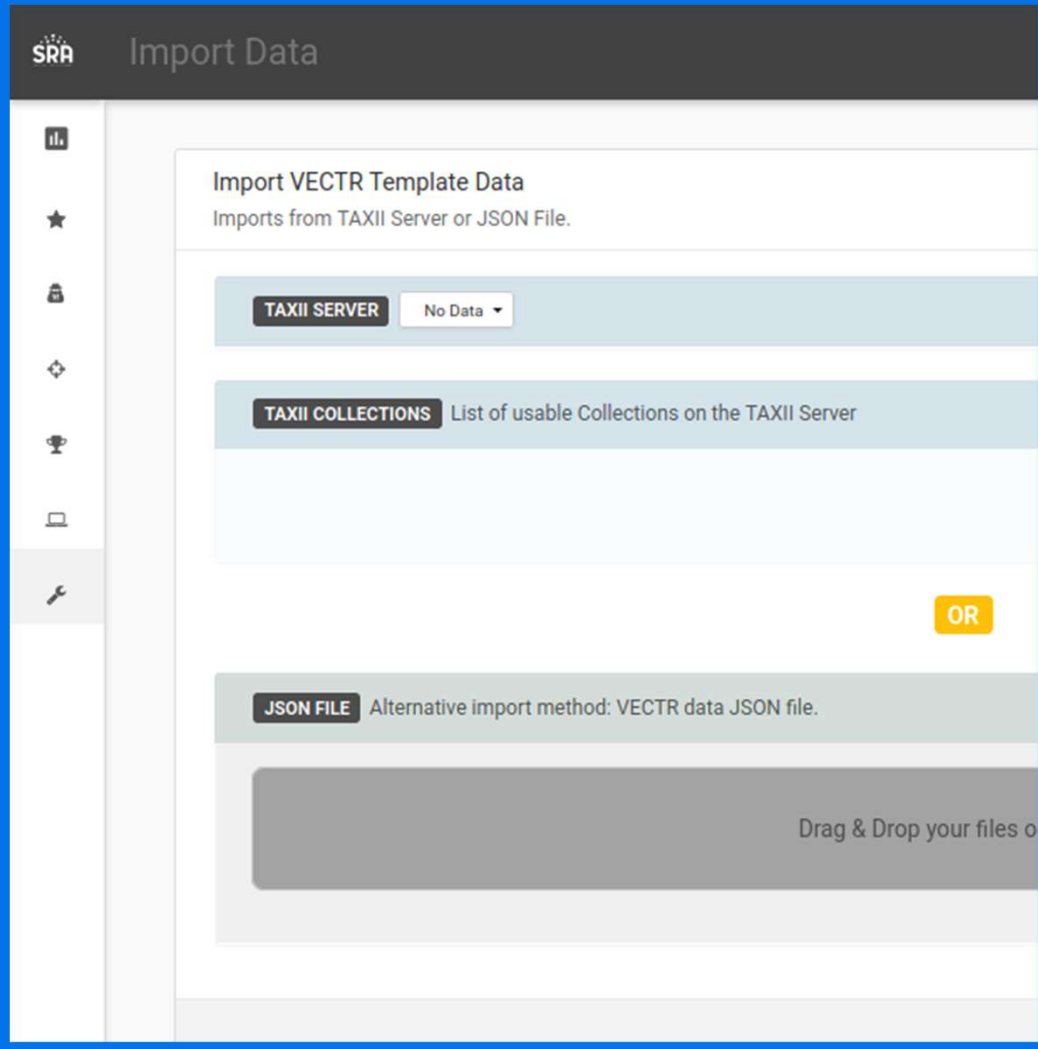
Atomic Red Team

github.com/redcanaryco/atomic-red-team/blob/master/atomics/Indexes/index.yaml

3

SRA Iran Analysis

github.com/SecurityRiskAdvisors/VECTR/tree/master/cti



EXERCISES: THREAT LIBRARY

PRACTICAL EXAMPLES TO GET YOU UP AND RUNNING

The rest of the session will be used to complete a few exercises to help develop your confidence and familiarity with VECTR — **pan-unit42.github.io/playbook_viewer/**

here for good™