3RD ANNUAL NATIONAL

CYBERSECURITY SUMMIT

Leveraging MITRE ATT&CK® for Cyber Operations and Risk Management

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Introductions

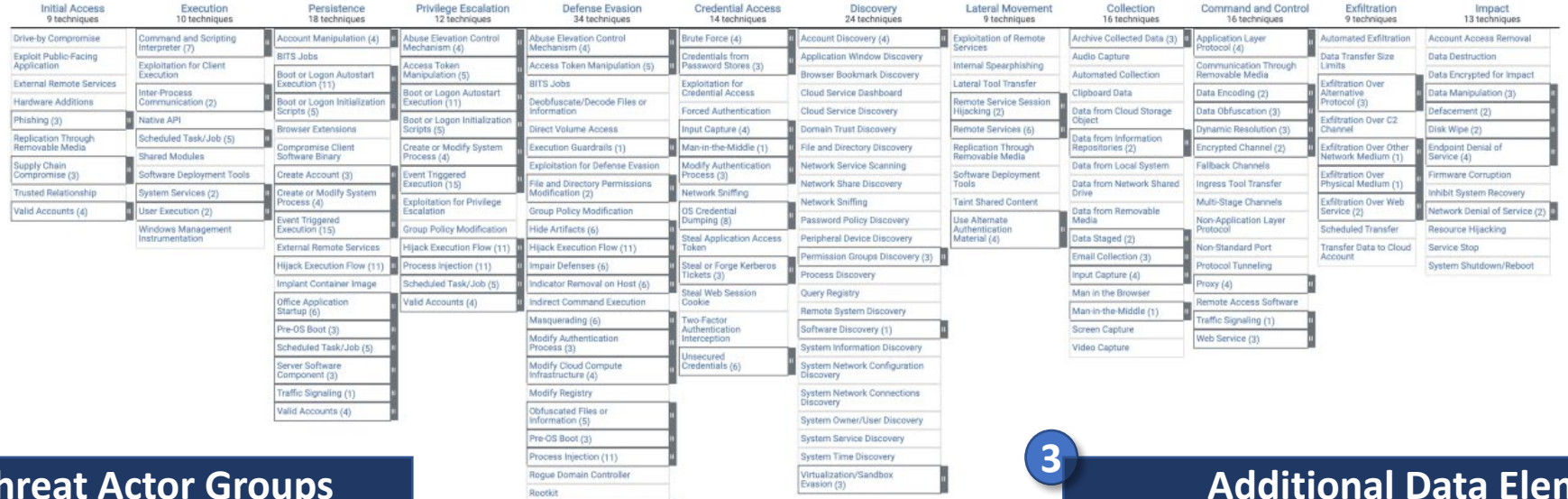
- Casey Kahsen
  - Section chief of network forensics for CISA hunt and incident response team
  - Previously served as incident response engagement lead and technical lead for host forensics
  - Extensive work in operationalizing ATT&CK for hunt and incident response operations
- Adam Isles
  - Principal, Chertoff Group, Cyber Defense, Risk Management
  - Led build-out of cyber defense model utilizing ATT&CK for organizations in financial services, retail and manufacturing sectors
  - Prior roles at DHS, DOJ

What is the Security Objective(s)?

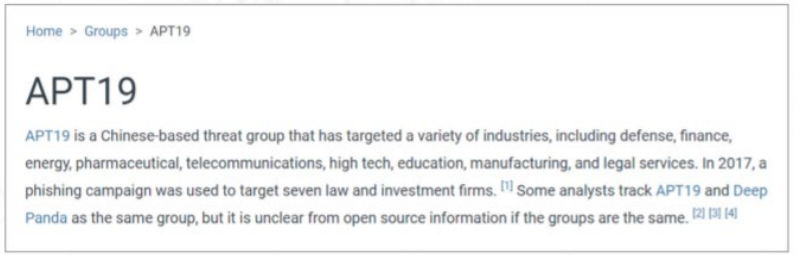
- Considerations:
  - Business model
  - Adversary interest
  - How could an adversary compromise me?
  - Security approach and security investments
- Measuring effectiveness:
  - Do our countermeasures actually work?
  - In the event of compromise, are we prepared to respond?

Enter…ATT&CK

1 "Periodic Table" of Tactics & Techniques
(prerequisite for mapping to defensive countermeasures)



2 Library of Threat Actor Groups
(enables mapping to business)



Source: MITRE Corporation

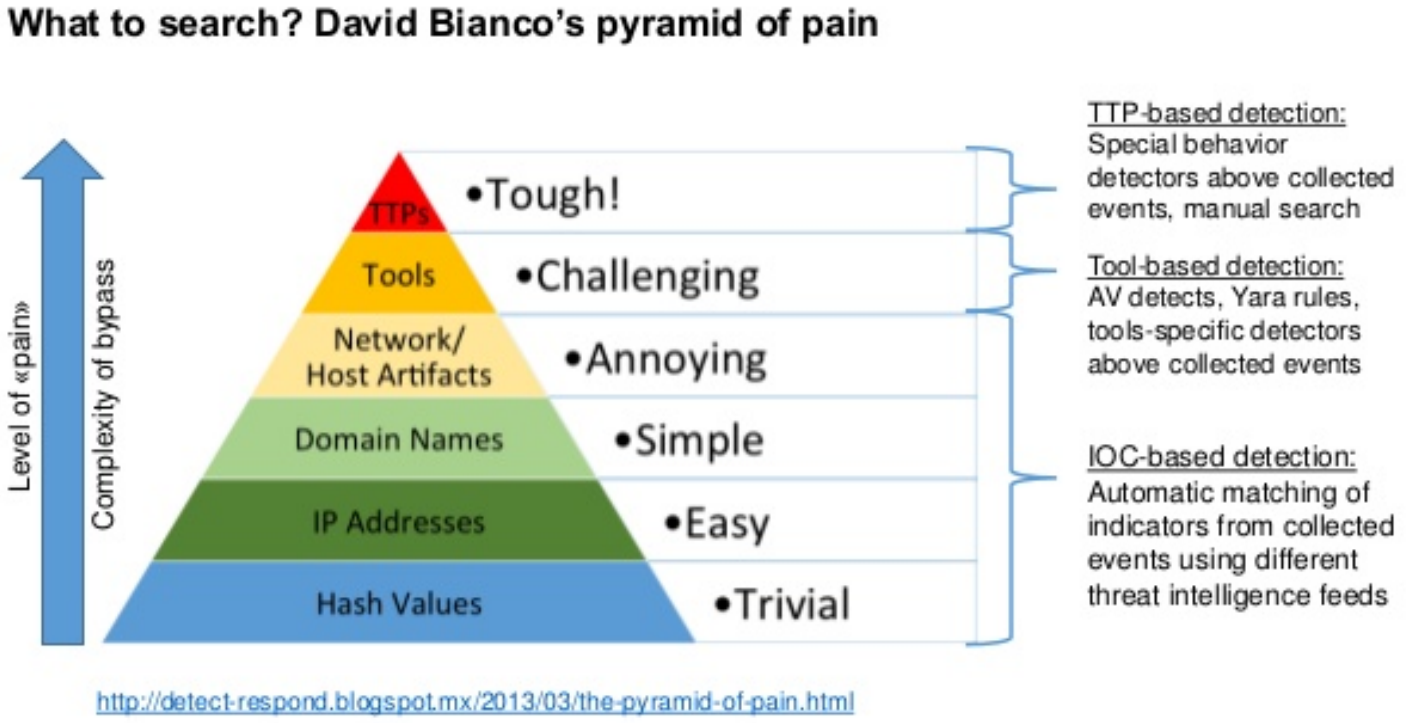
3 Additional Data Elements
(enables mapping to defensive countermeasures)

- Data sources
- Mitigations
- Filters (Windows, Linux, cloud, ICS, etc.)

https://attack.mitre.org/

Pyramid of Pain

- ATT&CK Reflects tactics and techniques observed in the real world
- Why is this important?
  - Industry historically focused on methodology that is low on the pyramid
  - Forces adversary to change tools and behavior to avoid detection
    - Lowers their ROI
  - For the Defender:
    - Behavior focused detection > artifact focused detection
    - ATT&CK based hunting



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Evolution of ATT&CK at CISA

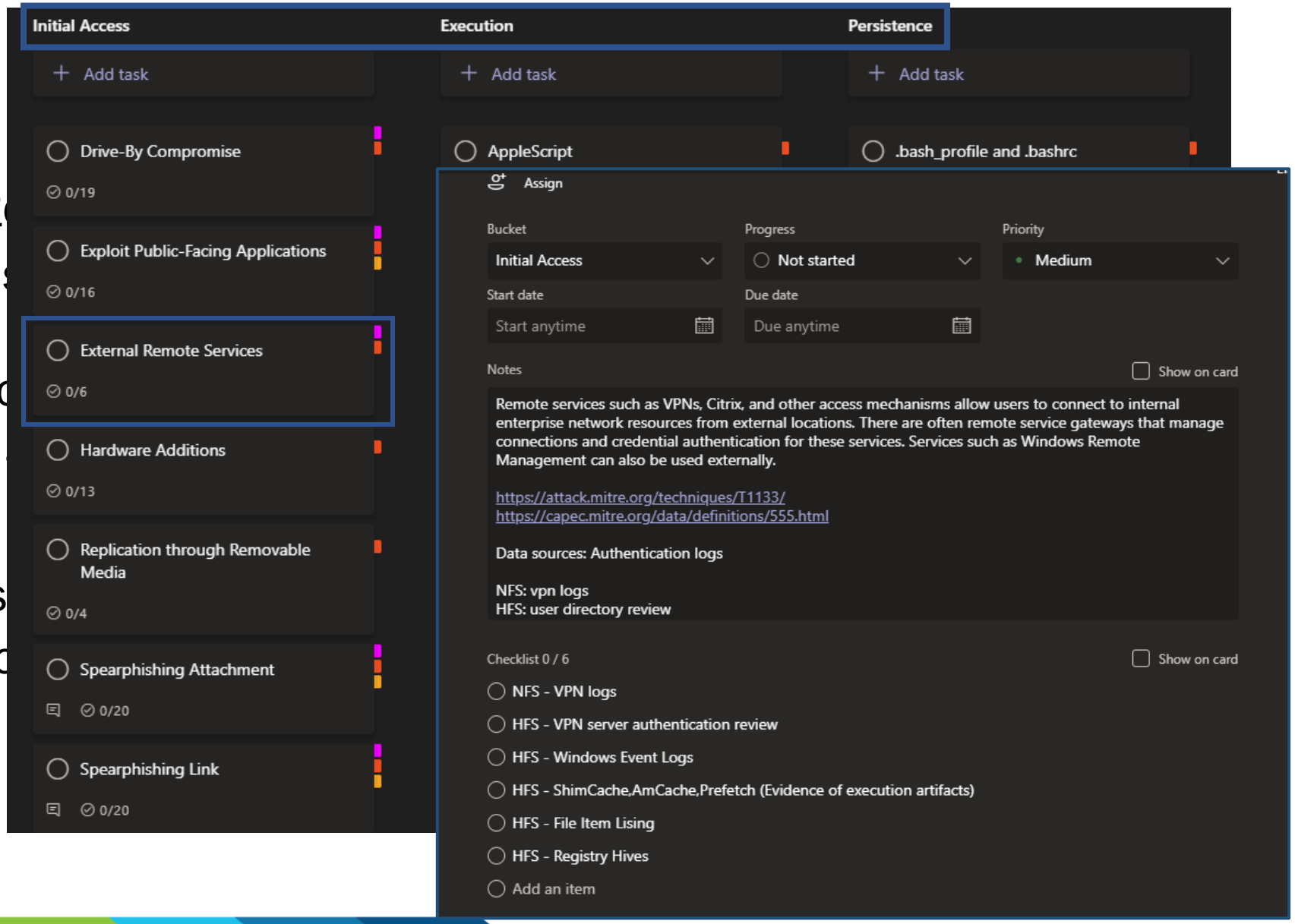
- 2017
  - Large scale campaign tracked via behavioral markers
- 2018
  - Early adoptions of the *Operations Management System* (OMS)
- 2019
  - Began working with MITRE to:
    - Research playbooks
    - Common techniques hunted for across IR industry
    - Data sources required to perform ATT&CK based hunting (tooling to accommodate)
- 2020
  - Evolution of the OMS to leverage ATT&CK
  - ATT&CK integration into custom Splunk App
  - ATT&CK integration into engagement report (customer deliverable)

Operations Management System (OMS)

- Centralized command center location for our deployment teams:
  - Team management and tasking (Planner)
  - Collaboration and document sharing (Teams)
  - Engagement notes and documentation (OneNote)
  - Engagement document management (SharePoint)
- Goals:
  - Significant reduction of **time to effective analysis** (automation & templates)
  - Compounded effect results in reduction of
    - **Time to effective detection**
    - **Time to effective defense**
    - **Time to effective reporting**

OMS cont.

- Pre-built templat
  - Standardized ta
    service)
  - All teams functi
- Allows our leads
  end)
  - Designate tasks
  - Track progress o



OMS cont.

- Analytical tasks organized and use ATT&CK methodology
  - Characterizes phases of threat actor activity
  - Industry standard lexicon/terminology
- Baseline data for understanding the analytical task
  - Junior analysts
- Adversary tactics based hunting
  - Drives our teams to look for relevant data that is **high on the pyramid**
- OMS 2.0
  - Leverage decision trees based on identified techniques (if X is detected, then search for Y)

ATT&CK in CIS

(1) Institute Multi-Factor Authentication for Access to M365

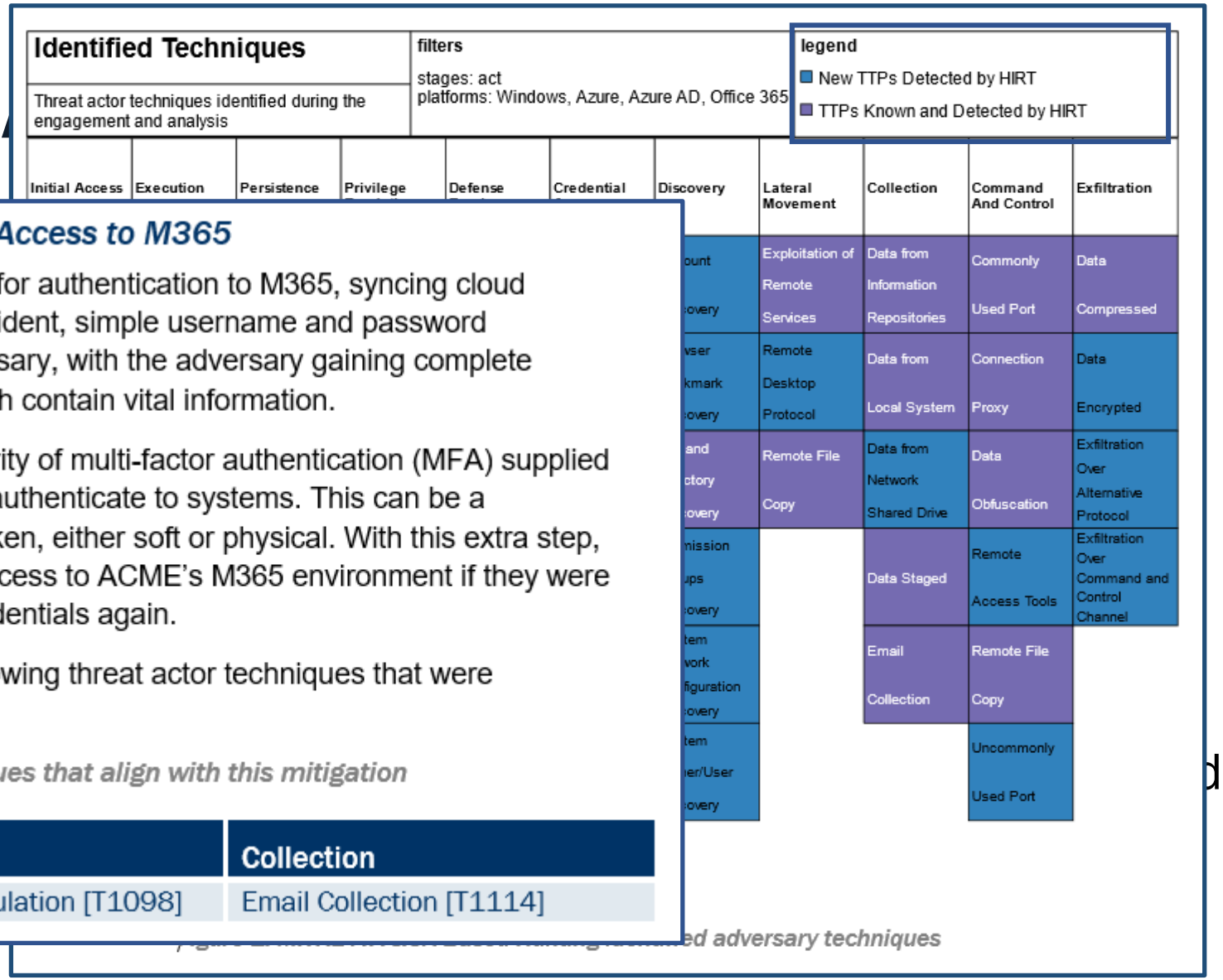
ACME currently utilizes username and password for authentication to M365, syncing cloud credentials to Active Directory. As seen in this incident, simple username and password authentication is easily compromised by an adversary, with the adversary gaining complete access to the compromised account's email, which contain vital information.

CISA recommends that ACME leverage the security of multi-factor authentication (MFA) supplied within M365. MFA utilizes two or more factors to authenticate to systems. This can be a combination of username and password and a token, either soft or physical. With this extra step, an adversary would be prevented from gaining access to ACME's M365 environment if they were able to compromise username and password credentials again.

Summary: MFA ([M1032]) helps mitigate the following threat actor techniques that were observed in use in this incident:

Table 3: Observed ATT&CK techniques that align with this mitigation

Initial Access	Persistence	Collection
Valid Accounts [T1078]	Account Manipulation [T1098]	Email Collection [T1114]



ed adversary techniques

ATT&CK: Tying Mission/Business Model to Threat and Tying Threat Actors to TTPs

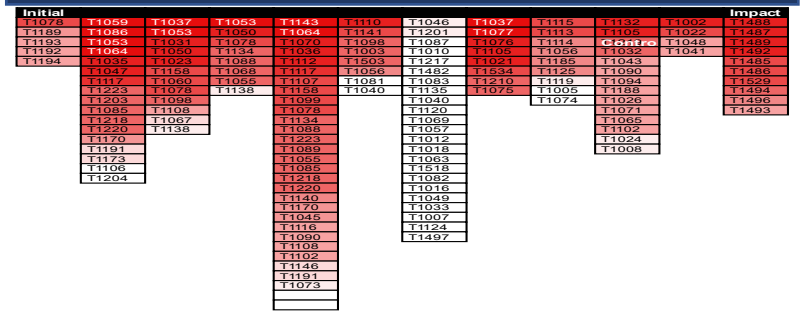
1 ID key business attributes

- Core manufacturing processes
- Sensitive IP
- Personal data
- Volume of financial transactions

2 Research to identify threat actors targeting those business attributes

- Research and analysis of Open-Source, Commercial Threat Intelligence
  - MITRE ATT&CK, etc.
- Alerts from CISA, other public sector sources
- Engage w/ defenders to confirm relevance

3 Map threat actors to TTPs

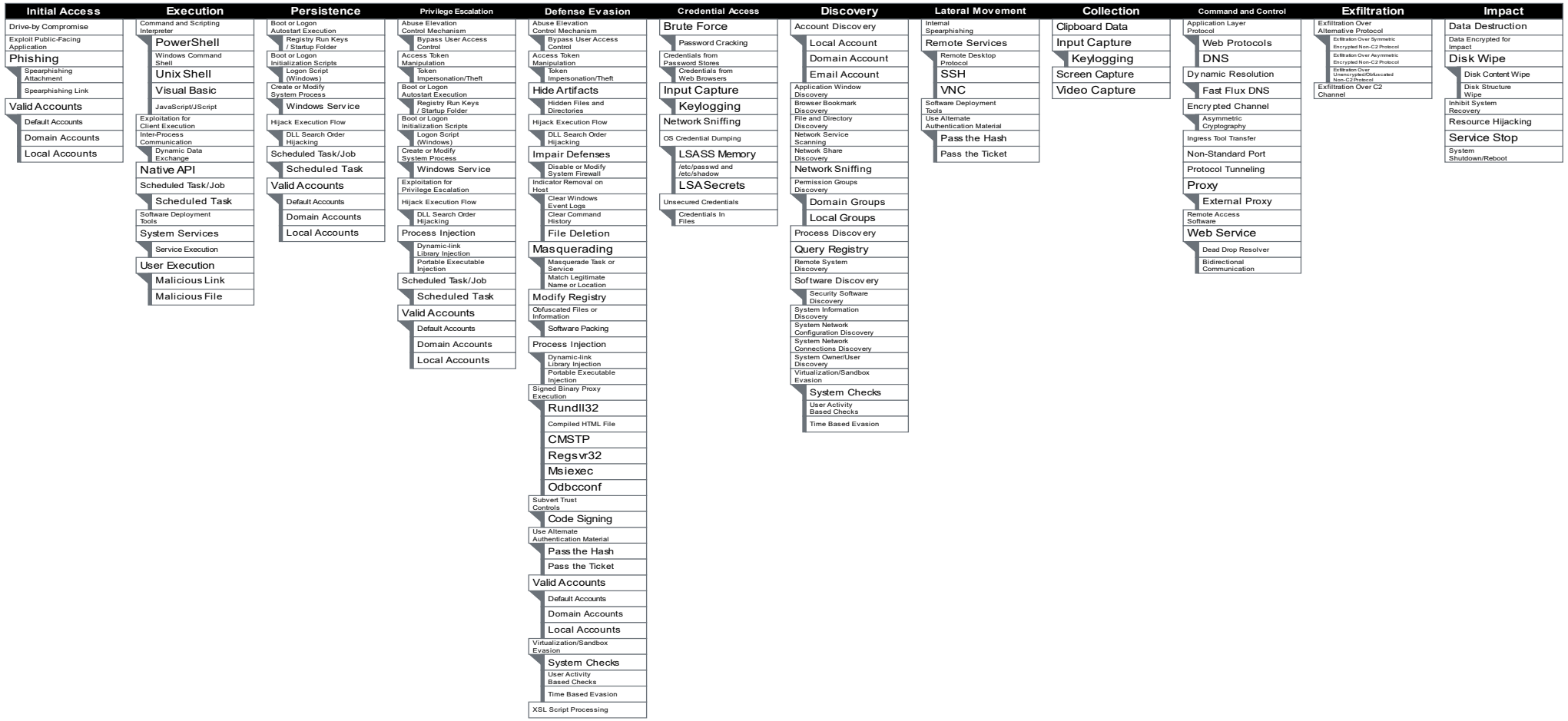


- TTPs are risk-rated and sorted based on priority
- Supplement with ubiquitous TTPs
  - TTPs used by all groups regardless of sightings

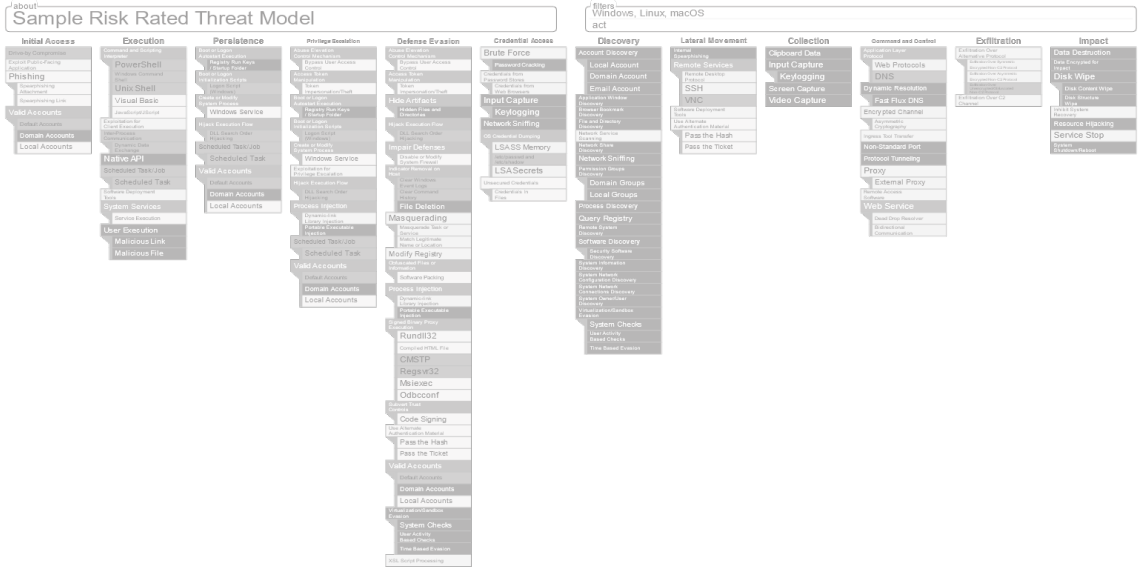
ATT&CK: Sample Threat Model

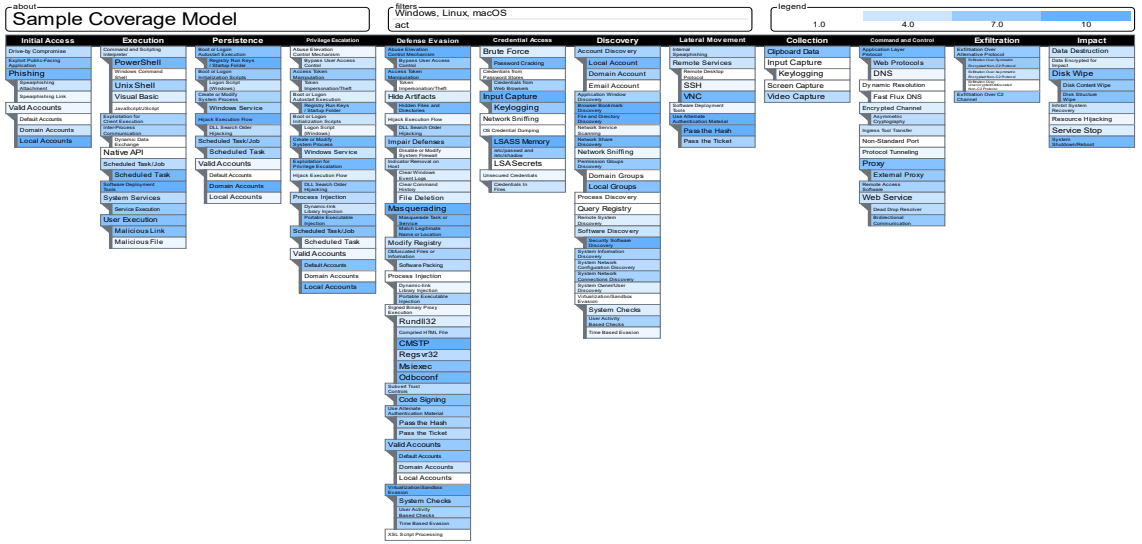
about
Sample Threat Model

filters
Windows, Linux, macOS
act



ATT&CK: Prioritizing Investments





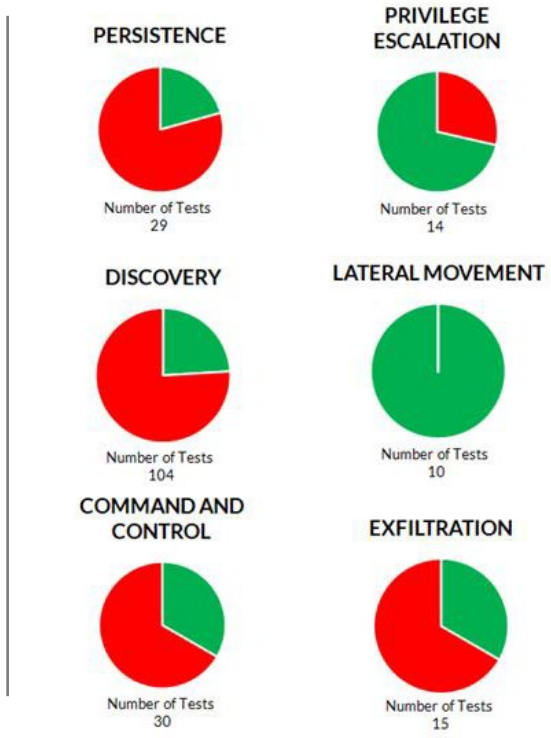
ATT&CK: Measuring Performance

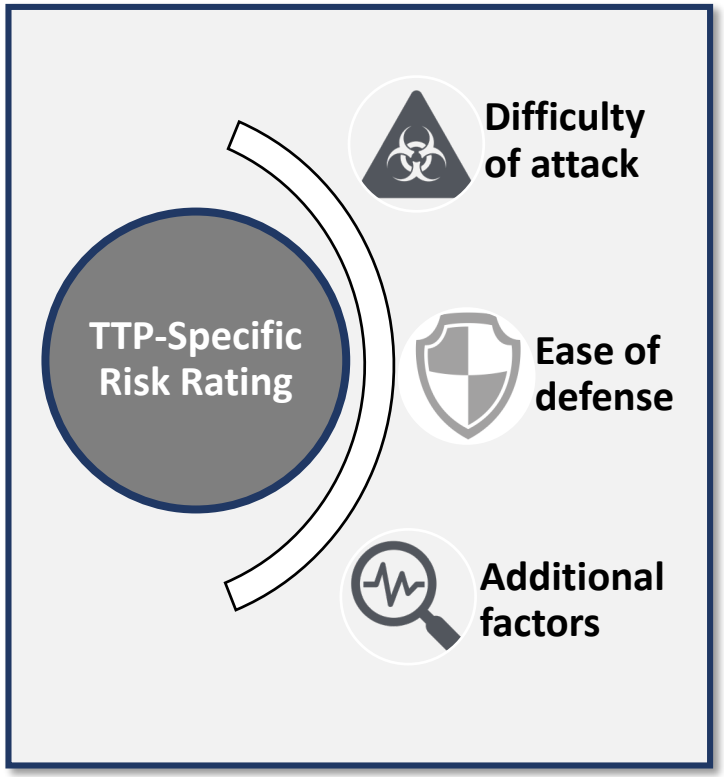
Run Testing;
Obtain Pass/Fail test results

Apply TTP-specific Risk Rating

Generate
Performance Rating

Risk Diagnostic Example





Trending/
benchmarking context

ATT&CK & Risk: Summary

ATT&CK TTP ID numbering in CISA alerts helps identify repeat TTPs (and thereby prioritize countermeasures)

When CISA alerts identify targeted asset types, this helps identify sample sets for testing

INHERENT RISK	THREAT MODEL	THREAT RATING	MAPPING	SAMPLE SET	MEASURE	BUSINESS CASE
Isolate a core set of risk-informing factors and generate inherent risk profiles across business units	Identify likely threat actors based on client's industry sector; generate set of TTPs likely to be applied against organization	Risk-rate TTPs based on factors such as ease of attack, difficulty of defense, impact, frequency	Map organization's defensive countermeasures to likely TTPs	Identify sample set of assets for initial diagnostic	Measure overall effectiveness in defending against sample TTP set	Develop business case justification for investments based on risk reduction potential

CISA alerts help map threat actors and TTPs to industry sectors

ATT&CK Mitigation ID numbering in CISA alerts help map TTPs to mitigations


CYBERSECURITY & INFRASTRUCTURE
CISA
SECURITY AGENCY

How’d I do?

- Survey Monkey Link

- Mobile Link
  - Text Survey to XXX-XXX