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THREAT INTELLIGENCE

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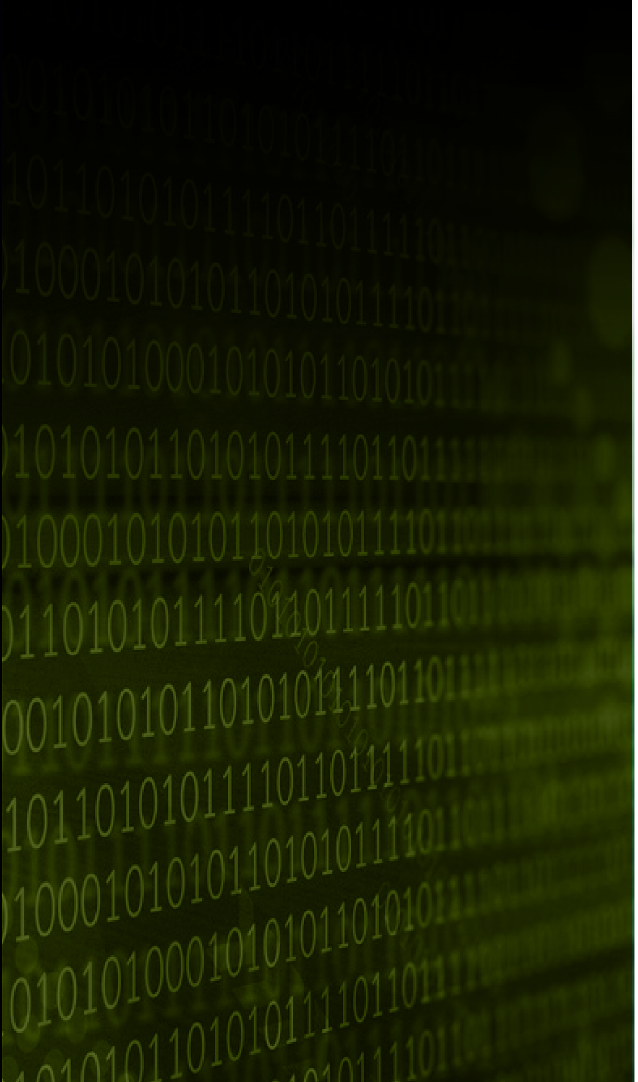

Introduction

To improve detection, response, and resolution of relevant threats to their business, security leaders and their teams are turning to the promise of intelligence-driven security. An intelligence-driven approach to security is different than other methods because it seeks to provide defenders with key data and capabilities exactly when they are needed, to maximize resource effectiveness and minimize damage incurred.

One of the key challenges with this new approach is that the term "threat intelligence" has become heavily diluted and attached to a very diverse array of products, services and capabilities which aren't easily adopted across the various enterprise security use cases. This paper will help enterprise security leaders understand exactly what threat intelligence is, and how their enterprises can leverage key capabilities to more effectively defend their organizations.

Meeting Business Needs

Security organizations need to rapidly modernize information, approaches, and platforms. Those security organizations still relying on legacy technologies and approaches will increasingly find that they do not have the tools in place to defend against current threats.

Modern security organizations require more complete and timely information about direct threats to their business – both potential and existing. High fidelity information including known bad binaries, IP addresses and other key pieces of data assist automated tools and human analysts in making rapid security decisions with greater accuracy. A comprehensive approach increases efficiency of detection and response, while minimizing negative business impact.

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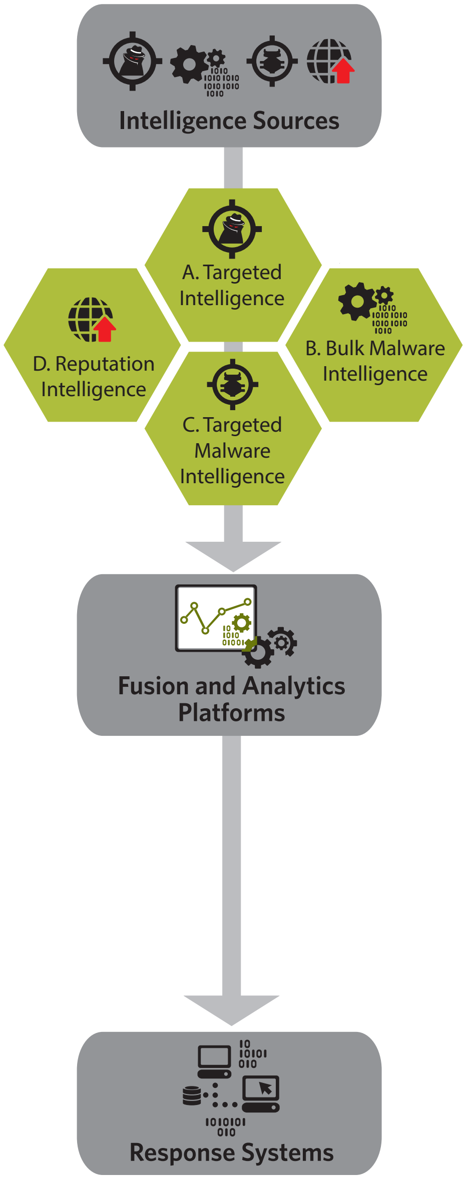
Threat Intelligence Defined

While threat intelligence has been defined in many different ways, Accuvant defines **threat intelligence** for the enterprise as:

Threat•Intelligence *n.* - 1. An ecosystem of contextually relevant and evidence-based knowledge – integrated into platforms and tools – to quickly and accurately address dangers to individuals, organizations, or assets in a standardized, consumable format.

Components of Threat Intelligence Marketplace


Intelligence Sources
A. Targeted Intelligence
B. Bulk Malware Intelligence
C. Targeted Malware Intelligence
D. Reputation Intelligence
Fusion and Analytics Platforms
Response Systems

The threat intelligence solution market is categorized into three key sub-groups:

1. **Intelligence Sources –** organizations, products, or persons that produce either raw data point, or refined data can be classified as threat intelligence sources. These organizations have operational capability in one or more of the following areas - identify, classify, validate, refine and distribute threat raw data. This group further breaks down into the following specialized sub-groups:
   a. <u>Targeted intelligence</u> – Focus on infiltration, aggregation, collection and analysis of active intelligence on actors (individuals, activists, state-sponsored, etc.) and their tactics, techniques and procedures (TTPs) using open-source intelligence (OSINT) or closed-sourced methods. This includes (but is not limited to) attacker tools, command and control (C2) infrastructure, specific vulnerabilities exploited, methodologies of attack, etc. Additionally, targeted intelligence may focus on a specific market vertical, or individual entity (in the case of a brand) to provide actionable intelligence.
   b. <u>Bulk malware intelligence</u> –Intelligence from analysis of potentially massive quantities of malware/malicious software via sandboxes or other automated methods falls into the category of bulk malware analysis. Common methods for collection and analysis are distributed code sample ingestion platforms (such as VirusTotal), customer on premise or remote sandboxes/services, or manual collection/analysis. The goal is to produce high fidelity intelligence on bulk binaries and attach varying levels of attributes to better track/diffuse the malware.
   c. <u>Targeted malware intelligence</u> – Intelligence gained from analysis of incident or response-specific code samples falls into the category of targeted malware intelligence. A common method of analysis is reverse engineering a binary as part of a forensic investigation into an incident. Targeted malware intelligence produces data points for integration into TTPs, indicators of compromise (IoCs), and specific information dealing with campaigns, threat actors, etc.
   d. <u>Reputation intelligence</u> –Identify "known bad" internet protocol (IP) addresses, uniform resource locators (URLs), domain name system (DNS) entries focusing on fidelity, low false-positive rates, and threat severity. This feed type includes objects such as known command and control (C2) servers.

Effective exchange of threat intelligence information must be done in a structured format. To address this need, a number of different types of data formats specialized for different purposes have emerged. These include several standards from Mitre (www.mitre.org) - CybOX[1], STIX[2], TAXII[3], MAEC[4] and other acknowledged standards such as OpenIOC[5] as a schema framework to share indicators of compromise, and CIF[6] as a client/server system for sharing threat intelligence data.

2. Fusion and Analytics Platforms – Fusion platforms provide a framework for ingestion of raw data feeds, aggregation and analysis, integration into response tools, facilitation of work streams and information sharing internally and outside the organization. Analytics platforms can be a standalone product or an integrated feature, but are defined as tools used to enrich data points for the purpose of investigation.

3. Response Systems – Ecosystems of tools and systems that facilitate actions (manual or automated) in response to intelligence data. These range from network and system-based platforms to policy engines and manual response tools that take in refined or raw intelligence and take action to mitigate or minimize the threat.

Operationalizing Threat Intelligence

Fundamentals

Any organization can take advantage of threat intelligence capabilities. The results depend on varying degrees of planning, pre-requisites and operational maturity.

The less mature a security organization is the more heavy the reliance on vendor-supplied tools and decision-making based on threat data. For example, a security organization may simply leverage an IP reputation feed into a next-generation firewall (NGFW) which would provide automated blocking based on IP address reputation to decrease the amount of triggered alerts. The net effect is one of decreasing the amount of noise analysts must review, and potentially increasing the efficiency of the response process.

More mature organizations that adopt an intelligence-oriented security program rely less on pre-canned response and increase their level of direct involvement. These organizations develop business-sensitive methodologies, capabilities and threat data drawing on internal context fused with external content to determine appropriate response. It is not uncommon for security organizations of advanced maturity to begin contributing indicators of compromise (IoCs) and threat indicators to their sharing communities such as the various Information Sharing and Analysis Centers (ISACs).

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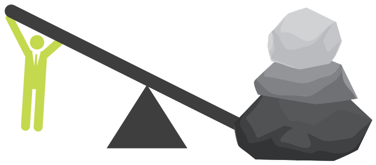
Leveraging Threat Intelligence

To meaningfully consume and act on threat intelligence beyond the basics of automation, the enterprise security organization should possess at least these three key capabilities:

1. Threat and Vulnerability Management Program – One of the foundations of an enterprise security strategy is a threat and vulnerability management program (TVM). A TVM program is critical in part due to the identification and classification of critical assets, which helps the security team focus defense on assets critical and important to the organization. Threat intelligence, as a maturing capability, is a logical extension of a mature TVM program that is built upon the knowledge of internal threats, vulnerabilities and risk classifications. Without a strong internal TVM program, risks identified by the threat intelligence program are unlikely to receive the proper prioritization to be addressed.



Leveraging Threat Intelligence

1. Threat and Vulnerability Management

2. Change, Configuration, Asset Management

3. Cross-Silo Workstreams and Response

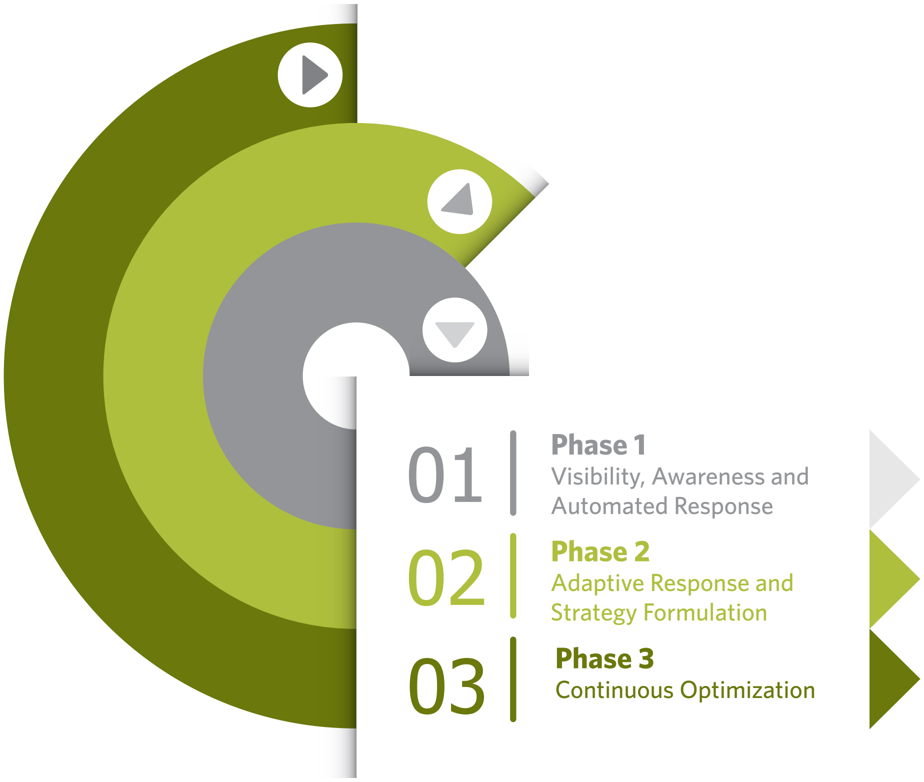
2. Change, Configuration, Asset Management – In order to effectively utilize threat intelligence data, the enterprise security organization must be able to tell what any particular asset is, what changes have been allowed or made to it, and its proper configuration. Without this base capability, the enterprise security organization will spend more time tracking down asset owners and investigating objects rather than actively fighting threats. As a result, an attempt to leverage threat intelligence will simply become a drain on time and resources.

3. Cross-Silo Workstreams and Response – To successfully utilize threat intelligence, organizations must have visibility and be able to respond effectively across functional IT units within an enterprise. Threat intelligence often requires that the security organization collects, analyzes and communicates threat information outside of the security realm in order to receive cooperative support from functions such as risk and network operations. These functions generally do not fall within the enterprise security team's domain of responsibility. Thus, if a security organization does not have solid cross-silo workstream and response framework, it will likely encounter an uphill battle to leverage the newly acquired threat intelligence data into actionable tactics.

A strategic approach is required to effectively integrate threat intelligence into an existing security program.

Developing a Program Strategy Approach

A strategic approach is required to effectively integrate threat intelligence into an existing security program. There are three basic phases to develop an initial threat intelligence consumption capability.



01 **Phase 1** Visibility, Awareness and Automated Response

02 **Phase 2** Adaptive Response and Strategy Formulation

03 **Phase 3** Continuous Optimization

Phase 1 – Visibility, Awareness and Automated Response

Drivers

Initially, enterprise security organizations consume threat intelligence to raise threat awareness and gain increased visibility into existing threats. This additional visibility further helps to focus critical expenditures, potentially providing cost-savings. Additionally these organizations leverage automated response platforms dormant within their infrastructure to raise security without dramatically increasing costs. The organization should use threat intelligence as a built-in operational capability, leveraging **response systems** via product suites enabled with threat intelligence data from vendors with already deployed tools in the environment.

This data comes in the form of lists of known bad URLs, IP addresses, bulk malware signatures, and DNS domains and is used by existing automated technologies to identify high risk, high fidelity activity and mitigate through automated means.

Components

- Threat intelligence data and response capabilities within existing tools like anti-malware suites, firewalls, IPS, security information and event management (SIEM), and web and email gateways.

Capabilities

- Increase awareness and drive visibility of security issues – provide hard data to drive security-related decisions.

Operational Advice

- Emphasis on leveraging existing tools and infrastructure – minimally invasive, while providing noticeable security value;

- Utilize automation to get faster, more accurate response to potential issues; and

- Focus on reducing background noise in your security tools, while fine-tuning the ability to detect real threats.

Phase 2 – Adaptive Response and Strategy Formulation

Drivers

Once security organizations become more adaptive to real threats, they begin to use more advanced tools and techniques to detect and respond to live threats. Using a mix of raw data and automation, and relying more increasingly on human-based processes they become more strategic in their defense.

With a more clear understanding of the nature of threats to their organization, security teams can focus on protecting business-critical assets such as personally identifiable information (PII), electronic protected health information (ePHI) and intellectual property. This path leads to a more structured approach to incident response and program maturation through strategy development. Organizations will start to consume raw and refined data from **intelligence sources**, and push into leveraging more advanced **response systems** integrated with **fusion and analytics platforms** to identify, investigate, and respond efficiently to threats.

Components

- Raw intelligence from diverse **intelligence sources** in structured, consumable format;
- Operationalized **fusion and analytics platform** for research, triage, and analysis of raw data;
- Specialized analysts and response personnel; and
- Well-defined strategy and operational processes to facilitate targeted response.

Capabilities

- Significant reduction in the noise (non-actionable alerts) security devices produce through fine-tuning, process maturity, and intelligence;
- Decrease in the likelihood of long-term undiscovered compromise through internal and external intelligence factors;
- Efficient orchestration of people across different operational silos, repeatable processes and effective tooling; and
- Capability to define and measure key performance indicators (KPIs) against business goals, and identify leading and trailing indicators.

Operational Advice

- Focus on creating a scalable operation;
- Develop highly repeatable processes and workflows, implemented across the organization;
- Set up a formal team of analysts and responders, and develop specialized skills;

- Focus on repeatability and efficiency of processes through continuous improvement, leveraging tools where applicable to improve efficiency of detection, response and resolution; and

- Develop and share internally-derived threat indicators and threat observables in standardized formats (STIX, etc.).

Phase 3 – Continuous Optimization

Drivers

Organizations with the need for highly developed and optimized threat intelligence capabilities consume and produce a significant amount of intelligence. In addition, these organizations develop processes and tools, and share intelligence in structured ways with various parts of their community and the broader intelligence community as well. While few organizations require this level of operational excellence, the shift from broad spectrum intelligence to an adversary-focused view provides razor sharp clarity to optimize strategy and tactics in even extremely adverse threat environments.

Components

- Highly structured program strategy and operationalized tactical response, driven by targeted, externally derived, adversary-focused intelligence;

- Formal, highly specialized threat intelligence organization focused on collecting, analyzing and producing targeted, direction actionable threat intelligence; and

- Specialized tools for advanced detection and response including binary analysis tools, sandboxes and forensics analysis tools.

Capabilities

- Analysis of large quantities of targeted intelligence focused on adversaries, actions, and TTPs to rapidly produce actionable results;

- Contribution to the broader intelligence community of knowledge data in the form of TTPs, IoCs, and observables in various standardized formats; and

- Identification of trends which pose a danger to the organization and create tactical guidance for the mitigation.

Operational Advice

- Focus on optimizing resources, and leveraging automation wherever possible to minimize human lag-time in response capability;

- Optimize detection through information sharing, near real-time analysis of deviations from established baselines – even producing externally shareable threat intelligence; and
- Tightly integrate tools and processes across operational IT boundaries to maximize effectiveness and minimize business disruption.

The incorporation of threat intelligence into a security strategy and tactical operation plan requires forethought, guidance, and a goal aligned with business need.

Call to Action

Security organizations are investing in better ways to prevent, detect, and respond to attacks. Tools and approaches that yield greater certainty and reduce time to respond help minimize negative impact to the business.

A logical progression in developing a mature security posture is to find and implement various aspects of threat intelligence, including next-generation technologies and business processes, into the enterprise security program. This allows teams to consume, use, and eventually create the intelligence necessary to guide action.

The incorporation of threat intelligence into a security strategy and tactical operation plan requires forethought, guidance, and a goal aligned with business need.

References

1. CybOX – http://cybox.mitre.org/

2. STIX – http://stix.mitre.org/

3. TAXII – http://taxii.mitre.org/

4. MAEC – http://maec.mitre.org/

5. OpenIOC – http://www.openioc.org

6. CIF – https://code.google.com/p/collective-intelligence-framework/

For more information, including details about the Accuvant threat intelligence solutions blueprint, contact CISO@accuvant.com.

Special thank you to:

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