Advancing Cyber Intelligence Practices Through the SEI's Consortium

SEI Emerging Technology Center

Jay McAllister

Melissa Kasan Ludwick

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Agenda

The Cyber Intelligence Research Consortium

- Purpose
- Origins
- Offerings

Demonstrations

- Evaluating Intelligence
- Evaluating Analysts

Future Work

- How-To Guides
- Cyber Threat Baseline
- Crisis Simulation

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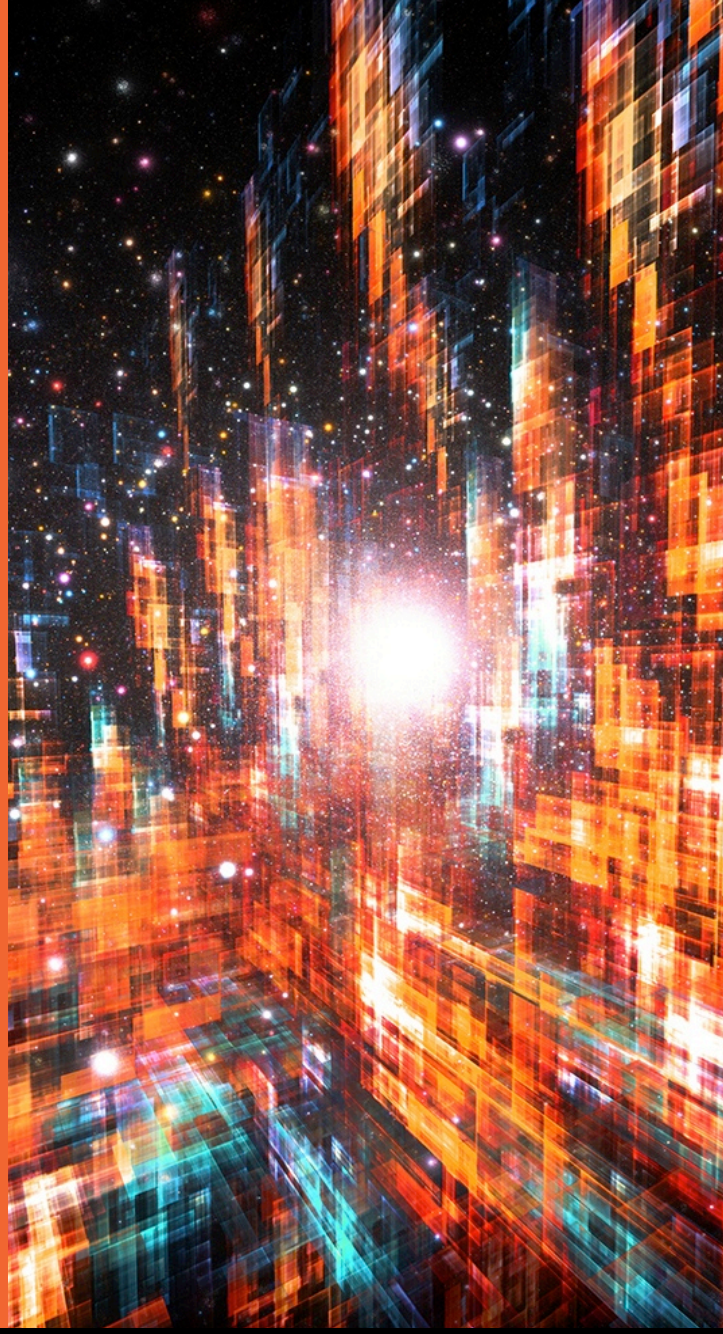
The Cyber Intelligence Research Consortium



Purpose

The Consortium is a member-funded initiative that researches and develops technical solutions and analytical practices to advance the art and science of cyber intelligence

Cyber intelligence: The acquisition and analysis of information to identify, track, and predict cyber capabilities, intentions, and activities to offer courses of action that enhance decision making

It was formed because government, industry, and academia were looking for…

- Access to cost-effective resources for cyber intelligence workforce development and technology scouting
- Awareness of analytical practices from all organizations, regardless of size and economic sector
- Insight into SEI and Carnegie Mellon skills and capabilities

Origins

Cyber Intelligence Tradecraft Project

- www.sei.cmu.edu/etc/cyber-intelligence/citp
- Studied how 30 organizations from government, industry, and academia performed cyber intelligence

Overall finding

- Effective organizations balance the need to protect their network perimeters with the need to look beyond them for strategic insights

Deliverables

- Summary of Key Findings: Best practices and lessons learned
- Implementation Frameworks: How-to-guides for analysis
- White Paper: Practitioner core competencies and skills

Offerings

Steering Committee: Guide Consortium activities and plan for future success

Cyber Threat Baseline: Anonymized research of members' cyber threat environments to identify common challenges and associated best practices

Tradecraft Labs: Workshops to advance cyber intelligence capabilities and showcase relevant technologies

Implementation Frameworks: How-to guides for navigating key analytical practices and technologies

Crisis Simulation: Capture-the-flag exercise to apply analytical techniques and technologies to a simulated cyber attack

Intelligence Insights: Biweekly emails and bimonthly newsletters on topics relevant to the practice of cyber intelligence

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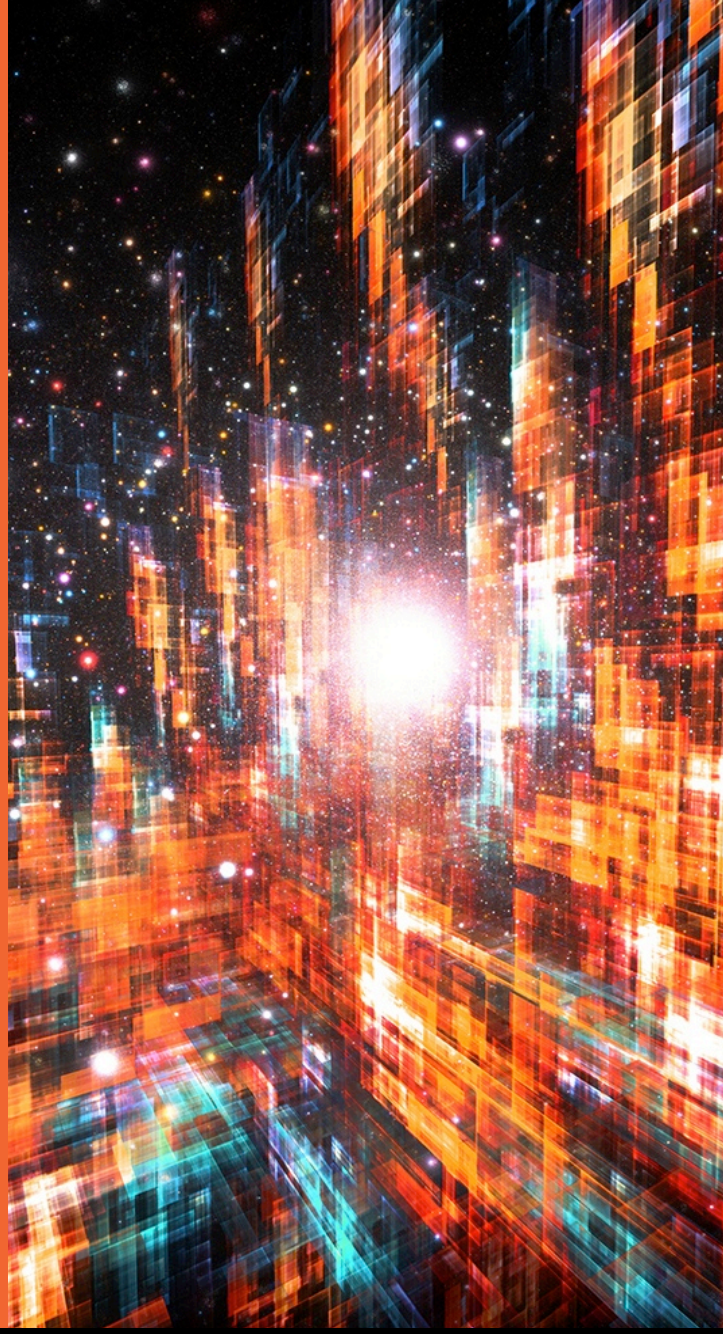
Offering Demonstrations



Evaluating Intelligence

Challenge

- Cyber intelligence is a phrase often used, but interpreted in many different ways, leading to a diverse output of threat analysis categorized as cyber intelligence
- Such output is difficult to evaluate and compare, stifling an organization's ability to establish guidelines and goals

Solution

- An evaluation template based on standards observed during our research and set forth in U.S. Intelligence Community Directive Number 203
  - http://www.dni.gov/files/documents/ICD/ICD%20203%20Analytic%20Standards%20pdf-unclassified.pdf

Template – Evaluating Intelligence

Assess the quality and thoroughness of an intelligence analyst's work using a grading system based on points accumulated for criteria the analyst satisfies in an intelligence product

Grading system

A: 17-16, **B:** 15-14, **C:** 13-12, **D:** 11-10, **F:** 9 and below

Criteria

- Objective
- Independent of political considerations
- Timely
- Based on all available sources
- Exhibiting proper standards of analytic tradecraft

Criteria - Objective

Worth 4 points

- Functions from an unbiased perspective
- Gives due regard to alternative perspectives
- Gives due regard to contrary reporting
- Acknowledges developments that necessitate adjustments to analytic judgments

Criteria – Independent of Political Considerations

Worth 2 points

- Provides objective assessments informed by available information
- Is not distorted or altered with the intent of supporting or advocating a particular policy, political viewpoint, or audience

Criteria - Timely

Worth 1 point

- Is actionable

Criteria – Based on All Available Sources

Worth 3 points

- Is informed by all relevant information that is available, including open source information
- Addresses where critical intelligence gaps exist
- Identifies appropriate collection, dissemination, and access strategies to fill the gaps

Criteria – Exhibiting Proper Standards of Analytic Tradecraft

Worth 7 points

- Properly describes the quality and reliability of the underlying sources
- Caveats and expresses confidence in analytic judgments
- Distinguishes between assumptions and judgments
- Demonstrates relevance to the stakeholder(s)
- Uses logical argumentation
- Exhibits consistency of analysis over time
- Makes judgments and assessments that are justified with supporting information

Evaluating Analysts

Challenge

- No analyst produces intelligence the same way, making it difficult to evaluate critical thinking and problem solving skills

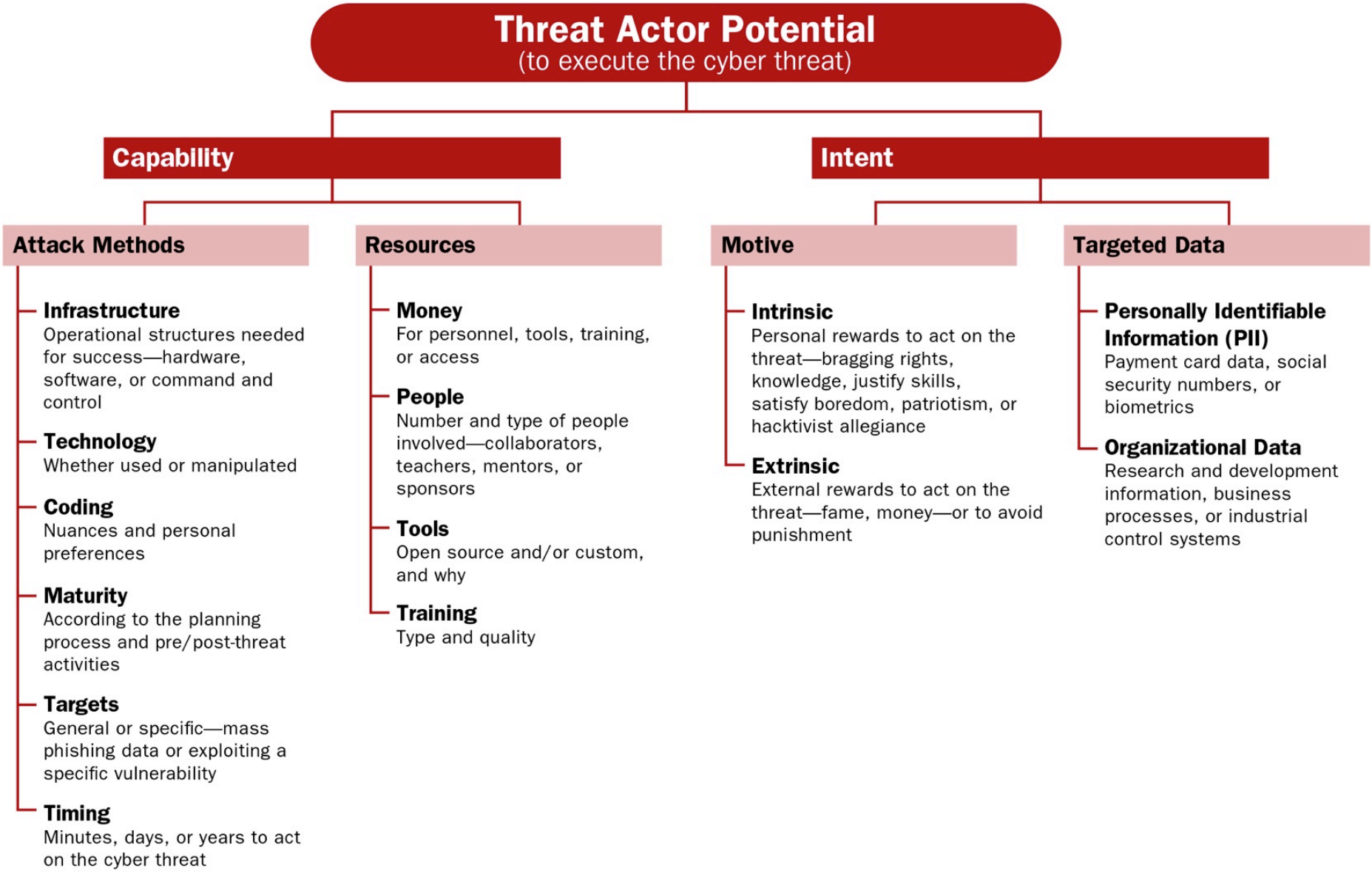
Solution

- An evaluation template based on how analysts assess fictitious, ill-structured, and complex cyber threats presented through scenario-based exercises

Template – Evaluating Analysts

The template conveys a holistic approach to assessing cyber threats

- It consists of three components
  - Threat actor potential to execute the cyber threat
  - Organizational impact of the cyber threat on the target
  - Target exposure to the cyber threat because of potential vulnerabilities



Target Exposure
(to the cyber threat because of potential vulnerabilities)

People

Relevance

Internet Presence
Susceptible witting and unwitting information target-related individuals put online and their popularity on blogs/social media

Extracurricular Activities
Vulnerabilities from these individuals roles with non-target entities—non-profits, activist groups, or local/national politics

Motive
The reasons for why such individuals are susceptible to the cyber threat—ignorance, financial trouble, disgruntlement, or boredom

Access

Physical
Vulnerabilities from target-related individuals ability to access the target's tangible aspects—office space, transportation, or equipment

Network
Susceptible administrative privileges or sensitive data access provided to such individuals

Position
How threat actors exploit the different roles these individuals play for the target—network administrator, senior leader, or rank-and-file employee

Abnormal Activities
Deviations from normal physical, network, or position-based activities of key target-related individuals can signify potential vulnerabilities

Cyber Footprint

Infrastructure

Hardware
Risks emanating from where network appliances, workstations, and third party equipment connect to the target's network

Software
Risks associated with the target relying on particular software for day-to-day operations, providing access to high-risk software, and detecting software vulnerability exploitation

Supply Chain
How the cyber threat affects the target's acquisition, implementation, maintenance, and discontinuation of hardware and software

Internet Presence

Website
How the threat actor can leverage the target's website—compromise content, collect data, or deny access

Social Media
Risks associated with the target's use of it for organizational activities—marketing, customer service, or product placement

Additional Services
Risks emanating from the target's use of FTP, Telnet, VPN, webmail, remote desktop, and other web-based services

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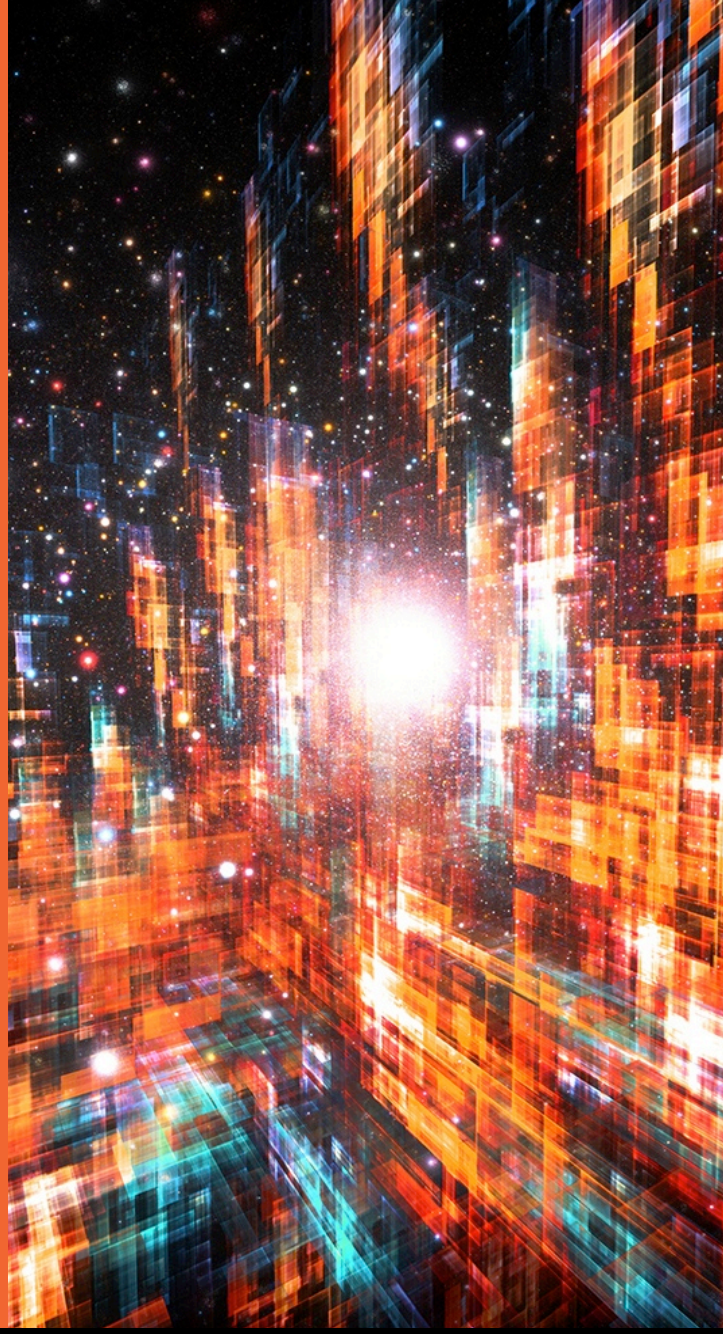
Future Work



Future Work

Automation of templates for evaluating intelligence and analysts

Implementation frameworks

- Predictive analytics
- Red teaming
- Intelligence collection management

Interactive platform for learning how to build a cyber intelligence capability

Crisis simulation

Contact Information

Presenter / Point of Contact

Jay McAllister

Senior Analyst

Telephone: +1 412.268.9193

Email: jjmcallister@sei.cmu.edu

Twitter: @sei_etc

Customer Relations

Email: info@sei.cmu.edu

Telephone: +1 412.268.5800

SEI Phone: +1 412.268.5800

SEI Fax: +1 412.268.6257