
OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

# A Common Cyber Threat Framework:
## A Foundation for Communication

LEADING INTELLIGENCE INTEGRATION

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# With So Many Cyber Threat Models or Frameworks, why build another?

## *…because comparison of data across them can be problematic*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Intent | Reconnaissance | Resource development | Staging | Target ID | Exploitation | Delivery | Maintain/expand Target access | Detection voidance | Establish/modify Network infrastructure | C2 | Deny Access | Extract Data | Manipulate |
| Administer | | | | Prepare | | | Engage | | | | Propagate | | Effect |
| Intent | Reconnaissance | Development | Staging | Delivery | Configure | Maneuver | Exploitation | C2 | Effect | | | | |
| Foot printing | Scanning | Enumeration | Gain access (exploitation) | Privilege escalation | Situational awareness | Covering tracks | Creating Backdoors | | | | | | |
| Malware | Hacking | Social | Environmental threat | Physical threat | Misuse | Error | | | | | | | |
| Actor | | | Tactics, Techniques, & Procedures | | | | Infrastructure | | | | | Victim | |
| Reconnaissance | Weaponization | Delivery | Exploitation | Installation | C2 | Actions on Objective | Lockheed Martin Kill Chain ® | | | | | | |
| Intent | Development | Reconnaissance | Staging | Engagement | Maneuver | Configure | C2 | Effect | STIX™ | | | | |

# Goals for a Common Approach to Threat Frameworks

Following a common approach helps to:

- *Establish a shared ontology* and *enhance information-sharing* since it is easier to maintain mapping of multiple models to a common reference than directly to each other
- *Characterize and categorize threat activity* in a straightforward way that can support missions ranging from strategic decision-making to analysis and cybersecurity measures and users from generalists to technical experts
- *Support common situational awareness* across organizations

# Key Attributes and Goals in Building a Cyber Threat Framework

- Incorporate a *hierarchical/layered perspective* that allows a focus on a level detail appropriate to the audience while maintaining linkage and traceability of data
- Employ *Structured and documented categories* with explicitly *defined terms* and labels (lexicon)
- Focus on *empirical/sensor-derived 'objective' data*
- Accommodate a wide variety of data sources, threat actors and activity
- Provide as a foundation for analysis and decision-making

# The Common Cyber Threat Framework

- Since 2012, the Office of the DNI has worked with interagency partners to build and refine The Common Cyber Threat Framework reflecting these key attributes and goals
- The Common Cyber Threat Framework is not intended to displace or replace an organization's existing model which is tailored to its specific mission and requirements; rather, it is intended to:
  - *Serve as a viable Universal Translator* (a cyber Esperanto or Rosetta Stone) facilitating efficient and possibly automated exchange of data and insight across models once each has been mapped to it and the mappings shared
  - *Provide a Starting Point* featuring a simple threat model and value-neutral concepts. It can be customized for any organization as needed—and any deviations from the common approach are readily apparent, facilitating mapping and data exchange.

# The Common Cyber Threat Framework

## A Hierarchical, Layered Approach

**The progression of cyber threat actions over time to achieve objectives**

Stages

**Layer 1**

**The purpose of conducting an action or a series of actions**

Objectives

**Layer 2**

**Actions and associated resources used by an threat actor to achieve an objective**

Actions

**Layer 3**

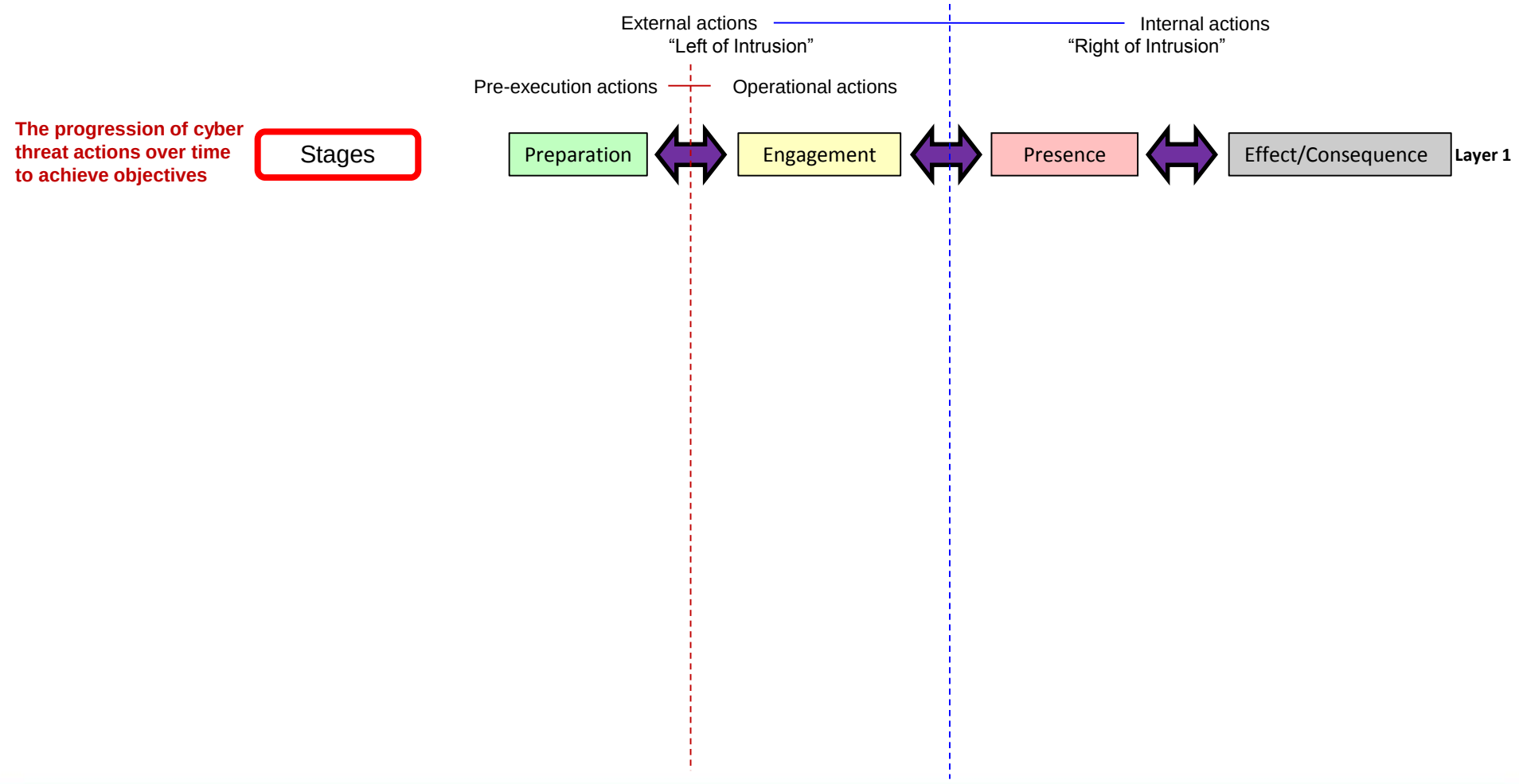
**Discrete cyber threat intelligence data**

Indicators

**Layer 4**

# The Common Cyber Threat Framework

## Structured around a Simplified "Threat Lifecycle"



# The Common Cyber Threat Framework

## Threat Actor Objectives within the "Threat Lifecycle"

**The progression of cyber threat actions over time to achieve objectives**

**Stages**

Layer 1

| Preparation | Engagement | Presence | Effect/Consequence |
|---|---|---|---|

Layer 2

**The purpose of conducting an action or a series of actions**

**Objectives**

| Preparation | Engagement | Presence | Effect/Consequence |
|---|---|---|---|
| Plan activity | Deploy capability | Establish controlled access | Enable other operations |
| Conduct research & analysis | Interact with intended victim | Hide | Deny access |
| Develop resources & capabilities | | Expand presence | Extract data |
| Acquire victim specific knowledge | Exploit vulnerabilities | Refine focus of activity | Alter data and/or computer, network or system behavior |
| Complete preparations | Deliver malicious capability | Establish persistence | Destroy HW/SW/data |

Layer 3

**Actions and associated resources used by an threat actor to satisfy an objective**

**Actions**

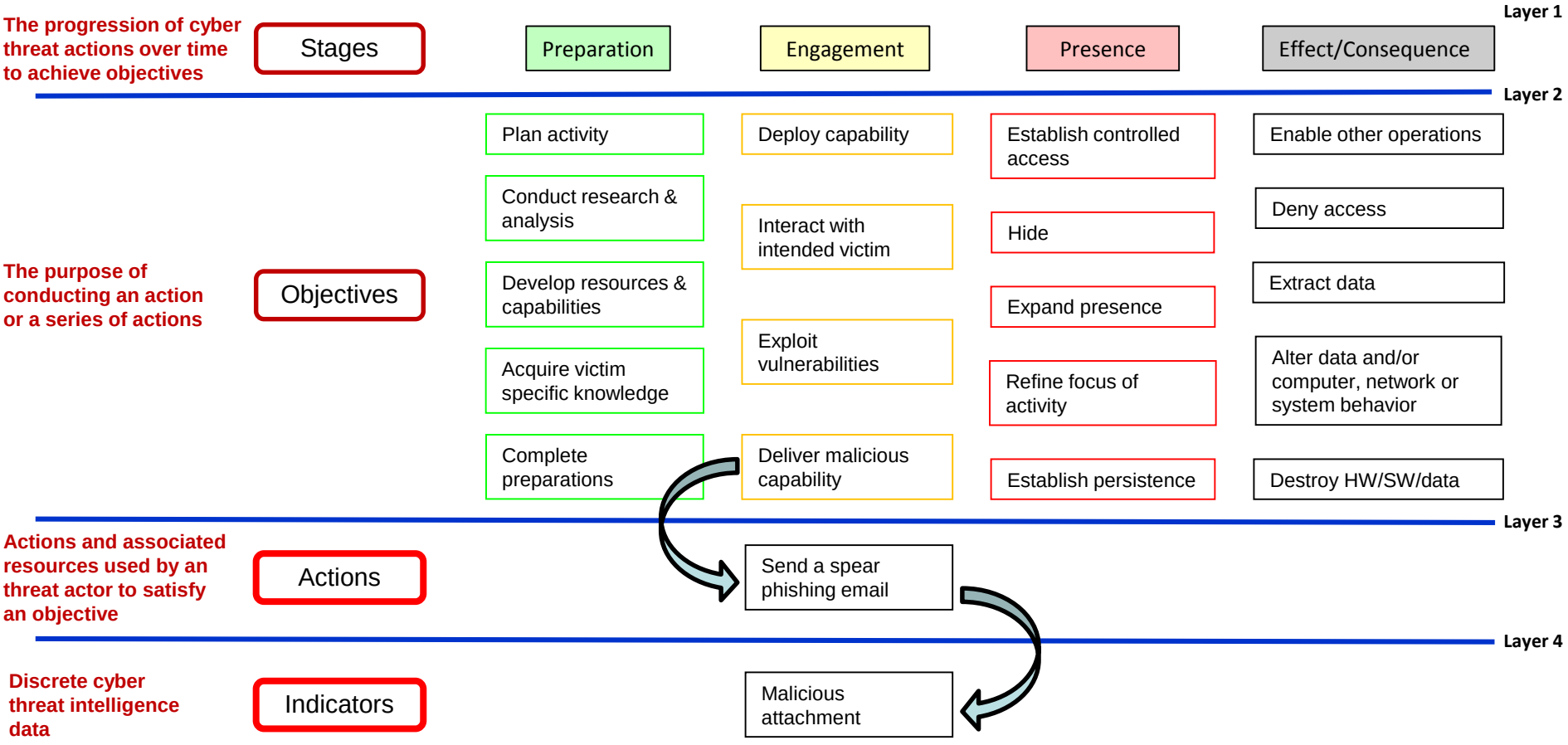
Layer 4

**Discrete cyber threat intelligence data**

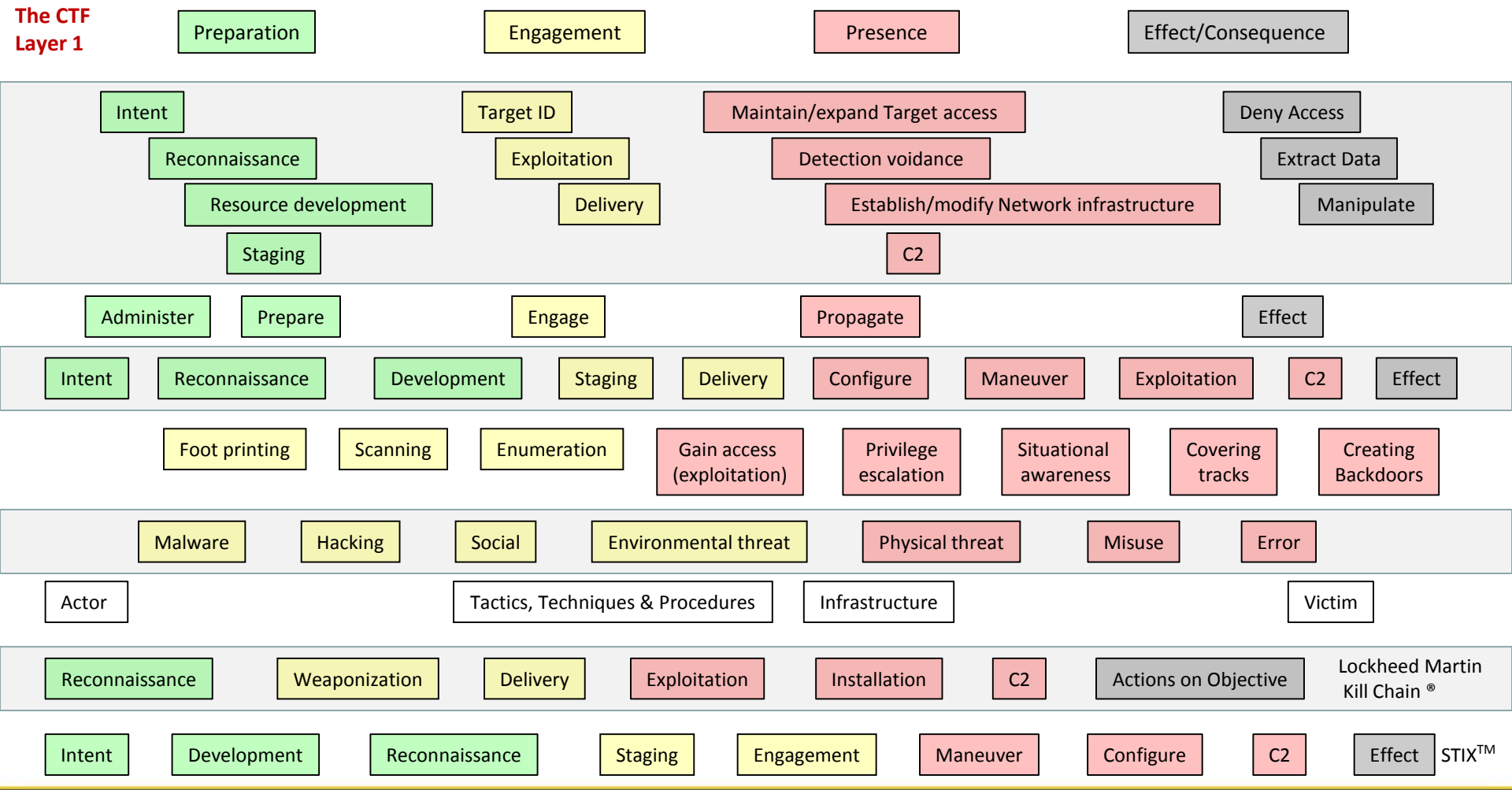
**Indicators**

# The Common Cyber Threat Framework

## Actions and Indicators are the Details of Threat Activity



# This Common Approach Facilitates Grouping and Comparison of Cyber Threat Activities Seen from Different Perspectives



# *Status of Framework Socialization and Use*

- Foundation of threat activity in US government's Cyber Incident Response Schema since 2013
- 2018 OMB priority for implementation across the Executive Branch
- Used in threat products by DHS, FBI and the ODNI
- DHS prototyping use with states and fusion centers and preparing to teach the Framework to state and local partners
- Mapped to the NIST Cybersecurity Framework
- Shared serially with industry and academia; included in curricula and research at multiple universities
- Shared with ~40 partner nations and international organizations; some have adopted it and are exploring its use to create a regional common operating picture and enhance information sharing
- The 'threat description' in NATO's evolving Cyber Defense Strategy
- Research underway on a shareable 'cookbook' on applying the Framework approach to visualization and knowledge discovery
- Framework and associated Lexicon available at DNI.GOV