OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

A Common Cyber Threat Framework

A Foundation for Communication

LEADING INTELLIGENCE INTEGRATION

We both speak English?

- Apartment
- French Fries
- Elevator
- Gasoline
- Bin
- Active

- Flat
- Chips
- Lift
- Petrol
- Bin
- Active

What You Need to Know

- Define Cyber Threat Framework
- Recognize the benefits of using standardized language to describe cyber activity and enable consistent categorization
- Understand the Cyber Threat Framework hierarchy and its four layers of information
- Understand how the Cyber Threat Framework can be used to support analysis

Cyber Threat Framework (CTF) Overview

The Cyber Threat Framework was developed by the US Government to enable consistent characterization and categorization of cyber threat events, and to identify trends or changes in the activities of cyber adversaries. The framework captures the adversary life cycle from (a) “PREPARATION” of capabilities and targeting to (b) initial “ENGAGEMENT” with the targets or temporary nonintrusive disruptions by the adversary to (c) establishing and expanding the “PRESENCE” on target networks, to (d) the creation of “EFFECTS and CONSEQUENCES” from theft, manipulation, or disruption. The framework categorizes the activity in increasing “layers” of detail (1- 4) as available in the intelligence reporting.

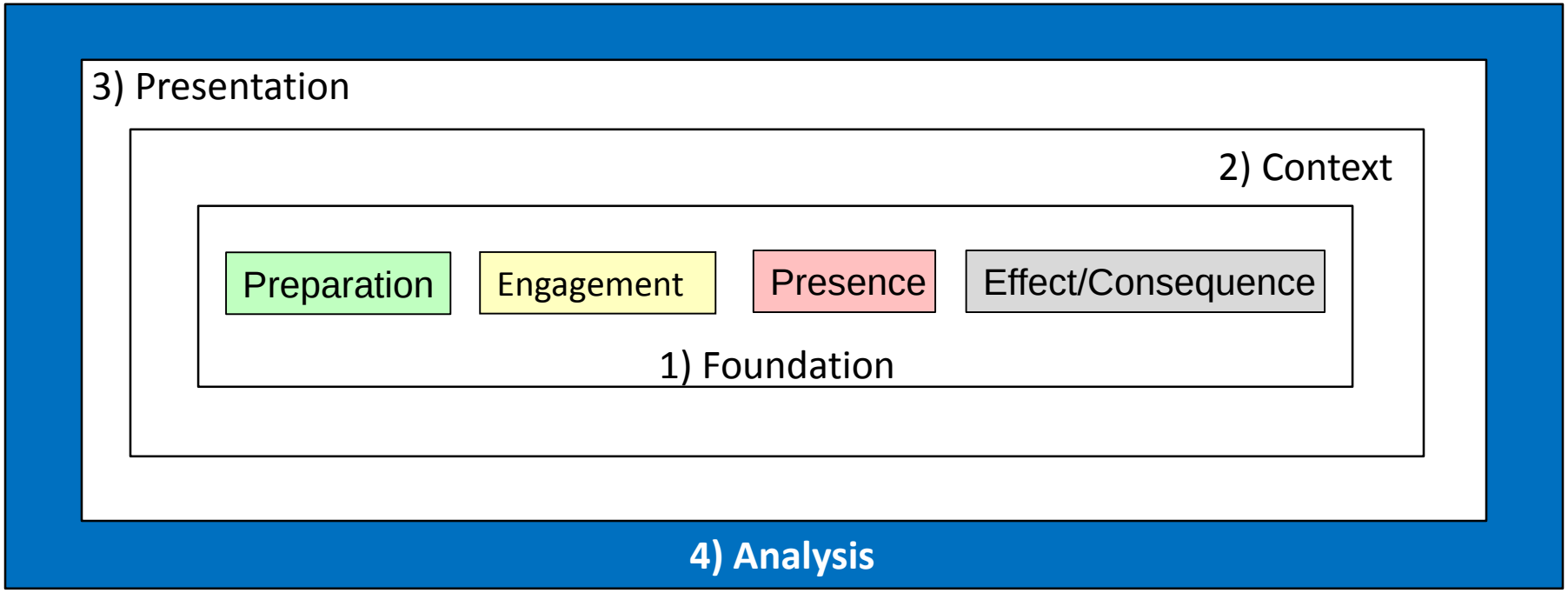
There are many cyber threat models or frameworks – *why build another*?

- Began as a construct to enhance data-sharing throughout the US Government
- Facilitates efficient situational analysis based on objective (typically, sensor-derived) data
- Provides a simple, yet flexible, collaborative way of characterizing and categorizing activity that supports analysis, senior-level decision making, and cybersecurity
- Offers a common backbone ('cyber Esperanto'); easier to map unique models to a common standard than to each other
- Facilitates cyber threat trend and gap analysis, and assessment of collection posture

Merging Disparate Data Layers into a Common Framework is a Standard Practice

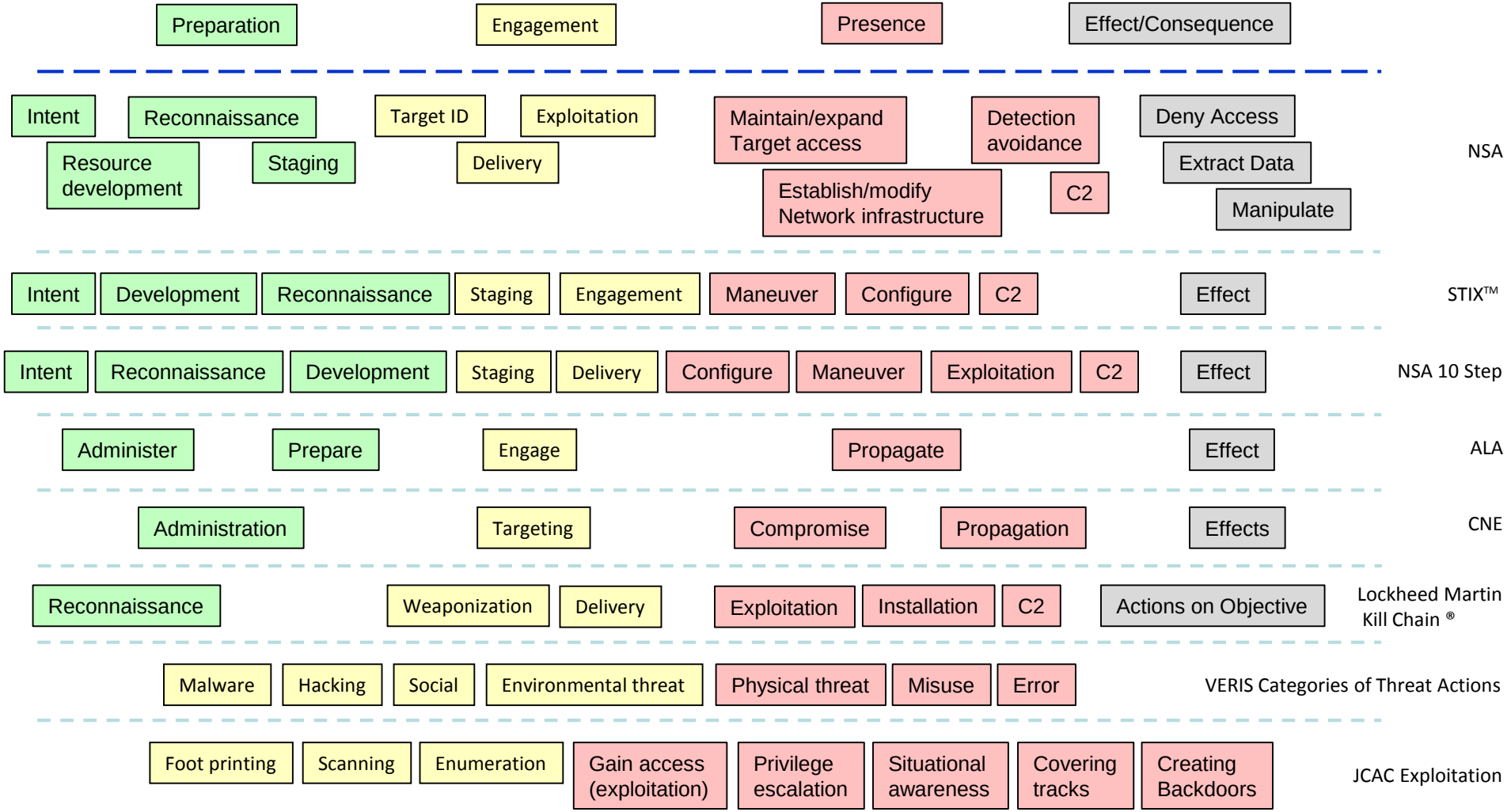
- Weather – overlaying satellite (clouds), doppler (rain), and thermometer (temperature) data atop a map yields a forecast: "take your umbrella and wear a light coat"
- Air Traffic Control – integrating weather, regional/ground control radars, scheduling data, aircraft/ground handler status to control air traffic: "you are cleared to land"
- In a similar fashion, a cyber threat framework based on measurable data facilitates visualization, analysis, and realization of a Common Operating Picture of threat activity
- It can also be matched with other data layers (e.g., vulnerability, shared connections) to become more actionable

Cyber Threat Framework Evolution

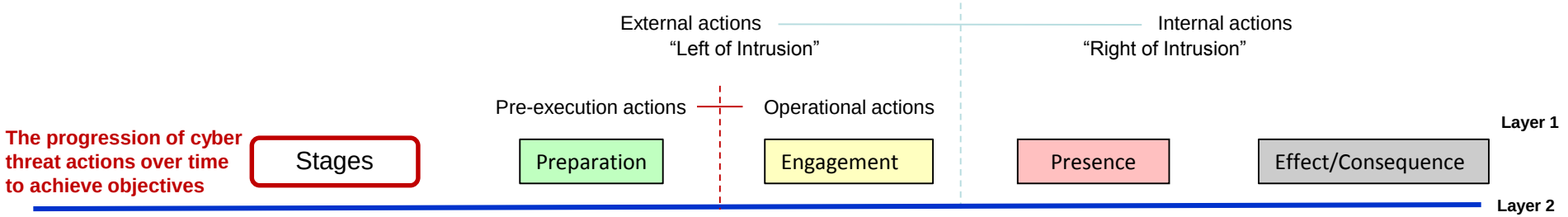


1) Created consensus around a foundation
2) Added context to validate linkages and demonstrate that you could move up and down the framework
3) Developed presentation models
4) Current focus – encompass analytics and automation

Deriving a 'Best of Breed' Common Framework



Cyber Threat Framework Layer 1



- Threat activity based on measurable/observable actions
- Every victim and all reported activity accounted for
- Layered data hierarchy providing activity traceability

CTF Layer 1 Definition – Preparation

Preparation

- Activities undertaken by a threat actor, their leadership and/or sponsor to prepare for conducting malicious cyber activities, e.g., establish governance and articulating intent, objectives, and strategy; identify potential victims and attack vectors; securing resources and develop capabilities; assess intended victim's cyber environment; and define measures for evaluating the success or failure of threat activities.

CTF Layer 1 Definition – Engagement

Engagement

- Threat actor activities taken prior to gaining but with the intent to gain unauthorized access to the intended victim's physical or virtual computer or information system(s), network(s), and/or data stores.

CTF Layer 1 Definition – Presence

Presence

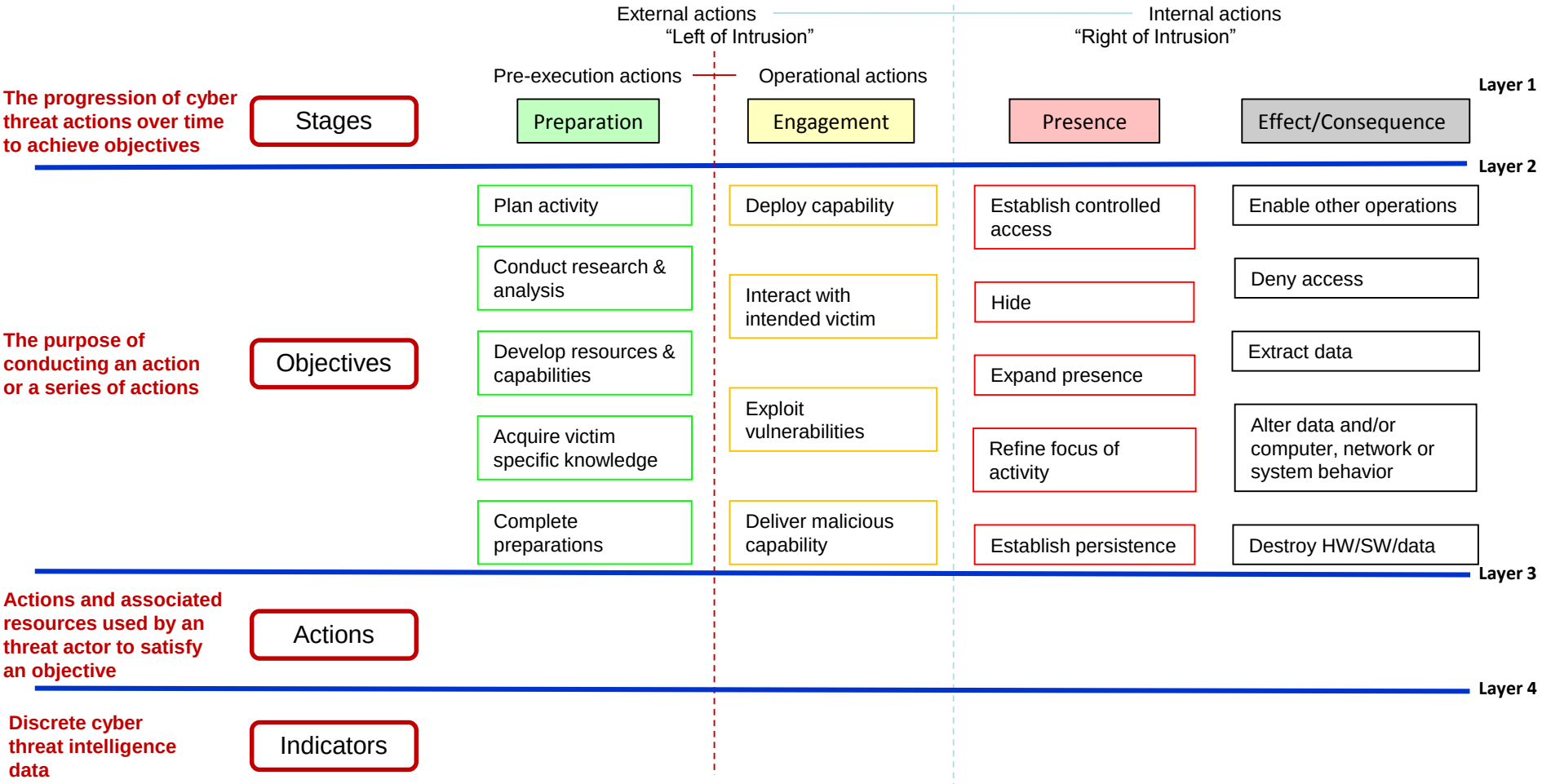
- Actions taken by the threat actor once unauthorized access to victim(s)' physical or virtual computer or information system has been achieved that establishes and maintains conditions or allows the threat actor to perform intended actions or operate at will against the host physical or virtual computer or information system, network and/or data stores.

CTF Layer 1 Definition – Effect/Consequence

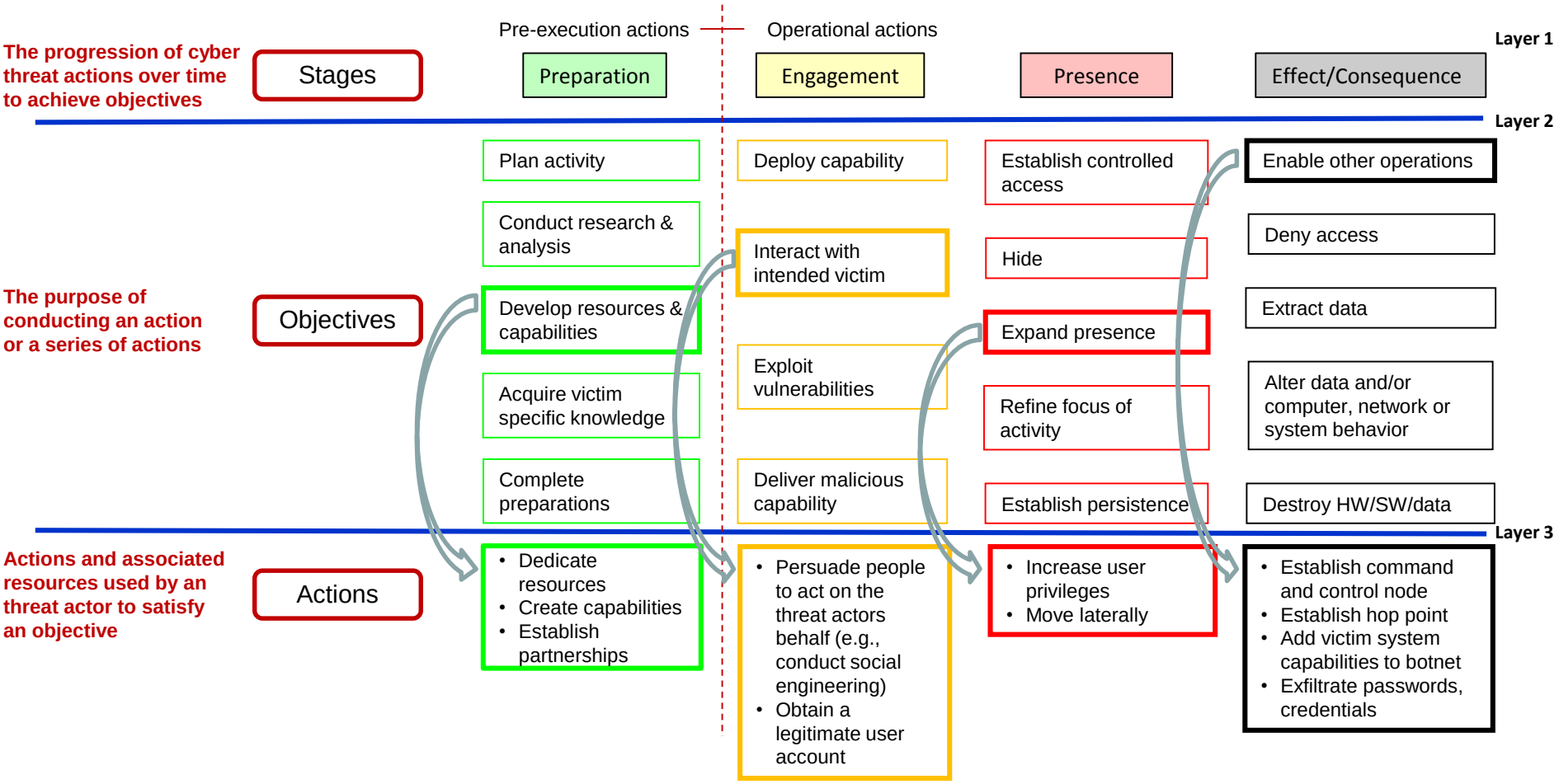
Effect/Consequence

- Outcomes of threat actor actions on a victim's physical or virtual computer or information system(s), network(s), and/or data stores.

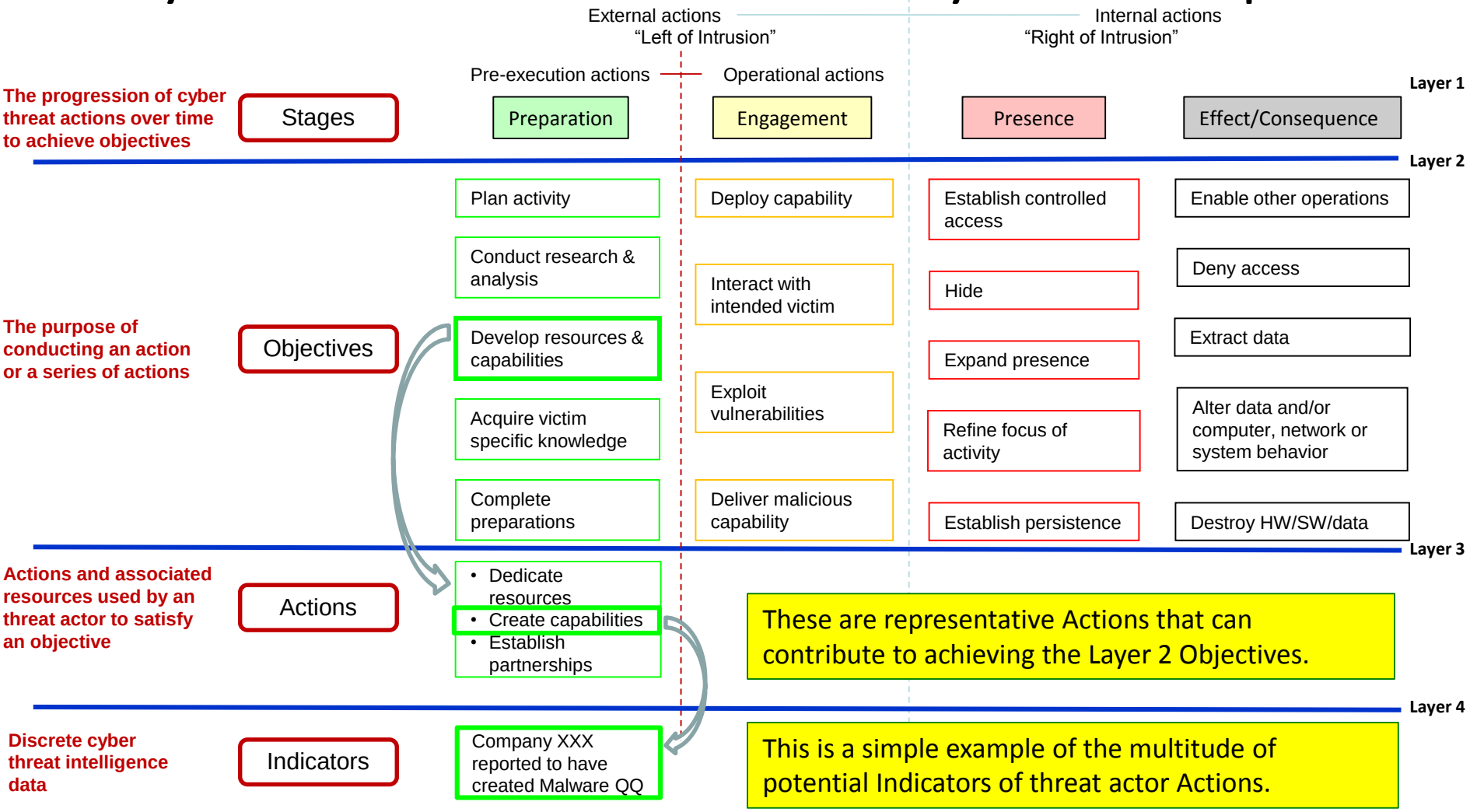
Cyber Threat Framework (v4) Layer 2 Details



Cyber Threat Framework (v4) Layer 3 Exemplars



Cyber Threat Framework (v4) Layer 4 Exemplar



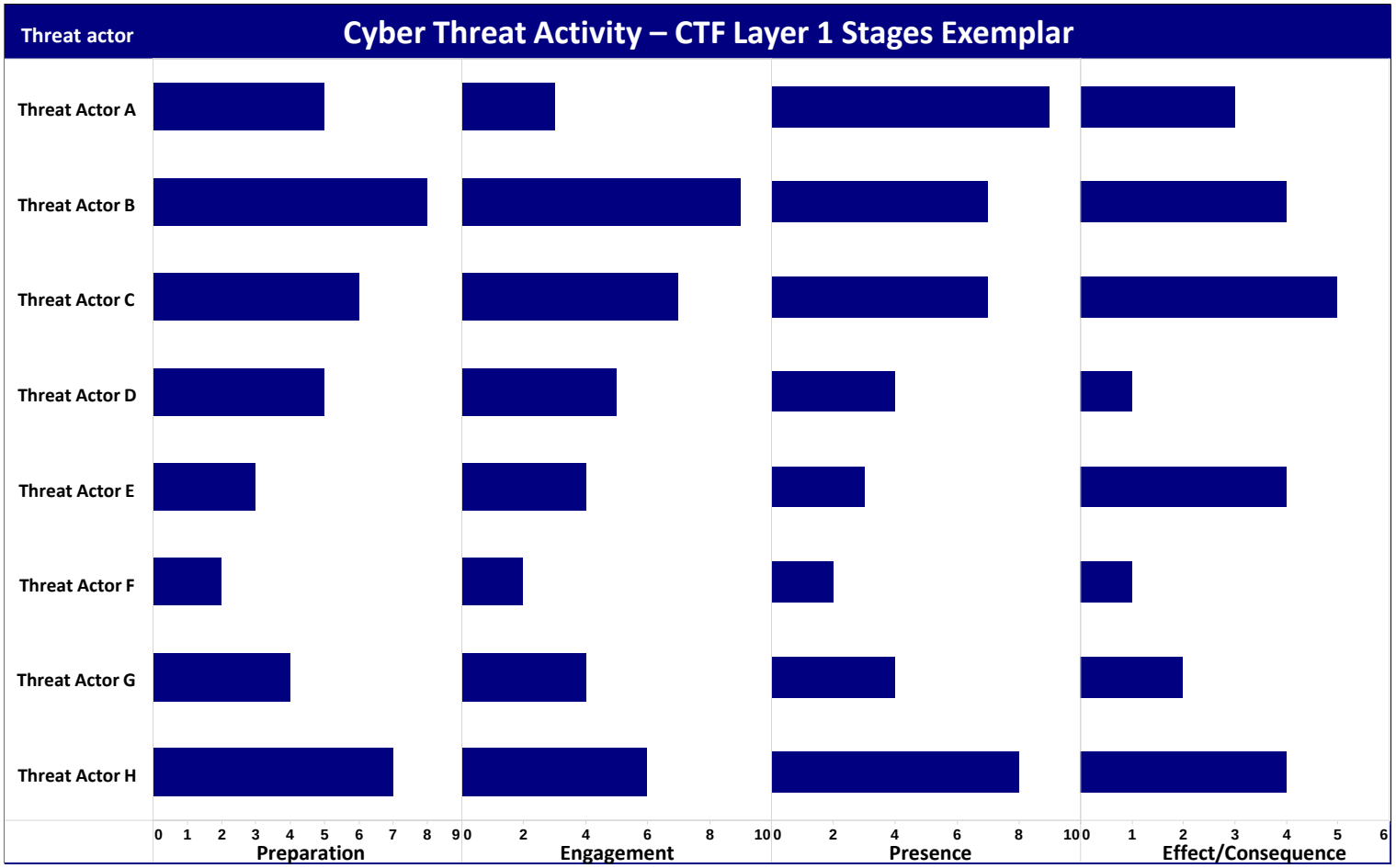
Consumer Needs Dictate Perspective and Content

- The foundation, based on empirical data, is the common reference point for all subsequent views
  - The consumer provides the focus by defining the view and/or adjusting the type of content (actor, activity, targeted sector, and victim)
  - The consumer defines the required granularity in each view but can "drill down" to see the underlying detail as desired
- The framework is applicable to a range of threat actors, activity, targeted sectors, and victims

Analysis

- Depending on the information selected and its presentation, one can begin to conduct a variety of analysis:
  - Trends – change over time
    - What caused the change
  - Predictive – what's next
  - Environmental
    - Was the threat different than expected
    - What vulnerabilities were missed
    - How to optimize remedial action
  - Vulnerability – risk analysis
  - Defensive posture

Threat Actor | Preparation | Engagement | Presence | Effect/Consequence

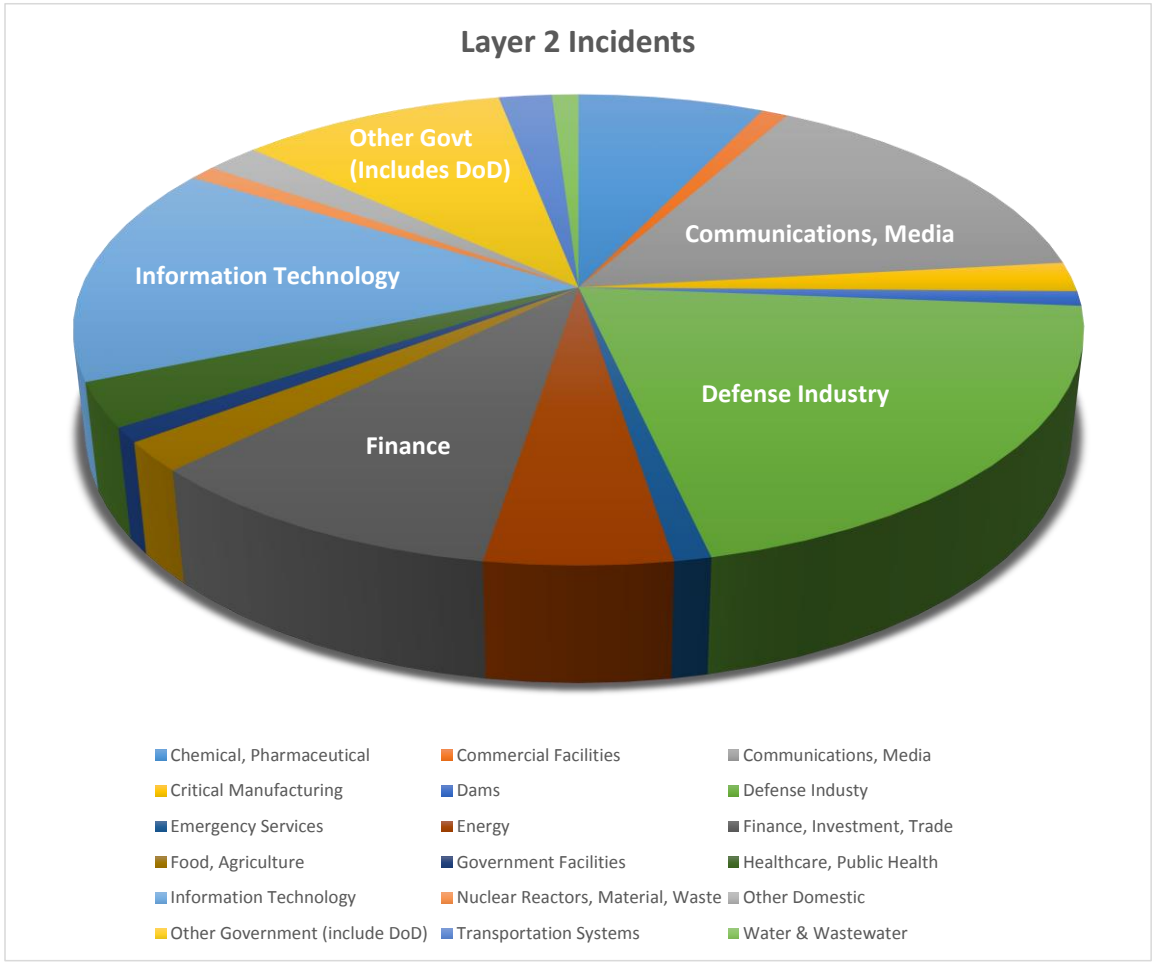


Reporting Period: January – March 2016

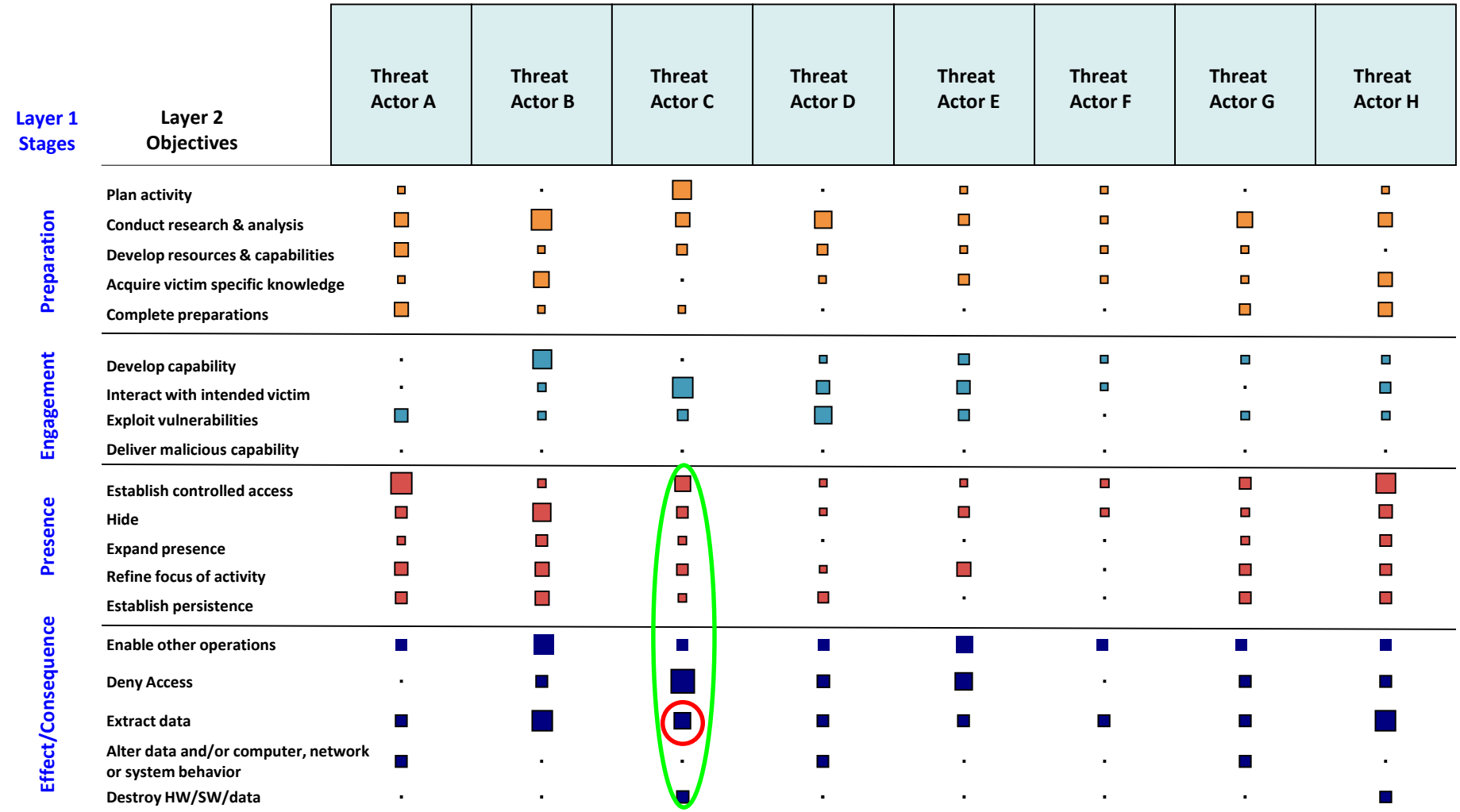
CTF Layer 2 Exemplar

Threat Events by Sector

Chemical, Pharmaceutical	7
Commercial Facilities	1
Communications, Media	15
Critical Manufacturing	2
Dams	1
Defense Industy	20
Emergency Services	1
Energy	5
Finance, Investment, Trade	10
Food, Agriculture	2
Government Facilities	1
Healthcare, Public Health	3
Information Technology	15
Nuclear Reactors, Material, Waste	1
Other Domestic	2
Other Government (include DoD)	10
Transportation Systems	2
Water & Wastewater	1



CTF (v4) Layer 2 Objectives Exemplar



Summary

- The Cyber Threat Framework supports the characterization and categorization of cyber threat information through the use of standardized language.
- The Cyber Threat Framework categorizes the activity in increasing “layers” of detail (1- 4) as available in the intelligence reporting.
- The Cyber Threat Framework can be used to support analysis

Questions?