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OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

A Common Cyber Threat Framework:
A Foundation for Communication

LEADING INTELLIGENCE INTEGRATION

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Overview

- Why did we do build one?
- What are its attributes?
- What does ours look like?
- How has it worked in practice?
- Current status/what's next?

With So Many Cyber Threat Models or Frameworks

Why build another?

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™

… Because comparison of threat data across models and users is problematic

Following a common approach helps to:

- ***Establish a common ontology*** and ***enhance information-sharing*** since it is easier to map unique models to a common standard than to each other ('N-to-1' easier than 'N-to-N')
- ***Characterize and categorize threat activity*** in a straightforward way that can support multiple missions ranging from strategic decision-making to analysis and cybersecurity measures, and users from generalists to technical experts
- ***Achieve common situational awareness*** across organizations

Our Intent

- Began as a construct to enhance data-sharing throughout the US Government
- Facilitate efficient situational awareness based on objective (typically, sensor-derived) data
- Provide a simple, yet flexible, collaborative way of characterizing and categorizing threat activity that supports analysis, senior-level decision making, and cybersecurity
- Offer a common approach ('cyber Esperanto')
- Facilitate cyber threat trend and gap analysis, assessment of collection posture
- Support (not replace!) analysis – and free the human to spend more time *doing analysis*

Goals of a Common Approach

- Key Attributes: a model that is ***hierarchical***, ***structured***, ***transparent*** *and* ***repeatable***, tied to ***explicit definitions***
- An optimized cyber threat framework
  - Is focused on empirical and often sensor-derived data; serves as the foundation for subsequent analysis and decision-making
  - Supports analysis and the characterization and categorization of cyber threat information through the use of standardized language
  - Accommodates a wide variety of data sources, threat actors and threat activity
  - Information arranged hierarchically and organized in increasing "layers" of detail
  - Can be tailored or customized to meet individual needs

Ground Rules as we built our approach

- No one's current model is 'wrong'
- …And we are not advocating that anyone stop using their own!
- Map your model to the common backbone and tell the rest of us how you've done it
- …Or use the common backbone and customize it as needed

Common Cyber Threat Framework

A Hierarchical 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 satisfy an objective

Actions

Layer 3

Discrete cyber threat intelligence data

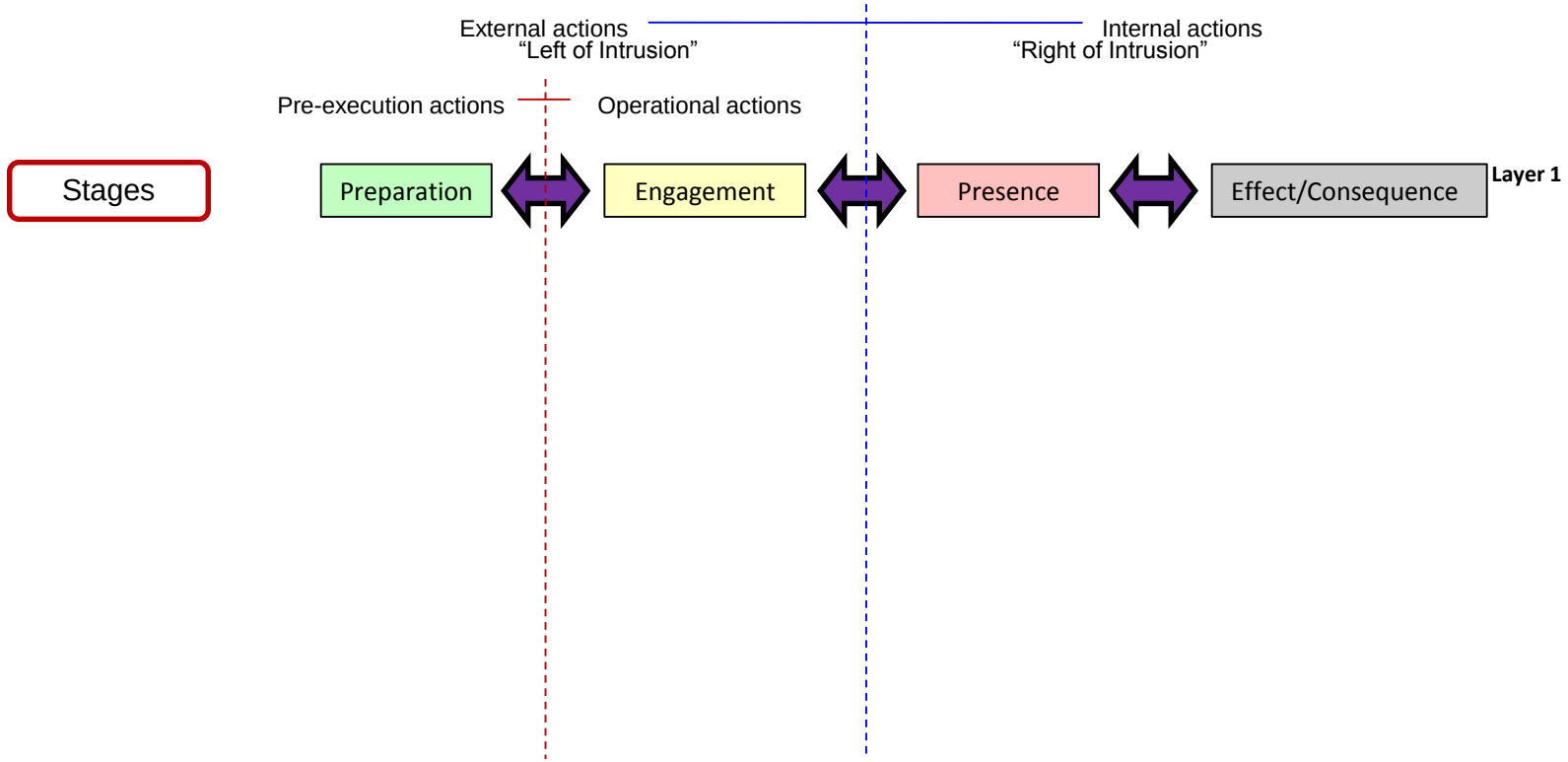
Indicators

Layer 4

Common Cyber Threat Framework

Structured around a Simplified "Threat Lifecycle"

The progression of cyber threat actions over time to achieve objectives



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

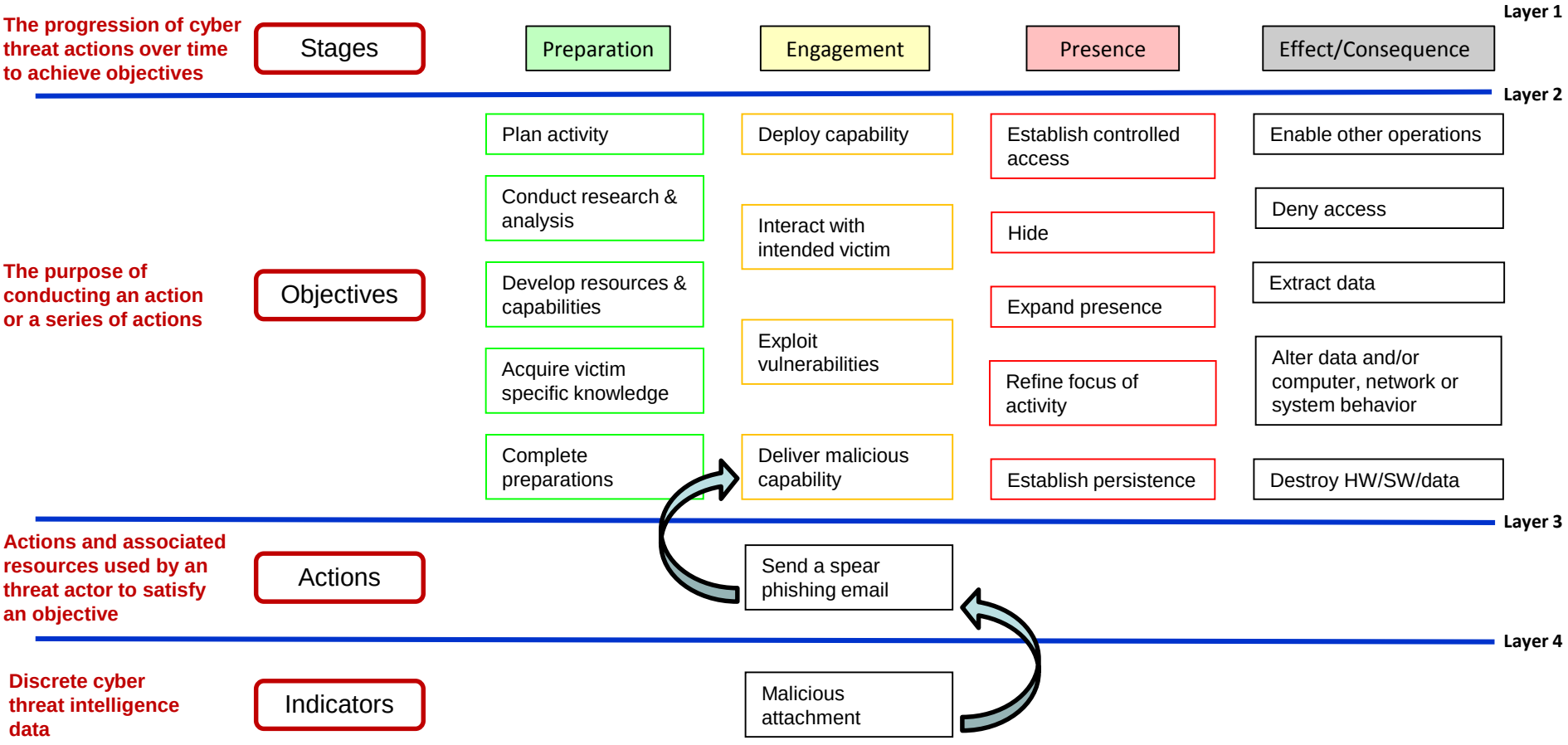
Layer 4

Discrete cyber threat intelligence data

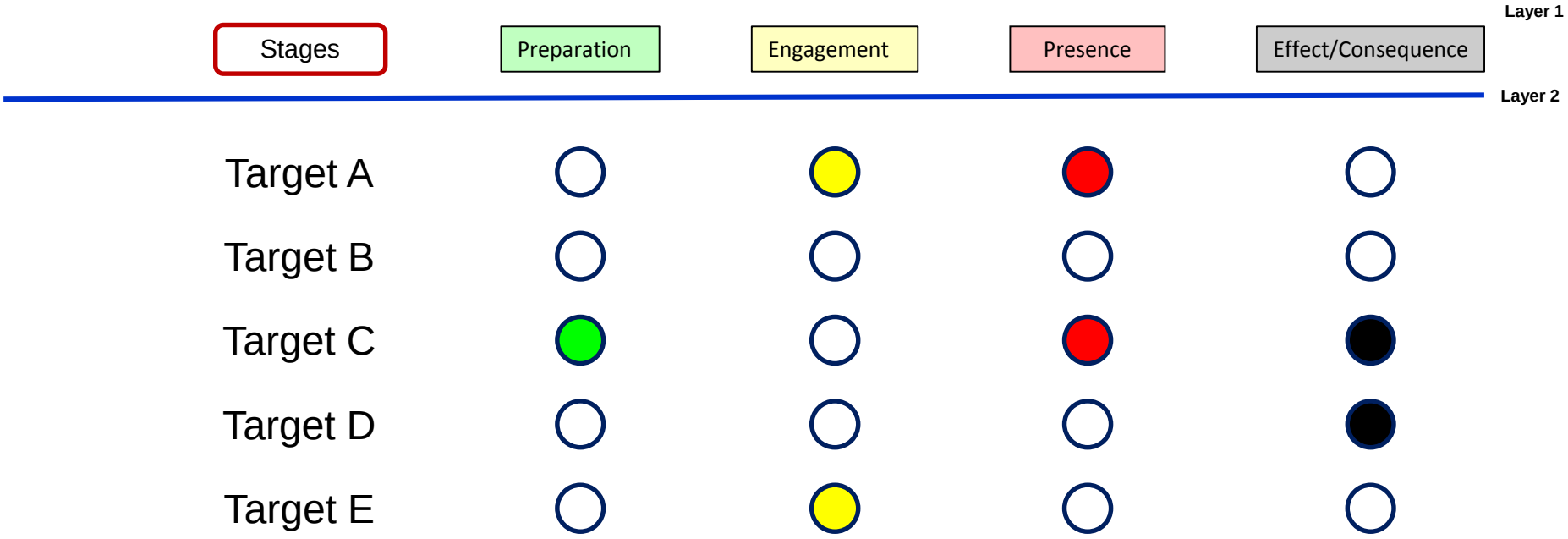
Indicators

Common Cyber Threat Framework

Actions and Indicators are the Details of Threat Activity

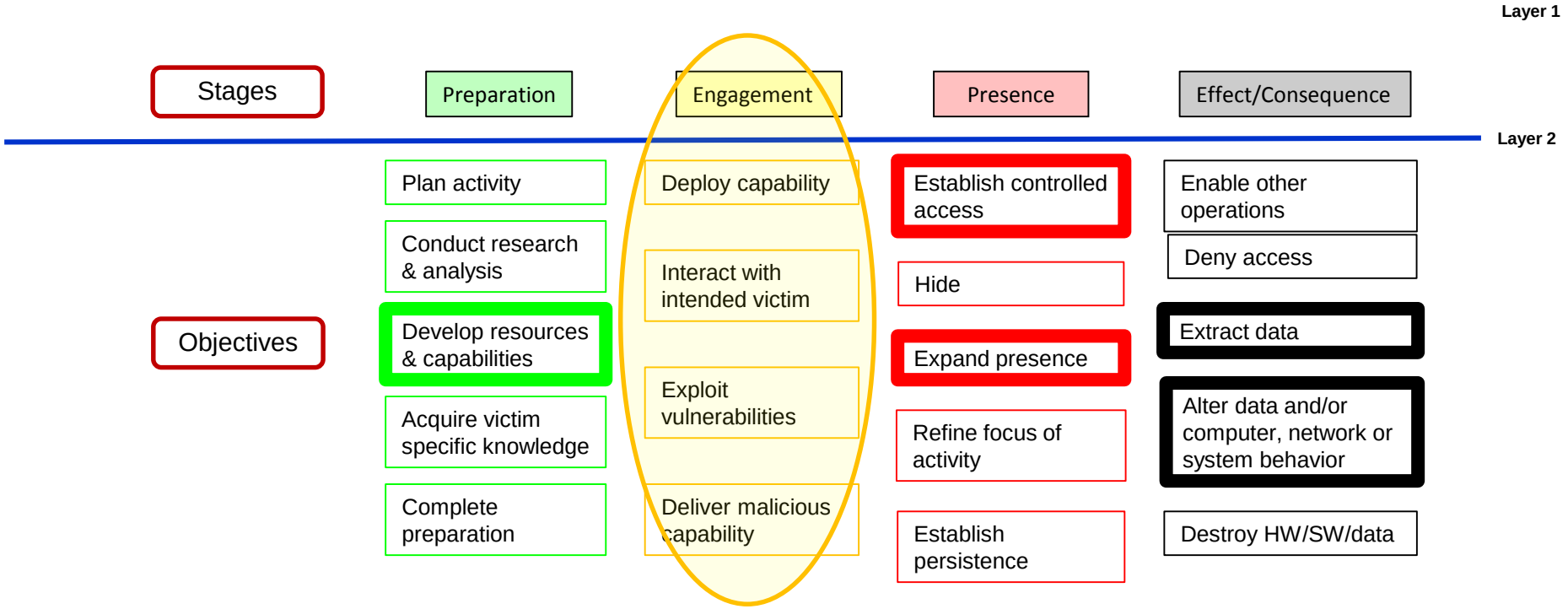


Real Use cases: Cyber Threat Activity Analysis



- Where is my greatest threat?
- What actions should I be taking to protect myself?

Real World Use case: Link or Gap Analysis



The Missing Link?

- Am I looking in the wrong place?
- Is there nothing illicit to see? (insight into adversary behavior)

Recap: With So Many Cyber Threat Models or Frameworks *Why build another?*

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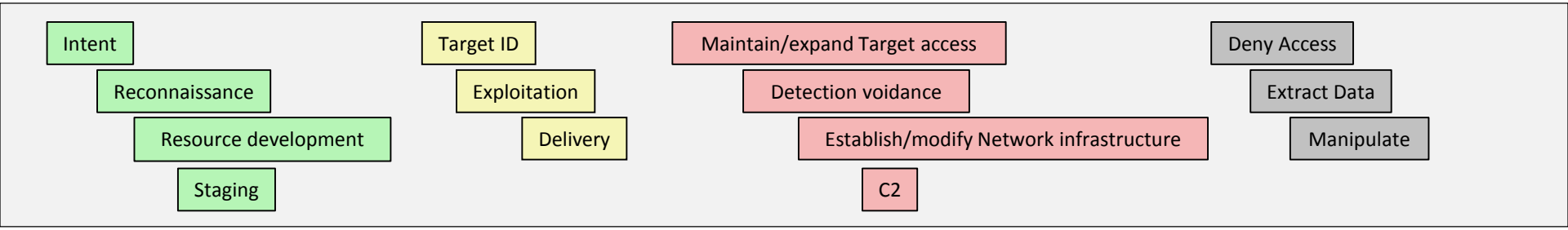
…because a Common Approach Facilitates Grouping and Comparison of Cyber Threats from Different Perspectives



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Common Cyber Threat Framework

Current Status

- Used in threat products by multiple US Government agencies and some Allies
- Adoption across the Executive Branch high priority for 2018
- Under consideration by NATO and Asian allies to facilitate a common operating picture and enhance information sharing
- Being taught to new US Government cyber analysts
- Included in curricula and research at multiple universities
- Evolution continues based on use and ongoing outreach to industry, academia, government, and international partners

Framework materials available at DNI.GOV