



National Security Agency/Central Security Service



INFORMATION ASSURANCE DIRECTORATE

CGS Understand Mission Flows Capability

Version 1.1.1

Understand Mission Flows encompasses the definition and articulation of the relationship and dependencies of the mission to the people, process, technology, and environment that directly fulfill or support the missions.

07/30/2012



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1 Revisions

Name	Date	Reason	Version
CGS Team	30 June 2011	Initial release	1.1
CGS Team	30 July 2012	Inclusion of new IAD document template & Synopsis	1.1.1



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2 Capability Definition

The Capability definition provides an understanding of the importance of the Capability to the Enterprise. It provides a high-level overview of the Capability based on definitions derived from Committee on National Security Systems (CNSS) Instruction No. 4009.

Understand Mission Flows encompasses the definition and articulation of the relationship and dependencies of the mission to the people, process, technology, and environment that directly fulfill or support the missions. Understand Mission Flows provides the capability for the following:

1. Intelligent allocation of resources to establish and maintain functions that fulfill the mission
2. Mission resiliency, i.e., fighting through the attack and service outage, among others
3. Characterization of the mission by its operational status

3 Capability Gold Standard Guidance

The Capability Gold Standard Guidance evaluates the Enterprise needs and overlays the expected Gold Standard behavior. The guidance goes beyond the concept of “good enough” when describing the Gold Standard recommendations, considers industry best practices, and describes a level of security that not only meets current standards but also exceeds them across the Enterprise.

Understand Mission Flows provides context for all other mission assets. The Enterprise shall be able to articulate the relationship and dependencies of the mission to the mission’s functions and component parts. Component parts shall include people, processes, technology, and environment that directly fulfill or support a mission. Moreover, the Enterprise shall be able to articulate the implications to the mission given the degradation or failure of any component part or aggregation of component parts.

Concepts that support Understand Mission Flows include the following:

1. Mission assurance—Lifecycle management process to identify and mitigate design, production, test, and field support deficiencies to ensure mission success
2. Mission resilience—The positive ability of a mission to adapt to the consequences of a catastrophic failure caused by service outage, attack, or other event



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3. Mission schema—A structural outline of an Organization's missions, mission goals, and mission objectives that depicts the relationships between these components
4. Mission map—A visual representation of all the parts of a mission depicting how each part relates to the others
5. Mission dependencies—Functions within or between missions that rely on the operation or output of other missions or their functions
6. Capability map—A visual representation of Capabilities depicting how each Capability relates to the others
7. Function map—A visual representation of functions depicting how each function relates to the others
8. Task map—A visual representation of tasks depicting how each task relates to the others
9. Technology map—A visual representation of a technology implementation depicting how each system and component relates to the others
10. Business process—A collection of related, structured activities or tasks that produce a specific service or product
11. Workflow—A sequence of connected steps used to accomplish a specific purpose

It is important that the Enterprise understand the mission so that it can understand what missions may be impacted and can ensure that the network can continue to operate as expected. It is also important that the Enterprise understand the vision and goals that the mission supports so that it can generate an accurate mission map. The mission map shall be able to be integrated into the overall Organization mission maps, vision, and other overarching areas. Output of this type of analysis shall go toward managing the network. This can be complex because an Enterprise can have compounded missions.

The mission definitions shall be obtained from authoritative sources and are used in the activities for Understand Mission Flows. The activities are discovery of the mission, definition of how missions flow, and creation/allocation of resources to achieve mission flows. Resources can include bandwidth, hardware, software, and manpower. Allocating resources shall require coordination with other Capabilities. For example, Understand Mission Flows links to the asset databases as defined in the Hardware Device Inventory and Software Inventory Capabilities to provide an information technology linkage to the defined missions. Specific allocation decisions shall be based on mission priority, precedence, and preemption. The Enterprise shall develop a schema they can use as a framework for allocating resources based on the aforementioned criteria. This schema shall provide the structure for the mission map. The schema shall include mission



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relationships, impacts, prioritization, resources assigned, and impact as resources are reassigned, covering the entire network architecture.

The Enterprise shall assess its needs and develop standards to dictate common formats, content types, and update frequency for missions, mission flow information, mission maps, and mission schemas. Feedback on mission flow shall be collected based on security posture and used when making decisions about updating missions.

Once mission flows are established, monitoring the Organization's data flows and other network activity shall be coordinated with other Community Gold Standard Capabilities (see Capability Interrelationships). The other Capabilities shall identify which network traffic supports which mission and shall monitor the network activity. Reports generated by those Capabilities about network activity related to mission flows shall assist the Organization in monitoring the operational status of missions and aid in future decisions regarding mission sustainment and resource allocation.

4 Environment Pre-Conditions

The environment pre-conditions provide insight into environmental, user, and technological aspects needed for Capability implementation. These pre-conditions are services or other Capabilities that must be in place within the Enterprise for the Capability to function.

1. Some resources may support multiple missions.
2. Mission availability/criticality requirements are clearly identified.
3. Missions are clearly defined and articulated.
4. Functions that fulfill the mission are clearly defined.
5. Mission function component parts are clearly defined (people, process, technology, and environment).
6. Enterprise monitoring is in place to discern the current operating states.
7. Characteristics of the component parts are enumerated, and those characteristics critical to executing mission functions are identified.
8. The operational functions that fulfill the mission can be articulated.
9. Existing infrastructure supports communications (inputs and outputs) to integrate Understanding Mission Flows in operations and support decisions related to mission assurance.
10. All missions have an established program management role or office that has a clear understanding of the mission and mission capabilities.



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5 Capability Post-Conditions

The Capability post-conditions define what the Capability will provide. They define functions that the Capability will perform or constraints that the Capability will operate under when performing its function.

1. The Capability does not define the mission, but reflects the mission.
2. The Capability does not interfere with the ability to perform the mission.
3. The Capability provides decision support in terms of mission assurance.
4. The Capability focuses on how the component parts relate to accomplish the mission.
5. The Capability is a process (see Reference Implementation Section) that produces artifacts, which take the form of mission maps and capability maps, among others.
6. The mission map aligns mission with component parts.
7. The mission map identifies critical mission functions and, by extension, critical component parts.
8. The Capability groups mission assets (e.g., systems and resources) according to which missions they support.

6 Organizational Implementation Considerations

Organizational implementation considerations provide insight into what the Organization needs to establish, ensure, and have in place for the specified Capability to be effective. It provides guidance specific to the actions, people, processes, and departments that an Organization will need to execute or establish to implement the guidance described in Section 3 (Capability Gold Standard Guidance).

When Understand Mission Flows is employed correctly, the Organization will possess the ability to understand how people, processes, technology, environment degradation, failure, or loss affects the mission.

Part of Understand Mission Flows is to create a mission map. The mission map will be articulated in a consistent manner for consumption within the enclave and by other parts of an authoritative or sister Organization with need to coordinate many missions or provide direct support to the enclave mission. Mission mapping can be a dynamic process where emerging real-time circumstances can change mission objectives, and hence modify the criticality of mission functions and the component parts of those functions. Understanding Mission Flows is more a dynamic methodology than static product. Mission mapping will be carried out in conjunction with mission management



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personnel including decision-makers, strategists, and those with tactical responsibility. The Organization will be able to identify these resources from its own internal staff or external contractors. Mission mapping is a multistep process that is outlined as follows:

- Understand the Mission Flows Development—Development of mission flows includes discussions and coordination among resource owners, resource operators, and users in a multistep process. First, each mission will be defined along with its associated intent, goals, and objectives. As discussed, this step will be performed outside of the Capability and provided to complete the next steps. Once the mission is defined, functions and their output that directly achieve the mission will be enumerated. Some functions do not directly achieve mission objectives but support the mission in other ways. These functions will be identified as well, including their output and their relationship with mission direct functions. Functions, whether complex or not, will be composed of component parts (people, process, technology, and environment), each of which plays a role that will be taken into account. The connections, interactions, and dependencies between each function and its component parts will be enumerated, including any relevant priorities and impact on achieving the mission. Finally, the expected outputs of the relevant components that either work to achieve the mission or that the mission depends on will be identified. In addition, contingency plans will be in place that take into consideration all mission dependencies and the impact on the mission given a loss or degradation of any of the components the mission relies on.
- Understand Mission Flows Implementation—The Organization will establish monitoring of all resources that provide outputs to or accept inputs from the mission in order to provide situational awareness of mission flows. Moreover, the Organization will establish manual or automated procedures for intervention upon mission flow interruption. Other Capabilities will be responsible for monitoring and intervention (see Capability Interrelationships).
- Understand Mission Flows Reporting—The Capability will provide reports on mission flow characteristics including trending. These reports will vary in detail depending on the consumer of the report (see Understand Mission Flows Report Consumers). Some data included in these reports will be acquired from other Capabilities (e.g., Understand Data Flows, Network Enterprise Monitoring).
- Understand Mission Flows Report Consumers—The Understand Mission Flows Capability will generate reports as output. Several different groups will act as the consumers of these reports including policy makers, strategists, and operations groups. These reports will be useful for governance purposes because they detail awareness of mission readiness and current operational status. Reports



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also will aid in decisions about policy changes and reviews related to various missions. System administrators and project managers will use the reports for resource planning and allocation to maintain service level agreements (SLAs). As a part of operations management, reports will be used to make decisions about tactical movement of resources to maintain SLAs. Mission flow reports also will feed into other Capabilities, namely Understand Data Flows and Network Enterprise Monitoring, for use in their ongoing situational awareness functions.

7 Capability Interrelationships

Capability interrelationships identify other Capabilities within the Community Gold Standard framework that the Capability in this document relies on to operate. Although there are many relationships between the Capabilities, the focus is on the primary relationships in which the Capabilities directly communicate with or influence one another.

7.1 Required Interrelationships

The following Capability interrelationships include the other Capabilities within the Community Gold Standard framework that are necessary for the Capability in this document to operate.

- Network Mapping—The Understand Mission Flows Capability relies on the Network Mapping Capability to provide a visualization of the network components so they can all be related to a mission.
- Understand Data Flows—The Understand Mission Flows Capability relies on the Understand Data Flows Capability to provide information about data flows that support mission operations and mission flows.
- Hardware Device Inventory—The Understand Mission Flows Capability relies on the Hardware Device Inventory Capability to provide information about hardware that feeds into mission planning decisions.
- Software Inventory—The Understand Mission Flows Capability relies on the Software Inventory Capability to provide information about software that feeds into mission planning decisions.

7.2 Core Interrelationships

The following Capability interrelationships include the Capabilities within the Community Gold Standard framework that relate to every Capability.



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- Portfolio Management–The Understand Mission Flows Capability relies on the Portfolio Management Capability to determine current and future investment needs and prioritize investments based on those needs.
- IA Policies, Procedures, and Standards–The Understand Mission Flows Capability relies on the IA Policies, Procedures, and Standards Capability to provide information about applicable federal laws, Executive Orders, regulations, directives, policies, procedures, and standards.
- IA Awareness–The Understand Mission Flows Capability relies on the IA Awareness Capability for an awareness program to inform personnel of their responsibilities related to IA.
- IA Training–The Understand Mission Flows Capability relies on the IA Training Capability to provide training programs related to IA activities in accordance with agency policies.
- Organizations and Authorities–The Understand Mission Flows Capability relies on the Organizations and Authorities Capability to establish the relevant roles and responsibilities.

7.3 Supporting Interrelationships

The following Capability interrelationships include the other Capabilities within the Community Gold Standard framework that are not necessary for the Capability to operate, although they support the operation of the Capability in this document.

- Network Security Evaluations–The Network Security Evaluations Capability relies on the Understand Mission Flows Capability to provide information that is used to fill any gaps that may have been overlooked when enumerating mission flows.
- Risk Mitigation–The Understand Mission Flows Capability implements individual countermeasures that may be selected by the Risk Mitigation Capability.

8 Security Controls

This section provides a mapping of the Capability to the appropriate controls. The controls and their enhancements are granularly mapped according to their applicability. In some instances, a control may map to multiple Capabilities.

Control Number/Title	Related Text
NIST SP 800-53 Revision 3, <i>Recommended Security Controls for Federal Information Systems and Organizations</i>	
PM-7 ENTERPRISE ARCHITECTURE	Control: The organization develops an enterprise architecture with consideration for information security and the resulting risk



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	to organizational operations, organizational assets, individuals, other organizations, and the Nation. Enhancement/s: None Specified
PM-11 <i>MISSION/BUSINESS PROCESS DEFINITION</i>	Control: The organization: a. Defines mission/business processes with consideration for information security and the resulting risk to organizational operations, organizational assets, individuals, other organizations, and the Nation; and b. Determines information protection needs arising from the defined mission/business processes and revises the processes as necessary, until an achievable set of protection needs is obtained. Enhancement/s: None Specified

9 Directives, Policies, and Standards

This section identifies existing federal laws, Executive Orders, regulations, directives, policies, and standards applicable to the Capability but does not include those that are agency specific.

Understand Mission Flows Directives and Policies

Title, Date, Status	Excerpt / Summary
Intelligence Community (IC)	
Nothing found	
Comprehensive National Cybersecurity Initiative (CNCI)	
NSPD-54/HSPD-23 Cybersecurity Presidential Directive (Comprehensive National Cybersecurity Initiative [CNCI]), 8 January 2008, Classified	Summary: National Security Presidential Directive-54/Homeland Security Presidential Directive-23 (NSPD-54/HSPD-23), in which the Comprehensive National Cybersecurity Initiative (CNCI) is described, is classified. Initiative 7 deals with increasing the security of classified networks.
Department of Defense (DoD)	
DoDI 8410.02 NetOps for the Global Information Grid (GIG), 19 December 2008, Unclassified	Summary: This instruction identifies a purpose “Establishes policy and assigns responsibilities for implementing and executing NetOps, the DoD-wide operational, organizational, and technical capabilities for operating and



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	<p>defending the GIG.” It sets policy, “4. d. As information systems capabilities mature, they shall be capable of reporting their system status to include fault, configuration, performance, and security to facilitate GIG health and mission readiness assessments.</p> <p>4. f. A common set of NetOps mission-driven metrics, measurements, and reporting criteria shall be used to assess GIG operating performance and to determine the mission impact of service degradations or outages.”</p>
Committee for National Security Systems (CNSS)	
CNSSI 1253 Security Categorization and Control Selection for National Security Systems, October 2009, Unclassified	<p>Summary: This instruction targets many information assurance (IA) professional roles and also targets mission/application owners. In addition to providing the basis for security controls, Chapter 2 addresses establishing the security categorizations, and the mission owner helping assess the impact on the mission with the loss of security controls. Understanding the mission flow is necessary to complete this process.</p>
Other Federal (OMB, NIST, ...)	
Nothing found	
Executive Branch (EO, PD, NSD, HSPD, ...)	
Nothing found	
Legislative	
Nothing found	

Understand Mission Flows Standards

Title, Date, Status	Excerpt / Summary
Intelligence Community (IC)	
Nothing found	
Comprehensive National Cybersecurity Initiative (CNCI)	
Nothing found	



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Department of Defense (DoD)	
Nothing found	
Committee for National Security Systems (CNSS)	
Nothing found	
Other Federal (OMB, NIST, ...)	
Nothing found	
Executive Branch (EO, PD, NSD, HSPD, ...)	
Nothing found	
Legislative	
Nothing found	
Other Standards Bodies (ISO, ANSI, IEEE, ...)	
Nothing found	

10 Cost Considerations

This section provides examples of some of the types of costs that the Organization will need to consider when implementing this Capability. The following examples are costs that are common across all of the Community Gold Standards Capabilities:

1. Solution used for implementation (hardware and/or software)
2. Necessary training
3. Licensing (if applicable)
4. Lifecycle maintenance
5. Impact/dependency on existing services
6. Manpower to implement, maintain, and execute
7. Time to implement, maintain, and execute
8. Network bandwidth availability and consumption
9. Scalability of the solution relative to the Enterprise
10. Storage and processing requirements

In addition to the common costs, the following are examples of cost considerations that are specific to this Capability:



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1. Mission incompatibility—The Enterprise will need to prioritize missions and mission objectives when missions are incompatible with one another.
2. Number of connections—The number of different connections within the Enterprise, with other Organizations, and with the Internet will contribute to the overall complexity of understanding mission flows.
3. Scope of work—The number of devices and breadth of hardware/software will contribute to the complexity of understanding mission flows.

11 Guidance Statements

This section provides Guidance Statements, which have been extracted from Section 3 (Capability Gold Standard Guidance) of this Capability document. The Guidance Statements are intended to provide an Organization with a list of standalone statements that are representative of the narrative guidance provided in Section 3. Below are the Guidance Statements for the Network Mapping Capability.

- To understand mission flows, the Enterprise shall be able to define and articulate the relationship and dependencies of the mission to the component parts (people, process, technology, and environment) that directly fulfill or support the missions.
- Component parts shall include people, processes, technology, and environment that directly fulfill or support a mission.
- Each department and agency shall be able to articulate the implications to the mission given the degradation or failure of any component part or aggregation of component parts.
- The Enterprise shall include mission assurance to identify and mitigate design, production, test, and field support deficiencies to ensure mission success.
- The Enterprise shall include mission resilience, which is the positive ability of a mission to adapt to the consequences of a catastrophic failure caused by service outage, attack, or other event.
- The Enterprise shall include mission schema, which is a structural outline of an Organization's missions, mission goals, and mission objectives that depicts the relationships between these components.
- The Enterprise shall include mission maps, which are visual representations of all the parts of a mission depicting how each part relates to the others.
- The Enterprise shall include mission dependencies, which are functions within or between missions that rely on the operation or output of other missions or their functions.



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- The Enterprise shall include capability maps, which are visual representations of the relationship of capabilities to the other capabilities.
- The Enterprise shall include function maps, which are visual representations of functions depicting how each function relates to the others.
- The Enterprise shall include task maps, which are visual representations of tasks depicting how each task relates to the others.
- The Enterprise shall include a visual representation of a technology implementation depicting how each system and component relates to the others.
- The Enterprise shall include business processes, which are a collection of related, structured activities or tasks that produce a specific service or product.
- The Enterprise shall include workflows, which are a sequence of connected steps used to accomplish a specific purpose.
- The mission map shall be able to be integrated into the overall Organization mission maps, vision, and other overarching areas.
- Output of the mission map analysis shall be used to manage the network.
- The mission definitions shall be obtained from authoritative sources and used in the activities for understand mission flows.
- Allocating resources shall require coordination with other Enterprise systems.
- Specific allocation decisions shall be based on mission priority, precedence, and preemption.
- The Enterprise shall develop a schema, which can be used as a framework for allocating resources and provides the structure for the mission map. The schema shall include mission relationships, impacts, prioritization, resources assigned, and impact as resources are reassigned, covering the entire network architecture.
- Each department or agency shall assess its needs and develop standards to dictate common formats, content types, and update frequency for missions, mission flow information, mission maps, and mission schemas.
- Feedback on mission flow shall be collected based on security posture and used when making decisions about updating missions.
- The Enterprise shall identify which network traffic supports which mission and shall monitor the network activity.
- The Enterprise shall leverage reports about network activity related to mission flows to assist the Organization in monitoring the operational status of missions and aid in future decisions regarding mission sustainment and resource allocation.