Information Security Continuous Monitoring (ISCM) Program Evaluation

Cybersecurity Assurance Branch
Federal Network Resilience Division

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Introduction

- **Chad J. Baer, Chief Operational Assurance**
  - Cybersecurity Assurance Branch, Federal Network Resilience
- **NCCoE tasked in three areas to support Federal Network Resilience**
  - Task #1 – Develop Information Security Continuous Monitoring Assessment Methodology
    - NCCoE will develop a methodology to assess federal agency ISCM programs. The methodology will be based on a staff assistance approach as opposed to a more traditional compliance based approach.
  - Ron Rudman, Senior Principal Cybersecurity Engineer
- **Get out of the Audit mindset for this presentation!**

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Agenda

- INTRODUCTION
- FEDERAL NETWORK RESILIENCE
- CYBERSECURITY ASSURANCE BRANCH ASSISTANCE
- FEDERAL ISCM EVALUTION

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Federal Network Resilience

A brief overview of the FNR mission and organizational goals

Federal Cybersecurity Priorities and Drivers

- **FISMA 2014 Authorities**
  - The Secretary of DHS, in consultation with the Director of OMB, shall administer the implementation of agency information security policies and practices for information systems:
    - "monitoring agency implementation of information security policies and practices"
    - "providing operational and technical assistance to agencies in implementing policies, principles, standards, and guidelines on information security, including ***implementation of standards promulgated under section 11331 of title 40"***
  - ***Supports Federal Agencies mission in meeting responsibilities under Section 3554***
- **Administration Cross-Agency Priority Goals (FY15-17)**
  - Information Security Continuous Monitoring Mitigation (ISCM) – *Provide ongoing observation, assessment, analysis, and diagnosis of an organization's cybersecurity: posture, hygiene, and operational readiness*
- ***OMB Memorandum 14-03 – Enhancing the Security of Federal Information and Information Systems***

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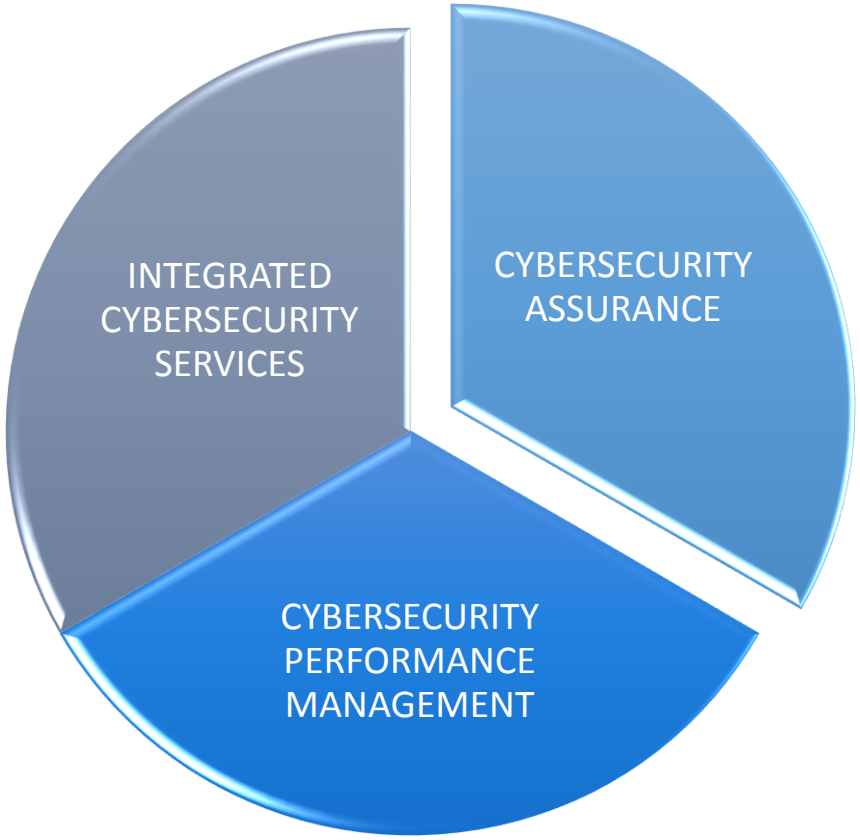
FNR Mission Goals

- Improve Federal cybersecurity
- Develop measureable cybersecurity performance metrics
- Engage with agencies across the Executive Branch to support priority cybersecurity programs



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Cybersecurity Assurance Branch Goals

- Deploy ***adaptive*** cybersecurity assessments of federal civilian agency systems to validate current state cybersecurity against critical federal cybersecurity initiatives, and improve agency and federal cybersecurity posture.
- Provide ***continuous*** assistance to agencies by engaging in security engineering and solution support efforts to verify implementation of security controls, review security architecture, and help define critical systems; to ensure good quality data collection and integration of all priority Federal cybersecurity programs.
- Provide a ***holistic*** view of Federal cybersecurity posture, and show agencies are improving!

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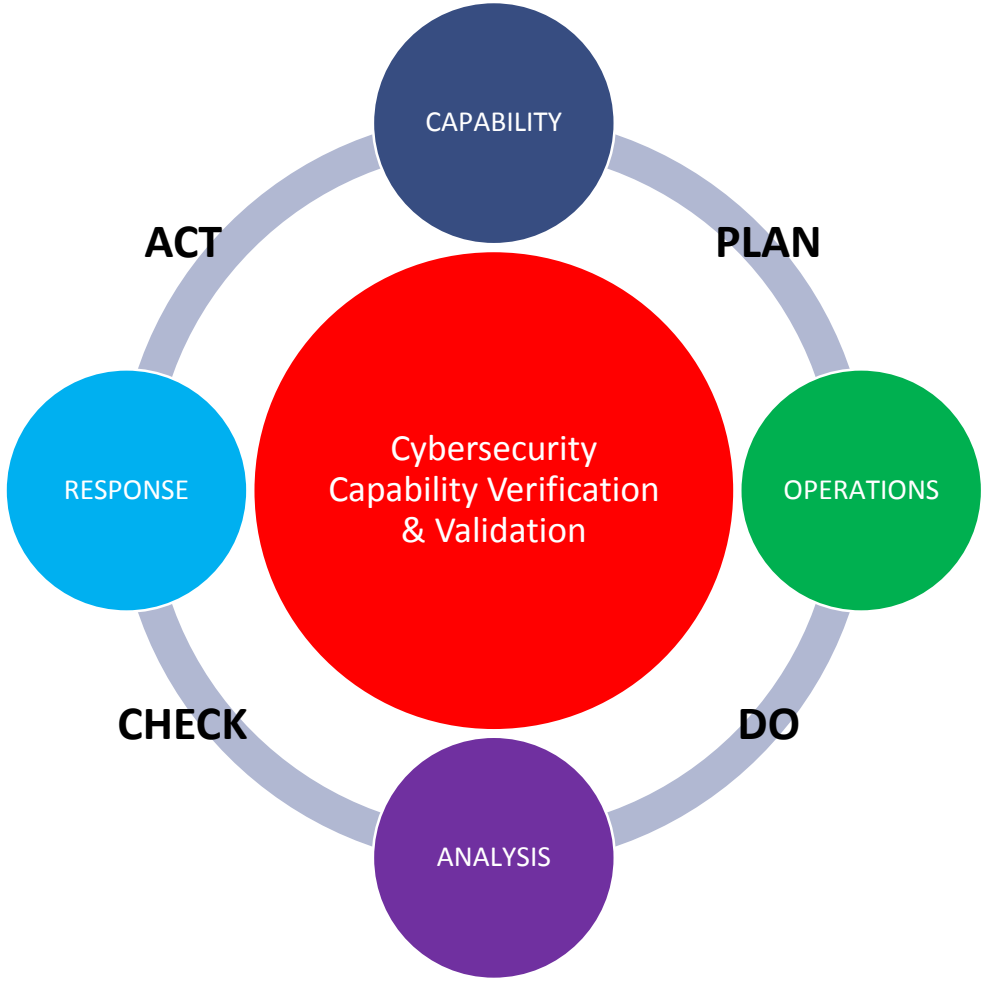
Operational Assurance & Readiness

- ***Capability*** **–** Does the agency have a capability adopted and defined?
- ***Operations*** **–** Are they meeting those capabilities functionally in operations?
- ***Analysis*** **–** Do they collect and understand data outputs?
- ***Response*** **–** Does the agency use this information to improve their capabilities, operations, and analysis?



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Operational Assurance Services

- **Federal Incident Response Evaluation –** Based off the Federal Computer Network Defense (F-CND) assessment developed by FNR, US-CERT, and SEI. Added DISA Evaluator's Scoring Metrics (ESM) and priority levels.
  - This is a robust evaluation of incident management **capabilities** that can facilitate an initial triage of IR/IH program implementation. This is not a verification of operational execution.

✓ **Federal ISCM Evaluation –** A modular evaluation which initially leverage NIST SP 800-137 Information Security Continuous Monitoring guidance and the US Government Concept of Operations for ISCM to provide a holistic view of D/A cybersecurity based on ISCM domains.
  - Validates ISCM implementations, both automated and traditional, and verifies select operational functions.
  - Validates CDM Phases implementation rate and reported coverage
  - Provides feedback to DHS programs of gaps, deficiencies, and areas of concern for improvement.

- **Staff Assistance and Verification –** Provides subject matter expertise to agencies in developing cybersecurity capabilities by verifying functional/operational procedures to meet program goals.
- **Binding Operational Directive Validation –** Develop evaluation criteria for select BOD's issued within the Cybersecurity Posture scope of interest and incorporate data points into the assessment methodology for scoring.

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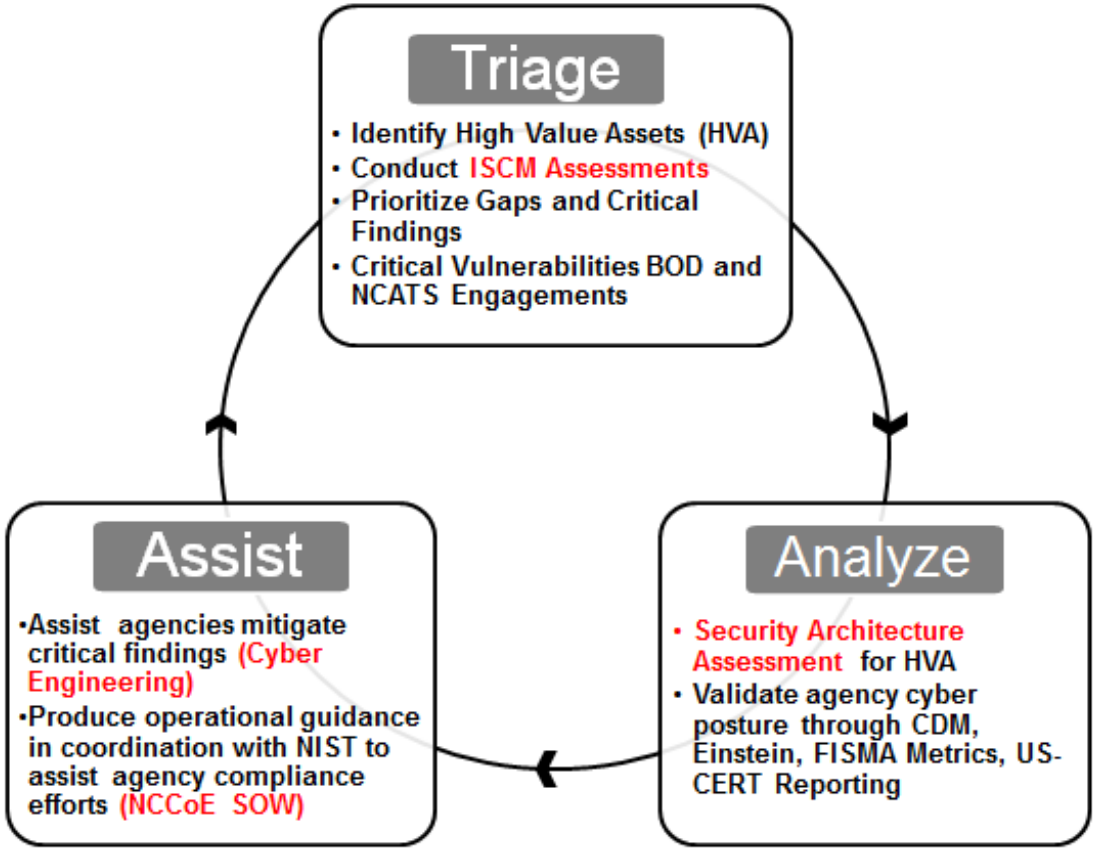
CAB Security Assistance Approach

Strategy to deploy an adaptive and continuous engagement evaluation model based on continuously improving assessment methodologies

CAB Lifecycle Portfolio



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Security Assistance Value Proposition

Federal Audit Model

- Assessment Based
- Temporal Auditing
- Internally Facing
- Stagnant Criteria
- Insulated Information
- Prescriptive Reports

CAB Assistance Model

- Assistance Focused
- Continuous Engagement
- Externally Facing
- Adaptive Criteria
- Accessible Information
- Tailorable Reports

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OA Program Principles

- **Iterative and Adaptive Development (People, Process, Product)**
  - **3 year cycle of relevance for evaluation versions**
    - Issue updated assessment criteria based on lessons learned in previous cycle
    - Bake in mandatory improvements to evolve methodology and maintain relevancy
  - Iterative improvements throughout the cycle
  - Elicit input from agencies, lessons learned, and best practice
- **Verify and Validate Cybersecurity Programs**
  - Are we doing cybersecurity right?
  - Are we doing the right cybersecurity?
  - Are we providing and maintaining our programs properly?
- **Continuous engagement, continuous loopback**
  - Iterative improvements are adopted during one cycle for deployment in the next
  - Upstream and downstream feedback is incorporated
  - Build and maintain positive relationships and equities

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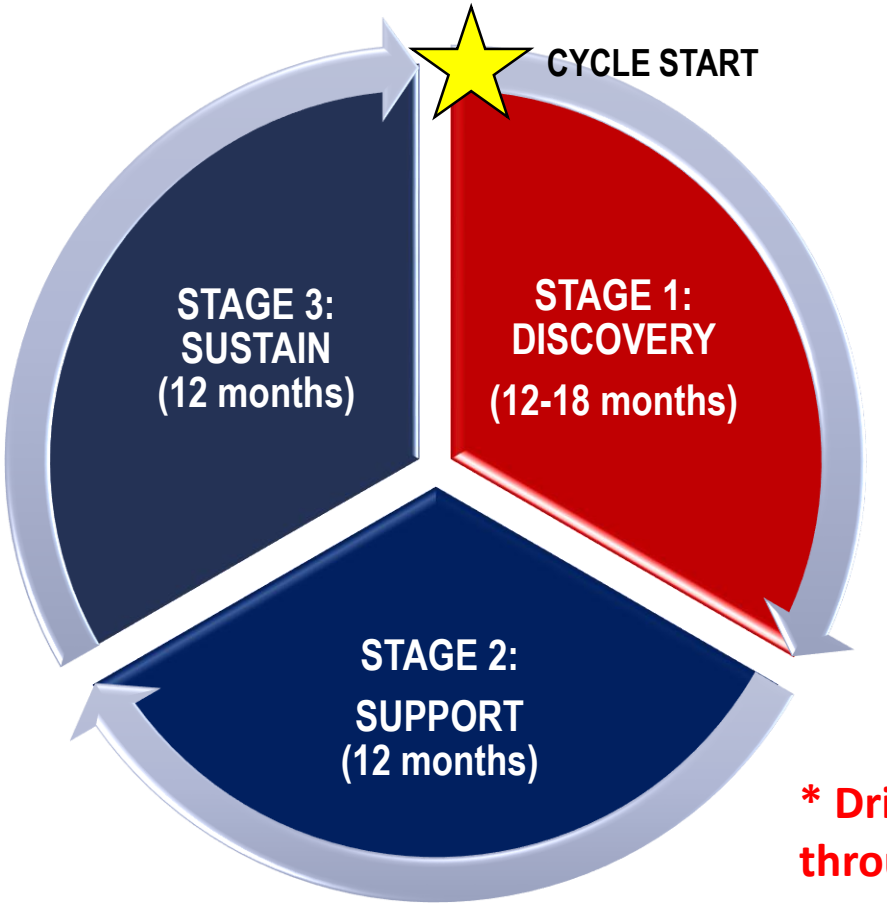
Example: the CAB Assistance Cycle



STAGE 1: DISCOVERY

- **Initiate assistance cycle**
- **Assessment #1**
  - Initial assessment baseline
  - Do they Implement the right cybersecurity?
- **Verify functional security (voluntary)**
  - Analysis and design of systems and programs. A limited view of "do they perform cybersecurity right?"
- **Develop initial Wellness Plan**
  - Plan of Action & Milestones
  - Engineering approach

STAGE 2: SUPPORT

- **Assessment #2**
  - Re-validation and gap analysis
  - Are they managing deficiencies?
- **Wellness support**
  - POA&M Update
  - Engineering Plan
- **Program Gap Analysis**
  - Define new capabilities based on program, operations, or industry

STAGE 3: SUSTAIN

- **Assessment #3**
  - Final Assessment
  - Are they planning for and adopting improvements?
- **Assess New Capabilities**
  - Non-scoring
  - Adopted next cycle
- **Closeout Wellness Plan**
  - POA&M Close out
  - Initiate Next Cycle Wellness Plan
- **Final Reporting for Cycle**

*** Drive improvements throughout the process!**

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Federal ISCM Evaluation

A modular evaluation of cybersecurity posture incorporating ISCM principles and other concerns

TASK 1 OBJECTIVES

- Measure the adoption and implementation of ISCM at agencies
- Quantify the impact of CDM in ISCM programs
- Determine the extent ISCM programs support risk management decisions
- Measure the readiness of agencies for ongoing authorization

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ISCM Evaluation

- Provides a foundation of cybersecurity goals which can then incorporate modular security domains for evaluation.
- Provide a **balanced scorecard** measuring ISCM implementation based on associated program perspectives to determine posture health
- Define automation gaps and assess compensating approach
- Validate and provide feedback to DHS programs
- All assessment activity will be based on and reference appropriate NIST standards and widely accepted best practices.
- *Assumption: Information Security Continuous Monitoring (ISCM) strategy represents a baseline technical foundation for prescribed cybersecurity implementation at this time*

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Guiding Principles

- **Focus on the basic principles of ISCM.**
  - Most agencies are just getting started.
- **Stay at a high level.**
  - Level should be more general than detailed approaches like CDM and NISTIR 8011.
  - Avoid being prescriptive.
- **Provide traceability to authoritative sources.**
- **Keep it simple and straightforward for both agencies and assessment teams.**
- **Be capable of adapting as agency programs mature.**
- **Provide value to agencies so that they desire this engagement regularly to measure their progress.**

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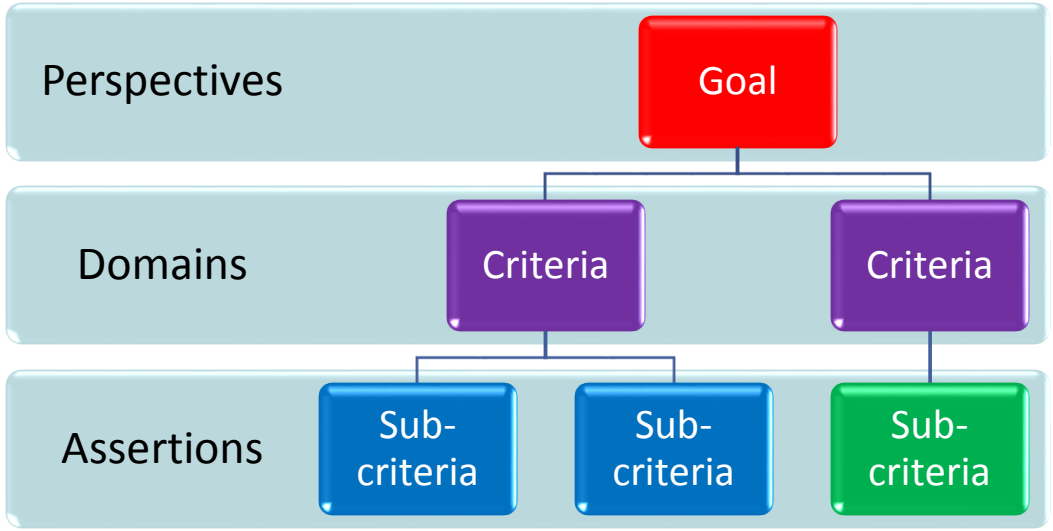
Evaluation Approach

- **Workflow consists of 3 phases in collaboration with the environment owner:**
  - Preparation, Execution, and Delivery
- **Prepare baseline of environment**
- **Collect and review relevant data**
  - Documents: organizational policies and strategies, operational ISCM processes
  - Dynamic ISCM data: dashboards and reports
  - Human insight and interviews
- **Incorporate a sound process for analyzing ISCM based on assessment perspectives**
  - Develop relevant reports for external, internal, and temporal business requests



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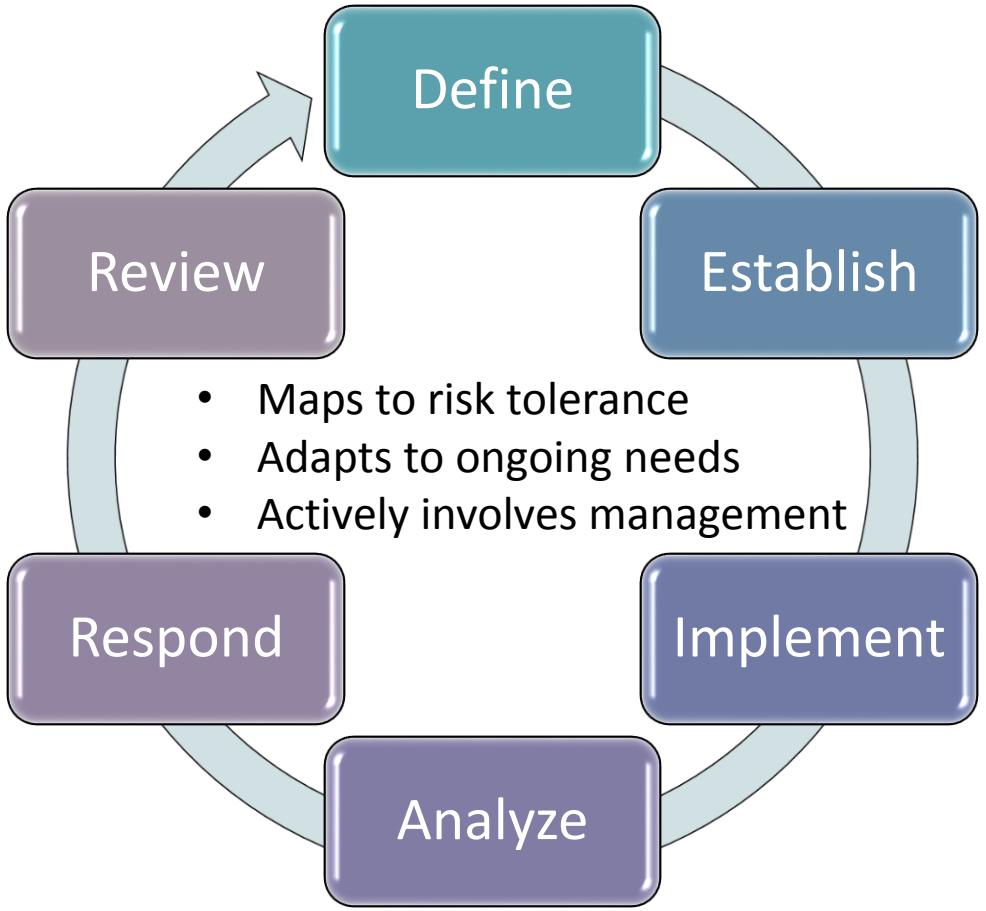
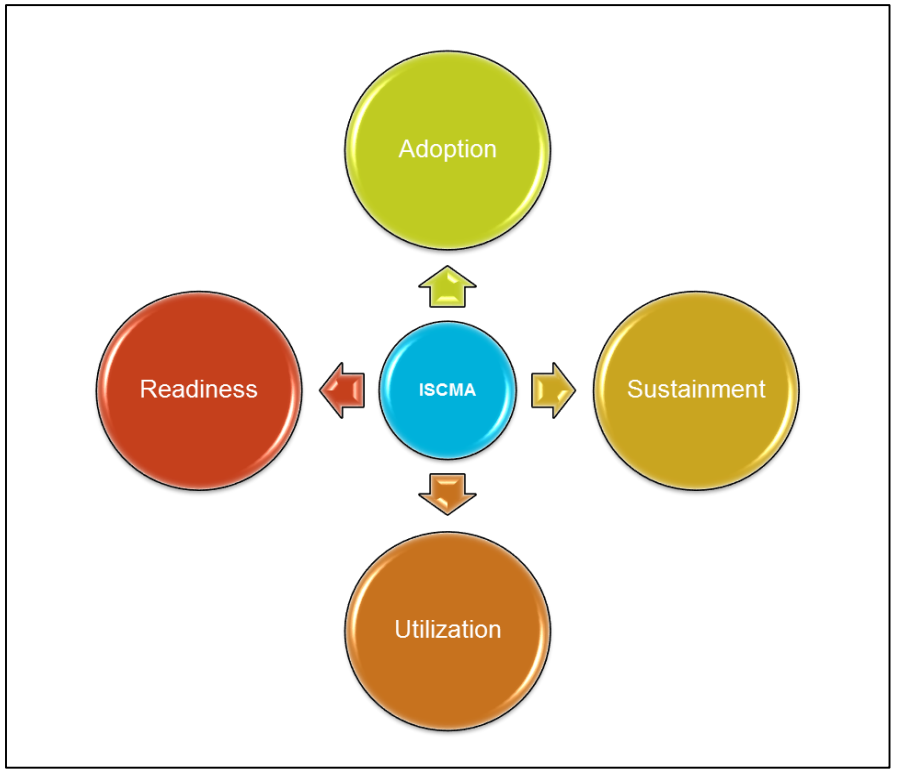
ISCM Process Steps

- **Define** the strategy
- **Establish** a program
- **Implement** the program
- **Analyze** and **Report** findings
- **Respond** to findings
- **Review** and **Update** the program and strategy



Proposed Assessment Perspectives

- **Adoption –** Measures the extent to which ISCM is defined and implemented
- **Utilization –** Measures the integration of ISCM program into the organizations technical and business processes
- **Readiness –** Measures the capability to use the ISCM program to inform the organization for Ongoing Authorization; as well as investments, mitigations, etc.
- **Sustainment –** Measures the degree to which the organization has established support structures to ensure long-term viability of ISCM program



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Breadth

- **The breadth of coverage is based on NIST SP 800-137, NIST SP 800-37, and OMB M-14-03, OMB A-130.**
- **The assessment structure can be viewed as a matrix**
  - Rows: The 6 process steps
  - Columns: The 4 assessment areas

	Adoption	Sustainment	Utilization	Readiness
Define				
Establish				
Implement				
Analyze/Report				
Respond				
Review/Update				

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Flexibility

- **The breadth is flexible.**
  - Begins with Define
  - Can stop after any step to accommodate less mature programs, e.g.,
    - Stop after Define (a “strategy” assessment)
    - Stop after Establish (a “design” assessment)
    - Stop after Implement (an “implementation” assessment)
    - Include all steps (a “full” ISCM assessment)
- **The scope of ISCMA version 1 is steps 1-3.**

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Assessment Scope

- **The assessment scope is a designated agency or possibly a major component of an agency.**
- **Assertions about "each mission/component":**
  - Are reviewed for each mission/component in the designated scope.
  - Must be true for all such missions/components, otherwise they are only partially true.
- **Assertions about "each information system":**
  - Are reviewed for each *high-value system* (at a minimum) in the designated scope.
  - Must be true for all reviewed systems, otherwise they are only partially true.

Assertion Development

- **Assertions are**
  - Statements to be validated by the assessment team
  - Associated with each cell of the matrix
  - At various levels of detail
- **Assertions are generally based directly on the statements related to continuous monitoring extracted from the authoritative sources.**
  - Some assertions were also expanded if this was deemed operationally necessary, e.g., data must be "current and complete" (SP 800-137 Section 2.6) was expanded, as shown in the examples [on the previous slide] of "timeliness."
  - Some assertions were reworded to mitigate ambiguity in the source documents, e.g., "Includes metrics that provide *meaningful* indications of security status"
- **Assertions are also annotated as being critical vs. non-critical, which impacts how they are scored.**

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Assertion Distribution

	Adoption	Sustainment	Utilization	Readiness	Total
Define	18	1	4	2	**25**
Establish	16	5	1	3	**25**
Implement	34	5	3	8	**50**
Total	**68**	**11**	**8**	**13**	**100**

- **Sustainment, Utilization and Readiness will contain additional assertions when the remaining SP 800-137 steps are added.**
- **The contribution of a given assertion toward the total score is independent of the number of other assertions in its cell.**

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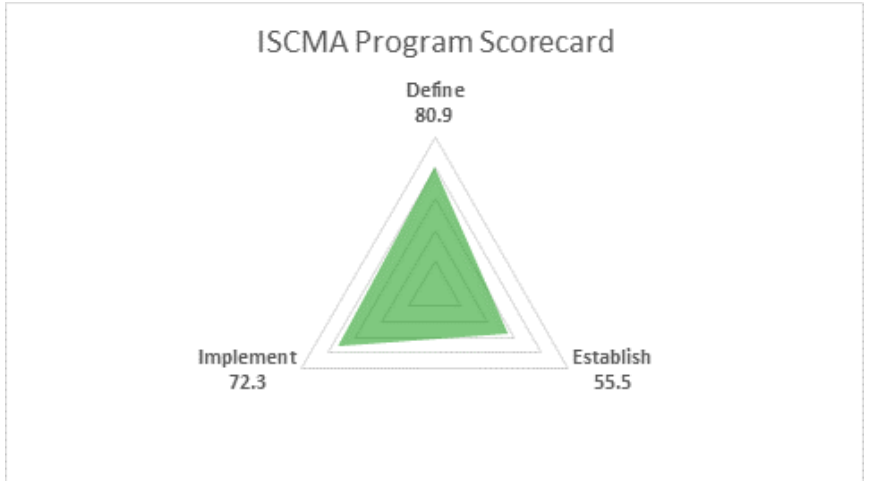
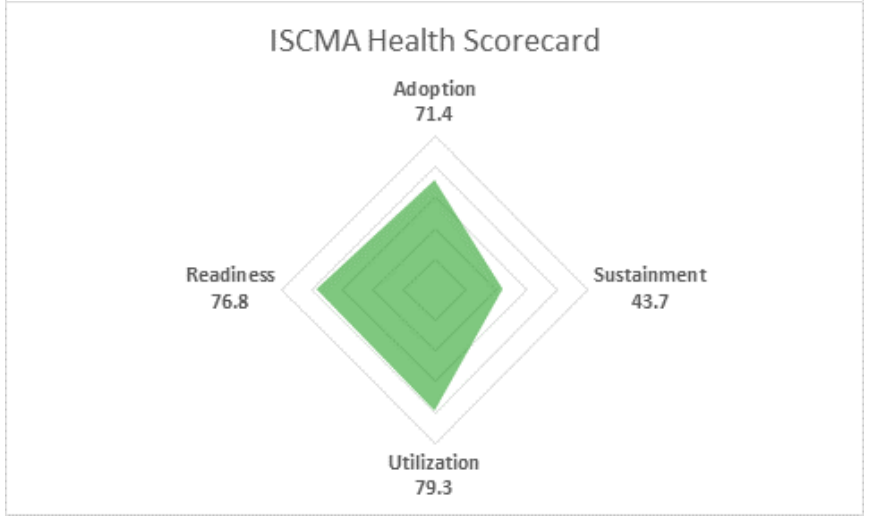
Cyber Posture Scorecard

- A balanced scorecard based on relevant performance perspectives
- Quantifies the health of ISCM strategy and implementation within agency
- Provides decision makers meaningful views of security posture
- Can be used to support maturity model determination





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Analytic Outcomes

- Where can efficiencies be found in the ISCM program?
- How is ISCM affecting risk decisions?
- What portion of ISCM program can be implemented via automation?
- What portion of the ISCM program is implemented via CDM?

Future Directions

- Implement frequent process improvements, especially early in deployment.
- Add Process Steps for Analyze/Report, Respond, and Review/Update.
- Add privacy assertions, as ISCM and Privacy Continuous Monitoring programs are often combined into a single program.
- Explore other scoring techniques.
- Explore integration with existing assessments of maturity level.
- Explore integration with the CyberSecurity Framework.
- Explore ways of addressing outcomes (vs. outputs)

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Thank you!

Please contact Chad Baer (DHS) with any further questions!