RMF for HPC and RDT&E

NIST / NRF HPC Security Working Group

DOD HPC MODERNIZATION PROGRAM

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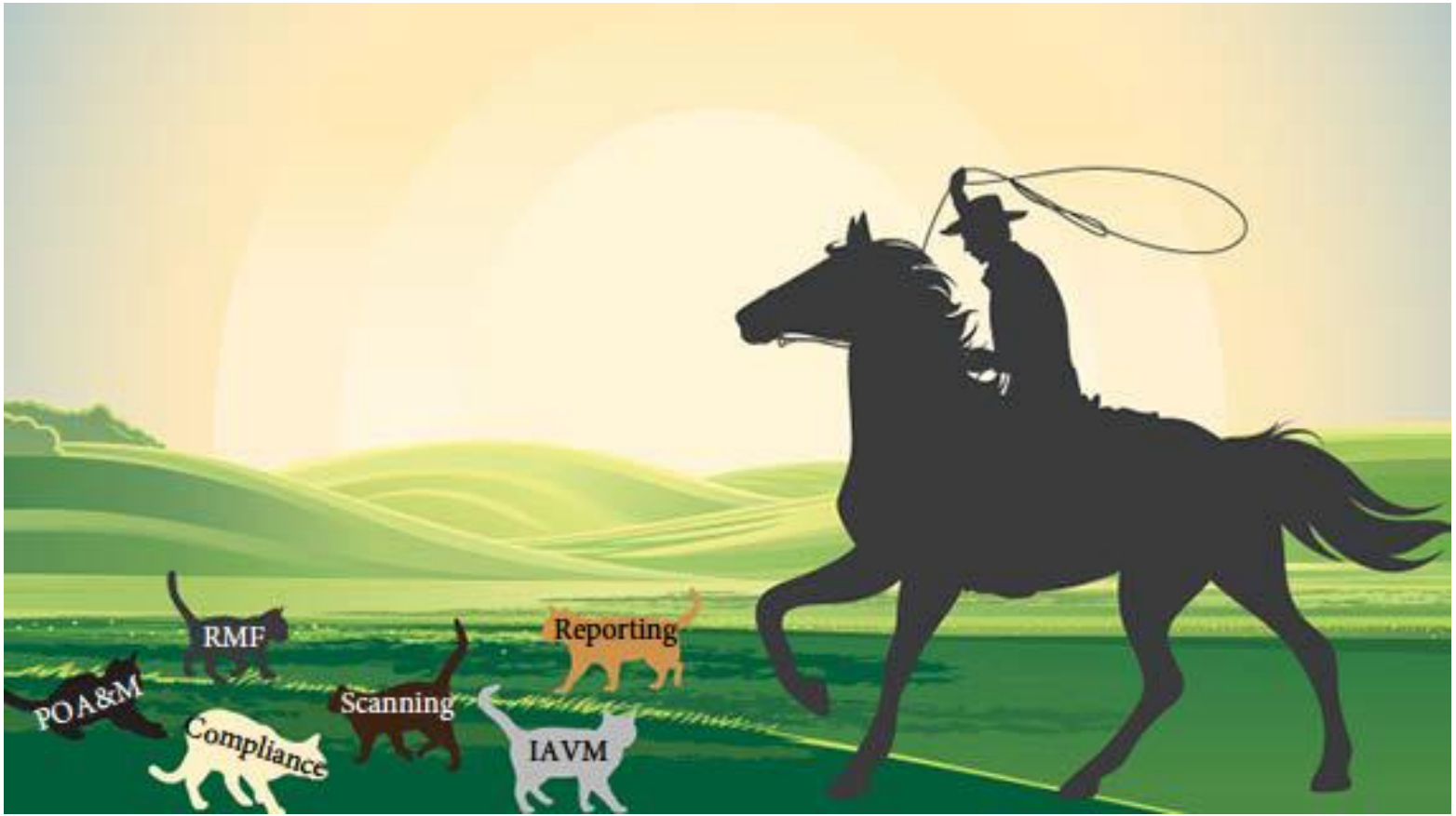
20 May 2024

Cybersecurity is like Herding Cats

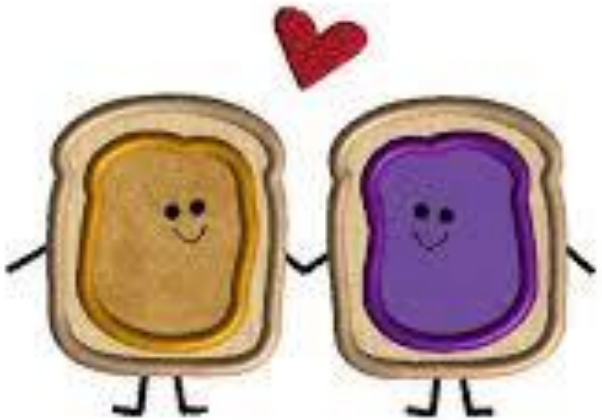


Outline

- **Risk Management Framework Overview**
  - RMF & RDT&E
  - RMF Package Types
  - Inheritance
  - Reciprocity
- **Policies & Procedures**
  - NIST
  - DoD Guidance
- **Questions**

RMF & RDT&E

Go together like peanut butter and jelly…



RMF

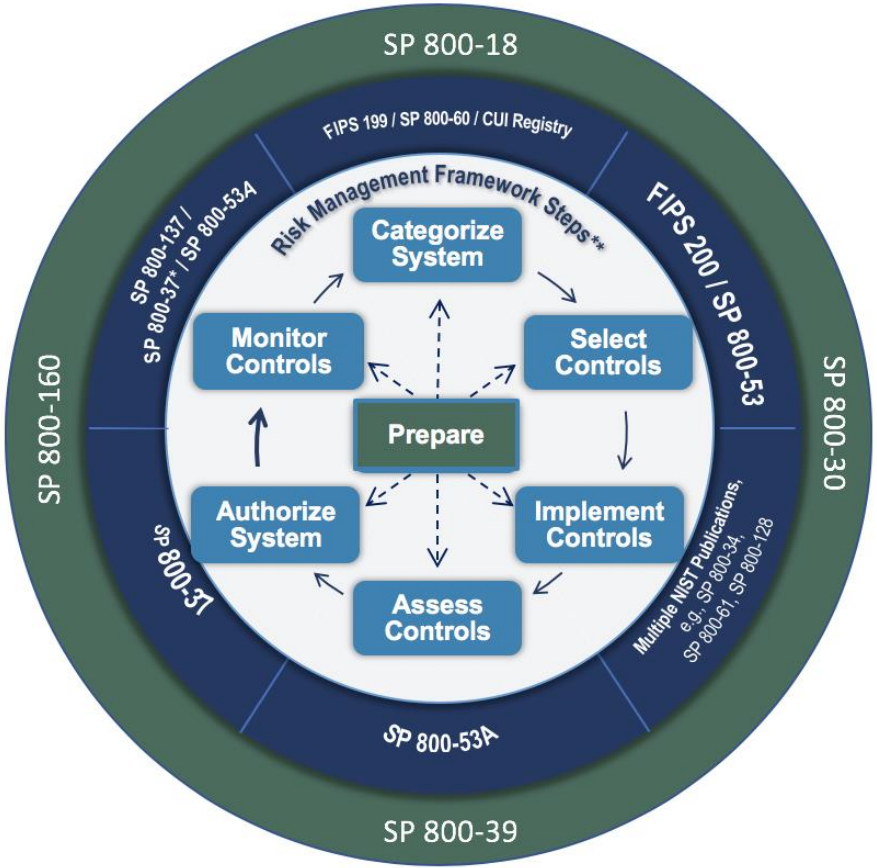
- RMF addresses three basic security principles: **Confidentiality**, **Integrity**, & **Availability** (CIA) to ensure that data cannot be shared or accessed without authorization, cannot be accidentally or maliciously changed, and is available to authorized personnel when and where needed.

- RMF provides consistency for implementing new systems and a mechanism to evaluate risk
  - Documentation, configuration settings, vulnerability scanning, reviews and tiered approvals

- Processes can be adjusted to fit unique systems
  - Package types and approval durations

RMF Has Seven Steps ;)

1. Prepare
2. Categorize
3. Select
4. Implement
5. Assess
6. Authorize
7. Monitor



RMF & RDT&E

Most RMF efforts are focused on the product or result; e.g., software, hardware, system, facility.

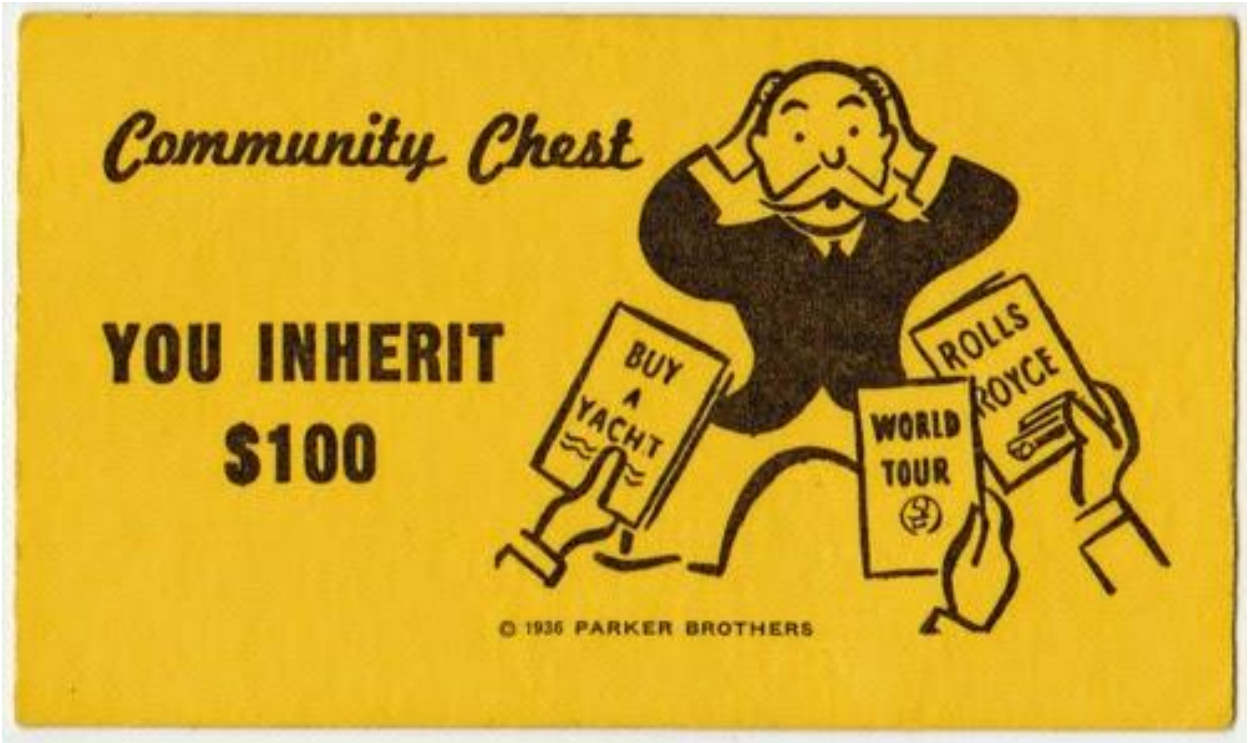
- The focus in RDT&E environments *should* be on the process.
  - How do we develop the software or code? How do we build these systems or appliances? How do we accomplish the test?
- By shifting the focus to the process, we allow for greater flexibility of what needs to be authorized and how to identify and assess the risk.
  - Focus on the **HOW**, not the **WHAT**…

Choosing an RMF Package Type…

RMF Package Types

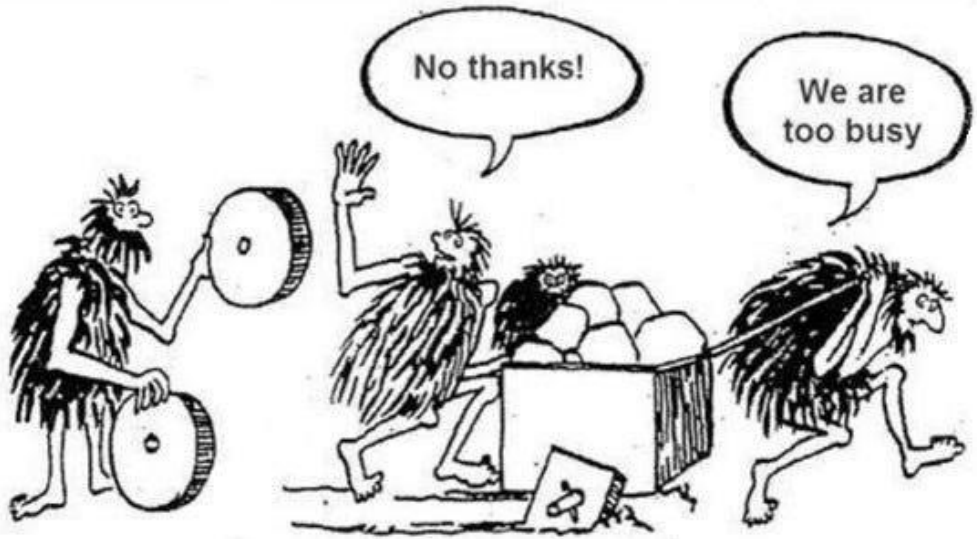
- **Interim Authority to Test (IATT) –** *6 to 12 months*
  - Temporary systems for test events or proof of concept
- **Assess Only –** *12 months*
  - Introducing new systems into an existing authorized enclave or system
    - Technology Insertion, new HPC, new major applications
- **Authority to Connect (ATC) –** *Up to 3 years or ATD*
  - When incorporating an existing authorized system/software into an enclave
    - ACAS, HBSS, software developed/tested by external entity and accepted via reciprocity
- **Assess and Authorize (A & A) –** *3 years*
  - Authorizing new or existing enclaves or systems
    - Software rollout, data center, storage array

RMF Inheritance can be nice…



Inheriting Controls

- Inheritance offers time savings by incorporating security control test results from an entity that has previously obtained approval.



Inheritable Controls

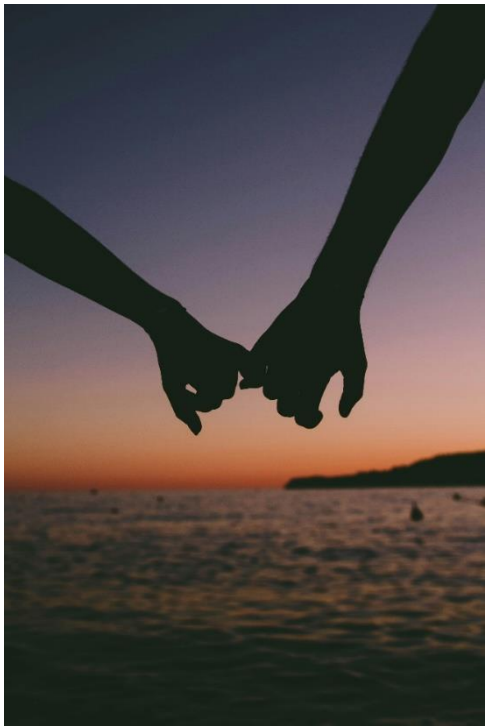
- **Controls can be inherited from a variety of sources.**
  - ***Tier I*** *(High level organization)*
    - *DoD, DoE via a Common Control Provider (CCP)*
    - *Full inheritance*
  - ***Tier II*** *(Mission or business processes)*
    - *Common Control Provider or host organizational package*
    - *Full inheritance*
  - ***Tier III*** *(System or user level)*
    - *Cybersecurity Service Provider (CSSP)*
    - *User organization*
    - *Hybrid inheritance*

**** NOTE ****

Hybrid inheritance = each side has responsibilities for the compliance of the security control.

Reciprocity

- **Reciprocity goes hand in hand with inheritance.**
  - *“reduce redundant testing assessing and documentation,* and the associated costs in time and resources.*” (RMF Knowledge Service)*
  - Inheritance focuses on the controls; reciprocity is aimed at valid approvals of the system or software.
  - Reciprocity can vary from organization to organization, ultimately the decision to accept another entity’s approval resides with the Authorization Official (AO), the individual accepting risk for the system or software.
  - "I expect testing re-use and reciprocity to be implemented except when the cybersecurity risk is too great.“ *(Dep Defense Secretary, K. Hicks)*



Policies & Procedures

Policies & Procedures - DoD

- **The HPCMP adheres to DoD Instructions, Regulations and Memorandums**
  - 8500.01 Cybersecurity
  - 8510.1 Risk Management Framework
  - Defense Information System Agency (DISA)
    - Security Technical Implementation Guides (STIGs)
- **DoD guidance is derived from higher level documents**
  - Appendix III to OMB Circular A-130, Security of Federal Automated Information Resources
  - Public Law 100-235, Computer Security Act of 1987
- **HPCMP Polices and Memos derived from mandated documents**

Non-DoD Policies

- **Other federal organizations, industry partners and academia generally follow NIST guidance**
  - SP800-18 Developing Security Plans
  - SP800-30 Conducting Risk Assessments
  - SP800-37 Risk management Framework
  - SP800-39 Managing Information Security Risk
  - SP800-53 Security & Privacy Controls
  - SP800-53A Assess Security & Privacy Controls
  - SP800-137 Information System Continuous Monitoring
  - SP800-160 Systems Security Engineering
  - SP800-223 High Performance Computing Security
  - FIPS 199 Security Categorization

- **NIST & DoD guidance are derived from higher level documents**
  - Appendix III to OMB Circular A-130, Security of Federal Automated Information Resources
  - Public Law 100-235, Computer Security Act of 1987
  - Executive Orders

Questions?

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Abbreviations and Acronyms

TERM	DEFINITION
A & A	Assess and Authorize
AO	Authorizing Official
ATC	Authority to Connect
CIA	Confidentiality, Integrity, Availability
CSSP	Cybersecurity Service Provider
DISA	Defense Information System Agency
DREN	Defense Research and Engineering Network
eMASS	Enterprise Mission Assurance Security System
FIPS	Federal Information Processing Standards
IATT	Interim Authority to Test
ISSM	Information System Security Manager
NIST	National Institute of Standards and Technology
OMB	Office of Management and Budget
POA&M	Plan of Action and Milestones
RDT&E	Research Development Test & Evaluation
RMF	Risk Management Framework
SCA	Security Control Assessor
SP	Special Publication (NIST naming convention)
STIG	Security Technical Implementation Guide