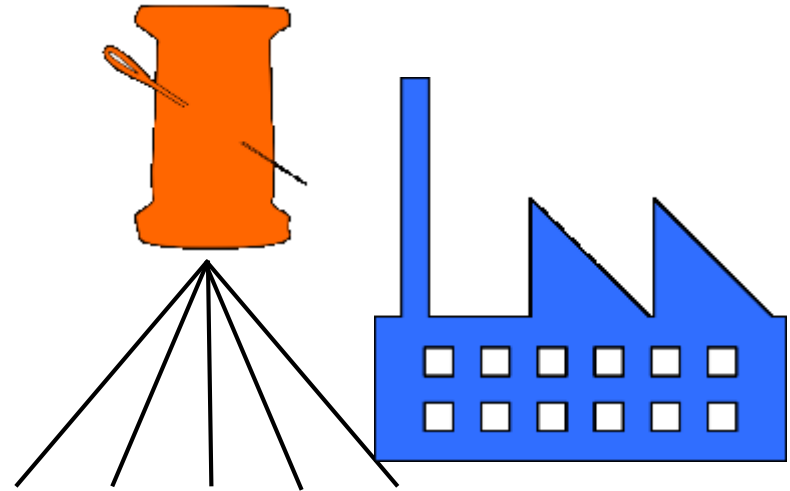


# Baseline Tailor

## Software-aided Security Control Selection

Joshua Lubell  
Engineering Laboratory  
April 21, 2016



Security Control Editor | Cyber Framework Browser | Cross References | Framework Profile

Baselines:  LOW  MODERATE  HIGH  N/A Defaults

Priorities:  P0  P1  P2  P3 Defaults

Restrict controls to Framework Profile informative references:

Control family: IDENTIFICATION AND AUTHENTICATION

Control: IA-3 - DEVICE IDENTIFICATION AND AUTHENTICATION

Framework Core Subcategories Referencing IA-3

CONTROL NUMBER	CONTROL NAME <i>Control Enhancement Name</i>	BASELINE IMPACT	ADDED SUPPLEMENTAL GUIDANCE	CONTROL BASELINES		
				LOW	MODERATE	HIGH
IA-3	<b>DEVICE IDENTIFICATION AND AUTHENTICATION</b>	LOW	<input checked="" type="checkbox"/>	Added	Selected	Selected
IA-3(1)	CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION	MODERATE	YES		Added	Added
IA-3(3)	DYNAMIC ADDRESS ALLOCATION	N/A	NO			
IA-3(4)	DEVICE ATTESTATION	MODERATE	(1)	Added		Added

XML representation:

```
<tailoredControl>
  <family>IDENTIFICATION AND AUTHENTICATION</family>
  <rationale flag="true">ICS may exchange information with many external systems and devices. Identifying and authenticating the devices introduces situations that do not exist with humans. These controls include assignments that enable the organization to categorize devices by types, models, or other group characteristics. Assignments also enable the organizations to select appropriate controls for local, remote, and network connections.</rationale>
  <control number="IA-3">
    <title>DEVICE IDENTIFICATION AND AUTHENTICATION</title>
    <default value="2"/>
    <impact value="1"/>
    <guidance flag="true">The organization may permit connection of devices, also known as non-person entities (NPE), belonging to and authorized by another organization (e.g., business partners) to their ICS. Especially when these devices are non-local, their identification and authentication can be vital. Organizations may perform risk, and impact analysis to determine the required
```

Additional Supplemental Guidance:  
requires strength or authentication protocols which do not provide remote network connections, in physical security measures.

Control Enhancement (1)  
time the software is changed to purpose hardware (e.g., custom and printed-circuit boards) as dependencies. Organization def may be different among the imp

Rationale for changing the enable the organization to cat types, models, or other group Assignments also enable the org appropriate controls for local connections.]

# Disclaimer



Certain commercial products are identified to help explain the research. Such identification is not intended to imply recommendation or endorsement by the National Institute of Standards and Technology, nor is it intended to imply that the products identified are necessarily the best available for the purpose.

# Outline

- What, who, and why
- Baseline Tailor overview
- Demo: tailoring a security control
- Demo: supporting Risk Management Framework (RMF) **Select** step with a Cybersecurity Framework (CSF) Profile
- Concluding remarks

---

*Examples inspired by guidance from NIST SP 800-82  
(Guide to Industrial Control Systems Security)*

# What is Baseline Tailor?

Experimental open-source software for:

- Developing Cybersecurity Framework Profiles
- Tailoring National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53 security controls
- Generating Extensible Markup Language (XML) output
- Using the CSF and NIST SP 800-53 together

*Baseline Tailor supports the **Select** step of the RMF*

# Potential Baseline Tailor Users

- People responsible for:
  - Information system development
  - Cybersecurity implementation and operation
- Developers of:
  - Industry sector-specific cybersecurity guidance
  - Cybersecurity-related software applications
- Organizations wishing to improve communication of cybersecurity information

# Baseline Tailor Goals

- Make it easier to create and document Profiles, tailored baselines, overlays
- Enforce NIST SP 800-53 tailoring constraints
- Promote interoperability and reuse
- Enable security automation

# About Me

- Relatively new to the world of cybersecurity
- Past experience with XML and data modeling
- Contributed to ISO 10303 (aka STEP) standard, used in most computer-aided design systems
- Member of NIST's **Cybersecurity for Smart Manufacturing Systems** project
  - Objective: Deliver a manufacturing-tailored cybersecurity RMF with supporting guidelines, methods, metrics and **tools** that addresses performance, reliability, and safety requirements



NIST Special Publication 800-82  
Revision 2

## Guide to Industrial Control Systems (ICS) Security

Supervisory Control and Data Acquisition (SCADA) Systems, Distributed Control Systems (DCS),  
and Other Control System Configurations such as Programmable Logic Controllers (PLC)

Keith Stouffer  
Victoria Pillitteri  
Suzanne Lightman  
Marshall Abrams  
Adam Hahn

This publication is available free of charge from:  
<http://dx.doi.org/10.6028/NIST.SP.800-82r2>

**NIST**  
National Institute of  
Standards and Technology  
U.S. Department of Commerce

DRAFT

# MANUFACTURING PROFILE

NIST Cybersecurity Framework

A Manufacturing-Sector tailored approach to protecting against cyber risk  
April 2016

**NIST**  
National Institute of  
Standards and Technology  
U.S. Department of Commerce

Mission 4 - Production Goals	
1-1	ID-AM-1
1-2	ID-AM-2
1-3	ID-AM-3
1-4	ID-AM-4
1-5	ID-AM-5
1-6	ID-AM-6
1-1	ID-BE-1
1-2	ID-BE-2
1-3	ID-BE-3
1-4	ID-BE-4
1-5	ID-BE-5
1-1	ID-GV-1
1-2	ID-GV-2
1-3	ID-GV-3
1-4	ID-GV-4
1-1	ID-RA-1
1-2	ID-RA-2
1-3	ID-RA-3
1-4	ID-RA-4
1-5	ID-RA-5
1-6	ID-RA-6
1-1	ID-RM-1
1-2	ID-RM-2
1-3	ID-RM-3
1-1	PR-AC-1
1-2	PR-AC-2
1-3	PR-AC-3
1-4	PR-AC-4
1-5	PR-AC-5
1-1	PR-AT-1
1-2	PR-AT-2



# Why I'm Here

- To get feedback
  - Is Baseline Tailor useful in its current state?
  - What would make it more useful?
  - Am I on the right track?
- To spread the word
  - Prospective users
  - Third-party developers (and those they listen to)

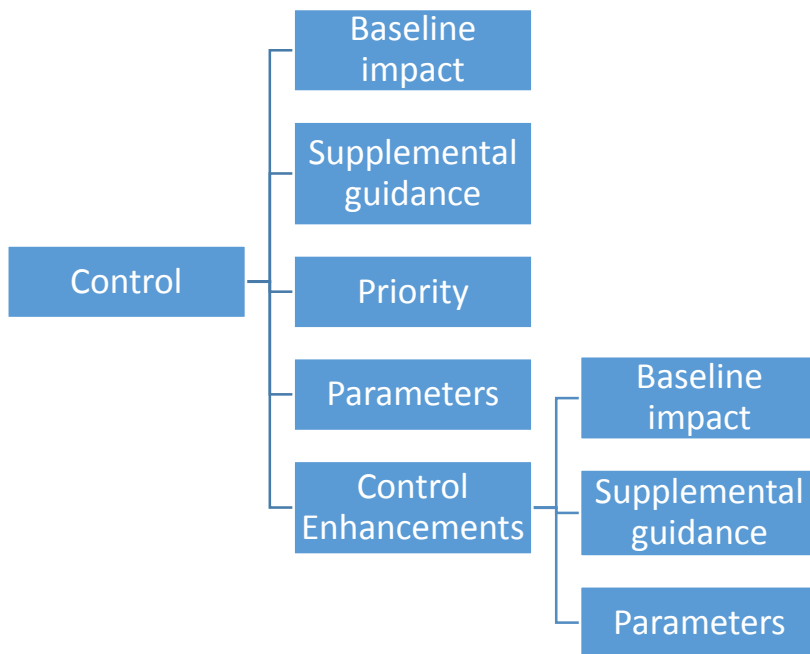
# Why Baseline Tailor?

## **Reason 1: Incompatible representations**

- NIST SP 800-82 Industrial Control System overlay documented as a series of tables
- Tailored baselines for mobile devices and cloud computing services each documented as spreadsheets
- All use divergent documentation conventions
- None are easy for users to navigate or for software developers to integrate

# Reason 2: Challenges Combining RMF and CSF

## Security Control

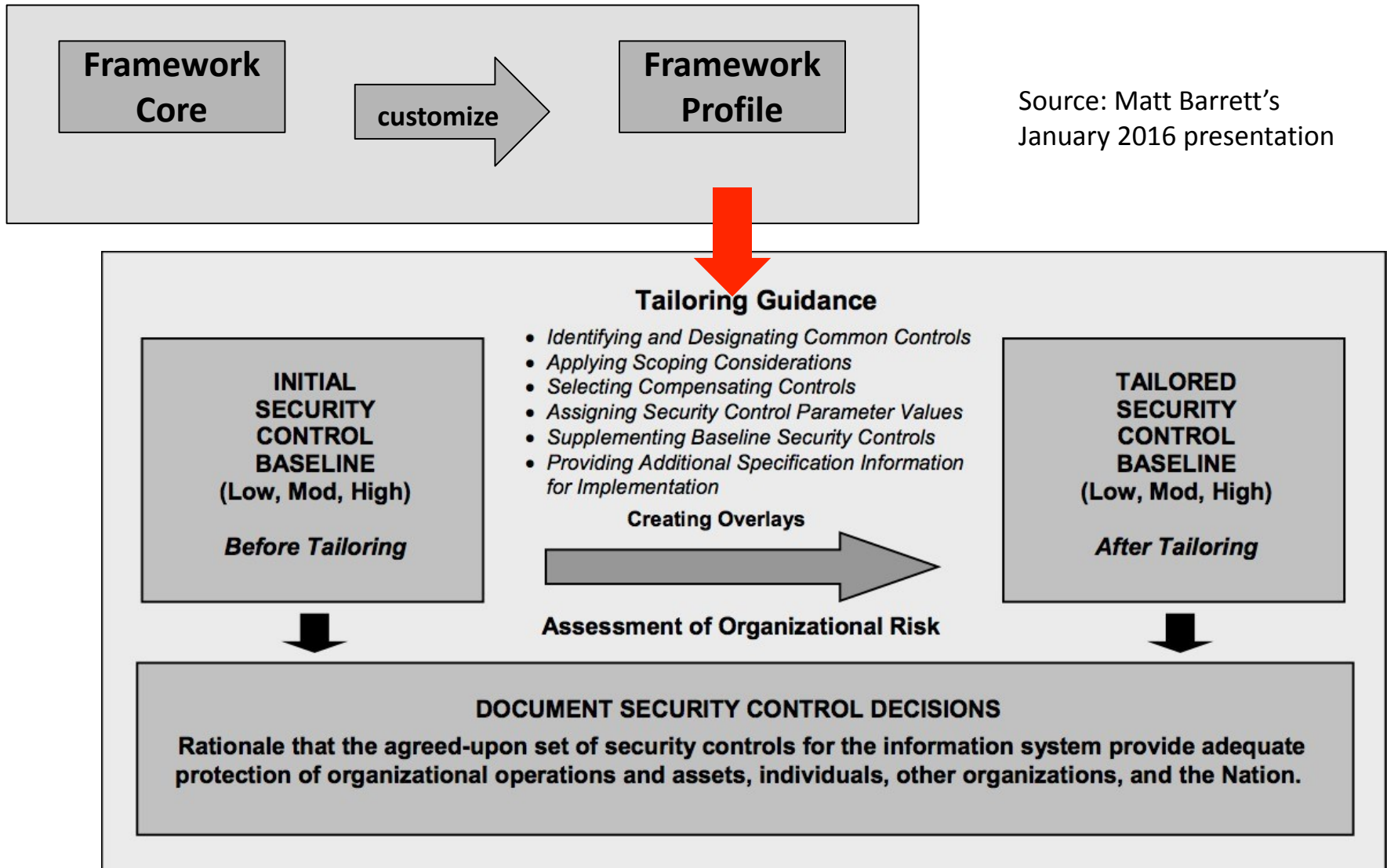


## CSF Core

Functions	Categories	Subcategories	Informative References
Identify			
Protect			
Detect			
Respond			
Recover			

# Tailoring SP 800-53 Security Controls

*Use Case: Supporting the RMF Select step with a Framework Profile*



# Outline

- What, who, and why
- **Baseline Tailor overview**
- Demo: tailoring a security control
- Demo: supporting the RMF Select step with a Framework Profile
- Concluding remarks

# About Baseline Tailor

- Single-page web application
- Hosted at <https://pages.nist.gov/sctools>
- Easy to install and run locally
- Includes internal data model of CSF Core
- Leverages existing information sources
  - NIST SP 800-53 database (<https://nvd.nist.gov/800-53>)
    - XML NIST SP 800-53 Controls (Appendix F and G)
    - Online search
  - NIST SP 800-82 Industrial Control System baselines

# Tabbed User Interface

## Baseline Tailor

Version 0.9

[User Guide \(PDF\)](#) | [License](#) | [Security Content and Tools](#)

Preferences

Security Control Editor | **Cyber Framework Browser** | Cross References | Framework Profile

Baselines:  LOW  MODERATE  HIGH  N/A Defaults

Priorities:  P0  P1  P2  P3 Defaults

Restrict controls to Framework Profile informative references:

Control family: AUDIT AND ACCOUNTABILITY

Control: AU-3 - CONTENT OF AUDIT RECORDS

Framework Core Subcategories Referencing AU-3

CONTROL NUMBER	CONTROL NAME <i>Control Enhancement Name</i>	BASELINE IMPACT	ADDED SUPPLEMENTAL GUIDANCE	CONTROL BASELINES		
				LOW	MODERATE	HIGH
AU-3	<b>CONTENT OF AUDIT RECORDS</b>	LOW	<input checked="" type="checkbox"/>	Selected	Selected	Selected
AU-3(1)	ADDITIONAL AUDIT INFORMATION	MODERATE	NO		Selected	Selected
AU-3(2)	CENTRALIZED MANAGEMENT OF PLANNED AUDIT RECORD CONTENT	HIGH	NO			Selected

XML representation:

```
<tailoredControl>
  <family>AUDIT AND ACCOUNTABILITY</family>
  <rationale flag="false"/>
</tailoredControl>
```

Additional Supplemental Guidance:

Guidance here.

# What You Can Do With the Tabs

Tab	Operations
Security Control Editor	<ul style="list-style-type: none"><li>• Navigate security control catalog and ICS overlay</li><li>• Modify baselines</li><li>• Add to supplemental guidance</li></ul>
Cyber Framework Browser	<ul style="list-style-type: none"><li>• Navigate Core</li><li>• Modify Profile</li></ul>
Cross References	<ul style="list-style-type: none"><li>• Show all Core subcategories referencing a control</li></ul> <i>Helpful for using CSF to support RMF <b>Select</b> step</i>
Framework Profile	<ul style="list-style-type: none"><li>• Modify Profile</li><li>• View subcategory details</li></ul>



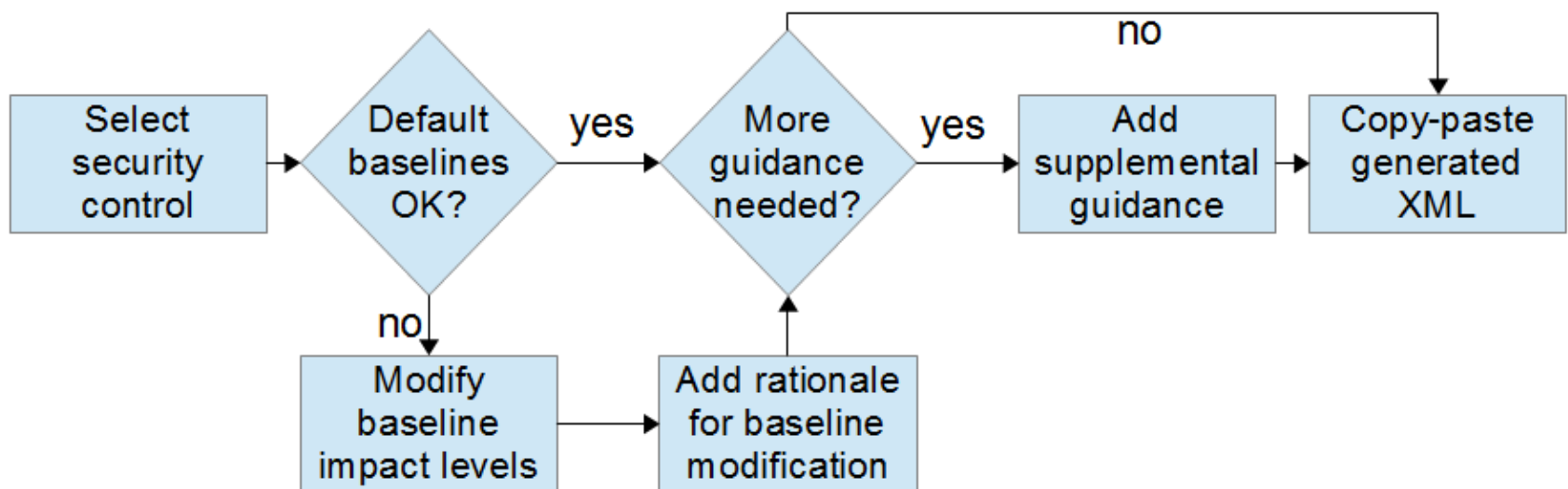
# Baseline Tailor Implementation

- Source code is all XML (XForms, XSLT, XHTML)
  - Eases leveraging of NIST SP 800-53 XML data
  - Reduces dependence on programming/scripting languages
- All processing client side
- Runs in common browsers (Chrome, Firefox, Safari, Opera, ...)
- Can be run from local file system without HTTP server

# Outline

- What, who, and why
- Baseline Tailor overview
- **Demo: tailoring a security control**
- Demo: supporting the RMF Select step with a Framework Profile
- Concluding remarks

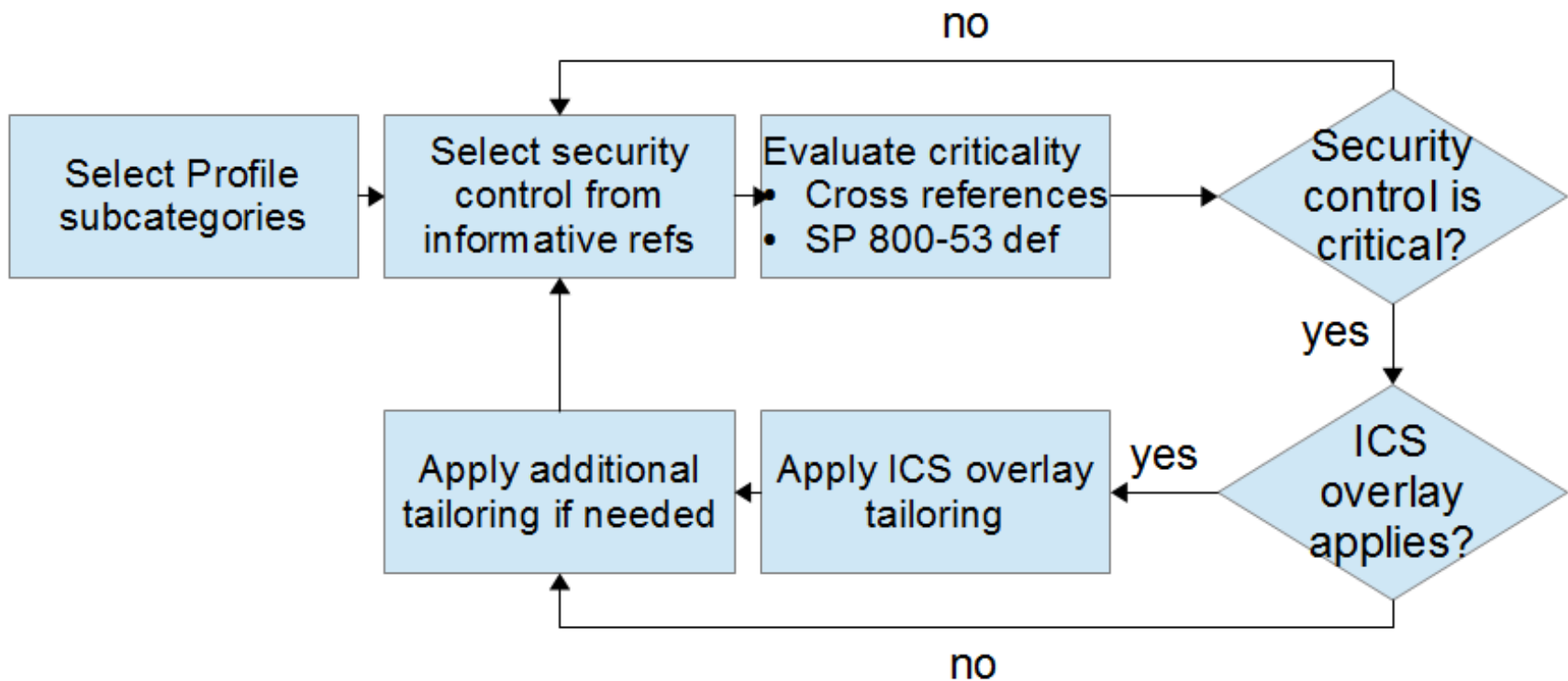
# Security Control Editor Workflow



# Outline

- What, who, and why
- Baseline Tailor overview
- Demo: tailoring a security control
- Demo: supporting the RMF **Select** step with a Framework Profile
- Concluding remarks

# Workflow: Bringing it all Together



# Outline

- What, who, and why
- Baseline Tailor overview
- Demo: tailoring a security control
- Demo: supporting the RMF Select step with a Framework Profile
- **Concluding remarks**

# Summary

- Baseline Tailor is experimental open source software for CSF and NIST SP 800-53 RMF users
- Usage scenarios
  - Tailoring a security control
  - Browsing and using the CSF
  - Creating structured XML
  - Using the CSF and RMF together
  - *More likely to emerge*
- Was useful in creating CSF Manufacturing Profile employing NIST SP 800-53 and NIST SP 800-82 guidance

# Limitations of Baseline Tailor

- Implementation tied to current versions on NIST specifications
  - New versions will require software updates
- Framework Profile XML could include more information
- Cannot import an existing tailored control
  - Needed for composability (e.g., tailoring an overlay)
- No support for NIST SP 800-53 assignment and selection parameters
  - Example from IA-3 description: “The information system uniquely identifies and authenticates [Assignment: organization-defined specific and/or types of devices] before establishing a [Selection (one or more): local; remote; network] connection.”
- And many more...



# A Plea



## Security professionals:

- Try Baseline Tailor
- Encourage software developers to support CSF/RMF usage

## Software developers:

- Experiment with the source code
- Build more and better tools

## Everyone:

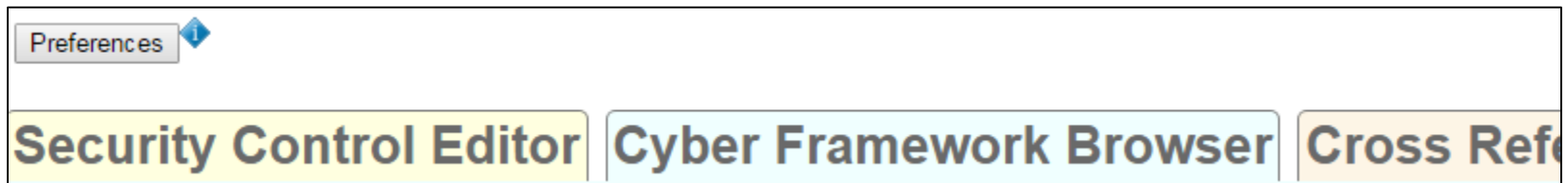
- Provide feedback, ask questions, report bugs

# For More Information

- Baseline Tailor information page: <http://go.usa.gov/cuxq3>
- NIST Pages site: <https://pages.nist.gov/sctools>
  - Baseline Tailor online application
  - XML schemas and data
  - User Guide (NISTIR 8130)
- My email: [lubell@nist.gov](mailto:lubell@nist.gov)

# Backup Slides

# Preferences Dialog



# Cyber Framework Browser Tab

Security Control Editor | Cyber Framework Browser | Cross References | Framework Profile

Framework core function:

- IDENTIFY (ID)
- PROTECT (PR)
- DETECT (DE)
- RESPOND (RS)
- RECOVER (RC)

Category: Access Control (PR.AC)

**PR.AC:** Access to assets and associated facilities is limited to authorized users, processes, or devices, and to authorized activities and transactions.

Subcategory: PR.AC-1

**PR.AC-1:** Identities and credentials are managed for authorized devices and users

Add to Profile

PR.AC-1 Informative References to NIST SP 800-53:

IA family

AC-2

# Framework Profile Tab

## Security Control Editor | Cyber Framework Browser | Cross References | Framework Profile

Check/uncheck the subcategory box to add to or remove the subcategory from the profile. Click the subcategory button to show its Framework Core information.

<input type="checkbox"/> ID.GV-1	<input type="checkbox"/> ID.RA-3	<input checked="" type="checkbox"/> PR.AC-1	<input type="checkbox"/> PR.IP-5	<input type="checkbox"/> PR.DS-4	<input type="checkbox"/> DE.CM-2	<input type="checkbox"/> DE.DP-1	<input type="checkbox"/> RS.CO-4
<input type="checkbox"/> ID.GV-2	<input type="checkbox"/> ID.RA-4	<input checked="" type="checkbox"/> PR.AC-2	<input type="checkbox"/> PR.IP-6	<input type="checkbox"/> PR.DS-5	<input type="checkbox"/> DE.CM-3	<input type="checkbox"/> DE.DP-2	<input type="checkbox"/> RS.CO-5
<input type="checkbox"/> ID.GV-3	<input type="checkbox"/> ID.RA-5	<input checked="" type="checkbox"/> PR.AC-3	<input type="checkbox"/> PR.IP-7	<input type="checkbox"/> PR.DS-6	<input type="checkbox"/> DE.CM-4	<input type="checkbox"/> DE.DP-3	<input type="checkbox"/> RS.MI-1
<input type="checkbox"/> ID.GV-4	<input type="checkbox"/> ID.RA-6	<input checked="" type="checkbox"/> PR.AC-4	<input type="checkbox"/> PR.IP-8	<input type="checkbox"/> PR.DS-7	<input type="checkbox"/> DE.CM-5	<input type="checkbox"/> DE.DP-4	<input type="checkbox"/> RS.MI-2
<input type="checkbox"/> ID.AM-1	<input type="checkbox"/> ID.BE-1	<input checked="" type="checkbox"/> PR.AC-5	<input type="checkbox"/> PR.IP-9	<input type="checkbox"/> PR.AT-1	<input type="checkbox"/> DE.CM-6	<input type="checkbox"/> DE.DP-5	<input type="checkbox"/> RS.MI-3
<input type="checkbox"/> ID.AM-2	<input type="checkbox"/> ID.BE-2	<input type="checkbox"/> PR.IP-1	<input type="checkbox"/> PR.PT-1	<input type="checkbox"/> PR.AT-2	<input type="checkbox"/> DE.CM-7	<input type="checkbox"/> RS.AN-1	<input type="checkbox"/> RS.RP-1
<input type="checkbox"/> ID.AM-3	<input type="checkbox"/> ID.BE-3	<input type="checkbox"/> PR.IP-10	<input type="checkbox"/> PR.PT-2	<input type="checkbox"/> PR.AT-3	<input type="checkbox"/> DE.CM-8	<input type="checkbox"/> RS.AN-2	<input type="checkbox"/> RS.IM-1
<input type="checkbox"/> ID.AM-4	<input type="checkbox"/> ID.BE-4	<input type="checkbox"/> PR.IP-11	<input type="checkbox"/> PR.PT-3	<input type="checkbox"/> PR.AT-4	<input type="checkbox"/> DE.AE-1	<input type="checkbox"/> RS.AN-3	<input type="checkbox"/> RS.IM-2
<input type="checkbox"/> ID.AM-5	<input type="checkbox"/> ID.BE-5	<input type="checkbox"/> PR.IP-12	<input type="checkbox"/> PR.PT-4	<input type="checkbox"/> PR.AT-5	<input type="checkbox"/> DE.AE-2	<input type="checkbox"/> RS.AN-4	<input type="checkbox"/> RC.RP-1
<input type="checkbox"/> ID.AM-6	<input type="checkbox"/> ID.RM-1	<input type="checkbox"/> PR.IP-2	<input type="checkbox"/> PR.DS-1	<input type="checkbox"/> PR.MA-1	<input type="checkbox"/> DE.AE-3	<input type="checkbox"/> RS.CO-1	<input type="checkbox"/> RC.CO-3
<input type="checkbox"/> ID.RA-1	<input type="checkbox"/> ID.RM-2	<input type="checkbox"/> PR.IP-3	<input type="checkbox"/> PR.DS-2	<input type="checkbox"/> PR.MA-2	<input type="checkbox"/> DE.AE-4	<input type="checkbox"/> RS.CO-2	<input type="checkbox"/> RC.IM-1
<input type="checkbox"/> ID.RA-2	<input type="checkbox"/> ID.RM-3	<input type="checkbox"/> PR.IP-4	<input type="checkbox"/> PR.DS-3	<input type="checkbox"/> DE.CM-1	<input type="checkbox"/> DE.AE-5	<input type="checkbox"/> RS.CO-3	<input type="checkbox"/> RC.IM-2

XML representation:

```
<frameworkProfile>  
<id>PR.AC-1</id>  
<id>PR.AC-2</id>  
<id>PR.AC-3</id>  
<id>PR.AC-4</id>  
<id>PR.AC-5</id>  
</frameworkProfile>
```

# Security Control Editor Tab: IA-3

Security Control Editor
Cyber Framework Browser
Cross References
Framework Profile

**Baselines:**

LOW

MODERATE

HIGH

N/A

Defaults

**Priorities:**

P0

P1

P2

P3

Defaults

Restrict controls to Framework Profile informative references:

**Control family:**

IDENTIFICATION AND AUTHENTICATION ▼


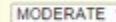



**Control:**

IA-3 - DEVICE IDENTIFICATION AND AUTHENTICATION ▼

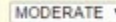
Framework Core Subcategories Referencing IA-3

CONTROL NUMBER	CONTROL NAME <i>Control Enhancement Name</i>	BASELINE IMPACT	ADDED SUPPLEMENTAL GUIDANCE	CONTROL BASELINES		
				LOW	MODERATE	HIGH
IA-3	<b>DEVICE IDENTIFICATION AND AUTHENTICATION</b>	MODERATE ▼	<input type="checkbox"/>		Selected	Selected
IA-3(1)	CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION	N/A ▼	NO ▼			
IA-3(3)	DYNAMIC ADDRESS ALLOCATION	N/A ▼	NO ▼			
IA-3(4)	DEVICE ATTESTATION	N/A ▼	NO ▼			

# NIST SP 800-53 Constraints

CONTROL NUMBER	CONTROL NAME <i>Control Enhancement Name</i>	BASELINE IMPACT	ADDED SUPPLEMENTAL GUIDANCE	CONTROL BASELINES		
				LOW	MODERATE	HIGH
IA-3  	<b>DEVICE IDENTIFICATION AND AUTHENTICATION</b>	MODERATE 	<input type="checkbox"/>		Selected	Selected
IA-3(1)	CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION	LOW 	NO 	Added	Added	Added
IA-3(3)	DYNAMIC ADDRESS ALLOCATION	N/A 				
IA-3(4)	DEVICE ATTESTATION	N/A 				

Control Enhancement impact lower than control impact.

CONTROL NUMBER	CONTROL NAME <i>Control Enhancement Name</i>	BASELINE IMPACT	ADDED SUPPLEMENTAL GUIDANCE	CONTROL BASELINES		
				LOW	MODERATE	HIGH
IA-3  	<b>DEVICE IDENTIFICATION AND AUTHENTICATION</b>	MODERATE 	<input type="checkbox"/>		Selected	Selected
IA-3(1)	CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION	MODERATE 	YES 		Added	Added
IA-3(3)	DYNAMIC ADDRESS ALLOCATION	N/A 	NO 			
IA-3(4)	DEVICE ATTESTATION	MODERATE 	(3) 	Added		Added




XML representation:

```
<tailoredControl>
  <family>IDENTIFICATION AND AUTHENTICATION</family>
  <rationale flag="true">Rationale here.</rationale>
  <control number="IA-3">
  <title>DEVICE IDENTIFICATION AND AUTHENTICATION</title>
  <default value="2"/>
</tailoredControl>
```

Control Enhancement Guidance here.

Rationale for changing Control Enhancement without added supplemental guidance.

Cross-reference to Control Enhancement without added supplemental guidance.

CONTROL NUMBER	CONTROL NAME <i>Control Enhancement Name</i>	BASELINE IMPACT	ADDED SUPPLEMENTAL GUIDANCE	CONTROL BASELINES		
				LOW	MODERATE	HIGH
IA-3  	<b>DEVICE IDENTIFICATION AND AUTHENTICATION</b>	MODERATE 	<input type="checkbox"/>		Selected	Selected
IA-3(1)	CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION	N/A 	YES 			
IA-3(3)	DYNAMIC ADDRESS ALLOCATION	N/A 	NO 			
IA-3(4)	DEVICE ATTESTATION	N/A 	NO 			

XML representation:



```
<tailoredControl>
  <family>IDENTIFICATION AND AUTHENTICATION</family>
  <rationale flag="false"/>
  <control number="IA-3">
</tailoredControl>
```

Control Enhancement Guidance here.

Control Enhancement must have LOW, MODERATE, or HIGH impact if adding supplemental guidance.



# IA-3 Tailored for an Industrial Control System

CONTROL NUMBER	CONTROL NAME <i>Control Enhancement Name</i>	BASELINE IMPACT	ADDED SUPPLEMENTAL GUIDANCE	CONTROL BASELINES		
				LOW	MODERATE	HIGH
IA-3  	<b>DEVICE IDENTIFICATION AND AUTHENTICATION</b>	LOW <input type="text"/>	<input checked="" type="checkbox"/>	Added	Selected	Selected
IA-3(1)	<i>CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION</i>	MODERATE <input type="text"/>	YES <input type="text"/>		Added	Added
IA-3(3)	<i>DYNAMIC ADDRESS ALLOCATION</i>	N/A <input type="text"/>	NO <input type="text"/>			
IA-3(4)	<i>DEVICE ATTESTATION</i>	MODERATE <input type="text"/>	(1) <input type="text"/>		Added	Added
XML representation:		Additional Supplemental Guidance:				
<pre> &lt;tailoredControl&gt;   &lt;family&gt;IDENTIFICATION AND AUTHENTICATION&lt;/family&gt;   &lt;rationale flag="true"&gt;Rationale here.&lt;/rationale&gt;   &lt;control number="IA-3"&gt;     &lt;title&gt;DEVICE IDENTIFICATION AND AUTHENTICATION&lt;/title&gt;     &lt;default value="2"/&gt;     &lt;impact value="1"/&gt;     &lt;guidance flag="true"&gt;Guidance here.&lt;/guidance&gt;   &lt;/control&gt;   &lt;enhancement number="1"&gt;     &lt;title&gt;CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION&lt;/title&gt;     &lt;default value="4"/&gt;     &lt;impact value="2"/&gt;     &lt;guidance flag="true"&gt;Guidance here.&lt;/guidance&gt;   &lt;/enhancement&gt; &lt;/tailoredControl&gt; </pre>		<p>Guidance here.</p> <p><b>Control Enhancement (1) Additional Supplemental Guidance:</b></p> <p>Guidance here.</p> <p><b>Rationale for changing the baseline:</b></p> <p>Rationale here.</p>				

# ICS-specific Text Added, Copy-Pasted

```
<tailoredControl>
  <family>IDENTIFICATION AND AUTHENTICATION</family>
  <rationale flag="true">ICS may exchange information with many external systems and devices. Identifying and authenticating the devices introduces situations that do not exist with humans. These controls include assignments that enable the organization to categorize devices by types, models, or other group characteristics. Assignments also enable the organizations to select appropriate controls for local, remote, and network connections.</rationale>
  <control number="IA-3">
    <title>DEVICE IDENTIFICATION AND AUTHENTICATION</title>
    <default value="2"/><impact value="1"/>
    <guidance flag="true">The organization may permit connection of devices, also known as non-person entities (NPE), belonging to and authorized by another organization (e.g., business partners) to their ICS. Especially when these devices are non-local, their identification and authentication can be vital. Organizations may perform risk and impact analysis to determine the required strength of authentication mechanisms. Example compensating controls for devices and protocols which do not provide authentication for remote network connections, include implementing physical security measures.</guidance>
  </control>
  <enhancement number="1">
    <title>CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION</title>
    <default value="4"/><impact value="2"/>
    <guidance flag="true">Configuration management for NPE identification and authentication customarily involves a human surrogate or representative for the NPE. Devices are provided with their identification and authentication credentials based on assertions by the human surrogate. The human surrogate also responds to events and anomalies (e.g., credential expiration). Credentials for software entities (e.g., autonomous processes not associated with a specific person) based on properties of that software (e.g., digital signatures) may change every time the software is changed or patched. Special purpose hardware (e.g., custom integrated circuits and printed-circuit boards) may exhibit similar dependencies. Organization definition of parameters may be different among the impact levels.</guidance>
  </enhancement>
  <enhancement number="4">
    <title>DEVICE ATTESTATION</title>
    <default value="4"/><impact value="2"/><guidance flag="1"/>
  </enhancement>
</tailoredControl>
```

# Controls Referenced by PR.AC Subcategories

Security Control Editor | Cyber Framework Browser | Cross References | Framework Profile

Baselines:  LOW  MODERATE  HIGH  N/A Defaults

Priorities:  P0  P1  P2  P3 Defaults

Restrict controls to Framework Profile informative references:

Control family:  
 ACCESS CONTROL  
 ACCESS CONTROL  
 IDENTIFICATION AND AUTHENTICATION  
 PHYSICAL AND ENVIRONMENTAL PROTECTION  
 SYSTEM AND COMMUNICATIONS PROTECTION

Framework Core Subcategories Referencing AC-2

Baselines:  LOW  MODERATE  HIGH  N/A Defaults

Priorities:  P0  P1  P2  P3 Defaults


Restrict controls to Framework Profile informative references:

Control family:  
 ACCESS CONTROL

Control:  
 AC-2 - ACCOUNT MANAGEMENT  
 AC-2 - ACCOUNT MANAGEMENT  
 AC-3 - ACCESS ENFORCEMENT  
 AC-4 - INFORMATION FLOW ENFORCEMENT  
 AC-5 - SEPARATION OF DUTIES  
 AC-6 - LEAST PRIVILEGE  
 AC-19 - ACCESS CONTROL FOR MOBILE DEVICES  
 AC-20 - USE OF EXTERNAL INFORMATION SYSTEMS

CONTROL	CONTROL NAME	BASELINE	AD SUF
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# Security Control AC-2

CONTROL NUMBER	CONTROL NAME <i>Control Enhancement Name</i>	BASELINE IMPACT	ADDED SUPPLEMENTAL GUIDANCE	CONTROL BASELINES		
				LOW	MODERATE	HIGH
AC-2 	<b>ACCOUNT MANAGEMENT</b>	LOW	<input type="checkbox"/>	Selected	Selected	Selected
AC-2(1)	<i>AUTOMATED SYSTEM ACCOUNT MANAGEMENT</i>	MODERATE	NO		Selected	Selected
AC-2(2)	<i>REMOVAL OF TEMPORARY / EMERGENCY ACCOUNTS</i>	MODERATE	NO		Selected	Selected
AC-2(3)	<i>DISABLE INACTIVE ACCOUNTS</i>	MODERATE	NO		Selected	Selected
AC-2(4)	<i>AUTOMATED AUDIT ACTIONS</i>	MODERATE	NO		Selected	Selected
AC-2(5)	<i>INACTIVITY LOGOUT</i>	HIGH	NO			Selected
AC-2(6)	<i>DYNAMIC PRIVILEGE MANAGEMENT</i>	N/A	NO			
AC-2(7)	<i>ROLE-BASED SCHEMES</i>	N/A	NO			
AC-2(8)	<i>DYNAMIC ACCOUNT CREATION</i>	N/A	NO			
AC-2(9)	<i>RESTRICTIONS ON USE OF SHARED GROUPS / ACCOUNTS</i>	N/A	NO			
AC-2(10)	<i>SHARED / GROUP ACCOUNT CREDENTIAL TERMINATION</i>	N/A	NO			
AC-2(11)	<i>USAGE CONDITIONS</i>	HIGH	NO			Selected
AC-2(12)	<i>ACCOUNT MONITORING / ATYPICAL USAGE</i>	HIGH	NO			Selected
AC-2(13)	<i>DISABLE ACCOUNTS FOR HIGH-RISK INDIVIDUALS</i>	HIGH	NO			Selected

# Cross References Tab

**Security Control Editor** | **Cyber Framework Browser** | **Cross References** | **Framework Profile**

Framework Core subcategories referencing control IA-3:

- PR.AC-1

**Security Control Editor** | **Cyber Framework Browser** | **Cross References** | **Framework Profile**

Framework Core subcategories referencing control AC-2:

- PR.AC-1
- PR.AC-4
- DE.CM-1
- DE.CM-3

# NIST SP 800-53 Database Lookup

## AC-2 - ACCOUNT MANAGEMENT

Family: [AC - ACCESS CONTROL](#)  
Priority: P1 - Implement P1 security controls first.

Baseline Allocation:	Low	Moderate	High
	AC-2	AC-2 (1) (2) (3) (4)	AC-2 (1) (2) (3) (4) (5) (11) (12) (13)

**Jump To:**  
[Revision 4 Statements](#)  
[Control Description](#)  
[Supplemental Guidance](#)  
[References](#)

### Control Description

#### The organization:

- a. Identifies and selects the following types of information system accounts to support organizational missions/business functions: [Assignment: organization-defined information system account types];
- b. Assigns account managers for information system accounts;
- c. Establishes conditions for group and role membership;
- d. Specifies authorized users of the information system, group and role membership, and access authorizations (i.e., privileges) and other attributes (as required) for each account;
- e. Requires approvals by [Assignment: organization-defined personnel or roles] for requests to create information system accounts;
- f. Creates, enables, modifies, disables, and removes information system accounts in accordance with [Assignment: organization-defined procedures or conditions];
- g. Monitors the use of information system accounts;
- h. Notifies account managers:
  1. When accounts are no longer required;
  2. When users are terminated or transferred; and
  3. When individual information system usage or need-to-know changes;
- i. Authorizes access to the information system based on:
  1. A valid access authorization;
  2. Intended system usage; and
  3. Other attributes as required by the organization or associated missions/business functions;
- j. Reviews accounts for compliance with account management requirements [Assignment: organization-defined frequency]; and
- k. Establishes a process for reissuing shared/group account credentials (if deployed) when individuals are removed from the group.



# NIST SP 800-82 ICS

## AC-2 ACCOUNT MANAGEMENT

CNTL NO.	CONTROL NAME <i>Control Enhancement Name</i>	CONTROL BASELINES		
		LOW	MOD	HIGH
<b>AC-2</b>	<b>Account Management</b>	Selected	Selected	Selected
AC-2 (1)	ACCOUNT MANAGEMENT   AUTOMATED SYSTEM ACCOUNT MANAGEMENT		Selected	Selected
AC-2 (2)	ACCOUNT MANAGEMENT   REMOVAL OF TEMPORARY / EMERGENCY ACCOUNTS		Selected	Selected
AC-2 (3)	ACCOUNT MANAGEMENT   DISABLE INACTIVE ACCOUNTS		Selected	Selected
AC-2 (4)	ACCOUNT MANAGEMENT   AUTOMATED AUDIT ACTIONS		Selected	Selected
AC-2 (5)	ACCOUNT MANAGEMENT   INACTIVITY LOGOUT / TYPICAL USAGE MONITORING			Selected
AC-2 (11)	ACCOUNT MANAGEMENT   USAGE CONDITIONS			Selected
AC-2 (12)	ACCOUNT MANAGEMENT   ACCOUNT MONITORING / ATYPICAL USAGE			Selected
AC-2 (13)	ACCOUNT MANAGEMENT   ACCOUNT REVIEWS			Selected

ICS Supplemental Guidance: Example compensating controls include providing increased physical security, personnel security, intrusion detection, auditing measures.

Control Enhancement: (1, 3, 4) ICS Supplemental Guidance: Example compensating controls include employing nonautomated mechanisms or procedures.

Control Enhancement: (2) ICS Supplemental Guidance: In situations where the ICS (e.g., field devices) cannot support temporary or emergency accounts, this enhancement does not apply. Example compensating controls include employing nonautomated mechanisms or procedures.

Control Enhancement: (5) ICS Supplemental Guidance: Example compensating controls include employing nonautomated mechanisms or procedures.

Control Enhancement: (11, 12, 13) No ICS Supplemental Guidance.

# Framework Core: Database Export

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<RESULTSET FOUND="96">
  <ROW MODID="0" RECORDID="420">
    <COL>
      <DATA>IDENTIFY (ID)</DATA>
    </COL>
    <COL>
      <DATA>Governance (ID.GV): The policies, procedures, and processes to
manage and monitor the organization's regulatory, legal, risk, environmental,
and operational requirements are understood and inform the management of
cybersecurity risk.</DATA>
    </COL>
    <COL>
      <DATA>ID.GV-1: Organizational information security policy is
established</DATA>
    </COL>
    <COL>
      <DATA>. _____ NIST SP 800-53 Rev. 4 -1 controls from all families </DATA>
    </COL>
  </ROW>
  <ROW MODID="0" RECORDID="428">
    <COL>
      <DATA>IDENTIFY (ID)</DATA>
    </COL>
    <COL>
      <DATA>Governance (ID.GV): The policies, procedures, and processes to
manage and monitor the organization's regulatory, legal, risk, environmental,
and operational requirements are understood and inform the management of
cybersecurity risk.</DATA>
```



# Structured XML via XSLT 2.0

```
<function id="ID">
  <name>IDENTIFY</name>
  <category id="ID.GV">
    <name>Governance</name>
    <dropDownLabel>Governance (ID.GV)</dropDownLabel>
    <description>The policies, procedures, and processes to manage and
monitor the organization's regulatory, legal, risk, environmental, and
operational requirements are understood and inform the management of
cybersecurity risk.</description>
    <subCategory id="ID.GV-1">
      <description>Organizational information security policy is
established</description>
      <sp800-53 all="true"/>
    </subCategory>
    <subCategory id="ID.GV-2">
      <description>Information security roles & responsibilities are
coordinated and aligned with internal roles and external partners</description>
      <sp800-53>
        <control>PM-1</control>
        <control>PS-7</control>
      </sp800-53>
    </subCategory>
    <subCategory id="ID.GV-3">
      <description>Legal and regulatory requirements regarding
cybersecurity, including privacy and civil liberties obligations, are
understood and managed</description>
      <sp800-53 all="true">
        <except>PM-1</except>
      </sp800-53>
    </subCategory>
  </category>
</function>
```