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Control Baselines for Information Systems and Organizations

JOINT TASK FORCE

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INFORMATION SECURITY



Draft NIST Special Publication 800-53B

Control Baselines for Information Systems and Organizations

JOINT TASK FORCE

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July 2020



U.S. Department of Commerce Wilbur L. Ross, Jr., Secretary

National Institute of Standards and Technology Walter Copan, NIST Director and Under Secretary of Commerce for Standards and Technology

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National Institute of Standards and Technology
Attn: Computer Security Division, Information Technology Laboratory
100 Bureau Drive (Mail Stop 8930) Gaithersburg, MD 20899-8930
Email: sec-cert@nist.gov

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control baseline; tailoring; control selection; control overlays.

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Eduardo Takamura

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Andrew Regenscheid

NIST

Jon Boyens

NIST

Ned Goren

NIST

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113 **Notes to Reviewers** 114 NIST Special Publication (SP) 800-53B has been developed to provide security and privacy 115 control baselines for the Federal Government. These control baselines had previously been 116 published in NIST SP 800-53 [SP 800-53]. The control baselines were moved to a separate 117 publication so that SP 800-53 could serve as a consolidated catalog of security and privacy 118 controls regardless of how those controls were used by different communities of interest. NIST 119 SP 800-37, Revision 2 [SP 800-37] (i.e., Risk Management Framework), provides two distinct 120 approaches for control selection. The first approach uses the control baselines and tailoring 121 process described in this publication. The second approach uses a systems development life 122 cycle requirements engineering process to generate security and privacy requirements, which in 123 turn guide and inform the selection of controls to satisfy the requirements. This organization-124 defined control selection approach also supports the use of other security, privacy, and risk 125 frameworks (e.g., the Cybersecurity Framework, Privacy Framework). Thus, different user 126 communities can use the same consolidated catalog of security and privacy controls to meet 127 their specific security and privacy needs within the context of whatever control selection 128 process or framework the organization desires to use. 129 The security and privacy control baselines have been updated with the controls described in SP 130 800-53, Revision 5. The content of the control baselines reflects the results of a comprehensive 131 interagency review conducted during the summer of 2017. The control baselines also reflect the 132 continuing input and analyses of threat data and empirical cyber-attack data collected since the 133 last update to [SP 800-53]. 134 In addition to your feedback on the three security control baselines, NIST is also seeking your 135 comments on the privacy control baseline and the privacy control baseline selection criteria. 136 Since the selection of the privacy control baseline is based on a mapping of the controls and 137 control enhancements in [SP 800-53] to the privacy program responsibilities under OMB Circular 138 A-130 [OMB A-130], suggested changes to the privacy control baseline must be supported by a 139 reference to [OMB A-130]. Alternatively, you may provide a description and rationale for new or 140 modified privacy control baseline selection criteria. 141 Your feedback on this draft publication is important to us. We appreciate each contribution 142 from our reviewers. The very insightful comments from both the public and private sectors, 143 nationally and internationally, continue to help shape the final publication to ensure that it 144 meets the needs and expectations of our customers.

145	Call for Patent Claims
146 147 148 149 150 151	This public review includes a call for information on essential patent claims (claims whose use would be required for compliance with the guidance or requirements in this Information Technology Laboratory (ITL) draft publication). Such guidance and/or requirements may be directly stated in this ITL Publication or by reference to another publication. This call includes disclosure, where known, of the existence of pending U.S. or foreign patent applications relating to this ITL draft publication and of any relevant unexpired U.S. or foreign patents.
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COMPLIANCE AND DUE DILIGENCE

Compliance requires that organizations exercise *due diligence* regarding information security and privacy risk management. Security and privacy due diligence requires organizations to establish a comprehensive risk management program, that, in part, uses the flexibility in NIST publications to categorize systems, select and implement security and privacy controls that meet mission and business needs, assess the effectiveness of the controls, authorize the system to operate, and continuously monitor the system. Risk management frameworks and processes are essential in developing, implementing, and maintaining the protection measures that are necessary to address stakeholder needs and the current threats to organizational operations and assets, individuals, other organizations, and the Nation. Employing effective risk-based processes, procedures, methods, and technologies ensures that information systems and organizations have the necessary trustworthiness and resiliency to support essential missions and business functions, U.S. critical infrastructure, and continuity of government.

COMMON SECURITY AND PRIVACY FOUNDATIONS

In working with the Office of Management and Budget to develop standards and guidelines required by FISMA, NIST consults with federal agencies, state, local, and tribal governments, and private sector organizations to improve information security and privacy, avoid unnecessary and costly duplication of effort, and help ensure that its publications are complementary with the standards and guidelines used for the protection of national security systems. In addition to a comprehensive and transparent public review and comment process, NIST is engaged in a collaborative partnership with the Office of Management and Budget, Office of the Director of National Intelligence, Department of Defense, Committee on National Security Systems, Federal CIO Council, and Federal Privacy Council in establishing a Risk Management Framework for information security and privacy for the Federal Government. This common foundation provides the Federal Government and its contractors cost-effective, flexible, and consistent ways to manage security and privacy risks to organizational operations and assets, individuals, other organizations, and the Nation. The framework provides a basis for reciprocal acceptance of security and privacy control assessment evidence and authorization decisions and facilitates information sharing and collaboration. NIST continues to work with public and private sector entities to establish mappings and relationships between the standards and guidelines developed by NIST and those developed by other organizations. NIST anticipates using these mappings and the gaps they identify to improve the control catalog.

USE OF EXAMPLES IN THIS PUBLICATION

Throughout this publication, examples are used to illustrate, clarify, or explain certain items in chapter sections, controls, and control enhancements. These examples are illustrative in nature and are *not* intended to limit or constrain the application of controls or control enhancements by organizations.

175 Table of Contents

176	CHAPTER ONE INTRODUCTION	1
177	1.1 PURPOSE AND APPLICABILITY	1
178	1.2 TARGET AUDIENCE	2
179	1.3 ORGANIZATIONAL RESPONSIBILITIES	3
180	1.4 RELATIONSHIP TO OTHER PUBLICATIONS	3
181	1.5 REVISIONS AND EXTENSIONS	3
182	1.6 PUBLICATION ORGANIZATION	4
183	CHAPTER TWO THE FUNDAMENTALS	
184	2.1 CONTROL BASELINES	
185	2.2 SELECTING CONTROL BASELINES	
186	2.3 CONTROL BASELINE ASSUMPTIONS	
187	2.4 TAILORING CONTROL BASELINES	
188	2.5 CAPABILITIES	14
189	CHAPTER THREE THE CONTROL BASELINES	
190	3.1 ACCESS CONTROL FAMILY	
191	3.2 AWARENESS AND TRAINING FAMILY	
192	3.3 AUDIT AND ACCOUNTABILITY FAMILY	
193	3.4 ASSESSMENT, AUTHORIZATION, AND MONITORING FAMILY	
194	3.5 CONFIGURATION MANAGEMENT FAMILY	
195	3.6 CONTINGENCY PLANNING FAMILY	
196	3.7 IDENTIFICATION AND AUTHENTICATION FAMILY	
197	3.8 INCIDENT RESPONSE FAMILY	
198	3.9 MAINTENANCE FAMILY	
199	3.10 MEDIA PROTECTION FAMILY	
200	3.11 PHYSICAL AND ENVIRONMENTAL PROTECTION FAMILY	
201	3.12 PLANNING FAMILY	
202	3.13 PROGRAM MANAGEMENT FAMILY	
203	3.14 PERSONNEL SECURITY FAMILY	
204 205	3.15 PII PROCESSING AND TRANSPARENCY FAMILY	
203	3.17 SYSTEM AND SERVICES ACQUISITION FAMILY	
207	3.18 SYSTEM AND COMMUNICATIONS PROTECTION FAMILY	
208	3.19 SYSTEM AND INFORMATION INTEGRITY FAMILY	
209	3.20 SUPPLY CHAIN RISK MANAGEMENT FAMILY	
210	REFERENCES	
211	APPENDIX A GLOSSARY	
212	APPENDIX B ACRONYMS	
213	APPENDIX C OVERLAYS	68
214		

215 **Executive Summary** 216 As we push computers to "the edge," building an increasingly complex world of connected 217 information systems and devices, security and privacy will continue to dominate the national 218 dialogue. In its 2017 report entitled, Task Force on Cyber Deterrence [DSB 2017], the Defense 219 Science Board provides a sobering assessment of the current vulnerabilities in the U.S. critical 220 infrastructure and the information systems that support the mission-essential operations and 221 assets in the public and private sectors. 222 "...The Task Force notes that the cyber threat to U.S. critical infrastructure is outpacing 223 efforts to reduce pervasive vulnerabilities, so that for the next decade at least the United States 224 must lean significantly on deterrence to address the cyber threat posed by the most capable 225 U.S. adversaries. It is clear that a more proactive and systematic approach to U.S. cyber 226 deterrence is urgently needed..." 227 There is an urgent need to further strengthen the underlying information systems, component 228 products, and services that the Nation depends on in every sector of the critical infrastructure— 229 ensuring those systems, components, and services are sufficiently trustworthy and provide the 230 necessary resilience to support the economic and national security interests of the United 231 States. 232 NIST SP 800-53B responds to the call by the Defense Science Board by providing a proactive and 233 systemic approach to developing and making available to federal agencies and private sector 234 organizations a comprehensive set of security and privacy control baselines for all types of 235 computing platforms, including general purpose computing systems, cyber-physical systems, 236 cloud-based systems, mobile devices, and industrial and process control systems. The control 237 baselines provide a starting point for organizations in the security and privacy control selection 238 process. Using the tailoring guidance and assumptions provided, organizations can customize 239 their security and privacy control baselines to ensure that they have the capability to protect 240 their critical and essential operations and assets. The ultimate objective is to make the systems 241 we depend on more penetration-resistant, limit the damage from attacks when they occur, 242 make the systems cyber resilient and survivable, and protect individuals' privacy.

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243 Errata

This table contains changes that have been incorporated into Special Publication 800-53B. Errata updates can include corrections, clarifications, or other minor changes in the publication that are either *editorial* or *substantive* in nature.

DATE	ТҮРЕ	REVISION	PAGE

248 CHAPTER ONE

INTRODUCTION

individuals and the Nation.

250 THE NEED FOR SECURITY AND PRIVACY CONTROL BASELINES

ecurity controls are the safeguards or countermeasures selected and implemented within an information system¹ or an organization to protect the confidentiality, integrity, and availability of the system and its information and to manage information security risk.

Privacy controls are the administrative, technical, and physical safeguards employed within a system or an organization to ensure compliance with applicable privacy requirements and to manage privacy risks.² Security and privacy controls are selected and implemented to satisfy the security and privacy requirements levied on an information system and/or organization. The requirements are derived from applicable laws, executive orders, directives, regulations, policies, standards, and mission needs to ensure the confidentiality, integrity, and availability of information processed, stored, or transmitted and to manage risks to individual privacy. The selection, design, and effective implementation of controls are important tasks that have significant implications for the operations and assets of organizations as well as the welfare of

NIST Special Publication (SP) 800-37 [SP 800-37] defines two approaches for the selection of security and privacy controls: a *baseline* control selection approach and an *organization-generated* control selection approach. The baseline control selection approach uses control baselines, which are predefined sets of controls specifically assembled to meet the protection needs of a group, organization, or community of interest. The control baselines serve as a starting point for the protection of individuals' privacy, information, and information systems. The organization-generated control selection approach is not addressed in this publication.

1.1 PURPOSE AND APPLICABILITY

This publication establishes security and privacy control baselines for federal information systems³ and organizations and provides tailoring guidance for those baselines. The use of the security control baselines is mandatory, in accordance with OMB Circular A-130 [OMB A-130] and the provisions of the Federal Information Security Modernization Act⁴ [FISMA], which requires the implementation of a set of minimum controls to protect federal information and information systems. Whereas use of the privacy control baseline is not mandated by law or [OMB A-130], SP 800-53B, along with other supporting NIST publications, is designed to help

¹ An *information system* is a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information.

² [OMB A-130] defines security controls and privacy controls.

³ A *federal information system* is an information system used or operated by an agency, a contractor of an agency, or another organization on behalf of an agency.

⁴ Information systems that have been designated as national security systems (as defined in 44 U.S.C., Section 3542) are not subject to the requirements in [FISMA]. However, the controls established in this publication may be selected for national security systems as otherwise required (e.g., the Privacy Act of 1974) or with the approval of federal officials exercising policy authority over such systems. CNSS Policy No. 22 [CNSSP 22] and CNSS Instruction No. 1253 [CNSSI 1253] provide guidance for *national security systems*. DoD Instruction 8510.01 [DODI 8510.01] provides guidance for the Department of Defense.

among others. The publication accomplishes this objective by providing security and privacy control baselines as a starting point to meet the protection needs of organizations. The controls can be implemented within any organization or information system that processes, stores, or transmits information. The controls in the baselines are tailored following the process described in Section 2.4 to further facilitate the management of security and privacy risk specific to the organization. The tailoring process can be guided and informed by many factors, including

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1.2 TARGET AUDIENCE

This publication is intended to serve a diverse audience, including:

organizations satisfy their stated security and privacy requirements.

 Individuals with system, information security, privacy, or risk management and oversight responsibilities, including authorizing officials, chief information officers, senior agency information security officers, and senior agency officials for privacy

organizations identify the security and privacy controls needed to manage risk and satisfy the

security and privacy requirements in FISMA, the Privacy Act of 1974 [PRIVACT], selected OMB

policies (e.g., [OMB A-130]), and designated Federal Information Processing Standards (FIPS),

organizational mission and business needs, stakeholder protection needs, and assessments of

SECURITY AND PRIVACY CONTROL BASELINES

Security and privacy control baselines are predefined sets of controls specifically assembled to

address the protection needs of groups, organizations, or communities of interest. The control baselines serve as a starting point for the protection of individuals' privacy, information, and

information systems and can be tailored (i.e., customized)—appropriately taking into account organizational missions and business functions, specific and credible threat information, the

environment in which the organization operates, and individuals' privacy interests.

risk. The combination of control baseline selection and control tailoring processes can help

- Individuals with system development responsibilities, including mission owners, program managers, system engineers, system security engineers, privacy engineers, hardware and software developers, system integrators, and acquisition or procurement officials
- Individuals with logistical or disposition-related responsibilities, including program managers, procurement officials, system integrators, and property managers
- Individuals with security and privacy implementation and operations responsibilities, including mission or business owners, system owners, information owners or stewards, system administrators, system security or privacy officers

⁵ While the control baselines established in this publication are designed for federal information systems and organizations, other organizations—such as state, local, and tribal governments, as well as private sector organizations—are encouraged to consider using these baselines, as appropriate.

- Individuals with security and privacy assessment and monitoring responsibilities, including auditors, Inspectors General, system evaluators, control assessors, independent verifiers and validators, and analysts
- Commercial entities, including industry partners, who produce component products and systems and develop security and privacy technologies

1.3 ORGANIZATIONAL RESPONSIBILITIES

- 318 Organizations have the responsibility to choose a control selection approach in accordance with
- [SP 800-37]. If the baseline control selection approach is chosen, organizations select a security
- 320 control baseline and privacy control baseline as described in Chapter Three. Once the control
- baseline is selected, organizations apply the tailoring guidance provided in Chapter Two to help
- ensure the resulting controls are necessary and sufficient to manage security risk⁷ and privacy
- 323 risk.8

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324 1.4 RELATIONSHIP TO OTHER PUBLICATIONS

- 325 This publication establishes security and privacy control baselines derived from the controls in
- NIST SP 800-53 [SP 800-53]. The control baselines in this publication are in accordance with
- requirements for federal information and information systems included in [OMB A-130],⁹
- 328 Federal Information Processing Standard 199 [FIPS 199], and Federal Information Processing
- 329 Standard 200 [FIPS 200]. [SP 800-37] provides guidance on control selection approaches.

330 1.5 REVISIONS AND EXTENSIONS

- 331 The security and privacy controls specified in the baselines represent the state-of-the-practice 332 protection measures for individuals, information systems, and organizations. The controls 333 comprising the baselines are periodically reviewed and revised to reflect the experience gained 334 from using the controls; new or revised laws, executive orders, directives, regulations, policies, 335 and standards; changing security and privacy requirements; emerging threats, vulnerabilities, 336 attacks, and information processing methods; and the availability of new technologies. Thus, the 337 security and privacy controls specified in the baselines are also expected to change over time as 338 controls are withdrawn, revised, and added. In addition to the need for change, the need for 339 stability is addressed by requiring that proposed changes to the baseline undergo a rigorous and 340 transparent public review process to obtain public and private sector feedback and to build a
- consensus for baseline changes. The public review process provides a stable, flexible, and
- technically sound set of security and privacy control baselines.

⁶ In the *baseline* control selection approach and *organization-generated* control selection approach, organizations develop a well-defined set of security and privacy requirements using a life cycle-based systems engineering process as described in the Risk Management Framework (RMF) *Prepare—System Level* step, Task P-15, *Requirements Definition*. This process generates a set of requirements that can be used to guide and inform the selection of controls to satisfy the requirements.

⁷ [SP 800-30] provides guidance on the risk assessment process.

⁸ [IR 8062] introduces privacy risk assessment concepts.

⁹ [OMB A-130] establishes policy for the planning, budgeting, governance, acquisition, and management of federal information, personnel, equipment, funds, IT resources, and supporting infrastructure and services.

1.6 PUBLICATION ORGANIZATION

- 344 The remainder of this special publication is organized as follows:
- Chapter Two describes the fundamental concepts associated with control baselines, selecting the appropriate baseline, baseline assumptions, tailoring baselines, overlays, and capabilities.
- Chapter Three provides a set of tables organized by control family that contain the controls that comprise the low-impact, moderate-impact, and high-impact security control baselines as well as the privacy control baseline.
- A list of informative References¹⁰ is provided after Chapter Three.
- Supporting appendices include:
- 353 Appendix A: Glossary;
- 354 Appendix B: Acronyms; and
- 355 Appendix C: Overlay Guidance.



CHAPTER TWO

THE FUNDAMENTALS

358 CONTROL BASELINES, TAILORING, OVERLAYS, AND CAPABILITIES

his chapter presents the fundamental concepts associated with security and privacy control baselines, including the purpose of control baselines, how control baselines are selected, assumptions associated with control baselines, how the tailoring process is used to customize controls and baselines, the purpose of overlays and how overlays are used to address the security and privacy needs of communities of interest, and how the concept of capabilities can facilitate the grouping of mutually reinforcing controls.

2.1 CONTROL BASELINES

A significant challenge for organizations is selecting a set of security and privacy controls which, if correctly implemented and determined to be effective, adequately responds to mission and business risk while complying with security and privacy requirements defined by applicable laws, Executive Orders, regulations, policies, and directives. There is no single set of controls that addresses all security and privacy concerns in every situation. However, choosing the most appropriate controls for a specific situation or system to adequately respond to risk requires a fundamental understanding of the organization's missions and business priorities, the mission and business functions that the systems will support, and the environments where the systems will operate. It also requires close collaboration with key organizational stakeholders. With that understanding, organizations can demonstrate how to effectively and cost-effectively assure the confidentiality, integrity, and availability of organizational information and systems as well as the privacy of individuals in the context of supporting the organization's mission and business functions.

The concept of a control *baseline* is introduced to assist organizations in selecting a set of controls for their systems that is commensurate with security and privacy risk. A control baseline is a collection of controls from [SP 800-53] assembled to address the protection needs of a group, organization, or community of interest. ¹¹ The control baseline provides a generalized set of controls that represents an initial starting point for the subsequent tailoring activities that can be applied to the baseline to produce a targeted or customized security and privacy solution for the entity that it is intended to serve. The selection of controls for control baselines is based on a variety of factors, including sector-specific requirements, threat information, organizational assumptions and constraints, mission or business requirements, types of systems, operating environments, specific technologies, individuals' privacy interests, laws, Executive Orders, regulations, policies, directives, standards, or industry best practices. The control baselines are tailored or customized by each organization, sector, or individual company based on specific operating conditions and other factors. Tailoring activities are described in greater detail in Section 2.4.

¹¹ The U.S. Government, in accordance with the requirements set forth in [FISMA], [OMB A-130], and Federal Information Processing Standards, has established federally mandated security control baselines. The control baselines for non-national security systems are listed in [Chapter Three].

2.2 SELECTING CONTROL BASELINES

Information security programs are responsible for protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction (i.e., unauthorized system activity or behavior) in order to provide confidentiality, integrity, and availability. Privacy programs are responsible for ensuring compliance with applicable privacy requirements and for managing the risks to individuals associated with the creation, collection, use, processing, dissemination, storage, maintenance, disclosure, or disposal (collectively referred to as "processing") of personally identifiable information (PII). When a system processes PII, the information security and privacy programs have a shared responsibility to manage the impacts to individuals that arise from security risks and collaborate to determine the security catageorization and the selection and tailoring of controls from the security control baselines.

Security Control Baselines

In preparation for selecting and tailoring the appropriate security control baselines for organizational systems and their respective environments of operation, organizations first determine the criticality and sensitivity of the information to be processed, stored, or transmitted by those systems. The process of determining information criticality and sensitivity is known as *security categorization* and is described in [FIPS 199]. ¹³ The results of security categorization help guide and inform the selection of security control baselines to protect systems and information. The control baselines selected for systems are commensurate with the potential adverse impact on organizational operations, organizational assets, individuals, other organizations, or the Nation if there is a loss of confidentiality, integrity, or availability. [FIPS 199] requires organizations to categorize systems as low-impact, moderate-impact, or high-impact for the stated security objectives of confidentiality, integrity, and availability. ¹⁴

Since the potential impact values for confidentiality, integrity, and availability may not always be the same for a particular system, the high water mark concept (introduced in [FIPS 199]) is used in [FIPS 200] to determine the impact level of the system. The impact level of the system, in turn, is used for the express purpose of selecting the applicable security control baseline from one of the three baselines identified in Chapter Three. Thus, a low-impact system is defined as a system in which all three of the security objectives are low. A moderate-impact system is a system in which at least one of the security objectives is moderate and no security objective is high. Finally, a high-impact system is a system in which at least one security objective is high.

¹² Privacy programs may also choose to consider the risks to individuals that may arise from their interactions with information systems where the processing of PII may be less impactful than the effect that the system has on individuals' behavior or activities. Such effects would constitute risks to individual autonomy, and organizations may need to take steps to manage those risks in addition to information security and privacy risks.

¹³ [CNSSI 1253] provides security categorization guidance for national security systems.

¹⁴ NIST SP 800-60 (Volumes 1 and 2) [SP 800-60-1] [SP 800-60-2] provides guidance for the assignment of security categories to information systems. [SP 800-37] provides guidance for the specific tasks of the Risk Management Framework (RMF) Categorize step.

¹⁵ The high water mark concept is employed because there are significant dependencies among the security objectives of confidentiality, integrity, and availability. In most cases, a compromise in one security objective ultimately affects the other security objectives as well. Accordingly, security controls are not categorized by security objective. Rather, the security controls are grouped into baselines to provide a general protection capability for classes of information systems based on impact level.

Once the impact level of the system is determined, organizations select the appropriate security control baseline. ¹⁶ The selection of the security control baseline is based on the [FIPS 200] impact level of the information system as determined by the security categorization process described above. The organization selects one of three security control baselines from Chapter Three corresponding to the low-impact, moderate-impact, or high-impact categorization of the system. Note that not all controls or control enhancements are assigned to control baselines as indicated in the tables in Chapter Three. The controls and control enhancements that are assigned to baselines are indicated by an "x" in the low, moderate, or high columns in Tables 3-1 through 3-20. The use of the term control baseline is intentional. The controls and control enhancements in the baselines are a starting point from which controls/enhancements may be removed, added, or specialized based on the tailoring guidance in Section 2.4. ¹⁷

Privacy Control Baseline

In addition to the three security control baselines, <u>Chapter Three</u> provides a privacy control baseline for federal agencies to address privacy requirements and manage privacy risks that arise from the *processing* of PII. The controls are selected from the set of controls and control enhancements in [<u>SP 800-53</u>]. ¹⁸ The controls and control enhancements that are assigned to the privacy baseline are indicated by an "x". Whereas the selection of security controls for the security control baselines is based on an assessment of impact and the corresponding security categorization, as described above, the selection of privacy controls works differently. The selection of the privacy control baseline is based on a mapping of the controls and control enhancements in [<u>SP 800-53</u>] to the privacy program responsibilities under [<u>OMB A-130</u>]. This approach provides a starting point from which controls or control enhancements may be removed, added, or specialized based on the tailoring guidance in <u>Section 2.4</u>. ¹⁹ Organizations assess the applicable legal and policy requirements, and conduct privacy risk assessments, to guide the selection and implementation of these controls or enhancements in order to meet requirements and manage privacy risks.

A mapping between the privacy requirements in [OMB A-130] and the relevant controls from the control catalog in [SP 800-53] is provided on the NIST web site.²⁰ This mapping supports the implementation of the privacy requirements by federal agencies and nonfederal organizations that are required to meet such requirements based on federal contracts or other agreements. However, federal agencies should not assume that the implementation of the controls means

¹⁶ The general control baseline selection process may be augmented or further detailed by additional sector-specific guidance as described in <u>Appendix C</u>, *Overlays*.

¹⁷ Specialization refers to the modification of controls or control enhancements (including organization-defined parameters), or supplemental guidance to allow an organization to further refine the control baseline to address specific requirements, technologies, missions or business functions, or environments of operation. To address the need for specialized sets of controls for communities of interest, systems, and organizations, the *overlay* concept is introduced. For more information on overlays, see <u>Appendix C</u>.

¹⁸ Privacy control enhancements in Tables 3-1 through 3-20 in <u>Chapter Three</u> cannot be selected and implemented without the selection and implementation of the associated base control. Such actions may require collaboration with security programs in cases where the security program has responsibility for the base control. Organizations ensure that the responsibility for the selection and implementation of controls is clearly defined between the information security and privacy programs.

¹⁹ See footnote 17.

²⁰ See [NIST CSRC].

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that they have met all of their obligations under [OMB A-130]. Agencies may need to take additional, separate steps to fully comply with OMB privacy requirements.

2.3 CONTROL BASELINE ASSUMPTIONS

- 459 The control baselines in Chapter Three address the protection needs of a diverse set of 460 constituencies, including individual users and organizations. Thus, certain working assumptions 461 generally underlie the control baselines in Chapter Three. These assumptions, made when 462 determining the baselines in Chapter Three, consider the environments in which organizational 463 information systems operate, including legislative, regulatory, or policy obligations; the nature 464 of organizational operations; the specific functionality employed within the systems; the types 465 of threats confronting organizations, missions/business processes, and systems; individuals' 466 privacy interests; and the types of information processed, stored, or transmitted by systems. 467 Articulating the underlying assumptions is a key element in the Risk Framing step of the risk 468 management process described in NIST SP 800-39 [SP 800-39] and reinforced in the Prepare 469 step in [SP 800-37]. Specific assumptions that underlie the control baselines in Chapter Three 470 include:
- Organizational systems are located in physical facilities.
- Information in organizational systems is relatively persistent.²¹
- Organizational systems are multi-user (either serially or concurrently) in operation.
- Some information in organizational systems is not shareable with other users who have authorized access to the same systems.
- Organizational systems exist in networked environments, and are general purpose in nature.
- Organizations have the necessary structure, resources, and infrastructure to implement the controls. 22
- If any of the above assumptions are not valid, then some of the security controls allocated to the control baselines in <u>Chapter Three</u> may not be applicable—a situation that can be addressed by applying the tailoring guidance in <u>Section 2.4</u> and the results of organization- and system-level risk assessments. Additional assumptions that are **not** addressed in the baselines include:
- Insider threats exist within organizations.
 - Classified information is processed, stored, or transmitted by organizational systems.²³
- Advanced persistent threats (APTs) exist within organizations.
- Information requires specialized protection based on legislation, directives, regulations, or policies.
- Organizational systems communicate with other systems across different security domains.

²¹ Persistent data/information refers to data/information with utility for a relatively long duration (e.g., days, weeks).

²² In general, federal departments and agencies satisfy this assumption. However, the assumption can become an issue for nonfederal entities, such as municipalities, first responders, and small businesses. Such entities may not be large enough or sufficiently resourced to have elements dedicated to providing the range of security or privacy capabilities that are assumed by the baselines. Organizations consider such factors in their risk-based decisions.

²³ See NIST SP 800-59 [SP 800-59] and CNSS Instruction 1253 [CNSSI 1253].

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If any of these assumptions apply, then additional controls from [SP 800-53] are likely needed to ensure adequate protection—a situation that can also be effectively addressed by applying the

491 tailoring guidance in <u>Section 2.4</u> (specifically, security control supplementation) and the results

of organization- and system-level assessments of risk.

2.4 TAILORING CONTROL BASELINES

After selecting an appropriate control baseline, organizations initiate a tailoring process to align the controls more closely with the specific security and privacy requirements identified by the organization. ²⁴ The tailoring process is part of an organization-wide risk management process that includes framing, assessing, responding to, and monitoring information security and privacy risks. Tailoring decisions are not carried out in a vacuum. While tailoring decisions are focused on security and privacy considerations, the decisions are typically aligned with other risk-related issues that organizations must routinely address. Risk-related issues such as cost, schedule, and performance are considered in the determination of which controls to employ in organizational systems and environments of operation. ²⁵ The tailoring process can include but is not limited to the following activities: ²⁶

- Identifying and designating common controls
- Applying scoping considerations
- Selecting compensating controls
- Assigning values to organization-defined control parameters via explicit assignment and selection statements
- Supplementing baselines with additional controls and control enhancements
 - Providing specification information for control implementation

511 Organizations use risk management guidance to facilitate risk-based decision making regarding 512 the applicability of the controls in the baselines. Ultimately, organizations employ the tailoring 513 process to achieve cost-effective solutions that support organizational missions and business 514 needs and provide security and privacy protections commensurate with risk.²⁷ Organizations 515 have the flexibility to tailor at the organization level for systems in support of a line of business 516 or mission/business process, at the individual system level, or by using a combination of the 517 two. However, organizations do not arbitrarily remove security and privacy controls from 518 baselines. Tailoring decisions are expected to be defensible based on mission and business 519 needs, a sound rationale, and explicit risk-based determinations. 28

²⁴ Some organizations may select security and privacy controls from [SP 800-53] without the use of control baselines. For example, organizations may choose their controls as part of a life cycle-based systems engineering process during the development of systems, system components, or system services.

²⁵ It is inappropriate to tailor out security or privacy controls that pertain to specific federal legislative, regulatory, or policy requirements.

²⁶ See Section 2.2, <u>Privacy Control Baseline</u>, for additional guidance on tailoring privacy controls.

²⁷ See [SP 800-37], Task P-4.

²⁸ Tailoring decisions can be based on the timing and applicability of selected controls under certain conditions. That is, security and privacy controls may not apply in every situation, or the parameter values for assignment statements may change under certain circumstances. Federal agencies conduct baseline tailoring activities in accordance with OMB policy. In certain situations, OMB may prohibit agencies from tailoring specific security or privacy controls.

Tailoring decisions, including the risk-based justification for the decisions, are documented in the system security and privacy plans for organizational systems. ²⁹ Every control from the selected control baseline is accounted for by the organization. If certain controls are tailored out, the rationale is recorded in the system security and privacy plans and subsequently approved by the responsible officials within the organization as part of the approval process for the plans. Documenting risk management decisions during the baseline tailoring process is imperative for organizational officials to have the necessary information to make credible, risk-based decisions regarding security and privacy and to do so in a manner that fully supports transparency, traceability, and accountability.

Identifying and Designating Common Controls

Common controls are controls that may be inherited by one or more organizational systems. If a system inherits a common control provided by another entity (internal or external), there is no need to implement the control within that system. Organizational decisions on which controls are designated as common controls may affect the responsibilities of individual system owners with regard to the implementation of the controls in a baseline. Ocommon control providers ensure that current implementation information and assessment results are available to facilitate decision making by system owners and authorizing officials. System owners and authorizing officials determine if the common controls available for inheritance actually provide protection commensurate with risk for inheriting systems.

Common control designation and control implementation can affect organizations' resource expenditures. That is, in general, the greater the number of common controls implemented, the greater the potential cost savings since the protective measures are amortized over many systems. Additionally, deployment of controls as common controls often provides a more standardized, stable, scalable, and secure implementation across the organization as opposed to the same control implemented separately on multiple individual systems.

Applying Scoping Considerations

Scoping considerations, when applied in conjunction with risk management guidance, provide organizations with a more granular foundation with which to make risk-based decisions.³² The application of these scoping considerations can eliminate unnecessary controls from the initial control baselines and ensure that organizations select *only* those controls that are needed to provide a level of protection that is commensurate with risk. Organizations may apply the scoping considerations described below as needed to assist with making risk-based decisions regarding control selection and specification.

CHAPTER TWO PAGE 10

²⁹ [SP 800-18] provides guidance on developing system security plans. Guidance on developing privacy plans is forthcoming.

³⁰ See the *Organizational Prepare* Step, Task P-5, *Common Control Identification*, in [SP 800-37] for more information about organizational decisions on designating common controls.

³¹ Organizations may also leverage the use of hybrid controls. Hybrid controls are controls that are partially implemented by one or more common control providers and partially implemented by the information system.

³² The scoping considerations listed in this section are exemplary and *not* intended to limit organizations in rendering risk-based decisions based on other organization-defined considerations with appropriate justification or rationale.

554 - Control Implementation, Applicability, and Placement Considerations

The growing complexity of systems requires careful analysis in the implementation of security and privacy controls. Controls in the initial baselines may not be applicable to every component in the system. Controls are applicable only to system components that provide or support the security or privacy functions or capabilities addressed by the controls.³³ Organizations make explicit risk-based decisions about where to apply or allocate specific controls in organizational systems to achieve the needed security or privacy function or capability and to satisfy security and privacy requirements.

- Operational and Environmental Considerations

Certain controls in the control baselines assume the existence of operational or environmental factors. Where operational or environmental factors are absent or significantly diverge from the baseline assumptions described in Section 2.3, it is justifiable to tailor the baseline. Some of the more common operational and environmental factors include but are not limited to mobile devices and operations; single-user systems and operations; data connectivity and bandwidth; non-networked (i.e., air-gapped) systems; systems that have very limited or sporadic bandwidth such as tactical systems that support warfighter or law enforcement missions; cyber-physical systems, sensors, and Internet of Things (IoT) devices; limited functionality systems, such as facsimile machines, printers, scanners, and digital cameras; systems processing, storing, or transmitting non-persistent information or systems that employ virtualization techniques to establish non-persistent instantiations of operating systems and applications; and systems that require public access.

- Technology Considerations

Controls that refer to specific technologies—such as wireless, cryptography, or public key infrastructure—are applicable only if those technologies are implemented or are required for use within organizational systems. Controls that can be effectively supported by automated mechanisms do not require the development of such mechanisms if the mechanisms do not already exist or are not readily available in commercial or government off-the-shelf products. If automated mechanisms are not available, cost-effective, or technically feasible, compensating controls, implemented through nonautomated mechanisms or procedures, can be implemented to satisfy specified controls or control enhancements.

Mission and Business Considerations

Certain controls may not be appropriate if implementing those controls has the potential to degrade, debilitate, or interfere with organizational missions or business functions, including endangering or harming individuals. However, decisions on the appropriateness of control implemention always consider legislative, regulatory, and/or policy requirements.

- Legal and Policy Considerations

Although controls that are used to meet legislative, regulatory, or policy requirements are not to be tailored out of control baselines, some legislative, regulatory, or policy requirements may only apply in specified circumstances. It is justifiable to tailor the baseline when these circumstances are not applicable to an organization or certain systems.

³³ For example, auditing controls are typically applied to components of a system that provide auditing capabilities and are not necessarily applied to every user-level component within the organization.

- Security Objective Considerations

Controls that support only one or two of the security objectives (i.e., confidentiality, integrity, or availability) may be downgraded to the corresponding control in a lower baseline (or modified or eliminated if not defined in a lower baseline) only if the downgrading action: reflects the [FIPS 199] security category for the supported security objectives before considering the [FIPS 200] impact level (i.e., high water mark); is supported by an organizational assessment of risk; and does not adversely affect the level of protection for the security-relevant information within the system. For example, if a system is categorized as moderate-impact using the high water mark concept because confidentiality and/or integrity are moderate but availability is low, there are several controls that only support the availability security objective and that could potentially be downgraded to the low baseline controls. In this scenario, it may be appropriate to refrain from implementing CP-2(1) because the control enhancement only supports availability and is selected in the moderate baseline but not in the low baseline. The following security controls and control enhancements are candidates for downgrading for each of the security categories:

- Confidentiality: AC-21, MA-3(3), MP-3, MP-4, MP-5, MP-6(1), MP-6(2), PE-4, PE-5, SC-4
- Integrity: CM-5, CM-5(1), CM-5(3), SI-7, SI-7(1), SI-7(5), SI-10
 - Availability: CP-2(1), CP-2(2), CP-2(3), CP-2(4), CP-2(5), CP-2(8), CP-3(1), CP-4(1), CP-4(2), CP-6, CP-6(1), CP-6(2), CP-6(3), CP-7, CP-7(1), CP-7(2), CP-7(3), CP-7(4), CP-7(6), CP-8, CP-8(1), CP-8(2), CP-8(3), CP-8(4), CP-8(5), CP-9(2), CP-9(3), CP-9(5), CP-9(6), CP-10(2), CP-10(4), CP-11, MA-6, PE-9, PE-10, PE-11, PE-11(1), PE-13(1), PE-13(2), PE-15(1)

Selecting Compensating Controls

Compensating controls are used by organizations in lieu of specific controls in control baselines. The use of compensating controls is appropriate when controls are tailored out of the control baseline by necessity, but the protection provided by the controls is still needed to reduce risk to an acceptable level. Compensating controls are often chosen when implementing a baseline control is technically infeasible, not cost effective, or the control implementation negatively affects organizational missions or business functions. For technology-based scoping considerations, compensating controls are often temporary and used only until the system is updated. Compensating controls are intended to provide equivalent or comparable protection for systems, organizations, and individuals. Compensating controls are selected after applying the scoping considerations in the tailoring process. To use compensating controls, organizations:

- Select compensating controls from the control catalog in [SP 800-53].
- Provide a rationale for how compensating controls satisfy security or privacy requirements and why the baseline controls could not be implemented.

³⁴ For example, additional physical security controls may be implemented in lieu of a device lock in certain real-time mission or business applications. In a small organization, more frequent auditing, targeted role-based training, or stronger personnel screening may be implemented in lieu of separation of duties. Well-defined procedures, targeted role-based training, and more frequent auditing may be implemented in lieu of automated mechanisms.

³⁵ Compensating controls are not used to avoid the need to comply with requirements. Rather, the use of such controls provides alternative and suitable security and privacy protections to facilitate risk management.

³⁶ More than one compensating control may be required to provide the equivalent protection for a control that has been tailored out from a control baseline.

- Adopt suitable compensating controls from other sources if appropriate compensating controls are not available in [SP 800-53].
- Assess and accept the security and privacy risks associated with implementing compensating controls.

Assigning Control Parameter Values

Controls and control enhancements containing embedded parameters (i.e., assignment and selection statements) give organizations the flexibility to specify values for certain portions of controls and control enhancements to support specific organizational requirements. After the application of scoping considerations and the selection of compensating controls, organizations review the controls and control enhancements for assignment or selection statements and determine the appropriate organization-defined values for the identified parameters. The parameter values may be driven by mission or business requirements or the values may be prescribed by laws, Executive Orders, directives, regulations, policies, standards, guidelines, or industry best practices. Figure 1 illustrates the concept of organization-defined parameters.

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AU-4 AUDIT STORAGE CAPACITY

Organization-defined Parameter

<u>Control</u>: Allocate audit record storage capacity to accommodate [Assignment: organization-defined audit record retention requirements].

<u>Discussion</u>: Organizations consider the types of auditing to be performed and the audit processing requirements when allocating audit storage capacity. Allocating sufficient audit storage capacity reduces the likelihood of such capacity being exceeded and resulting in the potential loss or reduction of auditing capability.

Related Controls: AU-2, AU-5, AU-6, AU-7, AU-9, AU-11, AU-12, AU-14, SI-4.

Control Enhancements:

Organization-defined Parameter

(1) AUDIT STORAGE CAPACITY | TRANSFER TO ALTERNATE STORAGE

Off-load audit records [Assignment: organization-defined frequency] onto a different system or media than the system being audited.

<u>Discussion</u>: Off-loading is a process designed to preserve the confidentiality and integrity of audit records by moving the records from the primary system to a secondary or alternate system. It is a common process in systems with limited audit storage capacity; the audit storage is used only in a transitory fashion until the system can communicate with the secondary or alternate system designated for storing the audit records, at which point the information is transferred.

Related Controls: None.

References: None.

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FIGURE 1: ORGANIZATION-DEFINED CONTROL PARAMETERS

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³⁷ Organizations make every attempt to select compensating controls from the consolidated control catalog in [SP 800-53]. Organization-defined compensating controls are employed *only* when organizations determine that the control catalog does not contain suitable compensating controls.

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659 Once organizations specify the parameter values for the controls and control enhancements, the 660 specified assignment and selection values become a permanent part of the control and control 661 enhancement. As such, they are documented in security and privacy program plans or system 662 security and privacy plans, as appropriate. Organizations can specify the parameter values 663 before selecting compensating controls since the parameter specification completes the control 664 definitions and may affect the need for compensating controls. There can be significant benefits 665 to collaborating on the development of parameter values for controls. For organizations that 666 work together on a frequent basis or regularly conduct exchanges of information, it may be 667 useful to develop a mutually agreeable set of control parameter values.

Supplementing Control Baselines

669 In certain situations, additional controls or control enhancements beyond the controls and 670 enhancements contained in the control baselines in Chapter Three may be required to address specific threats to organizations, mission/business processes, and systems; to address privacy-672 related issues for individuals; and to satisfy the requirements of applicable laws, Executive 673 Orders, directives, policies, regulations, standards, and guidelines. Organizational assessments 674 of risk provide essential information for determining the necessity and sufficiency of the 675 controls and control enhancements in the control baselines. Organizations are encouraged to 676 make maximum use of the control catalog in [SP 800-53] to supplement control baselines with 677 additional controls or control enhancements.

Providing Additional Specification Information for Control Implementation

Since controls and control enhancements are statements of security or privacy functions or capabilities that are conveyed at higher levels of abstraction, the controls may lack sufficient information for implementation. Therefore, additional details may be necessary to fully define the intent of a given control for implementation purposes and to ensure that the security and privacy requirements related to that control are satisfied. For example, additional information may be provided as part of the process of moving from control to specification requirements, and may involve refinement of implementation details, refinement of scope, or iteration to apply the same control differently to different scopes. The need to provide additional control specification information occurs routinely when controls are employed in a system engineering process as part of requirements engineering. Organizations ensure that if existing control information is not sufficient to define the intended implementation details for the control, such information is provided to system owners and common control providers. Organizations have the flexibility to determine whether additional control specification information is included as part of the control statement or in a separate control addendum section. When providing additional detail, organizations are cautioned not to change the intent of the base control or modify the original language in the control. The additional implementation information is documented in the system security and privacy plans.

2.5 CAPABILITIES

Organizations consider defining a set of capabilities a precursor to the control selection process. The concept of *capability* recognizes that satisfying security or privacy requirements seldom derives from a single control but rather from a set of mutually reinforcing controls. For example, organizations may wish to define a capability for secure remote authentication. This capability can be achieved by the selection and implementation of a set of controls from [SP

800-53] (e.g., IA-2 [1], IA-2 [2], IA-2 [8], IA-2 [9], and SC-8 [1]). Moreover, capabilities can address a variety of areas that can include technical means, physical means, procedural means, or any combination thereof. Thus, in addition to the above capability for secure remote access, organizations may also need security capabilities that address physical means, such as tamper detection on a cryptographic module or anomaly detection/analysis on an orbiting spacecraft.

As the number of controls in [SP 800-53] grows in response to an increasingly sophisticated threat space, it is important for organizations to have the ability to describe key capabilities needed to protect organizational missions and business functions, and to subsequently select controls that—if properly designed, developed, and implemented—produce such capabilities. This simplifies how the protection problem is viewed conceptually. In essence, using the construct of a capability provides a shorthand method of grouping controls that are employed for a common purpose or to achieve a common objective. This is an important consideration, for example, when assessing controls for effectiveness.³⁸

Traditionally, assessments have been conducted on a control-by-control basis, producing results that are characterized as pass (i.e., control satisfied) or fail (i.e., control not satisfied). However, the failure of a single control or in some cases, multiple controls, may not affect the overall capability needed by an organization. Moreover, employing the broader construct of a capability allows an organization to assess the severity of the vulnerabilities discovered in its information systems and determine if the failure of a particular control or the decision not to deploy a certain control affects the overall capability needed for mission/business protection. It also facilitates conducting *root cause* analyses to determine if the failure of one control can be traced to the failure of other controls based on the established control relationships. Ultimately, authorization decisions (i.e., risk acceptance decisions) are made based on the degree to which the desired capabilities have been effectively achieved and are meeting the security and privacy requirements defined by an organization. These risk-based decisions are directly related to the organizational risk tolerance that is defined as part of an organization's risk management strategy.

³⁸ NIST Interagency Report 8011, Vol. 1 [IR 8011 v1], describes the grouping of controls by purpose that facilitates automated control assessments.

730 **CHAPTER THREE**

THE CONTROL BASELINES

732 SECURITY AND PRIVACY CONTROL BASELINES

■ables 3-1 through 3-20 provide a listing the controls and control enhancements assigned to 734 the control families in [SP 800-53] and the respective control allocations to the privacy 735 control baseline and the low-impact, moderate-impact, and high-impact security control baselines. Section 2.2 (Privacy Control Baseline) provides additional information on the privacy control selection criteria.

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SECURITY AND PRIVACY CONTROL BASELINE RELATIONSHIPS

- Controls and control enhancements that are assigned to security control baselines are used to manage risks arising from the loss of confidentiality, integrity, and availability. Since Senior Agency Officials for Privacy (SAOPs) have the responsibility for managing privacy risk in accordance with [OMB A-130], and since privacy risks arise from both the processing of PII and the loss of confidentiality, integrity, and availability of PII, it is important that organizations consider how privacy and security programs collaborate in activities related to these controls such as categorization, tailoring, implementation, and assessment.
- Controls and control enhancements that are assigned only to the privacy control baseline and not to the security control baselines are important for managing privacy program responsibilities under [OMB A-130] but do not generally support the management of risks that arise from the loss of confidentiality, integrity, and availability.
- Controls and control enhancements that are assigned to both the privacy and security control baselines are used to manage privacy program responsibilities under [OMB A-130] and risks that arise from the loss of confidentiality, integrity, and availability (including PII).
- Some controls and control enhancements are not assigned to any control baseline. Through tailoring, organizations make their own determinations as to whether the controls and control enhancements are needed to meet applicable requirements or are useful for managing risks that arise from the loss of confidentiality, integrity, and availability or the processing of PII.

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3.1 ACCESS CONTROL FAMILY

Table 3-1 provides a summary of the controls and control enhancements assigned to the Access Control Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

760 TABLE 3-1: ACCESS CONTROL FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
	CONTROL ENHANCEMENT NAME	PRIVACY BAS	LOW	MOD	HIGH
AC-1	Policy and Procedures	х	х	х	х
AC-2	Account Management		Х	х	х
AC-2(1)	AUTOMATED SYSTEM ACCOUNT MANAGEMENT			х	х
AC-2(2)	AUTOMATED TEMPORARY AND EMERGENCY ACCOUNT MANAGEMENT			х	х
AC-2(3)	DISABLE ACCOUNTS			х	х
AC-2(4)	AUTOMATED AUDIT ACTIONS			х	Х
AC-2(5)	INACTIVITY LOGOUT			х	Х
AC-2(6)	DYNAMIC PRIVILEGE MANAGEMENT				
AC-2(7)	PRIVILEGED USER ACCOUNTS				
AC-2(8)	DYNAMIC ACCOUNT MANAGEMENT				
AC-2(9)	RESTRICTIONS ON USE OF SHARED AND GROUP ACCOUNTS				
AC-2(10)	SHARED AND GROUP ACCOUNT CREDENTIAL CHANGE	W: Inco	orporated i	nto AC-2k.	
AC-2(11)	USAGE CONDITIONS				х
AC-2(12)	ACCOUNT MONITORING FOR ATYPICAL USAGE				х
AC-2(13)	DISABLE ACCOUNTS FOR HIGH-RISK USERS			х	х
AC-2(14)	PROHIBIT SPECIFIC ACCOUNT TYPES				
AC-3	Access Enforcement		х	х	х
AC-3(1)	RESTRICTED ACCESS TO PRIVILEGED FUNCTION	W: Inco	orporated i	nto AC-6.	
AC-3(2)	DUAL AUTHORIZATION				
AC-3(3)	MANDATORY ACCESS CONTROL				
AC-3(4)	DISCRETIONARY ACCESS CONTROL				
AC-3(5)	SECURITY-RELEVANT INFORMATION				
AC-3(6)	PROTECTION OF USER AND SYSTEM INFORMATION	W: Inco	orporated i	nto MP-4, S	C-28.
AC-3(7)	ROLE-BASED ACCESS CONTROL				
AC-3(8)	REVOCATION OF ACCESS AUTHORIZATIONS				
AC-3(9)	CONTROLLED RELEASE				
AC-3(10)	AUDITED OVERRIDE OF ACCESS CONTROL MECHANISMS				
AC-3(11)	RESTRICT ACCESS TO SPECIFIC INFORMATION TYPES				
AC-3(12)	ASSERT AND ENFORCE APPLICATION ACCESS				
AC-3(13)	ATTRIBUTE-BASED ACCESS CONTROL				
AC-3(14)	INDIVIDUAL ACCESS	х			
AC-3(15)	DISCRETIONARY AND MANDATORY ACCESS CONTROL				
AC-4	Information Flow Enforcement			х	х
AC-4(1)	OBJECT SECURITY AND PRIVACY ATTRIBUTES				
AC-4(2)	PROCESSING DOMAINS				

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH
AC-4(3)	DYNAMIC INFORMATION FLOW CONTROL				
AC-4(4)	FLOW CONTROL OF ENCRYPTED INFORMATION				Х
AC-4(5)	EMBEDDED DATA TYPES				
AC-4(6)	METADATA				
AC-4(7)	ONE-WAY FLOW MECHANISMS				
AC-4(8)	SECURITY AND PRIVACY POLICY FILTERS				
AC-4(9)	HUMAN REVIEWS				
AC-4(10)	ENABLE AND DISABLE SECURITY OR PRIVACY POLICY FILTERS				
AC-4(11)	CONFIGURATION OF SECURITY OR PRIVACY POLICY FILTERS				
AC-4(12)	DATA TYPE IDENTIFIERS				
AC-4(13)	DECOMPOSITION INTO POLICY-RELEVANT SUBCOMPONENTS				
AC-4(14)	SECURITY OR PRIVACY POLICY FILTER CONSTRAINTS				
AC-4(15)	DETECTION OF UNSANCTIONED INFORMATION				
AC-4(16)	INFORMATION TRANSFERS ON INTERCONNECTED SYSTEMS	W: Inco	orporated i	nto AC-4.	
AC-4(17)	DOMAIN AUTHENTICATION				
AC-4(18)	SECURITY ATTRIBUTE BINDING	W: Inco	orporated i	nto AC-16.	
AC-4(19)	VALIDATION OF METADATA				
AC-4(20)	APPROVED SOLUTIONS				
AC-4(21)	PHYSICAL OR LOGICAL SEPARATION OF INFORMATION FLOWS				
AC-4(22)	ACCESS ONLY				
AC-4(23)	MODIFY NON-RELEASABLE INFORMATION				
AC-4(24)	INTERNAL NORMALIZED FORMAT				
AC-4(25)	DATA SANITIZATION				
AC-4(26)	AUDIT FILTERING ACTIONS				
AC-4(27)	REDUNDANT/INDEPENDENT FILTERING MECHANISMS				
AC-4(28)	LINEAR FILTER PIPELINES				
AC-4(29)	FILTER ORCHESTRATION ENGINES				
AC-4(30)	FILTER MECHANISMS USING MULTIPLE PROCESSES				
AC-4(31)	FAILED CONTENT TRANSFER PREVENTION				
AC-4(32)	PROCESS REQUIREMENTS FOR INFORMATION TRANSFER				
AC-5	Separation of Duties			х	х
AC-6	Least Privilege			х	Х
AC-6(1)	AUTHORIZE ACCESS TO SECURITY FUNCTIONS			х	Х
AC-6(2)	NON-PRIVILEGED ACCESS FOR NONSECURITY FUNCTIONS			х	х
AC-6(3)	NETWORK ACCESS TO PRIVILEGED COMMANDS				х
AC-6(4)	SEPARATE PROCESSING DOMAINS				
AC-6(5)	PRIVILEGED ACCOUNTS			х	Х
AC-6(6)	PRIVILEGED ACCESS BY NON-ORGANIZATIONAL USERS				
AC-6(7)	REVIEW OF USER PRIVILEGES		х	х	х
AC-6(8)	PRIVILEGE LEVELS FOR CODE EXECUTION				
AC-6(9)	LOG USE OF PRIVILEGED FUNCTIONS		х	х	Х
AC-6(10)	PROHIBIT NON-PRIVILEGED USERS FROM EXECUTING PRIVILEGED FUNCTIONS			х	Х

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
		PRIVACY	LOW	MOD	HIGH	
AC-7	Unsuccessful Logon Attempts		х	х	Х	
AC-7(1)	AUTOMATIC ACCOUNT LOCK	W: Inc	orporated i	nto AC-7.		
AC-7(2)	PURGE OR WIPE MOBILE DEVICE					
AC-7(3)	BIOMETRIC ATTEMPT LIMITING					
AC-7(4)	USE OF ALTERNATE FACTOR					
AC-8	System Use Notification		х	х	Х	
AC-9	Previous Logon Notification					
AC-9(1)	UNSUCCESSFUL LOGONS					
AC-9(2)	SUCCESSFUL AND UNSUCCESSFUL LOGONS					
AC-9(3)	NOTIFICATION OF ACCOUNT CHANGES					
AC-9(4)	ADDITIONAL LOGON INFORMATION					
AC-10	Concurrent Session Control				х	
AC-11	Device Lock			х	х	
AC-11(1)	PATTERN-HIDING DISPLAYS			х	х	
AC-12	Session Termination			х	Х	
AC-12(1)	USER-INITIATED LOGOUTS					
AC-12(2)	TERMINATION MESSAGE					
AC-12(3)	TIMEOUT WARNING MESSAGE					
AC-13	Supervision and Review-Access Control	W: Inc	orporated i	nto AC-2, A	U-6.	
AC-14	Permitted Actions without Identification or Authentication		x x x			
AC-14(1)	NECESSARY USES	W: Inc	W: Incorporated into AC-14.			
AC-15	Automated Marking	W: Inc	orporated i	nto MP-3.		
AC-16	Security and Privacy Attributes					
AC-16(1)	DYNAMIC ATTRIBUTE ASSOCIATION					
AC-16(2)	ATTRIBUTE VALUE CHANGES BY AUTHORIZED INDIVIDUALS					
AC-16(3)	MAINTENANCE OF ATTRIBUTE ASSOCIATIONS BY SYSTEM					
AC-16(4)	ASSOCIATION OF ATTRIBUTES BY AUTHORIZED INDIVIDUALS					
AC-16(5)	ATTRIBUTE DISPLAYS FOR OUTPUT DEVICES					
AC-16(6)	MAINTENANCE OF ATTRIBUTE ASSOCIATION BY ORGANIZATION					
AC-16(7)	CONSISTENT ATTRIBUTE INTERPRETATION					
AC-16(8)	ASSOCIATION TECHNIQUES AND TECHNOLOGIES					
AC-16(9)	ATTRIBUTE REASSIGNMENT — REGRADING MECHANISMS					
AC-16(10)	ATTRIBUTE CONFIGURATION BY AUTHORIZED INDIVIDUALS					
AC-17	Remote Access		х	х	Х	
AC-17(1)	MONITORING AND CONTROL			х	Х	
AC-17(2)	PROTECTION OF CONFIDENTIALITY AND INTEGRITY USING ENCRYPTION			х	Х	
AC-17(3)	MANAGED ACCESS CONTROL POINTS			х	Х	
AC-17(4)	PRIVILEGED COMMANDS AND ACCESS			х	Х	
AC-17(5)	MONITORING FOR UNAUTHORIZED CONNECTIONS	W: Inc	orporated i	nto SI-4.		
AC-17(6)	PROTECTION OF MECHANISM INFORMATION					
AC-17(7)	ADDITIONAL PROTECTION FOR SECURITY FUNCTION ACCESS	W: Inc	orporated i	nto AC-3(10)).	

CONTROL NUMBER	CONTROL NAME		SECURITY CONTROL BASELINES				
NOZEIN	CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	LOW	MOD	HIGH		
AC-17(9)	DISCONNECT OR DISABLE ACCESS						
AC-17(10)	AUTHENTICATE REMOTE COMMANDS						
AC-18	Wireless Access		х	х	х		
AC-18(1)	AUTHENTICATION AND ENCRYPTION			х	х		
AC-18(2)	MONITORING UNAUTHORIZED CONNECTIONS	W: Inco	orporated i	nto SI-4.			
AC-18(3)	DISABLE WIRELESS NETWORKING			х	х		
AC-18(4)	RESTRICT CONFIGURATIONS BY USERS				х		
AC-18(5)	ANTENNAS AND TRANSMISSION POWER LEVELS				х		
AC-19	Access Control for Mobile Devices		х	х	х		
AC-19(1)	USE OF WRITABLE AND PORTABLE STORAGE DEVICES	W: Incorporated into MP-7.					
AC-19(2)	USE OF PERSONALLY OWNED PORTABLE STORAGE DEVICES	W: Inco	W: Incorporated into MP-7.				
AC-19(3)	USE OF PORTABLE STORAGE DEVICES WITH NO IDENTIFIABLE OWNER	W: Inco	orporated i	nto MP-7.			
AC-19(4)	RESTRICTIONS FOR CLASSIFIED INFORMATION						
AC-19(5)	FULL DEVICE AND CONTAINER-BASED ENCRYPTION			х	х		
AC-20	Use of External Systems		х	х	х		
AC-20(1)	LIMITS ON AUTHORIZED USE			х	х		
AC-20(2)	PORTABLE STORAGE DEVICES — RESTRICTED USE			х	х		
AC-20(3)	NON-ORGANIZATIONALLY OWNED SYSTEMS — RESTRICTED USE						
AC-20(4)	NETWORK-ACCESSIBLE STORAGE DEVICES						
AC-20(5)	PORTABLE STORAGE DEVICES — PROHIBITED USE						
AC-20(6)	NON-ORGANIZATIONALLY OWNED SYSTEMS — PROHIBITED USE						
AC-21	Information Sharing			х	х		
AC-21(1)	AUTOMATED DECISION SUPPORT						
AC-21(2)	INFORMATION SEARCH AND RETRIEVAL						
AC-22	Publicly Accessible Content		х	х	х		
AC-23	Data Mining Protection						
AC-24	Access Control Decisions						
AC-24(1)	TRANSMIT ACCESS AUTHORIZATION INFORMATION						
AC-24(2)	NO USER OR PROCESS IDENTITY						
AC-25	Reference Monitor						

3.2 AWARENESS AND TRAINING FAMILY

Table 3-2 provides a summary of the controls and control enhancements assigned to the Awareness and Training Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

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TABLE 3-2: AWARENESS AND TRAINING FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES				
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH		
AT-1	Policy and Procedures	х	х	x	х		
AT-2	Awareness Training	х	х	х	Х		
AT-2(1)	PRACTICAL EXERCISES						
AT-2(2)	INSIDER THREAT		Х	х	Х		
AT-2(3)	SOCIAL ENGINEERING AND MINING			х	Х		
AT-2(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR						
AT-2(5)	BREACH	х					
AT-2(6)	ADVANCED PERSISTENT THREAT						
AT-2(7)	CYBER THREAT ENVIRONMENT						
AT-2(8)	TRAINING FEEDBACK						
AT-3	Role-Based Training	х	х	х	Х		
AT-3(1)	ENVIRONMENTAL CONTROLS						
AT-3(2)	PHYSICAL SECURITY CONTROLS						
AT-3(3)	PRACTICAL EXERCISES						
AT-3(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR	W: Inco	orporated i	rporated into AT-2(4).			
AT-3(5)	ACCESSING PERSONALLY IDENTIFIABLE INFORMATION	х					
AT-4	Training Records	х	х	х	Х		
AT-5	Contacts with Security Groups and Associations	W: Inco	W: Incorporated into PM-15.				

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3.3 AUDIT AND ACCOUNTABILITY FAMILY

Table 3-3 provides a summary of the controls and control enhancements assigned to the Audit and Accountability Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

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CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVAC) BAS	LOW	MOD	HIGH	
AU-1	Policy and Procedures	х	х	х	Х	
AU-2	Event Logging	х	х	х	х	
AU-2(1)	COMPILATION OF AUDIT RECORDS FROM MULTIPLE SOURCES	W: Inc	orporated i	nto AU-12.		
AU-2(2)	SELECTION OF AUDIT EVENTS BY COMPONENT	W: Inc	orporated i	nto AU-12.		
AU-2(3)	REVIEWS AND UPDATES	W: Inc	orporated i	nto AU-2.		
AU-2(4)	PRIVILEGED FUNCTIONS	W: Inc	orporated i	nto AC-6(9)		
AU-3	Content of Audit Records		х	х	х	
AU-3(1)	ADDITIONAL AUDIT INFORMATION			х	х	
AU-3(2)	CENTRALIZED MANAGEMENT OF PLANNED AUDIT RECORD CONTENT				х	
AU-3(3)	LIMIT PERSONALLY IDENTIFIABLE INFORMATION ELEMENTS					
AU-4	Audit Log Storage Capacity		х	х	х	
AU-4(1)	TRANSFER TO ALTERNATE STORAGE					
AU-5	Response to Audit Logging Process Failures		х	х	х	
AU-5(1)	STORAGE CAPACITY WARNING				х	
AU-5(2)	REAL-TIME ALERTS				х	
AU-5(3)	CONFIGURABLE TRAFFIC VOLUME THRESHOLDS					
AU-5(4)	SHUTDOWN ON FAILURE					
AU-5(5)	ALTERNATE AUDIT LOGGING CAPABILITY					
AU-6	Audit Record Review, Analysis, and Reporting		х	х	х	
AU-6(1)	AUTOMATED PROCESS INTEGRATION			Х	х	
AU-6(2)	AUTOMATED SECURITY ALERTS	W: Inc	orporated i	nto SI-4.		
AU-6(3)	CORRELATE AUDIT RECORD REPOSITORIES			х	х	
AU-6(4)	CENTRAL REVIEW AND ANALYSIS					
AU-6(5)	INTEGRATED ANALYSIS OF AUDIT RECORDS				х	
AU-6(6)	CORRELATION WITH PHYSICAL MONITORING				х	
AU-6(7)	PERMITTED ACTIONS					
AU-6(8)	FULL TEXT ANALYSIS OF PRIVILEGED COMMANDS					
AU-6(9)	CORRELATION WITH INFORMATION FROM NONTECHNICAL SOURCES					
AU-6(10)	AUDIT LEVEL ADJUSTMENT	W: Inc	orporated i	nto AU-6.	1	
AU-7	Audit Record Reduction and Report Generation			х	Х	
AU-7(1)	AUTOMATIC PROCESSING			х	Х	
AU-7(2)	AUTOMATIC SORT AND SEARCH	W: Inc	orporated i	nto AU-7(1		
AU-8	Time Stamps		х	х	Х	
AU-8(1)	SYNCHRONIZATION WITH AUTHORITATIVE TIME SOURCE			х	Х	
AU-8(2)	SECONDARY AUTHORITATIVE TIME SOURCE					

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
		PRIVAC	LOW	MOD	HIGH	
AU-9	Protection of Audit Information		х	х	х	
AU-9(1)	HARDWARE WRITE-ONCE MEDIA					
AU-9(2)	STORE ON SEPARATE PHYSICAL SYSTEMS OR COMPONENTS				х	
AU-9(3)	CRYPTOGRAPHIC PROTECTION				х	
AU-9(4)	ACCESS BY SUBSET OF PRIVILEGED USERS			х	х	
AU-9(5)	DUAL AUTHORIZATION					
AU-9(6)	READ-ONLY ACCESS					
AU-9(7)	STORE ON COMPONENT WITH DIFFERENT OPERATING SYSTEM					
AU-10	Non-repudiation				х	
AU-10(1)	ASSOCIATION OF IDENTITIES					
AU-10(2)	VALIDATE BINDING OF INFORMATION PRODUCER IDENTITY					
AU-10(3)	CHAIN OF CUSTODY					
AU-10(4)	VALIDATE BINDING OF INFORMATION REVIEWER IDENTITY					
AU-10(5)	DIGITAL SIGNATURES	W: Inc	orporated i	nto SI-7.		
AU-11	Audit Record Retention	х	х	х	х	
AU-11(1)	LONG-TERM RETRIEVAL CAPABILITY					
AU-12	Audit Record Generation		х	х	х	
AU-12(1)	SYSTEM-WIDE AND TIME-CORRELATED AUDIT TRAIL				х	
AU-12(2)	STANDARDIZED FORMATS					
AU-12(3)	CHANGES BY AUTHORIZED INDIVIDUALS				х	
AU-12(4)	QUERY PARAMETER AUDITS OF PERSONALLY IDENTIFIABLE INFORMATION					
AU-13	Monitoring for Information Disclosure					
AU-13(1)	USE OF AUTOMATED TOOLS					
AU-13(2)	REVIEW OF MONITORED SITES					
AU-13(3)	UNAUTHORIZED REPLICATION OF INFORMATION					
AU-14	Session Audit					
AU-14(1)	SYSTEM START-UP					
AU-14(2)	CAPTURE AND RECORD CONTENT	W: Inc	orporated i	nto AU-14.		
AU-14(3)	REMOTE VIEWING AND LISTENING					
AU-15	Alternate Audit Logging Capability	W: Inc	orporated i	nto AU-5(5)		
AU-16	Cross-Organizational Auditing Logging					
AU-16(1)	IDENTITY PRESERVATION					
AU-16(2)	SHARING OF AUDIT INFORMATION					
AU-16(3)	DISASSOCIABILITY					

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3.4 ASSESSMENT, AUTHORIZATION, AND MONITORING FAMILY

Table 3-4 provides a summary of the controls and control enhancements assigned to the Assessment, Authorization, and Monitoring Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

TABLE 3-4: ASSESSMENT, AUTHORIZATION, AND MONITORING FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH	
CA-1	Policies and Procedures	х	х	х	х	
CA-2	Control Assessments	Х	х	х	х	
CA-2(1)	INDEPENDENT ASSESSORS			х	х	
CA-2(2)	SPECIALIZED ASSESSMENTS				х	
CA-2(3)	EXTERNAL ORGANIZATIONS					
CA-3	Information Exchange		х	х	х	
CA-3(1)	UNCLASSIFIED NATIONAL SECURITY SYSTEM CONNECTIONS	W: Mo	ved to SC-7	7(25).		
CA-3(2)	CLASSIFIED NATIONAL SECURITY SYSTEM CONNECTIONS	W: Mo	ved to SC-7	7(26).		
CA-3(3)	UNCLASSIFIED NON-NATIONAL SECURITY SYSTEM CONNECTIONS	W: Mo	ved to SC-7	7(27).		
CA-3(4)	CONNECTIONS TO PUBLIC NETWORKS	W: Mo	ved to SC-7	7(28).		
CA-3(5)	RESTRICTIONS ON EXTERNAL SYSTEM CONNECTIONS	W: Inc	orporated i	nto SC-7(5)		
CA-3(6)	TRANSFER AUTHORIZATIONS				х	
CA-3(7)	TRANSITIVE INFORMATION EXCHANGES					
CA-4	Security Certification	W: Inc	orporated i	nto CA-2.		
CA-5	Plan of Action and Milestones	Х	х	х	х	
CA-5(1)	AUTOMATION SUPPORT FOR ACCURACY AND CURRENCY					
CA-6	Authorization	Х	х	х	х	
CA-6(1)	JOINT AUTHORIZATION — INTRA - ORGANIZATION					
CA-6(2)	JOINT AUTHORIZATION — INTER - ORGANIZATIONS					
CA-7	Continuous Monitoring	Х	х	х	х	
CA-7(1)	INDEPENDENT ASSESSMENT			х	х	
CA-7(2)	TYPES OF ASSESSMENTS	W: Inc	orporated i	nto CA-2.		
CA-7(3)	TREND ANALYSES					
CA-7(4)	RISK MONITORING	Х	х	х	х	
CA-7(5)	CONSISTENCY ANALYSIS					
CA-8	Penetration Testing				х	
CA-8(1)	INDEPENDENT PENETRATION TESTING AGENT OR TEAM				х	
CA-8(2)	RED TEAM EXERCISES					
CA-8(3)	FACILITY PENETRATION TESTING					
CA-9	Internal System Connections		х	х	х	
	COMPLIANCE CHECKS					

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781 3.5 CONFIGURATION MANAGEMENT FAMILY

Table 3-5 provides a summary of the controls and control enhancements assigned to the Configuration Management Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

TABLE 3-5: CONFIGURATION MANAGEMENT FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE		JRITY CON BASELINES	
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH
CM-1	Policy and Procedures	х	х	х	х
CM-2	Baseline Configuration		х	х	Х
CM-2(1)	REVIEWS AND UPDATES	W: Inc	orporated i	into CM-2.	
CM-2(2)	AUTOMATION SUPPORT FOR ACCURACY AND CURRENCY			х	Х
CM-2(3)	RETENTION OF PREVIOUS CONFIGURATIONS			х	х
CM-2(4)	UNAUTHORIZED SOFTWARE	W: Inc	orporated i	into CM-7.	
CM-2(5)	AUTHORIZED SOFTWARE	W: Inc	orporated i	into CM-7.	
CM-2(6)	DEVELOPMENT AND TEST ENVIRONMENTS				
CM-2(7)	CONFIGURE SYSTEMS AND COMPONENTS FOR HIGH-RISK AREAS			х	х
CM-3	Configuration Change Control			х	х
CM-3(1)	AUTOMATED DOCUMENTATION, NOTIFICATION, AND PROHIBITION OF CHANGES				х
CM-3(2)	TESTING, VALIDATION, AND DOCUMENTATION OF CHANGES			х	х
CM-3(3)	AUTOMATED CHANGE IMPLEMENTATION				
CM-3(4)	SECURITY AND PRIVACY REPRESENTATIVES			х	х
CM-3(5)	AUTOMATED SECURITY RESPONSE				
CM-3(6)	CRYPTOGRAPHY MANAGEMENT				Х
CM-3(7)	REVIEW SYSTEM CHANGES				
CM-3(8)	PREVENT OR RESTRICT CONFIGURATION CHANGES				
CM-4	Impact Analyses	х	х	х	Х
CM-4(1)	SEPARATE TEST ENVIRONMENTS				Х
CM-4(2)	VERIFICATION OF CONTROLS			х	Х
CM-5	Access Restrictions for Change		х	х	Х
CM-5(1)	AUTOMATED ACCESS ENFORCEMENT AND AUDIT RECORDS				Х
CM-5(2)	REVIEW SYSTEM CHANGES	W: Inc	orporated i	into CM-3(7).
CM-5(3)	SIGNED COMPONENTS				х
CM-5(4)	DUAL AUTHORIZATION				
CM-5(5)	PRIVILEGE LIMITATION FOR PRODUCTION AND OPERATION				
CM-5(6)	LIMIT LIBRARY PRIVILEGES				
CM-5(7)	AUTOMATIC IMPLEMENTATION OF SECURITY SAFEGUARDS	W: Inc	orporated i	into SI-7.	
CM-6	Configuration Settings		х	х	Х
CM-6(1)	AUTOMATED MANAGEMENT, APPLICATION, AND VERIFICATION				Х
CM-6(2)	RESPOND TO UNAUTHORIZED CHANGES				Х
CM-6(3)	UNAUTHORIZED CHANGE DETECTION	W: Inc	orporated i	into SI-7.	

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME CONFORMANCE DEMONSTRATION	PRIVACY CONTROL BASELINE		RITY CON	
		PRIVACY	LOW	MOD	HIGH
CM-6(4)		W: Inc	orporated i	nto CM-4.	
CM-7	Least Functionality		х	х	Х
CM-7(1)	PERIODIC REVIEW			х	Х
CM-7(2)	PREVENT PROGRAM EXECUTION			х	Х
CM-7(3)	REGISTRATION COMPLIANCE				
CM-7(4)	UNAUTHORIZED SOFTWARE — BLACKLISTING				
CM-7(5)	AUTHORIZED SOFTWARE — WHITELISTING			х	Х
CM-7(6)	CONFINED ENVIRONMENTS WITH LIMITED PRIVILEGES				
CM-7(7)	CODE EXECUTION IN PROTECTED ENVIRONMENTS				
CM-7(8)	BINARY OR MACHINE EXECUTABLE CODE				
CM-8	System Component Inventory		х	х	Х
CM-8(1)	UPDATES DURING INSTALLATION AND REMOVAL			х	Х
CM-8(2)	AUTOMATED MAINTENANCE				Х
CM-8(3)	AUTOMATED UNAUTHORIZED COMPONENT DETECTION			х	Х
CM-8(4)	ACCOUNTABILITY INFORMATION				Х
CM-8(5)	NO DUPLICATE ACCOUNTING OF COMPONENTS				
CM-8(6)	ASSESSED CONFIGURATIONS AND APPROVED DEVIATIONS				
CM-8(7)	CENTRALIZED REPOSITORY				
CM-8(8)	AUTOMATED LOCATION TRACKING				
CM-8(9)	ASSIGNMENT OF COMPONENTS TO SYSTEMS				
CM-9	Configuration Management Plan			х	Х
CM-9(1)	ASSIGNMENT OF RESPONSIBILITY				
CM-10	Software Usage Restrictions		х	х	Х
CM-10(1)	OPEN SOURCE SOFTWARE				
CM-11	User-Installed Software		х	х	Х
CM-11(1)	ALERTS FOR UNAUTHORIZED INSTALLATIONS	W: Inc	orporated i	nto CM-8(3).
CM-11(2)	SOFTWARE INSTALLATION WITH PRIVILEGED STATUS				
CM-12	Information Location			х	Х
CM-12(1)	AUTOMATED TOOLS TO SUPPORT INFORMATION LOCATION			х	Х
CM-13	Data Action Mapping				

3.6 CONTINGENCY PLANNING FAMILY

Table 3-6 provides a summary of the controls and control enhancements assigned to the Contingency Planning Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

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TABLE 3-6: CONTINGENCY PLANNING FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE		IRITY CON	
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH
CP-1	Policy and Procedures		х	х	х
CP-2	Contingency Plan		х	х	х
CP-2(1)	COORDINATE WITH RELATED PLANS			х	х
CP-2(2)	CAPACITY PLANNING				х
CP-2(3)	RESUME MISSIONS AND BUSINESS FUNCTIONS			х	х
CP-2(4)	RESUME ALL MISSIONS AND BUSINESS FUNCTIONS	W: Inc	orporated i	nto CP-2(3)	
CP-2(5)	CONTINUE MISSIONS AND BUSINESS FUNCTIONS				х
CP-2(6)	ALTERNATE PROCESSING AND STORAGE SITES				
CP-2(7)	COORDINATE WITH EXTERNAL SERVICE PROVIDERS				
CP-2(8)	IDENTIFY CRITICAL ASSETS			х	х
CP-3	Contingency Training		х	х	х
CP-3(1)	SIMULATED EVENTS				х
CP-3(2)	MECHANISMS USED IN TRAINING ENVIRONMENTS				
CP-4	Contingency Plan Testing		х	х	х
CP-4(1)	COORDINATE WITH RELATED PLANS			х	х
CP-4(2)	ALTERNATE PROCESSING SITE				х
CP-4(3)	AUTOMATED TESTING				
CP-4(4)	FULL RECOVERY AND RECONSTITUTION				
CP-5	Contingency Plan Update	W: Inc	orporated i	nto CP-2.	
CP-6	Alternate Storage Site			х	х
CP-6(1)	SEPARATION FROM PRIMARY SITE			х	х
CP-6(2)	RECOVERY TIME AND RECOVERY POINT OBJECTIVES				х
CP-6(3)	ACCESSIBILITY			х	х
CP-7	Alternate Processing Site			х	х
CP-7(1)	SEPARATION FROM PRIMARY SITE			х	х
CP-7(2)	ACCESSIBILITY			х	х
CP-7(3)	PRIORITY OF SERVICE			х	х
CP-7(4)	PREPARATION FOR USE				х
CP-7(5)	EQUIVALENT INFORMATION SECURITY SAFEGUARDS	W: Inc	orporated i	nto CP-7.	
CP-7(6)	INABILITY TO RETURN TO PRIMARY SITE				
CP-8	Telecommunications Services			х	х
CP-8(1)	PRIORITY OF SERVICE PROVISIONS			х	х
CP-8(2)	SINGLE POINTS OF FAILURE			х	х
CP-8(3)	SEPARATION OF PRIMARY AND ALTERNATE PROVIDERS				х
CP-8(4)	PROVIDER CONTINGENCY PLAN				х

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
	CONTROL ENHANCEMENT NAME	PRIVAC) BAS	LOW	MOD	HIGH
CP-8(5)	ALTERNATE TELECOMMUNICATION SERVICE TESTING				
CP-9	System Backup		х	х	Х
CP-9(1)	TESTING FOR RELIABILITY AND INTEGRITY			х	Х
CP-9(2)	TEST RESTORATION USING SAMPLING				Х
CP-9(3)	SEPARATE STORAGE FOR CRITICAL INFORMATION				Х
CP-9(4)	PROTECTION FROM UNAUTHORIZED MODIFICATION	W: Inc	orporated i	nto CP-9.	
CP-9(5)	TRANSFER TO ALTERNATE STORAGE SITE				Х
CP-9(6)	REDUNDANT SECONDARY SYSTEM				
CP-9(7)	DUAL AUTHORIZATION				
CP-9(8)	CRYPTOGRAPHIC PROTECTION			х	Х
CP-10	System Recovery and Reconstitution		х	х	Х
CP-10(1)	CONTINGENCY PLAN TESTING	W: Inc	orporated i	nto CP-4.	
CP-10(2)	TRANSACTION RECOVERY			х	Х
CP-10(3)	COMPENSATING SECURITY CONTROLS	W: Inc	orporated i	nto PL-11.	
CP-10(4)	RESTORE WITHIN TIME PERIOD				Х
CP-10(5)	FAILOVER CAPABILITY	W: Incorporated into SI-13.			
CP-10(6)	COMPONENT PROTECTION				
CP-11	Alternate Communications Protocols				
CP-12	Safe Mode				
CP-13	Alternative Security Mechanisms				
CP-14	Self-Challenge				

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3.7 IDENTIFICATION AND AUTHENTICATION FAMILY

Table 3-7 provides a summary of the controls and control enhancements assigned to the Identification and Authentication Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

TABLE 3-7: IDENTIFICATION AND AUTHENTICATION FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
NOZEIN	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH	
IA-1	Policy and Procedures		х	х	х	
IA-2	Identification and Authentication (Organizational Users)		х	х	Х	
IA-2(1)	MULTIFACTOR AUTHENTICATION TO PRIVILEGED ACCOUNTS		х	х	х	
IA-2(2)	MULTIFACTOR AUTHENTICATION TO NON-PRIVILEGED ACCOUNTS		х	х	Х	
IA-2(3)	LOCAL ACCESS TO PRIVILEGED ACCOUNTS	W: Inc	orporated i	nto IA-2(1)(2).	
IA-2(4)	LOCAL ACCESS TO NON-PRIVILEGED ACCOUNTS	W: Inc	orporated i	nto IA-2(1)(2).	
IA-2(5)	INDIVIDUAL AUTHENTICATION WITH GROUP AUTHENTICATION				х	
IA-2(6)	ACCESS TO ACCOUNTS — SEPARATE DEVICE					
IA-2(7)	NETWORK ACCESS TO NON-PRIVILEGED ACCOUNTS — SEPARATE DEVICE	W: Inc	orporated i	nto IA-2(6).		
IA-2(8)	ACCESS TO ACCOUNTS — REPLAY RESISTANT		х	х	Х	
IA-2(9)	NETWORK ACCESS TO NON-PRIVILEGED ACCOUNTS — REPLAY RESISTANT	W: Inc	orporated i	nto IA-2(8).		
IA-2(10)	SINGLE SIGN-ON					
IA-2(11)	REMOTE ACCESS — SEPARATE DEVICE	W: Inc	orporated i	nto IA-2(1)(2).	
IA-2(12)	ACCEPTANCE OF PIV CREDENTIALS		х	х	х	
IA-2(13)	OUT-OF-BAND AUTHENTICATION					
IA-3	Device Identification and Authentication			Х	х	
IA-3(1)	CRYPTOGRAPHIC BIDIRECTIONAL AUTHENTICATION					
IA-3(2)	CRYPTOGRAPHIC BIDIRECTIONAL NETWORK AUTHENTICATION	W: Inc	orporated i	nto IA-3(1).		
IA-3(3)	DYNAMIC ADDRESS ALLOCATION					
IA-3(4)	DEVICE ATTESTATION					
IA-4	Identifier Management		х	х	Х	
IA-4(1)	PROHIBIT ACCOUNT IDENTIFIERS AS PUBLIC IDENTIFIERS					
IA-4(2)	SUPERVISOR AUTHORIZATION	W: Inc	orporated i	nto IA-12(1).	
IA-4(3)	MULTIPLE FORMS OF CERTIFICATION	W: Inc	orporated i	nto IA-12(2).	
IA-4(4)	IDENTIFY USER STATUS			х	х	
IA-4(5)	DYNAMIC MANAGEMENT					
IA-4(6)	CROSS-ORGANIZATION MANAGEMENT					
IA-4(7)	IN-PERSON REGISTRATION	W: Inc	orporated i	nto IA-12(4).	
IA-4(8)	PAIRWISE PSEUDONYMOUS IDENTIFIERS					
IA-4(9)	ATTRIBUTE MAINTENANCE AND PROTECTION					
IA-5	Authenticator Management		х	х	Х	
IA-5(1)	PASSWORD-BASED AUTHENTICATION		х	х	Х	
IA-5(2)	PUBLIC KEY-BASED AUTHENTICATION			х	Х	
IA-5(3)	IN-PERSON OR TRUSTED EXTERNAL PARTY REGISTRATION	W: Inc	orporated i	nto IA-12(4	l	

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH	
IA-5(4)	AUTOMATED SUPPORT FOR PASSWORD STRENGTH DETERMINATION	W: Inc	orporated i	nto IA-5(1).		
IA-5(5)	CHANGE AUTHENTICATORS PRIOR TO DELIVERY					
IA-5(6)	PROTECTION OF AUTHENTICATORS			х	Х	
IA-5(7)	NO EMBEDDED UNENCRYPTED STATIC AUTHENTICATORS					
IA-5(8)	MULTIPLE SYSTEM ACCOUNTS					
IA-5(9)	FEDERATED CREDENTIAL MANAGEMENT					
IA-5(10)	DYNAMIC CREDENTIAL BINDING					
IA-5(11)	HARDWARE TOKEN-BASED AUTHENTICATION	W: Inc	orporated i	nto IA-2(1)(2).	
IA-5(12)	BIOMETRIC AUTHENTICATION PERFORMANCE					
IA-5(13)	EXPIRATION OF CACHED AUTHENTICATORS					
IA-5(14)	MANAGING CONTENT OF PKI TRUST STORES					
IA-5(15)	GSA-APPROVED PRODUCTS AND SERVICES					
IA-5(16)	IN-PERSON OR TRUSTED EXTERNAL PARTY AUTHENTICATOR ISSUANCE					
IA-5(17)	PRESENTATION ATTACK DETECTION FOR BIOMETRIC AUTHENTICATORS					
IA-5(18)	PASSWORD MANAGERS					
IA-6	Authenticator Feedback		х	х	Х	
IA-7	Cryptographic Module Authentication		х	х	Х	
IA-8	Identification and Authentication (Non-Organizational Users)		х	х	Х	
IA-8(1)	ACCEPTANCE OF PIV CREDENTIALS FROM OTHER AGENCIES		х	х	Х	
IA-8(2)	ACCEPTANCE OF EXTERNAL CREDENTIALS		х	х	Х	
IA-8(3)	USE OF FICAM-APPROVED PRODUCTS	W: Inc	orporated i	nto IA-8(2).		
IA-8(4)	USE OF NIST-ISSUED PROFILES		х	х	х	
IA-8(5)	ACCEPTANCE OF PIV-I CREDENTIALS					
IA-8(6)	DISASSOCIABILITY					
IA-9	Service Identification and Authentication					
IA-9(1)	INFORMATION EXCHANGE	W: Cor	nplete with	ndrawal.		
IA-9(2)	TRANSMISSION OF DECISIONS	W: Inc	orporated i	nto IA-9.		
IA-10	Adaptive Authentication					
IA-11	Re-authentication		х	х	Х	
IA-12	Identity Proofing			х	Х	
IA-12(1)	SUPERVISOR AUTHORIZATION					
IA-12(2)	IDENTITY EVIDENCE			х	Х	
IA-12(3)	IDENTITY EVIDENCE VALIDATION AND VERIFICATION			x	Х	
IA-12(4)	IN-PERSON VALIDATION AND VERIFICATION				Х	
IA-12(5)	ADDRESS CONFIRMATION			х	X	

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3.8 INCIDENT RESPONSE FAMILY

Table 3-8 provides a summary of the controls and control enhancements assigned to the Incident Response Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

805 TABLE 3-8: INCIDENT RESPONSE FAMILY

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
	CONTROL ENHANCEMENT NAME	PRIVAC	LOW	MOD	HIGH
IR-1	Policy and Procedures	х	х	х	х
IR-2	Incident Response Training		х	х	х
IR-2(1)	SIMULATED EVENTS				х
IR-2(2)	AUTOMATED TRAINING ENVIRONMENTS				х
IR-3	Incident Response Testing	х		х	х
IR-3(1)	AUTOMATED TESTING				
IR-3(2)	COORDINATION WITH RELATED PLANS			х	х
IR-3(3)	CONTINUOUS IMPROVEMENT				
IR-4	Incident Handling	х	Х	х	Х
IR-4(1)	AUTOMATED INCIDENT HANDLING PROCESSES			х	х
IR-4(2)	DYNAMIC RECONFIGURATION				
IR-4(3)	CONTINUITY OF OPERATIONS				
IR-4(4)	INFORMATION CORRELATION				х
IR-4(5)	AUTOMATIC DISABLING OF SYSTEM				
IR-4(6)	INSIDER THREATS — SPECIFIC CAPABILITIES				
IR-4(7)	INSIDER THREATS — INTRA-ORGANIZATION COORDINATION				
IR-4(8)	CORRELATION WITH EXTERNAL ORGANIZATIONS				
IR-4(9)	DYNAMIC RESPONSE CAPABILITY				
IR-4(10)	SUPPLY CHAIN COORDINATION				
IR-4(11)	INTEGRATED INCIDENT RESPONSE TEAM				
IR-4(12)	MALICIOUS CODE AND FORENSIC ANALYSIS				
IR-4(13)	BEHAVIOR ANALYSIS				
IR-4(14)	SECURITY OPERATIONS CENTER				
IR-4(15)	PUBLIC RELATIONS AND REPUTATION REPAIR				
IR-5	Incident Monitoring		х	х	х
IR-5(1)	AUTOMATED TRACKING, DATA COLLECTION, AND ANALYSIS				х
IR-6	Incident Reporting	х	х	х	х
IR-6(1)	AUTOMATED REPORTING			х	х
IR-6(2)	VULNERABILITIES RELATED TO INCIDENTS				
IR-6(3)	SUPPLY CHAIN COORDINATION			х	х
IR-7	Incident Response Assistance	х	х	х	х
IR-7(1)	AUTOMATION SUPPORT FOR AVAILABILITY OF INFORMATION AND SUPPORT			х	Х
IR-7(2)	COORDINATION WITH EXTERNAL PROVIDERS				
IR-8	Incident Response Plan	х	х	х	х
IR-8(1)	PRIVACY BREACHES	х			

CONTROL NUMBER	CONTROL NAME	/ CONTROL SELINE	SECU		
NOMBER	CONTROL ENHANCEMENT NAME	PRIVACY BASI	LOW	MOD	HIGH
IR-9	Information Spillage Response				
IR-9(1)	RESPONSIBLE PERSONNEL	W: Inco	orporated i	n IR-9.	
IR-9(2)	TRAINING				
IR-9(3)	POST-SPILL OPERATIONS				
IR-9(4)	EXPOSURE TO UNAUTHORIZED PERSONNEL				
IR-10	Incident Analysis				х



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3.9 MAINTENANCE FAMILY

Table 3-9 provides a summary of the controls and control enhancements assigned to the Maintenance Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

811 TABLE 3-9: MAINTENANCE FAMILY

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE		IRITY CON	
		PRIVACY	LOW	MOD	HIGH
MA-1	Policy and Procedures		х	х	х
MA-2	Controlled Maintenance		х	х	Х
MA-2(1)	RECORD CONTENT	W: Inco	orporated i	nto MA-2.	
MA-2(2)	AUTOMATED MAINTENANCE ACTIVITIES				х
MA-3	Maintenance Tools			х	Х
MA-3(1)	INSPECT TOOLS			х	Х
MA-3(2)	INSPECT MEDIA			х	Х
MA-3(3)	PREVENT UNAUTHORIZED REMOVAL			х	Х
MA-3(4)	RESTRICTED TOOL USE				
MA-3(5)	EXECUTION WITH PRIVILEGE				
MA-3(6)	SOFTWARE UPDATES AND PATCHES				
MA-4	Nonlocal Maintenance		х	х	х
MA-4(1)	LOGGING AND REVIEW				
MA-4(2)	DOCUMENT NONLOCAL MAINTENANCE	W: Inco	orporated i	nto MA-1, N	VIA-4.
MA-4(3)	COMPARABLE SECURITY AND SANITIZATION				х
MA-4(4)	AUTHENTICATION AND SEPARATION OF MAINTENANCE SESSIONS				
MA-4(5)	APPROVALS AND NOTIFICATIONS				
MA-4(6)	CRYPTOGRAPHIC PROTECTION				
MA-4(7)	DISCONNECT VERIFICATION				
MA-5	Maintenance Personnel		х	х	х
MA-5(1)	INDIVIDUALS WITHOUT APPROPRIATE ACCESS				Х
MA-5(2)	SECURITY CLEARANCES FOR CLASSIFIED SYSTEMS				
MA-5(3)	CITIZENSHIP REQUIREMENTS FOR CLASSIFIED SYSTEMS				
MA-5(4)	FOREIGN NATIONALS				
MA-5(5)	NON-SYSTEM MAINTENANCE				
MA-6	Timely Maintenance			х	х
MA-6(1)	PREVENTIVE MAINTENANCE				
MA-6(2)	PREDICTIVE MAINTENANCE				
MA-6(3)	AUTOMATED SUPPORT FOR PREDICTIVE MAINTENANCE				
MA-7	Field Maintenance				

3.10 MEDIA PROTECTION FAMILY

Table 3-10 provides a summary of the controls and control enhancements assigned to the Media Protection Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

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TABLE 3-10: MEDIA PROTECTION FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVACY BAS	LOW	MOD	HIGH	
MP-1	Policy and Procedures	Х	х	х	х	
MP-2	Media Access		х	х	х	
MP-2(1)	AUTOMATED RESTRICTED ACCESS	W: Inc	orporated i	nto MP-4(2	2).	
MP-2(2)	CRYPTOGRAPHIC PROTECTION	W: Inc	orporated i	nto SC-28(1	L).	
MP-3	Media Marking			х	х	
MP-4	Media Storage			х	х	
MP-4(1)	CRYPTOGRAPHIC PROTECTION	W: Inc	orporated i	nto SC-28(1	L).	
MP-4(2)	AUTOMATED RESTRICTED ACCESS					
MP-5	Media Transport			х	Х	
MP-5(1)	PROTECTION OUTSIDE OF CONTROLLED AREAS	W: Inc	W: Incorporated into MP-5.			
MP-5(2)	DOCUMENTATION OF ACTIVITIES	W: Inc	orporated i	nto MP-5.		
MP-5(3)	CUSTODIANS					
MP-5(4)	CRYPTOGRAPHIC PROTECTION	W: Inc	orporated i	nto SC-28(1	L).	
MP-6	Media Sanitization	х	х	х	Х	
MP-6(1)	REVIEW, APPROVE, TRACK, DOCUMENT, AND VERIFY				х	
MP-6(2)	EQUIPMENT TESTING				х	
MP-6(3)	NONDESTRUCTIVE TECHNIQUES				х	
MP-6(4)	CONTROLLED UNCLASSIFIED INFORMATION	W: Inc	orporated i	nto MP-6.		
MP-6(5)	CLASSIFIED INFORMATION	W: Inc	orporated i	nto MP-6.		
MP-6(6)	MEDIA DESTRUCTION	W: Inc	orporated i	nto MP-6.		
MP-6(7)	DUAL AUTHORIZATION					
MP-6(8)	REMOTE PURGING OR WIPING OF INFORMATION					
MP-7	Media Use		х	х	х	
MP-7(1)	PROHIBIT USE WITHOUT OWNER	W: Inc	orporated i	nto MP-7.		
MP-7(2)	PROHIBIT USE OF SANITIZATION-RESISTANT MEDIA					
MP-8	Media Downgrading					
MP-8(1)	DOCUMENTATION OF PROCESS					
MP-8(2)	EQUIPMENT TESTING					
MP-8(3)	CONTROLLED UNCLASSIFIED INFORMATION					
MP-8(4)	CLASSIFIED INFORMATION					

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3.11 PHYSICAL AND ENVIRONMENTAL PROTECTION FAMILY

Table 3-11 provides a summary of the controls and control enhancements assigned to the
Physical and Environmental Protection Family. The controls are allocated to the low-impact,
moderate-impact, and high-impact security control baselines and the privacy control baseline,
as appropriate.

TABLE 3-11: PHYSICAL AND ENVIRONMENTAL PROTECTION FAMILY

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
		PRIVAC	LOW	MOD	HIGH
PE-1	Policy and Procedures		х	х	Х
PE-2	Physical Access Authorizations		х	х	х
PE-2(1)	ACCESS BY POSITION AND ROLE				
PE-2(2)	TWO FORMS OF IDENTIFICATION				
PE-2(3)	RESTRICT UNESCORTED ACCESS				
PE-3	Physical Access Control		х	х	х
PE-3(1)	SYSTEM ACCESS				х
PE-3(2)	FACILITY AND SYSTEMS				
PE-3(3)	CONTINUOUS GUARDS				
PE-3(4)	LOCKABLE CASINGS				
PE-3(5)	TAMPER PROTECTION				
PE-3(6)	FACILITY PENETRATION TESTING	W: Inc	orporated i	nto CA-8.	
PE-3(7)	PHYSICAL BARRIERS				
PE-3(8)	ACCESS CONTROL VESTIBULES				
PE-4	Access Control for Transmission			х	х
PE-5	Access Control for Output Devices			х	х
PE-5(1)	ACCESS TO OUTPUT BY AUTHORIZED INDIVIDUALS	W: Inc	orporated i	nto PE-5.	
PE-5(2)	LINK TO INDIVIDUAL IDENTITY				
PE-5(3)	MARKING OUTPUT DEVICES				
PE-6	Monitoring Physical Access		х	х	х
PE-6(1)	INTRUSION ALARMS AND SURVEILLANCE EQUIPMENT			х	х
PE-6(2)	AUTOMATED INTRUSION RECOGNITION AND RESPONSES				
PE-6(3)	VIDEO SURVEILLANCE				
PE-6(4)	MONITORING PHYSICAL ACCESS TO SYSTEMS				х
PE-7	Visitor Control	W: Inc	orporated i	nto PE-2, Pl	E-3.
PE-8	Visitor Access Records		х	х	х
PE-8(1)	AUTOMATED RECORDS MAINTENANCE AND REVIEW				х
PE-8(2)	PHYSICAL ACCESS RECORDS	W: Inc	orporated i	nto PE-2.	
PE-9	Power Equipment and Cabling			х	х
PE-9(1)	REDUNDANT CABLING				
PE-9(2)	AUTOMATIC VOLTAGE CONTROLS				
PE-10	Emergency Shutoff			х	х
PE-10(1)	ACCIDENTAL AND UNAUTHORIZED ACTIVATION	W: Inc	orporated i	nto PE-10.	
PE-11	Emergency Power			х	х

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
		PRIVAC	LOW	MOD	HIGH	
PE-11(1)	ALTERNATE POWER SUPPLY — MINIMAL OPERATIONAL CAPABILITY				х	
PE-11(2)	ALTERNATE POWER SUPPLY — SELF-CONTAINED					
PE-12	Emergency Lighting		х	х	х	
PE-12(1)	ESSENTIAL MISSIONS AND BUSINESS FUNCTIONS					
PE-13	Fire Protection		х	х	х	
PE-13(1)	DETECTION SYSTEMS — AUTOMATIC ACTIVATION AND NOTIFICATION			х	х	
PE-13(2)	SUPPRESSION SYSTEMS — AUTOMATIC ACTIVATION AND NOTIFICATION				х	
PE-13(3)	AUTOMATIC FIRE SUPPRESSION	W: Inco	orporated i	nto PE-13(2	2).	
PE-13(4)	INSPECTIONS					
PE-14	Environmental Controls		х	х	х	
PE-14(1)	AUTOMATIC CONTROLS					
PE-14(2)	MONITORING WITH ALARMS AND NOTIFICATIONS					
PE-15	Water Damage Protection		х	х	х	
PE-15(1)	AUTOMATION SUPPORT				х	
PE-16	Delivery and Removal		х	х	х	
PE-17	Alternate Work Site			х	х	
PE-18	Location of System Components				х	
PE-18(1)	FACILITY SITE	W: Mo	ved to PE-2	23.		
PE-19	Information Leakage					
PE-19(1)	NATIONAL EMISSIONS AND TEMPEST POLICIES AND PROCEDURES					
PE-20	Asset Monitoring and Tracking					
PE-21	Electromagnetic Pulse Protection					
PE-22	Component Marking					
PE-23	Facility Location					

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3.12 PLANNING FAMILY

Table 3-12 provides a summary of the controls and control enhancements assigned to the Planning Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

TABLE 3-12: PLANNING FAMILY

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	CONTROL NAME		ECURITY CONTROL BASELINES		
		PRIVAC	LOW	MOD	HIGH	
PL-1	Policy and Procedures	х	х	х	х	
PL-2	System Security and Privacy Plans	х	х	х	х	
PL-2(1)	CONCEPT OF OPERATIONS	W: Inc	orporated i	nto PL-7.		
PL-2(2)	FUNCTIONAL ARCHITECTURE	W: Incorporated into PL-8.				
PL-2(3)	PLAN AND COORDINATE WITH OTHER ORGANIZATIONAL ENTITIES	W: Incorporated into PL-2.				
PL-3	System Security Plan Update	W: Inc	orporated i	nto PL-2.		
PL-4	Rules of Behavior	х	х	х	х	
PL-4(1)	SOCIAL MEDIA AND EXTERNAL SITE/APPLICATION USAGE RESTRICTIONS	х	х	х	х	
PL-5	Privacy Impact Assessment	W: Inc	orporated i	nto RA-8.		
PL-6	Security-Related Activity Planning	W: Inc	orporated i	nto PL-2.		
PL-7	Concept of Operations					
PL-8	Security and Privacy Architectures	х		х	х	
PL-8(1)	DEFENSE-IN-DEPTH					
PL-8(2)	SUPPLIER DIVERSITY					
PL-9	Central Management	х				
PL-10	Baseline Selection		х	х	х	
PL-11	Baseline Tailoring		х	х	х	

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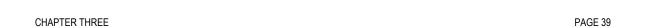
3.13 PROGRAM MANAGEMENT FAMILY

Table 3-13 provides a summary of the controls and control enhancements assigned to the Program Management Family. These controls are implemented at the organization level and are not directed at individual information systems. The Program Management controls are designed to facilitate compliance with applicable federal laws, Executive Orders, directives, regulations, policies, and standards.

TABLE 3-13: PROGRAM MANAGEMENT FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVAC	LOW	MOD	HIGH	
PM-1	Information Security Program Plan		х	х	х	
PM-2	Information Security Program Leadership Role		х	х	х	
PM-3	Information Security and Privacy Resources	х	х	х	х	
PM-4	Plan of Action and Milestones Process	х	х	х	х	
PM-5	System Inventory		х	х	х	
PM-5(1)	INVENTORY OF PERSONALLY IDENTIFIABLE INFORMATION	х	х	х	х	
PM-6	Measures of Performance	х	х	х	х	
PM-7	Enterprise Architecture	х	х	х	х	
PM-7(1)	OFFLOADING		х	х	х	
PM-8	Critical Infrastructure Plan	х	х	х	х	
PM-9	Risk Management Strategy	х	х	х	х	
PM-10	Authorization Process	х	х	х	х	
PM-11	Mission and Business Process Definition	х	х	х	х	
PM-12	Insider Threat Program		х	х	х	
PM-13	Security and Privacy Workforce	х	х	х	х	
PM-14	Testing, Training, and Monitoring	х	х	х	х	
PM-15	Security and Privacy Groups and Associations		х	х	х	
PM-16	Threat Awareness Program		х	х	х	
PM-16(1)	AUTOMATED MEANS FOR SHARING THREAT INTELLIGENCE		х	х	х	
PM-17	Protecting Controlled Unclassified Information on External Systems		х	х	х	
PM-18	Privacy Program Plan	х	х	х	х	
PM-19	Privacy Program Leadership Role	х	х	х	х	
PM-20	Dissemination of Privacy Program Information	х	х	х	х	
PM-21	Accounting of Disclosures	Х	х	х	х	
PM-22	Personally Identifiable Information Quality Management	Х	х	х	х	
PM-23	Data Governance Body		х	х	х	
PM-24	Data Integrity Board	Х	х	х	х	
PM-25	Minimization of PII Used in Testing, Training, and Research	Х	х	х	х	
PM-26	Complaint Management	х	х	х	х	
PM-27	Privacy Reporting	х	х	х	х	
PM-28	Risk Framing		х	х	х	
PM-29	Risk Management Program Leadership Roles		х	х	х	

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	0.00	TROL	
	CONTROL ENHANCEMENT NAME		LOW	MOD	HIGH
PM-30	Supply Chain Risk Management Strategy		х	х	х
PM-31	Continuous Monitoring Strategy	х	х	х	х
PM-32	Purposing		х	х	х
PM-33	Privacy Policies on Websites, Applications, and Digital Services	х			



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3.14 PERSONNEL SECURITY FAMILY

Table 3-14 provides a summary of the controls and control enhancements assigned to the Personnel Security Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

844 TABLE 3-14: PERSONNEL SECURITY FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH	
PS-1	Policy and Procedures		х	х	х	
PS-2	Position Risk Designation		х	х	Х	
PS-3	Personnel Screening		х	х	х	
PS-3(1)	CLASSIFIED INFORMATION					
PS-3(2)	FORMAL INDOCTRINATION					
PS-3(3)	INFORMATION WITH SPECIAL PROTECTION MEASURES					
PS-3(4)	CITIZENSHIP REQUIREMENTS					
PS-4	Personnel Termination		х	х	Х	
PS-4(1)	POST-EMPLOYMENT REQUIREMENTS					
PS-4(2)	AUTOMATED NOTIFICATION				Х	
PS-5	Personnel Transfer		х	х	Х	
PS-6	Access Agreements		х	х	Х	
PS-6(1)	INFORMATION REQUIRING SPECIAL PROTECTION	W: Inco	orporated i	nto PS-3.		
PS-6(2)	CLASSIFIED INFORMATION REQUIRING SPECIAL PROTECTION					
PS-6(3)	POST-EMPLOYMENT REQUIREMENTS					
PS-7	External Personnel Security		х	х	Х	
PS-8	Personnel Sanctions		Х	Х	х	

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3.15 PII PROCESSING AND TRANSPARENCY FAMILY

Table 3-15 provides a summary of the controls and control enhancements assigned to the Personally Identifiable Information Processing and Transparency Family. The controls are allocated to the privacy control baseline in accordance with the selection criteria defined in Section 2.2.

TABLE 3-15: PROCESSING PERMISSIONS FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE		RITY CON	
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH
PT-1	Policy and Procedures	х			
PT-2	Authority to Process Personally Identifiable Information	х			
PT-2(1)	DATA TAGGING				
PT-2(2)	AUTOMATION				
PT-3	Personally Identifiable Information Processing Purposes	х			
PT-3(1)	DATA TAGGING		•	controls are	
PT-3(2)	AUTOMATION			a to the sec paselines.	urity
PT-4	Minimization	х	Privacy h	oaseline cor	ntrols
PT-5	Consent	х	•	cted based	
PT-5(1)	TAILORED CONSENT			n criteria de	fined in
PT-5(2)	JUST-IN-TIME CONSENT		<u>Section</u> :	<u>2.2</u> .	
PT-6	Privacy Notice	х			
PT-6(1)	JUST-IN-TIME NOTICE				
PT-6(2)	PRIVACY ACT STATEMENTS	х			
PT-7	System of Records Notice	х			
PT-7(1)	ROUTINE USES	х			
PT-7(2)	EXEMPTION RULES	х			
PT-8	Specific Categories of Personally Identifiable Information	х			
PT-8(1)	SOCIAL SECURITY NUMBERS	х			
PT-8(2)	FIRST AMENDMENT INFORMATION	х			
PT-9	Computer Matching Requirements	х			

3.16 RISK ASSESSMENT FAMILY

Table 3-16 provides a summary of the controls and control enhancements assigned to the Risk Assessment Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

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TABLE 3-16: RISK ASSESSMENT FAMILY

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
		PRIVACY	LOW	MOD	HIGH
RA-1	Policy and Procedures	х	х	х	х
RA-2	Security Categorization		х	х	х
RA-2(1)	IMPACT-LEVEL PRIORITIZATION				
RA-3	Risk Assessment	Х	х	х	х
RA-3(1)	SUPPLY CHAIN RISK ASSESSMENT		х	х	х
RA-3(2)	USE OF ALL-SOURCE INTELLIGENCE				
RA-3(3)	DYNAMIC THREAT AWARENESS				
RA-3(4)	PREDICTIVE CYBER ANALYTICS				
RA-4	Risk Assessment Update	W: Incorporated into RA-3.			
RA-5	Vulnerability Monitoring and Scanning		х	Х	х
RA-5(1)	UPDATE TOOL CAPABILITY	W: Inc	orporated i	nto RA-5.	
RA-5(2)	UPDATE SYSTEM VULNERABILITIES		х	Х	х
RA-5(3)	BREADTH AND DEPTH OF COVERAGE				
RA-5(4)	DISCOVERABLE INFORMATION				х
RA-5(5)	PRIVILEGED ACCESS			Х	Х
RA-5(6)	AUTOMATED TREND ANALYSES				
RA-5(7)	AUTOMATED DETECTION AND NOTIFICATION OF UNAUTHORIZED COMPONENTS	W: Inc	orporated i	nto CM-8.	
RA-5(8)	REVIEW HISTORIC AUDIT LOGS				
RA-5(9)	PENETRATION TESTING AND ANALYSES	W: Inc	orporated i	nto CA-8.	
RA-5(10)	CORRELATE SCANNING INFORMATION				
RA-5(11)	PUBLIC DISCLOSURE PROGRAM				
RA-6	Technical Surveillance Countermeasures Survey				
RA-7	Risk Response	Х	х	Х	Х
RA-8	Privacy Impact Assessments	Х			
RA-9	Criticality Analysis			Х	Х
RA-10	Threat Hunting				

858

3.17 SYSTEM AND SERVICES ACQUISITION FAMILY

Table 3-17 provides a summary of the controls and control enhancements assigned to the System and Services Acquisition Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as

appropriate.

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TABLE 3-17: SYSTEM AND SERVICES ACQUISITION FAMILY

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
		PRIVAC	LOW	MOD	HIGH
SA-1	Policy and Procedures	Х	х	х	х
SA-2	Allocation of Resources		х	х	х
SA-3	System Development Life Cycle		х	х	х
SA-3(1)	MANAGE PREPRODUCTION ENVIRONMENT				
SA-3(2)	USE OF LIVE OR OPERATIONAL DATA				
SA-3(3)	TECHNOLOGY REFRESH				
SA-4	Acquisition Process	х	х	х	х
SA-4(1)	FUNCTIONAL PROPERTIES OF CONTROLS			х	х
SA-4(2)	DESIGN AND IMPLEMENTATION INFORMATION FOR CONTROLS			х	х
SA-4(3)	DEVELOPMENT METHODS, TECHNIQUES, AND PRACTICES				
SA-4(4)	ASSIGNMENT OF COMPONENTS TO SYSTEMS	W: Inc	orporated i	into CM-8(9).
SA-4(5)	SYSTEM, COMPONENT, AND SERVICE CONFIGURATIONS				х
SA-4(6)	USE OF INFORMATION ASSURANCE PRODUCTS				
SA-4(7)	NIAP-APPROVED PROTECTION PROFILES				
SA-4(8)	CONTINUOUS MONITORING PLAN FOR CONTROLS				
SA-4(9)	FUNCTIONS, PORTS, PROTOCOLS, AND SERVICES IN USE			х	х
SA-4(10)	USE OF APPROVED PIV PRODUCTS		х	х	х
SA-4(11)	SYSTEM OF RECORDS				
SA-4(12)	DATA OWNERSHIP				
SA-5	System Documentation		х	х	х
SA-5(1)	FUNCTIONAL PROPERTIES OF SECURITY CONTROLS	W: Inc	orporated i	into SA-4(1)	
SA-5(2)	SECURITY-RELEVANT EXTERNAL SYSTEM INTERFACES	W: Inc	orporated i	into SA-4(2)	
SA-5(3)	HIGH-LEVEL DESIGN	W: Inc	orporated i	into SA-4(2)	
SA-5(4)	LOW-LEVEL DESIGN	W: Inc	orporated i	into SA-4(2)	
SA-5(5)	SOURCE CODE	W: Inc	orporated i	into SA-4(2)	
SA-6	Software Usage Restrictions	W: Inc	orporated i	into CM-10	and SI-7.
SA-7	User-Installed Software	W: Inc	orporated i	into CM-11	and SI-7.
SA-8	Security and Privacy Engineering Principles		х	х	х
SA-8(1)	CLEAR ABSTRACTIONS				
SA-8(2)	LEAST COMMON MECHANISM				
SA-8(3)	MODULARITY AND LAYERING				
SA-8(4)	PARTIALLY ORDERED DEPENDENCIES				
SA-8(5)	EFFICIENTLY MEDIATED ACCESS				
SA-8(6)	MINIMIZED SHARING				

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVAC) BA	LOW	MOD	HIGH	
SA-8(7)	REDUCED COMPLEXITY					
SA-8(8)	SECURE EVOLVABILITY					
SA-8(9)	TRUSTED COMPONENTS					
SA-8(10)	HIERARCHICAL TRUST					
SA-8(11)	INVERSE MODIFICATION THRESHOLD					
SA-8(12)	HIERARCHICAL PROTECTION					
SA-8(13)	MINIMIZED SECURITY ELEMENTS					
SA-8(14)	LEAST PRIVILEGE					
SA-8(15)	PREDICATE PERMISSION					
SA-8(16)	SELF-RELIANT TRUSTWORTHINESS					
SA-8(17)	SECURE DISTRIBUTED COMPOSITION					
SA-8(18)	TRUSTED COMMUNICATIONS CHANNELS					
SA-8(19)	CONTINUOUS PROTECTION					
SA-8(20)	SECURE METADATA MANAGEMENT					
SA-8(21)	SELF-ANALYSIS					
SA-8(22)	ACCOUNTABILITY AND TRACEABILITY					
SA-8(23)	SECURE DEFAULTS					
SA-8(24)	SECURE FAILURE AND RECOVERY					
SA-8(25)	ECONOMIC SECURITY					
SA-8(26)	PERFORMANCE SECURITY					
SA-8(27)	HUMAN FACTORED SECURITY					
SA-8(28)	ACCEPTABLE SECURITY					
SA-8(29)	REPEATABLE AND DOCUMENTED PROCEDURES					
SA-8(30)	PROCEDURAL RIGOR					
SA-8(31)	SECURE SYSTEM MODIFICATION					
SA-8(32)	SUFFICIENT DOCUMENTATION					
SA-9	External System Services	х	Х	х	Х	
SA-9(1)	RISK ASSESSMENTS AND ORGANIZATIONAL APPROVALS					
SA-9(2)	IDENTIFICATION OF FUNCTIONS, PORTS, PROTOCOLS, AND SERVICES			х	х	
SA-9(3)	ESTABLISH AND MAINTAIN TRUST RELATIONSHIP WITH PROVIDERS					
SA-9(4)	CONSISTENT INTERESTS OF CONSUMERS AND PROVIDERS					
SA-9(5)	PROCESSING, STORAGE, AND SERVICE LOCATION					
SA-9(6)	ORGANIZATION-CONTROLLED CRYPTOGRAPHIC KEYS					
SA-9(7)	ORGANIZATION-CONTROLLED INTEGRITY CHECKING					
SA-9(8)	PROCESSING AND STORAGE LOCATION — U.S. JURISDICTION					
SA-10	Developer Configuration Management			х	х	
SA-10(1)	SOFTWARE AND FIRMWARE INTEGRITY VERIFICATION					
SA-10(2)	ALTERNATIVE CONFIGURATION MANAGEMENT					
SA-10(3)	HARDWARE INTEGRITY VERIFICATION					
SA-10(4)	TRUSTED GENERATION					
SA-10(5)	MAPPING INTEGRITY FOR VERSION CONTROL					
SA-10(6)	TRUSTED DISTRIBUTION					

CONTROL NUMBER	CONTROL NAME	/ CONTROL SELINE	SECURITY CONTRO BASELINES BASELINES MOD			
	CONTROL ENHANCEMENT NAME	PRIVAC) BAS	LOW	MOD	HIGH	
SA-11	Developer Testing and Evaluation	х		х	х	
SA-11(1)	STATIC CODE ANALYSIS					
SA-11(2)	THREAT MODELING AND VULNERABILITY ANALYSES					
SA-11(3)	INDEPENDENT VERIFICATION OF ASSESSMENT PLANS AND EVIDENCE					
SA-11(4)	MANUAL CODE REVIEWS					
SA-11(5)	PENETRATION TESTING					
SA-11(6)	ATTACK SURFACE REVIEWS					
SA-11(7)	VERIFY SCOPE OF TESTING AND EVALUATION					
SA-11(8)	DYNAMIC CODE ANALYSIS					
SA-11(9)	INTERACTIVE APPLICATION SECURITY TESTING					
SA-12	Supply Chain Protection	W: Mo	ved to SR F	amily.		
SA-12(1)	ACQUISITION STRATEGIES, TOOLS, AND METHODS	W: Mo	ved to SR-5	5.		
SA-12(2)	SUPPLIER REVIEWS	W: Mo	ved to SR-6	ô.		
SA-12(3)	TRUSTED SHIPPING AND WAREHOUSING	W: Inc	orporated i	nto SR-3.		
SA-12(4)	DIVERSITY OF SUPPLIERS	W: Mo	ved to SR-3	3(1).		
SA-12(5)	LIMITATION OF HARM	W: Mo	ved to SR-3	3(2).		
SA-12(6)	MINIMIZING PROCUREMENT TIME	W: Inc	orporated i	nto SR-5(1)		
SA-12(7)	ASSESSMENTS PRIOR TO SELECTION / ACCEPTANCE / UPDATE	W: Mo	ved to SR-5	5(2).		
SA-12(8)	USE OF ALL-SOURCE INTELLIGENCE	W: Inc	orporated i	nto RA-3(2)		
SA-12(9)	OPERATIONS SECURITY	W: Mo	ved to SR-7	7.		
SA-12(10)	VALIDATE AS GENUINE AND NOT ALTERED	W: Mo	ved to SR-4	1(3).		
SA-12(11)	PENETRATION TESTING / ANALYSIS OF ELEMENTS, PROCESSES, AND ACTORS	W: Mo	ved to SR-6	5(1).		
SA-12(12)	INTER-ORGANIZATIONAL AGREEMENTS	W: Mo	ved to SR-8	3.		
SA-12(13)	CRITICAL INFORMATION SYSTEM COMPONENTS	W: Inc	orporated i	nto MA-6 a	nd RA-9.	
SA-12(14)	IDENTITY AND TRACEABILITY	W: Mo	ved to SR-4	1(1)(2).		
SA-12(15)	PROCESSES TO ADDRESS WEAKNESSES OR DEFICIENCIES	W: Inc	orporated i	nto SR-3.		
SA-13	Trustworthiness	W: Inc	orporated i	nto SA-8.		
SA-14	Criticality Analysis	W: Inc	orporated i	nto RA-9.		
SA-14(1)	CRITICAL COMPONENTS WITH NO VIABLE ALTERNATIVE SOURCING	W: Inc	orporated i	nto SA-20.		
SA-15	Development Process, Standards, and Tools			х	х	
SA-15(1)	QUALITY METRICS					
SA-15(2)	SECURITY TRACKING TOOLS					
SA-15(3)	CRITICALITY ANALYSIS			х	х	
SA-15(4)	THREAT MODELING AND VULNERABILITY ANALYSIS	W: Inc	orporated i	nto SA-11(2	2).	
SA-15(5)	ATTACK SURFACE REDUCTION					
SA-15(6)	CONTINUOUS IMPROVEMENT					
SA-15(7)	AUTOMATED VULNERABILITY ANALYSIS					
SA-15(8)	REUSE OF THREAT AND VULNERABILITY INFORMATION					
SA-15(9)	USE OF LIVE DATA	W: Inc	orporated i	nto SA-3(2)		
SA-15(10)	INCIDENT RESPONSE PLAN					
SA-15(11)	ARCHIVE SYSTEM OR COMPONENT					
SA-15(12)	MINIMIZE PERSONALLY IDENTIFIABLE INFORMATION					

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
	CONTROL ENHANCEMENT NAME	PRIVACY BAS	LOW	MOD	HIGH
SA-16	Developer-Provided Training				х
SA-17	Developer Security Architecture and Design				Х
SA-17(1)	FORMAL POLICY MODEL				
SA-17(2)	SECURITY-RELEVANT COMPONENTS				
SA-17(3)	FORMAL CORRESPONDENCE				
SA-17(4)	INFORMAL CORRESPONDENCE				
SA-17(5)	CONCEPTUALLY SIMPLE DESIGN				
SA-17(6)	STRUCTURE FOR TESTING				
SA-17(7)	STRUCTURE FOR LEAST PRIVILEGE				
SA-17(8)	ORCHESTRATION				
SA-17(9)	DESIGN DIVERSITY				
SA-18	Tamper Resistance and Detection	W: Mo	ved to SR-9).	•
SA-18(1)	MULTIPLE PHASES OF SYSTEM DEVELOPMENT LIFE CYCLE	W: Mo	ved to SR-9	9(1).	
SA-18(2)	INSPECTION OF SYSTEMS OR COMPONENTS	W: Mo	ved to SR-9	9(2).	
SA-19	Component Authenticity	W: Mo	ved to SR-1	10.	
SA-19(1)	ANTI-COUNTERFEIT TRAINING	W: Mo	ved to SR-1	10(1).	
SA-19(2)	CONFIGURATION CONTROL FOR COMPONENT SERVICE AND REPAIR	W: Mo	ved to SR-1	10(2).	
SA-19(3)	COMPONENT DISPOSAL	W: Mo	ved to SR-1	10(3).	
SA-19(4)	ANTI-COUNTERFEIT SCANNING	W: Mo	ved to SR-1	10(4).	
SA-20	Customized Development of Critical Components				
SA-21	Developer Screening				х
SA-21(1)	VALIDATION OF SCREENING	W: Inco	orporated i	nto SA-21.	
SA-22	Unsupported System Components		х	х	х
SA-22(1)	ALTERNATIVE SOURCES FOR CONTINUED SUPPORT	W: Inco	orporated i	nto SA-22.	
SA-23	Specialization				

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3.18 SYSTEM AND COMMUNICATIONS PROTECTION FAMILY

Table 3-18 provides a summary of the controls and control enhancements assigned to the System and Communications Protection Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

TABLE 3-18: SYSTEM AND COMMUNICATIONS PROTECTION FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
NOMBER	CONTROL ENHANCEMENT NAME	PRIVAC	LOW	MOD	HIGH
SC-1	Policy and Procedures		х	х	х
SC-2	Separation of System and User Functionality			х	х
SC-2(1)	INTERFACES FOR NON-PRIVILEGED USERS				
SC-2(2)	DISASSOCIABILITY				
SC-3	Security Function Isolation				х
SC-3(1)	HARDWARE SEPARATION				
SC-3(2)	ACCESS AND FLOW CONTROL FUNCTIONS				
SC-3(3)	MINIMIZE NONSECURITY FUNCTIONALITY				
SC-3(4)	MODULE COUPLING AND COHESIVENESS				
SC-3(5)	LAYERED STRUCTURES				
SC-4	Information in Shared System Resources			х	Х
SC-4(1)	SECURITY LEVELS	W: Inc	orporated i	nto SC-4.	
SC-4(2)	MULTILEVEL OR PERIODS PROCESSING				
SC-5	Denial of Service Protection		х	х	Х
SC-5(1)	RESTRICT ABILITY TO ATTACK OTHER SYSTEMS				
SC-5(2)	CAPACITY, BANDWIDTH, AND REDUNDANCY				
SC-5(3)	DETECTION AND MONITORING				
SC-6	Resource Availability				
SC-7	Boundary Protection		х	х	Х
SC-7(1)	PHYSICALLY SEPARATED SUBNETWORKS	W: Inc	orporated i	nto SC-7.	
SC-7(2)	PUBLIC ACCESS	W: Inc	orporated i	nto SC-7.	
SC-7(3)	ACCESS POINTS			х	Х
SC-7(4)	EXTERNAL TELECOMMUNICATIONS SERVICES			х	Х
SC-7(5)	DENY BY DEFAULT — ALLOW BY EXCEPTION			х	Х
SC-7(6)	RESPONSE TO RECOGNIZED FAILURES	W: Inc	orporated i	nto SC-7(18).
SC-7(7)	PREVENT SPLIT TUNNELING FOR REMOTE DEVICES			х	Х
SC-7(8)	ROUTE TRAFFIC TO AUTHENTICATED PROXY SERVERS			х	х
SC-7(9)	RESTRICT THREATENING OUTGOING COMMUNICATIONS TRAFFIC				
SC-7(10)	PREVENT EXFILTRATION				
SC-7(11)	RESTRICT INCOMING COMMUNICATIONS TRAFFIC				
SC-7(12)	HOST-BASED PROTECTION				
SC-7(13)	ISOLATION OF SECURITY TOOLS, MECHANISMS, AND SUPPORT COMPONENTS				
SC-7(14)	PROTECT AGAINST UNAUTHORIZED PHYSICAL CONNECTIONS				
SC-7(15)	NETWORKED PRIVILEGED ACCESSES				

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH	
SC-7(16)	PREVENT DISCOVERY OF COMPONENTS AND DEVICES					
SC-7(17)	AUTOMATED ENFORCEMENT OF PROTOCOL FORMATS					
SC-7(18)	FAIL SECURE				х	
SC-7(19)	BLOCK COMMUNICATION FROM NON-ORGANIZATIONALLY CONFIGURED HOSTS					
SC-7(20)	DYNAMIC ISOLATION AND SEGREGATION					
SC-7(21)	ISOLATION OF SYSTEM COMPONENTS				Х	
SC-7(22)	SEPARATE SUBNETS FOR CONNECTING TO DIFFERENT SECURITY DOMAINS					
SC-7(23)	DISABLE SENDER FEEDBACK ON PROTOCOL VALIDATION FAILURE					
SC-7(24)	PERSONALLY IDENTIFIABLE INFORMATION					
SC-7(25)	UNCLASSIFIED NATIONAL SECURITY CONNECTIONS					
SC-7(26)	CLASSIFIED NATIONAL SECURITY SYSTEM CONNECTIONS					
SC-7(27)	UNCLASSIFIED NON-NATIONAL SECURITY SYSTEM CONNECTIONS					
SC-7(28)	CONNECTIONS TO PUBLIC NETWORKS					
SC-7(29)	SEPARATE SUBNETS TO ISOLATE FUNCTIONS					
SC-8	Transmission Confidentiality and Integrity			х	Х	
SC-8(1)	CRYPTOGRAPHIC PROTECTION			х	Х	
SC-8(2)	PRE- AND POST-TRANSMISSION HANDLING					
SC-8(3)	CRYPTOGRAPHIC PROTECTION FOR MESSAGE EXTERNALS					
SC-8(4)	CONCEAL OR RANDOMIZE COMMUNICATIONS					
SC-8(5)	PROTECTED DISTRIBUTION SYSTEM					
SC-9	Transmission Confidentiality	W: Inc	orporated i	nto SC-8.		
SC-10	Network Disconnect			х	Х	
SC-11	Trusted Path					
SC-11(1)	IRREFUTABLE COMMUNICATIONS PATH					
SC-12	Cryptographic Key Establishment and Management		Х	х	Х	
SC-12(1)	AVAILABILITY				Х	
SC-12(2)	SYMMETRIC KEYS					
SC-12(3)	ASYMMETRIC KEYS					
SC-12(4)	PKI CERTIFICATES	W: Inc	orporated i	nto SC-12.		
SC-12(5)	PKI CERTIFICATES / HARDWARE TOKENS	W: Inc	orporated i	nto SC-12.	1	
SC-12(6)	PHYSICAL CONTROL OF KEYS					
SC-13	Cryptographic Protection		Х	Х	Х	
SC-13(1)	FIPS-VALIDATED CRYPTOGRAPHY	W: Inc	orporated i	nto SC-13.		
SC-13(2)	NSA-APPROVED CRYPTOGRAPHY	W: Inc	orporated i	nto SC-13.		
SC-13(3)	INDIVIDUALS WITHOUT FORMAL ACCESS APPROVALS	W: Incorporated into SC-13.				
SC-13(4)	DIGITAL SIGNATURES	W: Incorporated into SC-13.				
SC-14	Public Access Protections	W: Incorporated into AC-2, AC-3, AC-5, SI-3, SI-4, SI-5, SI-7, SI-10.				
SC-15	Collaborative Computing Devices and Applications		х	х	х	
SC-15(1)	PHYSICAL OR LOGICAL DISCONNECT					
SC-15(2)	BLOCKING INBOUND AND OUTBOUND COMMUNICATIONS TRAFFIC	W: Inc	orporated i	nto SC-7.		
SC-15(3)	DISABLING AND REMOVAL IN SECURE WORK AREAS					
SC-15(4)	EXPLICITLY INDICATE CURRENT PARTICIPANTS					

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVACY	LOW	MOD	HIGH	
SC-16	Transmission of Security and Privacy Attributes					
SC-16(1)	INTEGRITY VERIFICATION					
SC-16(2)	ANTI-SPOOFING MECHANISMS					
SC-17	Public Key Infrastructure Certificates			х	х	
SC-18	Mobile Code			х	Х	
SC-18(1)	IDENTIFY UNACCEPTABLE CODE AND TAKE CORRECTIVE ACTIONS					
SC-18(2)	ACQUISITION, DEVELOPMENT, AND USE					
SC-18(3)	PREVENT DOWNLOADING AND EXECUTION					
SC-18(4)	PREVENT AUTOMATIC EXECUTION					
SC-18(5)	ALLOW EXECUTION ONLY IN CONFINED ENVIRONMENTS					
SC-19	Voice over Internet Protocol		chnology-sp controls for	ecific; addr	essed by	
SC-20	Secure Name/Address Resolution Service (Authoritative Source)		х	х	х	
SC-20(1)	CHILD SUBSPACES	W: Inc	orporated i	nto SC-20.		
SC-20(2)	DATA ORIGIN AND INTEGRITY					
SC-21	Secure Name/Address Resolution Service		х	х	х	
50 21	(Recursive or Caching Resolver)		^	^	^	
SC-21(1)	DATA ORIGIN AND INTEGRITY	W: Inc	orporated i	nto SC-21.		
SC-22	Architecture and Provisioning for Name/Address Resolution Service		х	х	х	
SC-23	Session Authenticity			х	х	
SC-23(1)	INVALIDATE SESSION IDENTIFIERS AT LOGOUT					
SC-23(2)	USER-INITIATED LOGOUTS AND MESSAGE DISPLAYS	W: Inc	orporated i	nto AC-12(1	L).	
SC-23(3)	UNIQUE SYSTEM-GENERATED SESSION IDENTIFIERS					
SC-23(4)	UNIQUE SESSION IDENTIFIERS WITH RANDOMIZATION	W: Inc	ornorated i	nto SC-23(3	()	
SC-23(5)	ALLOWED CERTIFICATE AUTHORITIES		. po. acca .		,	
SC-24	Fail in Known State				,	
					Х	
SC-25	Thin Nodes					
SC-26	Decoys	\A/1 Im =	ornerstadi	nto SC 3F		
SC-26(1)	DETECTION OF MALICIOUS CODE	vv: inc	orporated i	nto 3C-35.		
SC-27	Platform-Independent Applications					
SC-28	Protection of Information at Rest			Х	Х	
SC-28(1)	CRYPTOGRAPHIC PROTECTION			Х	Х	
SC-28(2)	OFF-LINE STORAGE					
SC-28(3)	CRYPTOGRAPHIC KEYS					
SC-29	Heterogeneity					
SC-29(1)	VIRTUALIZATION TECHNIQUES					
SC-30	Concealment and Misdirection					
SC-30(1)	VIRTUALIZATION TECHNIQUES	W: Inc	orporated i	nto SC-29(1	.).	
SC-30(2)	RANDOMNESS					
SC-30(3)	CHANGE PROCESSING AND STORAGE LOCATIONS					
SC-30(4)	MISLEADING INFORMATION					

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVAC	LOW	MOD	HIGH	
SC-30(5)	CONCEALMENT OF SYSTEM COMPONENTS					
SC-31	Covert Channel Analysis					
SC-31(1)	TEST COVERT CHANNELS FOR EXPLOITABILITY					
SC-31(2)	MAXIMUM BANDWIDTH					
SC-31(3)	MEASURE BANDWIDTH IN OPERATIONAL ENVIRONMENTS					
SC-32	System Partitioning					
SC-32(1)	SEPARATE PHYSICAL DOMAINS FOR PRIVILEGED FUNCTIONS					
SC-33	Transmission Preparation Integrity	W: Inco	orporated i	nto SC-8.		
SC-34	Non-Modifiable Executable Programs					
SC-34(1)	NO WRITABLE STORAGE					
SC-34(2)	INTEGRITY PROTECTION AND READ-ONLY MEDIA					
SC-34(3)	HARDWARE-BASED PROTECTION					
SC-35	External Malicious Code Identification					
SC-36	Distributed Processing and Storage					
SC-36(1)	POLLING TECHNIQUES					
SC-36(2)	SYNCHRONIZATION					
SC-37	Out-of-Band Channels					
SC-37(1)	ENSURE DELIVERY AND TRANSMISSION					
SC-38	Operations Security					
SC-39	Process Isolation		х	х	Х	
SC-39(1)	HARDWARE SEPARATION					
SC-39(2)	SEPARATE EXECUTION DOMAIN PER THREAD					
SC-40	Wireless Link Protection					
SC-40(1)	ELECTROMAGNETIC INTERFERENCE					
SC-40(2)	REDUCE DETECTION POTENTIAL					
SC-40(3)	IMITATIVE OR MANIPULATIVE COMMUNICATIONS DECEPTION					
SC-40(4)	SIGNAL PARAMETER IDENTIFICATION					
SC-41	Port and I/O Device Access					
SC-42	Sensor Capability and Data					
SC-42(1)	REPORTING TO AUTHORIZED INDIVIDUALS OR ROLES					
SC-42(2)	AUTHORIZED USE					
SC-42(3)	PROHIBIT USE OF DEVICES					
SC-42(4)	NOTICE OF COLLECTION					
SC-42(5)	COLLECTION MINIMIZATION					
SC-43	Usage Restrictions					
SC-44	Detonation Chambers					
SC-45	System Time Synchronization					
SC-46	Cross Domain Policy Enforcement					
SC-47	Communications Path Diversity					
SC-48	Sensor Relocation					
SC-48(1)	DYNAMIC RELOCATION OF SENSORS OR MONITORING CAPABILITIES					

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME		LOW	MOD	HIGH	
SC-50	Software-Enforced Separation and Policy Enforcement					
SC-51	Operational and Internet-Based Technologies		·			



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3.19 SYSTEM AND INFORMATION INTEGRITY FAMILY

Table 3-19 provides a summary of the controls and control enhancements assigned to the System and Information Integrity Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

TABLE 3-19: SYSTEM AND INFORMATION INTEGRITY FAMILY

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVAC	LOW	MOD	HIGH	
SI-1	Policy and Procedures	х	х	х	х	
SI-2	Flaw Remediation		х	х	х	
SI-2(1)	CENTRAL MANAGEMENT				х	
SI-2(2)	AUTOMATED FLAW REMEDIATION STATUS			х	х	
SI-2(3)	TIME TO REMEDIATE FLAWS AND BENCHMARKS FOR CORRECTIVE ACTIONS					
SI-2(4)	AUTOMATED PATCH MANAGEMENT TOOLS					
SI-2(5)	AUTOMATIC SOFTWARE AND FIRMWARE UPDATES					
SI-2(6)	REMOVAL OF PREVIOUS VERSIONS OF SOFTWARE AND FIRMWARE					
SI-3	Malicious Code Protection		х	х	х	
SI-3(1)	CENTRAL MANAGEMENT			х	х	
SI-3(2)	AUTOMATIC UPDATES	W: Inc	orporated i	nto SI-3.		
SI-3(3)	NON-PRIVILEGED USERS	W: Inc	orporated i	nto AC-6(10	0).	
SI-3(4)	UPDATES ONLY BY PRIVILEGED USERS					
SI-3(5)	PORTABLE STORAGE DEVICES	W: Inc	orporated i	nto MP-7.		
SI-3(6)	TESTING AND VERIFICATION					
SI-3(7)	NONSIGNATURE-BASED DETECTION	W: Inc	orporated i	nto SI-3.		
SI-3(8)	DETECT UNAUTHORIZED COMMANDS					
SI-3(9)	AUTHENTICATE REMOTE COMMANDS					
SI-3(10)	MALICIOUS CODE ANALYSIS					
SI-4	System Monitoring		х	х	х	
SI-4(1)	SYSTEM-WIDE INTRUSION DETECTION SYSTEM					
SI-4(2)	AUTOMATED TOOLS AND MECHANISMS FOR REAL-TIME ANALYSIS			х	х	
SI-4(3)	AUTOMATED TOOL AND MECHANISM INTEGRATION					
SI-4(4)	INBOUND AND OUTBOUND COMMUNICATIONS TRAFFIC			х	х	
SI-4(5)	SYSTEM-GENERATED ALERTS			х	х	
SI-4(6)	RESTRICT NON-PRIVILEGED USERS	W: Inc	orporated i	nto AC-6(10	0).	
SI-4(7)	AUTOMATED RESPONSE TO SUSPICIOUS EVENTS					
SI-4(8)	PROTECTION OF MONITORING INFORMATION	W: Inc	orporated i	nto SI-4.		
SI-4(9)	TESTING OF MONITORING TOOLS AND MECHANISMS					
SI-4(10)	VISIBILITY OF ENCRYPTED COMMUNICATIONS				х	
SI-4(11)	ANALYZE COMMUNICATIONS TRAFFIC ANOMALIES					
SI-4(12)	AUTOMATED ORGANIZATION-GENERATED ALERTS				х	
SI-4(13)	ANALYZE TRAFFIC AND EVENT PATTERNS					
SI-4(14)	WIRELESS INTRUSION DETECTION				х	

SI-4(15) SI-4(16)	CONTROL ENHANCEMENT NAME	PRIVACY CONTROI BASELINE			
		A.	LOW	MOD	HIGH
SI-4(16)	WIRELESS TO WIRELINE COMMUNICATIONS				
	CORRELATE MONITORING INFORMATION				
SI-4(17)	INTEGRATED SITUATIONAL AWARENESS				
SI-4(18)	ANALYZE TRAFFIC AND COVERT EXFILTRATION				
SI-4(19)	RISK FOR INDIVIDUALS				
SI-4(20)	PRIVILEGED USERS				х
SI-4(21)	PROBATIONARY PERIODS				
SI-4(22)	UNAUTHORIZED NETWORK SERVICES				х
SI-4(23)	HOST-BASED DEVICES				
SI-4(24)	INDICATORS OF COMPROMISE				
SI-4(25)	OPTIMIZE NETWORK TRAFFIC ANALYSIS				
SI-5	Security Alerts, Advisories, and Directives		х	х	Х
SI-5(1)	AUTOMATED ALERTS AND ADVISORIES				х
SI-6	Security and Privacy Function Verification				х
SI-6(1)	NOTIFICATION OF FAILED SECURITY TESTS	W: Inc	orporated i	nto SI-6.	
SI-6(2)	AUTOMATION SUPPORT FOR DISTRIBUTED TESTING				
SI-6(3)	REPORT VERIFICATION RESULTS				
SI-7	Software, Firmware, and Information Integrity			х	х
SI-7(1)	INTEGRITY CHECKS			х	х
SI-7(2)	AUTOMATED NOTIFICATIONS OF INTEGRITY VIOLATIONS				х
SI-7(3)	CENTRALLY MANAGED INTEGRITY TOOLS				
SI-7(4)	TAMPER-EVIDENT PACKAGING	W: Inc	orporated i	nto SR-9.	
SI-7(5)	AUTOMATED RESPONSE TO INTEGRITY VIOLATIONS				х
SI-7(6)	CRYPTOGRAPHIC PROTECTION				
SI-7(7)	INTEGRATION OF DETECTION AND RESPONSE			х	х
SI-7(8)	AUDITING CAPABILITY FOR SIGNIFICANT EVENTS				
SI-7(9)	VERIFY BOOT PROCESS				
SI-7(10)	PROTECTION OF BOOT FIRMWARE				
SI-7(11)	CONFINED ENVIRONMENTS WITH LIMITED PRIVILEGES	W: Mo	ved to CM-	-7(6).	
SI-7(12)	INTEGRITY VERIFICATION				
SI-7(13)	CODE EXECUTION IN PROTECTED ENVIRONMENTS	W: Mo	ved to CM-	-7(7).	
SI-7(14)	BINARY OR MACHINE EXECUTABLE CODE	W: Mo	ved to CM-	-7(8).	
SI-7(15)	CODE AUTHENTICATION				х
SI-7(16)	TIME LIMIT ON PROCESS EXECUTION WITHOUT SUPERVISION				
SI-7(17)	RUNTIME APPLICATION SELF-PROTECTION				
SI-8	Spam Protection			х	Х
SI-8(1)	CENTRAL MANAGEMENT			х	Х
SI-8(2)	AUTOMATIC UPDATES			х	Х
SI-8(3)	CONTINUOUS LEARNING CAPABILITY				
SI-9	Information Input Restrictions	W: Inco		nto AC-2, A	C-3, AC-
SI-10 SI-10(1)	Information Input Validation			х	х

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
	CONTROL ENHANCEMENT NAME	PRIVAC	LOW	MOD	HIGH	
SI-10(2)	REVIEW AND RESOLVE ERRORS					
SI-10(3)	PREDICTABLE BEHAVIOR					
SI-10(4)	TIMING INTERACTIONS					
SI-10(5)	RESTRICT INPUTS TO TRUSTED SOURCES AND APPROVED FORMATS					
SI-10(6)	INJECTION PREVENTION					
SI-11	Error Handling			х	х	
SI-12	Information Management and Retention	х	х	х	х	
SI-12(1)	LIMIT PERSONALLY IDENTIFIABLE INFORMATION ELEMENTS	х				
SI-12(2)	MINIMIZE PERSONALLY IDENTIFIABLE INFORMATION IN TESTING, TRAINING, AND RESEARCH	Х				
SI-12(3)	INFORMATION DISPOSAL	х				
SI-13	Predictable Failure Prevention					
SI-13(1)	TRANSFERRING COMPONENT RESPONSIBILITIES					
SI-13(2)	TIME LIMIT ON PROCESS EXECUTION WITHOUT SUPERVISION	W: Inc	orporated i	nto SI-7(16)		
SI-13(3)	MANUAL TRANSFER BETWEEN COMPONENTS					
SI-13(4)	STANDBY COMPONENT INSTALLATION AND NOTIFICATION					
SI-13(5)	FAILOVER CAPABILITY					
SI-14	Non-Persistence					
SI-14(1)	REFRESH FROM TRUSTED SOURCES					
SI-14(2)	NON-PERSISTENT INFORMATION					
SI-14(3)	NON-PERSISTENT CONNECTIVITY					
SI-15	Information Output Filtering					
SI-16	Memory Protection			х	х	
SI-17	Fail-Safe Procedures					
SI-18	Personally Identifiable Information Quality Operations	х				
SI-18(1)	AUTOMATION					
SI-18(2)	DATA TAGS					
SI-18(3)	COLLECTION					
SI-18(4)	INDIVIDUAL REQUESTS	х				
SI-18(5)	NOTICE OF COLLECTION OR DELETION					
SI-19	De-identification	Х				
SI-19(1)	COLLECTION					
SI-19(2)	ARCHIVING					
SI-19(3)	RELEASE					
SI-19(4)	REMOVAL, MASKING, ENCRYPTION, HASHING, OR REPLACEMENT OF DIRECT IDENTIFIERS					
SI-19(5)	STATISTICAL DISCLOSURE CONTROL					
SI-19(6)	DIFFERENTIAL PRIVACY					
SI-19(7)	VALIDATED SOFTWARE					
SI-19(8)	MOTIVATED INTRUDER					
SI-20	Tainting					
SI-21	Information Refresh					
SI-22	Information Diversity					

CONTROL NUMBER	CONTROL NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES			
NOWIBER	CONTROL ENHANCEMENT NAME		LOW	MOD	HIGH	
SI-23	Information Fragmentation					



885

3.20 SUPPLY CHAIN RISK MANAGEMENT FAMILY

Table 3-20 provides a summary of the controls and control enhancements assigned to the Supply Chain Risk Management Family. The controls are allocated to the low-impact, moderate-impact, and high-impact security control baselines and the privacy control baseline, as appropriate.

TABLE 3-20: SUPPLY CHAIN RISK MANAGEMENT FAMILY

CONTROL NUMBER	CONTROLIVATIVE	CONTROL	SECURITY CONTROL BASELINES			
		PRIVAC	LOW	MOD	HIGH	
SR-1	Policy and Procedures		х	х	х	
SR-2	Supply Chain Risk Management Plan		х	х	Х	
SR-2(1)	ESTABLISH SCRM TEAM		х	х	Х	
SR-3	Supply Chain Controls and Processes		х	х	Х	
SR-3(1)	DIVERSE SUPPLY BASE					
SR-3(2)	LIMITATION OF HARM					
SR-4	Provenance					
SR-4(1)	IDENTITY					
SR-4(2)	TRACK AND TRACE					
SR-4(3)	VALIDATE AS GENUINE AND NOT ALTERED					
SR-5	Acquisition Strategies, Tools, and Methods		х	х	Х	
SR-5(1)	ADEQUATE SUPPLY					
SR-5(2)	ASSESSMENTS PRIOR TO SELECTION, ACCEPTANCE, MODIFICATION, OR UPDATE					
SR-6	Supplier Reviews			х	Х	
SR-6(1)	PENETRATION TESTING AND ANALYSIS					
SR-7	Supply Chain Operations Security					
SR-8	Notification Agreements		х	х	Х	
SR-9	Tamper Resistance and Detection				Х	
SR-9(1)	MULTIPLE STAGES OF SYSTEM DEVELOPMENT LIFE CYCLE				Х	
SR-10	Inspection of Systems and Components		х	х	Х	
SR-11	Component Authenticity		х	х	Х	
SR-11(1)	ANTI-COUNTERFEIT TRAINING		х	х	Х	
SR-11(2)	CONFIGURATION CONTROL FOR COMPONENT SERVICE AND REPAIR		х	х	Х	
SR-11(3)	COMPONENT DISPOSAL		х	х	Х	
SR-11(4)	ANTI-COUNTERFEIT SCANNING					

CHAPTER THREE PAGE 56

886

REFERENCES

887 888

LAWS, POLICIES, INSTRUCTIONS, STANDARDS, GUIDELINES, AND INTERNAL REPORTS

	LAWS
[FISMA]	Federal Information Security Modernization Act (P.L. 113-283), December 2014. https://www.congress.gov/113/plaws/publ283/PLAW-113publ283.pdf
[FOIA96]	Freedom of Information Act (FOIA), 5 U.S.C. § 552, As Amended By Public Law No. 104-231, 110 Stat. 3048, Electronic Freedom of Information Act Amendments of 1996. https://www.govinfo.gov/content/pkg/PLAW-104publ231/pdf/PLAW-104publ231.pdf
[PRIVACT]	Privacy Act (P.L. 93-579), December 1974. https://www.govinfo.gov/content/pkg/STATUTE-88/pdf/STATUTE-88-Pg1896.pdf
[44 USC 3552]	Title 44 U.S. Code, Sec. 3552, Definitions. 2017 ed. https://www.govinfo.gov/app/details/USCODE-2017-title44/USCODE-2017-title44-chap35-subchapII-sec3552
	POLICIES AND INSTRUCTIONS
[CNSSI 1253]	Committee on National Security Systems Instruction No. 1253, Security Categorization and Control Selection for National Security Systems, March 2014. https://www.cnss.gov/CNSS/issuances/Instructions.cfm
[CNSSP 22]	Committee on National Security Systems Policy No. 22, <i>Cybersecurity Risk Management Policy</i> , August 2016. https://www.cnss.gov/CNSS/issuances/Policies.cfm
[DODI 8510.01]	Department of Defense Instruction 8510.01, <i>Risk Management Framework</i> (<i>RMF</i>) for DoD Information Technology (IT), March 2014. https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/851001_2014.pdf
[OMB A-130]	Office of Management and Budget Memorandum Circular A-130, Managing Information as a Strategic Resource, July 2016. https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A130/a13 Orevised.pdf
	STANDARDS, GUIDELINES, AND INTERNAL REPORTS
[FIPS 199]	National Institute of Standards and Technology (2004) Standards for Security Categorization of Federal Information and Information Systems. (U.S. Department of Commerce, Washington, D.C.), Federal Information Processing Standards Publication (FIPS) 199. https://doi.org/10.6028/NIST.FIPS.199

REFERENCES PAGE 57

[FIPS 200]	National Institute of Standards and Technology (2006) Minimum Security Requirements for Federal Information and Information Systems. (U.S. Department of Commerce, Washington, D.C.), Federal Information Processing Standards Publication (FIPS) 200. https://doi.org/10.6028/NIST.FIPS.200
[SP 800-18]	Swanson MA, Hash J, Bowen P (2006) Guide for Developing Security Plans for Federal Information Systems. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-18, Rev. 1.
	https://doi.org/10.6028/NIST.SP.800-18r1
[SP 800-30]	Joint Task Force Transformation Initiative (2012) Guide for Conducting Risk Assessments. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-30, Rev. 1. https://doi.org/10.6028/NIST.SP.800-30r1
[SP 800-37]	Joint Task Force (2018) Risk Management Framework for Information Systems and Organizations: A System Life Cycle Approach for Security and Privacy. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-37, Rev. 2. https://doi.org/10.6028/NIST.SP.800-37r2
[SP 800-39]	Joint Task Force Transformation Initiative (2011) Managing Information Security Risk: Organization, Mission, and Information System View. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-39. https://doi.org/10.6028/NIST.SP.800-39
[SP 800-53]	Joint Task Force Transformation Initiative (2019) Security and Privacy Controls for Information Systems and Organizations. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-53, Rev. 5.
[SP 800-59]	Barker W (2003) Guideline for Identifying an Information System as a National Security System. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-59. https://doi.org/10.6028/NIST.SP.800-59
[SP 800-60-1]	Stine KM, Kissel RL, Barker WC, Fahlsing J, Gulick J (2008) Guide for Mapping Types of Information and Information Systems to Security Categories. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-60, Vol. 1, Rev. 1. https://doi.org/10.6028/NIST.SP.800-60v1r1
[SP 800-60-2]	Stine KM, Kissel RL, Barker WC, Lee A, Fahlsing J (2008) Guide for Mapping Types of Information and Information Systems to Security Categories: Appendices. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Special Publication (SP) 800-60, Vol. 2, Rev. 1. https://doi.org/10.6028/NIST.SP.800-60v2r1

REFERENCES PAGE 58

[IR 8011 v1] Dempsey KL, Eavy P, Moore G (2017) Automation Support for Security

Control Assessments: Volume 1: Overview. (National Institute of Standards and Technology, Gaithersburg, MD), NIST Interagency or Internal (NISTIR)

8011, Volume 1.

https://doi.org/10.6028/NIST.IR.8011-1

[IR 8062] Brooks S, Garcia M, Lefkovitz N, Lightman S, Nadeau E (2017) An

Introduction to Privacy Engineering and Risk Management in Federal Systems. (National Institute of Standards and Technology, Gaithersburg,

MD), NIST Interagency or Internal Report (NISTIR) 8062.

https://doi.org/10.6028/NIST.IR.8062

MISCELLANEOUS PUBLICATIONS AND WEBSITES

[DSB 2017] Department of Defense, Defense Science Board, Task Force on Cyber

Deterrence, February 2017.

https://www.acq.osd.mil/dsb/reports/2010s/DSB-CyberDeterrenceReport 02-28-

17 Final.pdf

[NIST CSRC] National Institute of Standards and Technology Computer Security

Resource Center (CSRC).

https://csrc.nist.gov

[SCOR] Security Control Overlay Repository (SCOR).

https://csrc.nist.gov/Projects/Risk-Management/scor

889

REFERENCES PAGE 59

890 **APPENDIX A**

891

GLOSSARY

892 COMMON TERMS AND DEFINITIONS

ppendix A provides definitions for terminology used in NIST SP 800-53B. Sources for terms used in this publication are cited as applicable. Where no citation is noted, the source of the definition is SP 800-53.

agency Any executive agency or department, military department, [OMB A-130] Federal Government corporation, Federal Government-

controlled corporation, or other establishment in the Executive

Branch of the Federal Government, or any independent regulatory agency. See executive agency.

assignment statement A control parameter that allows an organization to assign a

> specific, organization-defined value to the control or control enhancement (e.g., assigning a list of roles to be notified or a

value for the frequency of testing).

See organization-defined control parameters and selection

statement.

Grounds for justified confidence that a [security or privacy] claim assurance

has been or will be achieved.

Note 1: Assurance is typically obtained relative to a set of specific claims. The scope and focus of such claims may vary (e.g., security claims, safety claims),

and the claims themselves may be interrelated.

Note 2: Assurance is obtained through techniques and methods that generate

credible evidence to substantiate claims.

authorizing official

[OMB A-130]

A senior Federal official or executive with the authority to authorize (i.e., assume responsibility for) the operation of an information system or the use of a designated set of common controls at an acceptable level of risk to agency operations (including mission, functions, image, or reputation), agency

assets, individuals, other organizations, and the Nation.

availability

[44 USC 3552]

Ensuring timely and reliable access to and use of information.

capability A combination of mutually reinforcing security and/or privacy

> controls implemented by technical means, physical means, and procedural means. Such controls are typically selected to achieve a common information security- or privacy-related purpose.

common control

[OMB A-130]

A security or privacy control that is inherited by multiple

information systems or programs.

common control provider

[SP 800-37]

An organizational official responsible for the development, implementation, assessment, and monitoring of common controls (i.e., security or privacy controls inheritable by systems).

compensating controls

The security and privacy controls employed in lieu of the controls in the baselines described in NIST Special Publication 800-53B that provide equivalent or comparable protection for a system or organization.

confidentiality

[44 USC 3552]

Preserving authorized restrictions on information access and disclosure, including means for protecting personal privacy and proprietary information.

control baseline [FIPS 200, Adapted]

The set of security and privacy controls defined for a low-impact, moderate-impact, or high-impact system or selected based on the privacy selection criteria that provide a starting point for the tailoring process.

control enhancement

Augmentation of a security or privacy control to build in additional but related functionality to the control, increase the strength of the control, or add assurance to the control.

control inheritance

A situation in which a system or application receives protection from security or privacy controls (or portions of controls) that are developed, implemented, assessed, authorized, and monitored by entities other than those responsible for the system or application; entities either internal or external to the organization where the system or application resides. See *common control*.

environment of operation

[<u>OMB A-130</u>]

The physical surroundings in which an information system processes, stores, and transmits information.

high-impact system [FIPS 200]

A system in which at least one security objective (i.e., confidentiality, integrity, or availability) is assigned a FIPS Publication 199 potential impact value of high.

hybrid control [OMB A-130]

A security or privacy control that is implemented for an information system, in part as a common control and in part as a system-specific control.

impact

The effect on organizational operations, organizational assets, individuals, other organizations, or the Nation (including the national security interests of the United States) of a loss of confidentiality, integrity, or availability of information or a system.

impact value [FIPS 199]

The assessed worst-case potential impact that could result from a compromise of the confidentiality, integrity, or availability of information expressed as a value of low, moderate, or high.

information [OMB A-130]

Any communication or representation of knowledge such as facts, data, or opinions in any medium or form, including textual, numerical, graphic, cartographic, narrative, electronic, or

audiovisual forms.

information security

[OMB A-130]

The protection of information and systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide confidentiality, integrity, and availability.

information system

[OMB A-130]

A discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information.

integrity

[44 USC 3552]

Guarding against improper information modification or destruction, and includes ensuring information non-repudiation and authenticity.

low-impact system

[FIPS 200]

A system in which all three security objectives (i.e., confidentiality, integrity, and availability) are assigned a FIPS Publication 199 potential impact value of low.

moderate-impact system

[FIPS 200]

A system in which at least one security objective (i.e., confidentiality, integrity, or availability) is assigned a FIPS Publication 199 potential impact value of moderate and no security objective is assigned a potential impact value of high.

national security system [OMB A-130]

Any system (including any telecommunications system) used or operated by an agency or by a contractor of an agency, or other organization on behalf of an agency—(i) the function, operation, or use of which involves intelligence activities; involves cryptologic activities related to national security; involves command and control of military forces; involves equipment that is an integral part of a weapon or weapons system; or is critical to the direct fulfillment of military or intelligence missions (excluding a system that is to be used for routine administrative and business applications, for example, payroll, finance, logistics, and personnel management applications); or (ii) is protected at all times by procedures established for information that have been specifically authorized under criteria established by an Executive Order or an Act of Congress to be kept classified in the interest of national defense or foreign policy.

organization

[FIPS 200, Adapted]

An entity of any size, complexity, or positioning within an organizational structure, including federal agencies, private enterprises, academic institutions, state, local, or tribal governments, or as appropriate, any of their operational elements.

organization-defined control parameter

The variable part of a control or control enhancement that is instantiated by an organization during the tailoring process by either assigning an organization-defined value or selecting a value from a pre-defined list provided as part of the control or control enhancement. See assignment statement and selection statement.

overlay

[OMB A-130]

A specification of security or privacy controls, control enhancements, supplemental guidance, and other supporting information employed during the tailoring process, that is intended to complement (and further refine) security control baselines. The overlay specification may be more stringent or less stringent than the original security control baseline specification and can be applied to multiple information systems. See *tailoring*.

personally identifiable information

[OMB A-130]

Information that can be used to distinguish or trace an individual's identity, either alone or when combined with other information that is linked or linkable to a specific individual.

potential impact [FIPS 199]

The loss of confidentiality, integrity, or availability could be expected to have a limited adverse effect (FIPS Publication 199 low), a serious adverse effect (FIPS Publication 199 moderate), or a severe or catastrophic adverse effect (FIPS Publication 199 high) on organizational operations, organizational assets, or individuals.

privacy control [OMB A-130]

The administrative, technical, and physical safeguards employed within an agency to ensure compliance with applicable privacy requirements and manage privacy risks.

privacy impact assessment [OMB A-130]

An analysis of how information is handled to ensure handling conforms to applicable legal, regulatory, and policy requirements regarding privacy; to determine the risks and effects of creating, collecting, using, processing, storing, maintaining, disseminating, disclosing, and disposing of information in identifiable form in an electronic information system; and to examine and evaluate protections and alternate processes for handling information to mitigate potential privacy concerns. A privacy impact assessment is both an analysis and a formal document detailing the process and the outcome of the analysis.

privacy plan [OMB A-130]

A formal document that details the privacy controls selected for an information system or environment of operation that are in place or planned for meeting applicable privacy requirements and managing privacy risks, details how the controls have been implemented, and describes the methodologies and metrics that will be used to assess the controls.

privacy program plan [OMB A-130]

A formal document that provides an overview of an agency's privacy program, including a description of the structure of the privacy program, the resources dedicated to the privacy program, the role of the Senior Agency Official for Privacy and other privacy officials and staff, the strategic goals and objectives of the privacy program, and the program management controls and common controls in place or planned for meeting applicable privacy requirements and managing privacy risks.

processing

[IR 8062]

Operation or set of operations performed upon PII that can include but is not limited to the collection, retention, logging, generation, transformation, use, disclosure, transfer, and disposal of PII.

risk

[OMB A-130]

A measure of the extent to which an entity is threatened by a potential circumstance or event, and typically is a function of: (i) the adverse impact, or magnitude of harm, that would arise if the circumstance or event occurs; and (ii) the likelihood of occurrence.

risk assessment

[SP 800-39]

The process of identifying risks to organizational operations (including mission, functions, image, reputation), organizational assets, individuals, other organizations, and the Nation, resulting from the operation of a system.

Part of risk management, incorporates threat and vulnerability analyses and analyses of privacy problems arising from information processing and considers mitigations provided by security and privacy controls planned or in place. Synonymous with *risk analysis*.

risk management

[OMB A-130]

The program and supporting processes to manage risk to agency operations (including mission, functions, image, reputation), agency assets, individuals, other organizations, and the Nation, and includes: establishing the context for risk-related activities, assessing risk, responding to risk once determined, and monitoring risk over time.

scoping considerations

A part of tailoring guidance providing organizations with specific considerations on the applicability and implementation of security and privacy controls in the control baselines. Considerations include policy or regulatory, technology, physical infrastructure, system component allocation, public access, scalability, common control, operational or environmental, and security objective.

security category

[<u>OMB A-130</u>]

The characterization of information or an information system based on an assessment of the potential impact that a loss of confidentiality, integrity, or availability of such information or information system would have on agency operations, agency assets, individuals, other organizations, and the Nation.

security control [OMB A-130]

The safeguards or countermeasures prescribed for an information system or an organization to protect the confidentiality, integrity, and availability of the system and its information.

security control baseline

[OMB A-130]

The set of minimum security controls defined for a low-impact, moderate-impact, or high-impact information system.

security functionality

The security-related features, functions, mechanisms, services, procedures, and architectures implemented within organizational information systems or the environments in which those systems operate.

security functions

The hardware, software, or firmware of the system responsible for enforcing the system security policy and supporting the isolation of code and data on which the protection is based.

security objective [FIPS 199]

Confidentiality, integrity, or availability.

security plan

Formal document that provides an overview of the security requirements for an information system or an information security program and describes the security controls in place or planned for meeting those requirements. The system security plan describes the system components that are included within the system, the environment in which the system operates, how the security requirements are implemented, and the relationships with or connections to other systems.

See system security plan.

security requirement [FIPS 200, Adapted]

A requirement levied on an information system or an organization that is derived from applicable laws, executive orders, directives, regulations, policies, standards, procedures, or mission/business needs to ensure the confidentiality, integrity, and availability of information that is being processed, stored, or transmitted.

Note: Security requirements can be used in a variety of contexts from high-level policy-related activities to low-level implementation-related activities in system development and engineering disciplines.

selection statement

A control parameter that allows an organization to select a value from a list of pre-defined values provided as part of the control or control enhancement (e.g., selecting to either restrict an action or prohibit an action).

See assignment statement and organization-defined control parameter.

senior agency official for privacy

[OMB A-130]

The senior official, designated by the head of each agency, who has agency-wide responsibility for privacy, including implementation of privacy protections; compliance with Federal laws, regulations, and policies relating to privacy; management of privacy risks at the agency; and a central policy-making role in the agency's development and evaluation of legislative, regulatory, and other policy proposals.

system owner (or program manager)

Official responsible for the overall procurement, development, integration, modification, or operation and maintenance of a system.

system security plan See *security plan*.

system-specific control

[OMB A-130]

A security or privacy control for an information system that is implemented at the system level and is not inherited by any other information system.

tailored control baseline

A set of controls resulting from the application of tailoring guidance to a control baseline. See *tailoring*.

tailoring

The process by which security and privacy control baselines are modified by identifying and designating common controls, applying scoping considerations on the applicability and implementation of baseline controls, selecting compensating controls, assigning specific values to organization-defined control parameters, supplementing baselines with additional controls or control enhancements, and providing additional specification information for control implementation.

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897 APPENDIX B

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ACRONYMS

899 COMMON ABBREVIATIONS

CIO Chief Information Officer

CISO Chief Information Security Officer

CNSS Committee on National Security Systems

CNSSI Committee on National Security Systems Instruction

CNSSP Committee on National Security Systems Policy

CSRC Computer Security Resource Center

DoD Department of Defense

DoDI Department of Defense Instruction

FIPS Federal Information Processing Standards

FISMA Federal Information Security Modernization Act

FOIA Freedom of Information Act

IT Information Technology

ITL Information Technology Laboratory

JTF Joint Task Force

MOD Moderate

NIST National Institute of Standards and Technology

O/S Organization or Information System

OMB Office of Management and Budget

PII Personally Identifiable Information

RMF Risk Management Framework

SAOP Senior Agency Official for Privacy

SP Special Publication

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901 APPENDIX C

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OVERLAYS

903 ADDITIONAL CUSTOMIZATION OPTIONS FOR CONTROL BASELINES

n certain situations, it may be beneficial for organizations to apply the tailoring guidance to develop a set of controls for particular communities of interest or to address specialized requirements, technologies implemented, or unique missions or environments of operation. An organization may decide to establish a set of controls for specific applications or use cases, including for example: cloud-based services that could be applied to organizations procuring or implementing such services; industrial control systems generating or transmitting electric power or controlling environmental systems in facilities; systems processing, storing, or transmitting classified information; or systems controlling the safety of transportation systems. In these examples, overlays can be developed for each sector, technology area, unique circumstances, or environments and promulgated to large communities of interest—thus achieving standardized security and privacy capabilities, consistency of implementation, and cost-effective security and privacy solutions.

To address the need for specialized sets of controls for communities of interest, systems, and organizations, the concept of overlay is introduced. An overlay is a fully specified set of controls, control enhancements, and other supporting information (e.g., parameter values) derived from the application of tailoring guidance to control baselines.³⁹ Overlays⁴⁰ complement and further refine the initial control baselines by providing an opportunity for the community of interest to add, modify, or eliminate controls; providing control applicability and interpretations for specific technologies, computing paradigms, environments of operation, types of systems, types of missions/operations, operating modes, industry sectors, and statutory/regulatory requirements; and establishing parameter values for assignment and/or selection statements in controls and control enhancements agreeable to communities of interest. Organizations use the overlay concept when there is divergence from the basic assumptions used to create the initial control baselines. In many ways, overlays function like alternative control baselines and may require tailoring like the baselines in **Chapter Three**. Using an overlay is not a substitute for the full tailoring process. The overlay concept is only applicable to groups of like systems, technologies, or communities of interest (i.e., the overlay concept is not appropriate for an individual system since the tailoring process is used to adapt control baselines for individual systems).

The full range of tailoring activities can be employed by organizations to provide a structured approach for developing overlays that support the areas described above. Overlays provide an opportunity to build consensus across communities of interest and develop security and privacy plans for systems and organizations that have broad-based support for specific circumstances, situations, or conditions. Categories of overlays that may be useful include:

³⁹ Control baselines can include the federal baselines in <u>Chapter Three</u>; baselines developed by State, local, or tribal governments; or baselines developed by private sector organizations (e.g., manufacturers, consortia, trade associations, industry and critical infrastructure sectors).

⁴⁰ Tailored control baselines may also be referred to as *overlays*. An organizationally tailored control baseline is analogous to an organization-wide overlay since an overlay is a tailored baseline that services a community of interest, in this case, the organization.

- Communities of interest, industry sectors, or coalitions/partnerships, such as healthcare, law enforcement, intelligence, financial, manufacturing, transportation, energy, and allied collaboration/sharing
- Information technologies and computing paradigms, such as virtualized systems, cloud, mobile, smart grid, and cross-domain solutions
- 942 Environments of operation, such as space, tactical, or sea
- 943 Types of systems and operating modes, such as industrial/process control systems, weapons 944 systems, single-user systems, standalone systems, IoT devices and sensors
 - Types of missions/operations, such as counterterrorism, first responders, research, development, test, and evaluation
 - Statutory/regulatory requirements, such as Foreign Intelligence Surveillance Act, Health Insurance Portability and Accountability Act, FISMA, and Privacy Act

Overlays provide uniformity and efficiency of control selection by presenting tailoring options developed by security and privacy experts and other subject matter experts to information system owners responsible for implementing and maintaining such systems. There are many options that can be used to construct overlays, depending on the specificity desired by the overlay developers. Some overlays may be very specific with respect to the hardware, firmware, and software that form the key components of the information system and the environment in which the system operates. Other overlays may be more abstract in order to be applicable to a large class of systems that may be deployed in different operational environments.

PUBLICATION OF OVERLAYS Overlays can be published independently in a variety of venues and publications, including OMB

policies, CNSS Instructions, NIST Special Publications, industry standards, and sector-specific guidance. The Security Control Overlay Repository (SCOR) provides stakeholders with a platform

for voluntarily sharing security control overlays. To learn more about the repository, including instructions on how to submit an overlay, and to obtain a list of published overlays, see [SCOR].

Organizations may use the following outline when developing overlays. 41 The outline is provided

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as an example only. Organizations may use any format based on specific organizational needs and the type of overlay being developed. The level of detail included in the overlay is at the discretion of the organization initiating the overlay but should be of sufficient breadth and depth to provide an appropriate justification and rationale for the overlay, including any riskbased decisions made during the overlay development process. The example overlay outline

969 includes the following sections:

APPENDIX C PAGE 69

⁴¹ While organizations are encouraged to use the overlay concept to tailor control baselines, the development of widely divergent overlays on the same topic may prove to be counterproductive. The overlay concept is most effective when communities of interest work together to create consensus-based overlays that are not duplicative.

- 970 Identification
- 971 Overlay characteristics
- 972 **Applicability**
- 973 Overlay summary
- 974 Overlay control specifications
- 975 Tailoring considerations
- 976 Terms and definitions
- 977 Additional information or instructions

978 **Identification**

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979 Organizations identify the overlay by providing a unique name for the overlay, a version number 980 and date, the version of [SP 800-53] used to create the overlay, other documentation used to 981 create the overlay, author or authoring group and point of contact, and type of organizational 982 approval received. Organizations define how long the overlay is to be in effect and any events 983 that may trigger an update to the overlay other than changes to [SP 800-53] or organization-984 specific guidance. If there are no unique events that can trigger an update for the overlay, this 985

Overlay Characteristics

section provides that notation.

987 Organizations describe the characteristics that define the intended use of the overlay in order to 988 help potential users select the most appropriate overlay for their missions or business functions. 989 This may include, for example:

- Describing the physical environment where the information system will be used or operate (e.g., inside a guarded building within the continental United States, in an unmanned space vehicle, while traveling for business to a foreign country that is known for attempting to gain access to sensitive or classified information, or in a mobile vehicle that is in close proximity to hostile entities)
- The type of information that will be processed, stored, or transmitted by the system (e.g., personal identity and authentication information, financial management information, facilities, fleet, and equipment management information, defense and national security information, system development information)
- The functionality within the information system or the type of system (e.g., standalone system, industrial/process control system, or cross-domain system)
- Other characteristics related to the overlay that help protect organizational missions/business functions, information systems, information, or individuals from a specific set of threats that may not be addressed by the assumptions described in Section 2.3.

Applicability

Organizations provide criteria to assist potential users of the overlay in determining whether or not the overlay applies to a particular information system or environment of operation. Typical

APPENDIX C PAGE 70

formats may include a list of questions or a decision tree based on the description of the characteristics of the system (including associated applications) and its environment of operation at the level of specificity appropriate to the overlay.

Overlay Summary

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- Organizations provide a brief summary of the characteristics of the overlay. The summary may include the controls and control enhancements that are affected by the overlay; an indication of which controls and control enhancements are selected or not selected based on the specific
- which controls and control enhancements are selected or not selected based on the specific
- characteristics and assumptions in the overlay, the tailoring guidance provided in Section 2.4, or $\frac{1016}{1000}$
- 1016 any organization-specific guidance; the selected controls and control enhancements including
- parameter values; and references to applicable laws, Executive Orders, directives, instructions,
- regulations, policies, or standards.

Overlay Control Specifications

- 1020 Organizations provide a comprehensive expression of the controls and control enhancements in
- the overlay as part of the tailoring process. This may include the justification for selecting or not
- selecting a specific control or control enhancement; modifications to the control discussion
- section that address the characteristics of the overlay and the environments in which the
- overlay is intended to be used; unique parameter values for control selection or assignment
- statements; specific statutory and/or regulatory requirements (above and beyond FISMA) that
- are met by a control or control enhancement; recommendations for compensating controls, as
- appropriate; and guidance that extends the capability of the control or control enhancement by
- specifying additional functionality, altering the strength of mechanism, or adding or limiting
- implementation options.

Tailoring Considerations

- 1031 Organizations provide information to system owners and authorizing officials to consider during
- the tailoring process when determining the set of controls and control enhancements applicable
- 1033 to their specific information systems. This is especially important for overlays that are used in an
- environment of operation different from the one assumed by the control baselines in Chapter
- 1035 <u>Three</u>. In addition, organizations can provide guidance on the use of multiple overlays applied to
- a control baseline and address any potential conflicts that may arise between the controls in the
- 1037 baselines and overlay specifications.

1038 Terms and Definitions

- 1039 Organizations provide any terms and associated definitions that are unique and relevant to the
- overlay. If there are no unique terms or definitions for the overlay, that is stated in this section.

1041 Additional Information or Instructions

- Organizations provide any additional information or instructions relevant to the overlay not
- 1043 covered in the previous sections.