Cybersecurity Framework Overview

Executive Order 13636

“Improving Critical Infrastructure Cybersecurity”

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

Executive Order 13636—Improving Critical Infrastructure Cybersecurity

"It is the policy of the United States to enhance the security and resilience of the Nation's critical infrastructure and to maintain a cyber environment that encourages efficiency, innovation, and economic prosperity while promoting safety, security, business confidentiality, privacy, and civil liberties"

- NIST is directed to work with stakeholders to develop a voluntary framework for reducing cyber risks to critical infrastructure

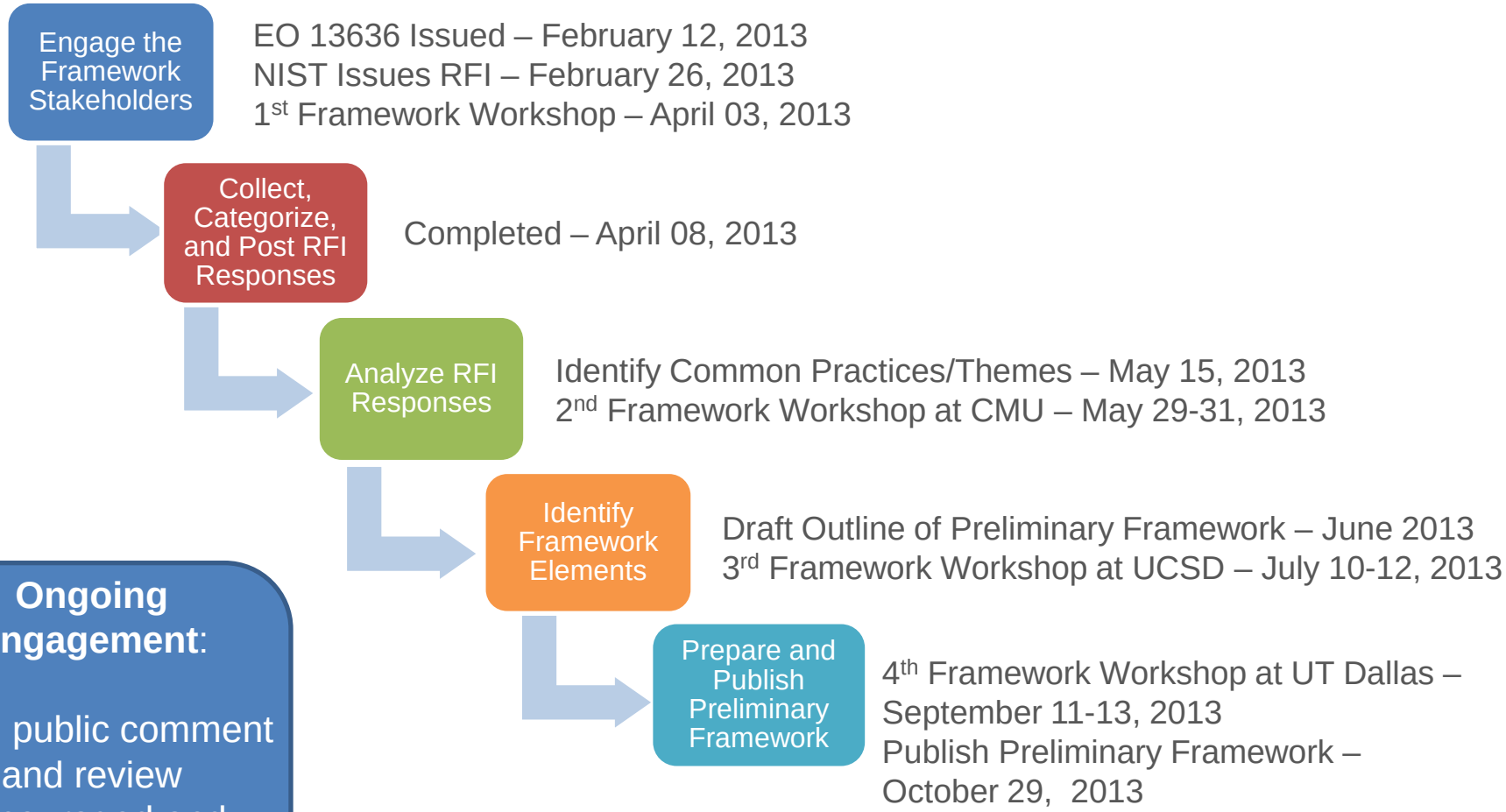
- This Cybersecurity Framework is being developed in an open manner with input from stakeholders in industry, academia, and government, including a public review and comment process, workshops, and other means of engagement.

The Cybersecurity Framework

For the Cybersecurity Framework to meet the requirements of the Executive Order, it must:

- include a set of standards, methodologies, procedures, and processes that align policy, business, and technological approaches to address cyber risks.
- provide a prioritized, flexible, repeatable, performance-based, and cost-effective approach, including information security measures and controls, to help owners and operators of critical infrastructure identify, assess, and manage cyber risk.
- identify areas for improvement that should be addressed through future collaboration with particular sectors and standards-developing organizations able technical innovation and account for organizational differences include guidance for measuring the performance of an entity in implementing the Cybersecurity Framework.

Development of the Preliminary Framework



Stakeholder Engagement Shaped the Framework Content

- The Framework language and communication is critical to success
- The Framework must reflect characteristics of people, processes, and technologies
- The Framework must be inclusive of and not disruptive to those good practices in use today
- The Framework must include the fundamentals
- Determination of risk tolerance for critical infrastructure must be informed by national interests
- Threat information must inform Framework implementation

Preliminary Cybersecurity Framework Posted in Federal Register – October 29, 2013

Includes a Note to Reviewers with questions for readers to consider and a comment template

Preliminary Cybersecurity Framework

- Framework Introduction
- Framework Basics
- How to Use the Framework
- Appendix A: Framework Core
- Appendix B: Methodology to Protect Privacy and Civil Liberties for a Cybersecurity Program
- Appendix C: Areas for Improvement for the Cybersecurity Framework
- Appendix D: Framework Development Methodology
- Appendix E: Glossary
- Appendix F: Acronyms

The Preliminary Cybersecurity Framework was posted in the Federal Register for a 45-day public comment period through December 13, 2013.

Questions for Reviewers to Consider

Does the Preliminary Framework:

- adequately define outcomes that strengthen cybersecurity and support business objectives?
  enable cost-effective implementation?
  appropriately integrate cybersecurity risk into business risk?
- provide the tools for senior executives and boards of directors to understand risks and mitigations at the appropriate level of detail?
  provide sufficient guidance and resources to aid businesses of all sizes while maintaining flexibility?
- provide the right level of specificity and guidance for mitigating the impact of cybersecurity measures on privacy and civil liberties?
  express existing practices in a manner that allows for effective use?

Will the Preliminary Framework, as presented:

- be inclusive of, and not disruptive to, effective cybersecurity practices in use today?
- enable organizations to incorporate threat information?

Is the Preliminary Framework:

- presented at the right level of specificity?
- sufficiently clear on how the privacy and civil liberties methodology is integrated with the Framework Core?

Risk Management and the Cybersecurity Framework

- While not a risk management process itself, the Framework enables the integration of cybersecurity risk management into the organization's overall risk management process.

- The Framework fosters:
  - Cybersecurity risk management approaches that take into account the interaction of multiple risks;
  - Cybersecurity risk management approaches that address both traditional information technology and operational technology (industrial control systems);
  - Cybersecurity risk management practices that encompass the entire organization, exposing dependencies that often exist within large, mature, and/or diverse entities, and with the interaction between the entities and their partners, vendors, suppliers, and others;
  - Cybersecurity risk management practices that are internalized by the organization to ensure that decision making is conducted by a risk-informed process of continuous improvement; and
  - Cybersecurity standards that can be used to support risk management activities

The Framework Core

Function and Unique Identifier	Category and Unique Identifier	Subcategory	Informative References
IDENTIFY (ID)	**Asset Management (AM):** Identify and manage the personnel, devices, systems, and facilities that enable the organization to achieve business purposes, including their relative importance to business objectives, in support of effective risk decisions.	**ID.AM-1:** Physical devices and systems within the organization are inventoried	• **ISA 99.02.01** 4.2.3.4 • **COBIT** BAI03.04, BAI09.01, BAI09, BAI09.05 • **ISO/IEC 27001** A.7.1.1, A.7.1.2 • **NIST SP 800-53 Rev. 4** CM-8 CSC1
		ID.AM-2: Software platforms and applications within the organization are inventoried	• **ISA 99.02.01** 4.2.3.4 • **COBIT** BAI03.04, BAI09.01, BAI09, BAI09.05 • **ISO/IEC 27001** A.7.1.1, A.7.1.2 • **NIST SP 800-53 Rev. 4** CM-8 • **CCS CSC** 2
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PROTECT (PR)	**Awareness and Training (AT):** Ensure that organizational personnel and partners are adequately trained to carry out their assigned information security-related duties and responsibilities through awareness and training activities.	**PR.AT-1:** General users are informed and trained	• **ISA 99.02.01** 4.3.2.4.2 • **COBIT** APO07.03, BAI05.07 • **ISO/IEC 27001** A.8.2.2 • **NIST SP 800-53 Rev. 4** AT-2 • **CCS CSC** 9ISA 99
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DETECT (DE)	**Detection Processes (DP):** Ensure timely and adequate awareness of anomalous events through tested and implemented detection processes and procedures.	**DE.DP-1:** Roles and responsibilities for detection are well defined to ensure accountability	• **ISA 99.02.01** 4.4.3.1 • **COBIT** DSS05.01 • **NIST SP 800-53 Rev 4** IR-2, IR-4, IR-8 • **CCS CSC** 5
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RESPOND (RS)	**Mitigation (MI):** Conduct activities to prevent expansion of an event, mitigate its effects, and eradicate the incident.	**RS.MI-1:** Incidents are contained	• **ISO/IEC 27001** A.3.6, A.13.2.3 • **ISA 99.02.01** 4.3.4.5.6 • **NIST SP 800-53 Rev. 4** IR-4
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RECOVER (RC)	**Recovery Planning (RP):** Execute Recovery Plan activities to achieve restoration of services or functions	**RC.RP-1:** Recovery plan is executed	• **COBIT** DSS02.05, DSS03.04 • **ISO/IEC 27001** A.14.1.3, A.14.1.4, A.14.1.5

Framework Core: Functions

The five Framework Core Functions provide the highest level of structure:

- **Identify** – Develop the institutional understanding of which organizational systems, assets, data, and capabilities need to be protected, determine priority in light of organizational mission, and establish processes to achieve risk management goals.
- **Protect** – Develop and implement the appropriate safeguards, prioritized through the organization's risk management process, to ensure delivery of critical infrastructure services.
- **Detect** – Develop and implement the appropriate activities to identify the occurrence of a cybersecurity event.
- **Respond** – Develop and implement the appropriate activities, prioritized through the organization's risk management process (including effective planning), to take action regarding a detected cybersecurity event.
- **Recover** - Develop and implement the appropriate activities, prioritized through the organization's risk management process, to restore the appropriate capabilities that were impaired through a cybersecurity event.

Framework Core: Categories

- Categories are the subdivisions of a Function into groups of cybersecurity activities, more closely tied to programmatic needs

Unique Identifier	Function	Unique Identifier	Category
ID	Identify	AM	Asset Management
		BE	Business Environment
		GV	Governance
		RA	Risk Assessment
		RM	Risk Management
PR	Protect	AC	Access Control
		AT	Awareness and Training
		DS	Data Security
		IP	Information Protection Processes and Procedures
		PT	Protective Technology
DE	Detect	AE	Anomalies and Events
		CM	Security Continuous Monitoring
		DP	Detection Processes
RS	Respond	CO	Communications
		AN	Analysis
		MI	Mitigation
		IM	Improvements
RC	Recover	RP	Recovery Planning
		IM	Improvements
		CO	Communications

Framework Core: Subcategories and Informative References

- **Subcategories** further subdivide a Category into high-level tactical activities to support technical implementation.
- **Informative References** are specific sections of standards and practices common among critical infrastructure sectors and illustrate a method to accomplish the activities within each Subcategory.
- The Informative References presented in the Framework Core are not exhaustive, and organizations are free to implement other standards, guidelines, and practices.

Framework Implementation Tiers

- Feedback indicated the need for the Framework to allow for flexibility in implementation

- Responding to feedback, Framework Implementation Tiers were proposed to reflect how an organization manages its cybersecurity risk.

- The Tiers range from Partial (Tier 1) to Adaptive (Tier 4) and describe an increasing degree of rigor and sophistication in cybersecurity risk management practices and the extent to which cybersecurity risk management is integrated into an organization's overall risk management practices.

- Each Tier includes a descriptions of the Risk Management Process, Integrated Program, and External Participation.

Framework Profile

- Enables organizations to establish a roadmap to reducing cybersecurity risk
- Can be used to describe current state and desired target state of specific cybersecurity activities
- Created by determining which Categories are relevant to a particular organization, sector, or other entity
- An organization's risk management processes, legal / regulatory requirements, business / mission objectives, and organizational constraints guide the selection of activities during Profile development

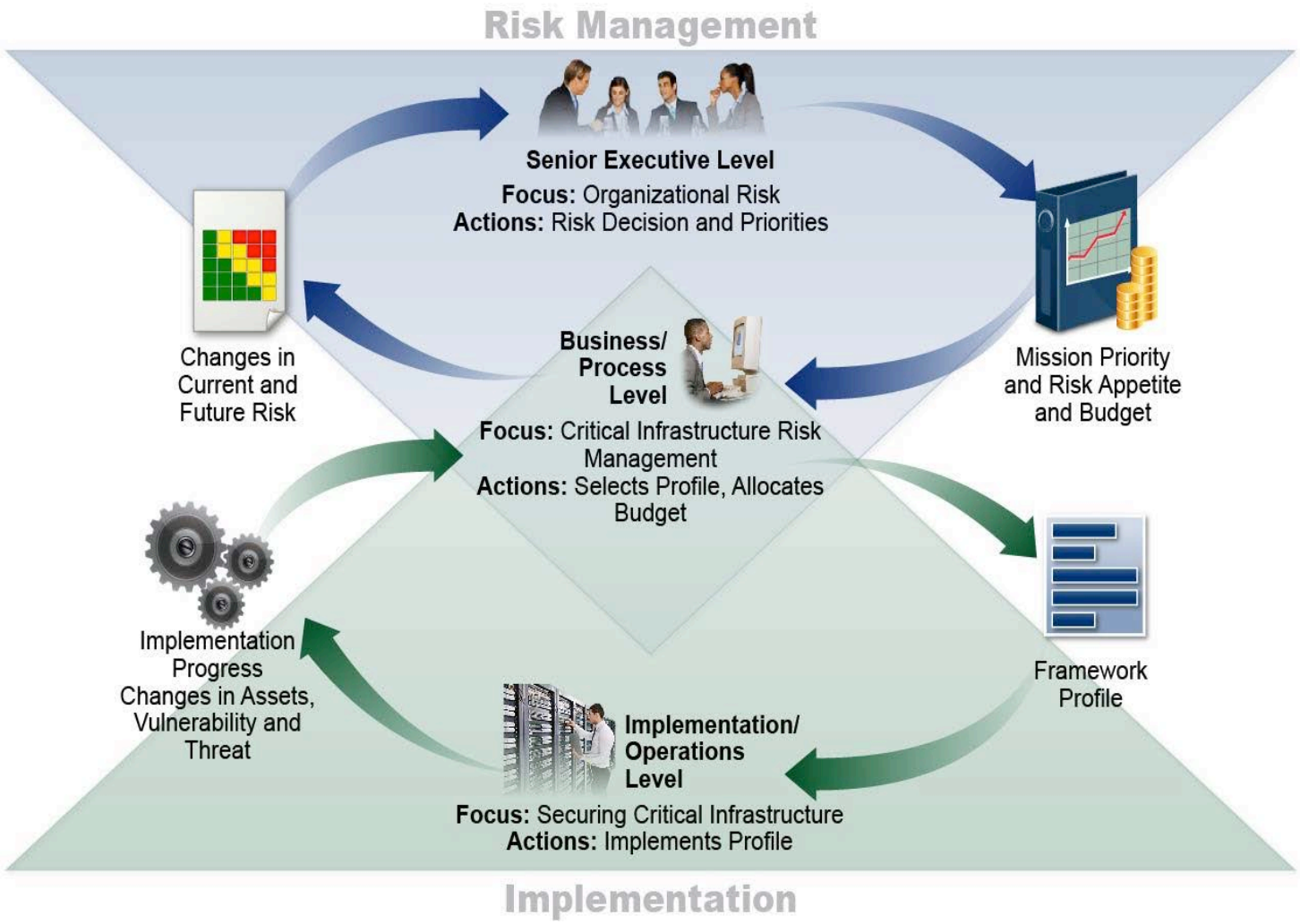
Framework Profile Implementation

- The method by which the Functions, Categories, and Subcategories described in the Core are aligned with business requirements, risk tolerance, and resources for the organization.

- The Framework provides a mechanism for organizations, sectors, and other entities to create their own Target Profiles.

- It does not provide Target Profile templates, nor identify Tier requirements that an organization should meet.

Notional Information and Decision Flows within an Organization



How to Use the Framework

The Framework can be leveraged by organizations looking to:

- **Establish or Improve a Cybersecurity Program**
  - Step 1: Make Organization Wide Decisions
  - Step 2: Establish a Target Profile
  - Step 3: Establish a Current Profile
  - Step 4: Compare Target and Current Profiles
  - Step 5: Implement Target Profile
- **Communicate Cybersecurity Requirements with Stakeholders**
- **Identify Gaps**

Methodology to Protect Privacy and Civil Liberties

- The EO directs NIST to include a methodology to identify and mitigate impacts of the Framework and associated security measures to protect individual privacy and civil liberties.

- Appendix B presents a Privacy methodology that is coordinated with the Framework Core. This methodology provides organizations with flexibility in determining how to manage privacy risk.
  - Organized by Function and Category to correspond with the Framework Core.
  - Every Category may not be represented as not all Categories give rise to privacy and civil liberties risks.
  - Includes Informative References

- This methodology is based on the Fair Information Practice Principles (FIPPs) referenced in the EO, and is designed to complement existing processes organizations may have in place.

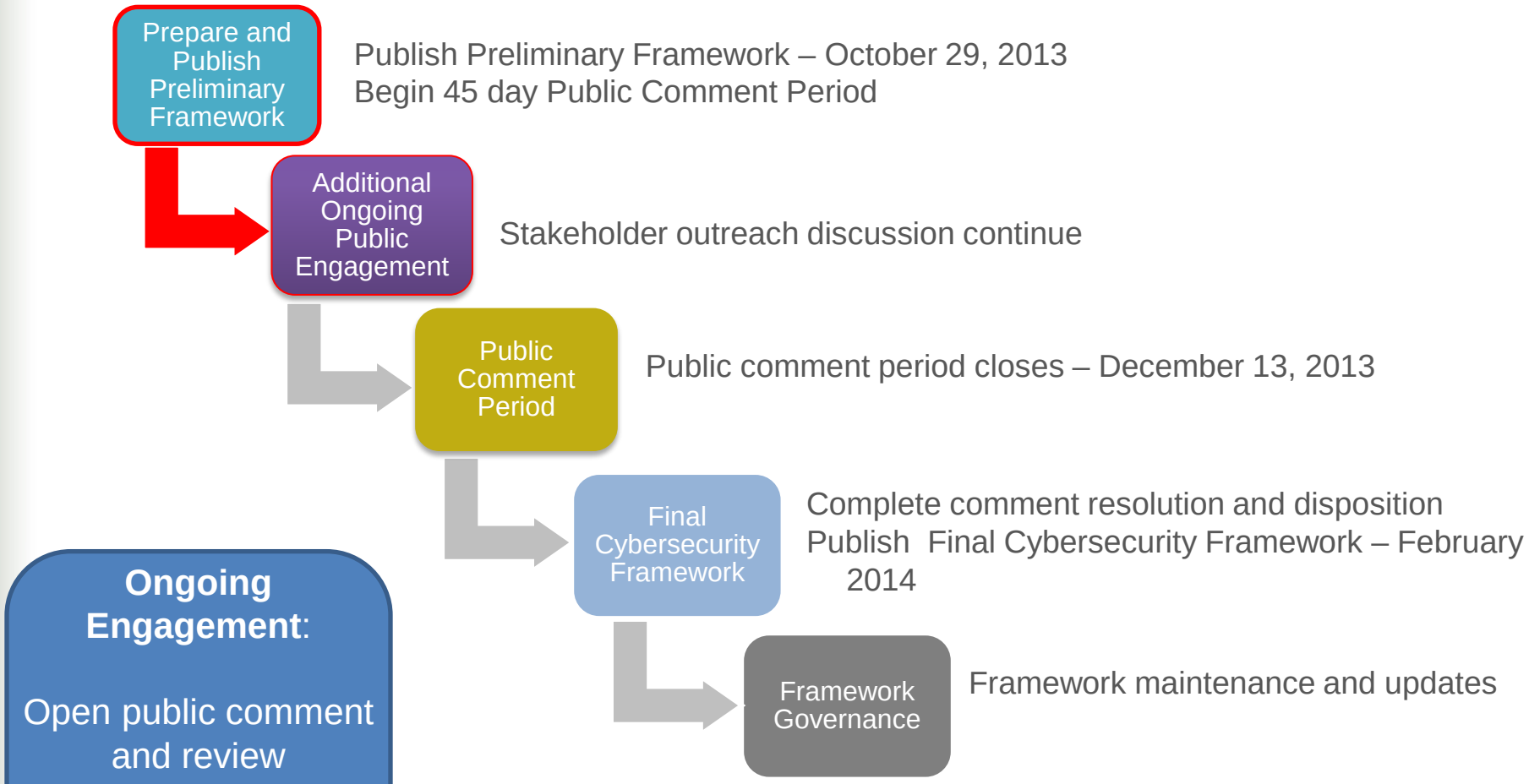
Areas for Improvement for the Cybersecurity Framework

Executive Order 13636 states that the Cybersecurity Framework will “identify areas for improvement that should be addressed through future collaboration with particular sectors and standards-developing organizations”.

Based on stakeholder input, several high-priority Areas for Improvement have been identified. Collaboration and cooperation must increase for these areas to further understanding and/or the development of new or revised standards.

- Authentication
- Automated Indicator Sharing
- Conformity Assessment
- Data Analytics
- International Aspects, Impacts, and Alignment
- Privacy
- Supply Chains and Interdependencies

Getting from the Preliminary Framework to the Final Framework and Beyond



Q & A

The Preliminary Cybersecurity Framework and supporting material is available at http://www.nist.gov/itl/cyberframework.cfm

Comments on the Preliminary Cybersecurity Framework are due no later than 5pm EST on December 13, 2013.

Electronic comments concerning the preliminary Framework should be submitted to: csfcomments@nist.gov, with the Subject line: Preliminary Cybersecurity Framework Comments