The NIEM Program: An OVERVIEW

1.0 Introduction

The National Information Exchange Model (NIEM) program is a community-driven, government-wide, standards-based framework to exchanging information. NIEM is designed to develop, disseminate, and support enterprise-wide information exchange standards and processes that enable bi-directional messaging between disparate applications and systems through automated information sharing via message exchanges. NIEM standards facilitate the creation of automated enterprise-wide information exchanges which can be uniformly developed, centrally maintained, quickly identified and discovered, and efficiently reused ensuring that the meaning of that information remains consistent and within context. The result is more efficient and expansive information sharing between systems; more cost-effective development and deployment of information systems; improved operations; better-quality decision making as a result of more timely, accurate, and complete information.

NIEM is predicated on identifying operational information exchanges between participating communities of interest (COIs) and the domains they represent. This is accomplished by examining current practice (i.e., by documenting business requirements for information exchange between agencies and the various domains they represent) and by modeling new and innovative information exchange opportunities to achieve greater efficiency, effectiveness, return on investment (ROI), and new operational capabilities.

NIEM standards enables bi-directional messaging to exchange data irrespective of the technology being used. Creating and adopting NIEM standards means that federal, state, local, and tribal agencies and organizations avoid the high cost, complexity and maintenance issues associated with the development and use of inefficient point-to-point interfaces by establishing standardized message exchanges. NIEM's flexible message exchange specifications provide a solution for any legacy system, application, or database to extend interoperability without entirely rebuilding or rewriting their systems to share information.

1.1 This Document

This document describes the NIEM program, its' governance approach, structure and processes, version management, and other key features. The NIEM program supports a large and varied community of users and a full description of this community is provided in the companion document titled ***The NIEM Program: An Overview of the NIEM Community.***

2.0 NIEM Program Purpose Statement

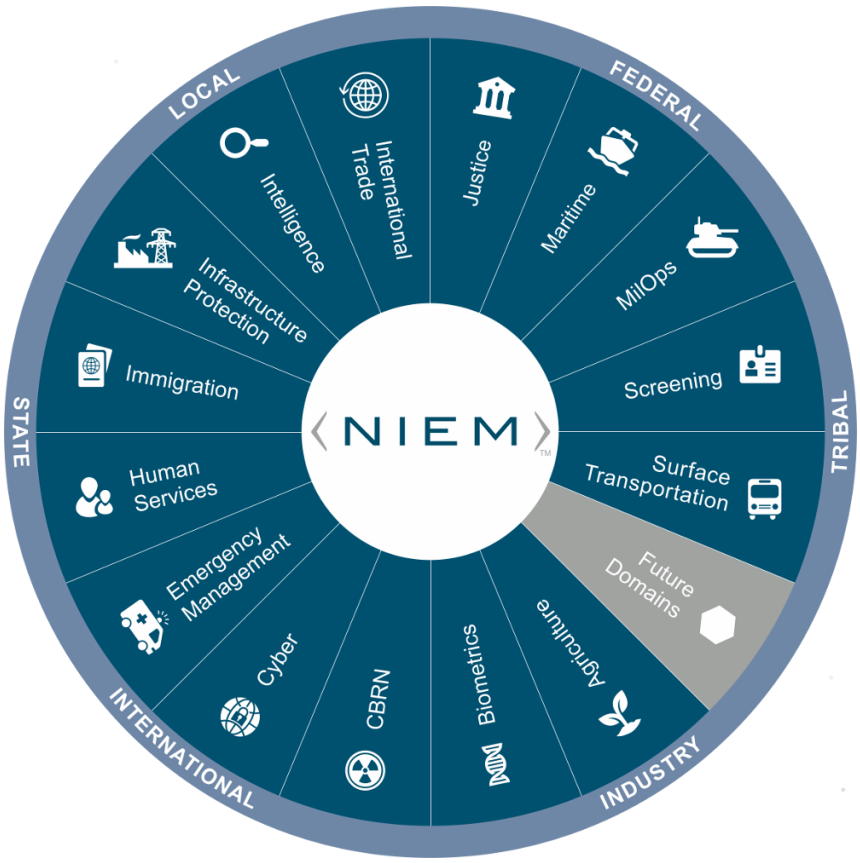
Provide a standardized, scalable, repeatable data-based means by which government (federal, state, local, tribal), international / multinational, and non-government entities are able to share information.

3.0 NIEM Program Key Tenets

3.1 Data Standardization and Flexibility. The scope and complexity of broad-based information sharing overwhelms any single approach for creating effective information exchanges. To overcome this

problem, NIEM maintains two sets of vocabularies in the NIEM Core and the individual domains. The NIEM Core maintains Universal components which are mandated for use by all users, and Common components which are mandated for use within a domain or Community-of-Interest (CoI), but not universally shared. The existence of both vocabularies enhances standardization while optimizing tailored exchanges within specific functional / professional realms, and is depicted at Figure 1.

3.2 Use of Federated Governance. The NIEM program divides its governance structure into two arenas: First, the NIEM central governance functions performed by the Executive Steering Council, the NIEM Management Office, the NIEM Business Architecture Committee, and the NIEM Technical Architecture Committee. These four entities ensure a foundation of consistent standardization and coherence in the NIEM program. Second, the information exchanges established and managed by Domains and Communities-of-Interest which produce tailored information sharing capabilities to meet operational and organizational needs. This governance approach ensures a workable division of labor and promotes long term consistency in the program, and is depicted at figure 2.


LOCAL
FEDERAL
TRIBAL
INDUSTRY
INTERNATIONAL
STATE
NIEM
International Trade
Justice
Maritime
MilOps
Screening
Surface Transportation
Future Domains
Agriculture
Biometrics
CBRN
Cyber
Emergency Management
Human Services
Immigration
Infrastructure Protection
Intelligence

Suggest this image for Figure 1

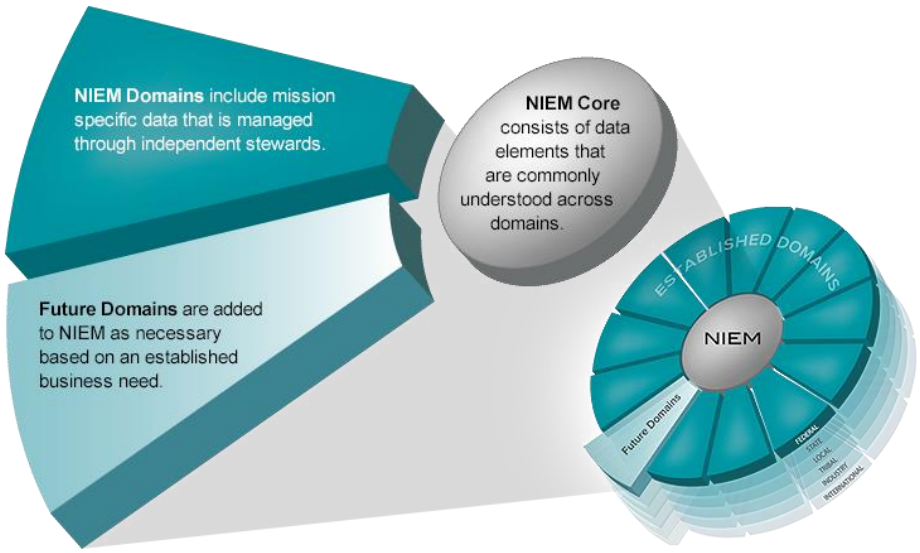
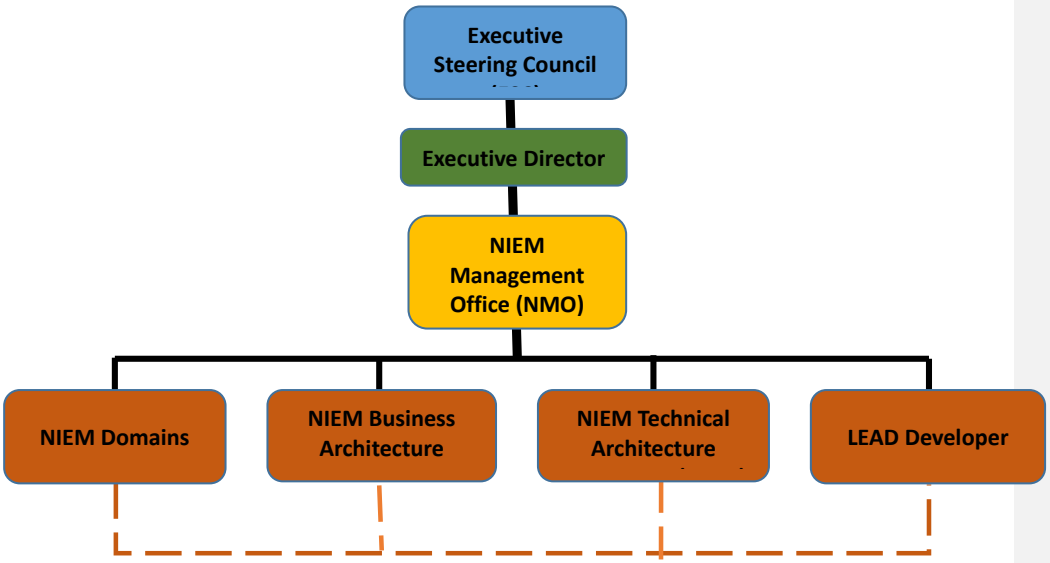
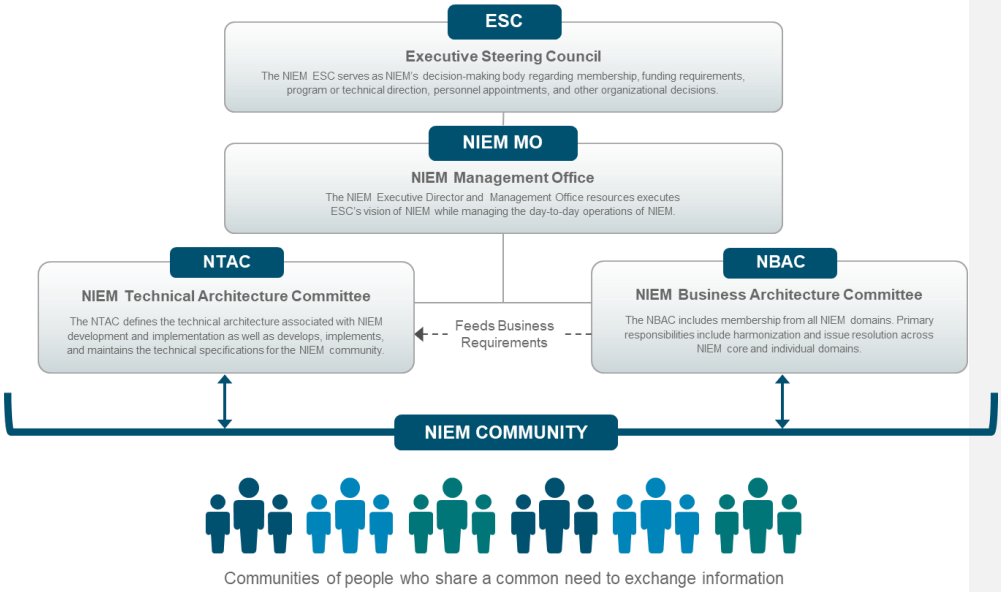


Figure 1





I suggest using this org chart. Or get Linda to build something that combines the two with the right colors.

Figure 2

4.0 **Key Terms / Entities**

Community-of-Interest: A functional / professional grouping of people who share a common concern, set of problems, or interest in a topic. Within the context of NIEM, COIs come together based on a common need to exchange information in order to advance their missions. COIs need to have a shared vocabulary for the information they exchange.

Content: The data, metadata, structures and relationships that comprise the NIEM data model.

Domain: A functional / professional community-of-interest formally established with executive stewards to represent the stakeholders, governance, and data model content oriented around their respective mission needs. Each domain is led by a domain steward that is responsible for the domain's model content, governance, and maintenance. Domain stewards work collaboratively with volunteer subject matter experts that collectively represent any involved Communities of Interest (COIs). Each domain represents both the governance and model content oriented around a community's business needs that collaborate across all levels of government, industry, and the international community.

Metadata: Structured data about data. It is information that is not descriptive of objects and their relationships but is descriptive of data itself

NIEM (National Information Exchange Model): ~~A reference model (use the word standard?) for information exchange containing elements such as terms, definitions, relationships and formats that permit the standardization of data exchanges between otherwise dissimilar information systems.~~

The National Information Exchange Model (NIEM) is a standards-based approach to defining information exchange specifications for structured, machine-to-machine data exchange. NIEM is comprised of:

- A data model, divided into a core and several independent subject-area domain models
- Technical specifications, defining NIEM-conforming exchange specifications and data
- Governance processes, through which federal, state, local, tribal, commercial, and international participants cooperate to create the data model and technical specifications

Executive Steering Council (ESC): NIEM's decision-making body regarding membership, funding requirements, program / technical direction, personnel appointments and other organizational decisions as required to support the development and use of NIEM –based information sharing arrangements.

NIEM Management Office (NMO): Executes the ESC's vision of NIEM while managing day-to-day NIEM operations encouraging adoption and use of NIEM, and overseeing all working group and committee activities. The NIEM NMO coordinates with Communities of Interest (COIs), principal stakeholders, and other information-sharing initiatives to promote collaboration and interest in NIEM priorities.

NIEM Business Architecture Committee (NBAC): Responsible for setting NIEM business architecture and requirements, manage NIEM Core, and facilitate the processes for regulation and support to NIEM Domains.

NIEM Technical Architecture Committee (NTAC): Responsible for defining and supporting the technical architecture that governs NIEM content. Specific tasks include the documentation and maintenance of NIEM technical specifications; providing for the development of NIEM core structure and complimentary processes to support and enable users to efficiently develop, use and reuse data definitions and exchange specifications, and delivers and maintains a tool strategy that meets cross-organizational user requirements.

5.0 **NIEM Program Governance**

NIEM is governed and managed through a collaborative group of entities that support NIEM development, use, day-to-day operations and future direction. Specific governance groups and functions are:

5.1 NIEM Executive Steering Council (ESC)

The ESC serves as NIEM's decision-making body regarding membership, funding requirements, program or technical direction, personnel appointments, and other organizational decisions as required

for supporting NIEM management. The primary sponsors of NIEM are Chief Information Officers (CIOs) of the U.S. Department of Defense (DOD), U.S. Department of Homeland Security (DHS), U.S. Department of Justice (DOJ), and U.S. Health and Human Services (HHS), and as such, are members of the ESC. Advisory members and invited guests of the ESC include but are not limited to the following additional members:

- The Global Justice Information Sharing Initiative (Global)
- The National Association of State Chief Information Officers (NASCIO)
- The Executive Office of the President Office of Management and Budget (OMB) Federal Enterprise Architecture (FEA) through the Chief Architect
- The Office of the Director of National Intelligence (ODNI) through the Program Manager of the Information Sharing Environment (PM-ISE).
- The Chief Information Officer of CrimTrac, Government of Australia.

5.2 NIEM Management Office (NMO)

The NMO executes the ESC's vision for NIEM while managing day-to-day operations, encouraging adoption and use of NIEM, and overseeing all working group and committee activities. The NIEM NMO coordinates with Communities of Interest (COIs), stakeholders, and other information-sharing initiatives to promote collaboration and interest in NIEM priorities.

5.3 NIEM Business Architecture Committee (NBAC)

As specified in its Charter, the mission of the NBAC is to set the business architecture and requirements of NIEM, manage NIEM Core, and facilitate the processes for the regulation and support of NIEM domains. The NBAC focuses on the following areas:

- Business Architecture: The NBAC oversees and validates the construction, maintenance, and use of the business architecture framework for NIEM.
- NIEM Core: The NBAC provides management and oversight of the NIEM Core—the central part of the NIEM data model that's commonly understood across all domains.
- Community: The NBAC serves as the forum for the admission of new domains and interactions between domains, and coordinates action to maintain the NIEM community.

The committee's responsibilities are to:

- Maintain the integrity, usability, and maturity of NIEM core, and engage in any requisite harmonization and issue resolution activities.
- Determine the need for new data model releases as necessary, such as to accommodate new domains and content, or to provide business requirements to the NTAC.
- Submit recommendations to the ESC concerning the admission of a new domain into the NIEM data model.
- Participants: The NBAC is made up of stakeholders across diverse communities. NIEM's domains are the foundations for the committee. The NBAC is led by co-chairs and includes voting members, a NMO liaison, observers and invited participants.

5.4 NIEM Technical Architecture Committee (NTAC)

As outlined in its Charter, the primary mission of the NTAC is to define and support the technical architecture that governs NIEM. In addition, the NTAC:

- Documents and maintains NIEM's technical specifications.
- Provides robust, effective development of the NIEM core structure and complementary processes to support and enable users to efficiently develop, use, and reuse data definitions and information exchange specifications.
- Delivers and maintains a tool strategy that meets stakeholder requirements in support of information exchange across organizations.

The committee's responsibilities are:

- Establish and support the NIEM technical architecture.
- Establish mechanisms and processes for publishing NIEM content artifacts.
- Ensure all content in the NIEM data model appropriately conforms to NIEM specifications.
- Maintain communication and interaction with other NIEM program entities, such as the help desk, NBAC, and NMO.
- Analyze and assess emerging technologies and how they relate to NIEM; develop roadmap for future capabilities.
- Establish goals, milestones, and desired outcomes, and measure performance.
- Participants: NTAC members represent operational practitioners and subject matter experts, key stakeholder agencies, domains, and systems developers across all levels and branches of government, as well as solution providers. Membership types include co-chairs, voting members, NMO liaison, lead developers, and observers/invited participants.

5.5 Domains

NIEM domains are formally chartered governance bodies that undertake the management and use of NIEM-based information exchanges within a functional / professional community-of-interest (e.g., Agriculture; Military Operations; Cyber). Domains are composed of voluntary participants who require improved information sharing with other entities to achieve mission / organizational objectives. A detailed description of NIEM domains, their structure and working processes is provided in the ***NIEM Community: An Overview*** document.

5.6 Lead Developer

The NIEM organization relies upon a contracted lead developer to perform, inter alia, technical development and management of NIEM version releases, integration of drafting and use tools, instantiation of Information Exchange Package Documentation (IEPD) models, and many other actions necessary to maintain the model and serve users.

6.0 **NIEM Program Version Management**

The NIEM program updates its data model and relating ~~XML~~ schemas on a regular basis with updates occurring in the form or 'major' or 'minor' releases, which are designed to incorporate change on a predictable and sustainable schedule. Major releases occur when the NIEM core and domains are updated and then synchronized, and any technical architecture changes to the model are exclusively made during a major release. Major releases are identified with version IDs such as 2.0, 3.0, or 4.0.

Commented [EKBCJJ(1]: to ensure these documents stay relevant we need to remove the specific references to XML. With the implemenation of the Meta Model NIEM will be Data Interchange Format agnostic, meaning that it can be leveraged by any format (e.g. XML, JSON, YAML, UML, etc.)

Minor releases incorporate and synchronize changes to domain content, and may contain core supplements. Minor releases are identified with version IDs such as 2.1, 2.2, 3.1, or 3.2.

6.1 Model Release Cycle timing and mechanisms

A major release usually occurs every three years, and minor release can occur as often as every 12 months, but a major and minor release will not occur in the same calendar year. The NBAC, the NTAC, and interested stakeholders work together to update the model and issue releases.

Core supplements are a special type of NIEM release that allow the program flexibility to apply strictly additive changes to a previously published NIEM core. A core supplement (CS) is issued when the NBAC determines that it is necessary to add content to a published NIEM core. Core Supplements can be issued within a major or minor release, or separately. Examples of when core supplements are issued include:

- Updating a code list with new values added by an authoritative source;
- Correcting a significant flaw in a component;
- Adding a new element to a substitution group;
- Applying other adjustments by adding content;
- Updating domain models.

Updates to NIEM domains occur as determined by each domain. Data requirements not already found in the model and yet specific to a particular domain / community-of-interest can be incorporated into the domain. Such approved updates are then incorporated into the next NIEM release (major or minor) for reconciliation and official publication.

6.2 Model harmonization

Harmonization is an ongoing activity and process that aims to prevent any duplication within the model as updates are incorporated and the model accommodates new information exchange requirements. In the model, harmonization occurs in two places:

One, harmonization is conducted within and between the domains. Each domain develops its own methodology for updating its data model, depending on the domain's business needs and resources available.

Two, harmonization is conducted between the NIEM core and domains, subject to the following formal process:

- A conflict issue is identified and an initial assessment is conducted by the NIEM lead developers;
- The issue is reviewed by the NBAC and is assigned to a team consisting of NBAC members with knowledge, expertise, and/or vested interest in resolving the issue. This team develops a recommendation for resolving the issue;
- The NBAC reviews the recommended solution and accepts, rejects, or defers the solution. If deferred, the issue will return to the team for further work.
- Upon acceptance, the solution is included in the next release.

6.3 Model content

Words are to a dictionary as elements are to a reference model.

When using NIEM, you only need to use two languages: your own system's vocabulary and NIEM. The NIEM model provides a reference vocabulary for enabling consistent reusable exchanges. This feature overcomes the common problem of agreeing to a common set of data elements and definitions. For example, a relatively small data exchange between four partner organizations would require connection to three different systems and a common language. With NIEM, the solution set is reduced to just your own language and NIEM.

The NIEM model consists of two related vocabularies: Core elements that are commonly agreed by all of the NIEM users, and community-specific elements that align to individual NIEM domains.

The NIEM core consists of data elements that are commonly understood and defined across domains, such as person, activity, document, location, and item. It's governed jointly by all NIEM domains.

NIEM domains contain mission-specific data components that build upon NIEM core concepts and add additional content specific to the community supporting that mission. A NIEM domain represents both the governance and model content oriented around a community's business needs, and manages their portion of the NIEM data model. Complete details about domains is provided in the ***NIEM Community: An Overview***.

7.0 NIEM Training

Insertion of content addressing NIEM training

The most efficient way to get involved with NIEM and start building effective information exchanges is to enhance the capability of your team and yourself. Significant informational resources are available online via the NIEM website; however, the best way to increase your team's NIEM knowledge is to participate in formal training offered by the NIEM Management Office (NMO).

NIEM training targets four distinct audience tracks that build NIEM knowledge across various participant levels. Instructors and training material are fitted for the particular audience so each participant receives exactly the type of training they need.

There is additional training available at https://niem.github.io/training/

Track	Target Audience	Goal
NIEM for Executive Managers	• Executives • Program Managers	To educate executives, program managers and system business owners on the emergence and importance of NIEM as an information sharing standard in order to increase discovery, reusability and adoption of this standard.
NIEM for Project Managers	• Program Managers • Project Managers	To educate project and program managers on the best practices for successful implementation of NIEM to make certain that their projects are conformant to NIEM standards, while promoting the adoption of NIEM throughout their organization.
NIEM for Architects	• Business Architects • Technical Architects	To educate architects on the technical foundation of NIEM in order to design and develop NIEM-conformant information exchanges within their organization.
NIEM for Implementers	• Designers • Implementers	To educate information exchange designers and implementers on the technical concepts specific to NIEM and the steps necessary for the creation, discovery and reuse of NIEM-conformant information exchanges.

8.0 Best of NIEM

Insertion of content describing the Best of NIEM awards.

The Best of NIEM awards celebrate amazing NIEM implementation projects. The winners demonstrate how collaboration and innovative technology can deliver measurable results that improve performance, increase efficiency, and advance interoperability.

Eligibility

This award is given to NIEM practitioners in the public and private sector who are implementing innovative solutions. Nominated programs or individuals must show work in information exchange projects using NIEM that directly support state, local, tribal, or federal, private sector and international federal government initiatives. . Senior executives and political appointees are ineligible. Nominations must demonstrate accomplishments based on the impacts for improving government services within the preceding 12 months.

Criteria

These awards will be given to individuals or teams for their dedication and commitment to advancing and substantially improving the way NIEM is used for business. Recognition will be given for recent advancements that have impacted the way organizations conduct business on a cross-boundary* basis, and for achievements in efficiency through reuse of information exchanges.

Accomplishments should:

- Demonstrate involvement of people and ideas from two or more organizations collaborating to solve a common information exchange problem.
- Demonstrate measurable improvement in performance, linked to mission objectives, by the successful implementation of NIEM.
- Demonstrate reuse of a NIEM exchange through cross-boundary information exchange initiatives.
- Demonstrate use of NIEM that supports a transparent and accountable government.
- Conform to NIEM as detailed in the NIEM Naming and Design Rules and Model Package Description Specification.

Evaluation Process

Nominations can be submitted to the NIEM Management Office (NMO) electronically during the nomination period. All submissions must include a nomination form, narrative description of the achievement or innovation, and a group or individual nominee's biography. The PMO evaluates submissions and makes award nominations to the ESC

NIEM is a Voluntary Consensus Standard

The National Information Exchange Model (NIEM) is a voluntary consensus standard developed through public-private partnerships with extensive Federal, State, local, tribal, and private sector involvement, facilitated by the NIEM Management Office (NMO). The NIEM Framework is the standards development process that has been applied to key nationwide initiatives such as Suspicious Activity Reporting (SAR) and the Terrorist Watchlist Person Data Exchange Standard (TWPDES). In general, the NIEM process is designed to develop, disseminate and support enterprise-wide information exchange standards and processes that can enable jurisdictions to effectively share critical information in emergency situations, as well as support the day-to-day operational information sharing requirements of agencies throughout the nation.

NIEM is defined by a set of rules managed under the NIEM process. These rules are codified in several official NIEM specification documents, including the NIEM Conformance Specification, the NIEM Naming and Design Rules (NDR), and the NIEM Model Package Description (MPD) Specification. The success and impact of NIEM will be enhanced by international consensus standards that define and support NIEM. These will facilitate its use in commercial and international settings. In addition, publicly developed and consumed specifications support NIEM's further open architecture and open source development goals.

ANNEX A

NIEM Program Documents

1. NIEM Program Overview. This document provides a high-level description of the NIEM program as an information exchange model.
2. NIEM Branding Policy.
3. NIEM Business Need template.
4. NIEM Tools Guidance.
5. NIEM Registry & Repository Guidance.
6. NIEM Business Architecture Committee (NBAC) Charter.
7. NIEM Business Architecture Committee (NBAC) Standard Operating Procedures (SOP's 1-11).
8. NIEM Technical Architecture Committee (NTAC) Charter
9. NIEM Technical Architecture Committee (NTAC) Standard Operation Procedures.

NIEM Program Management Documents (Internal)

1. Domain Readiness Assessment.
2. Domain Stewardship maturity
3. Domain Lifecycle Model.
4. Domain Maturity Proposal.
5. Domain Maturity Model.
6. Domain Maturity Scaled Metrics.

NOTES:

- NIEM User Guide document will be updated and consolidated with other documents as appropriate.
- NIEM Cost Model document will be updated and consolidated with other documents as appropriate. Will distinguish between Domain establishment and management costs, and additional costs to the NIEM Model when supporting additional Domains.

NIEM Community (Domains / Committees).

1. NIEM Domain Overview
2. Domain Stewardship Agreement template.
3. Domain Charter template.
4. Domain Value Proposition template.
5. Domain Guidebook.

6. Guidance for designing Domain Governance.
7. Establishing Domain Governance.

NIEM Community (Participation Options / Processes).

1. New User Guidance (Data Collection Tool).
2. New User Guidance (Interview Framework).
3. New User Guidance (Readiness Assessment).
4. New User Guidance (Cost Model User Guide).
5. New User Guidance (Roadmap to Adoption).

NIEM Specifications

https://reference.niem.gov/niem/specification/

1. NIEM Naming and Design Rules (NDR)
2. NIEM Model Package Description (MPD)
3. NIEM Code Lists
4. NIEM Conformance Targets Attribute
5. NIEM Conformance
6. NIEM High-Level Version Architecture (HLVA)
7. Web Services API (interface to search, retrieve component information, and build an XML subset from a wantlist)
8. Future specifications
    a. NIEM IEPD (replaces MPD spec above)
    b. NIEM JSON
    c. NIEM XML
    d. NIEM Model
9. Archived specifications
    a. Domain Update
    b. High-Level Tool Architecture
    c. Schematron in XSD
    d. UML Profile

NIEM Technical / Reference Documentation

1. NIEM JSON introduction (from https://niem.github.io/json/)
2. Non-Normative Guidance in Using NIEM with JSON (from https://niem.github.io/json/reference/guidance/)
3. NIEM Artifacts (from https://niem.github.io/reference/artifacts/)
4. NIEM Model Concepts (from https://niem.github.io/reference/concepts/)

5. NIEM Specifications Introduction (from https://niem.github.io/reference/specifications/)
6. NIEM Tools introduction (from https://niem.github.io/reference/tools/)
7. Domain Modeling Guide (from https://niem.github.io/reference/domain-modeling-guide/)
8. Release activities (from https://github.com/NIEM/NIEM-Releases/wiki/Release-Activities)
9. NIEM Technical training tracks on https://niem.github.io/training/
    a. Domain Modeler *(on-line only)*
    b. IEPD Developer *(on-line only)*
    c. IEPD Implementer *(on-line only)*