Establishing Domain Governance:
Making Self-Service a Reality

NIEM Business Architecture Committee (NBAC)

February 2009
Version 1.0

Approvals

NBAC

Approved by:

Name	Date
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NIEM PMO

Approved by:

Name	Date
Title	

Change History

No.	Date	Reference: All, Page, Table, Figure, Paragraph	A = Add. M = Mod. D = Del.	Revised By	Change Description
0.1	04/25/2008	All	A	Jim Pingel	Initial version
0.2	7/14/08	All	A	Jim Pingel	Feedback from Co-Chairs, GTRI
0.3	8/6/08	All	AMD	Jim Pingel	Incorporates all redline comments/review from PMO, NBAC Co-chairs, GTRI
0.4	8/26/08-9/24/08	All	AMD	Jim Pingel	Restructured sections, based on above feedback. Released to PMO & NBAC for initial review
0.8	10/22/08 to 12/15/08	All	AMD	NBAC members, J Pingel	Feedback from October, 2008 NBAC meeting
0.9	1/15/09	All	AMD	Jim Pingel, Mark Kindl	Final draft for NBAC review
1.0	2/9/09	All	M	Jim Pingel	Feedback from NBAC review on 15Jan09.

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1. Introduction

The National Information Exchange Model (NIEM) is organized into *domains*, defined as "an organization or body that works with NIEM governance to manage data component definitions for some community of interest (COI) or agency."[1] NIEM's Core is a shared domain comprised of the set of data elements that are common or universal to multiple functional areas. A shared Core is a key innovation of NIEM, which greatly improves the "economy of implementing information exchanges,[2]" especially where those exchanges span multiple functional domains.

One of the key tenets on which the National Information Exchange Model is based is *self-service*, which delegates, as much as possible, the governance and maintenance of each domain to the specific COI that corresponds to that domain[3]. A COI is essentially the collection of stakeholders who rely on and provide the expertise about a particular domain.

The flexibility afforded by domain independence must be balanced with the need to ensure consistency across domains, and maintain interoperability of the entire model. It is one of the NIEM Business Architecture Committee's (NBAC) primary responsibilities to ensure that the appropriate balance is struck between self-service and interoperability. This will be accomplished through the federated governance model described in this paper.

1.1. Background

NIEM is an ever-evolving model. As implementers use NIEM to craft information exchange solutions they are continually exposing requirements for new data components, as well as needs to improve the definitions, structures, or other aspects of existing components. In order to accurately reflect real-world information-sharing needs, this continuous improvement must be driven by the policymakers, officers, developers and implementers that are using NIEM on a daily basis. This paper prescribes a federated model for domain governance that draws on and is driven by the large and expanding community of NIEM implementers. The requirements in this paper are limited to those necessary to ensure that NIEM domains retain the level of consistency needed to ensure interoperability across domains.

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1 NIEM Technical Architecture Committee. *NIEM High-Level Version Architecture*, Version 1.0. July 31, 2008. Available online at http://www.niem.gov/pdf/NIEM_HLVA.pdf.. p. 1. *Hereafter referenced as "High-Level Version Architecture."*

2 Ibid., p. 1.

3 NIEM Program Management Office. *NIEM Concept of Operations*, January 9, 2007. *P. 28 (Hereafter referenced as "ConOps.")*

1.2.   Document Roadmap

Section 5.1 of the NIEM *ConOps* defines "domain management" as one of the "core processes [that] are the foundation for managing the development of NIEM product releases and deploying quality products."[4] This document is essentially one in a series of NIEM documentation that provides the framework for consistent, efficient management of the NIEM data model's lifecycle.   Figure 1 illustrates the relationship of this paper to other NIEM documents.
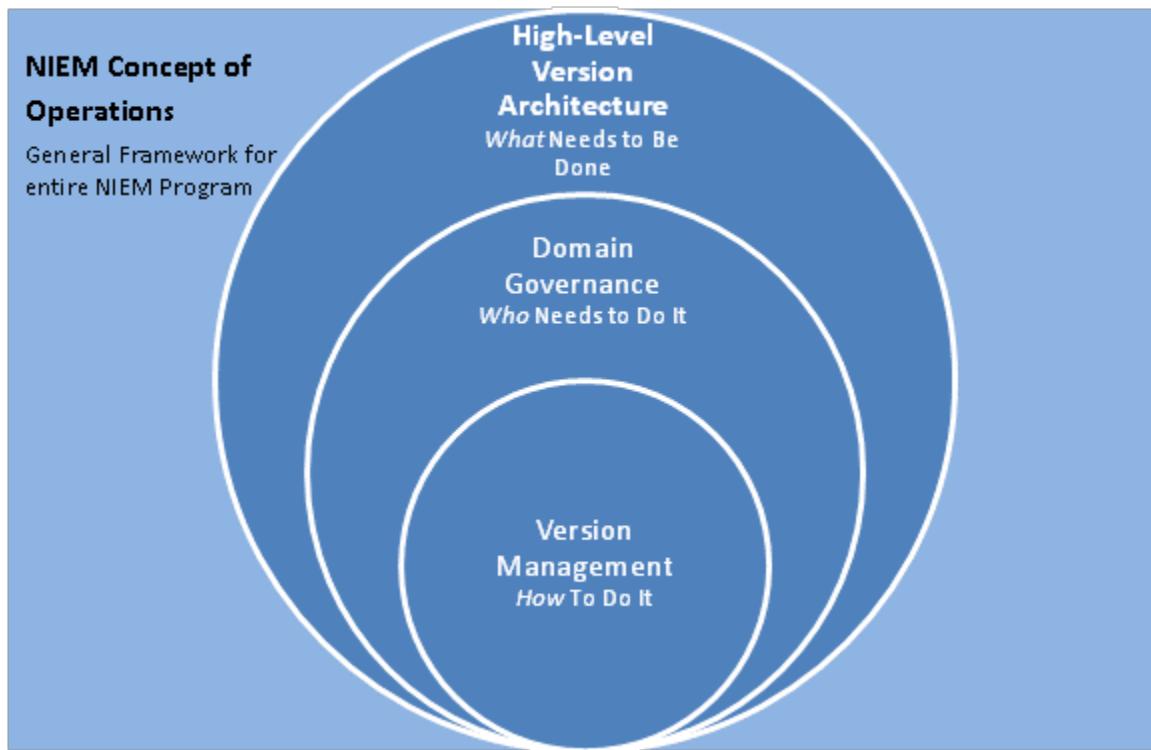
Figure 1-Version Management Document Roadmap

The *ConOps* provides the baseline and general description of all aspects of NIEM management, adoption and use.

The NIEM *High-Level Version Architecture* (HLVA) essentially defines what needs to be done to properly manage the model. It importantly frames version architecture in terms of striking an appropriate balance between "issues that have inherently conflicting tradeoffs[5]." Domain governance as well, "seeks a balance of concepts drawn from previous NTAC discussions and ideas. Major tradeoffs include:

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[4] ConOps, *p. 27.*

[5] *High-Level Version Architecture*, p. 1.

- Timeliness versus Stability
- Autonomy versus Interoperability
- Ease for Information Exchange Package Documentation (IEPD) developer versus ease for Domain [updates and management]. "

This *NIEM Domain Governance Policy Paper* describes *who* performs that tasks outlined in the Version Architecture paper. In short, a federation between NBAC and Domain Governance Groups will be responsible for carrying out the Version Architecture activities.

Finally, a *Version Management* document is currently jointly in development by the NIEM Technical and Business Architecture Committees (NTAC and NBAC). It will define *how* domain governance groups will meet their Version Architecture responsibilities.

1.3. In Scope

The purpose of this paper is to describe the requirements for establishing new domains, and the processes to ensure that those domains are able to collaborate effectively, and contribute efficiently to the NIEM model as a whole.

The term *governance* in this paper is used to specifically refer to the group structure, policy, processes and outputs that are requested of a group to properly manage a domain as part of the National Information Exchange Model (NIEM). The paper spells out the requirements that a group must meet to be recognized as a NIEM domain governance group, and what capacities will be required to manage a NIEM domain once established. At the same time, it also refers to the NIEM Program's central role in maintaining and directing this largely distributed governance model.

1.4. Out of Scope

The specific domain management activities –what a domain governance group will do— are out of scope of this document. Those activities, such as versioning and harmonization in which a domain governance group will engage, once established are summarized in Section 8.1, below. For a conceptual discussion of these activities see the companion NIEM document, *High-Level Version Architecture*[6]. Processes and policies for meeting such model maintenance requirements will follow in a companion NIEM policy paper.

1.5. Document Status

This paper should be seen as a living document. NBAC members, domain representatives and the NIEM PMO will continue to iteratively refine it, as implementation produces lessons learned. Each iteration will be finalized by NBAC and other participants, and sent to the NIEM Program Management Office (PMO) for

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[6] *High-Level Version Architecture.*

approval. Once approved, each version will be published to the NIEM Document Library. The current version will serve as a prescriptive policy for the NIEM community to follow in establishing and managing the domain groups that will serve to govern the various domains that comprise NIEM. The specific objectives this document seeks to fulfill are listed in a separate section, below.

1.6. Document Preview

The remainder of this paper identifies objectives for establishing domain governance; provides an overview of NIEM governance structure; defines common terms, and defines specific roles and responsibilities; describes how a federated domain governance model fits into NIEM governance; establishes characteristics and requirements for defining a domain and standing up a domain governance group; discusses the commitments that both NIEM and a domain governance group must make to achieve balanced, federated governance; and defines the processes for standing up groups to govern both domains already existing in the NIEM model, and entirely new domains. Finally, the paper identifies the next steps toward making these policies and processes an operational reality.

2. Objectives

Domain governance is about striking the appropriate balance of workload and responsibilities between largely independent, self-governing domains and NIEM's overall governance structure. The resulting federated governance model serves the dual purpose of ensuring that the NIEM community is represented in decisions on moving the program forward, and maintaining and improving on the quality of the model in a cost-effective manner. With respect to domain independence, this paper seeks to fulfill the following objectives:

- Create policies and processes to ensure consistent self-governance across domains
- Establish a **repeatable process and assessment criteria** for identifying and incorporating new domains into NIEM.
- Create a federated governance structure that divides governance work between the NIEM Program (especially NBAC and NTAC) and domain governance bodies.
- Clarify the terminology and the relationships between communities of interest, namespaces, domains, and domain governance groups.
- Identify specific steps by which a community of interest may establish a formal domain governance group, recognized by NIEM as the data steward for one or more NIEM namespaces.
- Identify the requirements for a domain governance group to practice effective data stewardship within the NIEM community.
- Provide support and guidance for those groups in managing and updating the content of their respective domains.

- Set the stage for cross-domain harmonization. It is a significant effort, spanning multiple domains and jurisdictions, to keep data content in each domain current, and to continuously harmonize content across domains, to improve consistency across domains, and ensure clarity of the data elements represented in the model as a whole. While harmonization may sound, at first blush, like a highly technical process, it is actually the process of ensuring that the real-world, business definitions of each data element are correct, and that the data model reflects and supports the real-world needs for information sharing.
- Uphold data management requirements across the entire NIEM model. Domain self-governance must ensure adherence to NTAC's prescribed data maintenance, quality assurance and configuration management requirements, as well as encourage broad participation in domain governance, across all levels of government and requisite skill sets

3. NIEM Organizational Structure and Governance

The release of NIEM 2.0 in July 2007 marked a significant turning point as NIEM transitioned from a pilot project to an operational program. This change brought on new opportunities and challenges as Federal, state, and local jurisdictions and agencies nationwide began aggressive programs to adopt and use NIEM. Institutional program support and broad-based participation in a nation-wide governance model become critical to sustaining this progress.

3.1. The NIEM Program Management Office

Within the NIEM governance structure, executive oversight and operational support are provided by the Executive Steering Council (ESC). The Executive Steering Committee is comprised of the Chief Information Officers for DOJ and DHS, representatives from PM-ISE, Directorate of National Intelligence and Global Advisory Committee. The PMO works with the ESC to establish strategic direction, coordinate activities with Committee Chairs and is the focal point for decisions, activities, planning, organizing, and strategic direction setting. See Figure 2-NIEM Organization Chart.
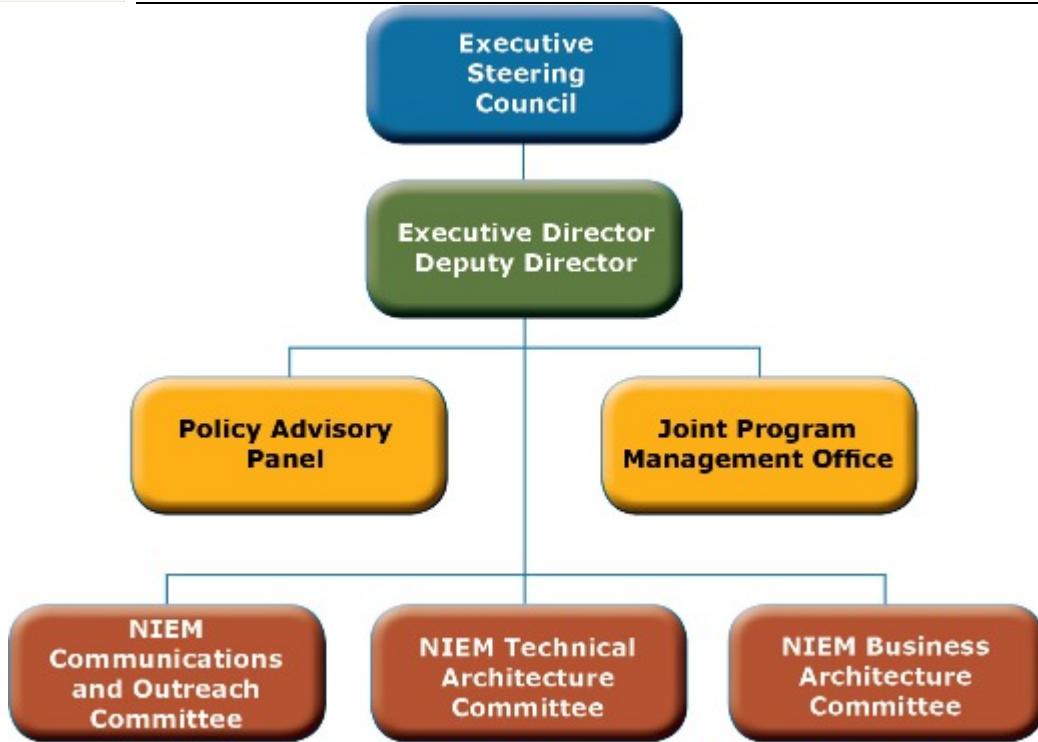
Figure 2-NIEM Organization Chart

The NIEM PMO manages the day-to-day operations of the program, and coordinates and supports the efforts of the various governing bodies. Governance on operational issues is provided by three committees that are comprised of members that span the domains, levels of government, and skills sets currently involved in NIEM.

3.2.   NBAC Committee Structure

The NIEM Business Architecture Committee (NBAC) is one of three committees within the NIEM Program. Under the direction of the NIEM Program Management Office, the NBAC operates in concert with the NIEM Technical Architecture Committee (NTAC) and the Communications & Outreach Committee (NCOC) and to meet the goals and objectives of the NIEM Program.

The NBAC is designed to address the "business"-related aspects of information needs and requirements. The Committee exists to ensure that the technical solutions that are built as part of the NIEM initiative are derived from, and driven by, the needs of practitioners to share information across geographic, organizational and functional boundaries. NBAC is structured to draw from the field the requirements, use cases and general needs for improved information sharing. Figure 3 shows that the committee consists of a top-level **voting membership** of between 12 and 20 members. This small group fulfills its mission by engaging the larger community of practitioners, implementers and policymakers for in-depth work on standing subcommittees and *ad hoc* tiger teams.
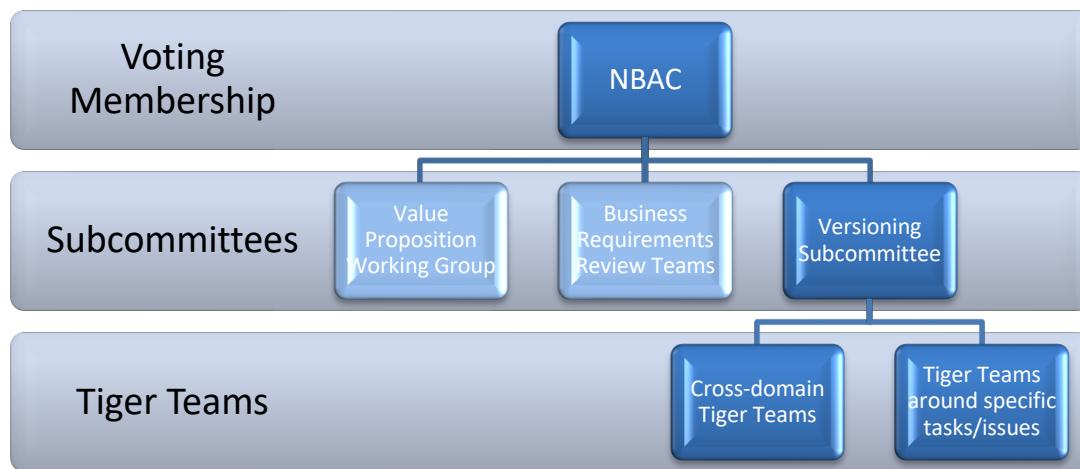
Figure 3-NBAC Committee Structure

NBAC's membership and participation are designed to reflect the community of stakeholders and users. Members represent federal, tribal, state and local levels of government, as well as policy, managerial and technical skills sets and perspectives.

3.3. NBAC Structure and Domain Governance

This broad representation means that NBAC can serve as the central authority in a federated governance model where NBAC will interact with domain governance groups, providing coordination, policy and technical direction while allowing each group to retain relative autonomy in governing its domain while interacting directly with its own community of interest.

To illustrate this federated governance model, Figure 4 superimposes NBAC and its relation to individual domain governance groups over a graphic frequently used to illustrate how NIEM is composed of individual data models that represent functional *domains*. The data content in each domain is defined by the information-sharing needs of a *community of interest*, defined by a certain functional area or set of business processes. Establishing domain governance then, is simply a matter of defining a *domain governance group* that is representative of community members from all levels of government. The remainder of this paper defines the process by which NBAC will recognize a group as a *domain steward*, and authorize it to act on behalf of the larger community of interest.
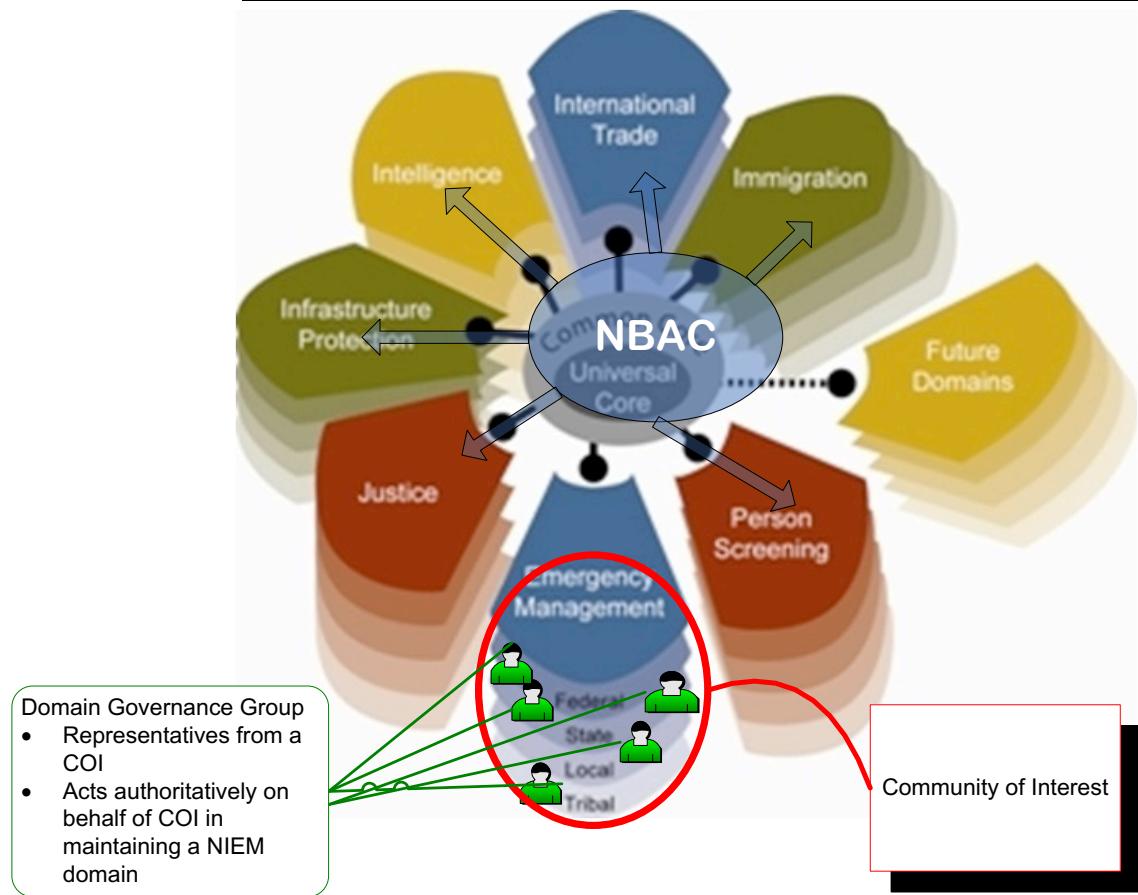
Figure 4-NBAC and Domain Governance

4. Terms and Definitions

4.1. Terms Describing Groups of NIEM Participants

Stakeholder

A person or organization that has a vested interest in a project or entity and the direction that entity takes. This is intended intended as a general and very inclusive term. It conveys the simple fact that the universe of actors having a *stake* in any given area of data-sharing will be very large. This is important for the significant challenge it poses in maintaining representativeness in NIEM's governance structure.

Throughout this paper, stakeholders may also be described in terms of specific roles they play, i.e., developer, implementer, practitioner.

Practitioner

Practitioners act as the 'users' of information exchange standards, which are implemented in real systems. They can act as data providers and consumers in an information

exchange. More importantly, they are the subject-matter expers who hold the business knowledge about the needs to share information.

Developer
The subset of stakeholders who directly perform the work of building IEPDs.

Implementer
The subset of stakeholders who directly perform the work of implementing IEPDs in real-world, production environments.

Community of Interest (COI):
A group of federal, state, tribal, local and industry stakeholders with a common interest, often to build and implement information exchanges within a given functional area or line of business. This term is intended to be inclusive and general, and to convey the breadth and depth of the community that a domain governance group must adequately represent.

It should also be noted that one agency, group or person may hold a stake in multiple domains, and thus be a member of multiple COIs.

Domain Governance Group:
A small body of representatives of a given COI that is formally recognized by NIEM as: (a) representative of all stakeholders in a that community of interest; and (b) acting authoritatively on behalf of a COI as the domain stewards over a given domain.

The xml Structure Task Force (xstf), which has developed and served as the steward for the justice domain from its beginnings as GJXDM, is an example of a small, semi-formal body that includes representatives of the broader justice community of interest, and is charged with maintaining a specific NIEM domain.

4.2.   Terms Describing NIEM Content

Domain:
A logical grouping of data components, metadata and other *content* that support a common, well-defined set of business needs. A domain is defined to achieve similar goals irrespective of organizational boundaries.   This term refers to the data model, and the metadata --the content that the COI produces, and the domain governance group is tasked with maintaining. It should not be used to define the people who have an interest in that data and metadata. The term *community of interest* is used to define the people who have a stake in a given domain.

In NIEM parlance, a domain is specifically *assigned a NIEM namespace.*

Content:
Data, metadata, structures, that comprise the NIEM data model.

Metadata

Structured data about data. Metadata includes data associated with either an information system or an information object for purposes of description, administration, legal requirements, technical functionality, use and usage, and preservation.

4.3. Terms Describing Governance Documents

Domain Stewardship Agreement (DSA):
Document signed by the NIEM PMO and a NIEM Domain Governance Group outlining domain governance roles, responsibilities and commitments.

5. Domain Governance Groups: Characteristics and Requirements

The first step in establishing this federation is to stand up domain governance groups to achieve a one-to-one correspondence between domains in the NIEM data model, and domain governance groups as depicted in **Error! Reference source not found.** These g roups are the conduit by which NIEM's governance model achieves the balance between autonomy and interoperability, referred to above.

Such groups will provide the interface between the NIEM Program (through NBAC) and the larger *community of interest* that works with and has a stake in developing and maintaining a given domain. "Community of interest" refers to an entire set of federal, state, tribal, local and industry partners who are working together to build and implement information exchanges pertaining to the data in a given domain. Thus one agency or group may hold a stake in multiple domains.

The following are characteristics that help define what a domain governance group should look like, how it should be constituted, etc., to be able to operate effectively within this federation.

5.1. Representative Governance

A governance group will not be comprised of a single agency or developer, but will include a cross-section of all developers, implementers and users who have a stake in sharing the information represented by that domain's data model, i.e., of the *community of interest* related to that data content.

- Include representation from the relevant federal, state, tribal, local, and industry practitioners.
- Include policy, managerial and technical experts from across the community of interest.
- Reach out to professional associations (e.g., International Association of Fire Chiefs; National Center for State Courts) to ensure representation of the business perspective, and reach-back to technical experts in each field.
- Provide feedback channels for the larger community of stakeholders in the particular domain to voice concerns, suggest improvements, and offer solutions.

5.2. Business Drivers for Information Sharing

Domain governance groups should strive to discover the business needs that are driving information sharing across the nation. It is important to focus on modeling the data elements that are exchanged across organizations and information systems to fulfill information sharing needs and collaborative interoperability requirements within and/or across domains.

New NIEM content can be discovered through a number of routine, every day processes:

- The creation of **extension schemas** in information exchange packages (IEPs). Extension schemas contain xml tags for the data elements required for a given exchange that are not currently found in NIEM. Domain governance groups may harvest candidates for new domain content from exchange schemas, particularly when the same element occurs across many exchanges, from many different jurisdictions and agencies. In fact, extension schemas may be the source for content for an entirely new domain, in cases where exchange partners are using NIEM in entirely new business contexts.
- Issues raised by developers or practitioners through the National Information Sharing Solutions Help Desk (NISS), and NIEM's issue tracking system, the NIEM Configuration Control Tool (NCCT).
- Executive decisions made by agencies or units of government to adopt NIEM as an enterprise standard may extend NIEM development into new domains.

Alternatively, NIEM leadership may make a decision, driven in whole or in part by the above trends, to interface with or incorporate an existing data-description standard. In such a case, the existing group that manages those standards would form the basis of a NIEM domain governance group.

5.3. Capacity to Participate in NIEM Governance

Each domain governance group also must have the capacity and resources to participate in harmonization and other NIEM governance processes led by the NTAC and NBAC. Resources can come from the domain governance members, or from members leveraging the skills sets and resources of their "home" agencies or firms. Often times, including representatives from professional associations that are national or larger in scope[7] can provide deep reach-back into the expertise in the field.

In any event, an effectively functioning domain governance group will need to have resources at its disposal to carry out the tasks involved in NIEM domain management, and the ability to sustain those resource levels over time.

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[7] *For example, National Emergency Managers' Association, International Association of Chiefs of Police, National Center for State Courts.*

Specific examples of necessary resources include:

- Available representatives to participate in NIEM committees, or their constituent subcommittees and tiger teams as appropriate and as requested.
- Resources to conduct the domain stewardship and model maintenance prescribed by NTAC (e.g., NDR conformance, harvesting Extension Schemas for new content candidates, and providing clear semantic definitions).
- Participation in harmonization activities coordinated by NBAC.

Depending on the size and sponsorship of the domain group, this may include budgetary support and/or volunteer time.

5.4. Data Stewardship

5.4.1 Namespace stewardship

A domain governance group's primary charge will be to assume responsibility for the maintenance and quality assurance over a given domain in the NIEM model. Establishment of a domain governance group assigns ownership and stewardship over a distinct domain, represented in the NIEM model as a specific namespace.

5.4.2 Code table stewardship

Each domain governance group will assume responsibility for and ownership of specific **code tables** represented in the NIEM model. This includes updating the code values as external conditions change[8]. Users of the code table may also request changes or updates to reflect specific operational needs.

5.4.3 Quality Assurance and Change Management Processes and Resources

A domain governance group also must exhibit at least a basic understanding of NIEM, and demonstrate capacity to follow the standards and guidelines for development and submission of NIEM-related artifacts.

Adherence to promulgated NIEM standards, specifications and guidelines, includes the following documentation. The most recent versions of these documents are available in the NIEM Documentation Library - http://www.niem.gov/library.php.:

- NIEM *Naming and Design Rules* (NDR).
- Quality Assurance – see *NIEM Quality Assurance Strategy and Plan*.
- Versioning activities as described in the *High Level Version Architecture.*

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[8] *For example, a new model year for automobile manufacturers prompts updates to a table representing the makes and models of cars and trucks.*

5.5. Scalability

From NIEM's perspective, it is important to keep the total number of domains to a manageable number, to keep governance from becoming too complex, and to manage the marginal costs of adding domains to the data model. At the same time, it is important that the set of domains reflect the information exchanges that are being developed and implemented across the country.

Currently, NBAC does not have hard-and-fast criteria to establish a minimum domain size, nor a maximum number of total domains in the governance federation. However, these are both thresholds that may have some impact on manageability, cost, sustainability and/or complexity as NIEM grows. So as NBAC exercises these governance processes, the need to establish more definitive criteria may become evident.

In the near term, NBAC will gather data or at least estimates on several dimensions of domain governance scalability and complexity:

- Number of elements per domain model;
- Number of cross-domain exchanges developed and implemented;
- Total number of domain governance groups in NIEM;
- Cost to manage domain governance components, e.g. individual Component Staging Areas[9].

6. Getting it in Writing: Domain Stewardship Agreements

Being recognized as a domain governance group essentially involves a "contract" between NIEM and a given group. NIEM agrees to support and assist the group in managing its portion of the NIEM model. Each domain governance group agrees to practice responsible citizenship in the broader NIEM community, and effective and diligent *stewardship* over its content in the NIEM model. This includes giving all stakeholders a voice in domain governance. And it means ensuring that the domain adheres to NTAC's technical standards and guidelines, (e.g., Naming and Design Rules; Quality Assurance Plan) that are promulgated to ensure interoperability with the rest of the model.

This contract will be memorialized through negotiation of a Domain Stewardship Agreement (DSA), and monitoring of a domain's performance against that DSA. The DSA most likely does not carry the weight of a formal contract. However it does capture the agreements by both parties to uphold the requirements for "good NIEM citizenship," and responsible domain stewardship. It should strike the appropriate balance between autonomy and interoperability that domain governance seeks to achieve.

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[9] *When Version Architecture is completely implemented.*

The DSA will specify commitments that the NIEM PMO will make in support of the domain. Likewise, the domain governance group will agree to meet certain governance, technical and operational requirements.

6.1. NIEM Commitments

- The NIEM PMO will:

- Provide hosting for the domain data model (in the long run, this is accomplished via online, domain-specific Collaboration and Publication Areas once Version Architecture is implemented);
- Provide seats on the principal governance committees, or appropriate subcommittees;
- Include the domain-governing body in all relevant communications and projects; and,
- Provide NIEM PMO representatives to participate in/observe NIEM-related governance body meetings.
- Training and Technical Assistance
- Tools
- Help Desk
- Documentation

6.2. Domain Commitments

- The Domain Governing Body will meet:

6.2.1 Governance Requirements

o Establish and sustain a domain governance body that is:

- Representative of the entire community of interest;
  - o A cross-section of federal, tribal, state, local and industry stakeholders and needs;
- Develop a charter;
- Respond to NIEM PMO requests for information and input/feedback;
- Identify a point of contact to field help-desk inquiries and other questions or issues;
- Participate on NBAC, and other NIEM governance bodies as required; and,
- Coordinate with NC&OC to share case studies and best practices.

6.2.2 Technical Requirements

- Participate in Domain Reconciliation, Synchronization and Harmonization as specified in NTAC's [High-Level Version Architecture](http://www.niem.gov/pdf/NIEM_HLVA.pdf)[10]; and,

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[10] *NTAC, High-Level Version Architecture, July 2008. Available online at http://www.niem.gov/pdf/NIEM_HLVA.pdf.*

- Provide clear definitions and complete metadata for each data element in the domain;
- Maintenance of specific code tables;
- Alignment any external standards based on business requirements and needs of domain (e.g., Emergency Management domain works with OASIS). If the domain relates to an existing standard that is external to NIEM, that body must reach out to related NIEM stakeholders and ensure that its functional data as represented in NIEM is broadly defined to account for the use cases of stakeholders not traditionally part of the existing governing body;
- Utilize the Domain Publication Area to be provided by GTRI, upon implementation of Domain Independence and Self-Service (e.g., manage your data on NIEM-provided resources, so that it can be easily reconciled to the rest of the model; don't manage your data model on your own separate platform);
- Perform quality assurance checks as prescribed by NTAC, in the Quality Assurance Strategy and Plan[11]
- Follow the current revision of NIEM's Naming and Design Rules as prescribed by NTAC[12].;
- Focus on submitting content being exchanged rather than taking a "boil-the-ocean" approach of incorporating the entire external data model into NIEM.

6.2.3 Operational Requirements

- Long Term Support, which varies by the level of government, and breadth of the COI;
- Budgetary support by participating federal agencies. Provide an appropriate share of the funding to sustain the NIEM program;
- Promotion and operational support by trade associations, practitioner groups;
- Implementation and conformance with the model by all state, local and industry participants;
- Provide leadership in encouraging all implementers within the COI to produce conformant IEPDs, and to post them to the niem.gov clearinghouse –or, in the long-term, in a repository that meets NIEM standards/specs for participation in a federation of registries if/when published; and,
- Communicate cross-domain data exchange needs to NBAC.

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[11] *NTAC,* Quality Assurance Strategy and Plan, May 2008. Available online at http://www.niem.gov/Quality_Assurance_Strategy_and_Plan.pdf .

[12] *NTAC,* Naming and Design Rules, *Version 1.3,October 2008 . Available online at* http://www.niem.gov/pdf/NIEM-NDR-1-3.pdf

6.3. Standardizing the Process

As of this writing, the NIEM Program Management Office is drafting a template Domain Stewardship Agreement which will be vetted with the Executive Steering Council, and employed to formally document the involvement of domain governance groups in each existing and future NIEM domain

Of course, each domain will be unique, and management of each different data model presents unique challenges and guidelines for both NIEM and the domain governance body. The template is a starting point, and will be modifiable, on a case-by-case basis to suit the unique nature of each domain/COI and its data model.

7. Establishing Domain Governance - a Proposed Process

Version 2.0 of NIEM was released in July 2007 with data content from seven domains:

- Justice
- Emergency Management
- Immigration
- Infrastructure Protection
- Intelligence
- International Trade
- Person Screening

Each of these domains, as well as any domains added to NIEM in the future, will follow the same general process to formally establish a domain governance group with the authority to take on domain self-management and participation in the NBAC-coordinated federation. This paper recognizes that each domain in NIEM brings a unique set of circumstances, and that the process and requirements will have to flexible to accommodate those circumstances. As a result, the following is a general framework for the process of establishing domain governance.

7.1. High-Level Process View

The process of establishing new domain governance groups must a iterative, with NBAC serving as a pivot point between a domain governance group and the NIEM executive leadership as embodied in the NIEM PMO and Executive Steering Council. Each step in this process will be iterative and open dialog between NBAC and a prospective domain governance group is expected. Figure 5 provides a visual overview of the process, with emphasis on the flows among the various actors. It must also be noted that this process is subject to continuous improvement. NBAC will refine and continuously improve the processes and criteria –as well as the other components of this policy paper—as NIEM works through the process with the first set of candidate domain governance groups.
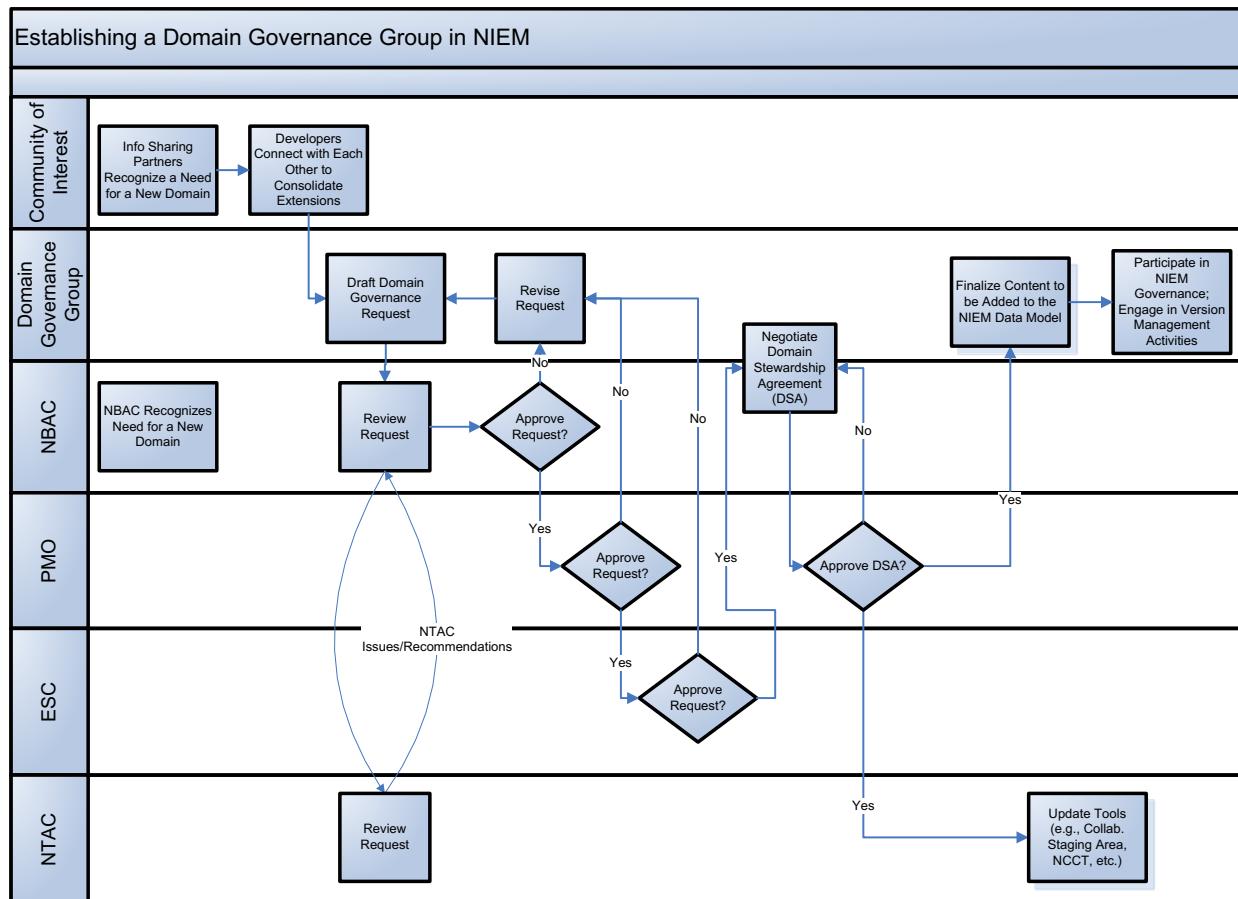
Figure 5 - High-Level Process View

7.2.   Detailed Process Description

7.2.1 The origins of a NIEM domain

In the continuous improvement envisioned by NTAC in its description of the Data Model Maturity Lifecycle,[13] NIEM implementation is always the first step in expanding and improving the data model. In general, there are 2 possible starting activities to this process:

- In the course of usage and adoption, implementers are discovering opportunities and needs for new and expanded data elements.

Figure 6-High-Level Process View

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[13] *HLVA, p. 8ff.*

- NBAC recognizes the need for a new NIEM domain. This would occur as the result of review of IEPD submissions, or extension schemas, or conversations during harmonization. Since the NBAC has a holistic view of all submissions, this may be another starting point, with the next steps being that they reach out to relevant stakeholders to ask them to become the steward for the new domain.

7.2.2 Developers Collaborate and Connect with Each Other.

Once disparate developers begin to recognize opportunities for collaboration and reuse, they will (hopefully) want to formally organize as a group, and look to joining NIEM's federated governance structure. Such a group should be encouraged to become familiar with the policies and processes in this document, especially the requirements and characteristics of a NIEM domain governance group.

NIEM will need to provide the incentives, the tools, and the impetus for these groups to come together, begin collaborating, and take a long-term view toward consolidating (and eventually harmonizing) the new content that each has developed in their extension schemas.

At the same time, the group itself needs to do outreach and due diligence to ensure that all potential stakeholders are being involved in the domain governance group. This includes making an ongoing effort to solicit information about information-sharing efforts in other communities and agencies that may be relevant to the domain.

7.2.3 Draft a NEIM Domain Governance Request

As interested stakeholders come together and establish a more formal collaboration, NIEM should encourage them to draft a Domain Governance Request. NIEM should develop a template for such a request. Following are some possible items to be included in such a template:

- What is the recommended name of the domain?
- Who is making the request? List the agencies participating in the proposed domain governance group.
- Identify a lead agency/single point of contact for all NIEM correspondence.
- Does the group have a charter or other formal agreement? Is there progress toward such an agreement among members?
- How will the domain management work get done?
- What data content does the group propose to steward? Will it assume ownership of any code tables?
- What prospects are there for securing funding and/or in-kind resource commitments from members in support of domain-group activities?

NBAC will work toward providing a standard template for this request.

When complete, the group will forward this request to NBAC for initial consideration.

7.2.4 NBAC Review of Domain Governance Request

The process of identifying and standing up domain governance groups must be an iterative one, involving regular communication between NBAC and the various members of a particular community of interest. It also must ensure that the objectives of federated domain governance are met.

NBAC will evaluate each domain-governance request against a consistent set of criteria.

Proposed criteria might include:

- Does the proposed governing body or team adequately represent all federal, state, tribal, local (and industry) stakeholders that contribute to the domain?
- Does the proposed group seem to have the capacity/resources to devote to domain management activities going forward?
- Does the group have a charter? What other steps has the group taken toward formal organization?
- Could this content be merged with another, similar existing domain (especially if the request is to add a relatively small number of data elements)?
- What are the business cases for reuse of these data elements in other, already-established NIEM COIs?
- Technical Complexity/Feasibility Cost: What opportunities and challenges are presented for the NIEM governance structure in terms of:
    - Cross-domain synchronization
    - Harmonization with the NIEM Core

The members of the NIEM Technical Architecture Committee (NTAC) will also be consulted at each stage in the process, to ensure technical feasibility and scalability as the NIEM model grows.

7.2.5 NIEM Review and Approval – Program Management Office and Executive Steering Council

With a clear description of the domain governance group, basic agreement on the need for the content that it would bring to the NIEM model, and confidence that the proposed group has the capacity to carry out the required domain governance duties, NBAC will make a recommendation to the Program Management Office for approval, and recognition of the new domain governance group.

Both the PMO and then the Executive Steering Council will review the domain governance request, and will have the opportunity to raise additional issues, and ask either NBAC or the proposed domain governance group for additional information, or to revise the governance request.

7.2.6 Negotiate a Domain Stewardship Agreement

Once fully vetted and approved through the NIEM governance structure, the domain governance group is officially recognized as a part of the federated governance structure. The group's first official task is to work with NBAC or its designate to negotiate a Domain Stewardship Agreement that formalizes its roles and expectations with respect to its portion of the NIEM model.

The principle elements of any DSA are discussed above, in Section 6, Getting it in Writing: Domain Stewardship Agreement.

7.2.7 Approve the Domain Stewardship Agreement

Once again, the approved agreement will be vetted through NIEM's governance structure. As with the construction of the domain governance request, this should be viewed as a cooperative, iterative process that balances the program's need for consistency and manageable growth, with the unique nature of each domain and its community of interest.

7.2.8 Creation of the Technical Infrastructure for Domain Management

With agreements in place, and NBAC and the new domain governance group in agreement on the data elements for which the group will be responsible, the next task is to actually add the information content to the data model itself. Thus the final approval of the DSA triggers NTAC and its subcontractor, GTRI, to create the Collaboration Staging Area and other technical tools the group will need to upload and manage its part of the model. It also triggers the domain governance group to upload its content, and then organize its members and resources to carry out the commitments it made in the DSA.

8. Up and Running: Version Management Activities

The domain governance group will then follow the *High-Level Version Architecture* and other documentation, standards and guidelines to maintain its content, and will participate in cross-domain harmonization activities. Details of these processes are provided in the section entitled Up and Running: Domain Management Processes, below.

8.1. Version Control and Harmonization

Once established, each NIEM community of interest will participate in the overall NIEM governance processes. The NTAC specifies four interrelated version-management

activities in which each domain governance group must participate. They are listed in Figure 7-Version Management Activities[14].

NBAC will stand-up a **Versioning Subcommittee** to oversee these processes, interface with domain governance groups. This will be a committee of roughly 6-10 members who possess both business knowledge and a working understanding of how the NIEM model– and the prescribed harmonization processes--will work. The Versioning Subcommittee may also create *ad hoc* **tiger teams** to perform specific cross-domain tasks, including synchronization and harmonization. Through these cross-domain tiger teams NBAC is able to reach deep into domains as needed, drawing on the experiences and subject-matter expertise of those closest to the issues and problems to be resolved.

This subcommittee takes from the shoulders of the voting members the more "technical" work of conducting and coordinating version management, and becomes NBAC's locus for institutional knowledge on these activities.

The Versioning Subcommittee will report to the NBAC on its activities and formulate specific recommendations on which the voting members will act.

Versioning Activities
1. Domain update: A domain may publish updates to its schemas. A domain update is published to the publication area. A domain update proposes updates to future NIEM releases.
2. Domain reconciliation: The NBAC will resolve conflicts between domain updates, through a process called domain reconciliation. This process results in a reconciled, coherent schema set. This schema set is published as a minor NIEM release.
3. Cross-domain harmonization: The NBAC will initiate tiger teams and working groups to resolve inconsistencies, overlaps, and other semantic issues between the domains, and between the domains and Core. The results of these efforts will go into the publication area, to be included in the next major or minor NIEM release, as appropriate.
4. Core synchronization: The results of cross-domain harmonization are merged into a new release of the NIEM Core namespace, with domains synchronized to the new NIEM Core. Together, these form a major release.

Figure 7-Version Management Activities

8.2. Monitoring Performance

NBAC will also need to develop means to monitor adherence to the agreements codified in the DSAs agreed upon with the domains. This process should be as simple, non-bureaucratic, and efficient as possible, while communicating the importance of sustaining representative governance and responsible metadata stewardship. It may include audits,

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[14]*NTAC,* High-Level Version Architecture*, Version 1.0, p. 5.*

periodic reporting requirements, or "after-action" reports on specific tasks, such as QA checks or harmonization exercises.

Whatever the mechanism, it also needs to be clear that, in the first place, NBAC will foster an open, collaborative, collegial relationship among all domain governance bodies. However, at the same time, it needs to be clear that there will be sanctions for governing bodies that repeatedly fail to uphold the requirements agreed upon in the DSAs.

9. NBAC –Next Steps

- Create a Versioning Subcommittee.
- Work with NTAC and its subcontractor on approving content updates for inclusion in NIEM Release 2.1. Use these updates as an opportunity to pilot and exercise the processes proposed in this paper.
- Draft a template Domain Governance Request
- Draft a template Domain Stewardship Agreement
- Negotiate DSAs with a domain governance group established for each existing NIEM domain
- Revise Domain Governance policy and process
- Engage groups wishing to establish new NIEM domains.
- Participate in and coordinate versioning activities on an ongoing basis.

10. NIEM Next Steps

- Develop a strategy for assessing NIEM Extension Schemas that are posted to IEPD repositories, looking for potential new domain content and opportunities to connect developers or initiatives that seem to be extending NIEM into similar functional areas or lines of business (see Section 7.2.2).
- Consider providing outreach and support resources, to foster this collaboration and guide such a group toward full, formal participation in domain governance.