



P&RCIO NEWSLETTER

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The National Information Exchange Model (NIEM) A Standards-Based Approach to Data Sharing (PART I)

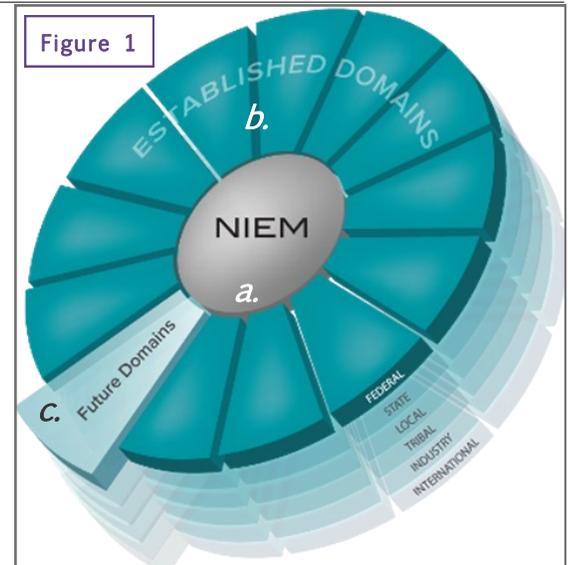
Launched in 2005, NIEM paves the way toward a more interoperable, agile government. Every day, leaders in the defense, intelligence, homeland security, and diplomacy communities rely on data to take actions that advance their organization's mission—whether it is to deploy troops, find a missing child, or manage an Ebola outbreak. To get the job done, data must be seamlessly shared between government agencies and state, local, tribal, industry, and international partners.

If *data* is what leaders use to make decisions, NIEM is the crucial framework to ensure data is *understood* by organizations that securely receive and use it. For “data in motion,” NIEM addresses the format in which data is exchanged between systems and organizations, so that a sender and receiver speak the same language once the data is accessed. NIEM standardization is created using [extensible markup language \(XML\) schemas](#), which define characteristics for the data shared.

NIEM consists of a data model, governance structure, tools/training, technical support services, and a user community. The data model serves as a data dictionary of agreed-upon terms with their definitions, relationships, and format characteristics. This section of the model is referenced as the “NIEM Core” data elements (see *Figure 1; a.*). Beyond NIEM Core are community (or domain)-specific data components (*b.*) that relate to a specific mission (e.g., Military Operations, Emergency Management). Future domains (*c.*) can be created based on emerging needs.

NIEM and the DoD

Although several federal organizations have adopted NIEM at varied maturity levels, its value will be greatest when applied federal-wide. NIEM can address the DoD's most challenging information-sharing priorities and adapt to our unique operating environment, including Interagency and mission partner data exchange. DoD leadership believes that NIEM is complementary to the Department's jointly-run IT operations structure, the Joint Information Environment (JIE). Over the last two years, the DoD CIO has advocated a “NIEM First” approach. For example, the [DoD CIO NIEM Adoption Memo](#) (March 28, 2013) indicates that “...DoD will adopt [NIEM] as best suited for standards-based data exchanges.” Furthermore, “DoD organizations shall first consider NIEM for their information-sharing solutions.” NIEM represents an



important step in creating interoperability among all data, information, and IT service users at the DoD, as instructed in [DoDI 8320.02](#) (August 5, 2013).

What's Next for DoD NIEM Adoption?

In December, DoD expects to release instructions for how NIEM will be carried out. DoD adoption is organized into three phases:

During Phase One (*Shape*), the DoD conducted NIEM pilots and analyzed outcomes. In Phase Two (*Implement*), the DoD established the Military Operations domain and will incorporate NIEM into its governance framework. NIEM Tiger Teams continue to meet. Next steps include establishing a NIEM Technical Assistance Organization and documenting implementation guidance for DoD developers. Looking ahead, Phase Three (*Maintain*) will measure progress of adoption after implementing the “NIEM First” policy across the DoD.

Learn More

[NIEM.gov](#) features resources that can equip you as the DoD moves forward with adoption. [Explore training](#), like free, online modules and webinars to grow your technical skills. [View infographics and videos](#) to solidify your understanding of the NIEM approach. [Meet people involved in implementation](#) to learn about NIEM governance. •

...How does NIEM work?
Find out on the next page.

POINTS OF INTEREST:

- [NIEM.gov Web site](#)
- [DoD CIO NIEM Adoption Memo](#)
- [DoDI 8320.02](#)



Understanding NIEM: How Does It Work?

NIEM adoption at the DoD and beyond comes with many benefits, but how does standards-based information exchange work and how do we explain the model's ability to help diverse communities boost efficiencies and improve data-based decision-making?

To understand how NIEM functions, we can examine its technical components.

NIEM as a Common Language: The Community-Driven Data Model

Part of the beauty of NIEM is that it is what developers describe as "**technology-agnostic**" - meaning adopting NIEM does not require any specific software or system. NIEM addresses the format of "data in motion" no matter how the information is stored in unique systems.

As explained on page 1, the NIEM Architecture is comprised of two sets of vocabularies:

1. *The NIEM Core*: data elements agreed to be "universal" and commonly understood across all NIEM domain users
2. *NIEM Domains*: mission-specific data elements that form terminology used by a certain domain

The NIEM data model maps out the terms, definitions, and technical formats of the content to be exchanged so that users are speaking a common language.

NIEM as an Iterative Process: The Information Exchange Development Lifecycle

As one agency collaborates with another to perform a mission, the data terms they use may be slightly different. Interoperable data is officially created via the **Information Exchange Package Documentation (IEPD) Lifecycle**. During this process, partners who

need to exchange data identify the specific content to be exchanged—then agree to share it in a standard way.

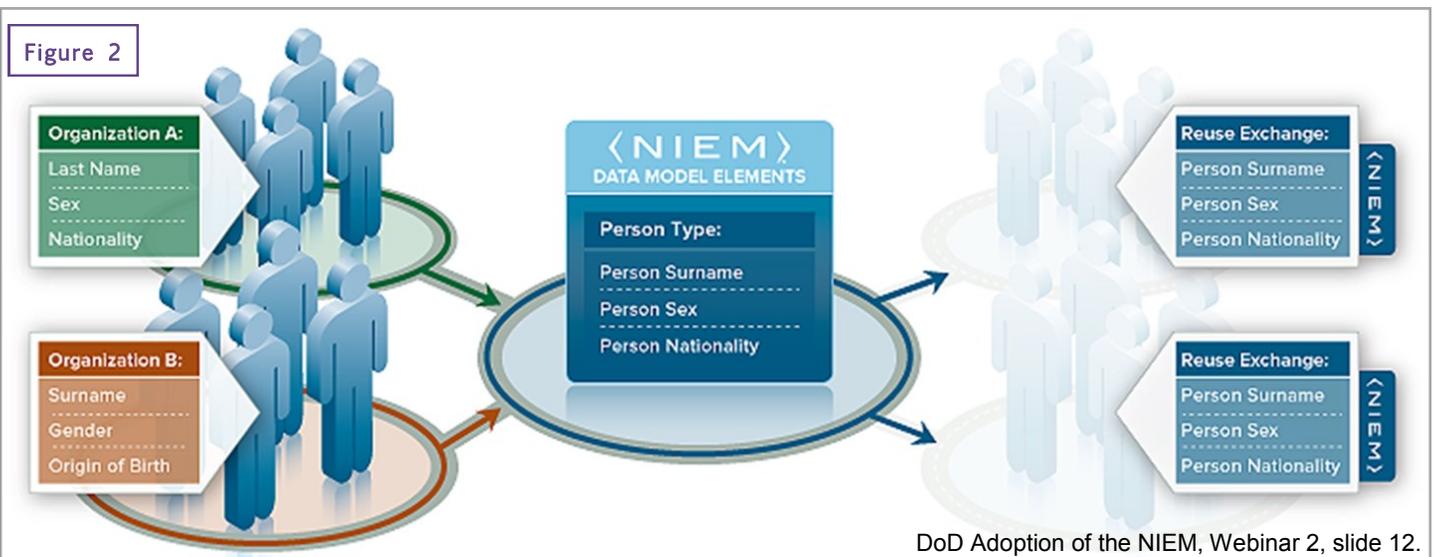
The first step for information-sharing partners is to create a data exchange. NIEM refers to this as an **Information Exchange Package (IEP)**. An IEP describes the particular data to be shared as an actual exchange instance, including the real data and metadata transmitted.

Next, the IEP is bundled with supporting documents to further define the content and structure of the exchange, such as technical and non-technical artifacts (e.g., sample XML schemas, business rules, etc.). The final product that emerges is the **Information Exchange Package Documentation (IEPD)**. This marks the final step in the Lifecycle, when an IEPD is published and implemented among partners. Complete, in-progress, and future IEPD initiatives are posted on the NIEM IEPD Clearinghouse web site for use by the NIEM community.

Since NIEM IEPD developers use a single methodology, they can leverage each other's work. For example, a data exchange developed for one business requirement can be reused to address a different need within that organization or across organizations.

Consider three agencies that need to exchange data to support veterans health. Should each agency develop three unique data exchanges? With NIEM, the group of partnering organizations instead agrees on a single exchange and reuses it. If a fourth agency were to join the domain, it can leverage the pre-existing exchange in use instead of investing time and resources to reinvent its own.

Figure 2 below summarizes how NIEM works in an example of two data-sharing agencies (left) who use NIEM to standardize their exchange (center). Future agencies (right) may reuse the established exchange to fulfil the same business need. •



DoD Adoption of the NIEM, Webinar 2, slide 12.

A CENTRAL PRINCIPLE OF NIEM:

If a data exchange exists, leverage it. Organizations save time and resources by not re-inventing their own exchanges.

Sources:

- DoD Adoption of the NIEM, Webinar 2. "Alignment with Federal and DoD Information Sharing Architectures," 14 August 2014.
- The National Information Exchange Model web site. <https://www.niem.gov>.