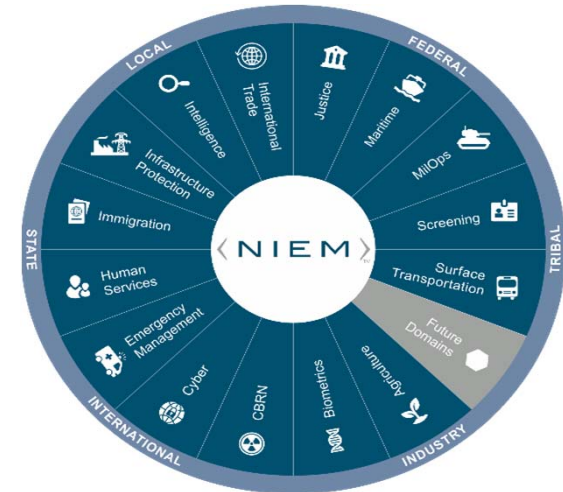


This briefing is unclassified



BUREAU OF THE
Fiscal Service
U.S. DEPARTMENT OF THE TREASURY



Financial Management and the National Information Exchange Model

Katherine Escobar
Deputy Chief Data and Standards Division
NIEM Managing Director
Joint Staff J6

This briefing is unclassified

Agenda

- **NIEM Overview**
- **Financial Management (FM) Data Standard Areas**
- **FM Data Standard Current Challenges and Integration Solution**
- **NIEM Integration Benefits**
- **Case Study – Grants Management**
- **Conclusions & Next Steps**

Agenda



- **The National Information Exchange Model (NIEM)**
 - What is NIEM
 - How NIEM Works
- **Treasury and NIEM**
 - History
 - Information Sharing Needs
 - NIEM for DHS Information Sharing
- **Recommendations**



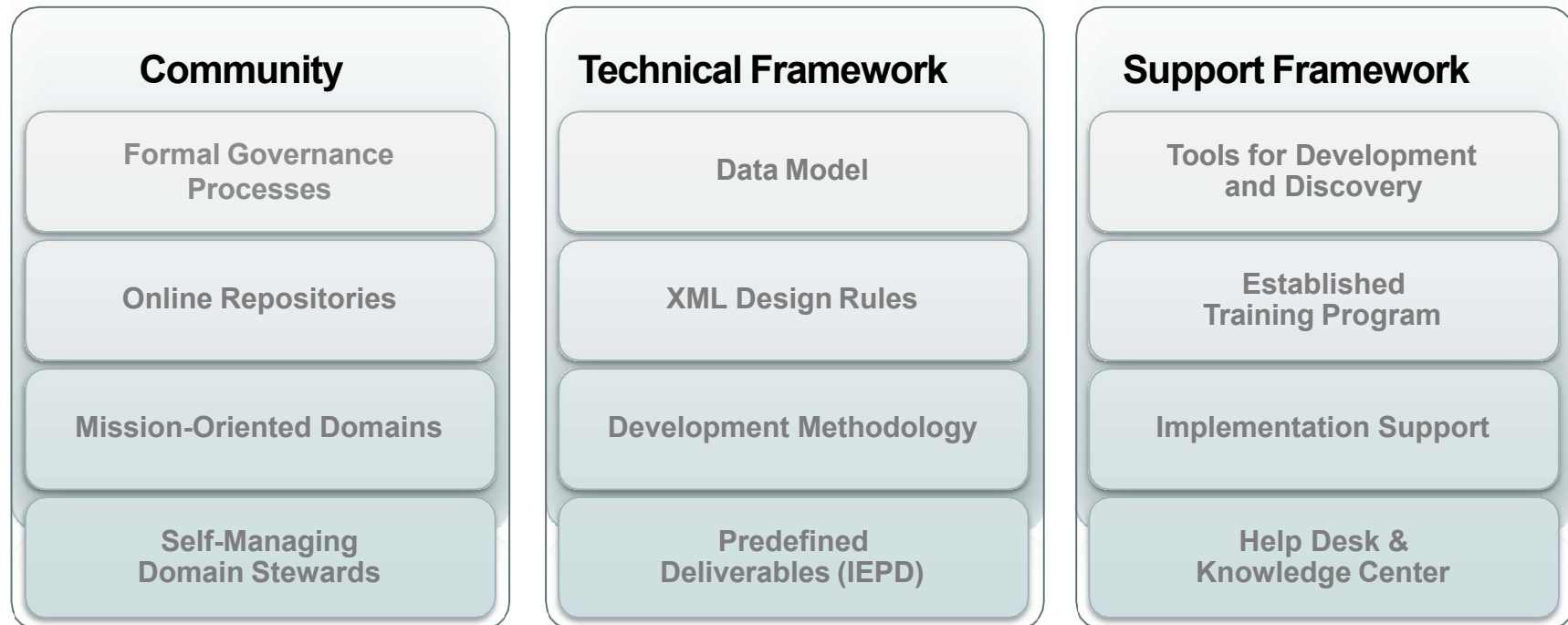
The National Information Exchange Model (NIEM)

The NIEM Framework

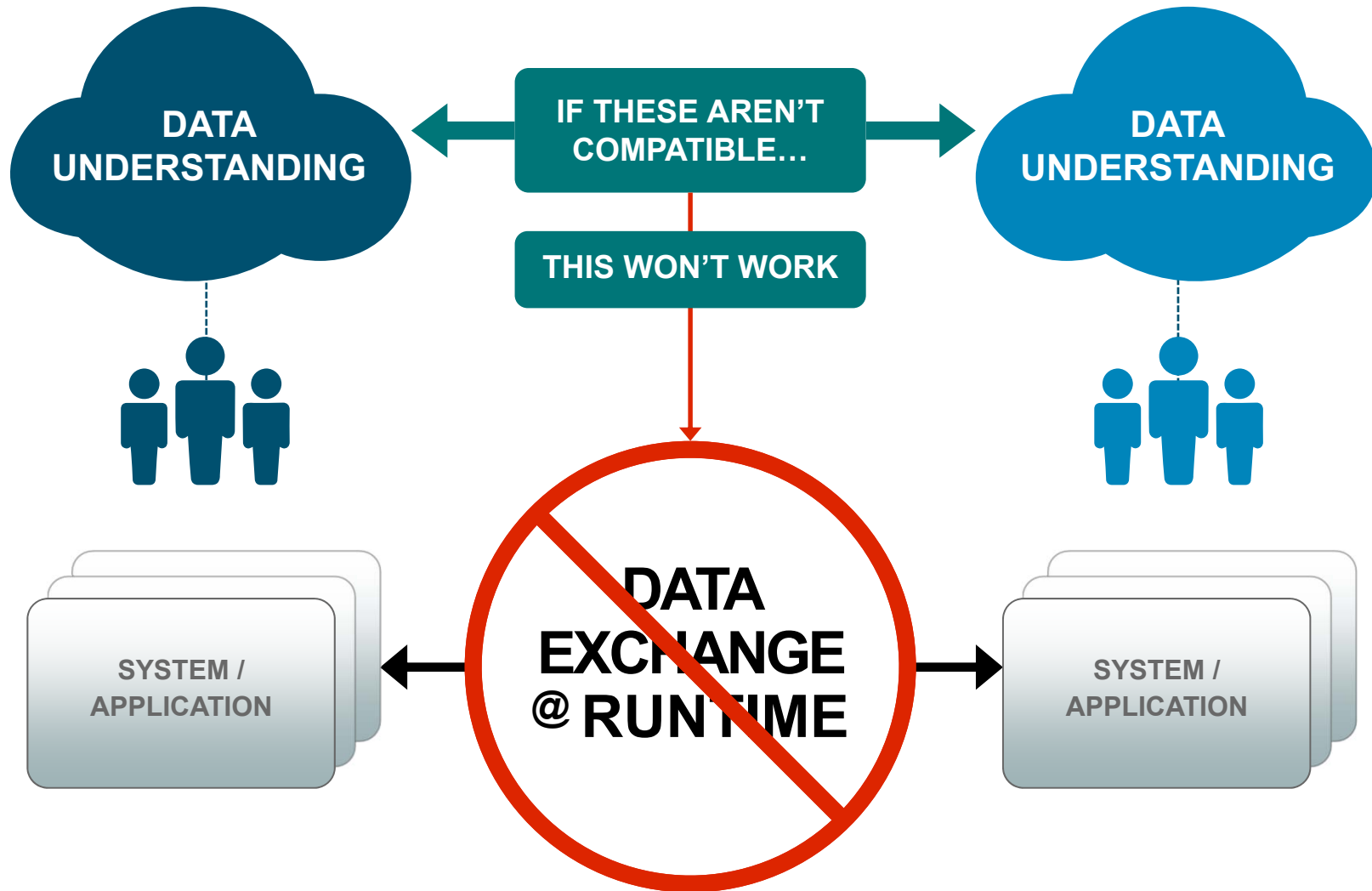
NIEM is a community-driven, government-wide, standards-based approach to exchanging information.

Diverse communities can collectively leverage **NIEM to increase efficiencies** and improve decision-making.

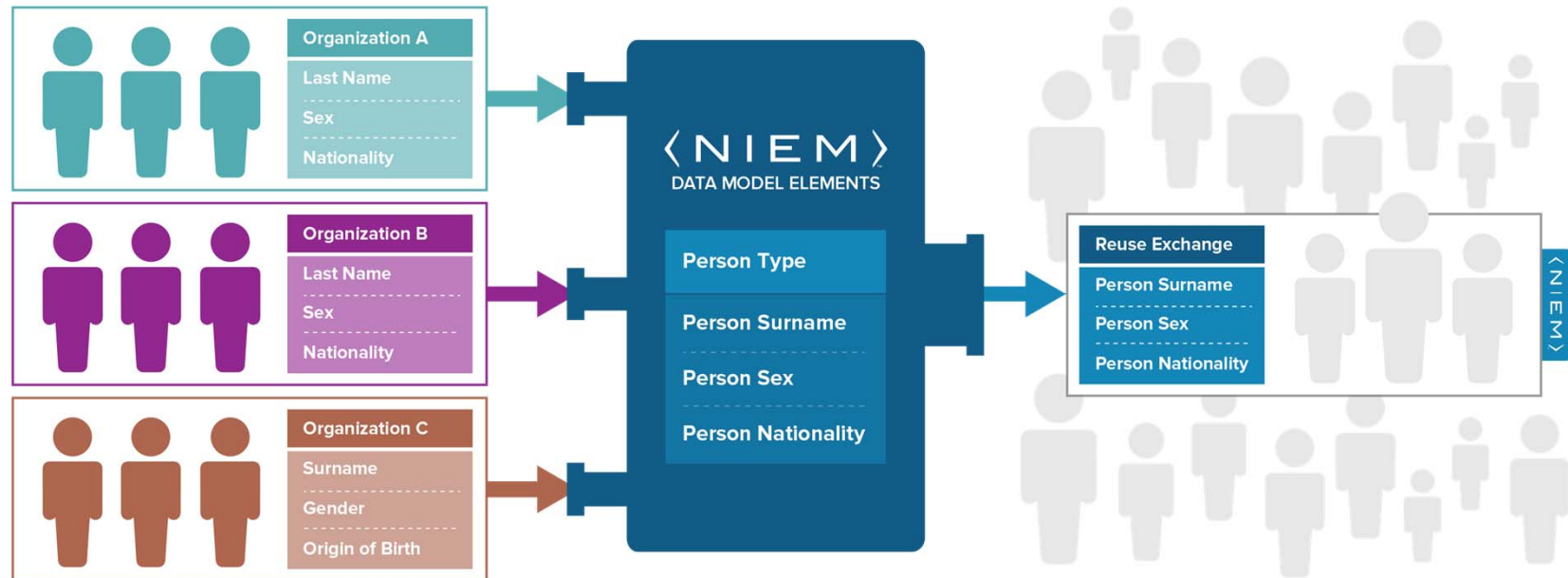
It is available to everyone, including both public and private organizations. NIEM includes a data model, governance, training, tools, technical support services, and an active community to assist users in adopting a standards-based approach to exchanging data.



Data Interoperability Problem



Standardizing Data in Motion



Using NIEM, organizations can come together to agree on a common vocabulary. When additional organizations need to be added to the information exchange, the initial NIEM exchange can be reused, saving time and money.

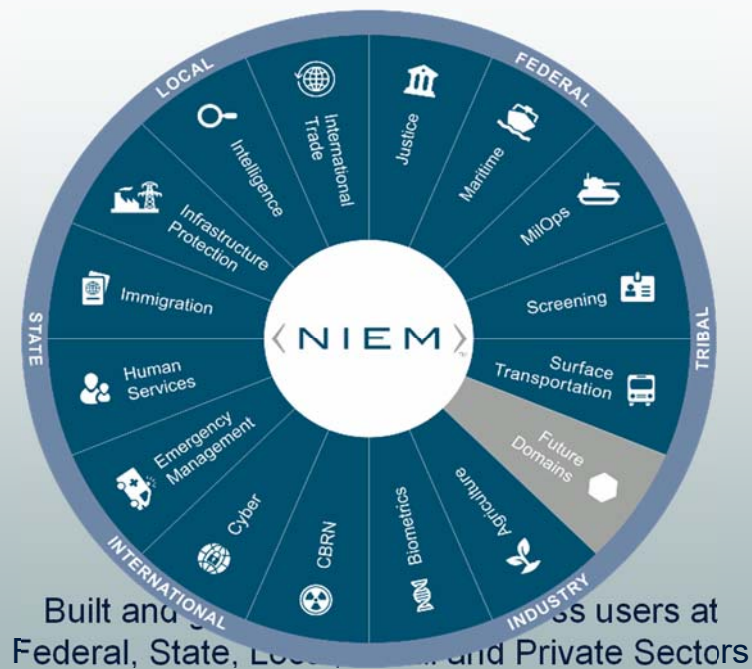
NIEM enables organizations to move information across organizational boundaries in order to interoperate and act as one, while maintaining authority of their own existing systems.

The NIEM Big Picture

NIEM enables organizations to move information across organizational boundaries in order to interoperate and act as one, while maintaining authority of their own existing systems.

Common Language

(Data Model Lifecycle)



Repeatable, Reusable Process

(Exchange Specification Lifecycle)



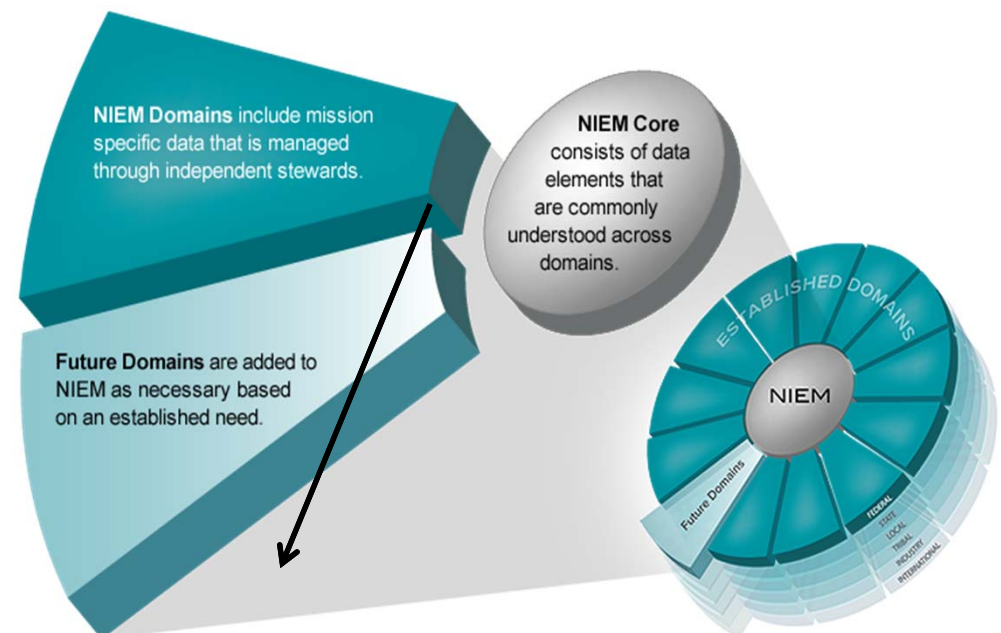
NIEM Model Content

Think of the NIEM data model as a mature and stable data dictionary of agreed-upon terms, definitions, and formats independent of how information is stored inside individual IT systems.

The data model consists of two sets of closely related vocabularies: **NIEM Core** and individual **NIEM Domains**.

NIEM Domains:

- Agriculture
- Biometrics
- Chemical, Biological, Radiological, & Nuclear
- Cyber
- Emergency Management
- Human Services
- Immigration
- Infrastructure Protection
- Intelligence
- International Trade
- Justice
- Maritime
- Military Operations
- Screening
- Surface Transportation



Example of Domain Governance



Biometrics Domain Management

Chair – DHS US-VISIT - William Graves

Vice-Chair – FBI - Justin Smith

Ombudsman – NIST - Brad Wing

Governance

- **Working closely with the ANSI/NIST-ITL Standards**
 - Requirements of the ANSI/NIST-ITL Standard are included in the Domain
 - Backward compatibility is maintained across all versions of the standard
- **The Biometrics Domain Change Control Working Group (BDCCWG) will meet jointly with the ANSI/NIST-ITL XML Working Group (ANXMKWG)**

Biometric Domain is Mission-based and organized to capture and facilitate XML Biometric Standards

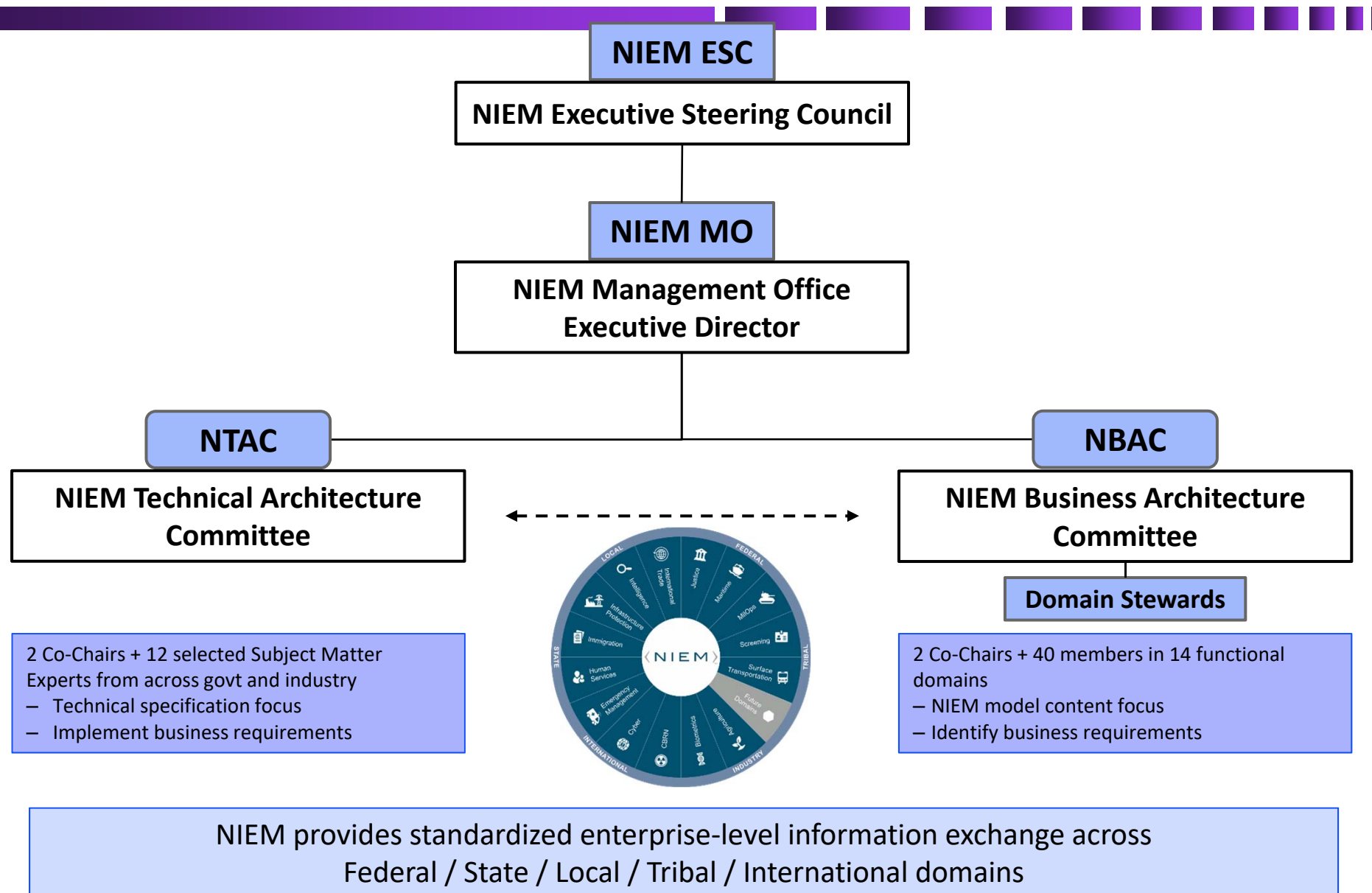
Domain Steward is responsible for actively managing and updating the Biometric data model day to day

Biometric Domain includes a cohesive group of Domain members who are part of a COIs

Onboarding NIEM Domain Overview

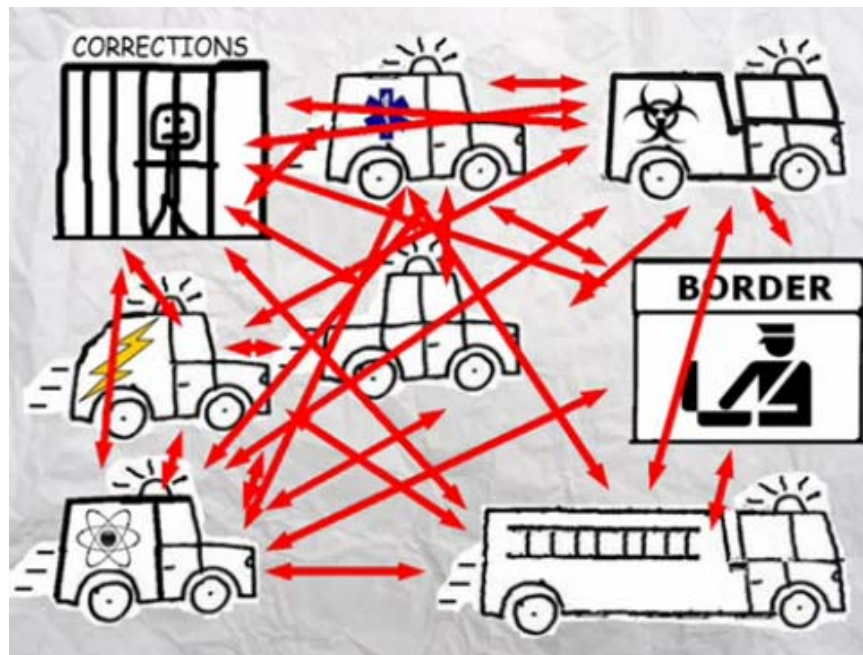
Domain	Organizational Sponsor	Content Focus	Point of Contact
Statistics	U.S. Census Bureau	Standardize information sharing between federal, state and local statistical data collection and processing organizations	Chris Carrino
Health	Department of Health and Human Services (HHS) Federal Health Architecture (FHA)	The Federal Health Architecture (FHA) team is working to adopt NIEM to standardize commonly used clinical fields, value sets and codes used in the Federal Health Information Model (FHIM)	Ms. Gail Kalbfleisch Mr. Kevin Mundy
Humanitarian Aid	U.S. Agency for International Development	Standardize information sharing between multinational governmental and nongovernmental partner to improve international development and disaster assistance	Brandon Pustejovsky
HUD	U.S. Department of Housing and Urban Development	Homelessness Management Information sharing across federal, state and local governments	William Snow Fran Ledger Dr. Russell Verando
Bureau of Reclamation	U.S. Department of the Interior	Share reclamation information with other Federal agencies through interagency agreements, as well as working with state and private entities through cooperative and technology transfer agreements	Andrew Marquat

NIEM Governance



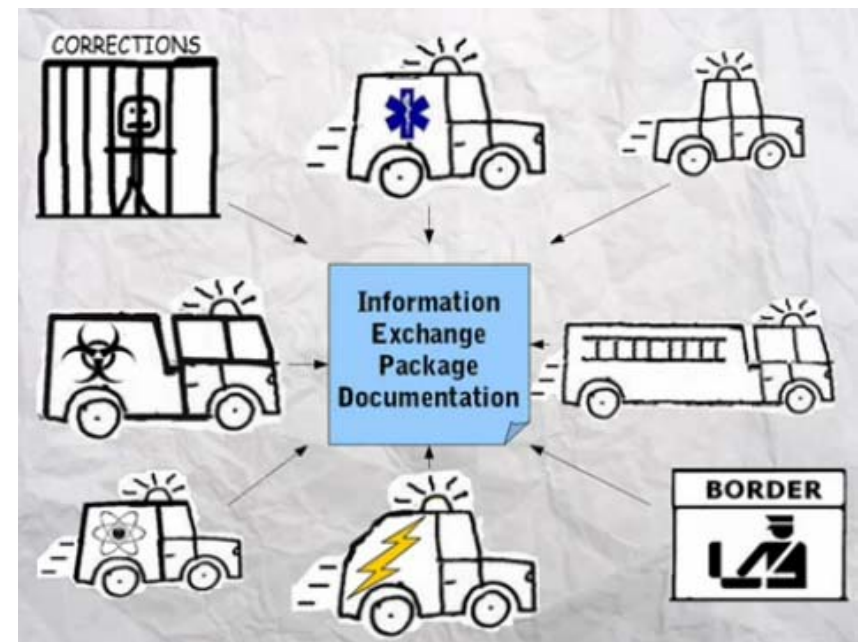
NIEM Connects Communities

When using NIEM, you only need to “speak” two languages — your own and NIEM



WITHOUT NIEM
 $(N-1)^2$

15 Systems
210 Total Interface Mappings
Total Mapping Level of Effort: LoE (210)
Single Program Mapping: LoE (14)



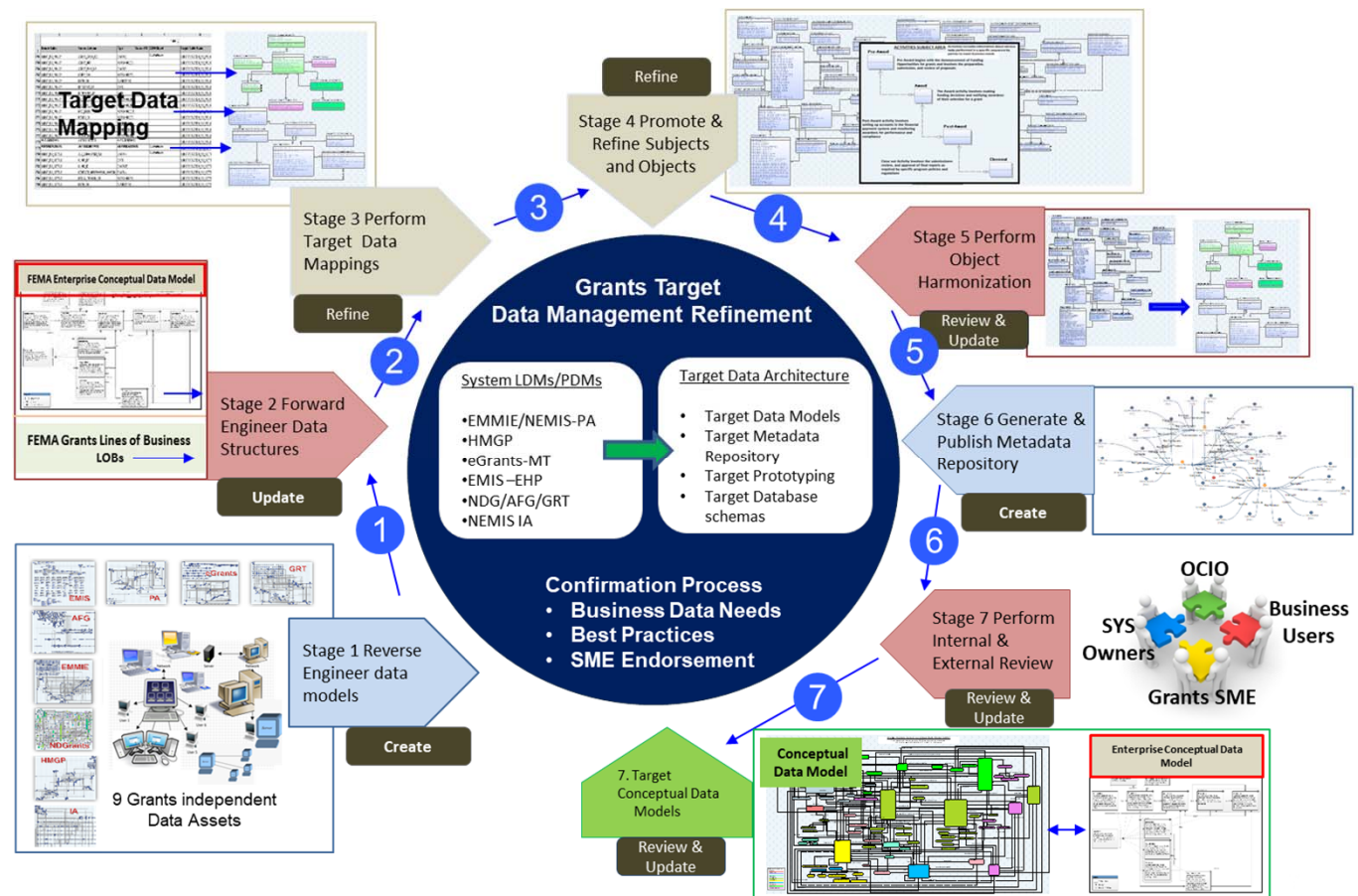
WITH NIEM
 $(N=2)$

15 Systems
15 Total Interface Mappings
Total Mapping Level of Effort: LoE (15)
Single Program Mapping: LoE (1)

Case Study – Grants Management

DHS FEMA Grants Management Data Architecture Approach

To Do:
Highlight current
NIEM integration on
Grants management
[NIEM team]



Why Use NIEM



**REDUCES COST
AND
REDUNDANCY**

**CONSISTENT DATA
DEFINITIONS
INCREASES
INTEROPERABILITY**

**LEVERAGES DATA
AS A CRITICAL
ASSET**



NATIONAL INFORMATION EXCHANGE MODEL



Treasury and NIEM

Transparency in the Federal Government



Transparency in the Federal Government



Recovery.gov

- Provides a mechanism to track, monitor, and report on taxpayer funds distributed through the American Recovery and Reinvestment Act of 2009 (ARRA) – ***as of 9/30/2011 approximately 274,498 total recipient awards have been reported***
- Uses and recipients of all funds are transparent to the public
- Funds are used for authorized purposes and instances of fraud, waste, error and abuse are mitigated



IT DASHBOARD

Federal IT Dashboard

- Enables federal agencies, industry, the general public and other stakeholders to ***view details of federal information technology investments***
- Provides information on the effectiveness of government IT programs and to support decisions regarding the investment and management of resources
- Used by the Administration and Congress to make budget and policy decisions

PUBLIC TRANSPARENCY AND GOVERNMENT ACCOUNTABILITY

Financial Management Data Standard Areas

FM Business Areas	Financial Accounting	Payment Management	Debt Management	Revenue Connection Management
Business Organizations	OFIT - Financial Management Line of Business (LoB)	Assistant Secretary Organizations	Shared Service (ARC)	Fiscal Service CDO Office
Data Standards for FM Administrative Data	<p>The Bureau of the Fiscal Service, on behalf of the Financial Management Line of Business (FM LoB), is issuing the standard financial management data elements,</p> <ul style="list-style-type: none"> • Federal FM Standard Data Elements (~500) • References DAIMS, 		<p>DAIMS</p> <ul style="list-style-type: none"> • ~800 data elements • Financial, Contracts, Grants • References core data from other authoritative sources: <ul style="list-style-type: none"> ○ Agency hierarchy, ○ business entity, ○ Demographic, ○ Geographic 	<p>Fiscal Service Data Registry (FSDR)</p> <ul style="list-style-type: none"> • ~1,300 data elements across different business areas <p>Dts.treasury.gov open data</p> <ul style="list-style-type: none"> • Meta data standards of Treasury open data sets
Governance	Financial Management Standards Committee (Led by OFIT)	CFOC DAIMS Working Group (Led by DAIMS PMO under FS CDO)	Fiscal Service ISS Data Architecture	

NIEM Recovery.gov Submissions

The purpose of the three submissions to the Recovery Accountability and Transparency Board is *to assist in providing accountability and transparency to Federal funds* allocated under the American Recovery and Reinvestment Act of 2009 (ARRA)

Financial & Activity Reports

- Purpose of the exchange is to allow federal agencies to *report obligations and gross outlays of ARRA funds on a weekly basis*
- Used to report core financial elements and major planned actions and major completed actions performed to date

Funding Notifications

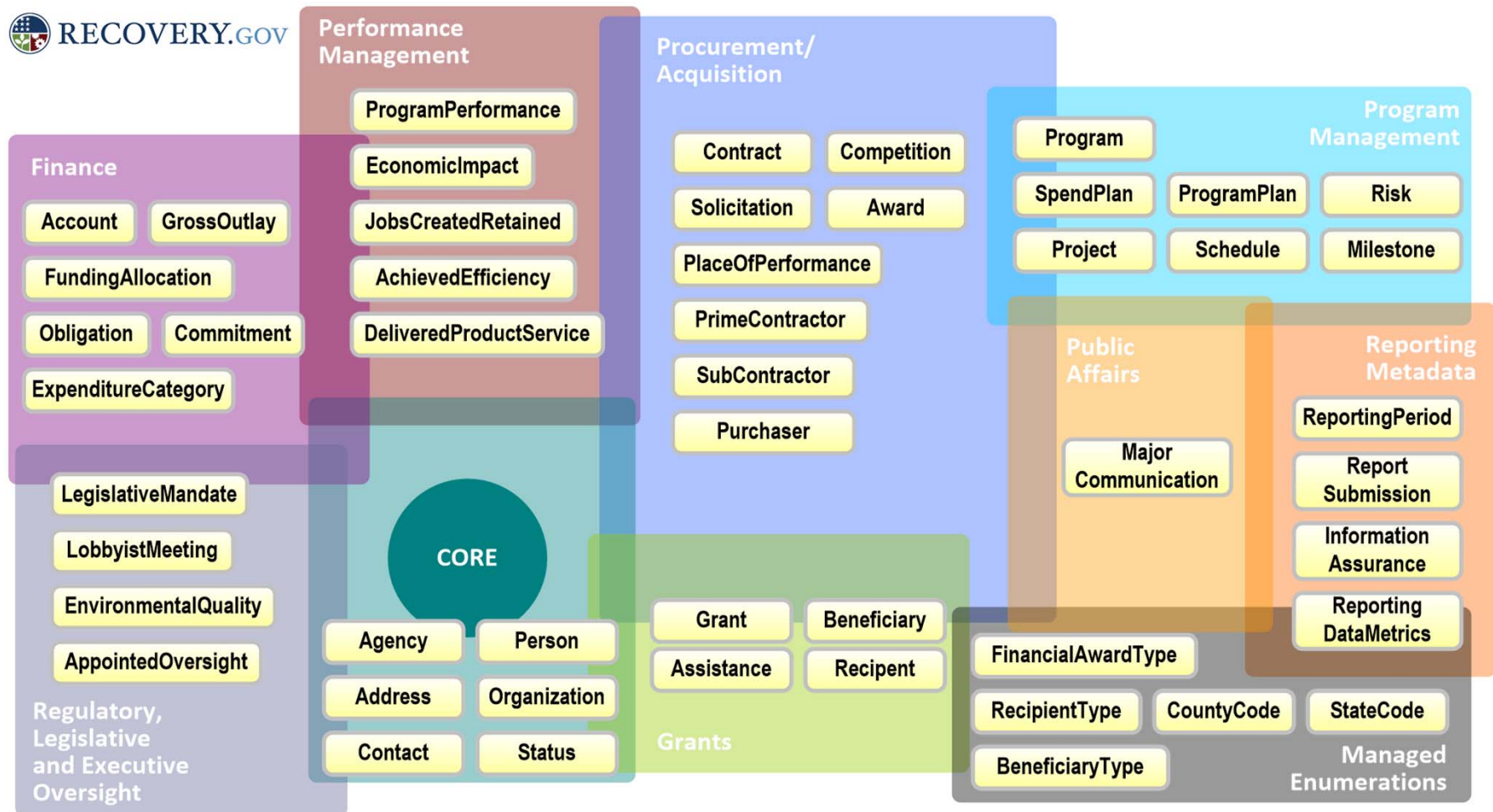
- Purpose of the exchange is to allow federal agencies to report the *amount of ARRA funds that have been publically announced*
- Used to provide details on allocations made for each grant, contract, loan, or cooperative agreement under ARRA

Recipient Reporting*

- Purpose of the exchange is to provide transparency on the allocation and *use of federal funds supporting initiatives established under ARRA*
- Used to provide individual recipient reports granulated to the level of contracts and grants/loans

* Implemented and published on FederalReporting.gov

Recovery.gov Scope: Conceptual-level Domain Model



NIEM Federal IT Dashboard Agency Submissions

- The purpose of the three submissions to OMB is to ***demonstrate an agency's ability to manage their IT investments*** and how governance processes are used when planning and implementing IT investments within the agency

Exhibit 53

- Purpose of the “Agency IT Investment Portfolio” exchange is to ***provide an overall picture of an agency's IT investments***
- Used to create an overall Federal IT Investment Portfolio published as part of the President's Budget

TechStat

- Purpose of the “TechStat Accountability Session” exchange is to ***update the status and other elements of TechStat events***
- Used to provide follow-up to TechStat events, including action items, status, and completion date

Exhibit 300

- Purpose of the “capital asset plans and business cases” exchange is to ***provide details for an agency's major IT investments***
- Used for budget justification and reporting requirements for major IT investments; non IT capital assets are not included as of yet

NIEM Financial Touch-points

Government Financials

- Contracts
- Grants/Cooperative Agreements
- Loans

Management

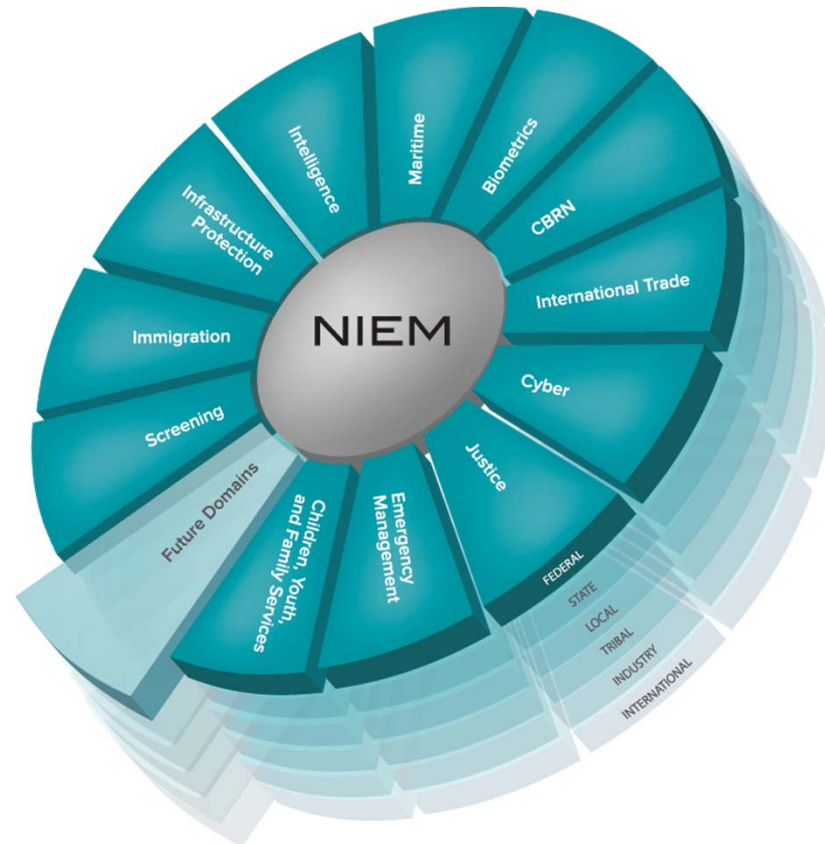
- Investment Management (CPIC) & IT Dashboard
 - OMB Exhibit 53
 - OMB Exhibit 300
 - TechStat
- Travel Management
- Real/Personal Property Management
- Fleet/Asset Management

Regulatory

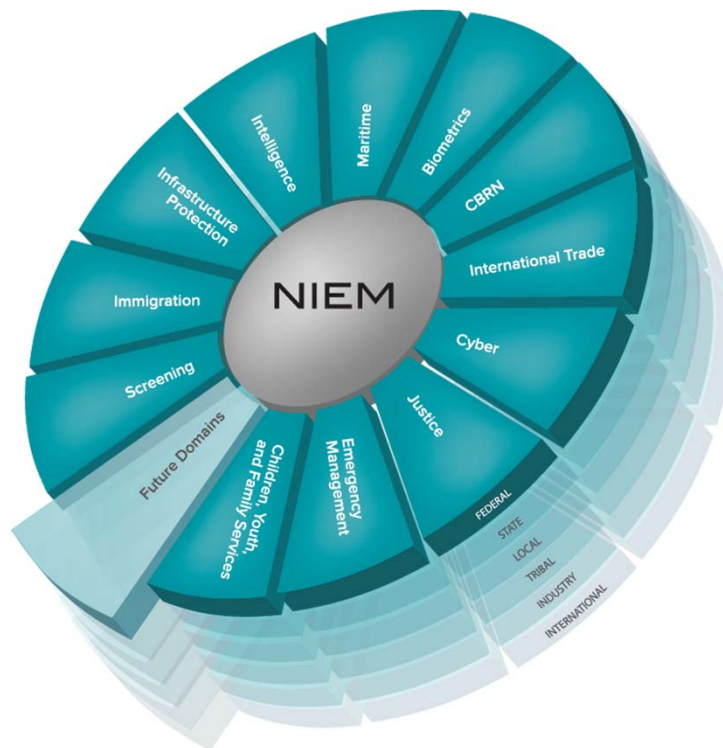
- Resolution
- Receivership
- Legal Entity Identifier

Treasury

- Financial Crimes Enforcement
- Financial Management Service
- Foreign Assets Control



Financial Information Exchange: NIEm Connects



Federal Agency to Federal Agency



Federal to State (State to Federal)



Federal/State to Industry (Industry to Federal/State)



Federal/State to Constituents

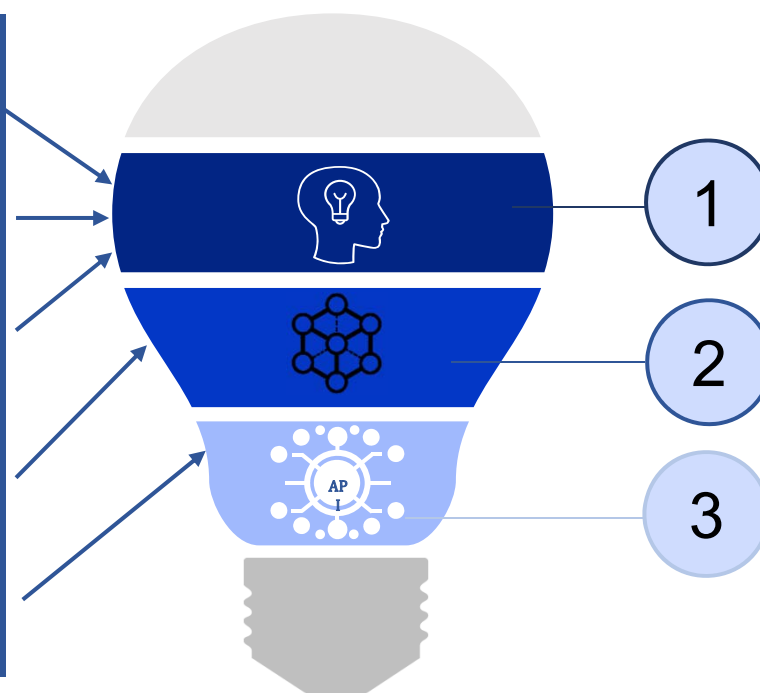


FM Data Standard Current Challenges and Integration Solution

FM data standard needs to be user friendly for diverse stakeholder groups, and integrated with the business processes and FM application systems.

CHALLENGES

1. Current standards does not provide a holistic view of FM business areas – user needs to look for meta data in different places.
2. Data elements is not easily discoverable – lack of intuitive user interface for search and drill down.
3. Data elements are not directly linked to data architecture and data models – requiring advanced user knowledge to understand data element relationships.
4. Lack of common core data elements that are shared and re-used in different business areas - such as agency identifiers, business entity elements, and addresses.
5. Data standard updates are costly to implement – lack of system to system interfaces for meta data prevents automated standard updates and increases cost for application system updates.



SOLUTIONS

User-centric Approach to FM Data Standard

- Central Access Point to Data Standard
- Provide advanced search capability for data elements
- Provide browsing and drill down capability from business areas to objects, and eventually to data elements

Decouple Data Domains to Enable Reuse

- Define a uniform structure for FM data standard domain with a common core domain

Enhance Automated Integration

- Establish APIs for FM data standard
- Integrate with FM applications systems to promote automated standard updates

NIEM Integration Benefits

SOLUTIONS

NIEM Integration Benefits

1

User-centric Approach to FM Data Standard

- Central Access Point to Data Standard
- Provide advanced search capability for data elements
- Provide browsing and drill down capability from business areas to objects, and eventually to data elements

2

Decouple Data Domains to Enable Reuse

- Define a uniform structure for FM data standard domain with a common core domain

3

Enhance Automated integration

- Establish APIs for FM data standard
- Integrate with FM applications systems to promote automated standard updates



- Provides open source tools and website infrastructure for search and drill down
- Provides capability to integrate intuitive data models (e.g., UML) on the data standard website
- Provides a well established domain structure with common core domain for re-use
- Facilities linking data sets across business areas with 14 existing NIEM business domains
- Provides open source tools for system to system integration

DHS History with NIEM



- In 2005, the U.S. Department of Justice (DOJ) and the U.S. Department of Homeland Security (DHS) jointly established the National Information Exchange Model (NIEM)
- DHS led stewardship of the NIEM Management Office Jan 2009 through Oct 2018
- DHS established and is the steward for 8 domains – Cyber being the newest domain to NIEM
- DHS NIEM milestones include a NIEM UML instantiation, formalization of domain policies and process, development of the Movement tool, and hundreds of NIEM implementations
- DHS establishes a “NIEM First” policy memo on 3 May 2019
- Many DHS components are using NIEM, to include but not limited to: ICE, CBP, USCIS, CWMD, S&T, FEMA, TSA, USCG, and CISA. NIEM is also a key element of many of the Department’s strategic imperatives.

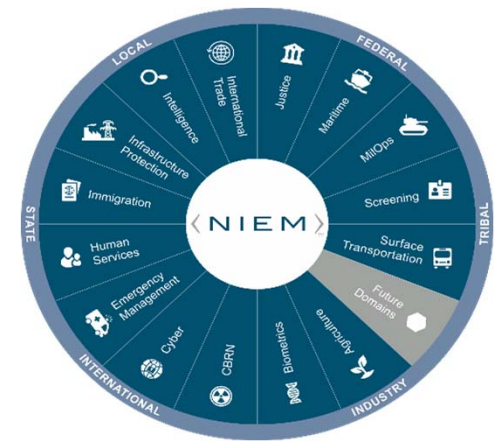
Information Sharing Requirements Exist



- **Department of Homeland Security (DHS) requires sharing of data**
 - Within and across DHS components
 - With Federal, State, Local, Tribal partners
 - With International partners
 - With Industry partners
- **For DHS, this includes**
 - Multiple, complex data sharing permutations (ex: Cyber, Immigration, Customs and Border Control, etc...)
 - Data must be shared across multiple networks, multiple security boundaries, multiple IT capabilities and still be understandable
 - Component programs are not equipped to handle all domains in this Enterprise-level data sharing challenge

NIEM for DHS Information Sharing

- The *National Information Exchange Model (NIEM)* is specifically and uniquely designed to meet the DHS enterprise-level data sharing need
- Whitehouse directed as a result of 9/11 data sharing lessons learned
- DOD assumed stewardship from DHS of the NIEM Initiative 31 Oct 2018
 - Executive lead: DOD CIO
 - In partnership: DOJ, HHS, DHS
 - Day-to-day management: JS J6
 - Resources and requirements sponsor: MPCO
- **Governance includes 15 Domains + Core**
 - From 12 different Federal government departments, agencies plus Canada
 - DHS leads 8 Domains



Includes Canada and NATO (as NATO Core Data Framework)

Domain Steward Roles and Expectations

Governance

- Complete domain charter*.
- Complete domain operations and maintenance plan*.
- Assign individuals to carry out governance and operations responsibilities, including identifying a NBAC representative.
- Hold initial governance group meeting.
- Develop a plan of action and milestones for remaining domain stand-up activities.

*The NIEM PMO will provide templates for these documents.

Stakeholder Engagement

- Notify the initially identified domain stakeholders that the domain has been established and inform them of any upcoming domain activities.
- Work with the NIEM PMO to create a domain collaboration zone on NIEM.gov, which provides a forum for domain members to exchange ideas and post relevant documents.
- Consider promoting NIEM training opportunities to the domain's COI.

Data Model

- After the IEPDs for the initially identified data exchanges have been developed, create the domain data model using the data elements that did not already exist within NIEM core or other domains.
- Publish the data model to publication.niem.gov*.

*Note that domains can publish their domain data models independently of overall NIEM releases.

Recommendations

- **Align all of DHS with the NIEM initiative**
 - Promulgate and educate the “NIEM First” policy memo
 - Review DHS led NIEM domains management and operations
 - Mature or reinvigorate DHS led domains
 - Integrate NIEM into DHS implementation way forward, including Legacy Data Exchanges, System Refreshes, and New System Development
 - Conduct appropriate “get smart” technical exchanges with the NIEM Management Office
 - Provide NIEM training to program teams
- **Continue DHS success, saving money, increasing data interoperability**
 - Take advantage of training and technical assistance
 - Stay connected with NIEM community (NTAC, NBAC, NMO)
 - Promote adoption across all lines of business

Contact Us

NMO Katherine Escobar (Katherine.b.escobar.civ@mail.mil), 757-203-8631

NMO Steve Sullivan (stephen.m.sullivan14.ctr@mail.mil), 757-203-8619

NBAC Kamran Atri (katri@a4safe.com), 703-930-6057

NBAC Thomas Krul (Thomas.krul@Canada.ca), 613-949-6513



GitHub

NIEM.github.io



LinkedIn

<http://www.linkedin.com/groups?qid=1903175>



Twitter

www.twitter.com/NIEMConnects



YouTube

www.YouTube.com/NIEMConnects



Back Ups And Amplifying Information

NIEM Program Strategic Focus



Increasing NIEM international adoption

Broadening NIEM state & local implementations

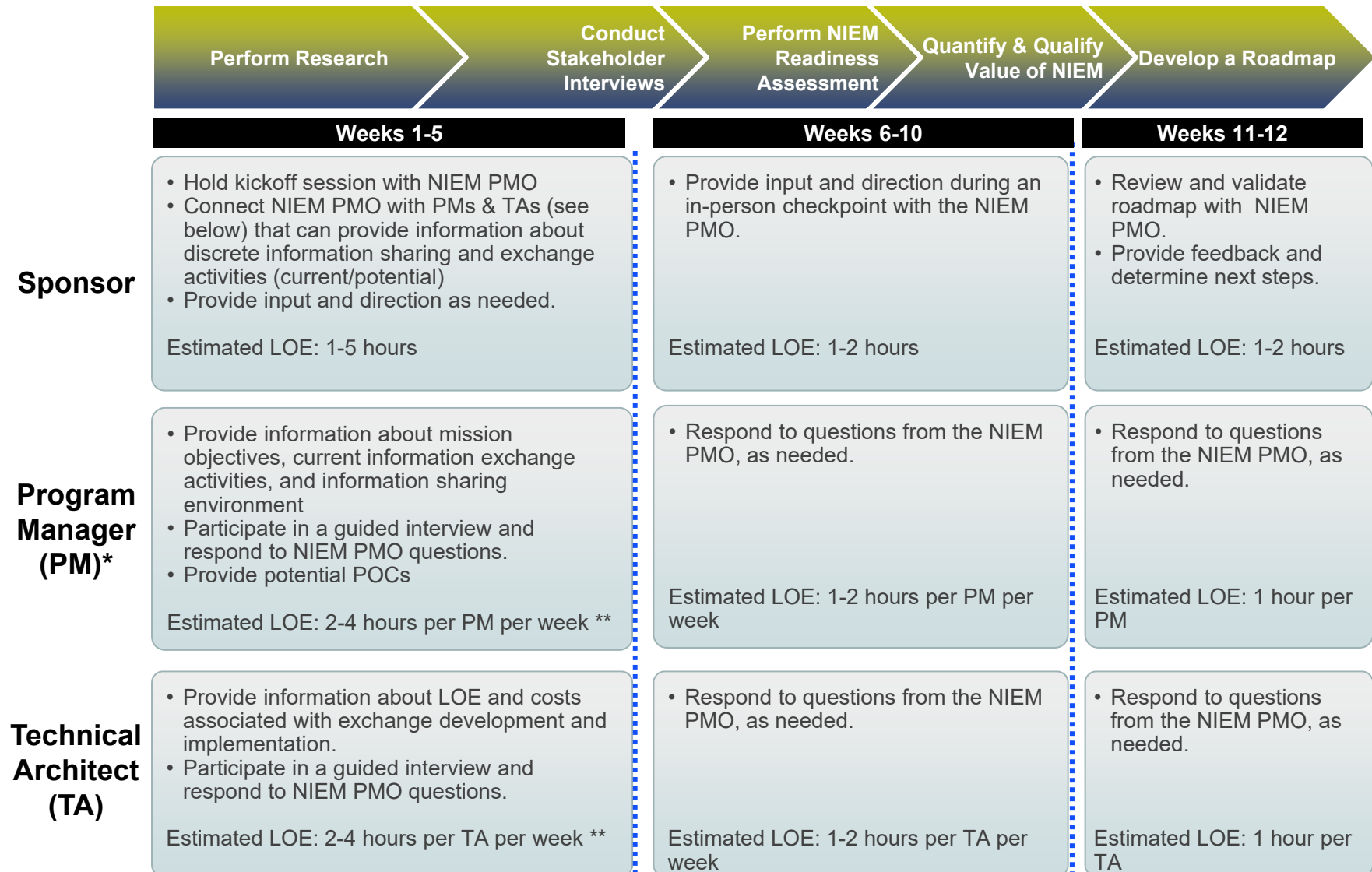
On-boarding new and strengthening existing NIEM Domains

Increasing content across the NIEM Model

Developing tools that improve the development of NIEM exchanges

Increase adoption by making NIEM technology agnostic (meta-model)

New Adoption Agency Roles and Expectations

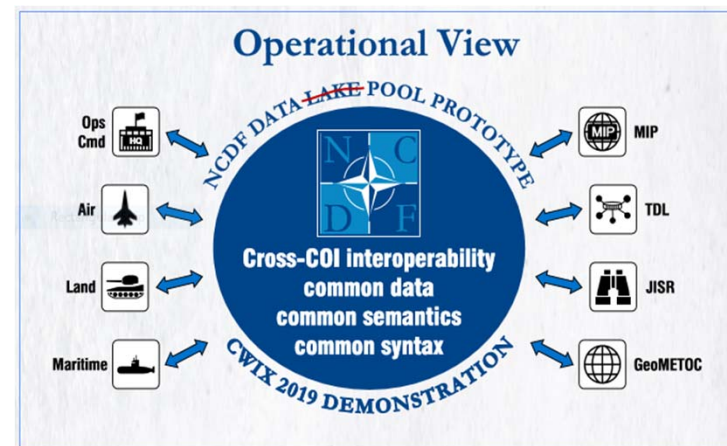
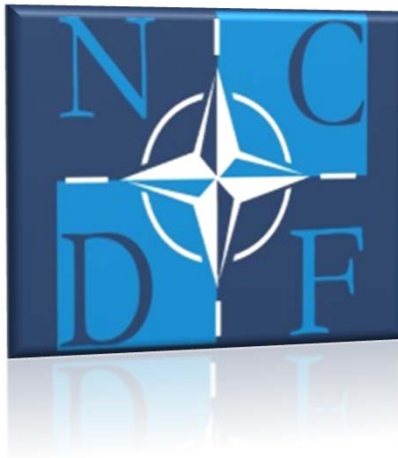


*One or more program managers/other equivalent POCs may be needed to provide information about different exchanges.

** The actual level of effort to complete the required tasks may be lower than initially estimated.

NIEM Adopted by NATO

- **NIEM relabeled, fully leveraged as NATO Core Data Framework (NCDF)**
 - Required by NATO information sharing policy
 - Enabler for Federated Mission Networking (FMN) cross-Community of Interest (COI) information sharing
 - Integrated into NATO programs
 - *Example:* NATO AWACS replacement program (Alliance Future Surveillance and Control (AFSC))
 - Foundation for mission partner CJTF-level data lake
 - *Example:* NATO Link 16 feed, national air track feed, maritime OTH-Gold, land SA feed,...





NIEM Governance

NIEM Domain Overview

NIEM Domain	Organizational Sponsor	Content Focus	Points of Contact
Agriculture	U.S. Department of Agriculture (USDA)	Farm Service Agency (FSA) and Risk Management Agency (RMA) reporting data about crops, acreage, and revenue as part of the federal crop insurance program	Mr. Brian Brotsos Ms. Jacquie Butler
Biometrics	DHS National Protection and Programs Directorate (NPPD) Office of Biometric Identity Management (OBIM)	Part of a coordinated global effort to maintain and refine operations focused on security, intelligence, law enforcement, international trade, travel and immigration by means of identity management and assurance	Mr. John Boyd (SES) Mr. Thomas Freed
Chemical, Biological, Radiological, and Nuclear	DHS Domestic Nuclear Detection Office (DNDO) with cooperation of Customs and Border Patrol (CBP)	National effort to detect and interdict radiological and nuclear threats. The GNDA (Global Nuclear Detection Architecture) involves DHS, DOJ, DOE, DOS, DOD, the Governmental Nuclear Regulatory Commission (NRC), state, local, and tribal agencies	Mr. Thomas Tullia Mr. Melson Martis
Core	DHS/DOD	Common data types, properties, code sets across multiple Domains	Ms. Christina Medlin Mr. Ralph O'Connell
Cyber	DHS Cybersecurity and Infrastructure Security Agency (CISA)	Enable Federal Government and critical infrastructure owner and operators information exchanges	Mr. Preston Wertz Mr. Consti Tudan
Emergency Management	DHS Science and Technology (S&T) First Responders Group (FRG)	Supports emergency-related services (first responders, responding to disasters), information sharing, and activities such as homeland security and resource communications management	Mr. Dan Cotter (SES) Mr. Kamran Atri
Human Services	Department of Health and Human Services (HHS) Administration for Children and Families (ACF)	Create and encourage greater collaboration and service integration among human service programs and agencies to improve client outcomes, lower costs, and enhance operational efficiencies	Mr. Christopher Traver Ms. Dorothy Wan
Immigration	DHS Citizenship and Immigration Services (CIS) and Immigration and Customs Enforcement (ICE)	Standardized information sharing to improve investigative and enforcement responsibilities for federal immigration laws, customs laws, and air security laws to foster better collaboration with their external partners	Ms. Jennifer Kish Mr. Curtis Ross

NIEM Domain Overview cont.

NIEM Domain	Organizational Sponsor	Content Focus	Points of Contact
Infrastructure Protection	DHS Office of Infrastructure Protection (IP)	Coordinated national program to reduce risks to the nation's critical infrastructure and key resources (CIKR)	Mr. Ash Chaterjee
Intelligence	ODNI Criminal Intelligence Coordinating Council and the federal Intelligence Community	Identify the operational needs to exchange intelligence, as well as the opportunities to share information with other domains and functions in justice and homeland security	Mr. Matthew Lucas Ms. Sue Dohr
International Trade	DHS Customs and Border Protection (CBP)	Enable resulting in greater facilitation of trade and more effective identification and elimination of security threats before they arrive at ports and borders. Aligns with the World Customs Organization (WCO) Data Model and the Customs Business Process models.	Ms. Renee Messalle Mr. Shailesh Sardesai
Justice	FBI stewardd the U.S. Attorney General's Advisory Council on Global Justice Information Sharing	Global Justice XML Data Model (GJXDM) became the first NIEM domain in 2005 to enable the entire justice and public safety communities to effectively share information at all levels – laying the foundation for local, state, tribal, and national justice interoperability.	Ms. Cherie Cochran Ms. Kate Silhol
Maritime	Office of Naval Intelligence (ONI) OCIO stewards in coordination with DHS	Support full Maritime Domain Awareness: "the effective understanding of anything associated with the global maritime domain that could impact the United States' security, safety, economy, or environment" including vessels, people, cargo, maritime locations and activities	Dr. Benjamin Apple
Military Operations	Joint Staff J6 stewards on behalf of the DOD CIO	Data components necessary to support improved data interoperability between DOD and mission partners for operations	Mr. Ralph O'Connell Mr. Rodney McCoy
Screening	DHS	Supports, coordinates, and harmonizes a wide range of screening and credentialing activity information across homeland security mission areas	Mr. Steve Yonkers
Surface Transportation	Department of Transportation (DOT)'s Chief Data Officer (CDO)	Exchange transportation information between organizations to support DOT Traffic Records Coordinating Committee and the State Traffic Records Coordinating Committees	Mr. Daniel Morgan (SES)

NIEM Domain Management Resources



The following resources provide additional guidance on managing a domain:

Governance

Guidance on Establishing Domain Governance – Provides detailed guidance on how to stand-up a domain governance model. Domains are advised to read this document before drafting their domain charters and domain operations and maintenance (O&M) plans.

Domain Charter Template – Provides a standard format and guidance for creating a domain charter.

Domain O&M Plan Template – Provides a standard format and guidance for creating a domain O&M plan.

Stakeholder Engagement

Domain Community of Interest Guidance– Planned for development by the NIEM PMO.

Domain Stakeholder Communications Guidebook – Planned for development by the NIEM PMO.

Data Model

NIEM Naming and Design Rules (NDR) – Provides detailed design rules on how a domain data model should be structured.

Model Package Description (MPD) Specification– Defines terminology, identifies required/optional artifacts and metadata, specifies normative rules, schemes and syntax, and provides non-normative guidance.

NIEM Community Stakeholders

The NIEM community continuously communicates with six different stakeholder types. Each stakeholder is interested in NIEM and how it can help its organization or project for different reasons



Executives

NIEM minimizes the time-to-market while allowing maximum flexibility.



Program Managers

NIEM can make a job easier by helping teams build exchanges in less time, for less money time.



Architects

NIEM offers a better way to exchange data and is adaptable; it can be modified or new capabilities added to an existing exchange.



Developers

Tools and support are available to make exchange development easier and faster.



Implementers

NIEM can lower the cost of maintenance in comparison to legacy formats.



Tool Providers

NIEM can be an avenue to connect with customers who have an interest in information sharing capabilities.



NIEM In DOD

DOD Adoption of NIEM

- **“NIEM First” policy codified in DOD CIO issuance 8320.07**

- Directs “NIEM First” consideration for new IT initiatives and for programs that are updating their interfaces
- Lacks enforcement mechanisms
- Policy language allows program opt out

Some Successes

- DHS lead for DOD cyber effects information sharing
- Military standards adoption (US MTF, Link 16)
- Alignment with NATO and FVEY
- DOD security sensors Best of NIEM award winner 2018
- Some adoption occurring in all four Services

Challenges Remain

- Policy relies on individual program “good citizen” approach
- Individual programs not driven by enterprise interoperability requirements
- No DOD standardized enterprise Information Exchange Requirements (IER)

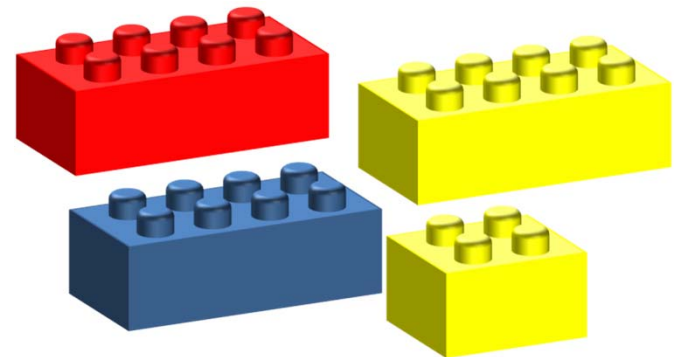
NIEM is a **critical enabler** for both the Mission Partner Environment (MPE) and Department of Homeland Security (DHS)



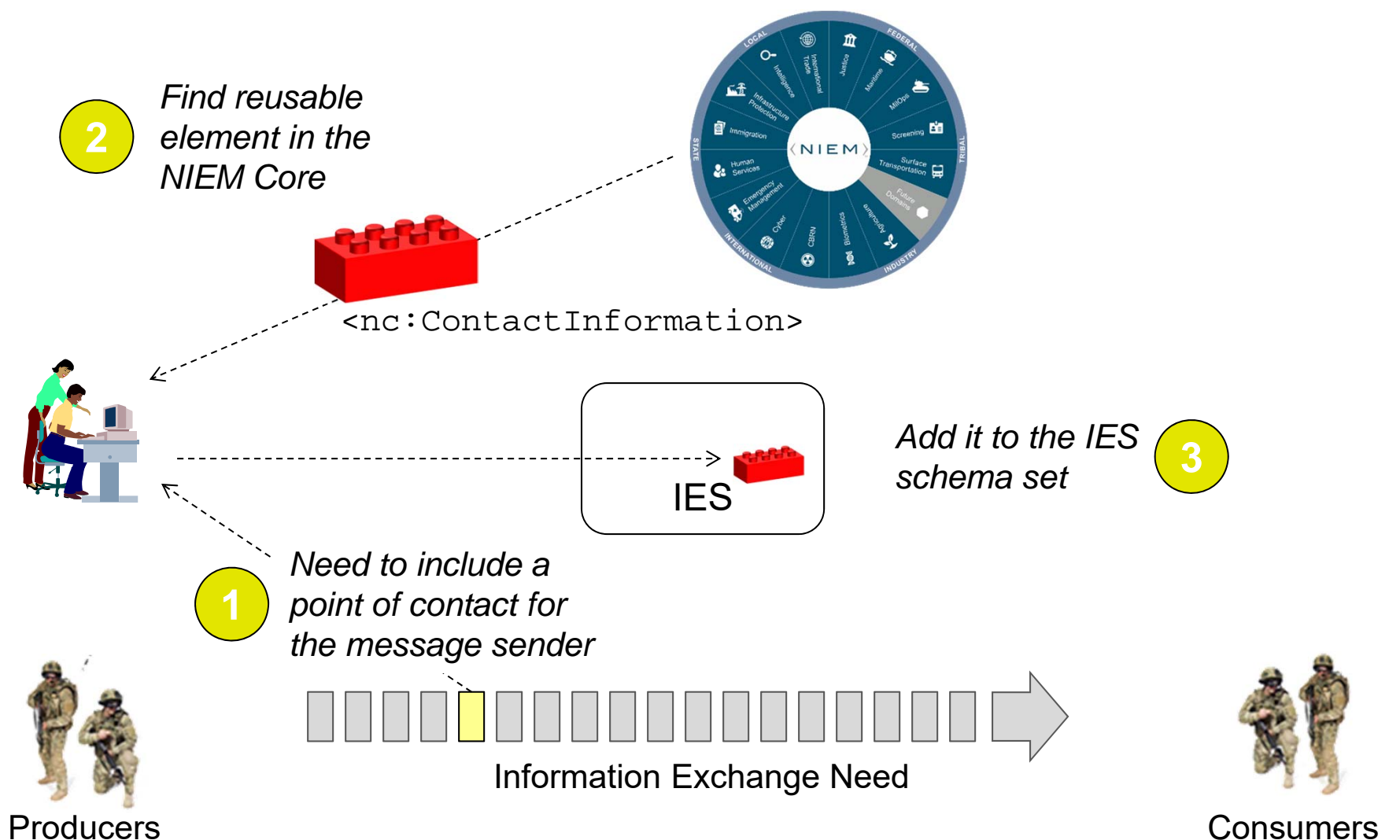
NIEM Technical Approach

“Lego™ Block” Modeling

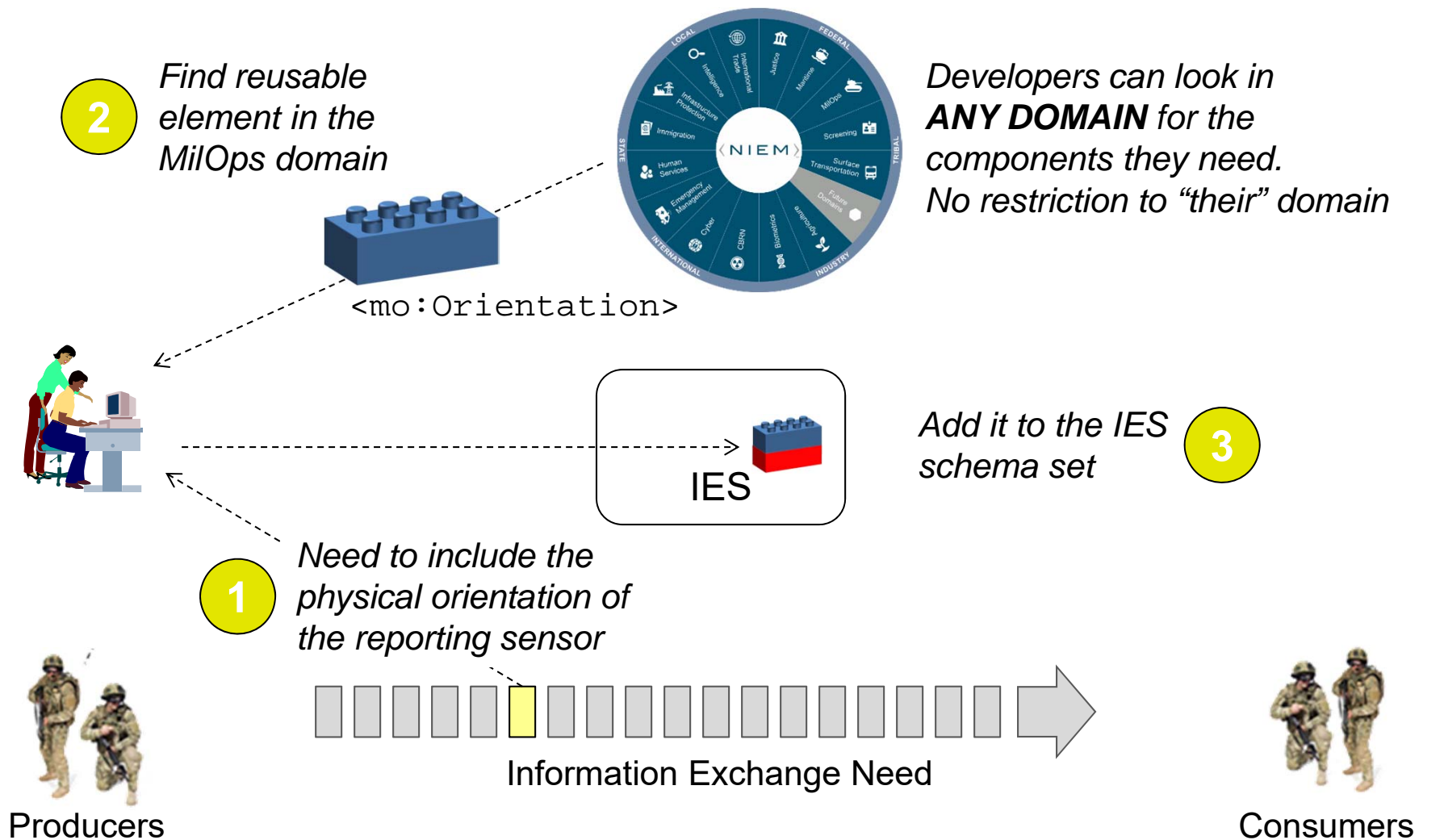
- **Designing an information exchange with NIEM is like building a plastic model out of Lego blocks**
 - You decide what the model should look like
 - You choose the blocks you need for your model
 - Technical specification ensures that the blocks will snap together
- **NIEM is even better than Legos, because**
 - Each NIEM domain provides a collection of useful blocks
 - You can easily create any block that’s missing from your set (and then share it with others)
 - The blocks are all free



Reuse Core Components for Data Needs



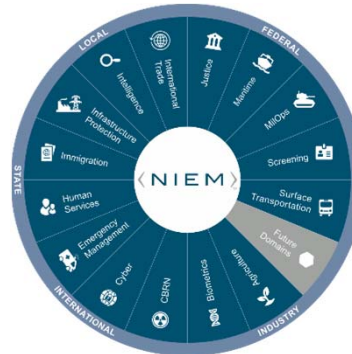
Reuse Domain Components for Data Needs



Create New Components for Data Needs

2

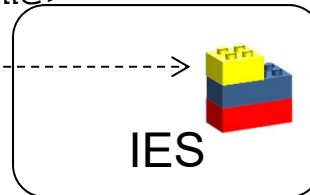
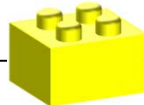
Can't find a matching component in core or domains



Developers can create **ANY COMPONENT** they need for their exchange. No restriction to what's already in the NIEM model.



<cot:SensorModelName>



Create and add a new component to the schema set

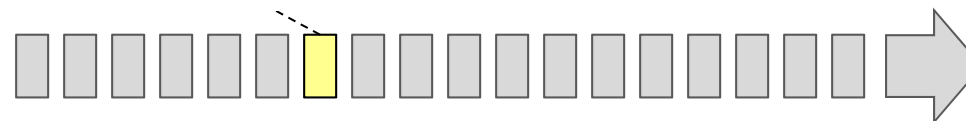
3

1

Need to include the model name of the reporting sensor



Producers

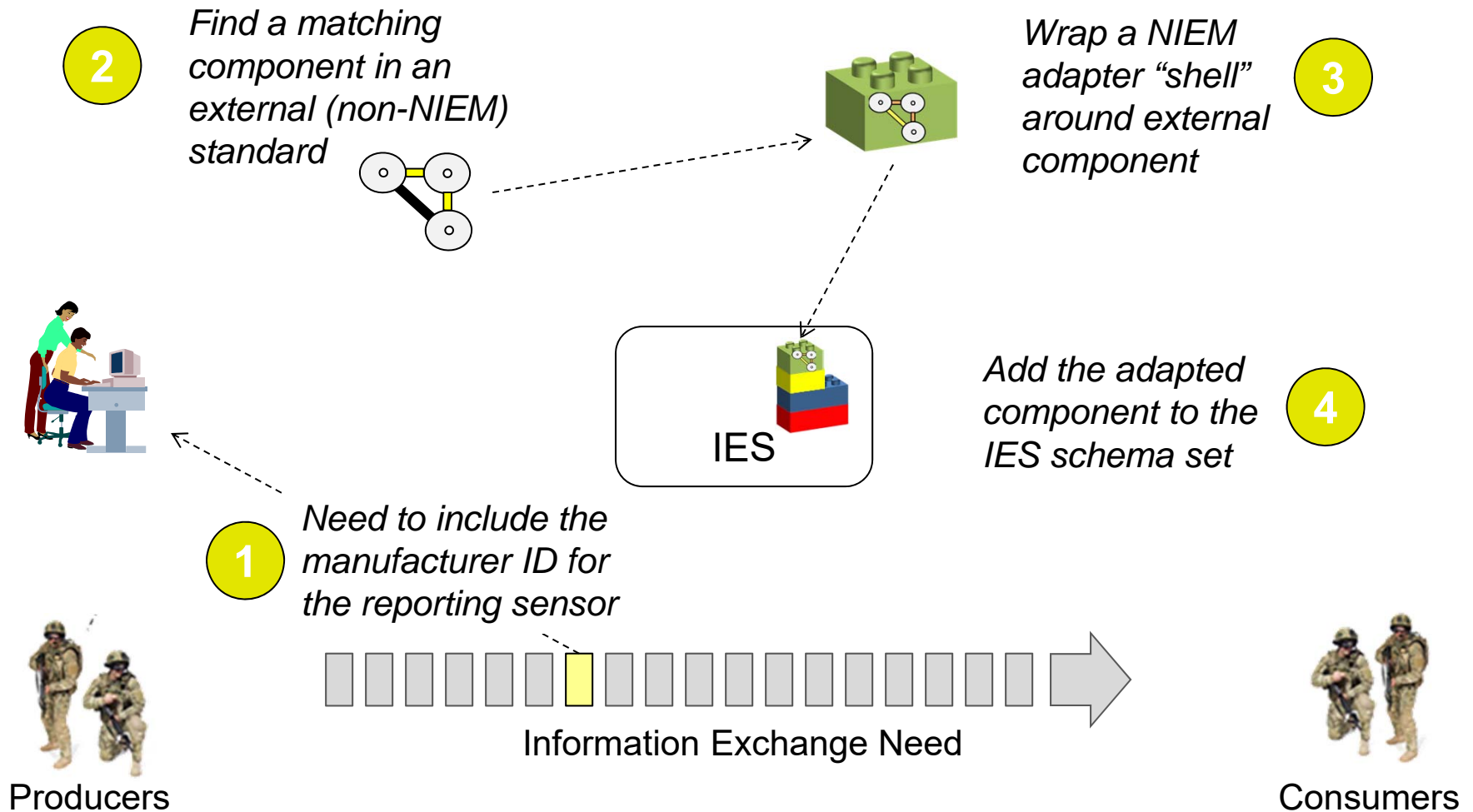


Information Exchange Need



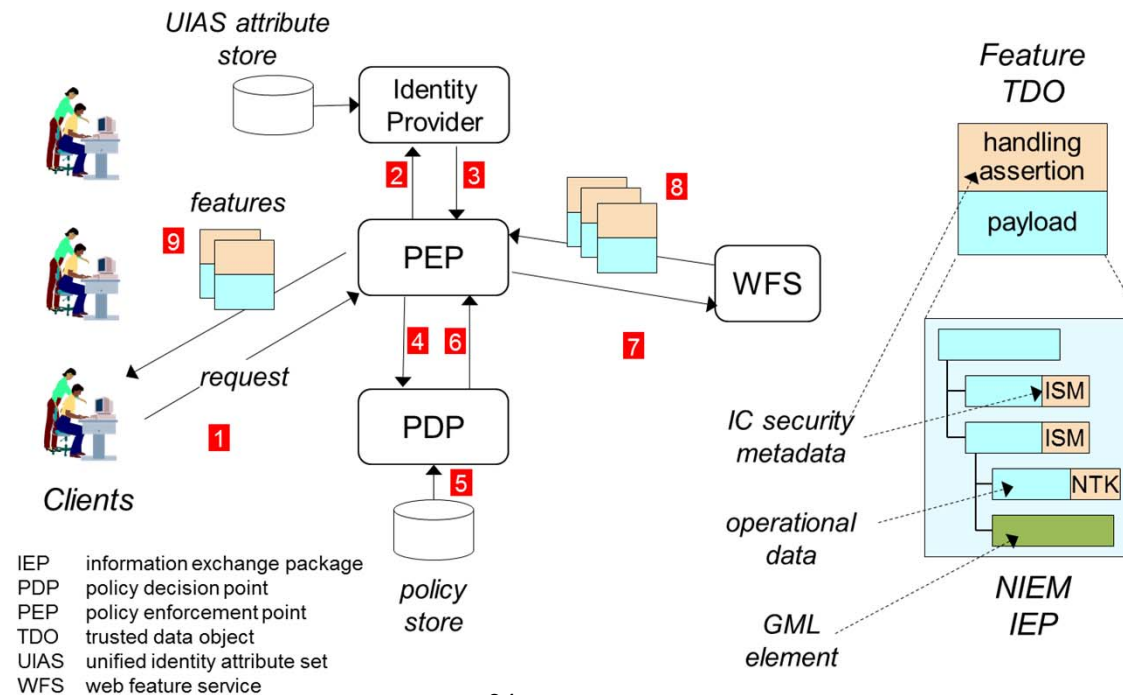
Consumers

Adapt External Components for Data Needs



NIEM Works With GML And IC Security

- Easy to embed GML elements in a NIEM IEP
 - No problems introduced by NIEM “adapter” mechanism
 - Validated by two OGC experiments (MOGIE & Geo4NIEM)
- Easy to include and enforce IC markings in a NIEM IEP
 - Demonstrated by Geo4NIEM phase 2



NIEM Works In Low-Bandwidth Environment

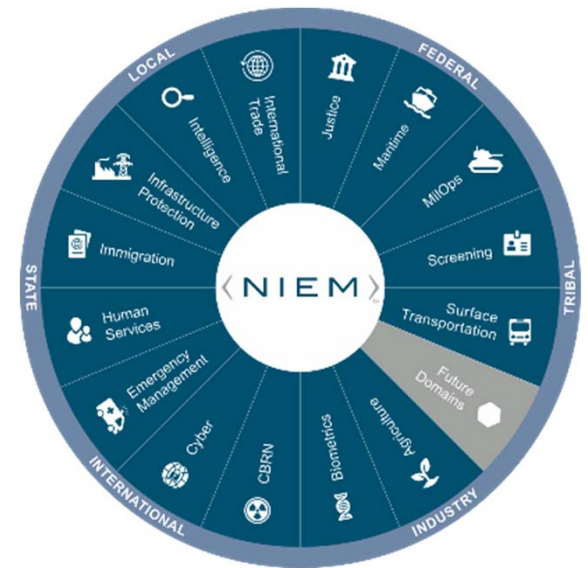


- **Efficient XML Interchange (EXI) is the W3C standard for compressed binary XML data**
- **For a properly designed schema, EXI produces messages very near the information-theoretic minimum size**
 - **Often smaller than hand-crafted binary message formats**
 - **Plenty of experimental evidence**
- **Properly-designed schemas are always possible with NIEM**
 - **Nothing in NIEM ensures a good low-bandwidth design, but...**
 - **Nothing in NIEM makes a good design impossible, and...**
 - **In practice, good design with NIEM is not difficult**

**People will always have bandwidth problems,
but these problems will not be caused by NIEM**

NIEM Is About Cooperation, Not Control

- **NIEM Core and NIEM domains create data components by consensus among data exchange designers**
- **Components are established when participants believe that a common definition will make their exchanges easier to create and implement**
- **Each domain changes on its own schedule, under its own control**
- **Changes in the core or in a domain do not force changes in other domains or in any data exchange**
- **No one is ever required to use a component that does not satisfy the data exchange needs, so there is no leverage for controlling the participants**



Applying NIEM Is Not Technically Difficult



- **Developers with the skills to design and implement an XML data exchange can learn the NIEM approach in a matter of hours**
- **Developer training is available**
 - **No-cost online courses are on the NIEM web site**
- **Plenty of example IEPDs to follow**
- **The NIEM technical specifications are complex, however**
 - **Most developers do not need to read them**
 - **Free tools can perform most of the conformance checking**



NIEM Video for Executives

NIEM Simplified



Please click *play* to begin.

<https://www.youtube.com/watch?v=BA1jY8LJ8tM>