A vendor's view into standards and its implementation

SUNGARD PUBLIC SECTOR

Connect
the
Community

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Key Standards

- GJXDM

- NIEM

- LEXS

- N-DEx

# Standards and their Evolution

- GJXDM

  - DOJ, OJP attempt to define reference data model, data dictionary, schema for public safety agencies

  - Initial draft April 2003

  - Second draft September 2005

  - Not an active standard currently

Standards and their evolution

- NIEM

  - 9/11 impact, founded February 2005

  - Define standard to effectively and efficiently share critical information at key decision points throughout the whole of the justice, public safety, emergency and disaster management, intelligence, and homeland security enterprise

  - NIEM 1.0 – 2006

  - NIEM and GJXDM converged with NIEM 2.0

  - Current NIEM version is 2.1

NIEM Technical Architecture
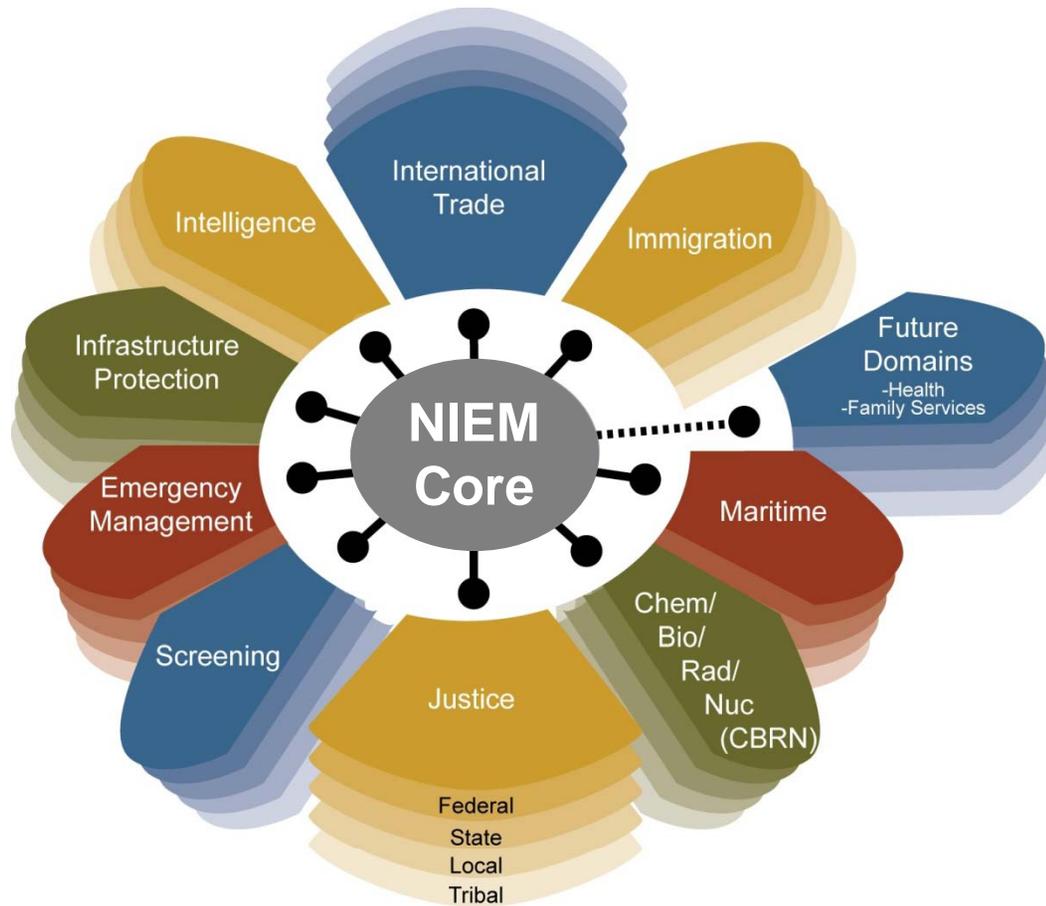
NIEM Core consists of data elements that are commonly understood across domains

NIEM Domains include mission specific data that is managed through independent stewards

Future Domains are added to NIEM as necessary based on an established need

NIEM Core

International Trade

Immigration

Intelligence

Future Domains
-Health
-Family Services

Infrastructure Protection

Maritime

Emergency Management

Chem/ Bio/ Rad/ Nuc (CBRN)

Screening

Justice

Federal
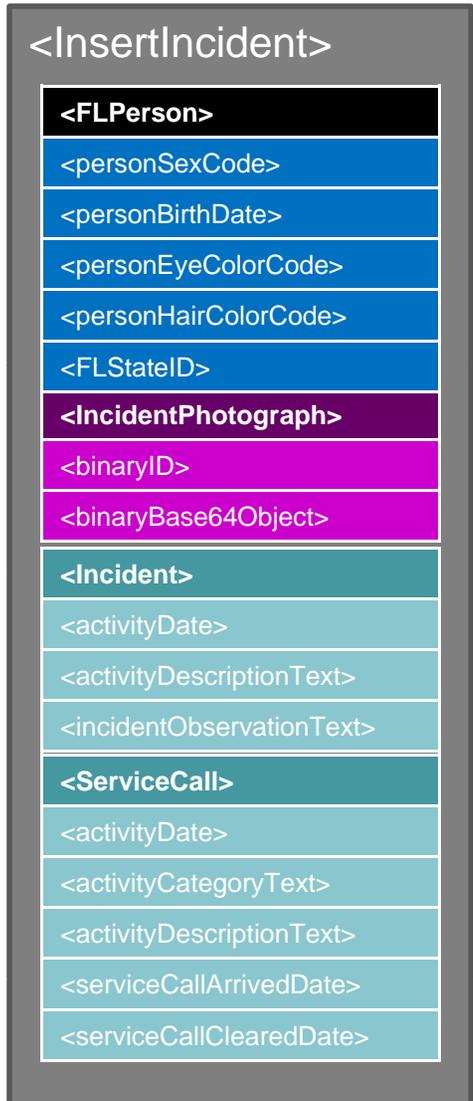State
Local
Tribal

Standards and their evolution

- NIEM Key Points
  - NIEM defines data elements, schema not the structure
  - NIEM does not provide a API for data exchange
  - NIEM is very flexible in extending data schema making data sharing difficult
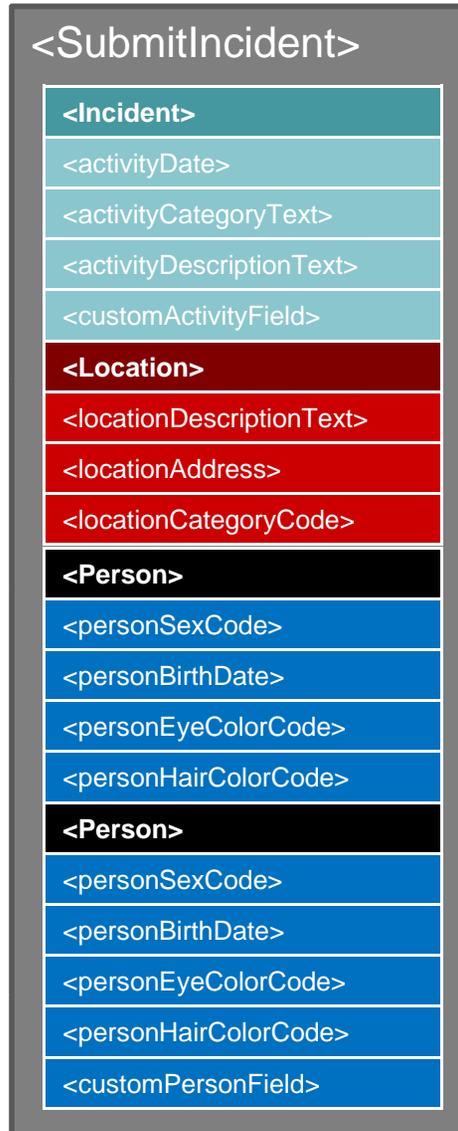
- **Freedom to create your own IEPDs has its benefits and drawbacks**
  - If everyone can customize, is it really a standard?

- **How does reuse work?**
  - IEPD Clearinghouse
  - Some IEPD scoped for local use, others for more broad use

- **Compare two(2) IEPDs for Incident Submission**
  - Both IEPDs NIEM-compliant
  - Root elements different
  - Element ordering different
  - CAD event not supported in #1
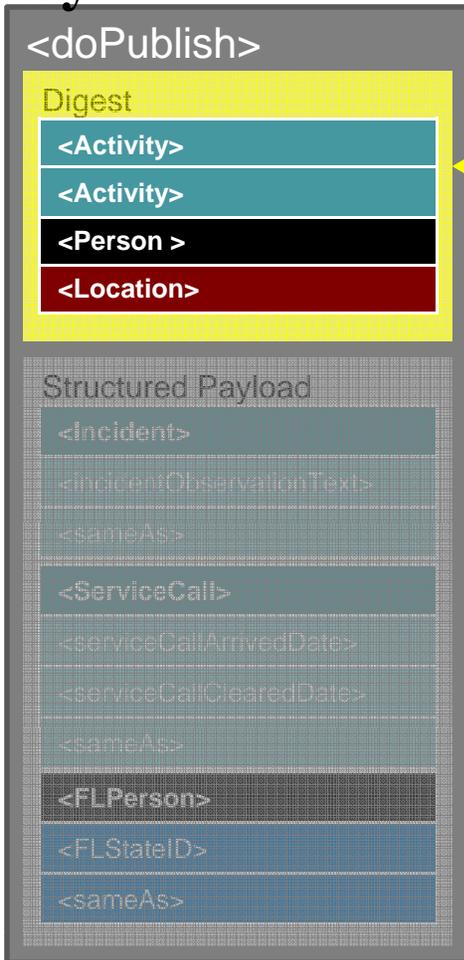 - Person element differences
  - Photo required for #2

IEPD #1

<SubmitIncident>

<Incident>
<activityDate>
<activityCategoryText>
<activityDescriptionText>
<customActivityField>
<Location>
<locationDescriptionText>
<locationAddress>
<locationCategoryCode>
<Person>
<personSexCode>
<personBirthDate>
<personEyeColorCode>
<personHairColorCode>
<Person>
<personSexCode>
<personBirthDate>
<personEyeColorCode>
<personHairColorCode>
<customPersonField>

IEPD #2

<InsertIncident>

<FLPerson>
<personSexCode>
<personBirthDate>
<personEyeColorCode>
<personHairColorCode>
<FLStateID>
<IncidentPhotograph>
<binaryID>
<binaryBase64Object>
<Incident>
<activityDate>
<activityDescriptionText>
<incidentObservationText>
<ServiceCall>
<activityDate>
<activityCategoryText>
<activityDescriptionText>
<serviceCallArrivedDate>
<serviceCallClearedDate>

Standards and their evolution

- LEXS (<u>L</u>ogical <u>E</u>ntity e<u>X</u>change <u>S</u>pecification)

  – DOJ, OJP funded GTRI to evolve GJXDM and converge NIEM and GJXDM

  – Provide implementation specific context for law enforcement

  – Provide API and tools to define, build and validate exchanges

  – LEXS current version is 3.1

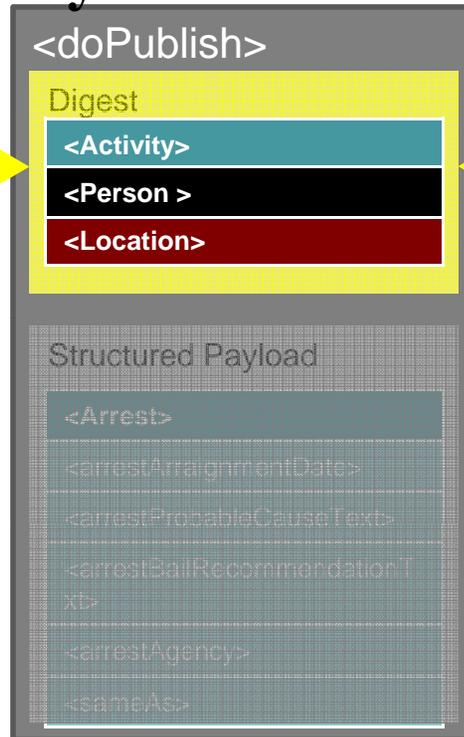 – "Special" IEPD created by US DOJ

Standards and their evolution

- **LEXS (Logical Entity eXchange Specification)**
  - Describes a general framework for laying out NIEM elements for maximum reusability
    - Concept of lowest common denominator
    - Identifies **common** fields and how they should be laid out
    - **Custom** elements/fields are supported and placed in a single, consistent location

  - Provides specific, standard constructs for message handling
    - Submit
    - Query
    - Subscribe/Notify(upcoming)

System A

<doPublish>

Digest

<Activity>
<Activity>
<Person >
<Location>

Structured Payload

<Incident>
<incidentObservationText>
<sameAs>

<ServiceCall>
<serviceCallArrivedDate>
<serviceCallClearedDate>
<sameAs>

<FLPerson>
<FLStateID>
<sameAs>

System B

<doPublish>

Digest

<Activity>
<Person >
<Location>

Structured Payload

<Arrest>
<arrestArraignmentDate>
<arrestProbableCauseText>
<arrestBailRecommendationText>
<arrestAgency>
<sameAs>

System C

<doPublish>

Digest

<Activity>
<Person >
<Location>

Structured Payload

<Citation>
<citationFineAmount>
<citationDismissalConditionText>
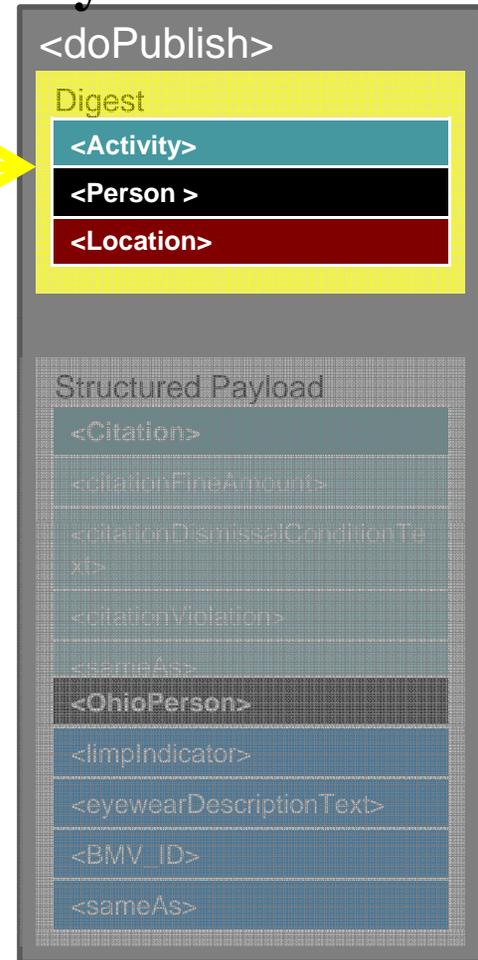<citationViolation>
<sameAs>

<OhioPerson>
<limpIndicator>
<eyewearDescriptionText>
<BMV_ID>
<sameAs>

- Systems can understand consistent Digest structure
- Can ignore Structured Payload
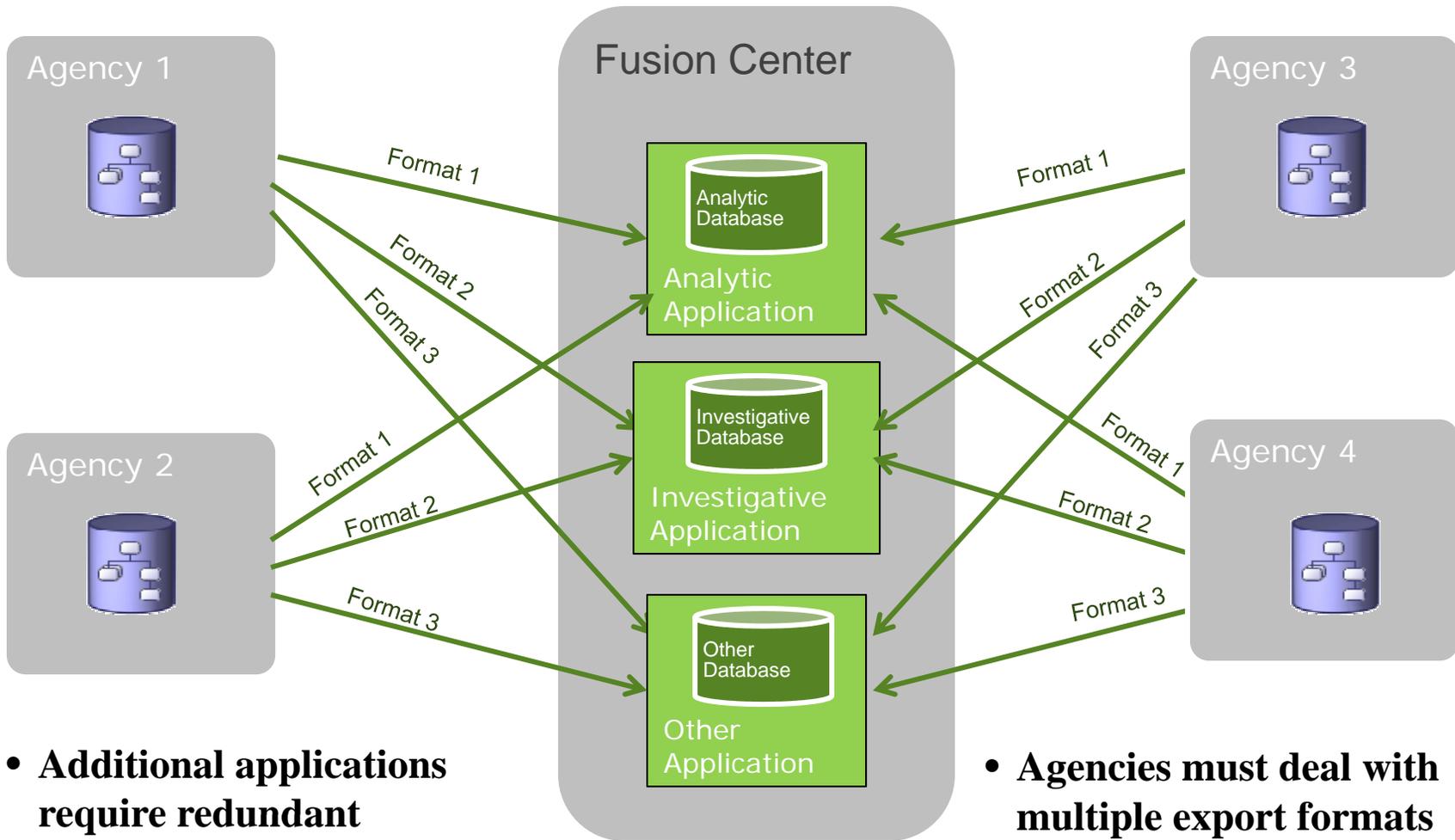- Can exchange base-level of understanding

Implementations of LEXS Standard

- **FBI's National Data Exchange (NDEX)**
  - LEXS-PD -> Allows agencies/states to push incident, arrest, booking data to NDEX
  - LEXS-SR -> search interface

- **OneDOJ**
  - Interconnects US DOJ systems (DEA, BOP, USMS, ATF)
  - LEXS-SR -> Allows state/locals to perform US DOJ searches

- **Suspicious Activity Report (SAR)**
  - LEXS-PD -> Transmit terrorism-related activities to fusion centers
  - LEXS-SR -> Facilitates queries to regional SAR nodes (ISE shared space)

- DHS

  – Immigration and Customs Enforcement (ICE) data

  – LEXS-SR -> search interface

- US Department of Defense

  – DOD agencies uses a standard called UCore

  – Interoperability with Ucore is being done via LEXS

- Regional/state/vendor initiatives

  – NCIS LiNX

  – Texas TDEX

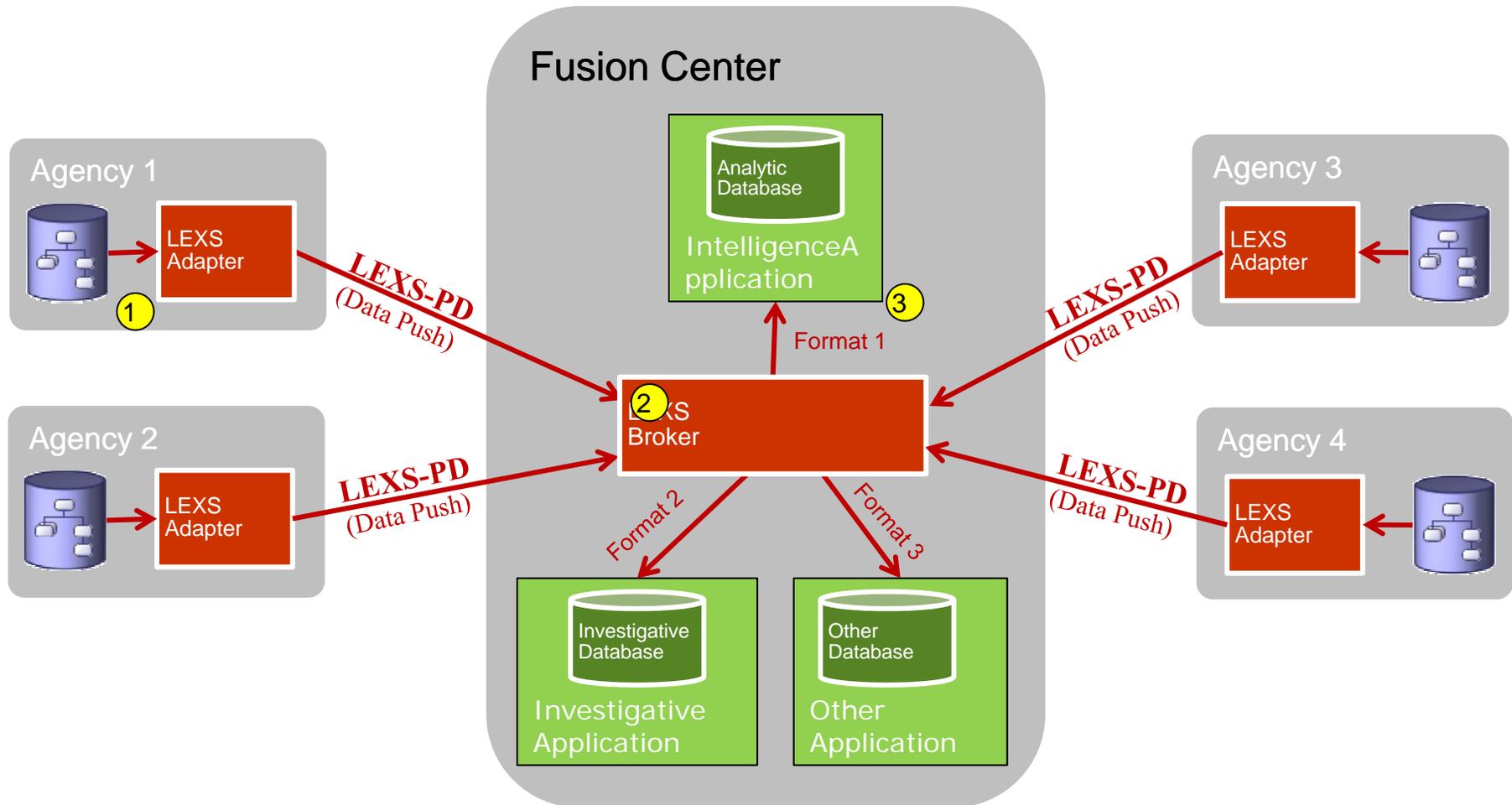 – LEXS support being added/has been added to these initiatives

LEXS Summary

- Rich information sources are exposing LEXS-based interfaces

    – Decoupling of application from data

    – Allows better interoperability

    – Broad adoption in Law Enforecement

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Data Warehouses
NIEM/LEXS Approach

Connect
the
Community

Fusion Center

Agency 1

LEXS
Adapter

1

Analytic
Database

IntelligenceA
pplication

3

Agency 3

LEXS
Adapter

LEXS-PD
(Data Push)

LEXS-PD
(Data Push)

2 LEXS
Broker

Format 1

Agency 2

LEXS
Adapter

LEXS-PD
(Data Push)

Format 2

Format 3

Agency 4

LEXS
Adapter

LEXS-PD
(Data Push)

Investigative
Database

Investigative
Application

Other
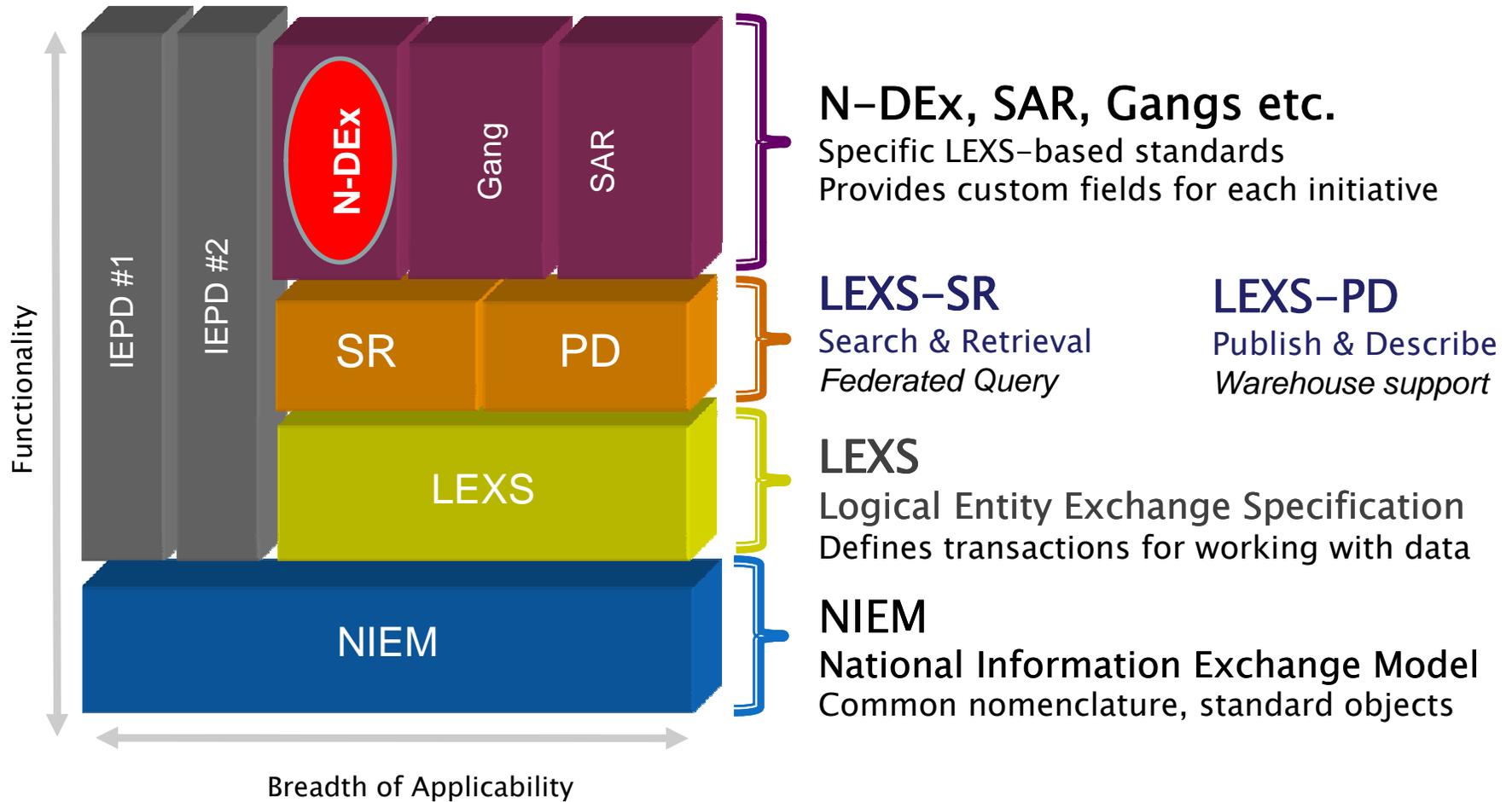Database

Other
Application

1 **Data is extracted and translated into LEXS-PD message**

2 **LEXS-PD message is received and translated**

3 **Data is written into central warehouse(s)**

Standards and their evolution

- ## N-Dex

  - Share complete, accurate, timely and useful information across jurisdictional boundaries and to provide new investigative tools that enhance the Nation's ability to fight crime and terrorism.

  - FBI's adaptation of the LEXS standard for Incident, Arrest, Booking, Probation, Parole

  - Currently NDex supports Incident and Arrest data import

  - IEPD's for Booking, Probation, Parole are published

N-DEx, SAR, Gangs etc.
Specific LEXS-based standards
Provides custom fields for each initiative

LEXS-SR
Search & Retrieval
Federated Query

LEXS-PD
Publish & Describe
Warehouse support

LEXS
Logical Entity Exchange Specification
Defines transactions for working with data

NIEM
National Information Exchange Model
Common nomenclature, standard objects

SOURCE: US Department of Justice

Why Use N-DEx Standards

- Industry adoption because of the N-DEx system

- More standardized layout then just NIEM

- Pre-defined operations for working with data

- Customizability

- Run-time interoperability

- Base framework underlies other federal initiatives
  - OneDOJ
  - SAR
  - Gang Information Sharing

N-DEx Standards Impl

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Connect the Community

Agency
Vendor C

Agency
Vendor C

Agency
Vendor B

Warehouse Support Data is "moved" for some agencies

NDEX API

NDEX API

NDEX API

Agency
Vendor C

NDEX API

Regional Initiative A
Agency Agency Agency

NDEX API

Federation Support Data is "accessed" from other initiatives

Agency
Vendor B

NDEX API

State Enterprise Architecture

Enterprise Service Bus

Applications
• Query Apps
• Links Analysis
• Business Intel

Data Warehouse (NIEM or otherwise)

NDEX API

Regional Initiative C
Agency Agency Agency

NDEX API

N-DEx
LAW ENFORCEMENT
NATIONAL DATA EXCHANGE

NDEX Submissions Uses same API as agency submissions

Additional Data Sharing option

- **LINX (Law Enforcement Information Exchange)**
  - Northrop Grumman developed system for collecting information
  - Uses triggers on vendors systems and/or data extracts to gather information
  - Data is stored in a aggregated database usually at a state level
  - Initially built on proprietary standards, evolved to support of GJXDM and Ndex
  - Provides link analysis tools similar to N-DEx
  - Varied experiences in support and upgrade of Linx based systems
  - Data can be extracted without vendor participation

Data sharing Landscape

- Ohio OLLEISN
  - GJDXM based own format
- Texas T-DEx
  - NIEM based, but limited data sharing
  - APPRISS vendor of choice
- Colorado CopLink
- Orange County CopLink
  - LEXS based limited data sharing
- Florida FLEX
  - SmartCop, CopLink, Finder, LINX, Metatomix
- Michigan Mi-Dex (Base Ndex format)

Next Steps/Recommendations

- Clarify State Objectives
  - What data is to be shared? Why? How?
  - Should the state use LINX for data aggregation?
  - Should the state focus on building a state-wide data aggregation or allow data to be submitted to N-DEx directly
- Focus on adopting standards such as N-Dex or extend data sharing using LEXS

Next Steps/Recommendations

- Evaluate other state initiatives to define strategy

- Use resources such as LEISP(US DOJ), IACP, IJIS

- Work with vendors such a SunGard and its implementation partners in building solutions to state needs.

- Example implementation vendors –

- Sypherlink – defining state N-Dex, LEXS IEPD, building adapters and aggregation database

- CopLink – solutions to analyze aggregated data

SunGard supports standards and is willing to contribute to the success of the state goals

Questions?