



National Data Exchange (N-DEx)

Information Exchange Package Document (IEPD)

Master Documentation

Version 4.0

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1. Introduction

The purpose of this document is to provide guidance on the usage of version 4.0 of the N-DEx Data Submission Information Exchange Package Document (IEPD). The N-DEx System provides Criminal Justice Agencies (CJAs) with a powerful investigative tool to search, link, analyze, and share criminal justice information (e.g., incident and case reports, etc.) on a national basis to a degree never before possible.

Unlike previous versions, which were dependent on the Logical Entity eXchange Specifications (LEXS), the new N-DEx 4.0 IEPD is capable of standing alone. Developers using this version have the ability to submit eXtensible Markup Language (XML) reports to the N-DEx System, using this specification alone. However, the N-DEx System will continue to support their LEXS data partners. For guidance on the continued use of the LEXS Publish/Discover (PD) specification, refer to section 4.4 in this document. This change does not affect the N-DEx System's current usage of the LEXS Subscription Notification (SN) and Search Request (SR) specifications. For more information on the SN and SR services, refer to the latest specifications on the N-DEx Program Office website.

This document is compliant with version 4.1 of "Requirements for a National Information Exchange Model (NIEM) Information Exchange Package Documentation (IEPD) Specification".

2. Purpose and Scope

The purpose of the N-DEx 4.0 IEPD is to provide CJAs documentation which lists exchange specifications to be used for the sharing of complete, accurate, and timely criminal justice information. The N-DEx 4.0 IEPD is based on the NIEM IEPD Template Requirements document and contains written documentation, schemas, instance documents, style sheet, a mapping spreadsheet, and additional documentation.

3. List of Artifacts

| Artifact Name | Purpose |
|--------------------------------|--|
| /mpd-catalog.xml | Hyperlinked Model Package Description (MPD) Catalog schema document file for the N-DEx 4.0 IEPD. |
| /N-DEx_4.0_mpd-changelog.txt | Change Log list details the change history between versions of the IEPD |
| /N-DEx_4.0_readme.txt | IEPD Content Listing |
| /NIEM_ConformanceAssertion.pdf | NIEM Conformance Assertion |
| base-xsd/cjis/3.0/cjis.xsd | CJIS Extension Schema |

| | |
|---|---|
| base-xsd/cjis/3.0/cjis_codes.xsd | CJIS Specific Codes Extension Schema |
| base-xsd/cjis_ncic/1.0/cjis_ncic.xsd | CJIS National Crime Information Center (NCIC) Specific Codes Extension Schema |
| base-xsd/ndex/4.0/ndex.xsd | N-DEx Extension Schema |
| base-xsd/ndex/4.0/ndex_codes.xsd | N-DEx Specific Codes Extension Schema |
| base-xsd/niem/*.* | Directory containing NIEM constrained subset schemas |
| base-xsd/niem/wantlist.xml | XML file represents a schema subset |
| base-xsd/niem/xml-catalog.xml | <i>XML catalog</i> associates target namespace URIs with file locations |
| documentation/bindings.xjb | JAXB binding file to produce java objects correctly for the NDEx_4.0 IEPD |
| documentation/NDEx_Data_Integration_FAQs.pdf | N-DEx Program Office frequently asked questions and answers for data integration |
| documentation/Data_Requirements_Final .pdf | N-DEx System Data Requirements for an N-DEx System submission |
| documentation/N-DEx System Data Integration and Connectivity Checklist - 12052019 | N-DEx Program Office checklist used prior to beginning a data integration project, for potential data participants |
| documentation/ N-DEx_4.0_AppendixB_BusinessRules.xlsx | N-DEx Program Office business rules which provide further guidance beyond XML schema, to deliver the best possible data to N-DEx System |
| documentation/N-DEx_4.0_CMW.xlsx | Component Mapping Workbook (CMW) spreadsheet containing mapping of domain model entities |
| documentation/N-DEx_4.0_CodeTables.xlsx | Code Table Spreadsheet containing code lists available for N-DEx System submissions |
| documentation/ N-DEx_4.0_High_Level_Model.pdf | High level Unified Modeling Language (UML) Message Overview Diagrams |
| documentation/N-DEx_MasterDocument.pdf | Provides guidance on the usage of the N-DEx 4.0 IEPD |
| documentation/nibrs/ N-DEx_4.0_CMW_NIBRS.xlsx | CMW spreadsheet containing mapping of domain model entities for NIBRS specific messages |

| | |
|---|--|
| documentation/nibrs/ N-DEx_4.0_CodeTables_NIBRS.xlsx | Code Table Spreadsheet containing code lists available for NIBRS specific messages |
| documentation/nibrs/ N-DEx_4.0_NIBRS_Submission_Guide.pdf | Provides guidance including graphical representation on the usage of the N-DEx 4.0 IEPD to submit to NIBRS. |
| iep-samples/lexs/ N-DEX_4.0_LEXS_5.0_Sample.xml | Sample LEXS 5.0 PD record with data elements in the LEXS digest, as well as an N-DEx 4.0 record in the LEXS structured payload |
| iep-samples/N-DEx_4.0_Sample.xml | Sample N-DEx 4.0 Incident Report xml. The file includes complete sequences for most elements listed in the CMW, even in cases where some elements do not make real-world sense |
| iep-samples/nibrs/ N-DEx_4.0_NIBRS_ArrestGroupB.xml | Sample NIBRS Arrest Group B submission using N-DEx 4.0 IEPD |
| iep-samples/nibrs/ N-DEx_4.0_NIBRS_ArrestGroupB_Combined.xml | Sample NIBRS Arrest Group B submission using N-DEx 4.0 IEPD that could also be sent to N-DEx |
| iep-samples/nibrs/ N-DEx_4.0_NIBRS_IncidentGroupA.xml | Sample NIBRS Incident Group A submission using N-DEx 4.0 IEPD |
| iep-samples/nibrs/ N-DEx_4.0_NIBRS_IncidentGroupA_Combined.xml | Sample NIBRS Incident Group A submission using N-DEx 4.0 IEPD that could also be sent to N-DEx |
| iep-samples/nibrs/ N-DEx_4.0_NIBRS_ZeroReport.xml | Sample NIBRS Zero Report submission using N-DEx 4.0 IEPD |
| iep-samples/nibrs/ N-DEx_4.0_NIBRS_ZeroReport_Combined.xml | Sample NIBRS Zero Report submission using N-DEx 4.0 IEPD that could also be sent to N-DEx |

4. N-DEx, NIEM, and LEXS Interaction

This section is a high-level overview of the interaction between N-DEx, NIEM, and LEXS representing the N-DEx System submissions and available objects to depict the data. This specification provides documentation detailing the method for publishing information to the N-DEx System. The following sections introduce the N-DEx System specification as it is built upon the NIEM model.

4.1 NIEM Constrained Subset Schemas

NIEM is the result of a collaborative partnership of agencies and organizations across all levels of government (local, state, tribal, and federal) and private industry. This partnership is a foundation for disseminating critical information to justice, public safety, emergency and disaster management, intelligence, and homeland security enterprise effectively and efficiently. NIEM provides fundamental structures, standards, and methods to define and share information internally and externally between agencies and domains. By leveraging NIEM, agencies and domains can implement exchanges in a national information-sharing environment, despite differences in the information systems each entity uses. Think of NIEM as a data model and reference vocabulary for XML schema-based data components to construct an IEPD.

From a data perspective, the N-DEx 4.0 IEPD is based on NIEM and employs the structures, standards, and usage guidelines of NIEM, including NIEM Naming and Design Rules, and is built in the style of a NIEM IEPD. The N-DEx 4.0 IEPD uses NIEM version 4.1 as a baseline to build the N-DEx 4.0 IEPD schemas. This group of schemas are included in the base-xsd/niem directory of the IEPD directory structure.

4.2 Extension XML Schemas

The N-DEx 4.0 IEPD schemas extend the NIEM schema to include CJIS and N-DEx System domain-specific elements and codes. These schemas include `ndex.xsd`, `ndex_codes.xsd`, which are in the `base-xsd/ndex/4.0/` directory, `cjis.xsd`, `cjis_codes.xsd` in the `base-xsd/cjis/3.0/` directory, and the `cjis_ncic.xsd` in the `base-xsd/cjis_ncic/1.0/` of the IEPD directory.

The `cjis-ncic` extension is a temporary extension in N-DEx until NIEM produces a new version to meet the structure and needs of the N-DEx System for this namespace.

4.3 NIBRS Data Submission

The N-DEx 4.0 IEPD was designed to provide data submitters the ability to utilize a single IEPD to submit data to both the N-DEx System and Uniform Crime Reporting (UCR) National Incident-Based Reporting System (NIBRS), to minimize implementation efforts by CJAs. The N-DEx 4.0 IEPD supports version 2019.2 of the *NIBRS XML Developers Guide*. Supporting documentation and graphical representation is included in this IEPD in the `documentation/nibrs` directory, as well as sample messages in the `iep-samples/nibrs` directory. For additional guidance on utilizing the N-DEx 4.0 IEPD to submit NIBRS messages, please contact the NIBRS helpdesk via email at ucr-nibrs@fbi.gov or by telephone at 304-625-9999.

4.4 LEXS

During the CJIS Advisory Policy Board (APB) Fall 2017 session, a paper was presented on the continued use of LEXS for CJIS submissions. The consensus of this meeting was CJIS does not

intend to leverage the LEXS specification for development of new systems or for future revisions of CJIS system interfaces. This includes any future version of the N-DEx IEPD beyond the delivery of version 4.0. However, N-DEx 4.0 IEPD supports the use of the LEXS 5.0 PD specification as an optional wrapper, with an N-DEx System submission in the Structured Payload. Refer to the CJIS APB Fall 2017 Informational Topic: *CJIS APB Subcommittee Action Item regarding the use of LEXS for CJIS Submissions*.

The N-DEx 4.0 IEPD was developed as a method for submitting data to the N-DEx System. The N-DEx 4.0 IEPD is all-inclusive, meaning all data elements are defined in the N-DEx 4.0 IEPD specification, without requiring the use of LEXS. However, the N-DEx System will continue to support LEXS PD users for this iteration.

LEXS 5.0 PD data submitters may submit a LEXS 5.0 PD record with data elements in the LEXS digest, as well as an N-DEx 4.0 IEPD record in the LEXS structured payload. In this case, the N-DEx System will ingest data elements from only the structured payload. A sample report file is located in the iep-samples/lexs directory and will provide a visual guidance for the structure and placement of data for LEXS 5.0 PD wrapper option. Links to the LEXS IEPDs can be found on the LEXS website at <http://www.lexsdev.org/>.

5. Additional IEPD Provisions

This section contains additional definitions, business rules, and further information to implement the IEPD over and above what is specified in the XML schemas.

5.1 Additional Property Definitions

The N-DEx 4.0 IEPD includes properties (i.e., elements and attributes), which are not defined in NIEM. The documentation/N-DEx_4.0_CMW.xlsx file shows all data elements, the business rules, and cardinality of the additional properties not defined in NIEM. The N-DEx 4.0 IEPD additions are located in the base-xsd/ndex/4.0/ndex.xsd of the IEPD directory.

The N-DEx 4.0 IEPD requires additional code tables which are not in NIEM. These code tables along with the ones from other schemas are in the documentation/N-DEx_4.0_CodeTables.xlsx file. The N-DEx 4.0 IEPD additions are located in the base-xsd/ndex/4.0/ndex_codes.xsd of the IEPD directory.

Additionally, this IEPD uses the CJIS XML standard schemas, which contain extra elements and codes not defined in NIEM, but are available for all CJIS IEPD development. Both the documentation/N-DEx_4.0_CMW.xlsx and documentation/N-DEx_4.0_CodeTables.xlsx files contain references to those additional elements and codes. The CJIS elements and codes are

located in following files of the IEPD directory: base-xsd/cjis/3.0/cjis.xsd, base-xsd/cjis/3.0/cjis_codes.xsd, and base-xsd/cjis_ncic/1.0/cjis_ncic.xsd.

5.2 Cardinality

The cardinality for the N-DEx 4.0 IEPD is defined through business rules. The Component Mapping Workbook (CMW) should be used to determine the desired cardinality for individual elements and attributes. For N-DEx System submissions, use the documentation/N-DEx_4.0_CMW.xlsx file (this may be a combination of both the “Cardinality” column and the “Comments” section labeled with a BR). For NIBRS System submissions, use the documentation/nibrs/N-DEx_4.0_CMW_NIBRS.xlsx file (“NIBRS Cardinality” column).

5.3 Minimal Property Set

The N-DEx System defines a minimal set of properties which must be included in a submission. Each submission must contain a Message Metadata section as well as a Report (Arrest Report, Booking Report, Holding Report, Incarceration Report, Incident Report, Information Report, Missing Person Report, Pre-Sentence Investigation Report, Pre-Trial Investigation Report, Service Call Report, Supervised Release Report, Warrant Investigation Report). All reports must contain a Report Metadata section, as well as the corresponding primary activity, i.e. Incident, Arrest, Missing Person Occurrence, or Service Call. Submissions may contain a combination of other objects, e.g., activities, people, places, things, etc., as there are a number of different representations which are valid. The file documentation/N-DEx_4.0_High_Level_Model.pdf demonstrates the modality/cardinality and relationships of high-level data elements for an N-DEx 4.0 IEPD submission.

5.4 Business Rules

Business rules provide further guidance beyond XML schema, to deliver the best possible data to the N-DEx System. The N-DEx System specific business rules are documented in [Appendix B. Business Rules](#); they can also be found in the documentation/N-DEx_4.0_CMW.xlsx file in the “Comments” section labeled with a BR (for Business Rule). The NIBRS-specific business rules are documented in version 2019.2 of the *NIBRS XML Developers Guide*.

5.5 Other Information

5.5.1 Data Inserts

The Data Item Publish Instruction Code indicates the processing action to be taken by the N-DEx System for a record. A value of “Insert” indicates the record is to be ingested into the N-DEx System. In order for data to be submitted to the N-DEx System, the records must contain a triple key of the Data Submitter Originating Agency Identifier (ORI), Data Owner ORI, and Data Item Identification (ID).

5.5.2 Data Updates

Data which has already been submitted may be updated in subsequent submissions. When an N-DEx System submission specifies the Data Item Publish Instruction as “Insert” and includes the Data Submitter ORI, Data Owner ORI, and Data Item ID as provided in a previous submission, the current submission replaces the original submission.

If the N-DEx System submission needs updated with more information or information has changed since last submission, the submitter would simply need to submit an updated XML file. The new file would need to contain all the unchanged information and any new or updated information, as the entire record gets replaced. The file must use the same Data Submitter ORI, Data Owner ORI, and Data Item ID previously provided and the information would be updated in the N-DEx System record [i.e., to update a Social Security Number (SSN) or add an Offense].

5.5.3 Data Deletes

Submitted data can be deleted in subsequent submissions. When an N-DEx System submission specifies the Data Item Publish Instruction as “Delete” and includes a submission where the Data Submitter ORI, Data Owner ORI, and Data Item ID are the same as provided in a previous submission, the data from the original submission is removed from the record in the N-DEx System database.

5.5.4 Substitution Elements

The N-DEx 4.0 IEPD schemas incorporate a number of elements as substitutions for NIEM elements. As such, both the original NIEM elements and the new N-DEx 4.0 IEPD elements are available in the schema. Whenever there is a choice between an N-DEx 4.0 IEPD element and a NIEM element, submitters should use the N-DEx 4.0 IEPD element. Where such substitutions exist, the CMW spreadsheet documents the N-DEx 4.0 IEPD elements.

6. Development Resources

The developmental tools utilized in the development of the N-DEx 4.0 IEPD are:

- <oXygen/> XML Editor 19 to create, edit, and validate against the xsd file.
- NIEM Subset Generation Tool (SSGT) to define wantlist.xml and generate schema documentation.

7. Testing and Conformance

XML Group tested the integrity of the IEPD schemas by parsing the sample instances (included in the xml/ directory) with <oXygen/> XML Editor 19. The workgroup reviewed the conformance of the IEPD.

8. Contact

For N-DEx questions:

POC: CJIS/N-DEx Program Office/GLESS
Email: ndex@leo.gov
Web: <https://www.fbi.gov/services/cjis/ndex>
Phone: 304.625.0555 M-F 730am-4pm ET
After hours CJIS Helpdesk at 304.625.4357

For UCR-NIBRS questions:

POC: CJIS/UCR/NIBRS Program Office/GLESS
Email: ucr-nibrs@fbi.gov
Web: <https://www.fbi.gov/services/cjis/ucr/nibrs>
Phone: 304.625.9999 M-F 730am-4pm ET

APPENDIX A. Acronyms and Abbreviations

| Acronym | Definition |
|---------|---|
| APB | Advisory Policy Board |
| CJA | Criminal Justice Agencies |
| CJIS | Criminal Justice Information Services |
| CMW | Component Mapping Workbook |
| GLESS | Global Law Enforcement Services Section |
| ID | Identification |
| IEPD | Information Exchange Package Document |
| ITMS | Information Technology Management Section |
| LEXS | Logical Entity eXchange Specifications |
| LEXS PD | LEXS Publish/Discover (PD) |
| LEXS SN | LEXS Subscription Notification |
| LEXS SR | LEXS Search Request |
| MPD | Model Package Description |
| N-DEx | National Data Exchange |
| NCIC | National Crime Information Center |
| NIBRS | National Incident-Based Reporting System |
| NIEM | National Information Exchange Model |
| ORI | Originating Agency Identifier |
| SSGT | Subset Generation Tool |
| SSN | Social Security Number |
| UCR | Uniform Crime Reporting |
| UML | Unified Modeling Language |
| XML | eXtensible Markup Language |