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Homeland Emergency Response Exchange (HERE)

(Formerly Heartland Emergency Response Exchange)

Flow Configuration Document

Version: 1.0 Final

Revision Date: 12/17/2007



Acknowledgements

This document was prepared with input and support from the following individuals:

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Amber Kreter (MO DNR)	Maryane Tremaine (EPA Region VII)
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Contractor Support	
Guy Outred – Windsor Solutions, Inc.	Mark Chmarny – Windsor Solutions, Inc.
Eric Schwenter – Windsor Solutions, Inc.	TK Conrad – Windsor Solutions, Inc.

Component Alignment and Change History

Flow Component Version History

Component	Version	Date	Changed By	Description of Change
FCD	1.0	12/17/2007	TK Conrad	Final Release Version
FCD	0.9	6/8/2007	TK Conrad	Draft Initial Release
Schema	1.0	5/29/2007	TK Conrad	Initial Release

Flow Component Versions Currently Supported

The current component versions are listed below however, as per Exchange Network policy, the current and penultimate versions will be supported to ensure continuity of service during the transition to any new version.

Component	Version(s) Supported
FCD	1.0
Schema	HERE Manifest v1.0.1 HERE DomainValues v1.0

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1 Introduction

1.1 Background

The four states in EPA Region VII created the Homeland Emergency Response Exchange (HERE) to provide available environmental, health, and natural resource information to state agencies involved in homeland security / emergency response planning and implementation. This exchange provides facility data as well as other environmental information among multiple partners, including five agencies in Iowa, Kansas, Missouri, and Nebraska. The resulting data is used to enhance decision-making and risk assessment for Homeland Security and/or Emergency Response situations occurring within or across state boundaries.

The primary users of HERE are state emergency planning agencies and U.S. EPA. Secondary users of the exchange may be other state agencies, other federal agencies, local emergency planners, and others involved in homeland security/emergency response planning. While the exchange began in EPA Region VII, it is intended to be extended to any Exchange Network partners who wish to publish their data so it can be shared with emergency personnel.

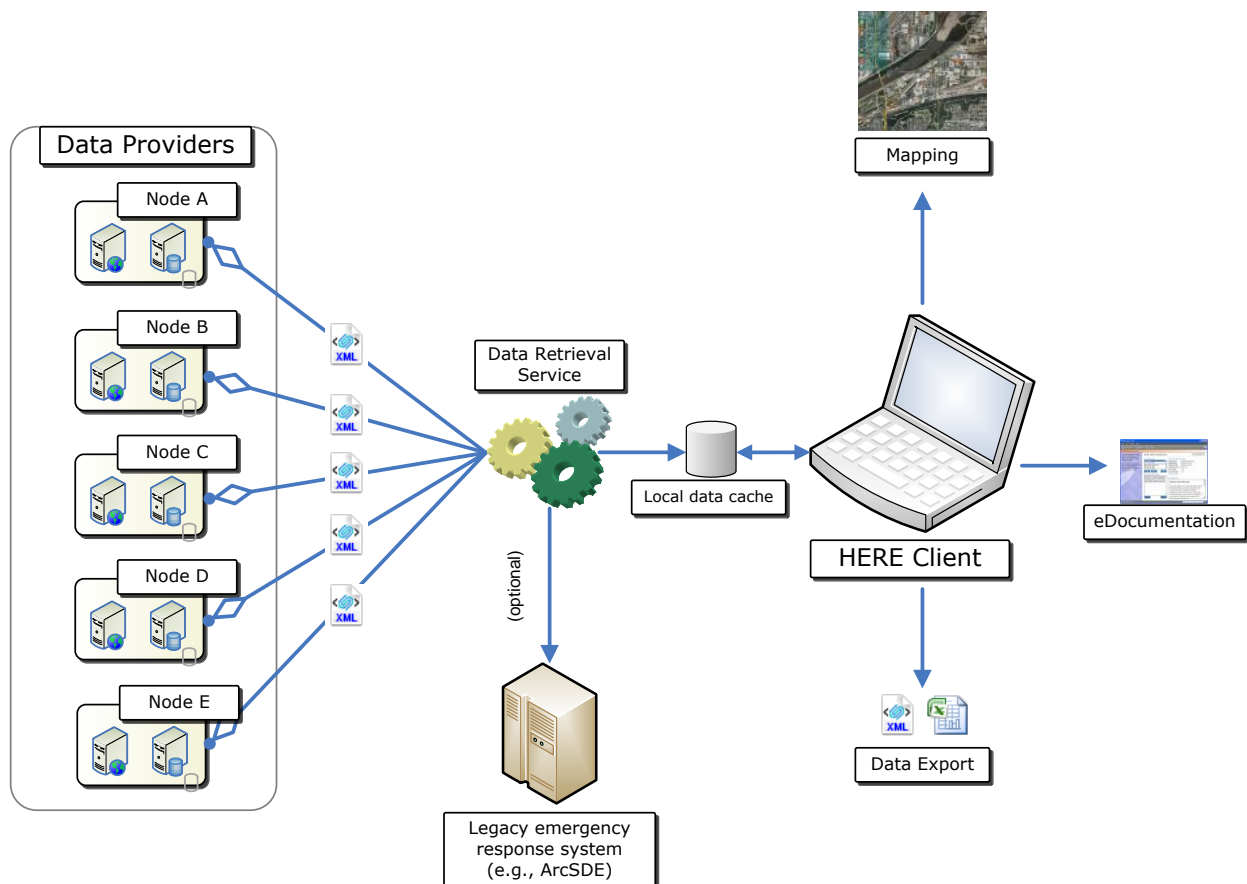


Figure 1: Homeland Emergency Response Exchange Overview

The exchange is supported by a client-based approach to retrieving and displaying data. In this approach, partners regularly publish XML files to a Node staging area for later retrieval by

multiple client machines. The retrieval process runs in the background at a time configured by the user. This service can then either store the data directly in the HERE Client's own local data cache or can be sent to an external database (e.g., ArcSDE). This method ensures that data is kept current within the client systems with minimal effort required on the part of the Nodes of the various partners.

Please refer to the HERE Project fact sheet for more context on the project as a whole, available here: <http://www.exchangenetwork.net/exchanges/cross/HEREFactSheet.pdf>

1.2 How to use this FCD

This document describes the recommended approaches for the Network exchange of Homeland Emergency Response Exchange data. This FCD document identifies and defines the processes and data services that are necessary to fully support the exchange of data from a Partner's Node. It contains the following sections:

- **Exchange Summary Information:** High-level information on how the components of the HERE Flow as well as a brief synopsis of the HERE Client and the exchange process.
- **Flow Definitions:** Detailed description of each dataset to be implemented as part of the HERE flow.
- **Flow Processes:** Describes how flow files will be composed (i.e., facility and detail files), published (i.e., full versus change files), and downloaded. In addition, a description of key meta-data categories is provided.
- **Security:** Explains the security measures implemented for the HERE Flow along with an overview of the secure flow exchange process.
- **Schema Information:** Provides information on the schema to be re-used for the HERE Flow as well as definitions for two new schema to be implemented, "HERE Manifest" and "HERE Domain Values".
- **Data Service Information:** Defines the services to be used in the HERE Flow.
- **Exchange Implementation Guidelines:** Provides minimum and recommended approaches to implementing the HERE Flow.
- **Open Issues:** The open issues currently being tracked for the HERE Flow.

1.3 Terminology

The following terms are used throughout the document:

Term	Description
Data set	A “Data set” is short-hand for a particular category of data to be shared with the HERE Flow (e.g., Facility, Chemical Storage, etc.). Technically, these are implemented as “flows”, but they are defined here within the context of a larger HERE Flow that integrates all the data into a seamless picture (via the HERE Client)
File Manifest	A “File Manifest” refers to a HERE-specific method of facilitating the file download process. It has nothing to do with a specific flow outside the HERE Project (e.g., “RCRA Manifest”).
NAAS	NAAS stands for Network Authentication and Authorization Services, which provides centralized security services. Security tokens and assertions issued by NAAS are trusted and accepted by all Network Nodes.

2 Exchange Summary Information

2.1 Exchange Identification

2.1.1 Exchange Name:

Homeland Emergency Response Exchange

2.1.2 Exchange Description:

The Homeland Emergency Response Exchange (HERE) exchange is an integrated set of data services, XML schema and software components designed to provide critical environmental information to emergency response personnel. Environmental data is made available by Partners (such as state environmental agencies) through their Node over the Exchange Network.

Emergency responders retrieve and aggregate this data using the HERE Client, a desktop program developed specifically for this purpose. The HERE Client connects to each registered data provider on a scheduled interval to refresh its local copy of the data. This ensures that the latest and most accurate data is available to the emergency responder at all times, even if the client cannot connect to the internet or the data source is unavailable.

2.1.3 Datasets:

The Homeland Emergency Response Exchange consists of the following datasets:

- **HERE Facility:** Contains site, geographic location, environmental interest, and contact information.
- **HERE Chemical Storage:** Contains information on chemicals stored at the site, collected per Emergency Planning and Community Right to Know Act (EPCRA) reporting requirements.
- **HERE Livestock:** Contains information on livestock managed by the site, submitted per National Pollutant Discharge Elimination System (NPDES) reporting requirements.
- **HERE Public Water Supply:** Contains information such as water type and population served, collected per Safe Drinking Water Act reporting requirements.

The datasets are based upon pre-existing schemas, promoting reuse and thereby making it easier for new partners to join the Homeland Emergency Response Exchange:

Table 1: List of HERE-related Datasets and their schemas

Flow	Schema	Version
HERE Facility	FRS (FACID)	2.3
HERE Chemical Storage	Tier II	1.0
HERE Livestock	CAFO	1.0
HERE Public Water Supply	SDWIS Inventory	2.0

The exchange of Facility data is a requisite for a Node to support the HERE exchange¹, however the remaining data sets are optional. The exact composition of the HERE-related data availability at a given partner Node will vary depending upon which detail files are supported:

Table 2: Example list of HERE Exchange partners and datasets supported

Node Source / Flow	Facility	Chemical Storage	Livestock	Public Water Supply
Node A	✓	✓		✓
Node B	✓	✓	✓	
Node C	✓	✓	✓	✓
Node D	✓	✓	✓	
Node E	✓			

2.1.4 Services

The exchange is supported by two services:

- **GetHEREManifest:** Used by the HERE Client to request files from each of the partner nodes.

¹In actuality, the Facility flow is not required for the HERE Client to be able to accept, process and present data that originates from some of the other datasets. For example, if the Tier 2 **Is Facility Source Indicator** is set to true, then the HERE Client will load the facility data contained in that dataset as the HERE ‘Site’ data. This makes it possible to load some of these ancillary datasets into the HERE Client without having a Facility file prepared that contains those same facilities. This approach does not allow for a reconciled single set of Sites to be presented to a user, and so is not recommended, but can be used if a providing agency has not yet integrated these facility/site datasets within their internal information systems. If used in this manner, a user may have to interpret multiple copies of a single facility or site when viewing the data.

- **GetHEREDomainLists:** Provides important additional context to the data presented by the HERE Client.

2.1.5 Flow Steward:

- Dennis Burling

2.2 HERE Client Overview

The Homeland Emergency Response Exchange is designed to work in conjunction with the HERE Client. This section provides an overview of the tool and its relationship with the exchange.

2.2.1 Desktop Client

Emergency management personnel will view data from the Homeland Emergency Response Exchange through a dedicated smart client tool installed on their local machine. The smart client allows users to query facilities and sites based upon a range of criteria, including location attributes and on-site stored chemicals. Results are displayed either in tabular format within the tool, or within a KML-supporting application (e.g., Google Earth). Finally, a detail page displays important information about the site. Depending upon which detail is provided and the type of site, this detail may include lists of chemicals or the types and quantities of animals housed or the type of water facility.

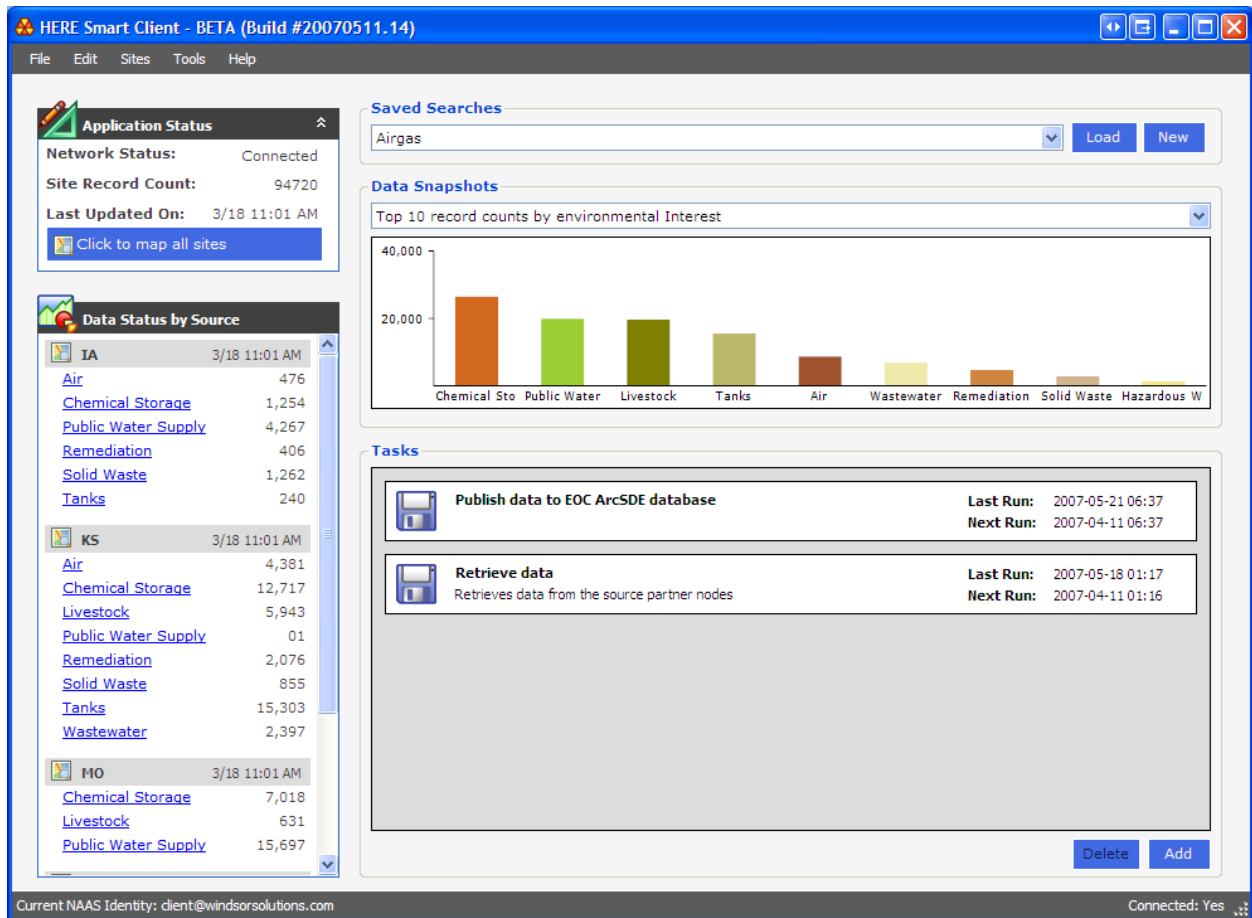


Figure 2: HERE Client dashboard

Site Detail: 001 Sample Facility

Map this site only

Site Name: 001 Sample Facility **Site ID:** 0123456789
Site Address: 2450 GRAND BLVD **Site Type:** Test Facility
 KANSAS CITY, KS 64108
County: JACKSON

Location Details

Contacts

Name	Phone	Email	Env. Interest	Affil. Type
Doe, John	(816) 513-3500	john_doe@kcmo.org	Chemical Storage	Emergency Contact
Donaldson, Sam	(816) 555-1212	sam_donaldson@kcmo.org	Chemical Storage	Secondary Emergency Contact
Aaronson, Jane	(816) 555-1213	jane_aaronson@kcmo.org	Chemical Storage	Non-Emergency Contact

Environmental Interests

Chemical Storage

Chemical Name	Days Onsite	Maximum Qty	Hazard
↑ Acetone	Always	99999 Lbs.	
CAS Number: 000067641 [CAMEO] Max Daily Range: 10000 - 99999 Lbs. EHS Name: Avg Daily Range: 10000 - 99999 Lbs. Hazard Type: Health, Fire Physical State: Pure, Liquid Health Effects: Immediate/Acute, Delayed/Chronic			
Storage Data			
Steel drum - Dock			
Amt Onsite:	Confidential:	No	
Temperature: Ambient temperature	Pressure:	Ambient pressure	
Above ground tank - Tank Farm			
Amt Onsite:	Confidential:	No	
Temperature: Ambient temperature	Pressure:	Ambient pressure	
↓ Cyclohexanone	Always	99999 Lbs.	
↓ Ethylene Glycol	Always	999999 Lbs.	
↓ Hexane	Always	99999 Lbs.	
↓ Methanol	Always	999999 Lbs.	
↓ Methyl Ethyl Ketone	Always	99999 Lbs.	
↓ Methyl Isobutyl Ketone	Always	99999 Lbs.	
↓ Toluene	Always	999999 Lbs.	
↓ 142 Solvent	Always	99999 Lbs.	
↓ Abalyn	Always	99999 Lbs.	
↓ Benzyl Alcohol	Always	99999 Lbs.	
↓ D-Limonene	Always	99999 Lbs.	

Figure 3: HERE Client site detail screen

2.2.2 Data Retrieval Service

The HERE Client includes a retrieval service which automatically obtains data from partner Nodes on a user-scheduled basis. This retrieval process occurs in the background and does not require the actual HERE Client to be running. Once data is retrieved, it is stored on their local machine so it can be available offline.

Upon installation, users are asked to enter their Network Authentication and Authorization Server (NAAS) credentials for accessing the partner Nodes. Once authenticated with NAAS, these credentials are stored on the local machine and used for the synchronization process.

The retrieval service is configured to poll one-to-many partner Nodes for data. The service will connect to the each partner Node automatically per the configured schedule, then attempt to download as many HERE-related datasets from the Node as the user's NAAS credentials will allow. These permissions for each NAAS account are administered by the Node manager for each partner.

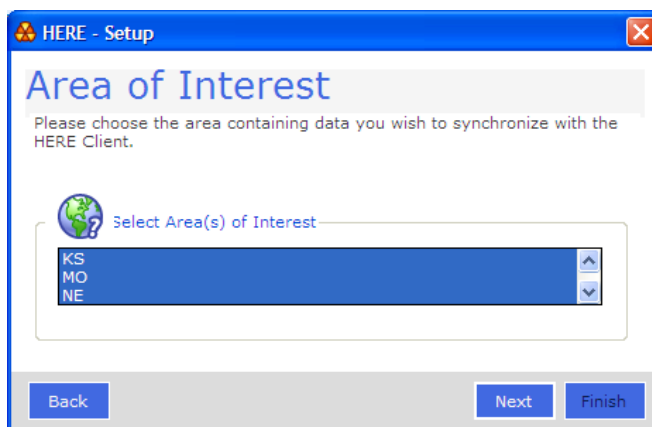


Figure 4: HERE Client Node configuration

2.2.3 Data Export Functionality

In addition to displaying data within the tool, the HERE Client provides methods for exporting the data to other systems. The client can generate comma-delimited or XML extracts which can then be imported into many common programs (such as Microsoft Excel) for further analysis. Furthermore, the client can also be configured to automatically export its data to ArcSDE on a scheduled basis without the need for the HERE Client UI to be opened. This allows emergency management agencies to seamlessly integrate HERE data with their legacy systems and gives them full access to any advanced GIS capabilities.

2.2.4 Data Contextualization

Data provided to the Exchange is generally collected by pre-existing programs (e.g., Tier II for Chemical Storage) in order to satisfy various state and federal reporting requirements (e.g., EPCRA). As such, the data in these systems often contains codes and other information that has limited meaning outside of the programs they support.

Because of this, the HERE Client also integrates the source data with a wide range of contextual help, code interpretation, and e-documentation. This information is also shared over the

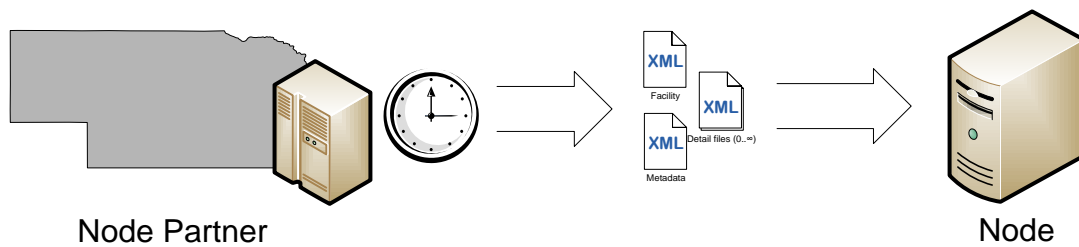
Exchange via a new service designed for the HERE initiative. Data for this flow is managed at each of the partner Nodes.

2.3 Exchange Process Overview

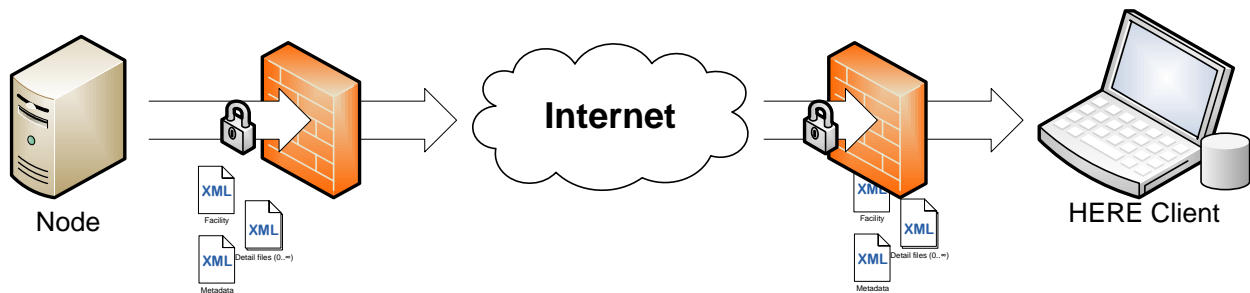
The exchange process consists of a coordination between HERE data providers and the HERE Client that is installed in state emergency management agencies as well as on emergency responders local machines. This overview focuses on the processes that Node Partners need to have in place in order for the HERE Client to receive data from the Node.

At the highest level, the flow process comprises the following steps:

1. Partner Nodes publish one or more data files on a regular basis to a secure location accessible to the Exchange Network:



2. On a regular schedule, HERE Clients authenticate to the Exchange Network and download the data files:



This unique approach allows the Homeland Emergency Response Exchange great scalability, both in terms of supporting multiple Nodes serving data to one client as well as multiple clients served by one Node:

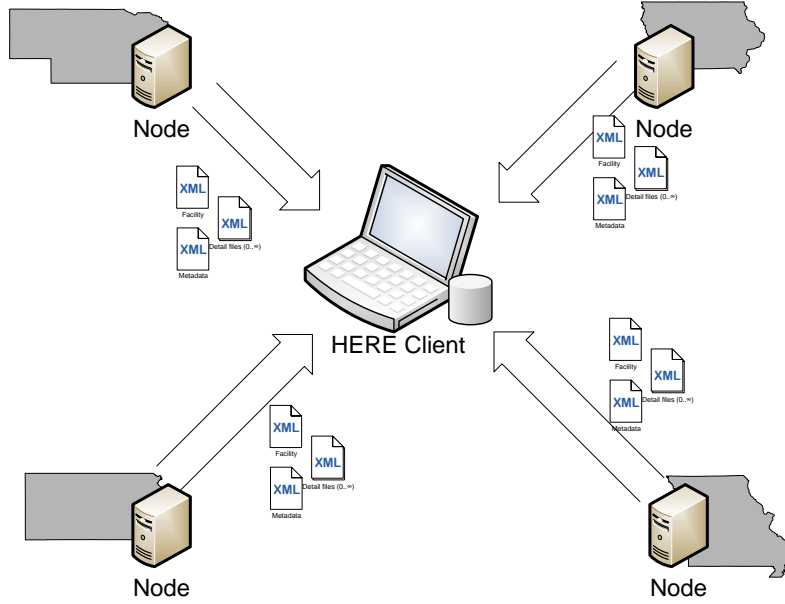


Figure 5: Multiple Nodes per client

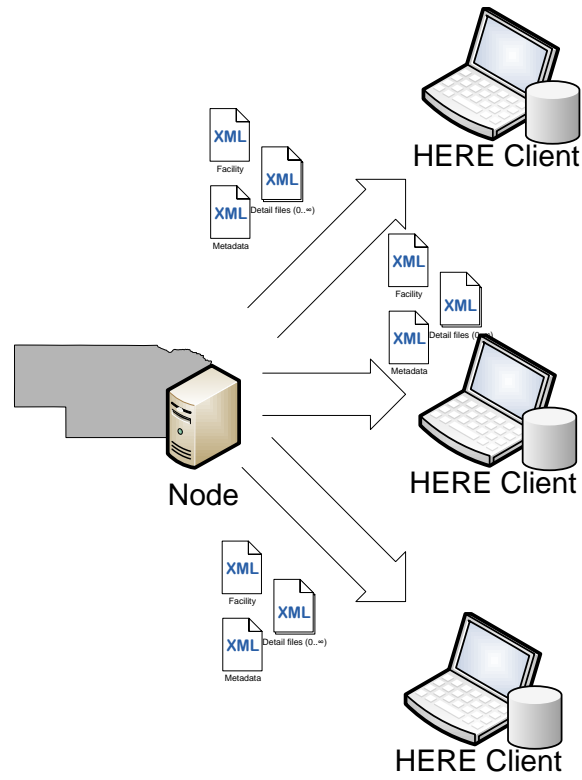


Figure 6: Multiple clients per Node

2.3.1 Synchronization of HERE Client

The HERE Client regularly connects with HERE partner Nodes to load and refresh the data stored in its local cache. This synchronization process occurs in the background on an automated basis on a user-configured schedule.

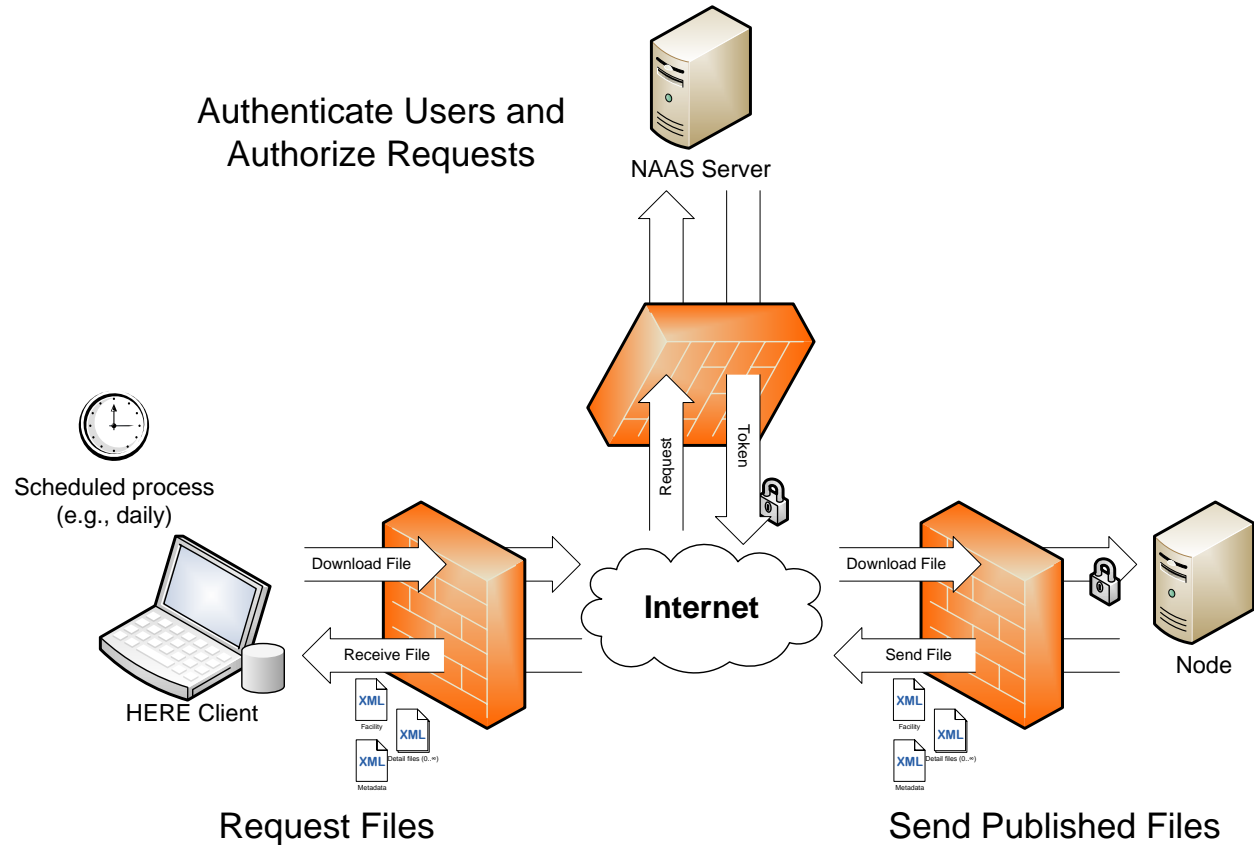


Figure 7: HERE Client Synchronization Overview

Because files to be shared with the Homeland Emergency Response Exchange have already been published on the source Nodes, the client only needs to request to download them, thus helping to ensure a faster synchronization process.

All requests to Nodes supporting the Homeland Emergency Response Exchange are first authenticated and authorized by NAAS to ensure that data is only flowing to the intended recipients. Once files are received by the HERE Client, the client integrates the data within the existing local data cache. More details on the download and security processes are provided later in this document.

3 Flow Definitions

This section provides definitions for the component datasets which in total make up the Homeland Emergency Response Exchange.

3.1 Summary

The Homeland Emergency Response Exchange is comprised of multiple datasets managing the information to be shared. This approach allows the exchange to leverage pre-existing schemas, thus lowering the initial cost of implementation as well as the barriers of entry for prospective new partners of the exchange.

Each of the datasets falls into two broad categories:

- **Content Datasets** define the exchange of actual information to be displayed in the HERE Client (e.g., facility names, chemicals at facilities, etc.). These include:
 - HERE Facility
 - HERE Chemical Storage
 - HERE Livestock
 - HERE Public Water Supply
- **Administrative Datasets** define the exchange of information needed by the HERE Client and Data Retrieval Service to retrieve, process, and contextualize the information provided in the Data Files. These include:
 - HERE Manifest
 - HERE Domain Lists

Each of these datasets is described in more detail in the following sections.

3.2 HERE Facility

The HERE Facility flow contains facility and environmental interest information to be shared with the Homeland Emergency Response Exchange. It is the only flow required for a partner to join the exchange.

Information provided by this flow would be used by emergency management personnel to locate facilities by geographic location and name, identify contacts for the site, locate facilities with risk management plans (RMPs), determine what interests are affiliated with the facility, and list which facilities could potentially be at risk in the event of an emergency. Having good coordinate data in this dataset will be of particular importance to emergency responders, but the lack of coordinates for a site will not prevent it from being shared with the Exchange.

Files created for this flow shall conform to the FACID 2.3 schema.²

² More details on the schema used in the Homeland Emergency Response Exchange are included in a separate section of this document.

3.3 HERE Chemical Storage

The HERE Chemical Storage flow contains information on chemicals reported to the state as part of compliance with the Emergency Planning and Community Right-to-Know Act, Section 312. This program is alternatively referred to as Tier II, Title III, and SARA 312.

Information provided by this flow would be used in an emergency to determine which facilities in a given area contain chemicals posing a significant health, fire, or reactivity threat. This information set also contains the quantities and locations of these chemicals at a given site, as well as the conditions under which they are stored. Additional information about the chemicals themselves is available through linking on a chemical's CAS Number to external chemical information sources available via the internet.

Files created for this flow shall conform to the Tier II 1.0 schema.

3.4 HERE Livestock

The HERE Livestock flow contains information about the type and number of animals managed at a confined animal feeding operation (CAFO). Information provided by this flow would be used in an emergency to determine where animals are housed in the event of a livestock emergency (e.g., disease outbreak) or other contamination endangering the animals (e.g., nuclear plant emission).

Files created for this flow shall conform to the CAFO 1.0 schema.

3.5 HERE Public Water Supply

The HERE Public Water Supply flow contains information about the drinking water infrastructure in a given region (e.g., water sources, treatment plants, consecutive connections, etc). Information provided by this flow would be used in an emergency to determine where exposed water sources are located and how they are connected to the larger drinking water network in the event of a contamination incident, among other emergencies.

Files created for this flow shall conform to the SDWIS Inventory 2.0 schema.

3.6 HERE Manifest

The HERE Manifest provides the Data Retrieval Tool with a list of files available for download from a HERE Exchange partner Node. This list is generated by the partner Node's internal flow processor as the result of a query request from the HERE Client's data retrieval service. The list contains all files created as of a passed-in "Created On" date which the requestor has permission to download.

Each file listed in the manifest is identified by a Transaction ID that is subsequently used by the HERE Client's Data Retrieval Service to request the file from the Node. The Endpoint URL, exchange type, and file type (e.g., Full, Change, Delete) are also included so the file can be correctly interpreted by the HERE Client once it is downloaded.

Files created for this flow shall conform to the HERE_Manifest 1.0 schema, defined below in this document.

3.7 HERE Domain Lists

The HERE Domain Lists flow provides the Data Retrieval Service with contextual information to be displayed and/or interpreted by the client. Each file contains the complete set of meta-data to be shared with the Data Retrieval Service and displayed in the HERE Client.

Data is organized into elements (e.g., SDWIS Water Facility Types, Tier II Reporting Ranges, etc.) which contain one or more items. Each item contains the code used within the data schema along with a short and (optional) long description for each code to be displayed in the application.

Files created for this flow shall conform to the HERE Domain Values 1.0 schema, defined below in this document.

4 Flow Processes

The following sections provide more detailed information on how the flow supports the exchange of the multiple datasets.

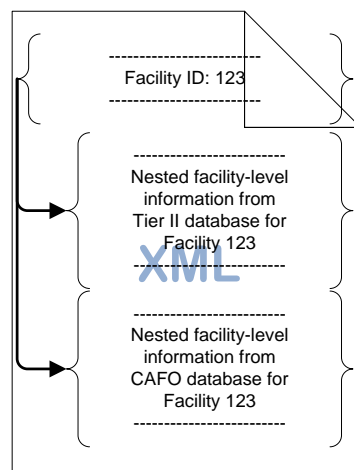
4.1 HERE Data File Composition

In many source systems, detail information for a given program (e.g., chemicals stored at a facility) is related to a facility that is maintained in an integrated facility system. This allows for reconciliation of multiple programs into a single tracked facility, with a single geographic coordinate and shared list of related contacts.

The HERE Client is designed to take advantage of such a relationship if it exists. This results in a more accurate depiction of the sites, as multiple programs are shown as reconciled in one site detail page and searches can be performed for more complex criteria (e.g., “Show all facilities with chemical ‘X’ that contain an RMP”).

In order to display the facilities in such a manner, the files should be constructed as follows:

1. Facility-level information for detail data sources (e.g., Tier II, CAFO, SDWIS, etc.) is merged and reconciled with the integrated facility system.
2. The facility dataset is generated from the integrated facility system. It contains all facility-level information for each site shared with the exchange.
 - a. If a site is shared by multiple programs, the facility information is consolidated and reconciled into one section. Information on the various separate programs is nested within each site as environmental interests (see diagram at right). In addition, contact and organizational information is aggregated at the facility level.
3. Each of the detail datasets is generated from the detail source system. Each contains all detail strictly related to that source system rather than that generically applies to the entire site (e.g., chemical information for the Chemical Storage dataset, livestock types and quantities for the Livestock dataset, etc.). Additionally, the file contains an identifier mapping to the how that program was represented in the facility dataset (i.e., the environmental interest).



For example, if a single site is associated with a Tier II chemical reporting program and a CAFO livestock reporting program, the data from each source system would be integrated and reconciled prior to the facility dataset's generation. This site would be represented in three files:

- *a Facility file containing all reconciled site detail from both program databases and a complete aggregated list of contacts across all programs (e.g., chemical plant supervisors, livestock managers, etc.)*

- a Chemical Storage file containing a list of all chemicals stored at the site and their locations
- a Livestock file containing a list of all animal types represented by the site and their quantities

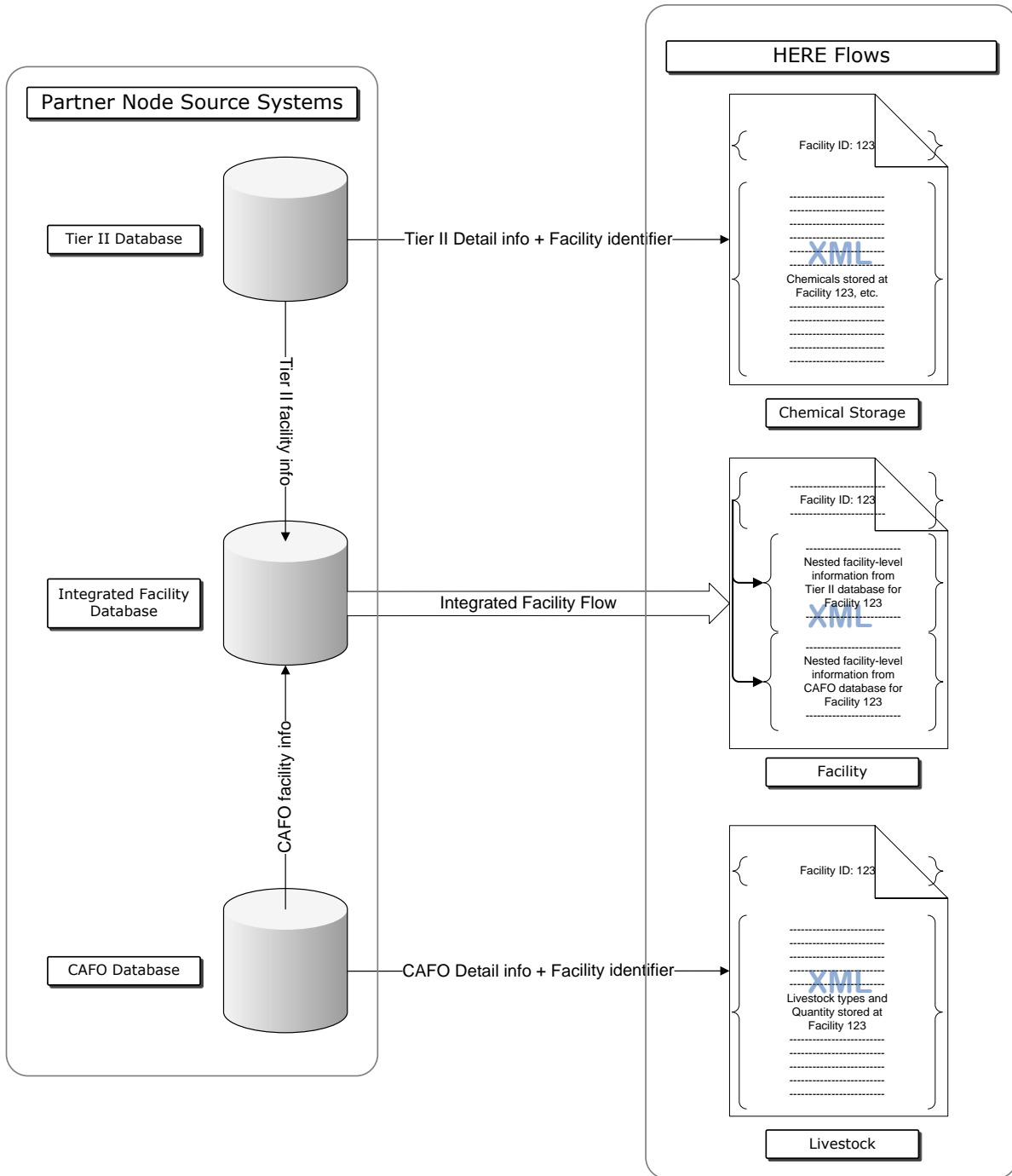


Figure 8: File Composition for Partner Nodes with Integrated Facility Systems

If a detail database is not already integrated with the facility system for a given Node, its facility data will be mapped to the HERE Client Facility data via the following process:

1. Facility-level information for detail data sources (e.g., Tier II, CAFO, SDWIS, etc.) is maintained in each of the source systems.
2. The facility dataset is generated from only the integrated facility system.
3. Each of the detail datasets contains both facility and detail information. The facility information within each detail dataset will be mapped to the detail schema as completely as is available from the source system.

When the data is retrieved by the HERE Client, it will be merged with the other facilities but not reconciled.

For example, if a single site is associated with a Tier II chemical reporting program and a CAFO livestock reporting program but the systems have not been integrated, the data from each source system would be mapped to the facility file independently. This site would be represented in three files:

- *a Facility file containing site detail and contacts from the integrated facility system.*
- *a Chemical Storage file containing the site detail and contacts as well as all chemicals stored at the site and their locations*
- *a Livestock file containing the site detail and contacts as well as all animal types represented by each site and their quantities*

The Facility, Chemical, and Livestock representations of the facility would be each displayed as separate facilities in the HERE Client.

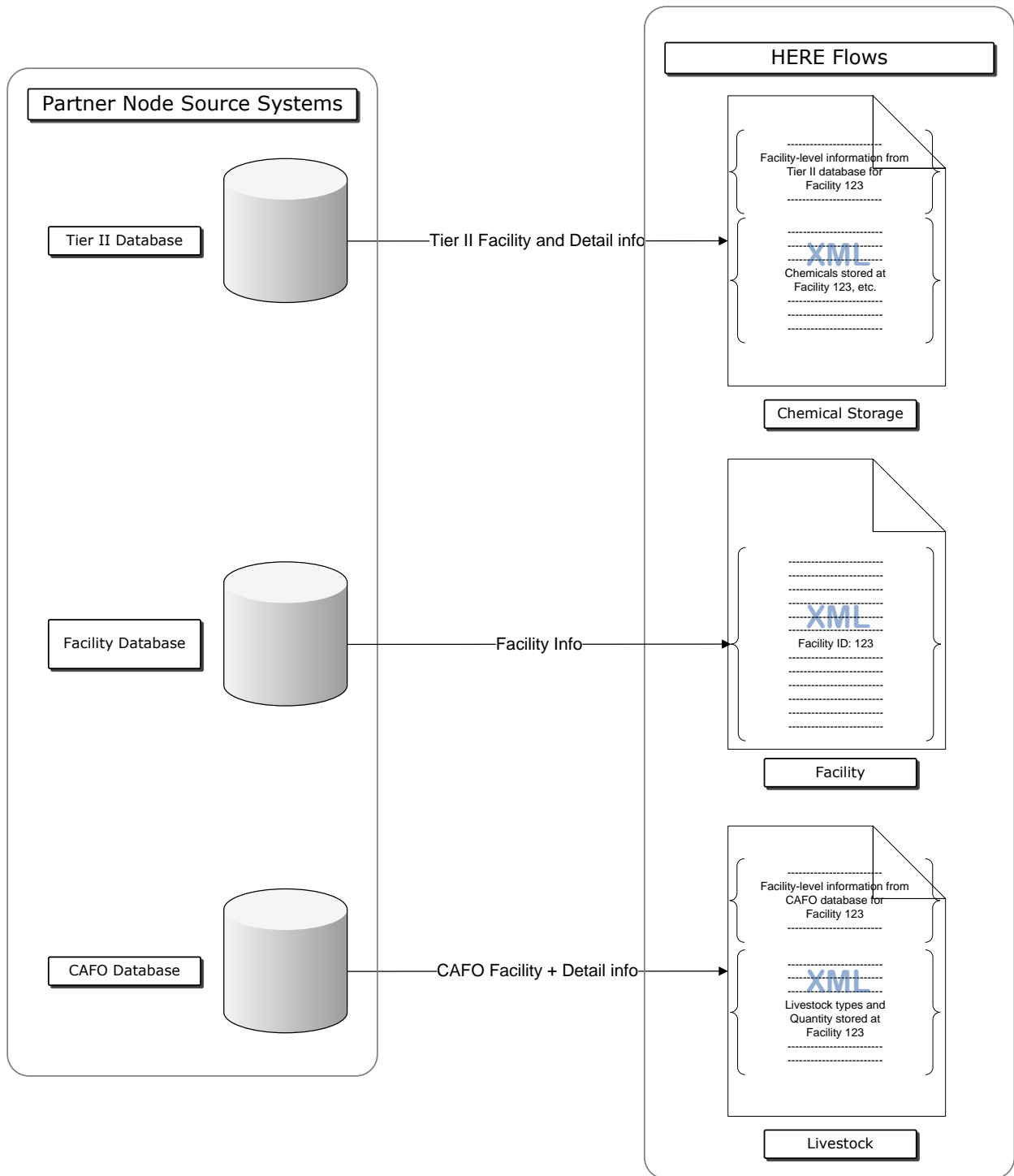


Figure 9: File Composition for Partner Nodes with Non-Integrated Facility Systems

4.2 File Publishing Methods

In order to improve performance and reduce the amount of data that needs to be shared across the Exchange Network, the HERE Client supports three types of file publishing methods: full,

change, and delete. The following section explains what is involved in producing each of these types of files.

4.2.1 Full Files

Full files shall be created for each data source that is mapped to the Homeland Emergency Response Exchange. These shall contain all of the records in the source system to be shared with the Exchange. The only requirement for a partner to participate in the Exchange is that these full files be created on a regular basis. The frequency by which full files should be created is determined by whether the partner has elected to also produce change files.

4.2.2 Change Files

In addition to producing full files, it is recommended that partners also produce change files containing only the records which have changed since the last file (full or change) was produced for that file type. A change record would be included in this file if any related field for that record has changed in the source system.

Change files are created only when a record has changed or been inserted in the source for that file type. For example, if the facility source system had a record changed between when the last change file was created and today, then the Node would produce a change file for facility information. If however during the same period the Tier II source remained unchanged, then no new Tier II change file need be created.

A partner is only required to produce full files on a regular basis to join the HERE network. However, there are significant performance gains to be had from clients creating change files, so this practice is highly recommended.

4.2.3 Delete Files

Finally, it is recommended that partners also create a file containing the IDs of facilities that are no longer being shared with the exchange and the date they were removed. This file is also optional, but if change files are in place, then this would be the only means by which the HERE Client could update which facilities have been “deleted” before a new full file is created.

4.3 Dataset Download Process Overview

The HERE Client retrieves its data by downloading pre-generated files corresponding to the HERE-related datasets stored on the partner Nodes. A data retrieval service running on the local machine where the HERE Client is installed will begin this process by querying each of the partner Nodes to produce a “file manifest”. The manifest contains a list of files available for download that are both available and permissible for the HERE Client’s NAAS credentials to obtain. The file manifest conforms to a new schema (HERE Manifest) created specifically for the Homeland Emergency Response Exchange.

Once the data retrieval service receives the file manifest, it will download each file listed based on the file’s transaction ID. Upon downloading all files from each Node, the HERE Client will update the data in the local data store according to the following logic:

- **Full file:** Replace the entire contents of the local data store from the data provider with the contents of the file
- **Change file:** Update the existing contents of the local data store from the data provider with the contents of the file. This process may result in inserts as well as updates, but no deletes.
- **Delete file:** Remove any records from the local data store that are included in the delete file. This will not result in any inserts or updates.

For a detailed sequence diagram describing the download process and the security checks involved, please refer to the section on Security.

4.4 HERE Domain List Categories

One of the major benefits of the HERE Client is that it provides context alongside the data produced by source systems. This allows emergency personnel from many regions to interpret the data from many regions in a similar manner. For example, a responder from Kansas does not need to know that Nebraska refers to its Chemical Storage information as the “Title 3” program and Iowa refers to it as “Tier II”. The HERE Client maps the data from both of these partners to a single EI Category of “Chemical Storage”, which is all the emergency responder will see when they use the client.

The context produced by each partner will vary depending upon the type of data that is being shared by that partner. However, the following categories will be common to any implementation of the Homeland Emergency Response Exchange:

4.4.1 Environmental Interest Categories

Each partner must provide a translation of their environmental interests (e.g., “Tier II”) as they relate to the standard used within the HERE Client by providing the following mapping information in the Meta-Data file:

- EI Category (e.g., “Chemical Storage”)
- Partner-specific term (e.g., “Tier II”)

The following list displays the standard terms for Environmental Interests used within the HERE Client:

EI Category	Examples
Air	Air facilities, SPARS Major/Minor, ISTEPS
Chemical Storage	SARA 312a, Tier II, Title 3, Right-to-know
Hazardous Waste	Resource Conservation Recovery (RCRA)
Livestock	CAFO, Animal Feeding Operations
Public Water Supply	SDWIS, Drinking Water System
Remediation	Superfund, Brownfields, Leaking Tanks
RMP	Risk Management Plan on-site
Solid Waste	Landfills, Sanitary Disposal Project Permits
Tanks	Above-ground storage tanks (AST), Underground storage tanks (UST)
Wastewater	NPDES Permits and Compliance, Municipal Treatment Plans, Lagoons

4.4.2 Contact Prioritization

It is vitally important for emergency personnel to know who at a site should be contacted in the event of an emergency. Because a single site can have dozens of contacts associated with it, each partner Node must supply a mapping of contact type to priority per environmental interest.

The mapping should include the following elements:

- Environmental Interest Category (e.g., “Chemical Storage”)
- Contact Title (e.g., “Owner”)
- Priority (1 is highest)

The contact priority will be used by the HERE Client in two ways. First, this determines the sort order of contacts displayed for a site’s detail page. Second, it determines which contact will be displayed for the site in the search results screen, where there is only room to display one contact.

4.4.3 Other Codelists

Depending upon which data is shared by a given Node, the following sets of codes may need to be shared as well:

Code Set Name	Description
CAFO Animal Units	Provides the calculation for converting Livestock codes (per the CAFO v1.0 schema) to animal units.
Horizontal Collection Method	Provides description for the horizontal collection method codes provided in the FACID v2.3 schema.
IDLH	Provides a mapping of chemical CAS numbers to pages in the Immediately Dangerous to Life and Health reference website (http://www.cdc.gov/niosh/idlh/idlh-1.html).
NAICS Codes	Provides descriptions for the North American Industry Classification System (NAICS) codes.
SIC Codes	Provides descriptions for the Standard Industrial Classification (SIC) codes.
NIOSH Sequence to CAS	Provides a mapping of chemical CAS numbers to pages in the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide reference website (http://www.cdc.gov/niosh/npg/).
SDWIS Codes	<p>Provides descriptions for the following SDWIS (i.e., public water supply) codes:</p> <ul style="list-style-type: none"> • Activity Flag • Affiliation Type • Availability • Facility Type • Facility Water Type • Owner Type • PWS Type
Tier II Codes	<p>Provides descriptions for the following Tier II (i.e., chemical storage) codes:</p> <ul style="list-style-type: none"> • Reporting Ranges • Storage Conditions • Storage Types

5 Security

This section describes the measures to be put in place in order to ensure the secure exchange of data amongst intended participants of the Homeland Emergency Response Exchange.

The security measures are implemented within the Exchange Network, which carries with it a set of protocols that are outside the scope of this document. For additional context, please refer to the following documents:

- Network Security Guidelines and Recommendations (http://exchangenetwork.net/node/dev_toolbox/security_guide.htm)
- Network Exchange Protocol Document (http://exchangenetwork.net/node/dev_toolbox/protocol.htm)

5.1 Account Management

The exchange leverages the Exchange Network's Network Authentication and Authorization Services (NAAS) for account management. Anyone wishing to obtain access to the HERE-related datasets for a given data source must first have a valid NAAS account. New accounts can be requested using the HERE Client.

Once a user has a NAAS account, they will need to contact the Node manager for each restricted source of data they wish to obtain. For example, an emergency responder who wishes to access Kansas and Missouri data will first need to obtain a NAAS account (if they don't already have one), then will need to receive permission from the Kansas and Missouri Node managers to access any restricted HERE-related datasets they manage.

Accounts can belong to one of the following two roles:

5.1.1 Authorized User

Authorized Users have the ability to access datasets on specific Nodes (e.g., the HERE Facility dataset on the Kansas Node) as well as the ability to manage their account (i.e., change their password).

Most end users of the HERE Client will be associated with Authorized User accounts.

5.1.2 Administrator

Administrators have all rights of the Authorized User role, plus the following:

- Ability to create security policies
- Ability to assign/remove users to security policies
- Ability to change the passwords of other Authorized Users

Node managers are by default administrators for NAAS accounts.

5.2 Security Policies

Security for the HERE-related datasets is administered through the creation of security policies for each NAAS account. A HERE security policy consists of a mapping of a user's account to a set of datasets available on a given Node:

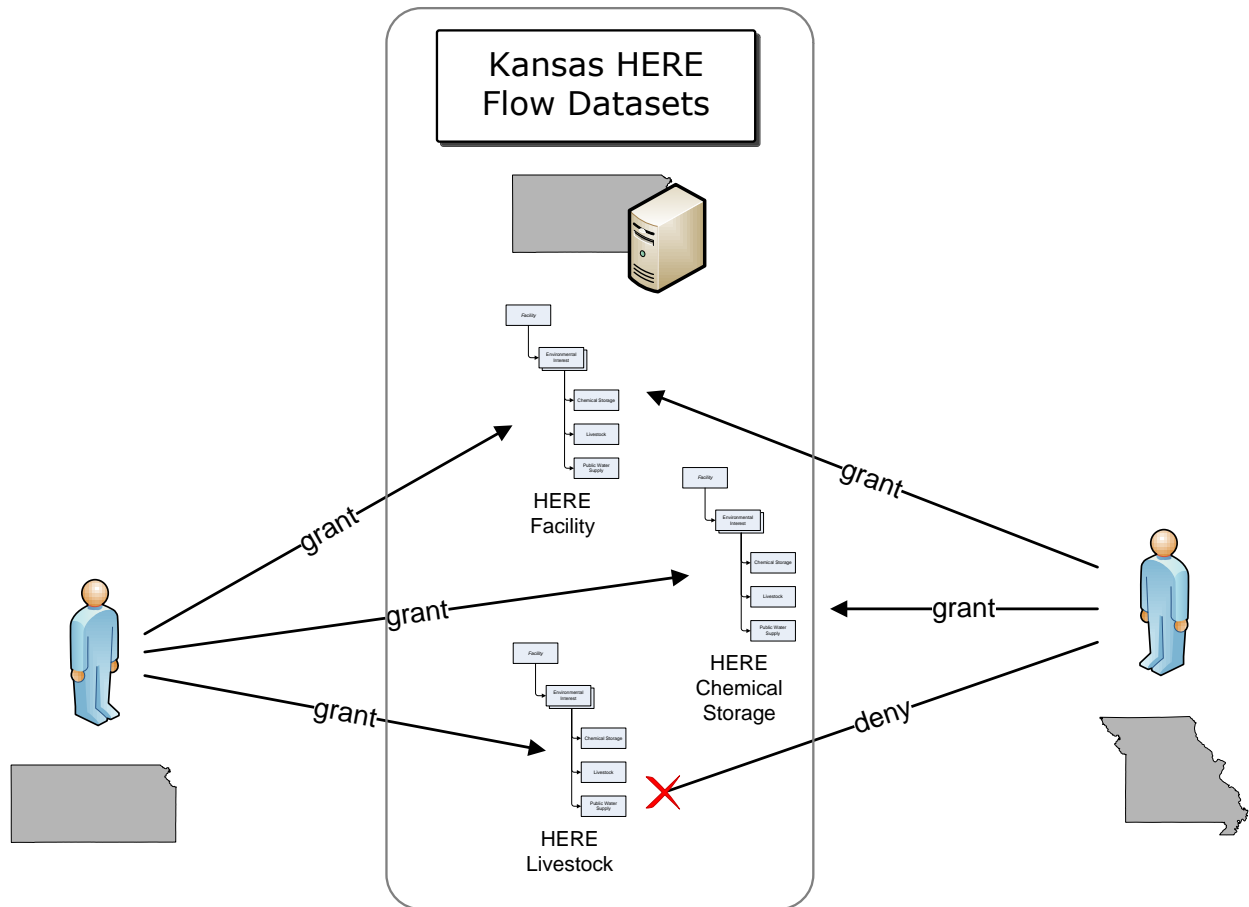


Figure 10: Example of security policies for two NAAS users on a given Node

Policies can be setup to either grant or deny access for a user to one of the following datasets:

- HERE Facility
- HERE Chemical Storage
- HERE Livestock
- HERE Public Water Supply
- HERE (includes the Manifest and Domain Lists services)

For example, a Node manager may determine that all emergency management personnel who request access to their HERE-related datasets should be able to access the Facility and Public Water Supply datasets, but only certain personnel should be able to access the Livestock dataset. Policies are created and managed by each Node manager for their Node (example):

Node Manager

HERE Security Policy Management

Account: tk_conrad@windsorsolutions.com

tk_conrad@windsorsolutions.com
guy_outred@windsorsolutions.com

Account Details

Email Address	Affiliation	Account Created By
tk_conrad@windsorsolutions.com	Windsor	Dennis.Burling@NDEQ.state.ne.us

Policy Management

Flow	Grant Access?
HERE Facility	<input checked="" type="checkbox"/>
HERE Chemical Storage	<input checked="" type="checkbox"/>
HERE Livestock	<input type="checkbox"/>
HERE Public Water Supply	<input checked="" type="checkbox"/>

Figure 11: Sample security policy management screen

A single user's NAAS account may be associated with many security policies across participating Nodes:

Node/Flow	Facility	Chemical	Livestock	Public Water Supply	HERE
Node A	✓	✓	✓	✗	✓
Node B	✓	✗	✓	✓	✓
Node C	✓	✓	✓	✓	✓
Node D	✓	✓	✓	✗	✓

Figure 12: Example security matrix for a given user’s NAAS credentials across multiple Nodes

5.3 Security Protocols

Each connection to the Homeland Emergency Response Exchange shall require receiving a token from NAAS. This token is presented as part of each query and download request from partner Nodes. The partner Node then sends the token to NAAS to confirm that the account associated with the token is allowed access to the requested file before including it in the file manifest or allowing it to be subsequently downloaded.

The following step-by-step process describes how files will be exchanged between the HERE partner Nodes and the HERE Client in a secure fashion:

1. HERE Data Retrieval Service starts the data refresh process (scheduled) by requesting an authentication token from NAAS
2. NAAS Server sends authentication token affirming that the user is recognized as a valid NAAS account
3. For each Node that the client is configured to communicate with:
 - a. HERE Data Retrieval Service requests the list of files available for download from that Node by that user
 - b. Node passes on the request to the internal flow processor
 - c. For each file available on the Node:
 - i. Internal flow processor checks with the NAAS Server to see whether the user is authorized to download each file. This authorization is based on whether the user’s credentials are given permission for the flow associated with each file as per the security policy.
 - ii. NAAS Server sends a token indicating user is authorized to receive that file
 - d. Internal flow processor compiles a “file manifest” XML document adhering to the HERE_Manifest_v1.0.1.xsd schema containing a list of files which the user is authorized to receive. The list is further limited by only including those files which were either created on or after a passed-in date or that are the most recent available for that flow.
 - e. Internal flow processor sends the file manifest to the Node
 - f. Node forwards on the file manifest to the HERE Data Retrieval Service
 - g. The HERE Data Retrieval Service determines which files to request from the Node based on reviewing the file manifest and comparing it to the local data already retrieved by the application.

- h. For each file the HERE Data Retrieval Service wishes to download:
 - i. HERE Data Retrieval Service requests the file from the Node matching the transaction ID in the file manifest
 - ii. Node sends the file matching the transaction ID

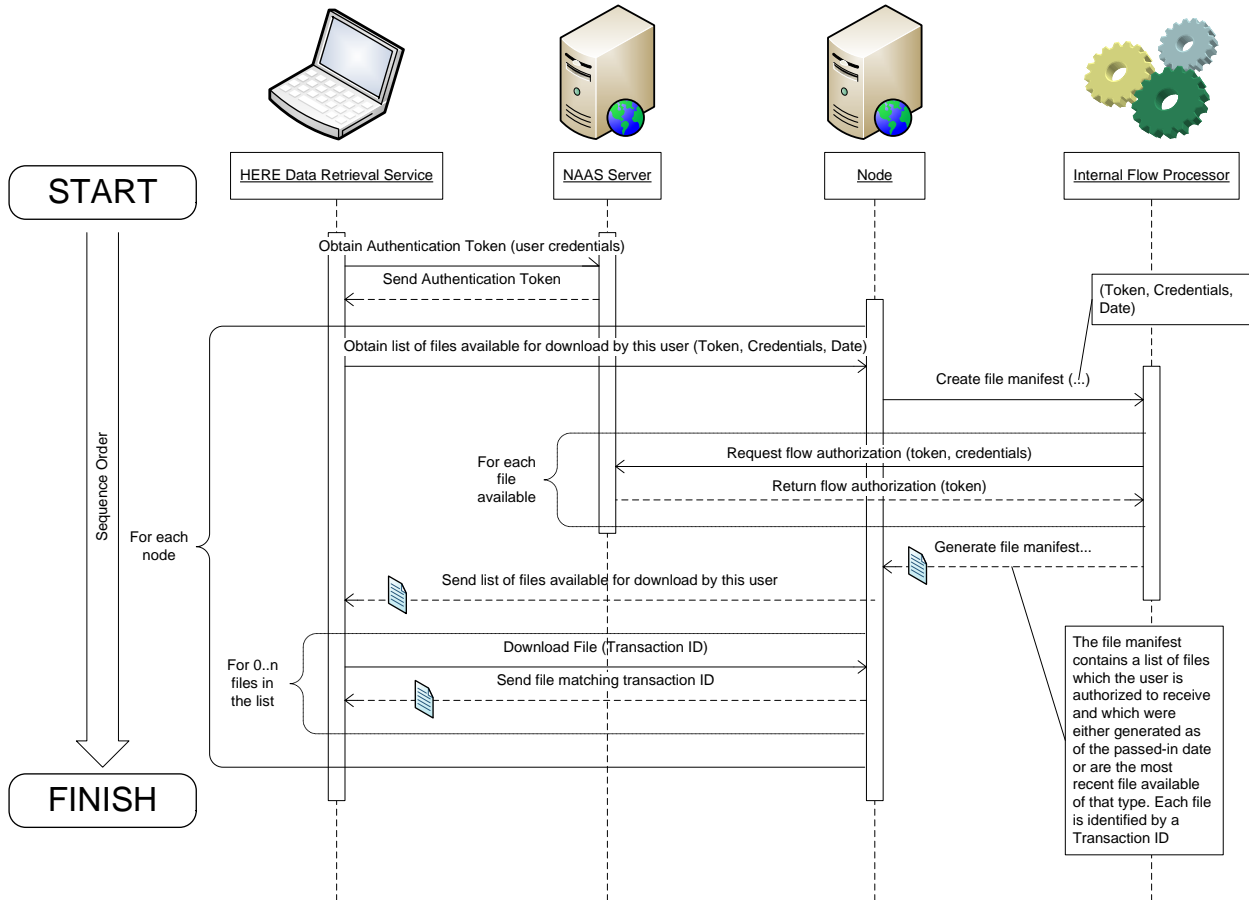


Figure 13: HERE file download sequence diagram

5.4 Local Cache Security

NAAS credentials used by the HERE Client’s Data Retrieval Service to access the HERE-related datasets are stored within the HERE Client’s local cache. This allows the retrieval process to occur at any scheduled time without the need for prompting a user directly. The passwords associated with these credentials are encrypted to prevent account impersonation.

The local cache can manage multiple users for the same installation of the HERE Client. Each user’s NAAS account is associated with their Windows account upon creation. The HERE Client’s Data Retrieval Service shall only use the NAAS credentials associated with the user who is logged into the machine at the time of synchronization.

6 Schema Information

The Homeland Emergency Response Exchange is supported by the following types of schemas:

- **Content schemas** support the HERE-related datasets and are all based on existing schemas. Fields are mapped only as necessary for the purposes of the exchange.
- **Administrative schemas** are designed specifically for the HERE project to support the download and metadata processes.

6.1 Data Schemas

6.1.1 Facility Registry System (FRS)

Dataset Supported: HERE Facility

Main File: FACID_FacilitySiteAll_v2.3.xsd

Version: 2.3

Schema Location: http://www.exchangenetwork.net/Registry/FRS_new_sch_ver_2.3.zip

Purpose: This schema defines and validates the HERE Facility dataset, which contains all facility and environmental interest data to be displayed in the HERE client.

Mapping Requirements: Fields are mapped to this schema as they would for a standard outbound flow of Facility ID data to another Partner such as EPA.

6.1.2 Tier II

Dataset Supported: HERE Chemical Storage

Main File: TierII_TierII_v1.0.xsd

Version: 1.0

Schema Location:

http://www.statesdx.net/homelandsecurity/pages/public/general_information.htm

Purpose: This schema defines and validates the HERE Chemical Storage dataset, which contains the detailed chemical data to be displayed for any facility that has submitted a Tier II report to a State partner.

Mapping Requirements: For the purposes of the exchange, the following entities must be mapped:

- a facility identifier that uniquely identifies this record in the HERE Facility dataset
- all fields that are part of the “Chemical Inventory” hierarchy (main file: “TierII_ChemicalInventory_v1.0.xsd”)

Additional fields may exist in this file, but are not required and will likely be ignored.

6.1.3 Concentrated Animal Feeding Operation (CAFO)

Dataset Supported: HERE Livestock

Main File: CAFO_CAFO_v1.0.xsd

Version: 1.0

Schema Location: <http://www.exchangenetwork.net/schema/CAFO/1/0/>

Purpose: This schema defines and validates the HERE Livestock dataset, which contains the detailed animal type and quantity data to be displayed for any facility that submits information to the state.

Mapping Requirements: For the purposes of the exchange, the following entities must be mapped:

- a facility identifier that uniquely identifies this record in the HERE Facility dataset
- all fields that are part of the “Animal Type” hierarchy (main file: “CAFO_AnimalType_v1.0.xsd”)

6.1.4 Safe Drinking Water Information System (SDWIS) Inventory

Dataset Supported: HERE Public Water Supply

Main File: SDWA_DataFlowInventory_v2.xsd

Version: 2.0

Schema Location: http://www.exchangenetwork.net/registry/sdwis_schema.zip

Purpose: This schema defines and validates the HERE Public Water Supply dataset, which contains all water systems and facilities related to the water system.

Mapping Requirements: For the purposes of the exchange, the following entities must be mapped:

- a facility identifier that uniquely identifies this record in the HERE Facility dataset
- selected fields that are part of the following hierarchies:
 - “Water Systems” (main file: “SDWA_WaterSystem_v2.xsd”)
 - “WaterSystemFacilities” (main file: “SDWA_WaterSystemFacility_v2.xsd”)

6.2 Administrative Schemas

These schemas manage the data flow and data interpretation processes within the HERE Data Retrieval Tool:

6.2.1 HERE Manifest

Dataset Supported: HERE Manifest

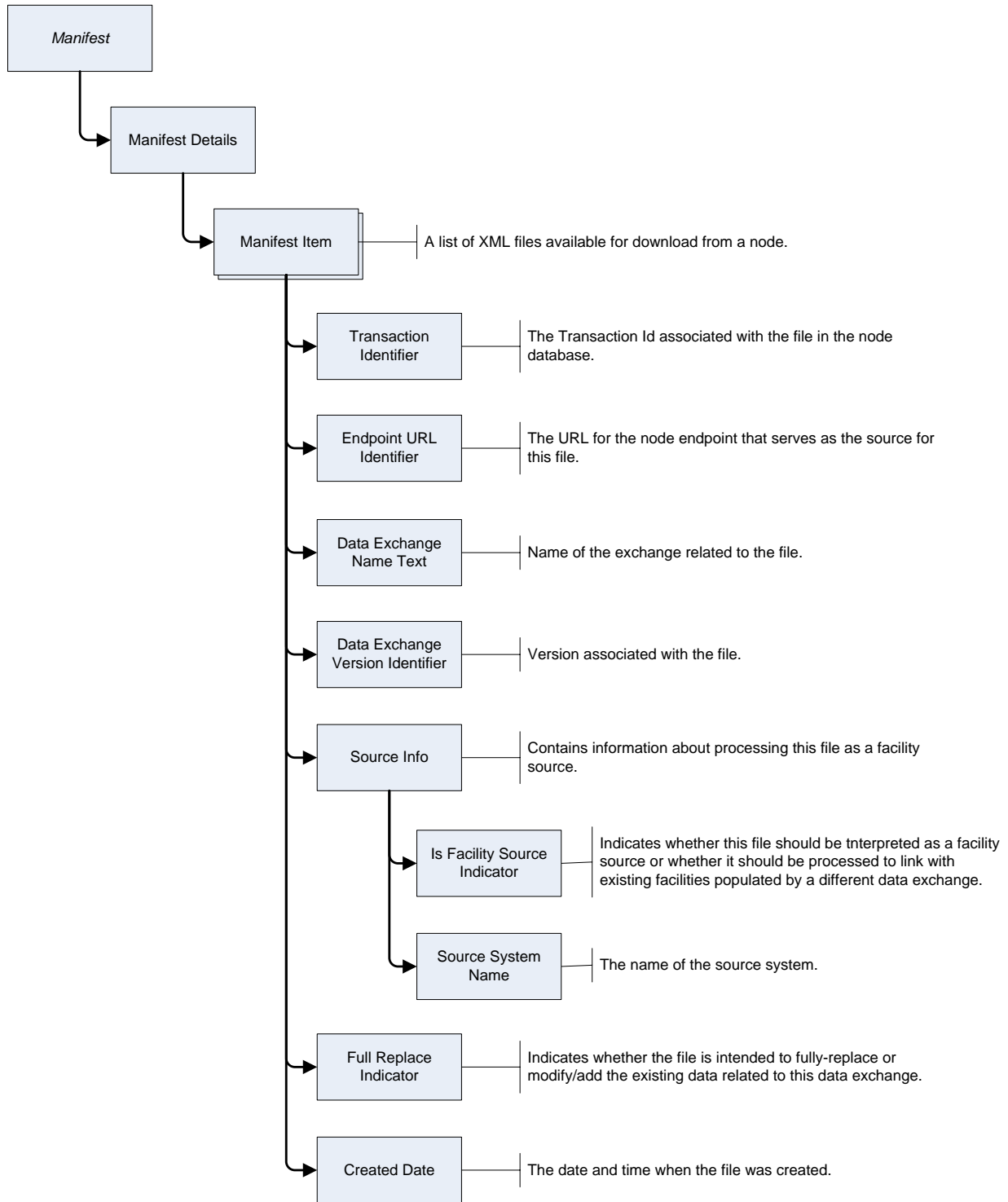
Main File: HERE_Manifest_v1.0.1.xsd

Version: 1.0

Schema Location: <http://www.windsorsolutions.biz/xsd/HERE/1/0>

Purpose: This schema defines and validates the HERE Manifest dataset, which contains a list of all files available to be downloaded from a HERE partner Node.

6.2.1.1 Schema Diagram



6.2.1.2 Data Exchange Template

Element	Datatype	Occurs	Description
Transaction Identifier	string	once	The Transaction Id associated with the file in the Node database.
Endpoint URL Identifier	string	once	The URL for the Node endpoint that serves as the source for this file.
Data Exchange Name Text	string	once	Name of the exchange related to the file.
Data Exchange Version Identifier	string	once	Version associated with the file.
Is Facility Source Indicator	boolean	once	True if file should be interpreted as a source of facilities in the HERE Client. False if expected to link with other facilities.
Source System Name	string	once	The name of the source system.
Full Replace Indicator	boolean	once	True if file contains all data. False if file contains only incremental changes.
Created Date	dateTime	once	The date and time when the file was created.

6.2.2 HERE Domain Values

Dataset Supported: HERE Domain Lists

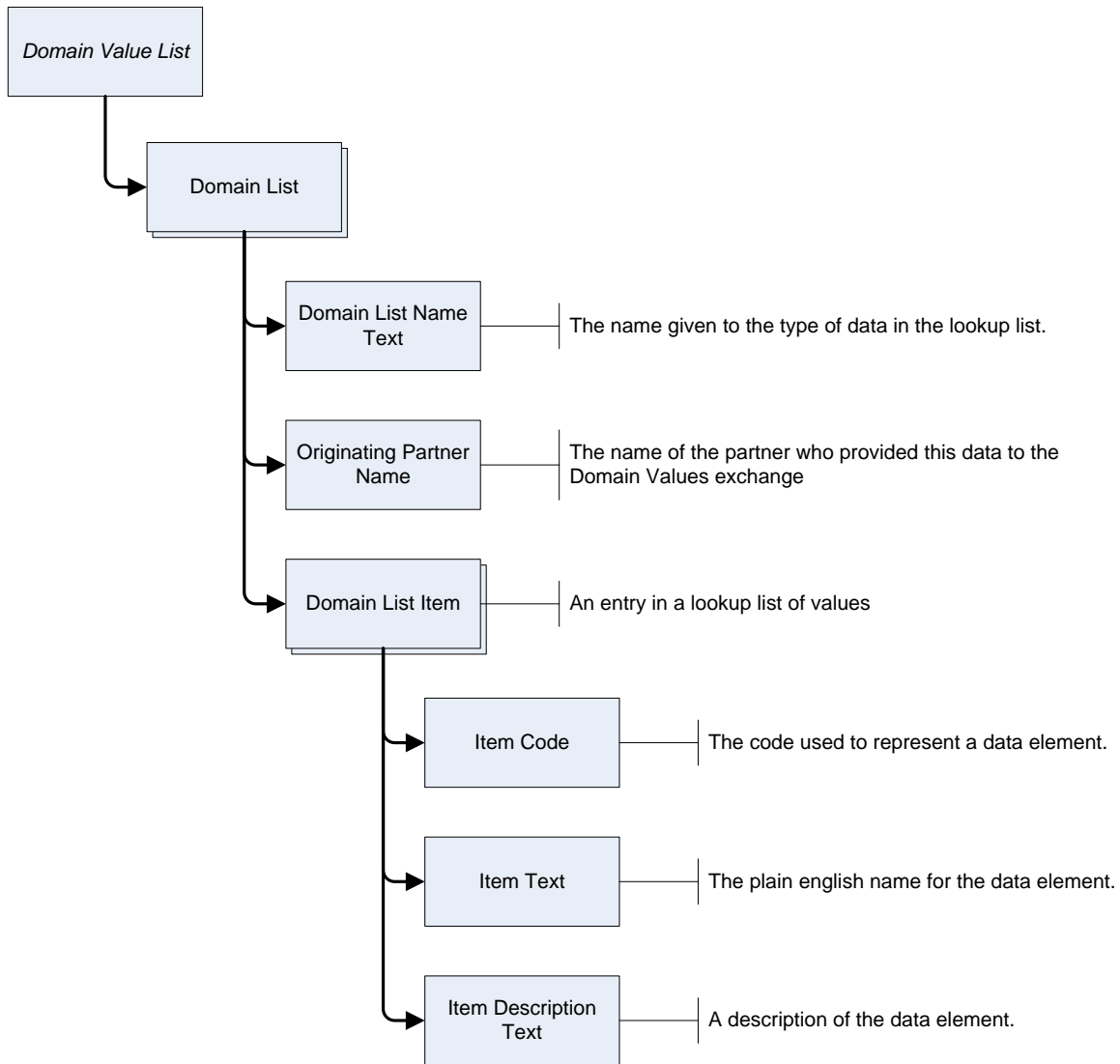
Main File: HERE_DomainValues_v1.0.xsd

Version: 1.0

Schema Location: <http://www.windsorsolutions.biz/xsd/HERE/1/0>

Purpose: This schema defines and validates the HERE Domain Lists dataset, which contains a list of lookup codes and other contextual information to be shared with the HERE Client.

6.2.2.1 Schema Diagram



6.2.2.2 Data Exchange Template

6.2.2.2.1 Domain List

Element	Datatype	Occurs	Description
Domain List Name Text	string	once	The name given to the type of data in the lookup list.
Originating Partner Name	string	once	The name of the partner who provided this data to the Domain Values exchange.
Domain List Item	complex	zero..many	Array of items and descriptions associated with

Element	Datatype	Occurs	Description
			Domain List Name Text.

6.2.2.2.2 Domain List Item

Element	Datatype	Occurs	Description
Item Code	string	once	The code used to represent a data element.
Item Text	string	once	The plain English name for the data element.
Item Description Text	string	once	A description of the data element.

7 Data Service Information

7.1 Data Service Summary

The following table lists the seven data services available in the Facility Identification v3.0 exchange.

Service Name or Description	Service Types	Notes	Return Schema
HERE.GetHEREManifest_v1.0	Query	Requests a list of all files available for download on the partner Node. This is the first step of the data refresh process for the HERE Client.	HERE_Manifest_v1.0.1.xsd

7.2 HERE.GetHEREManifest_v1.0

Data Service Type: Query

Data Service Parameters, Order, and Format:

Position	Name	Data Type	Required?	Max Length	Wildcards	Notes and Examples	Multi-value?
1	Change Date	Date	Yes	N/A	N/A	Date since when any file was created.	No

Return Method: N/A

Payload Format: HERE Manifest Schema (HERE_Manifest_v1.0.1.xsd)

Data Service-level Business Rules: N/A

Error Conditions and Fault Follow-up Actions: N/A

EN Header Usage: Required.

Example Uses: Get all facility data so that a replica of that data can be retained and synchronized.

8 Exchange Implementation Guidelines

Because the Homeland Emergency Response Exchange is comprised of many datasets and the information shared can vary by partner, this allows for a variety of methods for implementation. This section does not describe all of the possible implementations but presents two examples, Minimum and Recommended.

8.1 Minimum Implementation

This section describes the minimum steps to implementing the Homeland Emergency Response Exchange:

8.1.1 Publish Files for Data and Meta-Data

In order to join the Homeland Emergency Response Exchange, a partner first needs to publish files for the HERE Facility and HERE Domain Lists datasets on a regular basis:

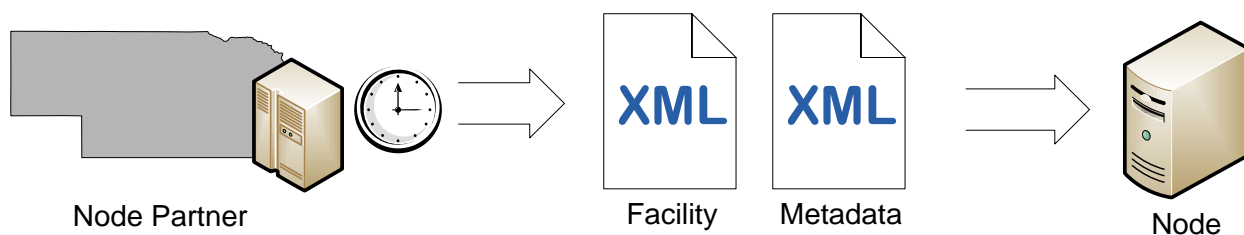


Figure 14: File Creation Overview: Minimum Implementation

Each dataset file should contain all records in the source system. Files are then stored in the Node for later retrieval by the HERE Client, along with the following attributes:

- The creation date for each file
- The transaction ID associated with each file's creation

8.1.1.1 Publishing Frequency

In a minimum implementation, the HERE Facility dataset will need to be published to the partner Node on a frequent-enough basis to ensure that HERE Client installations have current facility information. This will vary from partner to partner depending upon how frequently their facility systems are updated.

8.1.2 Implement HERE Manifest Dataset and Get Manifest Service

The Node will need to provide the HERE Manifest dataset on request by the HERE Client. Additionally, the partner will need to implement the `HERE.GetHEREManifest_v1.0` service which responds to the HERE Client's query for a new HERE Manifest file. Both the dataset and the download process are described in better detail in the preceding section on "Security".

8.2 Recommended Implementation

The minimum implementation described above will address the basic needs of the Homeland Emergency Response Exchange for a partner to begin sharing data. However, the anticipated size of a full facility file could present both bandwidth and performance problems, particularly as this exchange scales to reach many clients served by many Nodes. In addition, there are other datasets that provide crucial detail information about each facility that would be advantageous to share with the flow if at all possible.

For these reasons, the following is the recommended implementation for a partner to participate in the Homeland Emergency Response Exchange:

8.2.1 Data and Meta-Data

As per the minimum implementation, a partner will need to publish files for the HERE Facility and HERE Meta-Data datasets to the Node. Additionally, it is recommended that each partner publish files for as many of the following datasets as possible:

- HERE Chemical Storage
- HERE Livestock
- HERE Public Water Supply

8.2.1.1 File Publishing Methods

Additionally, it is recommended for partners to create three versions of the data files:

- **Full files**, containing all records in the source system to be shared with the exchange
- **Change files**, containing all records which have changed since the last file of the same type was created
- **Delete files**, containing a list of sites and the date they were no longer shared with the Homeland Emergency Response Exchange.

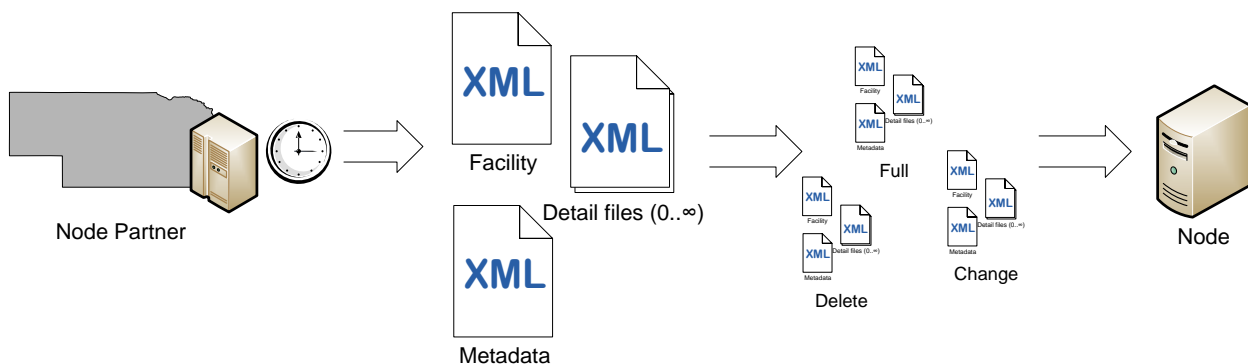


Figure 15: File Creation Overview: Recommended Implementation

8.2.1.2 Publishing Frequency

Change and delete files should be published as often as information changes in the source system (e.g., daily). Full files can be created on a more sporadic basis (e.g., yearly), as these are only

necessary for new HERE Client installations and for reconciliation³. The HERE Client will determine on each connection to the Node which files should be downloaded and how they should be merged in the synchronization process.

8.2.1.3 File Composition

It is recommended that facility information from the detail source systems be incorporated into an integrated facility system if available, and that the facility file contain all facility information for all detail sources. See the previous section on Data File Composition for more details on how to accomplish this.

8.2.2 Implement HERE Manifest Dataset and Get Manifest Service

The Node will need to provide the HERE Manifest dataset on request by the HERE Client per the `HERE.GetHEREManifest_v1.0` service.

³ The HERE Client uses very little resources on the local personal computer when processing incremental update files from a Node. However, when a large full refresh file is processed it can require five or more minutes of intense processing, in which time the computer will provide limited resources for other tasks. So full refresh files should occur infrequently and ideally not in bulk across all datasets at the same time.