



MEDNET Technical Specification

MEDNET NHIN Gateway™

MEDNET-TS-001

MEDNETWorld.com, Inc

Executive Summary

The MEDNET NHIN Gateway™ provides core service interfaces, enabling administrative and clinical information exchanges across healthcare communities, such as health information exchanges (HIEs) or regional health information organizations (RHIOs). The MEDNET NHIN Gateway includes interfaces such as intra/inter-community patient discovery, clinical document query/retrieval, health information event messaging, audit log query, and consumer-oriented preference management. By utilizing the MEDNET NHIN Gateway, trading partners are able to securely exchange administrative and clinical information and data with other HIEs, as well as other NHIN trading partners. The MEDNET NHIN Gateway has been fully tested and has been found compliant with all NHIN standards, and is fully compatible with the federal NHIN gateway and other 3rd party NHIN gateways. This technical specification will serve to

1. Describe the basics of electronic clinical information exchange
2. Describe how to build a health information exchange (HIE)
3. Describe how to connect HIEs

Basics of electronic clinical information exchange

Interoperability is one of the fundamental requirements for the successful transition of healthcare providers to fully electronic clinical information exchange. Interoperability can be achieved by addressing issues such as a standard electronic clinical document, standard messaging platform, and standards for patient location and identification. As shown in figure 1, electronic clinical information exchange enables a healthcare provider in an HIE to look up a specific patient and retrieve clinical documents about the patient within the HIE as well as across other HIEs.

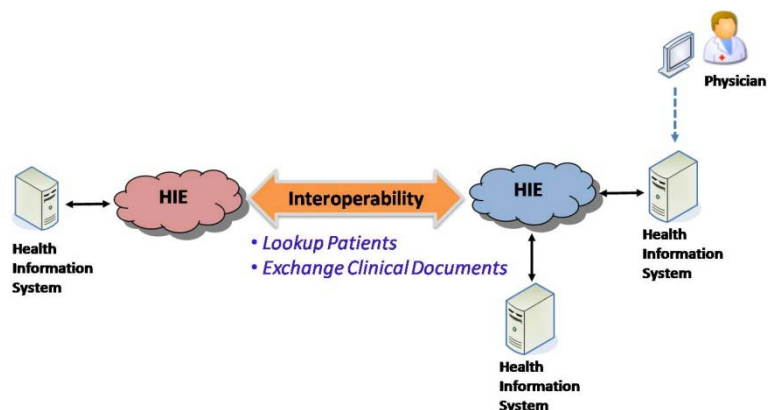


Figure 1 Electronic Clinical Information Exchange

Electronic Clinical Documents

A widely implemented and universally accepted standard is needed for clinical documents to assure portability, availability, and interoperability. One push for a universal standard clinical document is the use of XML for data portability and interoperability. ASTM's continuity of care record (CCR) and HL7/ASTM continuity of care document (CCD) follows this trend. Adopting an XML-based clinical information exchange ensures that healthcare organizations maintain adaptability and sustainability. The MEDNET NHIN Gateway supports both CCR and CCD as standard electronic clinical documents.

Standard Messaging Platform

For decades, healthcare organizations have been focusing on building proprietary networks using various communication protocol standards to securely exchange information between trading partners. Web Services is a technology that has recently emerged as a standard

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communication platform to overcome the interoperability problems. One of the key features of the Web Services technology is an ability to wrap existing resources (such as electronic medical records, scanned images, lab results etc) and expose them as services, available to other trading partners. This feature enables a healthcare enterprise to address the interoperability problems of their legacy/proprietary healthcare information systems. The MEDNET NHIN Gateway implements Web Services profiles (WS-I Basic Profiles and WS-I Security Profiles) as a standard messaging platform for the XML-based messaging exchange.

Patient Location and Identification

In general, a patient's health information is spread out over a number of different geographically distributed healthcare organizations within a community or across communities. For the interoperable exchange of electronic clinical documents, a patient's location and identification need to be addressed and identified. Prior to sharing patient health data between healthcare providers, both trading partners need to be sure that they are talking about the same physical person. This consists of two steps: 1) identifying the location of the facilities where the patient health information is held and 2) identifying patients of interest. The MEDNET NHIN Gateway addresses this problem by supporting standard based patient identification such as the IHE PIX/PDQ profile and the NHIN Subject Discovery specification.

Nationwide Health Information Network (NHIN)

NHIN is a national level initiative driven by the Office of the National Coordinator (ONC) to build a "network of networks". NHIN provides a secure, nationwide, interoperable health information infrastructure that connects providers, consumers, and other stakeholders involved in supporting healthcare. The core capability of the NHIN infrastructure includes 1) patient lookup across HIEs without a national patient identifier, 2) summary patient records (in CCD format) query and retrieval, 3) secure communication and notification, 4) audit logging and error handling for data access and exchange, 5) audit log querying allowing security officers and consumers to review audit log data and 6) support of consumer-defined preferences including (opt-in/opt-out) between HIEs.

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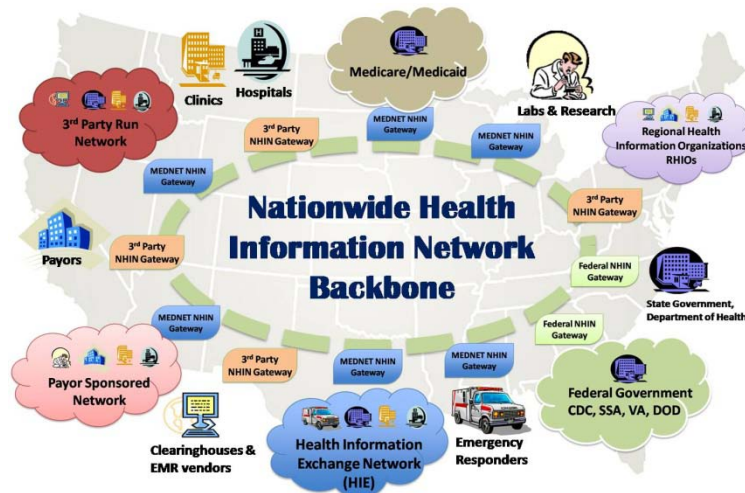


Figure 2 Nationwide Health Information network

The MEDNET NHIN Gateway is fully compatible with the Federal NHIN Gateway and other 3rd party NHIN Gateway as shown in figure 2. The table below shows the NHIN core service interface specifications defined in the NHIN infrastructure, and the compatibility of the MEDNET NHIN Gateway with the Federal NHIN gateway. In 2009, NHIN moved into production.

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Interface Specification	Description	References Standards	Federal CONNECT Team	MEDNET
<i>Authorization Framework</i>	Enabling authorization decision based on SAML assertions exchanged and local permissions and policies	OASIS SAML	Implemented /Tested	Implemented/ Tested
<i>Messaging Platform</i>	Providing WS based secure messaging services for all communications between HIEs	SOAP/WSDL/WS-Addressing/WS-Security	Implemented /Tested	Implemented/ Tested
<i>Subject Discovery</i>	Locating (cross-referencing) patients based on demographics information	IHE PIX v3	Implemented /Tested	Implemented/ Tested
<i>Query for Documents</i>	Locating clinical documents associated with a specific patient	IHE XCA & XDS	Implemented /Tested	Implemented/ Tested
<i>Retrieve Documents</i>	Retrieving a set of documents associated with a patient	IHE XCA & XDS	Implemented /Tested	Implemented/ Tested
<i>Audit Log Query</i>	Querying audit logs for a patient and making the logs available to healthcare providers/patients	IHE ATNA	Implemented /Tested	Implemented/ Tested
<i>Health Information Event Messaging</i>	Providing a publish/subscribe capability for ongoing feeds of data between NHIN-enabled health organizations	OASIS WS-BaseNotification	Implemented /Tested	Implemented/ Tested
<i>Consumer Preferences Profile</i>	Enabling consumers to specify with whom they wish to share their electronic health information	XACML	Implemented /Tested	Implemented/ Tested
<i>NHIE Service Registry</i>	Enabling HIEs to discover the existence and connection information for other HIEs	UDDI	Implemented	Not Implemented
<i>Authorized Case Follow-Up</i>	Providing authorization to obtain patient identity for case investigation purposes (Pseudonymization & Reidentification)	IHE PIX v3	To Be Implemented	To Be Implemented

Figure 3 MEDNET NHIN Gateway Interoperability Matrix

Building a health information exchange (HIE) with The MEDNET NHIN Gateway

A well built HIE should enable clinical interoperability with physician EMR systems (within the HIE) as well as interoperability with outside health information systems (HISs). The MEDNET NHIN Gateway is a core building block component for an HIE. Along with NHIN capability, The MEDNET NHIN Gateway adopts a federated architecture design to build an HIE and allows each provider to retain control over its own data (PHI – personal health information). The MEDNET NHIN Gateway ensures the security and privacy of the PHI, even within the community. Even though the data is shared within the HIE and across HIEs, there is no central repository for the data. Since there is no centralized master patient index (MPI), a record locator service (RLS) is built in to locate patient’s health information distributed across different data repositories.

Community Patient Lookup

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The record locator service (RLS) combined with distributed MEDNET NHIN Gateways enables identification of a specific patient's information across the internal HIE network. The MEDNET Gateway deployed inside a healthcare provider (it also can be integrated with other type of health information systems such as personal health record (PHR) systems, public health registries, or a payor system) can be integrated with the provider's EMR system to import/export clinical data to/from the system. Each MEDNET Gateway contains a patient database containing patient's demographics, and the RLS searches the patient database simultaneously.

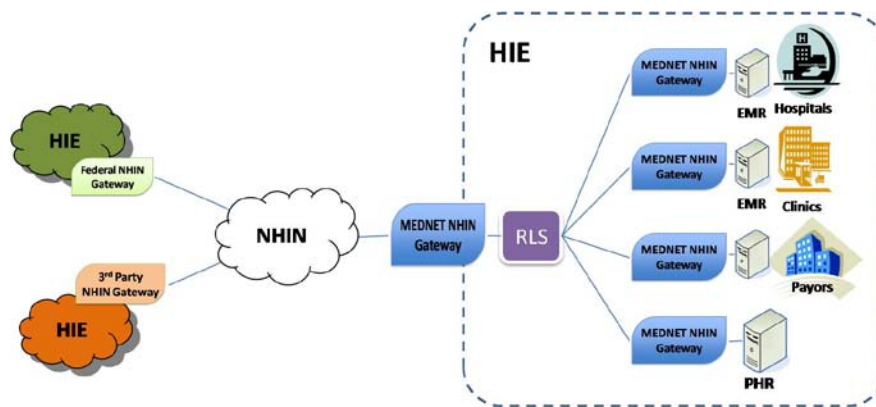


Figure 4 Intra/Inter HIE Communication

Community Clinical Data Exchange

The MEDNET NHIN Gateway deployed inside healthcare providers contains a standard document repository (IHE XDS repository) to store all types of clinical documents locally. The RLS queries a community-level standard document registry (IHE XDS registry) to locate clinical documents of a specific patient of interest stored in distributed document repositories.

Connecting HIEs

The NHIN core services interfaces are built into the MEDNET NHIN Gateway to support the information and data exchange between HIEs. Figure 5 shows system architecture of the MEDNET NHIN Gateway, enabling inter-HIE health information exchange. The initiating Gateway allows outbound requests to other HIEs while the responding Gateway controls incoming requests from other HIEs. All incoming requests are filtered by the authorization framework module, before being passed other service interfaces. This authorization framework ensures the integrity of the messages and verifies the identity of the authorized users. The services supported by the MEDNET NHIN Gateway are 1) inter-community patient discovery, 2) cross-

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community Clinical Data Exchange 3) event-driven message exchange, 4) audit log query, and 5) consumer-oriented preference management.

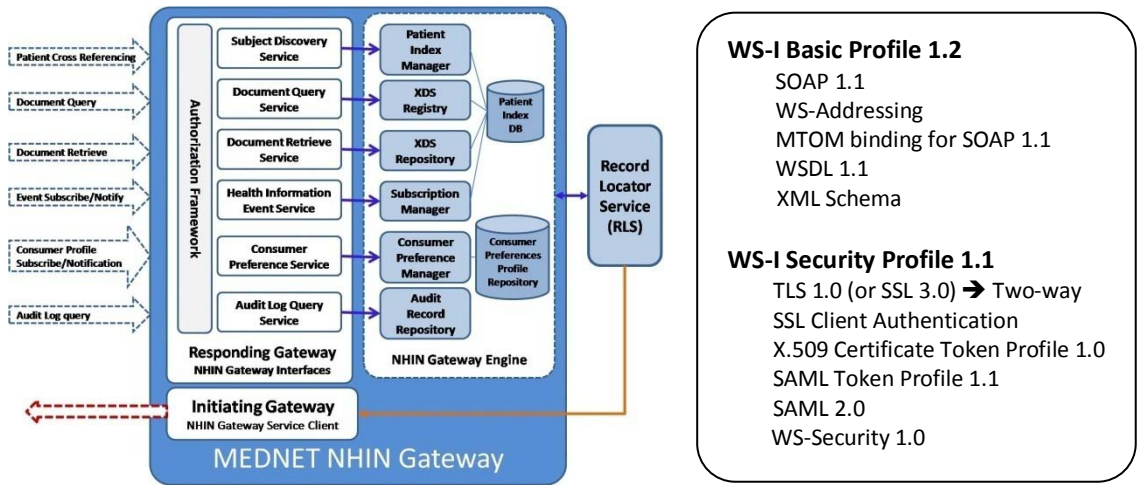


Figure 5 MEDNET NHIN Gateway & Standard Profiles Implemented



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