

# changing the way healthcare **co**nnects



## HEALTH OPTIMUM

Veneto, Italy

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### BENEFITS OF THE PROJECT

HEALTHcare delivery OPTimisation through teleMedicine (HEALTH OPTIMUM) connects 34 community hospitals in the Veneto Region of Italy to seven specialty centers for neurosurgery. Managing more than 2,300 telecounselling requests each year, this system allows three of every four patients to be treated closer to home with the support of family and friends rather than being transferred to a remote tertiary medical center.

The HEALTH OPTIMUM network has dramatically reduced the economic, organizational and social costs related to patient transfers while significantly increasing the quality and continuity of care assistance across the region. Sixty percent of cases today can be closed within the first hour and users recently rated their satisfaction with the system as 4.3 out of a possible 5.

### THE APPROACH

Establishing a common language for interoperability between the hospitals was an essential first step for the HEALTH OPTIMUM network. Integration profiles developed by Integrating the Healthcare Enterprise (IHE) were adopted, including XDS.b, XDS-I and NAV. Next a common interoperability platform based upon IHE's XCA profile was used to link hospitals across the region.

#### ABOUT HEALTH OPTIMUM

HEALTH OPTIMUM began in 2004 as a European Union project to demonstrate the effectiveness of telemedicine. The Veneto Region served as coordinator for the project with participation from other European countries, including Gobierno de Aragon (Spain), Region Syddamark (Denmark), County of Uppsala (Sweden) and County of Timisoara (Romania). By 2009 the model validated during the project's demonstration phase was scaled up as a regional pilot for telecounselling services in ischemic stroke management and oral anti-coagulation therapy.

Arsenal.IT, the Veneto's Research Center for eHealth Innovation, is a Consortium of all the 23 Local Health Authorities (LHA) and Hospital Trusts to harmonize the organizational processes among the region. Since 2007, Arsenal.IT served as a sub-contractor for HEALTH OPTIMUM Project writing the IHE-based technical guidelines for the implementation of the telemedicine services and continues now to support the LHAs in developing innovative e-health solutions and participates in other European (RENEWING HEALTH), National (Veneto ESCAPE) and Regional Projects (DOGE).

### THE CHALLENGES

Beyond the celebrated canals of Venice, the Veneto region rises to become a hilly countryside where more than 70% of the residents live in small towns and villages. Access to expert medical service was as varied as the landscape for 4.9 million Venetians, a population larger than some European countries.

For patients with head & spinal cord injuries, the situation was even more critical, typically requiring transportation to a specialized center for diagnosis or neurosurgery. The goal of the HEALTH OPTIMUM project was to offer an homogeneous level of assistance to smaller hospitals receiving these patients.

At the beginning of the project each hospital operated a stand-alone information system with its own technical features, its own languages, its own vendors and without a common communication infrastructure for sharing data with other centers. Winning the cooperation of vendors for the initial testing phase presented a significant challenge.

HEALTH OPTIMUM applied a layered hub-and-spoke strategy where specialized neurosurgery hospitals served like the hub of a wheel for peripheral hospitals extending like the spokes of the wheel out into the communities. Seven hubs were established in this overlapping system with each receiving requests for service from multiple spokes. A physician in a spoke clinic makes available to the neurosurgeon at the hub hospital a digitally signed telecounselling request (XML CDA2 document with LOINC CODES) and a set of CT Images (thanks to a DICOM Manifest). On the basis of the information sent, the neurosurgeon can take a decision whether a patient transfer is required, providing the answer in a reply form. Where the decision is positive, the surgeon can begin preparations for a therapeutic or surgical intervention during the time required to transfer of patient.

#### Implementation

Each of the seven hub provinces acts as an independent Affinity Domain. While there is a single XDS Document Registry, there are several XDS Document Sources, XDS Document Consumers, XDS Document Repositories, and XDS-Imaging Document Sources. In this environment the notification of availability of new documents is managed by NAV Senders/Receivers and the information contained in these notification are used to query and retrieve for documents and images.

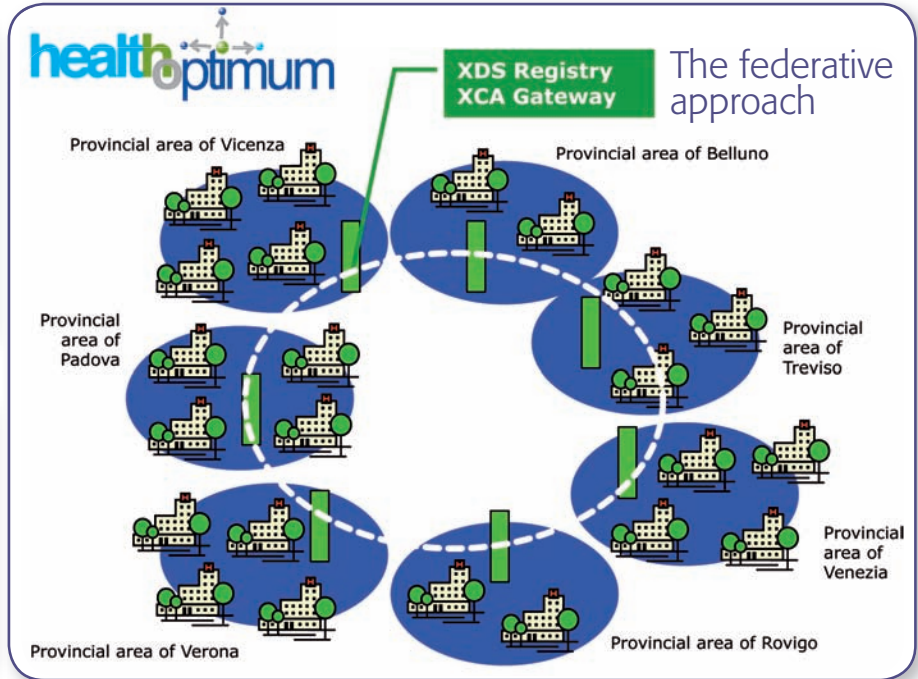
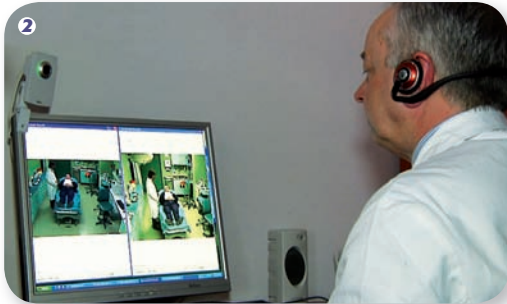
Adoption of the IHE XCA Profile enables a further level of interoperability as each XDS Affinity Domain can act as a XCA Community and interoperate with the others through dedicated Gateways able to manage both documents and images. A new functionality was added to the XCA Gateways by enabling them to manage the WADO Retrieve transaction with some modifications that include adding the homeCommunityID and the AE Title to the transaction.

#### Further Potential

The IHE-driven interoperability of the central platform enables an infrastructure lending itself to multiple uses. Additional services have been easily added, such as telecounselling for ischemic stroke. Extensions of the platform are expected to include laboratory and medical report sharing, e-prescription, and e-referral services for general practitioners and pediatricians.

#### IHE-EUROPE aisbl

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1. The neurosurgeon of the specialty center displays the CT image received from the peripheral hospital in order to study the case and to give his advice to the physician of peripheral hospital.
2. Thanks to the videoconference, the neurologist of the specialty center talks to the physician of peripheral hospital and displays the movements of the patient in real time.

## IHE Integration Profiles, Actors and Transactions Implemented

Integration Profile	System / vendor	IHE Actor	IHE Transaction	New or Upgrade
Cross-Enterprise Document Sharing	Solinfo, Exprivia, EbitAET, Intema (Gruppo Dedalus), A-thon	Document Source	Provide And Register Document Set - b (ITI-41) Patient Identity Feed (ITI-8)	New
	Solinfo, Exprivia, EbitAET, Intema (Gruppo Dedalus), A-thon	Document Consumer	Registry Stored Query (ITI-18) Retrieve document set (ITI-43)	New
	Solinfo, Exprivia, EbitAET, Intema (Gruppo Dedalus), A-thon	Imaging Document Source	Provide and Register Imaging Document Set (RAD-54) WADO Retrieve (RAD-55)	New
	Solinfo, Exprivia, EbitAET, A-thon	Imaging Document Consumer	WADO Retrieve (RAD-55)	New
	Solinfo, Exprivia, A-thon, InsielMercato	Document Registry	Register Document Set (ITI-42) Registry Stored Query(ITI-18) Patient Identity Feed (ITI-8)	New and upgrades
	Solinfo, Exprivia, A-thon, InsielMercato, Intema (Gruppo Dedalus)	Document Repository	Provide and Register Imaging document Set (RAD-54) Register Document Set (ITI-42) Retrieve Document Set (ITI-43)	New and upgrades
Notification of Document Availability	Solinfo, Exprivia, A-thon, Ebit-AET, Intema (Gruppo Dedalus)	NAV Sender NAV Receiver	Send Notification (ITI-25) Receive Notification (ITI-26) Send Acknowledgement (ITI-27) Receive Acknowledgement (ITI-28)	New
Audit Trail and Node Authentication	All vendors involved	All actors	Record Audit Event	New
Cross-Community Access	Solinfo, Exprivia, A-thon, InsielMercato, Telemedicina Rizzoli	Initiating Gateway	Cross-Gateway Query (ITI-38) Cross-Gateway Retrieve (ITI-39) (RAD-55)*	New * (WADO Retrieve transaction enriched with AETitle and home CommunityID)
Cross-Community Access	Solinfo, Exprivia, A-thon, InsielMercato, Telemedicina Rizzoli	Responding Gateway	(ITI-38) (ITI-39) (RAD-55)*	New

### IHE-EUROPE MEMBERS:

**IHE-Europe National Initiatives:** IHE-Austria, IHE-France, IHE-Germany, IHE-Italy, IHE-NL, IHE-Spain, IHE Suisse, IHE-Turkey, IHE-UK

**IHE-Europe User Members:** IEAHP, ESR, GuiG, SFR

**IHE-Europe Vendor Members:** Agfa Healthcare, Etiam, Forcare, GE Healthcare, Philips Healthcare, Siemens Healthcare, Visus

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