Interoperability Standards for AAL and Personal Health Applications – the Role of CEN TC251 / WGIV
What is CEN TC 251 / WGIV?

WG Structure of CEN TC 251 (Health Informatics) and Related International Organizations (about 2005)

- WG1: Models and Messages
  - e.g. USA (ANSI), IEEE, HL7, ASTM
- WGII: Terminology
- WGIII: Security
- WGIV: Technology for Interoperability

ISO TC215

- WG1: Messages and Communication
- WG3: Terminology
- WG4: Security
- WG5: Cards
International Standardization Co-Operation on Health Informatics: How It Works

"Joint International Council" – ISO / HL 7 / CEN Co-Operation

IEC
ISO (TC 215)

ISO / IEEE
Pilot project

ISO / DICOM
Liaison

NSBs, e.g., ANSI (USA)

Users / Industry

CONTINUA

DICOM

"Vienna Agreement"

CLSI
IEEE

One-member (active), one vote

Weighted voting
ISO TC 215: The Shift Towards Global Standards

ISO TC 215 (Health Informatics) Structure (since 2007)
2009: ca. 200 Continua members developing Personal Health solutions
Disease Management

860 million chronic disease patients worldwide

Disease Management

- Vital sign monitoring (Remote Patient Monitoring)
- Medication reminders and compliance
- Utilize home network to locate devices in logical places:
  - Scale in bathroom
  - Pill reminder in kitchen
  - Blood Pressure cuff in living room
- Trend analysis and alerts
- Email, chat, video
- Appointment scheduling

Continua member companies help people with chronic conditions live healthier lives by connecting them to their care team through a more efficient exchange of personal health information.
Health & Wellness

- Weight loss
- Fitness
- “Worried Well” vital sign monitoring:
  - Weight
  - Blood pressure
  - Glucose
  - Cholesterol
  - Activity level
- Personal Health Records
- Appointment scheduling

In the future...

- Extension of healthcare system into the home
- Initial triage of non-emergency conditions
  - Vital signs
  - Images
  - Email / chat / video

Continua member companies help people live healthier, more active lives by connecting them to their health and wellness team through a more efficient exchange of their personal fitness information.
Aging Independently = „Ambient Assisted Living“!

- An adult child helping their elderly parents age gracefully in their own home
- Basic life monitoring as appropriate (ADL):
  - Bed pressure (sleep)
  - Bathroom sensor
  - Gas / water sensor
  - Emergency sensor
- Vital sign monitoring (RPM)
- Medication reminders and compliance
- Trend analysis and alerts
- Email, chat, video
- Appointment scheduling

Continua member companies help the elderly age independently, with dignity and security, through the efficient exchange of personal health and safety information that connects them to their family and care team.
Continua Version One Device Connectivity Standards

- ISO/IEEE 11073-20601 = Base Protocol
- ISO/IEEE 11073-10404 = Pulse Oximeter
- ISO/IEEE 11073-10406 = Pulse / Heart Rate
- ISO/IEEE 11073-10407 = Blood Pressure
- ISO/IEEE 11073-10408 = Thermometer
- ISO/IEEE 11073-10415 = Weighing Scale
- ISO/IEEE 11073-10417 = Glucose
- ISO/IEEE 11073-10441 = Cardiovascular Fitness Monitor
- ISO/IEEE 11073-10442 = Strength Fitness Equipment
- ISO/IEEE 11073-10471 = Independent Living Activity
- ISO/IEEE 11073-10472 = Medication Monitor

Bluetooth Medical Device Profile Specification
USB Personal Healthcare Device Class Specification

© Continua Health Alliance

© Fraunhofer AAL
Why were ISO/IEEE 11073 standards & group selected for (Continua) Personal Health standardization?

- Respected standards body with open participation
- Harmonized with ISO for International Standards
- Also harmonized with NCCLS/CLSI, HL7, CEN TC251, ISO TC215, IHE, FDA, and NIST
- ISO/IEEE 11073 already formed and active
- ISO/IEEE 11073 Charter contains health care devices
- Standards structured to be transport portable
- Able to support Disease Management, Health and Fitness, and Independent Living
- Low cost for membership and access to standards
Development of CEN/ISO/IEEE 11073 Standards

A history of co-operative and complementary working (1983 - 2003):

- ISO TC215 'POCMDC'
- CEN TC251 'VITAL'
- IEEE 1073 'MIB'
- POC-CIC/NCCLS 'POCT1A'
- HL7
- IEEE 'MEDIX'

Arrows indicate effective transfer of development and/or maintenance responsibility.
<table>
<thead>
<tr>
<th>Number</th>
<th>Year</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENV 1064</td>
<td>1993</td>
<td>Medical informatics - Standard communication protocol - Computer- assisted electrocardiography</td>
</tr>
<tr>
<td>ENV 13728</td>
<td>1999</td>
<td>Health informatics - Instrument interfaces to laboratory information systems</td>
</tr>
<tr>
<td>ENV 13734</td>
<td>1999</td>
<td>Health Informatics - Vital signs information representation (CEN Project Team PT021 VITAL 1994-1997)</td>
</tr>
<tr>
<td>ENV 13735</td>
<td>1999</td>
<td>Health Informatics - Interoperability of patient connected medical devices (CEN Project Team PT035 INTERMED 1998-2000)</td>
</tr>
<tr>
<td>SSS-HIDE</td>
<td>2001</td>
<td>Health Informatics – Strategies for harmonisation and enterprise-wide methodologies</td>
</tr>
</tbody>
</table>
CEN 13734/35 Scenario: Intensive Care

 PDMS-System

 Respirator

 Patient Monitor

 Syringe Pumps and Infusors

 “Plug & Play” Functionality:
Variable Configuration – changing within minutes

<table>
<thead>
<tr>
<th>DV-System / PDMS</th>
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<tr>
<td>Patient Monitor</td>
</tr>
<tr>
<td>Respirator</td>
</tr>
</tbody>
</table>

Additional Monitor

Syringe Pumps and Infusors

Additional Pump
“Health informatics”:

- generally interpreted as relating to ISO/OSI Level 7 (HL7!)

Medical Device & (Mobile)
Personal Systems
Interoperability:

- implies all ISO/OSI Levels,
- defines/ modifies standards in ISO/OSI levels 7 – 5
- in levels 1 – 4 chiefly references to other standards (such as 802.x, IrDA, BT, …)
An object oriented data model that specifies objects, attributes, attribute groups, event reports, and services that may be used to communicate device data and to control / configure the reporting of information...

- Medical Devices and functionalities
- Measured Data and Settings
- Alert Information
- Remote Control
- Patient Information
- Communication
Nomenclature:
A set of numeric codes that identify every item that is communicated between systems.

Nomenclature Concept

<table>
<thead>
<tr>
<th>Codeblock Number (Hi-order 16 bits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Object-Oriented (OO)</td>
</tr>
<tr>
<td>2  Supervisory Control and Data Acq’n (SCADA)</td>
</tr>
<tr>
<td>3  Events</td>
</tr>
<tr>
<td>4  Dimensions (Units of Mgmt)</td>
</tr>
<tr>
<td>5  Virtual Attributes</td>
</tr>
<tr>
<td>6  Parameter Groups</td>
</tr>
<tr>
<td>7  [Body] Sites</td>
</tr>
<tr>
<td>8  Infrastructure</td>
</tr>
<tr>
<td>...</td>
</tr>
<tr>
<td>256 External Nomenclature Ref’s</td>
</tr>
<tr>
<td>...</td>
</tr>
<tr>
<td>1024 Private</td>
</tr>
</tbody>
</table>

Term Code (Lo-order 16 bits)

31 . . . . . . 23 . . . . . . 15 . . . . . . 7 . . . .
0

Context-sensitive parts

Context-free code
Objective 7.1b –

Open Systems Reference Architectures, Standards and ICT Platforms for Ageing Well:
this should facilitate, interoperability, systems integration … and services for independent living, smart workplaces and mobility of elderly people and for their carers. … Concrete contributions to relevant standardisation is expected as well as a clear approach for making the resulting work available to the wider community

**UNIVERsal open platform and reference Specification for Ambient Assisted Living**

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One way to build them all,
One way to bind them;
One Store to save them all,
And help the users find them

Inspired from the Rhyme from Tolkien’s Lord of the Rings
<table>
<thead>
<tr>
<th>List of initiatives</th>
<th>Good results</th>
<th>Things to improve</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOPRANO</strong> (still running)</td>
<td>Context-awareness, Around 10 services to be implemented. Good ontological approach.</td>
<td>Good results in user requirements collection.</td>
</tr>
<tr>
<td><strong>OASIS</strong> (still running)</td>
<td>Ontological interaction approach between legacy applications.</td>
<td>Hundreds of users to test the proposed solution.</td>
</tr>
<tr>
<td><strong>VAALID</strong> (still running)</td>
<td>The whole project develops a tool for modelling, prototyping and simulation of AAL Solutions.</td>
<td>Good solution to evaluate how tools are delivered effectively to software producers.</td>
</tr>
<tr>
<td><strong>GENESYS</strong> (still running)</td>
<td>Good approach for devices abstraction layer.</td>
<td>Initiated by ARTEMISIA.</td>
</tr>
<tr>
<td><strong>CONTINUOUSA Ref. Arch.</strong></td>
<td>Profiling standards for connected health and wellness and telehealth.</td>
<td>One of the strongest world wide industrial communities in its field.</td>
</tr>
</tbody>
</table>
Thank you for your attention

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