

"Welcome" from Mark Shafarman Chairman, HL7.org



Dear Health Informatics Colleagues, Dear Clinicians interested in Health Information Technology, Honoured Guests

I welcome you to the 1st Asia-Pacific HL7 Roadshow!

The use of computers in healthcare brings with it many new possibilities, but also new challenges. Clinicians and technologists will be able to let computers do tasks that have the risk of errors and are repetitive. But computers lack the intelligence and understanding of humans and so "standard" ways of expressing and doing things are necessary.



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"Welcome" from Mark Shafarman

The event will inform and educate on the necessity of health Information Standards, what standards are available and the function of the HL7 Standards.

The international HL7 organisation creates, develops and supports global standards for the exchange, management and integration of electronic healthcare information. HL7 promotes the use of its standards within and among healthcare organisations to increase the effectiveness and efficiency of healthcare delivery for the benefit of all. I'd like to extend a sincere and friendly invitation to all of you to join us in these global activities.

I wish you a successful event and hope it will help you specify, design and implement good health information systems.

Mark Shafarman - Chairman HL7.org



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Message from Stephen Chu Vice-Chairman, HL7 New Zealand



Dear Asia-Pacific Health Informatics Colleagues and Distinguished Guests: Greetings from HL7 New Zealand! A very warm welcome to the first HL7 Roadshow in our region.

Rapid advances in Information and Communication Technologies (ICT) allow us to connect healthcare services around the world and to perform robotic microsurgeries by remote control. However, connectivity alone is no longer considered adequate. For systems to interoperate and for the exchanged information to be understood and used by humans, standards are the critical ingredient. HL7 has provided a set of inter-



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Message from Stephen Chu Vice-Chairman, HL7 New Zealand

nationally accepted standards for cost effective health information interchange used in over 30 nations.

I am extremely honoured to have this opportunity to share with you some of our experiences in HL7 standards development and implementation. I look forward to meeting you all. I am absolutely confident that your excellent organisation capacity and dedications will ensure this inaugural HL7 Asia-Pacific Roadshow a highly successful event.



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Introduction to HL7

Klaus Veil

Member - HL7 Board

Chair HL7 Australia & Standards Australia IT14-6-3

Research Fellow - University of Ballarat, Australia

Principal - HL7 Systems & Services, Sydney

HL7.org (USA) Certified V2.4 & V2.5 Specialist

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The Program

- Why standards in healthcare communications?
- What is HL7?
- HL7 - an global standard!
- A brief tour of HL7
- What is Version 3?
- What about XML?
- Q&A



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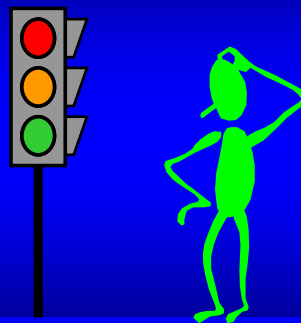
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Session Overview

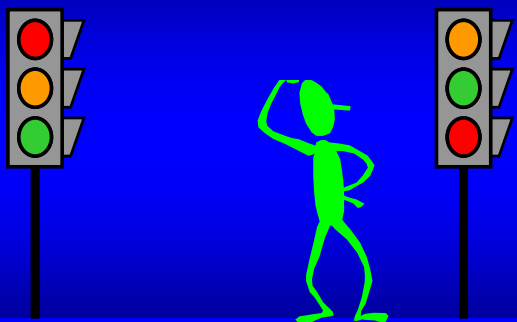
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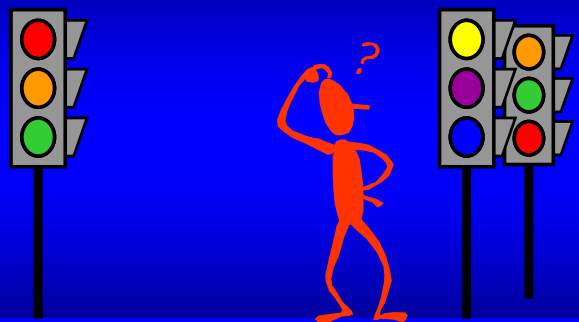
Why do we need Standards? (1)



Why do we need Standards? (1)



Why do we need Standards? (2)



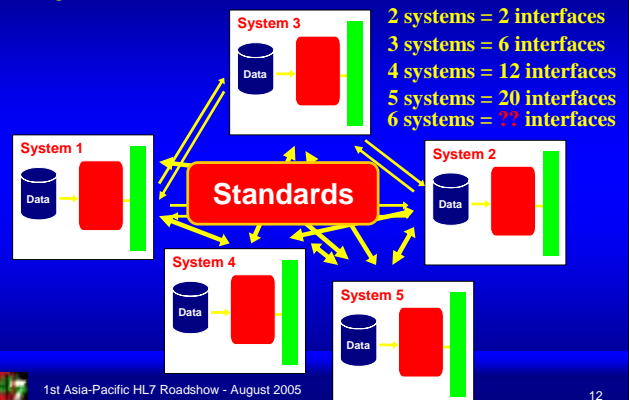
Why Standards?

- For Healthcare IT systems to exchange information, they can either:
 - communicate via custom interfaces *or*
 - share a common data format
- Custom interfaces are costly to design and difficult to maintain (~ \$100k each).

A common data format is cost-effective, but needs up-front agreement and commitment = "a Standard"



Why Communication Standards?



Other Examples of Standards

- Mobile Phones (“GSM”)
- CDs (“ISO”)
- ATMs
- “yes” and “no” in Bulgaria



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global HL7 Mission



- To provide standards for the exchange, management and integration of data that supports clinical patient care and the management, delivery and evaluation of healthcare services.
- Specifically, to create flexible, cost effective approaches, standards, guidelines, methodologies, and enable healthcare information system interoperability and sharing of electronic health records.”



Interoperability?



Interoperability

● Interoperability

“Ability of two or more systems or components to exchange information and to use the information that has been exchanged”

[IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries, IEEE, 1990]

Functional interoperability

Semantic interoperability



global HL7 Mission



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EHR + Messaging

The Data is persistent!

("Rowed's Theorem")

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A Brief History of HL7 ...

- 1987: standard
- 1990: **More than 95% of all organisations in the US with Health IT systems use HL7!***
- 1993/94: First international Annates joint.
- 1994: HL7 becomes ANSI-accredited.
- 1997: Aust. Dept of Health first to acknowledge HL7 as the healthcare messaging standard.
- June 2003: HL7 V2.5 released.
- July 2005: HL7 V3 11th Ballot
- December 2004: HL7 V2.6 2nd Ballot

* The HIS Desk Reference: A CIO Survey, 1998, CHIME and HCIA Inc.

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What is HL7.org?

- ANSI-approved Standards Developing Organisation (SDO).
- Not-for-profit
- >2200 members
- >1200 corporate members
- Local organisations in 32 countries
- Three 6-day Working Meetings per year
- www.HL7.org

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Why Health Level "Seven"?

7-layer ISO Communication Model

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HL7: Messages and More ...

- Decision Support
 - Arden Syntax Standard (1999)
 - Guideline Interchange Format (GLIF)
 - "GELLO"
- Visual Integration ("CCOW")
- Clinical Document Architecture (CDA)
- Electronic Health Record (EHR)

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HL7 is open ... (1)

- HL7 Bylaws Art 2.3.2 (2001):
 - "The information content of HL7 protocol specifications shall be in the public domain and be actively promoted for use by any interested party. The protocol specification documents or other productions thereof shall be the intellectual property of HL7."

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HL7 is open ... (2)

- Access to HL7 is open!
- Anyone can join
 - \$300 (\$150 for students)
 - pays for HQ to organise the Working Meetings, phone conferences, publishing, etc.
- Anyone can influence the Standard
- HL7 is a Standard by Consensus
 - The "power of the negative vote" ...



HL7 is open ... (3)

- Anyone can use HL7 Standards
- No licensing required
- \$50 for a CD "distribution" of HL7 V2.4 (OpenOffice: \$45, Linux \$30, etc.)
- Access to V3 DTDs, etc. is free.
- HL7 funds the standards work through:
 - Volunteers ...
 - Education, Certification, etc.
 - Memberships & Benefactors



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- HL7 - global standard!
- A brief tour of HL7
- What is Version 3?
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- Q&A



HL7 is a Global Standard!

- | | | |
|-------------|---------------|---------------|
| • USA | • UK | • Germany |
| • Canada | • China | • France |
| • India | • Netherlands | • Japan |
| • Australia | • New Zealand | • ... etc ... |

HL7 Organisations in 32 Countries!



Background Information (1)

- In Australia, standards are created by "STANDARDS AUSTRALIA" - a government-supported organisation representing all stakeholders. 
- Standards are created by volunteers in an open, transparent and consensus-based approach.
- Draft Standards are put to "Public Comment" for a few months to allow input from anybody in Australia

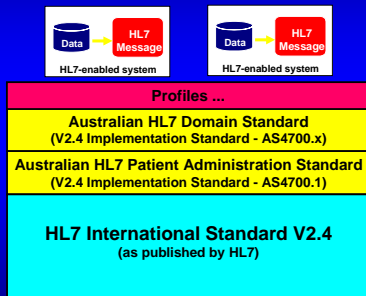


Background Information (2)






- Completed Standards are reviewed by SAI technical boards to ensure proper process has occurred.
- Standards are reviewed at least every 5 years for currency



Structure of HL7 Standards in Australia



SAI HL7 Technical Committees

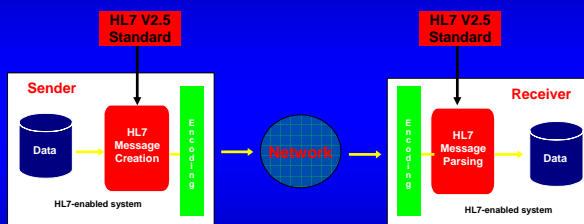
-  **Patient Administration Messaging (IT-014-06-03)**
HL7 Patient Administration Messages "AS4700.1"
-  **Drug Prescription Messaging (IT-014-06-04)**
HL7 Prescription Messages "AS4700.3"
HL7 Immunisation Messages "AS4700.5"
-  **Diagnostic Messaging (IT-014-06-05)**
HL7 Pathology Order & Reports Messages "AS4700.2"
Pathology HL7 Messages Handbook "HB262"
HL7 Registry Messages "AS4700.4"
Diagnostic Imaging Messages "AS4700.7"
-  **Collaborative Care Messaging (IT-014-06-06)**
HL7 Discharge & Referral Messages "AS4700.6"
-  **Telehealth Messaging (IT-014-06-07)**

Any Questions so far?

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How does HL7 Messaging work?



What does HL7 look like?

```
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RIDGE^NSW^2392|||||219171803<cr>
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OBX|2|NM|1779-8^S Alkaline Phosphatase^LN||52|U|L|30-120||||F<cr>
```

Segments ...

```
MSH|^~\&|PATH||GP123||20050317||ORU^R01|101|P|2.5^AUS||AL|NE|AUS||en<cr>  
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Segments ...

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```



Repeated Segments ...

```
MSH|^~\&|PATH||GP123||20050317||ORU^R01|101|P|2.5^AUS||AL|NE|AUS||en<cr>  
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Repeated Segments ...

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OBX|2|NM|1779-8^S Alkaline Phosphatase^LN||52|U/L|30-120||||F<cr>
```



Let's look at a "Segment" ...

```
MSH|^-|&|PATH||GP123||20050317||ORU^R01|101|P|2.5^AUS|||AL|NE|AUS||en<cr>
PID|||KNEE123||Knees^Nobby^J^^Mr||19601130|M||23 Shady Lane^L
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```



Coding Laboratory Results

```
MSH|^-|&|PATH||GP123||20050317||ORU^R01|101|P|2.5^AUS|||AL|NE|AUS||en<cr>
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OBR|1|PMS66666|956635.9|LFT^LIVER FUNCTION TEST^N2270<cr>
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```



Logical Observation Identifier Names & Codes



Session Overview

- Why standards in healthcare communications?
- What is HL7?
- HL7 - a global Standard
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Limitations of HL7 V2.x

- Too much optionality...
- No explicit information model...
- Events and profiles not unambiguous...
- Terminology/Vocabularies/Code sets not tightly defined...
- Not object-oriented...







The Promise of HL7 V3

- Based on a formal Information Model.
- Improve adaptability of the spec to change.
- Allow easier internationalization.
- *May even achieve "plug & play"!*



The HL7 V3 Approach


HL7 Development Framework (HDF)

	Use Cases	Capture real-life healthcare requirements
	Information Model	Specifies data, its semantics, state transitions, etc.
	Interaction Model	Defines roles and information flows between entities
	Message Specification	Defines message contents and optionalities

2nd Order
1 choice of
via Drug
0-1 Nursing


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The RIM V0.92 - 1999



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The RIM V2.08 - 2005



- 4 Subject Areas
- 181 Attributes
- 28 Generalisations
- 35 Classes
- 9 Associations

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The Components of the RIM (1)

- Every happening is an **Act**, an intentional action in the business domain of HL7
 - Examples: Procedure, observation, medication, supply, registration, etc.
- Acts are related through an **Act_Relationship**
 - Examples: composition, precondition, revision, support, etc.
- **Participation** defines the context for an Act
 - Examples: author, performer, subject, location, etc.

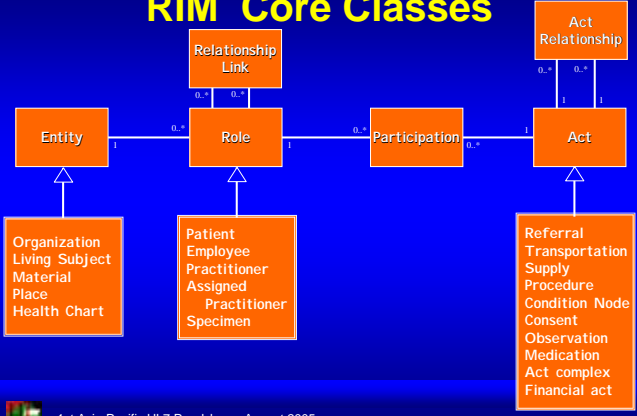
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The Components of the RIM (2)

- **Entities**, a physical thing or organization and grouping of physical things
 - Examples: person, organization, material, place, device, etc.
- The participants are in **Roles**, which define the competency of an Entity.
 - Examples: patient, provider, practitioner, specimen, etc.

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RIM Core Classes



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HL7 V3 Status

- Version 3 is maturing (RIM V2.08)
- 1st technical review (“ballot”) August 2001
- 11th technical review July 2005
- Substantial parts complete
 - Normative
 - DSTU (“Draft Standard for Trial Use”)
- Some early adoption projects are in progress (UK, Canada, Japan, The Netherlands, etc.)
- Challenge: Implementation documentation



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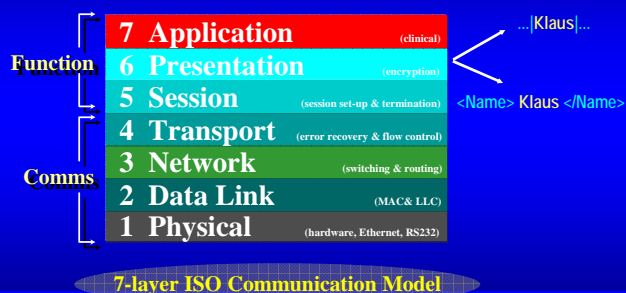


What about XML?

- eXtensible Markup Language
- A “sibling” of HTML, derived from SGML - ISO Standard 8879:1986(E).
- Structure: Name/Value pairs, eg.:
`<Name> Klaus </Name>`



How does XML fit in?



HL7 and XML

- HL7 V2.x can be encoded in XML!
 - V2.3.1, V2.4 and V2.5 have XML encoding specifications!
 - See www.HL7.org.au/HL7-V2-Resrcs.htm
 - Easier to read, but voluminous (~7x)!
 - Cool!?
- HL7 V3 is committed to XML encoding.



XML Example

Example: Klaus D Veil

V2.x encoding:

...|Veil^Klaus^D|...

XML encoding:

```
<PatientName>
  <Surname> Veil </Surname>
  <FirstName> Klaus </FirstName>
  <MiddleName> D </MiddleName>
</PatientName>
```



XML Schemas

- Schemas can technically define data
- But cannot ensure agreement on data
- Not a “content” standard



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ebXML

- A standard mechanism to exchange healthcare XML messages
- But cannot ensure agreement on data
- Not a “content” standard



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International HL7 Calendar

- March 25-26, 2004: HL7 Australia Conference, Melbourne
- Oct. 18-19, 2004: 5th International Affiliates Meeting, Mexico
- Dec. 10, 2004: HL7 Australia Conference, Melbourne
- Jan. 23-28, 2005: HL7 Working Meeting, Orlando, USA
- April 6, 2005: HL7 Australia Conference, Brisbane
- May 1-, 62005: HL7 Working Meeting, Amsterdam, Holland
- July 28-29, 2005: HL7 Australia Conference, Melbourne
- **Aug. 6-17, 2005: 1st Asia-Pacific HL7 Roadshow**
- Sept. 11-16, 2005: HL7 Plenary Meeting, San Diego, USA

HL7 Events Calendar: www.HL7.org.au/Events.htm

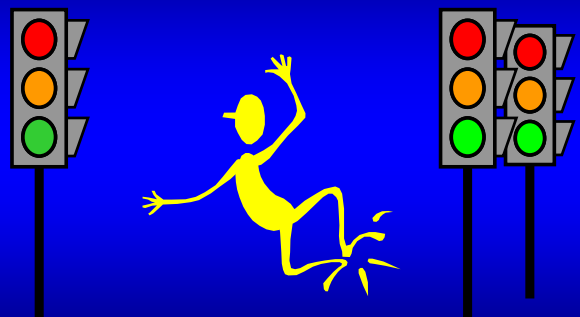


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We need to use Standards!

Slides: <http://www.HL7.org.au/Roadshow>



Klaus.Veil@HL7.com.au



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