A Formal Analysis of HL7 Version 2.x

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Introduction

• Effective Implementations require correct understanding
  • Message structures
  • Data types
  • Vocabulary
  • encoding
• HL7 V2.x: old standard, but w/o official model
• Provide knowledge about communication standards
  • Entity-Relationship Model: UML class diagram
  • Future: Represent as ontologies
    • Communication Standards Ontology (CSO)
V2.x = old Stuff?

- v2.7
  - Min+max length + C.LEN
  - Truncation
- v2.7.1
  - Conditions
- v2.8
  - Documentation quality hierarchy
- v2.9
  - Further proposals
  - ...
1. the relationship between message types, event types and the structure of a message

2. the relationship between data items, data types, components and tables
PhD Thesis

ER-Model

Comments are explained in paper
MIE 2011: A Formal Analysis of HL7 Version 2.x

UML class diagram

Comments are explained in paper
ER-Model: Data Types with Examples

```
<table>
<thead>
<tr>
<th>Name</th>
<th>HL7 v2.x Datentypen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dokumentation</td>
<td>Meta-Modell</td>
</tr>
</tbody>
</table>
```

```
Datentyp
- Type
- Beschreibung
- Name
```

```
2..*
```

```
zusammengesetzt
```

```
einfach
```

```
CODIERT
- Format
```

```
uncodiert
```

```
ED
```

```
TS
```

```
CE
```

```
Tabellenwerte
- Wert
- Beschreibung
```

```
Code-Tabelle
- Tabellen Nr
- Beschreibung
- Typ
```

```
0..*
```

```
variabel
```

```
fix
```

```
user-defined Tab.
```

```
externe Tab.
```

```
importierte Tab.
```

```
ID
```

```
ST
```

```
TX
```

```
DT
```

```
DTM
```

```
IS
```

```
HL7-Tabelle
```

Future: Representation as Ontology

Communication Standards Ontology (CSO)
Alignment with GCM: HL7 v2.x

(Enterprise View)

(Information View)

Business Concepts

Relations Network

Aggregations

Details

Table Values

Data Types

Data Elements

Tables (Domains)

Data Types

Data Elements

Msg Struct

Events

Segments

Business Domain

Application Roles

Interactions

ADT

Pharm., Lab, Rad,
Information Object

- Information Objects + Quality
- Process Information
Relationship

- Hierarchic
- Supports intelligent agents
Information Object: Specializations

- HL7 V3
- HL7 v2.6
Discussion/Conclusion

- A model is necessary for interoperable implementations
- This class diagram can serve to keep the standard consistent
- Communication standards share the same principle structure
  - Re-use for mapping with domain ontologies
  - To serve other SDOs
Thank You

For Your Attention!
Dr. Frank Oemig
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HL7-USA:
  Past Int’l Affiliate Representative to the TSC 2008
  HL7 Ambassador
  Conformance & Guidance for Implementation/Testing Co-Chair
VHitG:
  Chair AG Interoperability

IHE:
  Founding Member IHE Germany
  Caretaker IT-Infrastructure
  Delegate to epSOS
GMDS:
  Co-Chair AG SIE