HL7 Version 2 & 3 Comparison

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What is HL7?

HL7 is a Standards Developing Organization accredited by the American National Standards Institute to author consensus-based standards representing a broad view from healthcare system stakeholders. What this definition means from a practical standpoint is that HL7 has compiled a collection of message formats and related clinical standards that loosely define an ideal presentation of clinical information, and together the standards provide a framework in which data may be exchanged.

The HL7 standard is often called the “non-standard standard.” While not entirely fair, it does reflect the fact that almost every hospital, clinic, imaging center, lab, and care facility is “special” and, therefore, there is no such thing as a standard business or clinical model for interacting with patients, clinical data, or related personnel.

HL7 ORU – HL7 Result Message (Observation Result)

The HL7 ORU-R01 message transmits observations and results from the producing system/filler (i.e. LIS, EKG system) to the ordering system/placer (i.e. HIS, physician office application). It may also be used to transmit result data from the producing system to a medical record archival system, or to another system not part of the original order process. ORU messages are also sometimes used to register or link to clinical trials, or for medical reporting purposes for drugs and devices.

Types of observations reported in the ORU-R01 message include:

- Clinical lab results
- Imaging study reports
- EKG pulmonary function study results
- Patient condition or other data (i.e. vital signs, symptoms, allergies, notes, etc.)

The ORU message is a structured report where each observation is separated into an individual entity, and then separated into fields. ORU messages do not carry images; they use varying data types but most often use text, numbers and codes.

In the ORU message, the OBR (Observation request) and OBX (Observation) segments are most significant due to their functions:

- The OBR segment is used in all ORU messages as a report header, and contains important information about the order being fulfilled (i.e. order number, request date/time, observation date/time, ordering provider, etc.). This segment is part of a group that can be used more than once for each observation result that is reported in the message.

- The OBX segment transmits the actual clinical observation results as a single observation or observation fragment. OBX segments can also be used more than once in the message, and may be followed by one or more NTE segments to provide additional notes and comments about the observation.
The Comparison: HL7 VERSION 2 versus VERSION 3

**HL7 Version 2**
- HL7 V2 was initially created by clinical interface specialists.
- Accordingly, the development approach for HL7 V2 was user-led and real-world focused.
- In retrospect, the group’s goal was to substantially reduce the cost of building interfaces.
- The first usable version was 2.1 (released in 1990) with minor additions in 2.2 (1994) and ultimately 2.3 (1997) and 2.3.1 (1999).

**Sample Message**

<table>
<thead>
<tr>
<th>MSH</th>
<th>DDETEK LAB</th>
<th>ELAB-1</th>
<th>DDETEK OI</th>
<th>BLDG14</th>
<th>200502150930</th>
<th>ORU</th>
<th>R01</th>
<th>ORU_R01</th>
<th>CTRL-5876</th>
<th>F</th>
<th>2.4</th>
<th>CR</th>
</tr>
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<tbody>
<tr>
<td>PID</td>
<td>010-11-1111</td>
<td>L. Smith</td>
<td>19720520</td>
<td>F</td>
<td>266 Sherwood Forest Dr.</td>
<td>Baton Rouge</td>
<td>LA</td>
<td>70809</td>
<td>-</td>
<td>(225)343-5232</td>
<td>(225)752-1213</td>
<td></td>
</tr>
<tr>
<td>OBR</td>
<td>91954-2</td>
<td>DDETEK OI</td>
<td>917363</td>
<td>DDETEK LAB</td>
<td>1554-5</td>
<td>GLUCOSE</td>
<td>200502150930</td>
<td>175</td>
<td>O30-33-33336</td>
<td>Honeywell 16 Carson St. MD</td>
<td>Boston</td>
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<tr>
<td>OBX</td>
<td>184</td>
<td>SH</td>
<td>1554-5</td>
<td>GLUCOSE</td>
<td>POST</td>
<td>12H</td>
<td>CFST</td>
<td>MCNC</td>
<td>PT</td>
<td>SER</td>
<td>FLAS</td>
<td>QN</td>
</tr>
</tbody>
</table>

**Benefits**
- Reflects the complex “everyone is special” world of healthcare
- Much less expensive to build HL7 interfaces compared to custom interfaces
- Provides 80 percent of the interface and a framework to negotiate the remaining 20 percent on an interface-by-interface basis
- Historically built in an ad hoc way, allowing the most critical areas to be defined first
- Generally provides compatibility between 2.X versions

**Challenges**
- Provides a “one size fits none” standard
- “Loose and optional ridden” HL7 definitions lead to discrepancies in HL7 interfaces
- Not inclusive of international needs
- No compatibility with HL7 V3
- Defining a detailed list of items to be discussed and negotiated before interfacing can occur is required
- Application vendors do not support the latest and best-defined versions of HL7

**HL7 Version 3**
- V3 has been mostly created by medical informaticists.
- The version 3 standard has been influenced strongly by work from volunteers representing the government and medical informaticist users.
- This means that the level of formal modeling, complexity, and internal consistency is radically higher in V3 when compared to V2.
- In late 2005, the HL7 community released the first version of HL7 V3 – the Normative Edition 2005. In mid-2006, the Normative Edition 2006 was published.
Sample Message

<?xml version="1.0" encoding="UTF-8"?>
<Message xmlns="urn:hl7-org:v3" xmlns:id="urn:hl7-org:v3" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <id root="2.24.750.2.937172.4433" extension="DOTEK Lab"/>
  <agencyFor>
    <representedOrganization>
      <id root="2.24.750.2.937172.4433" extension="DOTEK Lab"/>
      <representedOrganization>
        <location>
          <id root="2.24.750.2.937172.4433" extension="ELAB-1"/>
        </location>
      </representedOrganization>
    </representedOrganization>
  </agencyFor>
</Message>
Benefits

- More of a "true standard" and less of a "framework for negotiation"
- Model-based standard provides **consistency** across entire standard
- Application roles **well defined**
- Much **less message optionality**
- **Less expensive** to build and maintain mid-to-long term interfaces
- Many decades of effort over ten year period reflecting "**best and brightest**" thinking

Challenges

- For clinical interface specialists
- No **compatibility** with HL7 V2
- **Adoption** will be **expensive** and take time
- **Long adoption cycle**, unless strong business case or regulatory requirement changes
- **Retraining** and retooling necessary
- Applications will have to support both V2 and V3 in the foreseeable future

The early decision to make V3 non-compatible with V2 means that existing V2 interfaces will not, without considerable modification, be able to communicate with newer V3 interfaces. This will create a new “digital divide” where applications that need to speak V3 will also need to speak V2. Early to mid-term adopters of V3 will often need both V2 and V3 interfaces to communicate between applications and healthcare providers. The double expense of implementing two HL7 versions may deter or delay the V3 adoption

References:

http://www.corepointhealth.com/resource-center/hl7-resources/hl7-oru-message