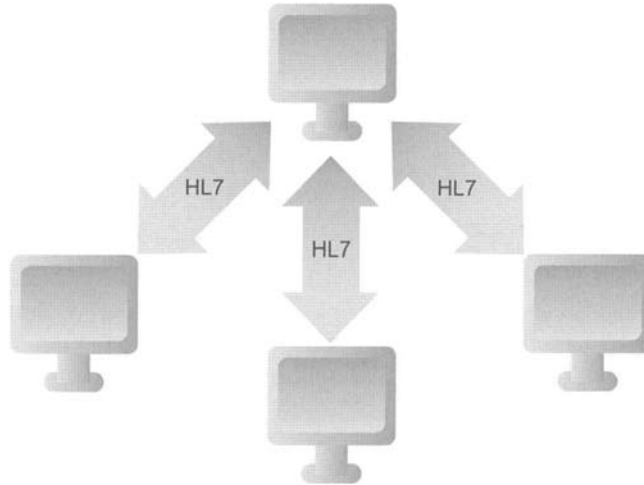


What Is HL7 Version 2.x?



■ The Standards

The Health Level Seven family of standards is one of the most widely discussed and used application data standards groups in the information technology industry. Most healthcare IT professionals have heard of HL7; many work in enterprises that use one or more of the HL7 standards.

But if you are reading this book, you may well have heard of HL7 without knowing exactly *what* it is or *why* HL7 standards are used. This book is meant to answer your basic questions.

Let us begin our survey of the HL7 standards with a statement of scope and a trio of definitions.

The scope of this book with respect to HL7 will be confined to the **Version 2.x** series of messages. While other HL7 standards such as Version 3, Clinical Document Architecture, and Arden Syntax are also widely adopted, HL7 Versions 2.1 through Version 2.5¹ are the most implemented globally and are the versions almost exclusively in use in the United States at the time of this writing.

Now on to the definitions. First, what is HL7 Version 2.x? There are formal intricate definitions for the organization and for the standards. But as this book focuses on HL7 Version 2.x messaging, we offer the following somewhat simplified definition here.

Definition

Health Level Seven (HL7), Version 2.x, is a standard series of predefined logical formats for packaging healthcare data in the form of messages to be transmitted among computer systems.

¹ Version 2.0 was the original Version 2 release but was not widely implemented. At the time of this writing, Version 2.6 was being balanced and is scheduled for final release in calendar year 2007

So what exactly is a message?

Definition

A *message* is a collection of data that sends information about an event in the healthcare enterprise.

A third definition will come in handy now and later.

Definition

The data connection between two computer systems is called an *interface*.

Put another way, we can say that HL7 Version 2.x is a standard interface format for messages, although it is actually considerably more than that, as we shall see.

The ability to use standard formats is useful in many ways. Instead of having to write specifications from scratch each time data needs to be sent between two systems, we can make reference to a uniform document whose definitions assist in providing a common understanding to both systems.

Originally developed in 1987, HL7 Version 2.x is now in use in more than twenty countries around the world. It contains messages for almost every conceivable healthcare application area, including the following:

- registration
- orders (clinical and other)
- results and observations
- queries
- finance
- master files and indexes
- document control
- scheduling and logistics
- personnel administration
- patient care planning
- network synchronization
- laboratory automation

The HL7 standards are called “Level Seven” because their message formats are layered upon the seventh level of the Open Systems Interconnection (OSI) protocol of the International Standards Organization (ISO).

Unlike other standards such as DICOM, HL7 standards specify almost no restrictions whatever on the protocols to be used in the lower layers of the interface. The definitions in HL7 standards concentrate on the logical arrangement of data and what is meant by information in various parts of the message.

An Inpatient Care Episode

To illustrate the use of HL7 standards throughout a healthcare enterprise, we will introduce a fictional series of events revolving around an invented patient named Barry Q. Kleinsample. (These events are intended to be illustrative of messaging instances, rather than of any particular clinical practices.) At each stage of the scenario, we will look at the HL7 Version 2.x messages that are typically used, and will discuss the structures in those messages. The table below shows each of the steps and the messages that are issued in support of those steps.

Description

Mr. Kleinsample is admitted to XYZ Hospital with chest pain.



An order is placed for a 12-lead EKG.



An order is placed for a complete blood count.



The cardiology procedure is scheduled.



The waveforms are acquired and evaluated, and a cardiology report is issued.



It is decided to send Mr. Kleinsample to the Coronary Care Unit (CCU).



The decision to send Mr. Kleinsample to CCU is rescinded; he will be discharged instead. (Mr. Kleinsample is improving faster than expected.)



A discharge date is scheduled for Mr. Kleinsample.



Mr. Kleinsample is discharged.



Messages

An **admission** message is sent from the registration system to the ancillary systems in the medical center.

An **order** message is sent from the order entry system to the cardiology system.

An **order** message is sent from the order entry system to the laboratory system.

A **procedure scheduled** message is sent from the cardiology system to the cardiology worklist provider.

A **report** message is sent from the dictation system to the cardiology system.

A **transfer patient** message is issued from the registration system to the ancillary systems.

A **cancel patient transfer** message is issued from the registration system to the ancillary systems.

A **pending discharge** message is sent from the registration system to the ancillary systems.

A **discharge** message is sent from the registration system to the ancillary systems.

Step

1

2

3

4

5

6

7

8

9

The Structure of a Message

The *physical* format of the message – that is, *how* the message is actually put together and sent over the wire – is up to the implementer. However, HL7 suggests a format, which we call the *default encoding*.

The default encoding is used in the following example *admission* message, used in Step 1 of our inpatient episode.

```
MSH|^~\&|MegaReg|XYZHospC|SuperOE|XYZImgCtr|20060529090131-
0500||ADT^A01^ADT_A01|01052901|P|2.5
EVN||200605290901|||200605290900
PID|||56782445^^^UAREg^PI||KLEINSAMPLE^BARRY^Q^JR||19620910|MI|2028-
9^^HL70005^RA99113^^XYZ|260 GOODWIN CREST DRIVE^^BIRMINGHAM^AL^35
209^^M~NICKELL'S PICKLES^10000 W 100TH AVE^BIRMINGHAM^AL^35200^^0
|||||0105I30001^^^99DEF^AN
PV1||I|W^389^1^UABH^AAA3||||12345^MORGAN^REX^J^^MD^0010^UAMC^L||678
90^GRAINGER^LUCY^X^^MD^0010^UAMC^L|MED|||||A0||13579^POTTER^SHER
MAN^T^^MD^0010^UAMC^L|||||||||||||||||||||200605290900
OBX|1|NM|^Body Height||1.80|m^Meter^ISO+||||F
OBX|2|NM|^Body Weight||79|kg^Kilogram^ISO+||||F
AL1|1||^ASPIRIN
DG1|1||786.50^CHEST PAIN, UNSPECIFIED^I9|||A
```

Definition

The *default encoding* is the delimiter-based formatting that is used to illustrate messages in HL7 Version 2.x

Each of the data lines contains an identifying tag, such as **MSH**, and some number of data elements that are arranged by position.

The two objectives of this book are:

- To help you understand *message definition*: how to read and write HL7 messages like the one above.
- To help you understand *interface architecture*: how to use HL7 messages to build a set of interfaces such as that needed to support the above scenario.

Most of this book will contain messages that use the HL7 default encoding. However, system implementers may agree on another format if they find it more useful. HL7 publishes a normative document that gives instructions for formatting messages using XML. The use of XML for formatting HL7 messages has been gaining acceptance in recent years, and accordingly we will look at some XML-formatted message data later on in this book.

First though, let's learn more about the HL7 standard by “unpacking” the contents of our example admission message.