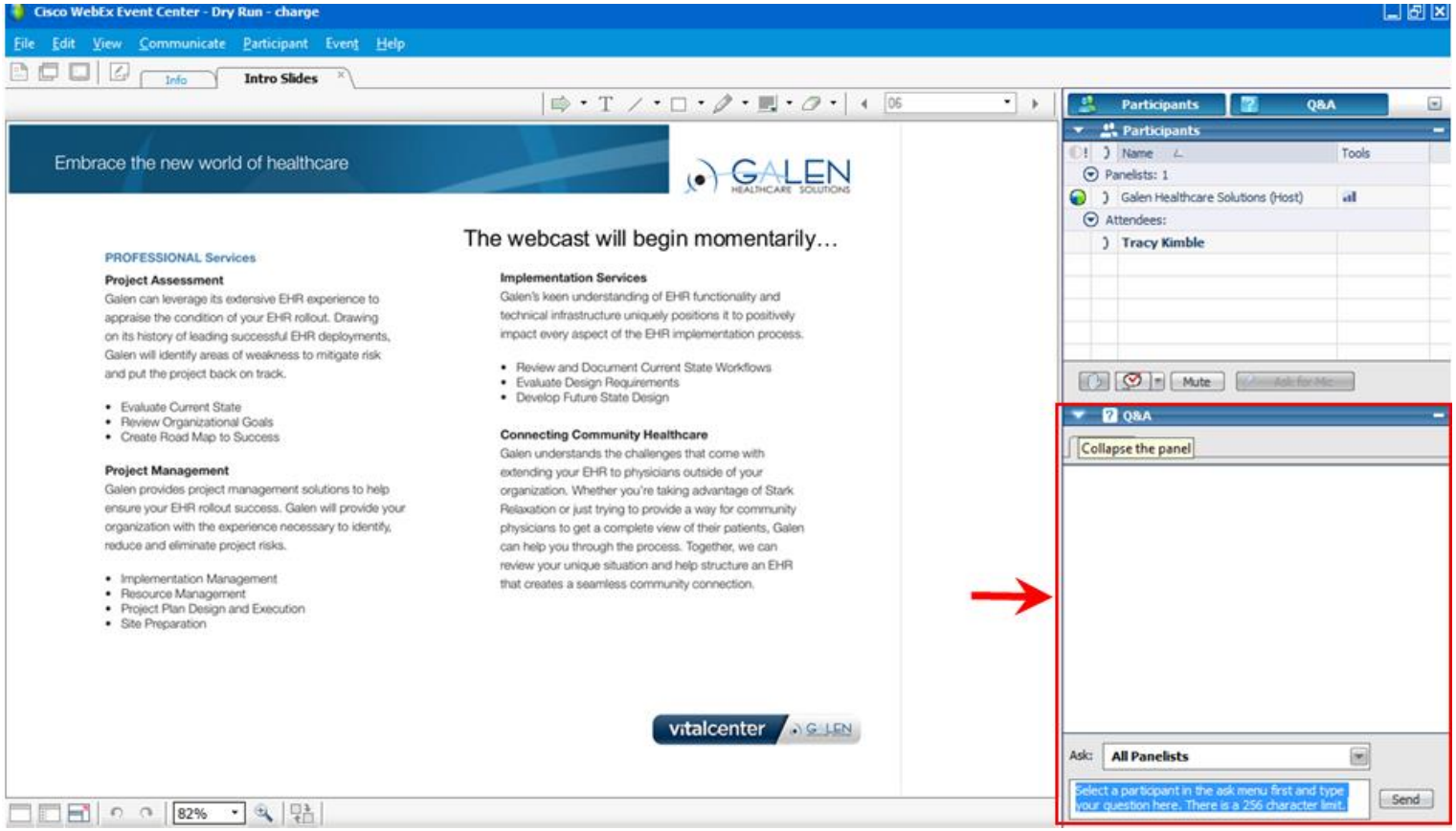
Your phone has been automatically muted. Please use the Q&A panel to ask questions during the presentation!



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HL7 Fundamentals

Presented by: Kim Tremblay

February 2014

Welcome

- Background of HL7
- How does it work?
- Messages
  - Common message types
- Trigger Events
- Segments
  - Common segments
  - Repeating segments
- Delimiters
- Sample Message
- ACK and NACK
- Data Exchange Standards
- Future of HL7
- Steps to Successful Interface Development
- Q&A

What is HL7?

- Founded in 1987
- Health Level Seven (HL7) is an application protocol for exchanging healthcare data among different applications.
- The HL7 protocol is a collection of standard formats that support the implementation of interfaces between computer applications and different vendors.
- HL7's purpose is to facilitate communication and sharing of data in healthcare settings.
- The primary goal is to eliminate or substantially reduce the custom interface programming and program maintenance that may otherwise be required.

What is HL7?

- HL7 provides a method for disparate systems to communicate clinical and administration information in a normalized format with acknowledgement of receipt.
- HL7 was created as a framework for negotiation to enable independent systems to communicate with one another.
- Highly adaptable
- Allows many different types of systems to communicate via a base format

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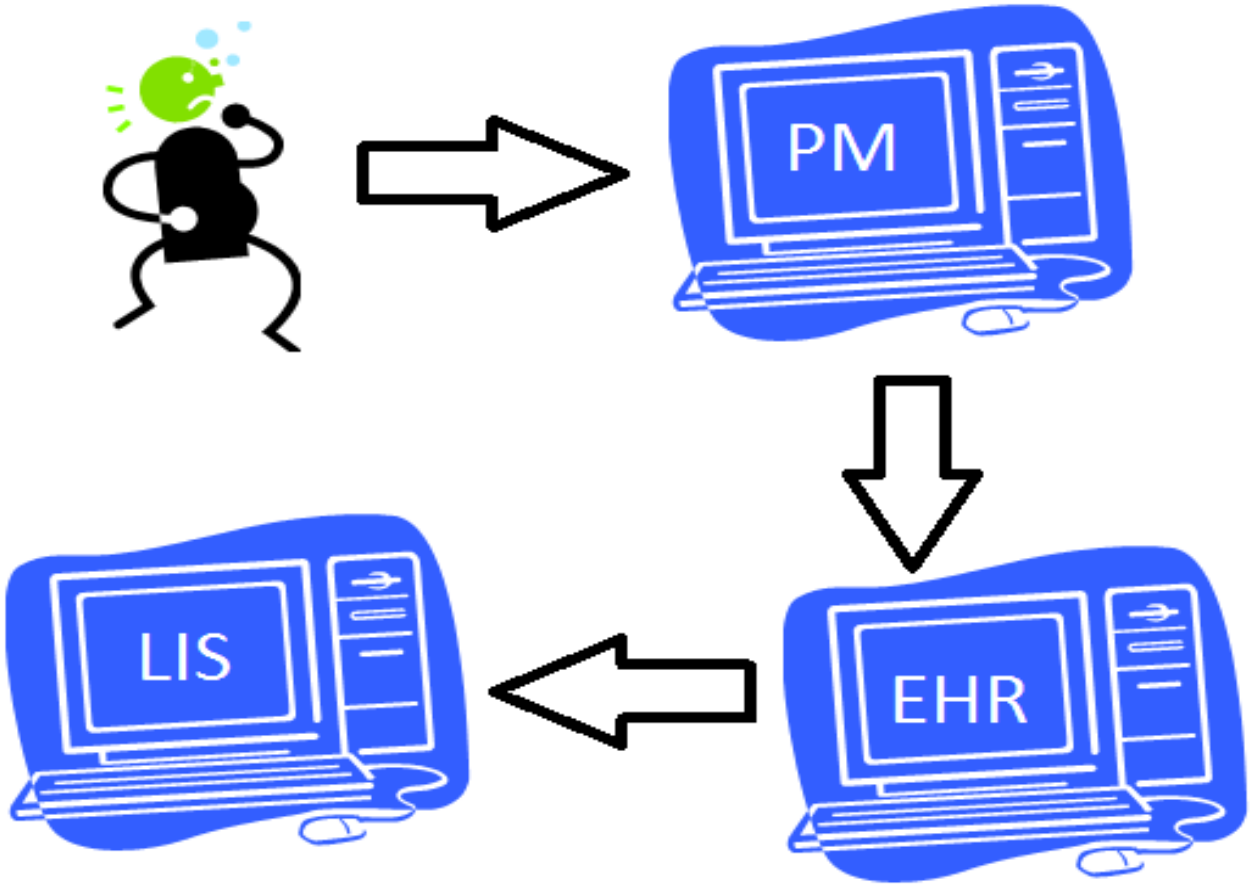
How does it work?



Messages

- Messages are the base format used for all HL7 communication

- Every message contains:
  - Message type
  - Segments
  - Fields

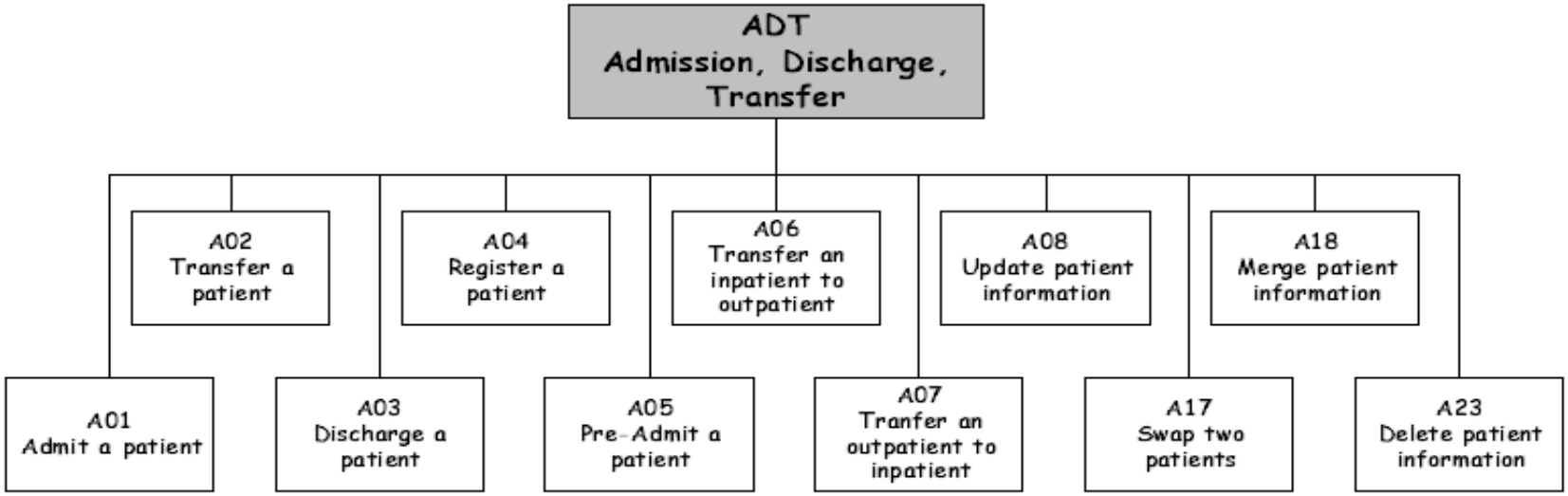
- Trigger event initiates an exchange of messages

Most Common Message Types

- ADT (Registering, admitting, updating, or discharging a patient)
- SIU (Scheduling)
- ORM (Order)
- ORU (Result)
- DFT (Charge)
- MFN (Dictionary updates)
- ACK (Acknowledgement)

Trigger Events

- Each HL7 transaction set supports many different types of activities.
- These activities are referred to as ‘events’.
- An event is used to identify what triggered the creation of the HL7 message.
- Quite often, an application that receives HL7 messages will use the event to identify how the data should be used by the application.



Segments

- Logical grouping of data fields
- May be required or optional
- There are over 120 types of segments that can be sent
- Each segment is given a name and three-character code
  - Example: Message Header (MSH), Event Type (EVN), Patient ID (PID)

Segments

MSH|^~\&|AHSADT|AHS|SMSADT|SMS|201312271400|SECURITY|ADT^A01|MSG00001|P|2.3.1|

EVN|A01|201312271400||

PID|||565256^^^GENHOS^MR~555-55-5625^^^USSSA^SS|253763|DOE^JOHN||19760306|
M|||276 EAST^^ALBANY^NY^12061^USA||(518)252-5344|

Common Segments

- MSH - Message Header
  information about a message
- EVN - Event Type
  event information
- PID - Patient Identification
  information about a patient
- NK1 - Next of Kin
  information about the patient's other related parties
- OBR - Observation Request
  information about an order
- OBX - Observation Report
  information about a result

Repeating Segments

- Some segments such as OBX, NTE, or NK1 can be repeating
- An example is the NK1 segment which shows the next of kin/associated parties

Delimiters

- | - Field Delimiter
- ^ - Sub Field Delimiter
- & - Sub-Sub Field Delimiter
- ~ - Separator for Repeating Fields
- \- Escape Character

Characteristics of HL7 Messages

MSH|^~\&|SEMM||PYXIS||20040301192350||ADT^A04|ADT757452230|P|2.1|||

EVN|A04|20040301192350|

PID|||H000000076||TESTCHRISTIANSEN^JOHN^||19931212|M|||1400 CHARLES ST^^LOVES PARK^IL^61111||||

PV1||O|HH.ADULT^^|ELE||^^|DEM^DEMING,RICHARD E|^|^|||||AROU|||^|RCR||MED||||||||||||||||||HHC||REG RCR|||200402251124||

PD1||||DEM^DEMING,RICHARD E||

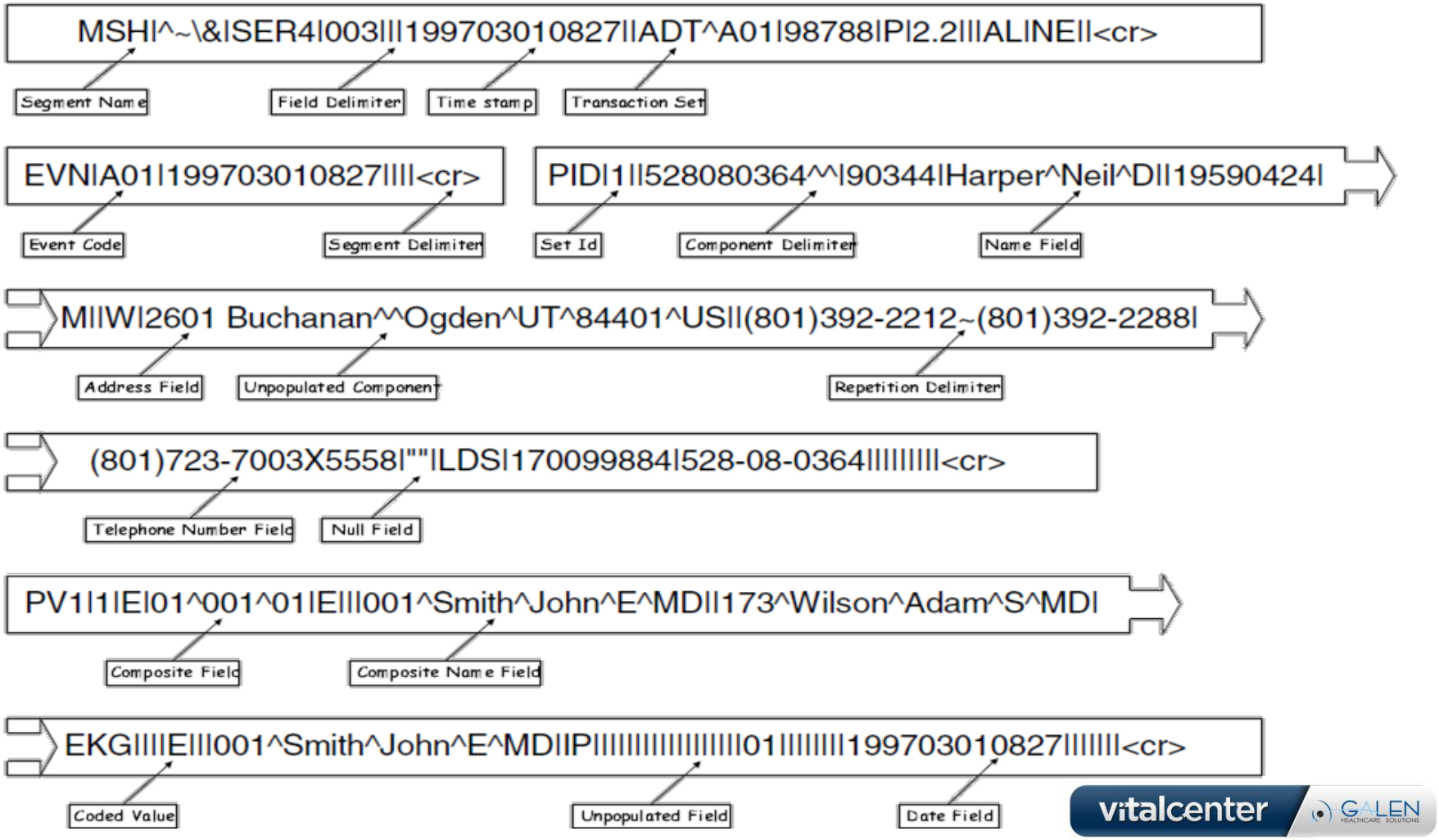
GT1|||TESTCHRISTIANSEN,JOHN||1400 CHARLES ST^^LOVES PARK^IL^61111|885-2277|||||SP|745-69-5847|||

DG1||||TEST

IN1|1|MCR-A||MEDICARE|PO BOX 1602^^OMAHA^NE^68101||Y||||UNK||||||SP|||||1|||||||||||||7896547

ZSR|||||||||||||||||||||||^^^^|||||||||UNKNOWN

HL7 Sample Message



Mapping Example – Phone Number

- [34]-HomePhoneArea
  - Pce(Script InboundPhone(PID.1-[13]-Phone Number - Home.1.1.0),-,1) | '0'
- [35]-HomePhoneExchange
  - Pce(Script InboundPhone(PID.1-[13]-Phone Number - Home.1.1.0),-,2) | '0'
- [36]-HomePhoneLast4
  - Ext((Pce(Script InboundPhone(PID.1-[13]-Phone Number - Home.1.1.0),-,3) | '0'),1,4)

ACK and NACK

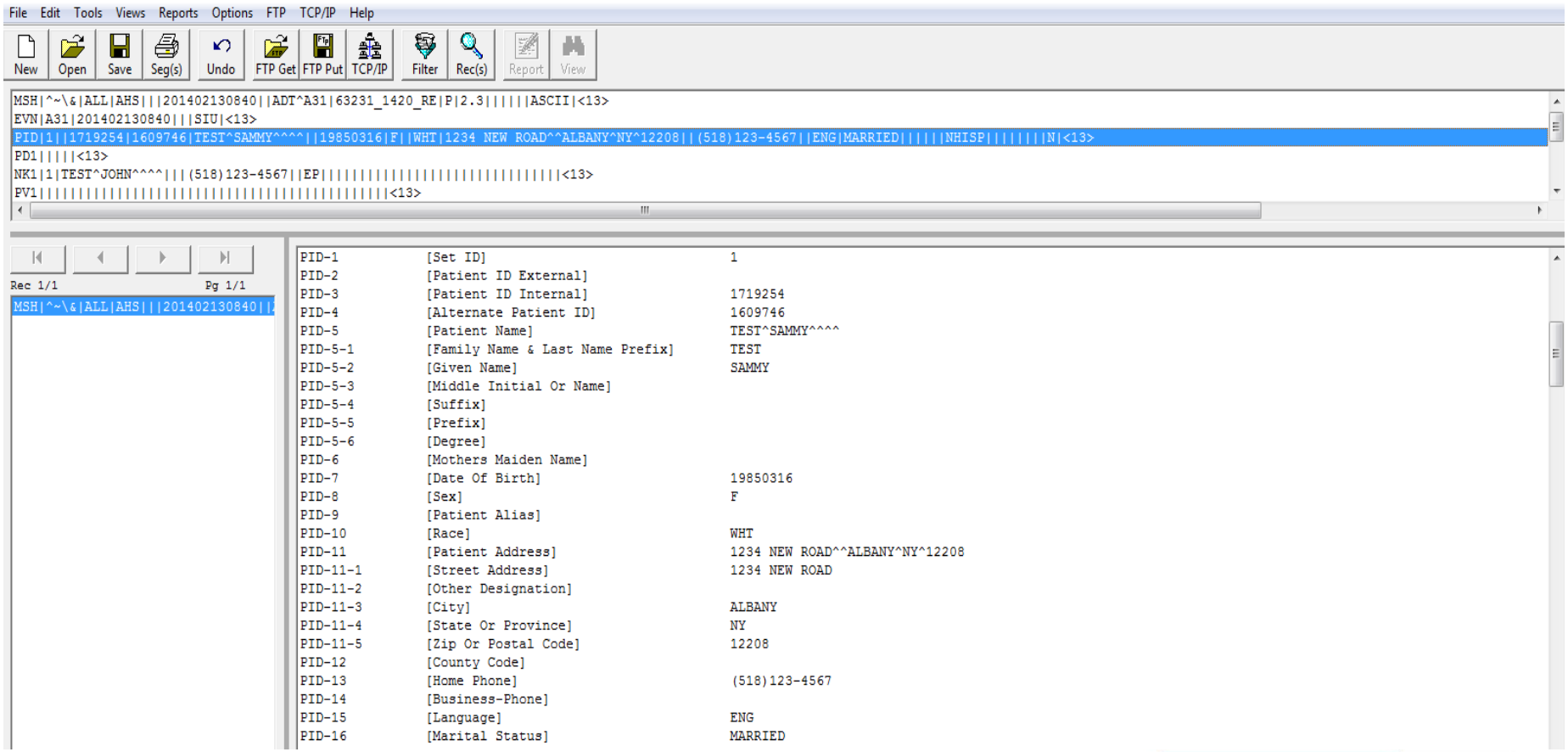
- Every time an application accepts a message and processes the data it sends an Acknowledgement (ACK) back to the sending application.

```
MSH|^~\&||||SWA|201305221309||ACK|ADT1.1.9200|P|2.1||||
MSA|AA|ADT1.1.9198
```

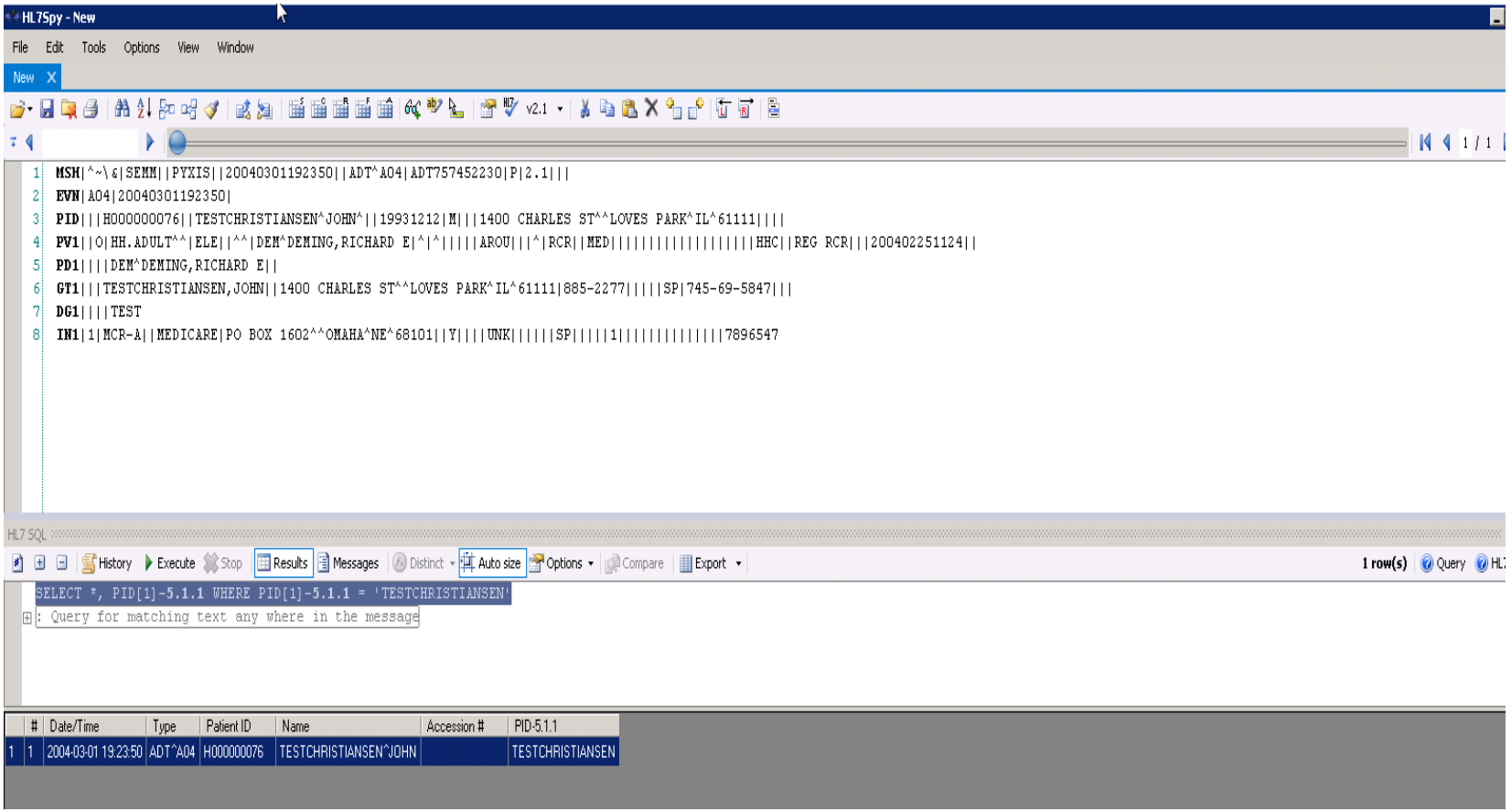
- A NACK is an ACK that contains an error that is sent back to the sending application.

```
MSH|^~\&||||201305221309||ACK|ADT1.1.9200|P|2.1||||
MSA|AE|000001
ERR|DRG_DiagnosisRelatedGroupSegment^1^11^unexpected data found
```

Interface Explorer

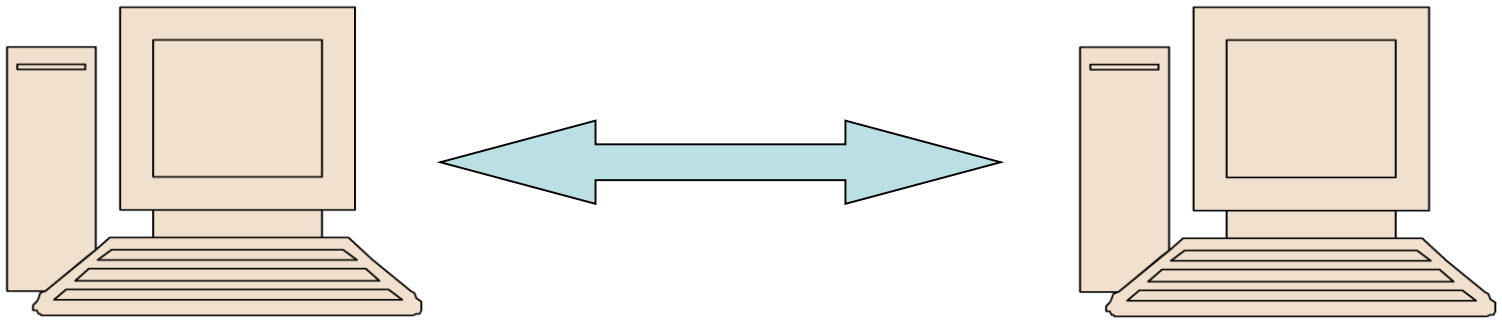


HL7 Spy


HL7Spy - New
File Edit Tools Options View Window
New
MSH|^~\&|SEMM||PYXIS||20040301192350||ADT^A04|ADT757452230|P|2.1|||
EVN|A04|20040301192350|
PID|||H000000076||TESTCHRISTIANSEN^JOHN^||19931212|M|||1400 CHARLES ST^^LOVES PARK^IL^61111||||
PV1||O|HH.ADULT^^|ELE||^^|DEM^DEMING,RICHARD E|^|^|||||AROU|||^|RCR||MED|||||||||||||||||||HHC||REG RCR|||200402251124||
PD1||||DEM^DEMING,RICHARD E||
GT1|||TESTCHRISTIANSEN,JOHN||1400 CHARLES ST^^LOVES PARK^IL^61111|885-2277|||||SP|745-69-5847|||
DG1||||TEST
IN1|1|MCR-A||MEDICARE|PO BOX 1602^^OMAHA^NE^68101||Y||||UNK|||||SP|||||1|||||||||||||7896547
HL7 SQL
History Execute Stop Results Messages Distinct Auto size Options Compare Export
1 row(s) Query
SELECT *, PID[1]-5.1.1 WHERE PID[1]-5.1.1 = 'TESTCHRISTIANSEN'
: Query for matching text any where in the message
Date/Time Type Patient ID Name Accession # PID-5.1.1
1 1 2004-03-01 19:23:50 ADT^A04 H000000076 TESTCHRISTIANSEN^JOHN TESTCHRISTIANSEN

Data Exchange Standards

- Typically moved via a network connection via TCP/IP
- One acts as the Client and the other acts as the Server.
- The Client will open a TCP/IP Socket with the Server.
- This connection will be exclusively used for these two systems to communicate.



Data Exchange Standards

- Once the TCP/IP Connection is established the sending system can deliver an HL7 message

```
MSH|^~\&||SEM|||200605221309||ADT^A04|ADT1.1.9198|P|2.1
EVN|A04|200605221309
PID|1||M000001327||TEST^RECURRING^^^^||19680215|F|^^^^^||^^^^|||||||L0000295
12|74
DG1|1|TX||PROTIMES
PV1|1|O|RCA^^||||TESTC^TEST^CAROL|TESTC^TEST^CAROL|||||||||RCR||U||||
```

- The receiving system will acknowledge the message using an ACK Message

```
MSH|^~\&||||SWA|200605221309||ACK|ADT1.1.9200|P|2.1||||
MSA|AA|ADT1.1.9198
```

Data Exchange Standards

- The acknowledgment of the delivery of a message is a significant feature
- In the MSH of the sending message is a field called the Message Control ID (MCI).

```
MSH|^~\&||SEM|||200605221309||ADT^A04|ADT1.1.9198|P|2.1
EVN|A04|200605221309
PID|1||M000001327||TEST^RECURRING^^^^||19680215|F|^^^^^^||^^^^|||||||L0000295
12|74
DG1|1|TX||PROTIMES
PV1|1|O|RCA^^||||HARR^HARNER^ROBERT|HARR^HARNER^ROBERT|||||||||RCR||U||||


MSH|^~\&||||SWA|200605221309||ACK|ADT1.1.9200|P|2.1||||
MSA|AA|ADT1.1.9198
```

Other Data Exchange Methods

- Other methods can be used to deliver HL7 messages to the receiving system.
  - Send message via FTP
  - Download and copy to a shared folder
  - Batch mode

Future

- Version 2.x has been approved by ANSI since the early 90's and is used throughout the Healthcare industry almost exclusively.
- Version 3.x is a departure from the 2.x version in how the messages are formatted.
- Version 3.x is based on XML, which is a Web based language.
- XML – CCD and Dictionary Updates

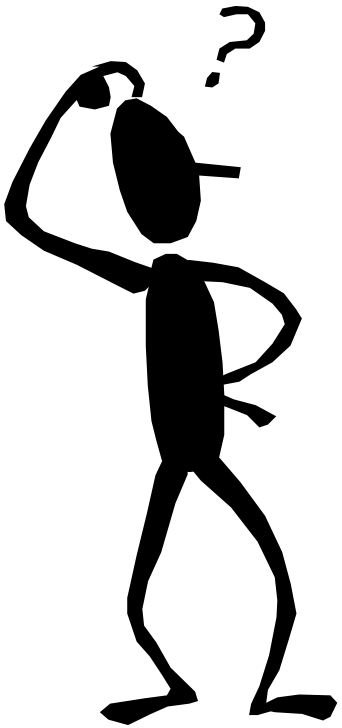
XML Message

<DictionaryEntry ID="93343:36">
<Name>Other abdominal pain-R10.8</Name>
<Code>R10.8</Code>
<DxCode>R10.8</DxCode>
<LastUpdate>ICD10 Upload</LastUpdate>
<CreDt ID="63223">02/05/2014</CreDt>
<CreTm>10:42AM</CreTm>
<CreIni>KAT</CreIni>
<UpdDt ID="63223">02/05/2014</UpdDt>
<UpdTm>10:42AM</UpdTm>
<UpdUsername>DGS</UpdUsername>
<IcdCmDescription>Other abdominal pain</IcdCmDescription>
<IcdCmCode>R10.8</IcdCmCode>
<IcdCmVersion>10</IcdCmVersion>
<VerNum>1</VerNum>
<DeletedFlag></DeletedFlag>
<IDXDictionaryInternalNumber>36</IDXDictionaryInternalNumber>
<IDXDictEntryInternalNumber>93343</IDXDictEntryInternalNumber>
</DictionaryEntry>

Steps to Successful Interface Development

- Introductory Calls
- Calls to Vendors and Spec Exchange
- Kickoff Meeting
- Gap Analysis
- Plan Interface Design
- Build Interface in Test/Dev
- Deploy to Test
- Test Interface with Real Messages
- Was the Test Successful?
- Go-Live Prep
- Go-Live
- Was Live Testing Successful
- Post-Live Monitoring

Q&A



Thank you for joining us today, for additional assistance….

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