



Introduction to Health Level Seven Standard Version 2.8.2

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Agenda



- Why Medical Standard?
- What is Health Level Seven (HL7)?
- Purpose
- Timeline of HL7 Standards
- HL7 in Communication
- Scope of HL7
- HL7 Systems
- HL7 Message
- Understanding HL7 Message Structure

Why Medical Standard?



- In order to reduce disconnects between all health care systems, there must some standard to achieve interoperability.
- Standards are vital for interoperability.
- Provide quality improvement and greater value.
- Improve information access.
- Helps to identify the mechanisms for protecting the privacy & confidentiality of individual's health data.
- Allows industry to move forward without having each individual having to the ground implementation.

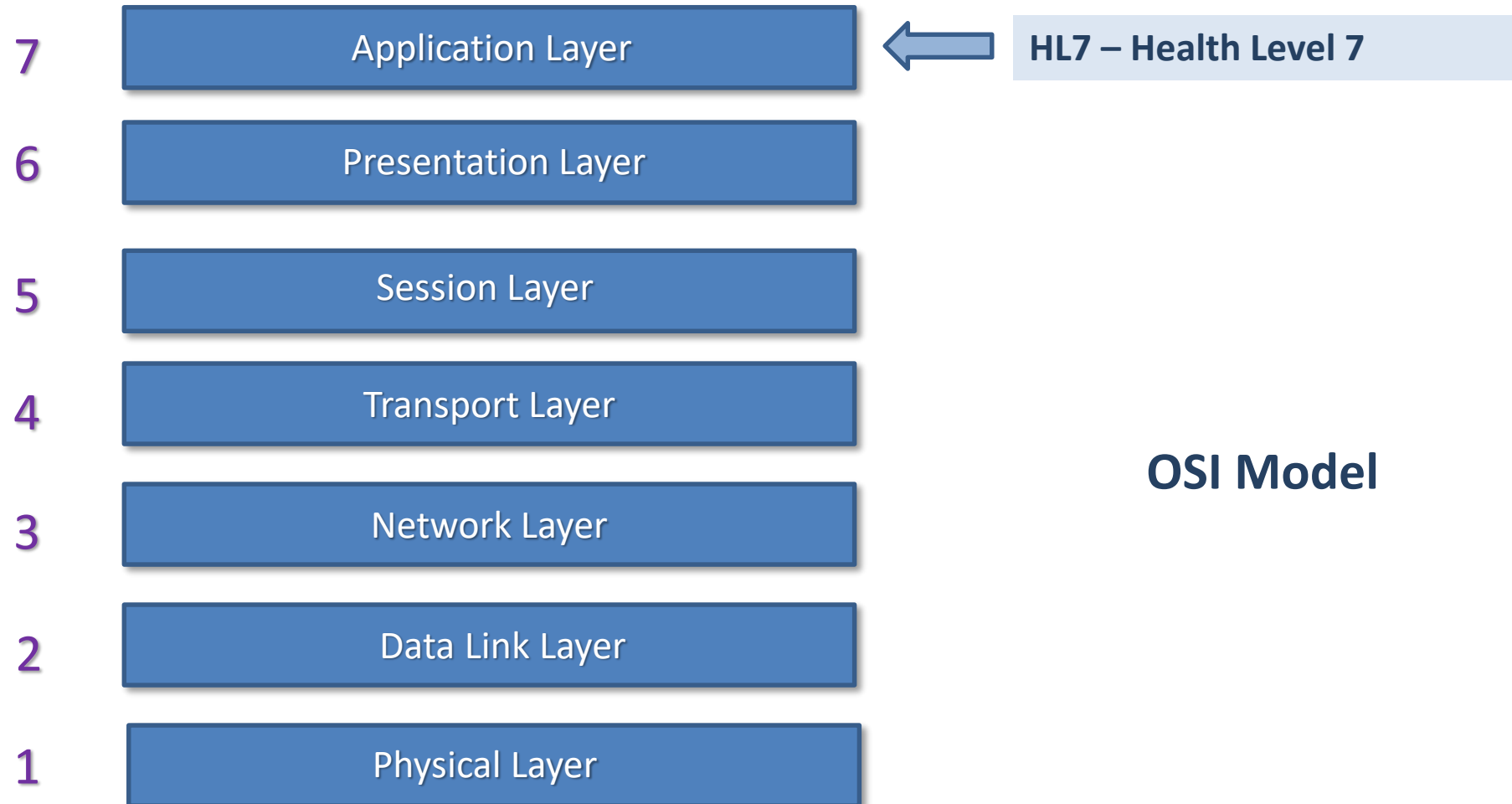
What is Health Level Seven (HL7)?

Version 2.8.2



- *An Application Protocol for Electronic Data Exchange in Healthcare Environments*
- **Health Level-7** or **HL7** refers to a set of international standards for transfer of clinical and administrative data
- Language that describes you, and your medical information, to all the Hospital information systems
- Produced by the **Health Level Seven International**
 - A not-for-profit, international standards developing organization
 - ANSI-accredited
 - Founded in 1987

HL7 - What Does it Mean?



OSI Model

- To provide a comprehensive framework and related standards for the exchange, integration, sharing and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services
- **HL7 Vision** - A world in which everyone can securely access and use the right health data when and where they need it
- **HL7 Mission** - To provide standards that empower global health data interoperability

- HL7 provides standards for interoperability that improves –
 - Care delivery
 - Reduce ambiguity
 - Enhance knowledge transferamong healthcare providers, government agencies, vendor community and patient

Timeline of HL7 Standards



- 1987 Founded and Version 1.0
- 1988 Version 2.0
- 1990-2000 Version 2.1 to 2.4
- 2000-2007 Version 2.5
- 2007-2014 Version 2.6 to Version 2.7
- 2014 Version 2.8 to version 2.8.2
- 2015 Version 2.8.2

HL7 in Communication



Health Information System



Patient Registration



Clinical Laboratory
Information System



Financial Management
Information System



Radiology Information
System

..... and more

HL7 in Communication



Patient Registration



Patient Arrives



Clinical Laboratory
Information System



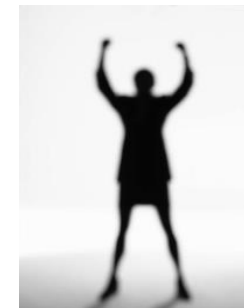
Patient goes for Lab test



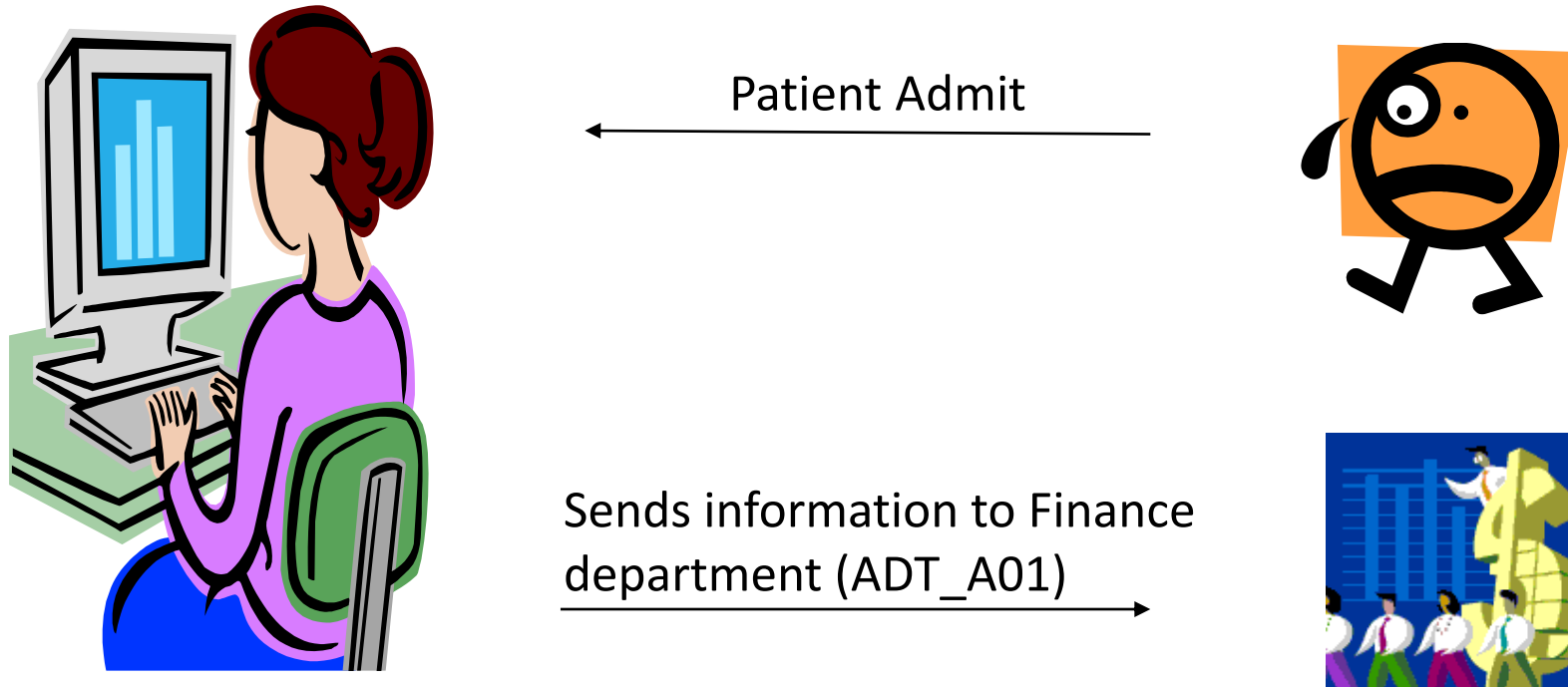
Financial Management
Information System



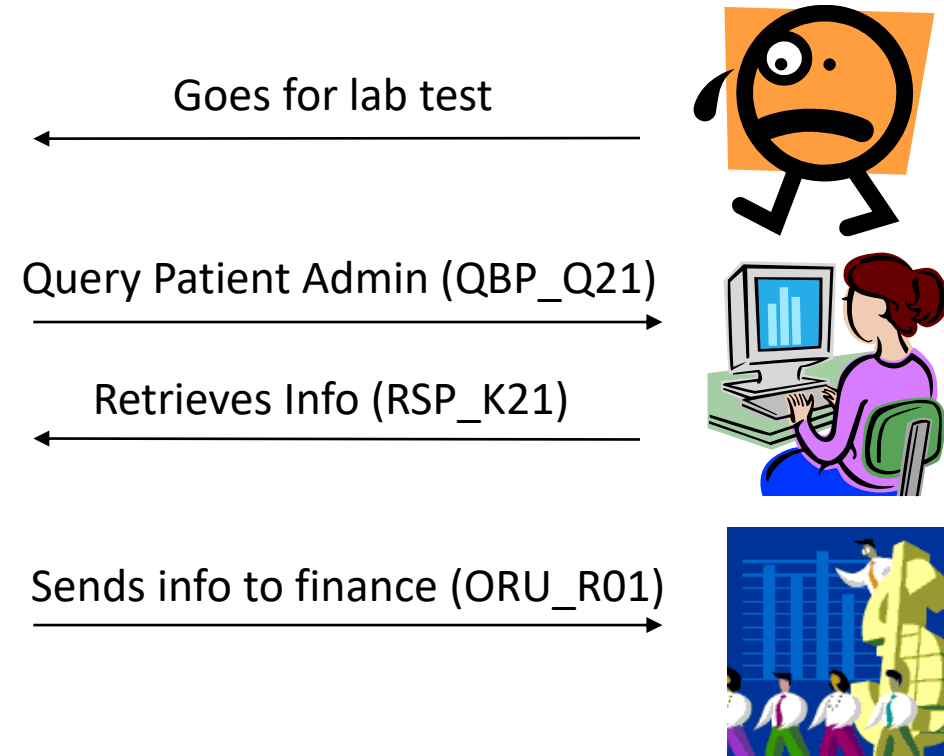
Patient Discharge



Patient Registration Scenario



Patient Lab Test Scenario



Patient Discharge Scenario



Sends discharge
notification (ADT_A03)



Generates Bill



HL7 Version 2.8.2 provide a considerable service in everyday use, in thousands of locations and in many different countries, However, there are certainly many areas of healthcare system integration that HL7 does not address or addresses with what may prove to be an inadequate or incomplete solution.

- **A Complete Solution**
 - HL7 Version 2.8.2 is not, in itself, a complete systems integration solution. There are several barriers in today's healthcare delivery environment that makes it difficult for HL7 to create a complete "plug-and-play" solution.
- **Protection of Healthcare Information**
- HL7 Version 2.8.2 is largely silent about the issues of privacy authentication and confidentiality of data that pass through HL7 messages. HL7 makes no assumption about the ultimate use of data but rather assumes that both source and destination applications provide for these requirements.
- **Enforcement of Organizational Security and Access Control Policies**
 - HL7 Version 2.8.2, itself, does not provide for the enforcement of a provider organization's security and access control policies.

- Roles and Relationships
 - HL7 Version 2.8.2 does not, in itself, attempt to define or even support the implicit and explicit relationships between persons such as patients, physicians, providers, etc.
- Accountability, Audit Trails and Assigned Responsibility
 - HL7 Version 2.8 does not attempt to define typical transaction processing features such as audit trails.
- Tracking of Corrections, Amendments or Refusals to Correct or Amend Protected Health Information
 - HL7 Version 2.8 does not provide messages to support the tracking of corrections, amendments or refusals to correct or amend protected health information.
- Tracking Input Validation
 - HL7 Version 2.8 does not provide messages for tracking the validation (or lack of validation) of data from its source (human or machine).

- There are large number of Messages present for different departments in Health information system.
- HL7 standard categories these messages according to their purpose in different HL7 Systems.
- In HL7 v2.8.2, total 15 Systems are stated.
- Patient Administration, Observation Reporting, Medical Records, Order entry, Application Management, Scheduling, Patient Referral, Financial Management, Master Files, Patient Care, Clinical Laboratory Automation, Personnel Management, Claims and Reimbursement, Materials Management.

- Atomic unit of data transferred between systems
- Group of segments in a defined sequence
- Each message has a **message type** that defines its purpose
- Message Code
 - A three-character code contained within each message identifies its type.

For example: the ADT Message type is used to transmit portions of a patient's Patient Administration (ADT) data from one system to another.

- Trigger Event
 - The real-world event that initiates an exchange of messages.
 - Event type

Value	Description
A01	ADT/ACK - Admit/visit notification
A02	ADT/ACK - Transfer a patient
A03	ADT/ACK - Discharge/end visit
A04	ADT/ACK - Register a patient
A05	ADT/ACK - Pre-admit a patient

- A segment is a logical grouping of data fields.
- Segments of a message may be required or optional.
- A segment may occur only once in a message or they may be allowed to repeat.
- Each segment contains a unique three-character code which defines nature of Segment.
- All segment ID codes beginning with the letter Z are reserved for locally defined segments.

- Two or more segments may be organized as a logical unit called a segment group.
- A segment group may be required or optional and might or might not repeat.
- A segment group is assigned a name that represents a permanent identifier that may not be changed.

- A field is a string of characters.
- Fields for use within HL7 segments are defined by HL7.
- HL7 does not care how systems actually store data within an application. When fields are transmitted, they are sent as character strings.
- A field SHALL exist in one of three population states in an HL7 message:
 - Populated (Synonyms: valued, non-blank, not empty.)
 - Not populated (Synonyms: unpopulated, not valued, unvalued, blank, empty, not present, missing.)
 - Null

- The basic building block used to construct or restrict the contents of a data field.
- Each field is assigned a data type that defines the value domain of the field.
- In the segment attribute tables this information is provided in the column labeled **DT**.
- If the data type of the field is variable, the notation "varies" will be displayed.

Data Type Types



- Primitive

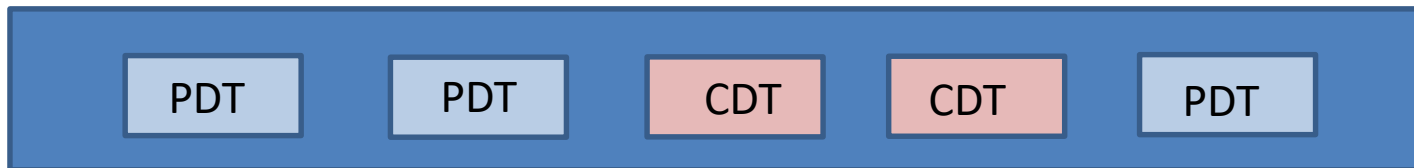
- Series of characters
- E.g. DT, DTM, ID, ST etc.



← Primitive Data Type

- Composite

- Series of components that are themselves assigned to a data type, which may again be either primitive or composite data types
- The components of a component are called sub-components, and they SHALL only be assigned primitive data types.
- E.g. AD, CNE, CWE, XCN, XPN etc.



← Composite Data Type

Message Delimiters



Delimiter	Suggested Value	Encoding Character Position	Usage
Segment Terminator	<cr>	-	Terminates a segment record. This value cannot be changed by implementers.
Field Separator		-	Separates two adjacent data fields within a segment. It also separates the segment ID from the first data field in each segment.
Component Separator	^	1	Separates adjacent components of data fields where allowed.
Repetition Separator	~	2	Separates multiple occurrences of a field where allowed.
Escape Character	\	3	Escape character for use with any field, component, or sub-component represented by an ST, TX or FT data type.
Subcomponent Separator	&	4	Separates adjacent subcomponents of data fields where allowed.
Truncation character	#	5	Indicated character to be used for the truncation pattern.

Understanding HL7 Message Structure



```
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|M||2028-9^^HL70005^RA99113^^XYZ|260 GOODWIN CREST D
PV1||I|W^389^1^UABH^^^^3|||12345^MORGAN^REX^J^^MD^0010^UAMC^L||67890^GRAINGER^LUCY^X^^MD^0010^UAMC^L|MED|||
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
```

Understanding HL7 Message Structure



HL7 Message

Understanding HL7 Message Structure



Segment	<cr>
Segment	<cr>
Segment	<cr>
Segment	<cr>
Segment	<cr>
Segment	<cr>
Segment	<cr>
Segment	<cr>
Segment	<cr>
Segment	<cr>

Understanding HL7 Message Structure



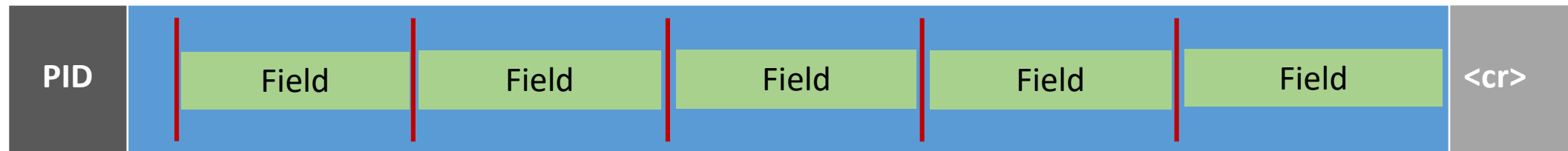
MSH	Message Header	<cr>
	Segment	<cr>
	Segment	<cr>
	Segment	<cr>
	Segment	<cr>
	Segment	<cr>
	Segment	<cr>
	Segment	<cr>
	Segment	<cr>
	Segment	<cr>

Understanding HL7 Message Structure

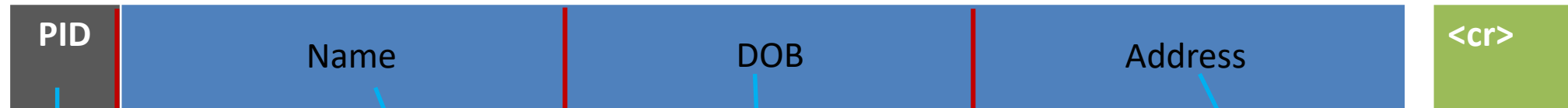


MSH	Message Header	<cr>
SFT	Software Segment	<cr>
UAC	User Authentication Credential	<cr>
EVN	Event Type	<cr>
PID	Patient Identification	<cr>
PD1	Additional Demographics	<cr>

Patient Identification

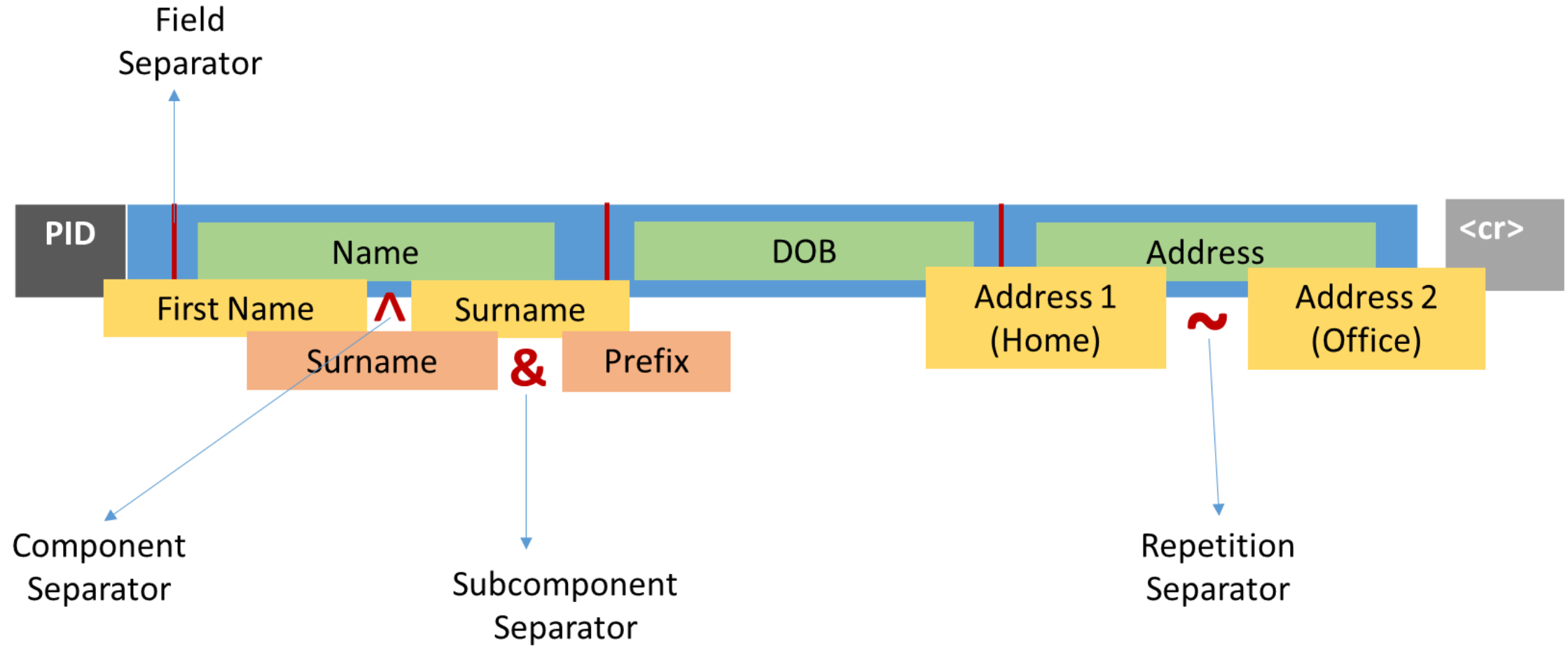


Understanding HL7 Message Structure



```
MSH|^~\&|MegaReg|XYZHospC|SuperOE|XYZImgCtr|20060529090131-0500||ADT^A01^ADT_A01|01052901|P|2.5
EVN||200605290901|||200605290900
PID|||56782445^^^UABH^^^3|||KLEINSAMPLE^BARRY^Q^JR||19620910|M||2028-9^^HL70005^RA99113^^XYZ|260 GOODWIN CREST D
PV1||I|W^389^1^UABH^^^3|||12345^MORGAN^REX^J^^MD^0010^UAMC^L||67890^GRAINGER^LUCY^X^^MD^0010^UAMC^L|MED|||
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
```

Understanding HL7 Message Structure



- Sequence Number Protocol
- Message and Segments Continuation (Fragmentation/Defragmentation)
- Publish-Subscribe Protocol
- Interactive Continuation Protocol
- Query Cancellation
- Batch Protocol
- Local Extension Protocol

References



- <http://www.hl7.org/>
- HL7 Messaging Standard Version 2.8.2 -
http://www.hl7.org/implement/standards/product_brief.cfm?product_id=185

Thank You

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