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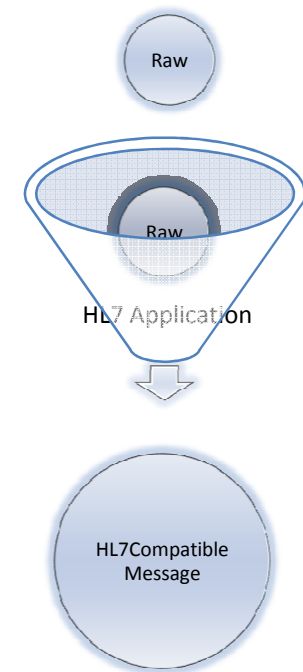


Laboratory Messaging Interoperability Using HL7 V 3.0

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Presenter:

Maqbool Hussain



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AGENDA

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1st

- Requirements of Laboratory (CITI Lab Pakistan)

2nd

- Current Problem with Existing System

3rd

- Mapping of Requirements to HL7 RIM model

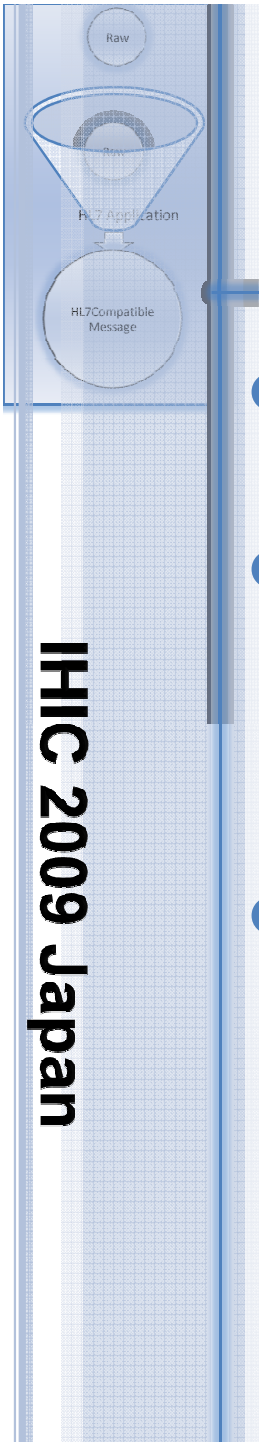
4th

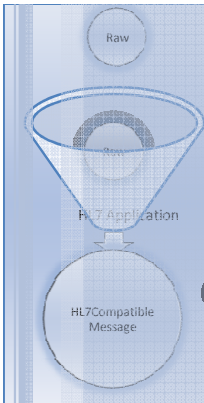
- Conclusion & Reference

Requirements of Laboratory

(CITI Lab Pakistan)

- CITI Lab is renown lab in Pakistan, having various collection points in different cities.
- Main requirements of CITI lab is to exchange information of;
 - Test Orders
 - Test Results
- The exchange of these messages occurred;
 - Within the collection point and main Lab
 - With other reference labs





Current Problems of CITI Lab



Mailing charges is cost overhead.



Deliveries of reports are often delayed that leads to patient dissatisfaction.



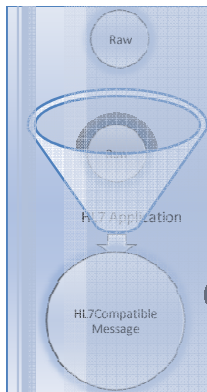
Lack of reliable delivery of reports: report results are dictated via phone which are often error prone.



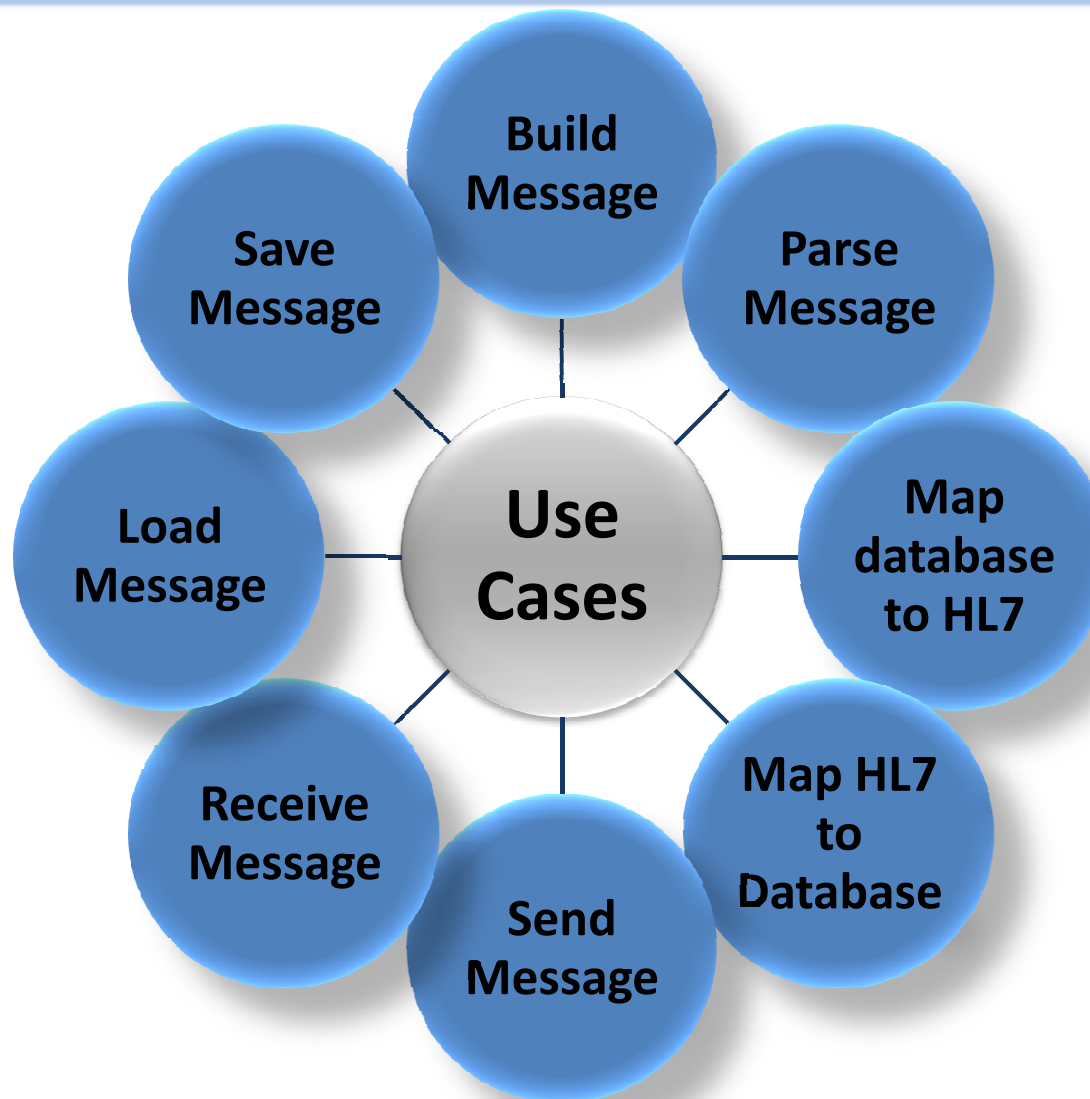
Manual entry at sender and receiver side is time consuming.



Customers will not ready to attend the lab due to not entertainment of urgent reports, which need outer lab communication.

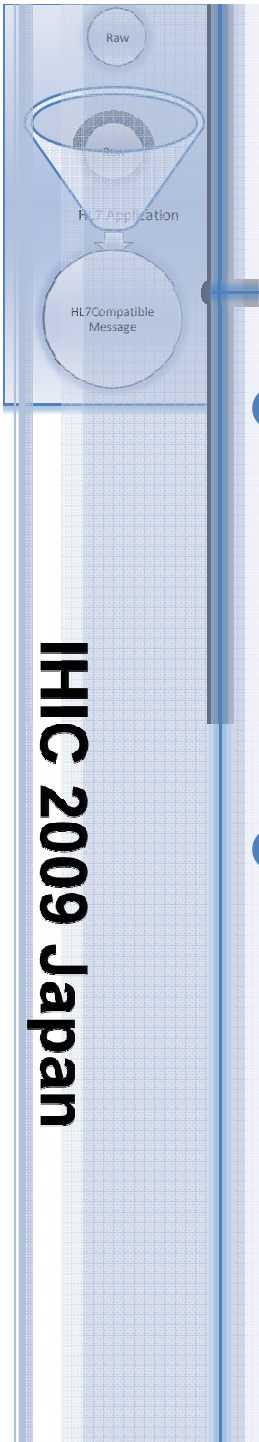


Use Cases For Lab HL7 Interfaces



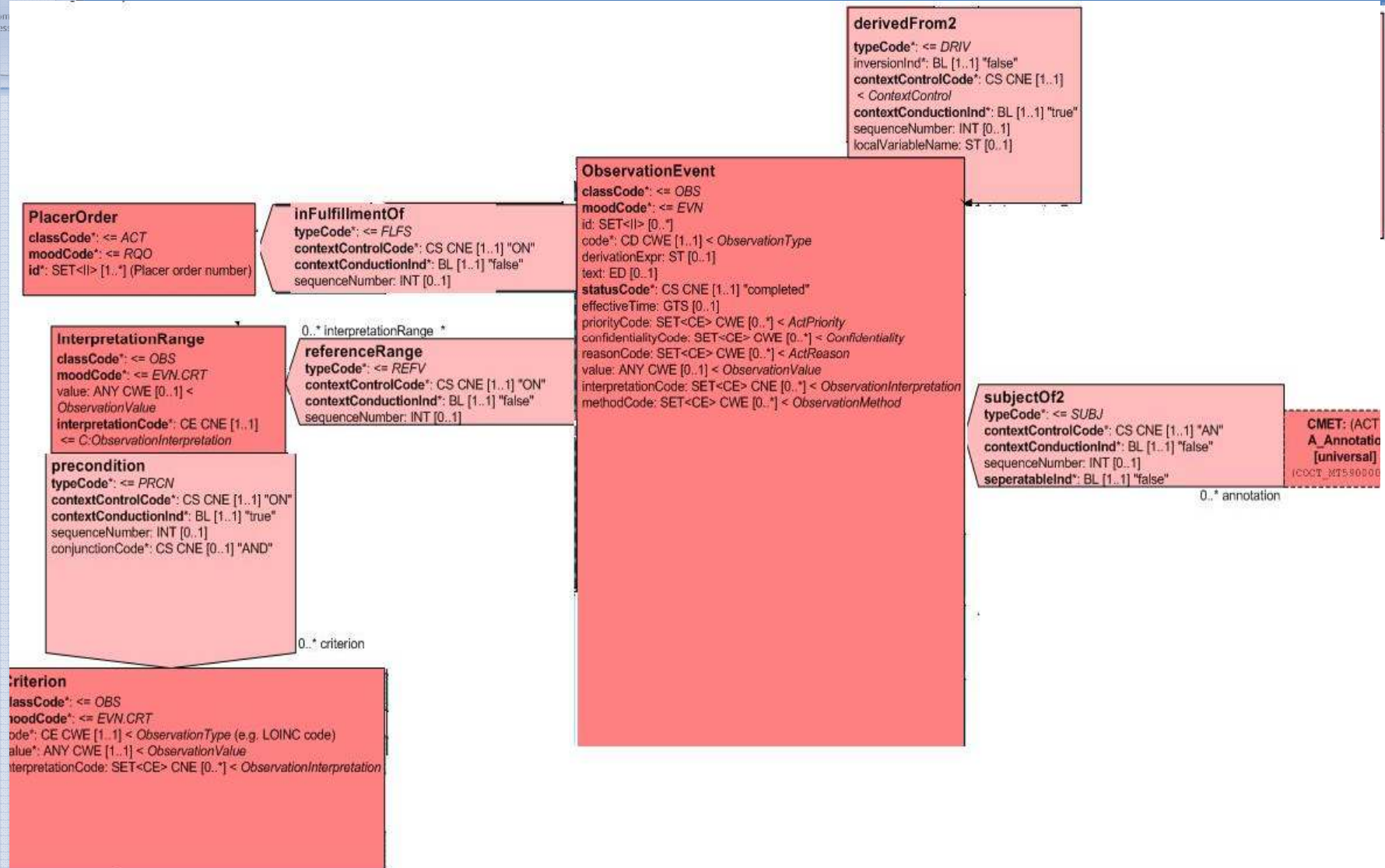
Mapping of Requirements to HL7 Messages

- The Messages required are;
 - Test Order Messages
 - Test Result Messages
- Domains of HL7
 - Test order and Test result Messages -> **Lab Domain**

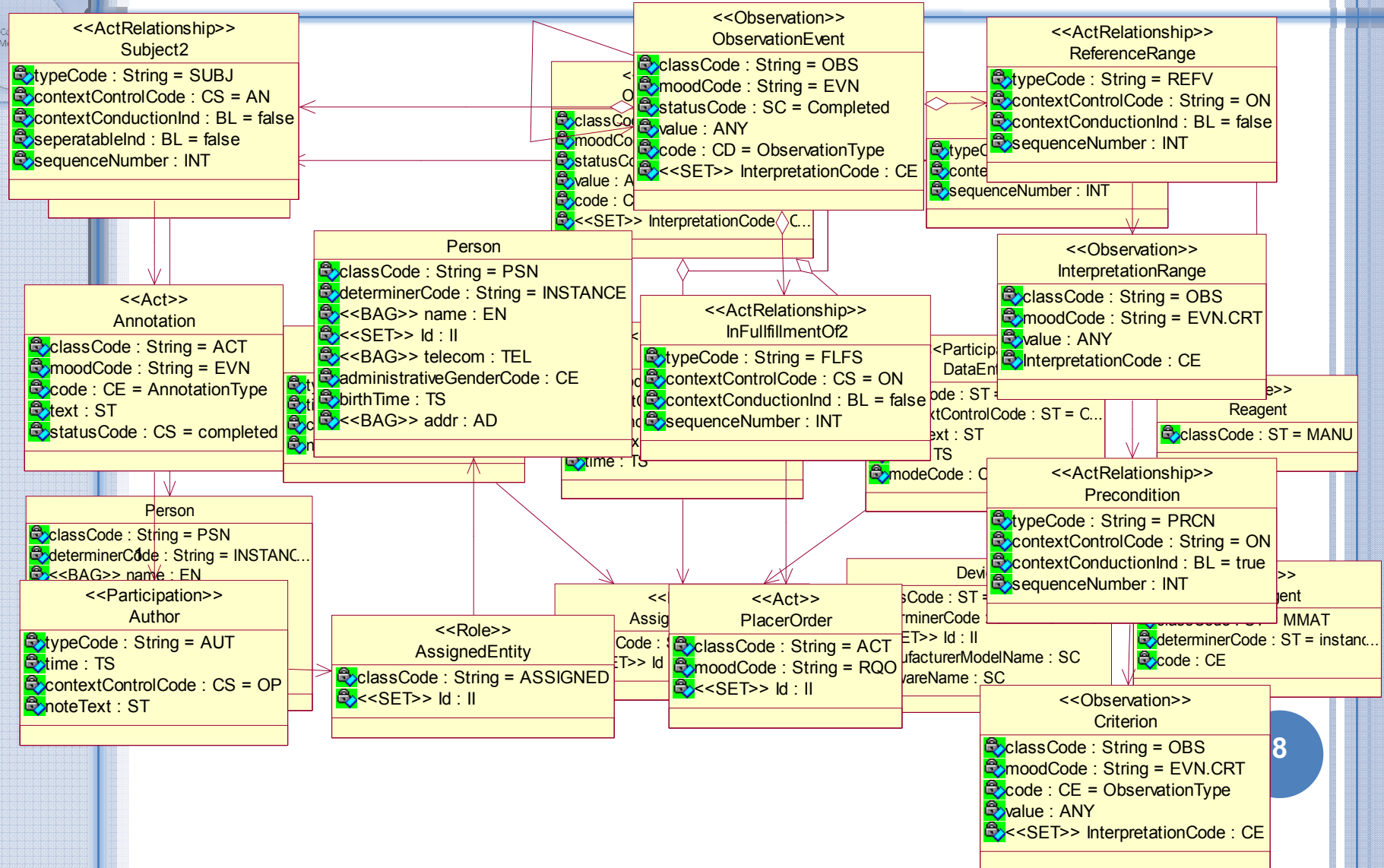


TEST RESULTS <-> RESULT EVENT RMIM

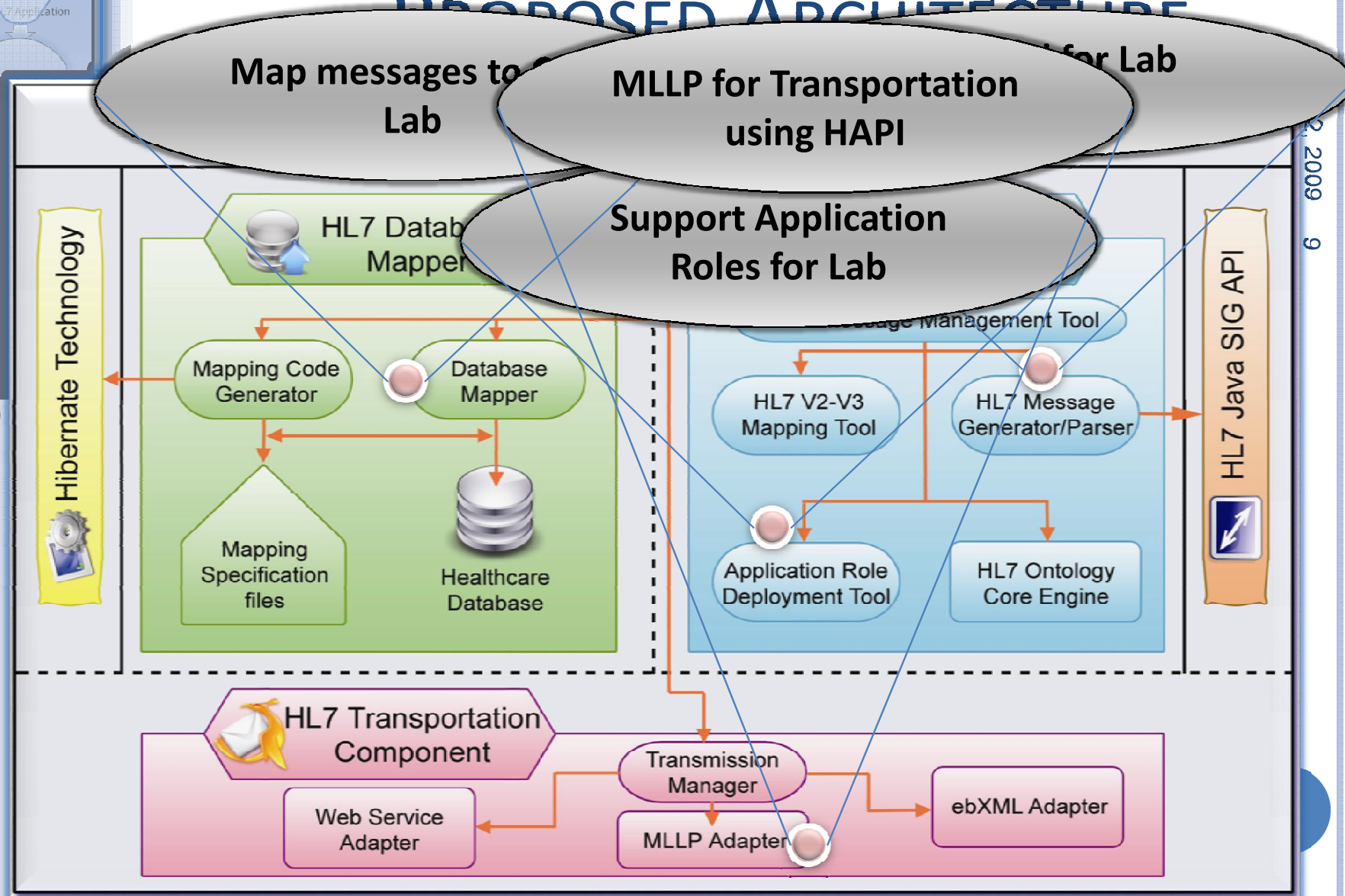
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TEST RESULTS <-> RESULT EVENT RMIM



PROPOSED ARCHITECTURE



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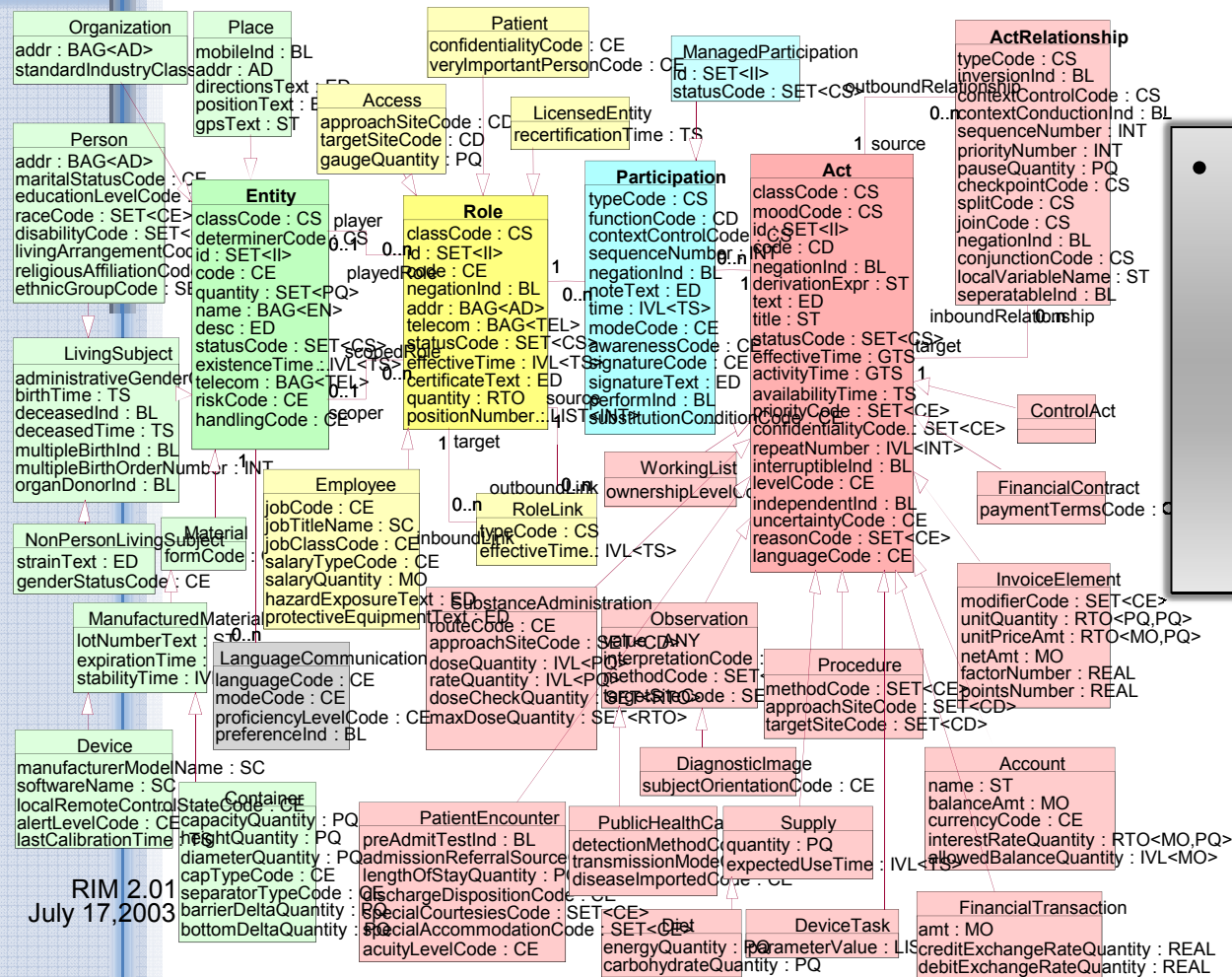
CONCLUSION

- In this implementation we have analyzed the CITI lab requirements, map the requirements to HL7 messages and RMIMs.
- This implementation gives us end to end experience in developing HL7 V 3.0 messaging environment.

THANKS FOR ATTENTION

RIM 2.01

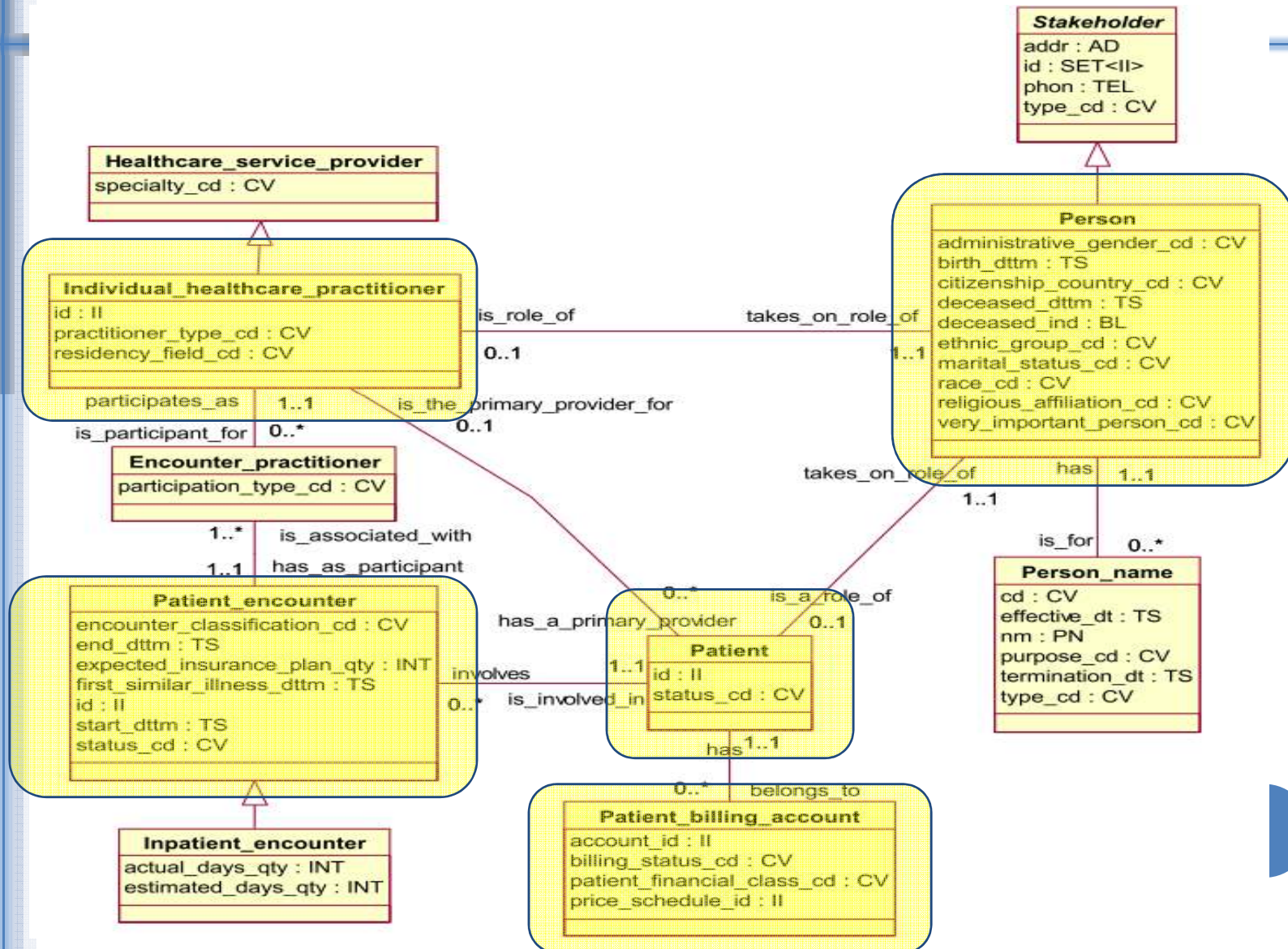
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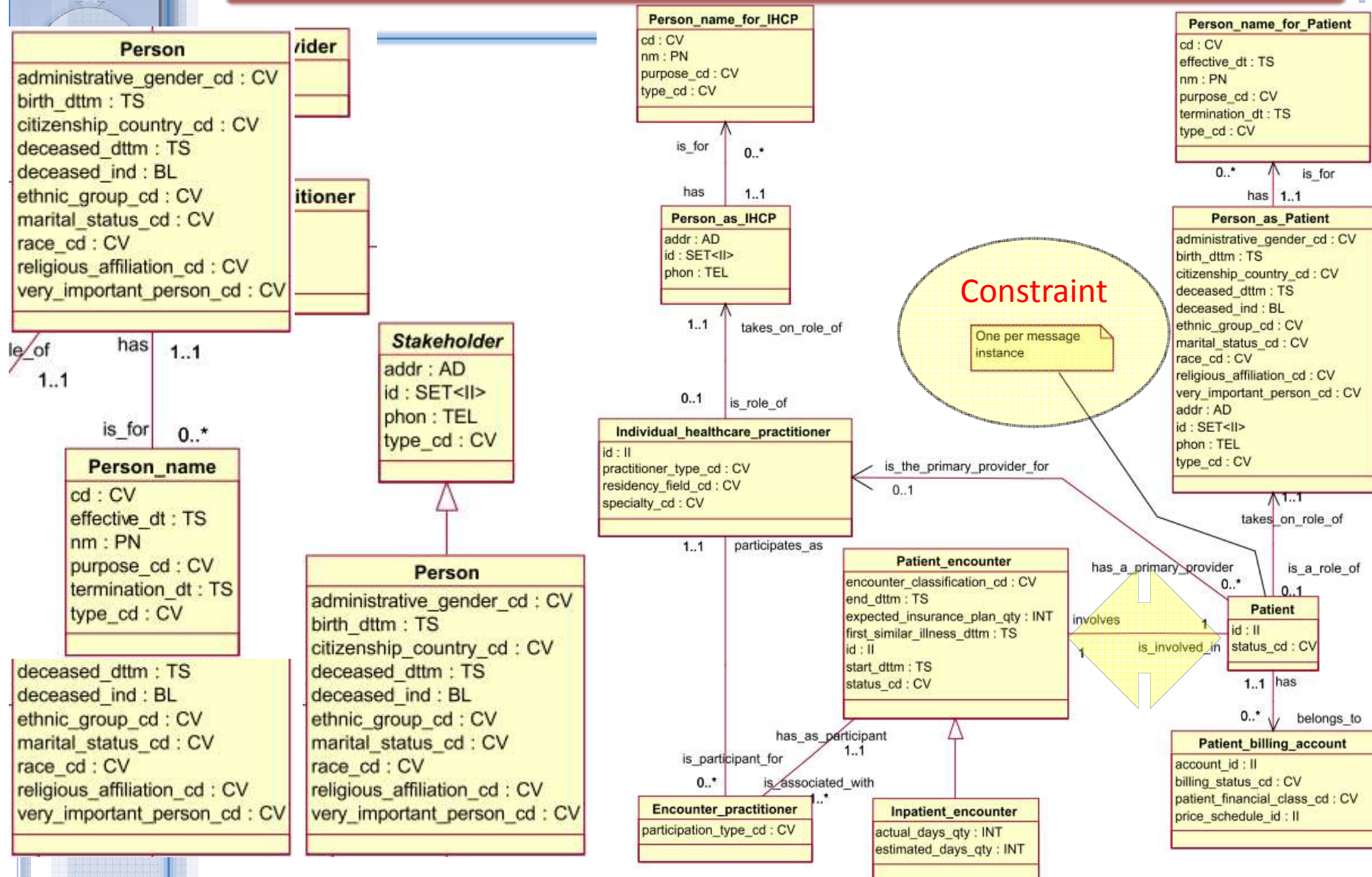
- RIM provide abstract model for healthcare arena.

Patient Encounter MIM

Raw
 HL7 Application
 HL7Compatible Message
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Cloning of New Classes

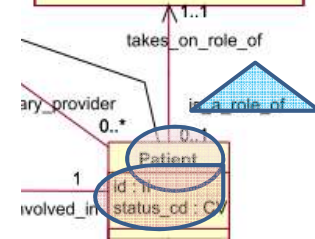


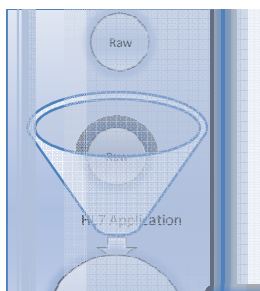
Note: this exhibit needs to be expanded to show message type definitions when R2T2 can generate them.

Row Number	Row Type	Class or Property of Class (Attribute or Association)	Rim Source Class	Message Element Name	Message Element Short Name	in Message Element Type	Source of Message Element Type	of Message Element Type	Cardinality	Domain Specification (#)	Coding Strength (default CWE)	Mandatory	Constraint/Note #	Default Value (#)	Default Default = "N"	Default Update Mode	Default Default = R	Update mode set
3	hmd	COO_RIM_0092D	COO_MDF_0092D	COO_RRIM_0092D	COO_HMD_0092D	HMD												
4	class	Patient	Patient	Patient	Pt	MessageType	N	Pt	0..1									
5	attr	id	Patient	id	id	Pt	D	II										
6	attr	status_cd	Patient-encounter	status_cd	status	Pt	D	CV	1..1		CWE	M						
7	assoc	is_a_role_of	Patient	is_a_role_of_Person_as_Patient	isAroleOfPersonAsPt	Pt	N	PersonAsPt	1..1									

Person_as_Patient

administrative_gender_cd : CV
 birth_dttm : TS
 citizenship_country_cd : CV
 deceased_dttm : TS
 deceased_ind : BL
 ethnic_group_cd : CV
 marital_status_cd : CV
 race_cd : CV
 religious_affiliation_cd : CV
 very_important_person_cd : CV
 addr : AD
 id : SET<II>
 phon : TEL
 type_cd : CV



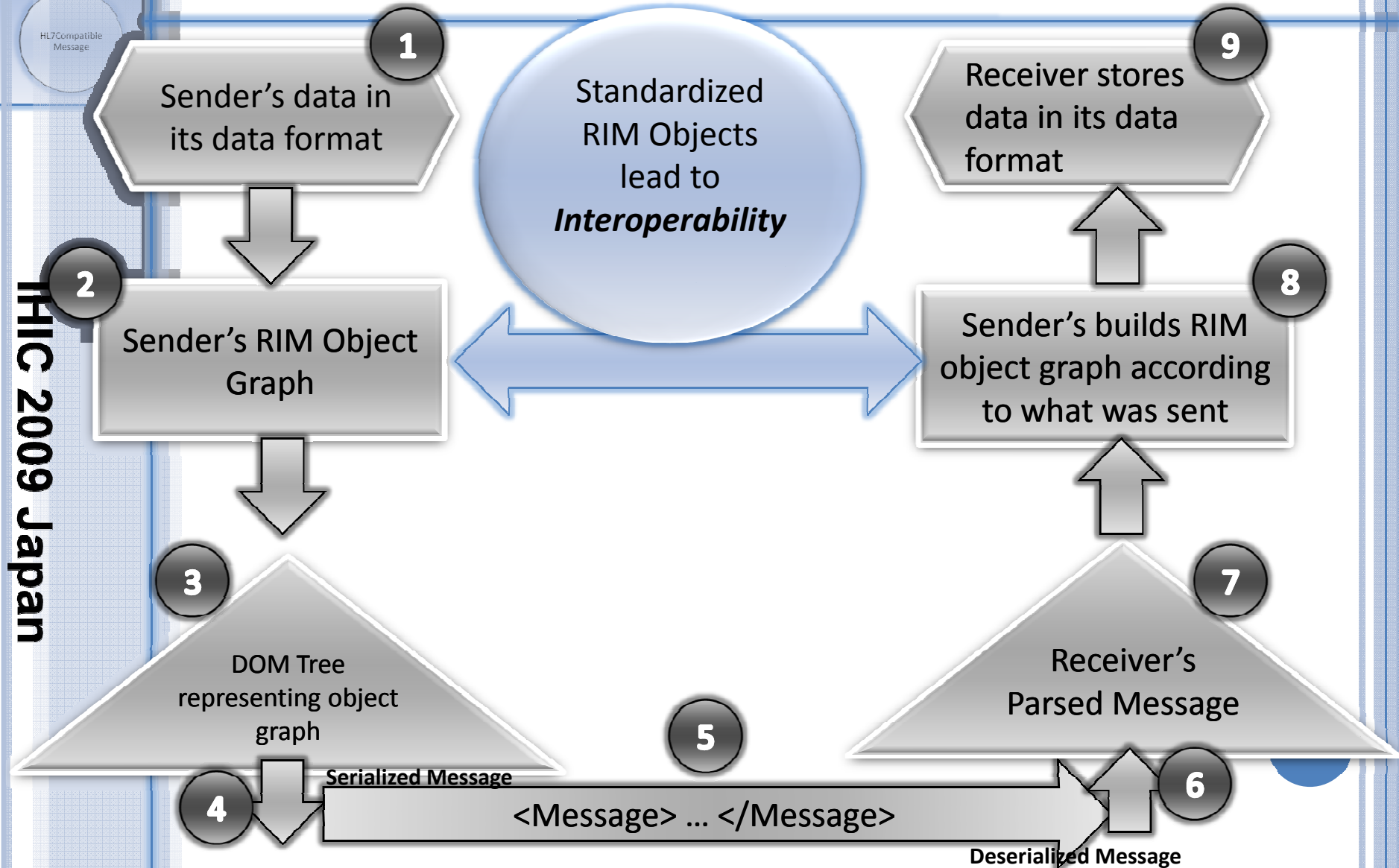


Patient Encounter HMD

Note: this exhibit needs to be expanded to show message type definitions when R2T2 can generate them.

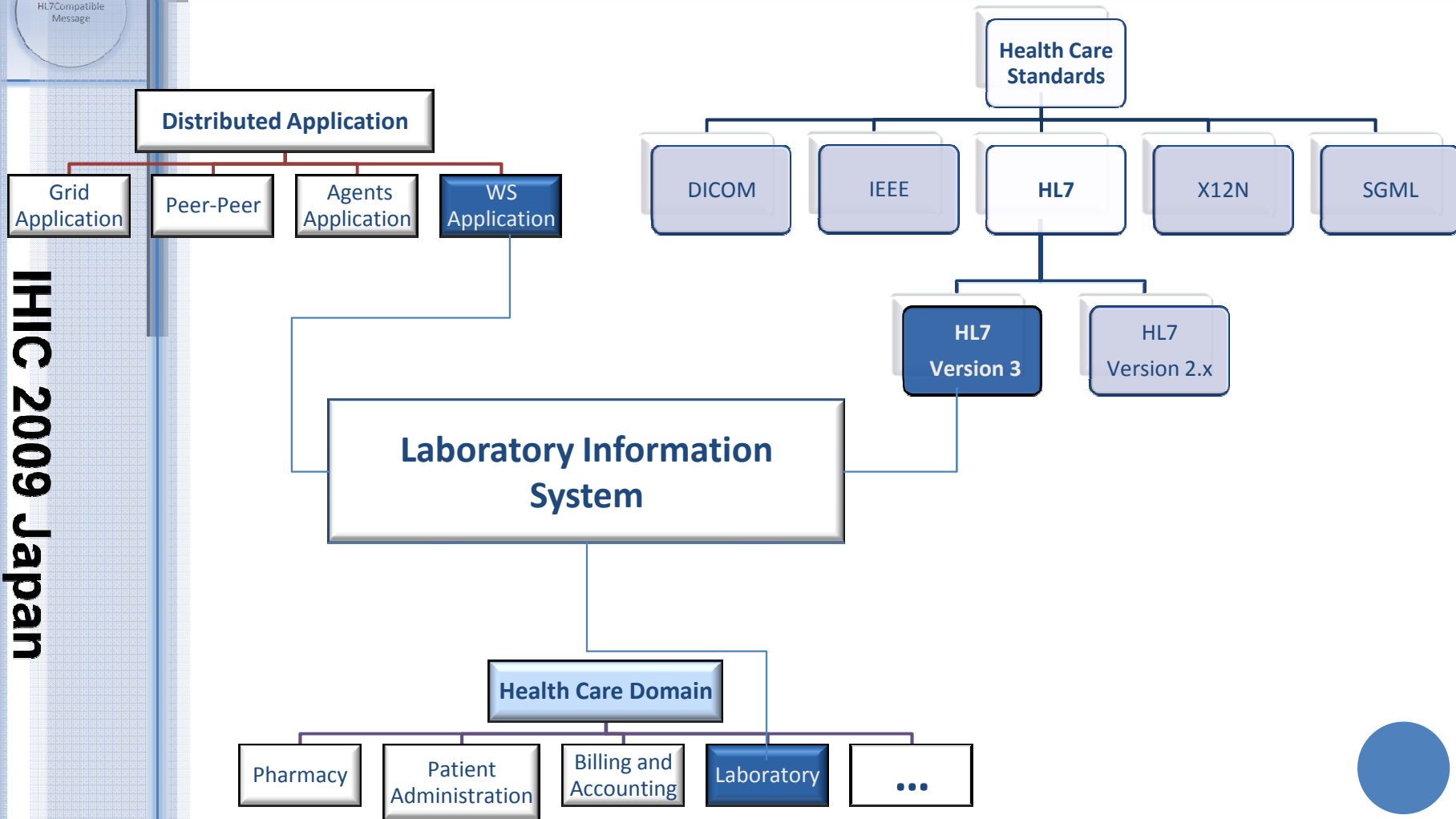
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Row Number	Row Type	Class or Property of Class (Attribute or Association)	Rim Source Class	Message Element Name	Message Element Short Name	In Message Element Type	Source of Message Element Type	of Message Element Type	Cardinality	Domain Specification (#)	Coding Strength (default CWE)	Mandatory	Constraint/Note #	Default Value (#) Default Default = "N"	Default Update Mode Default Default = R	Update mode set
1	hmd	C00_RIM_0092D	C00_MDF_0092D	C00_RRIM_0092D	C00_HMD_0092D	HMD										
2	class	Patient	Patient	Patient	Pt	Message Type	N	Pt	0..1							
3	attr	id	Patient	id	Pt		D	II								
4	attr	status_cd	Patient encounter	status_cd	Pt		D	CV	1..1		CWE	M				
7	assoc	is_a_role_of	Patient	is_a_role_of_Person_as_Patient	isAroleOfPersnAsPt	Pt	N	PersnAsPt	1..1							
8	attr	administrative_gender_cd	Person	administrative_gender_cd	adminvGendr	PersnAsPt	D	CV	0..1		CNE					
9	attr	birth_dtm	Person	birth_dtm	birthDtm	PersnAsPt	D	TS	0..1							
10	attr	citizenship_country_cd	Person	citizenship_country_cd	citizshpCountry	PersnAsPt	D	CV	0..1		CNE					
11	attr	deceased_dtm	Person	deceased_dtm	decsdDtm	PersnAsPt	D	TS	0..1							
12	attr	deceased_ind	Person	deceased_ind	decsdInd	PersnAsPt	D	BL	0..1							
13	attr	ethnic_group_cd	Person	ethnic_group_cd	ethncGroup	PersnAsPt	D	CV	0..1		CNE					
14	attr	marital_status_cd	Person	marital_status_cd	maritiStatus	PersnAsPt	D	CV	0..1		CNE					
15	attr	race_cd	Person	race_cd	race	PersnAsPt	D	CV	0..1		CNE					
16	attr	religious_affiliation_cd	Person	religious_affiliation_cd	relgsAffltn	PersnAsPt	D	CV	0..1		CNE					
17	attr	very important person cd	Person	very important person cd	veryImptrntPrsn	PersnAsPt	D	CV	0..1		CNE					
18	attr	addr	Stakeholder	addr	PersnAsPt	PersnAsPt	D	AD								
19	attr	id	Stakeholder	id	PersnAsPt	PersnAsPt	D	SET-<II>								
20	attr	phon	Stakeholder	phon	PersnAsPt	PersnAsPt	D	TEL								
21	attr	type_cd	Stakeholder	type_cd	PersnAsPt	PersnAsPt	D	CV	0..1		CNE					
22	assoc	has	Person	has_Set_Person_name_for_Patient	hasSetPrsnNameForPt	PersnAsPt	N	Set<PrsnNameForPt>	0..*							
23	item		Person	_PrsnNameForPt	_PrsnNameForPt	Set<PrsnNameForPt>	D	PrsnNameForPt	1							
24	attr	ed	Person name	ed	PrsnNameForPt	PrsnNameForPt	D	CV			CWE					
25	attr	effective_dt	Person name	effective_dt	PrsnNameForPt	PrsnNameForPt	D	TS	0..1							
26	attr	nm	Person name	nm	PrsnNameForPt	PrsnNameForPt	D	PN								
27	attr	purpose_cd	Person name	purpose_cd	PrsnNameForPt	PrsnNameForPt	D	CV	0..1		CNE					
28	attr	termination_dt	Person name	termination_dt	PrsnNameForPt	PrsnNameForPt	D	TS	0..1							
29	attr	type_cd	Person name	type_cd	PrsnNameForPt	PrsnNameForPt	D	CV	0..1		CNE					
30	assoc	has	Patient	has_Set_Patient_billing_account	hasPtBillingAcctnt	Pt	N	Set<PtBillingAcctnt>	0..*							
31	item		Patient	_PtBillingAcctnt	_PtBillingAcctnt	Set<PtBillingAcctnt>	D	PtBillingAcctnt	1							
32	attr	account_id	Patient billing account	account_id	PtBillingAcctnt	PtBillingAcctnt	D	II	0..1							
33	attr	billing_status_cd	Patient billing account	billing_status_cd	PtBillingAcctnt	PtBillingAcctnt	D	CV	0..1		CNE					
34	attr	patient financial class_cd	Patient billing account	patient financial class_cd	finclClass	PtBillingAcctnt	D	CV	0..1		CNE					
35	attr	price_schedule_id	Patient billing account	price_schedule_id	priceSchedId	PtBillingAcctnt	D	II	0..1							
36	assoc	has_a_primary_provider	Patient	has_a_primary_provider_Individual_healthcare_practitioner	hasAPrimryProvdrlIHCP	Pt	N	IHCP	0..1							
37	attr	specialty_cd	Healthcare_service_provider	specialty_cd	IHCP	IHCP	D	CV	0..1		CNE					
38	attr	id	Healthcare_service_provider	id	IHCP	IHCP	D	II								
39	attr	practitioner_type_cd	Healthcare_service_provider	practitioner_type_cd	IHCP	IHCP	D	CV	0..1		CNE					
40	attr	residency_field_cd	Healthcare_service_provider	residency_field_cd	resdncyField	IHCP	D	CV	0..1		CNE					
41	assoc	is_role_of	Healthcare_service_provider	is_role_of_Person_as_IHCP	isRoleOfPersnAsIHCP	IHCP	N	PersnAsIHCP	1..1							
42	attr	addr	Stakeholder	addr	PersnAsIHCP	PersnAsIHCP	D	AD								
43	attr	id	Stakeholder	id	PersnAsIHCP	PersnAsIHCP	D	SET-<II>								
44	attr	phon	Stakeholder	phon	PersnAsIHCP	PersnAsIHCP	D	TEL								
45	attr	type_cd	Stakeholder	type_cd	PersnAsIHCP	PersnAsIHCP	D	CV	0..1		CNE					
46	assoc	has	Person	has_Person_name_for_IHCP	hasPrsnNameForIHCP	PersnAsIHCP	N	PrsnNameForIHCP	1							
47	attr	ed	Person_name	ed	PrsnNameForIHCP	PrsnNameForIHCP	D	CV			CWE					
48	attr	effective_dt	Person_name	effective_dt	PrsnNameForIHCP	PrsnNameForIHCP	D	TS	0..1							
49	attr	nm	Person_name	nm	PrsnNameForIHCP	PrsnNameForIHCP	D	PN								

HL7 MESSAGE INTEROPERABILITY

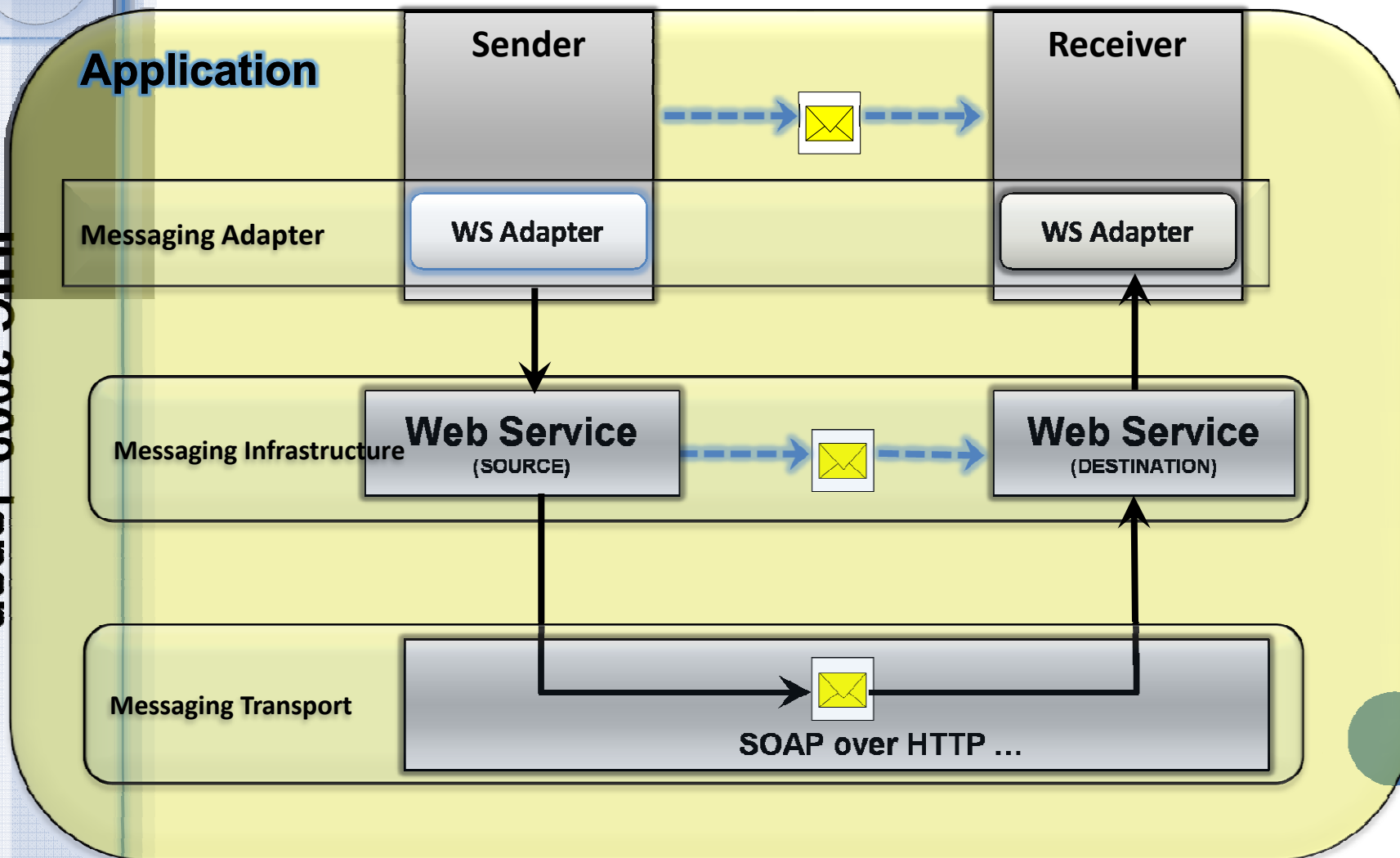


APPLICATION CATEGORY

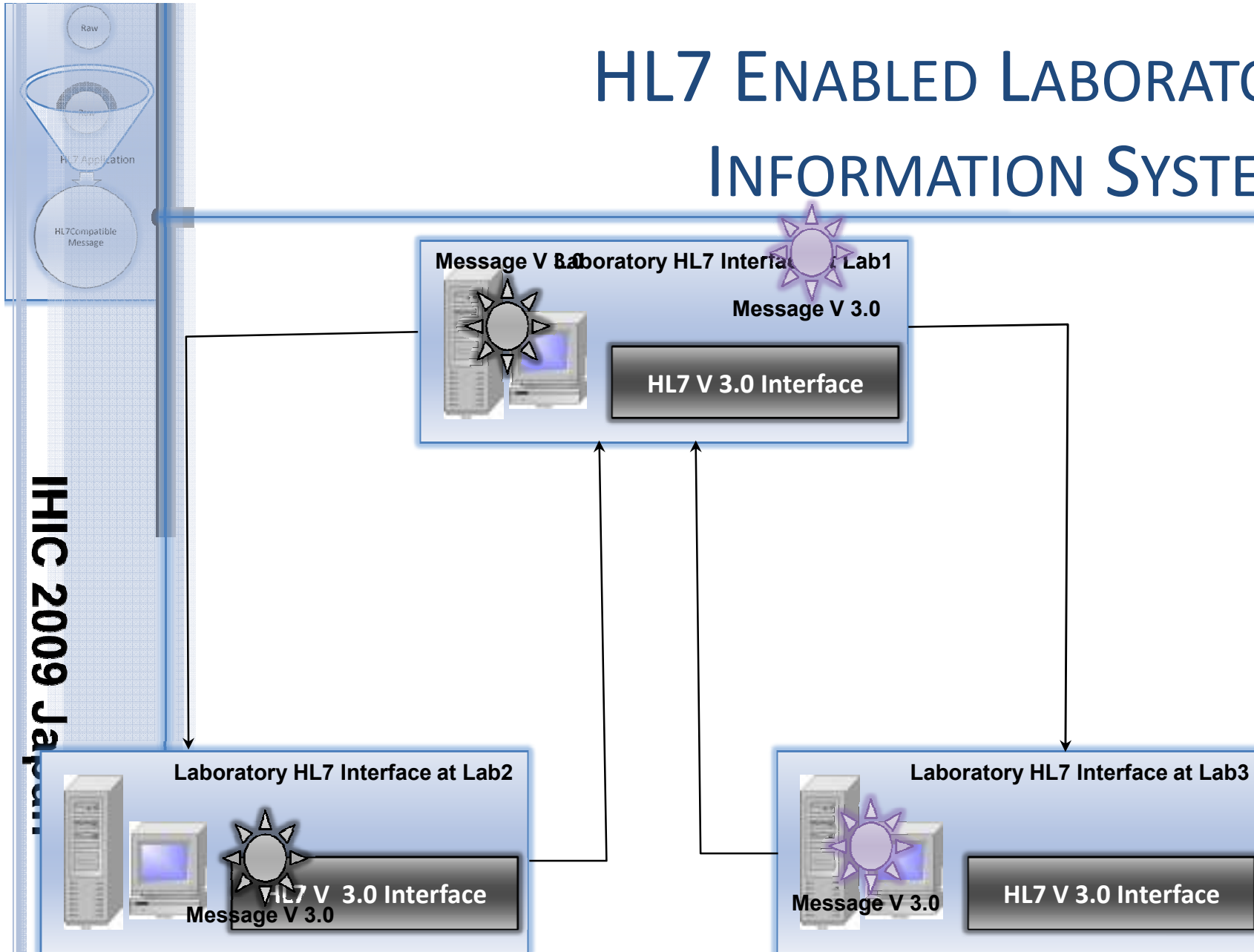
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HL7 MESSAGE TRANSPORTATION



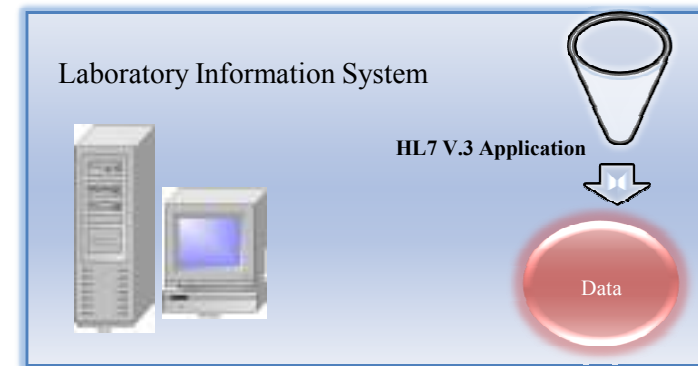
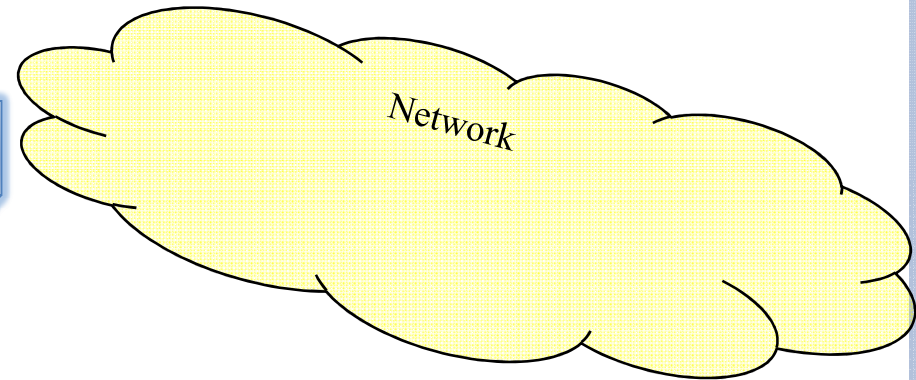
HL7 ENABLED LABORATORY INFORMATION SYSTEMS



HL7 Application as middleware

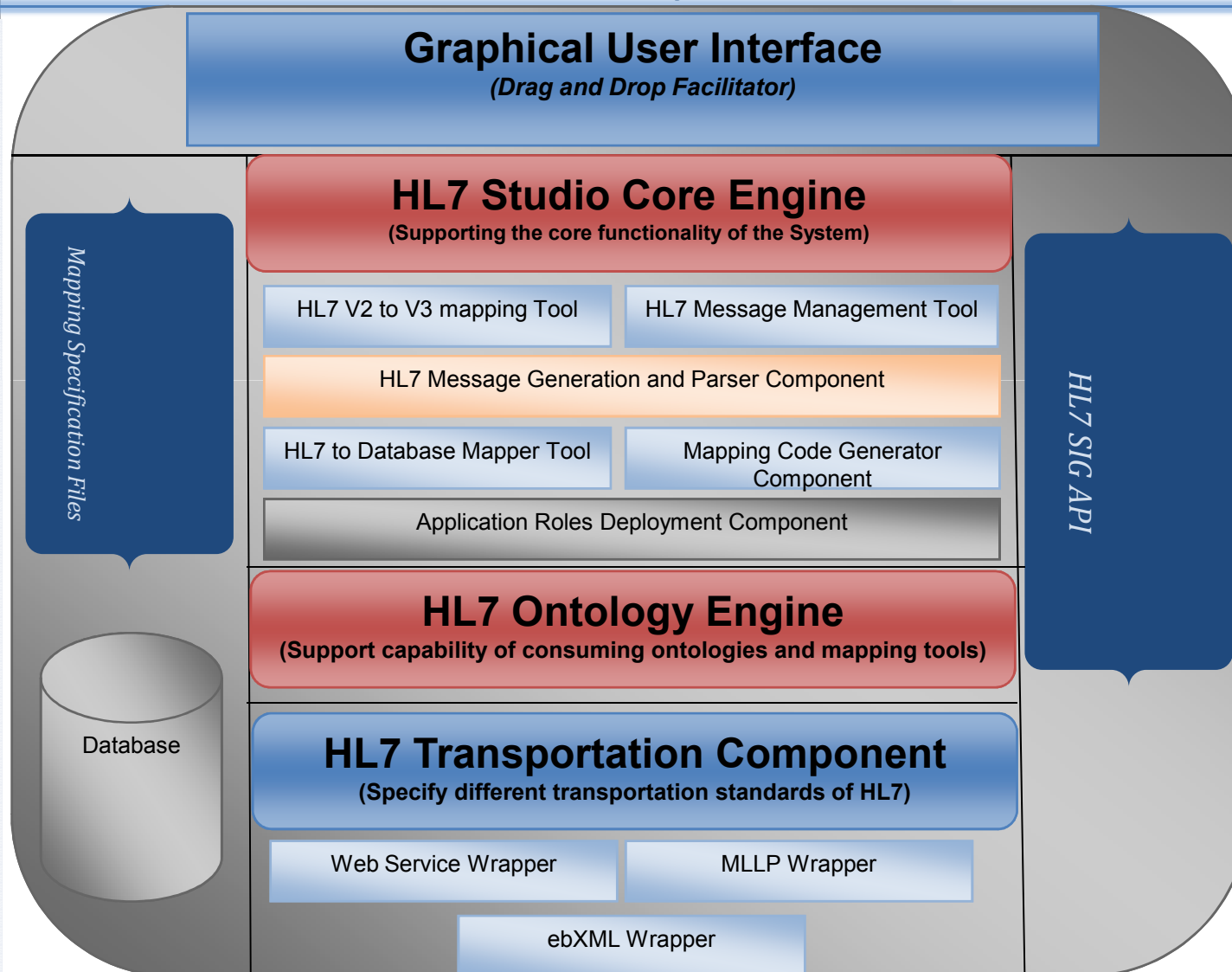


**HL7
Message**

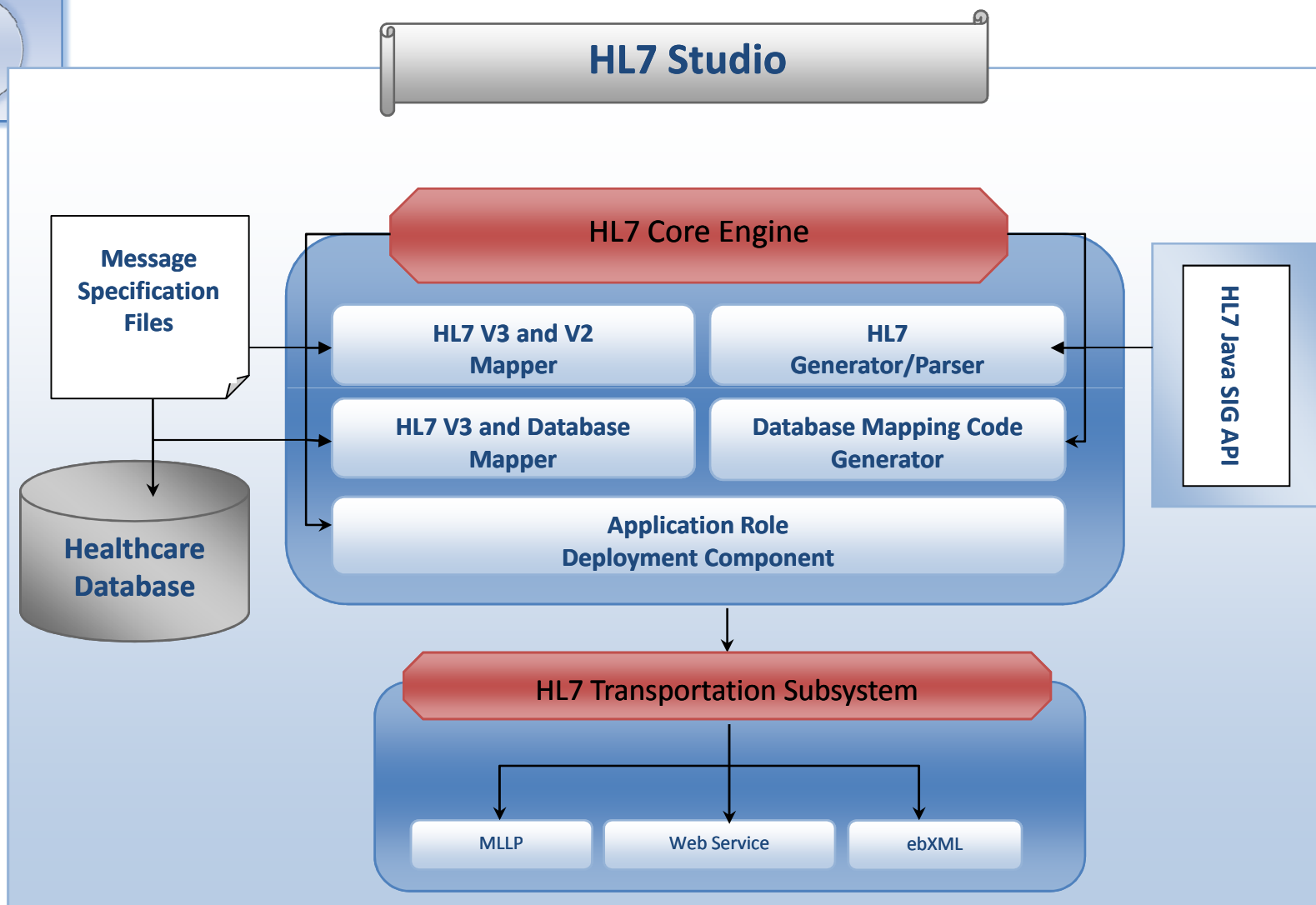


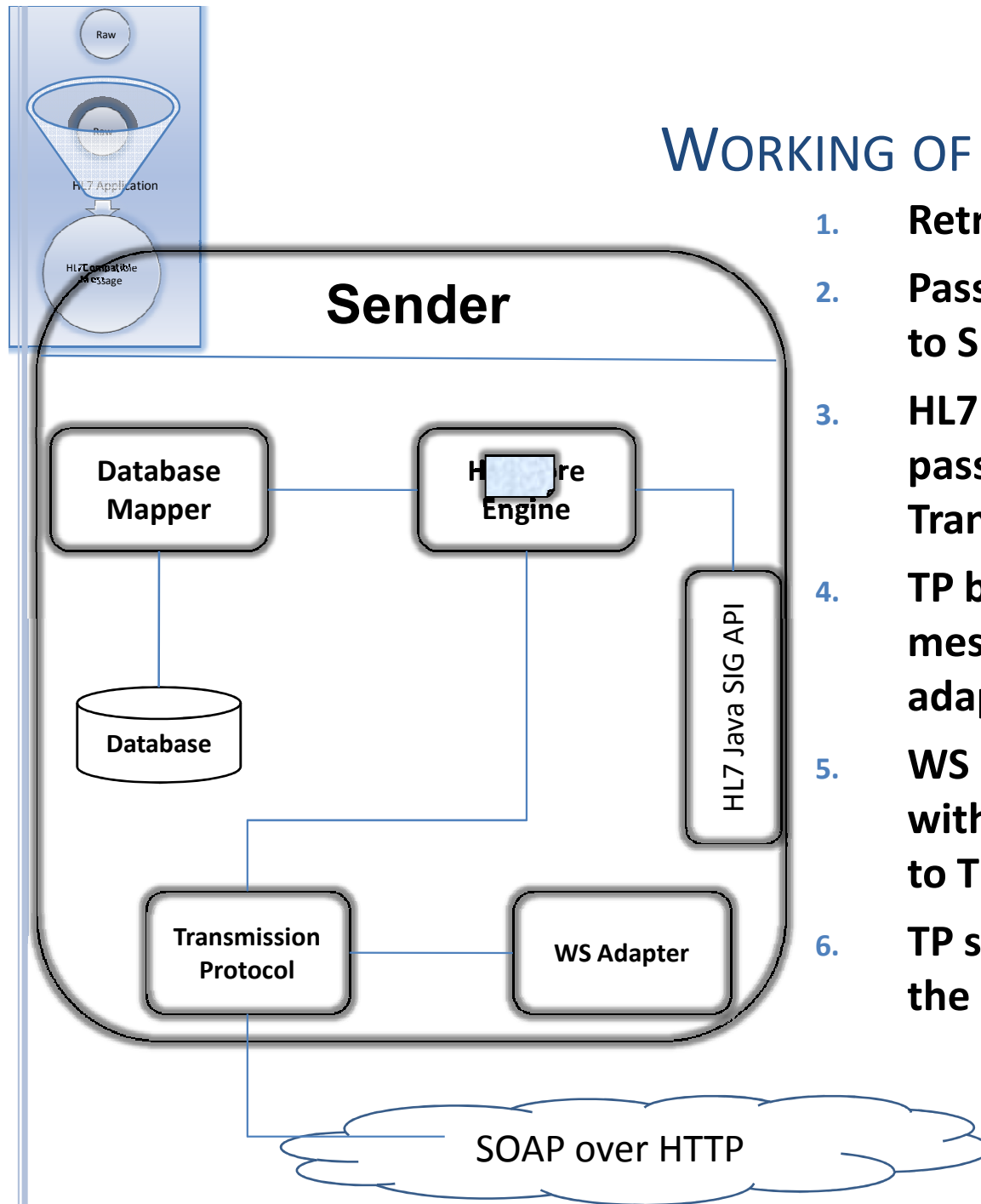
HL7 application will act as middleware used in same way for other Healthcare Systems.

Proposed Architecture



PROJECT PHASE I: MODULES



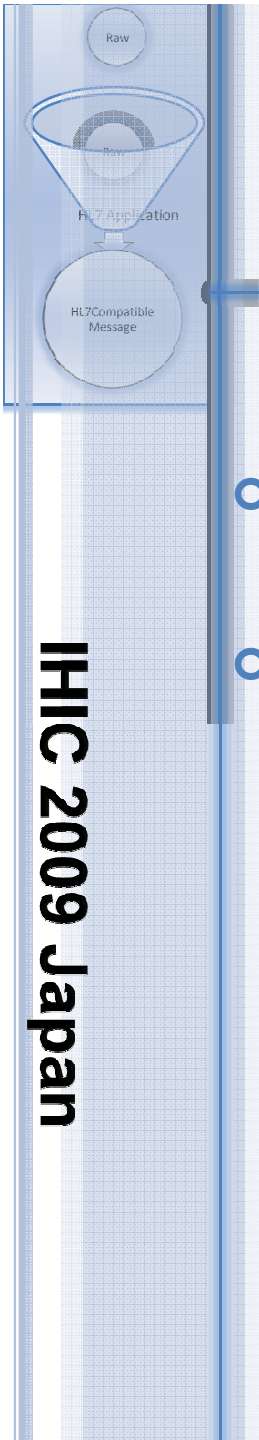


WORKING OF HL7 APPLICATION

1. Retrieve and Map the data
2. Pass the data and mapping criteria to SIG API and generate message.
3. HL7 CE Manage the interaction and pass the generated message to Transmission Protocol.
4. TP bind the control act wrappers to message and send it to Web Service adapter.
5. WS adapter wrap the HL7 message with SOAP packet and send back it to TP.
6. TP sends the HL7 SOAP message to the destination over or http.

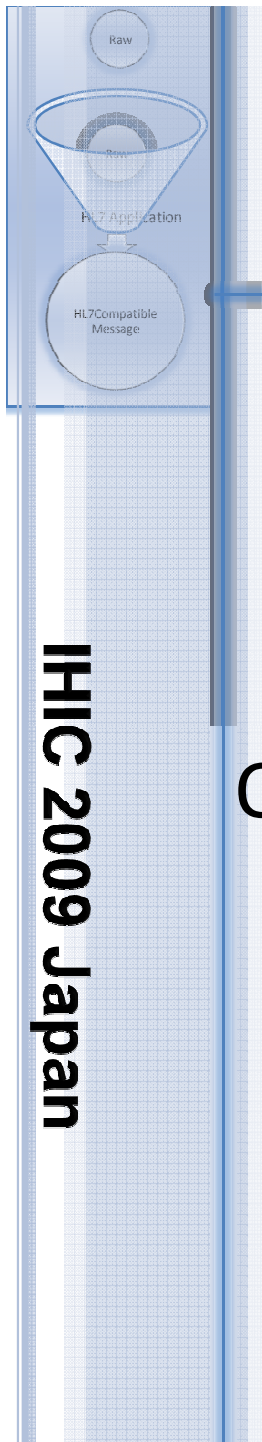
Conclusion

- HL7 has been achieved semantic interoperability through UML Reference Information Model.
- The purpose of our proposed architecture will be to develop an HL7 studio that can support,
 - Version 3 messaging
 - Version 2 to Version 3 conversion
 - Semantic HL7
 - SOA HL7



REFERENCES

- www.hl7.org
- HL7 Version 3 Guide
- www.ringlhom.com
- www.interfaceware.com
- HL7 Normative 2006
- Message Development Framework



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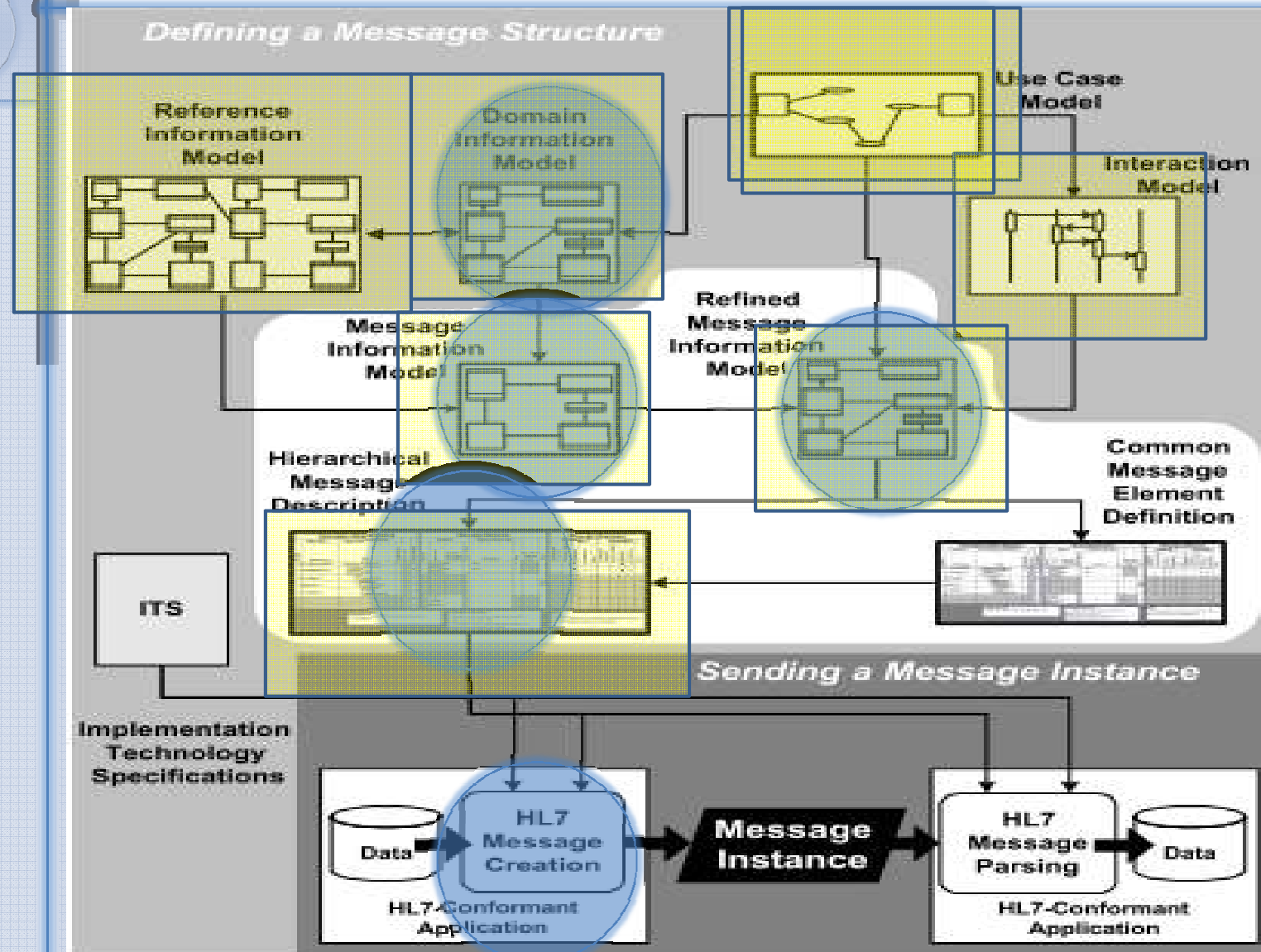
Thanks

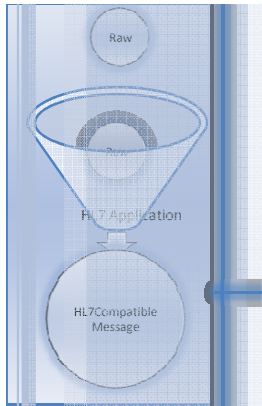
Question?



V 3.0 MESSAGE DERIVATION

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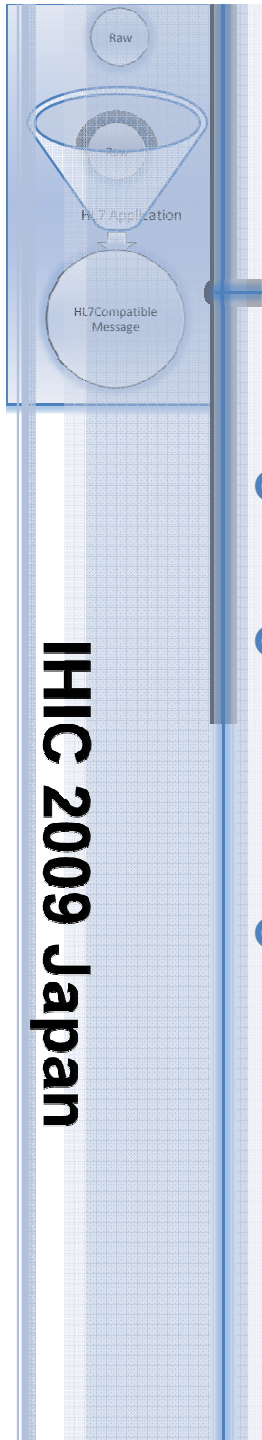




First: Message Information Model (MIM)

- MIM represent only those classes, attributes and association from RIM which are interest for specific *Set of Message Type*.
- Consider Example of Patient Encounter
 - RIM consist of more than 100 classes
 - We will only select those classes that can carry information for Patient Encounter message





Second: Refined Message Information Model (RMIM)

- RMIM is refined MIM which specify semantic constraint on group of message type.
- RMIM is valuable when distinct view of object is created from same class, message may contain more than one Person like as patient or next of kin or practitioner.
- Example, consider RMIM for Patient Encounter



Third: HMD

- HMD is tabular representation specifying all necessary information elements to be send in message.
- R-MIM is traversed and mapped classes, association and attributes to the rows of HMD.
- To start with the first class is called root.
- When HMD is converted to XML, all the other elements are nested under root class.

