卫生部电子病历委员会临床检验结果共享系统互操作性规范厂商培训研讨会，2007年10月18-19日，北京

HL7 V3 基础框架

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北京甲骨文软件有限公司(Oracle)

2007/10/18 9:30-10:50

主要内容

- HL7 V3 基础框架
- HL7 V3 实现技术规范（说明）
- Q&A

Healthcare Level 7 v3

Reference Information Model

Vocabulary

EIS

DataType

ITS

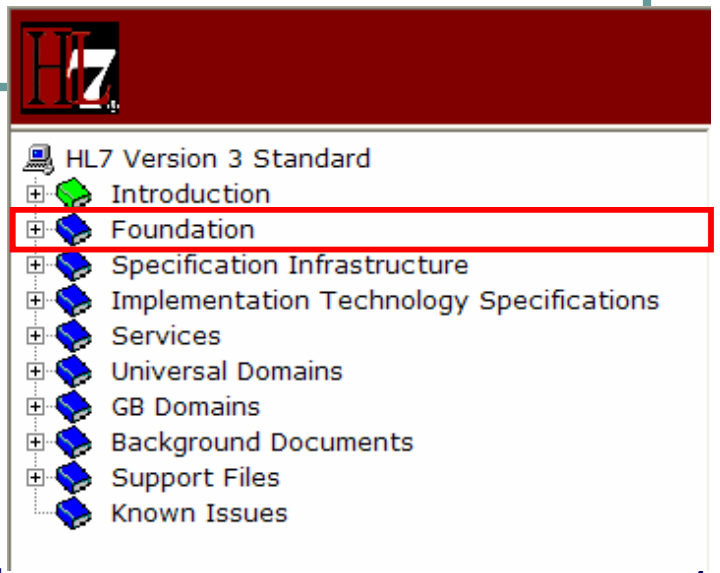
DSS

CTS

SOA/XML/UML

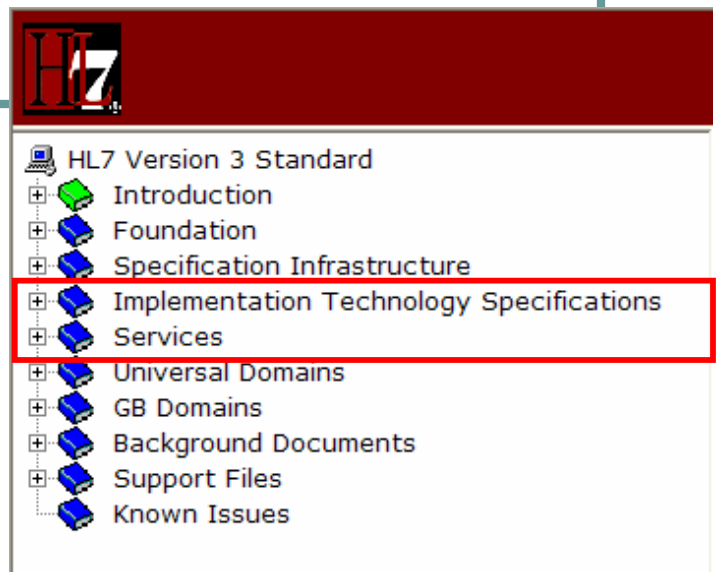
主要内容

- HL7 V3 基础框架
  - 基于语义的交互(Semantics)
  - HL7 V3基础(Foundation)
    - RIM, DataType, Vocabulary
    - CDA in HL7 V3
- HL7 V3 实现技术规范
- Q&A



主要内容

- HL7 V3 基础框架
- HL7 V3 实现技术规范（说明）
  - UML，XML
  - SOA4HL7
- Q&A



主要内容

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  - HL7 V3基础(Foundation)
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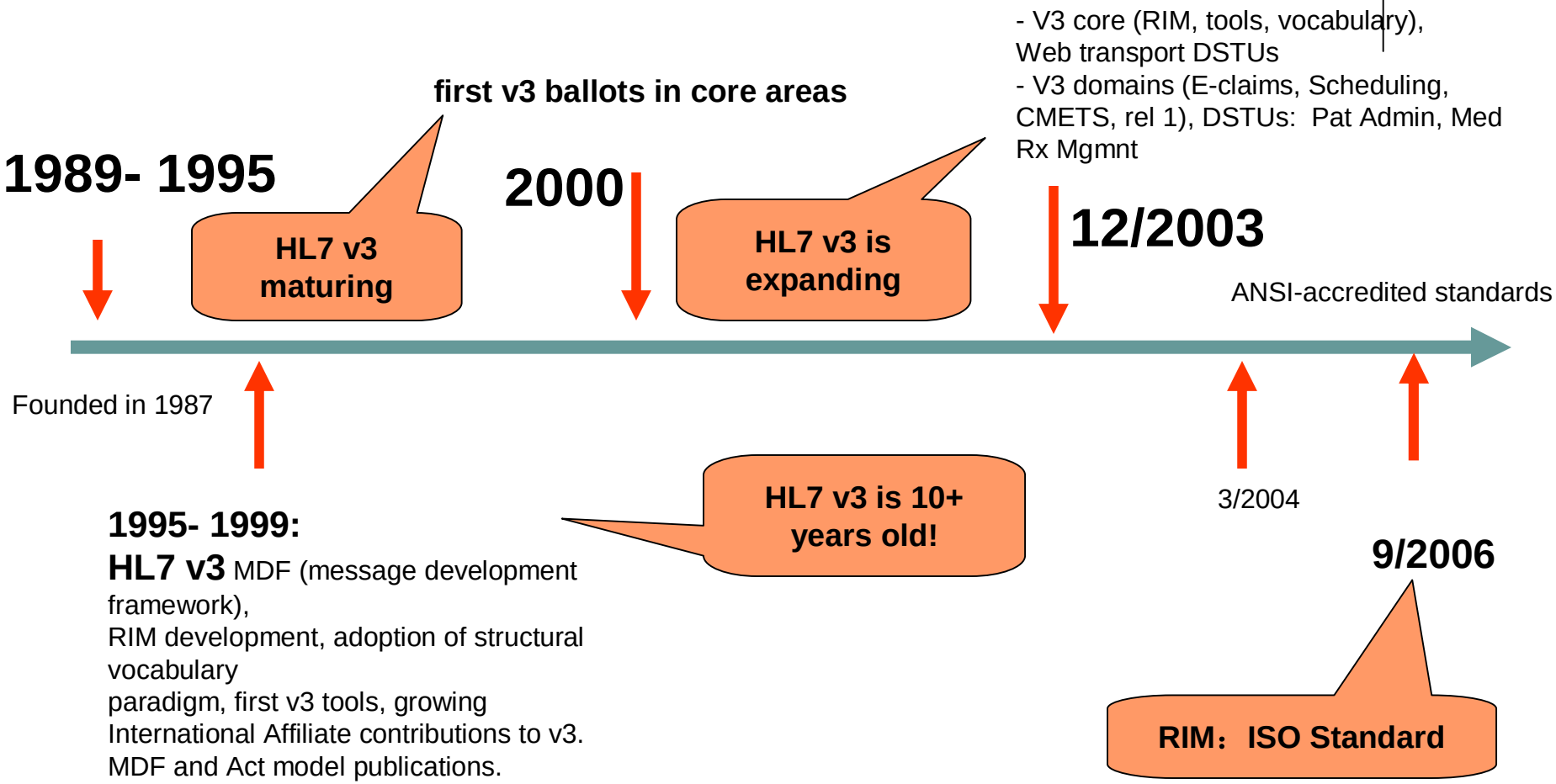
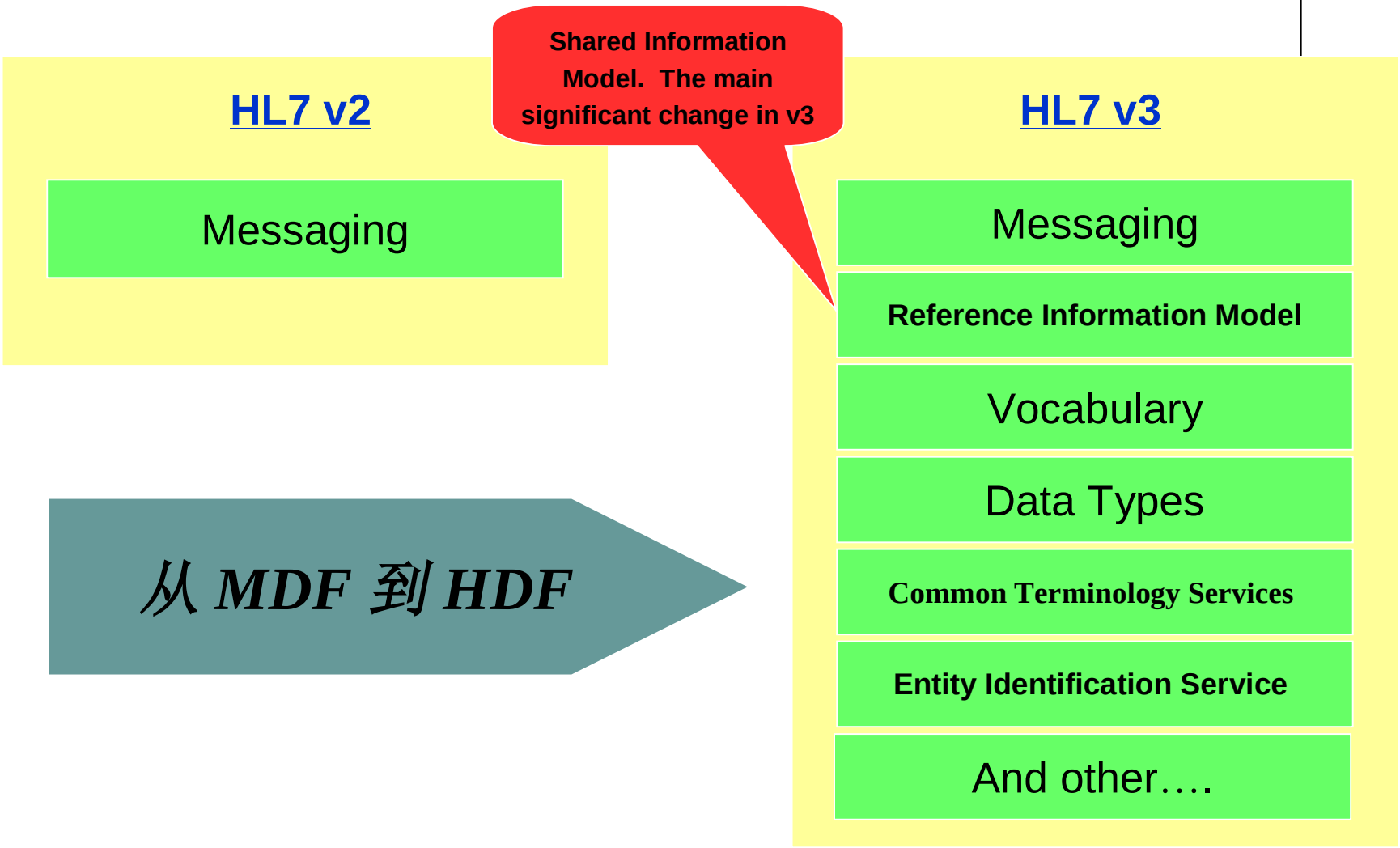
HL7 v3 发展历史


- V3 core (RIM, tools, vocabulary), Web transport DSTUs
- V3 domains (E-claims, Scheduling, CMETS, rel 1), DSTUs: Pat Admin, Med Rx Mgmnt
first v3 ballots in core areas
1989- 1995
2000
12/2003
HL7 v3 maturing
HL7 v3 is expanding
ANSI-accredited standards
Founded in 1987
1995- 1999:
HL7 v3 MDF (message development framework),
RIM development, adoption of structural vocabulary
paradigm, first v3 tools, growing International Affiliate contributions to v3.
MDF and Act model publications.
HL7 v3 is 10+ years old!
3/2004
9/2006
RIM：ISO Standard

HL7 v2 Vs. HL7 v3



语法 (Syntax) vs语义(Semantics)

- The dog eats red meat.
- The dog drinks blue trees.

- Give the patient pain medication.
- Give the patient medication for pain.

- Time flies like an arrow.
- Fruit flies like a banana.

语法 (Syntax) vs语义(Semantics)

- Syntax **à** *structure*
  - HL7 v2.x message
  - X12 message
  - XML document
- Semantics **à** *meaning*
  - ICD / CPT / SNOMED-CT code sets
  - HL7 v3 message

互操作性 (Interoperability)

Main Entry: **in·ter·op·er·a·bil·i·ty**

: ability of a system ... to use the parts or equipment of another system

Source: Merriam-Webster web site

interoperability

: ability of two or more systems or components to exchange information and to *predictably* use the information that has been exchanged.

Source: IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries, IEEE, 1990]

Syntactic interoperability

Systems recognize the structure of the data

Semantic interoperability

Systems understand the meaning of the information

HL7 v2 和HL7 v3 消息

HL7 V2 Message：

```
MSH|^~\&|REG|TGH|LAB|TML|200502151126||ADT^A01|M12345|P|2.5|<cr>
EVN|A01|200502151126|<cr>
PID|1||PATID1234^5^M11||FORBES^JAMES^H||19670329|M||C|
1200 ELM STREET^^TORONTO^ON^M5G1Z6|GL| (416)555-
1212|(416)555-3434||S||X45 ^2^M10|123456789|987654^ON|<cr>
NK1|1|FORBES^SADIE^K|WIFE||||CP^Contact person|<cr>
PV1|1|I|0^2012^01|E||||004777^LEBAUER^SARA^J.||TRMA||||A
DM|A0|<cr>
```

HL7 v2 和HL7 v3 消息

HL7 V3 Message：

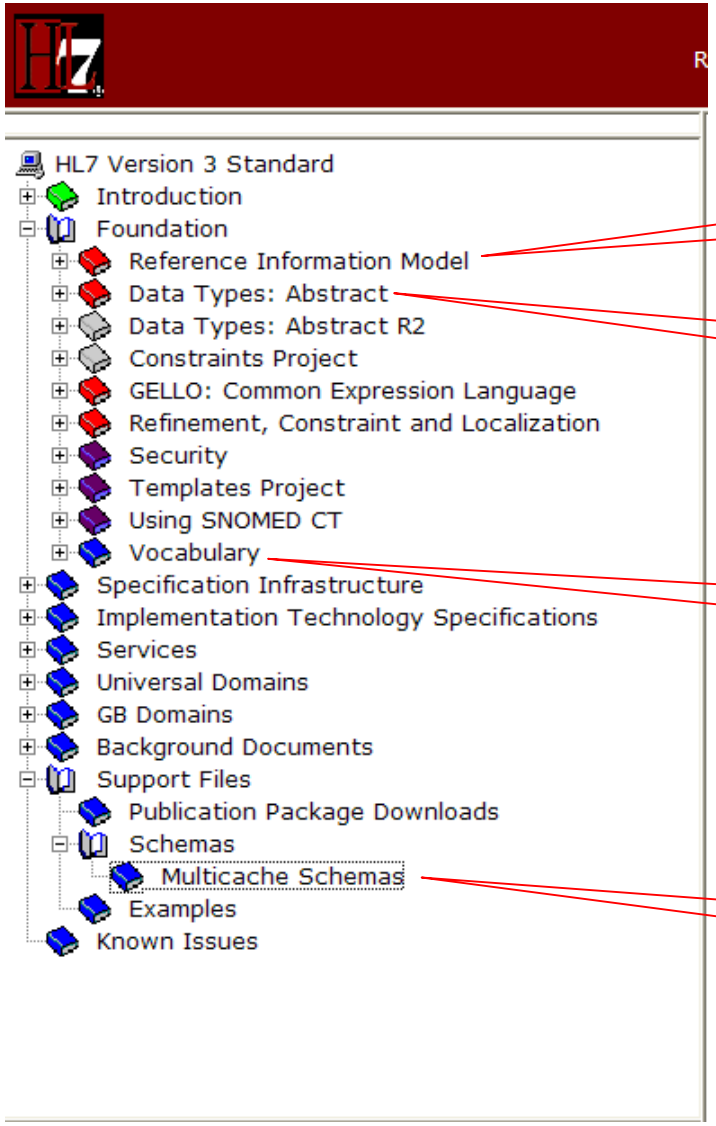
```
<PRPA_MT400001HT03.EncounterEvent moodCode="EVN" type="PatientEncounter" classCode="ENC">
    <id extension="ENC.P0001.1" root="10.301.3.10.0"/>
    <effectiveTime htb:dataType="IVL_TS" operator="I">
        <low value="200601101201"/>
        <high value="200602101202"/>
    </effectiveTime>
    <subject contextControlCode="OP" type="Participation" typeCode="SBJ">
        <Patient type="Patient" htb:association="role" classCode="PAT">
            <id extension="PAT.P0001" root="10.301.5.10"/>
            <Person type="Person" determinerCode="INSTANCE" htb:association="player" classCode="PSN">
                <id extension="PSN.P0001" root="10.301.1.10"/>
                <name use="L" htb:dataType="PN">
                    <family encoding="TXT" partType="FAM">萨达姆</family>
                </name>
                <telecom value="TEL:+86 10 21450001" use="H"/>
                <administrativeGenderCode code="1" codeSystemName="GenderCode_301"/>
                <birthTime value="198009101209"/>
                <addr use="H">
                    <postalCode encoding="TXT" partType="ZIP">X0001</postalCode>
                    <streetAddressLine encoding="TXT" partType="SAL">伊拉克</streetAddressLine>
                </addr>
                <raceCode code="2034-7" codeSystemName="Race"/>
        </Person>
        <Organization type="Organization" determinerCode="INSTANCE"  classCode="ORG">
                <id extension="ORG.OG.0004" root="10.301.1.20"/>
                </Organization>
        </Patient>
    </subject>
</PRPA_MT400001HT03.EncounterEvent>
```

语义交互的支柱

Necessary but *not* Sufficient

- Common model across all domains-of-interest: 通用信息模型
  - Concepts and relationships
  - Information model vs Data model
- Robust, formal Data Type Specification:数据类型
- Methodology for binding value sets to concept-based terminologies: 词汇库（**Vocabulary**）
- Formal process for defining interchange structures：消息结构

HL7 V3 基础



RIM:信息模型

Datatype:数据类型

Vocabulary:词汇库

消息结构定义

HL7 v3 RIM

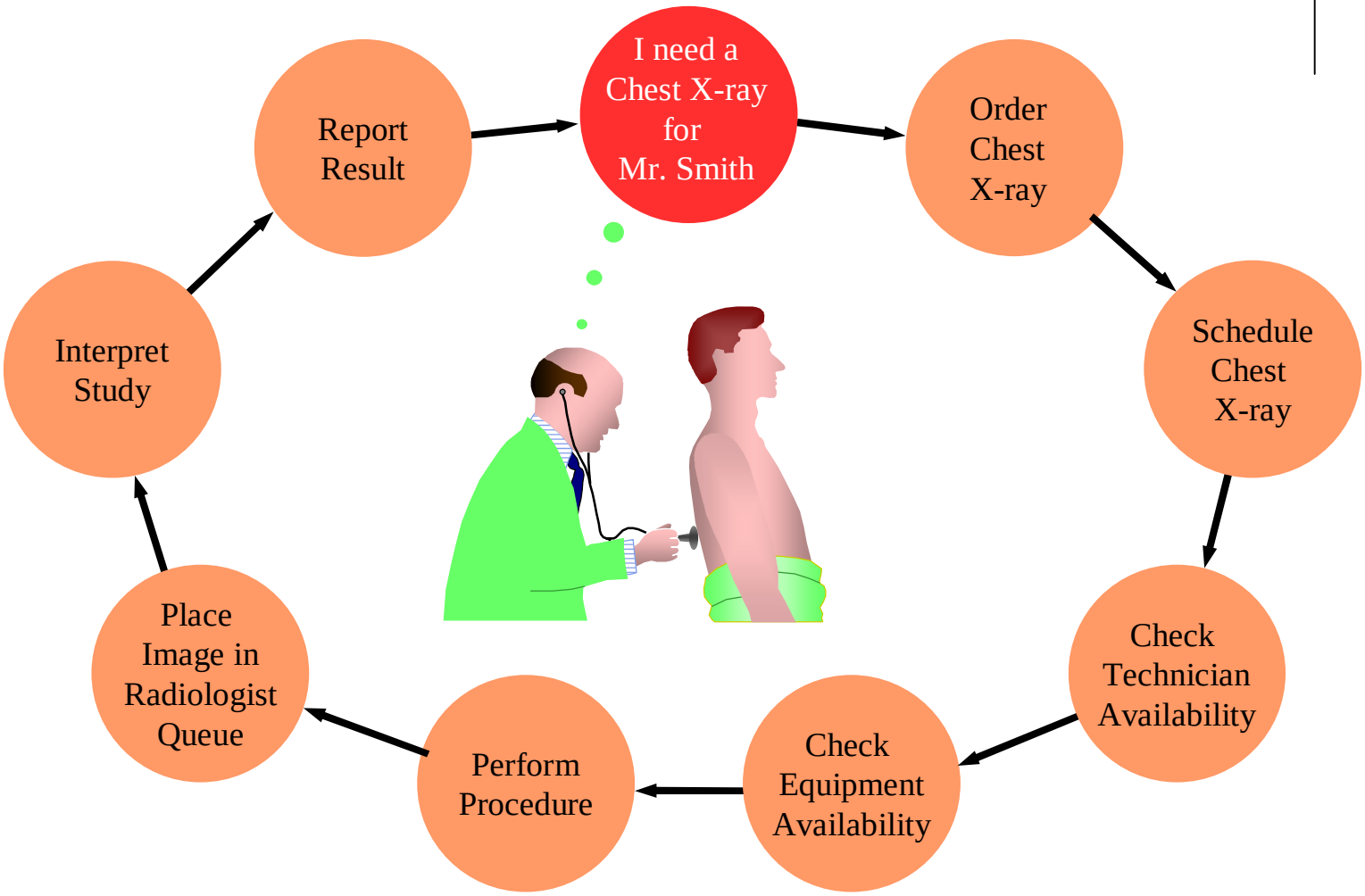
The HL7 RIM是一个成熟的关于医疗应用的信息模型

已被接纳为ISO标准 'ISO/HL7 21731:2006' 18 Sep 2006

HL7 RIM支持 interfaces and system design

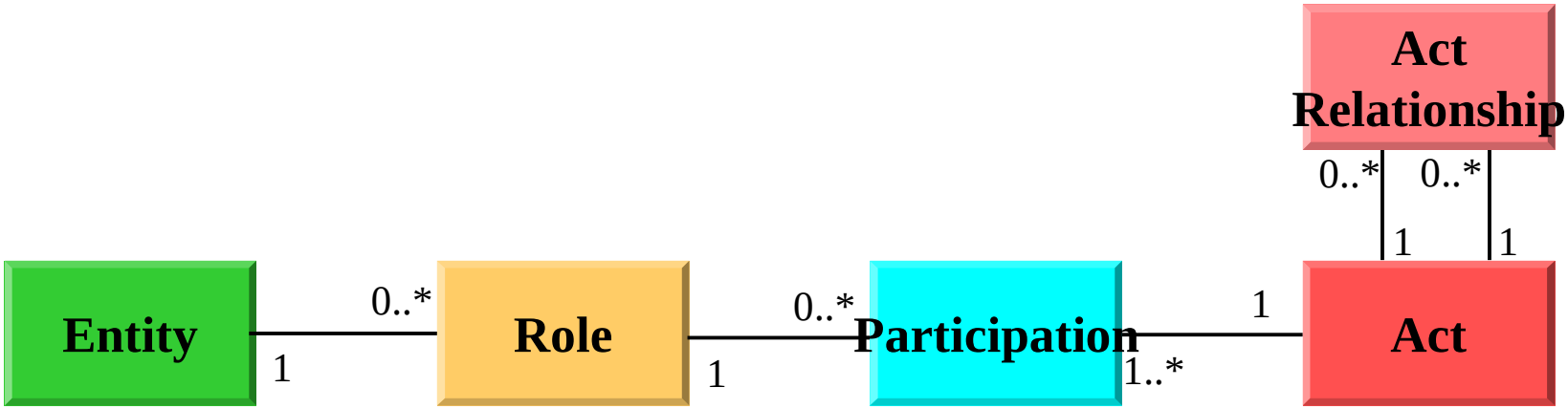
- 不仅仅为定义 messages 使用, 还支持 CDR/E.H.R. applications, Structured Documents, templates, rules, etc.
- 不仅仅涉及 clinical 还覆盖 patient administrative, financial, public health, genomics
- 不仅仅是一个 MDF (message development framework), 还是 HDF (health development framework)

医疗行为/事务


I need a Chest X-ray for Mr. Smith
Order Chest X-ray
Schedule Chest X-ray
Check Technician Availability
Check Equipment Availability
Perform Procedure
Place Image in Radiologist Queue
Interpret Study
Report Result

HL7 Version 3

参照信息模型 (*Reference Information Model)*



- Organization
- Place
- Person
- Living Subject
- Material

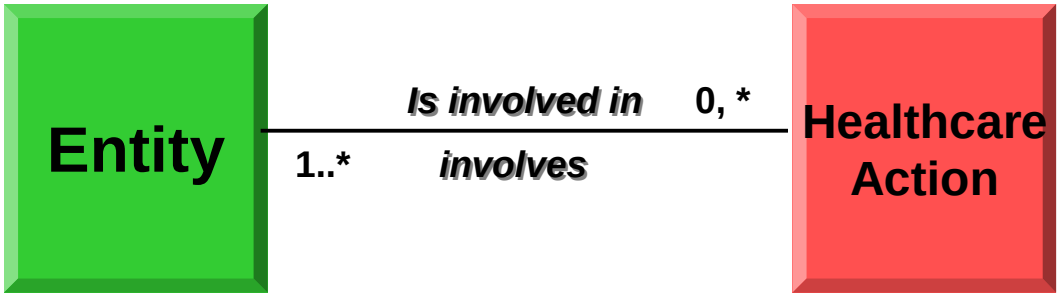
- Patient
- Member
- Healthcare facility
- Practitioner
- Practitioner assignment
- Specimen
- Location

- Author
- Reviewer
- Verifier
- Subject
- Target
- Tracker

- Referral
- Transportation
- Supply
- Procedure
- Consent
- Observation
- Medication
- Administrative act
- Financial act

医疗活动的基本信息结构

- 一个实体 (Person or Organization) 参与0到N个 医疗活动

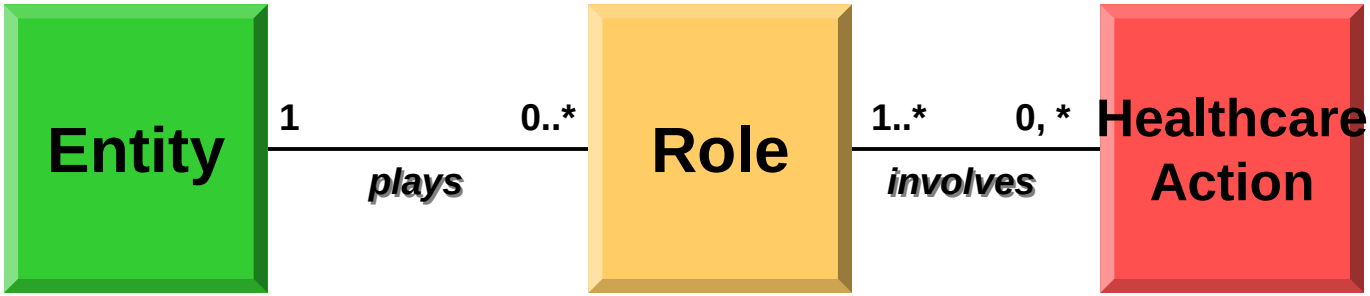


- 一个医疗活动涉及1到多个实体 (Persons or Organizations)

问题：如何判断这个人是一个医生还是一个病人？

医疗活动的基本信息结构

- 一个实体 (人或者组织) 在医疗活动中担当的角色（0..N）
- 一个实体 (人或者组织)担当特定的角色参与到医疗活动中（0..N）

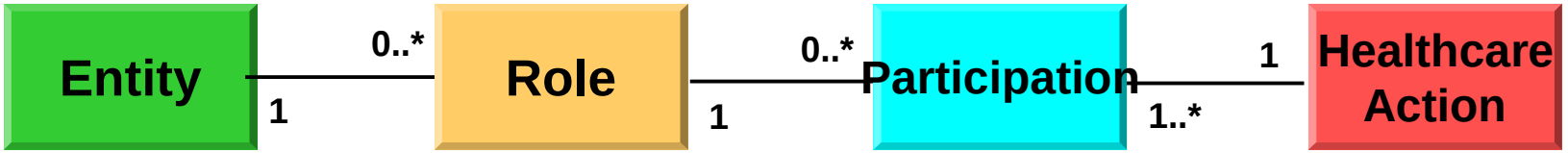


问题：如何表述一个医生在一个具体的医疗行为中所担任的具体的职责？比如：在一个手术中，他是主刀医生还是助手？

医疗活动的基本信息结构

- 一个实体 (人或者组织) 在医疗活动中担当的角色（0..N）

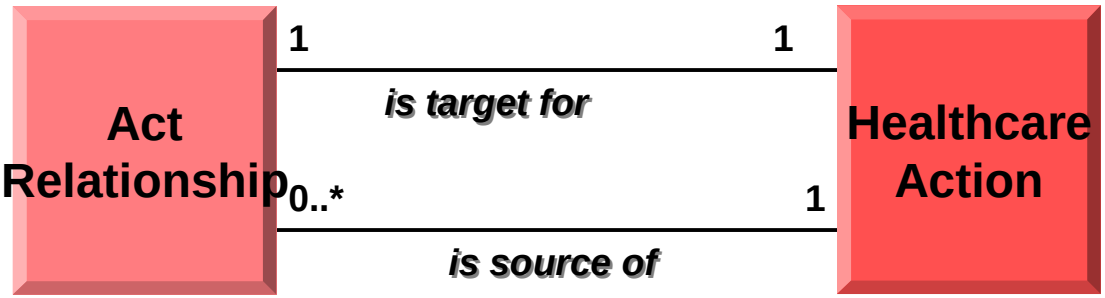
- 一个实体 (人或者组织)担当特定的角色承担特定的职责参与到具体的医疗活动中（0..N）



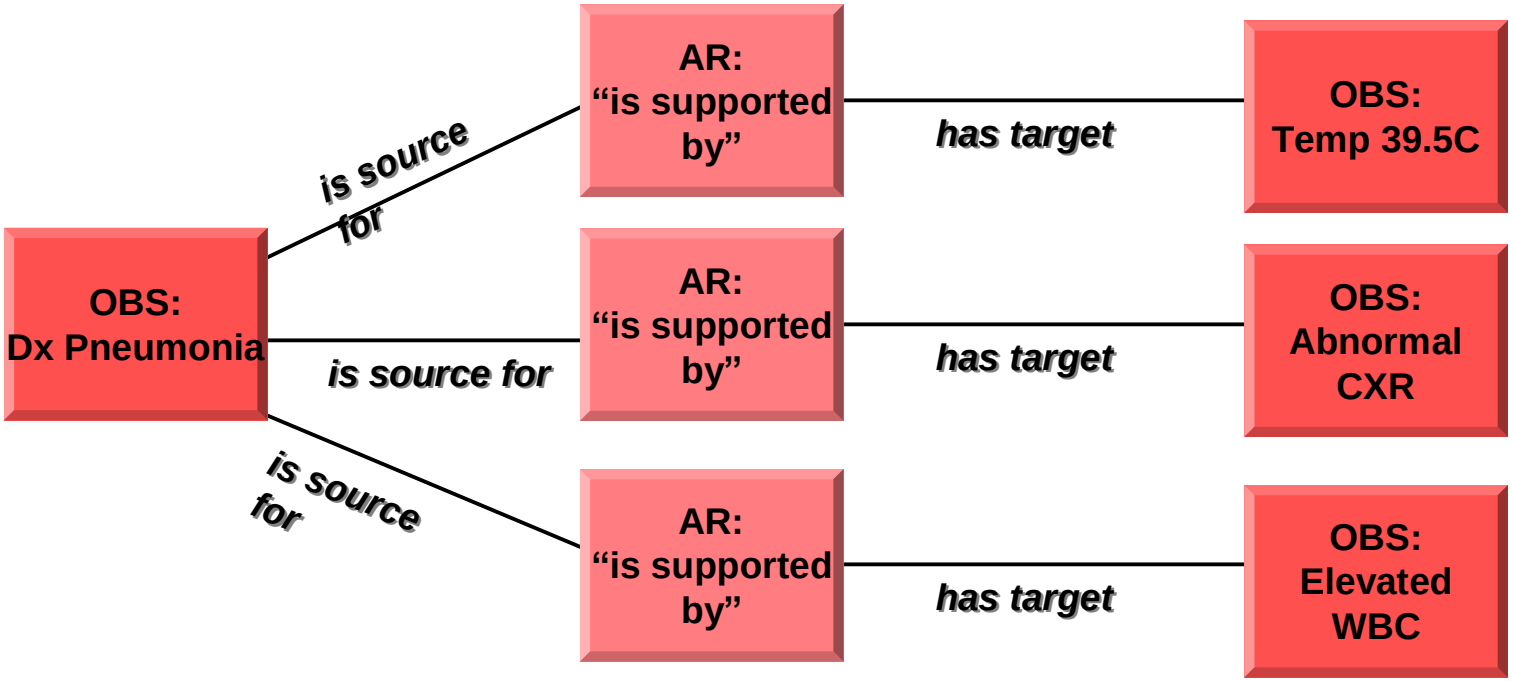
- 一个实体 (人或者组织)担当特定的角色承担特定的职责（0..N）

医疗活动的基本信息结构

ActRelationship 用来表示医疗活动/行为之间的关系（因果/组成/参照标准等等）

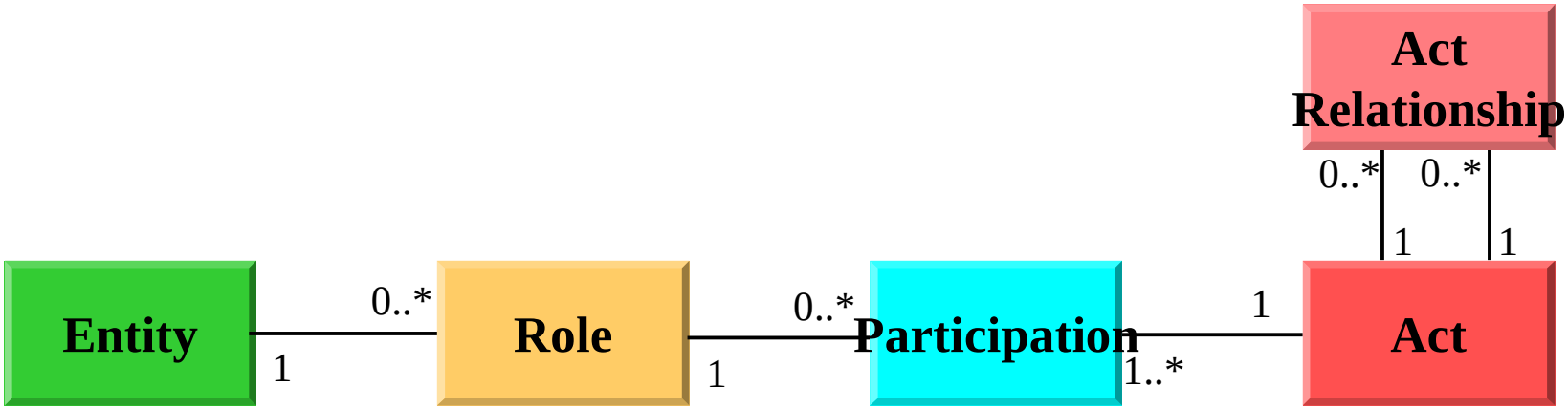


医疗活动的基本信息结构



HL7 Version 3

参照信息模型 (*Reference Information Model)*



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- Tracker

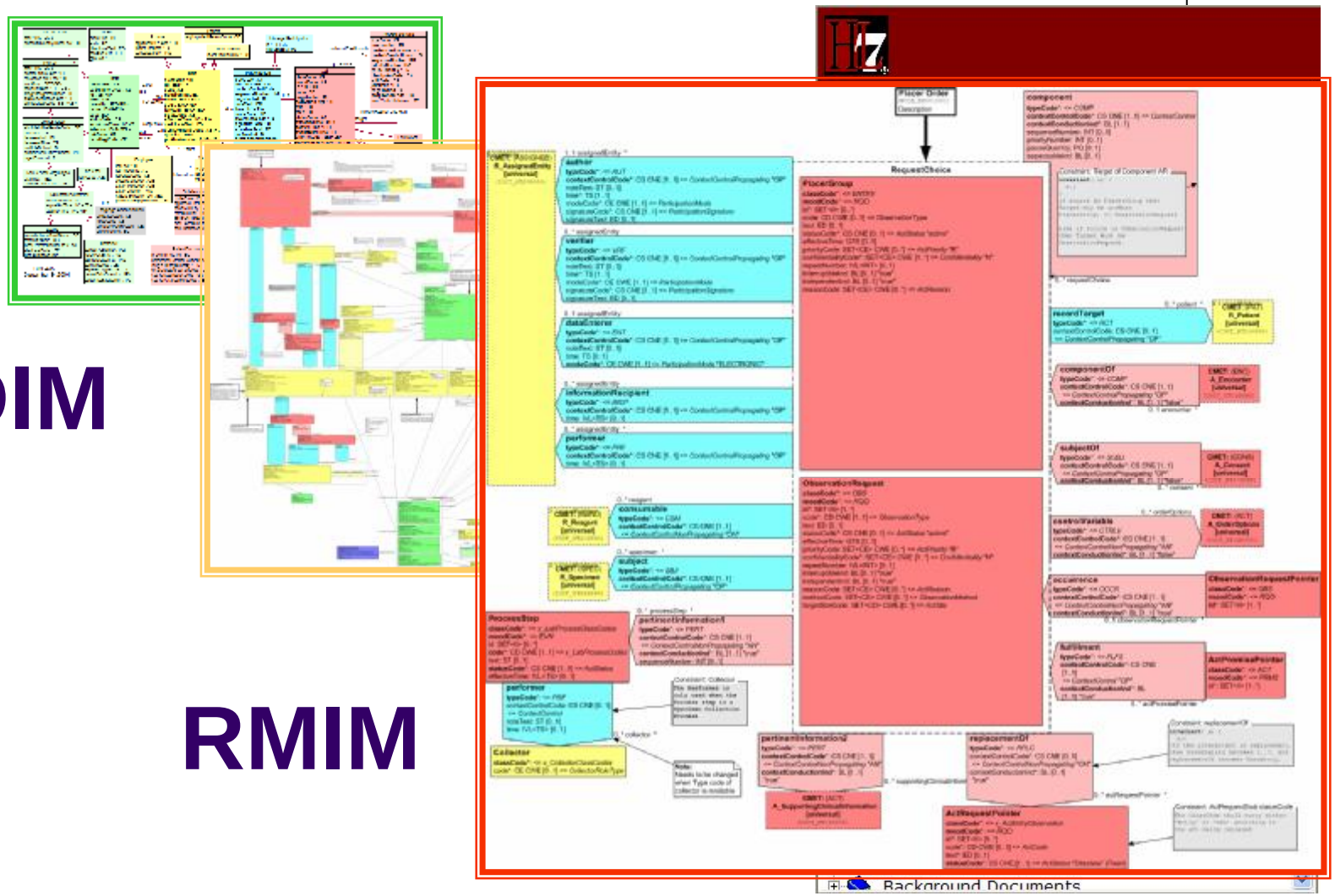
- Referral
- Transportation
- Supply
- Procedure
- Consent
- Observation
- Medication
- Administrative act
- Financial act

从 RIM à DIM à RMIM

RIM

DIM

RMIM



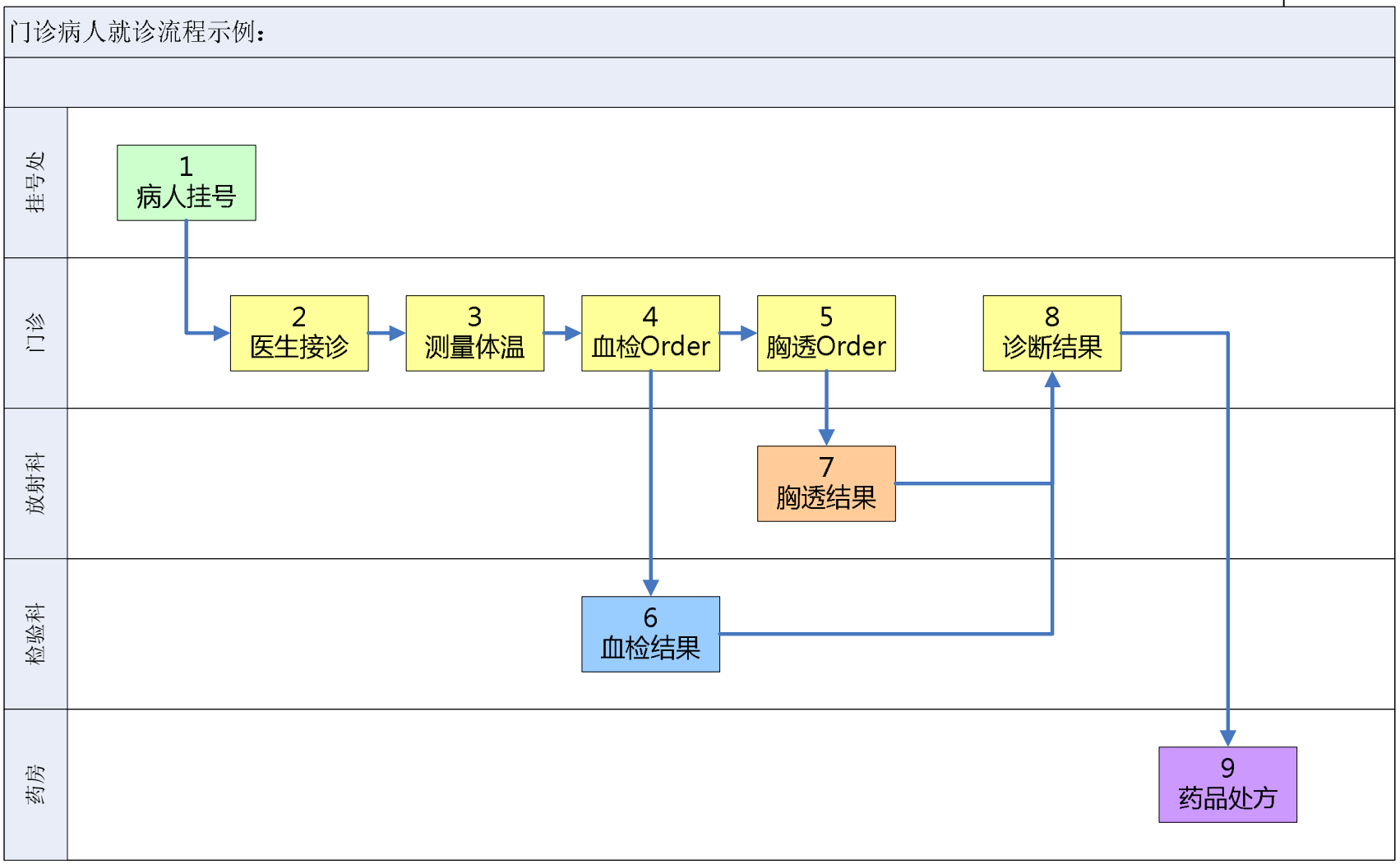
HL7 V3如何描述医疗事务？

基于 HL7 V3

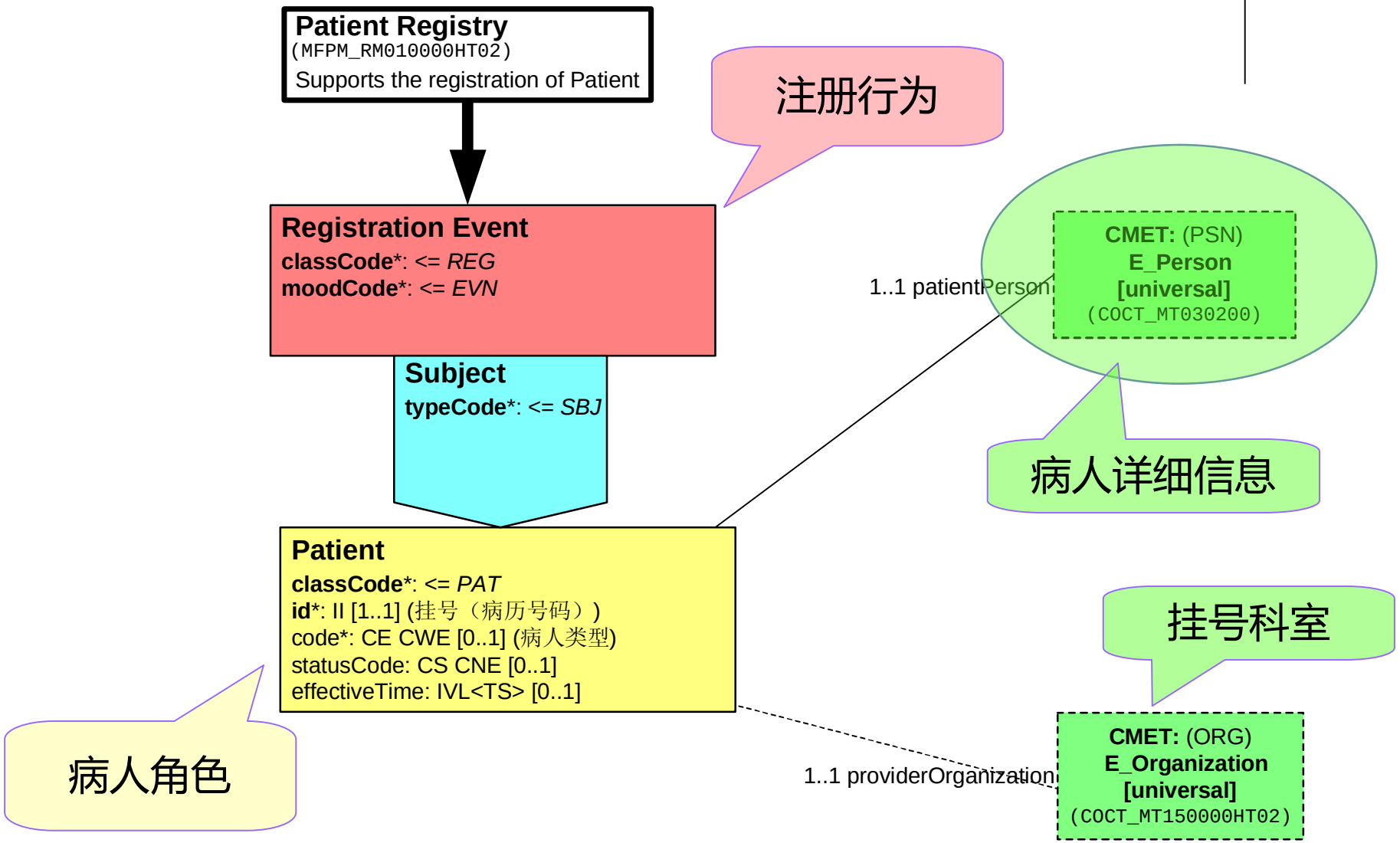
临床业务信息的描述

（门诊业务）

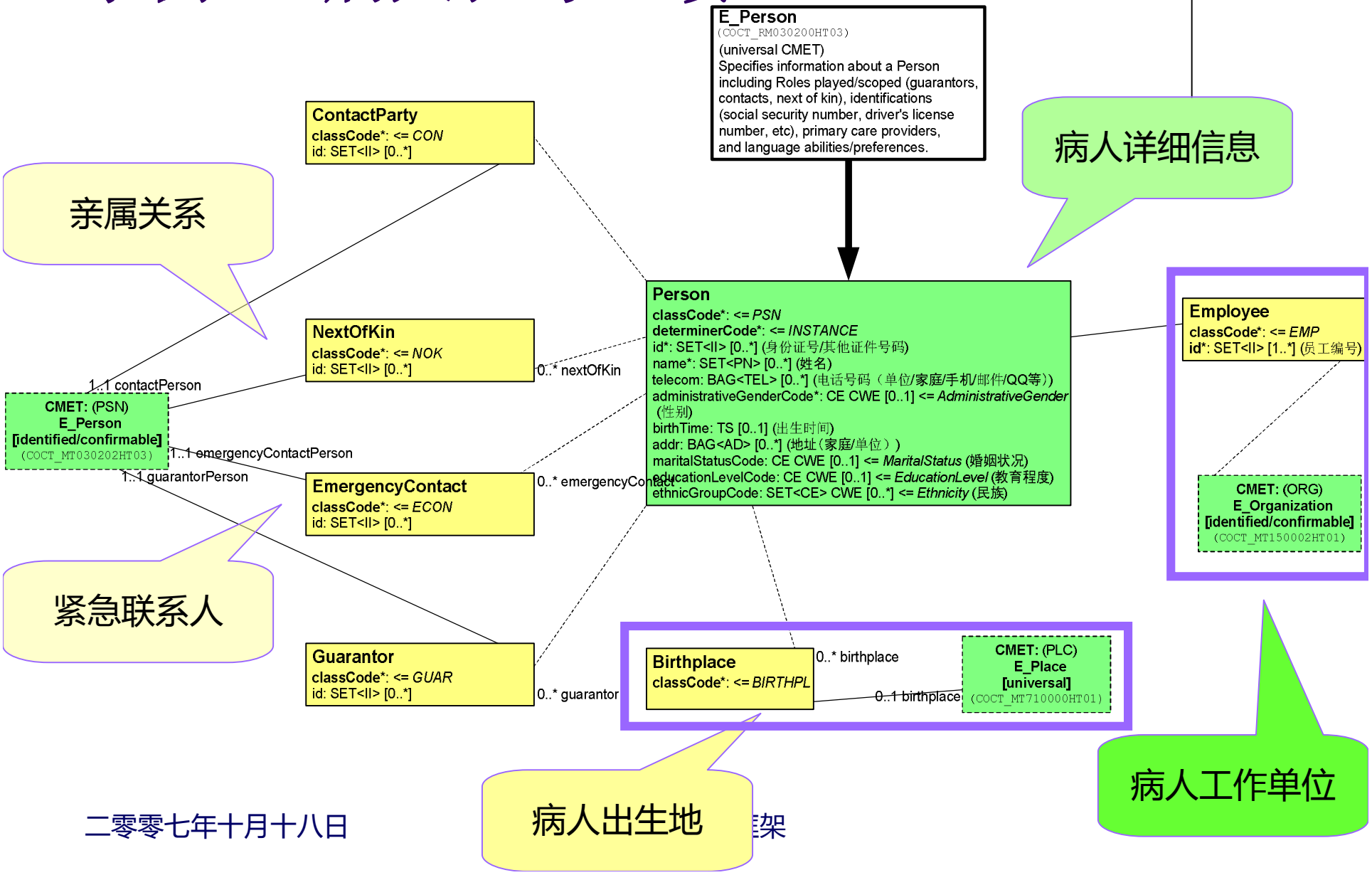
示例 (Scenario)


门诊病人就诊流程示例：
挂号处
门诊
放射科
检验科
药房
1
病人挂号
2
医生接诊
3
测量体温
4
血检Order
5
胸透Order
8
诊断结果
7
胸透结果
6
血检结果
9
药品处方

示例1：病人挂号

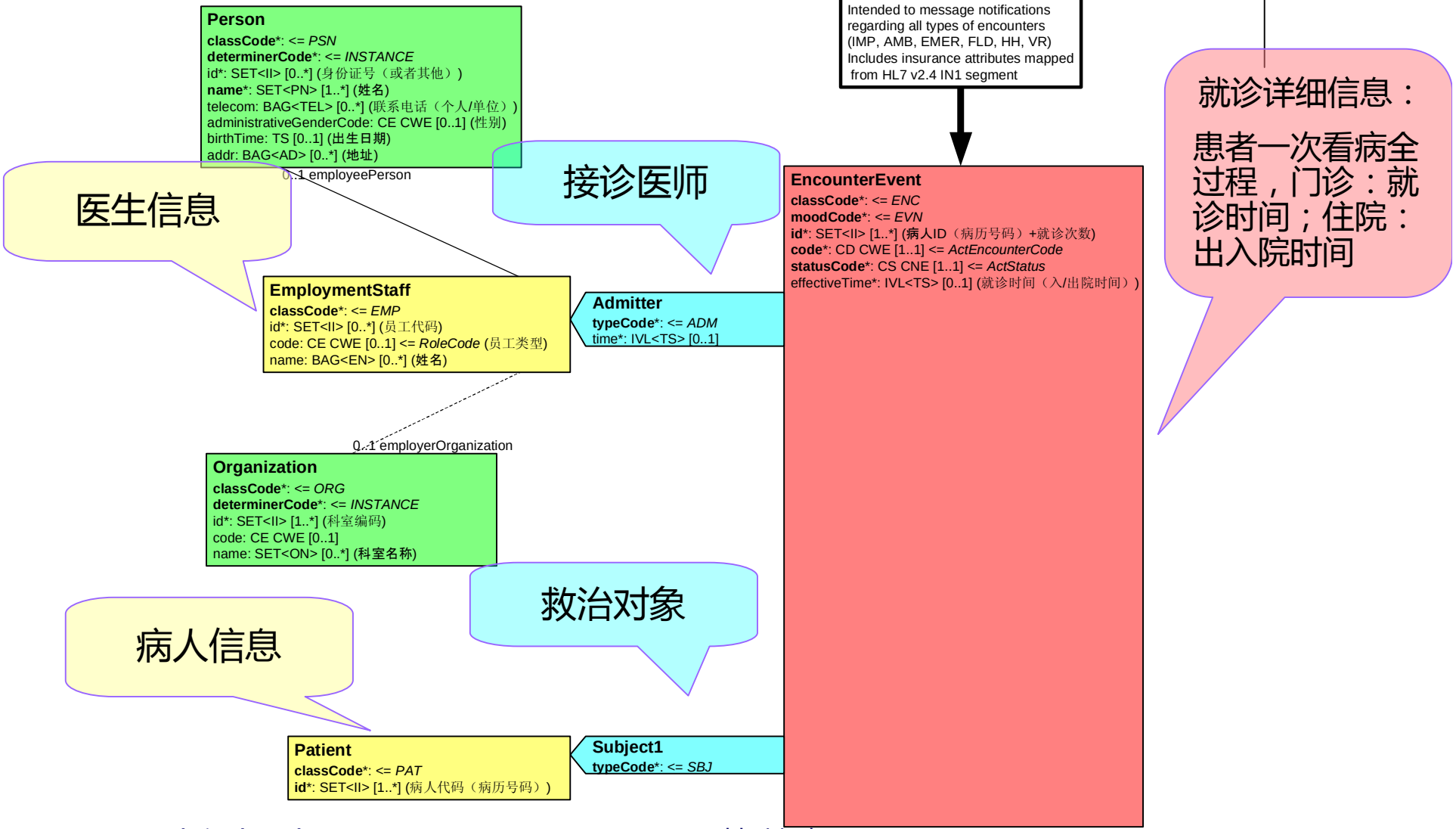

Patient Registry
(MFPM_RM010000HT02)
Supports the registration of Patient
注册行为
Registration Event
classCode*: <= REG
moodCode*: <= EVN
Subject
typeCode*: <= SBJ
1..1 patientPerson
CMET: (PSN)
E_Person
[universal]
(COCT_MT030200)
病人详细信息
Patient
classCode*: <= PAT
id*: II [1..1] (挂号（病历号码）)
code*: CE CWE [0..1] (病人类型)
statusCode: CS CNE [0..1]
effectiveTime: IVL<TS> [0..1]
挂号科室
病人角色
1..1 providerOrganization
CMET: (ORG)
E_Organization
[universal]
(COCT_MT150000HT02)

示例1：病人挂号（续）

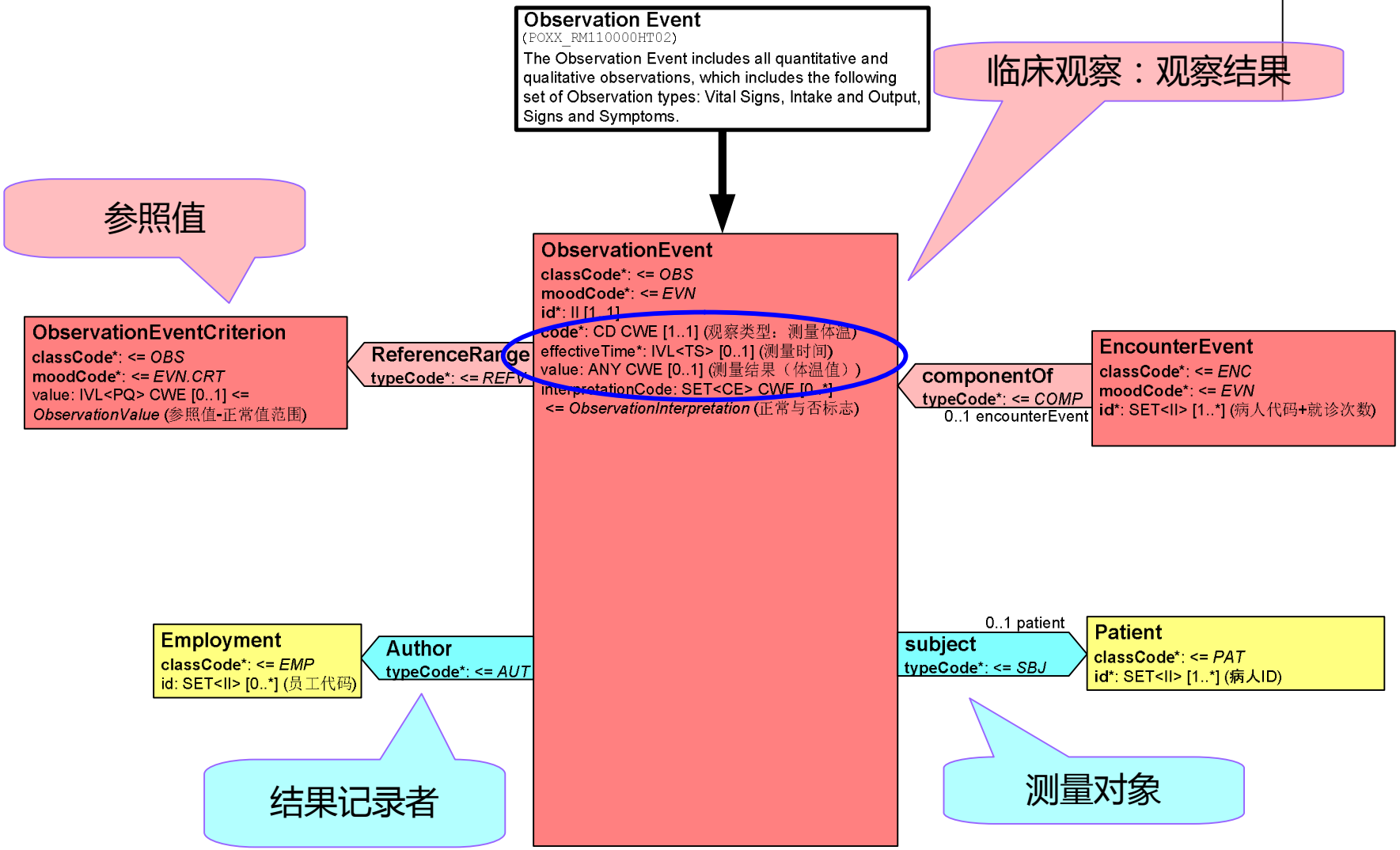


二零零七年十月十八日

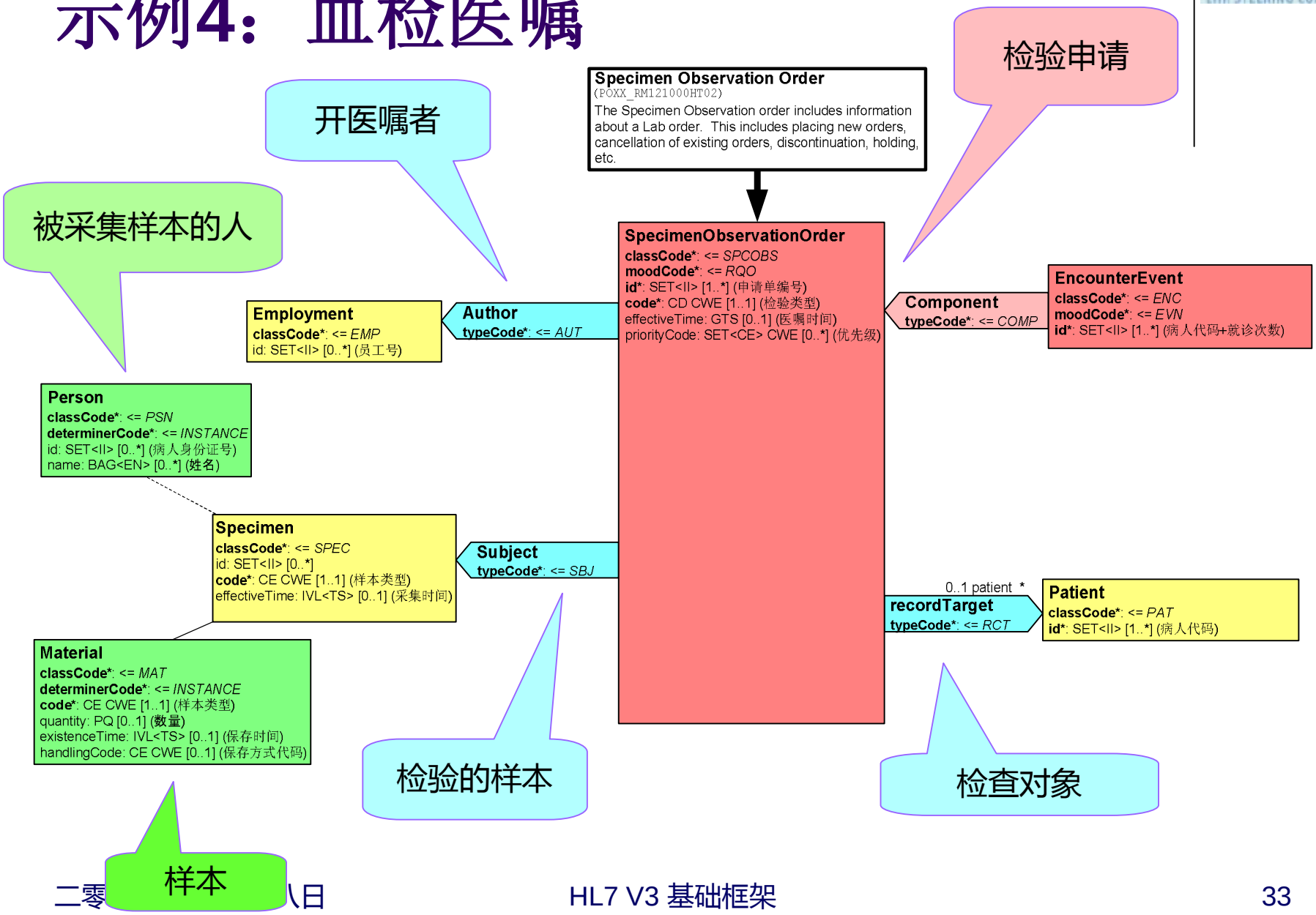
示例2：医生接诊


Encounter Event
(PRPA_RM400001HT03)
Patient Encounter in Event mood. Intended to message notifications regarding all types of encounters (IMP, AMB, EMER, FLD, HH, VR) Includes insurance attributes mapped from HL7 v2.4 IN1 segment
Person
classCode*: <= PSN
determinerCode*: <= INSTANCE
id*: SET<II> [0..*] (身份证号（或者其他）)
name*: SET<PN> [1..*] (姓名)
telecom: BAG<TEL> [0..*] (联系电话（个人/单位）)
administrativeGenderCode: CE CWE [0..1] (性别)
birthTime: TS [0..1] (出生日期)
addr: BAG<AD> [0..*] (地址)
0..1 employeePerson
医生信息
接诊医师
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
id*: SET<II> [1..*] (病人ID（病历号码）+就诊次数)
code*: CD CWE [1..1] <= ActEncounterCode
statusCode*: CS CNE [1..1] <= ActStatus
effectiveTime*: IVL<TS> [0..1] (就诊时间（入/出院时间）)
就诊详细信息：
患者一次看病全过程，门诊：就诊时间；住院：出入院时间
EmploymentStaff
classCode*: <= EMP
id*: SET<II> [0..*] (员工代码)
code: CE CWE [0..1] <= RoleCode (员工类型)
name: BAG<EN> [0..*] (姓名)
Admitter
typeCode*: <= ADM
time*: IVL<TS> [0..1]
0..1 employerOrganization
Organization
classCode*: <= ORG
determinerCode*: <= INSTANCE
id*: SET<II> [1..*] (科室编码)
code: CE CWE [0..1]
name: SET<ON> [0..*] (科室名称)
救治对象
病人信息
Patient
classCode*: <= PAT
id*: SET<II> [1..*] (病人代码（病历号码）)
Subject1
typeCode*: <= SBJ

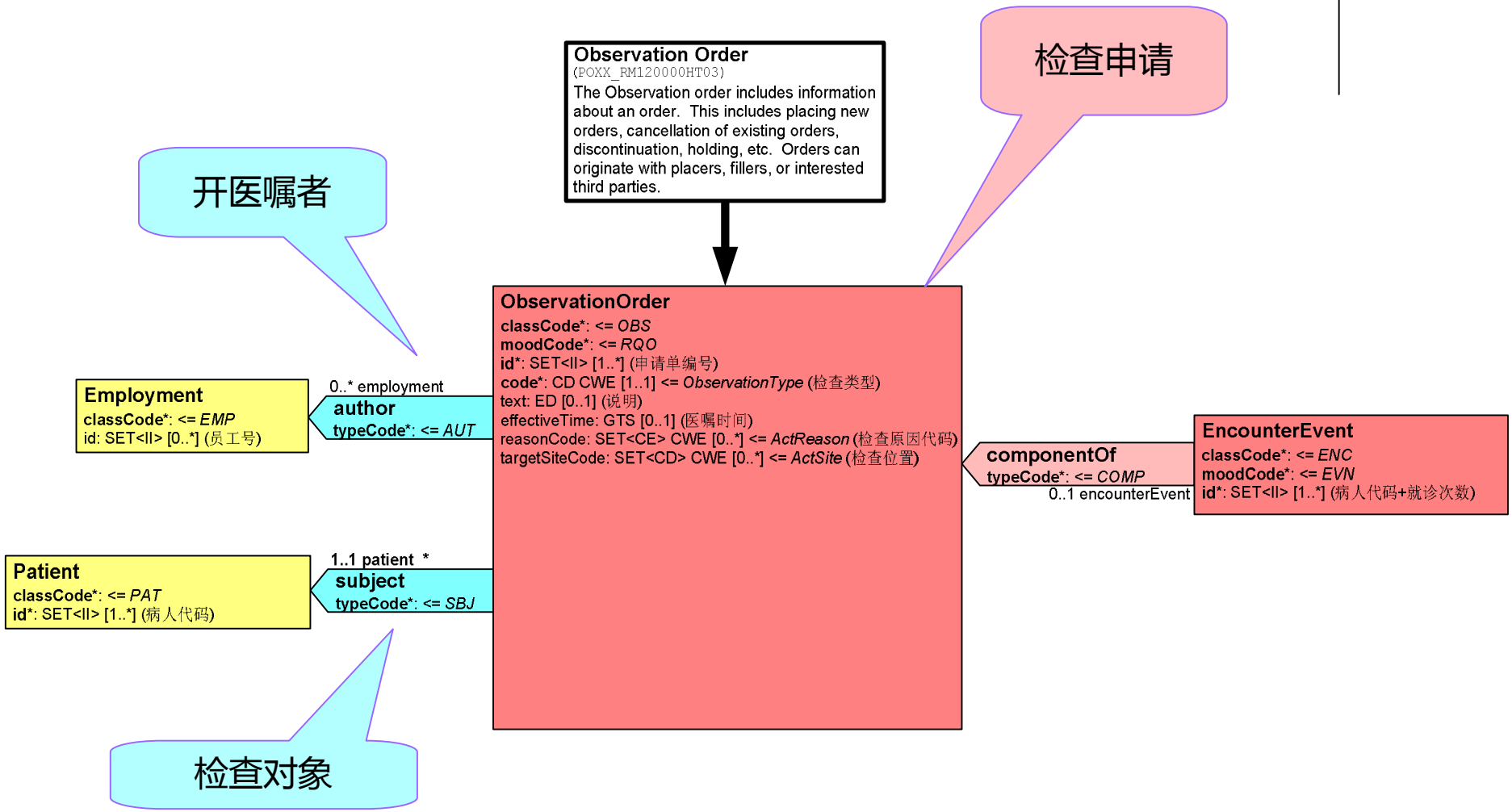
示例3：测量体温


Observation Event
(POXX_RM110000HT02)
The Observation Event includes all quantitative and qualitative observations, which includes the following set of Observation types: Vital Signs, Intake and Output, Signs and Symptoms.
临床观察：观察结果
参照值
ObservationEvent
classCode*: <= OBS
moodCode*: <= EVN
id*: II [1..1]
code*: CD CWE [1..1] (观察类型：测量体温)
effectiveTime*: IVL<TS> [0..1] (测量时间)
value: ANY CWE [0..1] (测量结果（体温值）)
interpretationCode: SET<CE> CWE [0..*]
<= ObservationInterpretation (正常与否标志)
ObservationEventCriterion
classCode*: <= OBS
moodCode*: <= EVN.CRT
value: IVL<PQ> CWE [0..1] <=
ObservationValue (参照值-正常值范围)
ReferenceRange
typeCode*: <= REFV
componentOf
typeCode*: <= COMP
0..1 encounterEvent
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
id*: SET<II> [1..*] (病人代码+就诊次数)
Employment
classCode*: <= EMP
id: SET<II> [0..*] (员工代码)
Author
typeCode*: <= AUT
0..1 patient
subject
typeCode*: <= SBJ
Patient
classCode*: <= PAT
id*: SET<II> [1..*] (病人ID)
结果记录者
测量对象

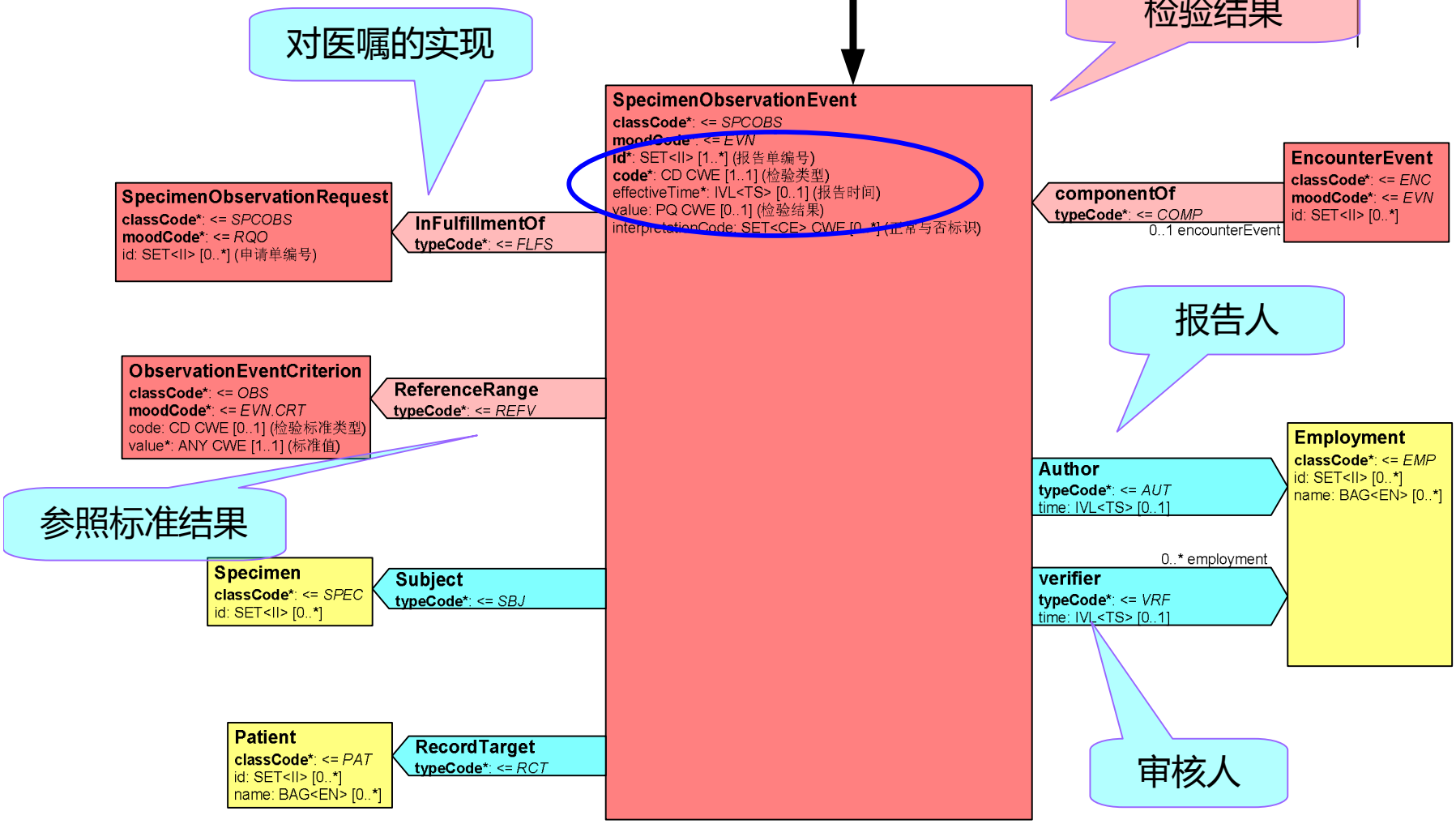
示例4：血检医嘱


检验申请
开医嘱者
被采集样本的人
Specimen Observation Order
(POXX_RM121000HT02)
The Specimen Observation order includes information about a Lab order. This includes placing new orders, cancellation of existing orders, discontinuation, holding, etc.
SpecimenObservationOrder
classCode*: <= SPCOBS
moodCode*: <= RQO
id*: SET<II> [1..*] (申请单编号)
code*: CD CWE [1..1] (检验类型)
effectiveTime: GTS [0..1] (医嘱时间)
priorityCode: SET<CE> CWE [0..*] (优先级)
Employment
classCode*: <= EMP
id: SET<II> [0..*] (员工号)
Author
typeCode*: <= AUT
Component
typeCode*: <= COMP
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
id*: SET<II> [1..*] (病人代码+就诊次数)
Person
classCode*: <= PSN
determinerCode*: <= INSTANCE
id: SET<II> [0..*] (病人身份证号)
name: BAG<EN> [0..*] (姓名)
Specimen
classCode*: <= SPEC
id: SET<II> [0..*]
code*: CE CWE [1..1] (样本类型)
effectiveTime: IVL<TS> [0..1] (采集时间)
Subject
typeCode*: <= SBJ
0..1 patient *
recordTarget
typeCode*: <= RCT
Patient
classCode*: <= PAT
id*: SET<II> [1..*] (病人代码)
Material
classCode*: <= MAT
determinerCode*: <= INSTANCE
code*: CE CWE [1..1] (样本类型)
quantity: PQ [0..1] (数量)
existenceTime: IVL<TS> [0..1] (保存时间)
handlingCode: CE CWE [0..1] (保存方式代码)
检验的样本
检查对象
样本

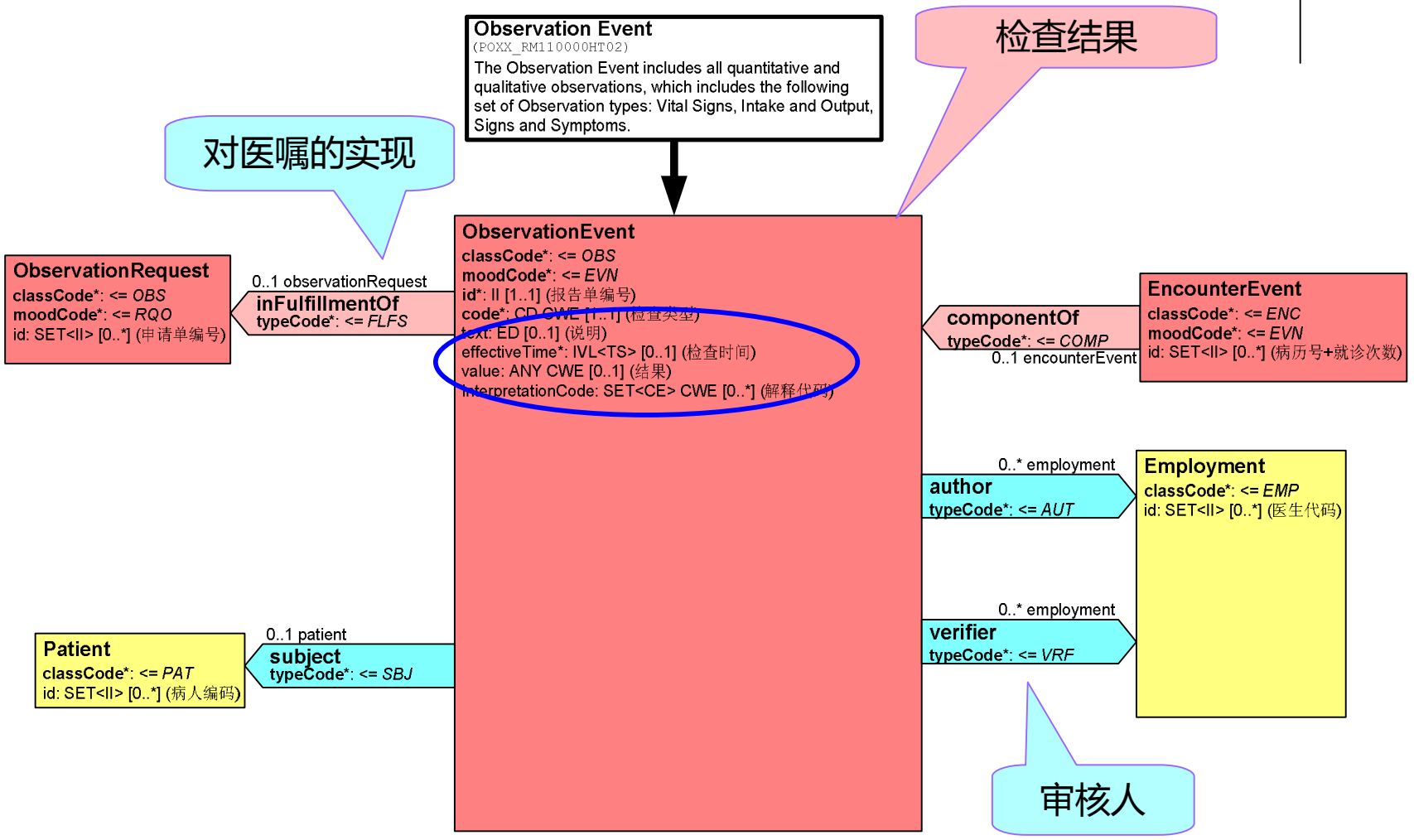
示例5：胸透检查医嘱


Observation Order
(POXX_RM120000HT03)
The Observation order includes information about an order. This includes placing new orders, cancellation of existing orders, discontinuation, holding, etc. Orders can originate with placers, fillers, or interested third parties.
检查申请
开医嘱者
ObservationOrder
classCode*: <= OBS
moodCode*: <= RQO
id*: SET<II> [1..*] (申请单编号)
code*: CD CWE [1..1] <= ObservationType (检查类型)
text: ED [0..1] (说明)
effectiveTime: GTS [0..1] (医嘱时间)
reasonCode: SET<CE> CWE [0..*] <= ActReason (检查原因代码)
targetSiteCode: SET<CD> CWE [0..*] <= ActSite (检查位置)
Employment
classCode*: <= EMP
id: SET<II> [0..*] (员工号)
0..* employment
author
typeCode*: <= AUT
componentOf
typeCode*: <= COMP
0..1 encounterEvent
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
id*: SET<II> [1..*] (病人代码+就诊次数)
Patient
classCode*: <= PAT
id*: SET<II> [1..*] (病人代码)
1..1 patient *
subject
typeCode*: <= SBJ
检查对象

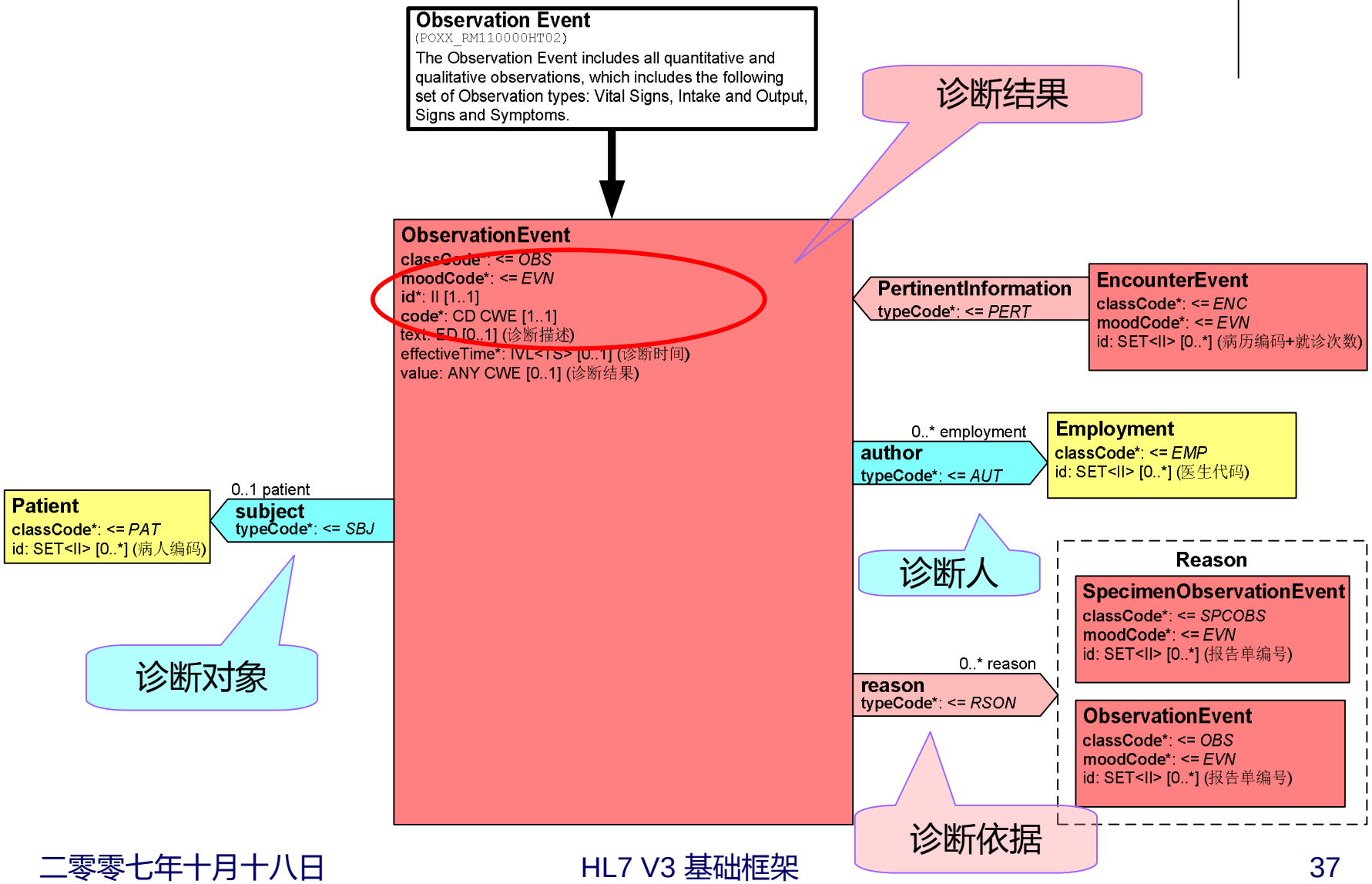
示例6：血检结果


Specimen Observation Event
(POXX_RM111000HT01)
The Specimen Observation Event includes all quantitative and qualitative observations for Lab results.
对医嘱的实现
检验结果
SpecimenObservationEvent
classCode*: <= SPCOBS
moodCode*: <= EVN
id*: SET<II> [1..*] (报告单编号)
code*: CD CWE [1..1] (检验类型)
effectiveTime*: IVL<TS> [0..1] (报告时间)
value: PQ CWE [0..1] (检验结果)
interpretationCode: SET<CE> CWE [0..*] (正常与否标识)
SpecimenObservationRequest
classCode*: <= SPCOBS
moodCode*: <= RQO
id: SET<II> [0..*] (申请单编号)
InFulfillmentOf
typeCode*: <= FLFS
componentOf
typeCode*: <= COMP
0..1 encounterEvent
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
id: SET<II> [0..*]
报告人
ObservationEventCriterion
classCode*: <= OBS
moodCode*: <= EVN.CRT
code: CD CWE [0..1] (检验标准类型)
value*: ANY CWE [1..1] (标准值)
ReferenceRange
typeCode*: <= REFV
参照标准结果
Author
typeCode*: <= AUT
time: IVL<TS> [0..1]
Employment
classCode*: <= EMP
id: SET<II> [0..*]
name: BAG<EN> [0..*]
0..* employment
Specimen
classCode*: <= SPEC
id: SET<II> [0..*]
Subject
typeCode*: <= SBJ
verifier
typeCode*: <= VRF
time: IVL<TS> [0..1]
Patient
classCode*: <= PAT
id: SET<II> [0..*]
name: BAG<EN> [0..*]
RecordTarget
typeCode*: <= RCT
审核人

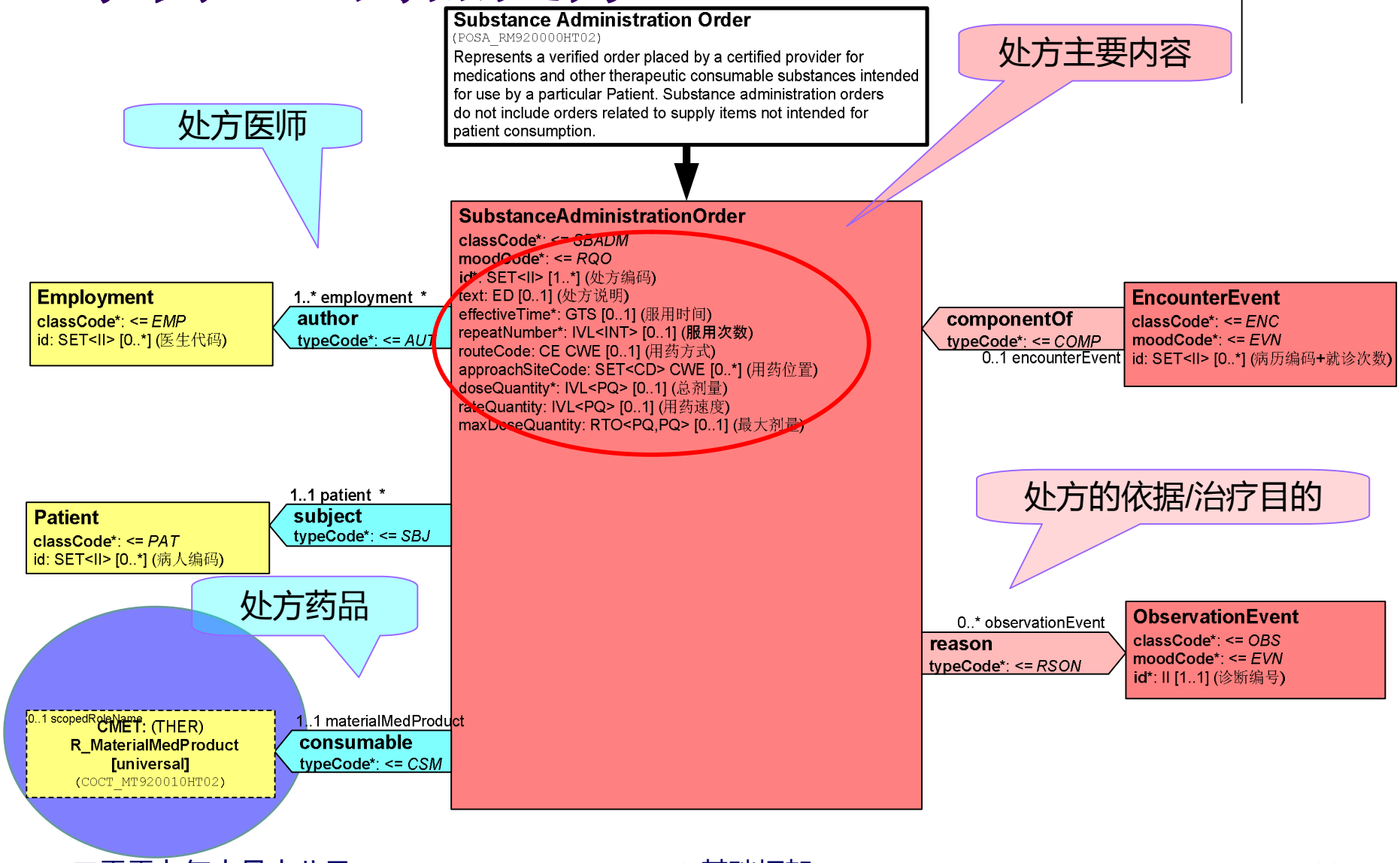
示例7： 胸透检查结果


Observation Event
(POXX_RM110000HT02)
The Observation Event includes all quantitative and qualitative observations, which includes the following set of Observation types: Vital Signs, Intake and Output, Signs and Symptoms.
检查结果
对医嘱的实现
ObservationEvent
classCode*: <= OBS
moodCode*: <= EVN
id*: II [1..1] (报告单编号)
code*: CD CWE [1..1] (检查类型)
text: ED [0..1] (说明)
effectiveTime*: IVL<TS> [0..1] (检查时间)
value: ANY CWE [0..1] (结果)
InterpretationCode: SET<CE> CWE [0..*] (解释代码)
ObservationRequest
classCode*: <= OBS
moodCode*: <= RQO
id: SET<II> [0..*] (申请单编号)
0..1 observationRequest
inFulfillmentOf
typeCode*: <= FLFS
componentOf
typeCode*: <= COMP
0..1 encounterEvent
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
id: SET<II> [0..*] (病历号+就诊次数)
0..* employment
author
typeCode*: <= AUT
Employment
classCode*: <= EMP
id: SET<II> [0..*] (医生代码)
0..* employment
verifier
typeCode*: <= VRF
0..1 patient
subject
typeCode*: <= SBJ
Patient
classCode*: <= PAT
id: SET<II> [0..*] (病人编码)
审核人

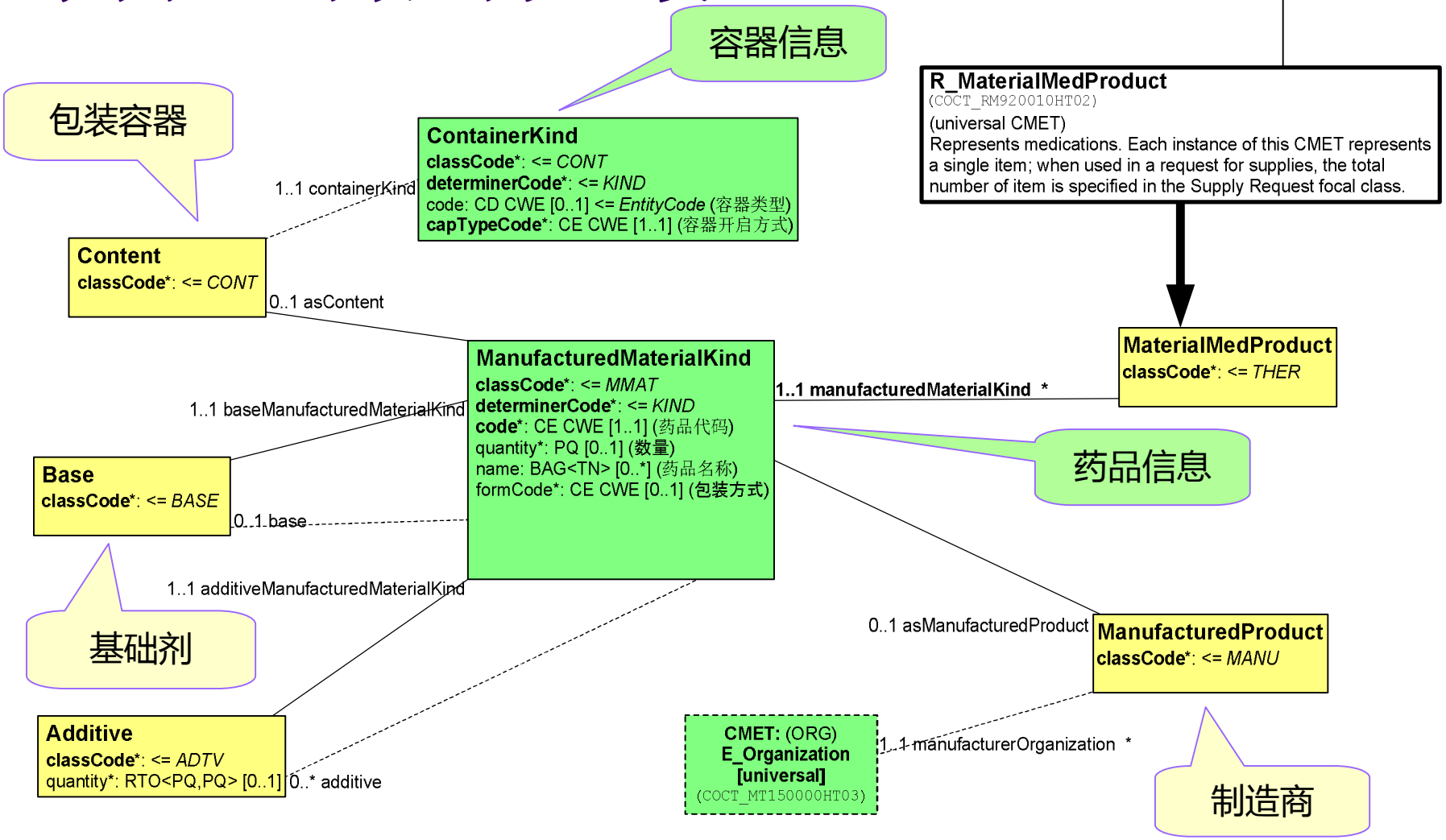
示例8： 诊断结果

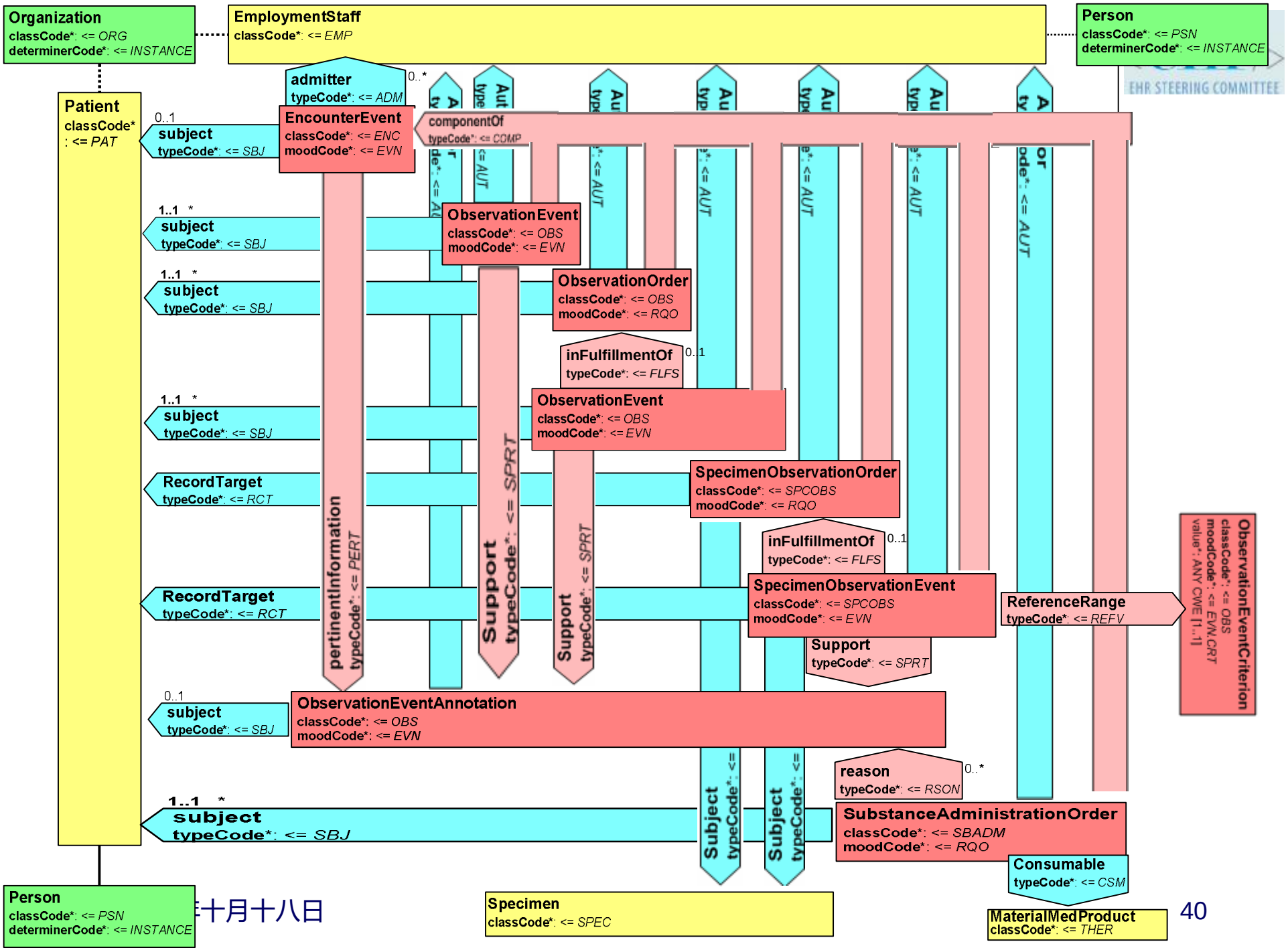

Observation Event
(POXX_RM110000HT02)
The Observation Event includes all quantitative and qualitative observations, which includes the following set of Observation types: Vital Signs, Intake and Output, Signs and Symptoms.
诊断结果
ObservationEvent
classCode*: <= OBS
moodCode*: <= EVN
id*: II [1..1]
code*: CD CWE [1..1]
text: ED [0..1] (诊断描述)
effectiveTime*: IVL<TS> [0..1] (诊断时间)
value: ANY CWE [0..1] (诊断结果)
PertinentInformation
typeCode*: <= PERT
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
id: SET<II> [0..*] (病历编码+就诊次数)
0..* employment
author
typeCode*: <= AUT
Employment
classCode*: <= EMP
id: SET<II> [0..*] (医生代码)
诊断人
0..1 patient
subject
typeCode*: <= SBJ
Patient
classCode*: <= PAT
id: SET<II> [0..*] (病人编码)
诊断对象
Reason
SpecimenObservationEvent
classCode*: <= SPCOBS
moodCode*: <= EVN
id: SET<II> [0..*] (报告单编号)
0..* reason
reason
typeCode*: <= RSON
ObservationEvent
classCode*: <= OBS
moodCode*: <= EVN
id: SET<II> [0..*] (报告单编号)
诊断依据

示例9： 药品处方


Substance Administration Order
(POSA_RM920000HT02)
Represents a verified order placed by a certified provider for medications and other therapeutic consumable substances intended for use by a particular Patient. Substance administration orders do not include orders related to supply items not intended for patient consumption.
处方主要内容
处方医师
SubstanceAdministrationOrder
classCode*: <= SBADM
moodCode*: <= RQO
id*: SET<II> [1..*] (处方编码)
text: ED [0..1] (处方说明)
effectiveTime*: GTS [0..1] (服用时间)
repeatNumber*: IVL<INT> [0..1] (服用次数)
routeCode: CE CWE [0..1] (用药方式)
approachSiteCode: SET<CD> CWE [0..*] (用药位置)
doseQuantity*: IVL<PQ> [0..1] (总剂量)
rateQuantity: IVL<PQ> [0..1] (用药速度)
maxDoseQuantity: RTO<PQ,PQ> [0..1] (最大剂量)
Employment
classCode*: <= EMP
id: SET<II> [0..*] (医生代码)
1..* employment *
author
typeCode*: <= AUT
componentOf
typeCode*: <= COMP
0..1 encounterEvent
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
id: SET<II> [0..*] (病历编码+就诊次数)
处方的依据/治疗目的
Patient
classCode*: <= PAT
id: SET<II> [0..*] (病人编码)
1..1 patient *
subject
typeCode*: <= SBJ
处方药品
0..* observationEvent
reason
typeCode*: <= RSON
ObservationEvent
classCode*: <= OBS
moodCode*: <= EVN
id*: II [1..1] (诊断编号)
0..1 scopedRoleName
CMET: (THER)
R_MaterialMedProduct
[universal]
(COCT_MT920010HT02)
1..1 materialMedProduct
consumable
typeCode*: <= CSM

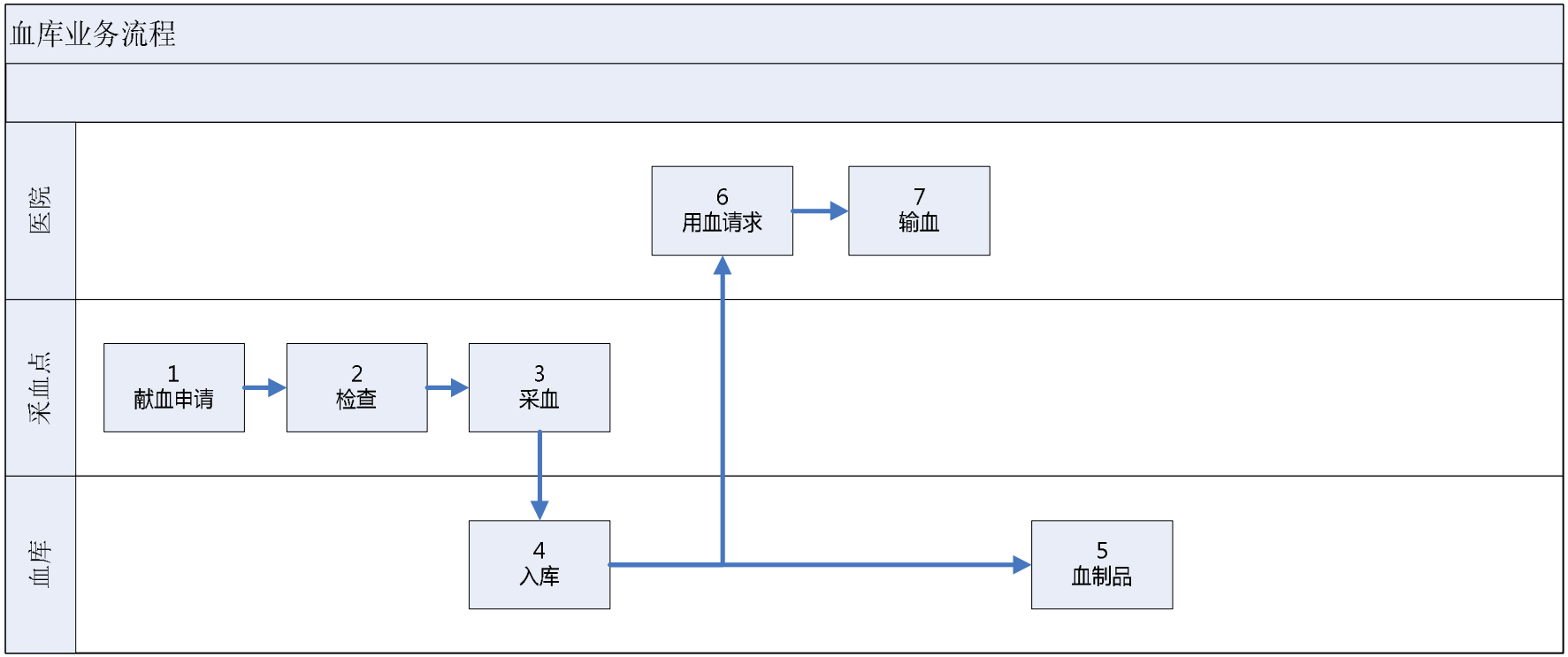
示例9： 开处方（续）


容器信息
包装容器
R_MaterialMedProduct
(COCT_RM920010HT02)
(universal CMET)
Represents medications. Each instance of this CMET represents a single item; when used in a request for supplies, the total number of item is specified in the Supply Request focal class.
ContainerKind
classCode*: <= CONT
determinerCode*: <= KIND
code: CD CWE [0..1] <= EntityCode (容器类型)
capTypeCode*: CE CWE [1..1] (容器开启方式)
1..1 containerKind
Content
classCode*: <= CONT
0..1 asContent
MaterialMedProduct
classCode*: <= THER
ManufacturedMaterialKind
classCode*: <= MMAT
determinerCode*: <= KIND
code*: CE CWE [1..1] (药品代码)
quantity*: PQ [0..1] (数量)
name: BAG<TN> [0..*] (药品名称)
formCode*: CE CWE [0..1] (包装方式)
1..1 manufacturedMaterialKind *
1..1 baseManufacturedMaterialKind
药品信息
Base
classCode*: <= BASE
0..1 base
1..1 additiveManufacturedMaterialKind
基础剂
0..1 asManufacturedProduct
ManufacturedProduct
classCode*: <= MANU
Additive
classCode*: <= ADTV
quantity*: RTO<PQ,PQ> [0..1]
0..* additive
CMET: (ORG)
E_Organization
[universal]
(COCT_MT150000HT03)
1..1 manufacturerOrganization *
制造商

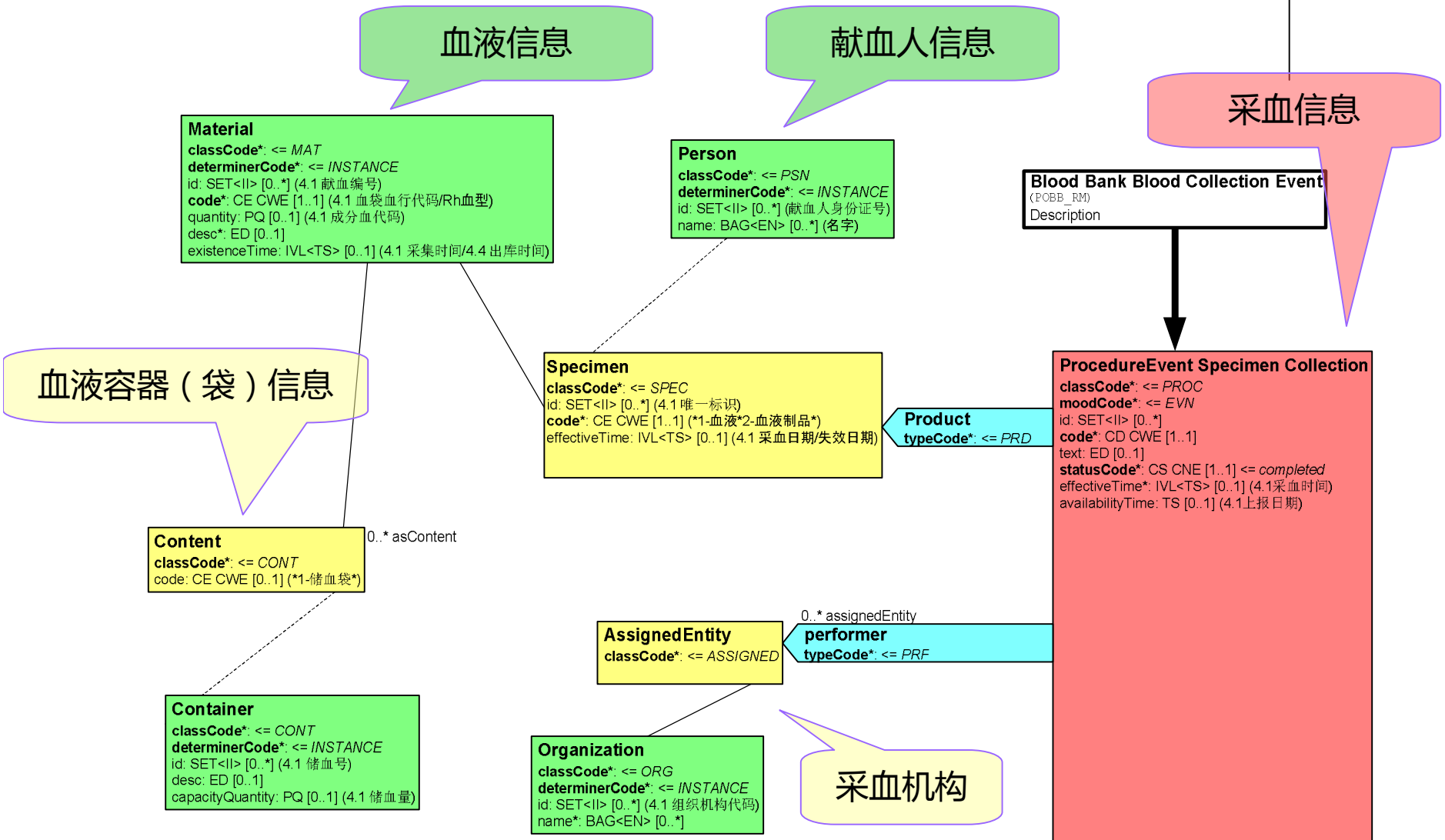

Organization
classCode*: <= ORG
determinerCode*: <= INSTANCE
EmploymentStaff
classCode*: <= EMP
Person
classCode*: <= PSN
determinerCode*: <= INSTANCE
Patient
classCode*
: <= PAT
admitter
typeCode*: <= ADM
0..*
EncounterEvent
classCode*: <= ENC
moodCode*: <= EVN
componentOf
typeCode*: <= COMP
0..1
subject
typeCode*: <= SBJ
1..1 *
subject
typeCode*: <= SBJ
ObservationEvent
classCode*: <= OBS
moodCode*: <= EVN
1..1 *
subject
typeCode*: <= SBJ
ObservationOrder
classCode*: <= OBS
moodCode*: <= RQO
inFulfillmentOf
typeCode*: <= FLFS
0..1
1..1 *
subject
typeCode*: <= SBJ
ObservationEvent
classCode*: <= OBS
moodCode*: <= EVN
RecordTarget
typeCode*: <= RCT
SpecimenObservationOrder
classCode*: <= SPCOBS
moodCode*: <= RQO
inFulfillmentOf
typeCode*: <= FLFS
0..1
RecordTarget
typeCode*: <= RCT
SpecimenObservationEvent
classCode*: <= SPCOBS
moodCode*: <= EVN
ReferenceRange
typeCode*: <= REFV
ObservationEventCriterion
classCode*: <= OBS
moodCode*: <= EVN.CRT
value*: ANY CWE [1..1]
Support
typeCode*: <= SPRT
pertinentInformation
typeCode*: <= PERT
Support
typeCode*: <= SPRT
Support
typeCode*: <= SPRT
0..1
subject
typeCode*: <= SBJ
ObservationEventAnnotation
classCode*: <= OBS
moodCode*: <= EVN
reason
typeCode*: <= RSON
0..*
1..1 *
subject
typeCode*: <= SBJ
Subject
typeCode*: <=
Subject
typeCode*: <=
SubstanceAdministrationOrder
classCode*: <= SBADM
moodCode*: <= RQO
Consumable
typeCode*: <= CSM
Person
classCode*: <= PSN
determinerCode*: <= INSTANCE
Specimen
classCode*: <= SPEC
MaterialMedProduct
classCode*: <= THER

基于 HL7 V3
公卫资源信息的描述
（血库业务）

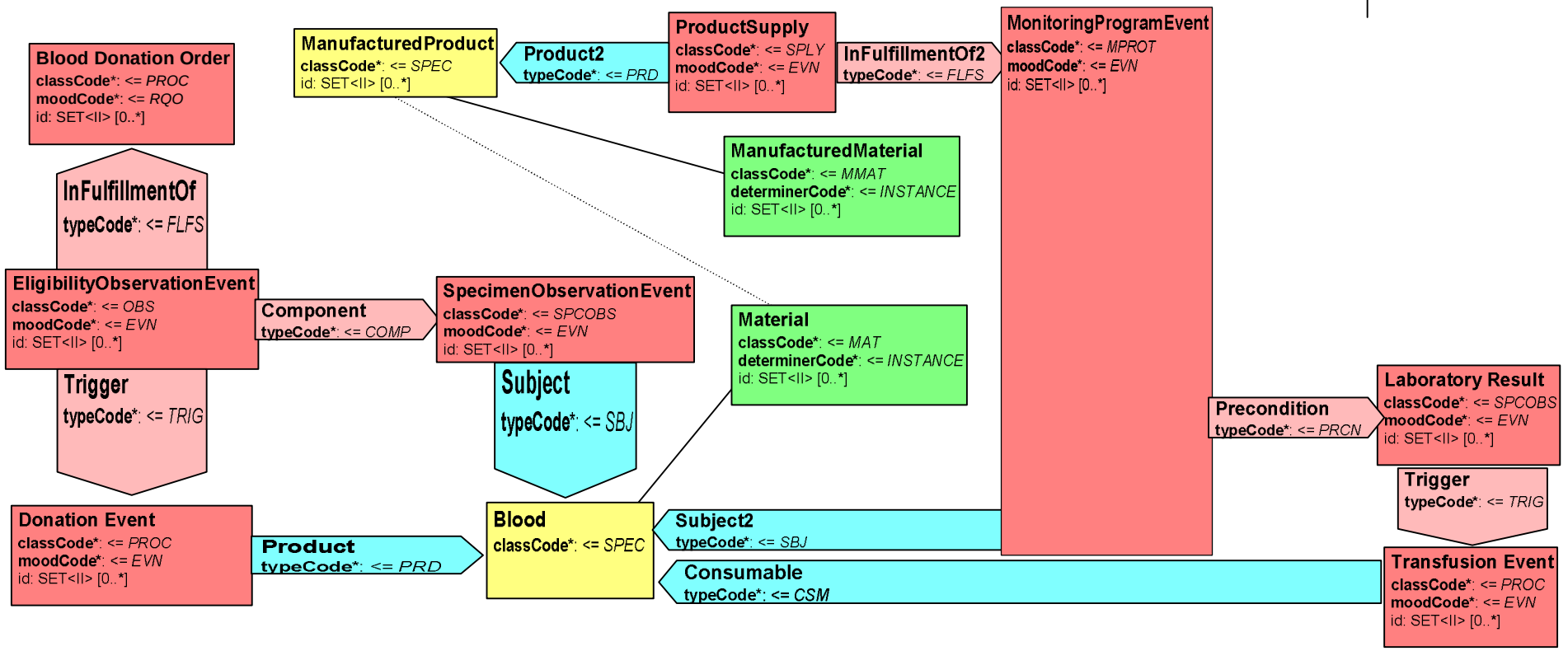
血库业务流程（示例）



示例1：血库业务流程-采血

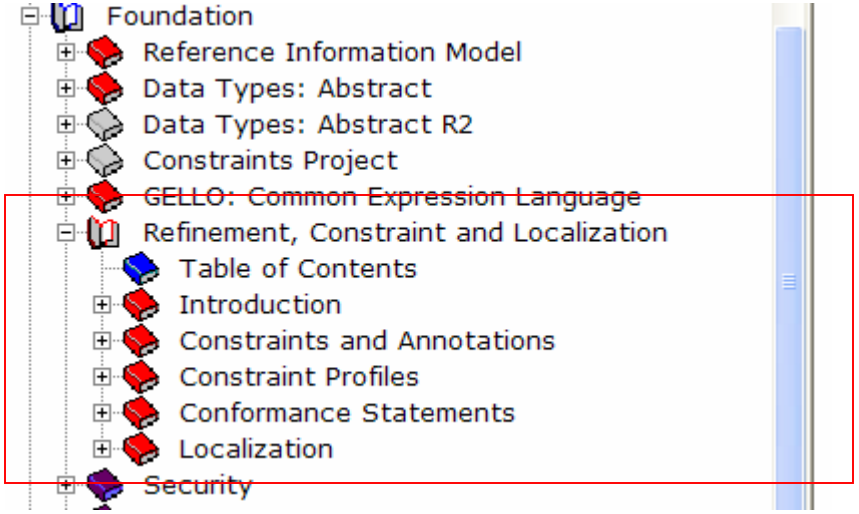


血库业务（示例）

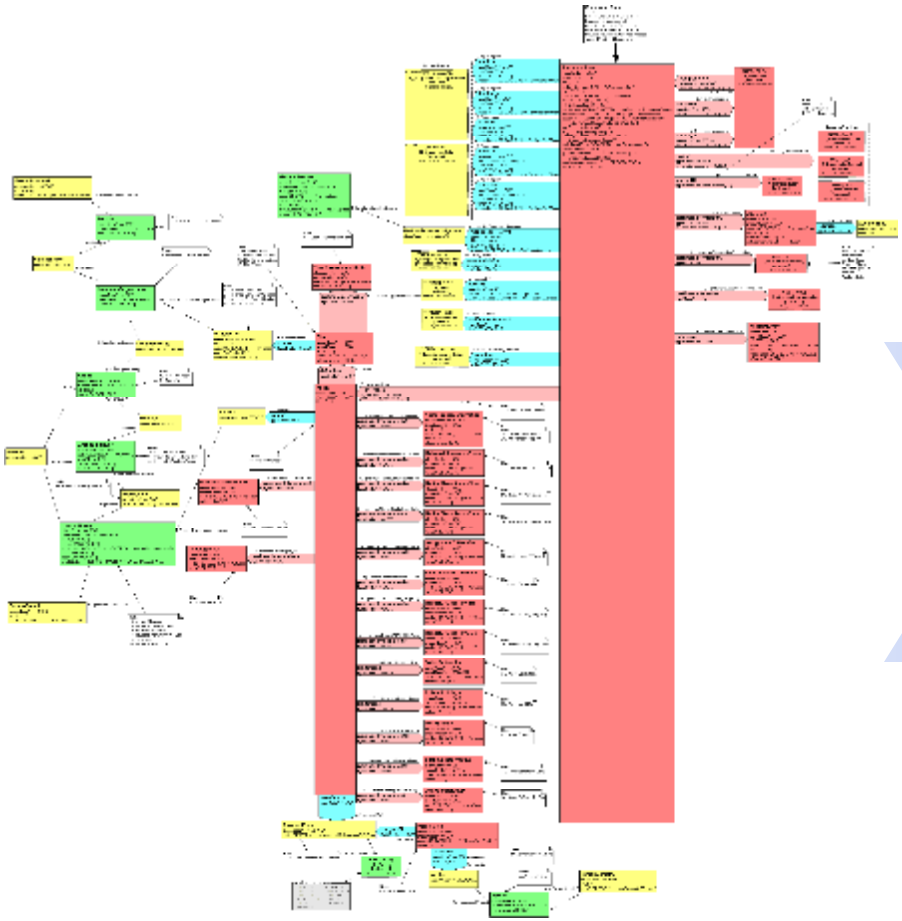

Blood Donation Order
classCode*: <= PROC
moodCode*: <= RQO
id: SET<II> [0..*]
InFulfillmentOf
typeCode*: <= FLFS
EligibilityObservationEvent
classCode*: <= OBS
moodCode*: <= EVN
id: SET<II> [0..*]
Trigger
typeCode*: <= TRIG
Component
typeCode*: <= COMP
SpecimenObservationEvent
classCode*: <= SPCOBS
moodCode*: <= EVN
id: SET<II> [0..*]
Subject
typeCode*: <= SBJ
ManufacturedProduct
classCode*: <= SPEC
id: SET<II> [0..*]
Product2
typeCode*: <= PRD
ProductSupply
classCode*: <= SPLY
moodCode*: <= EVN
id: SET<II> [0..*]
InFulfillmentOf2
typeCode*: <= FLFS
ManufacturedMaterial
classCode*: <= MMAT
determinerCode*: <= INSTANCE
id: SET<II> [0..*]
Material
classCode*: <= MAT
determinerCode*: <= INSTANCE
id: SET<II> [0..*]
MonitoringProgramEvent
classCode*: <= MPROT
moodCode*: <= EVN
id: SET<II> [0..*]
Precondition
typeCode*: <= PRCN
Laboratory Result
classCode*: <= SPCOBS
moodCode*: <= EVN
id: SET<II> [0..*]
Trigger
typeCode*: <= TRIG
Transfusion Event
classCode*: <= PROC
moodCode*: <= EVN
id: SET<II> [0..*]
Donation Event
classCode*: <= PROC
moodCode*: <= EVN
id: SET<II> [0..*]
Product
typeCode*: <= PRD
Blood
classCode*: <= SPEC
Subject2
typeCode*: <= SBJ
Consumable
typeCode*: <= CSM

HL7 V3 RIM 对医疗信息化的意义

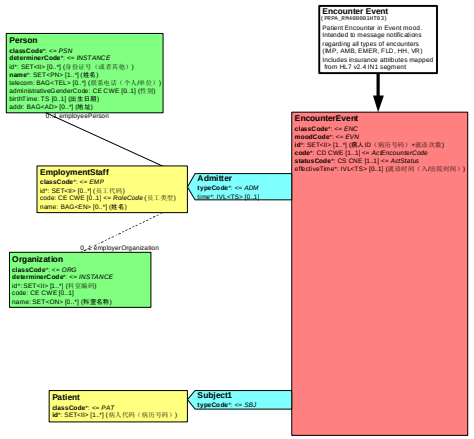
- 建立了全面的医疗信息的描述模型
- 全球5000+专业人员，10+年的成果：定义了医疗行为的标准的描述（RMIM，一个医疗行为的信息描述的最大集）
- 通过 Refinement, Constraint 和 Localization 定义自己适用的业务描述



HL7 V3 RIM 对医疗信息化的意义



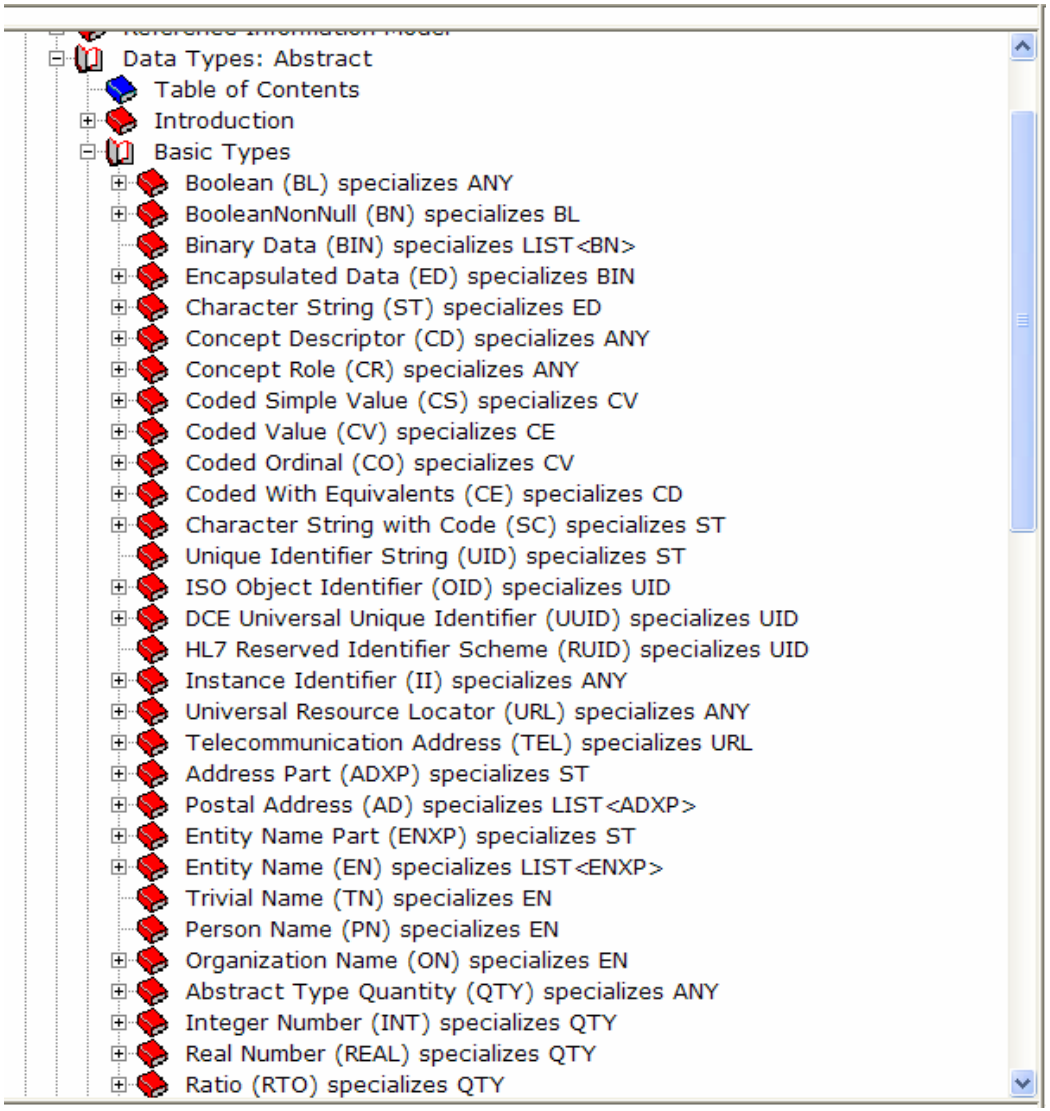
Refinement
Constraint



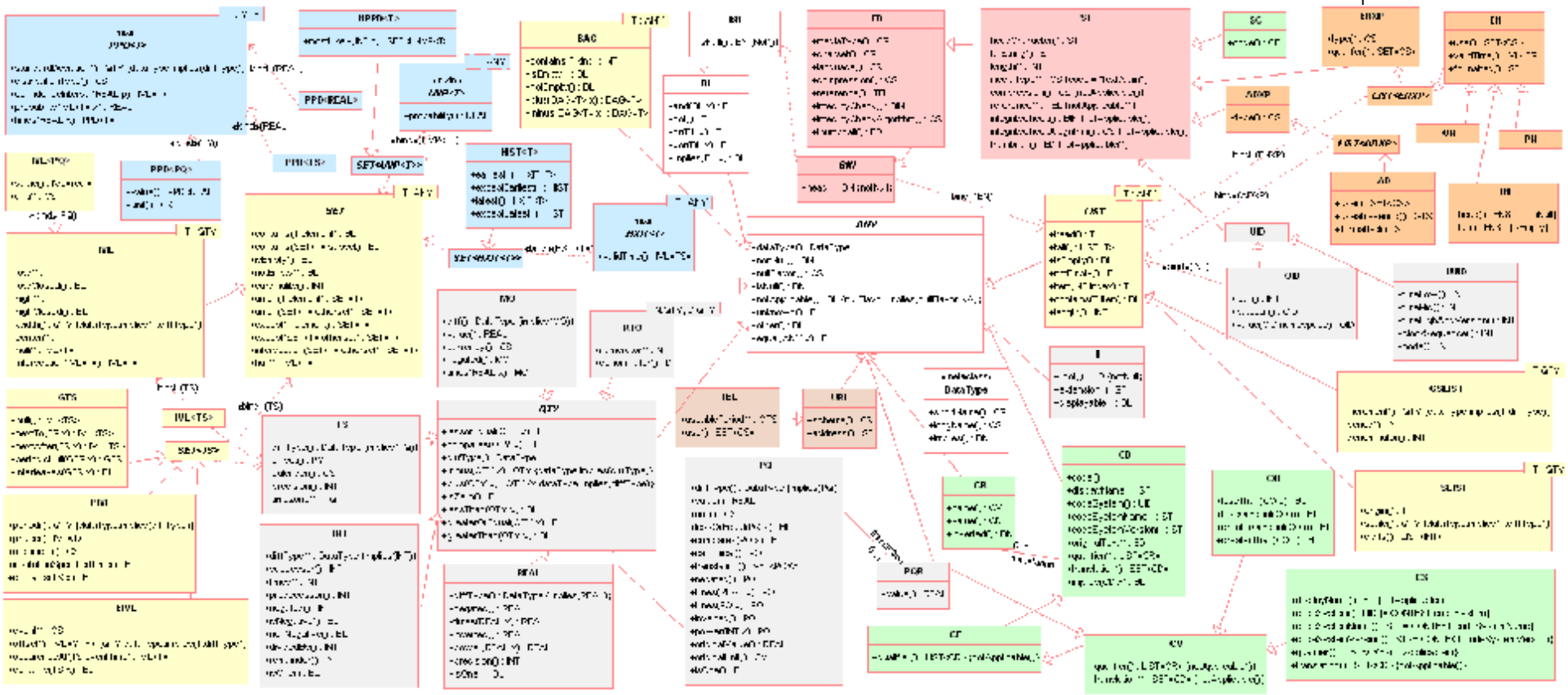
HL7 v3 Data Types

- 29 Nov 2004 被采纳为 US ANSI 标准
  - Name, Address, Telecom, Time, Quantity, Collections
- 交互过程中的数据项都有一个Data Type
- Data types define the meaning (semantics) of data values that can be assigned to a data element.
- Data Type可以理解为“Class”

HL7 v3 Datatypes 概览



HL7 v3 Datatypes 概览



HL7 v3 Data Types 示例（一）

Instance Identifier (II) 实例标识类型

```
type InstanceIdentifier alias II specializes ANY
{
        ST extension;
        UID root;
        ST assigningAuthorityName;
        BL equal(ANY x);
};
```

```
<Person determinerCode="INSTANCE" classCode="PSN">
        <id root="8601" extension="442501198010100252" />   /* 身份证号 */
        <id root="8602" extension="2019293812" />           /* 医保号 */
        <id root="8603" extension="442501198010100252" />   /* 驾驶证号*/
</Person>
```

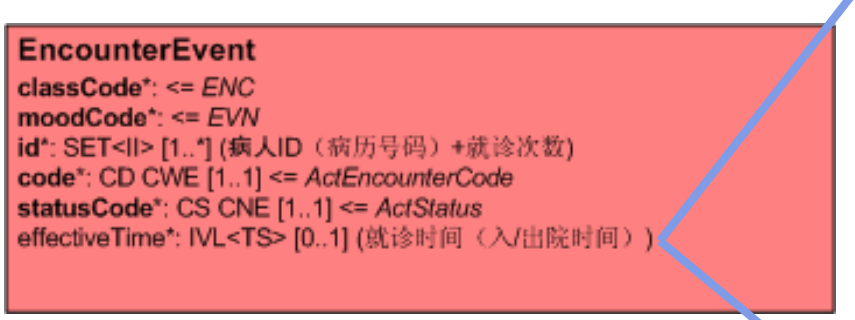
HL7 v3 Data Types 示例（二）

Telecommunication Address (TEL) 电子通讯地址类型

```
type TelecommunicationAddress alias TEL specializes URL {
   GTS       useablePeriod;
   SET<CS>   use;
   BL        equal(ANY x);
};
```

```
<Person determinerCode="INSTANCE" classCode="PSN">
        <telecom value="tel:1-213-555-2222" use="H"/>      /* 家庭电话 */
        <telecom value="tel:1-213-666-2222" use="WP"/>  /* 工作电话 */
        <telecom value="mail:a@163.com" use="PUB"/>    /* 电子邮件*/
        <telecom value="http://www.my.com" use="PUB"/> /* Web主页*/
</Person>
```

HL7 v3 Data Types 示例（三）



门诊：

effectiveTime **à** TS

TS：时间点

住院：

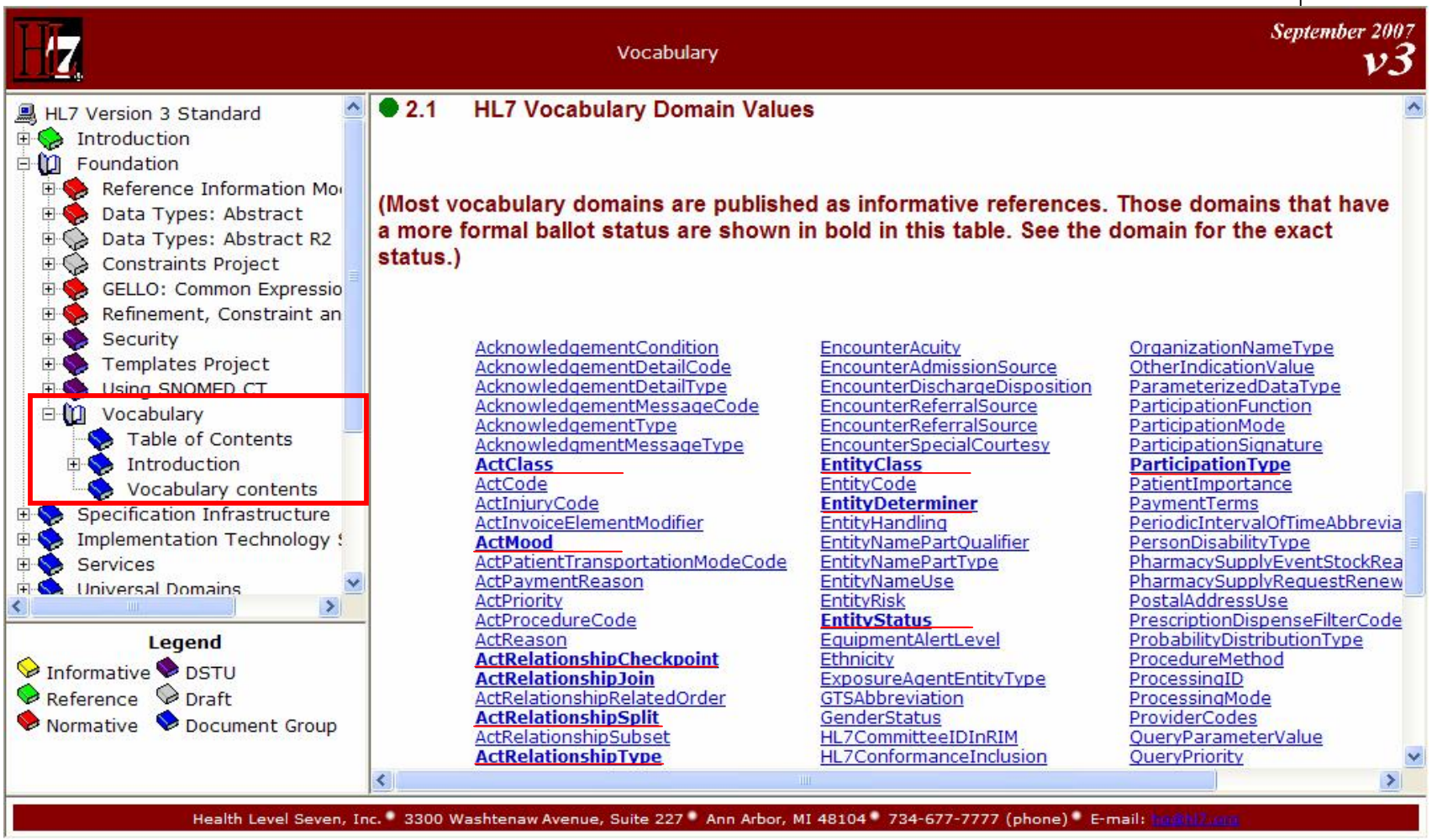
effectiveTime **à** IVL<TS>

IVL<TS>：时间间隔

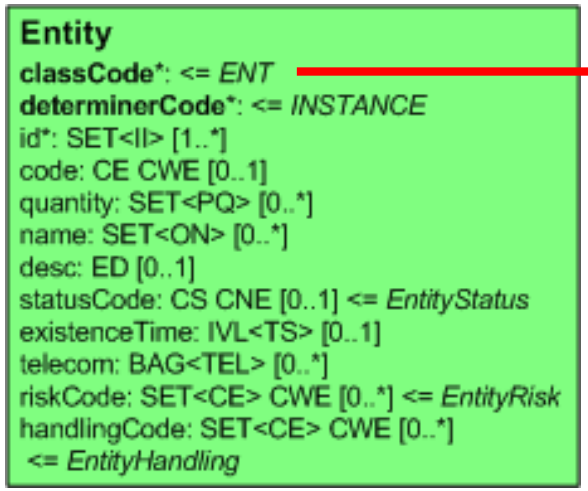
effectiveTime.low:入院时间

effectiveTime.high:出院时间

HL7 v3 Vocabulary



HL7 v3 Vocabulary 示例



Entity.classCode

Level	Mnemonic	Print Name
1	ENT	entity
.2	LIV	living subject
..3	NLIV	non-person living subject
...4	ANM	animal
...4	MIC	microorganism
...4	PLNT	plant
..3	PSN	person
.2	MAT	material
..3	MMAT	manufactured material
...4	CONT	container
....5	HOLD	holder
...4	DEV	Device

CDA 历史

- 1996 **à** Kona Architecture
- 1998 **à** Patient Record Architecture
- 2000 **à** ANSI/HL7 CDA R1.0

Clinical Document Architecture

From Wikipedia, the free encyclopedia

The HL7 **Clinical Document Architecture** (CDA) is an XML-based markup standard intended to specify the encoding, structure and semantics clinical documents for exchange.

It is based on the HL7 Reference Information Model (RIM) and the HL7 Version 3 Data Types, though can be used independently of any HL7 Version 3 messaging (i.e., CDA documents can be exchanged using other mechanisms, such as HL7 Version 2, DICOM, MIME attachments to email, http or ftp, etc.).

The CDA tries to ensure that the content will be human-readable and hence is required to content narrative text, yet still contain structure, and most importantly, allow for the use of codes (such as from SNOMED and LOINC) to represent concepts.

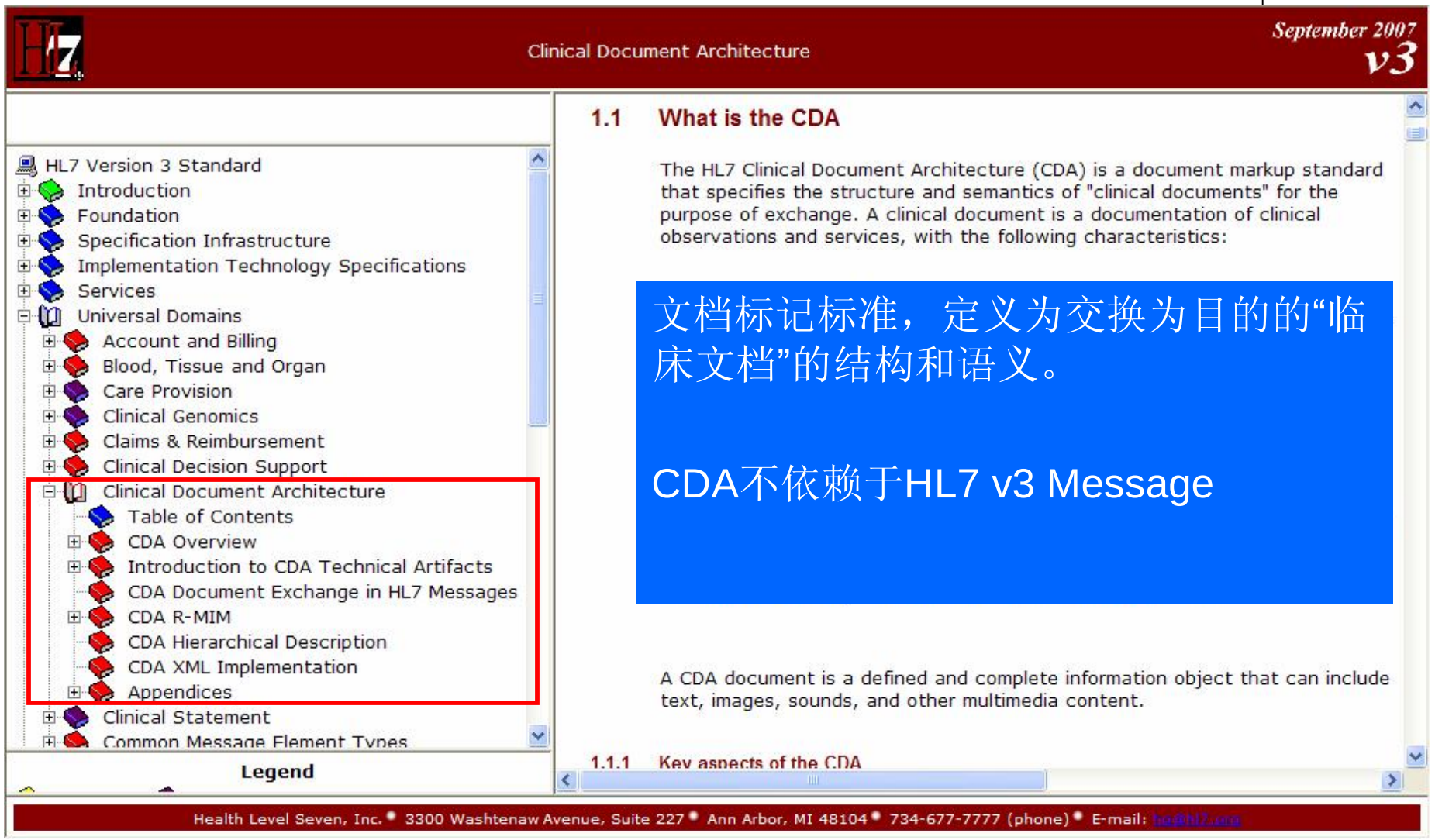
A good point to look for CDA information is in the Structured Documents group of HL7 , and the CDA FAQ

See also [edit]

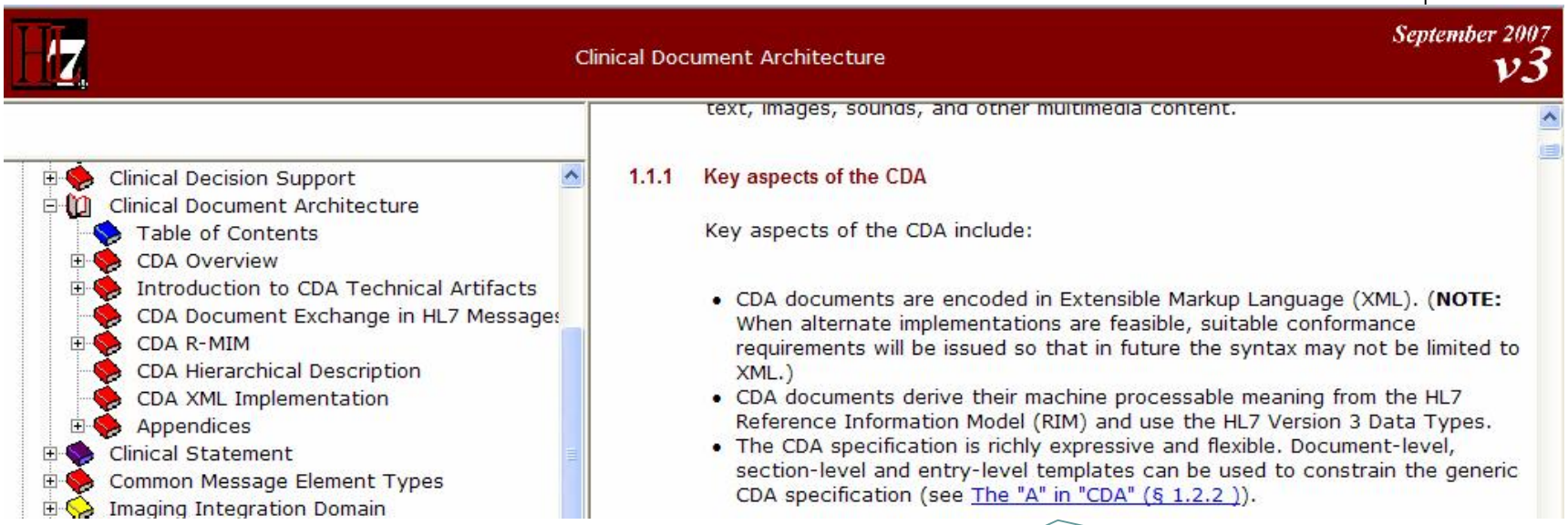
- CDISC
- eCTD
- EHRcom
- Health Informatics Service Architecture (HISA)

Categories: Computer file formats | XML-based standards

CDA 2.0

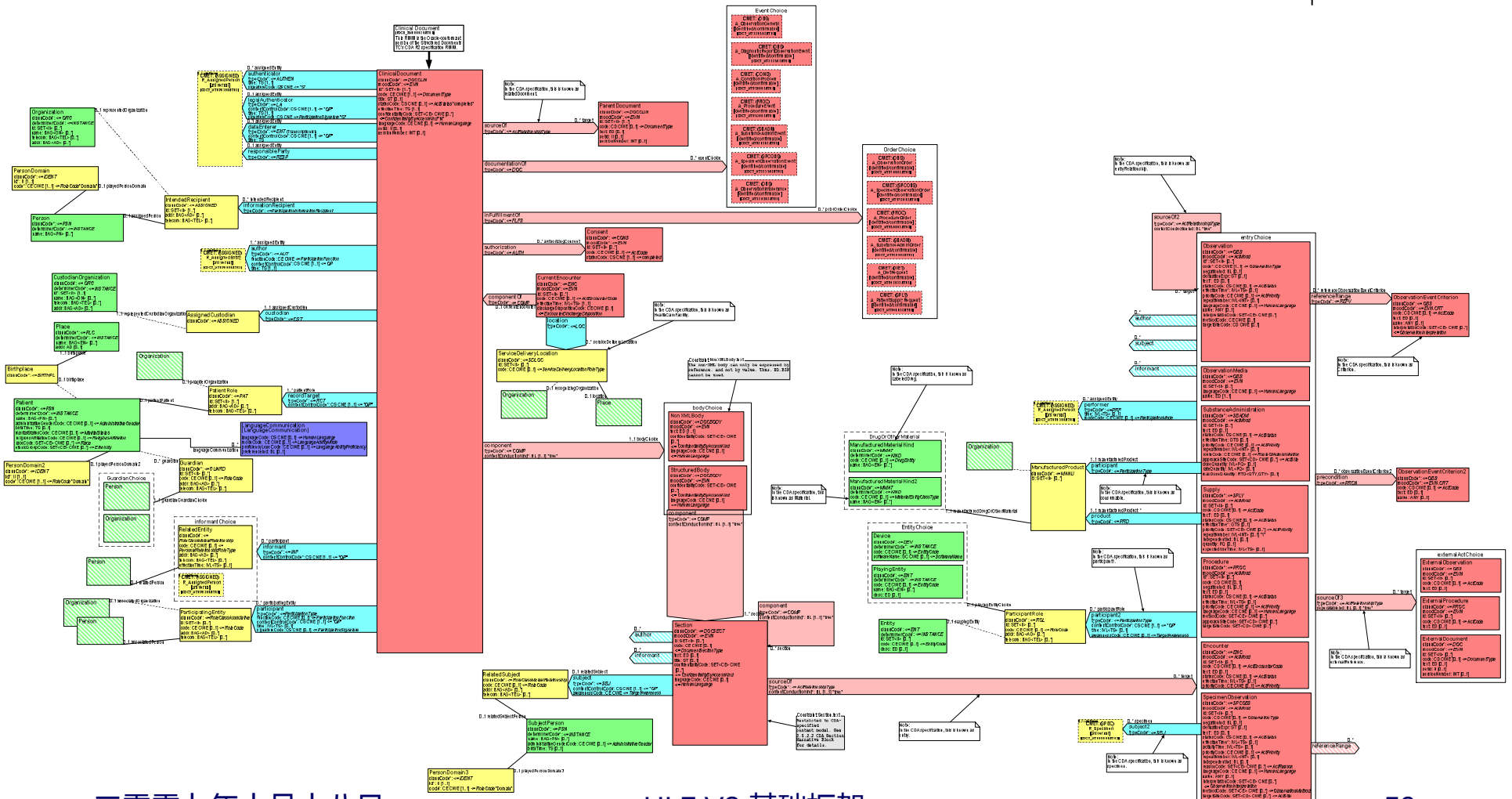

Clinical Document Architecture
September 2007
v3
HL7 Version 3 Standard
Introduction
Foundation
Specification Infrastructure
Implementation Technology Specifications
Services
Universal Domains
Account and Billing
Blood, Tissue and Organ
Care Provision
Clinical Genomics
Claims & Reimbursement
Clinical Decision Support
Clinical Document Architecture
Table of Contents
CDA Overview
Introduction to CDA Technical Artifacts
CDA Document Exchange in HL7 Messages
CDA R-MIM
CDA Hierarchical Description
CDA XML Implementation
Appendices
Clinical Statement
Common Message Element Types
Legend
1.1 What is the CDA
The HL7 Clinical Document Architecture (CDA) is a document markup standard that specifies the structure and semantics of "clinical documents" for the purpose of exchange. A clinical document is a documentation of clinical observations and services, with the following characteristics:
文档标记标准，定义为交换为目的的“临床文档”的结构和语义。
CDA不依赖于HL7 v3 Message
A CDA document is a defined and complete information object that can include text, images, sounds, and other multimedia content.
1.1.1 Key aspects of the CDA
Health Level Seven, Inc. 3300 Washtenaw Avenue, Suite 227 Ann Arbor, MI 48104 734-677-7777 (phone) E-mail:

CDA 2.0

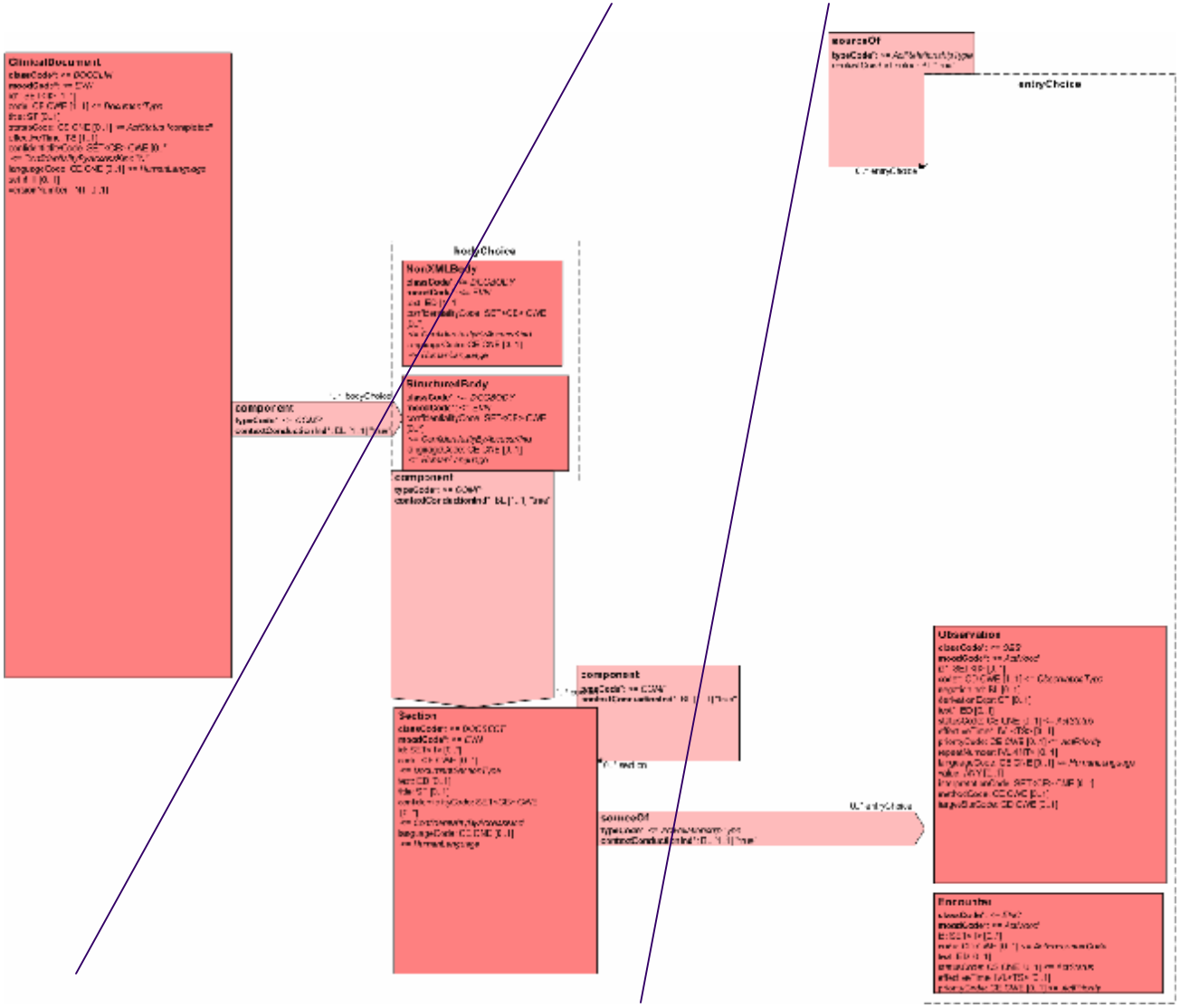


- CDA使用XML封装（目前！）
- 基于HL7 v3 RIM 和 Data Type
- 灵活的表达形式：
  - Document-level,
  - Section-level
  - Entry-level

HL7 RMIM -- CDA 2.0



HL7 RMIM -- CDA 2.0



CDA 在消息中（HL7 v3 消息）

Example 4. Example of a CDA document in a Version 3 message

```
<someMessage>
  <Act.Code code="11488-4"
    codeSystem="2.16.840.1.113883.6.1"
    displayName="Consultation note"/>
  <Act.text type="multipart/related">
MIME-Version: 1.0
Content-Type: multipart/related; boundary="HL7-CDA-boundary";
type="text/xml"; start="10.12.45567.43"
Content-Transfer-Encoding: BASE64

--HL7-CDA-boundary
Content-Type: text/xml; charset="US-ASCII"
Content-ID: &lt;10.12.45567.43>

... Base 64 of base CDA document, which contains
  ...
  <observationMedia classCode="OBS" moodcode="EVN">
    <id root="10.23.4567.345"/>
    <value mediaType="image/jpeg">
      <reference value="left_hand_image.jpeg"/>
    </value>
  </observationMedia>
  ...

--HL7-CDA-boundary
Content-ID: &lt;10.23.4567.345>
Content-Location: canned_left_hand_image.jpeg
Content-Type: image/JPEG

... Base64 image ...

--HL7-CDA-boundary--

    </Act.text>
  </someMessage>
```

CDA 在消息中（HL7 v2.x 消息）

Example 3. Example of a CDA document in an MDM message

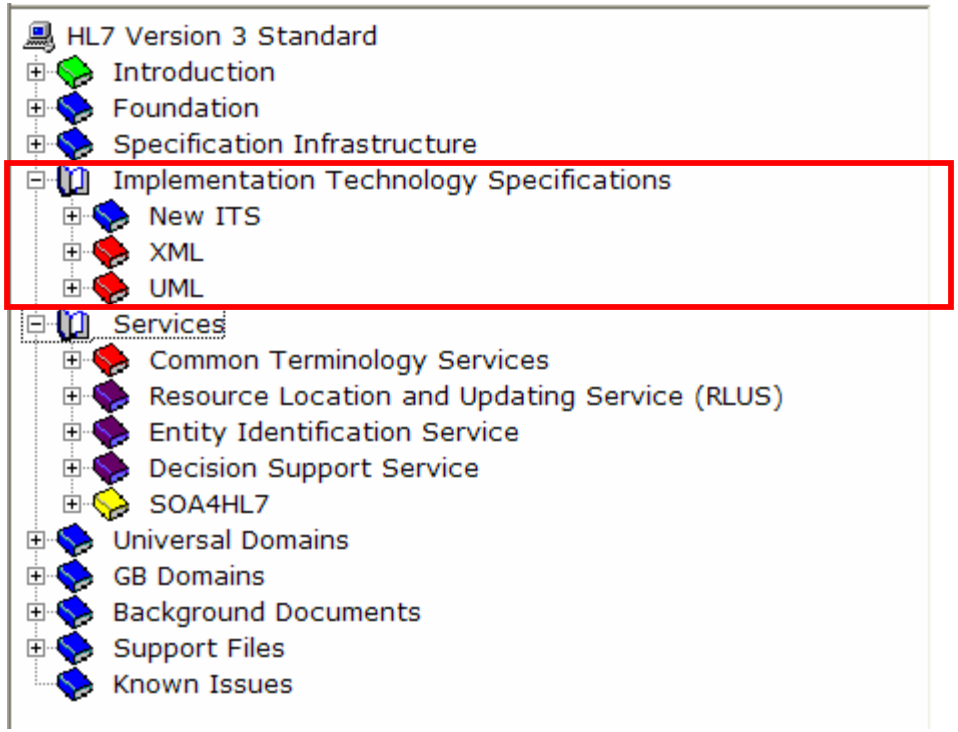
```
MSH|...
EVN|...
PID|...
PV1|...
TXA|...
OBX|1|ED|11492-6^History and Physical^LN||
   ^multipart^related^A^
   MIME-Version: 1.0
   Content-Type: multipart/related; boundary="HL7-CDA-boundary";
   type="text/xml"; start="10.12.45567.43"
   Content-Transfer-Encoding: BASE64

   --HL7-CDA-boundary
   Content-Type: text/xml; charset="US-ASCII"
   Content-ID: &lt;10.12.45567.43>

   ... Base 64 of base CDA document, which contains
      ...
      <observationMedia classCode="OBS" moodCode="EVN">
         <id root="10.23.4567.345"/>
         <value mediaType="image/jpeg">
            <reference value="left_hand_image.jpeg"/>
         </value>
      </observationMedia>
      ...

   --HL7-CDA-boundary
   Content-ID: &lt;10.23.4567.345>
   Content-Location: canned_left_hand_image.jpeg
   Content-Type: image/JPEG

   ... Base64 image ...

   --HL7-CDA-boundary--

   ...
```

主要内容

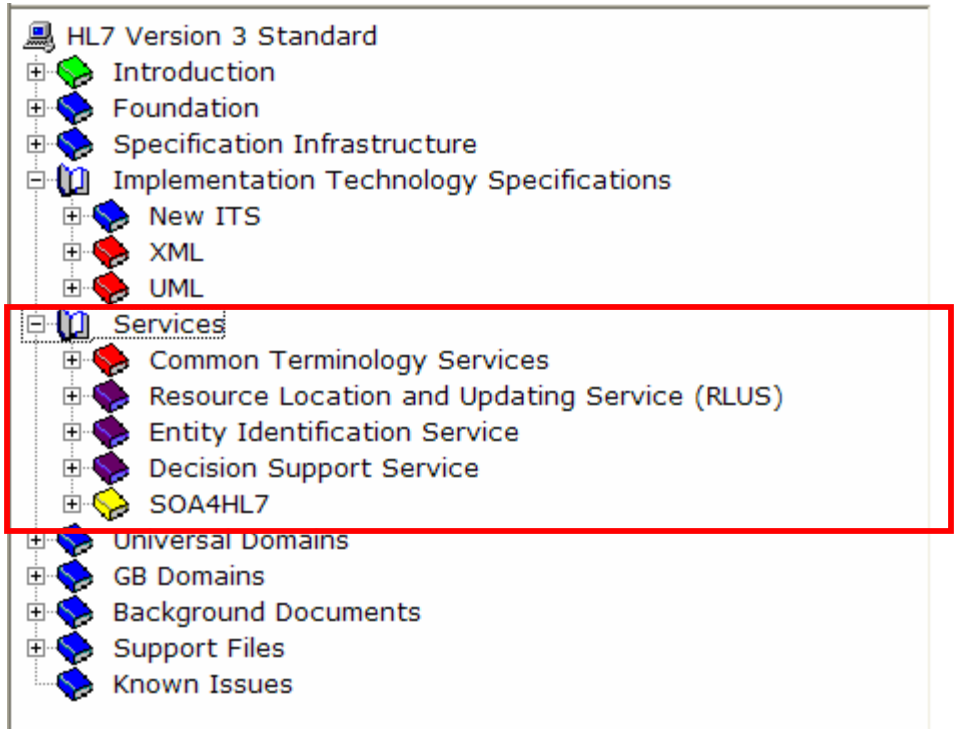
- HL7 V3 基础框架
- HL7 V3 实现技术规范（说明）
  - UML，XML
  - SOA4HL7
- Q&A

HL7 v3 技术基础

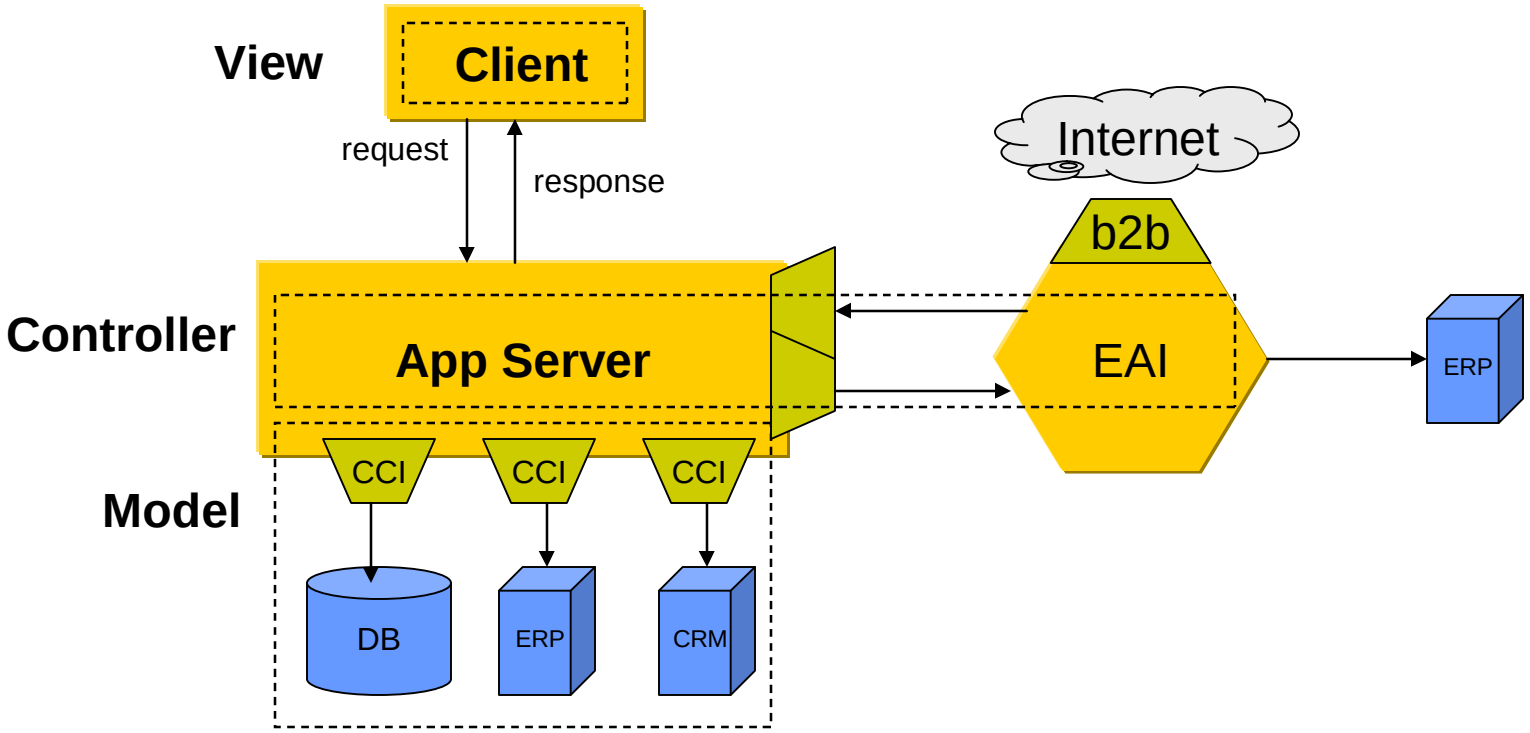
- OO 面向对象技术
- UML 通用建模
- XML 消息定义语言



HL7 v3 SOA4HL7

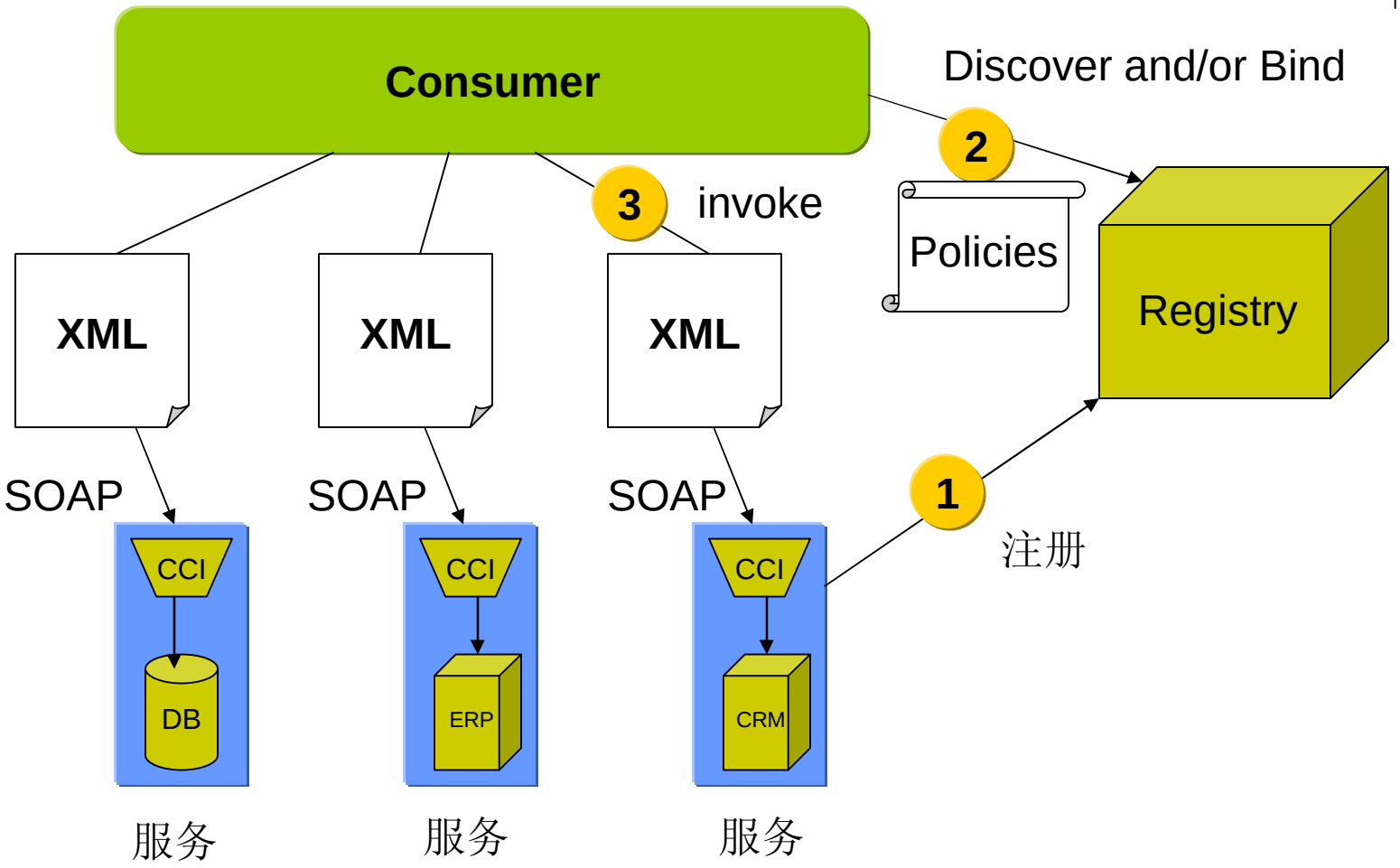


传统的交互架构

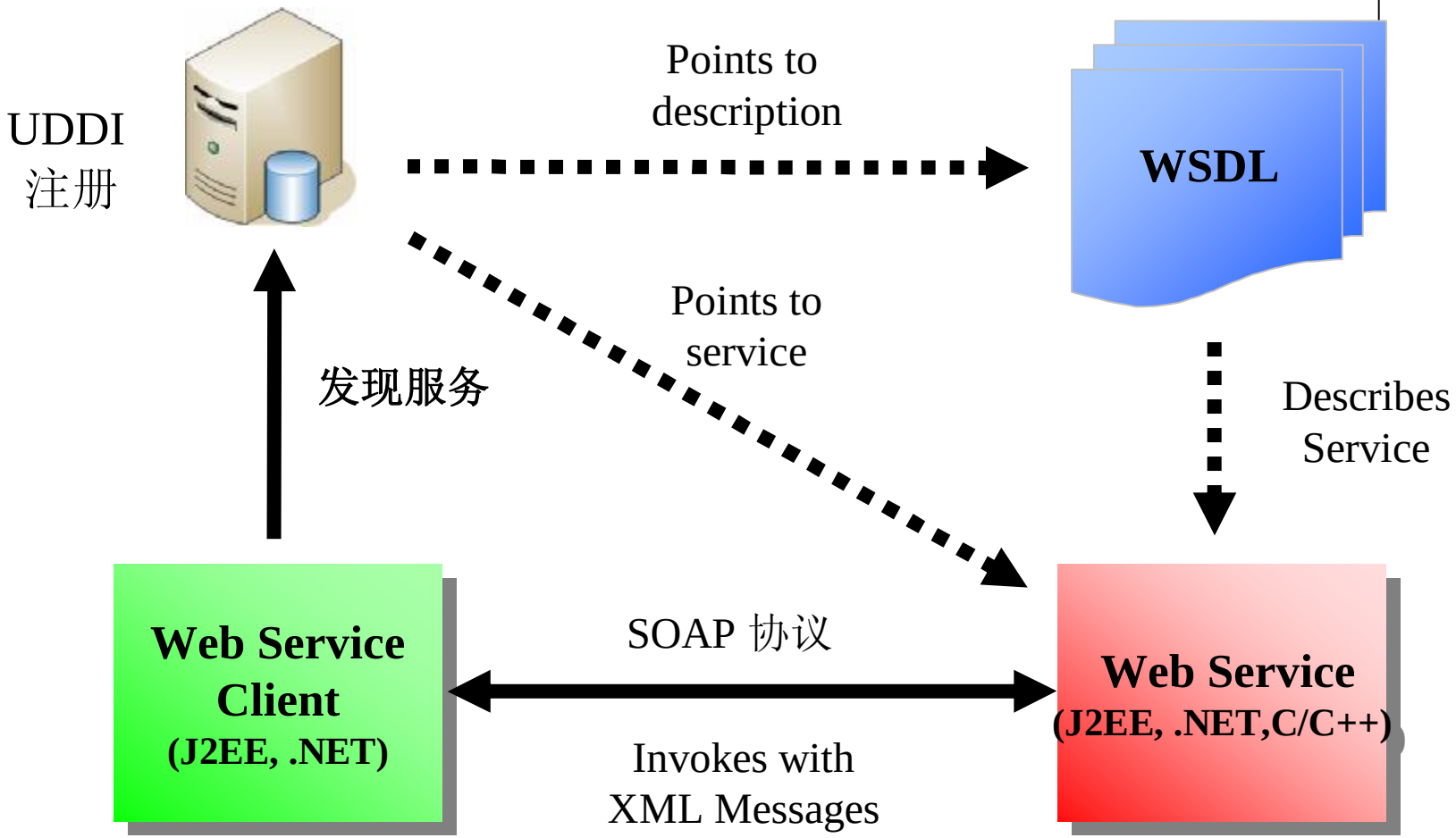


CCI: Client Communication Interface

基于服务的交互架构


Consumer
Discover and/or Bind
2
3
invoke
Policies
Registry
XML
XML
XML
SOAP
SOAP
SOAP
1
注册
CCI
CCI
CCI
DB
ERP
CRM
服务
服务
服务

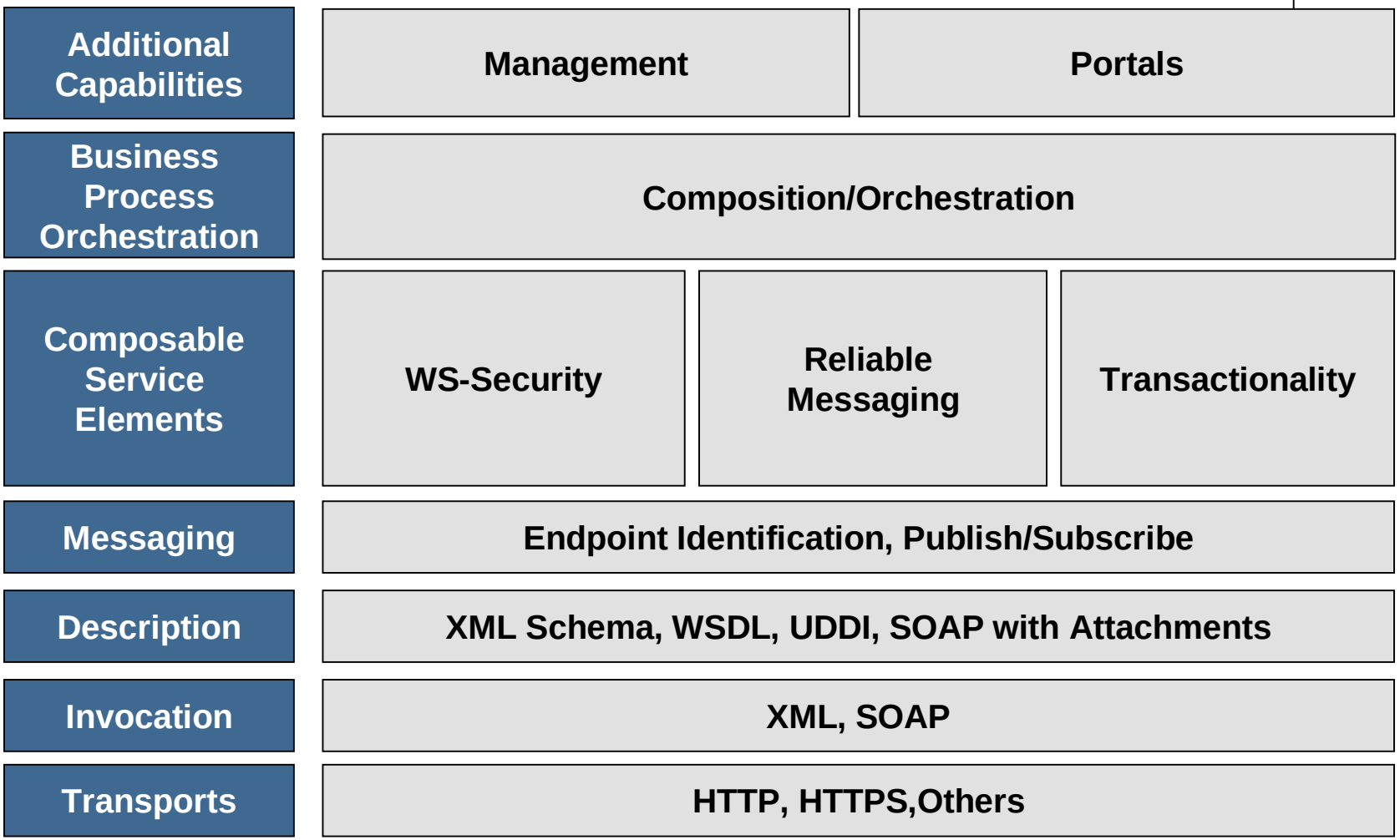
Web Services



WS-I （Web Services Interoperability）

二零零七年十月十八日

The Web Services Standards Stack

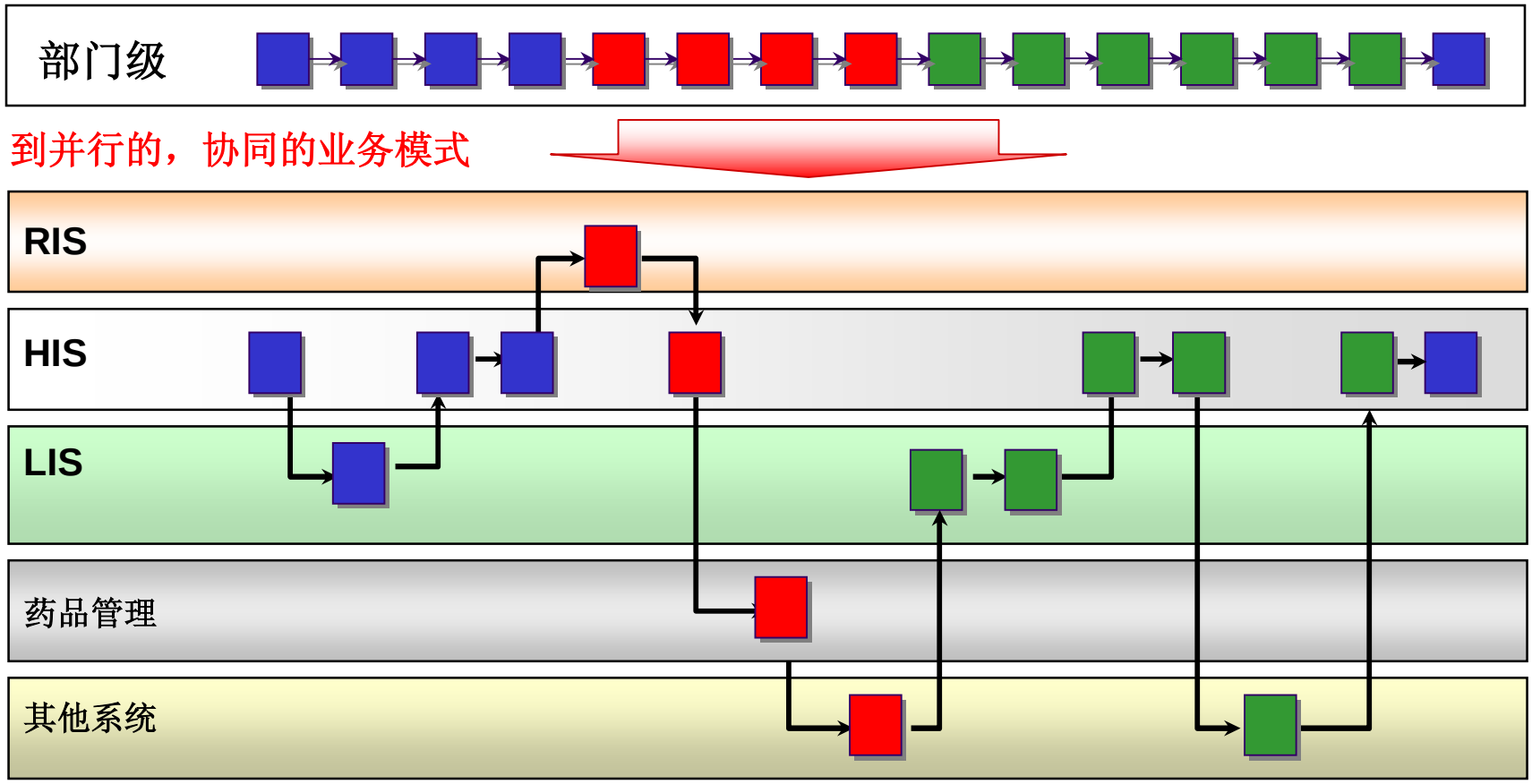


基于SOA的交互

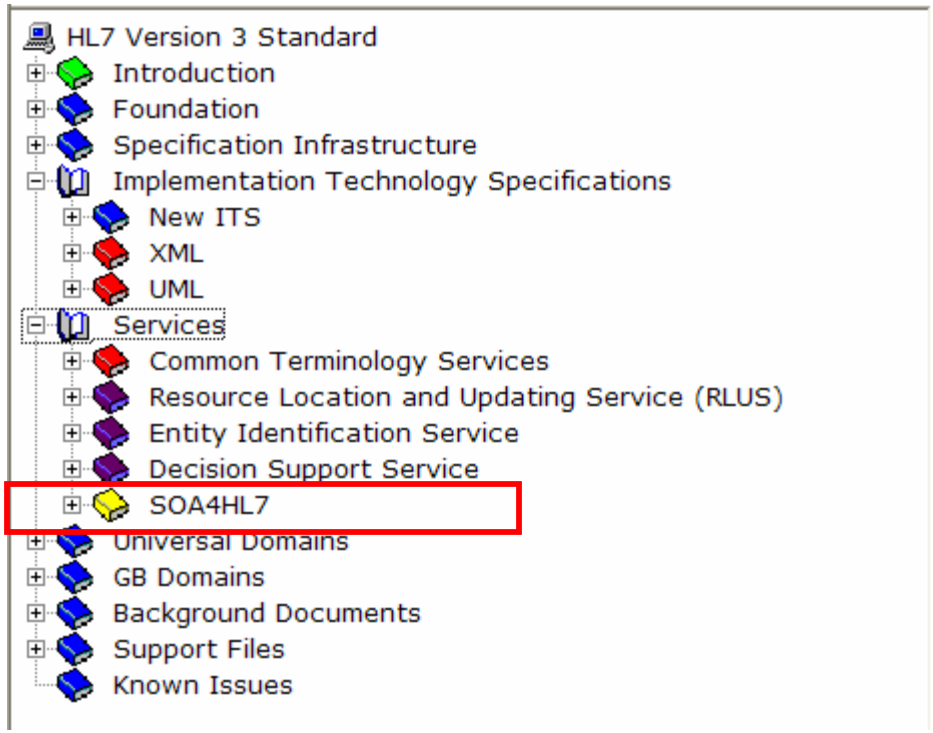
基于 SOA 架构，可以轻易实现跨两大技术体系J2EE 或 .NET之上的整合

基于SOA的应用交互

从传统的顺序的，竖直的业务模式



HL7 v3 SOA4HL7



HL7 Service Oriented Architecture
Special Interest Group (SOA SIG)

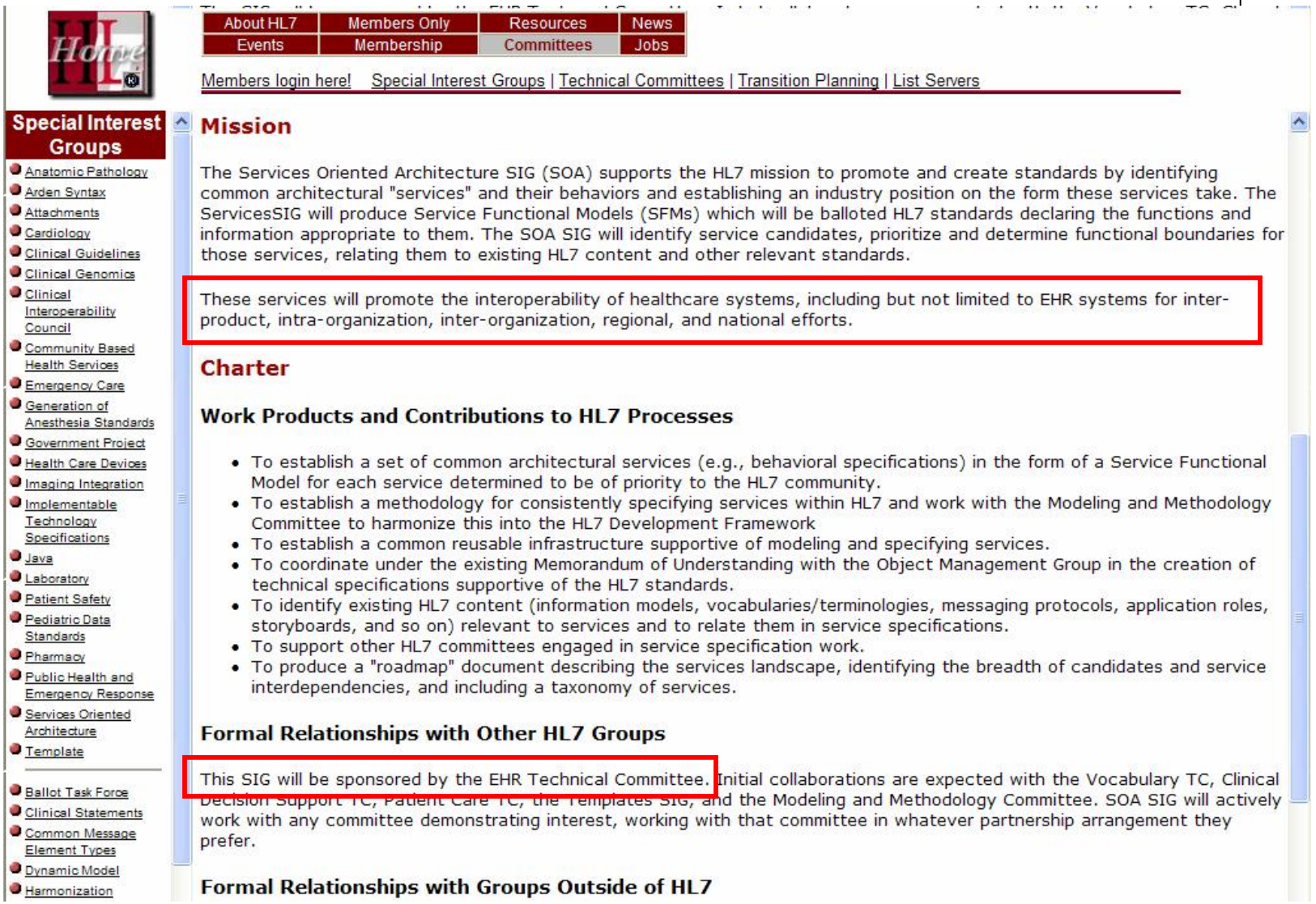
SERVICE ORIENTED ARCHITECTURE
AND HL7 V3

METHODOLOGY

VERSION NO. 0.9
DATE: November 10, 2006

Version 0.5 Page 1 Last Revision 11/14/2006

HL7 v3 SOA4HL7



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Events | Membership | Committees | Jobs

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Special Interest Groups

- Anatomic Pathology
- Arden Syntax
- Attachments
- Cardiology
- Clinical Guidelines
- Clinical Genomics
- Clinical Interoperability Council
- Community Based Health Services
- Emergency Care
- Generation of Anesthesia Standards
- Government Project
- Health Care Devices
- Imaging Integration
- Implementable Technology Specifications
- Java
- Laboratory
- Patient Safety
- Pediatric Data Standards
- Pharmacy
- Public Health and Emergency Response
- Services Oriented Architecture
- Template

- Ballot Task Force
- Clinical Statements
- Common Message Element Types
- Dynamic Model
- Harmonization

Mission

The Services Oriented Architecture SIG (SOA) supports the HL7 mission to promote and create standards by identifying common architectural "services" and their behaviors and establishing an industry position on the form these services take. The ServicesSIG will produce Service Functional Models (SFMs) which will be balloted HL7 standards declaring the functions and information appropriate to them. The SOA SIG will identify service candidates, prioritize and determine functional boundaries for those services, relating them to existing HL7 content and other relevant standards.

These services will promote the interoperability of healthcare systems, including but not limited to EHR systems for inter-product, intra-organization, inter-organization, regional, and national efforts.

Charter

Work Products and Contributions to HL7 Processes

- To establish a set of common architectural services (e.g., behavioral specifications) in the form of a Service Functional Model for each service determined to be of priority to the HL7 community.
- To establish a methodology for consistently specifying services within HL7 and work with the Modeling and Methodology Committee to harmonize this into the HL7 Development Framework
- To establish a common reusable infrastructure supportive of modeling and specifying services.
- To coordinate under the existing Memorandum of Understanding with the Object Management Group in the creation of technical specifications supportive of the HL7 standards.
- To identify existing HL7 content (information models, vocabularies/terminologies, messaging protocols, application roles, storyboards, and so on) relevant to services and to relate them in service specifications.
- To support other HL7 committees engaged in service specification work.
- To produce a "roadmap" document describing the services landscape, identifying the breadth of candidates and service interdependencies, and including a taxonomy of services.

Formal Relationships with Other HL7 Groups

This SIG will be sponsored by the EHR Technical Committee. Initial collaborations are expected with the Vocabulary TC, Clinical Decision Support TC, Patient Care TC, the Templates SIG, and the Modeling and Methodology Committee. SOA SIG will actively work with any committee demonstrating interest, working with that committee in whatever partnership arrangement they prefer.

Formal Relationships with Groups Outside of HL7

HL7 v3 SOA4HL7

Why “services” and not just “messages”?

- 公认的行业最佳业务实践
  - A common practice in healthcare but not yet healthcare IT
  - Common place usage across “IT” outside of healthcare
  - Many key products use them but do not expose interfaces
- 服务明确的定义行为而数据传输是隐性的
  - Ensures functional consistency across applications
  - Furthers authoritative sources of data
  - Minimizes duplication across applications, reuse
- 服务不排除使用消息
  - Services rely upon underlying transport protocols
  - Messages can be used as payloads for service calls
  - Messaging infrastructure may be used as underlying transport

Services and SOA

- Services are NOT just “synchronous request-reply”

  SOA covers asynchronous and synchronous equally. Both have their place.

- SOA is NOT just web services or even just technology

  Aspects of process, methodology and behavior are more important than technology. However, the unprecedented cooperation and alignment of many IT organizations has provided a uniquely widespread technology underpinning.

- SOA is NOT just a “fad”

  Like messaging, SOA is part of the natural progression or evolution of the IT industry. The specific technologies used today will continue to evolve. It is really the culmination of many best practices that have evolved over the years. Personal view – combined with EDA, BPM and further “Semantic” based concepts, I don’t believe that concepts will actually evolve that much further.

Coupling - SOA, HL7 Messaging (and also EDA)

- Services (SOA) : “Provider - do something and (optionally) let me know the result”
- HL7 Messaging: “Receiver - This happened, here is the information, and I expect you to do this in this interaction pattern”
- Events (EDA): “Anyone - This happened - do what you will about it”

Coupling Type	SOA	HL7 Messaging	EDA
Business Function	Tight	Tight	Loose
Business Process	Loose	Tight	Loose
Technology (Middleware)	Loose	Varies	Varies
Technology (Endpoint)	Loose	Loose	Loose

Achieving SOA Benefits

There are three main areas where realizing the benefits of SOA may be impaired using HL7 V3 and the Web Services Profile:

- Business
  - SOA defines services top-down based on business processes, maximizes alignment and agility to adapt to business needs. Driving from messages will not align functionally as well (sometimes it will)
  - Adaptability/Responsiveness to change. Use of simple, dynamic/ad-hoc intermediary capability within SOA is key to this flexibility. Constraints and complexity need to be minimized.
- Development Tools
  - Standard web service tooling makes it (relatively) cheap and easy for organizations to incorporate services into the enterprise (both on client and server side). These are increasingly configured to work with domain independent OASIS, WS-I standards etc. Should not handle different content in different ways
- Infrastructure
  - Standards based infrastructure for security, policy definition and run time evaluation, reliable messaging etc. Again, needs to deal with all content in same way for time and cost efficiencies and simplicity

Where would these specifications be used

Inter-Enterprise (such as NHIN, RHIOs, LHINs)

- By functionally specifying behavior, roles between applications and products are clarified, and the technologies supporting them can be profiled and sharpened

Intra-Enterprise

- Standardization on functionality allows for better integration of off-the-shelf and custom development environments, and promotes more of a “plug and play” environment

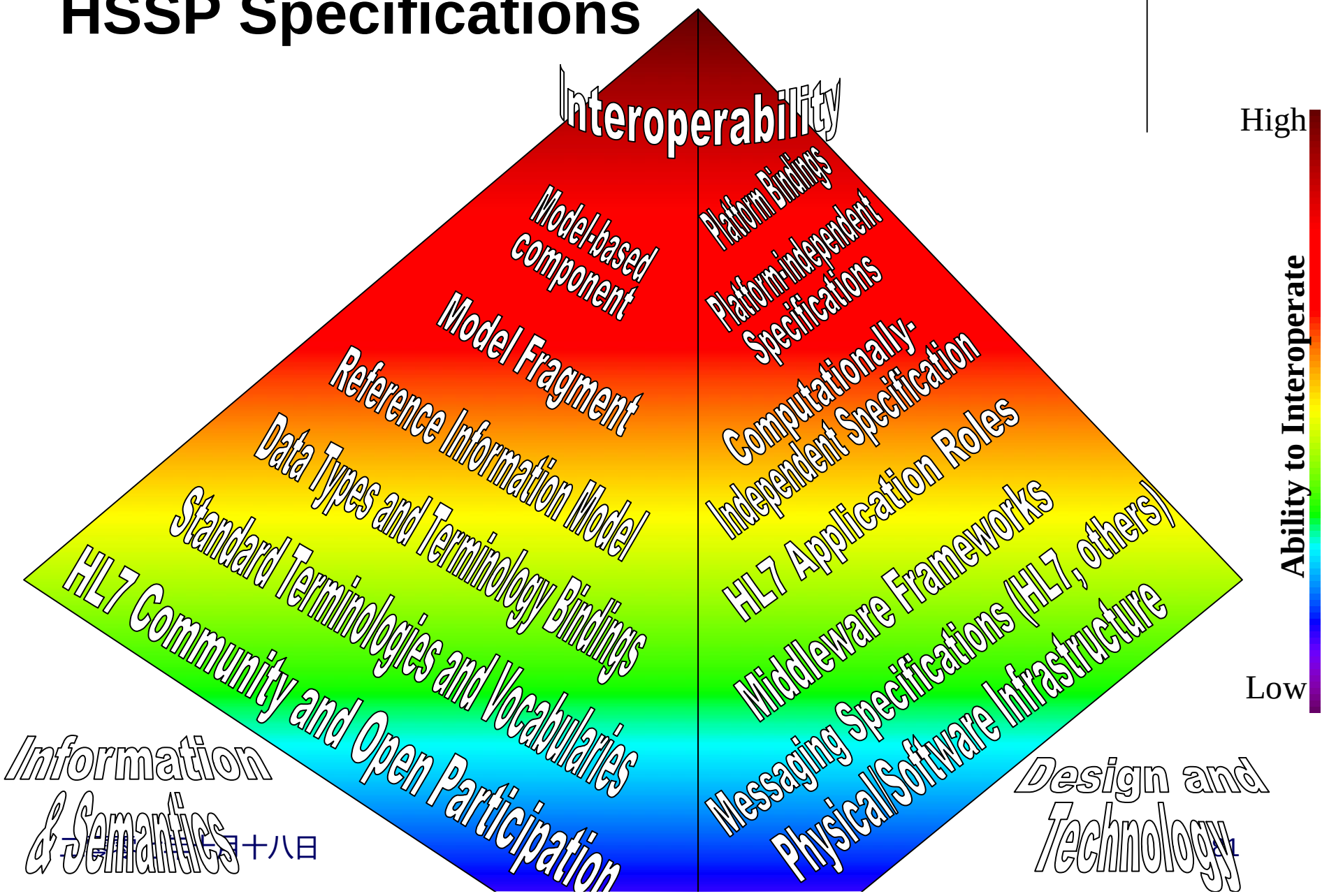
Intra-Product

- Facilitates vendors ability to integrate third-party value-add components and speed design phase with higher confidence

Custom-Implementation

- Affords organizations wishing to custom-develop the opportunity to later integrate off-the-shelf

HSSP Specifications



References

HSSP Wiki

- http://hssp.wikispaces.com

HL7 Website:

- http://www.hl7.org

OMG Website:

- http://www.omg.org

谢谢参加电子病历委员会厂商培训讨论班，欢迎提供反馈意见

haitong.wang@oracle.com