HEALTH IT
STANDARDS TESTING INFRASTRUCTURE

NIST
Medical Device Communication Testing

Semantic interoperability of Medical Devices

Test Tool Update
HL7 Healthcare Devices WG / IEEE x73 Upper Layers

John Garguilo
National Institute of Standards and Technology

24 September, 2013 – Cambridge, MA

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National Institute of Standards and Technology

NIST MDC Testing Staff

- John J. Garguilo
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- Julien Deshayes (Guest Researcher) – HL7 V2 Tools
- Nicolas Crouzier(GR) – RTMMS, HL7 V2 Tools
- Jing Gao (GR) – ICSGenerator
- Art Griesser + Michael Faughn (Contractor - *Prometheus Computing, LLC*) – DIM Modeling

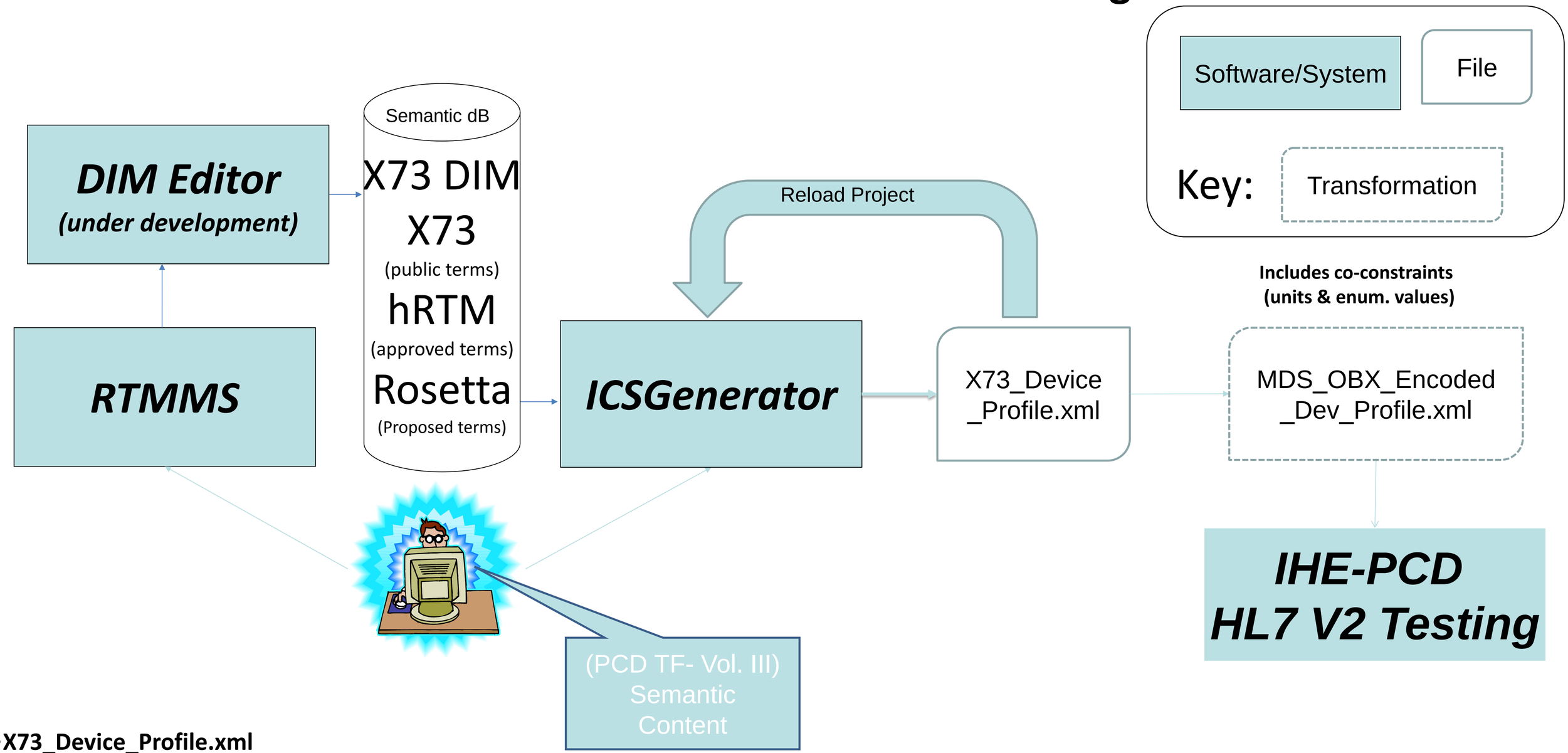
Staff Notes:

- *Julien will be leaving NIST in Dec;*
- *Jing will be shortly moving to new area (w/in NIST)*

Discussion Topics

- *HL7 V2 (2.6) IHE-PCD Validation Tools*
  - Enhancements
    Cycle 8 – 2013-14; Fall/Winter Pre-Connectathon + Virtual Testing, January/February 2014 Connectathon, March 2013 HIMSS14
  - IHE-PCD Pre-Connectathon, “Isolated Environment”
  - IHE-PCD Connectathon, “Instance Environment”
- Rosetta Terminology Mapping Management System (*RTMMS*) Overview + Update
  - RTMMS Deployment Update and service status
    - IEEE Agreement to make available the “Works” + latest numbers…
- ISO/IEEE 11073 ‘*Domain Information Model Editor*’ -> “MyDevice”
  - Progress/Roadmap Updates (Art Griesser + Michael Faughn)
  - UML Defined x73 DIM, Activity Diagram, Goals
  - Auto producing ISO/IEEE documentation (to meet SDO’s templates)
- IGAMT – Implementation Guide Authoring Management Tool
  - Later this morning Q2 – to aid user in communizing development and use of IGs

ICSGenerator and IHE-PCD V&V testing artifacts: Phase I



- **X73_Device_Profile.xml**
  - Main testing artifact, this file will be transformed to an **HL7 OBX encoded** file. ICSGenerator OBX encoded X73 device profile,
- **MDS_OBX_Encoded_Device_Profile.xml** includes:
  - OBX-2(data types) ➔ could develop for partial data type testing
  - OBX-3 (OBX-3.1= <term code> ,OBX-3.2= <refid> and OBX-3.3="MDC")
  - OBX-4 (containment), dotted notation
  - OBX-5 (enum values) – ICSGenerator access to hRTM
  - OBX-6(units) – ICSGenerator access to hRTM
  - OBX-7(value range) if provided
  - Cardinality at object level ???
  - Attribute, behaviour and notification information could also be added if there is a mapping to OBX segment.

MyDevice and IHE-PCD V&V testing artifacts: Phase II

Semantic dB

X73 DIM
(UML)
X73
(public terms)
hRTM
(approved terms)
Rosetta
(Proposed terms)
HL7
(Conf Profiles)

Reload Project

RTMMS

ICSGenerator

DIM Editor +
(under development)

MyDevice

IHE-PCD TF
Vol. III Semantic Content

IHE-PCD TFs
Vol. I Integration Profiles
Vol. II Transactions

IGAMT
MWB
By Hand

Context Validaton

IHE-PCD-
Conformance
-Profile.xml

X73_Device_
Profile.xml

Includes co-constraints
(units, body sites & enum. values)

MDS_OBX_Encoded
_Dev_Profile.xml

Context Validaton

IHE-PCD
HL7 V2 Testing

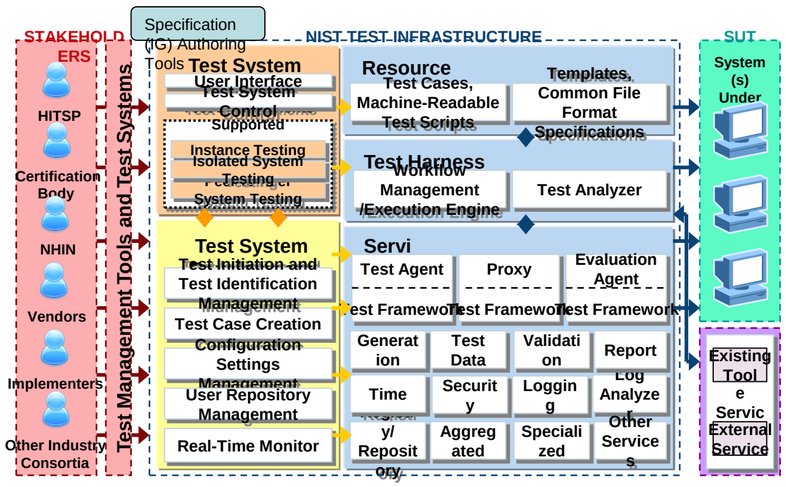
Software/System

File

Key:

Transformation

Health IT Test Infrastructure



HEALTH IT
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HL7 V2.6 Validation Tooling
IHE-PCD Pre-Connectathon Cycle 8

Semantic interoperability of Medical Devices

Test Tool Update
HL7 Healthcare Devices / IEEE WGs

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2013-14 IHE-PCD
Pre-Connectathon + Connectathon Status, Continued

- Cycle 8 - Test Cases being reviewed with IHE-PCD Tuesday calls
- IHE-PCD F2F – week of October 7th in Boca Raton at Philips Healthcare
  - Notable: Alarm Comm Mgmt → Alert Comm Mgmt
- CPs documented and submitted
- Roadmap of activities updated… see PCD wiki
- Revisions to TF Vols. I + II (PCD submitted, pending IHE approval),
  - Vol I: Revision 3, July 2013
  - Vol II: Revision 3, August 2013

2012-13 IHE-PCD Pre-Connectathon Status

- IHE-PCD: NIST “Isolated Environment” Test Tools required
  - HL7 V2.6
  - Supports 6 Integration Profiles (number of test cases)
    - DEC – Device Enterprise Communication (9)
      - SPD – Filter (4)
      - POI – Pulse Ox (3)
    - PIV – Patient Infusion Verification (7)
    - IPEC – Infusion Pump Event Communication (6)
    - IDCO – Implantable Device Cardiac Observation (4)
    - ACM – Alarm Communication Management (1)
    - RDQ – Retrospective Data Query (1)
    - OMS, RTLS/CMS white papers/WGs
- 30+ Test Cases
- 60+ existing User Accounts
  - Contributing Orgs, SDO (leads/Co-chairs), Reviewers
  - In total since tool made publically available (2011)

IHE-PCD 2013/14 Pre-Connectathon + Connectathon
NIST Testing Support

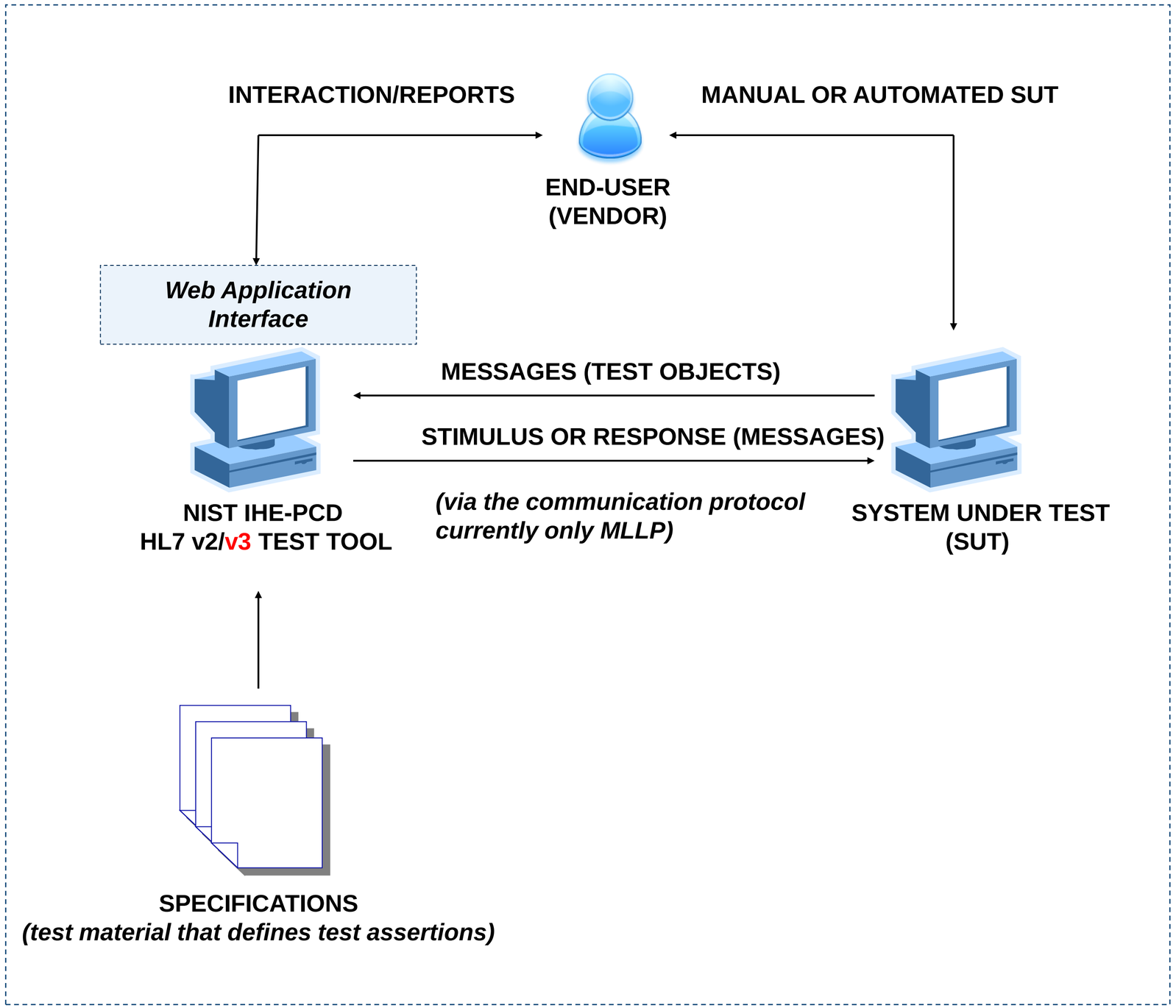
The NIST V2 (2.6) Tools perform the following validation:

- Syntax and Semantic Content Validation
  - Against IHE-PCD Technical Frameworks/Supplements (e.g., PCD-01, Communicate Device Data)
  - Against HL7 conformance profile
  - Against HL7 and/or user [local] provided tables
    - Example of user provided table is RTM for Ref_IDs, Units, etc.
  - Against ‘validation context’, including specific values
    - Defined in XML (e.g., specific test case values)

Testing Environments

- Instance Testing
  - Conformance (e.g., against HL7 2.x or CDA)
    - Test object conforms to specification on which it is based
    - IHE Model: ~*Virtual and Pre-Connectathon*
    - NIST IHE-PCD v2 Message Validation Test Tool
- Isolated System Testing
  - Includes *Instance Testing* Activities
  - Protocol Conformance
  - Functional Behavior Conformance
    - Features and operational behavior correspond to specifications
    - IHE Model: ~*Virtual and Pre-Connectathon*
    - NIST IHE-PCD v2 Test Tool
- Peer-to-Peer System Testing
  - Includes *Isolated System Testing* Activities
  - Interoperability Testing
    - Testing complete application environment
    - May include interacting with Database, using Network Communications, or interacting with other hardware, applications, or systems if appropriate
    - IHE Model: ~*Connectathon*

NIST V2 HL7 IHE-PCD Test Tool: Operational Process



V3 – Future Work

HL7 V2 Tool Updates (continued)

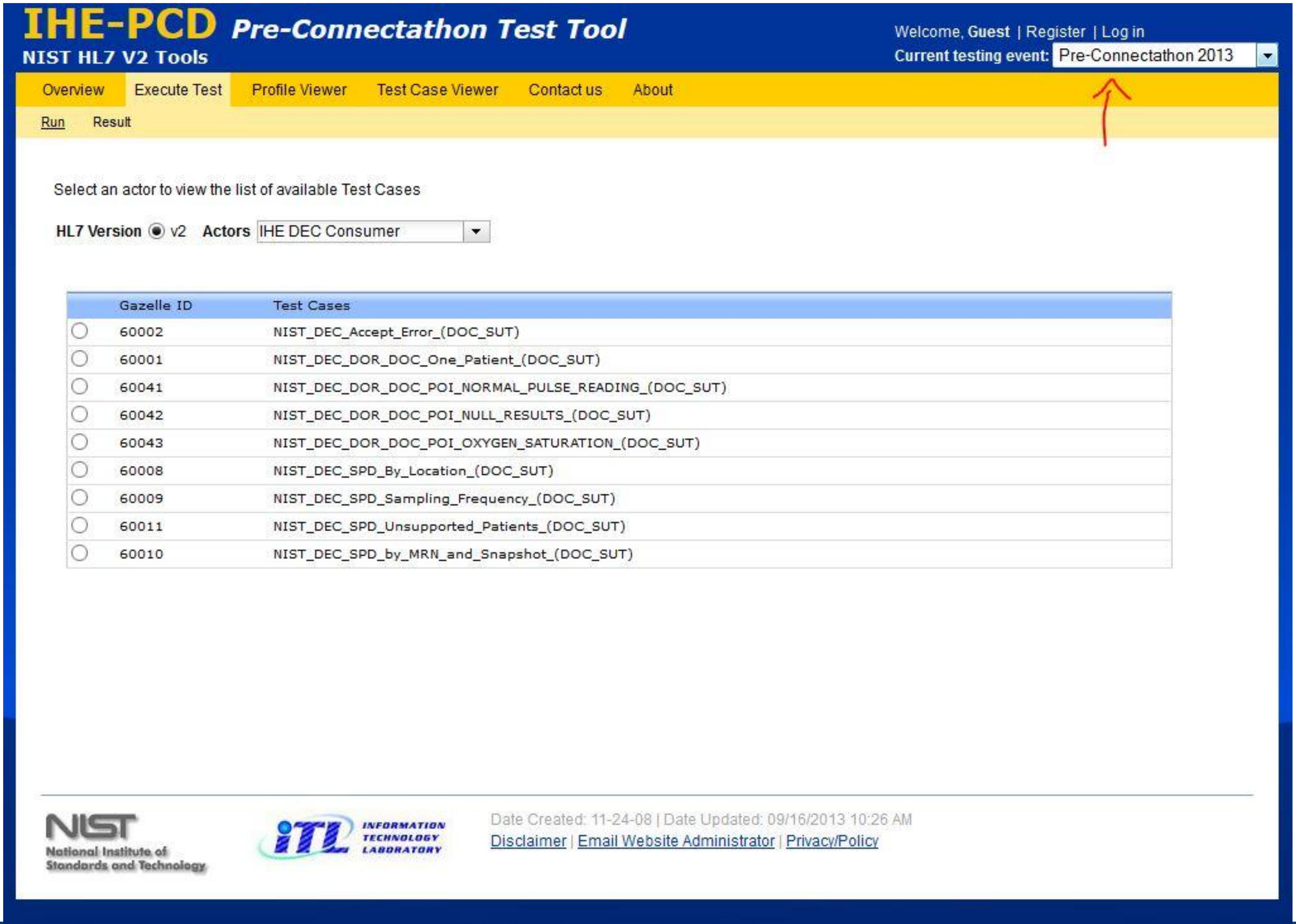
- Test event results now stored and selectable
  - Maintain (test management) data from test events
  - E.g., 2012, 2013, etc.
  - Not a live site (yet!) – updated release in Oct 2013
- Profile Viewer (shows message structure attributes)
- Resource Management Capability Added
- Test Case Scenario Viewer (Sequence Diagrams)

- New Directions (tool component research/work)
  - Constrains definition and generation methodologies and utilities

HL7 V2 Tool Updates (post cycle 7 test events)

- Documentation Tab (see coming slides)
  - Conformance Profile Tab
  - Patient Demographics
  - IDCO Patient Demographics
  - PIV Drugs
  - Other Resources
  - Looking into capability to upload libraries + demographics (future) – incorporated [automatically] into validation context files used by tooling

New Tool Updates: Test Event Selection



New tool updates – Profile Viewer

IHE-PCD *Pre-Connectathon Test Tool*
NIST HL7 V2 Tools

Welcome, **Guest** | Register | Log in
Current testing event: Pre-Connectathon 2013

Overview | Execute Test | Profile Viewer | Test Case Viewer | Contact us | About

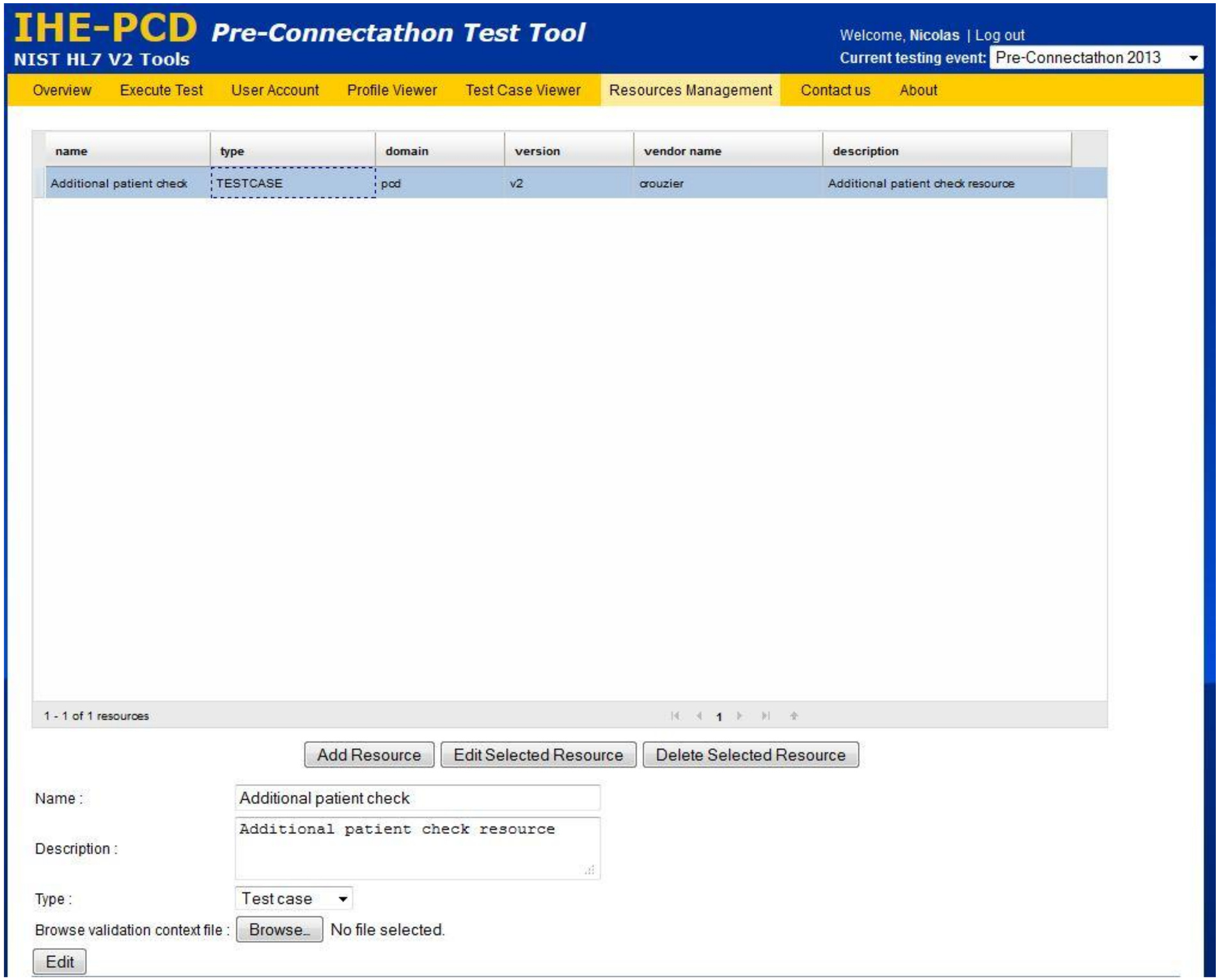
G Group S Segment F Field C Component S Subcomponent

Select Profile: PCD-01 (ORU^R01^ORU_R01)

Filter by usage: R,RE,C ○ All usage ◉

Location	Usage	Cardinality	Data Type	Length	Table	Report
▸ S MSH	R	[1,1]				
▸ S SFT	X	[0,*]				
▸ S UAC	X	[0,1]				
▾ G PATIENT_RESULT	R	[1,*]				
▾ G PATIENT	O	[0,1]				
▸ S PID	R	[1,1]				
▸ S PD1	X	[0,1]				
▾ S NTE	X	[0,*]				
F NTE.1 : Set ID - NTE	R	[0,1]	SI	4		
F NTE.2 : Source of Comment	X	[0,1]	ID	8	0105	
F NTE.3 : Comment	RE	[0,*]	FT	65536		
▾ F NTE.4 : Comment Type	X	[0,1]	CWE	250	0364	
C NTE.4.1 : Identifier	RE		ST	40		
C NTE.4.2 : Text	R		ST	199		
C NTE.4.3 : Name of Coding System	RE		ID	20	0396	
C NTE.4.4 : Alternate Identifier	RE		ST	20		
C NTE.4.5 : Alternate Text	RE		ST	199		
C NTE.4.6 : Name of Alternate Coding System	RE		ID	20	0396	
C NTE.4.7 : Coding System Version ID	C		ST	10		
C NTE.4.8 : Alternate Coding System Version ID	O		ST	10		
C NTE.4.9 : Original Text	O		ST	199		
▸ F NTE.5 : Entered By	X	[0,1]	XCN	3220		

New tool updates - Resource Management



New tool Updates - Resource

Overview | Execute Test | User Account | Profile Viewer | Test Case Viewer | Resources Management | Contact us | About

Run | Result

Select an actor to view the list of available Test Cases

HL7 Version ◉ v2 **Actors** IHE DEC Reporter

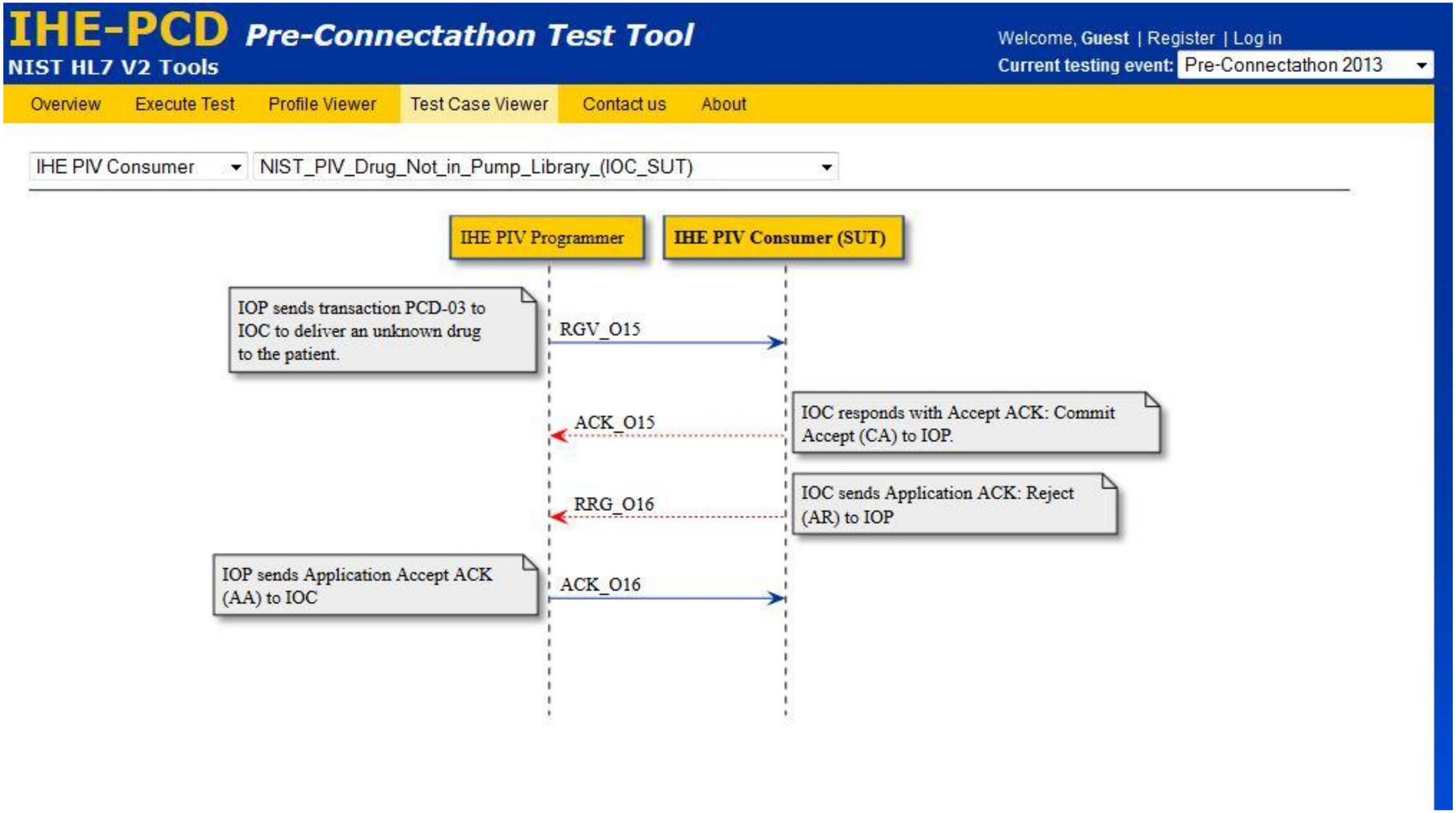
	Gazelle ID	Test Cases	Date of Test	Result
◉	**60001**	NIST_DEC_DOR_DOC_One_Patient_(DOR_SUT)		
○	**60041**	NIST_DEC_DOR_DOC_POI_NORMAL_PULSE_READING_(DOR_SUT)		
○	**60043**	NIST_DEC_DOR_DOC_POI_OXYGEN_SATURATION_(DOR_SUT)		
○		NIST_ICSA_DEC_DOR_DOC_Patients_(DOR_SUT)		
○	**123465**	TEST		
○	**1456786**	toto		

Test Case Information	
Gazelle ID	60001
Test Case Title	NIST_DEC_DOR_DOC_One_Patient_(DOR_SUT)
System under test	IHE DEC Reporter

Test Steps Information

Order	NIST actor	Description	Example of Message	Additional resources
1	IHE DEC Consumer	Step 1: DOR sends data for patient Albert Hon (MRN: HO2009001, DOB: Jan.1 1961, Location: HO Surgery, OR-1, Sex: M, Mother's Maiden Name: Adams). At least 4 parameters for each type of device are sent. Patient's data is not validated unless only validated data is supported.		
		Additional patient check : (Additional patient check resource)		
		Step 2: DOC responds with ACK message (MSA-1 = "AA")		

New tool Updates – Test Case Viewer



HL7 V2 Tool Updates (post cycle 7 test events)

- Current Version / Release Notes
  - Needs to be added – to be added soon…
  - Example shown from MU Lab Reporting Interface Tool

Release Notes

Release	Date	Notes
1.3.0	04/26/2013	LRI_Release_Notes.1.3.0.docx
1.2.0	03/22/2013	LRI_Release_Notes.1.2.0.docx
1.1.0	02/15/2013	LRI_Release_Notes.1.1.0.docx
1.0.0	12/15/2012	Initial Release

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Deployment Information
Update Date: 04/26/2013
Version: 1.3.0

Browsers Supported
IE 8, IE 9, Firefox 3.x, Chrome
Recommended Browsers: IE 9, Firefox, Chrome

External Links

Disclaimer

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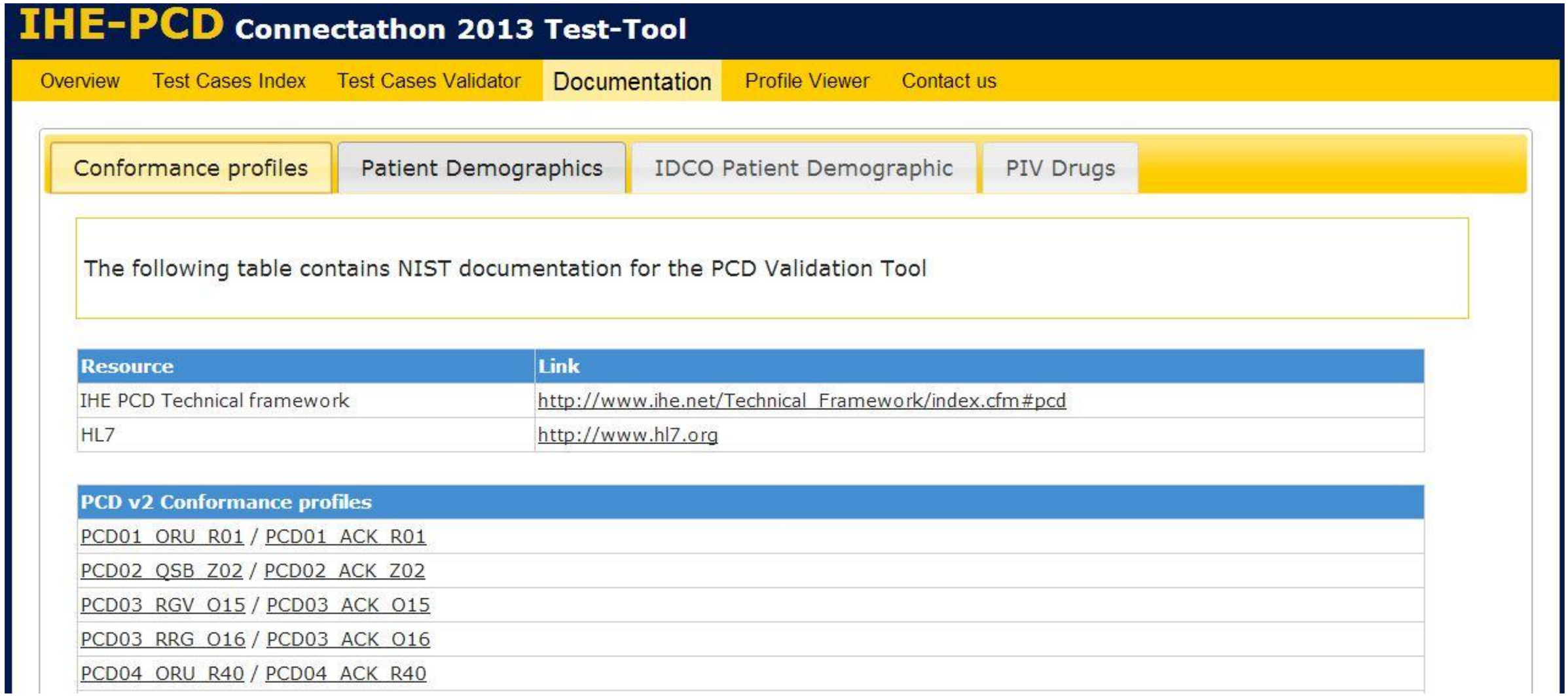
Website Administrator

INFORMATION TECHNOLOGY LABORATORY

HL7 V2 Tool Updates (post cycle 7 test events)

- Documentation Tab
  - Conformance Profiles



HL7 V2 Tool Updates (post cycle 7 test events)

- Documentation Tab
  - Patient Demographics

IHE-PCD Connectathon 2013 Test-Tool

Overview | Test Cases Index | Test Cases Validator | Documentation | Profile Viewer | Contact us

Conformance profiles | Patient Demographics | IDCO Patient Demographic | PIV Drugs

MRN (Namespace)	First Name	Last Name	Sex	DOB	Location (Point of Care, Room-Bed)	Mother's Maiden Name	Address	City	Postal Code
Patients for single PCD system									
HO2009001	Albert	Hon	M	19610101	HO Surgery, OR-1	Adams	15 N Saguaro	Tucson	85701
HO2009002	Charles	Hon	M	19610201	HO Surgery, OR-2	Brooks	3015 E Sagebrush	Tucson	85712
HO2009003	Amy	Hon	F	19610301	HO 3 West ICU, 10-1	Coburn	5615 S Palo Verde	Tucson	85706
HO2009004	Carrie	Hon	F	19610401	HO 3 West ICU, 10-2	Davidson	515 W Cholla	Tucson	85719
2010001	Albert	Smith	M	19610101	Surgery, OR-3	Adams	60 N Saguaro	Tucson	85701
2010002	Charles	Smith	M	19610201	Surgery, OR-4	Brooks	3060 E	Tucson	85712

HL7 V2 Tool Updates (post cycle 7 test events)

- Documentation Tab
  - IDCO Patient Demographics

IHE-PCD Connectathon 2013 Test-Tool

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Conformance profiles | Patient Demographics | IDCO Patient Demographic | PIV Drugs

Sending System Manufacturer	System Identifier	MRN (Namespace)	First Name	Last Name	Sex	DOB	Patient location	C Phy Phy Nu
Biotronik	REPORTER_BIO_EHR_DataSync	BI2009002	Charles	BiotronikA	M	19610301	BI ER, 5-2	He #H
Biotronik	REPORTER_BIO_EHR_DataSync	BI2009003	Amy	BiotronikA	F	19610401	Cardiac Clinic LA	He #H
Biotronik	REPORTER_BIO_EHR_DataSync	BI2009004	Carrie	BiotronikA	U	not known	Cardiac Clinic LA	He #H
Biotronik	REPORTER_BIO_EHR_DataSync	BI2009005	Franz	BiotronikA	M	19610201	Home 1	He

HL7 V2 Tool Updates (post cycle 7 test events)

- Documentation Tab
  - PIV Drugs

IHE-PCD Connectathon 2013 Test-Tool

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Drugs	Drug ID	Drug Name	Concentration	Dose/Rate	Dosing Unit	Volume to be Infused(mL)
Drug #1	1111	Dextrose 5%	50 gm/ 1000 mL	500	mL/hr	1000
Drug #2	2222	Dopamine	400 mg / 250 mL	5	mL/hr	250
Drug #3	3333	Heparin	25,000 Units / 500 mL	1200	mL/hr	500
Drug #4	4444	Propofol	1000 mg / 100 mL	50	mL/hr	100
Drug #5	5555	Morphine	100 mg / 100 mL	5	mL/hr	100
Drug #6	6666	Vancomycin	1000 mg / 250 mL	250	mL/hr	200
Drug #7	7777	Nitroglycerin	50 mg / 250 mL	5	mL/hr	250
Drug #8	8888	Ceftriaxone	2 g / 50 mL	100	mL/hr	50

New tool directions

- Predicate Project
  - assertion language to capture message value constraints
  - Needed in addition to the conformance profile, which does not capture all the HL7 constraints
  - Eg: MSH[1]-3[1].2[1]="sender“
- DataLibraryExpander project
- Resource Generator project

New tool directions

- DataLibraryExpander project
  - Generate any conformance profile by specifying an HL7 Profile + data that user wants to override
  - only the static definition

Example code snippet:

```
<Message Name="ORU_R01" Restriction="ORU_R01">
        <Segment Name="MSH">
                <Field Name="Sending Application">
                        <Component Name="Namespace ID" Length="10"/>
                </Field>
        </Segment>
</Message>
```

Generates:

```
<HL7v2xStaticDef MsgStructID="ORU_R01" xmlns="http://www.nist.gov/healthcare/hl7/ihe/pcd/profile">
  <Segment Name="MSH" LongName="Message Header" Usage="R" Min="1" Max="1">
    <Field Name="Field Separator" Usage="R" Min="1" Max="1" Datatype="ST" Length="1" ItemNo="00001"/>
    <Field Name="Encoding Characters" Usage="R" Min="1" Max="1" Datatype="ST" Length="4" ItemNo="00002"/>
    <Field Name="Sending Application" Usage="R" Min="0" Max="1" Datatype="HD" Length="227" Table="0361" ItemNo="00003">
      <Component Name="Namespace ID" Usage="RE" Datatype="IS" Length="10" Table="0300"/>
      <Component Name="Universal ID" Usage="RE" Datatype="ST" Length="999"/>
      <Component
```

New tool directions

- Resource Generator project
  - Reads an HTML document which contains all the constraints, identified as <Code> tags in the document, and translates them into HTML tags

Example code snippet:

```
<html>
  <body>
    <code type="staticDefinitionTable" id="ORU_R01">
      <Message Name="ORU_R01" Restriction="ORU_R01" xmlns="http://www.nist.gov/healthcare/profile/library">
        <Segment Name="SFT" Usage="X"/>
        <Segment Name="UAC" Usage="X"/>
        <Group Name="PATIENT_RESULT">
          <Group Name="PATIENT">
            <Segment Name="PD1" Usage="X"/>
            <Segment Name="NTE" Usage="X"/>
          </Group>
        </Group>
        <Segment Name="DSC" Usage="X"/>
      </Message>
    </code>
  </body>
</html>
```

New tool directions

- Resource Generator, continued
- Generates the static definition table:

IHE PCD Transactions

PCD-01 Communicate PCD Data

This section specifies Transaction PCD-01 of the IHE Patient Care Device Technical Framework, which is used to transmit patient care device data between systems. Transaction PCD-01 is used by the Device Observation Reporter and Device Observation Consumer actors. Note that these actor names are linked to abstract functions rather than to physical devices; a Device Observation Reporter may be implemented in a freestanding system or it may be implemented in the Patient Care Device itself.

static definition for "ORU_R01"

Name	Usage	Cardinality
<Segment="MSH">	Usage=R	Card=[1..1]
<Segment="SFT">	Usage=X	Card=[0..*]
<Segment="UAC">	Usage=X	Card=[0..1]
▼ <Group="PATIENT_RESULT">	Usage=R	Card=[1..*]
▼ <Group="PATIENT">	Usage=O	Card=[0..1]
<Segment="PID">	Usage=R	Card=[1..1]
<Segment="PD1">	Usage=X	Card=[0..1]
<Segment="NTE">	Usage=X	Card=[0..*]
<Segment="NK1">	Usage=O	Card=[0..*]
<Segment="OBX">	Usage=O	Card=[0..*]
▼ <Group="VISIT">	Usage=O	Card=[0..1]
<Segment="PV1">	Usage=R	Card=[1..1]
<Segment="PV2">	Usage=O	Card=[0..1]
▼ <Group="ORDER_OBSERVATION">	Usage=R	Card=[1..*]
<Segment="ORC">	Usage=O	Card=[0..1]
<Segment="OBR">	Usage=R	Card=[1..1]
<Segment="NTE">	Usage=O	Card=[0..*]
<Segment="ROL">	Usage=O	Card=[0..*]
▼ <Group="TIMING_QTY">	Usage=O	Card=[0..*]
<Segment="TQ1">	Usage=R	Card=[1..1]
<Segment="TQ2">	Usage=O	Card=[0..*]
<Segment="CTD">	Usage=O	Card=[0..1]
▼ <Group="OBSERVATION">	Usage=O	Card=[0..*]
<Segment="OBX">	Usage=R	Card=[1..1]
<Segment="NTE">	Usage=O	Card=[0..*]
<Segment="FT1">	Usage=O	Card=[0..*]
<Segment="CTI">	Usage=O	Card=[0..*]
▼ <Group="SPECIMEN">	Usage=O	Card=[0..*]
<Segment="SPM">	Usage=R	Card=[1..1]
<Segment="OBX">	Usage=O	Card=[0..*]
<Segment="DSC">	Usage=X	Card=[0..1]

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Rosetta Terminology Mapping Management System - RTMMS

Semantic interoperability of Medical Devices

Test Tool Update
Joint HL7/IEEE 11073 Healthcare Devices Working Group

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National Institute of Standards and Technology

RTMMS Overview

- A web application* that allows vendors and reviewers access, retrieval, and reporting of Rosetta Tables over the internet in conformance to IHE-PCD RTM Profile
- An electronic resource/tool providing the capability of saving data in xml format (as defined by RTM Profile)
- Aids the harmonization process by:
  - Identifying missing terms
  - Automatic generation of the “Harmonized Rosetta Table”
  - Providing latest up-to-date view of hRTM table
- Facilitates the proposal of New Terms to IEEE 11073 Nomenclature standard
- Facilitates Conformance Tooling
  - Message verification and conformance (syntax and semantics)
  - Leading to interoperability…
  - *developed by and currently hosted at NIST
  - Integrated with ICSGenerator Tool (hRTM also imported into DIM Editor)

Rosetta Terminology Mapping Data Base

- Rosetta Table
  - Maps vendor supported observations, units and enumerations to ISO/IEEE x73 nomenclature
- Units Table
  - Defines allowed units-of-measure
  - Defines groups of related units-of-measure
- Enumerations Table
  - Defines groups of enumerated values
- hRTM Table
  - Generated from the original Rosetta

X73 Nomenclature DB

- Linked to RTMMS

Security DB - Stores users information

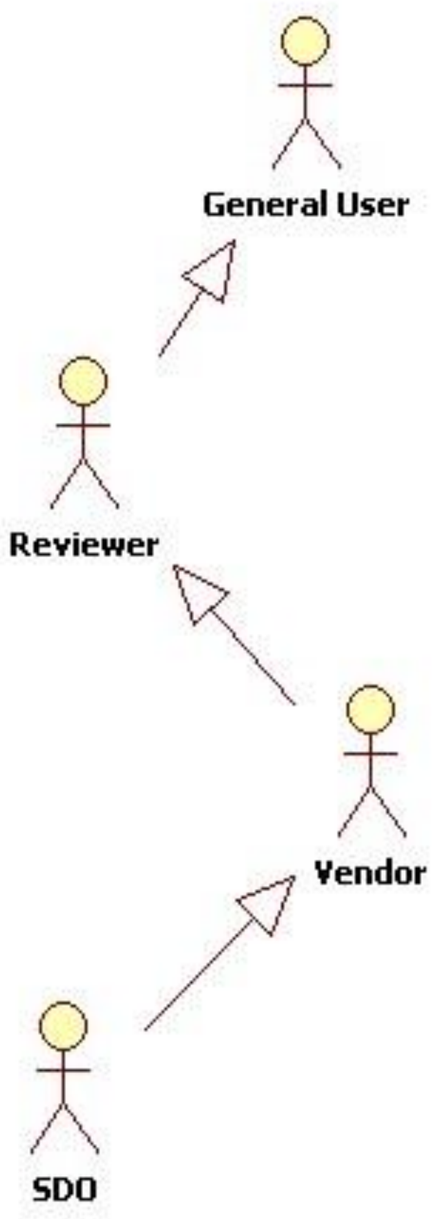
RTMMS Key Features

- Access to NIST IEEE 11073 Nomenclature database
  - Appendix A terms (from ISO/IEEE 11073 10101: Nomenclature)
  - Appendix B terms (from ISO/IEEE 11073 10101: Nomenclature)
  - IDCO terms (ISO/IEEE 11073-10301 – implantable device cardiac)
  - aECG (annotated Electrocardiography)
  - PHD terms (personal health domain)
- Access to RTM database
- Ability to propose terms in Rosetta
- hRTM, units, and enumeration download-able in XML format
- User registration
  - Email confirmation, approval process… controlled through ‘admin’
- Filtering based on regular expressions
- Rosetta validation against hRTM
- Management capabilities for SDO users

❖ *Integrated w/ ICSGenerator / exported to ‘DIM Editor’*

RTMMS Users

- General user
  - Views Rosetta Tables
- Reviewer
  - Participates in discussions
- Contributing Organizations
  - Vendor/Contributer ‘sandbox’
  - Modifies Vendor Rosetta Table
  - Suggests new terms
  - Modifies Units and Enumerations Table
- SDO (Standard Development Organization)
  - Modifies Units and Enumerations Table
  - Register new terms
- Admin
  - Manages User Accounts



RTMMS by the numbers (as of 23 September 2013)

- 1596 Rosetta terms
- 654 hRTM terms
- 222 Groups
- 8 Unit Groups
  - 442 Units (MDC)
  - 426 Units (UCUM)
- 27 Enumeration Groups
  - 261 Enumerations
- 37 Contributing Organizations now Registered!

Contributing Organization

Edit contributing organization | Add contributing organization | Delete contributing organization | Merge two contributing

CO ID	Suffix	CO Name
DocBox-Inc	DOCBOX	DocBox Inc
Draeger		Draeger-Siemens
Editorial-pss		Editorial additions (Paul Schluter)
Editorial-RTMV		
Elbrys-Networks	ELBRYS	Elbrys Networks
EPIC	EPIC	EPIC
Eversolve	EVERSOLVE	Eversolve
Fresenius	FRE	Fresenius
GE_Aware	GE	GE (Aware Gateway)
HL7-Hellas	HL7HELLAS	HL7 Hellas
Hospira	HSP	Hospira
IEEE	IEEE	ISO/IEEE 11073-10101 and its extensions
IHE PCD Infusion Pump Work ...	IHEPCDINF	IHE PCD Infusion Pump Work Group
LiveData		LiveData
Mindray	MR	Mindray
Nuvon		Nuvon
OSD_MIL	OSDMIL	OSD MIL
Philips		Philips Healthcare
Shoulders_Corporation	SCO	Shoulders Corporation
Siemens	SI	Siemens
Smiths Medical	SM	Smiths Medical
Spacelabs		Spacelabs Healthcare
STYK		
True Process Inc	TPI	True Process Inc.
VA	VA	Veterans Affairs
VIASYS		Cardinal VIASYS
WelchAllyn		Welch Allyn
West_Health	WH	West Health Institute

RTMMS (as of 23 September 2013)

- 11073 Tab
- Synched with Jan Wittenber's dBase (Spring 2013)

RTM Management Service
In partnership with NIST

sdo (SDO) | User Guide | Preferences | **Logout**

Home | Contributing Organizations Rosetta | Rosetta | hRTM | Units | Enumerations | Groups | Contributing Organizations | X73 | Term Approval

Select a partition from table then click on Next button to view terms from the Nomenclature.

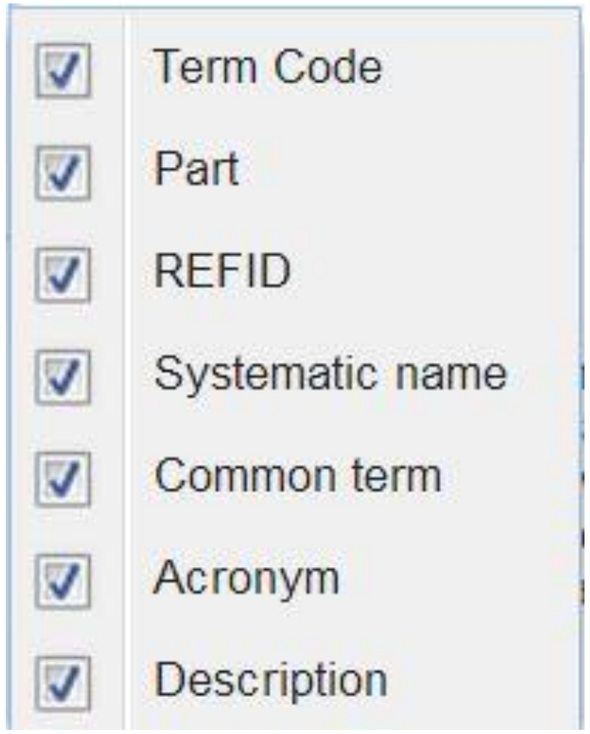
Term Partitions Table

Download | New term | Search all terms:

Block ID	Block Name	Block Description	Partition Name	Partition Description
***"Unspecified"* (1 Item)**				
0	MDC_PART_UNSPEC	Unspecified	UNKNOWN	unknown partition
***"Object-oriented"* (8 Items)**				
1	MDC_PART_OBJ	Object-oriented	ACT	Description Action
1	MDC_PART_OBJ	Object-oriented	AL-STAT	Description Alert Object ID
1	MDC_PART_OBJ	Object-oriented	ATTR/GROUP	Description Attribute Group
1	MDC_PART_OBJ	Object-oriented	ATTRs	Description Attribute
1	MDC_PART_OBJ	Object-oriented	MD-Gen	Description Medical Device - Generic
1	MDC_PART_OBJ	Object-oriented	MOC/BASE	Description Object
1	MDC_PART_OBJ	Object-oriented	NOTI	Description Notification
1	MDC_PART_OBJ	Object-oriented	PMS	Description Persistent Metric Store Object ID
***"Supervisory control and data acquisition (SCADA)"* (10 Items)**				
2	MDC_PART_SCADA	Supervisory control and data acquisition (SCA...	BLD CHEM	Description Blood/Fluid Chemistry
2	MDC_PART_SCADA	Supervisory control and data acquisition (SCA...	ECG-LEADS	Description ECG Lead

RTMMS (as of 23 September 2013)

- 11073 Tab



ISO/IEEE 11073 Tab

RTM Management Service
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sdo (SDO) | User Guide | Preferences | Logout

Home | Contributing Organizations Rosetta | Rosetta | hRTM | Units | Enumerations | Groups | Contributing Organizations | X73 | Term Approval

EVENTS/ADVISORY partition terms

Download | New term | Edit term | Delete term | Search terms:

Term Code	Part	REFID	Systematic name	Common term	Acronym	Description
6658	3	MDC_EVT_ADVIS_CHK				
6660	3	MDC_EVT_ADVIS_CALIB_CHK				
6662	3	MDC_EVT_ADVIS_CALIB_REQD				
6664	3	MDC_EVT_ADVIS_CALIB_AND_ZERO_CHK	Advisory | Calibration, CheckingNecessary | FunctionalStatus | Device	Calibration checking necessary		Advisory: Check Calibration/Zero (system is not sure if calibration data is still ok.)
6666	3	MDC_EVT_ADVIS_CONFIG_CHK				
6668	3	MDC_EVT_ADVIS_SETTINGS_CHK				
6670	3	MDC_EVT_ADVIS_SETUP_CHK				
6672	3	MDC_EVT_ADVIS_SRC_CHK				
6674	3	MDC_EVT_ADVIS_ZERO_CHK				
6676	3	MDC_EVT_ADVIS_BATT_COND	Advisory | Battery, ConditioningRequired | FunctionalStatus | Device	Battery conditioning required		Advisory: Condition Battery (battery needs a special ÃƒÂ¢??'conditionÃƒÂ¢??' charge cycle for full capacity.)
6678	3	MDC_EVT_ADVIS_BATT_REPLACE	Advisory | Battery, NeedsReplacement | FunctionalStatus | Device	Battery needs replacement		Advisory: Replace Battery (a full charge is now a too small fraction of the original capacity, or this is not a rechargeable battery that is close to empty.)
6680	3	MDC_EVT_ADVIS_CABLE_CHK				

RTMMS Primary Updates

- ✓ Agreement finalized between IEEE and NIST (Dec 2012)
  - Allows users free and public access of terminology attributes that were formally ‘pay-for’ via the NIST tool
  - The “Works”

Definition of the “Works” [from IEEE/NIST Agreement]

The following data items within the approved standards , existing and future versions, currently designated as:

1 – IEEE 11073-10xxx

2 – IEEE 11073-20xxx

Limited to the following data items within, currently designated as:

1 – Ref ID

2 – Code

3 – Description

4 – Systematic Name

- ✓ Revised “term approval” Functionality

RTMMS Primary Updates – Signed Agreement 12/20/12

Click on Tools to convert PDF documents to Word or Excel.

For IEEE:
Konstantinos Karachalios
Managing Director, IEEE-SA
The Institute of Electrical and
Electronic Engineers, Inc.
445 Hoes Lane, Piscataway, NJ 08854

For NIST:
Ram Sriram
Chief – Systems and Software Division
Information Technology Laboratory
National Institute of Standards & Technology
100 Bureau Drive, Gaithersburg, MD 20899

WHEREFOR, the signatories below, having signed this License Agreement, attest as to having the authority to enter into this Agreement and, agree to comply with all of the terms and conditions, covenants and obligations contained herein.

Licensor

Signature

Konstantinos Karachalios
Name

Managing Director IEEE-SA
Title

20 Dec 2012
Date

Licensee

R. S. Ra
Signature

Ram D. Sriram
Name

Division Chief
Title

12-20-12
Date

RTMMS Updates, cont.

- User can now download (an XML, HTML, and CSV) version of:
  - Rosetta [1596]
  - “hRTM” [654]
  - Units (MDC [442] + UCUM [426]) and Enumerations [261]
  - Term Approval::“Proposed terms” [189]
  - Term Approval::”Ready Terms” [269]
  - *Note: Basis from prior WG discussions - this version enables greater flexibility to work with when working outside the tool*
- “Standard Table”
  - A new column “Standard Tbl” is now present in all Rosetta, hRTM and review tables
  - Provides association of the term with corresponding table in the base standard
  - Only the terms given by Jan W. (275) REFIDs are currently linked
  - NIST can add more if community provides the/additional mapped terms.
- Term Approval Updates (see subsequent slides)

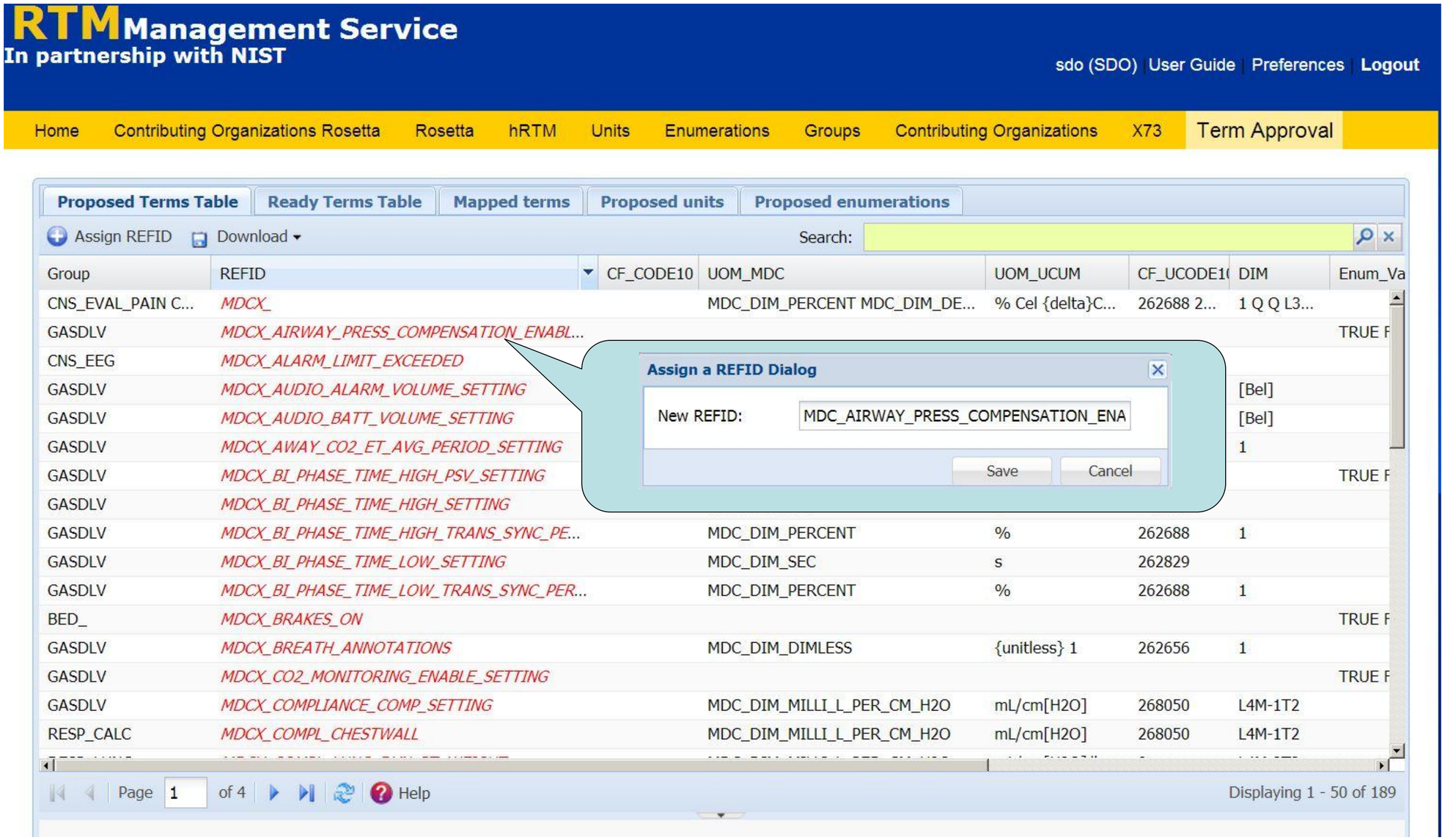
Term Approval

Revised “term approval” tables/tab

“Proposed terms” tab (189 rows)

Re-groups all the newly proposed terms with “MDCX_” prefix

The ‘Assign REFID’ button allows to change the *REFID* from an “MDCX_” term to a “MDC_ term” (or anything else)



Term Approval, cont.

- "Ready to review terms" tab: 269 rows:
  - Terms with MDC_ prefix and null or 0 term code

RTM Management Service
In partnership with NIST

sdo (SDO) | User Guide | Preferenc

Home | Contributing Organizations Rosetta | Rosetta | hRTM | Units | Enumerations | Groups | Contributing Organizations | X73 | Term Approva

Proposed Terms Table | **Ready Terms Table** | Mapped terms | Proposed units | Proposed enumerations

Edit RefID | Register RefID | Download | Search:

Group	REFID	CF_CODE10	Standard Tbl	UOM_MDC	UOM_UCUM	CF_UCODE
GASDLV_CO2	MDC_CONC_CO2_ET_SETTING		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASMON_CO2	MDC_CONC_CO2_EXP MDC_AWAY_CO2_EXP		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASDLV_CO2	MDC_CONC_CO2_EXP_SETTING MDC_VENT_CO2...		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASDLV_CO2	MDC_CONC_CO2_FG_SETTING		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASMON_CO2	MDC_CONC_CO2_INSP MDC_AWAY_CO2_INSP		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASDLV_CO2	MDC_CONC_CO2_INSP_SETTING MDC_VENT_CO...		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASDLV_CO2	MDC_CONC_CO2_SETTING MDC_VENT_AWAY_C...		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASMON_AA_DESFL	MDC_CONC_DESFL MDC_AWAY_DESFL		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASMON_AA_DESFL	MDC_CONC_DESFL_BREATH		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASMON_AA_DESFL	MDC_CONC_DESFL_ET		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASDLV_AA_DESFL	MDC_CONC_DESFL_ET_SETTING		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASMON_AA_DESFL	MDC_CONC_DESFL_EXP MDC_AWAY_DESFL_EXP		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASDLV_AA_DESFL	MDC_CONC_DESFL_EXP_SETTING MDC_VENT_D...		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASDLV_AA_DESFL	MDC_CONC_DESFL_FG_SETTING		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASMON_AA_DESFL	MDC_CONC_DESFL_INSP MDC_AWAY_DESFL_INSP		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..
GASDLV_AA_DESFL	MDC_CONC_DESFL_INSP_SETTING MDC_VENT_...		A.7.4.1	MDC_DIM_PERCENT MDC_DIM_VO...	% %{vol} kPa ...	262688 2..

Page 1 of 6 | Help | Displaying 1 -

Group: GASMON_AR
REFID: MDC_CONC_AR
Synonym: MDC_AWAY_AR

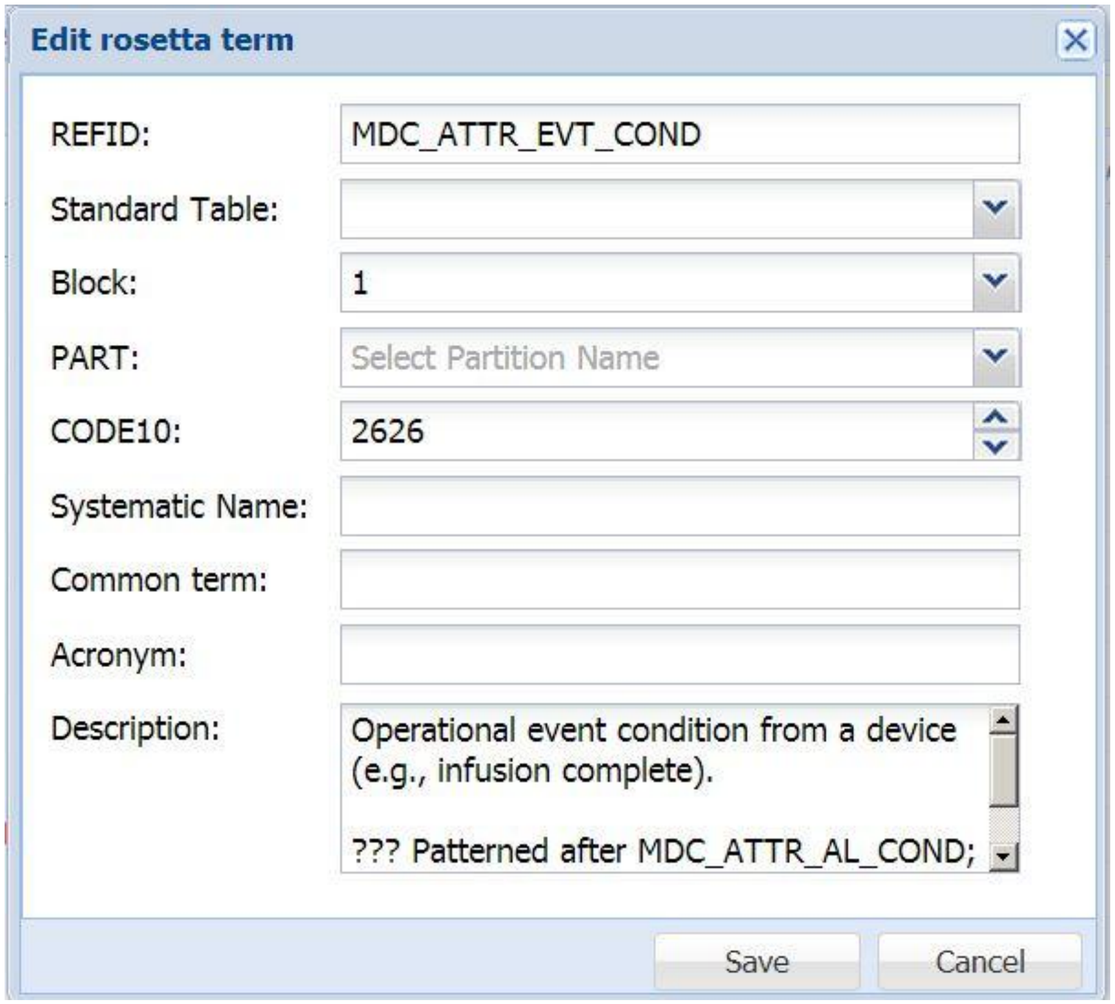
Units:

UOM_MDC_REFID	UOM_UCUM	DIM	CF_UCODE10
MDC_DIM_PERCENT	%	1	262688

- ✓ Term being worked on by SDOs/MDC experts
- ✓ These processed terms would become / be added to the harmonized Rosetta terms (hRTM) upon approval by SDO user and balloting

Term Approval, cont.

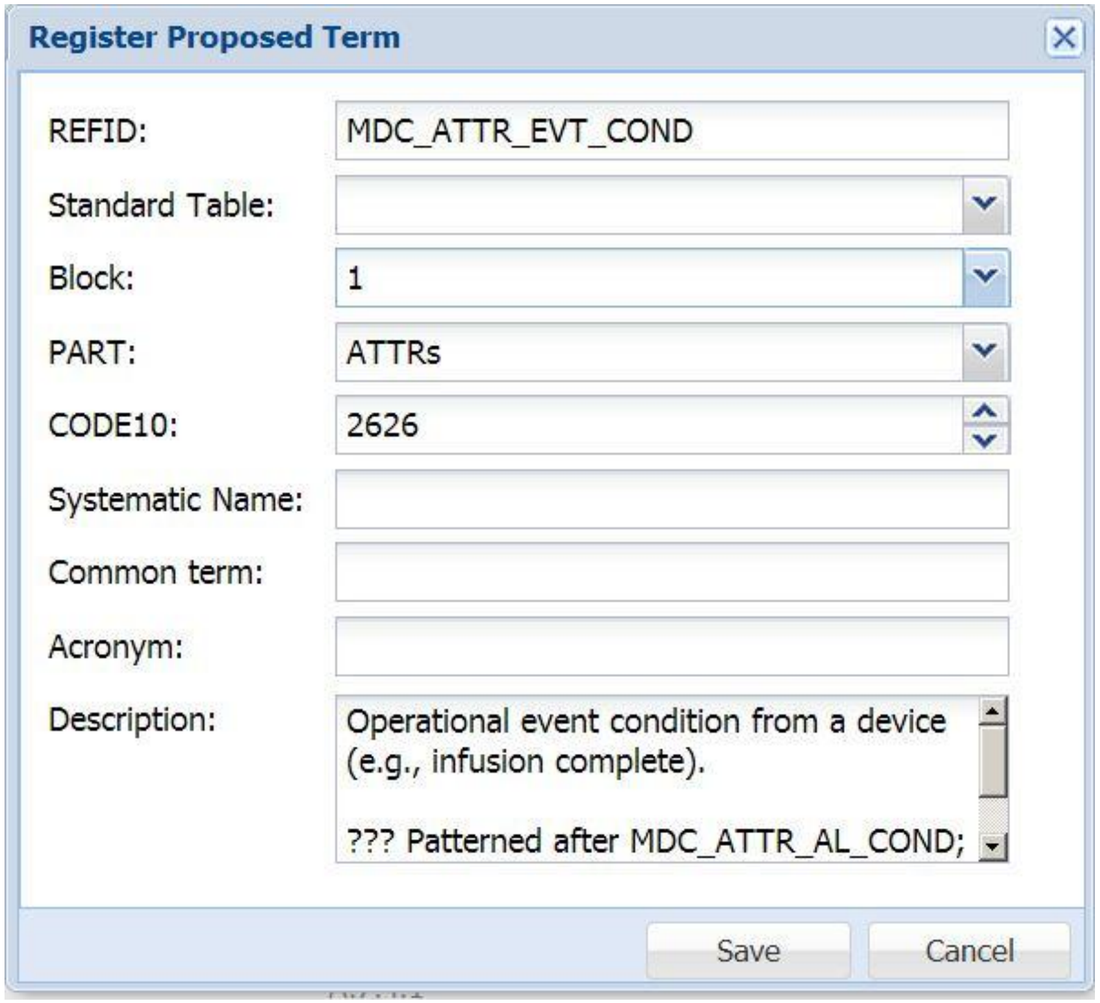
- "Ready to review terms" tab: 269 rows:
  - The 'Edit RefID' button allows approved user to edit a term and it's attributes



  - Edit a REFID, Standard Table, Block, Partition, Code(base 10), Systematic Name, Common Term, Acronym, and Description to the x73 database
  - Pull down menus available (where enumerations provided/exist)

Term Approval, cont.

- "Ready to review terms" tab: 269 rows:
  - The '**Register RefID**' button allows to register a term



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HEALTH IT
STANDARDS TESTING INFRASTRUCTURE

Domain Information Model UML / DIM Editor, Progress Update

Semantic interoperability of Medical Devices

Test Tool Update – Art Griesser, Ph.D.,
Prometheus Computing
Joint HL7/IEEE 11073 Healthcare Devices Working Group

National Institute of Standards and Technology

24 September, 2013 – Cambridge, MA

National Institute of Standards and Technology

Status 1/2

- http://mdcx73-working.wikispaces.com/_NIST-ArtG
- Goal model
- Gap analysis
- Clause 8 API
- Complete UML model from DIM standard, with
  - RTMMS data
  - Conformance statements
  - Meta-information

Status 2/2

- Programmatically derived from UML:
  - –XML Schema
  - –ASN.1 schema
  - –Relational database schema
  - –Web-based editor
  - –JSON meta-information
- Java parser for JSON meta-information
- Gap analysis
  - –Gap Analysis Report
  - –http://mdcx73-working.wikispaces.com/file/view/DIM%20Gap%20Analysis%20v3b.docx/431746184/DIM%20Gap%20Analysis%20v3b.docx

Progress

- Containment tree browser added
- Resolved many questions at NIST face-to-face
- Now generating LaTeX from UML
- Draft of MyDevice functional requirements

3.2.14 Event_Log class

PDF Snippet From LaTeX

- Class: Event_Log
- Description: The Event Log object is a general Log object that stores system events in a free-text or in a binary representation.
- Derived from: Log
- Name binding: Handle
- Registered as: MDC_MOC_LOG_EVENT

Table 42: Attributes of Event_Log

Attribute name	Attribute ID	Attribute type	Remark	Qualifier
Event-Log-Entry-List	MDC_ATTR_-EVENTLOG_EN-TRY_LIST	EventLogEntry	Event entries; can be retrieved with GET service.	M
Event-Log-Info	MDC_ATTR_-EVENTLOG_-INFO	EventLogInfo	Static and dynamic specifications.	O
Type	MDC_ATTR_ID-TYPE	OCTET STRING	Further specification of log entry format.	O

```
Event_Log ::= SEQUENCE {
COMPONENTS OF Log,
Event-Log-Entry-List EventLogEntryList,
Event-Log-Info EventLogInfo,
Type OCTET STRING
}

EventLogEntryList ::= SEQUENCE OF EventLogEntry
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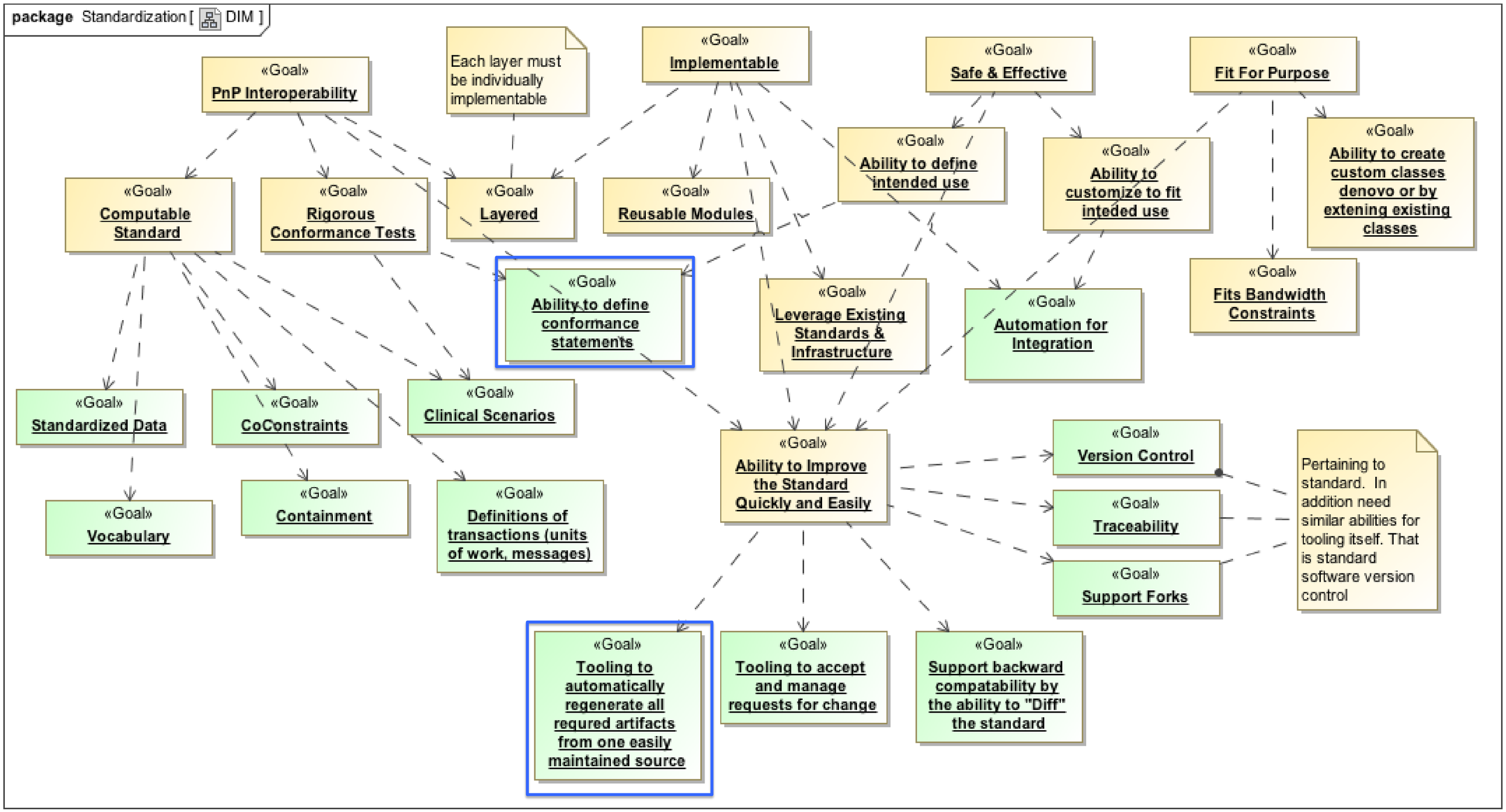
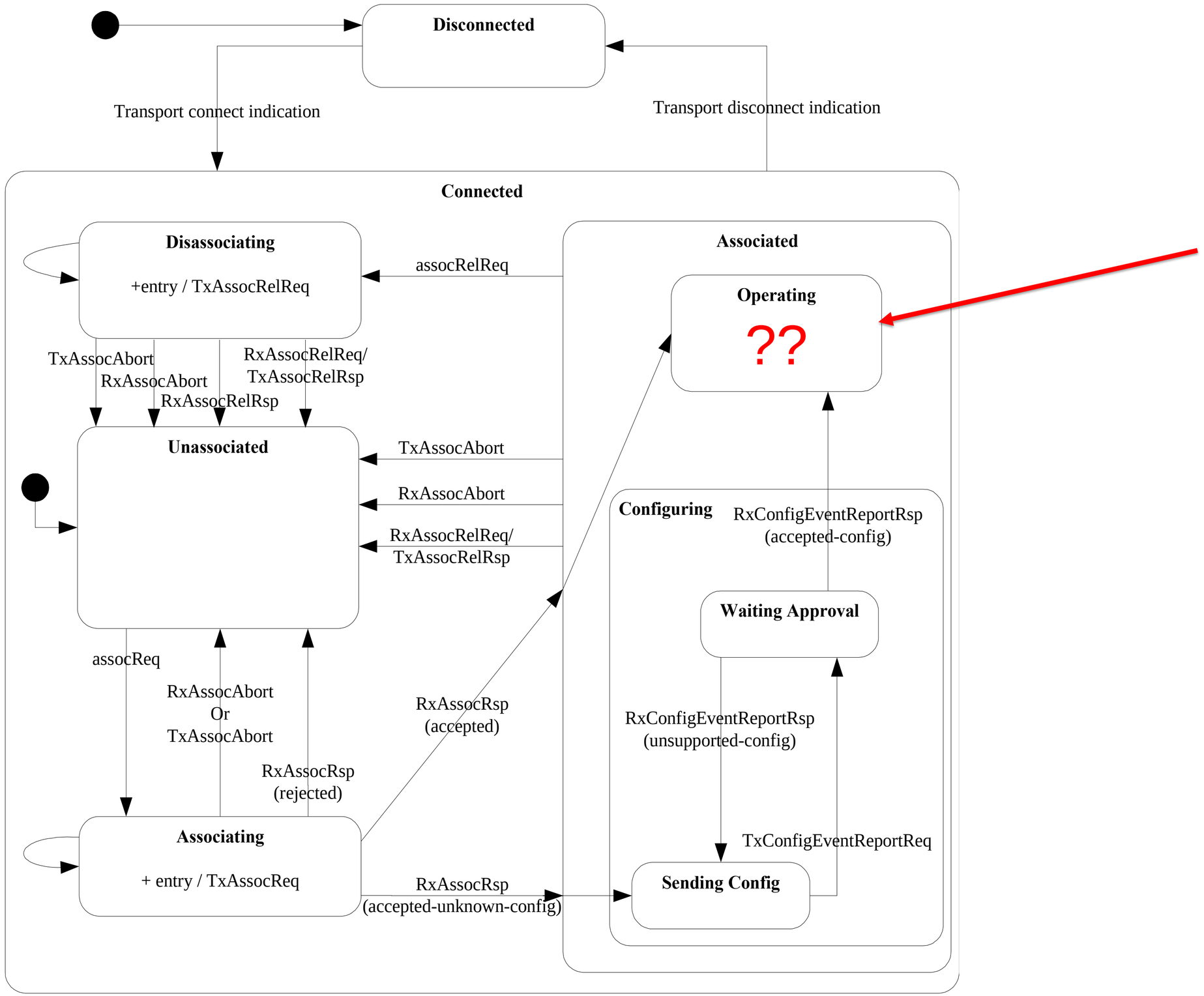
Goals for DIM



Plan

- Standard generation
  - LaTeX meeting ISO publication requirements
  - Add UML diagram snippets
- Enhance usability of MyDevice
  - Simplify profile construction, viewing
  - Profile & conformance statement import/export
  - Help text (snippets from the standard)
  - Stand alone desktop version
- Should we describe operational state?

State Machine



HEALTH IT
STANDARDS TESTING INFRASTRUCTURE

‘MyDevice’ Progress Update

Semantic interoperability of Medical Devices

Test Tool Update – Art Griesser/Michael Faughn
Joint HL7/IEEE 11073 Healthcare Devices Working Group

National Institute of Standards and Technology

24 September, 2013 – Cambridge, MA

Contact: Arthur Griesser, Ph. D. a.griesser@prometheuscomputing.com, Prometheus Computing, LLC

National Institute of Standards and Technology

MyDevice 1.0

- A tool to create device profiles and conformance statements.
- An application built directly from the DIM UML model.
- Outputs: device profiles, conformance statements
- Output formats: JSON, PDF
  - Java API to parse JSON

‘MyDevice’ Now

- ICSGenerator functionality analyzed with assistance from Jing Gao (GR @ NIST).
- Initial documentation and discussion of requirements – we have enough to start writing code.
- Prototype application demonstrated in March 2013 showing interface to all DIM objects, ability to construct and store profiles, and containment tree view.

‘MyDevice’ v1 in FY2014

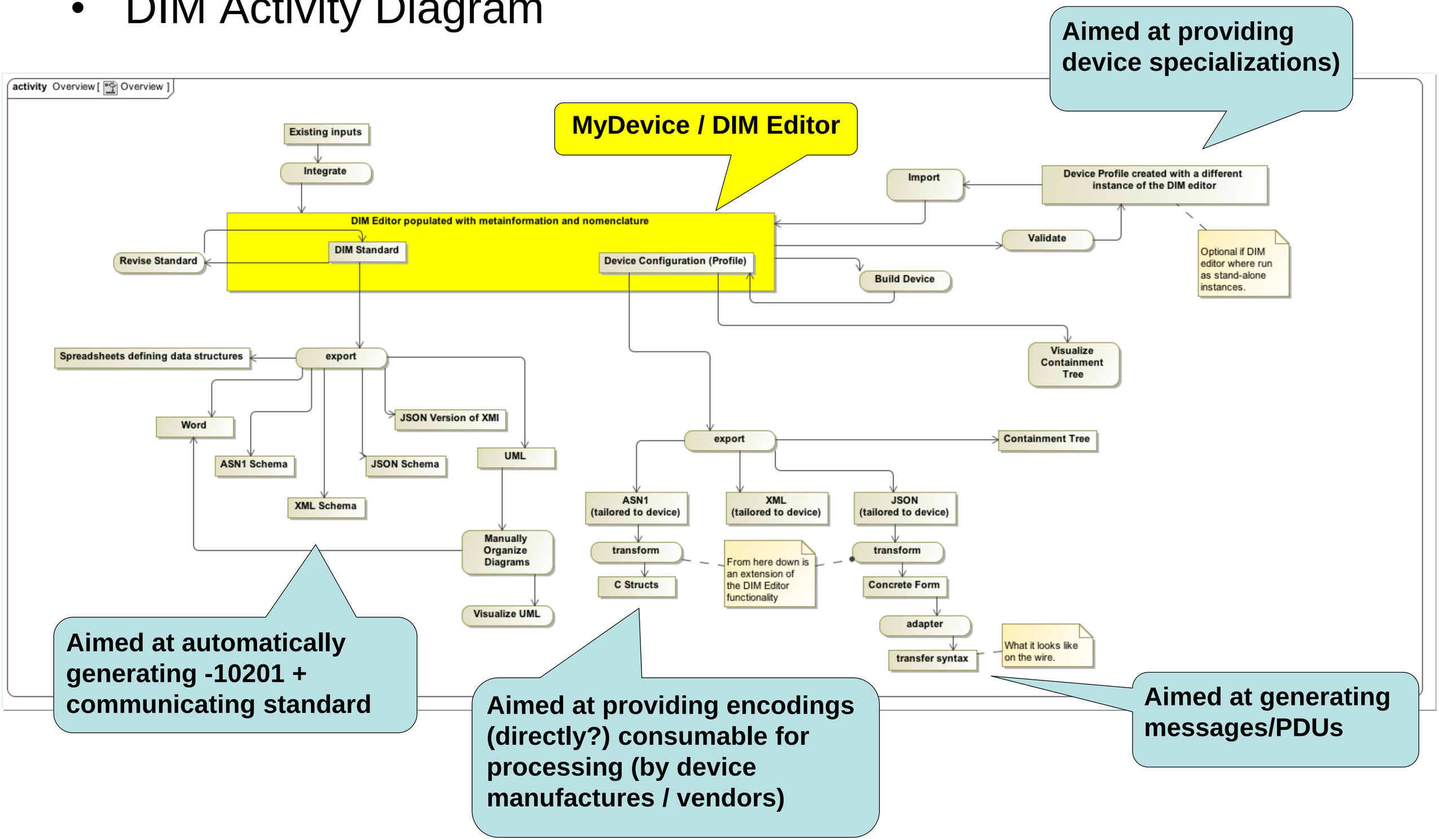
- Implement and improve capabilities of ICSGenerator – integrated into ‘MyDevice’
- Continue discussions to clarify stakeholder needs
- Improve application, collect feedback from stakeholders, repeat
- In use by stakeholders before end of FY2014 (September 30, 2014)

‘MyDevice’ after v1.0: Possibilities

- Facilitate the construction of messages
- Participate in message verification
- Verify profiles with respect to device specializations
- Package as a stand-alone application
- Produce useful artifacts - C headers, HL7 PDUs, others
- Expand the scope of ‘device profile’

Outcomes from 2-day Summit @ NIST (March '13)

- DIM Activity Diagram



NIST MDC Testing Project Web Sites

- **Project Web site: www.nist.gov/medicaldevices**
- ***NIST HL7 V2 Test Tooling* Web sites:**
  - **IHE-PCD Pre-Connectathon: http://hit-testing.nist.gov:13100/PCD-HL7WebPreCon/**
  - **IHE-PCD Connectathon: http://hit-testing.nist.gov:13100/PCD-HL7WebCon/**
- **NIST Medical Device Terminology Service:**
  - **Rosetta Terminology Mapping Management System (*RTMMS*): http://hit-testing.nist.gov:13110/rtmms/**
- **NIST Implementation Conformance Statement Generator (*ICSGenerator*):**
  - **http://hit-testing.nist.gov/medicaldevices/ICSGenerator/ics_download.html**
- **DIM Work**
  - http://mdcx73-working.wikispaces.com/_NIST-ArtG