

NIST Contacts

- John J. Garguilo
301-975-4248
john.garguilo@nist.gov
- Sandra Martinez
301-975-3579
sandra.martinez@nist.gov
- Maria Cherkaoui (Guest Researcher)
- Jing Gao (GR)

Project Web site:

www.nist.gov/medicaldevices

Rosetta Terminology Mapping Management System (RTMMS)

National Institute of Standards and Technology (NIST)

John J. Garguilo, Maria Cherkaoui, Sandra Martinez

April 2010

NIST Tooling To Support RTM Process (*Championed by Paul Schluter [GE Healthcare])

What is RTMMS?

- A web application that allows vendors and reviewers access, retrieval, and reporting of Rosetta Tables over the internet in conformance to RTM
- The tool provides the capability of saving the data in the XML format as defined by RTM
- Aid in The harmonization process by:
 - Identifying missing terms
 - Facilitate the proposal of new terms
 - Facilitate discussion of the proposed term
 - Automatic generation of the “Harmonized Rosetta Table”
- Database/XML Server initially prototyped and located at NIST
- A web service/tool used as part of SDO’s ballot / approval process

“RTM Management System”

What is RTMMS? (Continued)

- Facilitate Conformance Tooling
 - Message verification and conformance
 - Leading to interoperability...

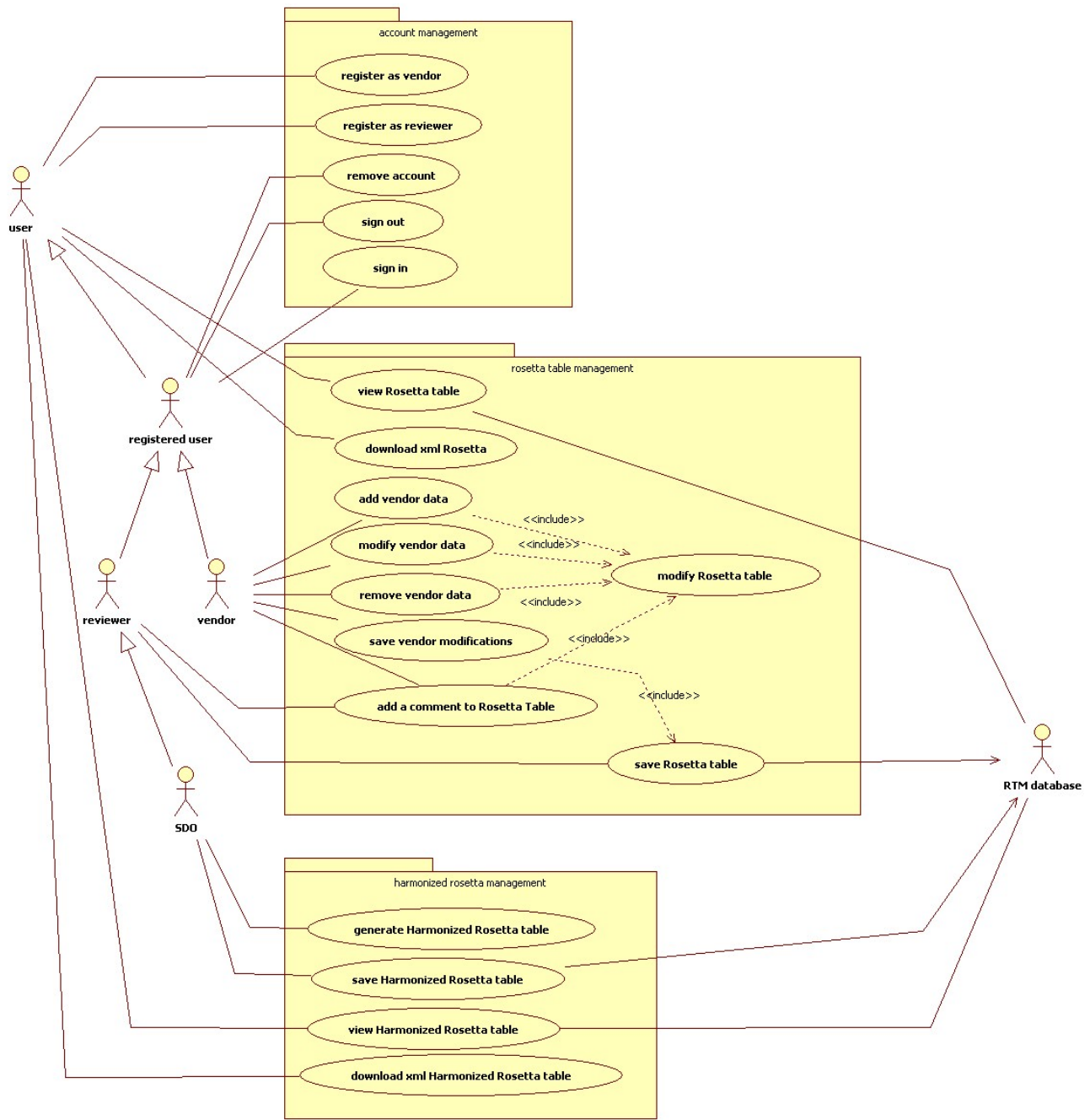
“RTM Management System”

RTMMS vs. RTM Excel process

- For Vendors
 - Facilitate input of entries by vendors
 - Tooltips providing supplementary information
 - Available Interface to lookup values from the database
 - Automatic completion of codes
 - Validation of required content
 - Reduce errors made by vendors while submitting entries
- For Reviewers and SDO
 - Facilitate the generation of the Harmonized Rosetta
 - Help the review process of Rosetta entries
 - Highlighting discussed entries
 - Highlighting proposed REFIDs
 - Adequate interface to view discussions and add comments
- For all users
 - Rosetta data available to everyone any time
 - Provide XML version of tables
 - All XSLT transformations can still be used

Next Steps

- Features based on the Rosetta Supplement
 - Incorporate “Enumerations” management capabilities
 - Add “containedBy”, “contains” and “External_Sites” to the interface
 - Ability to edit Harmonized Rosetta table and save changes
- User oriented features
 - Implement “change trailing” capabilities
 - To identify occurred changes, time they were made, users who made them...
 - Incorporate enhanced X73 Nomenclature database
 - Includes Systematic name, description...
 - Automate generation of the “Harmonized Rosetta Table”
 - Adding new user role “Expert (or Technical) Reviewer”
- Continue discussion of approving and adding normalized terminology to IEEE x73
 - Build on April 23 Discussion (w/ Jan, Paul, Melvin, Todd, John R, others?)



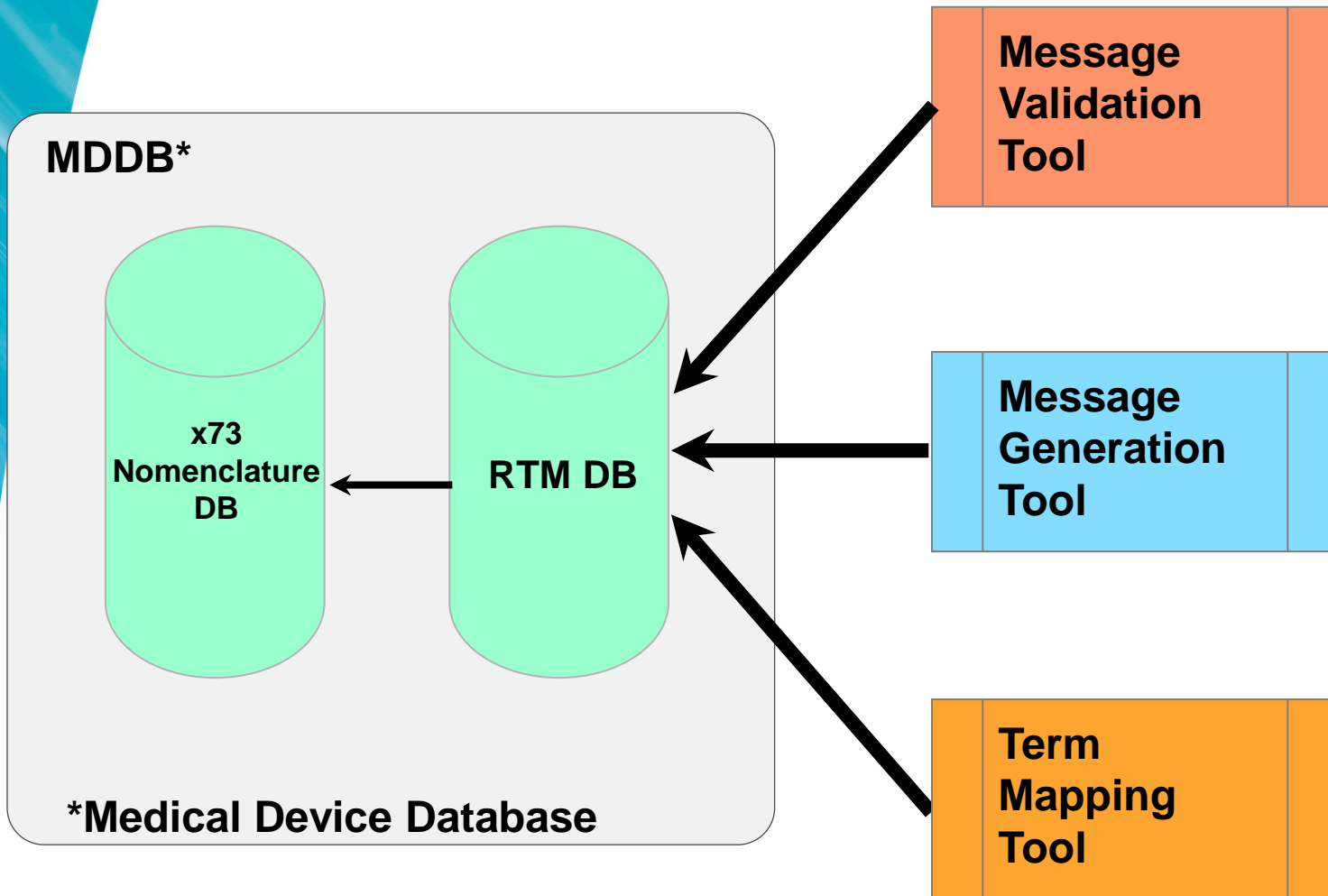
RTMMS Roles

- “Non-registered User”
 - Able to download RTM (latest approved version)
- “Vendor” (Registered)
 - Able to view, edit and propose vendor terms (only for vendor they are registered with)
- “Reviewer” (Registered)
 - Able to view all vendor terms and make annotations (discussion points)
- “Expert Reviewer” (Registered and approved by SDO)
 - Technical expert (e.g., Jan Wittenber (Phillips) and Paul Schluter (GE)) who can view and comment on all vendor terms
 - Expert has the ability to generalize term to overall specification
- “SDO” (Standards Development Organization approved official)
 - Authority to approve/decline new or edited term proposed by vendor
 - Approval based on SDO ballet rules
 - Considers working group and especially ‘Expert Reviewer’ input
 - Usually chair/co-chair of standards body and or working group
- “Administrator” (Approved by ‘SDO’)
 - Provides administrative support to database
 - Generates and provides new user account information (user name and password), delete accounts, etc.

Database

- Models RTM data and relationships
- Uses x73 Nomenclature database
 - REFIDs
 - Term codes
 - Partition numbers
 - (New terms added as approved/normative additions to standard)
- Stores RTM data
 - Rosetta table
 - Units and Unit Groups
 - Enumerations and Enumeration Groups
 - hRTM table
 - (New terms proposed – may be missing from x73 Nomenclature Database)

Database

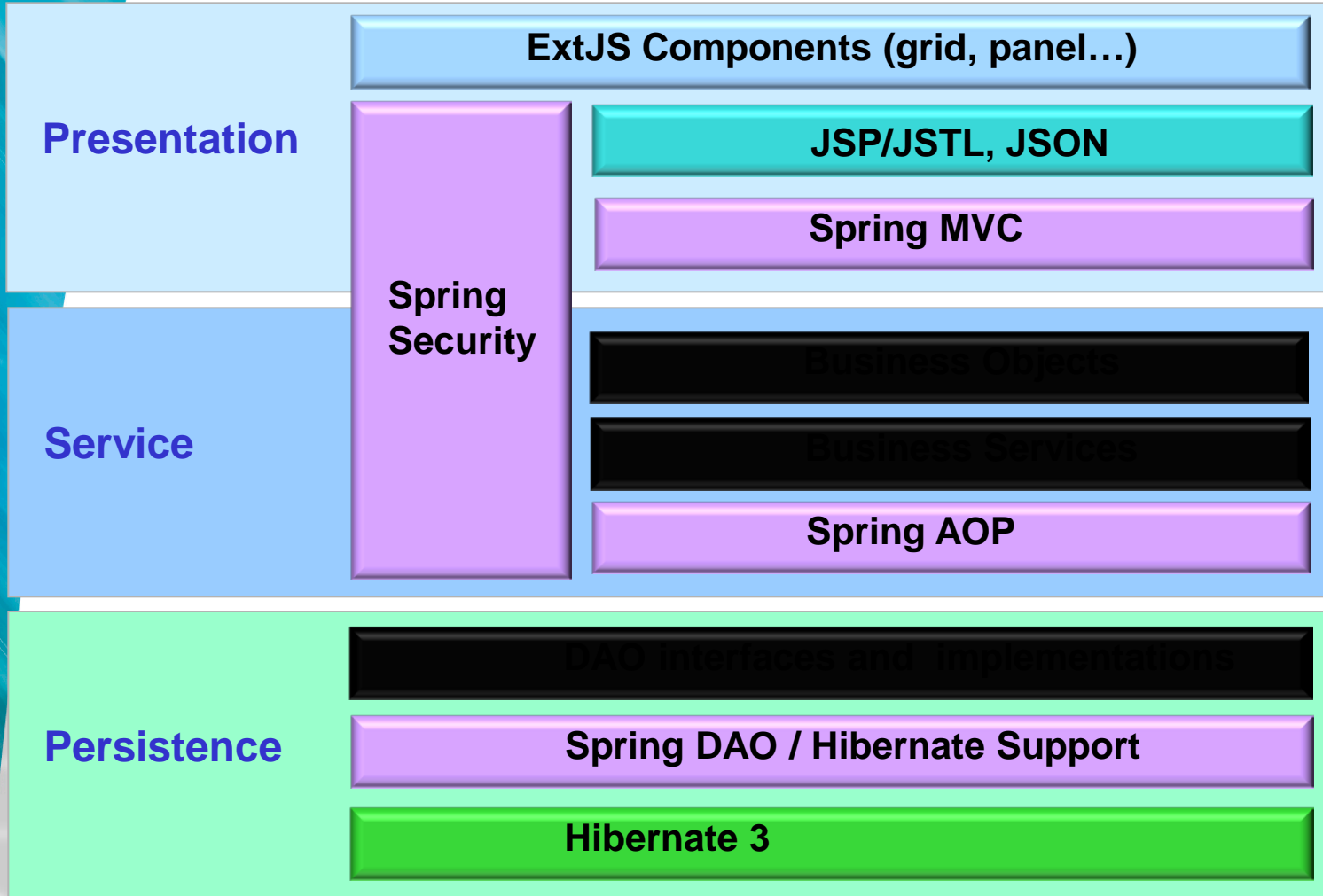


Technologies employed

- J2EE / JAVA 5
- ExtJS 2.2.1 Cross-browser JavaScript library
- Spring Framework
 - Spring MVC: full-featured MVC (Model View Controller) implementation
 - Spring Security: provides security solutions (authentication, identification)
- Hibernate 3 Java persistence framework
- MySQL 5.1
- XMLBeans technology for accessing XML by binding it to Java types
- Apache Tomcat 5.5
- MySQL Workbench to design the database

- Tested browsers
 - Mozilla Firefox 3
 - IE 7
 - Google Chrome 1

Architecture



Benefits From Technologies

- JavaScript library
 - Sophisticated widgets library
 - Cross browser compatibility
 - Use of powerful techniques (AJAX, DHTML and DOM scripting)
 - MVC design
 - Separation between business logic and GUI
 - Modification of either the visual appearance of the application or the underlying business rules doesn't affect the other
 - Persistence framework
 - Mapping of Java classes to relational database tables
 - Build a database independent application
- Scalability, Performance and Stability

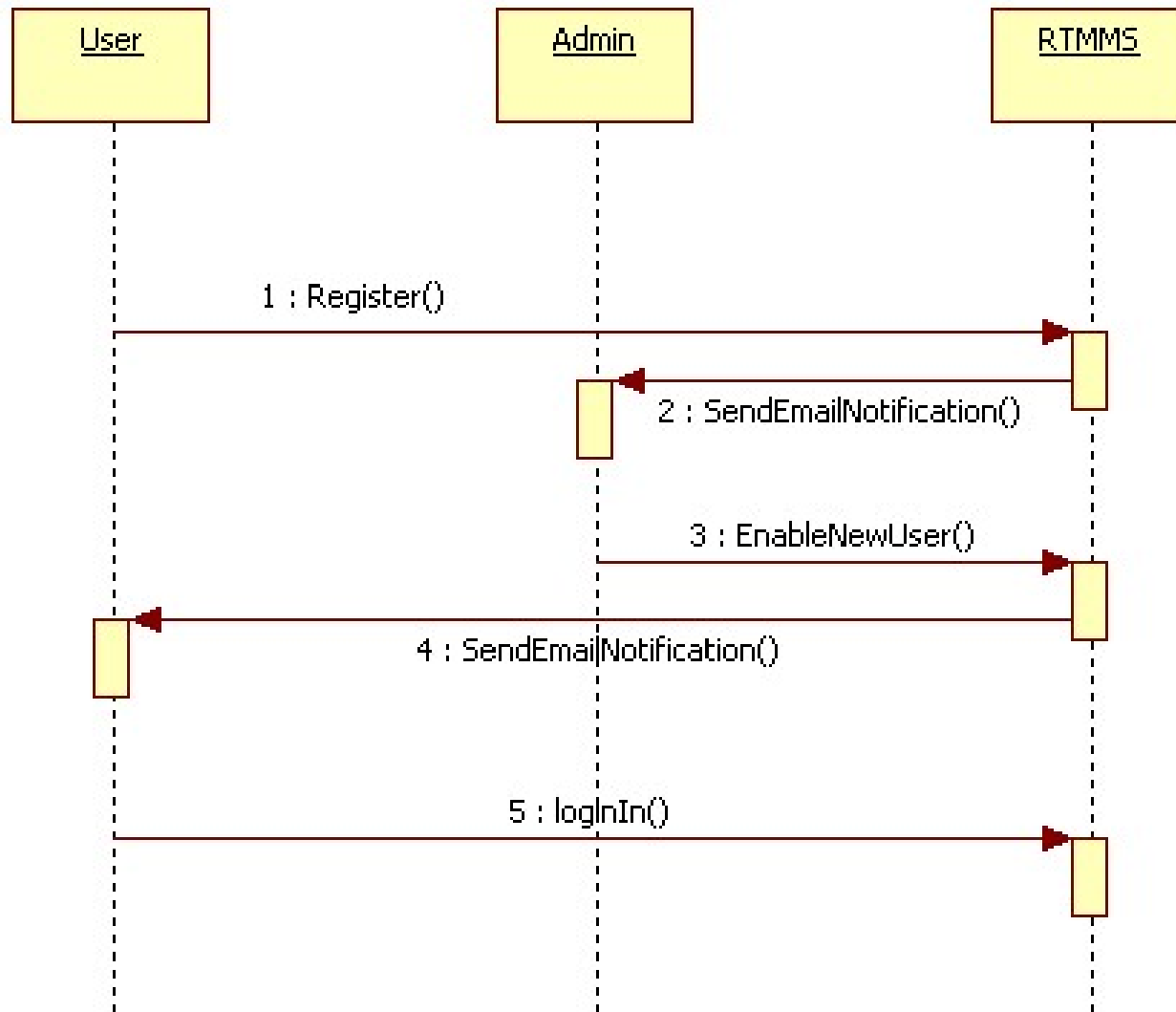
Available Features of RTMMS

- Features based on the Rosetta Supplement
 - Units table management
 - Unit groups management
 - Rosetta table management
 - Handling uncertain REFIDs
 - Automatic generation of the Harmonized Rosetta
 - Need additional requirements
 - XML Rosetta download
- User oriented features
 - User management module (Implemented user (roles) and privileges)
 - Columns filtering
 - REFIDs lookup in database
 - Group lookup in database
 - Units and Enumerations lookup in database
 - Term codes completion from database
 - Saving browsing history
 - User registration

Features of RTMMS (continued)

- RTMMS Architecture improvements
- New Features (enhancements from May 2009 WG meetings)
 - New x73 Nomenclature
 - Terms in both annexes A and B.
 - IDC Nomenclature
 - Highlighted New Terms in Rosetta, Units and Enumerations Tables
 - Added Interface for selecting REFID from x73 Nomenclature database
 - Added Interface to propose New Terms
 - Added New Term View for SDO users
 - Implement Rosetta validation against H-Rosetta
 - Enhanced registration process.
 - Email confirmation, approval...
 - Added Admin Type of users to manage users and enable new users
 - XML Units Download
 - Added ranking capabilities to assess probability of valid terms in the Rosetta table
 - Scale from 1 to 10
 - Include column filtering based on regular expressions

User Registration



Units Table

Units Unit Groups

Dimension:

Download Table

UOM_MDC_REFID	UOM_UCUM	CODE10	Symbol	Description	Discussion
MDC_DIM_NOS	{unknown}	0	?	«Unspecified»	
MDC_DIM_DIMLESS		512	-	«dimensionless»	
MDC_DIM_BOOLEAN	1 {unitless}		1/0	«boolean»	(2009-03-06): Must be 1 (true)
MDC_DIM_X_BEL	B		B	B	(2009-03-06): 6432 for Bel ?
MDC_DIM_DECI_BEL	dB		dB	Decibel	(2009-03-06): 6432+16=6448 1
MDC_DIM_DECIBEL	dB	6432	DB	Decibel	(2009-03-06): DEPRECATE?
MDC_DIM_X_BEL_MV	B[mV]		B(mV)	bel millivolt	(2009-03-06): (new code) for
MDC_DIM_DECI_BEL_MV	dB[mV]		dB(mV)	decibel millivolt	(2009-03-06): (new code) +16
MDC_DIM_PERCENT	%	544	%	10-2 (percent)	
MDC_DIM_PARTS_PER_10_TO	[ppth]	576	Ppht	10-3 (part(s) per thousand)	
MDC_DIM_PARTS_PER_10_TO	[ppm]	608	Ppm	10-6 (part(s) per million)	
MDC_DIM_PARTS_PER_10_TO	10^-9 10^-9	640		10-9 (part(s) per milliard)	
MDC_DIM_PARTS_PER_10_TO	10^-12 10^-12	672	Ppb	10-12 (part(s) per billion)	
MDC_DIM_PARTS_PER_10_TO	10^-15 10^-15		Ppt	10-18 (part(s) per trillion)	
MDC_DIM_ANG_DEG	deg	736	Degree	angle degree	
MDC_DIM_ANG_RAD	rad	768	Rad	angle radian	
MDC_DIM_X_G_PER_G	g/g	800	g g-1	«magnitude» gram(s) per gram	
MDC_DIM_X_KG_PER_KG	kg/kg	832	kg kg-1	«magnitude» gram(s) per kilogram	

Enumeration Groups Table

Enumerations		Enumeration Groups			
Enumeration groups					
_ENUM_GROUP	GroupDescription				
_MDC_ATTR_AL_COND	Alarm Condition				
_MDC_PUMP_MODE	Operational Mode				
_MDC_PUMP_STAT	Operational Status				
_BODY_SITE_NBP_BP	Body Site - BP				
_BODY_SITE_HR	Body Site - HR				
_BODY_SITE_TEMP	Body Site - Temperature				
_BODY_SITE_SPO2	Body Site - SpO2				
_BODY_SITE_EEG_EX	Body Site - EEG				
_BODY_SITE_EEG	Body Site - EEG				
MDC_BREATH_PHASE	See MDCY_BREATH_ANNOTATIONS				
Contained enums					
ENUM_VALUE_TOKEN	ENUM_VALUE_REFID	PART	CODE10	VendorDescription	Discussion
	MDC_UPEXT_ARM_UPPER_L			Left Upper Arm	
	MDC_UPEXT_ARM_UPPER_R			Right Upper Arm	
	MDC_LOEXT_LEG_L			Left Leg	
	MDC_LOEXT_LEG_R			Right Leg	

Edit Entry Form

Entry Information Vendor Discussion General Discussion

Group information

Group: CVS_HEMO_NBP

Term information

REFID: MDC_PRESS_BLD_NONINV_SYS

is uncertain REFID

PART: 2

CODE10: 18949

CF_CODE10: 150021

Vendor parameter information

Description: Non-invasive blood pressure (systolic)

DisplayName: NIBP Sys

Vendor_UOM: mmHg/kPa

Vendor_Status: SC

Vendor_Sort: 170

Units/Enumerations

has units has enumerations

+ Add - Remove

UOM_MDC_REFID	UOM_UCUM
MDC_DIM_KILO_PASCAL	kPa
MDC_DIM_MMHG	mm[Hg]

Save Cancel

Add Comment Dialog

All Rosetta Table

Vendor Discussion | General Discussion | XML Download Table

Group	REFID	PART	CODE10	CF_CODE1	Vendor_ID	Description	DisplayName	Vendor_UOM	UOM_MDC	UOM_IEFF	Enum_Values	Venc	Venc	Gene
INFUS	MDC_VOL_FLL	2												
CNS_EEG	MDC_EMG_ELE	2										F		
CNS_EEG	MDCX_											F		
CVS_HEMO_IBI	MDC_PRESS_B	2										F		
CVS_HEMO_IBI	MDC_PRESS_B	2										F		
CVS_HEMO_IBI	MDC_PRESS_B	2										F		
CVS_HEMO_IBI	MDC_PRESS_B	2										F		
CVS_HEMO_CC	MDC_OUTPUT_											F		
CVS_HEMO_CC	MDCX_											F		
CVS_HEMO_CC	MDCX_											F		

Page 1 of 5

Group: CNS_EEG
REFID: MDCX_
PART:
CODE10:
DisplayName: AMP
Vendor_UOM: dB
Vendor_Status: F
Vendor_Sort:
Description: Amp
Enum_Values:

Add New Comment Dialog

Discussion

2009-03-06:
Aspect dB relative to 0.0001 (μV)²

John, 2009-4-21:
Comment

New Comment

Name:

New Comment:

Displaying topics 1 - 25 of 114

Rosetta Table

Rosetta Table

Vendor Discussion | General Discussion | Download Table

Group	REFID	PART	CODE10	CF_CODE1	Vendor_ID	Description	DisplayName	Vendor_UOM	UOM_MDC	UOM_UCUM	Enum_Values	Vendor	Vendor	Gene
CVS_ECG_ST	MDC_ECG_AMF	2	768	131840	Philips	ST generic label	ST	mm	MDC_DIM_MILL	mm mV		S		
CVS_ECG_ST	<i>MDC_ECG_AI</i>				Philips	ST lead I	ST-I	mm	MDC_DIM_MILL	mm mV		S		
CVS_ECG_ST	<i>MDC_ECG_AI</i>				Philips	ST lead II	ST-II	mm	MDC_DIM_MILL	mm mV		S		
CVS_ECG_ST	<i>MDC_ECG_AI</i>				Philips	ST lead V1	ST-V1	mm	MDC_DIM_MILL	mm mV		S		
CVS_ECG_ST	<i>MDC_ECG_AI</i>				Philips	ST lead V2	ST-V2	mm	MDC_DIM_MILL	mm mV		S		
CVS_ECG_ST	<i>MDC_ECG_AI</i>				Philips	ST lead V3	ST-V3	mm	MDC_DIM_MILL	mm mV		S		
CVS_ECG_ST	<i>MDC_ECG_AI</i>				Philips	ST lead V4	ST-V4	mm	MDC_DIM_MILL	mm mV		S		
CVS_ECG_ST	<i>MDC_ECG_AI</i>				Philips	ST lead V5	ST-V5	mm	MDC_DIM_MILL	mm mV		S		
CVS_ECG_ST	<i>MDC_ECG_AI</i>				Philips	ST lead V6	ST-V6	mm	MDC_DIM_MILL	mm mV		S		

Page 1 of 46 | Displaying topics 1 - 25 of 1148



Group: CVS_ECG_ST
 REFID: *MDC_ECG_AMPL_ST_I*
 PART:
 CODE10:
 DisplayName: ST-I
 Vendor_UOM: mm
 Vendor_Status: 5
 Vendor_Sort: 20
 Description: ST lead I

Vendor_Discussion
 General_Discussion

UOM_MDC_REFID | UOM_UCUM
 MDC_DIM_MILL | M | mm

User Management Table

User Management

 Edit  Remove

User Name	Email	Type	Vendor	Enabled
john	john@nist.com	Vendor		false
sandra	sandra@nist.gov	Vendor	IEEE	true
admin	mcherk@nist.gov	Admin		true
maria	mcherk@nist.gov	Vendor	IEEE	true
sdo	mcherk@nist.gov	SDO		true

REFID Selection Dialog (1/3)

Term Selection Wizard [X]

REFIDs are defined in ISO/IEEE 11073 Nomenclature Standard. New REFIDs starting with MDCX_ can be proposed.

Select REFID from ISO/IEEE 11073 Nomenclature Standard

Propose new REFID starting with MDCX_

Enter New REFID... [v]

Back Done Next

REFID Selection Dialog (2/3)

Term Selection Wizard [X]

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

Block	Block Name	Block Description	Partition Name	Partition Description
Block ID: 1 (8 Items)				
1	MDC_PART_OB	Object Infrastr.	ACT	Description Action
1	MDC_PART_OB	Object Infrastr.	AL-STAT	Description Alert Object ID
1	MDC_PART_OB	Object Infrastr.	ATTR/GROUP	Description Attribute Group
1	MDC_PART_OB	Object Infrastr.	ATTRs	Description Attribute
1	MDC_PART_OB	Object Infrastr.	MD-Gen	Description Medical Device - Generic
1	MDC_PART_OB	Object Infrastr.	MOC/BASE	Description Object
1	MDC_PART_OB	Object Infrastr.	NOTI	Description Notification
1	MDC_PART_OB	Object Infrastr.	PMS	Description Persistent Metric Store Object ID
Block ID: 2 (10 Items)				
2	MDC_PART_SC	SCADA(Physio IDs)	BLD CHEM	Description Blood/Fluid Chemistry
2	MDC_PART_SC	SCADA(Physio IDs)	ECG-LEADS	Description ECG Lead

Back Done Next

REFID Selection Dialog (3/3)

Term Selection Wizard [X]

Select term from table.

Term Code	Part	REFID
1	1	MDC_MOC_VMO
2	1	MDC_MOC_VMO_VMD
3	1	MDC_MOC_VMO_CHAN
4	1	MDC_MOC_VMO_METRIC
5	1	MDC_MOC_VMO_METRIC_ENUM
6	1	MDC_MOC_VMO_METRIC_NU
7	1	MDC_MOC_VMO_METRIC_SA
8	1	MDC_MOC_VMO_METRIC_SA_D
9	1	MDC_MOC_VMO_METRIC_SA_RT
10	1	MDC_MOC_VMO_METRIC_SA_T
16	1	MDC_MOC_SCAN
17	1	MDC_MOC_SCAN_CFG
18	1	MDC_MOC_SCAN_CFG_FPI

Back Done

New Terms Table

New Terms Table

Vendor Discussion | General Discussion

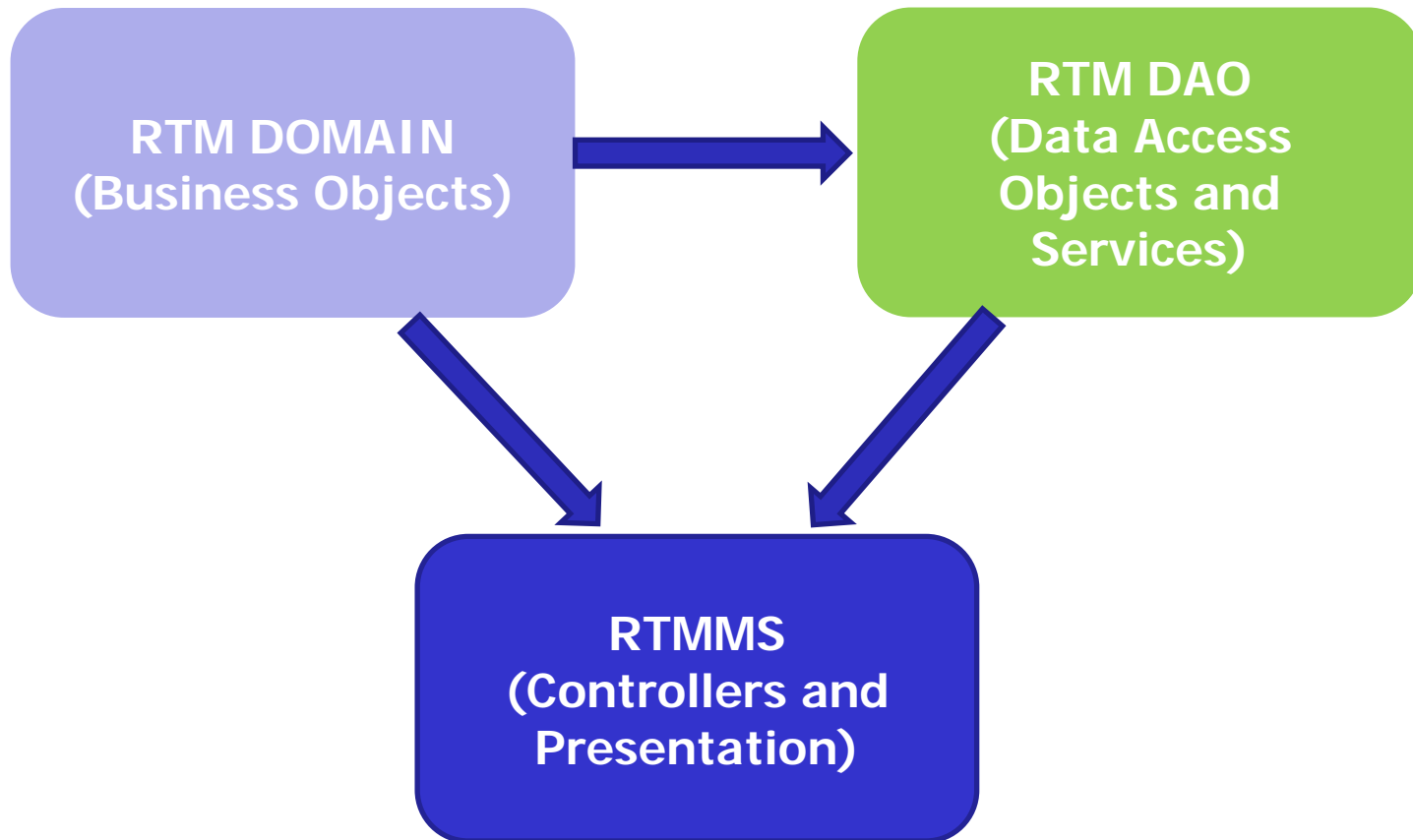
Group	REFID	Vendor_ID	Description	DisplayName	Vendor_St	Vendor_Dk	General_Di
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_I</i>	Philips	ST lead I	ST-I	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_II</i>	Philips	ST lead II	ST-II	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_V1</i>	Philips	ST lead V1	ST-V1	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_V2</i>	Philips	ST lead V2	ST-V2	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_V3</i>	Philips	ST lead V3	ST-V3	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_V4</i>	Philips	ST lead V4	ST-V4	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_V5</i>	Philips	ST lead V5	ST-V5	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_V6</i>	Philips	ST lead V6	ST-V6	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_III</i>	Philips	ST lead III	ST-III	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_AVR</i>	Philips	ST lead aVR	ST-aVR	S		
CVS_ECG_ST	<i>MDC_ECG_AMPL_ST_AVL</i>	Philips	ST lead aVL	ST-aVL	S		

Page 1 of 18 | Displaying topics 1 - 25 of 435

Group: CVS_ECG_ST
REFID: *MDC_ECG_AMPL_ST_V1*
DisplayName: ST-V1
Vendor_Status: S
Description: ST lead V1

Vendor_Discussion
General_Discussion

RTMMS Modules



Next Steps

- Features based on the Rosetta Supplement
 - Incorporate “Enumerations” management capabilities
 - Add “containedBy”, “contains” and “External_Sites” to the interface
 - Ability to edit Harmonized Rosetta table and save changes
- User oriented features
 - Implement “change trailing” capabilities
 - To identify occurred changes, time they were made, users who made them...
 - Incorporate enhanced X73 Nomenclature database
 - Includes Systematic name, description...
 - Automate generation of the “Harmonized Rosetta Table”
 - Adding new user role “Expert (or Technical) Reviewer”
- Continue discussion of approving and adding normalized terminology to IEEE x73
 - Build on April 23 Discussion (w/ Jan, Paul, Melvin, Todd, John R, others?)