US Office of National Coordinator
Standards and Interoperability (S&I) Framework

S&I Simplification Work Group End-to-End Demo

HL7 Working Group Meeting
Hosted by HL7 EHR Work Group
22 January 2014 – Wed Q3
San Antonio, Texas

S&I Simplification WG @ HL7 in San Antonio

Key Participants

In San Antonio		
J.D. Baker	Sparx Systems	Developer, Enterprise Architect (UCAT)
Gary Dickinson	CentriHealth	Lead, S&I Simplification; Co-Chair, HL7 EHR WG
John Feikema	ONC	Coordinator, S&I Framework
Art Griesser	Prometheus [NIST]	Developer, Use Case Editor (UCAT)
Freida Hall	Quest Diagnostics	S&I and LRI Expert
Stephen Hufnagel	TIAG [DOD/VA]	Co-Facilitator, HL7 EHR Interoperability WG
Galen Mulrooney	JP Systems [ONC]	Lead, FHA FHIM
Rob Snelick	NIST	Lead, IGAMT/TCAMT
On the Phone		
Robin Barnes	DC Group [AHRQ]	Lead, USHIK
Kevin Brady	NIST	Lead
Ed Larsen	Accenture [ONC]	Staff, S&I Simplification

S&I Simplification WG @ HL7 in San Antonio

Agenda

Introductions	13:45-13:50	
S&I Simplification Intro, Analysis, Progression Steps	13:50-14:05	Gary
Use Case Authoring Tools (UCAT) Prometheus Use Case Editor Sparx Enterprise Architect Extensions	14:05-14:30	 Art J.D.
How UCAT Fits With: ISO/HL7 10781/16527 EHR/PHR SFMs FHA FHIM NIST IGAMT, TCAMT AHRQ USHIK	14:30-14:50	 Steve Galen Rob, Kevin Robin
UCAT Priorities, Status, Next Steps	14:50-15:00	Gary
Adjourn – Afternoon Break		

Considering…

- Which Components of a Use Case are:
  - Potentially computable?
    - As implementable software and/or data objects?
  - Uniquely identifiable? Catalogue-able?
    - In an established repository?
  - Candidates for re-use?
    - In another Use Case scenario?

From each S&I Initiative Use Case

Components are selected…

- Requirements
- Actors and Roles
  - Individuals, Organizations, Systems
- Scenarios
- Events and Actions
- Data Objects and Elements

Key Objectives

- To identify a set of Core Components broadly applicable to – and *re-usable* in subsequent specification of – Use Cases
- Broadly stated, Core Components are Requirements, Events, Actions, Actors, Roles and Data Objects, that we:
  - Find in common across Use Cases, Scenarios and Events;
  - Might re-use in a new Use Case Scenario.
- To establish/maintain a Core Component Registry
- To allow each Use Case Initiative to select (re-use) Core Components applicable to their needs or create anew
- To identify new Core Component candidates as each Use Case Initiative reaches consensus
- To identify Implementable Data and Software Constructs fulfilling Core Component requirements

US Standards and Interoperability (S&I) Framework

S&I Simplification WG

- Compiled and Distilled Components from S&I Initiatives
  - Current Analysis: 17 Use Cases with 39 Multi-Step Scenarios
- Use Cases Convey Uniform and Integrated Patterns of:
  - Patient Flow – with Patient as Actor
  - Provider (Work/Process) Flow – with Provider as Actor
  - Information Flow – including System as an Actor
- Showing:
  - Event Steps with Actions taken – by Actors in Roles – to support individual health and provide healthcare
  - Health record entries resulting from Actions taken
- With Commonalties, Patterns of Repetition/Re-Use
  - Both Current and Potential

S&I Simplification - Analysis Status - 17 January 2014 - Core Matrix Version 2.6 (Working Draft)
Incorporation of Use Case Initiatives in S&I Simplification Core Matrix

Initiative	Initial Analysis Phase - Core Matrix					FHIM	AHRQ	Consensus Core Matrix
	Analysis Type	Common Requirements	Common Actors, Systems, Roles	Scenarios, Event Steps	Common Actions	Common Data Objects, Elements	US Health Information Knowledgebase	
Transitions of Care (TOC)	Retro	COMPLETE	COMPLETE	COMPLETE	COMPLETE	Data Requirements Compiled	REGISTERED	v1
Lab Results Interface (LRI)								
Longitudinal Coordination of Care (LCC) 1								v2.1
LCC 2		In Progress						TBD
Lab Orders Interface (LOI)		COMPLETE	COMPLETE	COMPLETE	COMPLETE	Compiled	REGISTERED	v2.1
Provider Directory (PD) - Digital Certificate								
PD - Electronic Address								
esMD 1 - Electronic Submission of Medical Documentation, Provider Profiles Authentication								
esMD 2 - Structured Content of Electronic Medical Documentation Request (eMDR)								
esMD 3 - Author of Record Level 1	Concurrent						Awaiting Consensus	TBD
esMD 3 - Author of Record Level 2	Retro							
esMD 3 - Author of Record Level 3	TBD	Future						
Query Health (QH)	Retro	COMPLETE	COMPLETE	COMPLETE	COMPLETE	Compiled	REGISTERED	v2.1
Data Segmentation for Privacy (DS4P)								
Public Health Reporting (PHRI)								
HeD 1 - Health eDecisions - Clinical Decision Support (CDS) Artifact Sharing		In Progress					Awaiting Consensus	TBD
HeD 2 - CDS Guidance Service								
Structured Data Capture								
EU/US eHealth Initiative	Concurrent	COMPLETE						
RESTful Health Exchange (RHEx)	TBD	TBD						
Automated Blue Button								
Data Access Framework (DAF)								
Electronic Certificate	Retro	N/A				Compiled	REGISTERED	N/A

Light Blue Background - From S&I Use Case Initiative Scenarios
White Background - Added by Simplification Work Group for Illustration

(To show full Action Names, Unhide Rows 1, 2, 4.)

ACTION REPETITION EXAMPLE...

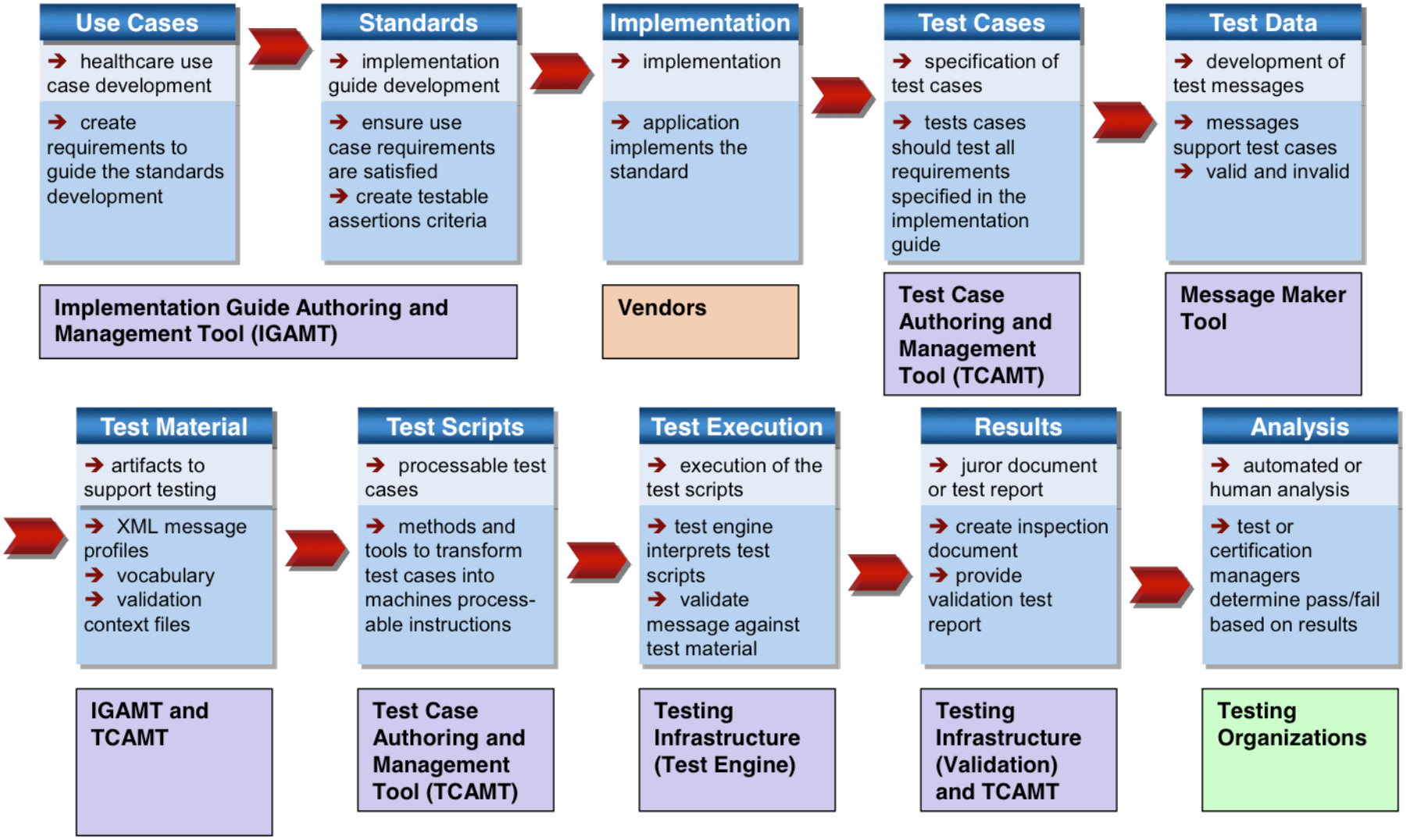
	Actor	Event/Description	Inputs	Outputs	Sample Action(s)	Audit	Signature		Consistent Time	ID Patient	ID Provider	ID System	Verify ID Certificate	Set Permissions	Check Permissions	Control Access	Originate Entry	Retain Entry	Verify Entry	Attest Entry	Amend Entry	De-Identify Entry	Re-Identify Entry	Extract Entries	Translate Entries	Transmit	Receive	Acknowledgment	Query
						A.AUDIT	A.SIGN	Sender/Source	A.TIME	A.ID.1/2	A.ID.3/4	A.ID.5	A.ID.6	A.PERMIT	A.ACCESS.1	A.ACCESS.2	A.REC.1	A.REC.2	A.REC.3	A.REC.4	A.REC.5	A.REC.6	A.REC.7	A.REC.8	A.REC.9	A.XFER.1	A.XFER.2	A.ACK	A.QUERY
							A.SIGN	Author/Source																					
Transitions of Care (TOC) - Transitions of Care - Scenario 1A - Exchange of Discharge Summary to Support Transfer of Patient Information from One Provider to Another Provider																												
Pre	EHR System(s)	Reference/Set Consistent Time			Reference Consistent Time	X			X																			
1	Provider	Trigger Generation of Discharge Summary for Patient A	START	Discharge Instructions	Identify Patient, Provider, EHR System	X				X	X	X																	
					Originate/Attest/Retain - Discharge Summary	X		X									X	X		X									
					Set Data Access Permissions	X								X															
2	Hospital EHR System	Send Discharge summary to PCP's EHR System or other Provider EHR System	Discharge Instructions	Discharge Instructions	Transmit - Discharge Summary	X	X																		X			
3	PCP or other Provider EHR System	Receive Discharge Summary	Discharge Instructions	Discharge Instructions	Identify (EHR) System	X						X																
					Receive/Retain - Discharge Summary	X												X								X		
4	Provider	Trigger Generation of Discharge Summary for Patient A	Discharge Summary	Discharge Summary	Identify Patient, Provider, EHR System	X				X	X	X																
					Originate/Attest/Retain - Discharge Summary + Instructions	X		X									X	X		X									
					Set Data Access Permissions	X								X															
5	Hospital EHR System	Send Discharge summary to PCP's EHR System or other Provider Organization	Discharge Summary	Discharge Summary	Transmit - Discharge Summary + Instructions	X	X																		X			
6	PCP or other Provider EHR System	Receive Discharge Summary	Discharge Summary	Discharge Summary	Identify (EHR) System	X						X																
					Receive/Retain - Discharge Summary + Instructions	X												X								X		
7	Provider	View Discharge Summary/Instructions	Discharge Summary	END	Identify, Authenticate Provider	X					X																	
					Check User Data Access Permissions	X									X														
					Access/View - Discharge Summary + Instructions	X										X													
Transitions of Care (TOC) - Transitions of Care - Scenario 1B - Exchange of Clinical Summaries to Support Closed Loop Referral of Patient from One Provider to Another																												
Pre	EHR System(s)	Reference/Set Consistent Time			Reference Consistent Time	X			X																			
1	Provider	Trigger Generation of Consultation Request Clinical Summary for Patient A	START	Generated Consultation Request Clinical Summary	Identify Patient, Provider, EHR System	X				X	X	X																
					Originate/Attest/Retain - Clinical Summary	X		X									X	X		X									
					Verify - Clinical Summary	X		X											X										
					Set Data Access Permissions	X								X															
2	PCP EHR System	Send Consultation Request Clinical Summary to specialist's EHR System	Consultation Request Clinical Summary	Consultation Request Clinical Summary	Transmit - Clinical Summary	X	X																		X			
3	Specialist EHR System	Receive Consultation Request Clinical Summary from PCP's EHR System	Consultation Request Clinical Summary	Consultation Request Clinical Summary	Identify (EHR) System	X						X																
					Receive/Retain - Clinical Summary	X												X								X		
4	Provider	View Consultation Request Clinical Summary in specialist's EHR System	Consultation Request Clinical Summary	END	Identify Provider	X					X																	
					Check User Data Access Permissions	X									X														
					Access/View - Clinical Summary	X										X													
5	Provider	Trigger Generation of Consultation Summary for patient A	START	Generated Consultation Summary	Identify Patient, Provider EHR System	X				X	X	X																
					Originate/Attest/Retain - Consultation Summary	X		X									X	X		X									
6	Specialist EHR System	Send Consultation Summary to PCP's EHR System	Consultation Summary	Consultation Summary	Transmit - Consultation Summary	X	X																		X			
7	PCP EHR System	Receive Consultation Summary from specialist's EHR System	Consultation Summary	Consultation Summary	Identify (EHR) System	X																						
					Receive/Retain - Consultation Summary	X												X								X		
8	Provider	View Consultation Summary in PCP's EHR System	Consultation Summary	END	Identify, Authenticate Provider	X					X																	
					Check User Data Access Permissions	X									X														
					Access/View – Consultation Summary	X										X													

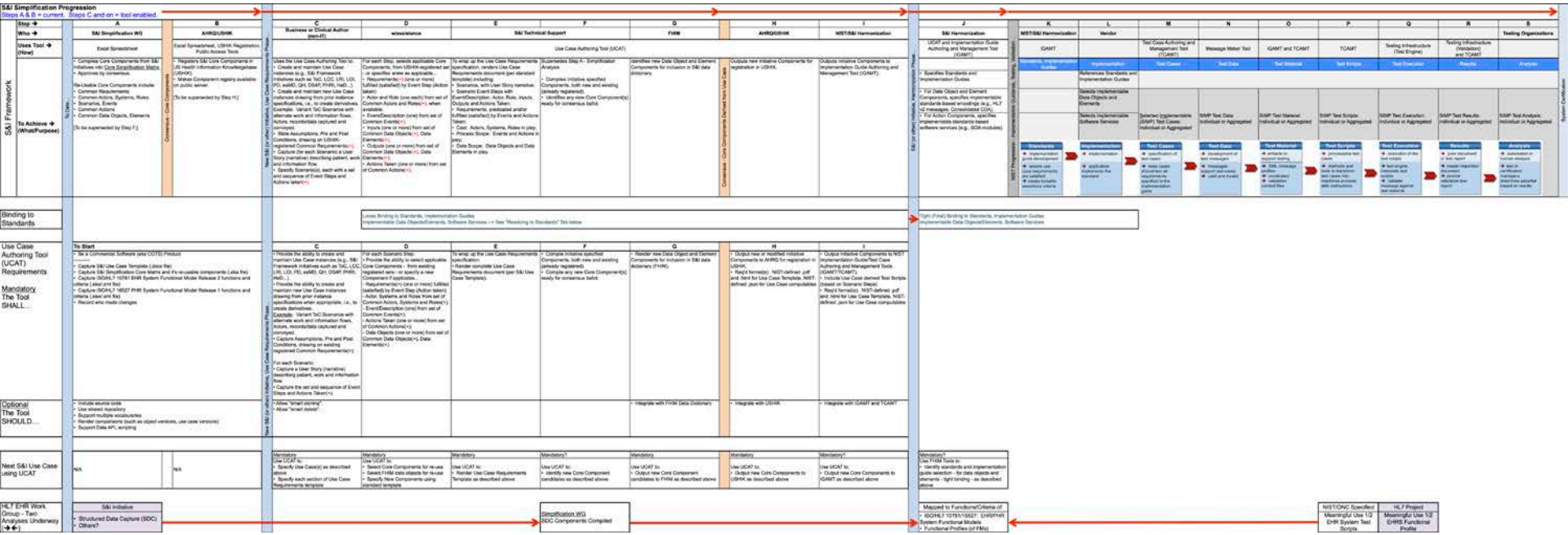
Action Category	Action ID	Action	Related Requirement(s)	Data Objects Note Re-Use across Multiple Actions	EHR System Functions (Ref: ISO/HL7 10781 EHRS Functional Model Release 2)	PHR System Functions (Ref: ISO/HL7 16527 PHRS Functional Model Release 1)	Action Auditable? (A.AUDIT)	Action Signed by… (A.SIGN)
Identity	A.ID.1	Identify, Authenticate Individual Patient	R3-R5, R15	DES101 Patient ID	TI.1.1 - Entity Authentication CPS.1.1 - Manage Patient Record CPS.1.2 - Manage Patient Demographics	PH.1.1, S.2.1, S.3.1, IN.1, IN.1.7, IN.3.1-4	Yes	N/A
	A.ID.2	Select Individual Patient					Yes	N/A
	A.ID.3	Identify, Authenticate Provider	R9-R11, R15	DES102 Individual Provider ID and/or DES103 Organizational Provider ID	TI.1.1 - Entity Authentication AS.1 - Manage Provider Information AS.1.1 - Manage Provider Registry or Directory AS.1.7 - Manage Practitioner/Patient Relationships RI.1.1.1-24.1 - Evidence of <Provider> in EHR Record Entry	S.1.2, S.1.3, IN.3.1-4	Yes	N/A
	A.ID.4	Select Provider					Yes	N/A
	A.ID.5	Identify System	R14	DES104 System ID	TI.1.1 - Entity Authentication CPS.2.8 - Support Medical Device Originated Data RI.1.1.1-24.1 - Evidence of <System> in EHR Record Entry TI.3 - Registry and Directory Services	IN.3.1-3, IN.3.5	Yes	N/A
	A.ID.6	Validate Identity Certificate	R8-R11	DES102 Individual Provider ID and/or DES103 Organizational Provider ID	<Not included in EHRS FM R2>	<Not included in PHRS FM R1>	Yes	N/A
Consistent Time	A.TIME	Reference Current Time	R1, R2, R12, R13	DES107 Consistent Time	RI.2 - Record Synchronization	PH.1.4, IN.1.1, IN.3.4	Yes	N/A
Data Access Permissions	A.PERMIT.1	Set Data Access Permissions, including Patient Consent	R2, R7, R15	DES105 Data Access Permissions	TI.1.2 - Entity Authorization CPS.1.7.3 - Manage Consents and Authorizations AS.2.6 - Manage Patient Privacy Consent Directives	S.3.3.1, S.7, IN.3.1, IN.3.8	Yes	N/A
	A.PERMIT.2	Determine/designate Scope of Data Access Permissions	R7, R7.1	DES105 Data Access Permissions	AS.3.2.1 - Manage Consents and Authorizations from a PHR RI.1.1.6-9 - Output/Disclose/Transmit/Receive Record Entry Content		Yes	N/A
Access Control	A.ACCESS.1	Check User Data Access Permissions	R2, R2.1, R7, R15	DES102/DES103 Provider ID DES105 Data Access Permissions	TI.1.1 - Entity Authentication TI.1.2 - Entity Authorization TI.1.3 - Entity Access Control RI.1.1.5 - Access/View Record Entries	IN.3.1-4, IN.3.8	Yes	N/A
	A.ACCESS.2	Access/View Record, Document or Message	R1, R2, R3-7, R9-R15	Any/All		IN.3.1-3	Yes	N/A
Audit	A.AUDIT	Audit Action and/or Record Action	R1, R12-R17	DES108 Audit Parameters	RI.1.1.1-24.1 - Evidence of Record Entry Provenance and Accountability TI.2.1.1 - Record Entry Audit Triggers TI.2.1.2 - Security Audit Audit Triggers TI.2.1.3 - System Audit Triggers TI.2.1.4 - Clinical Audit Triggers	IN.1, IN.3-4		N/A
Query	A.QUERY	Query		Any/All	CPS.9.5 - Ad Hoc Query and Rendering POP.6.1 - Outcome Measures and Analysis POP.6.2 - Performance and Accountability Measures	PH.5.4, IN.2.1	Yes	N/A
Encrypt	A.ENCRYPT	Encrypt Record or Exchange Content		Any/All	RI.1.1.8 - Transmit Record Entry Content RI.1.1.9 - Receive Record Entry Content TI.1.6 - Secure Data Exchange TI.8 - Database Backup and Recovery	IN.3.5, IN.3.10		
De-Crypt	A.DECRYPT	Decrypt Record or Exchange Content		Any/All				
Signature	A.SIGN	Apply Signature	R8-R11, R13-R14	DES102 Individual Provider ID DES103 Organizational Provider ID DES104 System ID	RI.1.1.1 - Originate and Retain Record Entry RI.1.1.2 - Amend Record Entry Content RI.1.1.4 - Attest Record Entry Content TI.1.5 - Non-Repudiation	IN.3.4, IN.3.5, IN.3.7	Yes	N/A
Signature	A.DSig	Apply Digital Signature	R8-R11, R13-R14	DESxxx Individual Provider Digital ID DESxxx Organizational Provider Digital ID DESxxx System Digial ID	RI.1.1.1 - Originate and Retain Record Entry RI.1.1.2 - Amend Record Entry Content RI.1.1.4 - Attest Record Entry Content TI.1.5 - Non-Repudiation	IN.3.4, IN.3.5, IN.3.7	Yes	N/A
Signature	A.DSigV	Validate Digital Signature	R8-R11, R13-R14	DESxxx Individual Provider Digital ID DESxxx Organizational Provider Digital ID DESxxx System Digial ID	RI.1.1.1 - Originate and Retain Record Entry RI.1.1.2 - Amend Record Entry Content RI.1.1.4 - Attest Record Entry Content TI.1.5 - Non-Repudiation	IN.3.4, IN.3.5, IN.3.7	Yes	N/A

Action Category	Action ID	Action	Related Requirement(s)	Data Objects Note Re-Use across Multiple Actions	EHR System Functions (Ref: ISO/HL7 10781 EHRS Functional Model Release 2)	PHR System Functions (Ref: ISO/HL7 16527 PHRS Functional Model Release 1)	Action Auditable? (A.AUDIT)	Action Signed by… (A.SIGN)
Exchange	A.XFER.1	Transmit Record, Document or Message	R1.1-R14.1	Documents/Messages, containing DESs, as exchanged	RI.1.1.8 - Transmit Record Entry Content RI.1.1.9 - Receive Record Entry Content TI.1.6 - Secure Data Exchange TI.1.7 - Secure Data Routing TI.5 - Standards-Based Interoperability	IN.3.1-3, IN.3.5-6, IN.3.10	Yes	Sender/Source
	A.XFER.2	Receive Record, Document or Message					Yes	N/A
Acknowledgement	A.ACK	Acknowledgement		DES109 Acknowledgement information			Yes	N/A
Registration, Admission, Discharge	A.REG	Register Patient	R1, R3-R5, R8	DES101 Patient ID DES1 Personal Information DESxxx Other registration, admission and discharge information	CPS.1.1 - Manage Patient Record CPS.1.2 - Manage Patient Demographics CPS.1.5 - Manage Patient Encounter	PH.1.1	Yes	N/A
	A.IP.1	Admit Inpatient				N/A	Yes	N/A
	A.IP.2	Discharge Inpatient					Yes	N/A
	A.AP.1	Checkin Ambulatory Patient					Yes	N/A
	A.AP.2	Checkout Ambulatory Patient					Yes	N/A
Clinical Summary	A.REC.1-2	Compile/Retain - Clinical Summary	R1-R11, R14, R15	DES101 Patient ID DES102/DES103 Provider ID DES104 System ID DES105 Data Access Permissions DES1-DES37, as appropriate	[Refer to Specific Actions Re-Used - Col B.]	[Refer to Specific Actions Re-Used - Col B.]	Yes	Author/Source
	A.REC.3	Verify - Clinical Summary					Yes	Author/Source
	A.XFER.1	Transmit - Clinical Summary	R1.1-R14.1				Yes	Sender/Source
	A.XFER.2	Receive - Clinical Summary					Yes	N/A
	A.REC.2	Retain - Clinical Summary	R1-R14				Yes	N/A
	A.ACCESS.2	Access - View Clinical Summary	R2, R4-R15				Yes	N/A
Clinical	[See Clinical Summary Sequence]	Clinical Actions, for example: • Order(s) • History and Physical • Assessment • Reconcile medication list • Update problem list • Update care plan • Capture vital signs	R1, R3-R5, R8-R15	Any/All	Care Provision (CP) and Care Provision Support (CPS) Functions	Personal Health (PH) Functions	N/A	N/A
Record Lifecycle	A.REC.1	Originate	R1, R12, R13, R15-R17	Any/All	RI.1.1.1 - Originate and Retain Record Entry	IN.3.1-3, IN.4	Yes	Author/Source
	A.REC.2	Retain				IN.4	Yes	N/A
	A.REC.3	Verify			RI.1.1.4 - Attest Record Entry Content	IN.4	Yes	Author/Source
	A.REC.4	Attest				IN.3.1-3, IN.3.7, IN.4	Yes	Author/Source
	A.REC.5	Amend			RI.1.1.2 - Amend Record Entry Content	IN.4	Yes	Author/Source
	A.REC.6	De-Identify or Alias			RI.1.1.10 - De-identify Record Entries RI.1.1.11 - Pseudomynize Record Entries	PH.3.6.1, S.4.1.2, IN.1.4, IN.4	Yes	N/A
	A.REC.7	Re-Identify			RI.1.1.12 - Re-identify Record Entries	IN.1.4	Yes	N/A
	A.REC.8	Extract			RI.1.1.13 - Extract Record Entry Content	S.3.8, S.4.1.3, S.4.3, IN.1.4, IN.4	Yes	N/A
	A.REC.9	Translate			RI.1.1.3 - Translate Record Entry Content	IN.1.13	Yes	Author/Source Sender/Source
	A.REC.10	Output/Report			RI.1.1.6 - Output/Report Record Entry Content	PH.2.4, S.2.3-4, S.3.5, S.3.8, IN.4	Yes	Author/Source Sender/Source
	A.ACCESS.2	Access/View			[Refer to Specific Actions Re-Used - Col B.]	[Refer to Specific Actions Re-Used - Col B.]	Yes	N/A
	A.ENCRYPT	Encrypt					Yes	Sender/Source
	A.DECRYPT	Decrypt					Yes	Sender/Source
	A.XFER.1	Transmit, Disclose					Yes	Sender/Source
	A.XFER.2	Receive					Yes	N/A

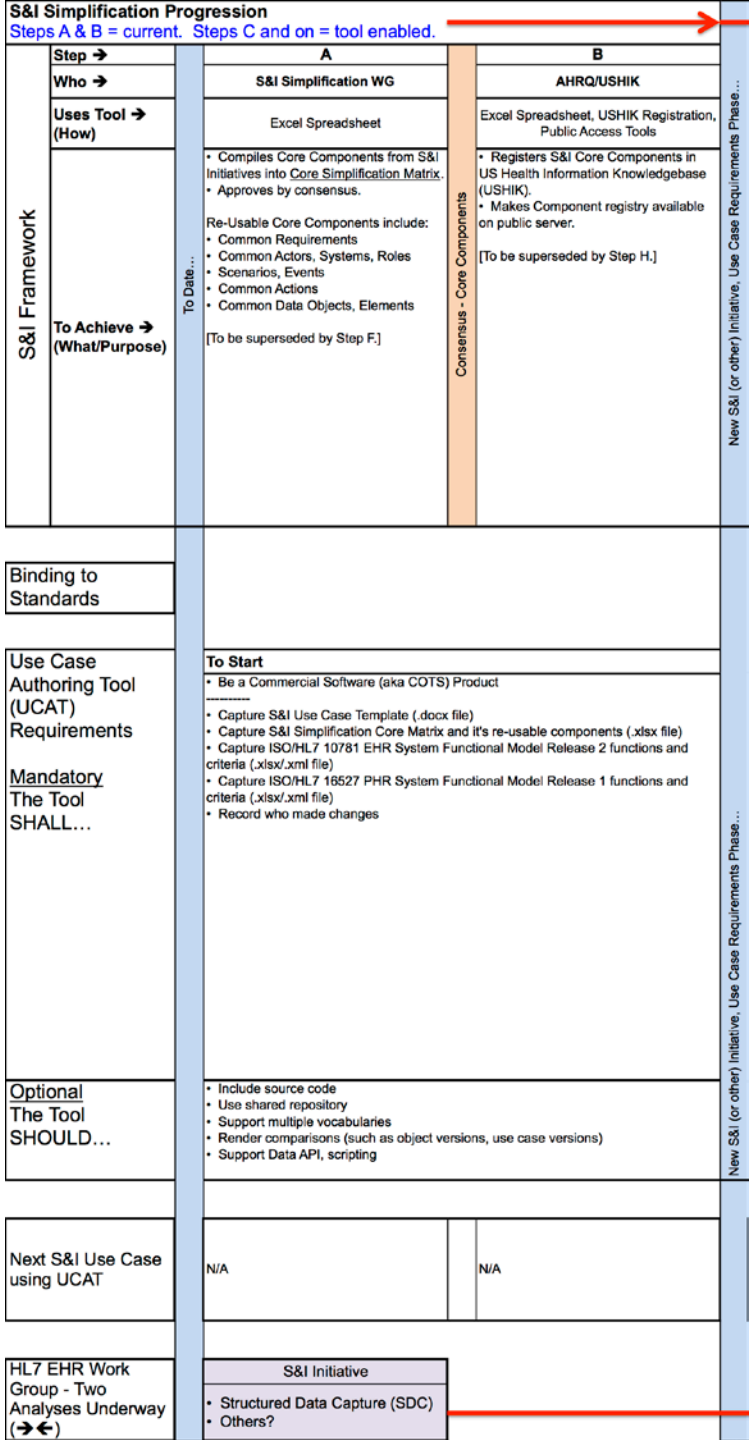
Re-Use Examples

What will the tools address?




S&I Simplification Progression
Steps A & B = current. Steps C and on = tool enabled.
S&I Framework
Step →
Who →
Uses Tool → (How)
To Achieve → (What/Purpose)
To Use:
Consensus - Core Components
New S&I (or other) Initiative, Use Case Requirements Phase
S&I (or other) Initiative, Harmonization Phase
NIST Programmatic - Implementation Guidance, Testing, Validation
System Certification
S&I Simplification WG
S&I Framework Tools
Excel Spreadsheet
Excel Spreadsheet, USHIK Registration, Public Access Tools
Use Case Authoring Tool (UCAT)
UCAT and Implementation Guide Authoring and Management Tool (IGAMT)
IGAMT
Test Case Authoring and Management Tool (TCAMT)
Message Maker Tool
IGAMT and TCAMT
TCAMT
Testing Infrastructure (Test Engine)
Testing Infrastructure (Validation) and TCAMT
Standards, Implementation Guides
Implementation
Test Cases
Test Data
Test Material
Test Scripts
Test Execution
Results
Analysis
Testing Organizations
Binding to Standards
Use Case Authoring Tool (UCAT) Requirements
Mandatory
The Tool SHALL…
Optional
The Tool SHOULD…
Next S&I Use Case using UCAT
HL7 EHR Work Group - Two Analyses Underway
S&I Initiative
Structured Data Capture (SDC)
Others?
Simplification WG
SDC Components Compiled
NIST/ONC Specified
Meaningful Use 1/2 EHR System Test Scripts
HL7 Project
Meaningful Use 1/2 EHRS Functional Profile

Steps A-B – Pre-Use Case Authoring Tool (UCAT)



S&I Simplification Progression
Steps A & B = current. Steps C and on = tool enabled.

	Step →	A	B
S&I Framework	Who →	S&I Simplification WG	AHRQ/USHIK
	Uses Tool → (How)	Excel Spreadsheet	Excel Spreadsheet, USHIK Registration, Public Access Tools
	To Achieve → (What/Purpose)	• Compiles Core Components from S&I Initiatives into Core Simplification Matrix. • Approves by consensus. Re-Usable Core Components include: • Common Requirements • Common Actors, Systems, Roles • Scenarios, Events • Common Actions • Common Data Objects, Elements [To be superseded by Step F.]	• Registers S&I Core Components in US Health Information Knowledgebase (USHIK). • Makes Component registry available on public server. [To be superseded by Step H.]

To Date…

Consensus - Core Components

New S&I (or other) Initiative, Use Case Requirements Phase…

Binding to Standards	
Use Case Authoring Tool (UCAT) Requirements Mandatory The Tool SHALL…	**To Start** • Be a Commercial Software (aka COTS) Product --------- • Capture S&I Use Case Template (.docx file) • Capture S&I Simplification Core Matrix and it's re-usable components (.xlsx file) • Capture ISO/HL7 10781 EHR System Functional Model Release 2 functions and criteria (.xlsx/.xml file) • Capture ISO/HL7 16527 PHR System Functional Model Release 1 functions and criteria (.xlsx/.xml file) • Record who made changes
Optional The Tool SHOULD…	• Include source code • Use shared repository • Support multiple vocabularies • Render comparisons (such as object versions, use case versions) • Support Data API, scripting
Next S&I Use Case using UCAT	N/A / N/A
HL7 EHR Work Group - Two Analyses Underway (→←)	S&I Initiative • Structured Data Capture (SDC) • Others?

Steps C-I – Use Case Authoring Tool (UCAT) Enabled

New S&I (or other) Initiative, Use Case Requirements Phase…

S&I (or other) Initiative, Harmonization Phase…

C	D	E	F	G		H	I
Business or Clinical Author (non-IT)	**w/assistance**	**S&I Technical Support**		**FHIM**		**AHRQ/USHIK**	**NIST/S&I Harmonization**
			Use Case Authoring Tool (UCAT)				
Uses the Use Case Authoring Tool to: • Create and maintain Use Case instances (e.g., S&I Framework Initiatives such as ToC, LCC, LRI, LOI, PD, esMD, QH, DS4P, PHRI, HeD...). • Create and maintain new Use Case instances drawing from prior instance specifications, i.e., to create derivatives. Example: Variant ToC Scenarios with alternate work and information flows, Actors, records/data captured and conveyed. • State Assumptions, Pre and Post Conditions, drawing on USHIK-registered Common Requirements(+). • Capture (for each Scenario) a User Story (narrative) describing patient, work and information flow. • Specify Scenario(s), each with a set and sequence of Event Steps and Actions taken(+).	For each Step, *selects* applicable Core Components, from USHIK-registered set - or *specifies* anew as applicable... • Requirements(+) (one or more) fulfilled (satisfied) by Event Step (Action taken) • Actor and Role (one each) from set of Common Actors and Roles(+), when available; • Event/Description (one) from set of Common Events(+); • Inputs (one or more) from set of Common Data Objects(+), Data Elements(+); • Outputs (one or more) from set of Common Data Objects(+), Data Elements(+); • Actions Taken (one or more) from set of Common Actions(+).	To wrap up the Use Case Requirements specification, renders Use Case Requirements document (per standard template) including: • Scenarios, with User Story narrative; • Scenario Event Steps with Event/Description, Actor, Role, Inputs, Outputs and Actions Taken; • Requirements, predicated and/or fulfilled (satisfied) by Events and Actions Taken; • Cast: Actors, Systems, Roles in play; • Process Scope: Events and Actions in play; • Data Scope: Data Objects and Data Elements in play.	Supersedes Step A - Simplification Analysis • Compiles Initiative specified Components, both new and existing (already registered). • Identifies any new Core Component(s) ready for consensus ballot.	Identifies new Data Object and Element Components for inclusion in S&I data dictionary.	Consensus - Core Components Derived from Use Case	Outputs new Initiative Components for registration in USHIK.	Outputs Initiative Components to Implementation Guide Authoring and Management Tool (IGAMT).

Loose Binding to Standards, Implementation Guides
Implementable Data Objects/Elements, Software Services --> See "Resolving to Standards" Tab below

New S&I (or other) Initiative, Use Case Requirements Phase…

C	D	E	F	G		H	I
• Provide the ability to create and maintain Use Case instances (e.g., S&I Framework Initiatives such as ToC, LCC, LRI, LOI, PD, esMD, QH, DS4P, PHRI, HeD...). • Provide the ability to create and maintain new Use Case instances drawing from prior instance specifications when appropriate, i.e., to create derivatives. Example: Variant ToC Scenarios with alternate work and information flows, Actors, records/data captured and conveyed. • Capture Assumptions, Pre and Post Conditions, drawing on existing registered Common Requirements(+). For each Scenario: • Capture a User Story (narrative) describing patient, work and information flow. • Capture the set and sequence of Event Steps and Actions Taken(+).	For each Scenario Step: • Provide the ability to select applicable Core Components - from existing registered sets - or specify a new Component if applicable... - Requirements(+) (one or more) fulfilled (satisfied) by Event Step (Action taken) - Actor, Systems and Roles from set of Common Actors, Systems and Roles(+); - Event/Description (one) from set of Common Events(+); - Actions Taken (one or more) from set of Common Actions(+); - Data Objects (one or more) from set of Common Data Objects(+), Data Elements(+).	To wrap up the Use Case Requirements specification: • Render complete Use Case Requirements document (per S&I Use Case Template).	• Compile Initiative specified Components, both new and existing (already registered). • Compile any new Core Component(s) ready for consensus ballot.	• Render new Data Object and Element Components for inclusion in S&I data dictionary (FHIM).		• Output new or modified Initiative Components to AHRQ for registration in USHIK. • Req'd format(s): NIST-defined .pdf and .html for Use Case Template, NIST-defined .json for Use Case computables	• Output Initiative Components to NIST Implementation Guide/Test Case Authoring and Management Tools (IGAMT/TCAMT). • Include Use Case derived Test Scripts (based on Scenario Steps) • Req'd format(s): NIST-defined .pdf and .html for Use Case Template, NIST-defined .json for Use Case computables
• Allow "smart cloning". • Allow "smart delete".				• Integrate with FHIM Data Dictionary		• Integrate with USHIK	• Integrate with IGAMT and TCAMT

Mandatory Use UCAT to: • Specify Use Case(s) as described above • Specify each section of Use Case Requirements template	Mandatory Use UCAT to: • Select Core Components for re-use • Select FHIM data objects for re-use • Specify New Components using standard template	Mandatory Use UCAT to: • Render Use Case Requirements Template as described above	Mandatory? Use UCAT to: • Identify new Core Component candidates as described above	Mandatory Use UCAT to: • Output new Core Component candidates to FHIM as described above		Mandatory Use UCAT to: • Output new Core Components to USHIK as described above	Mandatory? Use UCAT to: • Output new Core Components to IGAMT as described above

Simplification WG
SDC Components Compiled

Steps J-S – Harmonization, Guidance, Implementation, Testing

S&I (or other) Initiative, Harmonization Phase...

NIST Progression - Implementation Guidance, Testing, Validation...

J	K	L	M	N	O	P	Q	R	S
S&I Harmonization	**NIST/S&I Harmonization**	**Vendor**							**Testing Organizations**
UCAT and Implementation Guide Authoring and Management Tool (IGAMT)	IGAMT		Test Case Authoring and Management Tool (TCAMT)	Message Maker Tool	IGAMT and TCAMT	TCAMT	Testing Infrastructure (Test Engine)	Testing Infrastructure (Validation) and TCAMT	
	Standards, Implementation Guides	Implementation	Test Cases	Test Data	Test Material	Test Scripts	Test Execution	Results	Analysis
• Specifies Standards and Implementation Guides		References Standards and Implementation Guides							
• For Data Object and Element Components, specifies implementable standards-based encodings (e.g., HL7 v2 messages, Consolidated CDA).		Selects Implementable Data Objects and Elements							
• For Action Components, specifies implementable standards-based software services (e.g., SOA modules).		Selects Implementable Software Services	Selected Implementable (SIMP) Test Cases: Individual or Aggregated	SIMP Test Data: Individual or Aggregated	SIMP Test Material: Individual or Aggregated	SIMP Test Scripts: Individual or Aggregated	SIMP Test Execution: Individual or Aggregated	SIMP Test Results: Individual or Aggregated	SIMP Test Analysis: Individual or Aggregated
	Standards → implementation guide development → ensure use case requirements are satisfied → create testable assertions criteria	**Implementation** → implementation → application implements the standard	**Test Cases** → specification of test cases → tests cases should test all requirements specified in the implementation guide	**Test Data** → development of test messages → messages support test cases → valid and invalid	**Test Material** → artifacts to support testing → XML message profiles → vocabulary → validation context files	**Test Scripts** → processable test cases → methods and tools to transform test cases into machines process-able instructions	**Test Execution** → execution of the test scripts → test engine interprets test scripts → validate message against test material	**Results** → juror document or test report → create inspection document → provide validation test report	**Analysis** → automated or human analysis → test or certification managers determine pass/fail based on results

System Certification

Tight (Final) Binding to Standards, Implementation Guides
Implementable Data Objects/Elements, Software Services

Mandatory?
Use FHIM Tools to:
• Identify standards and implementation guide selection - for data objects and elements - tight binding - as described above

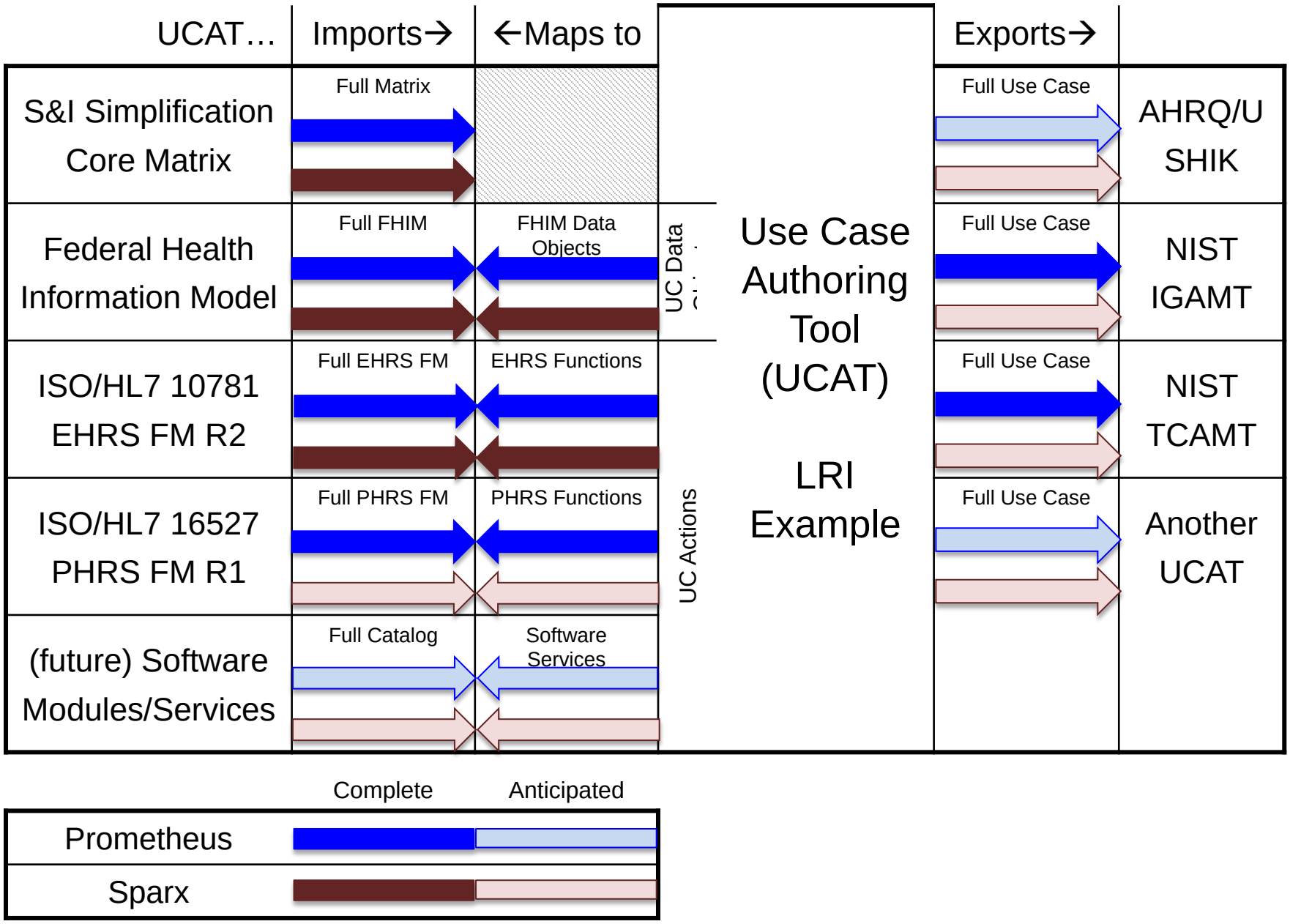
Mapped to Functions/Criteria of:
• ISO/HL7 10781/16527: EHR/PHR System Functional Models
• Functional Profiles (of FMs)

NIST/ONC Specified	HL7 Project
Meaningful Use 1/2 EHR System Test Scripts	Meaningful Use 1/2 EHRS Functional Profile

Progression Steps*

Steps	Tool	Used to…
S&I Use Case Requirements (UCR) Phase		
C-D	UCAT	Build Use Case, specify Requirements and Details
E		Render completed Use Case per S&I UCR Template (Word .docx)
F		Identify New Core Component Candidates from this Use Case
G		For FHIM update: identify new UC data objects, elements
H		Output to USHIK: full Use Case
I		Output to NIST Tool Suite (IGAMT/TCAMT): full Use Case
S&I Harmonization Phase		
J-K	IGAMT	Develop/manage Implementation Guides for selected standards
NIST-designed Software Testing and Certification		
M-S	IG/TCAMT	Develop/manage software test cases; support testing and validation

* See S&I Simplification – Progression Spreadsheet


UCAT…
Imports→
←Maps to
Exports→
S&I Simplification Core Matrix
Full Matrix
Full Use Case
AHRQ/USHIK
Federal Health Information Model
Full FHIM
FHIM Data Objects
UC Data
Full Use Case
NIST IGAMT
ISO/HL7 10781 EHRS FM R2
Full EHRS FM
EHRS Functions
Full Use Case
NIST TCAMT
ISO/HL7 16527 PHRS FM R1
Full PHRS FM
PHRS Functions
UC Actions
Full Use Case
Another UCAT
(future) Software Modules/Services
Full Catalog
Software Services
Use Case Authoring Tool (UCAT)
LRI Example
Complete
Anticipated
Prometheus
Sparx

S&I Simplification WG @ HL7 in San Antonio

Agenda

Introductions	13:45-13:50	
S&I Simplification Intro, Analysis, Progression Steps	13:50-14:05	Gary
Use Case Authoring Tools (UCAT) Prometheus Use Case Editor Sparx Enterprise Architect Extensions	14:05-14:30	 Art J.D.
How UCAT Fits With: ISO/HL7 10781/16527 EHR/PHR SFMs FHA FHIM NIST IGAMT, TCAMT AHRQ USHIK	14:30-14:50	 Steve Galen Rob, Kevin Robin
UCAT Priorities and Next Steps	14:50-15:00	Gary
Adjourn – Afternoon Break		

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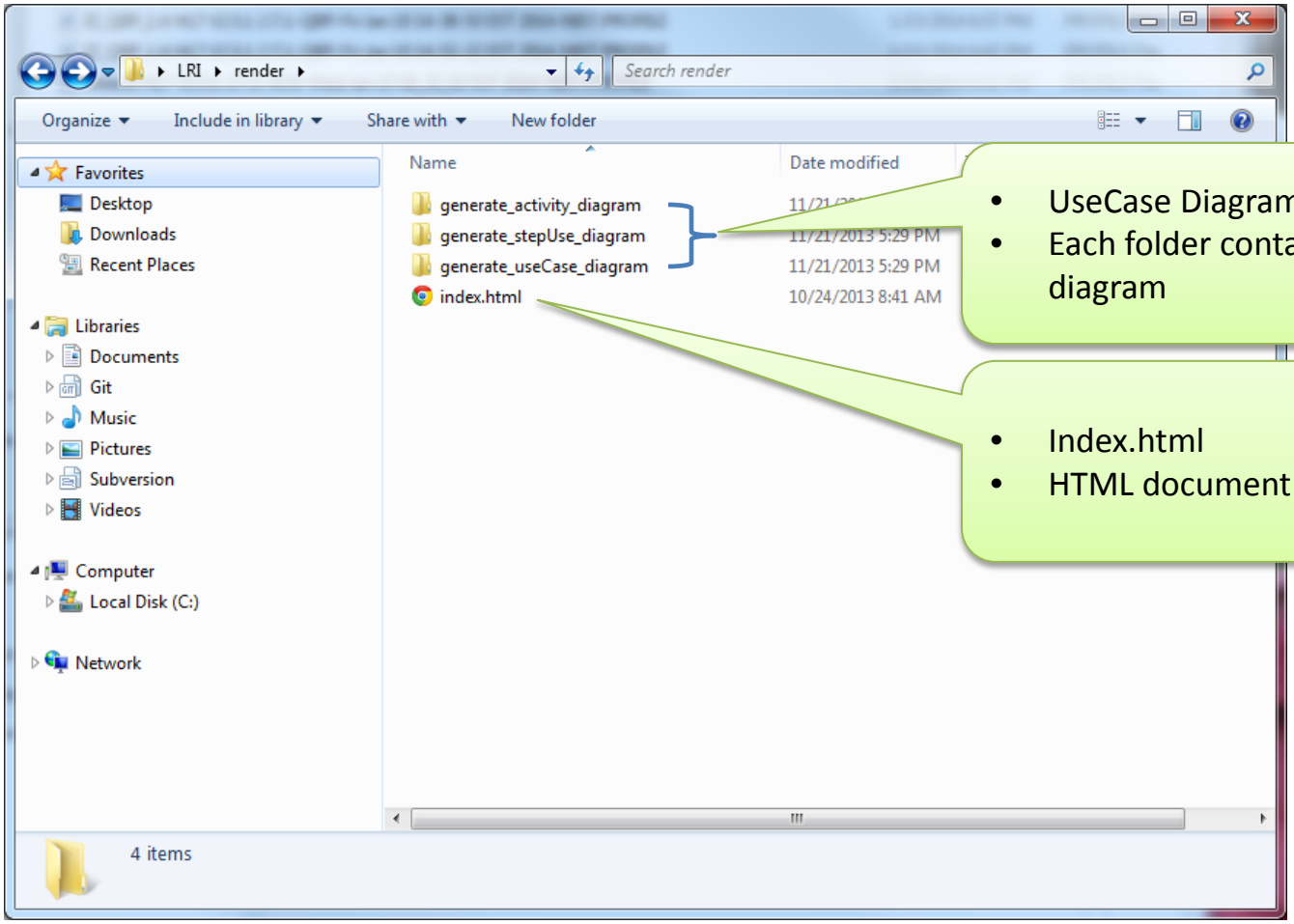
Integration of Use Case Tool (UCAT) into NIST IGAMT (HL7 V2 Implementation Guide Authoring and Management Tool)

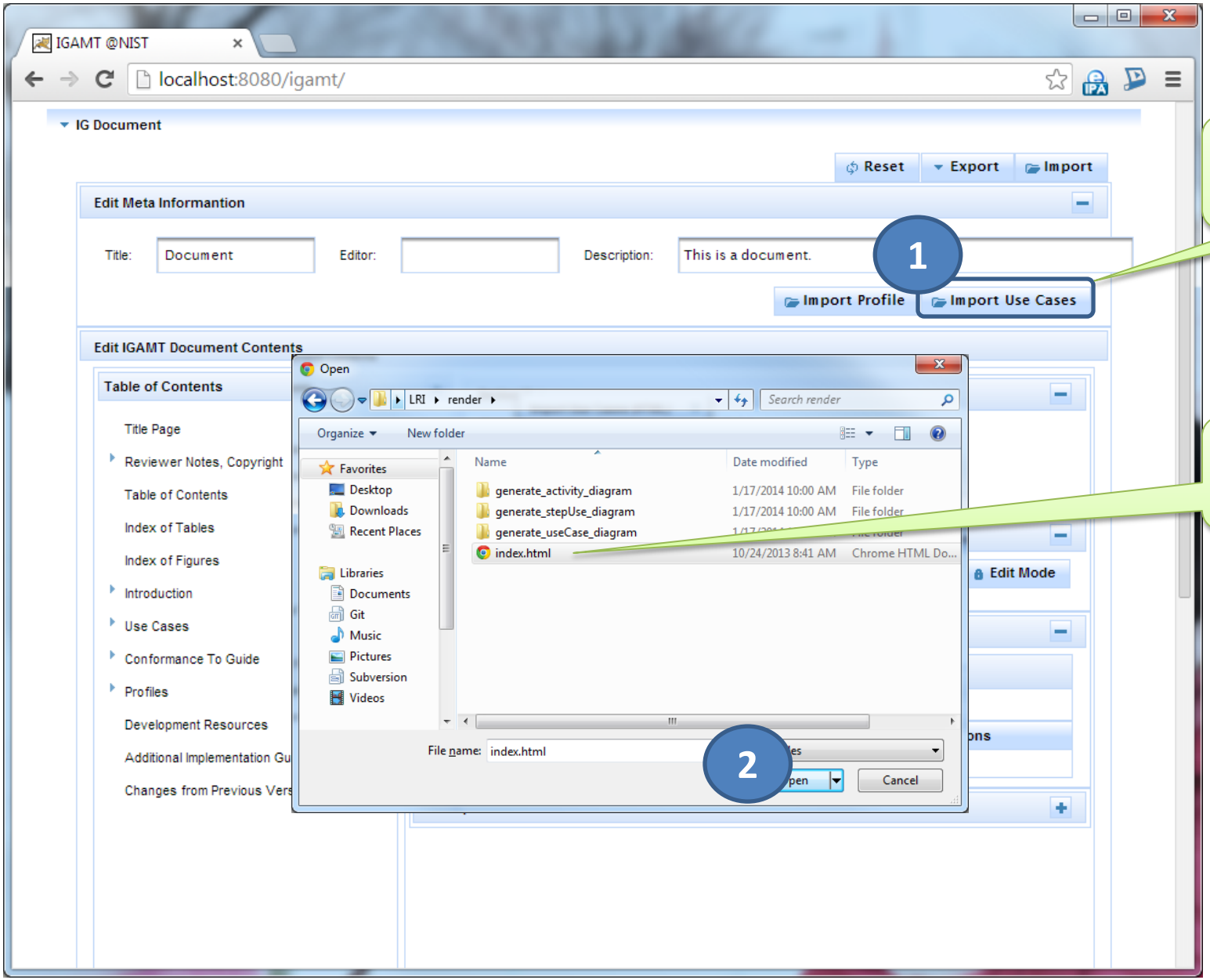
Output format of Use Case Tool (UCAT)



- UseCase Diagram Figure Folders
- Each folder contains an image file (.png) for diagram

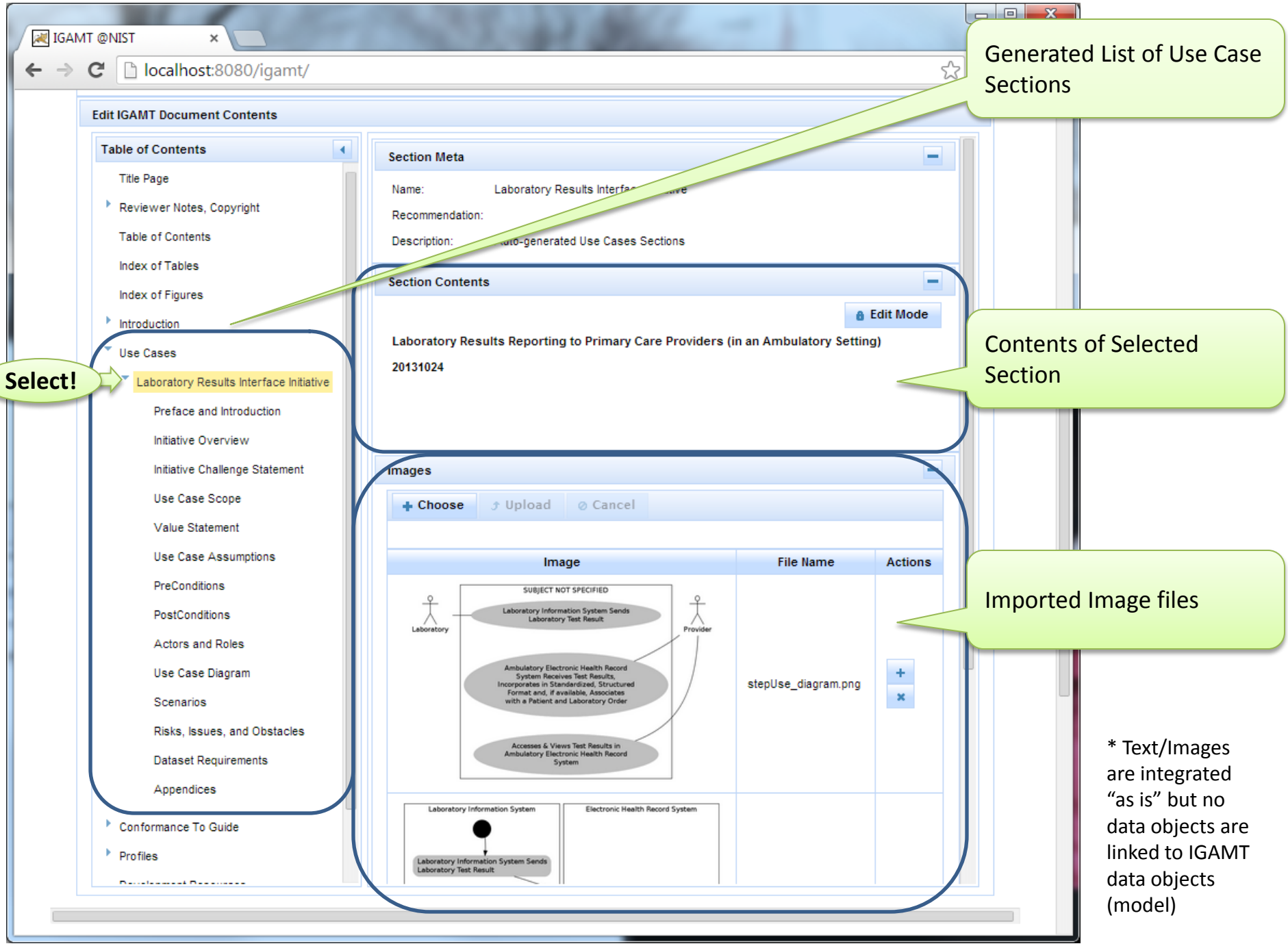
- Index.html
- HTML document to describe Use Case

Import Use Case into IGAMT



Import Use Case button

Select HTML document of Use Case



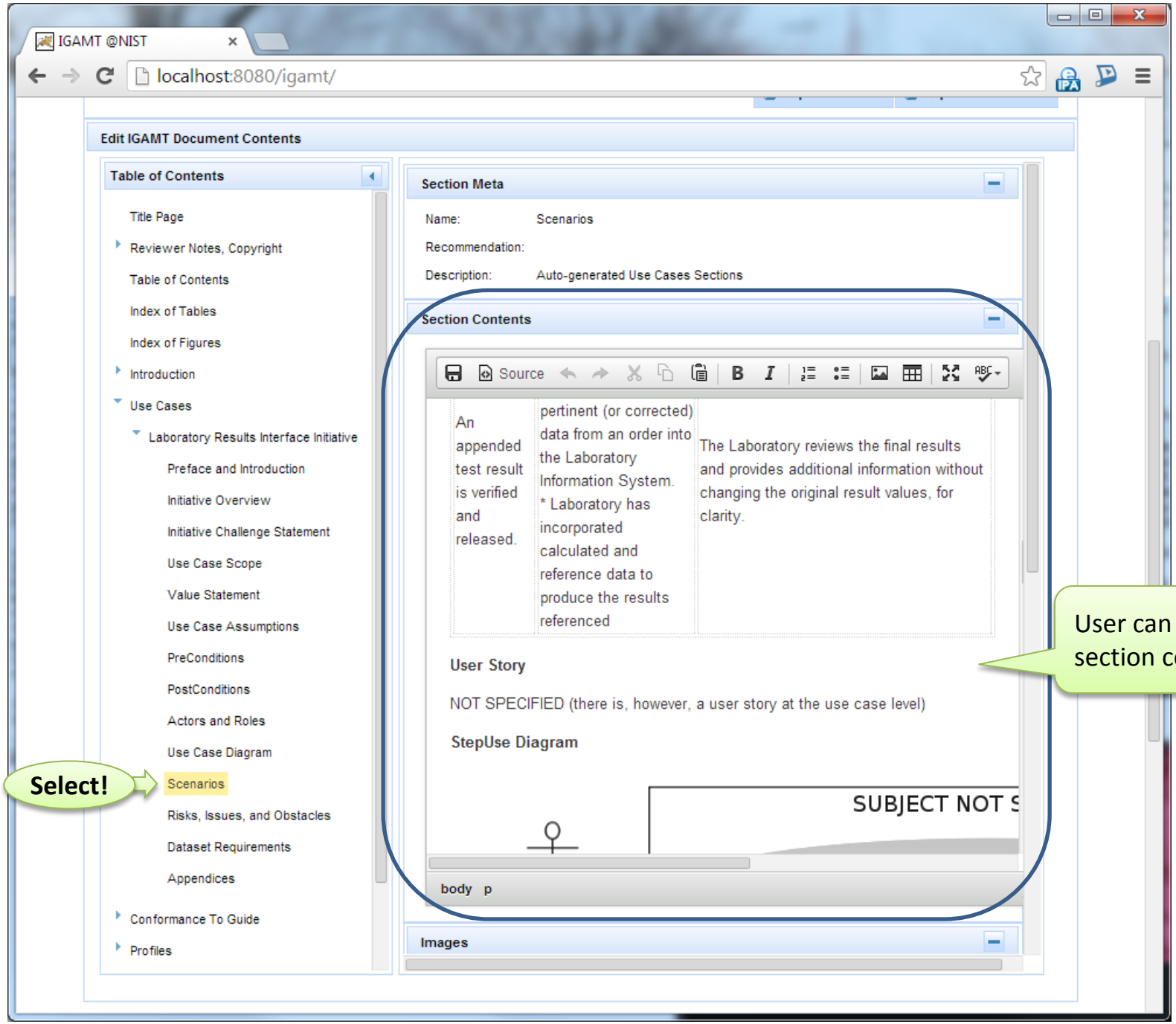
Generated List of Use Case Sections

Select!

Contents of Selected Section

Imported Image files

* Text/Images are integrated "as is" but no data objects are linked to IGAMT data objects (model)


IGAMT @NIST
localhost:8080/igamt/
Edit IGAMT Document Contents
Table of Contents
Title Page
Reviewer Notes, Copyright
Table of Contents
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Introduction
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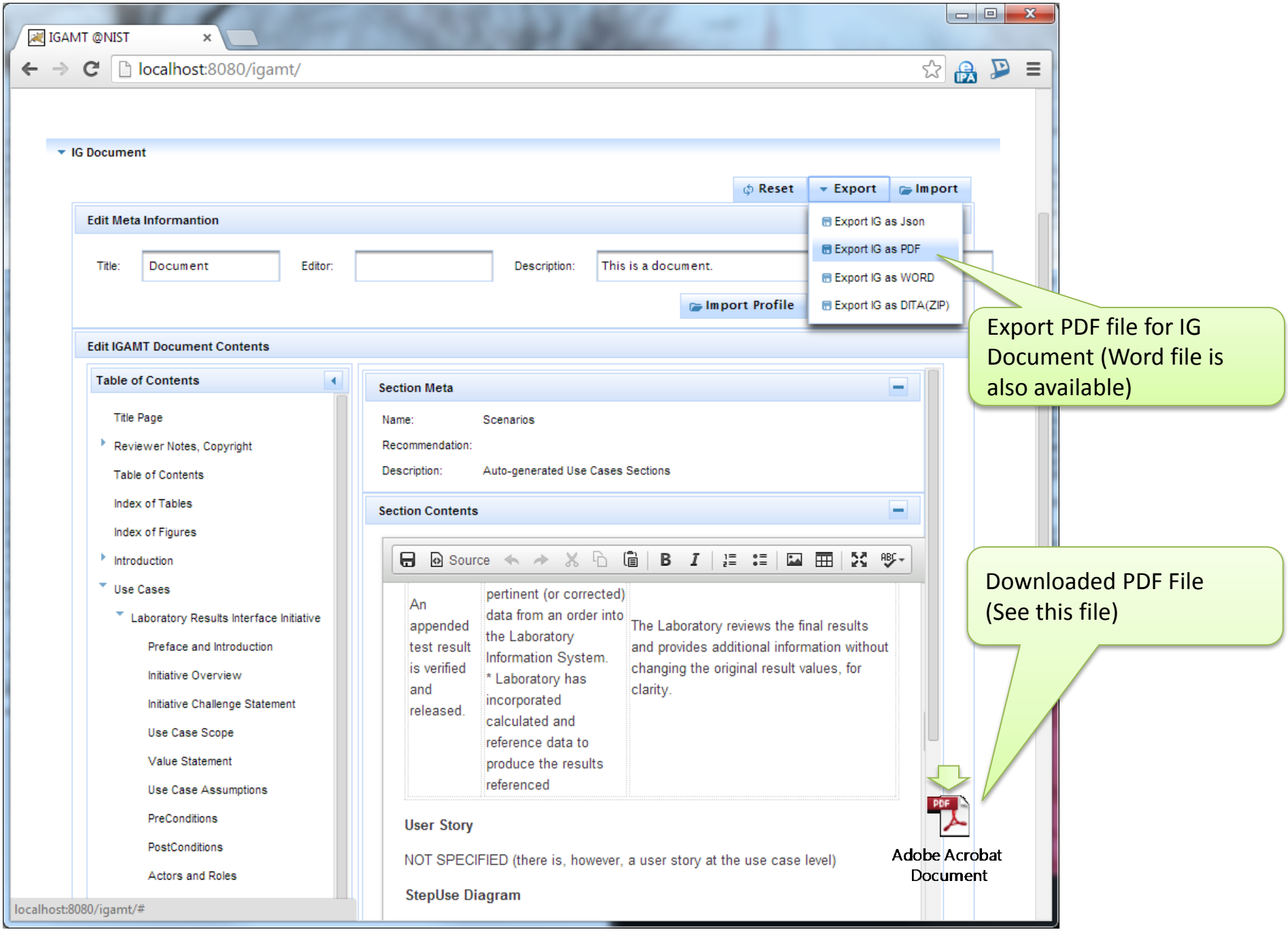
Laboratory Results Interface Initiative
Preface and Introduction
Initiative Overview
Initiative Challenge Statement
Use Case Scope
Value Statement
Use Case Assumptions
PreConditions
PostConditions
Actors and Roles
Use Case Diagram
Scenarios
Risks, Issues, and Obstacles
Dataset Requirements
Appendices
Conformance To Guide
Profiles
Select!
Section Meta
Name: Scenarios
Recommendation:
Description: Auto-generated Use Cases Sections
Section Contents
Source
An appended test result is verified and released.
pertinent (or corrected) data from an order into the Laboratory Information System. * Laboratory has incorporated calculated and reference data to produce the results referenced
The Laboratory reviews the final results and provides additional information without changing the original result values, for clarity.
User Story
NOT SPECIFIED (there is, however, a user story at the use case level)
StepUse Diagram
SUBJECT NOT S
body p
Images
User can edit the selected section contents


IGAMT @NIST
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IG Document
Reset
Export
Import
Edit Meta Informantion
Title:
Document
Editor:
Description:
This is a document.
Import Profile
Export IG as Json
Export IG as PDF
Export IG as WORD
Export IG as DITA(ZIP)
Edit IGAMT Document Contents
Table of Contents
Title Page
Reviewer Notes, Copyright
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Laboratory Results Interface Initiative
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StepUse Diagram
localhost:8080/igamt/#
Export PDF file for IG Document (Word file is also available)
Downloaded PDF File (See this file)
PDF
Adobe Acrobat Document

USHIK History

Health and Human Services (HHS) Secretary

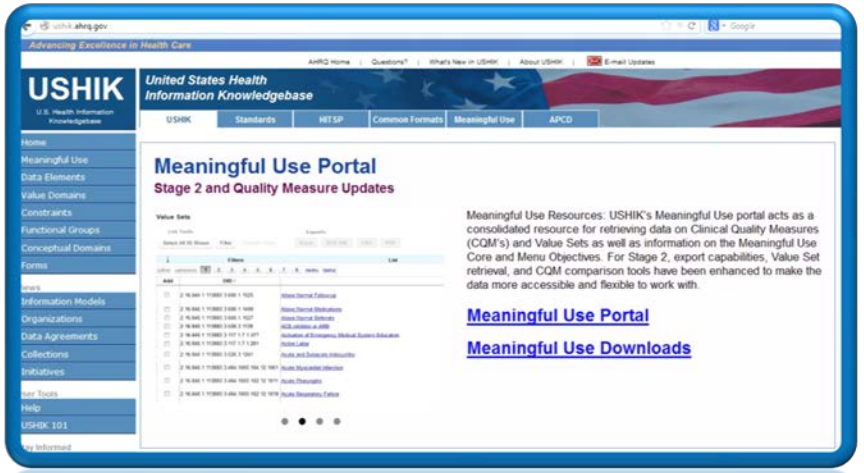
- Health Insurance Portability and Accountability Act (HIPAA) transactions
- Meaningful Use
- Others

The Agency for Healthcare Research and Quality (AHRQ) Director

- All-Payer Claims Database (APCD) state programs
- Patient Safety Common Formats (CF) of AHRQ

USHIK Overview

- The basis for USHIK is the International Organization for Standardization and International Electrotechnical Commission (ISO/IEC) 11179 metadata registry standard



- USHIK has been supported by the Department of Defense (DoD), Centers for Medicare and Medicaid Services (CMS), National Cancer Institute (NCI), Department of Health and Human Services/Office of the Secretary, and AHRQ since 1998
- USHIK's Data Element metadata (attributes) include their names, definitions, representations (vocabularies and code sets), base standard, and a variety of other fields.

USHIK Portals

- **USHIK**: HHS Secretary's adopted, endorsed, recognized data elements: HIPAA, Consolidated Health Informatics, Healthcare Information Technology Standards Panel (HITSP), and all other data elements
- **Standards**: Accredited Standards Committee X12 5010 Data Element Dictionary and National Council Prescription Drug Program October 2011 Data Dictionary
- **HITSP**: HITSP constructs C80, C83, C154 and C32
- **Common Formats for Patient Safety**: Specifications for electronically reporting patient safety events in hospitals among AHRQ-designated Patient Safety Organizations
- **Meaningful Use**: CQMs, value sets and Core and Menu Objectives
- **State All-Payer Claims Data**: Data element specifications from All-Payer Claims Data bases of 8 states
- **Standards and Interoperability Framework** (Pilot site): Data elements, value domains, and use cases and the S&I Simplification CSM.

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UCAT Priorities

<table>
<tr><td colspan="2">Priorities identified in consultation with ONC and S&I leadership.</td></tr>
<tr><td>Priority</td><td>Status</td></tr>
<tr><td>1. Seek Commercially Available UCAT Options
• Prometheus Use Case Editor (Art Griesser)
• Sparx Enterprise Architect w/extensions (J.D. Baker)</td><td rowspan="2">• UCAT Requirements are described in S&I Simplification Progress spreadsheet (rows 14-16)
• Each vendor has agreed to self-report tool development progress and status vs. UCAT Requirements
• Prometheus report posted
• Sparx TBD</td></tr>
<tr><td>2. Show UCAT options side-by-side
• With fit to S&I and Simplification Methodology</td></tr>
<tr><td>3. Identify UCAT interest with other FHA agencies</td><td>• NIST, AHRQ – engaged
• DOD, VA, FDA – in discussion
• Presentation to FHA Architecture and Modeling WG – 11 Feb 2014</td></tr>
</table>

UCAT Priorities

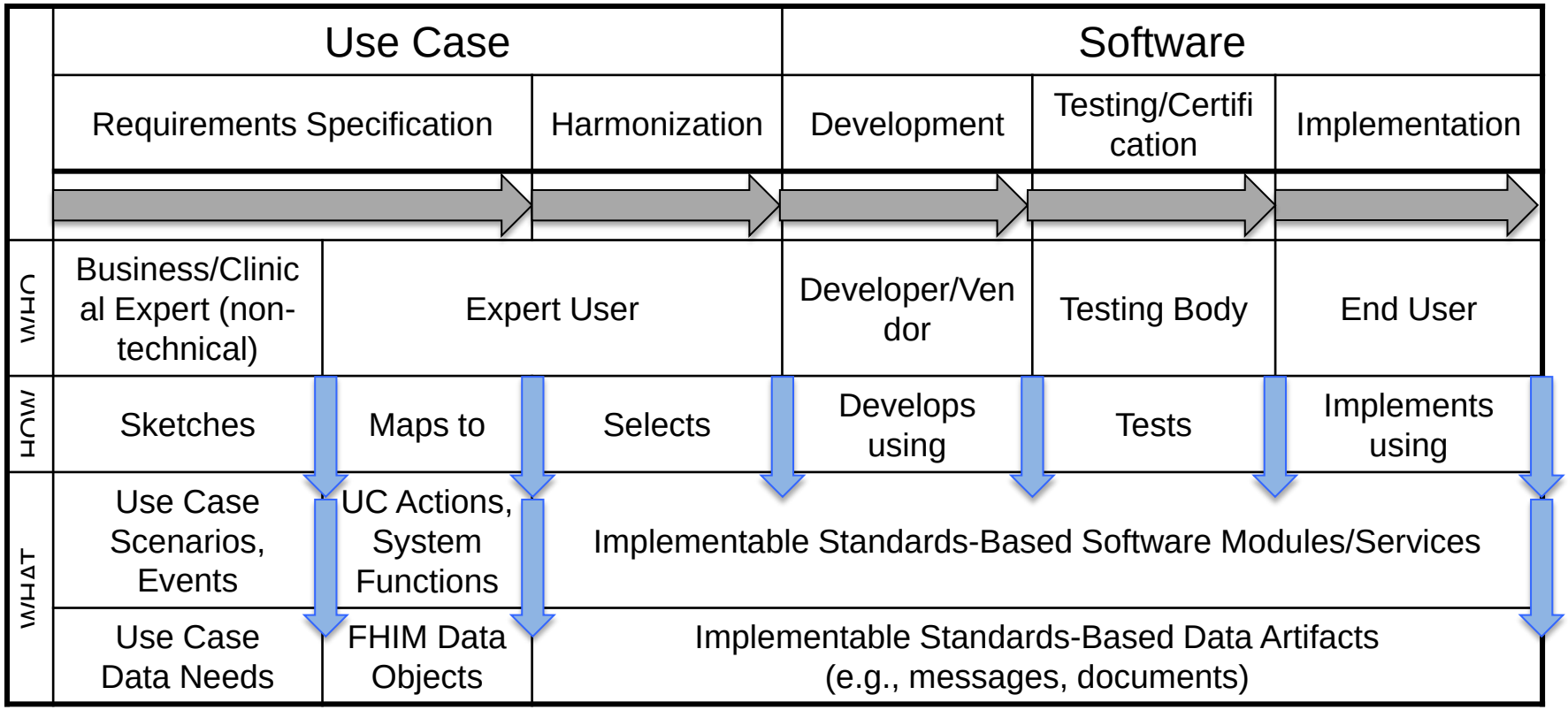
Priority	Status
4. Achieve UCAT/FHIM integration • FHIM is released in periodic versions • UCAT captures each new FHIM version (as .xmi) • UCAT maps UC Data Requirements to FHIM objects • UCAT captures new UC Data Objects (new FHIM candidates)	• Prometheus and Sparx: • Have captured latest FHIM .xmi file • Can map UC to FHIM data objects
5. Use UCAT in parallel w/upcoming S&I Use Case(s) • To complete UC Requirements Template	• Prometheus: Currently capturing EU/US eHealth Cooperation Initiative – Interoperability Use Case • Sparx: TBD

UCAT Priorities

Priority	Status
6. Validate non-IT Technical User Interface – To Create Initial Use Case Sketch by Clinical/Business SME	• Prometheus (future update) • Sparx TBD

Anchored by the Use Case Authoring Tool (UCAT)

From Sketch to Implementation



UCAT Priorities

Priority	Status
7. Develop UC Exchange Format – Render paginated UC template • As .pdf and .html files – Render computable UC details • As .json file – To facilitate output to: **A.** NIST IGAMT/TCAMT Tools **B.** AHRQ/USHIK **C.** Another UCAT	**A.** NIST has drafted exchange format for UCAT to IGAMT/TCAMT • Prometheus has output LRI files according to NIST specification • Sparx TBD **B, C.** AHRQ and tool vendors will either use NIST spec or create NIST+ spec

UCAT Priorities

Priority	Status
8. Develop End-to-End Demo – Anchored by UCAT – Candidate(s): Any Use Case expressed (express-able) in S&I Use Case Requirements Template – First: S&I Lab Results Interface (LRI)	• Presentation: 22 January 2014 Host: HL7 EHR WG • Prometheus: Full LRI • Sparx: TBD

Links

- US Office of National Coordinator (ONC) Standards and Interoperability (S&I) Framework Wiki
  - http://wiki.siframework.org
- S&I Simplification Wiki
  - http://wiki.siframework.org/Cross+Initiative+-+S%26I+Simplification+WG
  - http://wiki.siframework.org/Use+Case+Simplification+Reference+Materials
- Federal Health Information Model (FHIM)
  - http://www.fhims.org
- AHRQ/USHIK S&I Pilot Site
  - http://ushik-stg.dcgroupinc.com/index_si.jsp?system=si
- HL7 EHR Interoperability Wiki
  - http://wiki.hl7.org/index.php?title=EHR_Interoperability_WG