

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

Canada Health Infoway Presentation

Gary L. Dickinson

7 March 2014

S&I Framework – Cross Initiative – S&I Simplification

Quick History

2005-2009	<p>ANSI HITSP</p> <ul style="list-style-type: none"> • 17 Use Cases, each siloed
2011	<ul style="list-style-type: none"> • Meaningful Use Stage 1 Starts • Standards and Interoperability (S&I) Framework Starts • S&I Simplification Gets Underway, Data Element Starter Sets (DES) • Engage with AHRQ/US Health Information Knowledgebase
2012	<ul style="list-style-type: none"> • Common Element Data Dictionary (CEDD) supersedes DESs • Engage with National Institute for Standards and Technology (NIST)
2013	<ul style="list-style-type: none"> • Federal Health Information Model (FHIM) supersedes CEDD • UCAT Prototype development starts: Prometheus and Sparx • ISO TC215 Work Item Proposed: Re-Usable Component Strategy for Use Case Development
2014	<ul style="list-style-type: none"> • Meaningful Use Stage 2 Starts • UCATs are Maturing, NIST Tools in Development • Emerging Interests...

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
- And Show:
 - Event Steps with Actions taken – by Actors in Roles – to support individual health and provide healthcare
 - Often including health record entries resulting from Actions taken
- With Commonalties, Patterns of Repetition/Re-Use
 - Both Current and Potential

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

Key Objectives

- To identify a set of **Core Components** broadly applicable to, and *re-usable* in subsequent specification of, **Use Cases**
 - 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
 - Create anew: identify new Core Component candidates
- To identify **Implementable Data and Software Constructs** fulfilling Core Component requirements

Key Objectives

- To lay the foundation for a consistent infrastructure and build-out
- To lead to uniformity in requirement specification, standards and implementation guidance, software development, testing and certification, implementation
- To ensure requirements traceability, at each progression step, and end-to-end (use case to implementation)
- [NIST] To apply cross-industry: beyond S&I Framework, beyond the domain of health and healthcare
 - A generic approach

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)								v2.1		
Longitudinal Coordination of Care (LCC) 1								TBD		
LCC 2		In Progress								
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	COMPLETE	COMPLETE	COMPLETE	COMPLETE	Compiled	REGISTERED	v2.1	
esMD 3 - Author of Record Level 2	Retro	Awaiting Consensus								TBD
esMD 3 - Author of Record Level 3	TBD									
Query Health (QH)	Retro	COMPLETE	COMPLETE	COMPLETE	COMPLETE	Compiled	REGISTERED	v2.1		
Data Segmentation for Privacy (DS4P)										
Public Health Reporting (PHRI)		In Progress					Awaiting Consensus		TBD	
HeD 1 - Health eDecisions - Clinical Decision Support (CDS) Artifact Sharing										
HeD 2 - CDS Guidance Service										
Structured Data Capture	Concurrent	COMPLETE	COMPLETE	COMPLETE	COMPLETE	Compiled	REGISTERED	TBD		
EU/US eHealth Initiative										
RESTful Health Exchange (RHEX)	TBD	TBD								
Automated Blue Button										
Data Access Framework (DAF)										
Electronic Certificate	Retro	N/A				Compiled	REGISTERED	N/A		

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?

Component Candidates

Components selected from S&I Initiative Use Cases ↓	Is it...			Potentially Computable for...										
	In Common?	Re-Usable?	Computable?	Identity	Accountability	Permission, Control	Access, Data Flow	Performance/ Fulfillment	Capture, Persistence	Content: Structure/Inheritance	Coding, Classification	Completeness	Signature	Audit
Requirements	Y	Y	Y		•			•						
Actors, Roles	Y	Y	Y	•	•	•	•	•				•	•	•
Scenarios, Events, Actions	Y	Y	Y	•	•	•	•	•				•	•	•
Data Objects, Elements	Y	Y	Y	→ As standards-based software services										
				→ As standards-based data objects, messages, documents...										

Analysis Focus

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

Use Case Requirements Template

[\(LINK to Use Case Requirements Template\)](#)

- Starting Point
- S&I UCR Template is/has:
 - MS Word document
 - Evolved over past three years
 - Completed by each S&I Initiative
 - Consensus approved at end of UCR Phase (I)
 - Starting Point for S&I Harmonization Phase (II)
 - Starting Point for S&I Simplification Retrospective Use Case Analysis
 - Fully represented in Use Case Authoring Tool (UCAT)

Common Requirements Analysis

[\(LINK to Requirements Analysis Worksheet\)](#)

- Use Case Requirements (from UC Template)
 - Assumptions
 - Pre-Conditions
 - Post-Conditions
 - System Functional Requirements
- Raw Requirements
 - Duplicate discovery
 - Fulfillment: Pre, During or Post Use Case Scenario
 - Traceability: to Fulfilling Use Case Scenario/Event/Action
 - Re-Use: Requirements, Actions
 - Restatement of Requirement

Core Matrix

[\(LINK to Core Matrix Spreadsheet v2.6\)](#)

- Status – of S&I Simplification Initiative Analysis
- Key – Contents of All Tabs
- Assertions – Basis for Initial Requirements
- * Common Requirements
- * Common Actors
- * Scenarios, Events – w/Action examples
- * Common Actions
- * Common Data Objects

- * [Re-usable Components](#)

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.SIGN Author/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

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													

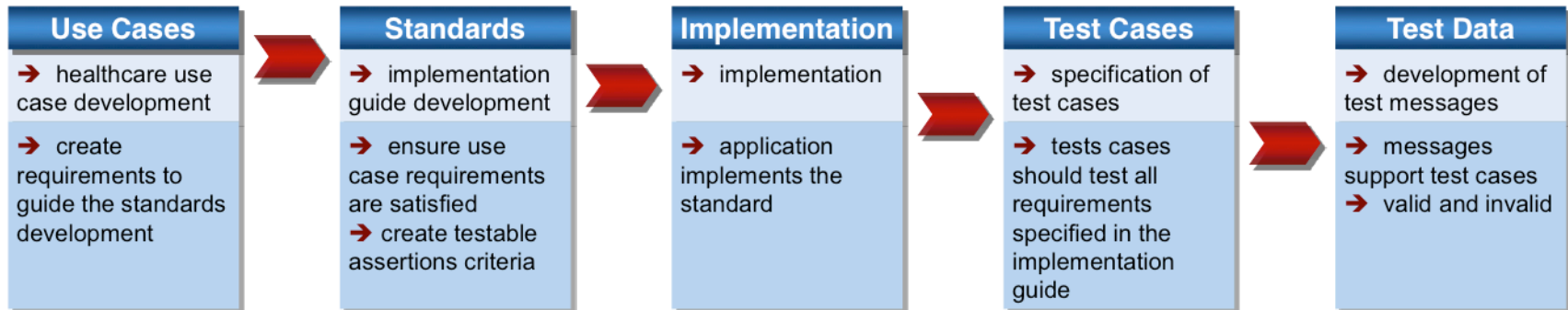
Transitions of Care (TOC) - Transitions of Care - Scenario 1B - Exchange of Clinical Summaries to Support Closed Loop Referral of Patient from One Provider to Another																												
Pre	EHR System(s)	Reference/Set Consistent Time		Reference Consistent Time	X		X																					
1	Provider	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										
					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 EHR 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 EHR 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 AS.3.2.1 - Manage Consents and Authorizations from a PHR RI.1.1.6-9 - Output/Disclose/Transmit/Receive Record Entry Content	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	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	RI.1.1.5 - Access/View Record Entries	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 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	IN.3.5, IN.3.10		
De-Crypt	A.DECRYPT	Decrypt Record or Exchange Content		Any/All	TI.1.6 - Secure Data Exchange TI.8 - Database Backup and Recovery			
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 Digital 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 Digital 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 EHR 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	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	TI.5 - Standards-Based Interoperability		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				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				N/A	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				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				IN.4	Yes	Author/Source		
	A.REC.6	De-Identify or Alias				RI.1.1.10 - De-identify Record Entries RI.1.1.11 - Pseudonymize 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							Yes	N/A
	A.ENCRYPT	Encrypt							Yes	Sender/Source
	A.DECRYPT	Decrypt						[Refer to Specific Actions Re-Used - Col B.]	[Refer to Specific Actions Re-Used - Col B.]	Yes
A.XFER.1	Transmit, Disclose					Yes	Sender/Source			
A.XFER.2	Receive					Yes	N/A			

Re-Use Examples

What will the tools address?

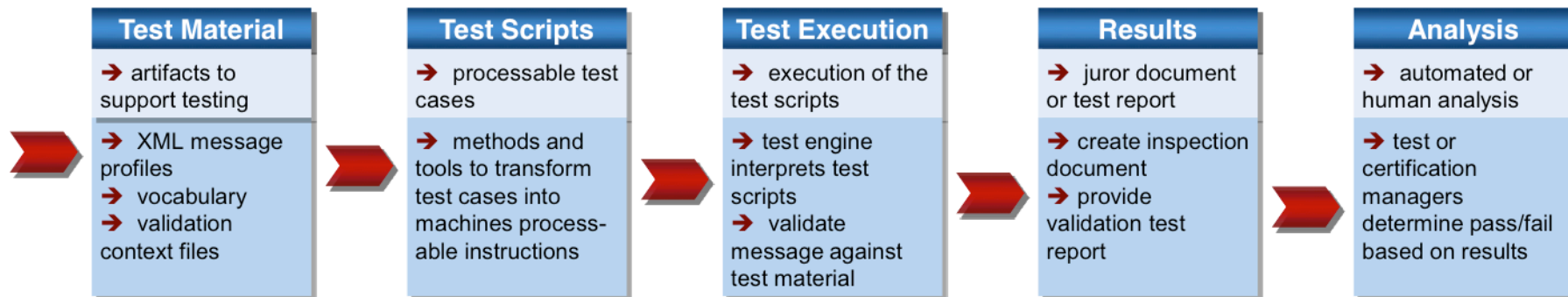


Implementation Guide Authoring and Management Tool (IGAMT)

Vendors

Test Case Authoring and Management Tool (TCAMT)

Message Maker Tool



IGAMT and TCAMT

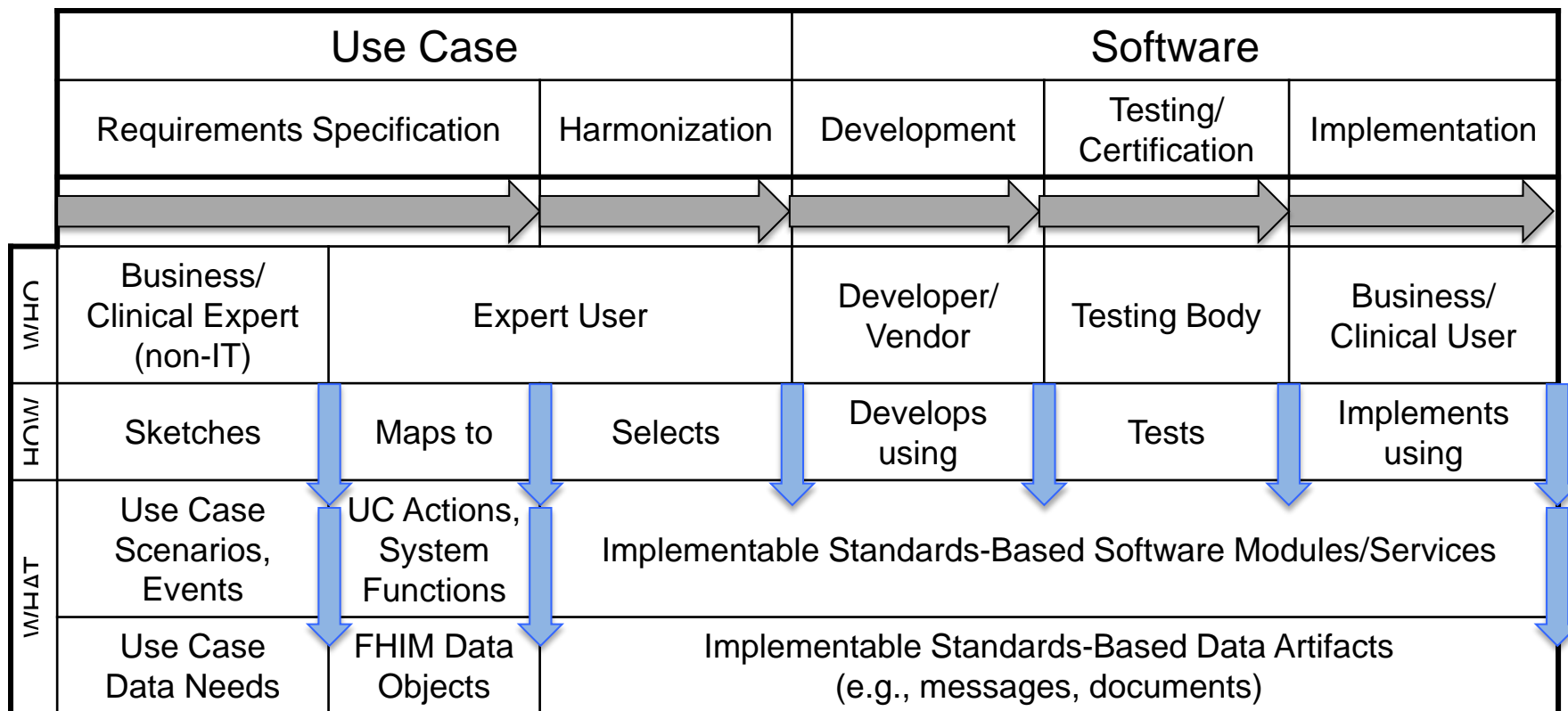
Test Case Authoring and Management Tool (TCAMT)

Testing Infrastructure (Test Engine)

Testing Infrastructure (Validation) and TCAMT

Testing Organizations

From Sketch to Implementation



Requirements

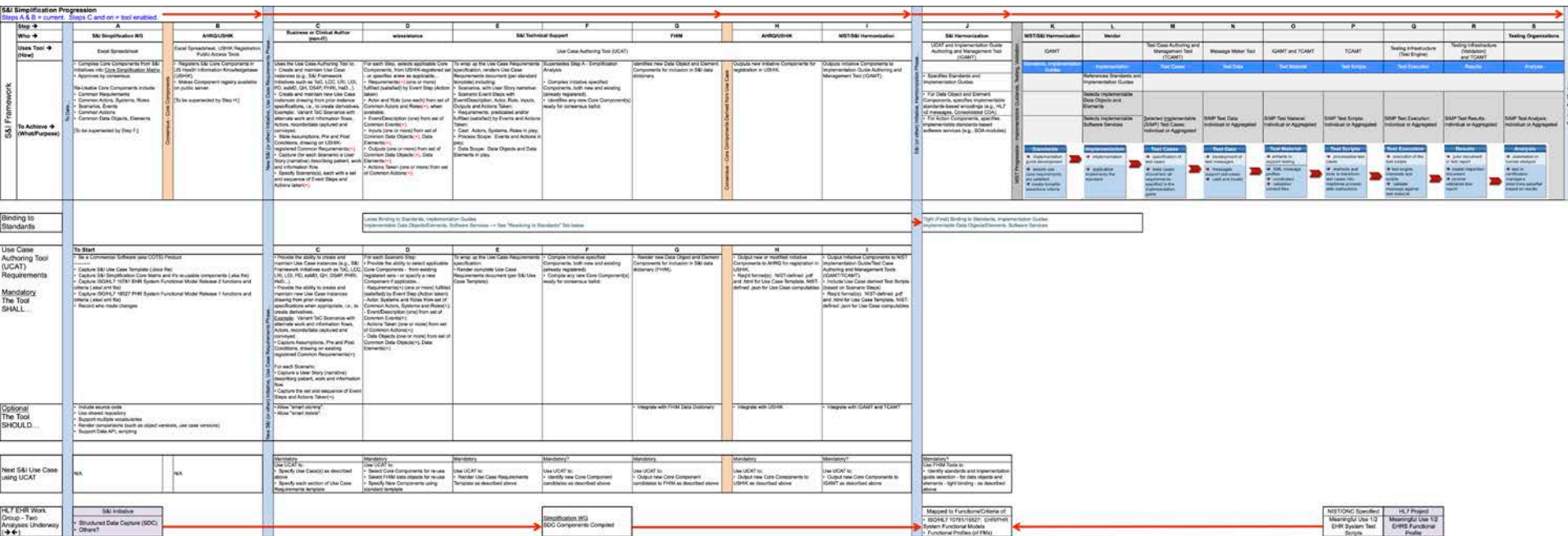
← Traceability →

Implementation

S&I Framework – Cross Initiative – S&I Simplification Progression

[\(LINK to Progression Spreadsheet\)](#)

- To Date (Steps A&B)
 - S&I Simplification + AHRQ
 - Core Matrix + USHIK Registry
- Future (Steps C-S)
 - S&I Use Case Requirements Phase with Use Case Authoring Tool (UCAT)
 - S&I Use Case Harmonization Phase with NIST Tools
 - Standards Selection
 - Implementation Guide (Tools)
 - Testing (Tools)



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
	Uses Tool → (How)	Excel Spreadsheet
	To Date ...	<ul style="list-style-type: none"> Compiles Core Components from S&I Initiatives into <u>Core Simplification Matrix</u>. Approves by consensus. Re-Usable Core Components include: <ul style="list-style-type: none"> Common Requirements Common Actors, Systems, Roles Scenarios, Events Common Actions Common Data Objects, Elements [To be superseded by Step F.]
	To Achieve → (What/Purpose)	Consensus - Core Components <ul style="list-style-type: none"> Registers S&I Core Components in US Health Information Knowledgebase (USHIK). Makes Component registry available on public server. [To be superseded by Step H.]
Binding to Standards		
Use Case Authoring Tool (UCAT) Requirements	To Start <ul style="list-style-type: none"> Be a Commercial Software (aka COTS) Product ----- <ul style="list-style-type: none"> 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 	
<u>Mandatory</u> The Tool SHALL...		
<u>Optional</u> The Tool SHOULD...	<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Structured Data Capture (SDC) Others? 	

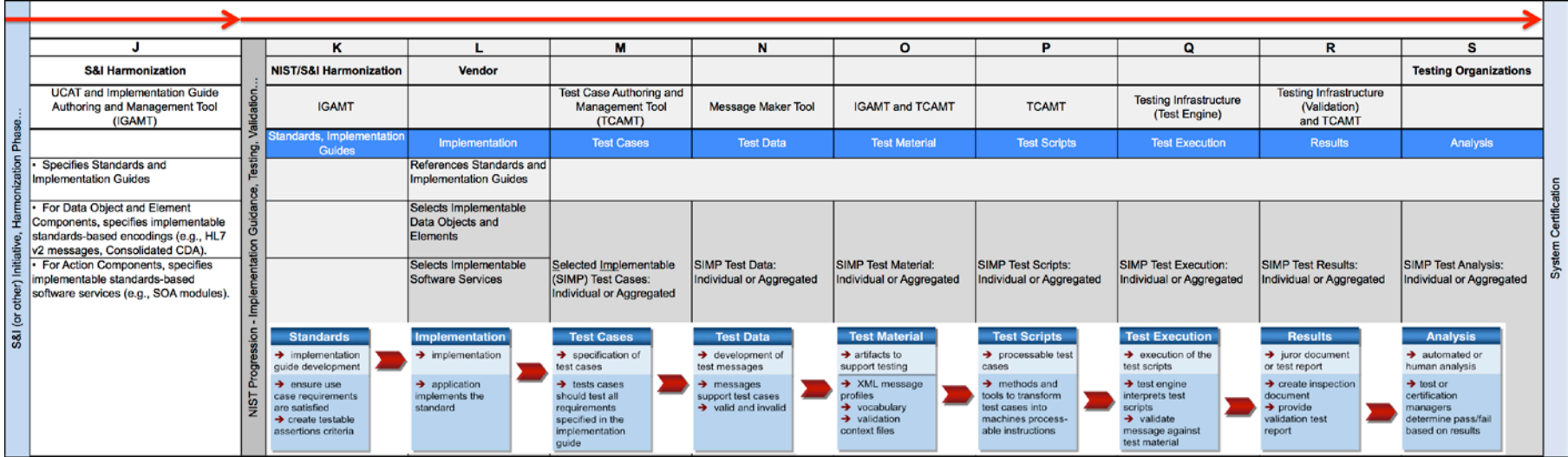
New S&I (or other) Initiative, Use Case Requirements Phase ...

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

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)								
<p>Uses the Use Case Authoring Tool to:</p> <ul style="list-style-type: none"> • 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(+). 		<p>For each Step, selects applicable Core Components, from USHIK-registered set - or specifies anew as applicable...</p> <ul style="list-style-type: none"> • 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(+). 	<p>To wrap up the Use Case Requirements specification, renders Use Case Requirements document (per standard template) including:</p> <ul style="list-style-type: none"> • 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. 	<p>Supersedes Step A - Simplification Analysis</p> <ul style="list-style-type: none"> • Compiles Initiative specified Components, both new and existing (already registered). • Identifies any new Core Component(s) ready for consensus ballot. 	<p>Identifies new Data Object and Element Components for inclusion in S&I data dictionary.</p>	<p>Outputs new Initiative Components for registration in USHIK.</p>		<p>Outputs Initiative Components to Implementation Guide Authoring and Management Tool (IGAMT).</p>
Loose Binding to Standards, Implementation Guides Implementable Data Objects/Elements, Software Services --> See "Resolving to Standards" Tab below								
C		D	E	F	G	H		I
<p>• 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...).</p> <p>• 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.</p> <p>• Capture Assumptions, Pre and Post Conditions, drawing on existing registered Common Requirements(+).</p> <p>For each Scenario:</p> <ul style="list-style-type: none"> • Capture a User Story (narrative) describing patient, work and information flow. • Capture the set and sequence of Event Steps and Actions Taken(+). <p>• Allow "smart cloning".</p> <p>• Allow "smart delete".</p>		<p>For each Scenario Step:</p> <ul style="list-style-type: none"> • 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(+). 	<p>To wrap up the Use Case Requirements specification:</p> <ul style="list-style-type: none"> • Render complete Use Case Requirements document (per S&I Use Case Template). 	<p>• Compile Initiative specified Components, both new and existing (already registered).</p> <ul style="list-style-type: none"> • Compile any new Core Component(s) ready for consensus ballot. 	<p>• Render new Data Object and Element Components for inclusion in S&I data dictionary (FHIM).</p>	<p>• Output new or modified Initiative Components to AHRQ for registration in USHIK.</p> <ul style="list-style-type: none"> • Req'd format(s): NIST-defined .pdf and .html for Use Case Template, NIST-defined .json for Use Case computables 		<p>• Output Initiative Components to NIST Implementation Guide/Test Case Authoring and Management Tools (IGAMT/TCAMT).</p> <ul style="list-style-type: none"> • 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
<p>• Integrate with FHIM Data Dictionary</p>						<p>• Integrate with USHIK</p>		<p>• Integrate with IGAMT and TCAMT</p>
Mandatory		Mandatory	Mandatory	Mandatory?	Mandatory	Mandatory		Mandatory?
<p>Use UCAT to:</p> <ul style="list-style-type: none"> • Specify Use Case(s) as described above • Specify each section of Use Case Requirements template 		<p>Use UCAT to:</p> <ul style="list-style-type: none"> • Select Core Components for re-use • Select FHIM data objects for re-use • Specify New Components using standard template 	<p>Use UCAT to:</p> <ul style="list-style-type: none"> • Render Use Case Requirements Template as described above 	<p>Use UCAT to:</p> <ul style="list-style-type: none"> • Identify new Core Component candidates as described above 	<p>Use UCAT to:</p> <ul style="list-style-type: none"> • Output new Core Component candidates to FHIM as described above 	<p>Use UCAT to:</p> <ul style="list-style-type: none"> • Output new Core Components to USHIK as described above 		<p>Use UCAT to:</p> <ul style="list-style-type: none"> • Output new Core Components to IGAMT as described above

Simplification WG
SDC Components Compiled

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



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)

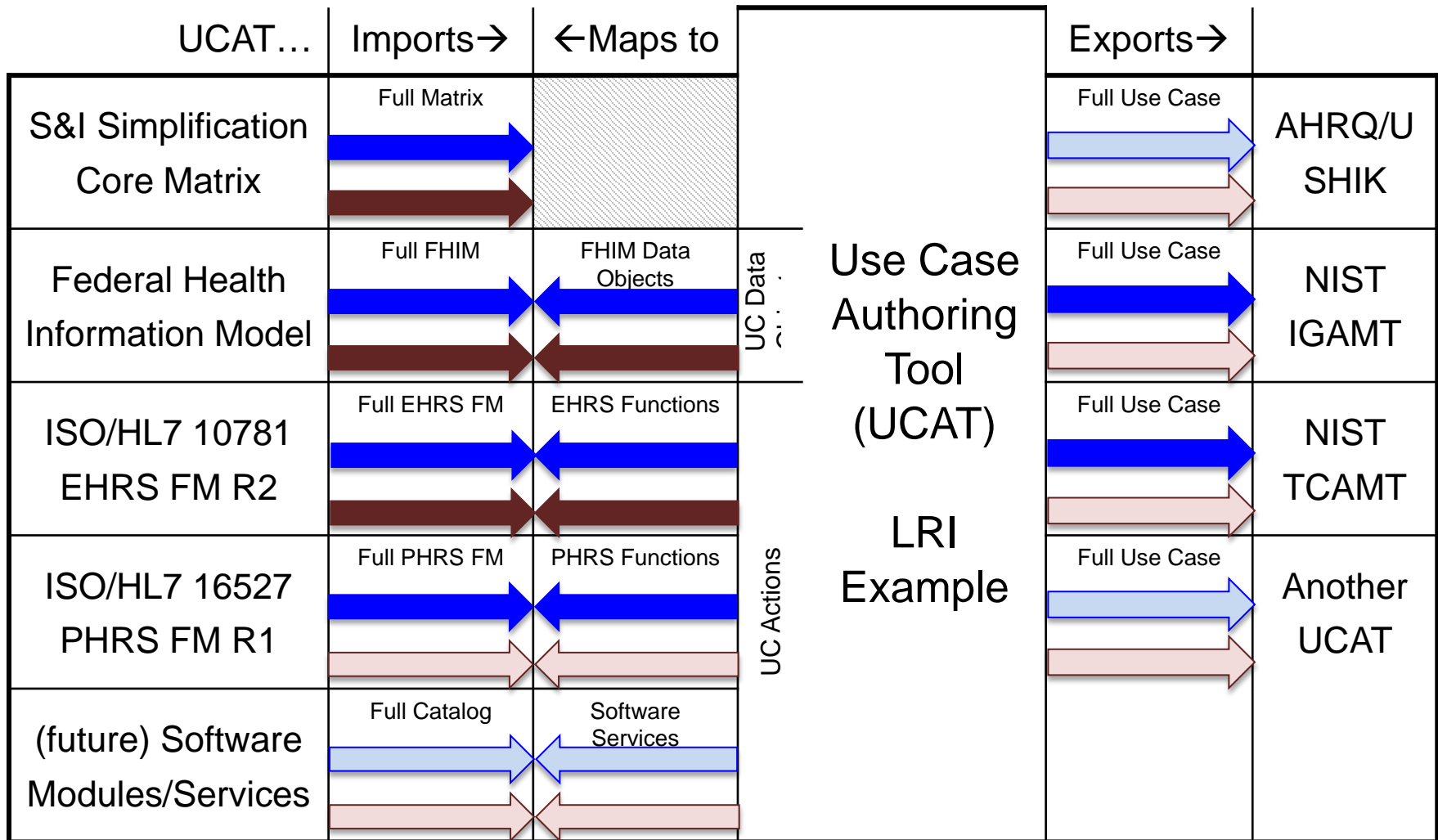
NIST/ONC Specified	HL7 Project
Meaningful Use 1/2 EHR System Test Scripts	Meaningful Use 1/2 EHR Functional Profile

S&I Framework – Cross Initiative – S&I Simplification

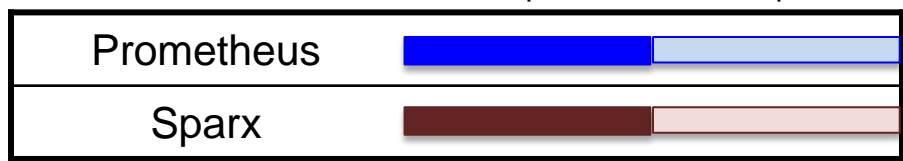
Progression Steps*

Steps	Tool	Used to...
S&I Use Case Requirements (UCR) Phase		
A-B	Excel	(Current) Analyze UC Components, Update Core Simplification Matrix
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



Complete Anticipated



S&I Simplification – Use Case Authoring Tool

UCAT Priorities

Priorities identified in consultation with ONC and S&I leadership.	
Priority	Status
1. Seek Commercially Available UCAT Options <ul style="list-style-type: none">• Prometheus Use Case Editor (Art Griesser)• Sparx Enterprise Architect w/extensions (J.D. Baker)	<ul style="list-style-type: none">• 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<ul style="list-style-type: none">• Prometheus report posted• Sparx to post
2. Show UCAT options side-by-side <ul style="list-style-type: none">• With fit to S&I and Simplification Methodology	
3. Identify UCAT interest with other FHA agencies	<ul style="list-style-type: none">• NIST, AHRQ – engaged• DOD, VA, FDA – in discussion• Presentation to FHA Architecture and Modeling WG – 11 Feb 2014

UCAT Priorities

Priority	Status
<p>4. Achieve UCAT/FHIM integration</p> <ul style="list-style-type: none">• 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)	<ul style="list-style-type: none">• Prometheus and Sparx:<ul style="list-style-type: none">• Have captured latest FHIM .xmi file• Can map UC to FHIM data objects
<p>5. Use UCAT in parallel w/upcoming S&I Use Case(s)</p> <ul style="list-style-type: none">• To complete UC Requirements Template	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Prometheus (development planned)• Sparx TBD

UCAT Priorities

Priority	Status
<p>7. Develop UC Exchange Format</p> <ul style="list-style-type: none">– Render paginated UC template<ul style="list-style-type: none">• As .pdf and .html files– Render computable UC details<ul style="list-style-type: none">• As .json file– To facilitate output to:<ul style="list-style-type: none">• NIST IGAMT/TCAMT Tools• AHRQ/USHIK• Another UCAT	<ul style="list-style-type: none">• NIST has drafted exchange format for UCAT to IGAMT/TCAMT<ul style="list-style-type: none">• Prometheus has output LRI files according to NIST specification• Sparx TBD• Will convene expert team to draft UC Exchange format• Will contact OMG seeking interest

S&I Framework – Cross Initiative – S&I Simplification

Acknowledgements

Gary Dickinson	CentriHealth / S&I Simplification WG Lead
Michael Fitzmaurice, PhD, Robin Barnes	US Agency for Health Research and Quality (AHRQ) / US Health Information Knowledgebase (USHIK)
Kevin Brady, Robert Snelick	US National Institute for Standards and Technology (NIST)
Art Griesser, Frederic DeVaulx	Prometheus (Tooling), NIST Contractor
J.D. Baker	Sparx Systems (Tooling)
Galen Mulrooney	JP Systems, FHA/FHIM Support
Stephen Hufnagel	TIAG, US Department of Defense / Military Health Systems Contractor
William and Anneke Goosen, Michael Van Der Zel	Results4Care, Netherlands
Ed Larsen	Accenture / S&I Support Staff

S&I Framework – Cross Initiative – S&I Simplification Ongoing...

- Further Discussion?
- Look At Tools? UCAT? NIST Suite?
- S&I Simplification
 - Meets Thursdays, 10AM ET (Next: 20 March)
 - All are Welcome
- S&I Face-to-Face
 - (none-scheduled, budget restricted)
- HL7 Meeting in Phoenix, May 2014
 - 1 Quarter planned with EHR Work Group

UCAT Tool Developers

- Prometheus Use Case Editor
 - Art Griesser, Lead
 - a.griesser@prometheuscomputing.com
 - <https://prometheuscomputing.com/beacon>
- Sparx Enterprise Architect Extensions
 - J.D. Baker, Lead
 - jbaker@sparxsystems.com
 - <http://www.sparxsystems.com>

Contact

- Gary L. Dickinson
 - Director, Healthcare Standards, CentriHealth
 - Lead, S&I Framework, S&I Simplification Work Group
 - Co-Chair, HL7 EHR Work Group
 - +1-951-536-7010
 - gary.dickinson@ehr-standards.com

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.dcgrouppinc.com/index_si.jsp?system=si
- HL7 EHR Interoperability Wiki
 - http://wiki.hl7.org/index.php?title=EHR_Interoperability_WG