

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

Overview Presentation

Gary L. Dickinson

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# Quick History

2005-2009	<p>AHIC, ANSI HITSP</p> <ul style="list-style-type: none"><li>• 17 Use Cases, each siloed, but lessons were learned</li></ul>
2011	<ul style="list-style-type: none"><li>• Meaningful Use Stage 1 Begins</li><li>• Standards and Interoperability (S&amp;I) Framework Starts</li><li>• <b>S&amp;I Simplification</b> Gets Underway with Data Element Sets (DES)</li><li>• Engaged with AHRQ, initiated Component Repository – US Health Information Knowledgebase (USHIK)</li></ul>
2012	<ul style="list-style-type: none"><li>• Common Element Data Dictionary (CEDD) supersedes DESs</li><li>• Engaged with National Institute for Standards and Technology (NIST)</li></ul>
2013	<ul style="list-style-type: none"><li>• Federal Health Information Model (FHIM) supersedes CEDD</li><li>• UCAT Prototype development starts: Prometheus and Sparx</li></ul>
2014	<ul style="list-style-type: none"><li>• Meaningful Use Stage 2 Begins</li><li>• UCATs Maturing, NIST Tools in Development</li><li>• ISO 19669 Approved as New Work Item by ISO TC215 – <i>Re-Usable Component Strategy for Use Case Development</i></li><li>• Emerging Interests beyond S&amp;I...</li></ul>

# Key Elements of Simplification

- 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 and Roles, Data Objects and Elements**, 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

US Standards and Interoperability (S&I) Framework

# S&I Simplification WG

Compiled and Distilled Components from S&I Initiatives

Current Analysis Status:

20 Use Cases with 44 Multi-Step Scenarios

**S&I Simplification - Analysis Status - 27 November 2014 - Core Matrix Version 3.2 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	FHIM Mapping in Progress	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	COMPLETE	FHIM Mapping in Progress	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 Tooling	v3					
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	FHIM Mapping in Progress	REGISTERED	v2.1						
Data Segmentation for Privacy (DS4P)														
Public Health Reporting (PHRI)							Awaiting Tooling	v3						
HeD 1 - Health eDecisions - Clinical Decision Support (CDS) Artifact Sharing														
HeD 2 - CDS Guidance Service														
Structured Data Capture														
EU/US eHealth Initiative														
DAF 1 - Data Access Framework - Local Access							Retro							
DAF 2 - Targeted Access														
Data Provenance							Concurrent							
RESTful Health Exchange (RHEX)	TBD	TBD						TBD						
Automated Blue Button														
Electronic Certificate		N/A				In Progress	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, Consent	Access, Data Use	Performance/Fulfillment	Capture, Provenance	Content: Struct/I Instruct	Coding, Classification	Completeness	Signature	Audit
Requirements	Y	Y	Y		●			●						
Actors, Roles	Y	Y	Y	●	●	●	●	●				●	●	●
Scenarios, Events, Actions	Y	Y	Y	●	●	●	●	●				●	●	●
				→ As standards-based software services										
Data Objects, Elements	Y	Y	Y		●	●	●		●	●	●	●	●	●
				→ 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

[\(LINK to S&I UCR Template\)](#)

- Starting Point for S&I Initiative Use Cases
- S&I Use Case Requirements Template is:
  - A Word document, completed by each Initiative
  - A consistent pattern, evolving over past 3+ years
  - 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

[\(LINK to S&I Simplification – Requirements Analysis Worksheet\)](#)

- Use Case Requirements (from UCR 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

# Common Actions

S&I Simplification WG has identified a set of 36 Common Actions used and re-usable across Use Cases. Actions fall into these categories:

- Identity: Patient, Practitioner, Organization
- Consistent Time
- Data Access Permissions
- Access Control
- Audit
- Query
- Encryption, Decryption
- Signatures: Individual, System
- Exchange: Transmit, Receive
- Registration, Admission, Discharge, Transfer
- Clinical Summary
- Clinical Entries
- Record Lifecycle: Originate, Retain, Amend, Verify, Attest, Access/View, Extract, Translate, Transmit/Receive, De-Identify...

# Common Actions

- **Next Two Slides** – Show a condensed version of the S&I Simplification Common Actions (L→R by column)
  - A. Action Category
  - B. Action ID
  - C. Action Description
  - D. Requirements Related to or Fulfilled by Action
  - E. Data Requirements (partial)
  - F. EHR-S Function ref: ISO/HL7 10781 EHR-S FM
  - G. PHR-S Function ref: ISO/HL7 16527 PHR-S FM
  - H. Is Action Auditable?
  - I. Is Action typically Signed: by individual, system?

# Common Actions from [S&I Simplification Core Matrix v3.2](#)

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
	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	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	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	TI.1.3 - Entity Access Control 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 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

# Common Actions from [S&I Simplification Core Matrix v3.2](#)

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					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				IN.4	Yes	Author/Source	
	A.REC.4	Attest			RI.1.1.4 - Attest Record Entry Content	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				IN.1.4	Yes	N/A	
	A.REC.8	Extract			RI.1.1.12 - Re-identify Record Entries	IN.1.4	Yes	N/A	
	A.REC.9	Translate			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.10	Output/Report			RI.1.1.3 - Translate Record Entry Content	IN.1.13	Yes	Author/Source Sender/Source	
	A.ACCESS.2	Access/View			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.ENCRYPT	Encrypt				Yes	N/A		
	A.DECRYPT	Decrypt				[Refer to Specific Actions Re-Used - Col B.]	[Refer to Specific Actions Re-Used - Col B.]	Yes	Sender/Source
	A.XFER.1	Transmit, Disclose				Yes	Sender/Source		
	A.XFER.2	Receive				Yes	N/A		

Re-Use Examples

# S&I Simplification Analysis

- Each S&I Use Case Scenario
  - Breaks down to Event Steps
- Each Event Step
  - Has an Actor (in Role)
  - Has Inputs and Outputs
  - Has Actions Taken (as examples)
- Each Action
  - Invokes EHR or other System Functions



# Core Matrix

[\(LINK to Core Matrix Spreadsheet v3.2\)](#)

- 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](#)

# Scenario Events to Actions

- **Next Slide** – Shows condensed version of **two S&I Transition of Care Scenarios** (L→R by column)
  - A. Event Step
  - B. Actor
  - C. Event Description
  - D. Inputs
  - E. Outputs
  - F. Action Examples
  - G and on. Action Repetition Tabulation

Light Blue Background - From S&I Use Case Initiative Scenarios					ACTION REPETITION EXAMPLE...																						
White Background - Added by Simplification Work Group for Illustration																											
(To show full Action Names, Unhide Rows 1, 2, 4.)																											
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		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																	X		
					Receive/Retain - Clinical Summary	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																

# Analysis

- S&I Simplification Work Group has:
  - Analyzed 20 S&I Use Cases with 44 Scenarios
  - Specified Actions (examples) for each Scenario and Event Step
- Next Slide
  - Shows Repetition Counts for Action Examples

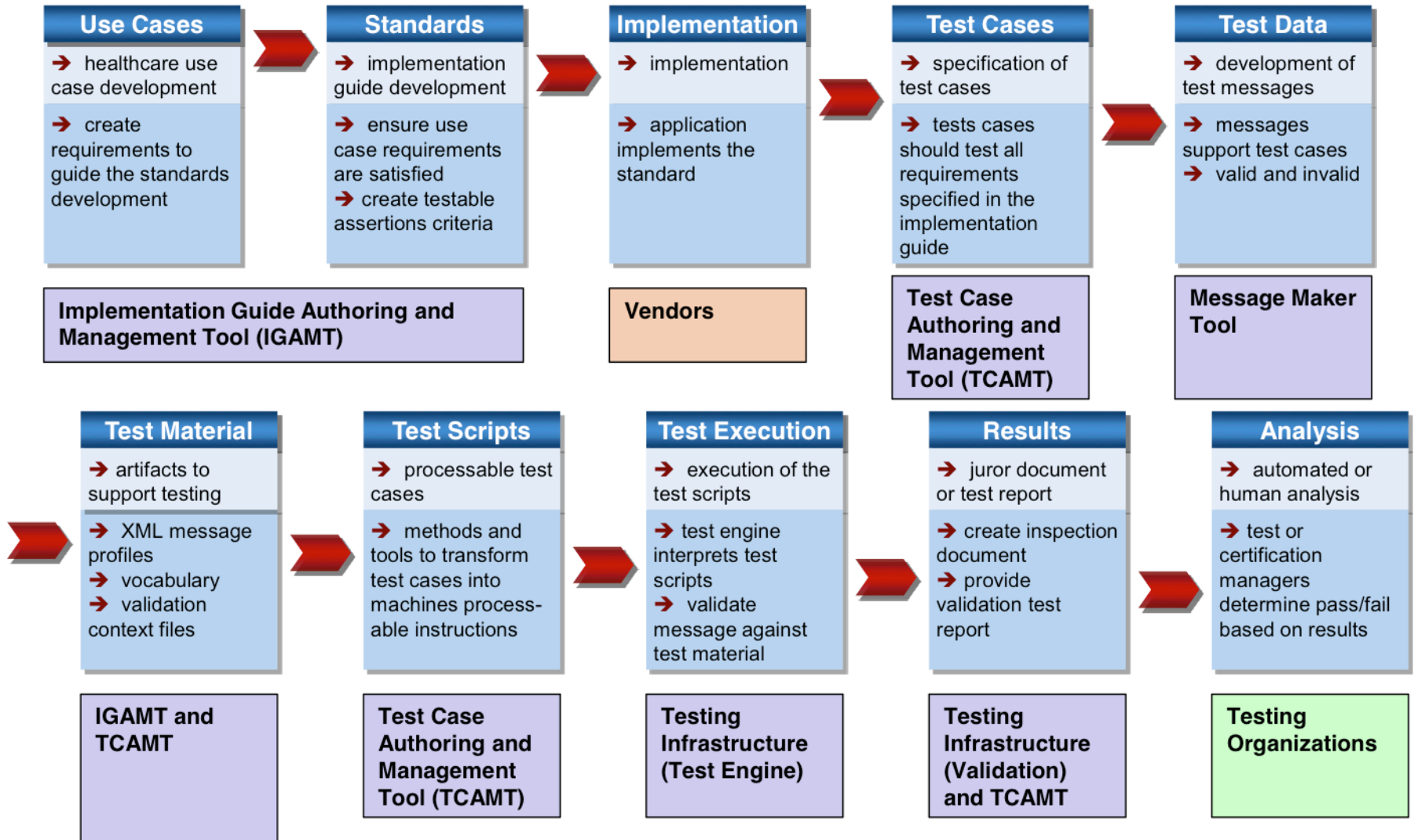
# Potential Re-Use – Actions

Repetition  
Count →

720	<b>A.AUDIT</b>	Audit
166	<b>A.SIGN</b> Sender/Source	Signature
53	<b>A.SIGN</b> Author/Source	
39	<b>A.TIME</b>	Consistent Time
39	<b>A.ID.1/2</b>	ID Patient
72	<b>A.ID.3/4</b>	ID Provider
98	<b>A.ID.5</b>	ID System
12	<b>A.ID.6</b>	Verify ID Certificate
39	<b>A.PERMIT</b>	Set Permissions
35	<b>A.ACCESS.1</b>	Check Permissions
19	<b>A.ACCESS.2</b>	Control Access
81	<b>A.REC.1</b>	Originate Entry
164	<b>A.REC.2</b>	Retain Entry
4	<b>A.REC.3</b>	Verify Entry
32	<b>A.REC.4</b>	Attest Entry
12	<b>A.REC.5</b>	Amend Entry
2	<b>A.REC.6</b>	De-Identify Entry
0	<b>A.REC.7</b>	Re-Identify Entry
8	<b>A.REC.8</b>	Extract Entries
18	<b>A.REC.9</b>	Translate Entries
0	<b>A.REC.10</b>	Output/Report Entries
166	<b>A.XFER.1</b>	Transmit
149	<b>A.XFER.2</b>	Receive
14	<b>A.ACK</b>	Acknowledgment
26	<b>A.QUERY</b>	Query

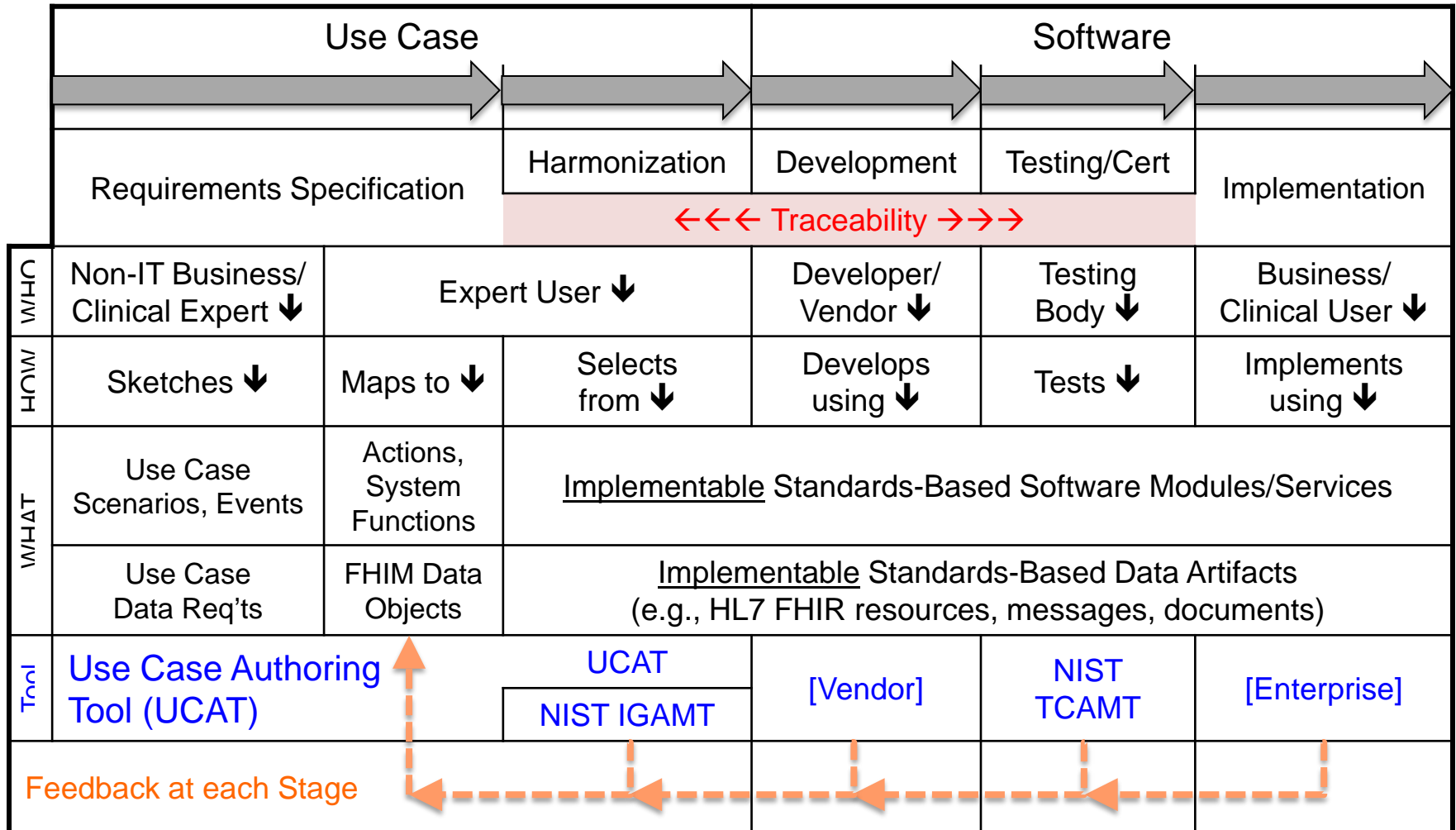
# What will the tools address?

Source: Rob Snelick, NIST



Traceability – Anchored by Use Case Authoring Tool (UCAT)

# From Sketch to Implementation



# Progression

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

- To Date (Steps A&B)
  - S&I Simplification + AHRQ
  - Core Matrix + USHIK Registry
- Going Forward (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	US Agency for Health Research and Quality (AHRQ)/US Health Information Knowledgebase (USHIK)
	Uses Tool → (How) Excel Spreadsheet	Excel Spreadsheet, USHIK Registration, Public Access Tools
	To Achieve → (What/Purpose) To Date... <ul style="list-style-type: none"> <li>Compiles Core Components from S&amp;I Initiatives into <u>Core Simplification Matrix</u>.</li> <li>Approves by consensus.</li> </ul> Re-Usable Core Components include: <ul style="list-style-type: none"> <li>Common Requirements</li> <li>Common Actors, Systems, Roles</li> <li>Scenarios, Events</li> <li>Common Actions</li> <li>Common Data Objects, Elements</li> </ul> [To be superseded by Step F.]	<ul style="list-style-type: none"> <li>Registers S&amp;I Core Components in US Health Information Knowledgebase (USHIK).</li> <li>Makes Component registry available on public server.</li> </ul> [To be superseded by Step H.]
Binding to Standards		
Use Case Authoring Tool (UCAT) Requirements	<b>To Start</b> <ul style="list-style-type: none"> <li>Be Commercial Software (aka COTS) Product</li> </ul> ----- <ul style="list-style-type: none"> <li>Import S&amp;I Use Case Template (.docx file)</li> <li>Import S&amp;I Simplification Core Matrix and it's re-usable components (.xlsx file)</li> <li>Import Federal Health Information Model (FHIM) (.xmi file)</li> <li>Import ISO/HL7 10781 EHR System Functional Model Release 2 functions and criteria (.xlsx/.xml/.eap file)</li> <li>Import ISO/HL7 16527 PHR System Functional Model Release 1 functions and criteria (.xlsx/.xml/.eap file)</li> <li>Record who made changes</li> </ul>	
Optional The Tool SHOULD...	<ul style="list-style-type: none"> <li>Include source code</li> <li>Use shared repository</li> <li>Support multiple vocabularies</li> <li>Render comparisons (such as object versions, use case versions)</li> <li>Support Data API, scripting</li> </ul>	
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"> <li>Structured Data Capture (SDC)</li> <li>Others?</li> </ul>	

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

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

C	D	E	F (supersedes A)	G	H (supersedes B)	I
Business or Clinical Author (non-IT)	w/assistance	S&I Technical Support	US Federal Health Information Model or equivalent	AHRQ/USHIK Repository or equivalent	US NIST/S&I Framework Harmonization or equivalent	
Use Case Authoring Tool (UCAT)						
<p>Uses UCAT to:</p> <ul style="list-style-type: none"> <li>• Create and maintain Use Case instances (e.g., S&amp;I Framework Initiatives such as ToC, LCC, LRI, LOI, PD, esMD, QH, DS4P, PHRI, HeD...).</li> <li>• Create and maintain new Use Case instances drawing from prior instance specifications, i.e., to create derivatives. Example: Variant Scenarios with alternate work and information flows, Actors, records/data captured and conveyed.</li> <li>• State Assumptions, Pre and Post Conditions, System Functional Requirements drawing on registered Common Requirements(+).</li> <li>• Capture (for each Scenario) a User Story (narrative) describing patient, work and information flow.</li> <li>• Specify Scenario(s), each with a set and sequence of Event Steps and Actions taken(+).</li> </ul>	<p>Uses UCAT and for each Event Step, selects applicable Core Components, from registered set - or specifies anew as applicable...</p> <ul style="list-style-type: none"> <li>• Requirements(+) (one or more) fulfilled (satisfied) by Event Step (Action taken)</li> <li>• Actor and Role (one each) from set of Common Actors and Roles(+), when available;</li> <li>• Event/Description (one) from set of Common Events(+);</li> <li>• Event Inputs (one or more) from set of FHIM Data Objects(+), Data Elements(+);</li> <li>• Event Outputs (one or more) from set of FHIM Data Objects(+), Data Elements(+);</li> <li>• Actions Taken (one or more) from set of Common Actions(+).</li> </ul>	<p>Uses UCAT to wrap up the Use Case Requirements specification, renders Use Case Requirements document (per standard template) including:</p> <ul style="list-style-type: none"> <li>• Scenarios, with User Story narrative;</li> <li>• Scenario Event Steps with Event/Description, Actor, Role, Inputs, Outputs and Actions Taken;</li> <li>• Requirements, predicated and/or fulfilled (satisfied) by Events and Actions Taken;</li> <li>• Cast: Actors, Systems, Roles in play;</li> <li>• Process Scope: Events and Actions in play;</li> <li>• Data Scope: Data Objects and Data Elements in play.</li> </ul>	<p>Uses UCAT to:</p> <ul style="list-style-type: none"> <li>• Compile Initiative specified Components, both new and existing (already registered).</li> <li>• Identify any new Core Component(s) ready for consensus ballot.</li> </ul>	<p>Uses UCAT to identify new Data Object and Element Components for possible inclusion in US Federal Health Information Model (FHIM) or its equivalent.</p>	<p>Uses UCAT to output new Initiative Components for registration in AHRQ/USHIK or its equivalent.</p>	<p>Uses UCAT to output Initiative Components to NIST Implementation Guide Authoring and Management Tool (IGAMT) or its equivalent.</p>

Consensus - Core Components Derived from Use Case

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

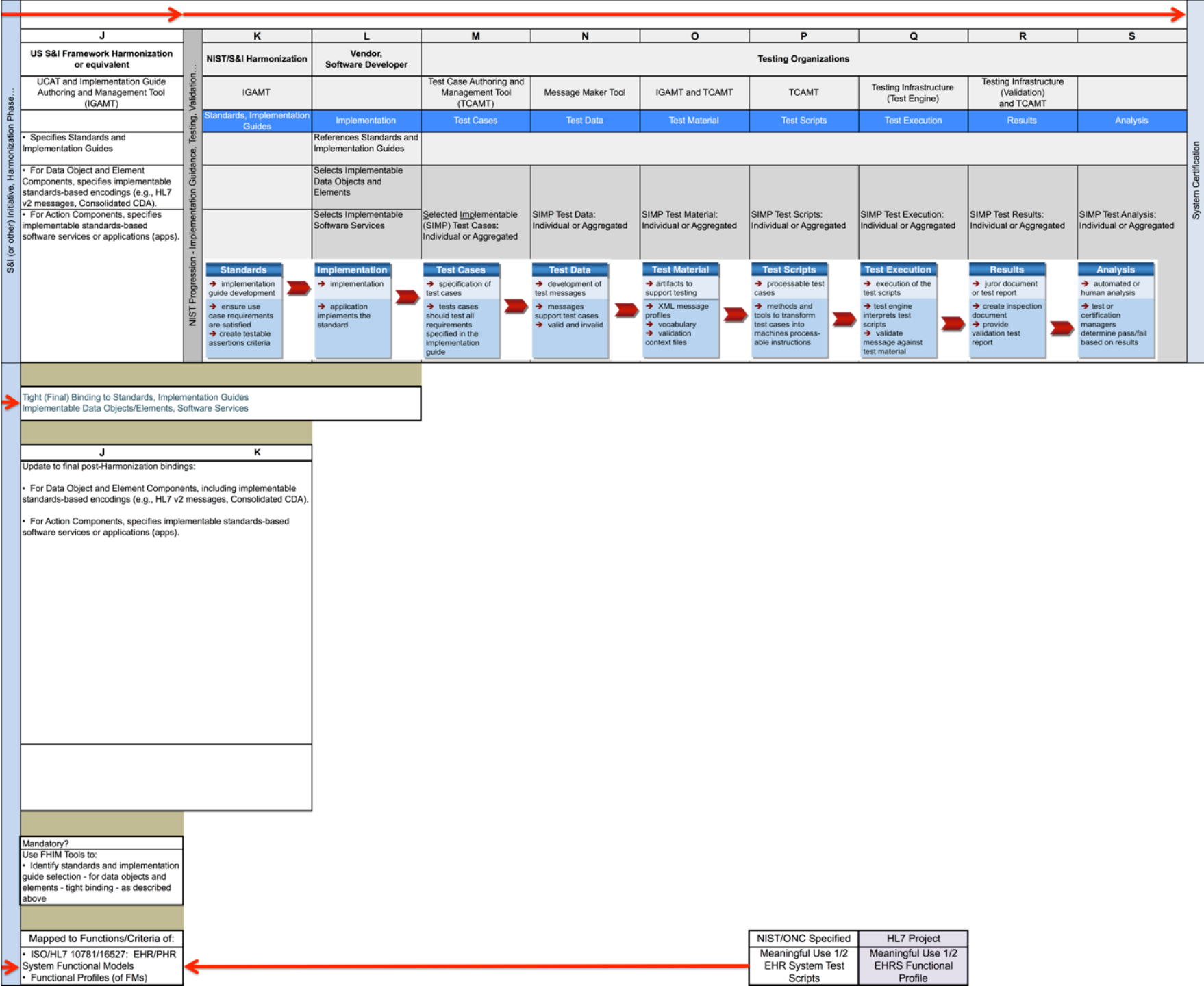
New S&I (or other) Initiative, Use Case Requirements Phase...

C	D	E	F	G	H	I
<p>• Provide the ability to create and maintain Use Case instances (e.g., S&amp;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 Scenarios with alternate work and information flows, actors, records/data captured and conveyed.</p> <p>• Capture Assumptions, Pre and Post Conditions, System Functional Requirements drawing on registered Common Requirements(+).</p> <p>For each Scenario:</p> <ul style="list-style-type: none"> <li>• Capture a User Story (narrative) describing patient, work and information flow.</li> <li>• Capture the set and sequence of Event Steps and Actions Taken(+).</li> </ul> <p>• Allow "smart cloning".</p> <p>• Allow "smart delete".</p>	<p>For each Scenario Step:</p> <ul style="list-style-type: none"> <li>• Provide the ability to select applicable Core Components - from existing registered sets - or specify a new Component if applicable...</li> <li>- Requirements(+) (one or more) fulfilled (satisfied) by Event Step (Action taken)</li> <li>- Actor, Systems and Roles from set of Common Actors, Systems and Roles(+);</li> <li>- Event/Description (one) from set of Common Events(+);</li> <li>- Actions Taken (one or more) from set of Common Actions(+);</li> <li>- Data Objects (one or more) from set of FHIM Common Data Objects(+), Data Elements(+).</li> </ul>	<p>To wrap up the Use Case Requirements specification:</p> <ul style="list-style-type: none"> <li>• Render complete Use Case Requirements document (per S&amp;I Use Case Template).</li> </ul>	<p>• Compile Initiative specified Components, both new and existing (already registered).</p> <ul style="list-style-type: none"> <li>• Compile any new Core Component(s) ready for consensus ballot.</li> </ul>	<p>• Render new Data Object and Element Components for possible inclusion in FHIM or its equivalent.</p> <p>• Integrate with FHIM Data Dictionary</p>	<ul style="list-style-type: none"> <li>• Output new or modified Initiative Components to AHRQ for registration in USHIK.</li> <li>• Req'd format(s): NIST-defined .pdf/.html for Use Case Template .json/.xml for Use Case computables</li> </ul> <p>• Integrate with USHIK</p>	<ul style="list-style-type: none"> <li>• Output Initiative Components to NIST Implementation Guide/Test Case Authoring and Management Tools (IGAMT/TCAMT).</li> <li>• Include Use Case derived Test Scripts (based on Scenario Steps)</li> <li>• Req'd format(s): NIST-defined .pdf/.html for Use Case Template .json/.xml for Use Case computables</li> </ul> <p>• Integrate with IGAMT and TCAMT</p>

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

# Progression Steps w/UCAT\*

Steps	Tool	Used to...
S&I Use Case Requirements (UCR) Phase		
A-B	Excel	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	UCAT/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 = Use Case Authoring Tool)

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Stephen Hufnagel	(formerly) TIAG, US Department of Defense / Military Health Systems Contractor
William and Anneke Goosen, Michael Van Der Zel	Results4Care, Netherlands
Ed Larsen	(formerly) Accenture / S&I Support Staff

# UCAT Tool Developers

- Prometheus Use Case Editor
  - Art Griesser, Lead
  - [a.griesser@prometheuscomputing.com](mailto:a.griesser@prometheuscomputing.com)
  - <https://prometheuscomputing.com/beacon>
- Sparx Enterprise Architect Extensions
  - J.D. Baker, Lead
  - [jbaker@sparxsystems.com](mailto: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](mailto: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/mdr/portals/si?system=si&enableAsynchronousLoading=true>
- HL7 EHR Interoperability Wiki
  - [http://wiki.hl7.org/index.php?title=EHR\\_Interoperability\\_WG](http://wiki.hl7.org/index.php?title=EHR_Interoperability_WG)