US Office of National Coordinator (ONC)
Standards and Interoperability (S&I) Framework
<u>Cross Initiative – S&I Simplification Work Group</u>

Simplification & UCAT Priorities

In collaboration with NIST and AHRQ

12 June 2014

S&I Simplification - Analysis Status - 23 April 2014 - Core Matrix Version 3 (Consensus Draft)
Incorporation of Use Case Initiatives in S&I Simplification Core Matrix

Initiative	Analysis Type	Initial Analysis Phase - Core Matrix				FHIM	AHRQ	Consensus Core Matrix
		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 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	Compiled	REGISTERED	v2.1
Data Segmentation for Privacy (DS4P)								
Public Health Reporting (PHRI)								
HeD 1 - Health eDecisions - Clinical Decision Support (CDS) Artifact Sharing							Awaiting Tooling	v3
HeD 2 - CDS Guidance Service								
Structured Data Capture								
EU/US eHealth Initiative	Concurrent							
DAF 1 - Data Access Framework - Local Access	Retro							
DAF 2 - Targeted Access								
RESTful Health Exchange (RHEx)	TBD	TBD						TBD
Automated Blue Button								
Electronic Certificate		N/A				Compiled	REGISTERED	N/A

Convened as S&I Work Group

- **S&I acts as Convening Organization**
  - S&I brings together parties with like interests, invites discourse and development
  - S&I relies on others to be repository of artifacts
    - » As: FHIM, USHIK, VSA, SNOMED, LOINC, CIMI…
  - S&I relies on others to develop and supply tools
    - » As: MDHT, HSPC…
  - S&I will adopt tools widely used by other federal agencies

S&I Simplification
Priorities

- Analyze Components from Latest S&I Use Case Requirements
  - Data Access Framework

- Solicit/Compare Use Case Templates (S&I plus)
  - Identify Core Use Case Template
  - Revise UCAT Requirements?

- Devise Use Case Exchange Format
  - Based on initial LRI sample export

- Leverage Opportunities

Leveraging Opportunities

- S&I Use Cases – Buildout
- ISO and CEN National Members (via ISO 19969)
  - Often tied to National HIT Programs
- Federal Health Architecture
  - US Federal Agencies
- NIST: Cross Industry
- Canada Health Infoway
- West Health Institute
- Health Services Platform Consortium (HSPC)

S&I Simplification
Leveraging HL7 Standards

- Via FHIM:
  - Version 2 Messages
  - Clinical Document Architecture (CDA) Release 2
    - » Consolidated CDA, Continuity of Care Document
  - Fast Health Interoperable Resources (FHIR)
- Via Use Case Events/Actions
  - EHR System Functional Model R2 Functions
  - PHR System Functional Model R1 Functions
  - EHR and PHR System Functional Profiles
- Results4Care FM/FP EA-based Tooling (HL7 contract)
- Meaningful Use Functional Profile

S&I Simplification
ISO 19969

- Re-Usable Component Strategy for Use Case Development
  - Approved as New Work Item Proposal: April 2014
  - Scope: S&I Use Case Simplification <u>Methodology</u>
  - In collaboration with ISO and CEN Appointed Experts
  - Initial Example:
    - EU/US eHealth Cooperation Initiative Interoperability Use Case (S&I Framework project)

S&I Simplification
Use Case Template Examples

- Seeking
  - Blank Use Case Requirements Template
  - Template with example Use Case filled in
- Requests to:
  - Nancy Orvis, DOD MHS
  - Other Federal Agencies (via FHA)
  - ISO National Member Bodies
    - » ISO TC215 May Meeting – Japan
  - Canada Health Infoway
  - Health Services Platform Consortia
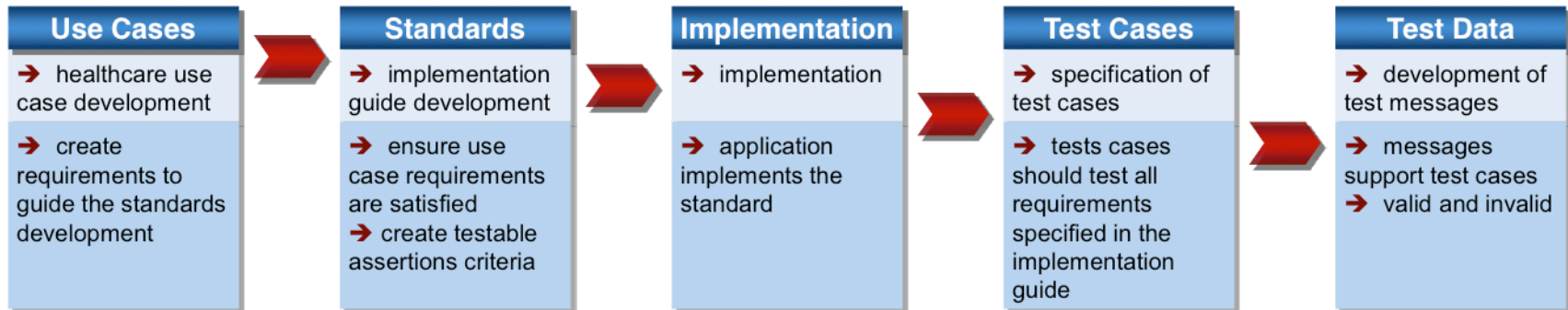
Core Use Case Template

- Is there a Basic UC Template?
- Built on S&I Simplification Components?
  - Requirements: Assumptions, Pre/Post Conditions, System Functional Requirements
  - Actors, Systems, Roles
  - Scenarios, Events
    » Actions linked to System Functions
    » ONC MU Stage 3 Direction: Privacy, Security, Interoperability, Quality Indicators
  - Data Objects and Elements
    » Mapped to FHIM, CDEs

S&I Simplification
Core Use Case Template

	S&I Framework Use Cases	Other Use Cases
	S&I Use Case Template	Core Use Case Template?
Requirements	• Assumptions • Pre/Post Conditions • System Functional Reqt's • Traceability	Same?
Actors, Roles	Person, Organization, System	Mapped to Domain Specific Actors/Roles
Scenarios, Event Steps	• Event Description • Actor, Role • Inputs, Outputs • Actions	Same?
Actions	Mapped to EHR/PHR/Other System Functions	Mapped to Domain Specific Actions and Function Set(s)
Data Objects	Mapped to FHIM Data Objects	Mapped to Domain Specific Information Model, Data Objects

What will the tools address?

Use Cases
→ healthcare use case development
→ create requirements to guide the standards development

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
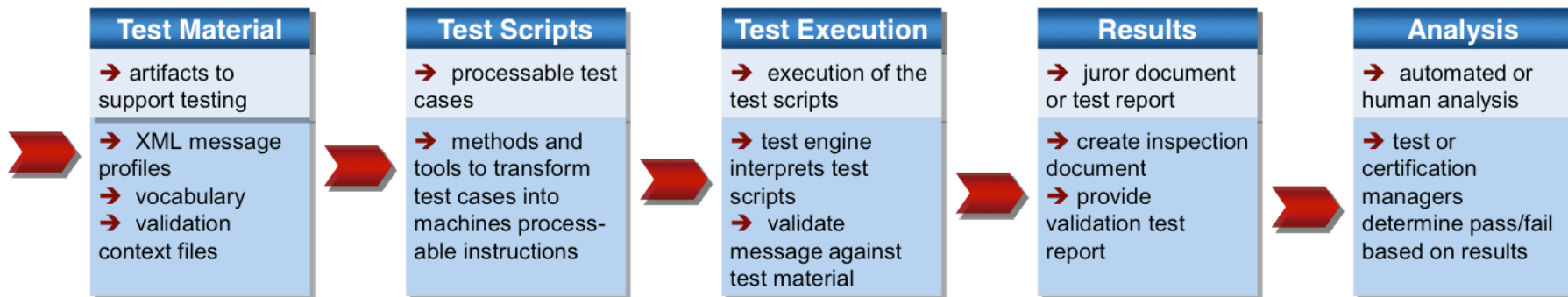→ messages support test cases
→ valid and invalid

Implementation Guide Authoring and Management Tool (IGAMT)

Vendors

Test Case Authoring and Management Tool (TCAMT)

Message Maker Tool

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

IGAMT and TCAMT

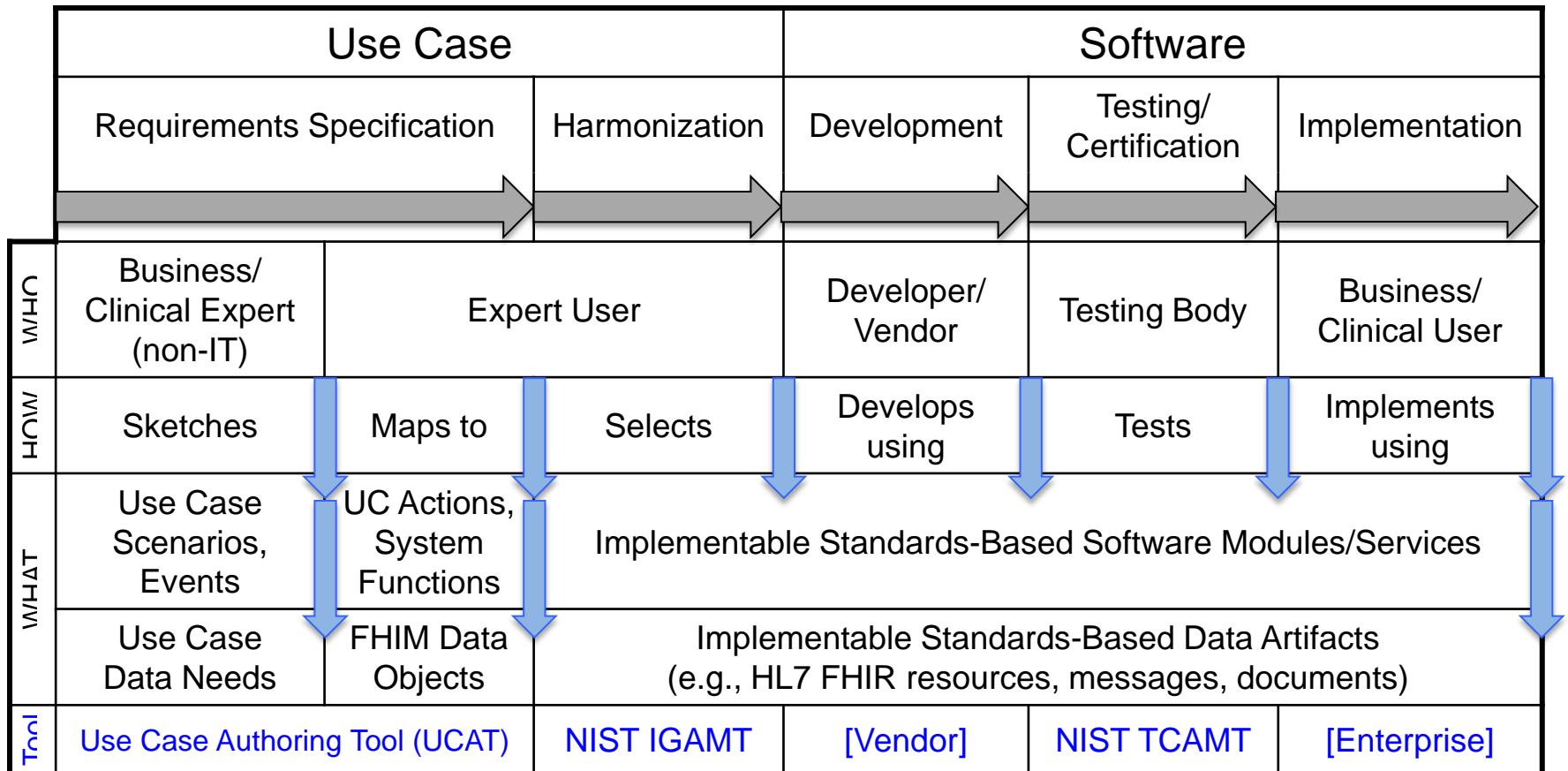**Test Case Authoring and Management Tool (TCAMT)**

Testing Infrastructure (Test Engine)

Testing Infrastructure (Validation) and TCAMT

Testing Organizations

Progression – Anchored by Use Case Authoring Tool (UCAT)
From Sketch to Implementation

	Use Case		Software		
	Requirements Specification	Harmonization	Development	Testing/ Certification	Implementation
WHO	Business/ Clinical Expert (non-IT)	Expert User		Developer/ Vendor	Testing Body	Business/ Clinical User
HOW	Sketches	Maps to	Selects	Develops using	Tests	Implements using
WHAT	Use Case Scenarios, Events	UC Actions, System Functions	Implementable Standards-Based Software Modules/Services			
	Use Case Data Needs	FHIM Data Objects	Implementable Standards-Based Data Artifacts (e.g., HL7 FHIR resources, messages, documents)			
Tool	Use Case Authoring Tool (UCAT)	NIST IGAMT	[Vendor]	NIST TCAMT	[Enterprise]	

Requirements   ←←← Traceability →→→   Implementation

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

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
• Prometheus Use Case Editor (Art Griesser)
• Sparx Enterprise Architect w/extensions (J.D. Baker)
	• 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 to post

2. Show UCAT options side-by-side • With fit to S&I and Simplification Methodology	
3. Identify UCAT interest with other FHA agencies	• Engaged – NIST, AHRQ, FHA • In discussion – VA, DOD, FDA

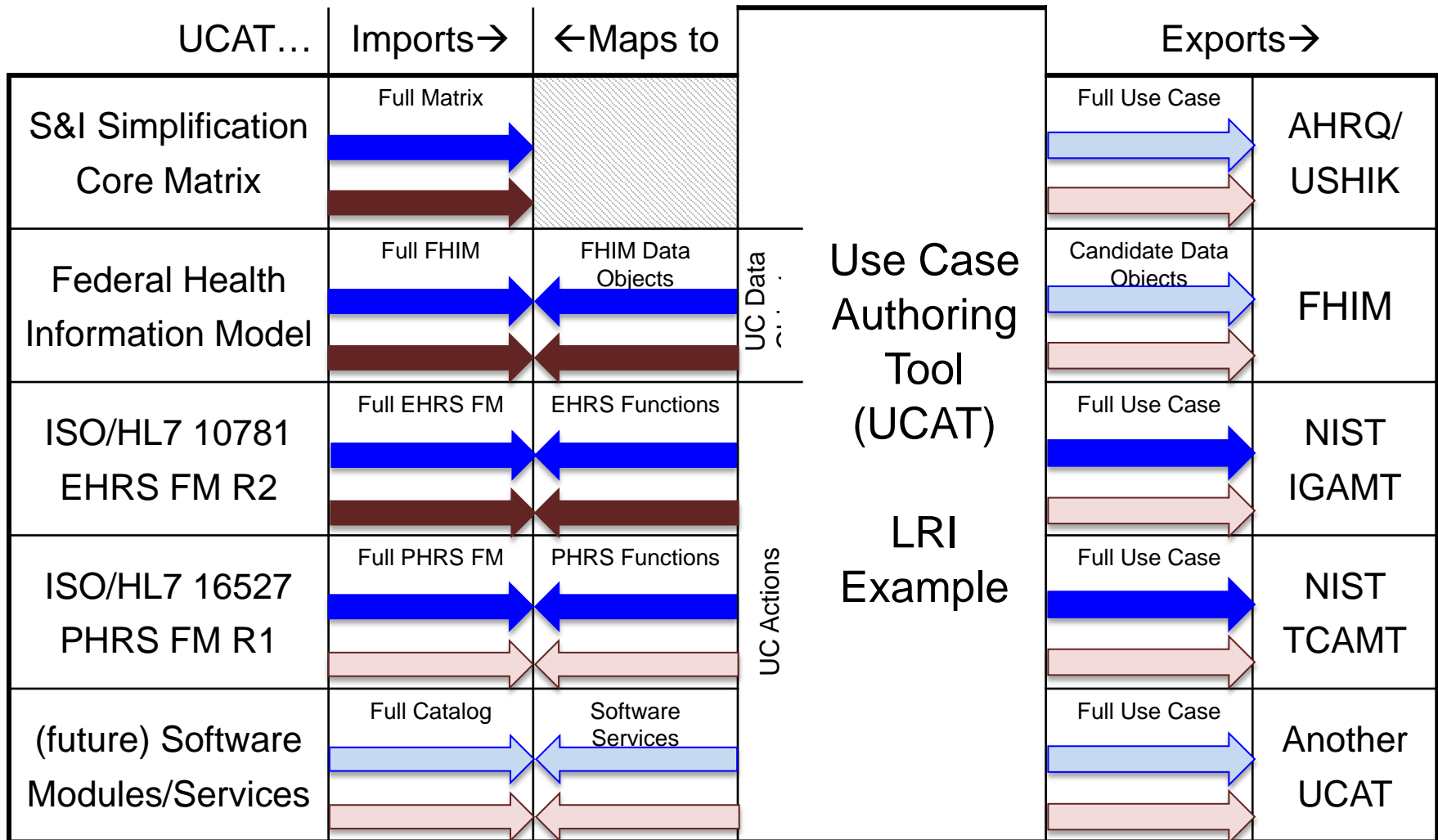# S&I Simplification – Use Case Authoring Tool (UCAT)
UCAT Priorities

Priority	Status

4. Achieve UCAT/FHIM integration
• FHIM is released each month
• UCAT captures each new FHIM version (as .xmi file)
• UCAT maps UC Data Requirements to FHIM objects
• UCAT identifies 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: LRI, next EU/US eHealth Cooperation Initiative – Interoperability Use Case • Sparx: LRI, next TBD

S&I Simplification – Use Case Authoring Tool (UCAT)
UCAT Priorities

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

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:
      • NIST IGAMT/TCAMT Tools
      • AHRQ/USHIK
      • Another UCAT
	• NIST has drafted exchange format for UCAT to IGAMT/TCAMT
	    • Prometheus has output LRI files
	    • Sparx TBD
	 • Will convene expert team to draft UC Exchange format

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

	Complete	Anticipated
Prometheus		
Sparx		

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/mdr/portals/si?system=si&enableAsynchronousLoading=true
- ## HL7 EHR Interoperability Wiki
  - http://wiki.hl7.org/index.php?title=EHR_Interoperability_WG