S&I Simplification WG

Briefing for the

HIT Standards Committee S&I Task Force

Submitted: 5 February 2015

S&I Simplification Work Group

- Recognized need for cross-initiative coordination during first S&I initiative (ToC)
  - Formed as Simplification WG in March 2011
  - Active since with weekly teleconferences
  - Produced three consensus artifacts
- All Volunteer Effort
  - Typically 6 to 8 on all calls
  - Gary Dickinson has served as WG Lead
- Compiled, Distilled and Integrated *Components* from across all S&I Initiatives

Current Analysis Status:
20 Use Cases with 44 Multi-Step Scenarios

S&I Simplification Work Group

- The Following Slides cover…
  - S&I Simplification Objectives and Overview
  - Collaboration with the Agency for Health Research and Quality (AHRQ)
    - US Health Information Knowledgebase (USHIK)
  - Collaboration with the Federal Health Information Model (FHIM) Team
  - Support for 2 Use Case Authoring Tools (UCATs)
    - Prometheus Beacon Use Case Editor
    - Sparx Enterprise Architect Extensions
  - Starting a new S&I Initiative using UCAT

Objectives

- To build a framework for consistent infrastructure and build-out through identification, cataloguing and re-use of common components

- 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)

- To enable integrated tools for use case requirements, implementation guides and test methods

- [NIST] To apply cross-industry: potentially beyond S&I Framework, beyond the domain of health and healthcare

Overview

- We identified 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
- We established 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
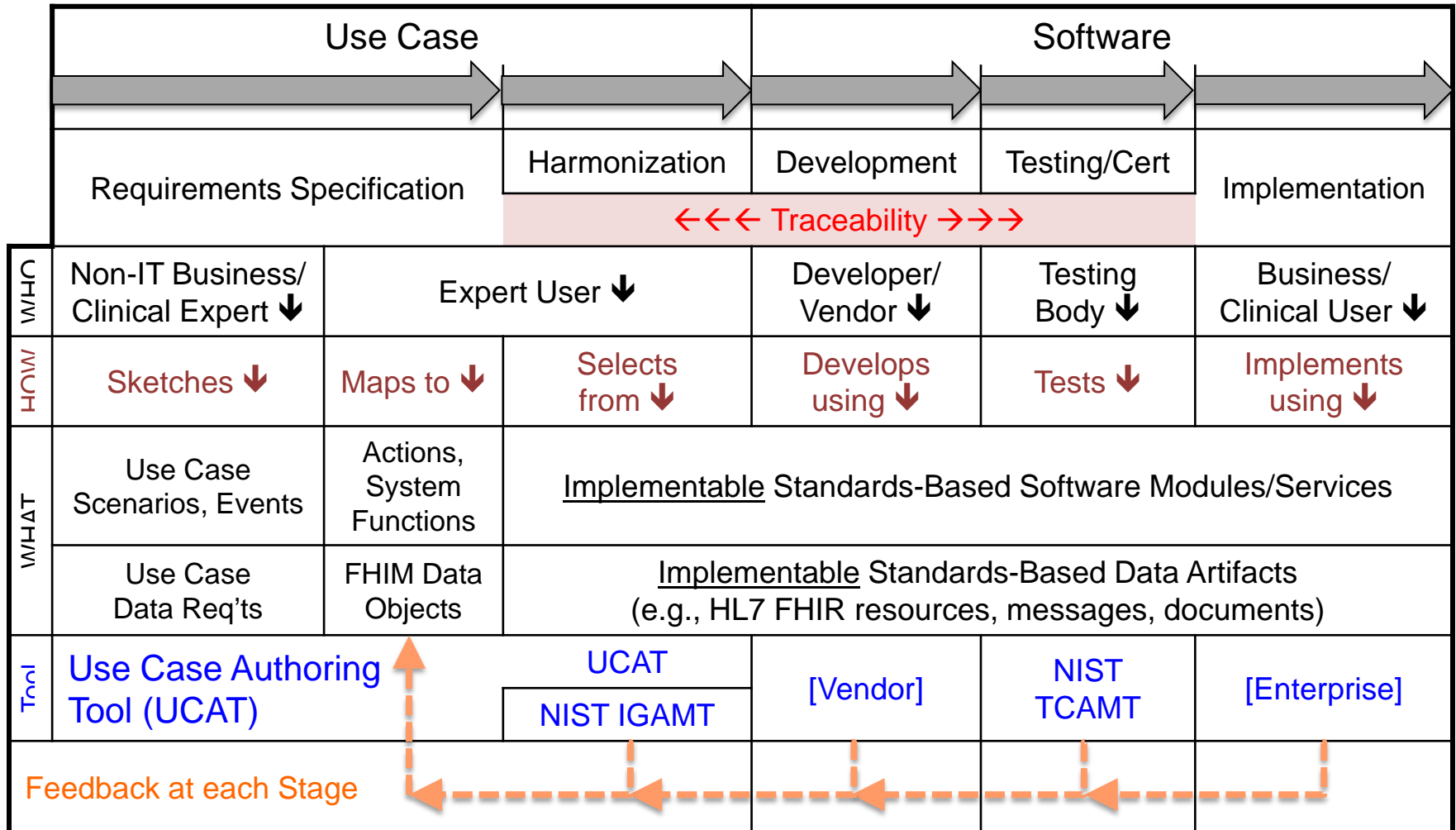
Overview (continued)

- We started with spreadsheets
  - S&I Simplification Core Matrix (now v3.3)
  - Including initial set of common data elements (subsequently rolled into CEDD and then CDE work) with transition to FHIM
- We worked with AHRQ to establish the Core Component Registry
  - US Health Information Knowledgebase (USHIK)
- We developed a set of progression steps, starting with
  - Use Case requirements, then
  - Harmonization (selection of standards and implementation guides), then
  - Software development (by vendors), then
  - Testing and certification, then
  - Implementation, with
  - Feedback (capturing updates to the original requirements)

Overview (continued)

- We reached out to the Federal Health Information Modeling (FHIM) team to
  - Capture S&I Initiative data requirements: data objects/elements
- We tied our Progression Steps to Tooling Requirements
  - To supplant our spreadsheet-based process
- We reached out to NIST for expertise and guidance
- We worked with Tool developers and NIST to facilitate/automate each Progression Step
  - Use Case Authoring Tools (UCATs)
    - Beacon Use Case Editor (Prometheus)
    - Enterprise Architect Extensions (Sparx Systems)
  - NIST Implementation Guide Authoring and Management Tool (IGAMT)
  - NIST Test Case Authoring and Management Tool (TCAMT)

Progression (with Traceability)

From Sketch to Implementation

Use Case				Software		
Requirements Specification		Harmonization	Development	Testing/Cert		Implementation
		←←← Traceability →→→				

WHO	Non-IT Business/ Clinical Expert ⬇	Expert User ⬇		Developer/ Vendor ⬇	Testing Body ⬇	Business/ Clinical User ⬇
HOW	Sketches ⬇	Maps to ⬇	Selects from ⬇	Develops using ⬇	Tests ⬇	Implements using ⬇
WHAT	Use Case Scenarios, Events	Actions, System Functions	Implementable Standards-Based Software Modules/Services			
	Use Case Data Req'ts	FHIM Data Objects	Implementable Standards-Based Data Artifacts (e.g., HL7 FHIR resources, messages, documents)			
Tool	Use Case Authoring Tool (UCAT)	UCAT / NIST IGAMT		[Vendor]	NIST TCAMT	[Enterprise]
Feedback at each Stage						

Preliminary Findings (What)

- "Support identified national priorities by:"
  - "Reducing optionality for existing standards"
    - How: Via Core Component Registry, FHIM and selective Re-Use
  - "Facilitating consolidated artifacts (e.g., consolidated implementation guides)"
    - How: Via Core Components, FHIM and Tools (e.g., UCATs, NIST IGAMT)

Using S&I Simplification methods and the Use Case Authoring Tool to
Start a New Initiative

- Complete S&I Use Case Requirements Template…
  - Compose the Preface and Introduction based on Initiative Charter and Standard Language
  - Derive Initiative Overview and Challenge Statement from the Initiative Charter
  - Align Use Case Scope and Background with Initiative Charter
    - In and Out of Scope Statements
    - Communities of Interest
  - Make Value Statement
  - Describe Use Case Assumptions, Pre and Post Conditions
  - Describe Actors and Roles
  - Create Use Case Diagram
  - Establish Scenario(s), User Story(ies)

Using S&I Simplification methods and the Use Case Authoring Tool to
Start a New Initiative (continued)

- Complete S&I Use Case Requirements Template…
  - Create Activity Diagram
  - Create Base and Alternative Flow(s)
    - Sequence (Steps)
    - Actors and Roles
    - Inputs and Outputs
    - Actions, linked to ISO/HL7 EHR/PHR System Functional Models
  - Describe Requirements, including
    - Functional, Information Interchange, System Requirements
  - Create Sequence Diagrams
  - Describe Issues, Risks and Obstacles
  - Establish Dataset Requirements
    - Linked to Federal Health Information Model (FHIM) Data Objects and Elements, and (via FHIM) to Standards and Implementation Guides

Agency for Health Research and Quality
US Health Information Knowledgebase

- AHRQ/USHIK S&I Pilot Site
  - http://ushik-stg.dcgroupinc.com/mdr/portals/si?system=si&enableAsynchronousLoading=true
- Special Thanks to:
  - Michael Fitzmaurice, PhD (AHRQ – now retired)
  - Robin Barnes (formerly with DC Group – AHRQ/USHIK contractor)
  - Jennifer Barnes (DC Group)

USHIK - United States Health Information Knowledgebase

- **USHIK:** an on-line, publicly accessible registry and repository of healthcare-related metadata, specifications, and standards; USHIK is funded and directed by the Agency for Healthcare Research and Quality (AHRQ) with management support and engagement from numerous public and private partners

- **Meaningful Use:** contains specifications, artifacts, downloads, search tools and other resources for Meaningful Use including Objectives, Clinical Quality Measures, and Value Sets

- **All-Payers Claims:** offers a convenient set of tools for users to compare and download All-Payer Claims reporting specifications from participating states and the APCD council

- **Draft Measures:** provides users a forum to solicit public feedback on draft Clinical Quality Measures and their respective Values Sets

- **Child EHR Format:** set of child specific requirements provided by ARHQ and CMS that an EHR should meet to perform optimally for the health care needs of children

- **Common Formats for Patient Safety:** provides detailed information on the Data Elements required for Patient Safety Event reporting

- **Standards**: contains healthcare IT metadata from Standards Developing Organizations who have been accredited by the American National Standards Institute which include:
    - ASC X12: Accredited Standards Committee, develops electronic data interchange standards
    - NCPDP: National Council for Prescriptions Drug Programs, providing standards for the pharmacy services industry

- **HITSP:** contains data for the health interoperability specifications and constructs and constructs such as C32, C80, C83 and C154

USHIK's potential role with S&I Simplification WG

- To build a working model for the S&I Simplification initiative outputs and their common components for reuse

- To promote uniformity across common S&I Simplification components

- To present what S&I Simplification has accomplished to date in an understandable model, highlighting the contributions of each initiative

- To provide these contributions so that they may be linkable to the requirements of real-world users and researchers

- To lay the foundation for a consistent infrastructure and build-out through identification and re-use of common components

Federal Health Information Model

- Federal Health Information Model (FHIM)

  - http://www.fhims.org

- Special Thanks to:

  - Galen Mulrooney

  - Ioana Singureanu

Federal Health Information Model

- A logical information model of health data (expressed in UML and closely aligned with Health IT standards) developed in collaboration with the federal partners

- Harmonizes content (information, terminologies and value sets) across federal partners and standards organizations

- Integrated with open source Model Driven Health Tools (MDHT) to utilize Model Driven Architecture (MDA) to generate HIE Implementation standards for multiple Platform Specific Models (PSMs) (e.g., HL7 CDA, NIEM, HL7 FHIR, etc.)

FHIM FEDERAL HEALTH INFORMATION MODELING

FHIM Support for ONC Initiatives

- FHIM can be utilized to harmonize and standardize data concepts across ONC Initiatives

- FHIM can be the repository for data concepts that are used by ONC Initiatives

  – Including and binding of data concepts to terminology systems / value sets (e.g., "Race" -> CDC Race/Ethnicity value set) and the specification of the value sets.

- S&I Framework can leverage the FHIM to more efficiently produce high-quality HIE Standards using automated tools

  – Both UCAT tools import the FHIM to provide the user with a pick-list of already-identified concepts. Any new concepts identified by the Initiative would be added to the FHIM.

Tool Developer

- Beacon Use Case Editor
  - Prometheus Computing
  - Art Griesser, Lead
  - Michael Faughn, Developer
  - Use invitation code: **ucat** at
    onc.prometheuscomputing.com/gb_users/register
  - Contact: m.faughn@prometheuscomputing.com

Manage Use Cases with Beacon™

Prometheus has created a custom edition of the Beacon Use Case Management tool for the S&I Framework.

Beacon's intuitive user interface is based on the ONC use case template. Other templates can be readily supported. Users use tools they can understand.

Each component, in each use case, is reusable and persisted in a relational database.

Beacon is a web application. All users share the same reusable elements.

Beacon is built on a solid framework that has been rigorously tested and that supports easy extensibility.

Source code is available. Use case data can be leveraged through a rich API. Integration with other tools within the S&I Framework is well within the realm of possibilities.

Prometheus Computing

Beacon™ is Purpose-Built

You get:

Multivocabulary support	ClearView ® in-situ editing
HL7 EHR Functions	HL7 PHR Functions
HL7 Definitions	FHIM, HITSP data objects
ONC SI Requirements	ONC SI Actions
ONC SI Initiatives, Use cases, Steps	Templates
Clone Use Cases, Scenarios, Steps	CSV Backup / Restore
JSON Backup / Restore	JSON Export
Rich, Powerful API	Integratable

Use invitation code: **ucat** at
onc.prometheuscomputing.com/gb_users/register

Inquiries: m.faughn@prometheuscomputing.com

Prometheus Computing

Tool Developer

- Enterprise Architect Extensions
  - Sparx Systems
  - J.D. Baker, Lead
  - http://www.sparxsystems.com
  - Contact: jbaker@sparxsystems.com

Enterprise Architect Use Case Development

- EA has been successfully used to develop use cases in many domains over many years
- EA is a full-featured modeling tool, not just a use case development tool
  - Enables the capturing and reuse of common elements such as the FHIM and Criteria from the HL7 Functional Model
  - Includes a full-feature document generator with customizable templates
  - Based on the UML standard, EA can be customized by UML profiles to identify model elements in a healthcare domain vocabulary
- EA data is stored in a relational database
  - The model can be queried in multiple ways to facilitate use and reuse of elements
  - Use case text can be linked to model elements to ensure consist use and understanding

EA Model Content
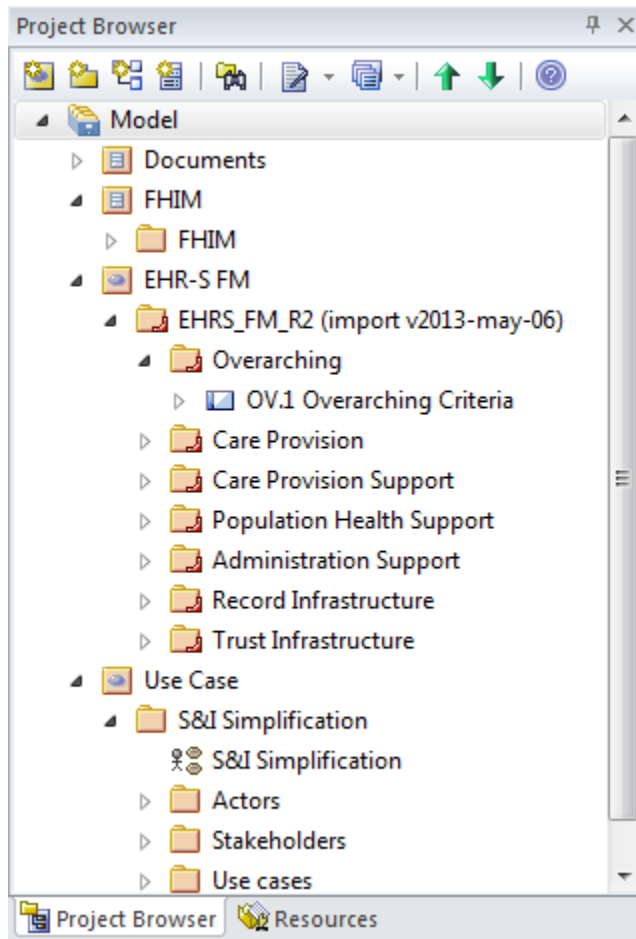
- FHIM imported from the RSA tool source
- EHR FM modeled in EA
- All elements defined once, used wherever applicable.

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
- HL7 EHR Interoperability Wiki
    - http://wiki.hl7.org/index.php?title=EHR_Interoperability_WG