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HITSP

Healthcare Information Technology Standards Panel

Proposed Simplification Process

Reston, VA | February 20, 2009

Presented by:

Gary L. Dickinson, CentriHealth

HITSP Foundations Framework Committee

- Accompanying this Presentation are two Spreadsheets:
  - 090211HITSP-Foundations-Simplification-Y1-Biosurveillance.xls
    - Example using ONC/AHIC Year 1 Biosurveillance Use Case
    - Includes Tab-oriented references denoted by the dark red box in upper right corner of select slides
  - 090211HITSP-Foundations-Simplification-UseCaseTemplate.xls
    - Blank template for your Use Case

Simplification Outline

- Introduction – Ideals and Objectives
- Simplification Strategy
  1. Correlate Health, Healthcare and its Information Currency
  2. Establish Common Conventions for Information Interchange
  3. Identify Commonalties, Repeat Patterns and supporting Services, Ready to Exploit
  4. Establish Libraries of Re-Usable Components, Ripe for Re-Use, and Auto-Generate Implementable Action Records
  5. Demonstrate Worksheet to capture Use Case details
  6. Employ HITSP Toolkit to Build It, Use It
- Conclusion
- Appendix

Simplification

Ideals

- Simple and sufficient
- Common – broadly applicable
- Concise – straight-forward
- Uniform – consistent, minimal variability
- Re-useable – recurrent, easily repurposed
- Standards-based
- End-to-end trust framework
  - To ensure continuous privacy and security protections

Simplification yields

Ready Adoption

- Make it universal, in common to all
- Make it technology, vendor and product neutral
- Make it easy to understand
- Make it easy to implement by small and large organizations alike
- Make it easy to bring to market
- Make it applicable to US and international

- Simplification Drives Adoption

HITSP Simplification

Objectives

- Identify and exploit commonalties broadly applicable
  - Across all ONC/AHIC Use Cases (circa 2006-09)
- Identify common
  - Patterns of real-world health and healthcare delivery, including process, actions (tasks), work flow, system functions
  - Information artifacts, including attributes & attribute aggregations
  - Patterns of information, including capture, retention and flow
  - Patterns of information protection, including privacy and security functions
- Promote path
  - From fragmented (disjoint, disparate)
  - To harmonized (common, uniform)

HITSP Simplification

Objectives, con't

- Simplify development, contents and assimilation (awareness, comprehension and adoption) of HITSP Interoperability Specifications (ISs)
- Offer common (core) set of standards-based Services in the context of a services-based architecture
- Posit expanded scope of interoperability
  - From instant of interchange – Point-to-point with transient artifacts
  - To entire record lifecycle – End-to-end with persistent records
- Establish common record unit
  - Uniformly evidencing all Use Case Actions, and
  - Serving as the common currency of health information

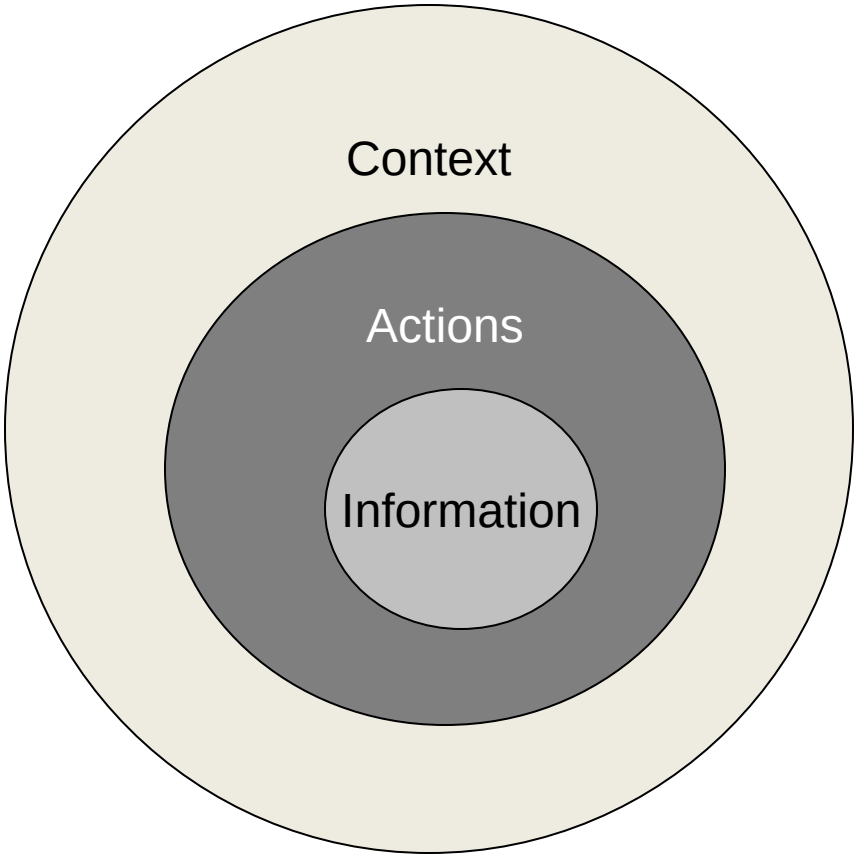
HITSP Simplification

Objectives, con't

- Maximize use and re-use of services, functionality, process and information artifacts, privacy and security protections
- Dramatically reduce HITSP resource needs by exploiting repeat patterns
- Offer HITSP toolkit allowing Stakeholders to
  - Compose their own Value/Use Cases
  - Re-purpose (localize) AHIC/NeHC and other Use Cases
  - Immediately assemble implementable standards-based services and functions, data/record containers (e.g., CDAr2), vocabulary and value sets
  - Sufficient to immediately implement their Scenarios

1a – Correlate Health, Healthcare, Information Currency

Information in Action



- **INFORMATION:** All health and healthcare information derives from, or is attributable to, a discrete Action
- **ACTIONS:** Actions are taken to support an individual's health and to effect healthcare delivery
  - Corollary – Healthcare is the sum of all Actions taken to ensure its safe and effective delivery
- **CONTEXT:** The essential context of health and healthcare information is indivisible from its originating Action:
  - Who, What, When, Where

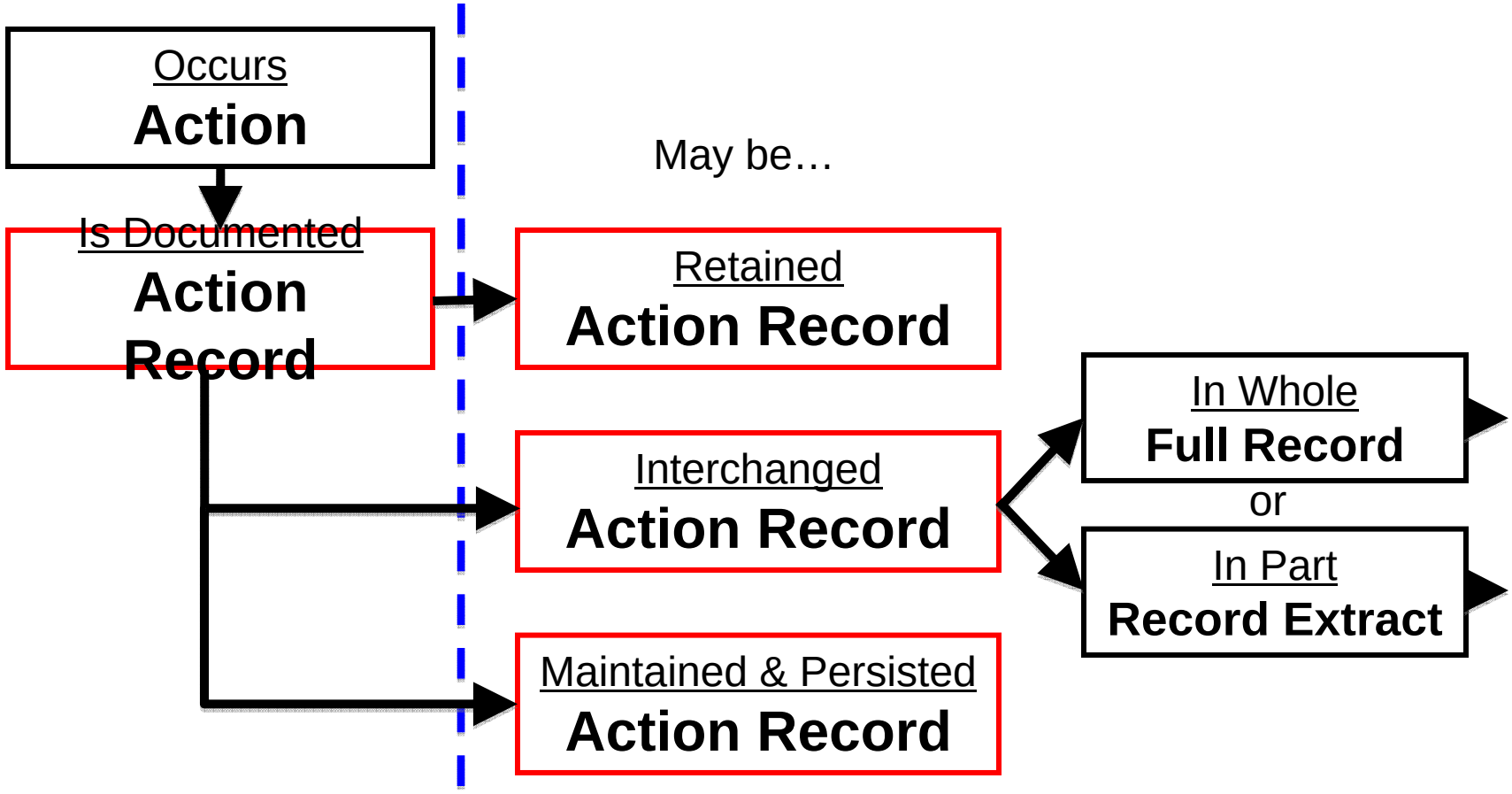
1a – Correlate Health, Healthcare, Information Currency

Action, Action Record

- An Action is taken, i.e.,
  - A Task or Procedure is performed; or
  - A Service is provided or rendered.
- A record is initiated, documenting Action facts, findings and observations.
- The resulting Action Record may be:
  - Retained; and/or
  - Interchanged (in whole or in part); and/or
  - Maintained and persisted.

1a – Correlate Health, Healthcare, Information Currency…

Action, Action Record, con't



1a – Correlate Health, Healthcare, Information Currency…

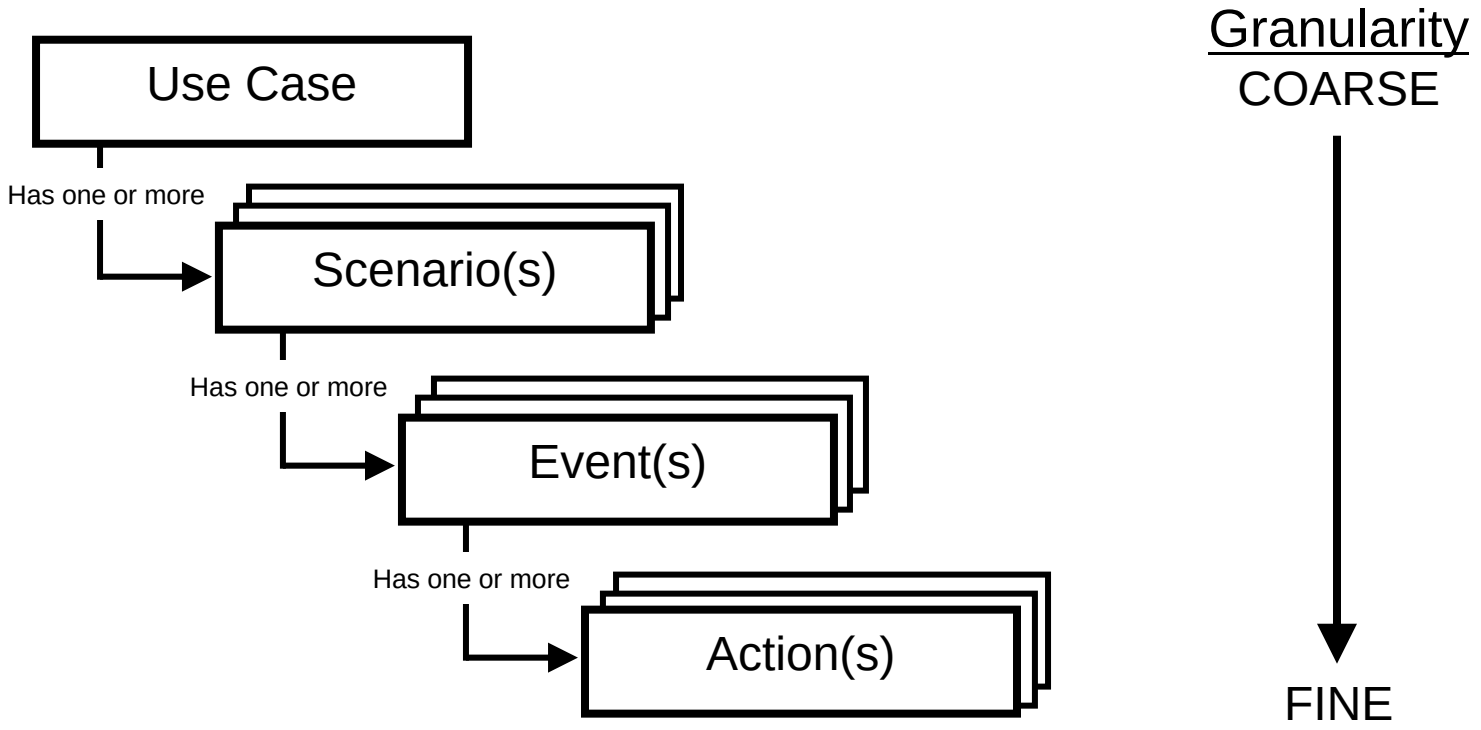
Actions, Action Records

Actions…	**Action Records…**
Are acts, tasks, procedures, or services	• Document (provide evidence of) each Action taken • May be entries in a persistent datastore (e.g., EHR or PHR) • Are a common information currency for health/healthcare
Are taken in: • Support of individual health • Provision of healthcare • Public Health	
Have chronology of occurrence	Have a corresponding chronology
Are a common *unit of service* in health/healthcare	Are a common and corresponding *unit of record* in health/healthcare
Have a context – who, what, when, where	Record/document Action context

Reference Tab "Use Case" Columns A-B

1b – Apply Correlation to

ONC/AHIC/HITSP Use Cases



1b – Apply Correlation to Use Cases

Reference Tab "Use Case" Columns A-B

Actions, Set(s) of Actions

- Actions occur at leaf level of each Use Case.
- All Use Cases resolve to the set (and sequence) of Actions necessary to fulfill (satisfy, complete) each Scenario.

2 – Establish Common Conventions for

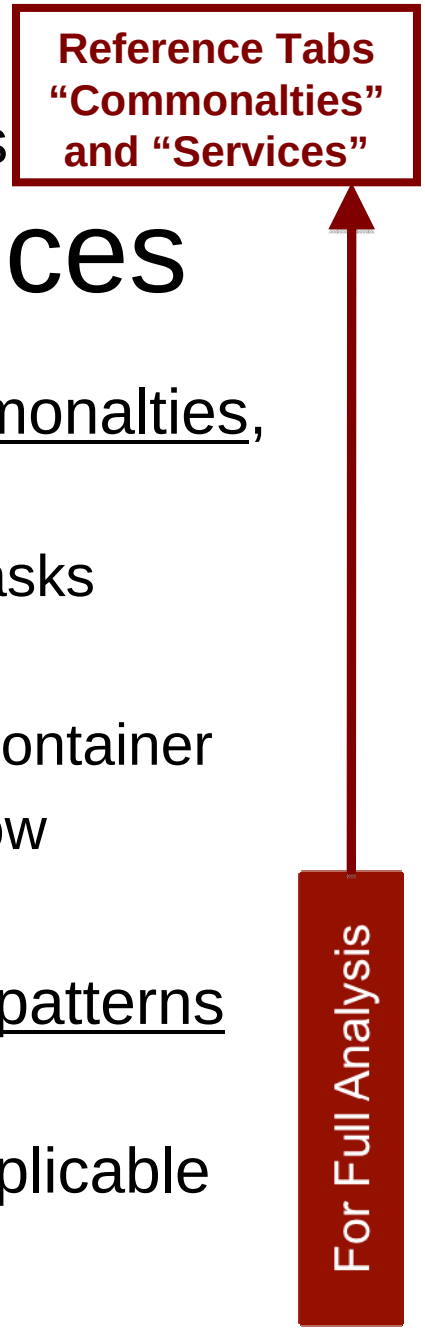
Information Interchange

- System Actors (simplified to)
  - Source, sender
  - Receiver
- Interchange Patterns (simplified to)
  - Push: publish, subscribe
  - Pull: query/locate, retrieve

3a – Analyze & Identify Use Case Commonalties

Repeat Patterns and Services

- Assert, as statements of fact, Use Case commonalties, focused on:
  - Use Cases and Actions: process, work flow, tasks
  - Attributes: data content
  - Action Records: common currency, common container
  - Record Interchange: exchange, information flow
  - Privacy and Security: trust and protection
- From asserted commonalties, identify repeat patterns as the basis for re-use.
- From identified patterns, identify the set of applicable and re-usable services.



3a – Analyze and Identify Commonalties…

Example

- Commonalty Assertion (RI-A2): Action Record(s) may be interchanged based on:
  - Subscribe criteria
  - Pre-configured (hard-coded rules) or
  - Ad hoc query criteria
- Repeat Pattern (RI-P1)
  - Push/publish record(s), triggered by Subscribe criteria
  - Push/publish record(s), triggered by pre-configured rules
  - Respond w/record(s), triggered by Query, based on Query criteria
- Supporting Services (S11): Record Transactional Services
  - Push: Subscribe, Publish
  - Pull: Query/Locate, Retrieve

Reference Tabs "Commonalties" and "Services"

For Full Analysis

Reference Tab
"Services"
Columns A-C

3b – Identify Core Services

Transactional and Persistence

Transactional Services
- Support Record Interchange
- Traditional HITSP Scope

- Push: Subscribe, Publish*
- Pull: Query/Locate, Retrieve Record(s)*
- Record Envelope*
- Record Addressing*
- Authorization*
- Source Signature*
- Author Signature*
- Source/Author Authentication*
- Record Content Integrity*
- Sender/Receiver Authentication*
- Payload Encryption*

* NHIN/FHA Identified Services

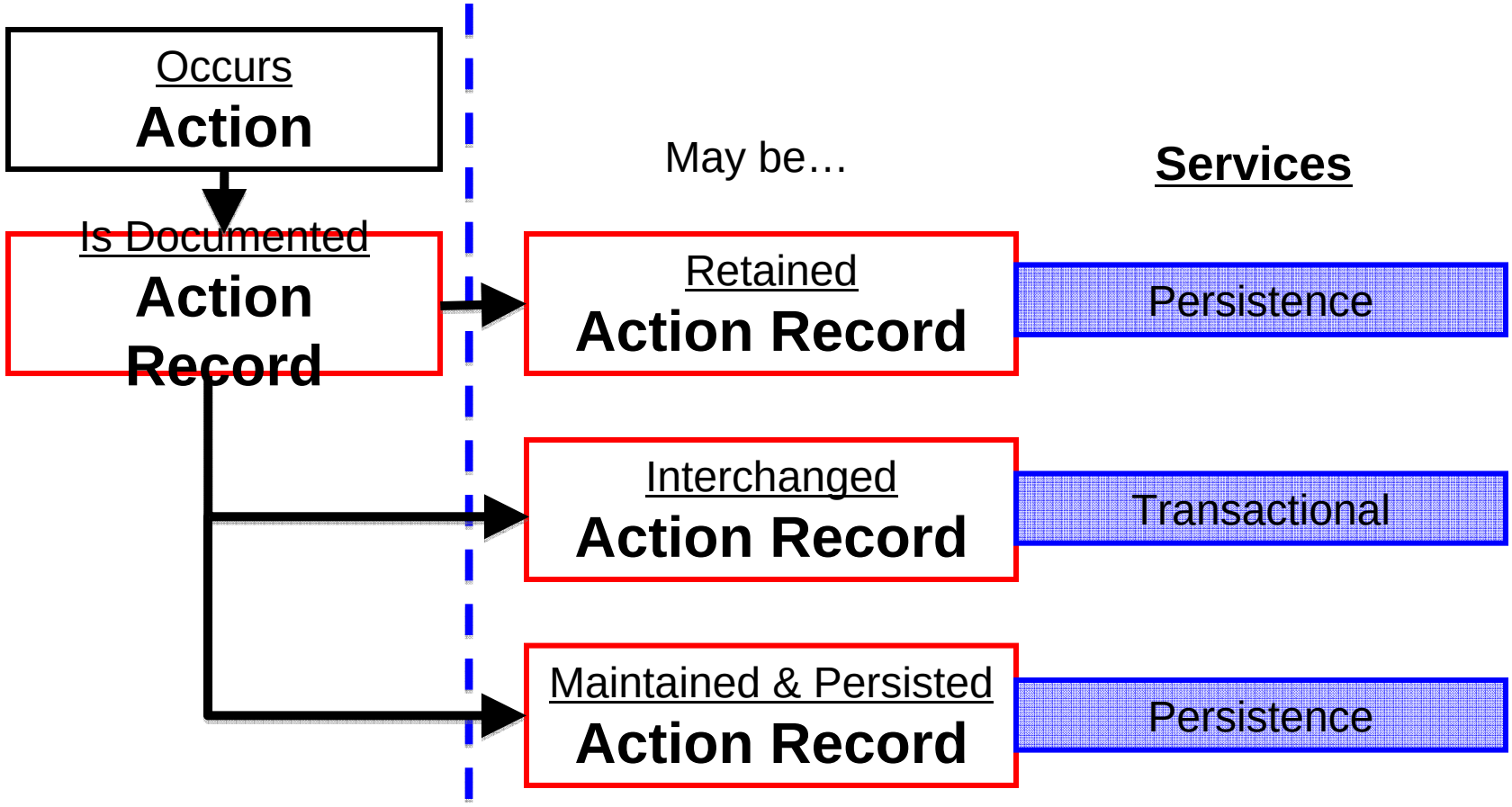
Persistence Services
- Support Record Persistence
- Correspond to Record Lifecycle Events

- Originate Record
- Index Record*
- Register/Retain Record*
- Link Record to Identity*
- Amend Record
- Translate Record
- Verify Record
- Attest Record
- Access/Use Record
- Transmit/Receive Record
- De-identify, Alias, Re-Identify Record
- Archive Record(s)
- Lose or Destroy Record(s)
- Deprecate Record(s)

Reference Tab
"Services"
Columns A-C

3b – Identify Core Services

Applicability of Services



3c – Identify Services to Support

Action Record Lifecycle

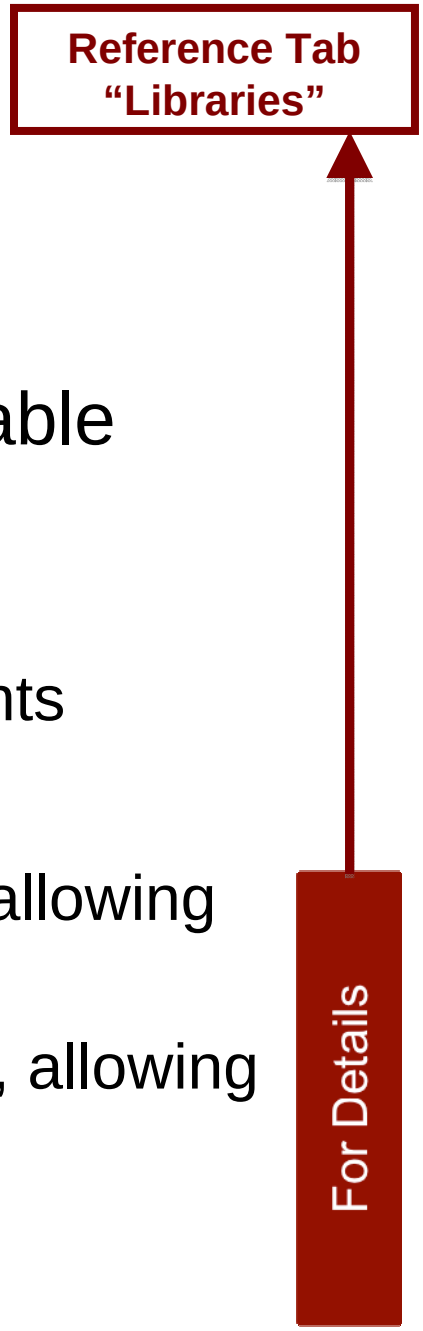
- Establish Services to support Action Record Lifecycle Events (as invoked by Use Case Actions)
  - e.g., originate record, amend record, transmit record

- Lifecycle Event Reference: HL7 EHR Lifecycle Model

4 – Establish

Libraries

- Establish Libraries (catalogs) of re-useable components
  - Use Cases, Actions: process components
  - Attributes, Action Records: data components
- Establish
  - Public Libraries– open to all stakeholders, allowing all entries
  - Harmonized Libraries – authority managed, allowing only consensus or mandated entries



Reference Tab
"Libraries"

4a – Establish Libraries for

Attributes

- Attributes are data elements, items or values
- Attributes may be atomic elements or aggregations (e.g., templates or archetypes)
- Attribute properties include: ID, name, description, data type, range, format, units of measure, coding scheme, value set, etc.
- Stakeholders are encouraged to select harmonized Attributes before creating their own variant

Open Public Library	**Harmonized Library**
Entries instantiate current clinical and business practice	Entries are registered upon: • Industry consensus agreement • Authority mandate
Open to All Stakeholders to register, update, lookup	• Authorities may register, update • All Stakeholders may lookup

Reference Tab
"Libraries"

4b – Establish Libraries for

Actions, Action Records

- Actions are acts, tasks, procedures or services performed/provided
- Each Action may have a corresponding Action Record
- Action Records are specified with Attributes selected from Attribute Library
- Stakeholders are encouraged to select harmonized Actions before creating their own variant

Open Public Library	**Harmonized Library**
Entries instantiate current clinical and business practice	Entries are registered upon: • Industry consensus agreement • Authority mandate
Open to All Stakeholders to register, update, lookup	• Authorities may register, update • All Stakeholders may lookup

Reference Tab
"Libraries"

4c – Establish Library for

Use Cases

- Open to All Stakeholders
- Stakeholders may
  - Compose Value/Use Cases for their immediate purposes, instantiating their Current Clinical and Business Practices
  - Compose Value/Use Cases for submission to NeHC
  - Re-purpose (or localize) AHIC, NeHC and other Value/Use Cases

Reference Tab
"Libraries"

4 – Sidelight

Potential Role of SDOs

- Attribute Libraries
  - Open Public
  - Harmonized

1. Identify commonalties in registered Attributes
2. Harmonize many to one (or small set)
3. Register upon consensus agreement

- Action Libraries
  - Open Public
  - Harmonized

1. Identify commonalties in registered Actions
2. Harmonize many to one (or small set)
3. Register upon consensus agreement

- Libraries may be initialized with previously agreed entries

Reference Tab
"Libraries"

4d – Auto-Generate

Implementable Action Record

- Auto-Generate, from specification of Use Cases Actions and related Action Records, a standards-based "container" (e.g., CDAr2)
  - Record Header – Action context (meta-data) attributes – common to all Actions
  - Record Body – Action facts, findings and observations
- For example:
  - Action = Vital Signs
  - Record Header = who, what, when, where
  - Record Body = blood pressure, heart rate, respiratory rate, temperature…

Reference Tabs "Key", "Use Case" and "Instructions"

5 – Demonstrate

Use Case Worksheet

- Enumerate Use Case Scenarios, Events, Actions
- Per Action:
  - Link to Action in Action Library
  - Establish relationship with Action Record: none, 1, 2 or more Action Records per Action
  - Identify Action data and Action Record content, link to Action Record Library
  - Identify Record lifecycle events (and/or Services) invoked, if any
    - Orchestrate Services resulting from Action, if applicable
  - Identify data input to, and data output resulting from, Action
  - Identify System functions likely invoked by Action
    - Reference HL7 EHR and PHR System Functional Models
  - Identify Actors, including interchange from/to, where applicable
  - Specify pre- and post- conditions and assumptions, if any

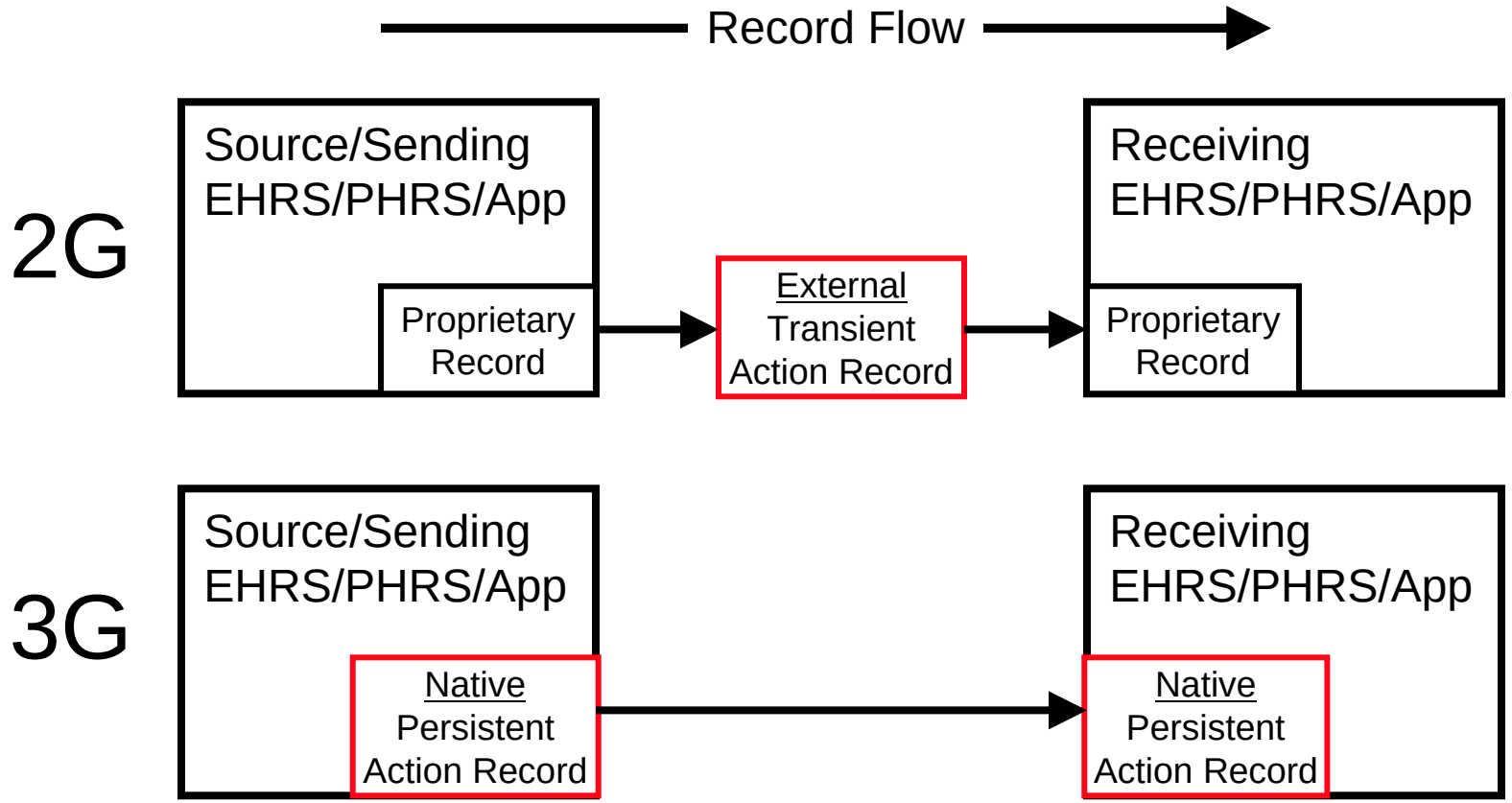
Transition Strategy

1st, 2nd, 3rd Generation

	1G 80s to Now	2G Next	3G Goal
Action Record	N/A	External to System architecture	Native to System architecture
Interchange Scheme	Often Customized Point to Point	Uniform (Back) End-to-End	Uniform (Front) End-to-End
	Transient Artifacts (e.g., messages)	Transient Action Records	Persistent Action Records
Record originated at System	Back-end interface, ready to transmit	Back-end interface, ready to transmit	Front-end – often at point of care or service
Digitally Signed by	N/A	Sending System	Originating Author and System
Authenticate-able (traceable) to	N/A	Sending System	Originating Author and System

Transition Strategy

External to Native



Transition Strategy

Record Flow

	Source/Sender			Receiver		
	Front-end (User Interface)	Internal	Back-end Interface	Back-end Interface	Internal	Front-end (User Interface)
Point of Record...	Origination, Authorship	Retention	Transmittal, Disclosure	Receipt	Retention	Access/ Use
Record Flow	→					
2G	Proprietary	Proprietary	Transformed to Standard	Transformed from Standard	Proprietary	Proprietary
			Action Record	Action Record		
3G	Standard	Standard	Standard	Standard	Standard	Standard
	Action Record	Action Record	Action Record	Action Record	Action Record	Action Record

6 – Build It, Use It

Developer's Toolkit

- Use Case Worksheet (as previously described)
- Browser for Open Public and Harmonized Registries
  - Value/Use Case Registry
  - Action, Action Record and Attribute Registries
  - Services
- Value/Use Case Composer
  - Select* or create Use Cases, Scenarios and/or Events
  - Select* or create Actions within each Event
  - Select* or create Attributes for each Action
  - Select* or compose Action Records (incorporating Attributes)
  - Select* or generate implementable Action Record

  * Select from Library entries (preferred)

6 – Build It, Use It

Developer's Toolkit, con't

- Assemble applicable Action Records for each Use Case Scenario planned for implementation
- If Service Oriented, assemble appropriate Services
  - Select from Transactional, for record interchange
  - Select from Persistence, for records management and retention
- If not, assemble equivalent application software
- If 2G, select or build software adapter to
  - Pack Action Record (as source/sender) to transmit
  - Unpack Action Record (as receiver) upon receipt

Conclusions

This Proposal…

- Establishes a few simple conventions – broadly applied
  - Health, Healthcare and its information currency
  - Action, Action Record (common unit of service, common unit of record, common currency)
  - Sender/source and receiver Actors
  - Push and Pull Interchange Patterns
- Logically extends interoperability from instant of interchange (point to point with transient messages) to full record lifespan (end-to-end persistent health records)
- Applies uniform standards foundation to the origination, retention, interchange, access/use and protection of health and healthcare information
- Identifies and exploits commonalties and repeat patterns

Conclusions, con't

This Proposal…

- Relies on a small set of Core Services – many already in place
- Employs libraries of re-usable process and data components
- Offers a developer's toolkit – making it easy to build, use and re-use
  - One-stop self-service Value/Use Case specification
  - Auto-generated data containers – standards-based
- Promotes standards-based transition from current information practices (fragmented, disparate) to harmonized (whole, uniform)
- Shows how true standards harmonization maximizes commonalty and uniformity to A REDUCIBLY SMALL SET of core standards
- Offers a path to build out 10s and 100s of Use Cases THIS YEAR
- Maximizes economies of scale, minimizes HITSP resource needs

Terms and Acronyms

ANSI	American National Standards Institute
AHIC	American Health Information Community
CDAr2	HL7 Clinical Document Architecture, Release 2
DSTU	Draft Standard for Trial Use
EHR, EHRS	Electronic Health Record, EHR System
FHA	US Federal Health Architecture Group
HIT	Health Information Technology
HITSP	ANSI Health Information Technology Standards Panel
HL7	Health Level Seven, an ANSI Accredited SDO
NHIN	US Nationwide Health Information Network
NeHC	US National eHealth Collaborative (AHIC Successor)
ONC	US Office of the National Coordinator for HIT
PHR, PHRS	Personal Health Record, PHR System
SDO	Standards Developing Organization

Key References

- ANSI HITSP Security and Privacy Technical Note, TN900 (2008)
- HL7 Clinical Document Architecture, Release 2 (2005)
- HL7 EHRS Functional Model (Mar 2007)
- HL7 PHRS Functional Model DSTU (Nov 2008)
- HL7 EHR Interoperability Model DSTU (Mar 2007)
- HL7 EHR Lifecycle Model DSTU (Jan 2008)
- HL7 Implementation Guide for Clinical Document Architecture Release 2, Reference Profile for EHR Interoperability (Jan 2008)
- ISO 21089, Trusted End-to-End Information Flows (2004)
- NHIN/FHA Core Services (Dec 2008)
- ONC/AHIC Use Cases x 14 (2006-09)

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