

Standards Convergence to Promote EHR Interoperability

(ISO TC215 New Work Item Proposal)

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Standards Convergence

Acknowledgments

Distilled from open standards and constructs developed by:

- ANSI Health Information Technology Standards Panel
 - Foundations Framework Committee
 - Security, Privacy and Infrastructure Technical Committee
 - Various Technical Committees and “Tiger Teams”
- Health Level Seven (HL7)
 - EHR, EHR Interoperability, Security and Structured Docs WGs
- ISO TC215
 - WG1 (Data Structure), WG2 (Data Interchange), WG8 (EHR Req'ts)
- Integrating the Health Enterprise (IHE)
- US Federal Health Architecture Group
- and others...

Standards-Based

Convergence...

- Promotes standards distillation – not proliferation
- Distills to a small core set of standards and standards-based constructs – broadly and uniformly applied
- Identifies key elements (of healthcare Process and Information)
- Promotes concision, comprehensibility and ready adoption
- Offers simple metaphor at juncture of Process & Information
 - An Action is taken, an Action Record instance documents/evidences Action
- Offers simple Electronic Health Record (EHR) metaphor
 - Health Record is comprised of Entries which evidence Actions taken in health and healthcare (i.e., Action Record instances)
 - Entries are comprised of Attributes (i.e., data elements, items or values)
 - Attributes may be aggregated in logical clusters (e.g., archetypes, templates)
 - Some Attributes are encoded via standard vocabularies, value sets

Standards-Based

Convergence...

- Envisions common information currency (EHR unit of record)
 - i.e., the Action Record
- Distills core requirements for EHR interoperability, privacy and security
 - See US HIT Policy Committee recommendations
- Maximizes standards-based economies of scale across
 - Provider EHRs, Individual HRs, Population HRs, HIEs, RHIOs, NHIN...
- Encompasses end-to-end record trust, assurance and fidelity
 - Point of health record origination to each point of record access/use
 - Accountability + privacy + security protection
- Maximizes re-use, re-purpose of, and effectively commoditizes
 - Process, Information and Services components

Standards-Based

Convergence...

- Empowers all Stakeholders, makes it easy to specify, build out and implement (use cases)
 - By clinical & business experts, independent of standards/technical gurus
 - By providers, health plans, professional societies, public health...
 - By small and large organizations alike
- Envisions rapid prototype then immediate implementation of standards-based constructs
- Ensures vendor, product and technology neutrality
- Has immediate market impact
- Actualizes “Do It Once, Do It Right, Do It International”
 - Regarding HIT/EHR Standardization, Ralph A. Korpman, MD, now CEO CentriHealth, 1991

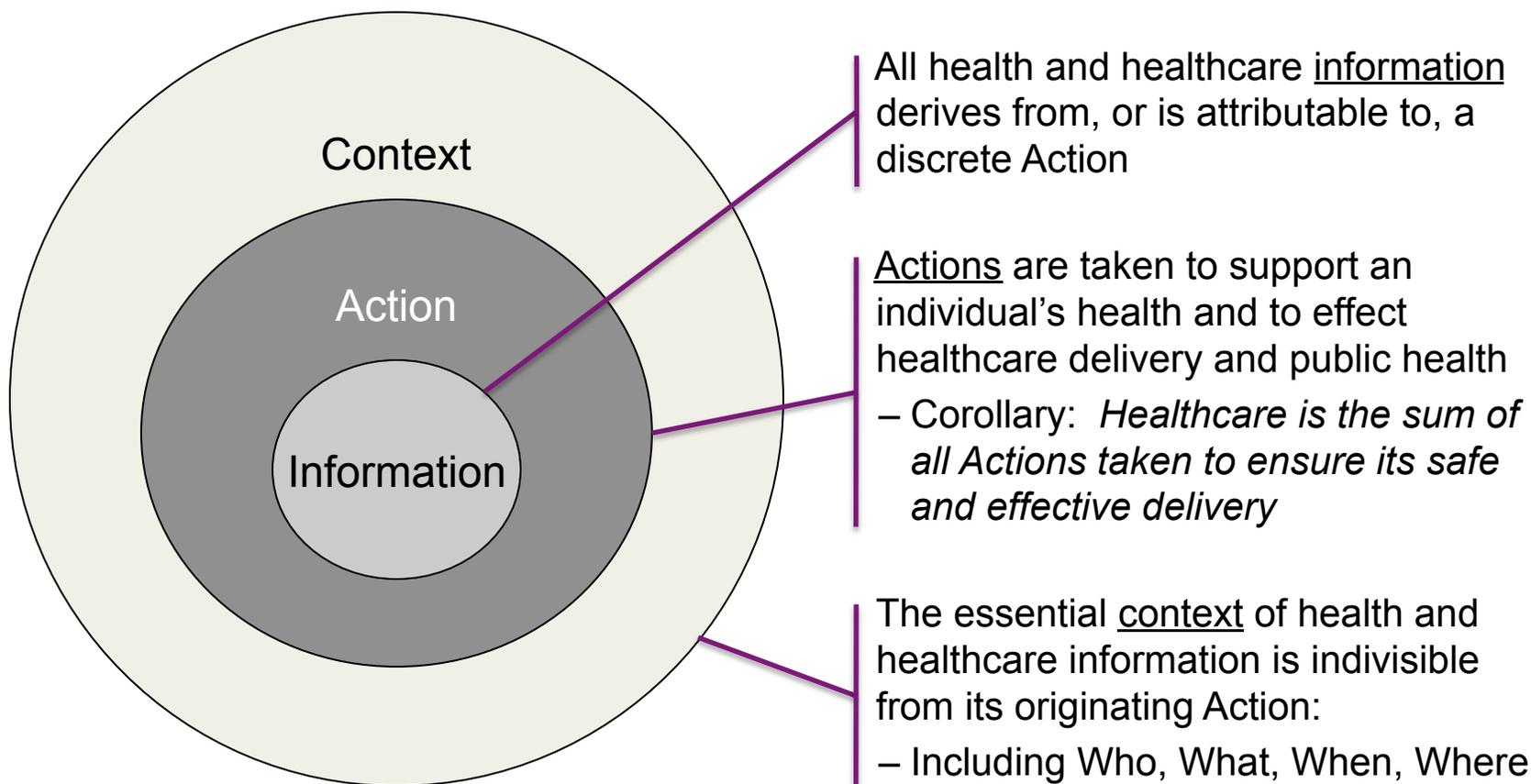
Standards Convergence

Elemental Strategy

1. Health, healthcare and health information correlation
2. Process and information correlation
Use Case Examples
3. Re-usable component libraries, ready to exploit
4. Suite of transactional and persistence services
5. Use Case Developer's Toolkit, available to any Stakeholder
6. Next Steps

1 – Health, Healthcare and Health Information Correlation

Information in Action in Context



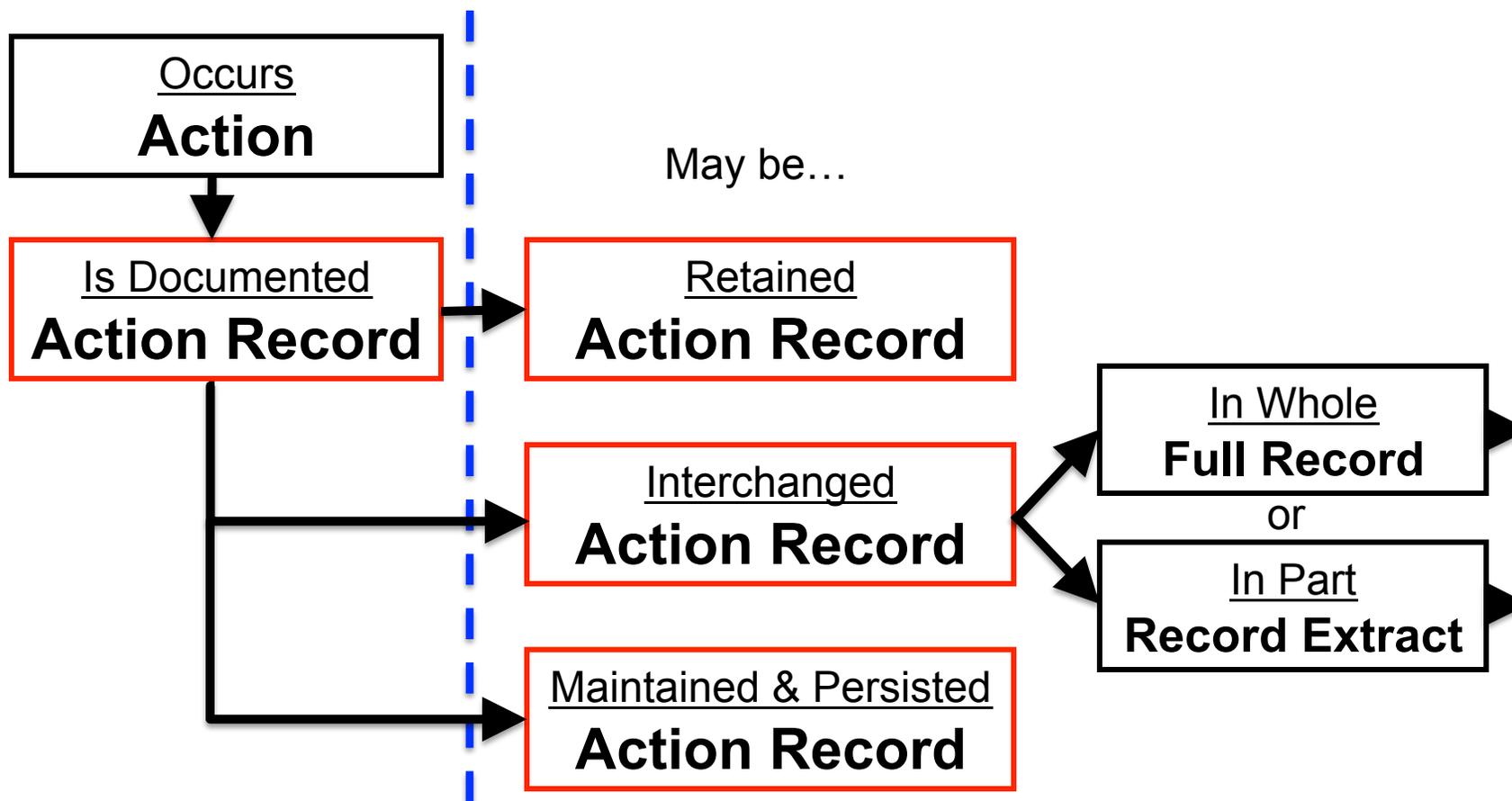
1 – Health, Healthcare and Health Information Correlation

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 (e.g., as an EHR Entry).

1 – Health, Healthcare and Health Information Correlation

Action, Action Record, graphically...



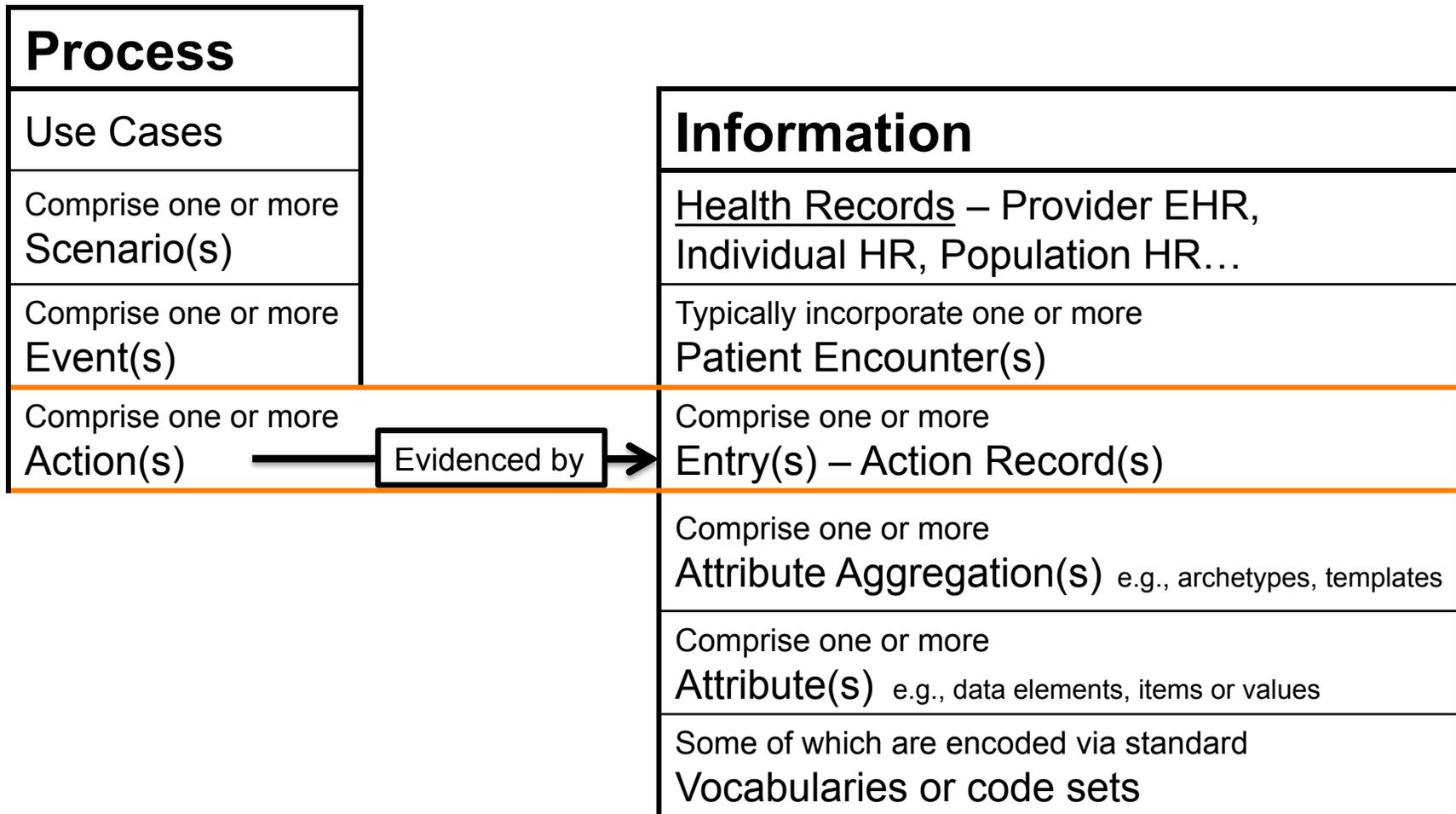
1 – Health, Healthcare and Health Information Correlation

Action, Action Record, con't

Actions...	Action Records...
Are tasks, procedures or services, taken in <ul style="list-style-type: none"> • Support of individual health • Provision of healthcare • Public Health 	<ul style="list-style-type: none"> • Document (provide evidence of) each Action taken • May be entries in a persistent datastore (e.g., EHR or PHR)
Are a <i>unit of service</i> performed/rendered	Are a corresponding <i>unit of record</i>
Have a chronology of occurrence	Have a corresponding chronology
Have a context – who, what, when, where	Document Action context
Are accountable to participants involved	<ul style="list-style-type: none"> • Document participating Actors • Ascribe source and authorship • Are attestable
	<ul style="list-style-type: none"> • Are a common information currency
<p style="text-align: center;">  Strategy – Establish common and corresponding elementals of Process (Action) and Information (Action Record) – Apply broadly and uniformly  </p>	

2 – Process and Information Correlation

Typical Hierarchy & Intersection



2 – Process and Information Correlation

Use Case Examples

Use Case	Actions	Corresponding Action Record Content
Medication	<ul style="list-style-type: none"> • Order • Check interactions • Verify order • Forward to pharmacy • Dispense • Administer (times x) • Review/refill order 	<ul style="list-style-type: none"> • Medication, dose, strength, quantity, route and other administration instructions... • Interactions and resolutions noted... • Verification details... • Transmittal, receipt details... • Dispensing notes, instructions... • Administration details... • Notes, refill details...
Lab	<ul style="list-style-type: none"> • Order • Verify order • Collect/label specimen • Accession specimen • Analyze specimen, report results 	<ul style="list-style-type: none"> • Panels, analytes, instructions... • Verification details... • Container, collection details... • Routing, assignment details... • Enumerated results, reference ranges, other details...
Encounter Summary	<ul style="list-style-type: none"> • Create Summary • Forward to Next Provider • Forward to HRB/PHR 	<ul style="list-style-type: none"> • Continuity of Care Document • Transmittal, receipt details... • Transmittal, receipt details...
Quality, Performance	<ul style="list-style-type: none"> • Filter Data • Aggregate, Calculate • Transmit 	<ul style="list-style-type: none"> • Measured and derived quality and performance metrics... • Transmittal, receipt details...

3 – Re-Usable Components

Process & Information Libraries

- Five Libraries (catalogs) enabling re-use and re-purpose
 - Process Components: Use Cases (1), Actions (2)
 - Information Components: Action Records (3), Attribute Aggregations (4), Attributes (5)
- Two Sub-Libraries
 - Open Public: Open to all stakeholders, allowing all entries
 - Harmonized: Authority managed, allowing only consensus or mandated entries
- Stakeholders
 - Encouraged to build Use Cases by re-using/re-purposing Process and Information components from Harmonized Libraries
 - Before creating their own variant in Open Public Libraries

3 – Re-Usable Components

Process Libraries

Re-Usable <u>Process Components</u>		Process Component Library, Ready for Re-Use	Open	Harm
 (1) Use Case	<ul style="list-style-type: none"> • <u>Use Case</u> is narrative description of real-world Scenario(s) • Based on work/process flow, resolves to set and sequence of Events & Actions necessary to complete (satisfy or fulfill) a particular Scenario • Example: Scenarios for Lab Order/Result, Medication Mgmt... 	<ul style="list-style-type: none"> • <u>Previously registered Scenarios, Events, Actions</u> • Meta-data per Use Case: ID, name, description, source/submitter, included Actions... 	Y	Y
(2) Action	<ul style="list-style-type: none"> • <u>Actions</u> are [tasks, procedures and services] taken in support of health and delivery of healthcare • Example: Register Patient, Capture Vital Signs, Order Medication... 	<ul style="list-style-type: none"> • <u>Previously registered Actions</u> • Meta-data per Action: ID, name, description, source/submitter, related Action Record(s)... 	Y	Y

3 – Re-Usable Components

Information Libraries

Re-Usable <u>Information Components</u>	Information Component Library, Ready for Re-Use	Open	Harm	
 <p>(3) Action Record</p>	<ul style="list-style-type: none"> • Action Records document (are evidence of) Actions taken • Also document Action details, as discrete Attributes and Attribute Aggregations • Record Header – Action context: who, what, when, where • Record Body: Action facts, findings and observations • Example: Action Records for Lab Order, Lab Result, Medication Order, Vital Signs, Encounter Summary (CCD)... 	<ul style="list-style-type: none"> • <u>Previously registered Actions and Action Records</u> • Meta-data per Action Record: ID, name, description, source/submitter, related Actions... 	Y	Y

3 – Re-Usable Components

Information Libraries, con't

Re-Usable <u>Information Components</u>	Information Component Library, Ready for Re-Use	Open	Harm	
 <p>(4) Attribute Aggregation</p>	<ul style="list-style-type: none"> • <u>Attribute Aggregations</u> are logical clusters (groups) of Attributes • Includes templates & archetypes • Example – Vital Sign cluster: Heart & Resp Rate, Temp, BP... 	<ul style="list-style-type: none"> • <u>Previously registered Aggregations</u> • Meta-data per Aggregation: ID, name, description, included Attributes... 	Y	Y
<p>(5) Attribute</p>	<ul style="list-style-type: none"> • <u>Attributes</u> are discrete data elements, items and values • Attributes may be valued by specific coding/classification schemes (ICD, CPT, SNOMED, LOINC and others) • Example: discrete elements for Heart Rate, Resp Rate, Temp, Diastolic DP, Systolic BP... • USHIK is an Attribute Library 	<ul style="list-style-type: none"> • <u>Previously registered Attributes</u> • Meta-data per Attribute: ID, name, description, data type, range, format, unit of measure, coding/ classification scheme, value set... 	Y	Y

3 – Re-Usable Component Libraries

Open Public and Harmonized

Process and Information Libraries	
Open Public	Harmonized
Entries instantiate current clinical and business practice <ul style="list-style-type: none">• Enables real-time Use Case build out	Entries are registered upon: <ul style="list-style-type: none">• Industry consensus agreement• Authority mandate
Open to All Stakeholders to <ul style="list-style-type: none">• Register, update own entries• Lookup and re-use any entry	<ul style="list-style-type: none">• Authorities may register/update• All Stakeholders may lookup and re-use entries in own Use Cases
For Use Cases, Stakeholders may: <ul style="list-style-type: none">• Re-use Process and Information components from Libraries• Compose Value/Use Cases for their immediate purposes, instantiating Current Clinical and Business Practices• Re-purpose (or localize) National or Regional and other Value/Use Cases	

3 – Re-Usable Component Libraries

Ongoing Harmonization

- Process Libraries x 2

- Open Public

- Harmonized

- Information Libraries x 3

- Open Public

- Harmonized

-
1. (Open Public) – Identify commonalties among registered entries
 2. Harmonize many to one (or small set)
 3. (Harmonized) – Register upon consensus agreement

- Libraries may be initialized with previously agreed entries

4 – Services Suite

Transactional and Persistence

Transactional Services

- Support Record Interchange
- Point to Point

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

* Ref: HL7 EHR Lifecycle Model

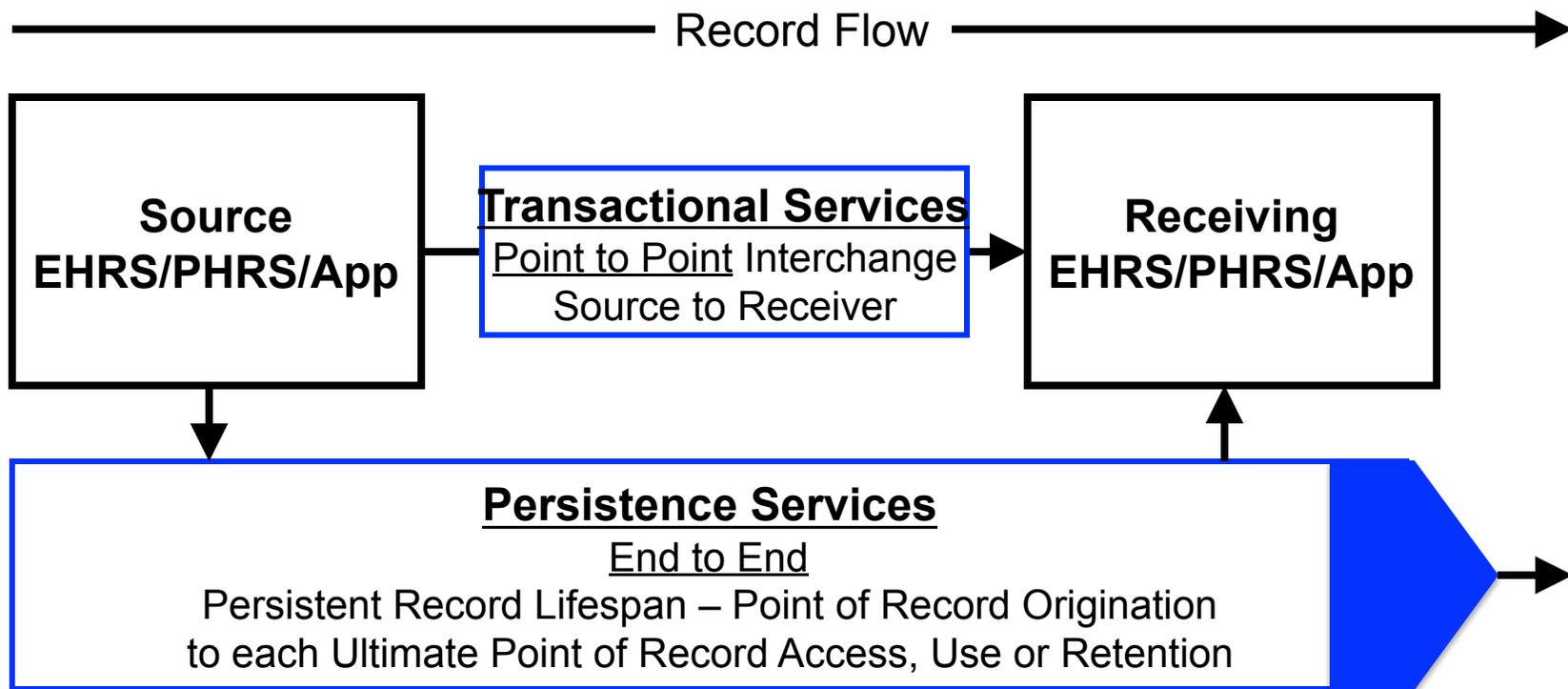
Persistence Services

- Support Record Persistence
- End to End
- Correspond to Record Lifecycle Events*

- Originate Record
- Index Record
- Register/Retain Record
- Link Record to Identity
- Manage Consent Directives and Permissions
- 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)

4 – Services Suite

Scope of Interoperability



5 – Use Case Developer's Toolkit

Composer

- Allows any Stakeholder to
 - Select* or create Use Cases with Scenarios and Events
 - Select* or create the set and sequence of Events w/Actions
 - Select* or create Attributes and/or Attribute Aggregations related to each Action (thus Action Records)
 - Select* or generate standards-based, implementation-ready information containers (Action Records)
 - Select relevant Transactional and/or Persistence Services
 - Proceed to immediate prototype then implementation

* Selecting harmonized Process/Information Library entries (preferred)

5 – Use Case Developer’s Toolkit

Build It, Use It

	Who	What	How
Process	Healthcare Clinical and Business Experts <u>Any Stakeholder</u>	Use Cases, resolving to Actions	Use Case Developer’s Toolkit
Information		Action Records, comprised of Attributes, Aggregations	
<u>Foundation</u> Technical Infrastructure	HIT Standards and Technology Experts	<u>Standards & Services</u> Privacy, Security, Record Transactional and Persistence	Standards, Services and Applied Technology

6 – Next Steps

Realization

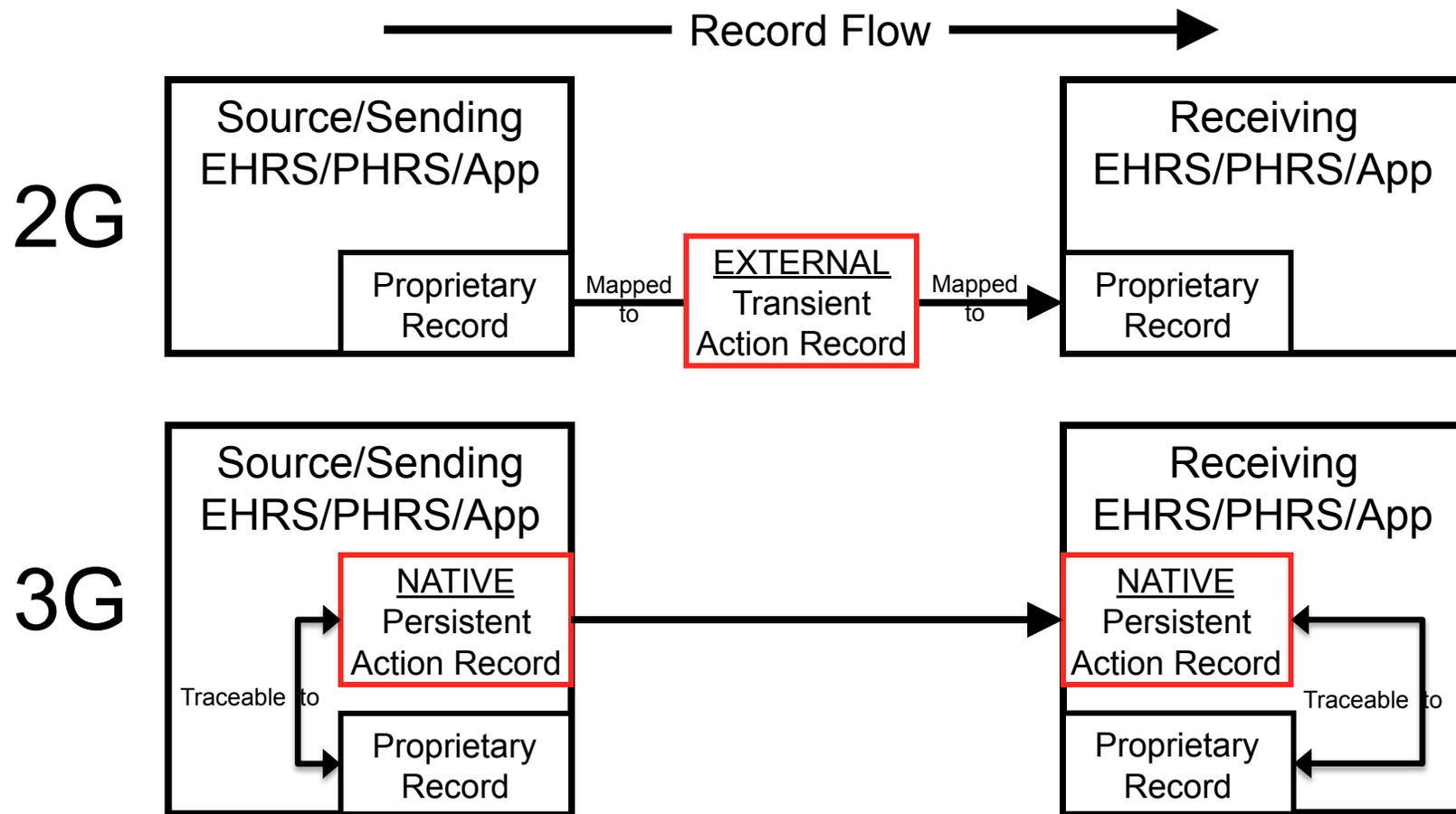
- US Health Informatics Technology Standards Panel
 - Reduce 26 “Tiger Team Capabilities” to One (or small handful)?
- US HIT Standards Committee – Key Recommendation
 - 2013 Target – Structured Content, Single Container for Exchange
- Recommendation of Joint Interoperability Council (JIC) Co-Chairs
 - Submit New Work Item Proposal to ISO TC215 WGs 1 & 8
- Health Level Seven
 - Harmonize with Enterprise Architectural Framework (formerly SAEAF)
- Establish Key Open Public and Harmonized Component Libraries
 - Process: Use Case, Action
 - Information: Action Record, Attribute Aggregation, Attribute
- Establish Use Case Developer’s Toolkit, including record generator
- Identify Core Services Suite: Persistence and Transactional
- Invite Stakeholders to specify process and information requirements
 - In the form of Use Cases, Actions, Attributes, Aggregations

6 – Next Steps – Transition

1st, 2nd, 3rd Generation

	1G 80s to Now	2G Next	3G Goal
Action Record	None	<u>External to System architecture</u>	<u>Native to System architecture</u>
Interchange Scheme	Point to Point Often Customized	Point to Point: Back-end to Back-end	End to End: Front-end to Front-end
	Transient Artifacts (e.g., messages)	Transient Action Records	Persistent Action Records
Record originated at System	<u>Back-end interface, ready to transmit</u>	<u>Back-end interface, ready to transmit</u>	<u>Front-end</u> – 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

6 – Next Steps – Transition External to Native



6 – Next Steps – Transition

Record Flow Example

	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 ●	Standard Action Record	Standard Action Record	Proprietary ●	Proprietary ●
2G→3G	Proprietary ●	Proprietary ●	Standard Action Record	Standard Action Record	Standard Action Record	Standard Action Record
3G→2G	Standard Action Record	Standard Action Record	Standard Action Record	Standard Action Record	Proprietary ●	Proprietary ●
3G	Standard Action Record	Standard Action Record	Standard Action Record	Standard Action Record	Standard Action Record	Standard Action Record

6 – Next Steps

Venues of Engagement

- US
 - National eHealth Collaborative (March 2009)
 - Health Record Banking Alliance (March 2009)
 - HHS HIT Standards Committee (Now)
 - ANSI HIT Standards Panel (Now)
 - National Institute for Standards and Technology (Now)
 - Health Level Seven (HL7) – Architectural Review Board, Technical Steering Committee, EHR, EHR Interoperability Structured Documents Work Groups (Now)
- International
 - Joint Initiative Council: ISO TC215, CEN TC251, HL7, CDISC, IHTSDO
 - ISO TC215 WG1/WG2/WG8 – New Work Item Proposal (Now)
 - European Commission Mandate 403 on eHealth Interoperability (In Discussion)
 - UK National Health Service – Connecting for Health (In Discussion)
 - Canadian Health Infoway (In Discussion)
 - Other Expressed Interests: Australia, Brazil, France

Conclusion

This Proposal...

- Supports safe, efficient, effective and cost-constrained healthcare through efficient and effective engagement of EHR/HIT standards
 - Simple, common, uniform, broadly applicable
- Promotes convergence
 - Of EHR/HIT standards to a small core set
 - At the juncture of healthcare (process) and evidence of its delivery (information)
- Promotes commoditization and encourages widespread re-use
 - Of Process and Information components
- Establishes a few simple conventions – broadly applied
 - Correlation of Health, Healthcare and Health Information
 - Convergence of Process and Information: Common unit of service (Action) evidenced by Common unit of record (Action Record)
 - Common HIT/EHR information currency (Action Record) for health and healthcare
- Logically extends scope of EHR interoperability and record fidelity
 - From instant of interchange (point to point with transient artifacts)
 - To full record lifespan (end-to-end persistent health records)

Conclusion, con't

This Proposal...

- Establishes uniform standards foundation for
 - Origination, amendment, retention, interchange, access/use & protection of health records
- Enables robust end-to-end health record management
- Relies on a small set of Core Services – many already in place
- Offers Use Case developer's toolkit – making easy to build, use & re-use
 - One-stop self-service Value/Use Case specification
 - Auto-generated data containers – standards-based, ready to implement
- With Toolkit, allows clinical and business experts to elaborate own process and information requirements
 - Without protracted standards deliberation/debate and distractive technical babble
- Offers swift path to end-to-end semantic interoperability of health records
- Allows build out of dozens and 100s of Use Cases THIS YEAR
 - At a pace compatible with industry needs and rate of adoption
 - Basic process/information specification & re-use pattern applied iteratively