ONC/AHIC/HITSP Use Cases

Part 1: Alignment with HL7 EHR/PHR Models

Part 2: Forward Strategy

HL7 EHR Technical Committee

2 June 2008

Presentation Overview

Part 2: A Forward Strategy

- Describes:
  - Premises and objectives
  - Health(care) Actions and corresponding Action Records
  - Common EHR record unit, common currency for health records and information
  - Consumer empowerment, engagement
    - Engaged, Participatory
    - Control of Personal Record Access and Use

Presentation Overview

Part 2: A Forward Strategy, con't

- Describes:
  - EHR Interoperability Requirements satisfied by a specific Implementation Strategy
    - HL7 Clinical Document Architecture Release 2
  - End-to-End Trust Framework w/Traceability
    - Point of Record Origination to each ultimate Point of Record Access/Use
    - Across one or more Points of Retention and/or Interchange
  - Strategy for simplification and acceleration
    - Building Uniformity
    - Engaging Clinical, Business and HIT Experts

The Premise and
A Simple Objective

A Simple Objective

Premises

- Patient Privacy and Confidentiality of Patient Health Records are Paramount
  - Record subject controls access, use and disclosure - within legal bounds
- Health Records provide persistent, indelible evidence of Actions taken in health(care)
- Health Record Authors and Users are accountable for their specific Actions

A Simple Objective

Premises, con't

- Health Records must be protected by an End-to-End Trust Framework
  - Traceable from Point of Record Origination to each Point of Record Access/Use
- Health Records must be interoperable between and amongst EHR and PHR Systems
- Health Records must be interoperable across, and neutral to:
  - Software products and architectures, technologies
  - Networks

A Simple Objective

Premises, con't

- Health Records are the immediate record (documentation) of health(care) and are
  - Integral to work flow and
  - Concurrent to clinical practice
- Health(care) occurs at points along a time continuum
- Health Records document (evidence) health(care) along the same time continuum

A Simple Objective

Ready Adoption

- Facilitate Adoption
  - Make it technology, vendor and product neutral
  - Make it easy to understand
  - Make it easy to implement by small and large alike
  - Make it easy to bring to market
  - Make it applicable to US and international alike
- Simplification Drives Adoption

A Simple Objective

Common EHR Currency

- Establish common EHR Currency
  - A common EHR unit of record
- Simplify retention, interchange and protection to a simple common record unit
  - Not 100s of proprietary and pseudo standard formats
  - Not 1000s of message variants (see HL7 v2/v3)
- Simplify interchange triggers to key EHR lifecycle events
  - 10 or 15 record-related trigger events
  - Not 1000s of trigger event variants (see HL7 v2/v3)

A Simple Objective

Trust Protections

- Embed Health Record trust protections, ensuring accountability and traceability
  - Consent-based use and disclosure
  - Source System and Author authentication
    - w/Digital Signature
  - Content authentication: original, amended, current
  - Access control: to Access/View Record, to Amend Record
  - Traceable Record Audit Trail encompassing:
    - Amendments, Revision History
    - End-to-End Flow and Custody
    - Lifecycle Events: originate, verify, amend, access/view, transmit/ disclose, receive, de-identify/alias, archive...
  - Attestation of Record Accuracy and Completeness

A Simple Objective

In the HITSP Context

- Be Reproducible, Applicable to all Use Cases
  - 1-day Target: Use Case narrative to complete interoperability specification in one day
- Ensure Foundational Infrastructure for all HITSP Interoperability Specifications
  - Focused on Greatest Common Denominator
  - Ensuring Common (Simple) Core
  - Extended only in the exception
    - When necessary to incorporate isolated use case requirements

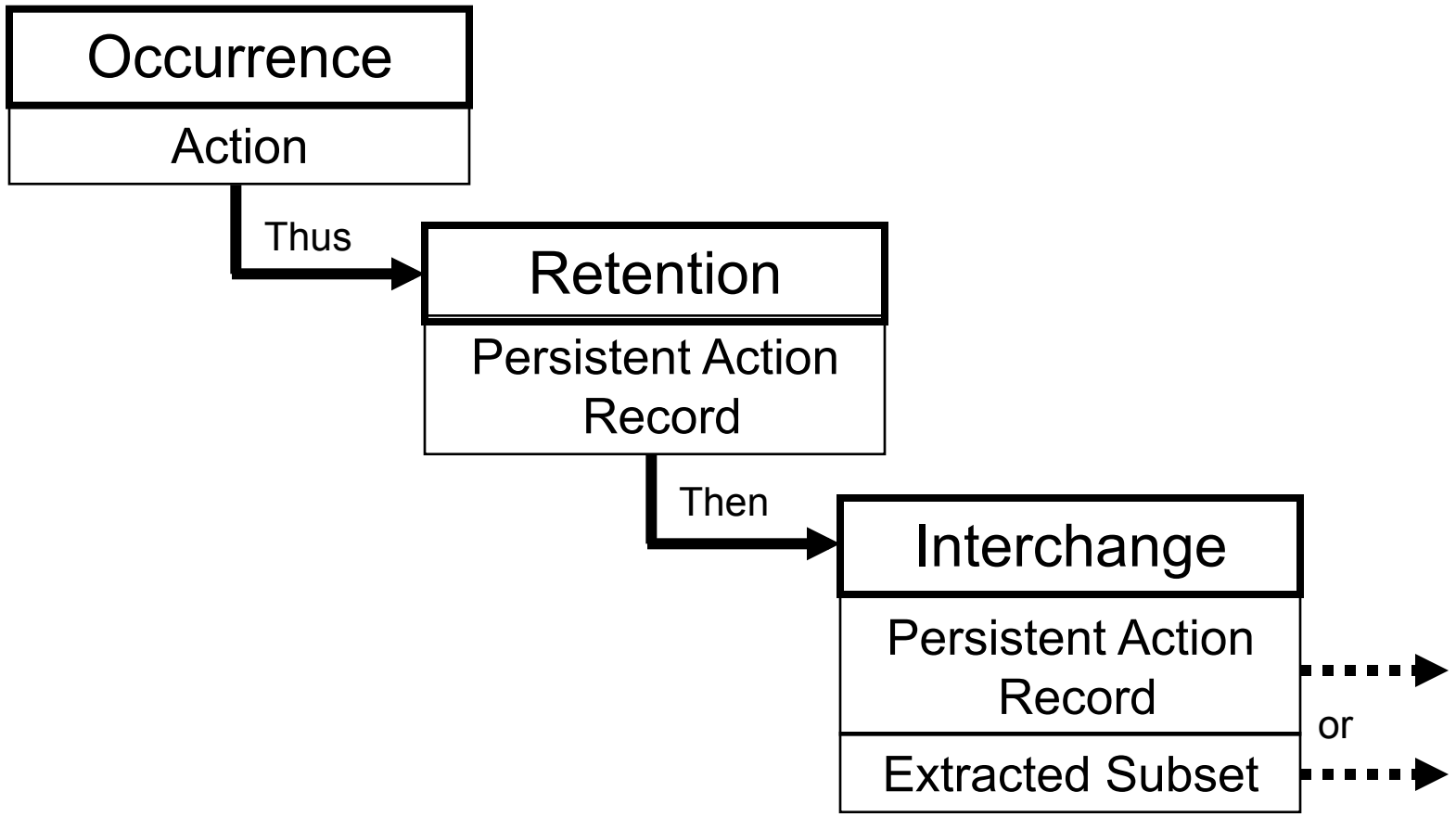
A Paradigm for Accountability
The Action + Action Record

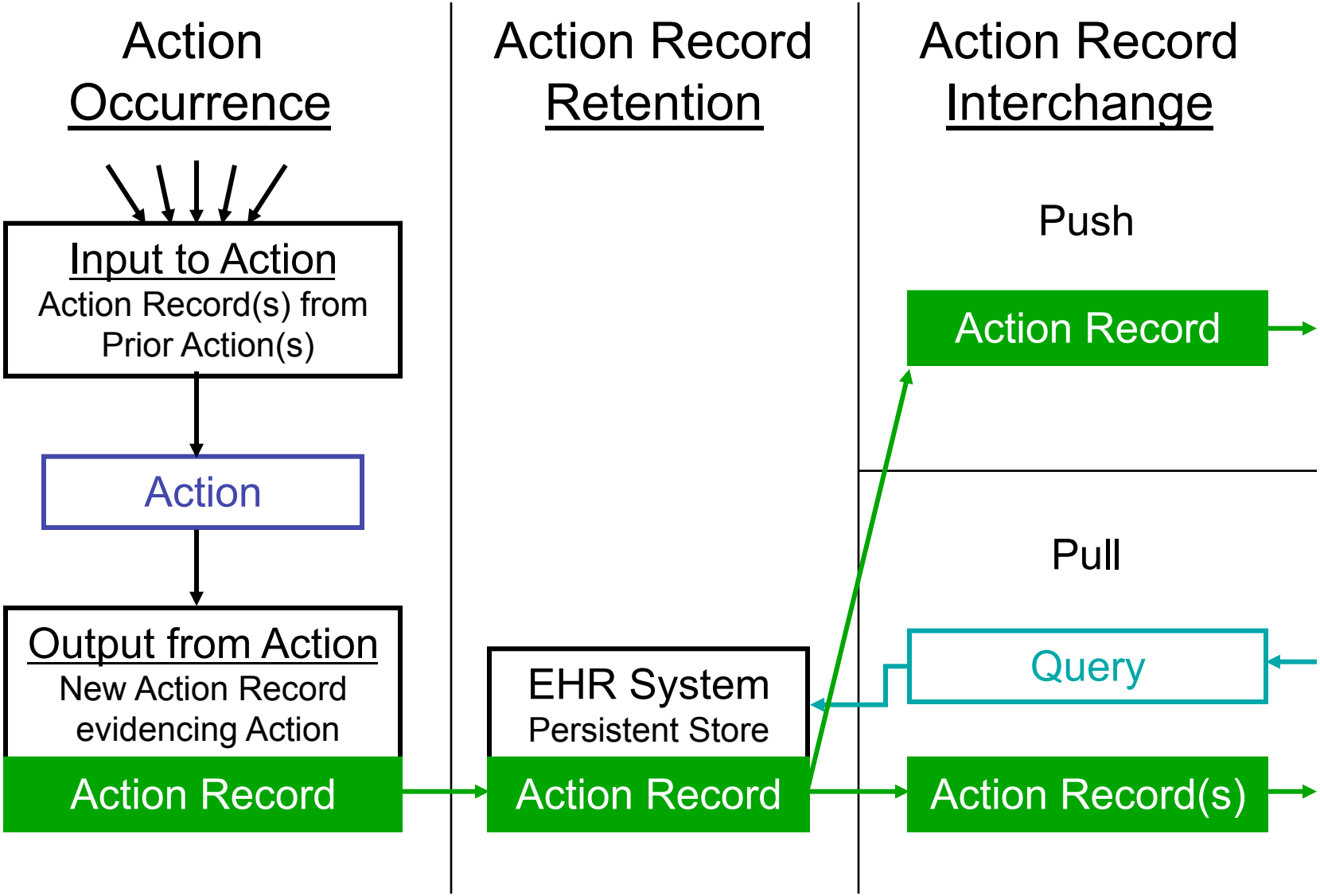
Simple Paradigm

- Start with a discrete unit of service
  - Action
- Establish a corresponding EHR unit of record
  - Action Record
- Persist in EHR
  - Action Records = persistent entries in EHR

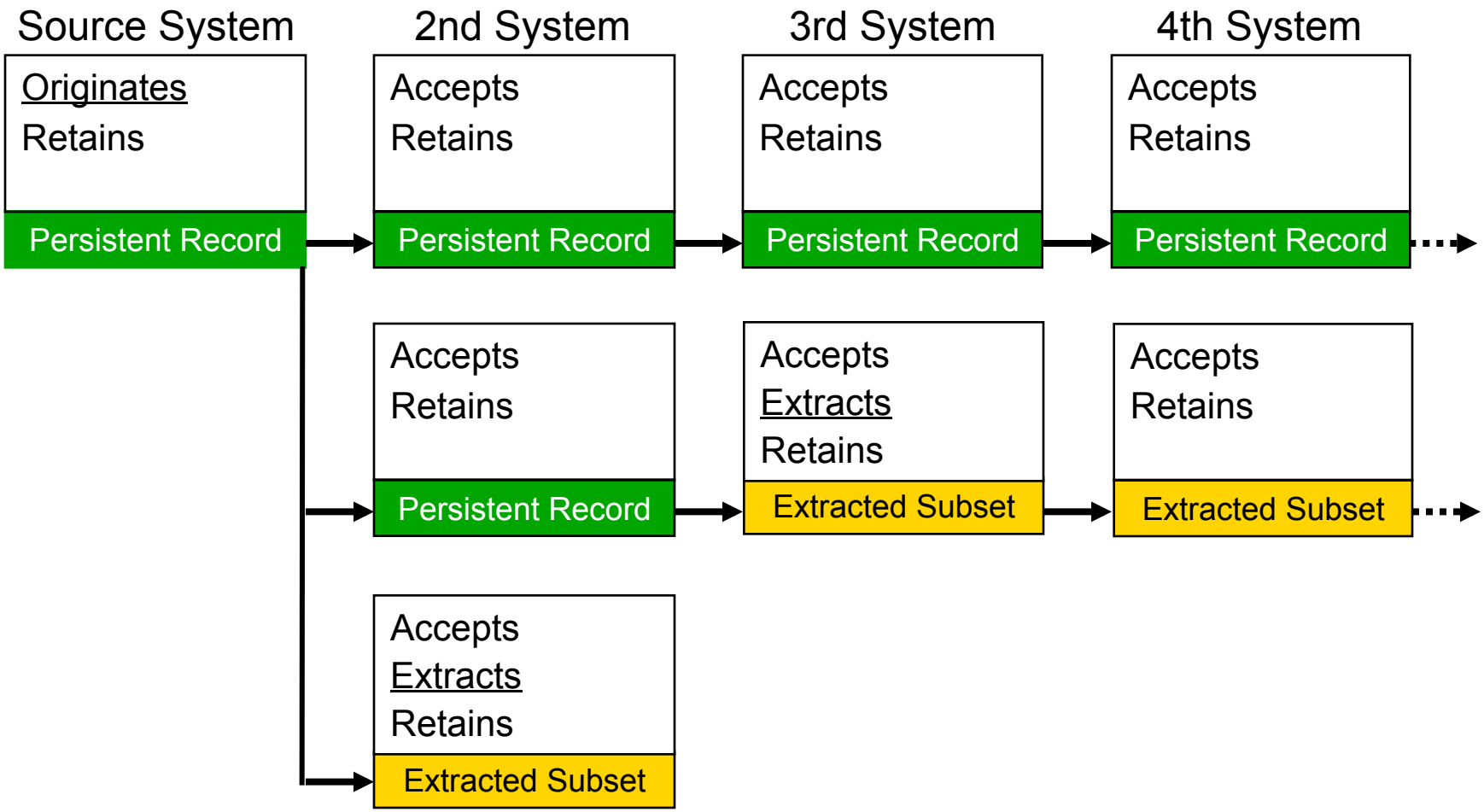
EHR Interoperability Fundamentals

Occurrence/Retention/Interchange




Action Occurrence
Action Record Retention
Action Record Interchange
Input to Action
Action Record(s) from Prior Action(s)
Action
Output from Action
New Action Record evidencing Action
Action Record
EHR System
Persistent Store
Action Record
Push
Action Record
Pull
Query
Action Record(s)

Example Interchange Pattern
Persistent Records and Extracted Subsets



EHR Interoperability Fundamentals

Information in Action

- All health(care) information derives from, or is attributable to, a discrete Action
- The essential context of health(care) information is indivisible from its originating Action
  - Who, What, When, Where

Correlating Health(care) Delivery and the EHR...

Health(care) Delivery	**Interoperable EHR**
Comprised of discrete Actions	Comprised of persistent Action Records
Action Occurs →	Action is documented by an Action Record in EHR (as Persistent Evidence of Action Occurrence)
Actions have a chronology of occurrence	Action Records have a corresponding chronology
Actions are a common unit of service in health(care)	Action Records are a common unit of record of the EHR

Correlating Action with Action Record...

Action...	**Action Record...**
Occurs	Documents (evidences) Action occurrence
Has context • Who, What, When, Where	Documents Action context
Has facts • Current and historical	Documents Action facts
Has one or more Actor(s) in role(s) and participation(s) • Roles: physician, nurse, pharmacist, therapist, secretary... • Participations: perform, assist, observe, scribe...	Documents Actors, roles and participations

Correlating Action with Action Record (con't)...

Action...	**Action Record...**
Is complete	Documents Action completion
If accountable to a Provider...	• Is persistent evidence of Action occurrence • Is retained as a persistent EHR entry • May be attested as accurate and/or complete
If consumer initiated...	• May be retained as PHR (or EHR) entry - or not

Correlating Action with Action Record (con't)...

Action...	**Action Record...**
• Is an instance: i.e., a discrete act, task or event • Is (often) an instance of care or service provided or performed	• Is a record instance
• Is a common convention to describe acts, tasks or events occurring in health(care)	• Is a common currency for health(care) information – Spanning origination, retention, interchange and use • Is a common unit of record • Is a persistent entry in the EHR

Correlating Action with Action Record (con't)...

Action...	**Action Record...**
Is (typically) confidential	• Is a protected unit of record • May be encrypted e.g., while "in transit" • May have embedded access controls • Is auditable as to amendment history • May be auditable as to access, "chain of trust" and custody • May be de-identified or aliased

Sample Actions...

- Register Patient
- Admit, transfer or discharge Patient
- Patient Care
  - Examine, assess, observe
  - Plan care & set goals
  - Update problem list
  - Order diagnostics, medications or therapies
  - Provide care
  - Perform therapy or procedure
  - Administer medications
  - Provide nutrition
- Medications
  - Check allergies, interactions
  - Dispense, label
  - Renew, refill
- Specimens
  - Collect, label
  - Accession
  - Analyze, report results
- Schedule exam or appointment
- Refer Patient
- Transport Patient
- Consult w/examination

Sample Actions, con't...

- Remind of:
  - Scheduled appointments
  - Periodic screening due
  - Immunizations due
- Notify Public Health Agency
  - Forward de-identified records
- Create Summary Record
  - e.g., CCR, CCD
- Forward Record(s) to PHR on behalf of Patient
- Perform epidemiological surveys
- Create acuity report
- Create staffing summary
- Create bed census
- Extract, report quality indicators
- Test, calibrate instrument
- Repair equipment
- Perform safety and emergency drills
- and many more...

Quick Review

Each (accountable)

Action instance

Has a corresponding (persistent)

Action Record instance

From Requirements to Implementation

HL7 Clinical Document Architecture

Reference Profile for EHR Interoperability

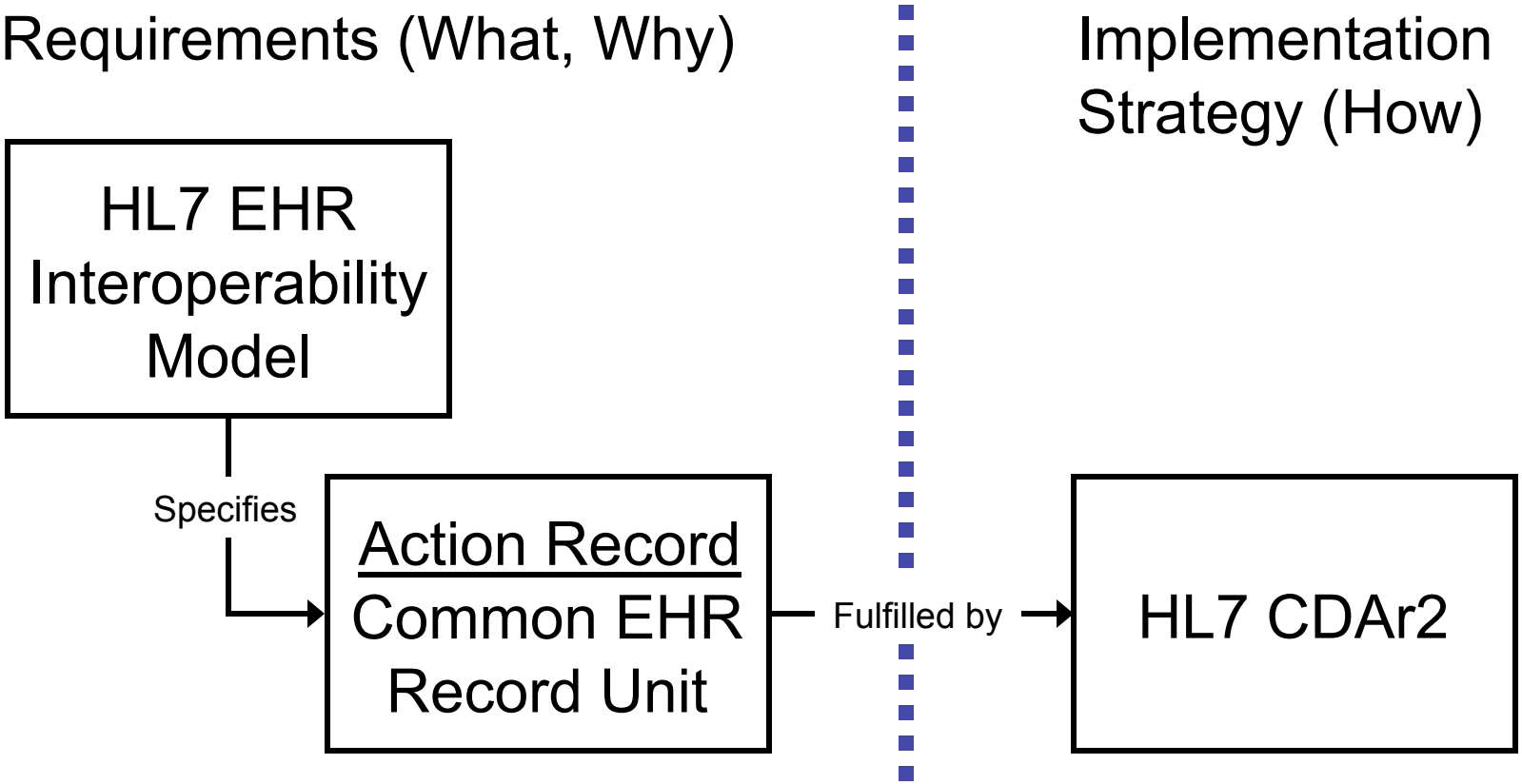
CDAr2 Re-Purposed for EHR Interoperability

Implementable Profile

- Profile of HL7 EHR Interoperability Model
  - Passed Ballot as Draft Standard - January 2008
  - Published - April 2008
  - Shows how HL7 Clinical Document Architecture, Release 2 (CDAr2) fulfills EHR Interoperability requirements
    - 51 of 56 Action Record (common record unit) requirements currently satisfied by CDAr2 attributes
  - Re-purposes CDAr2 from its exclusive document focus to implement persistent EHR Action Record

CDAr2 Re-Purposed for EHR Interoperability

Requirements Satisfied



CDAr2 Re-Purposed for EHR Interoperability

Why CDAr2?

- Mature, deployed standard
- Included in many HITSP Interop Specs
- Proposed for HIPAA Claims Attachments
- Incorporated in IHE XDS/XDR strategy
- Almost perfect fit for EHR Common Record Unit (Action Record) requirements
- Designed as persistent instance
- Ideal persistent object of SOA exchange
- Robust successor to transient message schemes

CDAr2 Re-Purposed for EHR Interoperability

Trust Protections

Privacy/Confidentiality Protection	CDAr2 Profile
Consent-based use and disclosure	In development
Source System and Author authentication ▪ w/Digital Signature	Included
Content authentication: original, amended, current	Included
Access control ▪ To Access/View Record, to Amend Record	Confidentiality Code (now) Discrete Attributes (future)
Traceable Record Audit Trail encompassing: ▪ Amendments, Revision History ▪ End-to-End Flow and Custody ▪ Lifecycle Events: originate, verify, amend, access/ view, transmit/disclose, receive, de-identify/alias, archive...	▪ Included ▪ In development ▪ Some included, some in development
Attestation of Record Accuracy and Completeness	Included

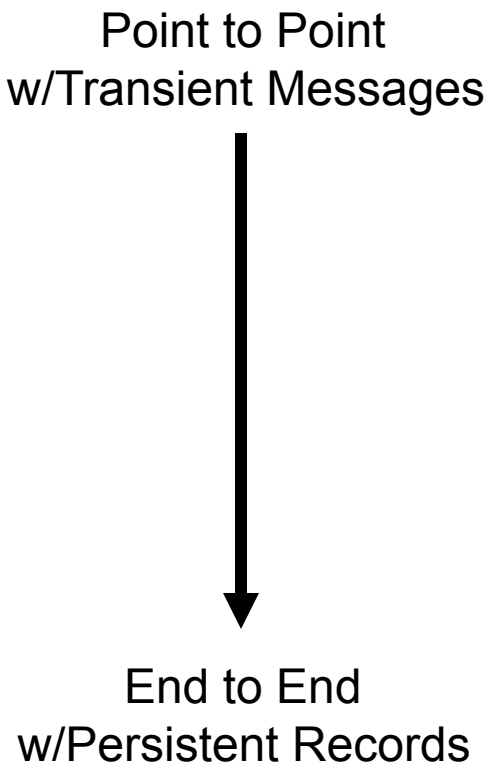
A Forward Strategy

Generations

1G - 1980s to Now

2G - Next (transitional)

3G - Goal



1G - 80s to Now	2G - Next	3G - Goal
	Action Record external to System architecture	Action Record native to System architecture
Customized Point to Point	Uniform (Back) End-to-End	Uniform (Front) End-to-End
Transient Messages • Originated at System back-end interface, ready to transmit	Persistent Action Records • Originated at System back-end interface, ready to transmit • Digitally signed by System • Authenticate-able (traceable) to Originating System	Persistent Action Records • Originated at System front-end (often at point of care/service) • Digitally signed by Author and System • Authenticate-able (traceable) to Originating System and Author

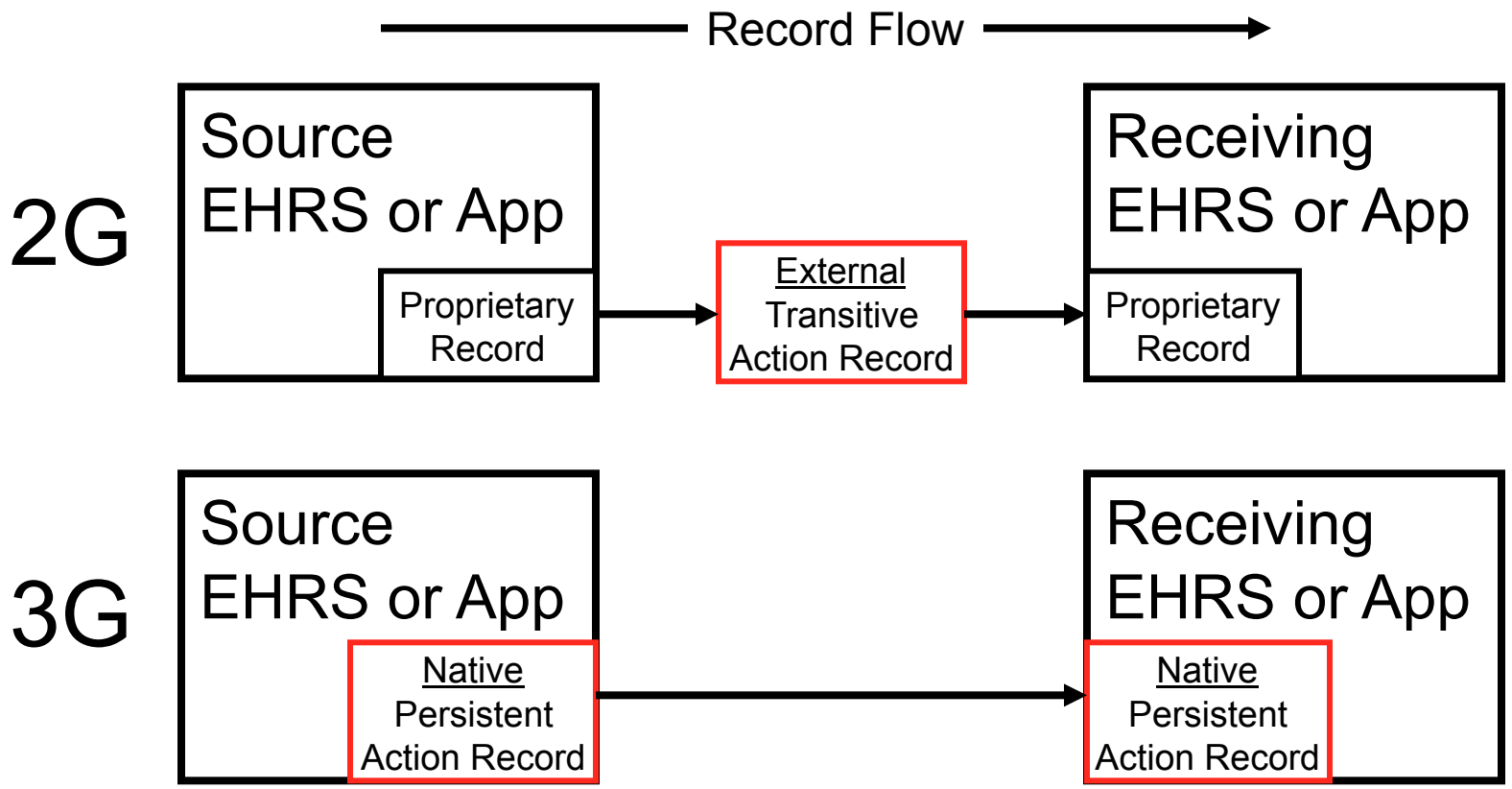
Health Information Capture, Retention and Exchange

The Transition Forward

1G - 80s to Now	2G	3G - Goal
Transitive, Volatile, Lossy	→	Persistent, Indelible, Lossless
Incomplete	→	Complete, As Originated
Piecemealed, Fragmentary	→	Whole, Uniform
Divergent Implementations	→	Common Currency, Consistent Exchange

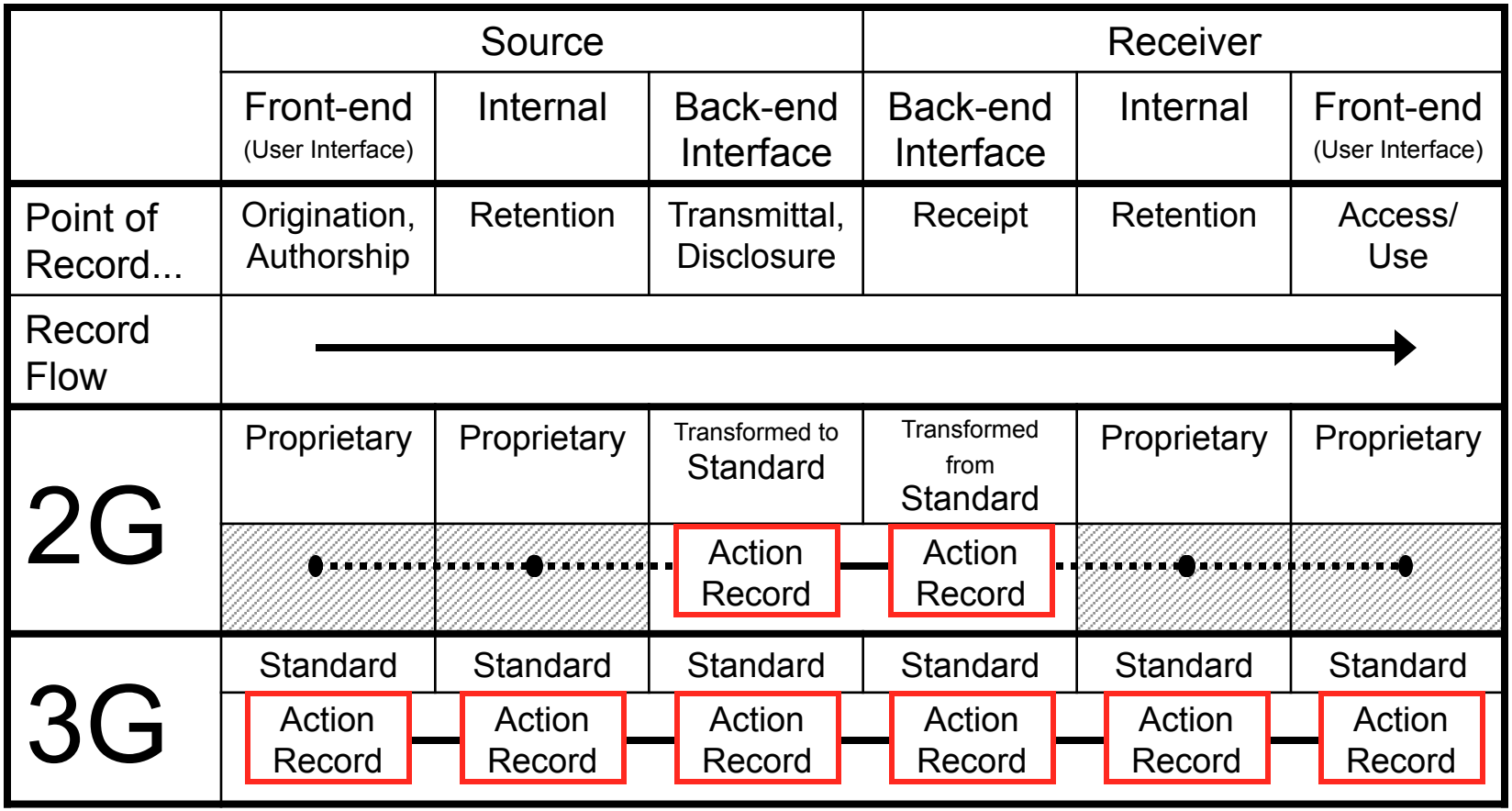
Transition Strategy

External to Native



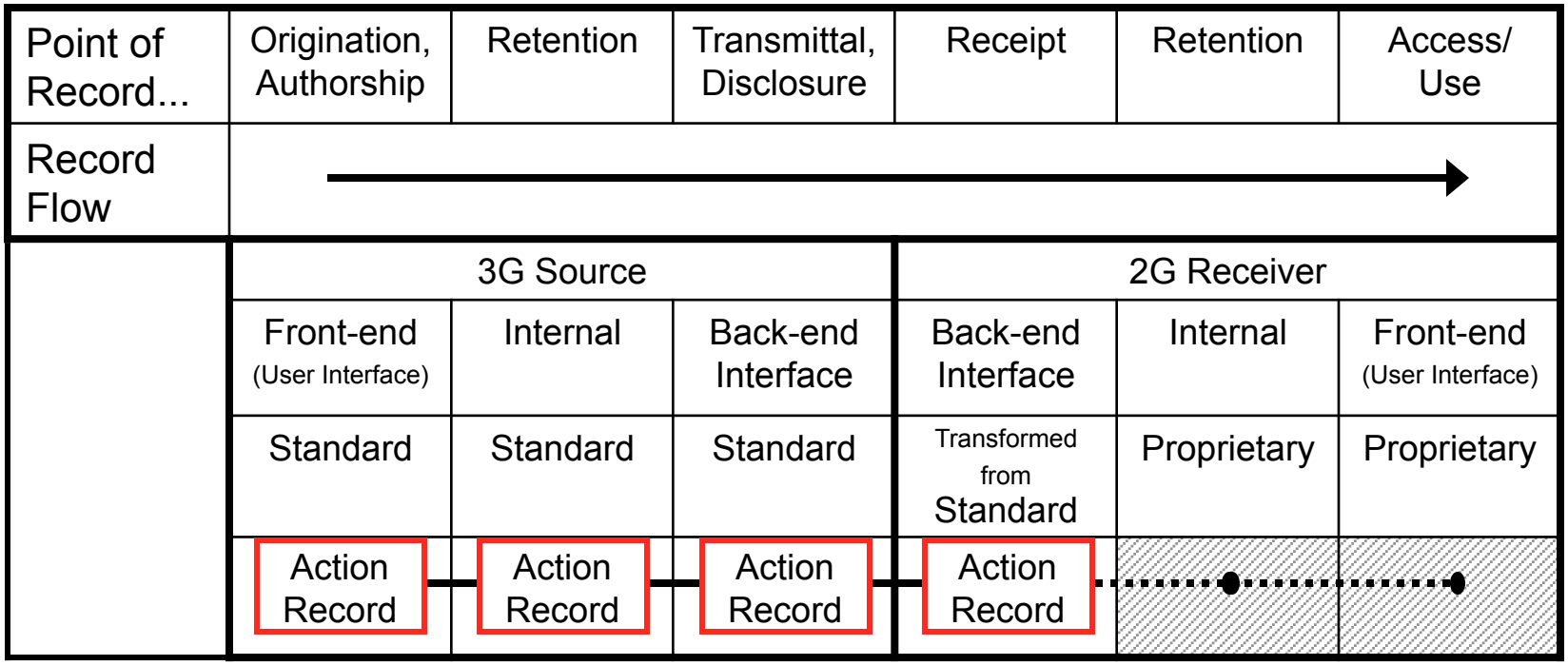
Transition Strategy

Record Flow



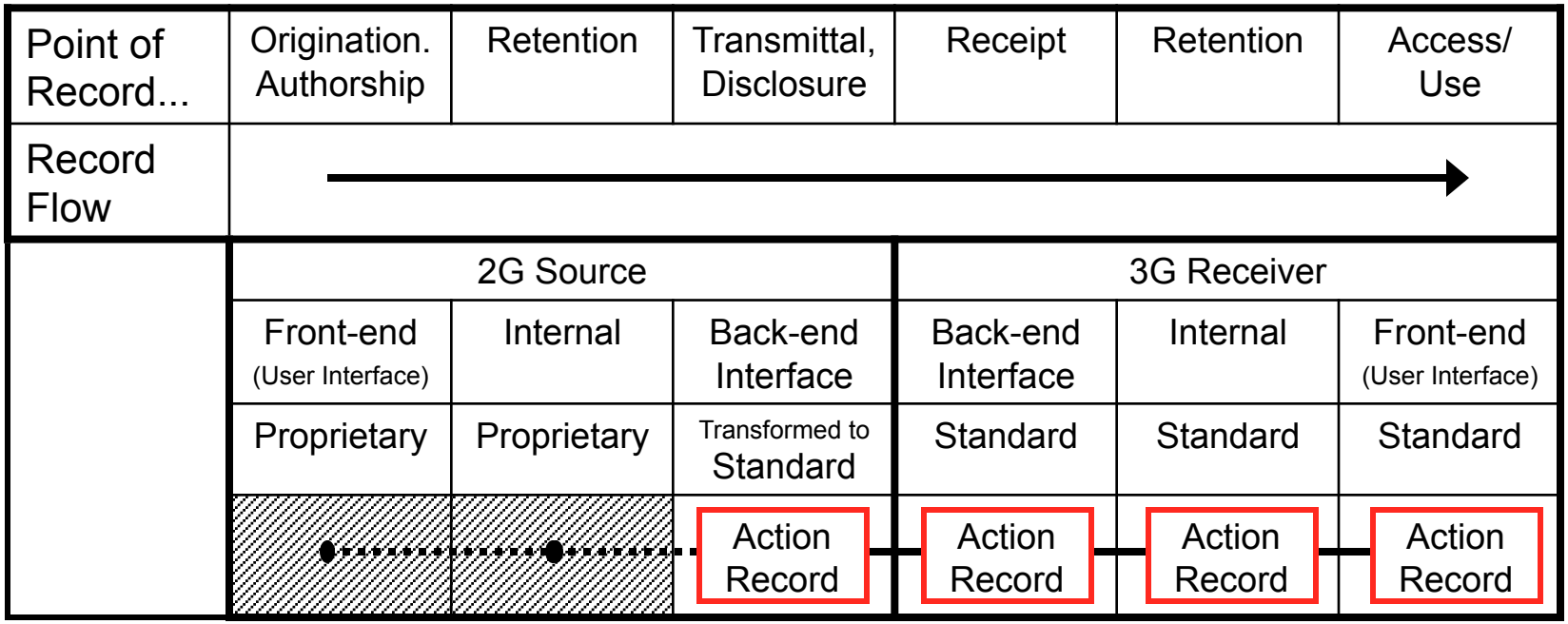
Transition Strategy

3G to 2G Record Flow



Transition Strategy

2G to 3G Record Flow



Action Record...	2G	3G
Is uniquely identifiable, as to: • Record Subject • Action	At point of record transmittal: • Asserted by System • Digitally signed by System	At point of record origination: • Captured in native Action Record • Digitally signed by Author and System
Has a context: • Who - Record Subject • Who - Record Author • Who - Action Participants • What - Action • When - Date, Time, Duration • Where - Location		
Is persistent As EHR entry	N/A	Yes, as native Unit of Record (Action Record)

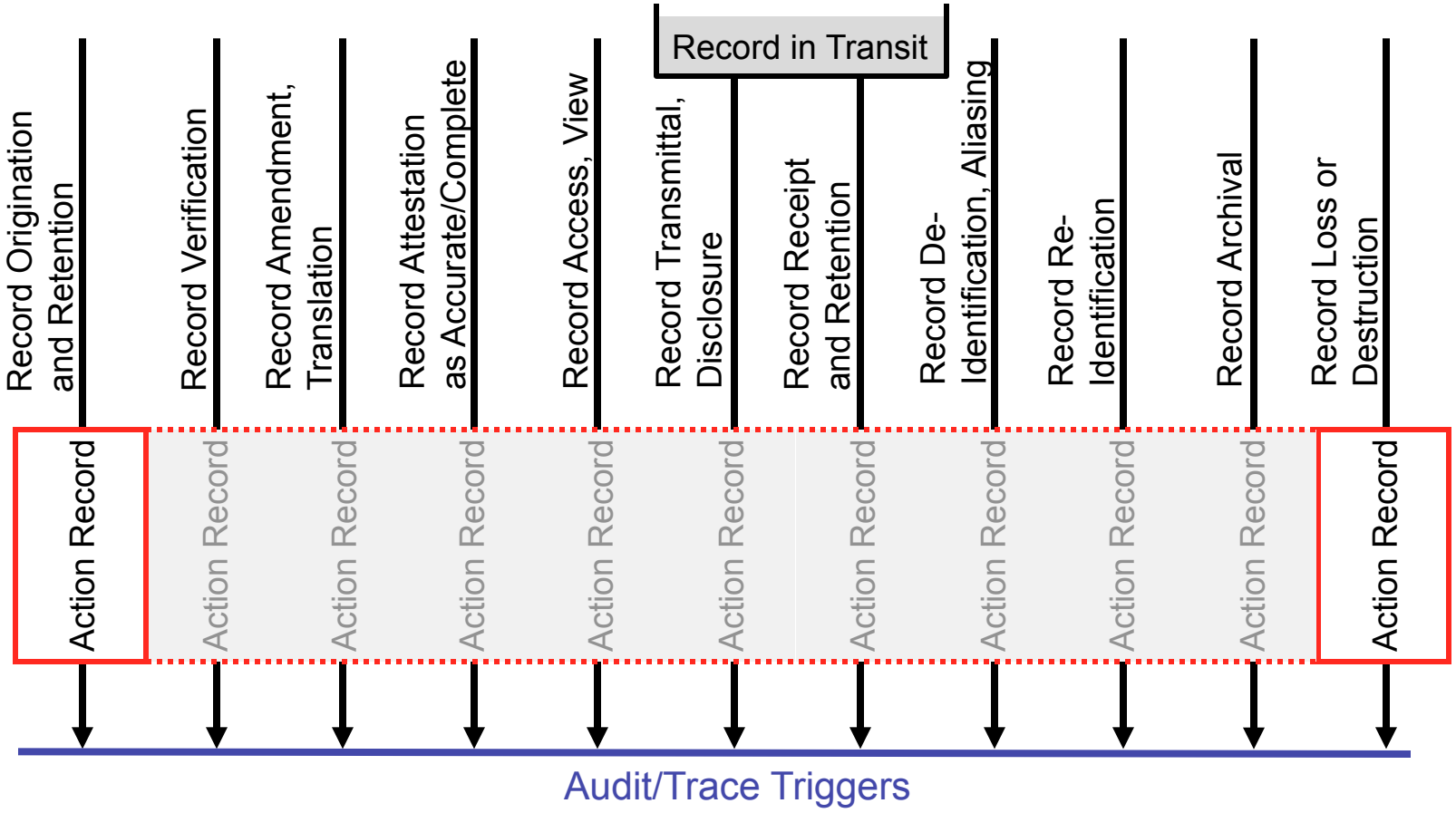
Action Record...	2G	3G
Is indelible	From point of originating System digital signature on	From point of originating Author's digital signature on
May be accessed or viewed: e.g., to recall Action context + facts	No (interface artifact only)	Yes, as native Unit of Record (Action Record)
Is authenticated	At point of original record transmittal, by System	At point of record origination, by Author
Is authenticate-able, as to source and author • By any record recipient, downstream from point of origination	Yes, to Originating System	Yes, to Originating Author and System

Action Record...	2G	3G
Is accessible, based on access control rules: • Record access/view • Record amendment	As asserted by Originating System Based on: • Established business rules • Patient/Consumer or Provider request May be: • Role based • Person or organization specific Coverage: • Confidentiality code, limiting access to whole record or section (see CDAr2 Reference Profile) • Fine grained, constraining access to specific record attributes	

Action Record...	2G	3G
May be attested as to accuracy	Asserted by System, based on algorithm	• Attested by Author, and/or • Asserted by System, based on algorithm
May be attested as to completeness		
Incorporates audit/trace log, showing: • Amendments and revision history • "Chain of trust" and custody • Points in record lifecycle	Asserted by System at back-end record origination	Maintained and updated within native Action Record

Audit/Trace Triggers

EHR Record Lifecycle



EHR Interoperability

Building Uniformity

Aspect of Interoperability*	**What is it? Uniformity as Manifest by…**	**Specified as…**	**By Whom?**
Process	Full Integration of Tasks, Work Flows and Information/Record Flows	**Actions** incorporated in Use Cases	Clinical and Business Experts
Semantic	Meaning, Intent and Context Preserved in Persistent Records	**Action Records** with Attributes and Vocabulary	
Technical	Safe and Robust Record Origination, Retention & Interchange	Privacy, Security and Interchange Constructs	HIT Technology Experts

* Reference “Coming to Terms” White Paper

EHR Interoperability

Building Uniformity, con't

Based on national, regional or local requirements:

Construct	Comprising...	
Use Case	Actions	Set of Actions in Typical Sequence
Action		Action Descriptions
Action Record	Attributes	Set of Attributes Pertinent to discrete Action
Attribute (data element)		Attribute Descriptions, including: data type, format, vocabulary

EHR Interoperability

Building Uniformity, con't

Construct	Specified by...
Use Case	AHIC and others
Action	• Standards Developing Organizations • Accreditation and Governance Agencies • Providers • Health Plans • Professional Societies/Groups • Quality Improvement Groups • Public Health Agencies • and others
Action Record	
Attribute	

EHR Interoperability

Building Uniformity, con't

- Public Registries of:
  - Use Cases
  - Actions
  - Action Records
  - Attributes (e.g., USHIK)

HL7 EHR Technical Committee

References

- ONC/AHIC/HITSP Use Case Alignment with HL7 EHR/PHR Models
  - Chapter 1, Year 1 EHR/Lab Results Reporting Use Case
  - Chapter 2, Year 1 Consumer Empowerment/Demographics and Medication History
  - Chapter 3, Year 1 Population Health/Biosurveillance
- HL7 EHR System Functional Model
- HL7 PHR System Functional Model
- HL7 EHR Interoperability Model
- HL7 EHR Lifecycle Model
- HL7 Implementation Guide for CDA Release 2: Reference Profile for EHR Interoperability
- HL7 “Coming to Terms” White Paper
- HL7 EHR System - Records Management and Evidentiary Support Functional Profile

HL7 EHR Technical Committee

Resources

- EHR TC
  - http://www.hl7.org/ehr