



Project HealthDesign

Common Platform Components

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Project HealthDesign

Two inter-related tracks

1. Novel, innovative personal health applications (PHAs)
2. Common resources to facilitate development and maximize benefits of PHAs

Common Platform Vision

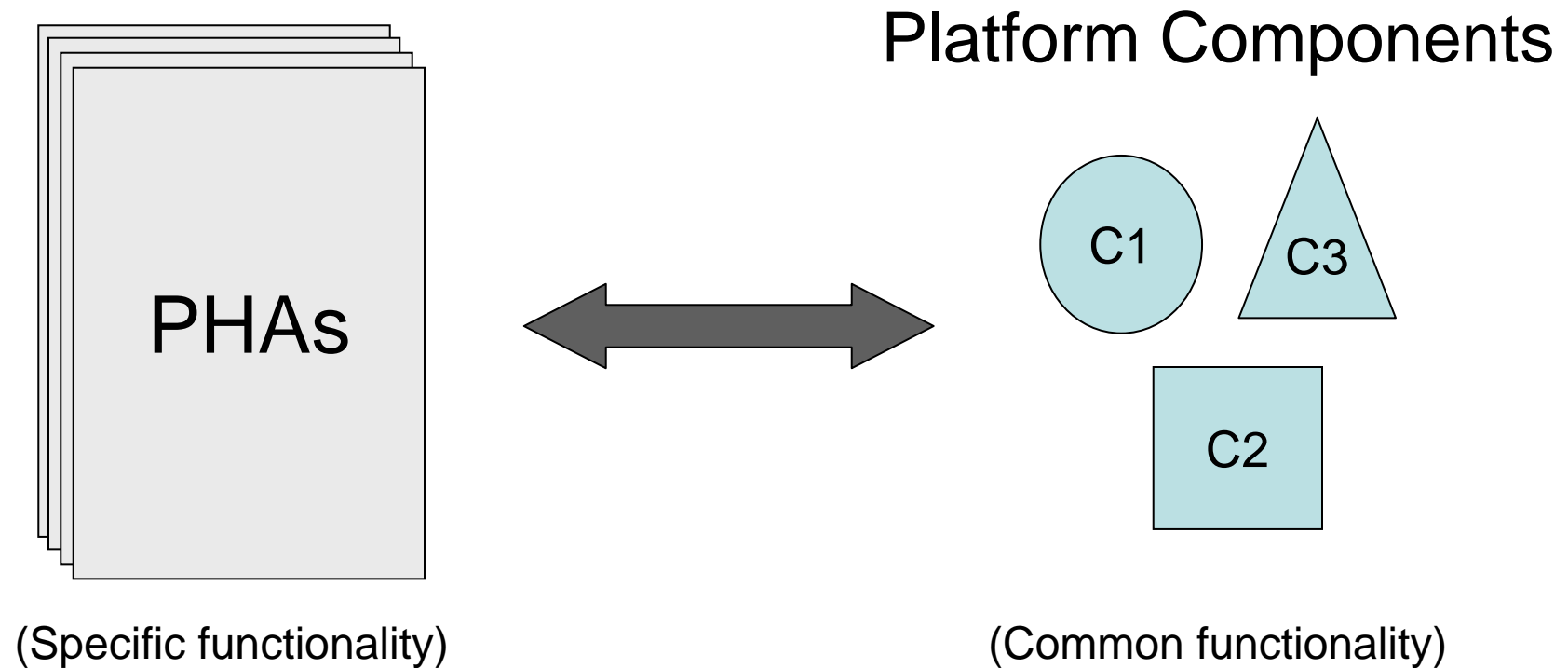
- 2006 Request for Proposals (RWJF)
 - What: “A common platform refers to a set of core data elements (e.g., medications, laboratory results...) and technical utilities (e.g., message handling and access controls) that can be used by multiple applications.”
 - So What: “Having a standards-based common platform that pairs application programming interfaces with a robust architecture could stimulate greater competition and innovation in the development and marketing of personal health applications, which could lead to a greater diversity of useful products and services.”

Premise

- Many different PHAs require similar components and resources, including:
 - Medication list management
 - Calendaring
 - Recording of observations at home
 - Safeguarding data
 - Authentication
 - Access control
 - Identity reconciliation

Implication

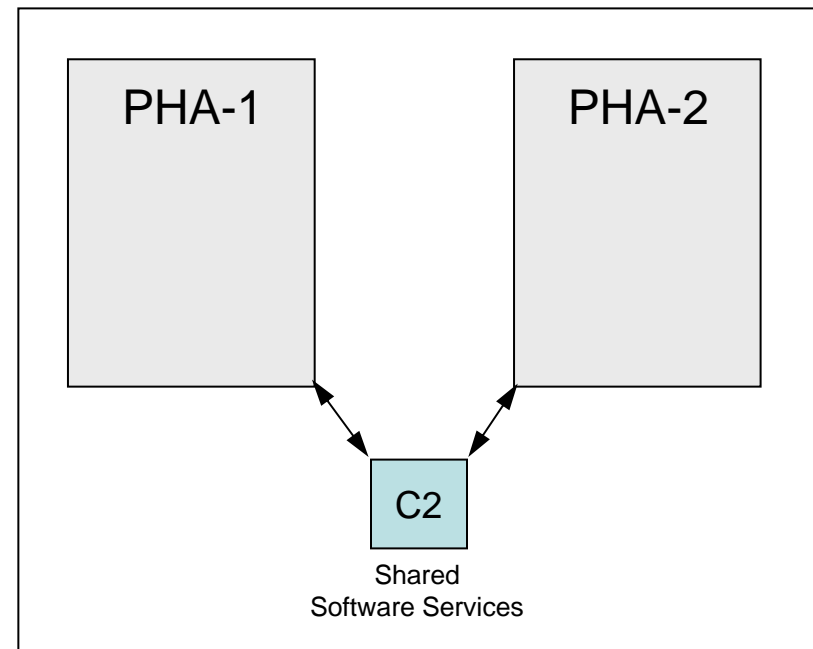
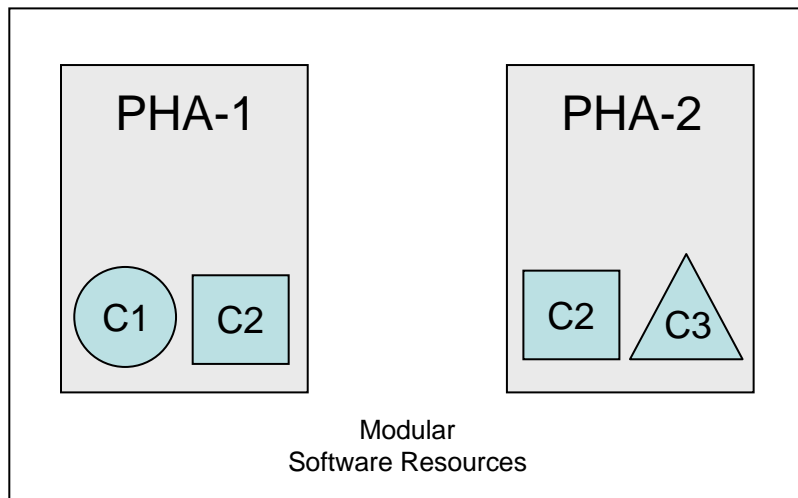
There is Value in Separating
PHAs from Platform Components



Goals of Common Platform Components

1. Facilitate development of PHAs through sharable, reusable resources

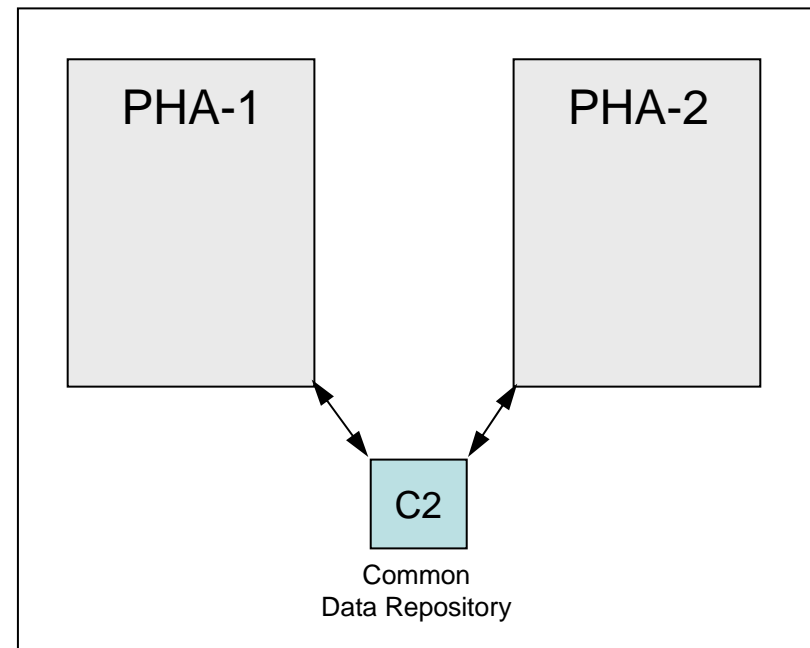
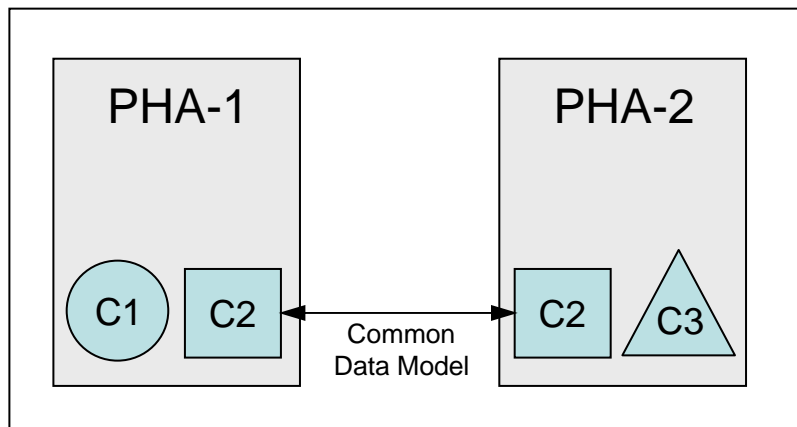
- Software components
- Appropriate data models
- Medical content



Goals of Common Platform Components

2. Promote interoperability among PHAs to Maximize value of data and services

- Modeling, messaging and terminology standards
- Shared data repositories



Design Philosophy

- The PHR / PHA concept is in its early development stages
- The role(s) of PHRs in the health care system are TBD
- The optimal / feasible / acceptable architecture(s) of PHRs are TBD
- So: The common platform components should accommodate various approaches

PHD Common Platform Work to Date

1. Functional requirements elicited from 9 PHD research grantees
 - Which common services are most useful?
 - What PHA functions should services support?
 - What functionality should services provide?
 - What scope and granularity of data should services manage?
 - Deliverable: Functional requirements for 4 components
 - www.projecthealthdesign.org/media/file/Common_Platform_Requirements.pdf

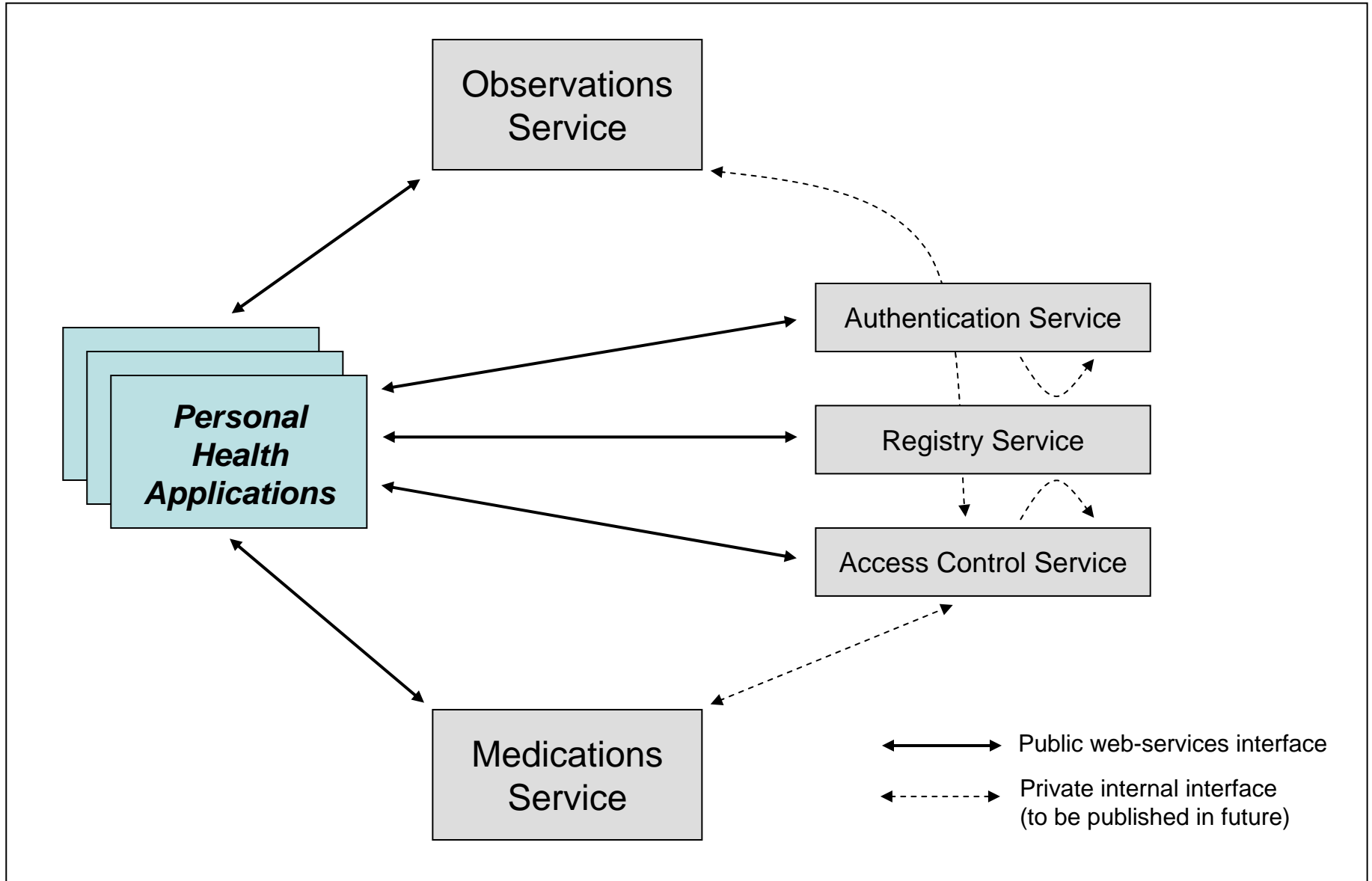
Common Platform Components

- A. Medication List Management
- B. Calendaring
- C. Observations captured in the course of daily living
 - Blood glucose, meals, exercise, self-reported signs/symptoms
- D. “Identity Management”
 - Authentication, registration, and access control

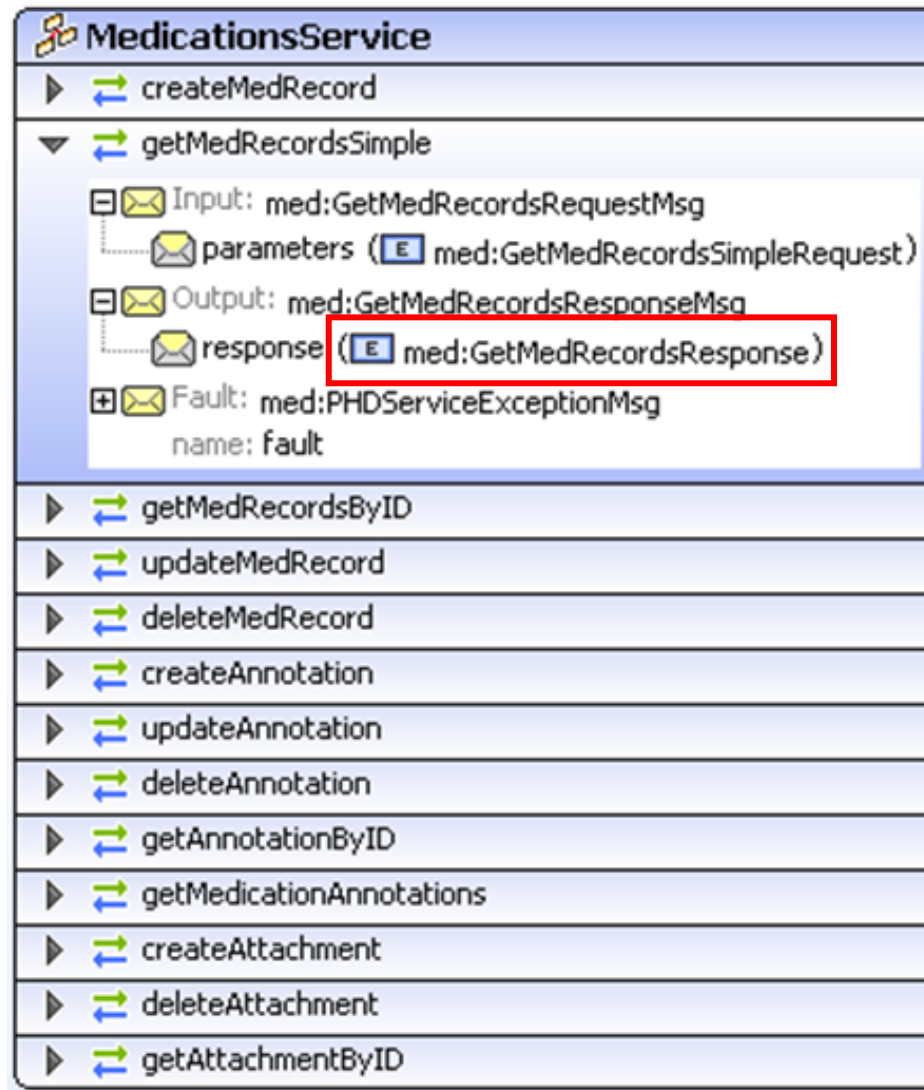
PHD Common Platform Work to Date (cont'd)

2. Web-services interface specifications for the components
 - What: APIs for programmatic access
 - How: Web Service Definition Language (WSDL)
 - Industry standard
 - Supported by many programming languages
 - Goal: Explore whether a flexible architecture can be developed, in which components could be “mixed and matched” as needed

PHD Common Platform Interfaces



WSDL Specifications: E.g., Medications Service



Example Data Type: GetMedRecordsResponse

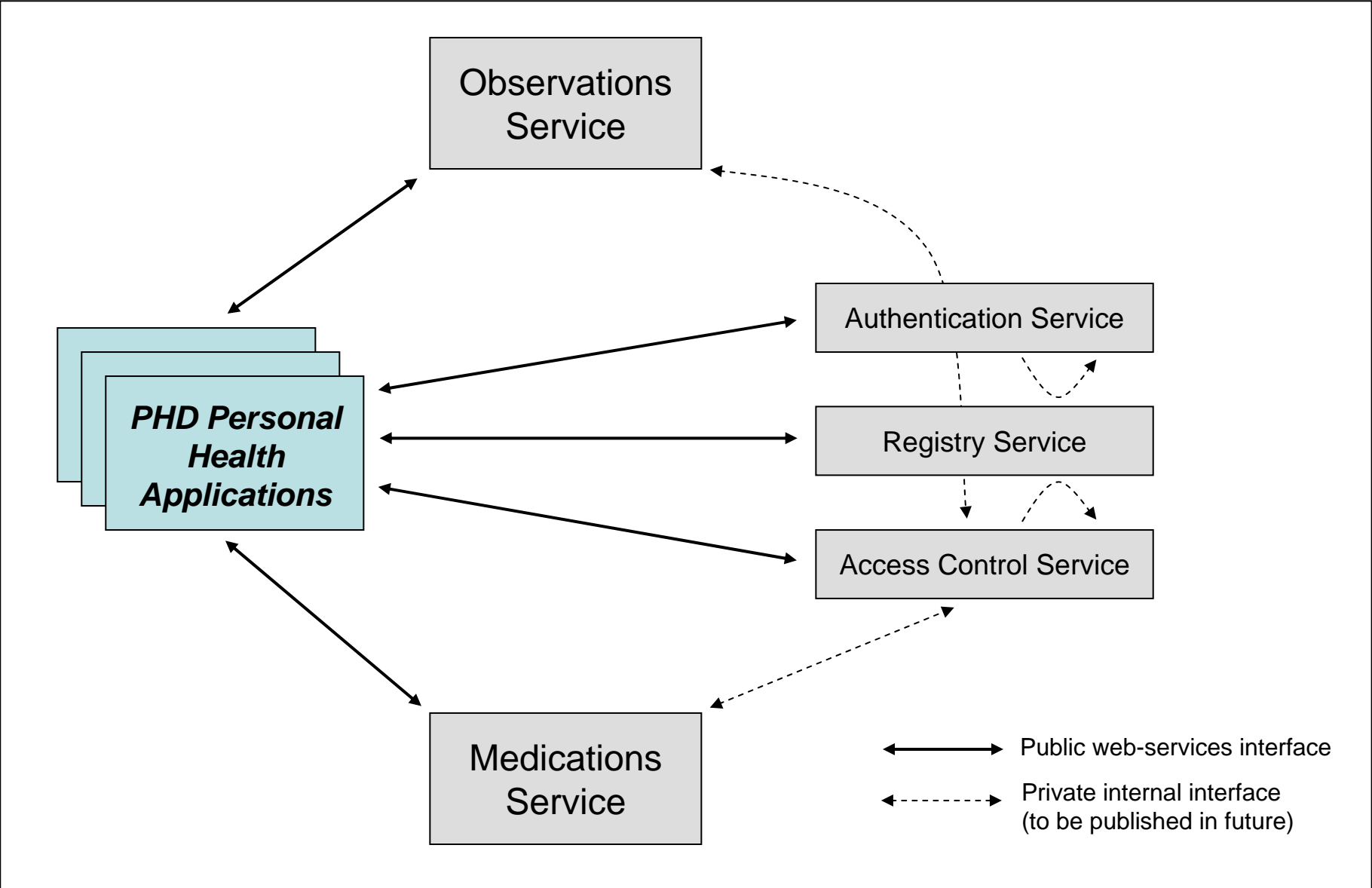


PHD Common Platform Work to Date (cont'd)

3. Prototype implementation of components

- Centrally hosted web services that are accessible over the internet via the WSDL APIs
- Made available to 9 PHD grantees for testing / integration
- [Calendar component was not implemented]
- Goal: evaluate the functional requirements and technical specifications in practice (test bed)

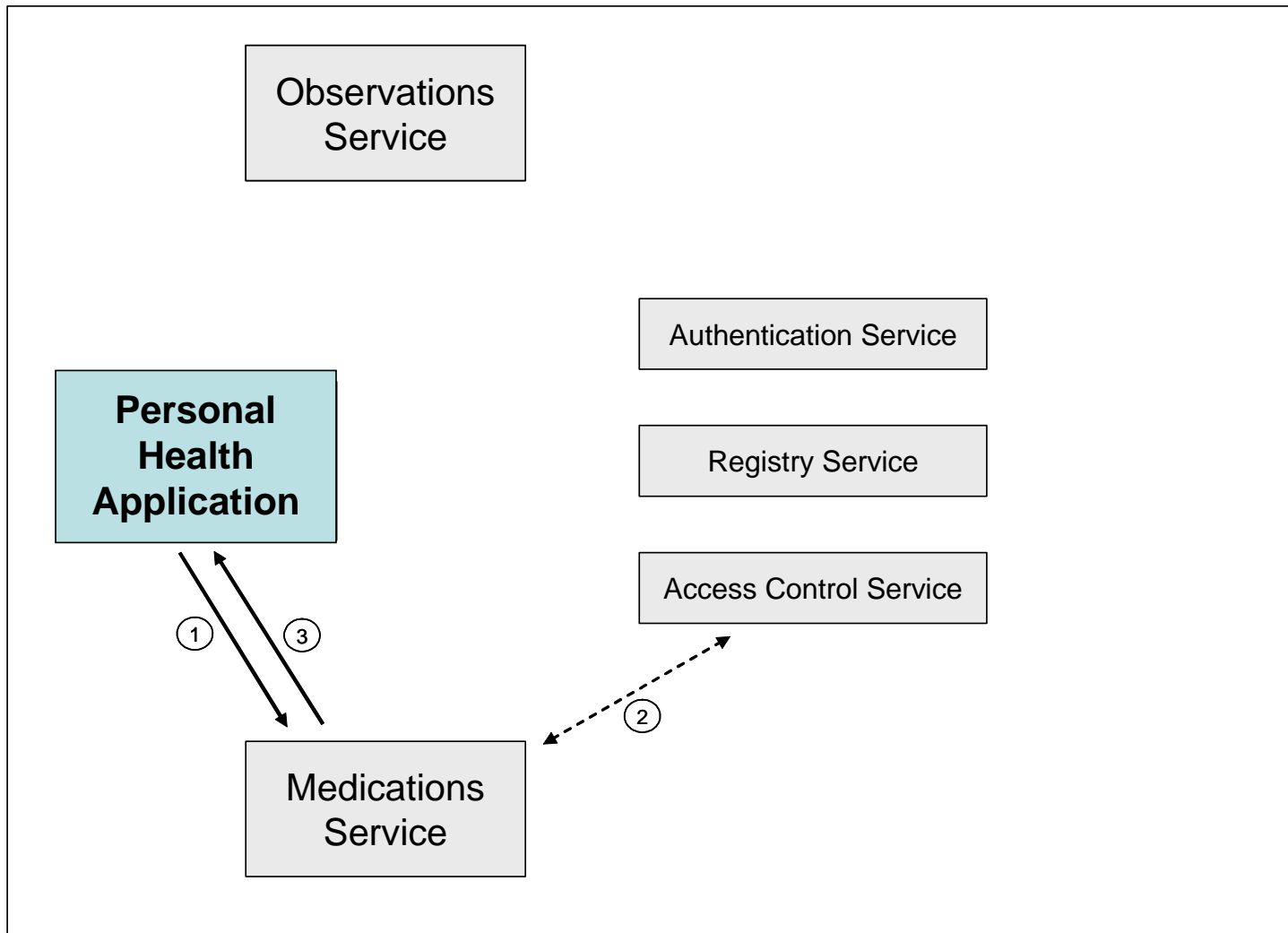
Prototype Implementation: 5 Web Services



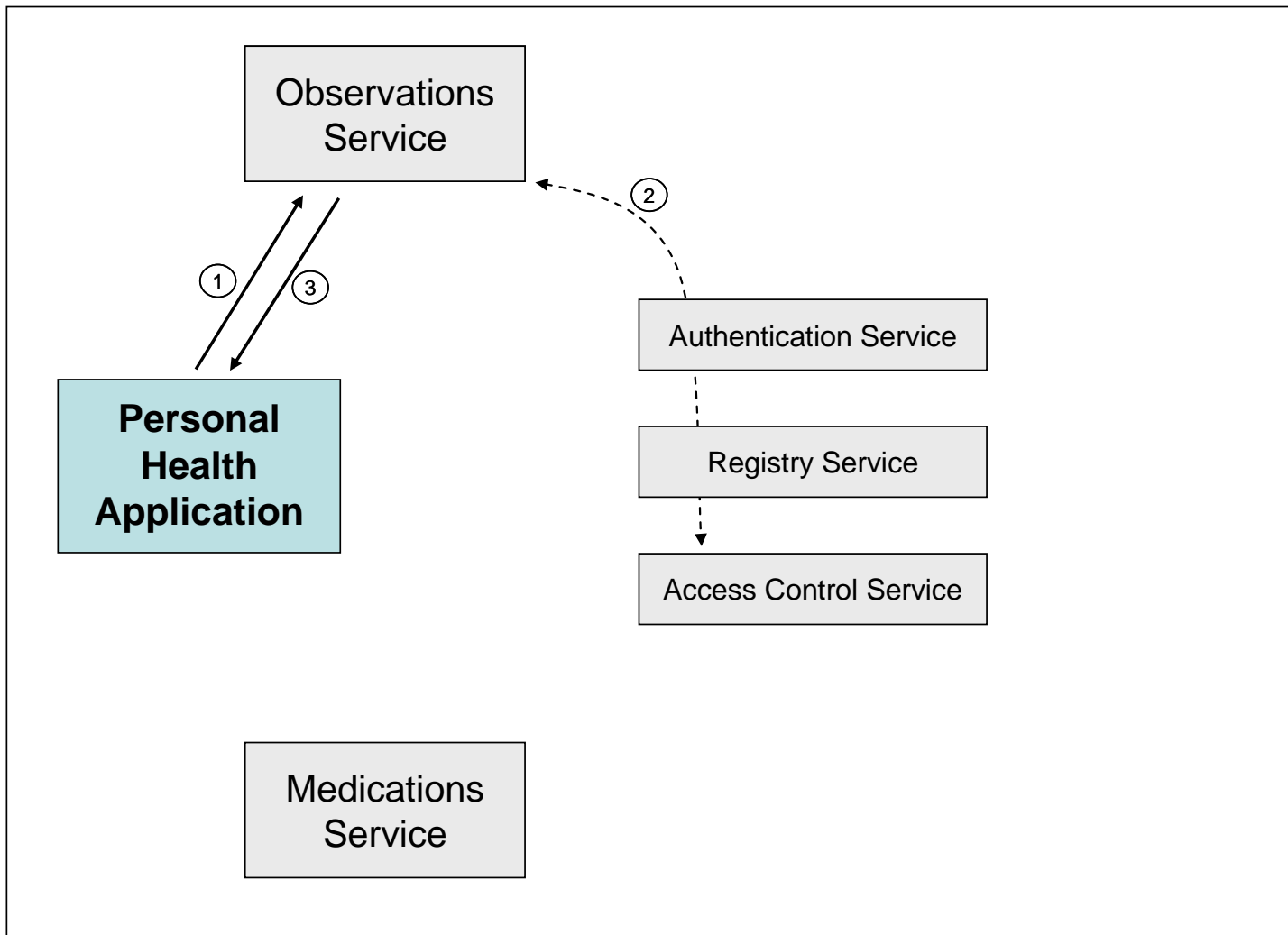
Platform Features: Notable Items

- Modularity and flexibility
- Single sign-on
- Centralized, hierarchical, role-based access control
- Clinical data types (somewhat extensible)
- *Optional* coding of data
- Support for annotations and multi-media attachments

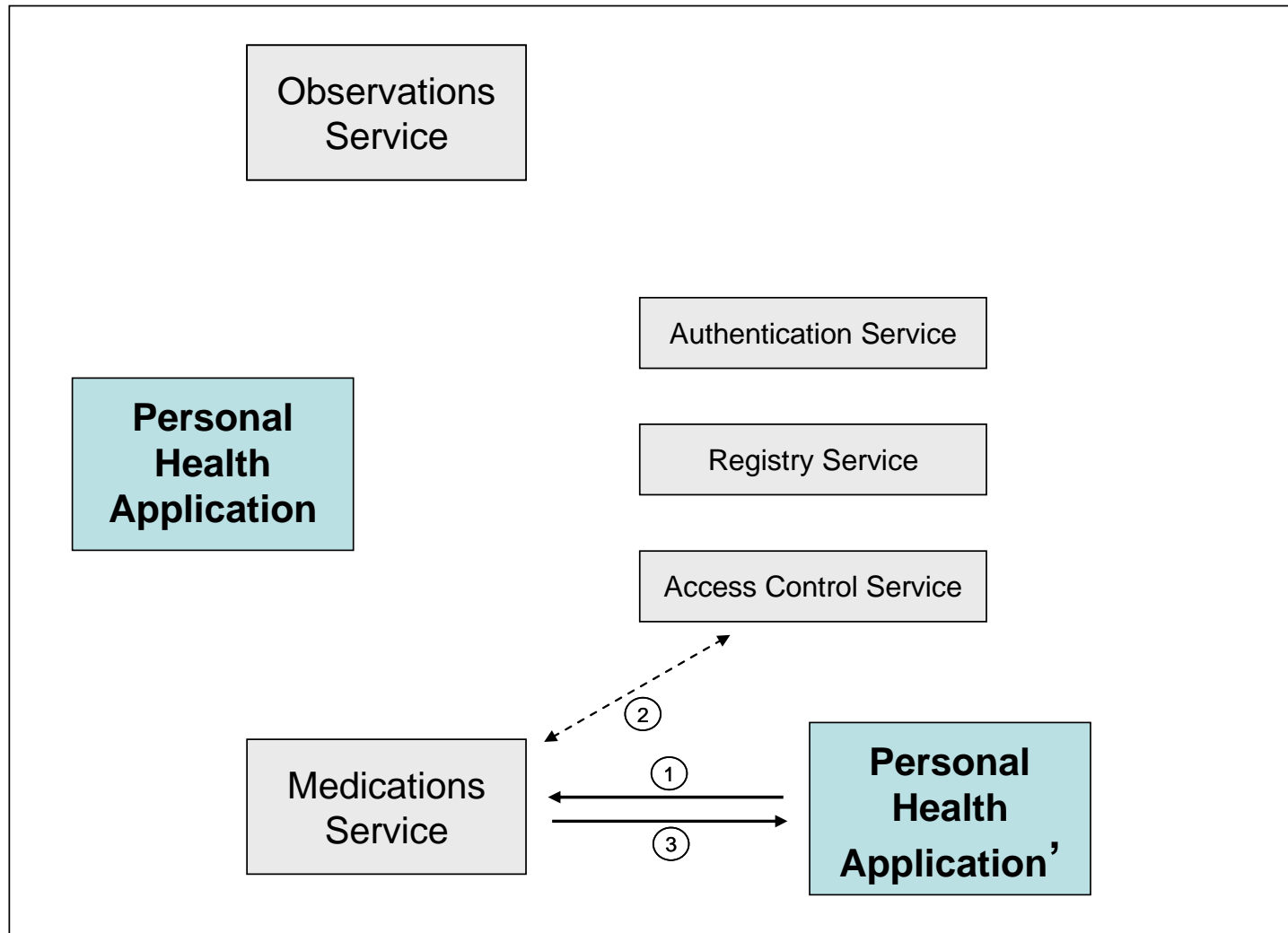
Access Control: Centralization



Access Control: Centralization



Access Control: Centralization



Access Control: Specificity

- “Anyone whom I designate as a *family member* may view all of my data, except for my journal entries and one of my personal medications...”
- “Any of my physicians may view my medication list and history of office visits and hospitalizations...”
- “My primary physician, Dr. Albright, may view and modify my medication list and may view and annotate my observation data...”
- “Dr. Albright’s EHR system may automatically add items to my medication list, but it may not change or retrieve any data unless Dr. Albright is logged in.”

PHD Platform Components vs. Other PHR Platforms

- Work on PHD components is *applied research*, not product development.
- PHD components were specifically designed to meet the requirements of the PHD PHAs.
- Lessons from the design, implementation, and use of the PHD components is intended to inform the product development of others.
- Availability of the PHD components (including source code) can provide a foundation for further applied research on software sharing and data interoperability among PHAs.



Thank you.

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Additional Slides

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Access Control Hierarchies

Project HealthDesign Common Platform

Access Control Hierarchies

OperationHierarchy

- [-] AllOperations
 - [+] RecordModification
 - [+] RecordViewing

ResourceHierarchy

- [-] AllData
 - PatientDemographics
 - [+] AccessControl
 - [-] AllHealthData
 - [+] AllMedicationListData
 - [-] AllObservationData
 - GeneralObservation
 - HealthcareEncounter
 - JournalEntry
 - MealOrSnack
 - MedicationAdministration
 - ObservableParameter
 - PhysicalActivity
 - [+] SignOrSymptom

RoleHierarchy

- [-] AllRoles
 - RecordSubject
 - RecordCustodian
 - [-] AllOtherRoles
 - [-] FamilyMember
 - Parent
 - Child
 - Sibling
 - ExtendedFamily
 - [+] HealthCareProvider
 - [+] AllPHADefinedRoles


Access Control Rules

1. Role Relationships (*createRelationship*)

<u>Patient Rec ID</u>	<u>Role</u>	<u>User ID</u>
P-12345	"RecordCustodian"	U-1111
P-12345	"FamilyMember"	U-3333
P-98765	"Physician"	U-3333

2. Access Rules [May be assigned to a *class* of resources] (*createAccessRule*)

<u>Patient Rec ID</u>	<u>Role</u>	<u>Operation</u>	<u>Resource</u>	<u>Context</u>	<u>Action</u>
P-12345	"RecordCustodian"	"AllOperations"	"AllData"	"AllApplications"	"Grant"
P-12345	"FamilyMember"	"RecordViewing"	"AllHealthData"	"AllApplications"	"Grant"
P-12345	"FamilyMember"	"RecordViewing"	"JournalEntry"	"AllApplications"	"Deny"
P-12345	"FamilyMember"	"RecordViewing"	Med-4857932	"AllApplications"	"Deny"



Access Control Logic

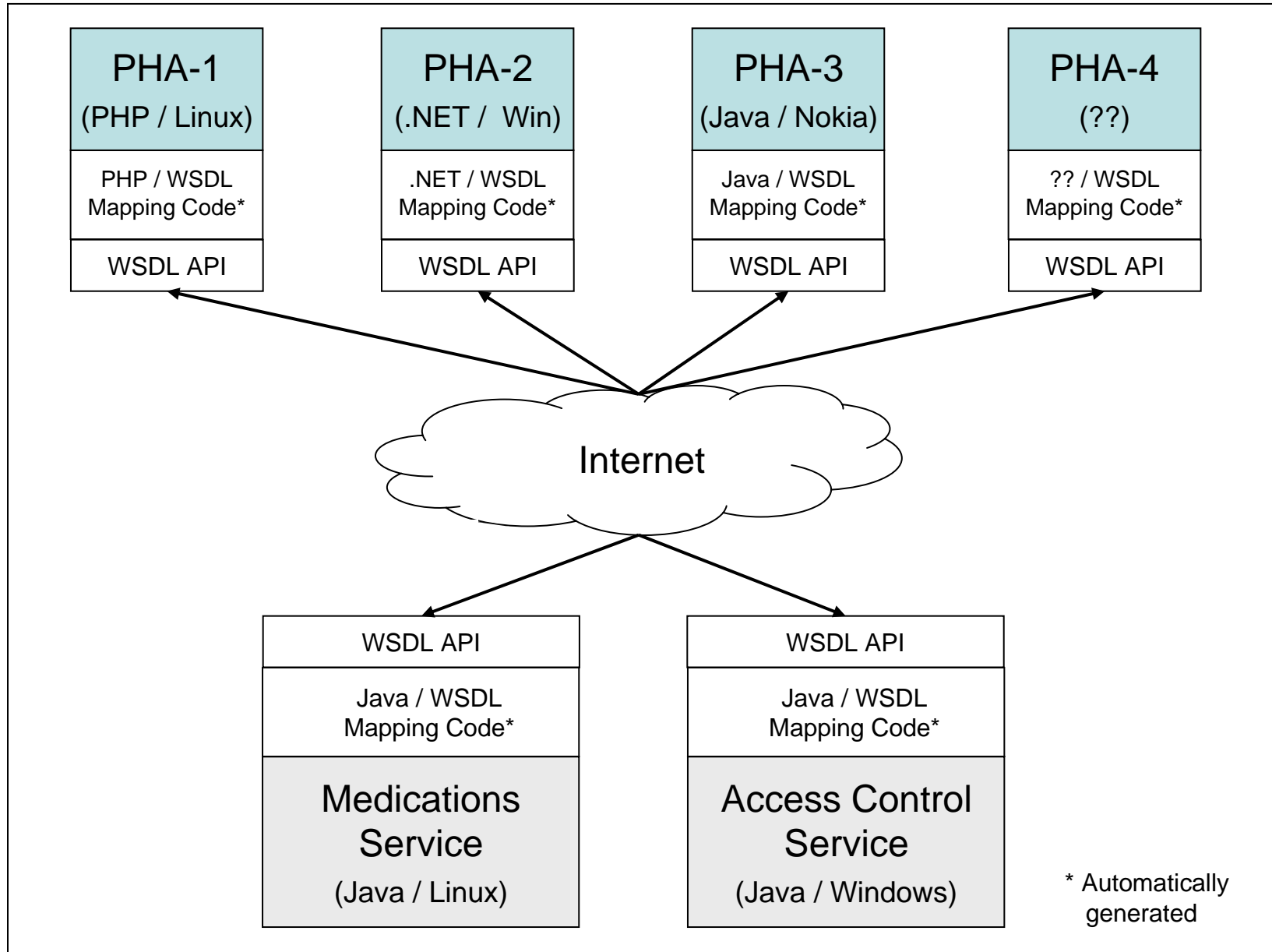
Access is ALLOWED if and only if

(1) At least one rule exists that GRANTS access for the requested operation

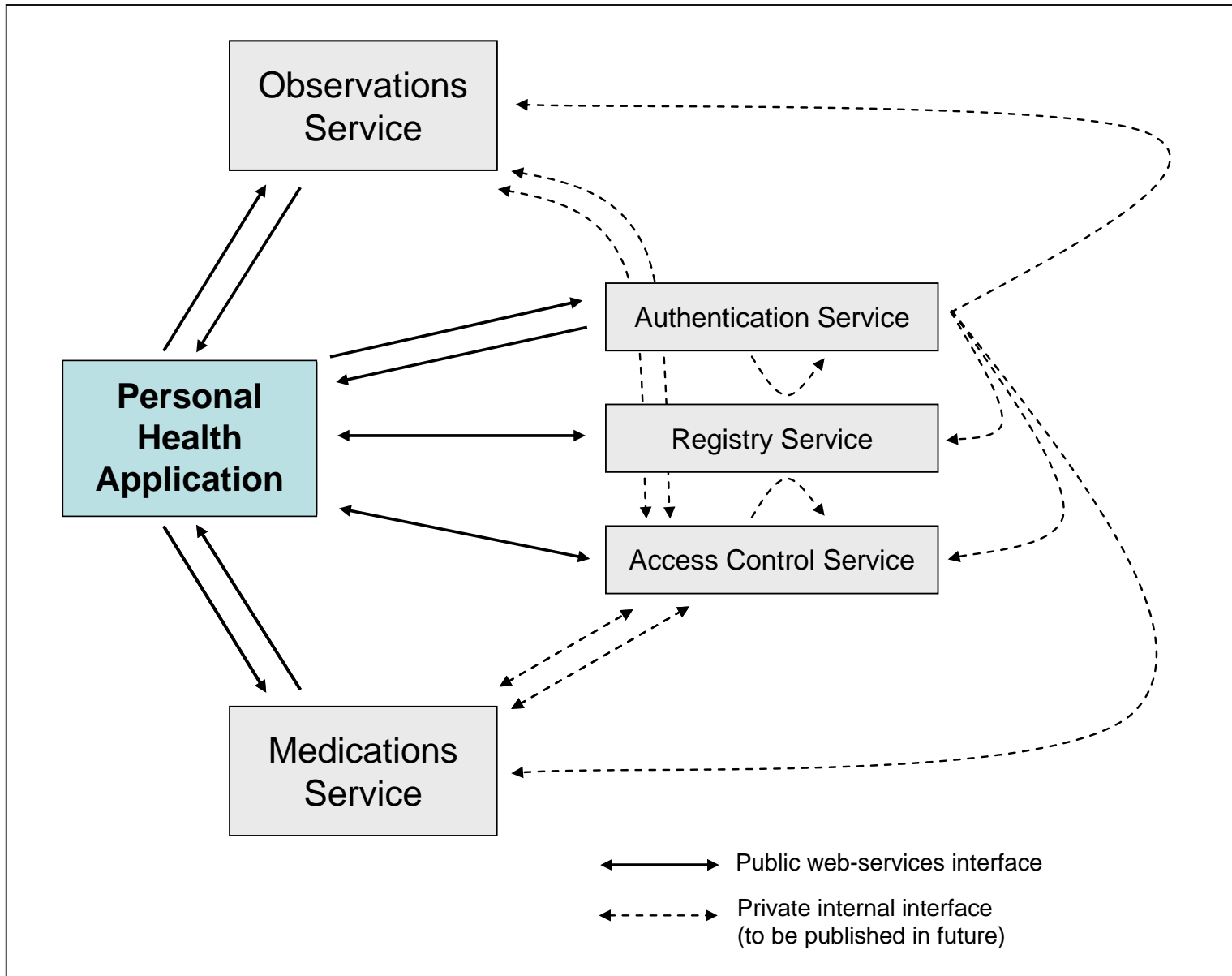
AND

(2) No rules exist that DENY access for the requested operation

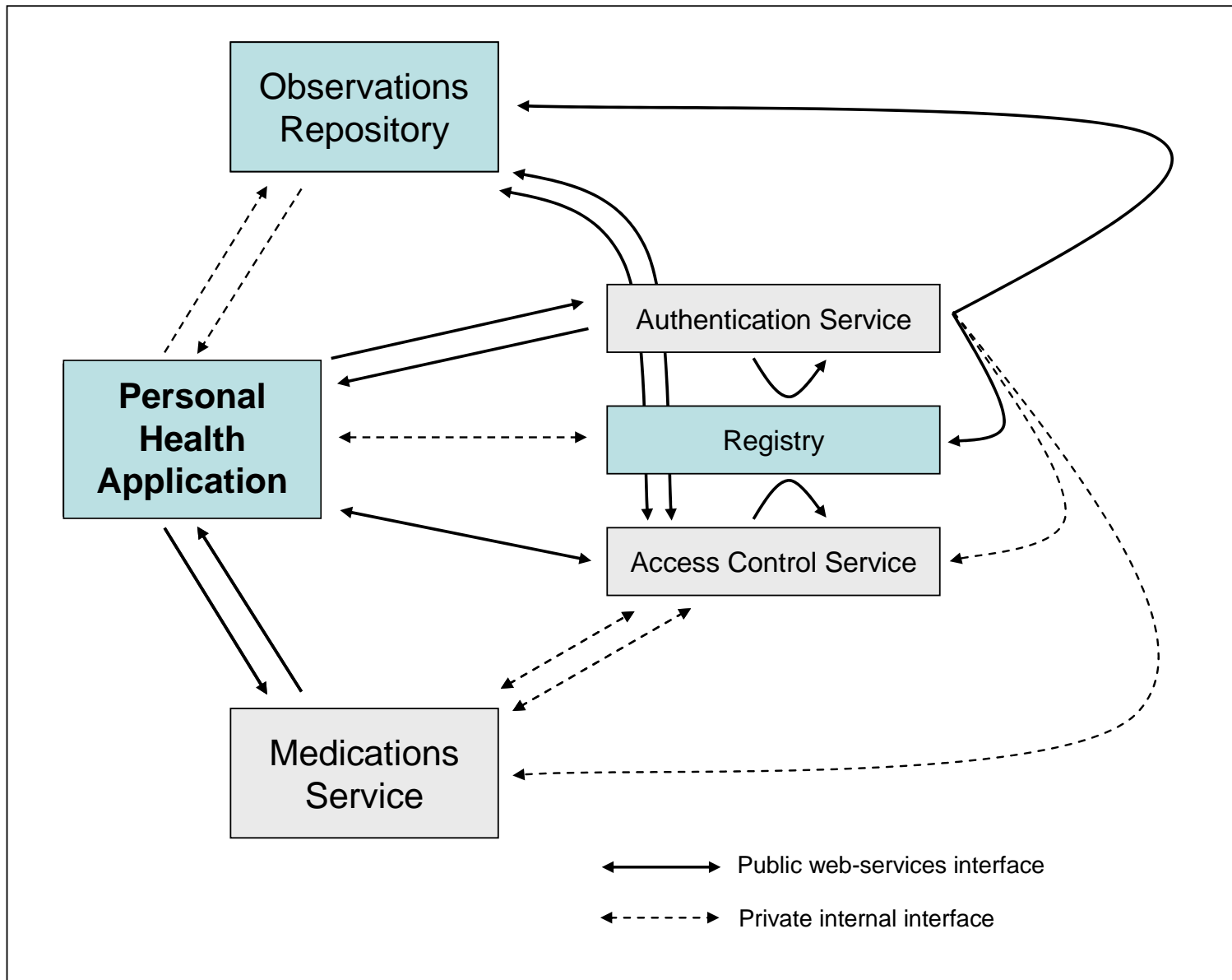
Web Services with WSDL APIs



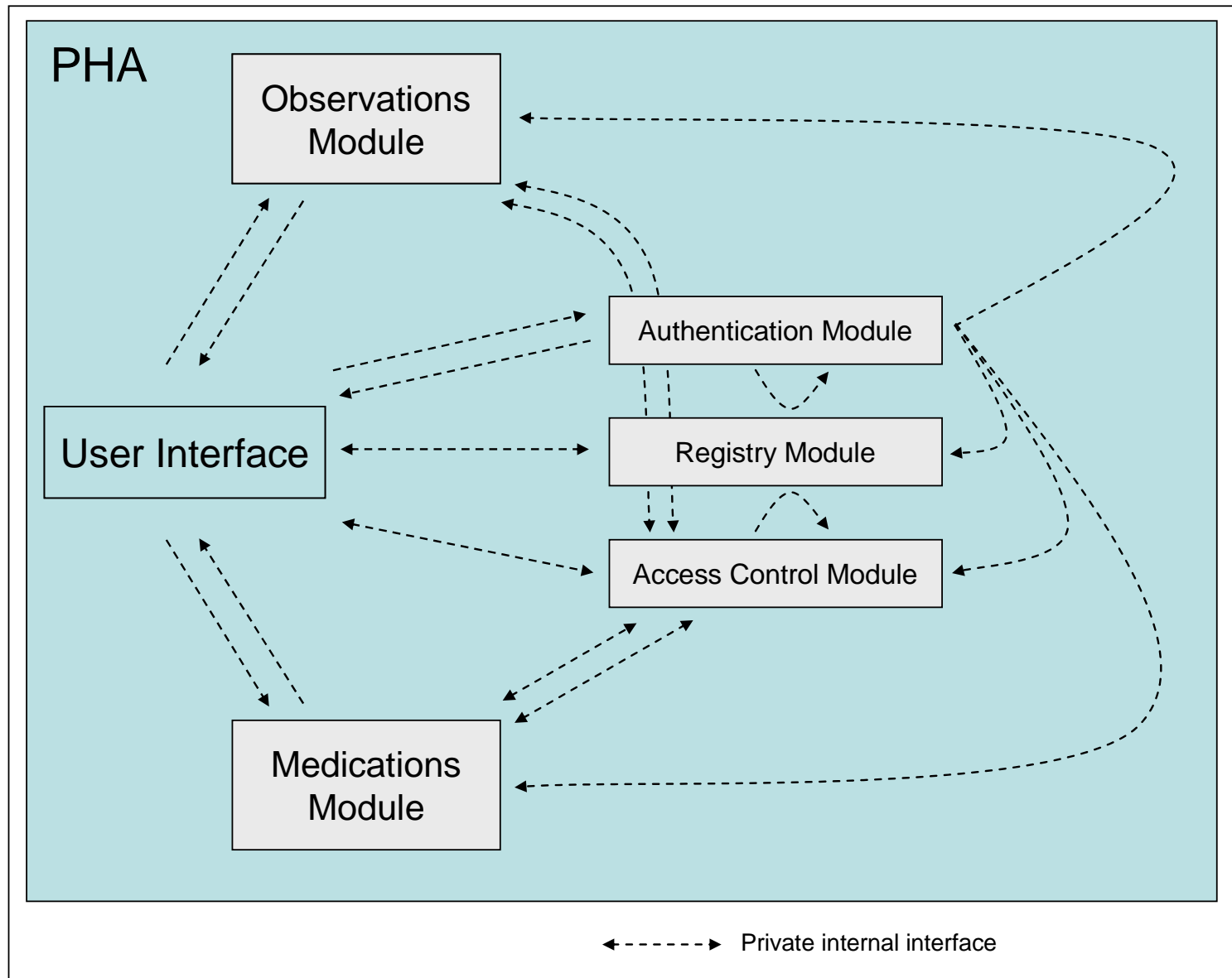
Modularity and Flexibility



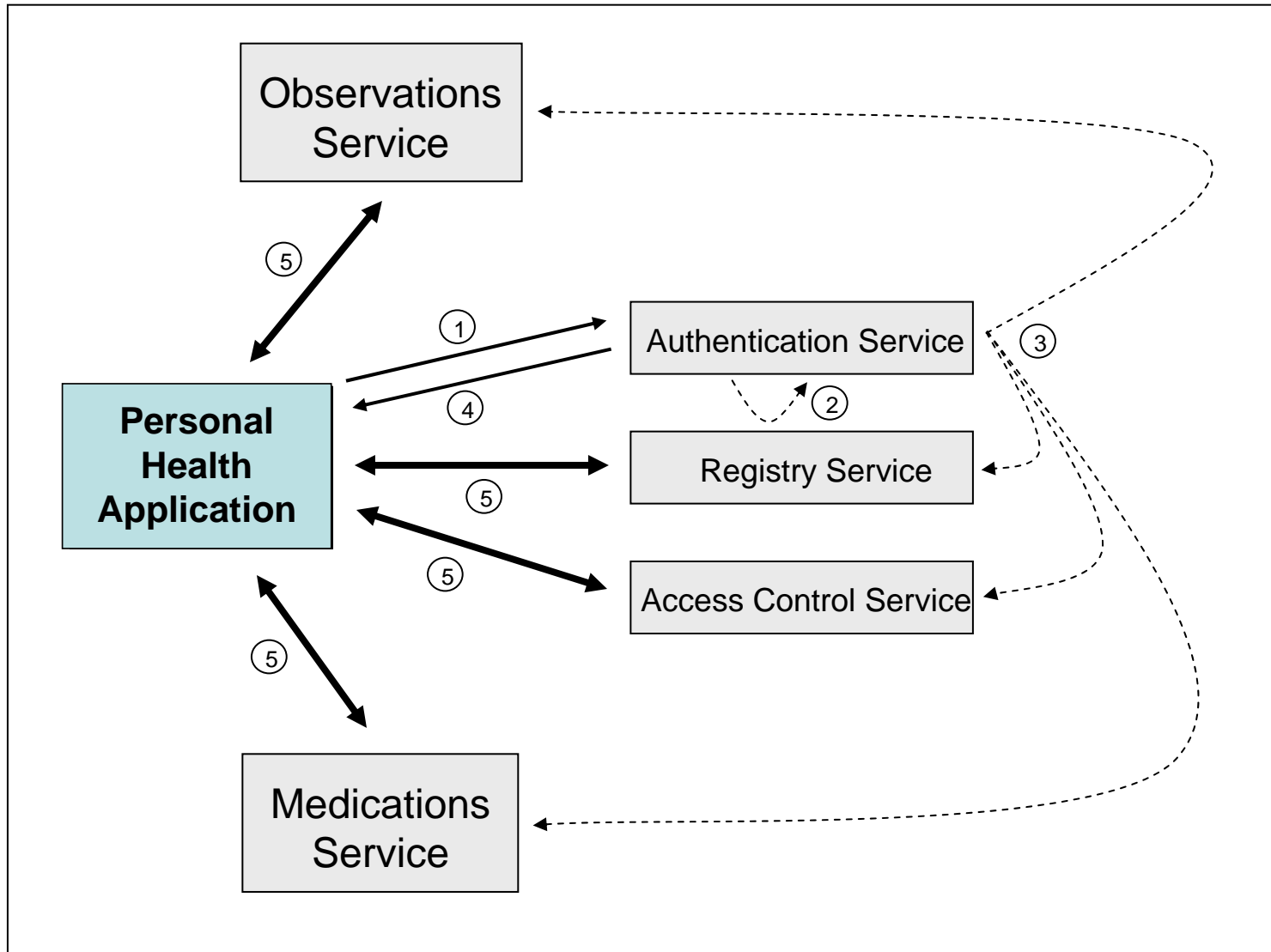
Modularity: Substitution of Certain Components



Flexibility: Tight Integration of Components with PHA



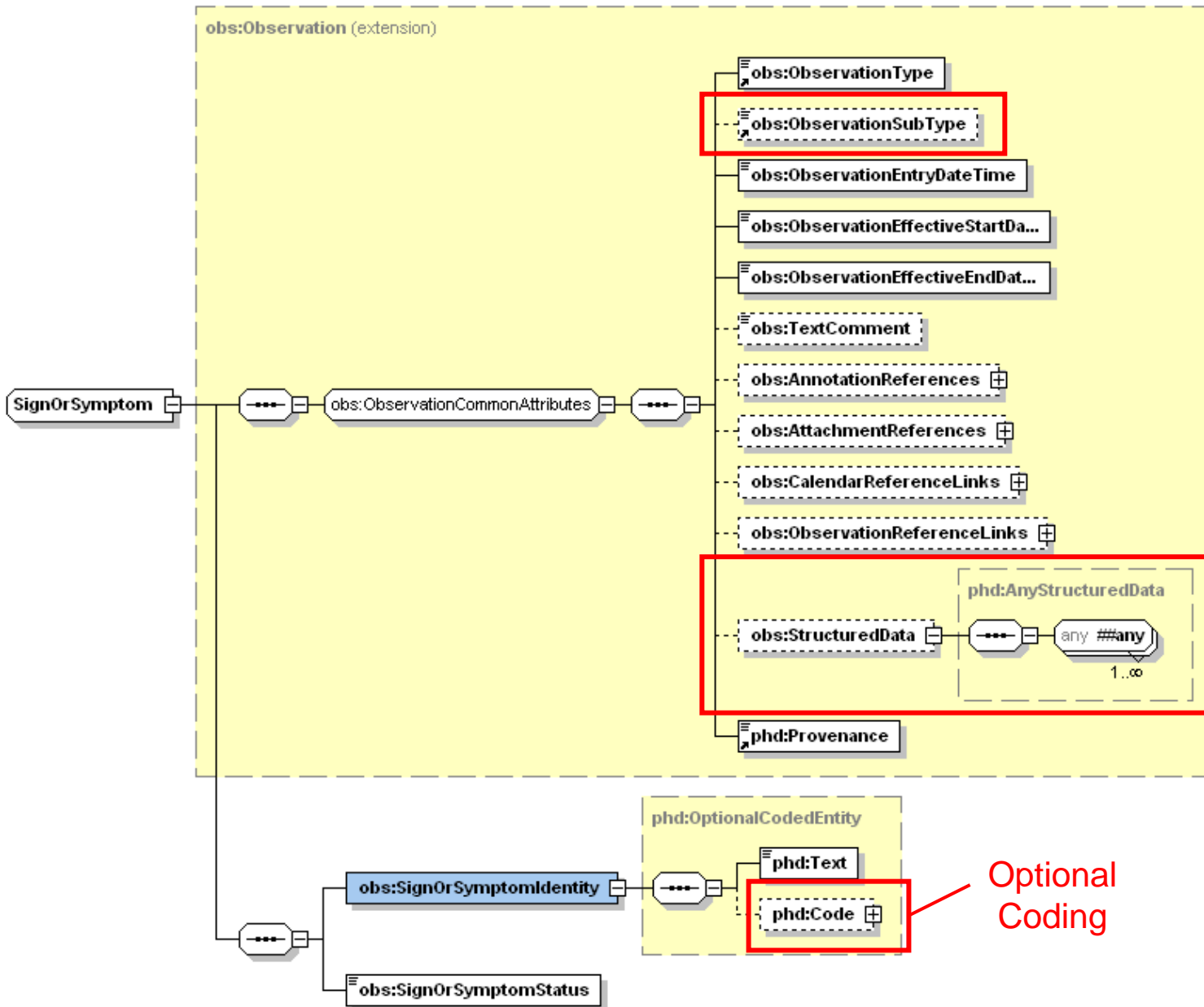
Single Sign-on



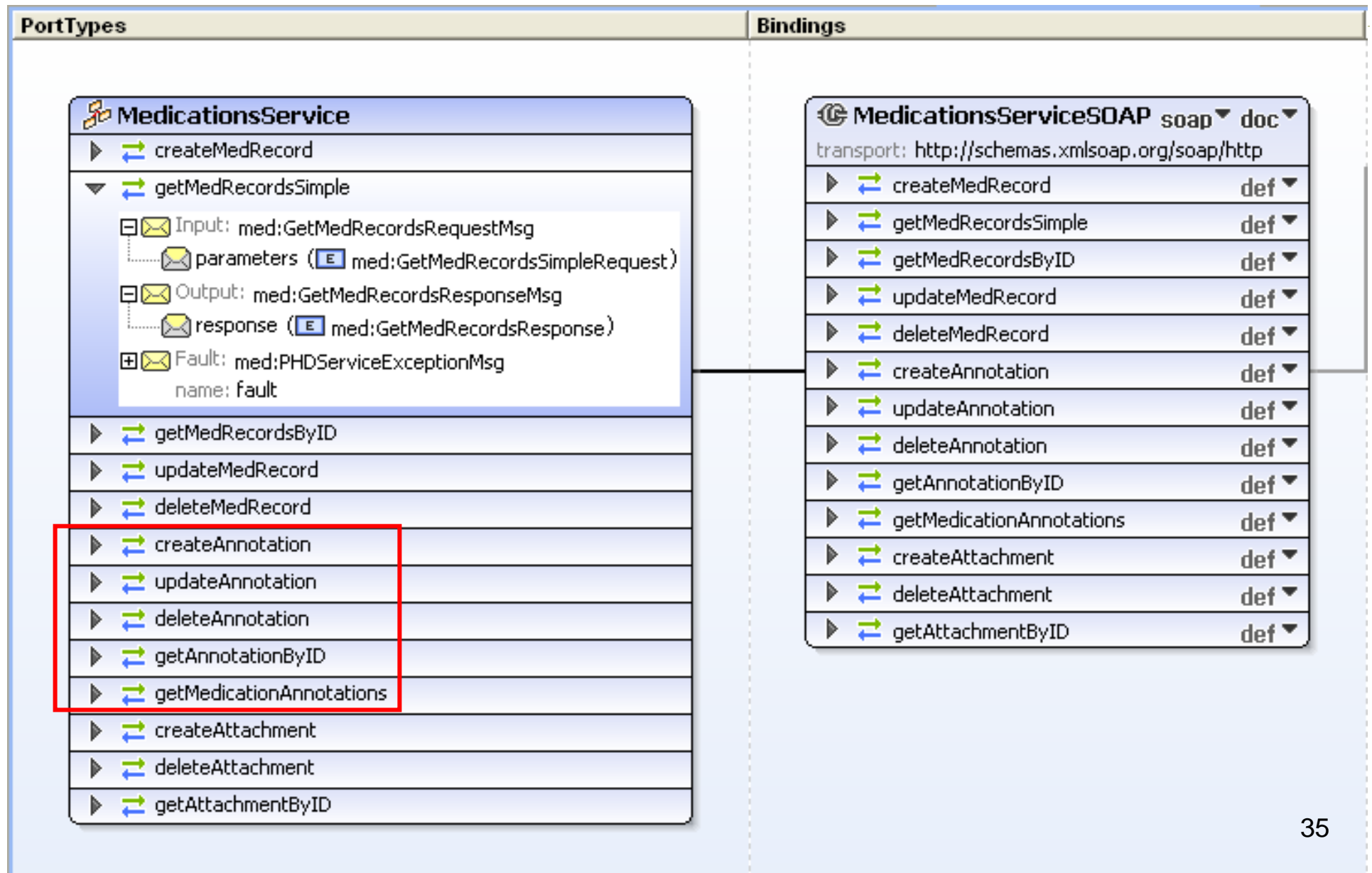
Clinical Data Types

- [-] AllHealthData
 - [-] AllMedicationListData
 - DispenseRecord
 - Prescription
 - AdHoc
 - [-] AllObservationData
 - GeneralObservation
 - HealthcareEncounter
 - JournalEntry
 - MealOrSnack
 - MedicationAdministration
 - ObservableParameter
 - PhysicalActivity
 - [-] SignOrSymptom
 - Pain

Clinical Data Types: Extensibility



Distinct Handling of Annotations: Operations



Distinct Handling of Annotations: Access Control

Access Control Hierarchies

OperationHierarchy

- [-] AllOperations
 - [-] RecordModification
 - [-] RecordInsert ← Allows writing of Record or Annotation
 - InsertAnnotation ← Allows writing of Annotation only
 - [+] RecordUpdate
 - [+] RecordDelete
 - [+] WriteOwnAnnotation
 - [-] RecordViewing ← Allows reading of Record or Annotations
 - [+] ReadRecord ← Allows reading of Record only
 - [+] ReadAnnotation

Sample PHA: Admin Portal

HEALTHDESIGN - WEB ADMIN PORTAL

LOGIN

Username: *

Password: *

Sample PHA: Admin Portal

HEALTHDESIGN - WEB ADMIN PORTAL User:

FAVRE, BRETT [6634@1.3.6.1.4.1.30291.0.1]

[Main](#) > Patient Information

Demographics **Observations** Medications Calendar Access Control

Type: Effective Start Date: From To

Observation Search Results (2)

Observation ID	Type	Description	Effective Start Date
6638@1.3.6.1.4.1.30291.0.3	Observable Parameter	Diastolic Blood Pressure = 80.0mm/Hg	2008-06-10 12:30:00
6637@1.3.6.1.4.1.30291.0.3	Observable Parameter	Systolic Blood Pressure = 120.0mm/Hg	2008-06-10 12:30:00

VIEW OBSERVATION

[Main](#) > [Observations](#) > [View Observation](#)

[Edit Observation](#) [Patient Home](#)

Observation ID: 6637@1.3.6.1.4.1.30291.0.3
Type: ObservableParameter
Sub-Type:
Entry Date/Time: Jun 10, 2008 12:32:25 PM PDT
Effective Start Date/Time: Jun 10, 2008 12:30:00 PM PDT
Effective Entry Date/Time: Jun 10, 2008 12:30:00 PM PDT
Text Comment: Systolic BP = 120
Parameter Identity: Systolic Blood Pressure
Parameter Value: 120.0
Parameter Units: mm/Hg(234234234 [SNOMED-CT])
Recording Context ID:
Provenance: Entered by medical profession

[Add Annotation](#)

Annotations

Annotation ID	Annotation Text
6639@1.3.6.1.4.1.30291.0.3	Brett, you need to relax. I suggest retirement. - Your MD

[Add Attachment](#)

Attachments

Attachment ID	File Description	File Type	File Size (KB)
6640@1.3.6.1.4.1.30291.0.3	FavreScrambling.jpg	image/jpeg	86

Observation References

Reference ID	Reference Type
No observation references found.	

Calendar References

Reference ID	Reference Type
No calendar references found.	

Platform Implementation: Specifications

- API Specifications
 - WSDL v1.0
 - SOAP v1.0

- Source Code Development
 - Java EE 5
 - JDK 1.6 (Java 1.6.0_03; Java HotSpot(TM) Client VM Java 1.6.0_03)
 - GlassFish V2 (java app server)
 - NetBeans IDE 6.0

- Current Deployment Environment
 - Linux (Ubuntu) -- Linux version 2.6.18-53.1.21.el5
 - Sun Java System Application Server 9.1_01 (build b09d-fcs)
 - Java HotSpot(TM) Client VM (10.0-b19) for linux-x86 JRE (1.6.0_04-b12)
 - MySQL Version 5.0.22