



CDC STARRS

Centers for Disease Control and Prevention Specimen Tracking and Results Reporting System

Public Health Information Network (PHIN) Conference
Integrating Laboratory Systems Within an Organization

Brian Levine (levineb@saic.com) – STARRS Project Manager

Lynda Vidot (vidotl@saic.com) – STARRS Business Analyst



TOPICS

- **What is STARRS?**
- **STARRS Use Case Example**
- **STARRS Relevance to Laboratory Integration**
- **STARRS Development**
- **STARRS Architecture**
- **Demonstration of LUNA**
- **Demonstration of a VB Application**



What is STARRS?

- **The CDC Specimen Tracking and Results Reporting System**
- **A central accessioning system**
- **A collection of summary specimen information**
- **A technology platform for sharing information between disparate LIMS**
- **An improvement to Emergency Preparedness**
- **A means of tracking chain of custody between LIMS**
- **An unambiguous way to associate specimen information**



STARRS Use Case Example

- **Potential Actors:**
 - State Laboratories
 - Field Investigators
 - Central Receiving at CDC
 - Testing Laboratories at CDC
 - ASTRO
- **Use Case Scenario:**
 - State Lab requests accessioning numbers and associates with Specimen
 - State Lab requests Transfer ID and associates with shipping information and associated specimen
 - Central Receiving Lab receives the box from the state lab and uses STARRS information to triage to appropriate lab
 - Lab receives box and confirms contents received are identical with STARRS information, updating the Test Order fields for each specimen
 - Lab publishes a summary result to STARRS
 - State lab queries STARRS for update



Relevance to Laboratory Integration

- STARRS allows laboratorians to continue using the technology in their labs as the interface to STARRS.
- STARRS allows applications, regardless of platform, to share information with the enterprise and other centers.
- STARRS team leads a consolidated working groups with other projects to develop a consensus on enterprise architecture, messaging, vocabulary, and data model.
- STARRS uses a message-based architecture, and has published an Interface Control Document explaining each message and how to call that message.
- STARRS users will be authenticated at the enterprise level through Active Directory or LDAP.
- STARRS will store summary data in a central data repository.
- STARRS will enable systems to request common data (lookup tables, accessioning numbers, etc.) from the repository.

Utilizes Existing Technology • Share Data • Central Information • Message-Based



Needs

Requirements

Development

Solutions



Needs

- **TECHNOLOGY** - In the fall of 2001, with the Anthrax scare, it became evident that the CDC did not have the technology to handle the tracking of specimen in large-scale events.
- **DATA SHARING and INFRASTRUCTURE CONSOLIDATION** - to meet directions from HHS
- **ADHERENCE TO E-GOVERNMENT STANDARDS**
- **INTEGRATEABLE LABORATORY INFORMATION MANAGEMENT SYSTEMS (LIMS)** - Most CDC laboratories had no enterprise-integrateable LIMS solution, or no solution at all

Data Sharing • Central Data Source • Consolidated Systems

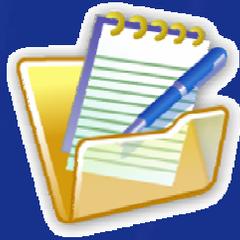


Needs

Requirements

Development

Solutions



Requirements

- STARRS shall support integration of bar coding, hand-held technology, and laboratory information management systems.
- STARRS shall have HL7 2.3z interface and XML file import support. The HL7 interface is for version 2.4Z.
- STARRS shall have configurable screens/forms to provide multiple interfaces based on user type and/or security.
- STARRS shall have a Web user interface that allows access to the applications through the use of a standard Web browser (*i.e.*, MS Explorer 6.0 or Netscape Communicator 7.0).
- STARRS shall have a security access that supports access controlled by User, Role, and/or Group, and a model that works with industry-standard protocols and services.
- STARRS shall support electronic management of chain of custody.
- STARRS shall support audit trail creation and maintenance of record creation and record modification, and views of tables/fields to be determined later.
- STARRS shall provide the ability to report, at a sample level test, summarized results for all CDC samples.
- STARRS shall have a database that is ODBC-compatible.
- STARRS shall support confirmation of message delivery.
- STARRS shall have 'Report Overdue' results based on user-defined deadlines.
- STARRS shall provide a source for central accessioning, concurrently generating reports on missing or out-of-sequence accession numbers.
- STARRS shall track specimen between laboratories and Centers.



Needs

Requirements

Development

Solutions



Development

- The STARRS team followed the Rational Unified Process to collect requirements, identify the architecture, develop use cases, and begin the development of STARRS.
- In an earlier phase, STARRS was built on an integration with a COTS LIMS tool to handle several of the use cases. This functionality has been replaced with custom development for improved efficiency and efficacy.
- Development began earlier this year on a subset of use cases while the business analysts and usability analysts continued elaboration of use cases for the next iteration. (Each iteration lasts approximately six months, providing biannual releases of STARRS.)
- STARRS development is founded on a service-based architecture for integration with other applications at the CDC. Each application uses the same messages.
- The STARRS data model is compliant with HL7 and other standards.



Needs

Requirements

Development

Solutions

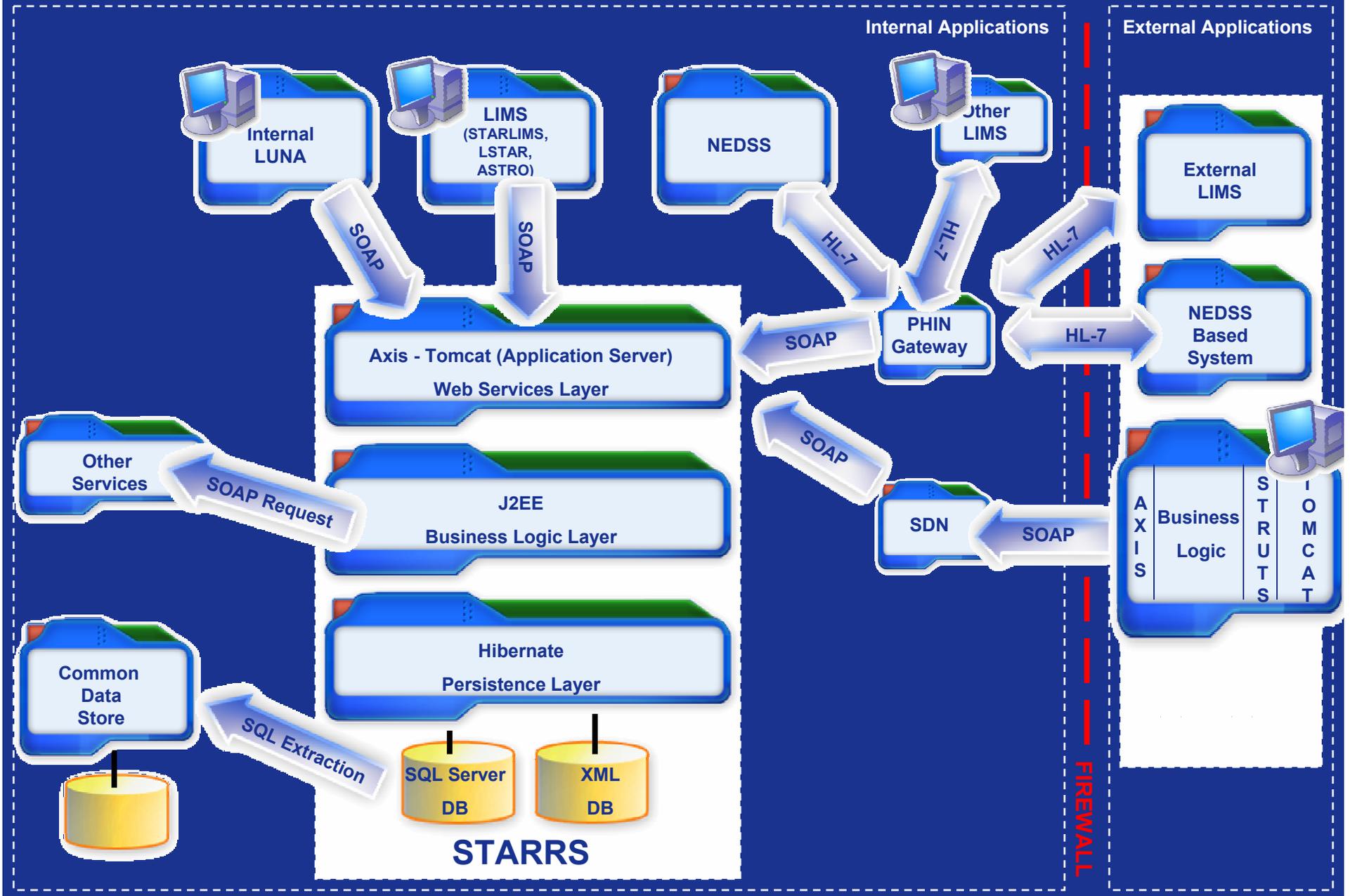


Solutions

- STARRS will deploy SOAP services for consumption for several messages to obtain accessioning numbers and information pertaining to create/update/retrieve specimen, transfers, test orders, and test results.
- Applications in the laboratories will serve as STARRS clients by implementing triggers to consume STARRS services.
- For those labs (both CDC and Public Health) that have no applications that support Web services, the Laboratory Unified Network Application (LUNA) will be deployed as a Web interface to STARRS.
- STARRS will track a specimen from creation to expiration on a summary level.
- Laboratories will use a central service for accessioning identifiers for transfers, samples, and containers.
- LIMS and STARRS will use a common security model for authentication.

One Common Interface • LUNA • Common Security Model • Platform Independent

STARRS Architecture





LABORATORY UNIFIED NETWORK APPLICATION



Quick Entry

Additional Info



Prepare Transfer - Quick Entry

* Indicates a required field.

Current User: Luna

Primary Submitter

- * CTID
- * Primary Sender Org. ID
- * Addressing Org. ID
- Job ID
- * Justification
- * Ordering
- Actual Sender
- Date/Time Sent
- Status
- Courier

Main Menu

Log Out

Main Menu

Specimen Data

- Record
- Edit
- Group
- Find

Shipment

- Setup
- Edit
- Find

Transfer

- Setup
- Edit
- Find

Print Labels

Quick Entry

Additional Info



Prepare Transfer - Quick Entry

* Indicates a required field.

Primary Submitter

Prepare Transfer - Summary

- * CTID
- * Primary Sender Org. ID
- * Addressing Org. ID
- * Justification
- * Ordering Provider
- Actual Sender
- Date/Time Sent
- Status
- Courier
- * Courier Name

Quick Entry

Test Order

Additional Info



Prepare Transfer - Quick Entry

* Indicates a required field.

STARRS WEB INTERFACE



Help Center



Contact



Accessibility

A service of STARRS



Visual Basic Application

- **Designed in two weeks as a prototype for a Microsoft application consuming STARRS Web Services.**
- **Uses the same messages as LUNA (Web interface).**
- **Demonstrates STARRS Transfer, Specimen, and Search capabilities.**
- **Provides a pathway for LIMS built with .NET technologies to interface with STARRS.**



Audience Questions