ICE Update: Product Governance, Roadmap, and Use

2017 AIRA National Meeting

Chicago, IL

April 12, 2017

Topics

- ICE Basics

- Open Sourcing ICE

- Use of ICE

- Open Source Governance

- Product Roadmap for ICE

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ICE Basics

Goal of the ICE Project

Create an immunization decision support system that:

| Objective	Achievement
Supports routinely administered vaccine groups	• Supports 15 (and growing) vaccine groups from birth through adulthood
Promotes clinical best practices	• Follows ACIP recommendations • Informed by CDC's CDSi project
Adapts to changing requirements	• Rule editing GUI tool for non-technical SMEs • Automated testing tool w/ 2,700+ test cases
Easily integrates with IIS and other health systems	• Standards-based, web service interface • Variety of deployment options
Freely available	• Standard open-source license • Downloadable from public website

Original ICE Collaborators

- New York City Citywide Immunization Registry

- HLN Consulting, LLC

- Alabama Department of Public Health

- OpenCDS Team

ICE System Architecture and Work Flow
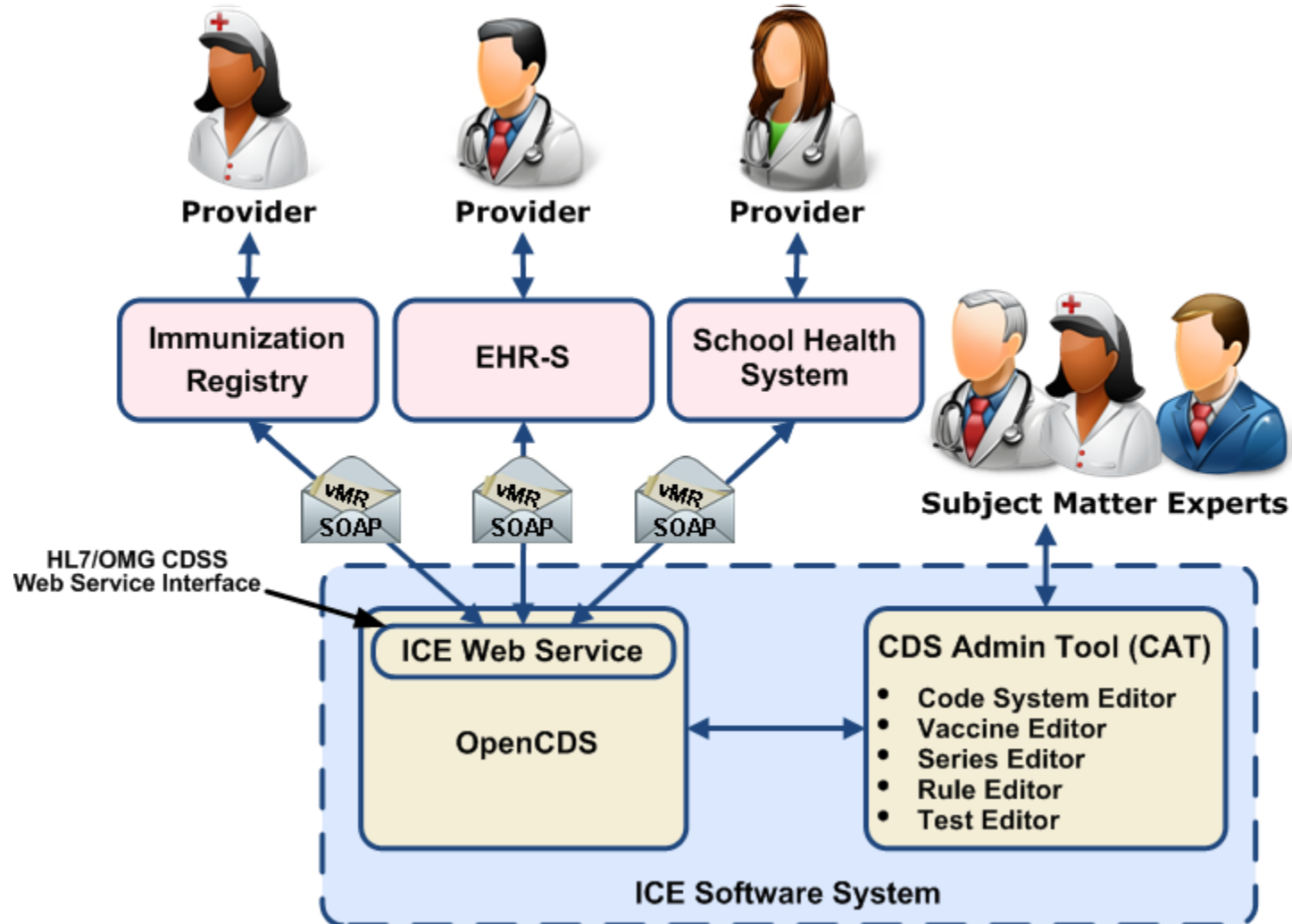
Open-Sourcing ICE

Background

- HLN has been developing and supporting CDS software for a number of years

- ICE and CAT software began under "work for hire" agreements with New York City

- NYC agreed to release ICE and CAT software into Open Source community under **GNU Lesser General Public License (LGPL) version 3**

Sharing the "Data" too

- **ICE Web Service**
  - Rules for ICE default immunization schedule are included in the ICE software distribution
  - ...even though the rules are the system's "data", which is not covered by Open Source Licenses
- **CDS Administration Tool (CAT)**
  - 2,700+ test cases are available upon request
  - ...even though the test cases are the system's "data", which is not covered by Open Source Licenses
  - In an XML format designed for CAT's automated test tool

Availability and Use of ICE

Availability

- **ICE Web Service**
  - In Production use since 2013
  - Available for download on ICE Wiki
  - Go to "CDSFramework.net", click "ICE", click "Downloads"
- **CDS Administration Tool (CAT)**
  - Currently used by ICE Team for automated testing
  - Implementing enhancements
  - Releasing to the community, module by module, starting in Q4 2017

Deployments of ICE

- National EHR – eClinicalWorks (December 2013)

- National PHR – CareDox (November 2014)

- Public Health Agency – Denver Public Health (July 2016)

- Nation's Largest Healthcare System – Veteran's Administration (on VA Test server since July 2016)

- New York City IIS – Scheduled for Summer 2017

- New Jersey IIS – In the process of scheduling...

CDS Knowledge Engineering

- ACIP defines and publishes recommended schedules as "best practice"; not computable

- CDC CDSi project developed and maintains a consensus logic specification often considered "gold standard"

- ICE default immunization schedule developed and **maintained by ICE SME workgroup** (NYC, ADPH, HLN)

- Some documented differences with CDC CDSi

Open Source Governance

Governance Challenges

- Because ICE is open source, it is primarily but not exclusively responsive to those who contribute staff or financial resources

- Although users are free to "fork" the product, without strong management of the software development effort there is great potential for confusion & error

- Even with consensus over the CDS rules some users might not agree nor accept consensus decisions.

- Management and coordination of governance process requires purposeful effort and funding to be sustainable.

- Equity issue: who pays for enhancements since *everyone* benefits in the end?

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HLN's Governance Principles

- Changes to the Open Source software should be available to all users.
- A base set of rules developed by consensus should be maintained and be freely available to all users.
- Alternate rule sets may or may not be freely available at the discretion of the organizations that create them or sponsor their creation.
- Resources and activities should be leveraged across participants as much as possible.
- Anyone may create products with "enhanced features" that must comply with the Open Source license but might not be freely available.

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New ICE Governance Process

- **Goals**
  - Implement more participative way to govern rule updates
  - Support ongoing ICE software development & maintenance
- **Establish a Review Board to**
  - Provide an unbiased review and validation of ACIP recommendations as they are proposed for implementation in ICE
  - Review relevant proposed enhancements to product functionality
- **Subject Matter Expert Workgroup to**
  - Support the Review Board
  - Make the specific detailed decisions regarding the rules for the ICE default immunization schedule.
- **Funding for this project provided in part by Pfizer, Inc.**

New ICE Governance Process (cont.)

- Strive to maintain a "core" or "base" rule set.

- Continue to post openly on the wiki

- Plan and post a product roadmap

- HLN continues to control the actual contents of the software distributed and maintained by this collaborative effort.

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Possible Funding Models for Enhancing Open Source Software

- First one who needs a new feature pays for it

- Negotiate joint/collaborative funding to implement common needs

- Use "unexpended" support dollars (if sufficient)

- Seek outside funding from a supportive non-user of the software

- Combination of all of the above

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ICE - Product Roadmap

ICE - Product Roadmap 2017

- Ongoing maintenance for ACIP compliance and CDSi compatibility
- Q3 2017
  - Influenza Modifications (for 2017-2018 season)
  - "Built-In" Batch Processing (for Higher Throughput)
  - Docker Image for Instant Deployments of ICE
- Q4 2017
  - Support for HALO Factors (health, age, lifestyle, occupation)
  - Production Release of CAT Rule Manager and CAT Test Manager

ICE - Product Roadmap 2018

- Adding a FHIR interface

- Co-leading the HL7 "CDSi on FHIR" workgroup

- Creating HL7 "CDSi on FHIR" implementation guide for September 2017 ballot

- Implementing the "CDSi on FHIR" interface in ICE

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Polio –
Minimum and Recommended Intervals

Vaccine Dose Parameters - Minimum and Recommended Intervals

Doses	Series Name	Absolute Minimum Interval	Minimum Interval	Recommended Interval
Dose 1 to 2	Polio 4-dose	24 days	28 days	28 days
Dose 2 to 3	Polio 4-dose	24 days	28 days	28 days
Dose 3 to 4	Polio 4-dose	24 days if dose 4 was administered before 8/7/2010 [1] 6 months minus 4 days if dose 4 was administered >= 8/7/2010	28 days if dose 4 was administered before 8/7/2010 [1] 6 months if dose 4 was administered >= 8/7/2010	6 months

See Footnote #1

Notes

- ICE takes into consideration changes to the polio schedule (dose 4) made in early 2010, and will evaluate under the old schedule if the conditions are met.[1] The CDC CDSi rules do not take this into consideration in their CDS logic; the CDC CDSi uses only the "new" rules.