# How to Achieve Successful Interoperability Within and Across Healthcare Organizations?

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# What is an Interoperability?

- Generally
  - Interoperability is the ability of two or more systems or components to exchange information and to use the information that has been exchanged.

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# What is an Interoperability?

- Specifically in Healthcare
  - <mark>All individuals, their families, and their health care providers have appropriate access to health information</mark> that (1) facilitates informed decision-making, (2) supports coordinated health management, (3) allows patients to be active partners in their health and care, and (4) improves the overall health of our population.

# Achieving Interoperability

- Interoperability is made possible by the implementation of standards.

- HIMSS Interoperability Showcase

  - Demonstrates interoperability using a variety standards provided by accredited standard development organizations

  - Unique events where healthcare stakeholders come together to demonstrate the benefits of using standards-based interoperable health IT solutions for effective and secure health data information exchange

# Interoperability in Korea

- Government project
- Health Information Exchange
- Adopt IHE profiles
- Community Center Hospitals
  - Chonnam Univ. Hospital
  - Chungnama Univ. Hospital
  - Kyungpook Univ. Hospital
  - Pusan Univ. Hospital
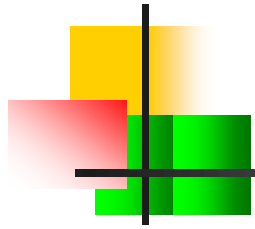  - SNU Seoul Hospital
  - Severance Hospital

# Levels of Interoperability
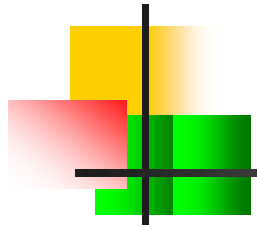
- Foundational

- Structural

- Semantic

# Foundational Interoperability

- Allows data exchange from one system to be received by another and does not require the receiving information technology system to be able to interpret the data.

# Structural Interoperability

- An intermediate level that defines the structure or format of data exchange.

- Defines the syntax of data exchange.

- It ensures that data exchanges between information technology systems can be interpreted at the data field level.
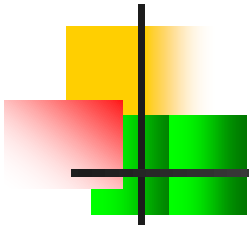
# Semantic Interoperability

- The highest level: the ability of two or more systems or elements to exchange information and to use the information that has been exchanged.

- Semantic interoperability takes advantage of both the structuring of the data exchange and the codification of the data, including vocabulary, so that the receiving information technology systems can interpret the data.
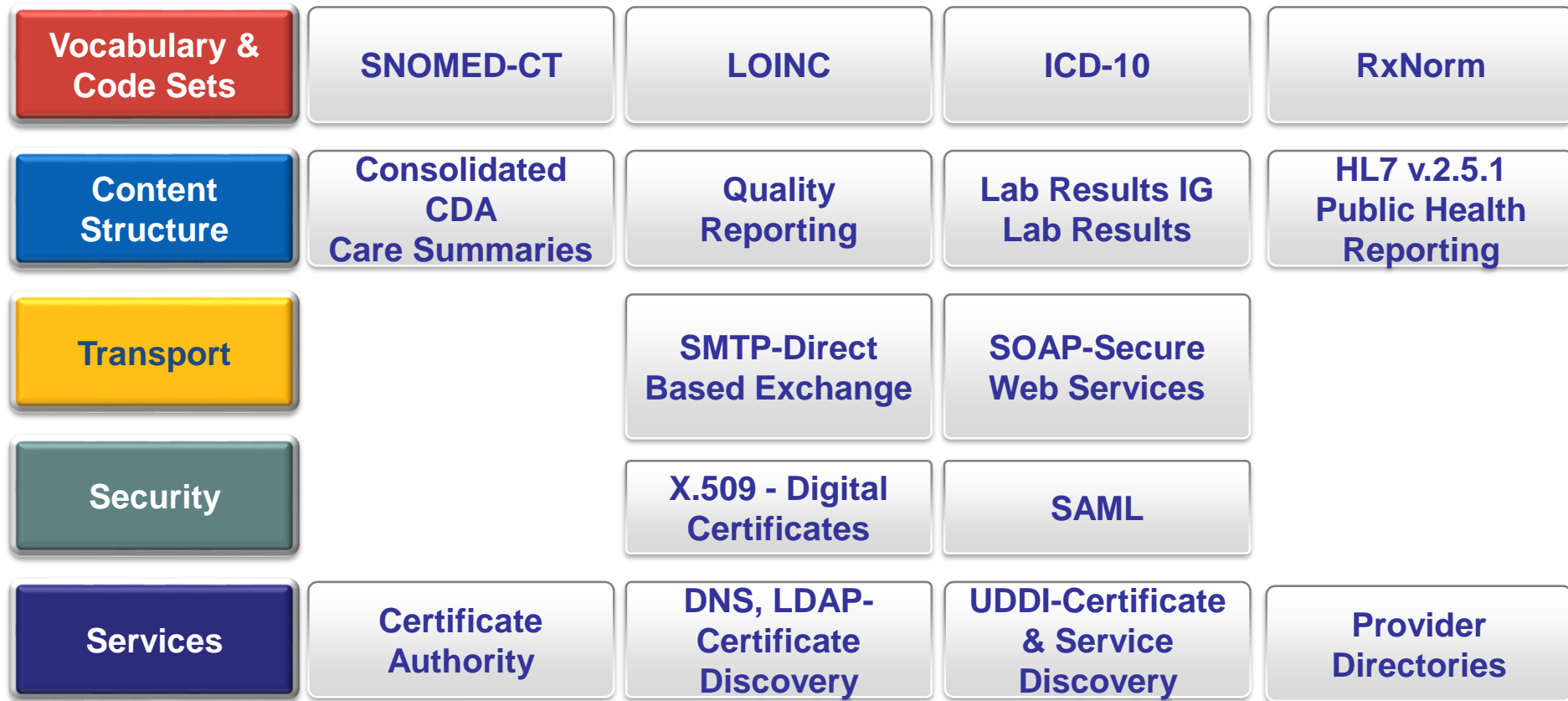
# Semantic Interoperability Requirements

- Vocabulary (Terminology)

- Contents

- Transport

- Security

# Interoperability Stacks

| Vocabulary & Code Sets | SNOMED-CT | LOINC | ICD-10 | RxNorm |
|---|---|---|---|---|
| **Content Structure** | Consolidated CDA Care Summaries | Quality Reporting | Lab Results IG Lab Results | HL7 v.2.5.1 Public Health Reporting |
| **Transport** | | SMTP-Direct Based Exchange | SOAP-Secure Web Services | |
| **Security** | | X.509 - Digital Certificates | SAML | |
| **Services** | Certificate Authority | DNS, LDAP- Certificate Discovery | UDDI-Certificate & Service Discovery | Provider Directories |

# Standards Developing Organizations

- ISO/TC 215
  - https://www.iso.org/committee/54960/x/catalogue/p/1/u/0/w/0/d/0
- HL7
  - v2 Message, CDA, FHIR
  - http://www.hl7.org/implement/standards/product_section.cfm?section=1&ref=nav
- IEEE 11073
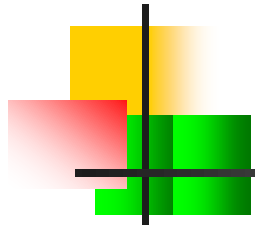  - http://standards.ieee.org/cgi-bin/lp_index?type=standard&coll_name=healthcare_it&status=active

# Profiling Organizations

- IHE Profiles
  - http://www.ihe.net/Technical_Frameworks/
  - http://wiki.ihe.net/index.php/Profiles
- Continua Design Guidelines
  - http://www.pchalliance.org/continua-design-guidelines

# Differences: SDO & IHE

■ SDO (Standards Developing Organizations)
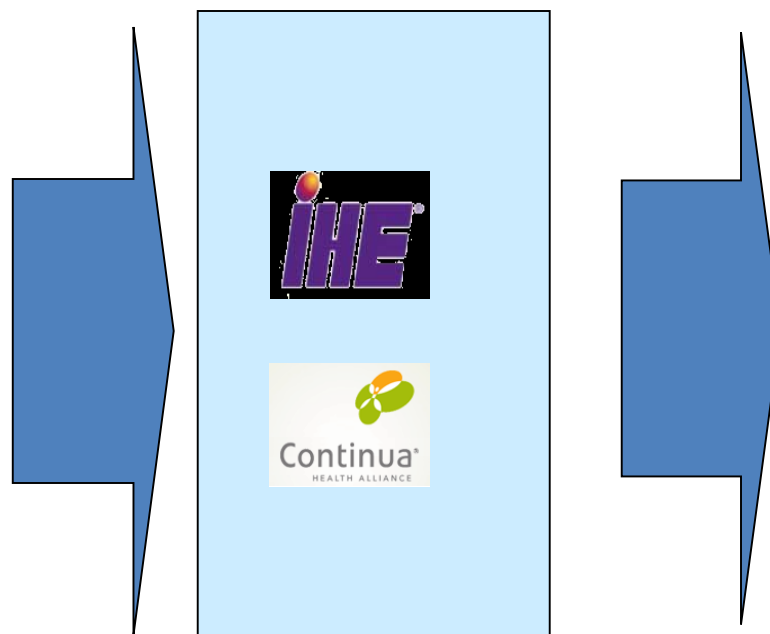
➢ Develops "future" standards in certain areas


■ IHE

➢ Uses "existing" standards to profile interoperability use-cases

# Interoperability:
## From a Problem to a Solution

**Base Standards**

**Profiling and Testing**
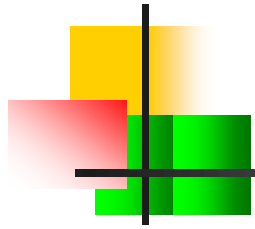
**eHealth Projects**



**Specific Extensions**

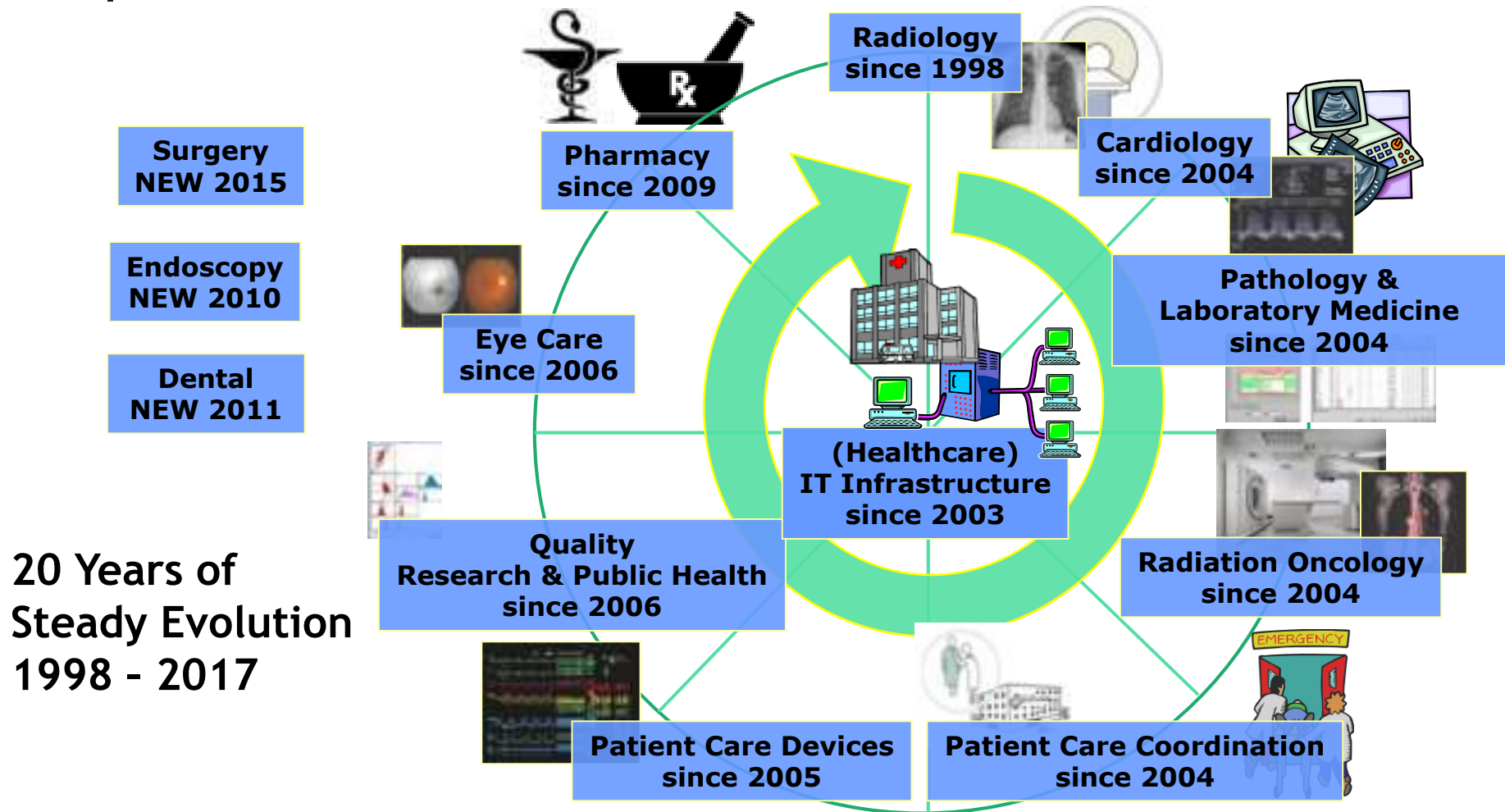**Profiling Organizations Have Emerged**

# IHE Mission

- Enables Standards-based Interoperability:
    - IHE applies existing standards such as HL7, IEEE, DICOM and others to specific healthcare interoperability needs

- Harmonizes Standards:
    - Into implementable specifications called *IHE Profiles*

- Public Forum:
    - All work output developed through a broad, consensus-based committee process and subjected to public review

- Publish and Promote:
    - IHE Technical Frameworks freely available to all, promoted through public demonstrations and education events

- Implement and Test:
    - Rigorous testing process and extensive tool set for implementers

# Who is IHE?

- **More than 510 healthcare-related organizations worldwide**
  - Professional associations, providers, research and educations, vendors, government agencies, SDOs and more
  - View the current membership:
- **Profile development committees in 13 clinical and operational domains**
- **20 national and regional deployment committees who oversee testing activities around the globe**
- http://www.ihe.net
- http://wiki.ihe.net

# IHE Development Domains



Surgery
NEW 2015

Endoscopy
NEW 2010

Dental
NEW 2011

20 Years of
Steady Evolution
1998 – 2017

Pharmacy
since 2009

Radiology
since 1998

Cardiology
since 2004

Pathology &
Laboratory Medicine
since 2004

Eye Care
since 2006

(Healthcare)
IT Infrastructure
since 2003

Radiation Oncology
since 2004

Quality
Research & Public Health
since 2006

Patient Care Devices
since 2005

Patient Care Coordination
since 2004

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# National/Regional Committees

- **IHE Asia-Oceania**
  - ➢ Australia, China, Japan, Korea, Taiwan

- **IHE Europe**
  - ➢ Austria, Finland, France, Germany, Italy, Spain, Switzerland, The Netherlands, Turkey, Luxembourg, United Kingdom

- **IHE North America**
  - ➢ Canada, U.S.A.

# IHE Activities

## IHE…

has three major types of activities:

- ➢ Developing Integration Profiles
- ➢ Conformance testing at Connectathons
- ➢ Developing Certification Programs

# What is an IHE Connectathon?

- Face-to-face interoperability testing event
- Tests implementation of IHE Profiles
- Testing structured and supervised by Technical Project Management Team
- Successful results recorded & published by event sponsors
- Used as preparation for demonstration
- Primary purpose: foster adoption of standards-based solutions in products
- http://www.iheusa.org/connectathon.aspx
- http://www.ihe-europe.net/connectathon/cat-2016

# Connectathon Summary

- Week-long testing event

- Required tests for each profile/actor

- You execute each test with 3 peer systems

- Connectathon monitors examine results

- Cooperative efforts to debug problems and work towards success

- Opportunity to find problems in products and in the profiles

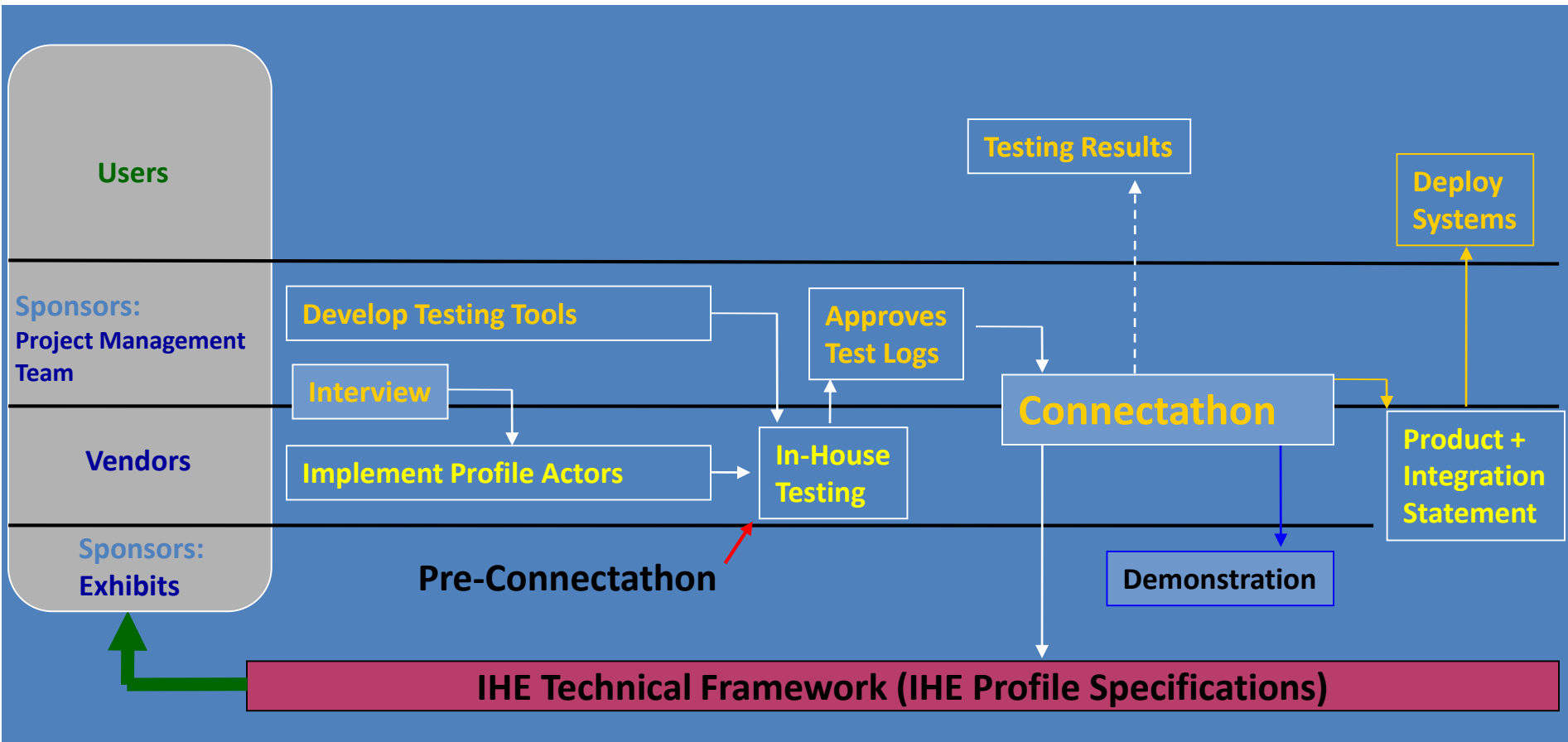- Showcase demonstration practice

# What do results signify?

- Successfully completed tests of IHE actors and integration profiles
    - We do not publish failures
- IHE Connectathon is not a certifying event
    - Connectathon testing does not *certify* product compliance
- Participants are strongly encouraged to test real products and to quickly productize IHE capabilities

# IHE Interoperability Testing

- **Difference between IHE interoperability testing and conformance testing?**

- **Conformance testing**
  - testing a system against IHE profiles or existing standards using testing tools

- **IHE interoperability testing**
  - connecting peer systems on a network and testing the communication and application behavior of those systems

# IHE Connectathon Process

# IHE Connectathon 2017

- ✓ North America Connectathon
  - ❖ 2017. 1. 23 – 27,  Cleveland, USA

- ✓ Europe Connectathon
  - ❖ 2017. 4. 03 - 07,  Venice, Italy

- ✓ Japan Connectathon
  - ❖ 2017. 9. 13 – 17,  Tokyo, Japan

- ✓ Korea Connectathon
  - ❖ 2017. 8. 21 - 25, Daegu, Korea

# IHE NA Connectathon 2017



- Cleveland, USA
- Jan. 23-27, 2017
- 69 organizations
- 115 IT systems
- New Testing Projects
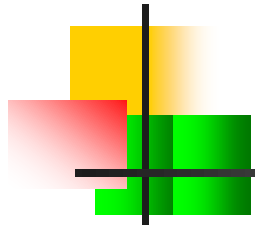  - ✓ Devices on FHIR
  - ✓ mHealth Plug-a-Thon

http://www.youtube.com/watch?v=ozHb9gm1nws
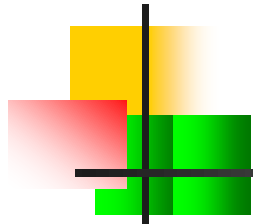
# IHE Korea Connectathon 2016

# IHE Connectathon Results

- ✓ http://connectathon-results.ihe.net

- ✓ http://product-registry.ihe.net

# IHE World Summit

- Pre-conference workshop at HIMSS AsiaPac 17
- 11 September 2017
- Marina Bay Sands, Singapore

# Thank You!

# 감사합니다!

# Q & A ?