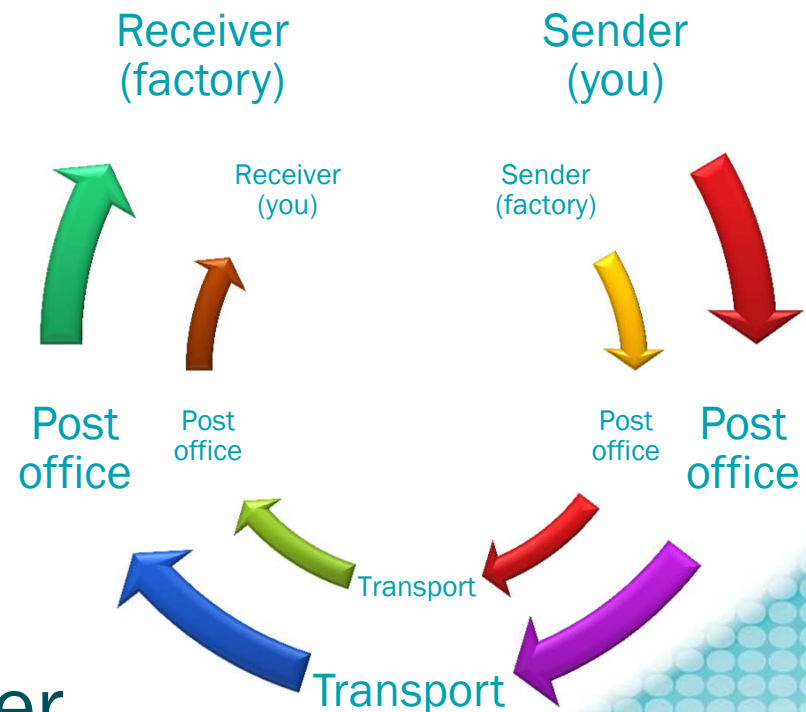


# Components of Laboratory Data Exchange

Dariusht Shirazi  
APHL Annual Meeting  
6/2013

# Components

- Data producer/sender
- Integration Engine
  - Mapping
  - Vocabulary
  - Routing
  - Security
- Data consumer/receiver



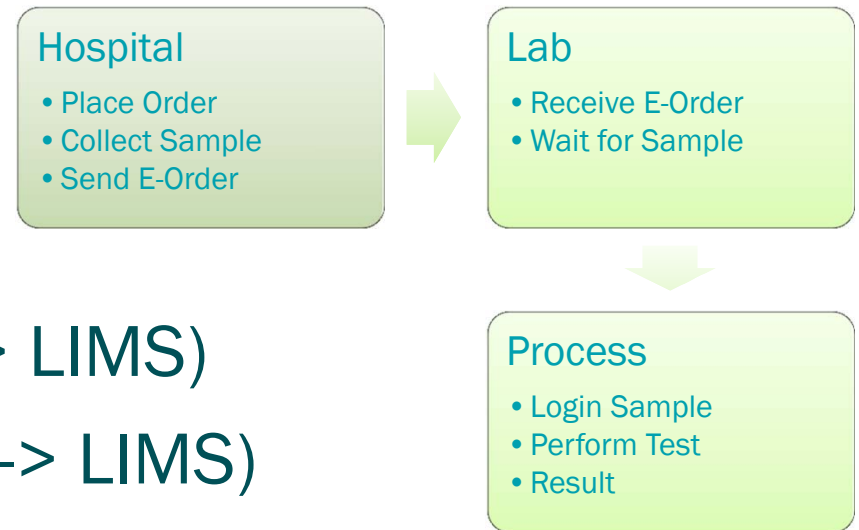
# Data Producer/Sender

- Order

- Hospitals (EMR -> LIMS)
- Clinics (EMR/EHR light -> LIMS)
- Labs to other labs (LIMS -> LIMS)
- Environmental Agencies (Various -> LIMS)

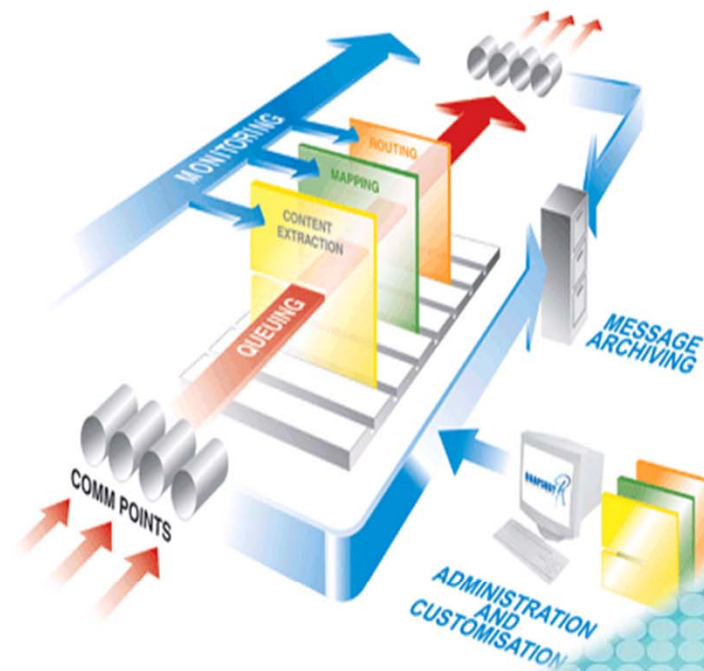
- Result

- PHL & Clinical Labs (LIMS -> EMR/LIS/ELR)
- PHL & Environmental Labs (LIMS -> Regulatory/Client)



# Integration Engine

- Integration/Interface Engine (IE) is a software tool that connects different systems together and allows them to become interoperable
  - Structure mapping
  - Vocabulary mapping
  - Validation
  - Message Encryption
  - Message Routing
  - Delivery Management



# Structure Mapping

- XML (Extensible Markup Language)
  - Good for carrying data
  - Self descriptive
  - Easy additions
  - Can have validation (Schema, DTD)
  - Standard for many business transactions
  - HL7 V3.0 & CDA are based on XML

```
<joke format = 'cross-the-road'>  
  <subject>rabbit</subject>  
</joke>
```

```
<recordTarget>  
  <patientClinical>  
    <id root="2.16.840.1.113883.19.1122.5"  
      extension="444-22-2222"  
      assigningAuthorityName="Lab Patient IDs"/>  
    <patientPerson>  
      <name use="L">  
        <given>Eve</given>  
        <given>E</given>  
        <family>Everywoman</family>  
      </name>
```

# Structure Mapping

- HL7
  - Standard for clinical exchange
  - Very structured/Easy to parse
  - Good suggestions on places for data
  - Commonly used in US Labs

**MSH**|^~\&|GHH LAB|ELAB-3|GHH  
 OE|BLDG4|200202150930||ORU^R01|CNTRL-  
 3456|P|2.4

HEADER

**PID**|||555-44-  
 4444||EVERYWOMAN^EVE^E^^^L|  
 JONES|19620320|F|||153 FERNWOOD DR.^  
 ^STATESVILLE^OH^35292|| (206)3345232|(20  
 6)752-121|||AC555444444||67-  
 A4335^OH^20030520

PATIENT

**OBR**|1|845439^GHH OE|1045813^GHH  
 LAB|15545^GLUCOSE^L|||200202150730|||  
 |||||555-55-5555^PRIMARY^PATRICIA  
 P^^^^MD^^|F|||||444-44-  
 4444^HIPPOCRATES^HOWARD H^^^^MD

OBSERVATION  
 REQUEST

**OBX**|1|SN|1554-5^GLUCOSE^POST 12H  
 CFST:MCNC:PT:SER/PLAS:QN^LN||^182|mg/dl|  
 70\_105|H|||F

OBSERVATION  
 SEGMENT

# Vocabulary Mapping

- Local code

- Easy to set up and use
- Proprietary
- Will not scale

Test code order: 155^GLUCOSE and Protein in Urine^L

Resulted test code: 15545^GLUCOSE in Urine^L  
Coded result: Det^Glucose detected in Urine^L

- LOINC,SNOMED,CAS#

- Interoperable
- Need Vocab specialist
- Need system infrastructure

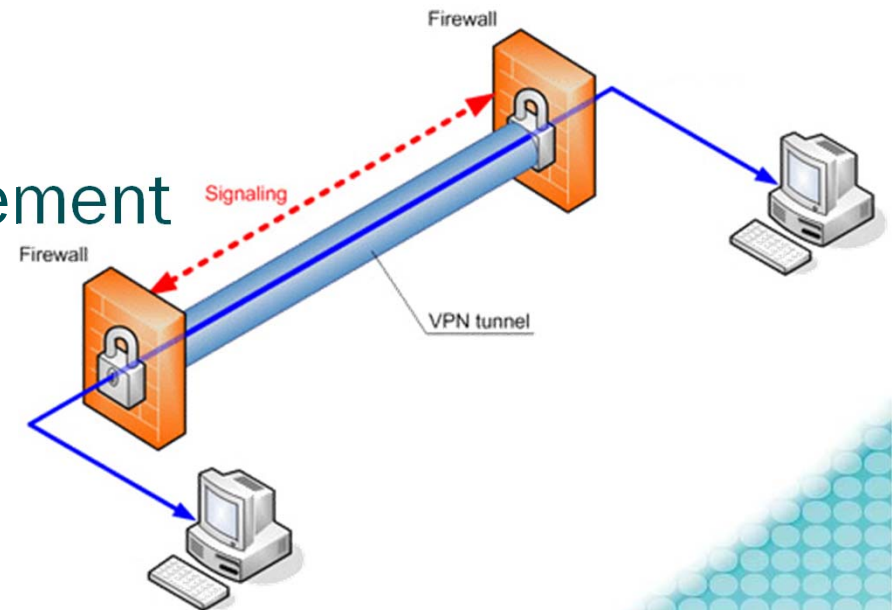
Test code order: 25428-4^ Glucose [Presence] in Urine by Test strip^LN

Resulted test code: 25428-4^ Glucose [Presence] in Urine by Test strip^LN

Coded result: 260373001^ detected^SCT

# Message Encryption/Security

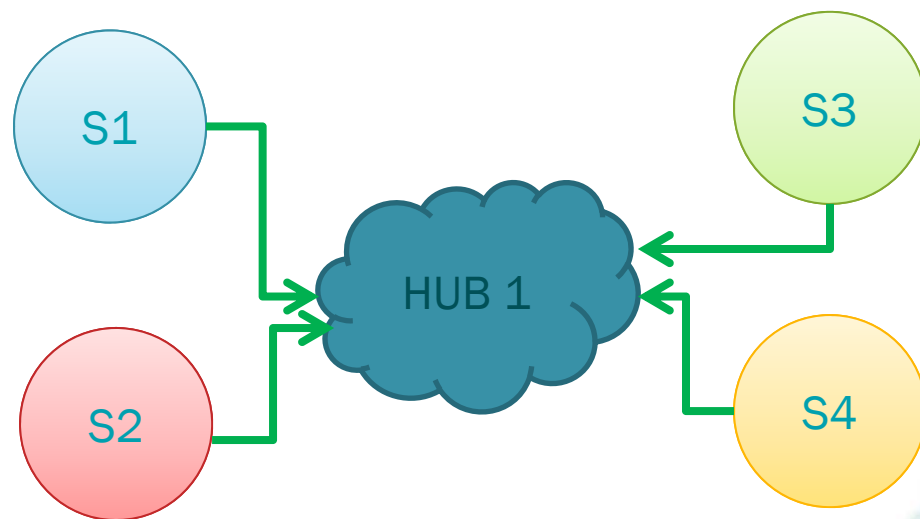
- Transport Security
  - VPN, HTTPS (SSL), SFTP
  - Network/Admin management
  - Automatic/1 time setup
- Message Encryption
  - Shared key
    - Simple setup, not scalable
  - Public/Private key
    - Known Sender/Receiver





# Message Routing

- Point to point
  - Commonly used by most hospitals
- RnR Hub
  - Only one route
  - Better security
- Direct project
  - Common protocol (email)
  - Hub model



# Data Consumer/Receiver

- Same needs as Producer
  - Structure mapping
  - Vocabulary mapping
- Message Validation
  - Structural
  - Content
- Error management
  - Notification
  - Resend



# Take Home

- Data exchange is challenging
- You need resources
  - Someone that understands your LIMS
  - Someone that understands vocabulary
- It is easier with tools
- Ongoing, never ending



"NO YOU CAN'T ASK A QUESTION."

# Contact Info



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