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Information Distribution Approaches

Greg Pfister

Manager, Clinical Systems Development

Northrop Grumman

HEALTH

DEFINING THE FUTURE

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Overview

➢High Level Overview

➢Common Issues

➢Panel Issues

High Level Overview

Given the requirement for the support of unsolicited data ("push"), there is a critical need to identify the destination(s) of the message.
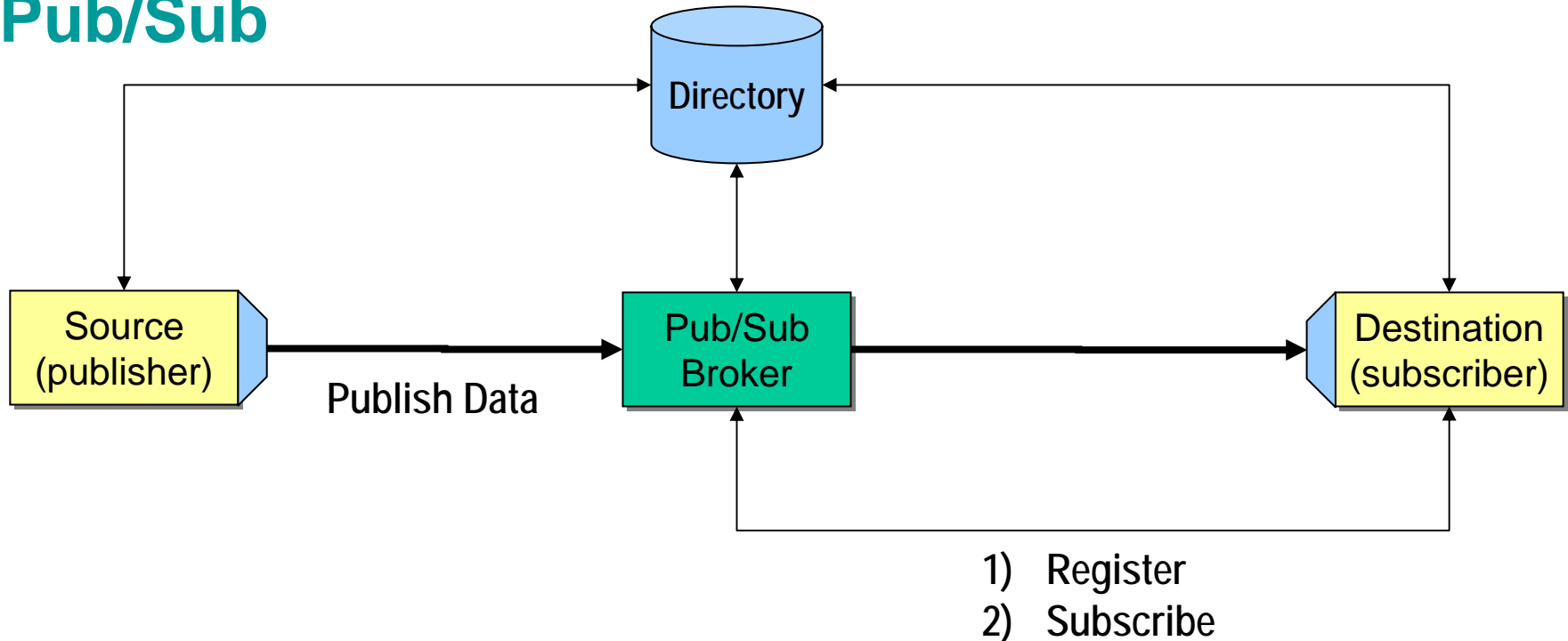
There are two basic ways to do that:

(1) destination specifically determined by the sender ("point-to-point" *[store and forward]*)

    (1) This approach may be appropriate for the delivery of Lab data 'copy/to'

(2) destination determined by the receivers ("publish/subscribe")

    (1) This approach may be appropriate for the distribution of BioSurveillance related data.

There are a myriad of approaches to support these models.

Perhaps both models are necessary.

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Pub/Sub

Directory

Source (publisher) → Publish Data → Pub/Sub Broker → Destination (subscriber)

1) Register
2) Subscribe

•The Directory is 'shared' in some way (Federated, Centralized, Distributed, etc)

•Publishers post messages to the Pub/Sub Broker.

•Subscribers register and subscribe with the Pub/Sub Broker.

•When data arrives, the Pub/Sub Broker evaluates the attributes associated with the data to determine a 'match' with the registered subscribers. If it does, then it is delivered to the subscriber.
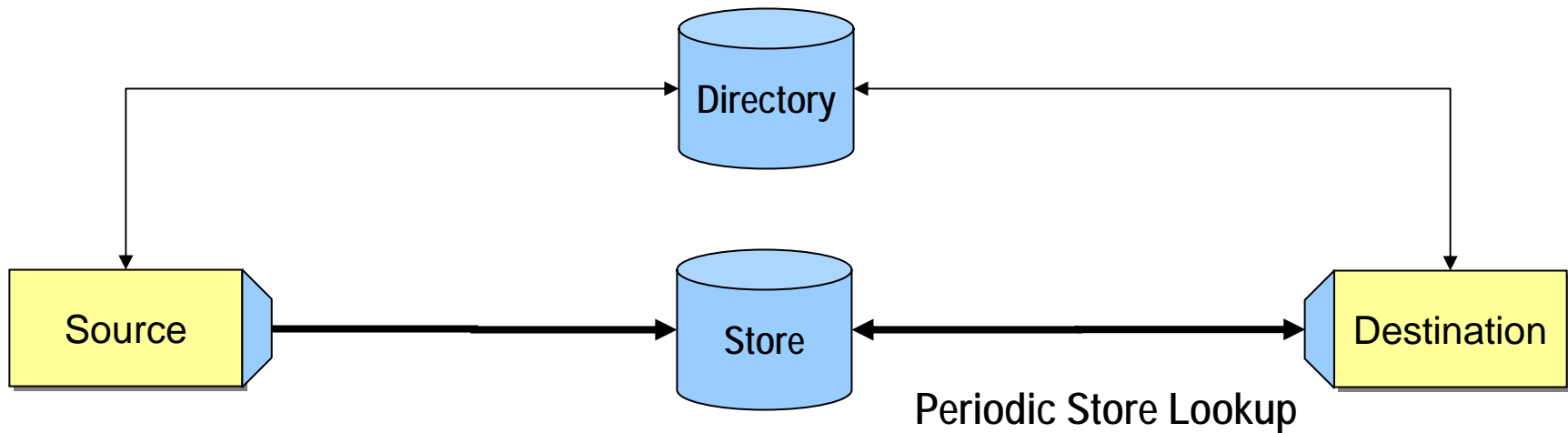
Pub/Sub

Pros

- Loosely coupled model
- Better scalability
- Bandwidth throttling capable
- Accommodates network topologies
- Closer to real-time

Cons

- Intended for large 'subscriber' base (many subscribers for same data)
- Granularity of topics

Store and Forward

Directory

Source

Store

Destination

Periodic Store Lookup

•The Directory is 'shared' in some way (Federated, Centralized, Distributed, etc)
•The Store in this diagram is 'logical'. It may be centralized like an email server, or it may be queue base and located at the source or destination.
•The Destination periodically polls for new data.

Store and Forward

Pro	Con
▪Better positioned for 'workflow' solutions	▪Typically a polling model
▪Simple model	▪Typically, data is stored at an intermediary
▪Destination in control of frequency of arrival of data	▪Typically, not 'real-time'

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Common Issues with 'Push'

➢ Destination Identification
- ➢ Difficult to maintain
- ➢ Difficult for senders to identify destinations (usability, large list)
- ➢ Forwarding addresses ?

➢ Pushing of Data
- ➢ Notifications
  - ➢ lower risk (not the data)
  - ➢ Retrieval of data resorts to 'pull model'
- ➢ Messages
  - ➢ Higher risk (patient data)
  - ➢ System Delivery or Individual delivery
  - ➢ Public Key model?
  - ➢ Explicit relationships between source of data and destination

➢ Security/Authentication/Authorization
- ➢ Trusted Source
- ➢ Trusted Destination
- ➢ Patient Consent
  - ➢ Can/Should the patient control who/what can receive pushed data?

Panel Issues

Issue #1 - Provider and organizational directories needed to support routing of messages

➢Common Concerns

   ➢Directory related issues
   - ➢Maintaining directories in a distributed, federated, centralized models
   - ➢Directory Management
   - ➢Providers may be associated with more than one organization

   ➢Routing related issues
   - ➢Routing requires that data is tagged with appropriate destinations at source
   - ➢Usability concerns
     - ➢Access to directory services for appropriate tagging at the source system?
     - ➢Providers do not want 'messages' arriving at facilities not involving the patient in question.
     - ➢Providers may want 'notification' of information for a patient regardless of facility.

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Issue #2 - Differing authentication needs for push strategies

➢ Common Concerns
  ➢ Trust relationships between the source and destination
  ➢ Pre-established or Directory based public key lookup.
  ➢ Patient Consent?
➢ Store/Forward
  ➢ Typical of smaller distributions
  ➢ Typically, authorization is granted per message (indicated by addressee) at the source
  ➢ Sender may use recipient's public key (more formal relationship)
➢ Pub/Sub
  ➢ Typical of larger distribution lists, frequent updates
  ➢ Requires authorizing subscribers
  ➢ Subscribers typically register for topics prior to data being sent.
  ➢ Typically, authorization is in granting access to subscription, not message.
➢ Differing levels of authentication required for notification vs. message
  ➢ A notification is less 'sensitive'. Retrieving data would require more rigorous authentication.
  ➢ Subsequently, the receiver of the notification enters into the 'pull' paradigm regardless of method used for notification (Pub/Sub or Store and Forward).

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Issue #3 - Matching the provider and the delivery address

➢Common Concerns
  ➢This is the heart of the issue.
    ➢The source of the data must identify the intended recipient(s)
    ➢The intended destination must be identified
  ➢A provider's qualified delivery address may vary
    ➢Provider may work at several 'clinics'
    ➢Appropriate clinic may depend on entity/provider/patient relationship

Issue #4 - Approaches to notifications for the availability of the data

➢ **Destination Considerations**
  - ➢ Individual
    - ➢ Services that can follow the individual from site to site (i.e. secure Instant Message with presence)
    - ➢ Services that can be used outside of EHR system (i.e. Blackberry, pocket device, etc)
  - ➢ System
    - ➢ Services where data is sent to the 'system' (e.g. EHR) tagged for the provider
    - ➢ Rely on EHR/System to notify provider

➢ **Approaches to Receive Notification**
  - ➢ Email
  - ➢ Instant Messaging (XMPP)
  - ➢ Destination System