

Cross-Community: Peer-to-Peer sharing of healthcare information

IT Infrastructure Planning Committee
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Outline

- **Defining the Cross-Community vision**
- **Cross-Community Patient Discovery (XCPD) – locating communities for patients and correlating patient identifiers**
- **Cross-Community Access (XCA) – query and retrieve patient data**
- **Other profiles used in a cross-community environment**

Timeline of ITI vision for Cross-Community

- **2006 – initial Cross-Community Vision**
 - Why is XDS not enough?
 - 2006 Whitepaper published
 - Community defined
 - Models of communication
 - Future IHE profiles
- **2007 – Cross-Community Access Profile (XCA)**
 - Defines query & retrieve peer-to-peer model
- **2008 – updated Cross-Community Vision**
 - Whitepaper refining and expanding vision from 2006
- **2009 – Cross-Community Patient Discovery Profile (XCPD)**
 - Defines transactions for discovery of patient locations and identification
- **2010 – Cross-Community use of XDR**
 - Anecdotal use of XDR in peer-to-peer environments

Why extend XDS?

- **XDS only addresses document sharing within an XDS Affinity Domain**
- **Cross-Community addresses the questions:**
 - How to share documents between XDS Affinity Domains?
 - How to share documents with non-XDS Affinity Domains?

What is Cross-Community

● Community

- **Definition:** *A community is defined as a coupling of facilities/enterprises that have agreed to work together using a common set of policies for the purpose of sharing clinical information via an established mechanism.*
- XDS Affinity Domain is an example of a community. Community expands the scope to include sharing of clinical information by a mechanism OTHER than XDS.

● Cross-Community

- Transactions that support sharing of clinical information across Community boundaries.
- Cross-Community is a peer-to-peer environment where information is exchanged between gateways which each represent a community.
- Typically a national or regional organizing body defines policies for the exchange.

Cross-Community support Infrastructure

- **Require method for finding communities of interest**
 - Local configuration files
 - DNS type discovery
 - UDDI Registry
 - Healthcare Provider Directory (see Provider presentation)
 - Patient Specific Health Data Locator (see XCPD)
 - Etc.
- **Require transactions between Community Gateways**
 - To resolve patient identifiers
 - To query by patient identifier
 - To retrieve documents
 - Etc.
- **Patterns of communication**
 - Targeted – initiator knows where to target the request.
 - Broadcast – initiator uses a group of communities of interest and sends queries to each

Existing IHE profiles used in XC environments

- **Cross Community Patient Discovery (XCPD)**
 - Profiled in 2009
 - the means to locate communities which hold patient relevant health data and
 - the translation of patient identifiers across communities holding the same patient's data.
- **Cross Community Access (XCA)**
 - Profiled in 2007
 - Query and retrieve of patient related clinical information
- **Cross-Enterprise Document Reliable Interchange (XDR)**
 - Existing profile applied to Cross-Community environment
 - Push of information
- **Cross-Enterprise Media Interchange (XDM)**
 - Existing profile applied to Cross-Community environment
 - Push of information



XCPD

Cross-Community Patient Discovery

XCPD Introduction

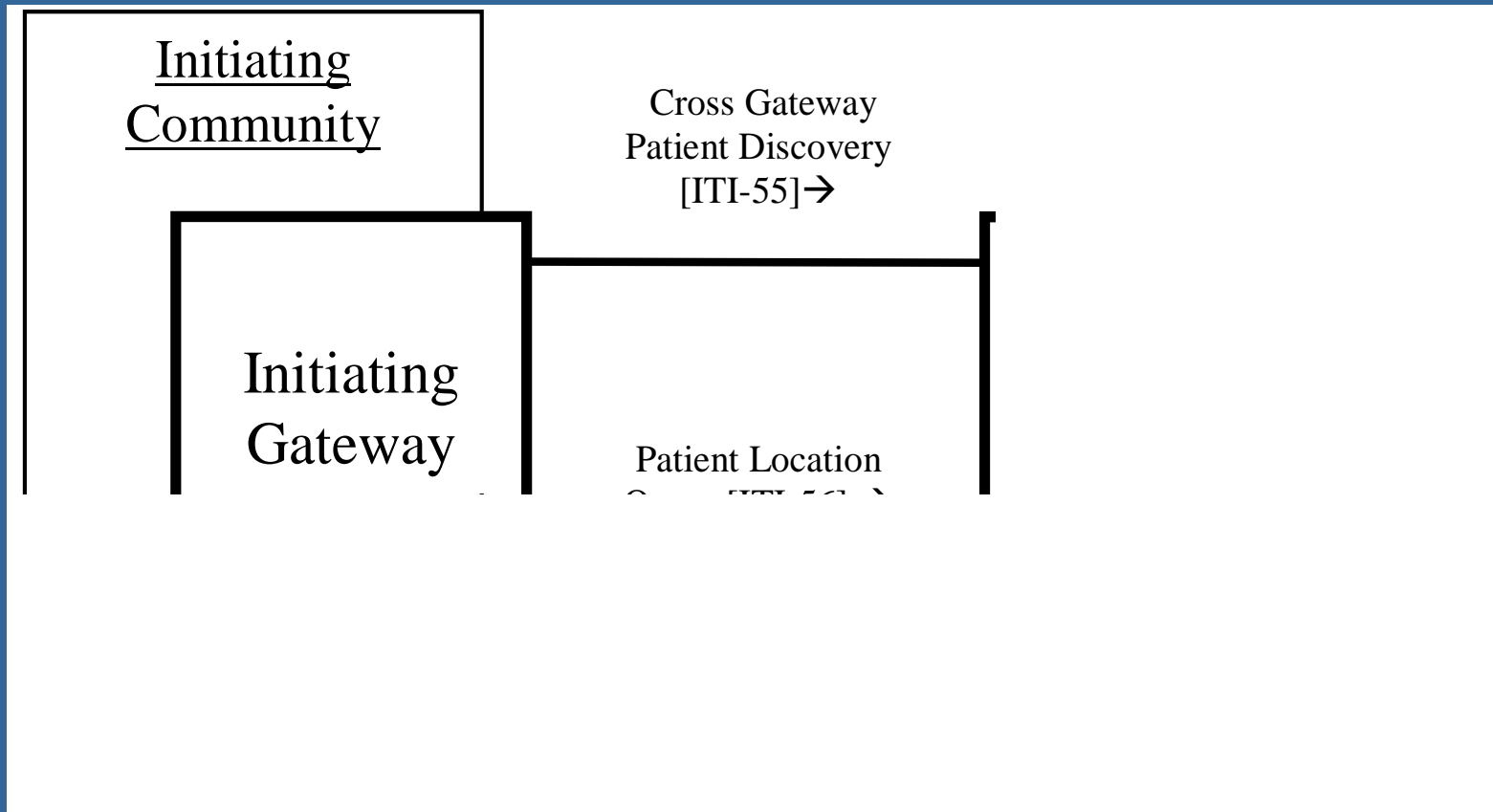
● The Cross-Community Patient Discovery (XCPD) profile supports:

- the means to locate communities which hold patient relevant health data and
- the translation of patient identifiers across communities holding the same patient's data.

XCPD Problem Statements

- **Multiple primary residences** — patients sometimes maintain more than one primary residence and may get care in more than one community. To delivery quality care the communities will need to exchange data about this type of patient.
- **Patient Move** — patients move from one community to another and healthcare data needs to be exchanged.
- **Vacationer** — patients travel away from their primary location for vacation and business reasons. Care may be necessary in another community and healthcare data must be exchanged to facilitate that care.

XCPD Actors and Transactions



XCPD Actors and Transactions Defined

● Actors

- Initiating Gateway
 - On behalf of internal actors, initiates all transactions leaving the community
 - initiates the new XCPD transactions
 - does not need to be grouped with XCA Initiating Gateway
- Responding Gateway
 - Single contact point for all transactions coming in to the community.
 - responds to the new XCPD transactions
 - does not need to be grouped with XCA Responding Gateway

● Transactions

- Cross Gateway Patient Discovery – discover mutually known patients.
- Patient Location Query – query Responding Gateway which supports Patient Locations for the particular patient for a list of communities which may have relevant health data.

XCPD Options

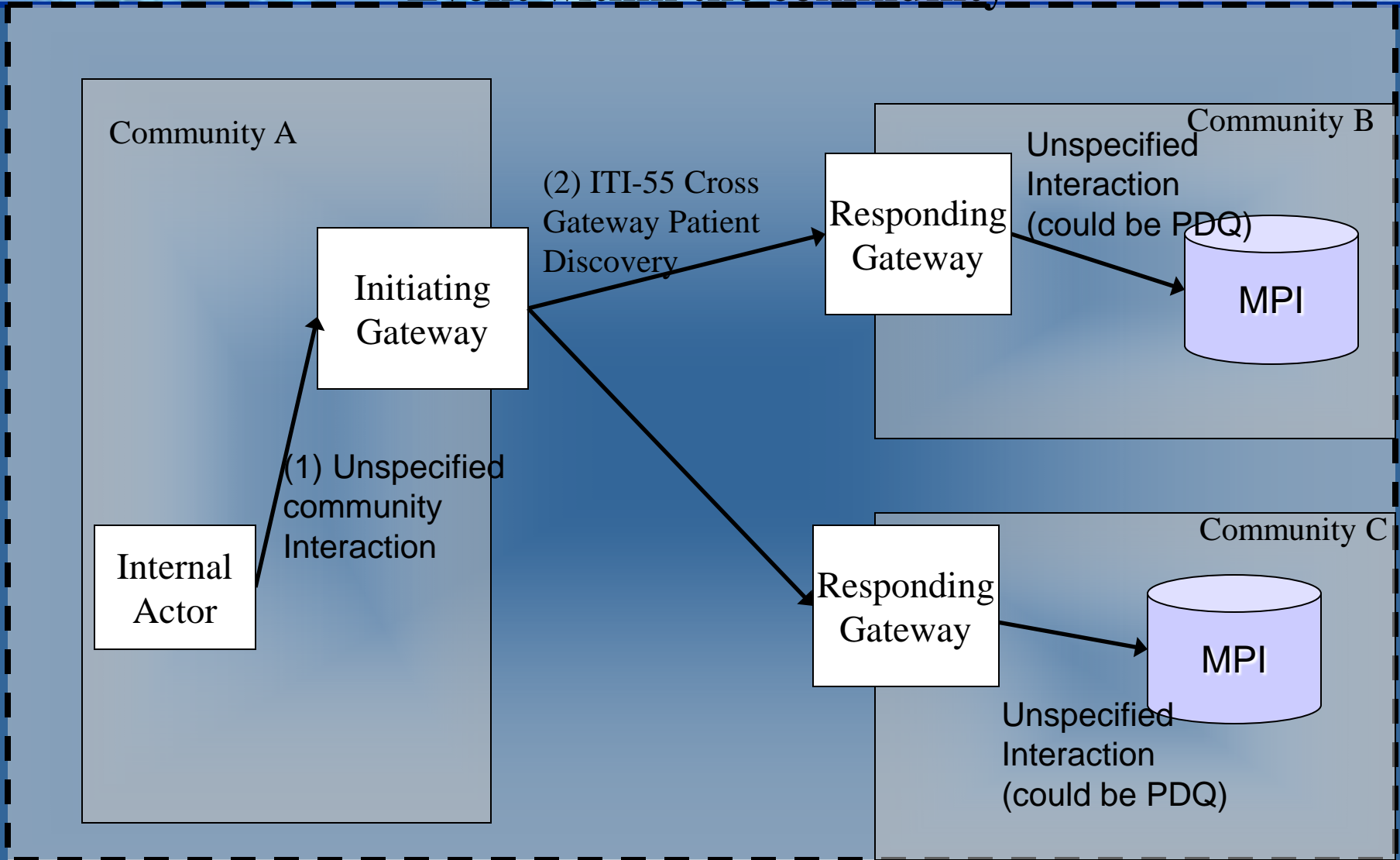
- **Health Data Locator – collects locations of health data for selected patients. Provides access to this data by other communities via the Patient Location Query.**
- **Revoke – invalidate cached patient correlations**
- **Asynchronous Web Services Exchange – short term delayed response**
- **Deferred Response – longer term delayed response**

XCPD Process Flow

- **Patterns of XCPD use:** (see XCPD Section 27.3.2 for detailed descriptions)
 - In response to an event within the community, for instance a patient registration
 - As part of responding to ITI-18 Registry Stored Query
 - Creating and sharing Health Data Locator
- **Identifying target Responding Gateways –** XCPD does not identify how this is done but some approaches are:
 - a static configuration file
 - service or provider directory lookup
 - known set based on patient identifier

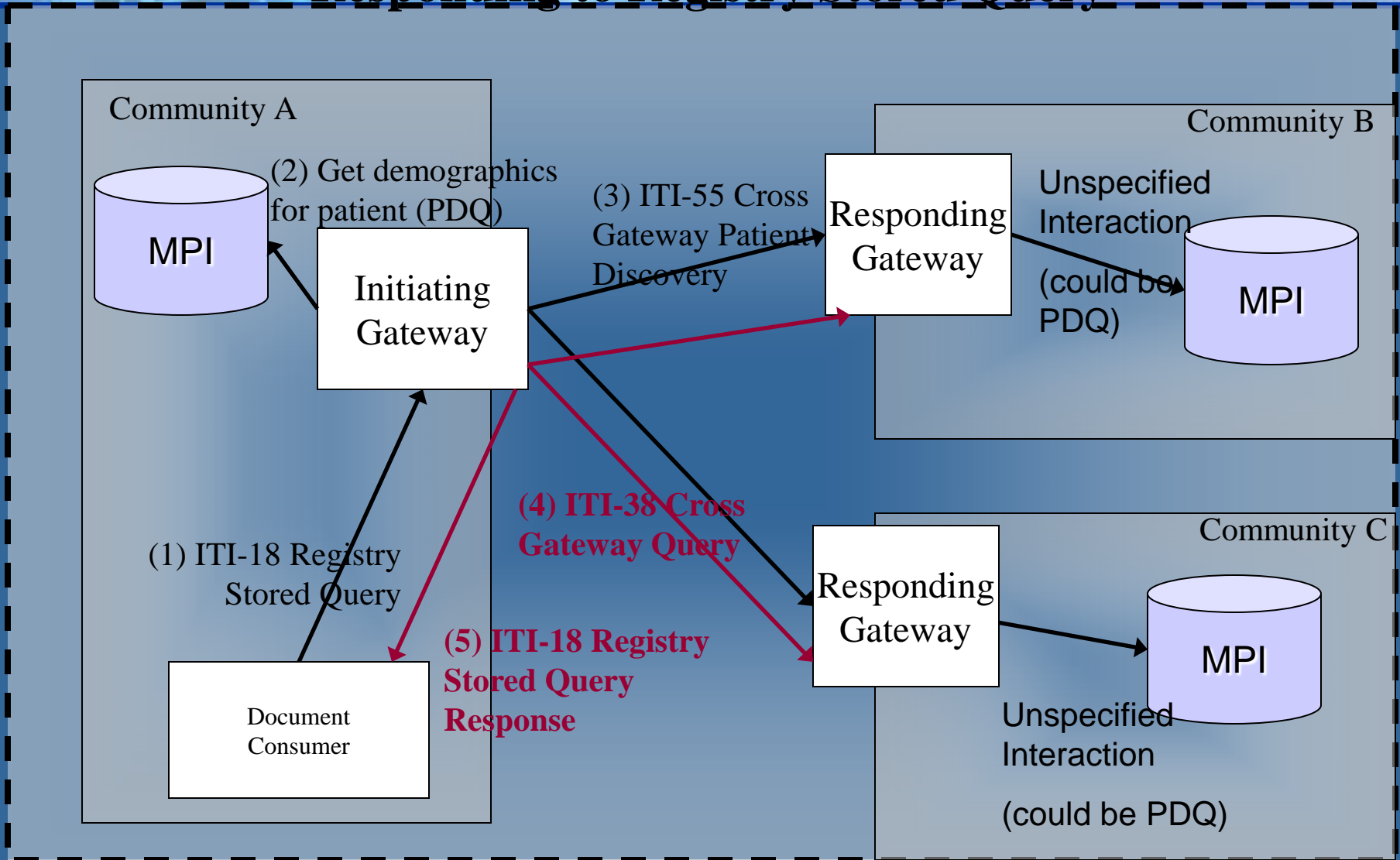
XCPD Process Flow

Event within the community



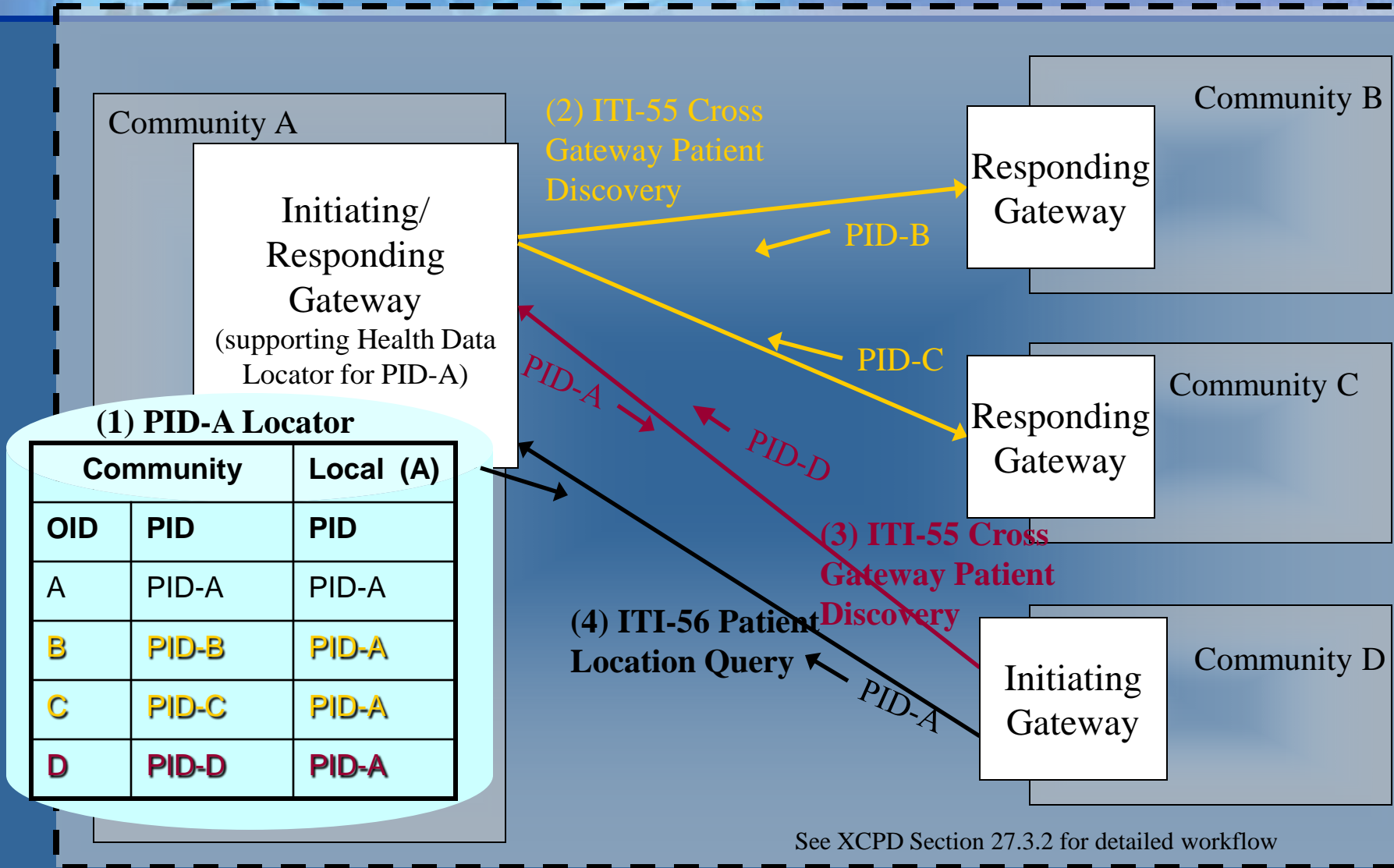
XCPD Process Flow

Responding to Registry Stored Query



XCPD Process Flow

Use of Health Data Locator



Cross Gateway Patient Discovery Transaction

- **Mutual discovery of patients - dual purposes:**
 - Query requesting demographic match
 - Feed announcing known patient
- **Result is patient identifier correlations, potentially in both initiating and responding side**
- **Different modes used in different environments:**
 - Demographic Query only
 - Demographic Query and Feed
 - Shared/National Patient Identifier Query and Feed
- **Includes a revoke message for remove correlations found through this transaction**
- **Supports both asynchronous and synchronous transport**

Cross Gateway Patient Discovery Transaction Standards

- **Based on HL7 V3 Patient Administration DSTU, Patient Topic**
 - Patient Registry Query by Demographics
 - Patient Registry Find Candidates Response
 - Patient Nullify
- **Design started with PDQ V3 Query (incomplete list of differences with PDQ V3):**
 - asynchronous web services exchange
 - mutual discovery of patient identifier correlations
 - special error codes
 - requiring name and gender
 - supports MothersMaidenName and PrincipalCareProviderId
 - specification of homeCommunityId and Community patient id assigning authority.
 - Etc.

Patient Location Query

- Request for list of communities that may have healthcare data for a specified patient
- Request includes a single patient identifier known by the responder
- Response includes a list of triples
 - homeCommunityId – identifies community which may have data for the patient
 - CorrespondingPatientId – identifies the patients identifier within homeCommunityId
 - RequestPatientId – same as request parameter
- Standards
 - Based on Appendix V IHE Web Services
 - Content defined by IHE schemas
 - Chose not to use HL7 or ebXML because the simplicity of the request/response content did not warrant complex content

XCPD Security/Privacy

- **ATNA Secure Node required – auditing and secure communication**
- **CT Time Client required – consistency of time in audit log**
- **Implementer must use network protection to guard against denial of service attacks**
- **Policy neutral profile - many policy decision required**

XCPD References

- **Trial Implementation status**
- **Primary Content**
 - XCPD Supplement
- **Underlying Technical Framework Content**
 - ITI TF-2x
 - Appendix E – use of II data type for patient identifiers
 - Appendix O “HL7 v3 Transmission and Trigger Event Control Act Wrappers”
 - Small update within XCPD Supplement
 - Appendix V “Web Services for IHE Transactions”
 - Small update within XCPD Supplement



XCA

Cross-Community Access

XCA Introduction

- **The Cross-Community Access (XCA) profile supports:**
 - the means to query and retrieve patient relevant medical data held by other communities.
- **Guiding principles and scope:**
 - *Sharing of documents across communities*
 - *Re-use of XDS.b transactions.*
 - *Document Consumer consistency*
 - *Requirements of Document Consumer are the same as for local document query and retrieval*
 - *Out of scope:*
 - *How to identify which communities to interact with*
 - *How to identify the patient id to use when interacting*
 - *XCPD supplies solutions to both of the above*

XCA Problem Statements

(same as XCPD)

- **Multiple primary residences** — patients sometimes maintain more than one primary residence and may get care in more than one community. To delivery quality care the communities will need to exchange data about this type of patient.
- **Patient Move** — patients move from one community to another and healthcare data needs to be exchanged.
- **Vacationer** — patients travel away from their primary location for vacation and business reasons. Care may be necessary in another community and healthcare data must be exchanged to facilitate that care.

XCA Transaction Diagram

Initiating Community

Responding Community

Initiating
Gateway

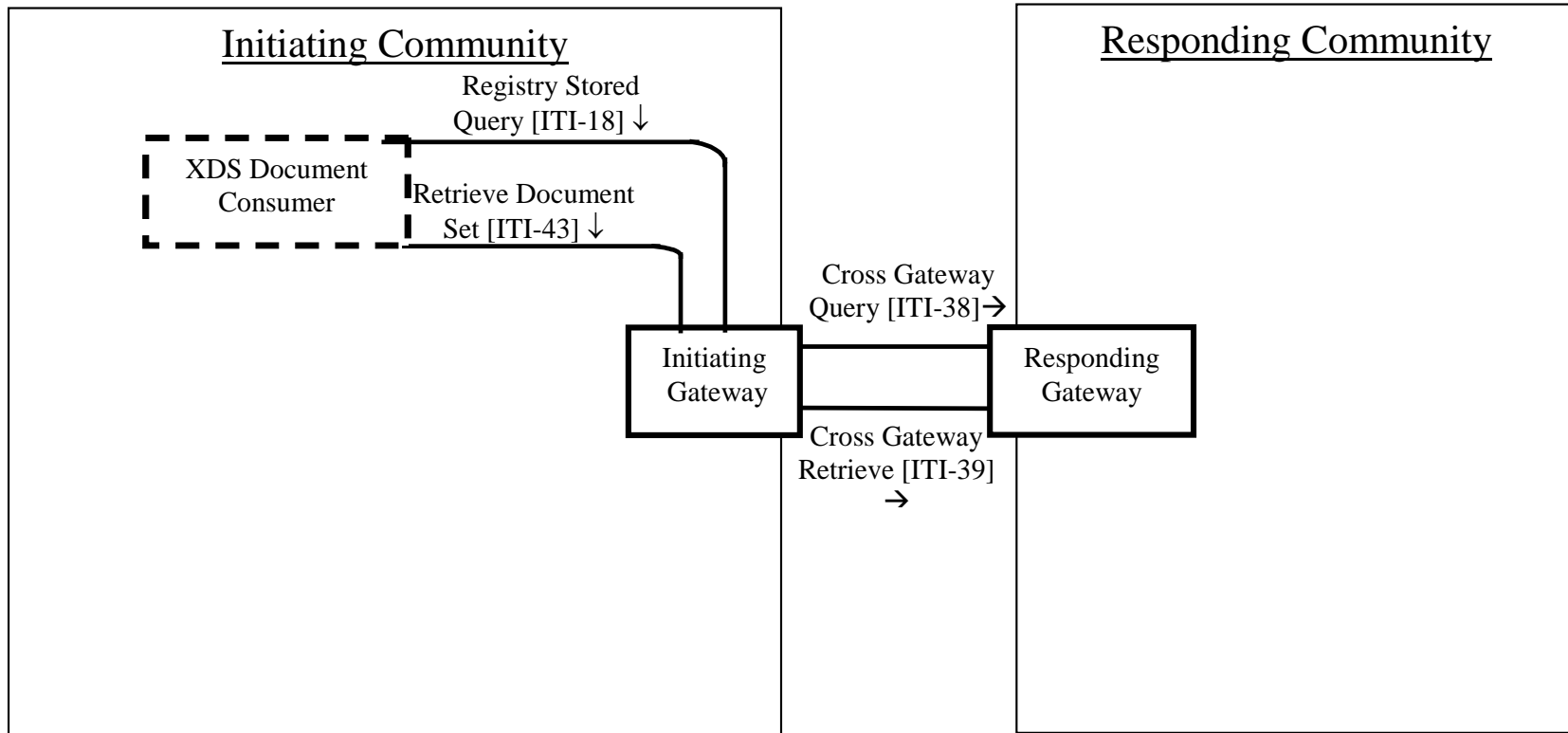
Responding
Gateway

Cross Gateway
Query [ITI-38] →

Cross Gateway
Retrieve [ITI-39]
→

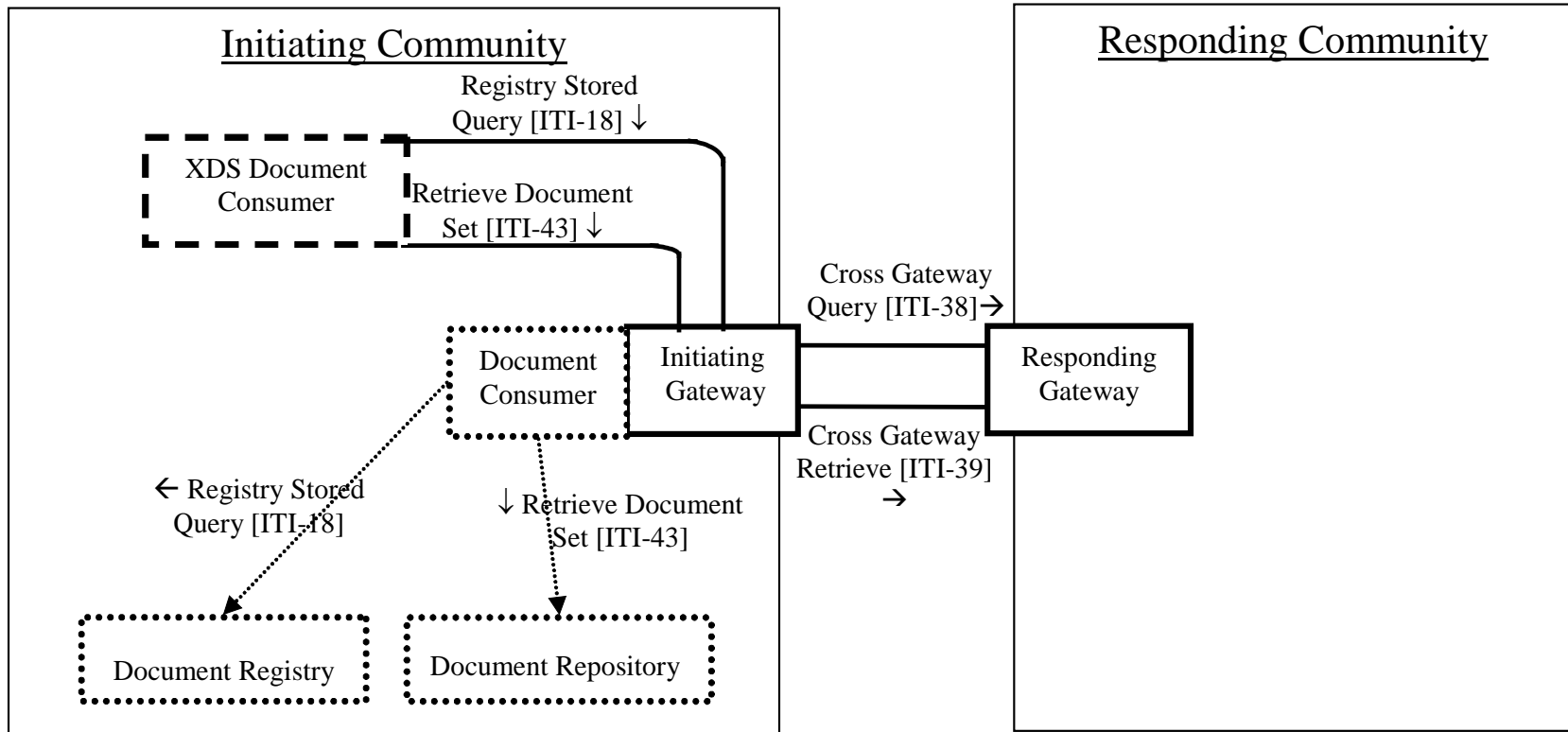
XCA Transaction Diagram

With XDS Affinity Domain Option



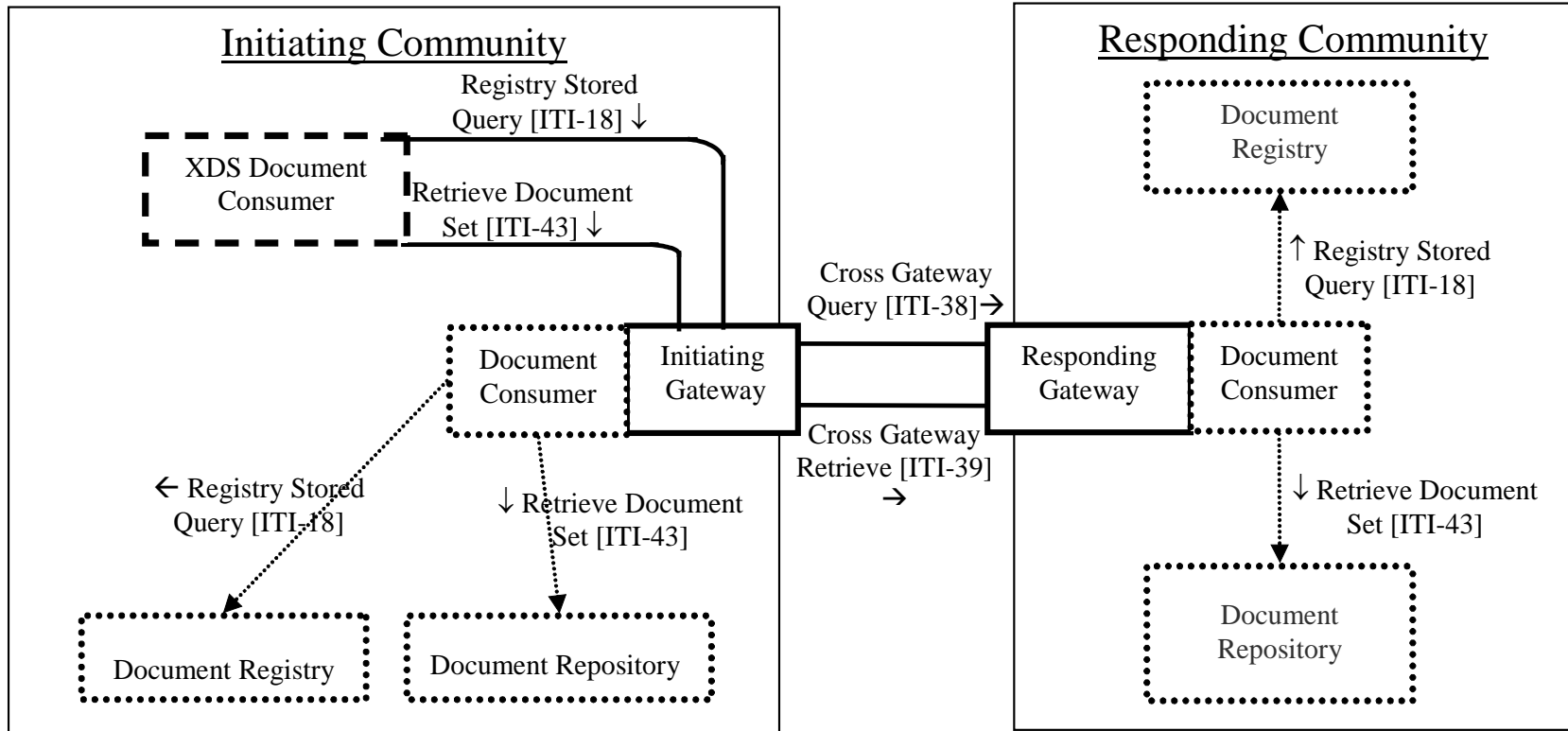
XCA Transaction Diagram

Initiating Grouped with Doc Consumer



XCA Transaction Diagram

Responding grouped with Doc Consumer



Cross Community Access

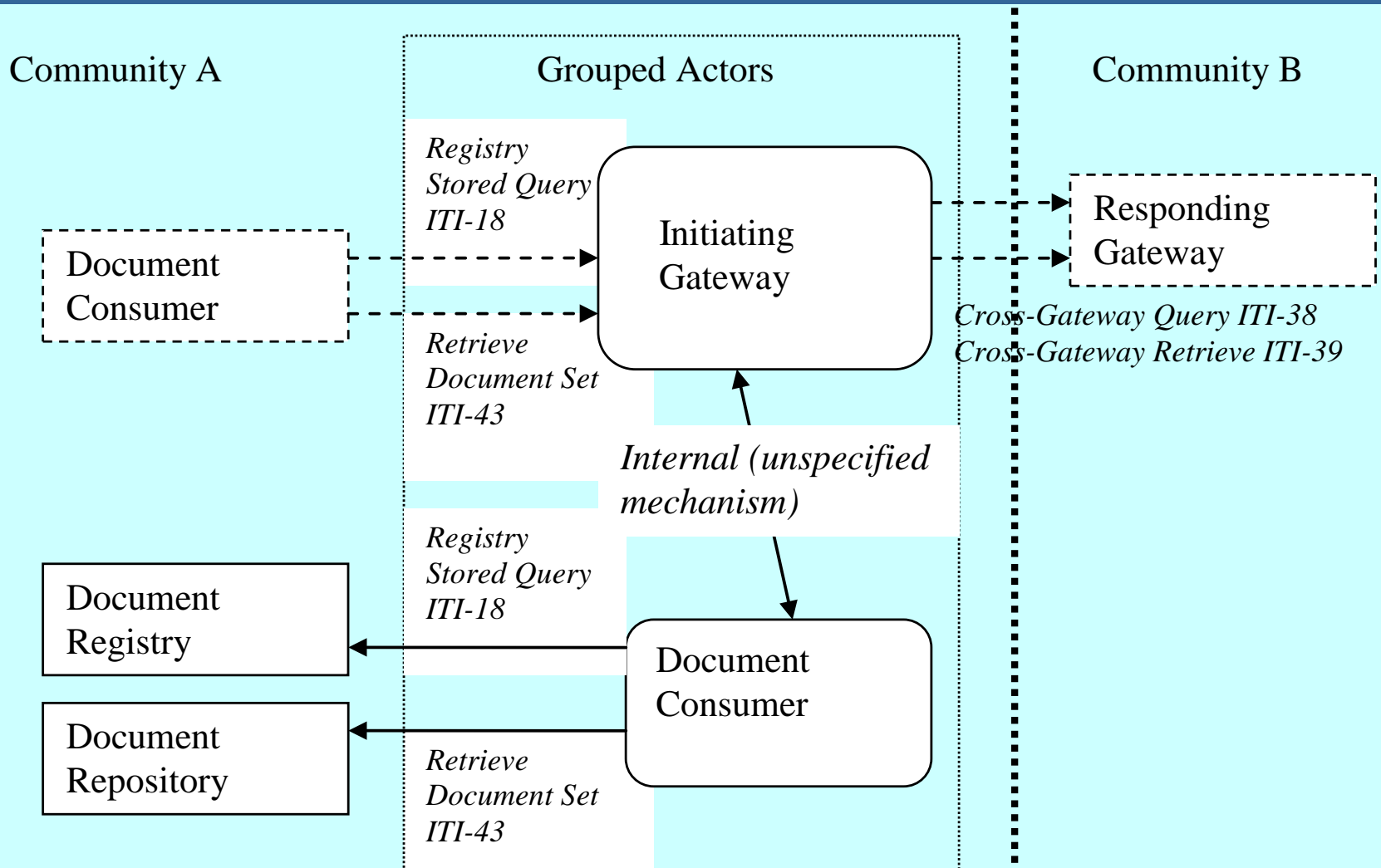
Actors

- **Initiating Gateway - on behalf of internal actors, initiates all transactions leaving the community**
 - Receives Registry Stored Query and Retrieve Document Set from Document Consumer
 - Propagates transaction to local Document Registry and Repository, if grouped with Document Consumer
 - Propagates transaction to other communities by contacting their Responding Gateway and sending: Cross Gateway Query and Cross Gateway Retrieve
 - In propagating the transaction the Initiating Gateway must identify a set of Responding Gateways to contact and must translate patient identifiers for each Responding Gateway
 - does not need to be grouped with XCPD Initiating Gateway
- **Responding Gateway**
 - Single contact point for all transactions coming in to the community.
 - Propagates incoming transactions to local actors
 - does not need to be grouped with XCPD Responding Gateway

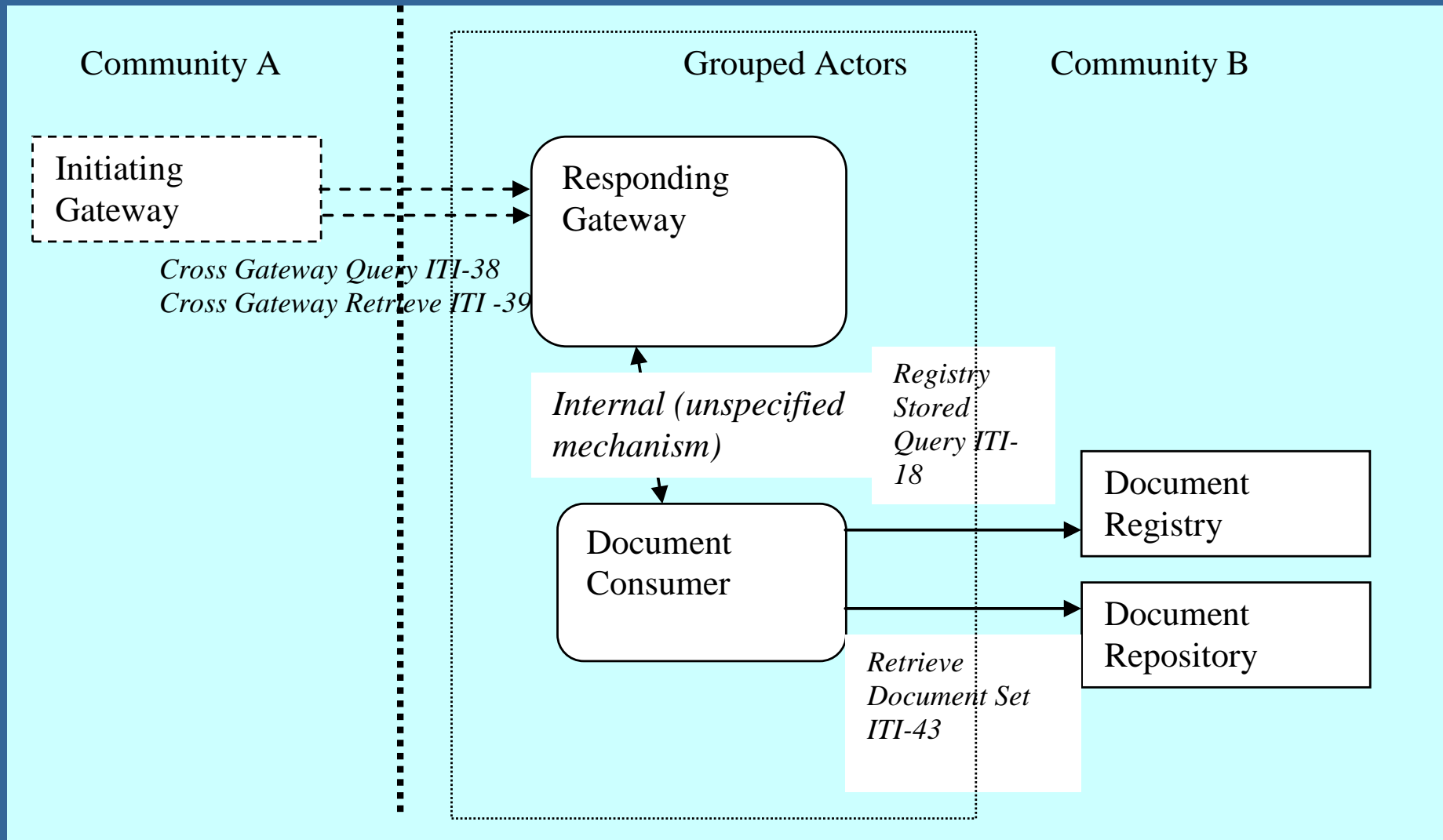
XCA Transactions and Options

- **New Transactions:**
 - Cross Gateway Query: from Initiating Gateway to Receiving Gateway, mimics Registry Stored Query
 - Cross Gateway Retrieve: from Initiating Gateway to Receiving Gateway, mimics Retrieve Document Set
- **Document Consumer**
 - Supports Registry Stored query and Retrieve Document Set
 - Supplies the homeCommunityId by propagating it from prior Registry Stored Query response
- **XDS Affinity Domain**
 - Initiating Gateways interact with Document Consumers within the XDS Affinity Domain served by the Initiating Gateway.
 - Initiating Gateways receive Registry Stored Query transactions
 - Initiating Gateways receive Retrieve Document Set (ITI-43) transactions
 - If an Initiating Gateway does not support the XDS Affinity Domain option it is expected to be using non-IHE specified interactions to communicate remote community data to systems within its local community. These proprietary interactions are not further described within any IHE profile.
- **Asynchronous Web Services Exchange**
 - Support for short term delayed response
 - Uses Web Services SOAP headers

Initiating Gateway grouped with Document Consumer

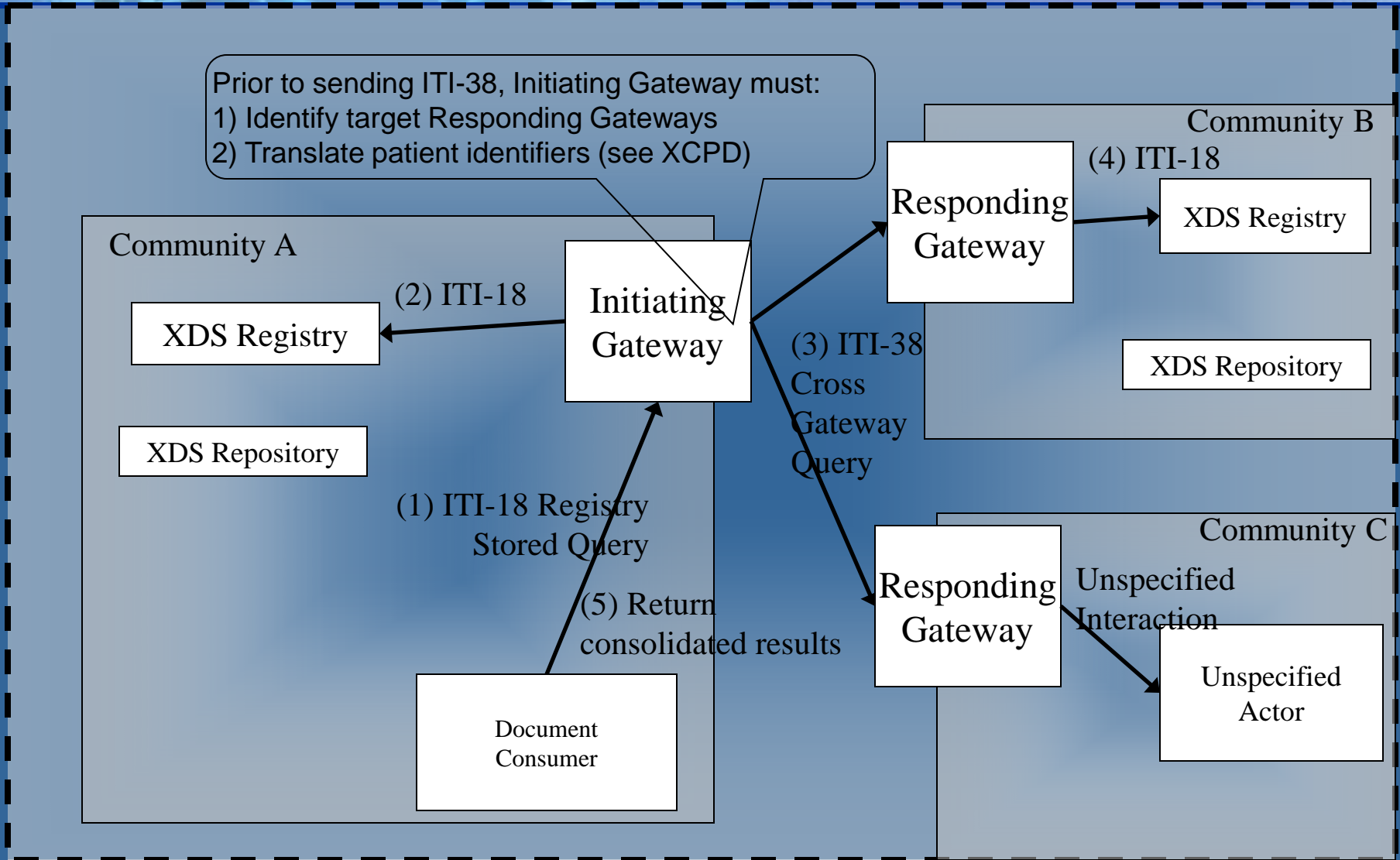


Responding Gateway grouped with Document Consumer



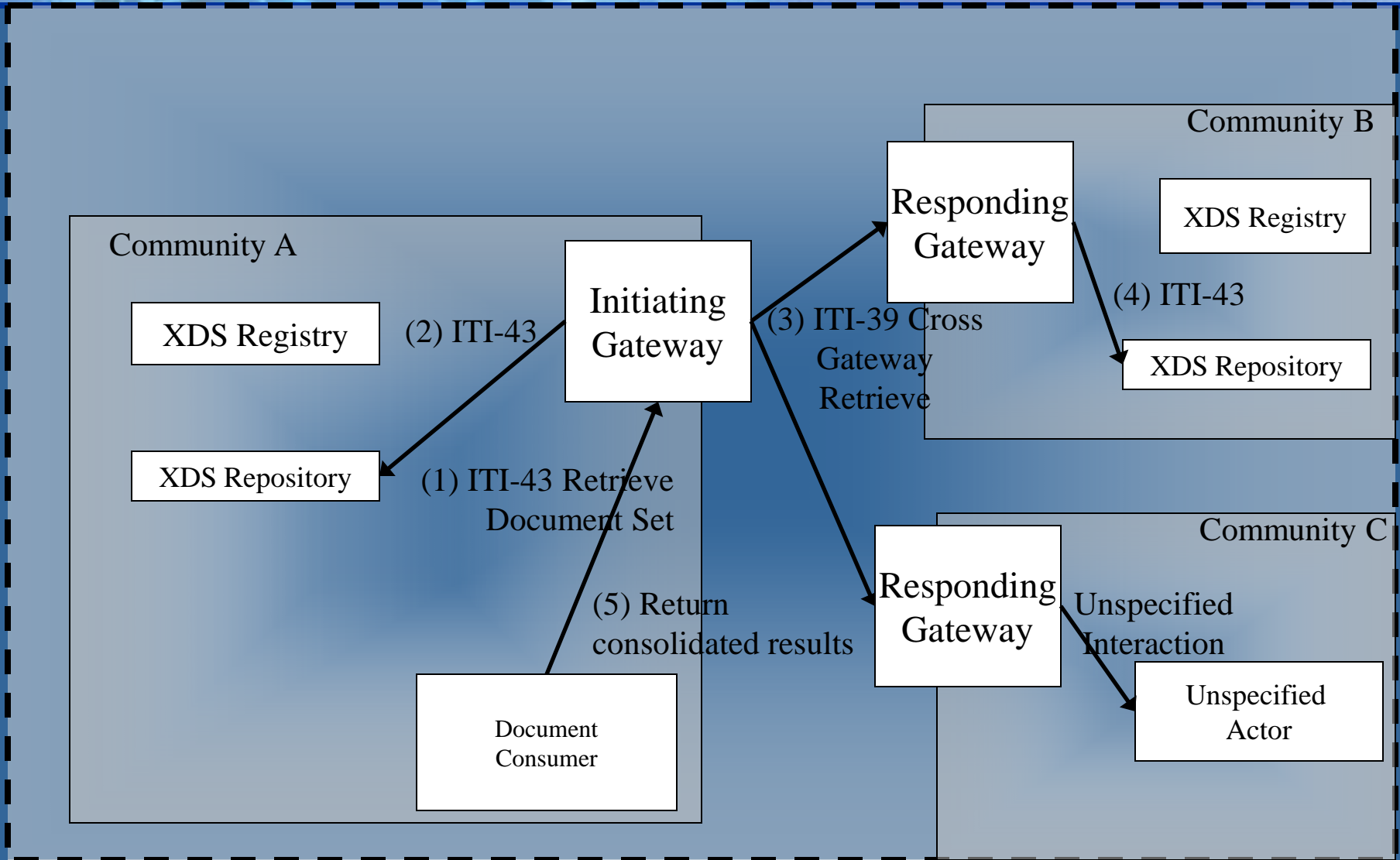
XCA Process Flow

Query with XDS Affinity Domain Option



XCA Process Flow

Retrieve with XDS Affinity Domain Option



homeCommunityId

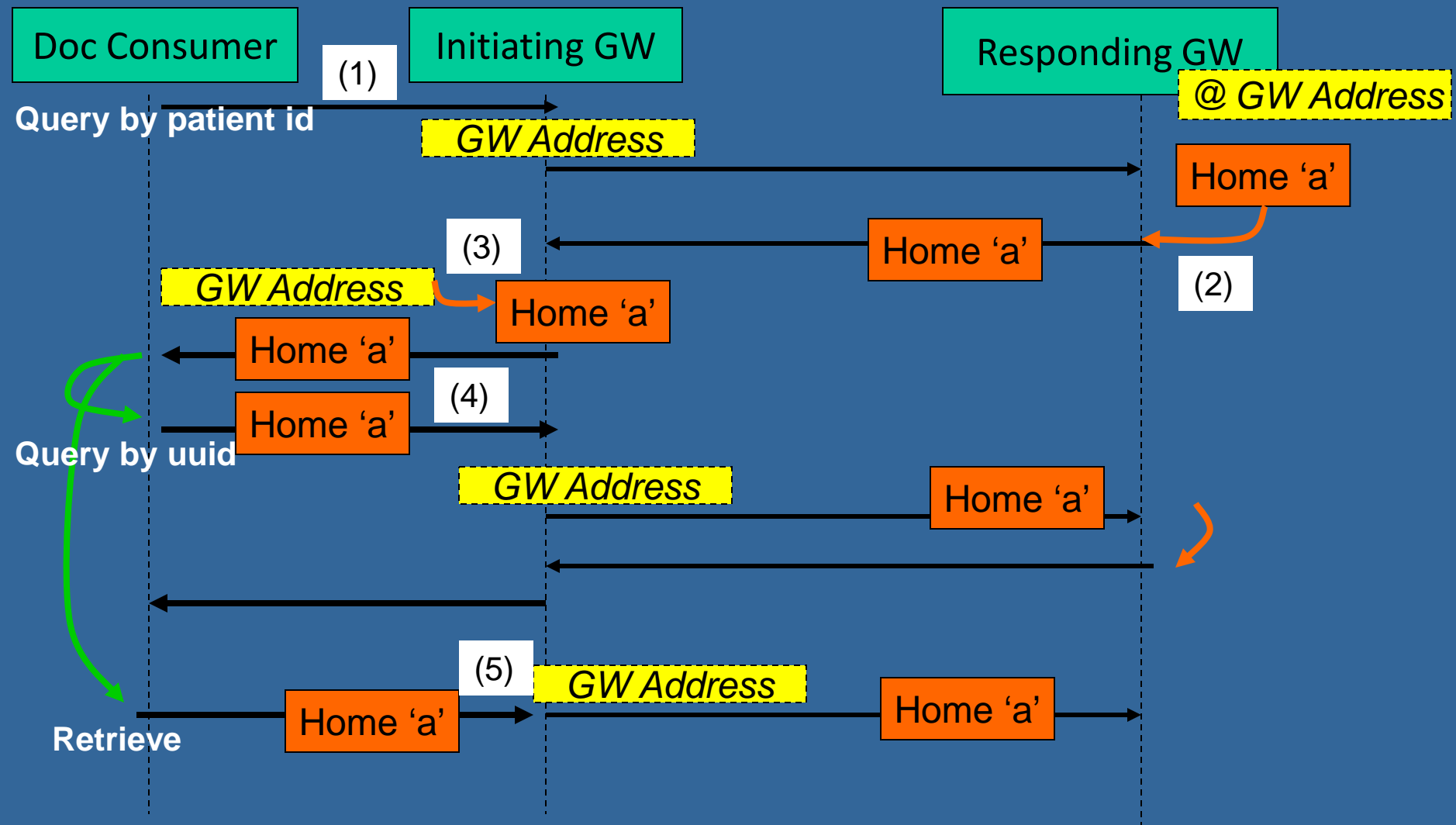
- **homeCommunityId value is unique and opaque**
- **Used by Initiating Gateway to map to the originator of the data**
- **Returned in ITI-38 Cross Gateway Query and from Initiating Gateway in response to ITI-18 Registry Stored Query**

- homeCommunityId corresponds to the 'home' attribute defined on the relevant ebRIM 3.0 elements. Example:

```
<ExtrinsicObject home="urn:oid:1.2.3.4"  
status="urn:oasis:names:tc:ebxml-regrep:StatusType:Approved" >
```

- **Optional parameter to stored queries of ITI-18 Registry Stored Query which do not include a patient id.**
- **Optional parameter on ITI-43 Retrieve Document Set transaction**

Processing of "home" (homeCommunityId)



XCA Standards

- **ebRIM - OASIS/ebXML Registry Information Model v3.0**
- **ebRS - OASIS/ebXML Registry Services Specifications v3.0**
- **ITI TF-2x: Appendix V**
 - **WS-I Profiles**
 - **WS-* Specifications**

XCA Security/Privacy

- **ATNA Secure Node required – auditing and secure communication**
- **CT Time Client required – consistency of time in audit log**
- **Use of SHA1 hash used to detect document corruption**
- **Patient Specific Queries only**
- **Policy neutral profile - many policy decision required**

XCA References

- **Final Text status**
- **Primary Content**
 - ITI TF-1 Section 18
 - ITI TF-2b Sections 3.38, 3.39
- **Underlying Technical Framework Content**
 - ITI TF-1
 - Appendix E.9 XCA Integration with XDS and non-XDS communities
 - Appendix E.10 XCA and Patient Identification Management
 - Appendix J Content and Format of XDS Documents
 - Appendix K XDS Concept Details
 - ITI TF-2a
 - Section 3.18 Registry Stored query
 - ITI TF-2b
 - Section 3.43 Retrieve Document Set
 - ITI TF-2x
 - Appendix V “Web Services for IHE Transactions”
 - ITI TF-3
 - Section 4.1 XDS Metadata Model



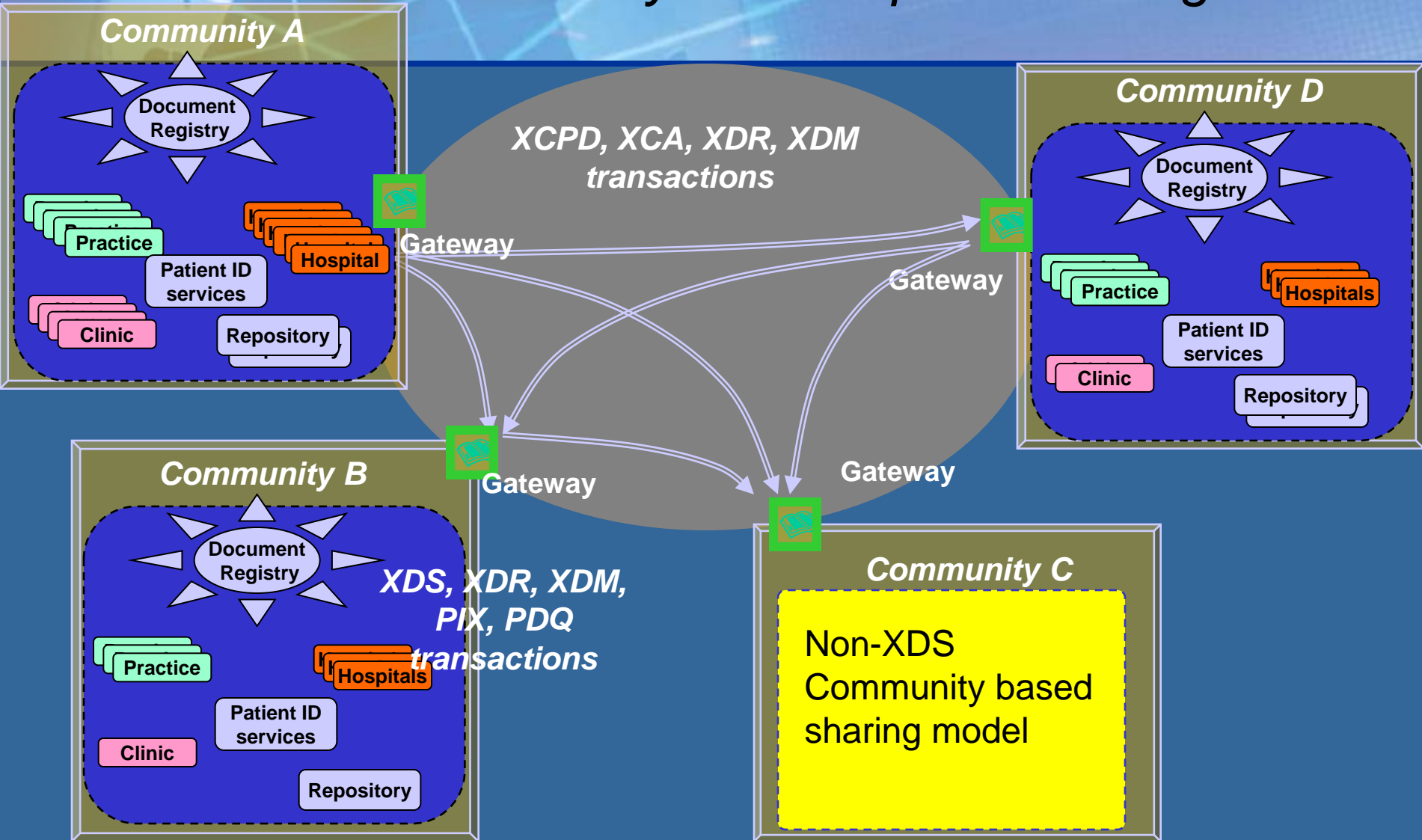
Conclusion

Cross-Community in a larger context

XDR & XDM

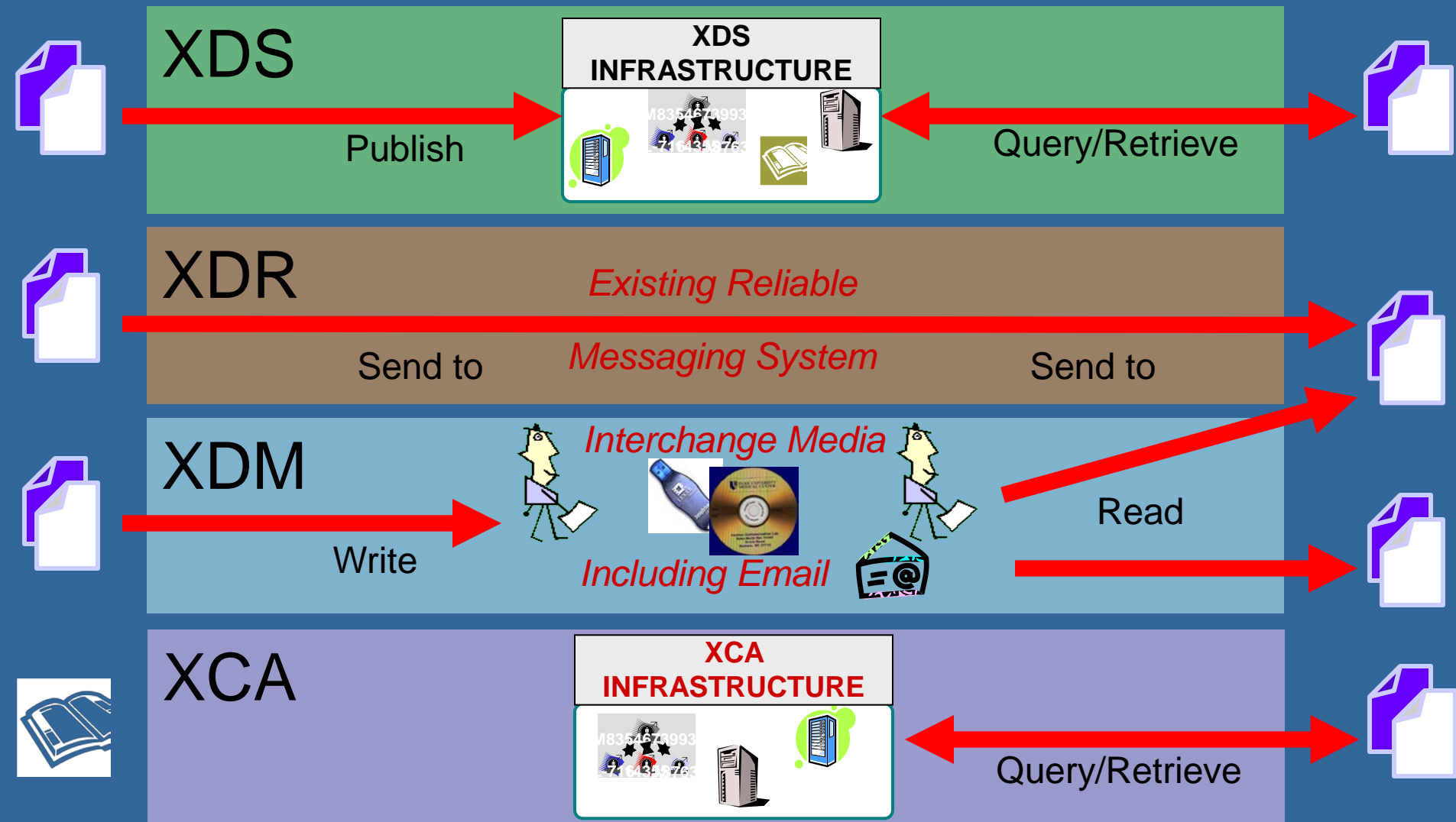
- XDR and XDM are peer-to-peer push transactions which are useful when a push model of information transfer is desired.
- The combination of XCA for query/retrieve and XDR/XDM for push information transfer completes the need for Cross Community sharing of health data.
- XDR/XDM are described in detail within the point-to-point HIE presentation.

Cross-Community Peer-to-peer Sharing



Health Document Exchange Options

Flexible Infrastructure



More Information

- IHE Web site: www.ihe.net
 - *IHE official material*
 - *Technical Framework documents*
- IHE Wiki site: wiki.ihe.net
 - *IHE committee pages*
 - *Implementation Notes*
 - *Ongoing committee work*
- IHE ITI technical committee mailing list
 - http://www.ihe.net/IT_infra/committees
 - *At the bottom of the page is a place to join the mailing list*



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