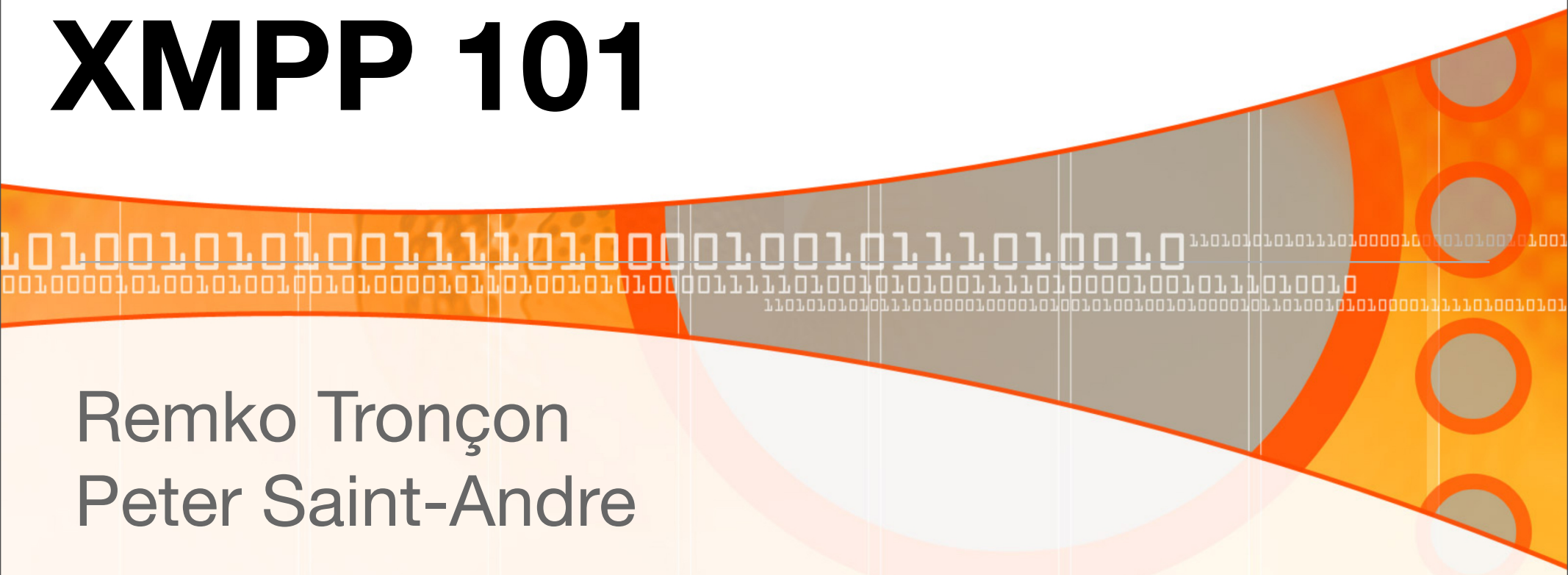
XMPP 101



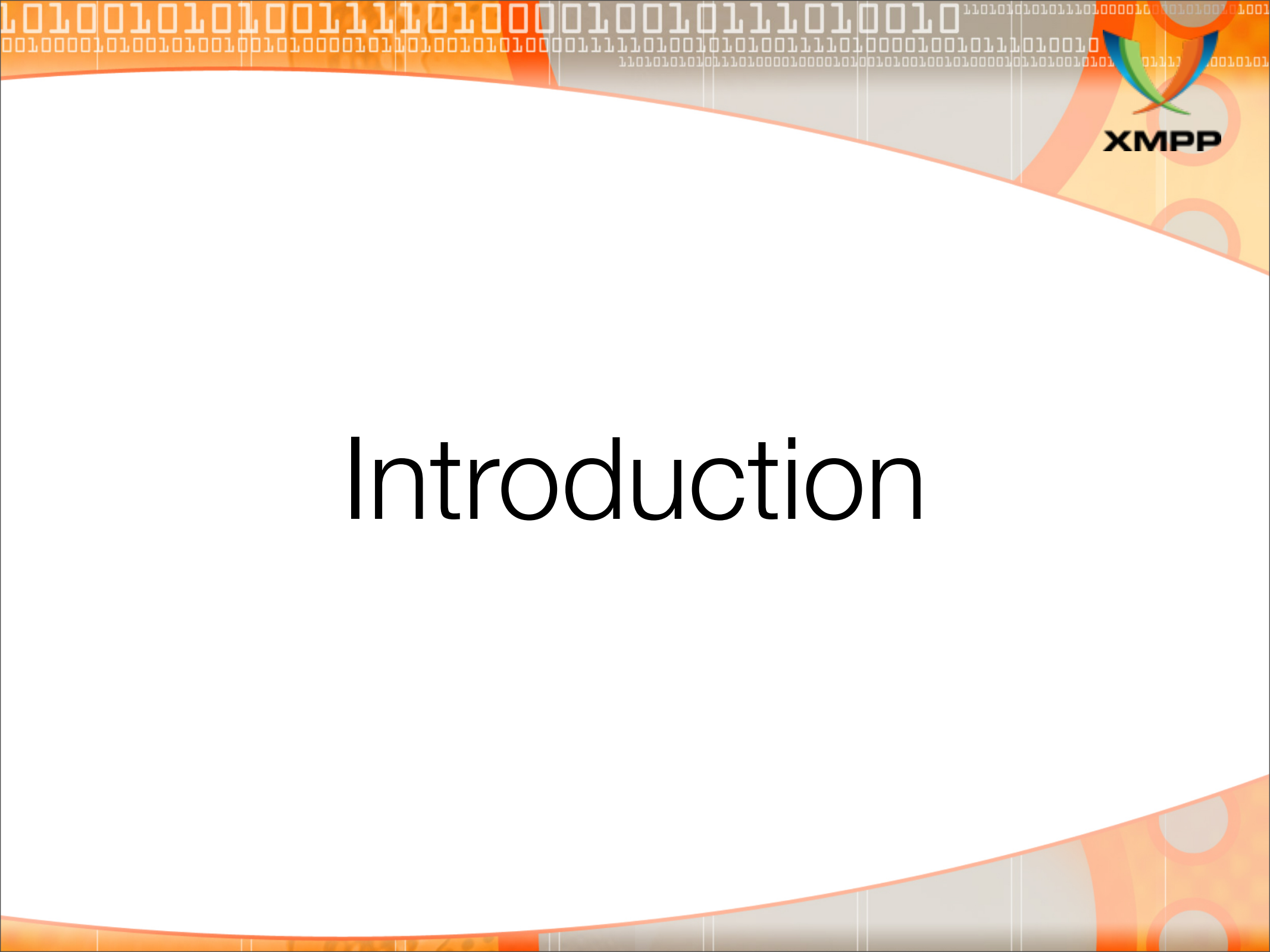
Remko Tronçon
Peter Saint-Andre

XMPP

Overview



- Introduction
- XMPP Basics
- Example code
- Extensions
- State of the bulb
- Conclusion



Introduction

About Us



About Us

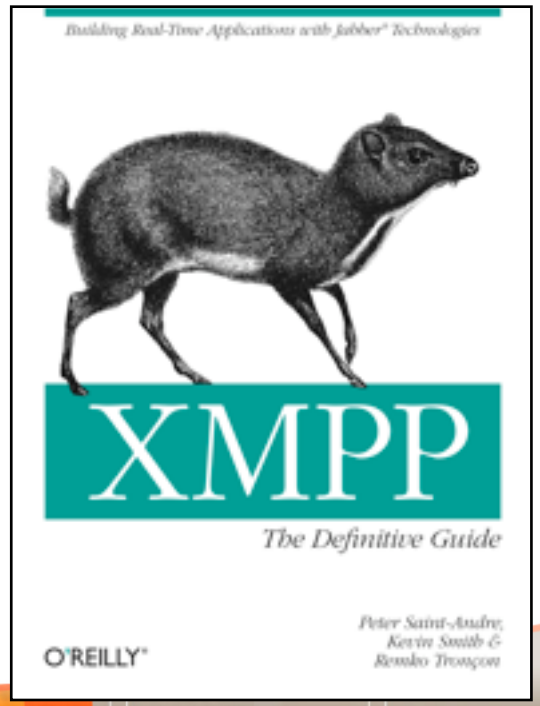
- **Peter**: Documentation guy and specification author

About Us

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- **Remko**: Developer for Psi client and other projects

About Us

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- **Remko**: Developer for Psi client and other projects
- Co-authors (with Kevin Smith) of *XMPP: The Definitive Guide (O'Reilly, 2009)*



About You



About You



- Why are you here?

About You



- Why are you here?
- What do you want to build?

About You



- Why are you here?
- What do you want to build?
- What is your background? (web, client-server, ...)

What is XMPP?



What is XMPP?



- eXtensible Messaging and Presence Protocol

What is XMPP?



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- Jabber

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Sister
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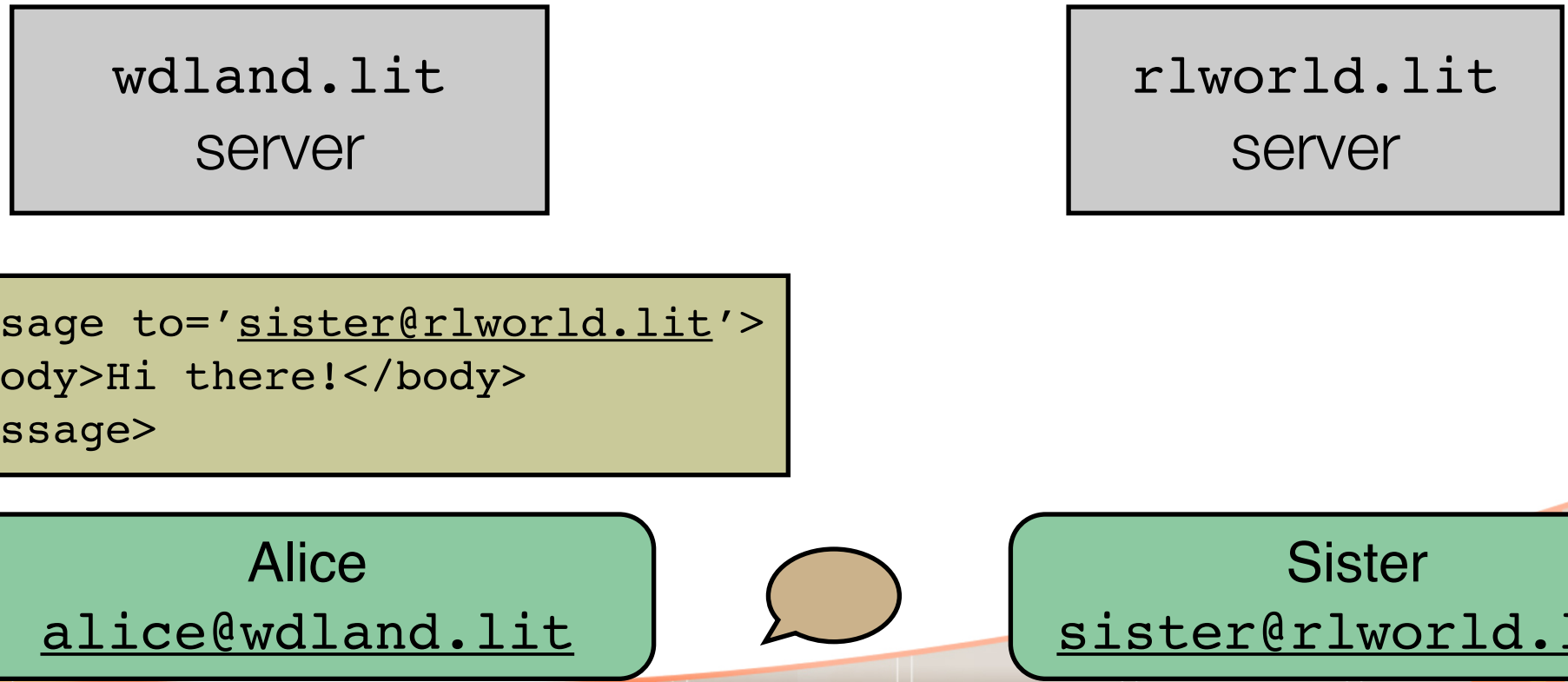
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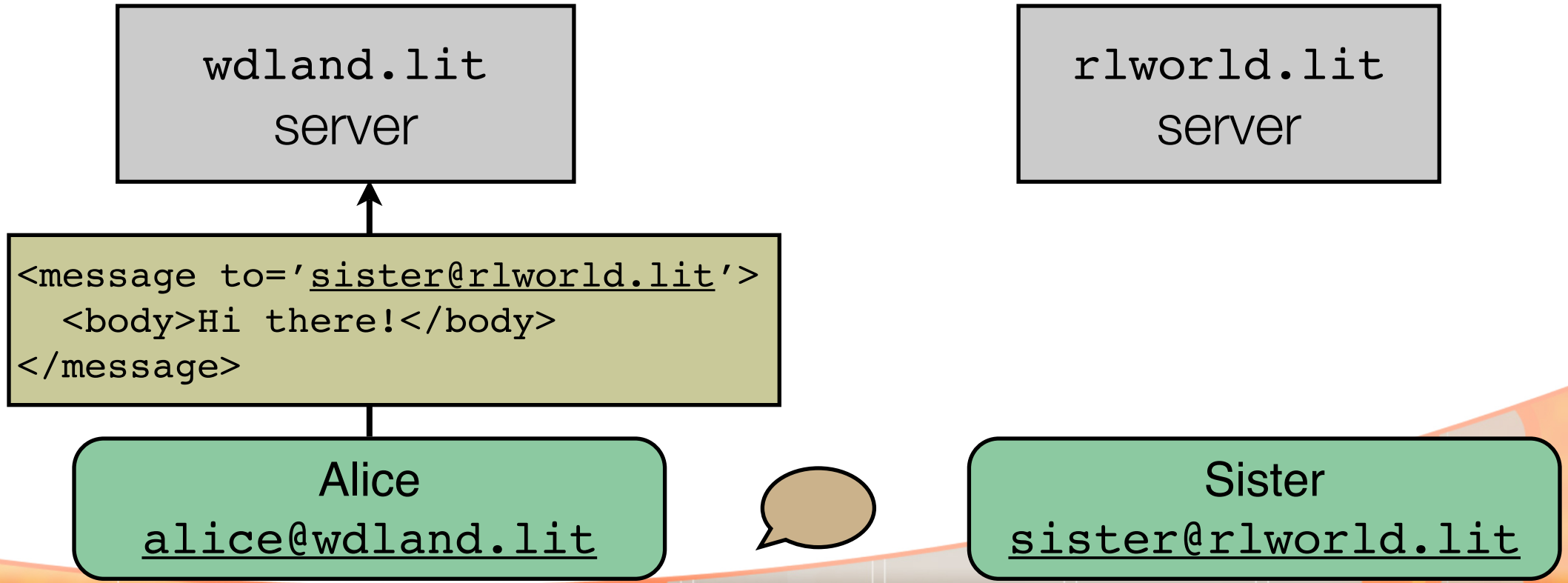
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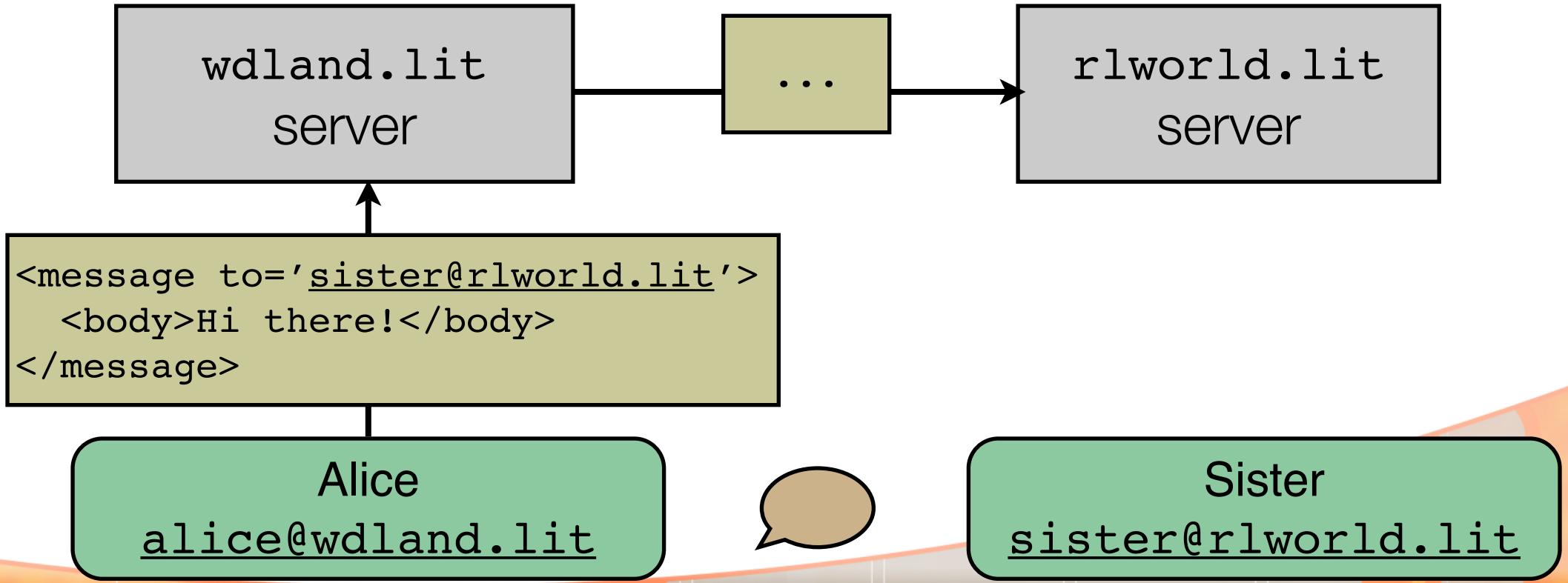
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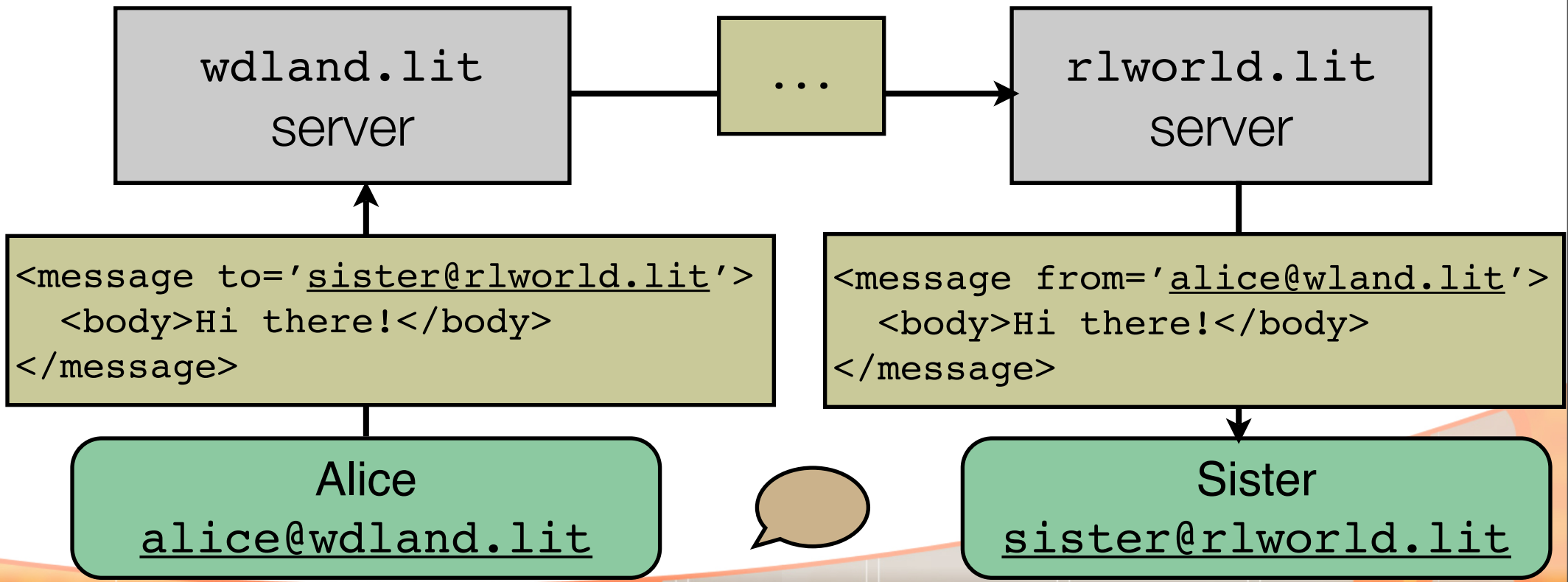
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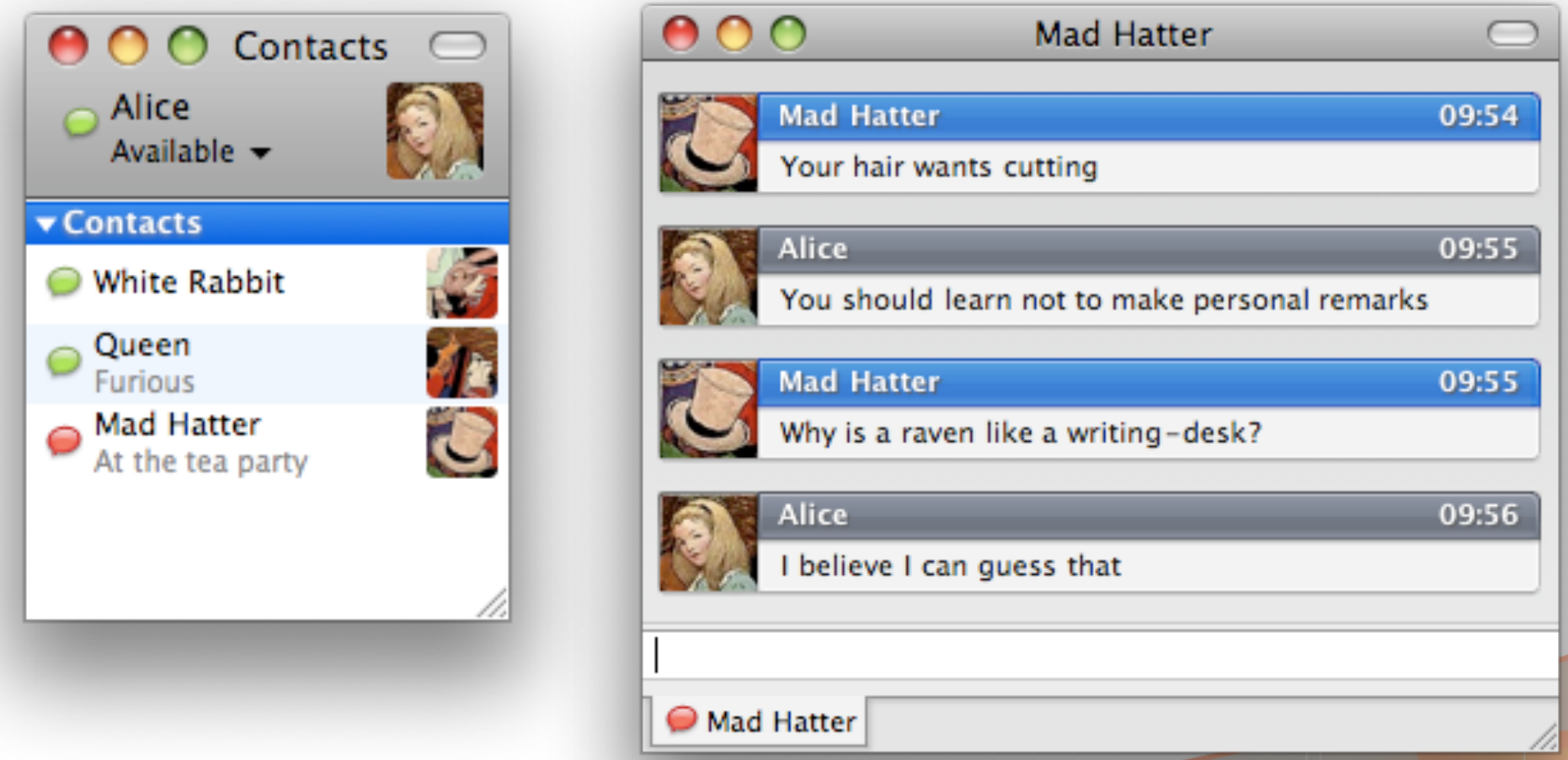


What can you do with XMPP?



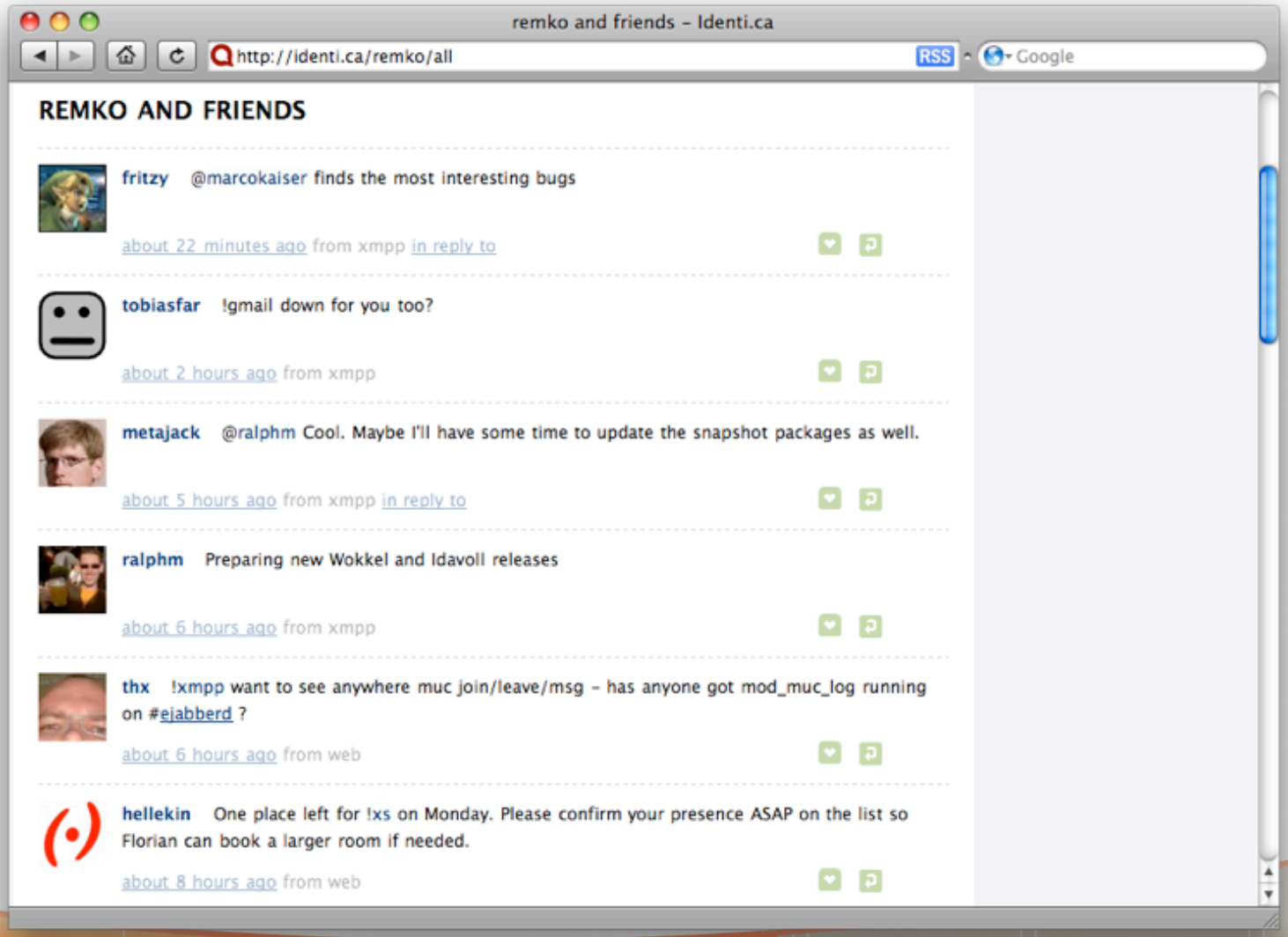
What can you do with XMPP?

Instant Messaging



What can you do with XMPP?

Real-time Social Networking





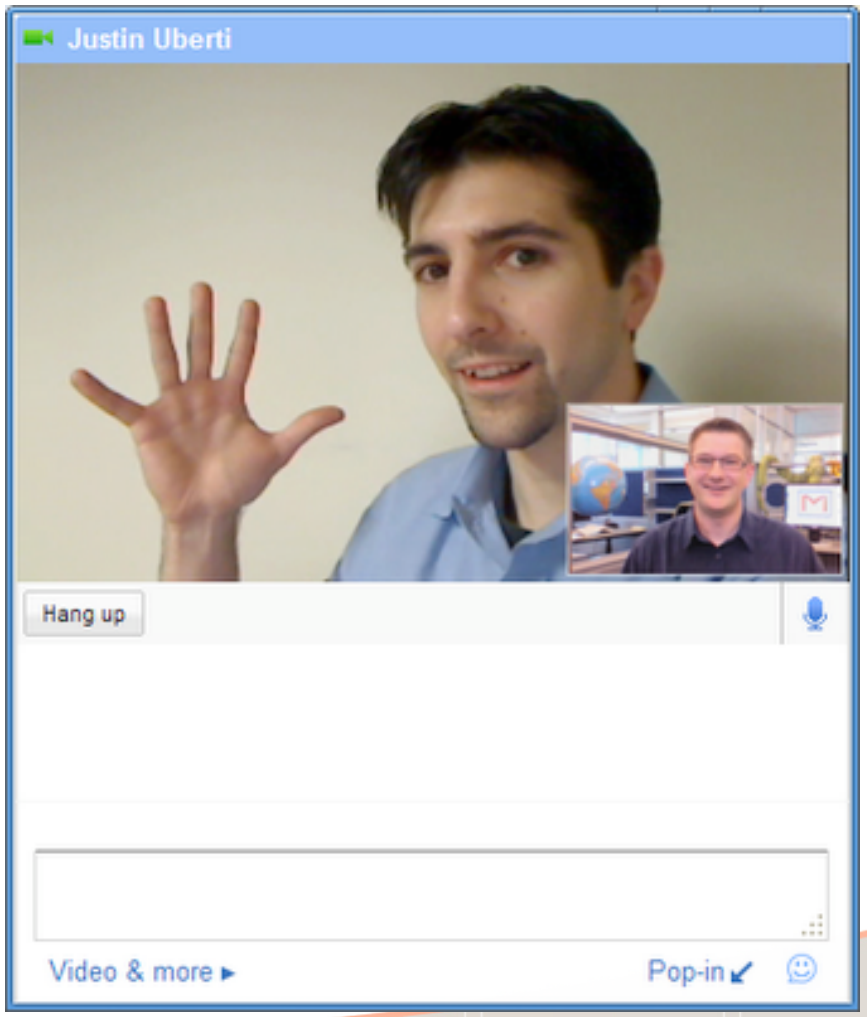
What can you do with XMPP?

Gaming



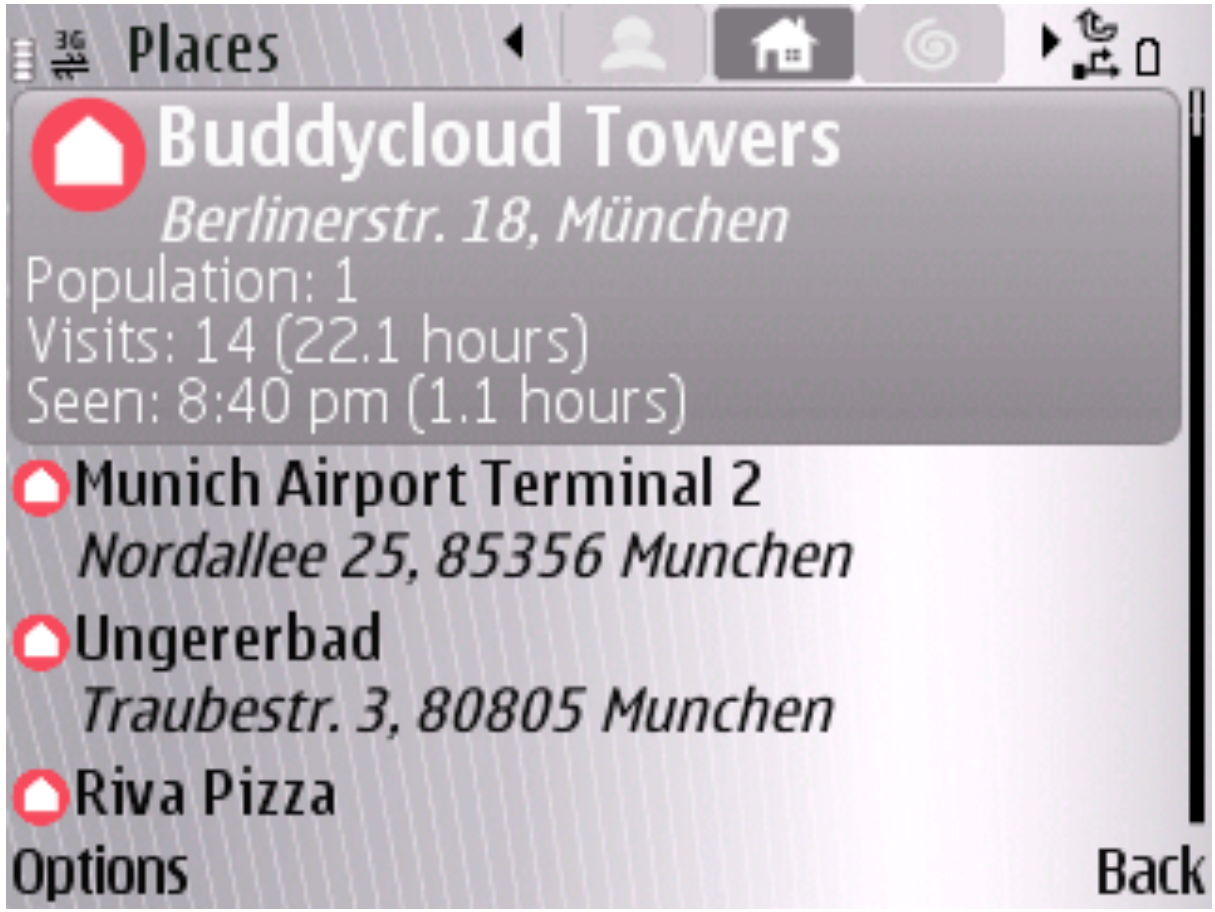
What can you do with XMPP?

Voice & Video



What can you do with XMPP?

Mobile apps / Geolocation



What can you do with XMPP?



<insert your idea here>

XMPP ...



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- Alerts and notifications (PubSub)
- Service discovery and device capabilities
- Peer-to-peer media sessions (Jingle)
- Data forms and remote commands
- And more (lots of extensions)

History

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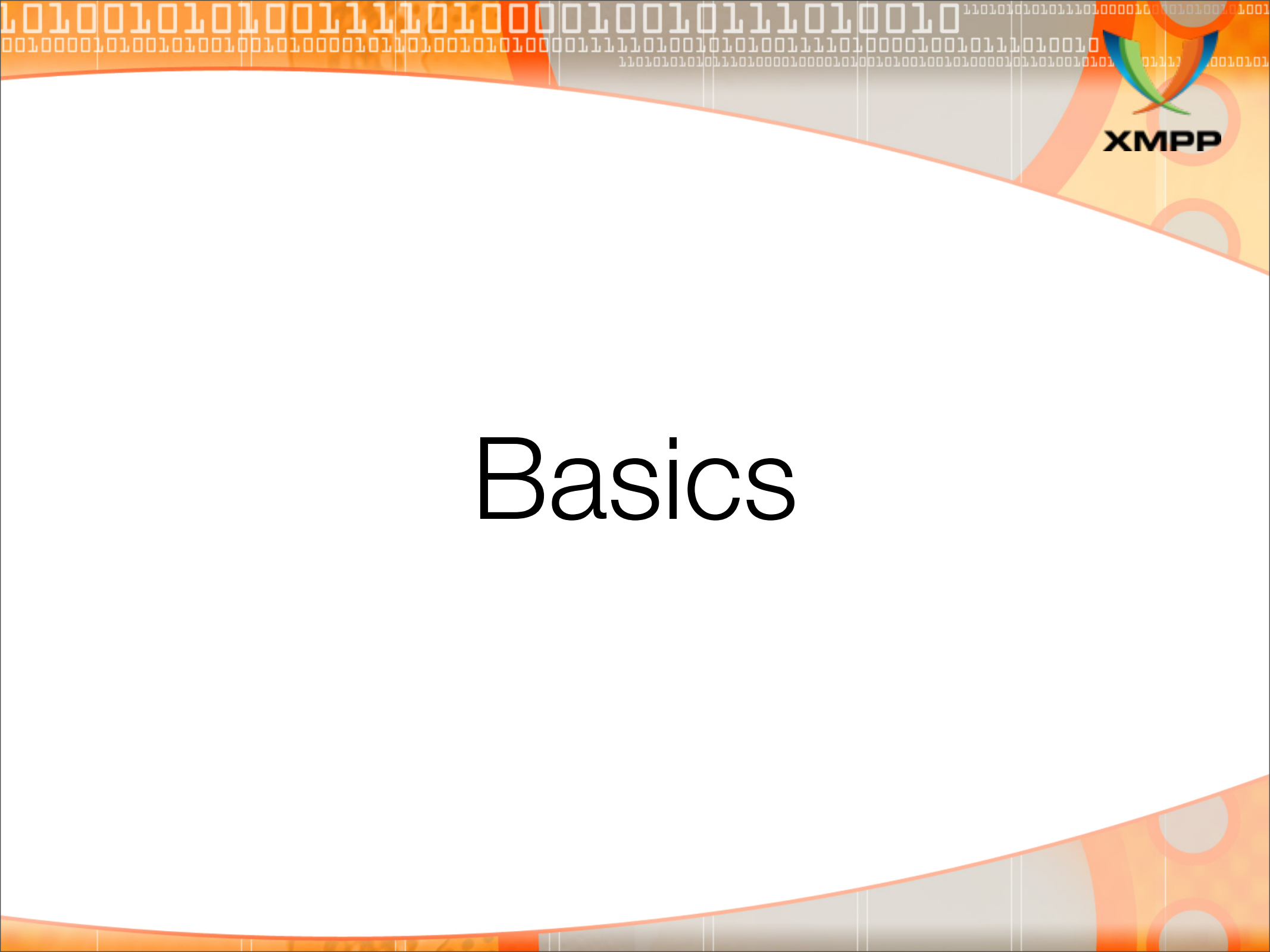
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- Continuing work on improved security and more application types



Basics

Architecture



- Web architecture

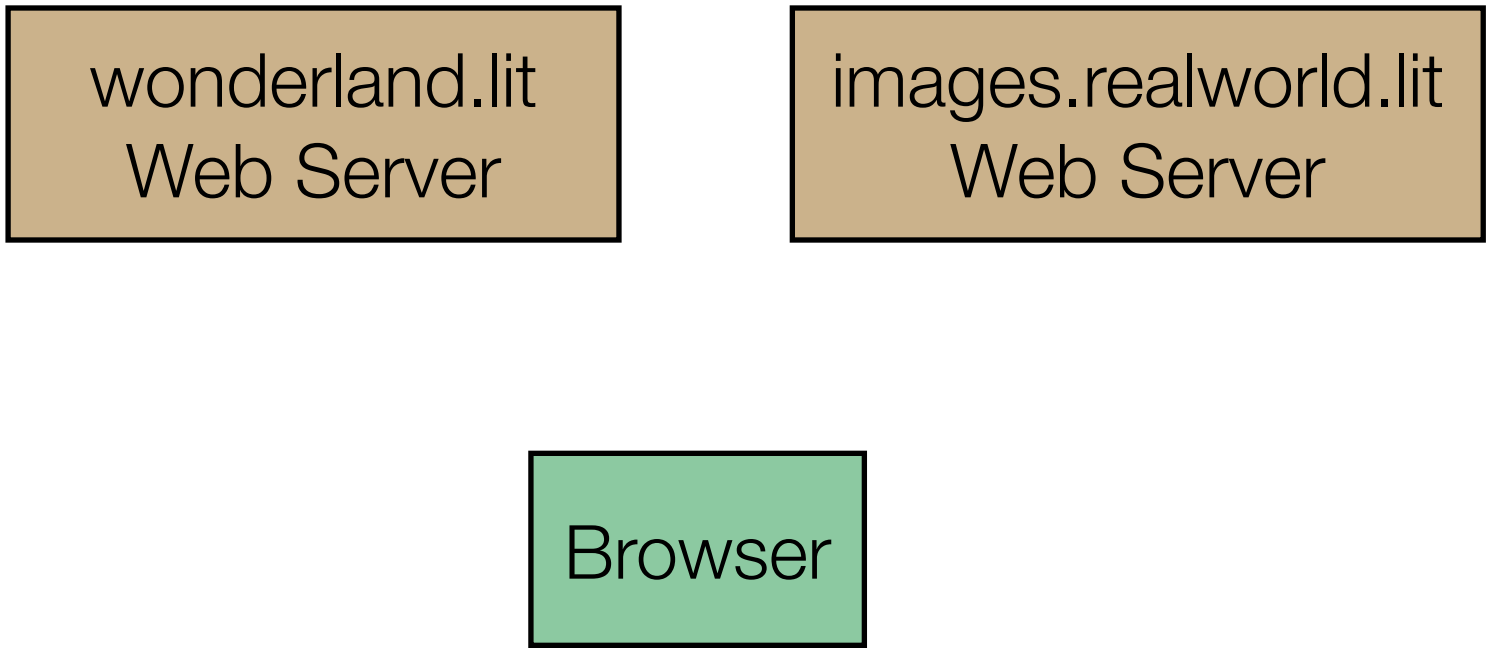
Architecture

- Web architecture



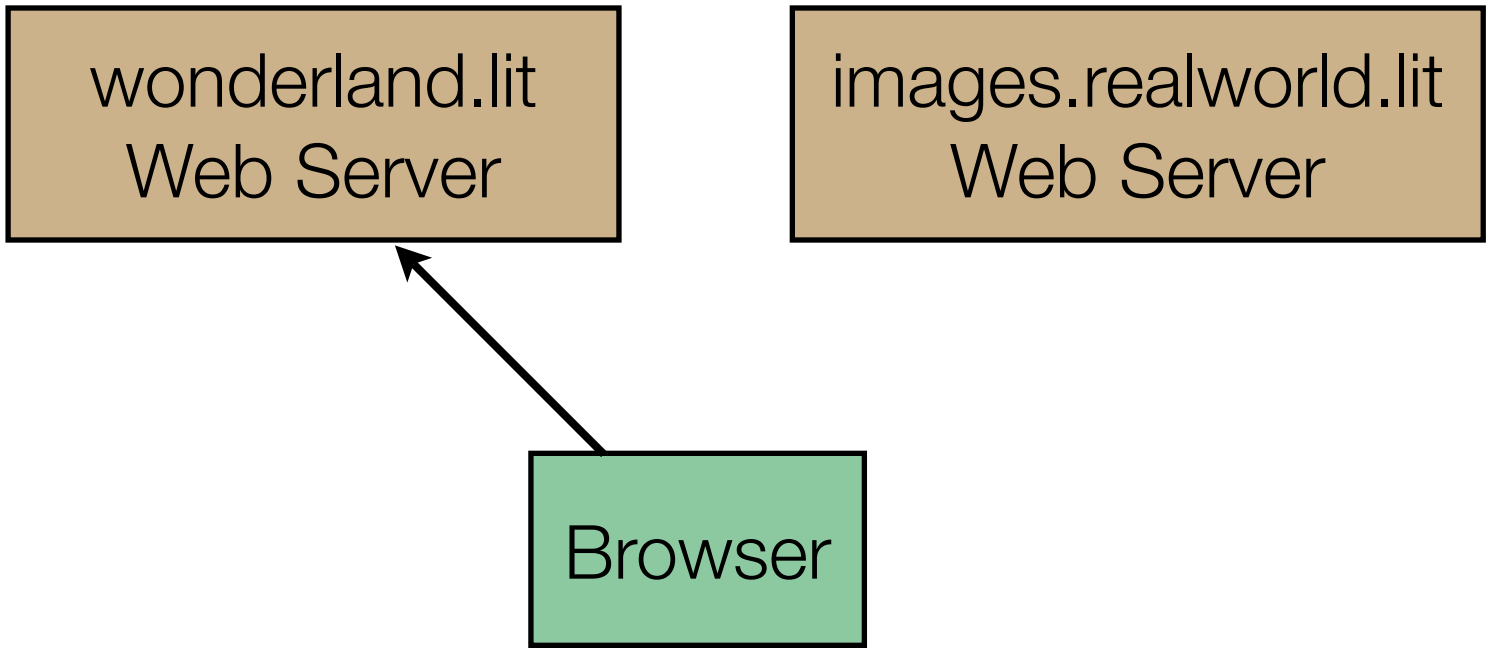
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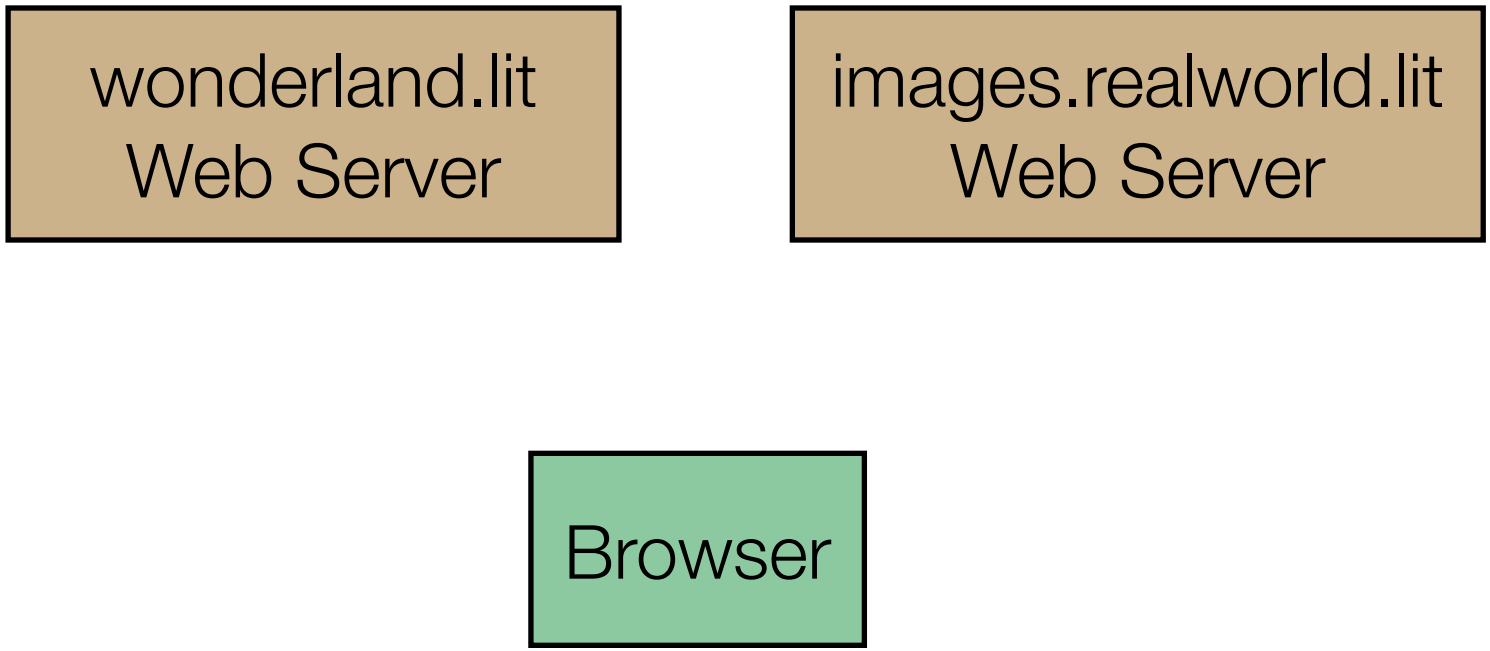
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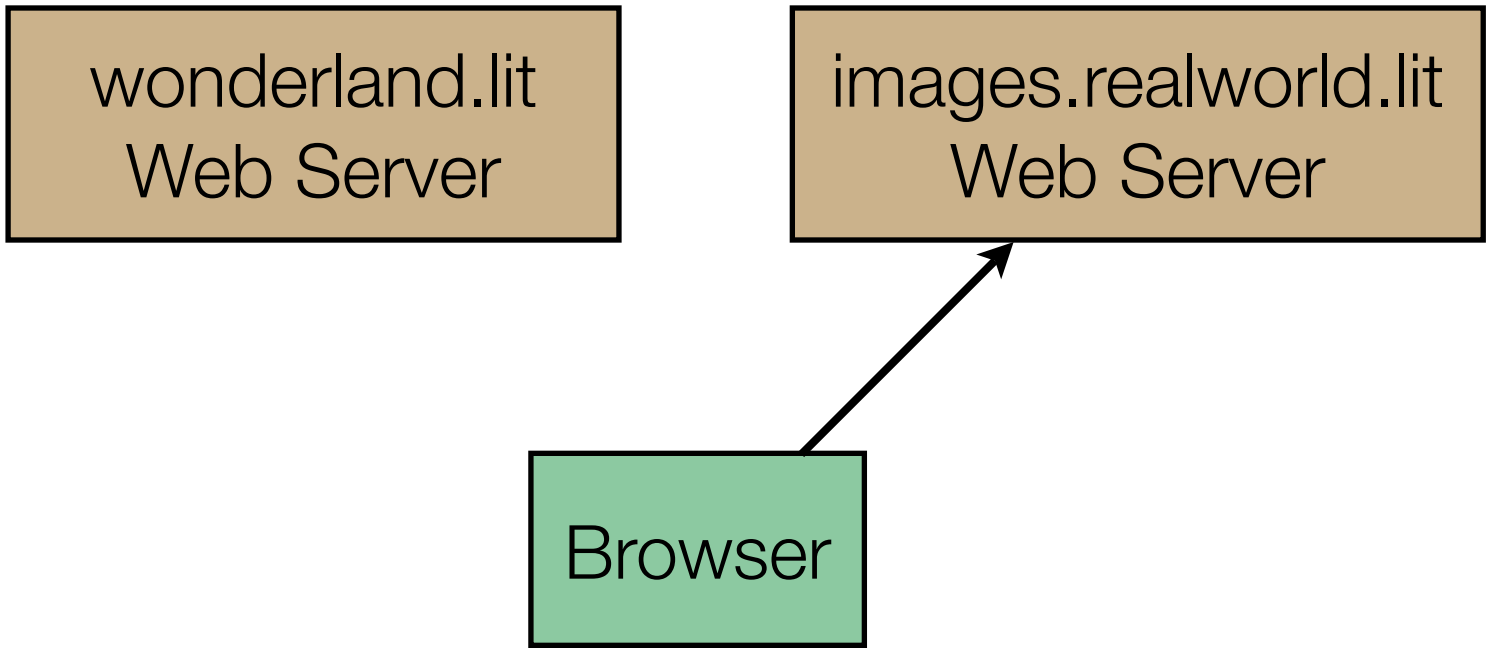
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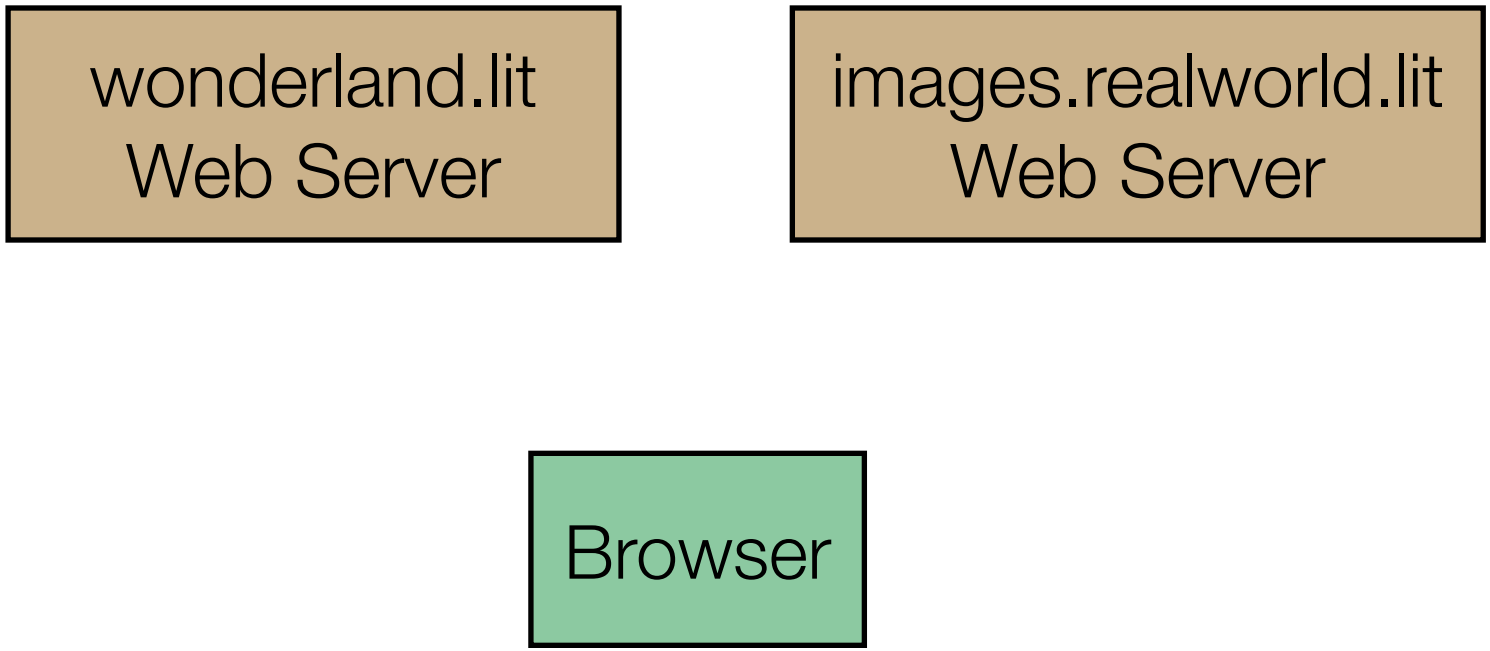
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Architecture



- E-Mail architecture

Architecture

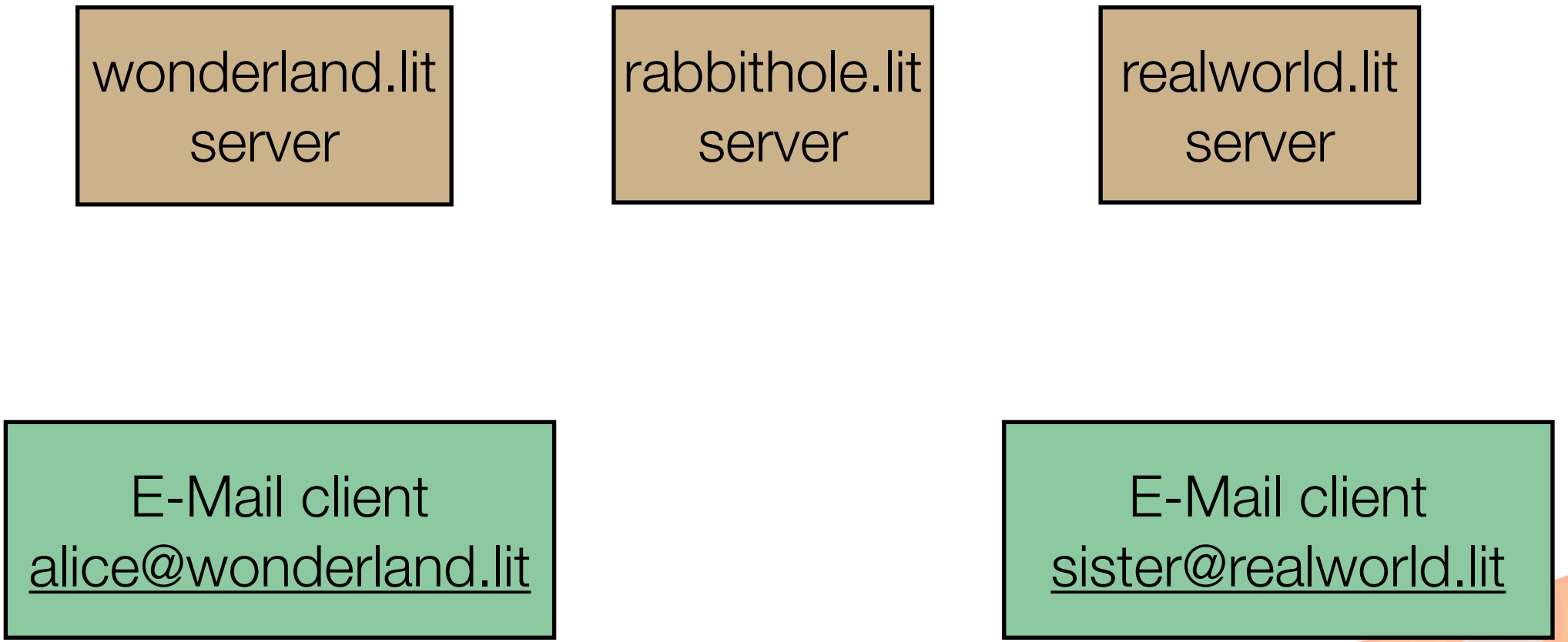
- E-Mail architecture

E-Mail client
alice@wonderland.lit

E-Mail client
sister@realworld.lit

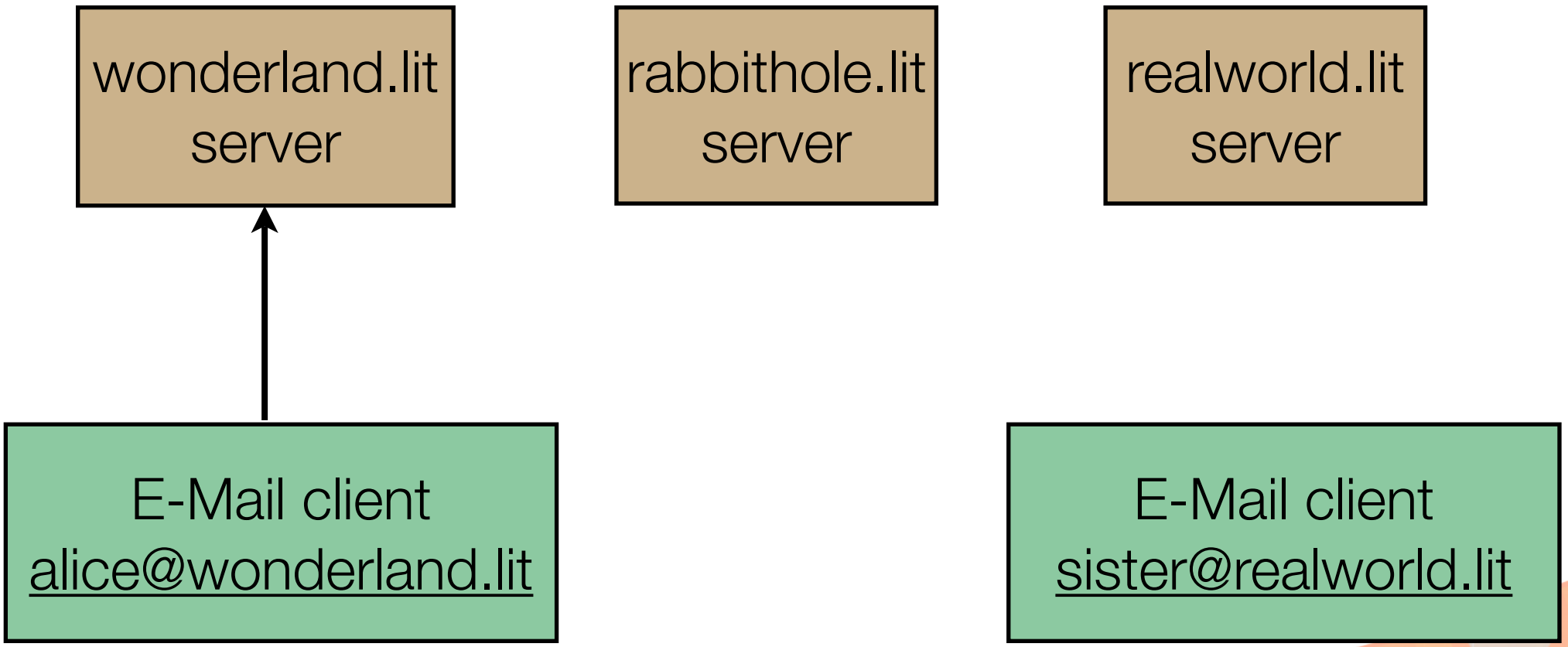
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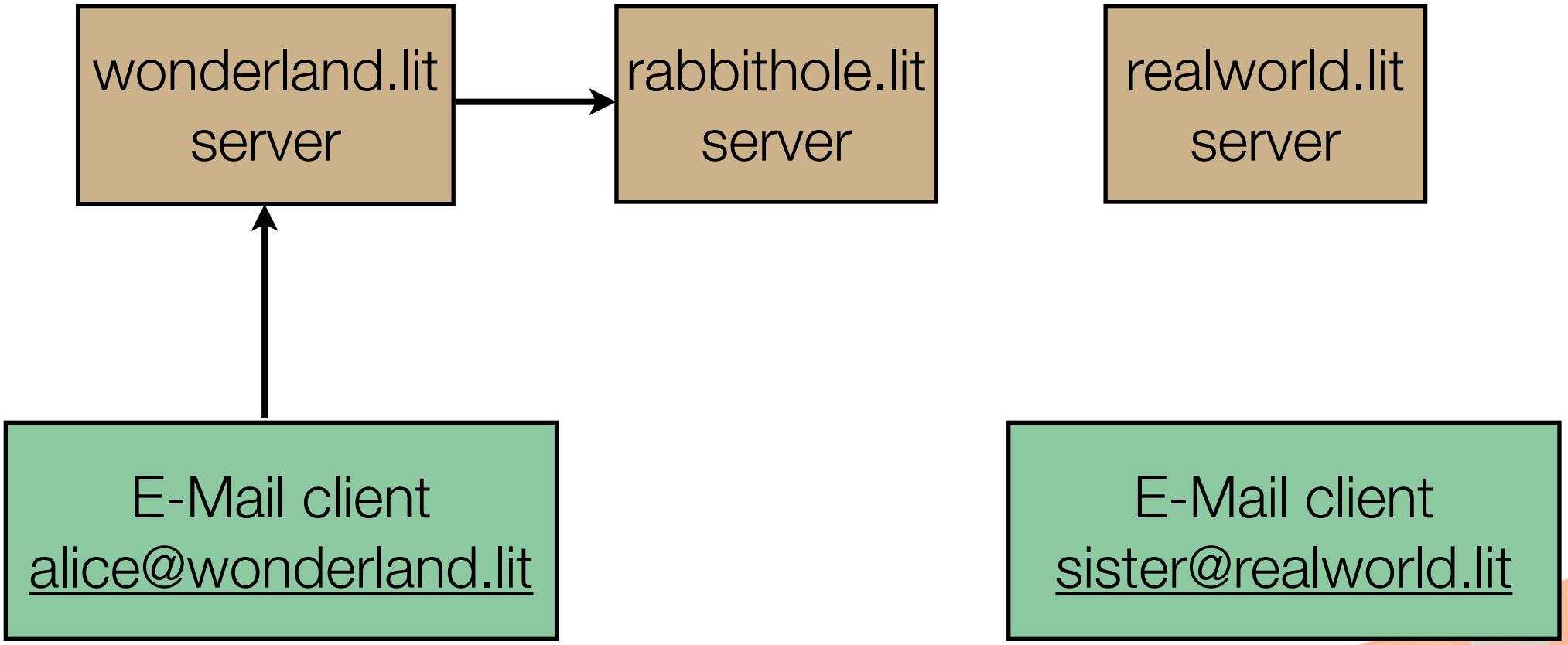
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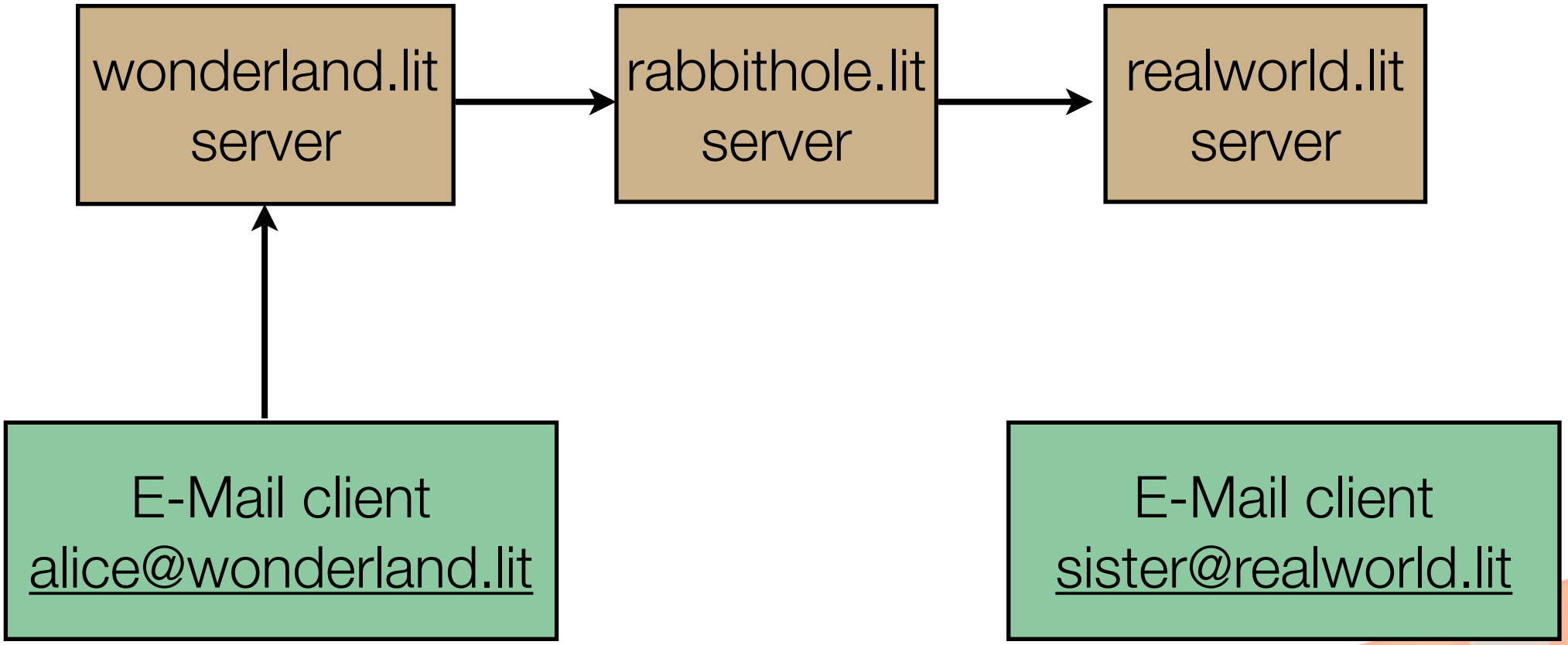
Architecture

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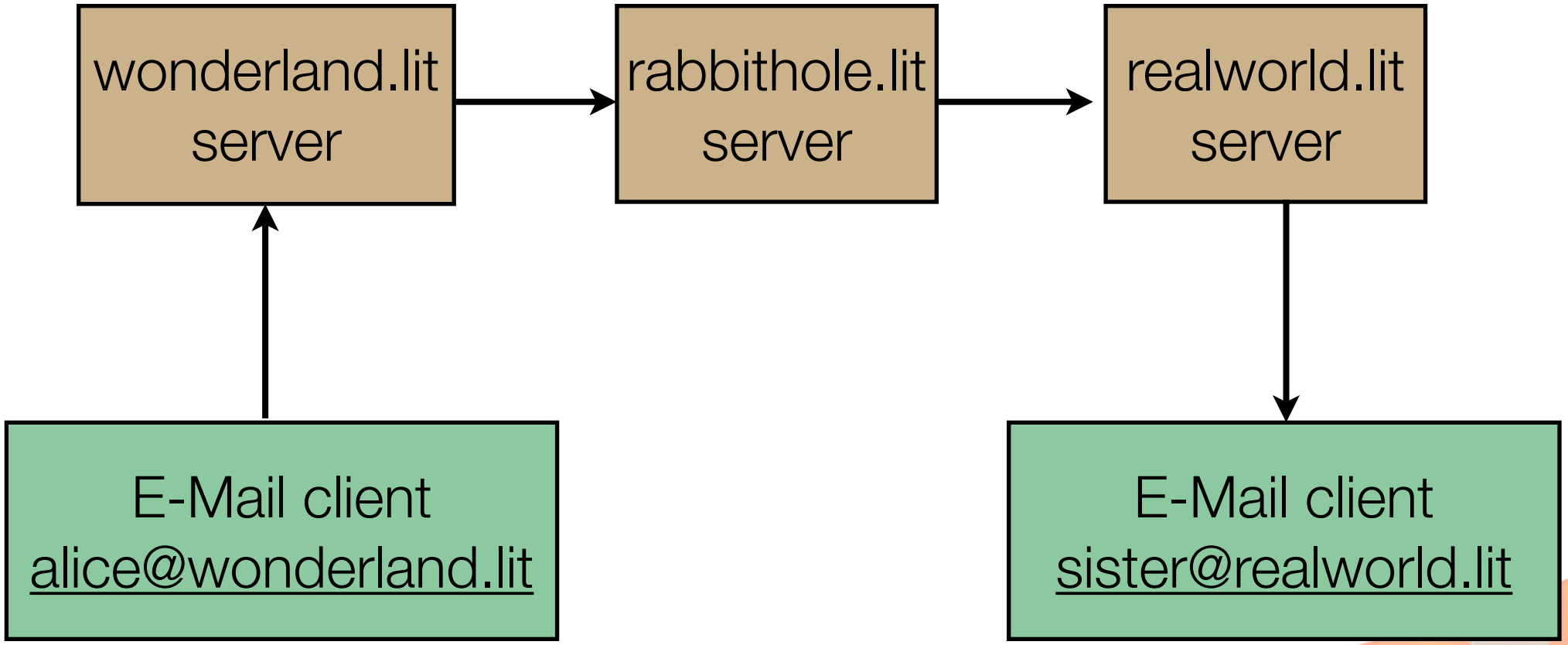
Architecture

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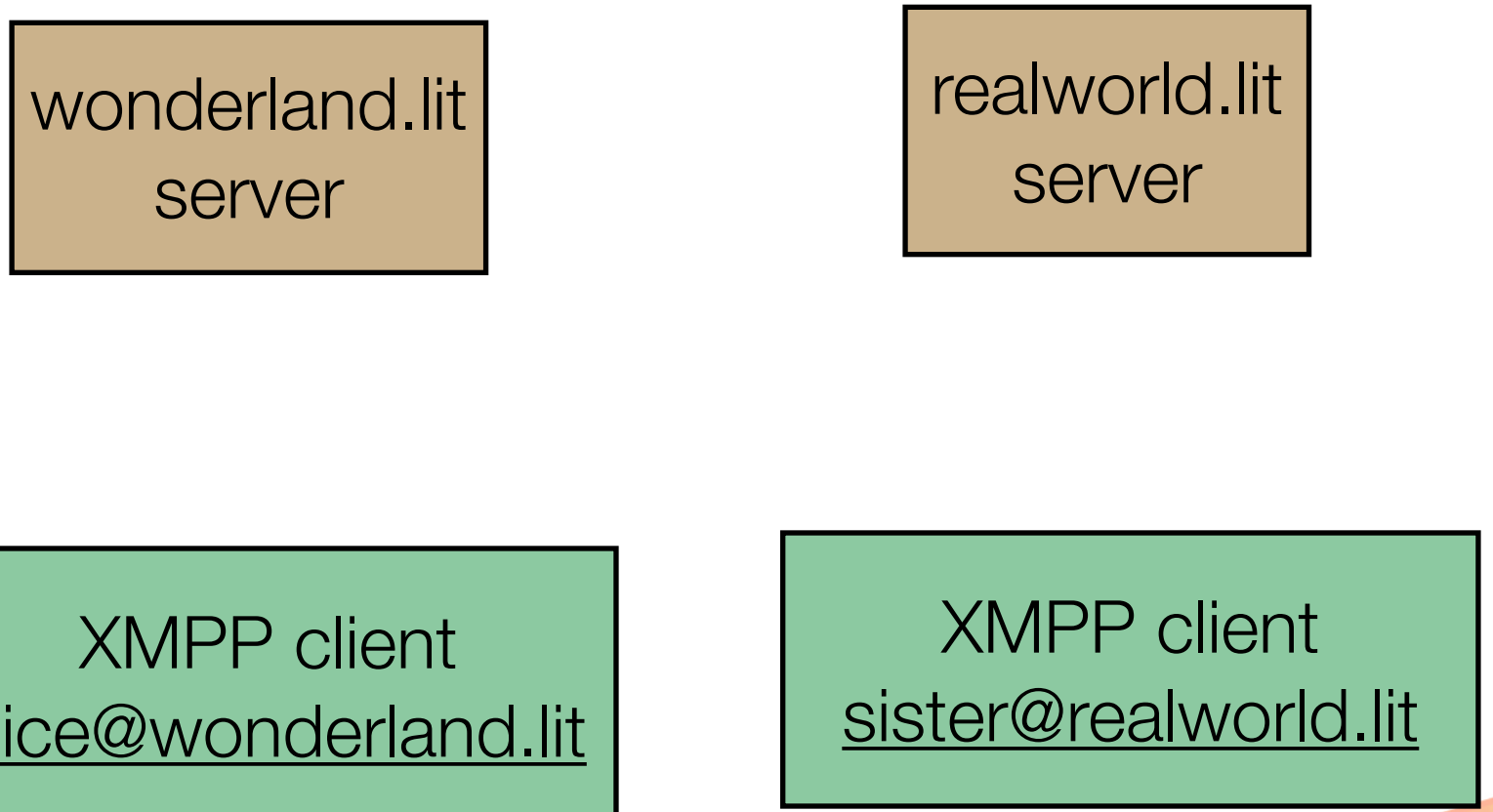
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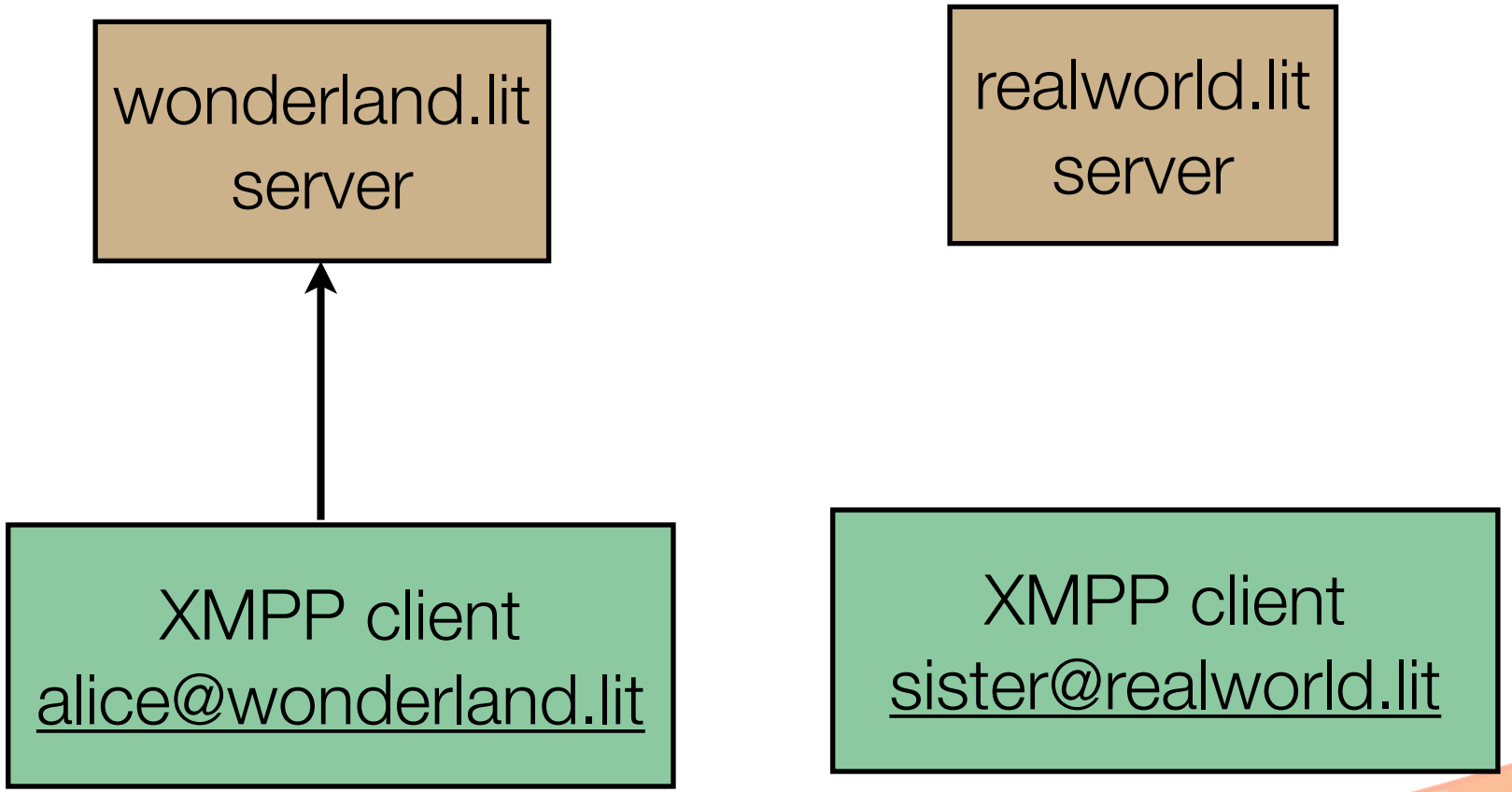
Architecture

- XMPP Architecture



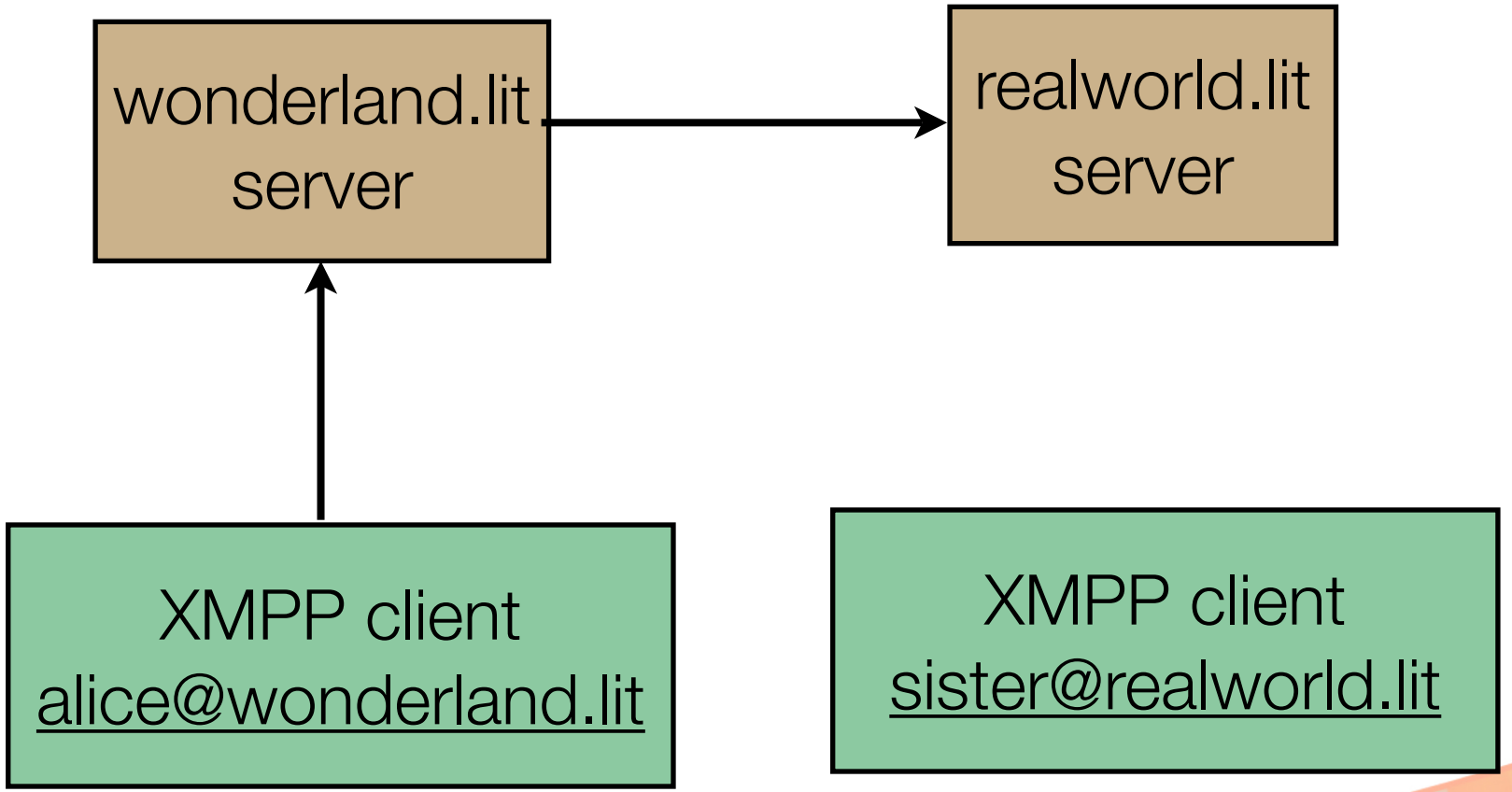
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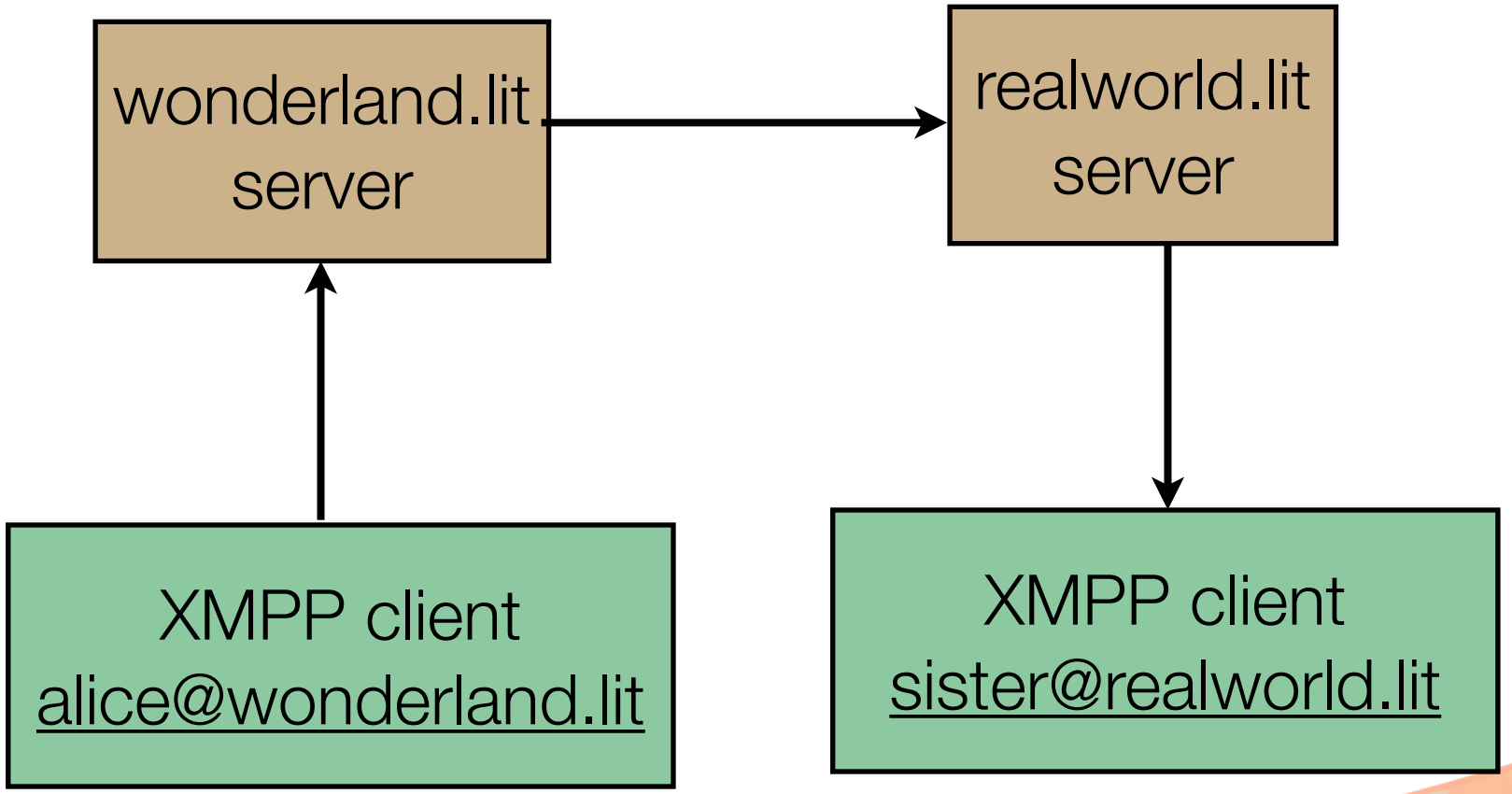
Architecture

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Architecture

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Architecture



Architecture



- Client-server

Architecture



- Client-server
  - Client developers can focus on user experience

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- Decentralized
  - Robust (no single point of failure)
  - Easier to manage
- No multiple hops
  - Harder to spoof

Addresses



Jabber ID (JID)

Addresses

XMPP

Jabber ID (JID)

Domain

`wonderland.lit`

Addresses

Jabber ID (JID)

User Domain

alice@wonderland.lit

Addresses

Jabber ID (JID)

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alice@wonderland.lit

Bare JID

Addresses

Jabber ID (JID)

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Addresses



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Addresses



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Full JID

Streaming XML



Streaming XML




```
<stream:stream>
```

Streaming XML

```
<stream:stream>
    <presence/>
```

Streaming XML




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<stream:stream>
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    <iq type="get">
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    </iq>
```

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Streaming XML

XMPP

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  <presence type="unavailable"/>
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Communication Primitives



Stanzas:

Communication Primitives



Stanzas:

<message/>

Communication Primitives



Stanzas:

<message/>

<presence/>

Communication Primitives



Stanzas:

<message/>

<presence/>

<iq/>

Message Stanzas



Message Stanzas

```
<message from="madhatter@wonderland.lit/foo"
         to="alice@wonderland.lit"
         type="chat">
  <body>Who are you?</body>
  <subject>Query</subject>
</message>
```

Message Stanzas

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- From, To

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- From, To
- Types: normal, chat, groupchat, headline, error
- Payloads: Body, Subject

Presence Stanzas



Presence Stanzas

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<presence from="alice@wonderland.lit/pda">
  <show>xa</show>
  <status>down the rabbit hole!</status>
</presence>
```

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- Advertise network availability (online/offline)

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- Advertise network availability (online/offline)
- ‘Show’ Statuses: Away, Do Not Disturb, Extended Away, Free for chat

Presence Stanzas

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- ‘Show’ Statuses: Away, Do Not Disturb, Extended Away, Free for chat
- Status messages

Presence Stanzas

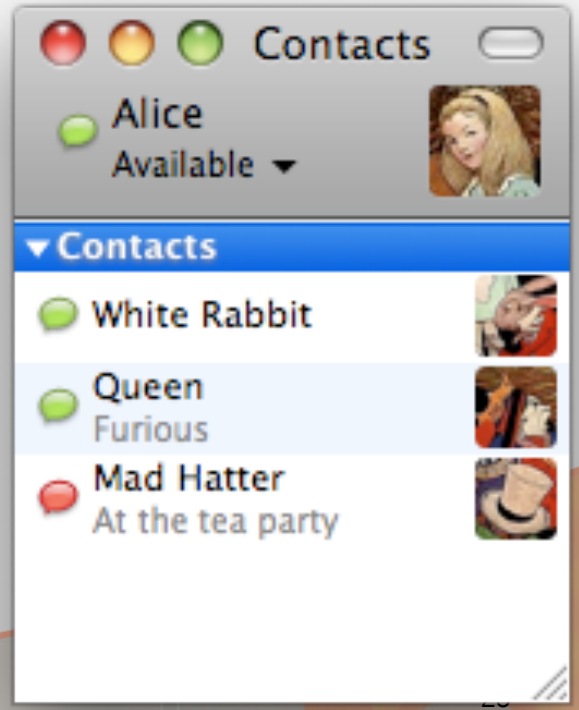
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<presence from="alice@wonderland.lit/pda">
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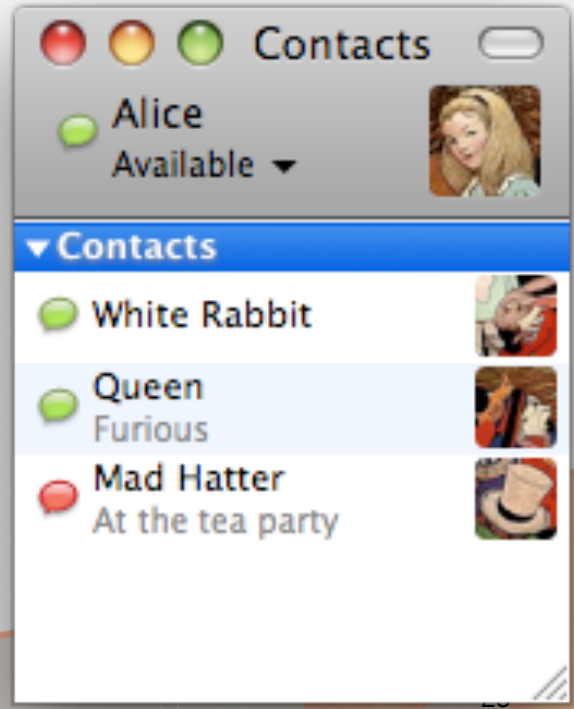
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- Presence subscriptions



IQ Stanzas

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- Request/Response

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- Request/Response
- Workflows, execute commands, query information

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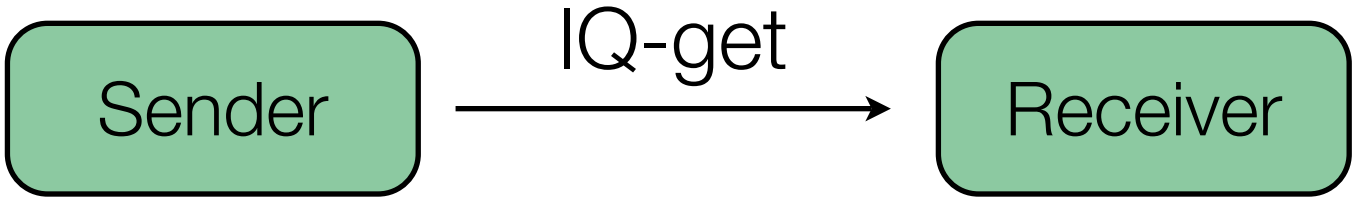
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  </query>
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```

- Request/Response
- Workflows, execute commands, query information
- Similar to HTTP GET, POST, PUT

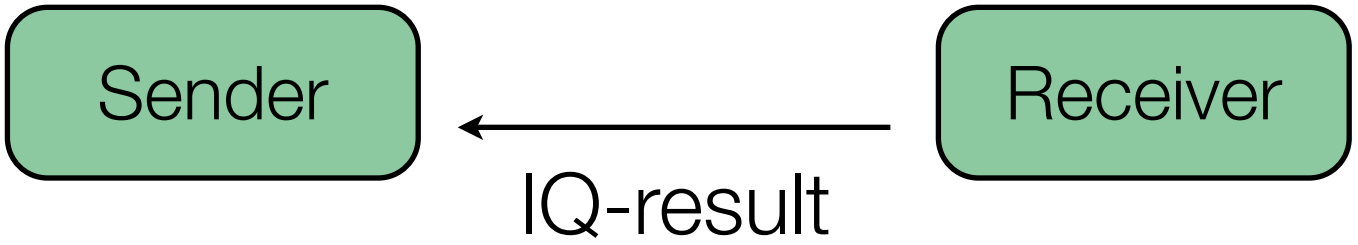
IQ Stanzas



IQ Stanzas



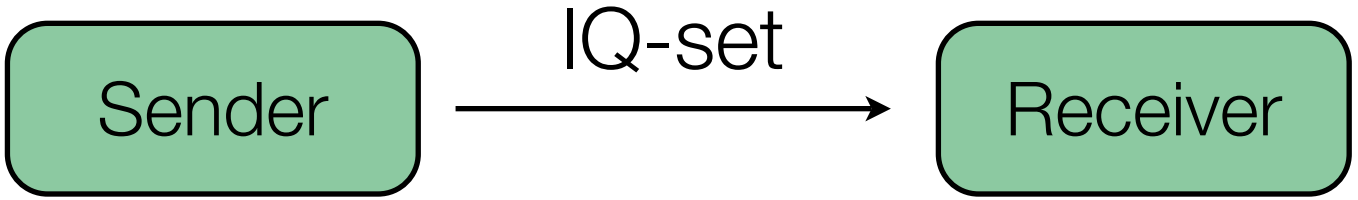
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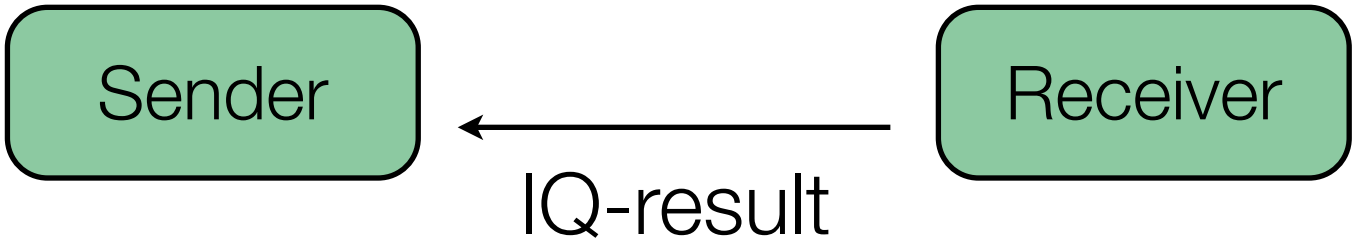
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  - get: Ask for information (HTTP GET)

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  - result: Returns requested information / acknowledge set
  - error

Extensibility



Extensibility



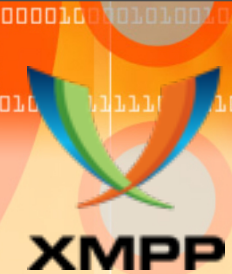
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- Extensions typically developed @ XMPP Standards Foundation's
- Open, developer-friendly standards process
- Can write your own "private" extensions for custom functionality

Asynchronicity



Asynchronicity



- Web

Asynchronicity



- Web
  - Send request to server

Asynchronicity



- Web
  - Send request to server
  - Wait for response

Asynchronicity



- Web
  - Send request to server
  - Wait for response
  - Short-lived connections

Asynchronicity



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Asynchronicity



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- Jabber
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  - Events are sent out / come in asynchronously

Asynchronicity



- Web
  - Send request to server
  - Wait for response
  - Short-lived connections
- Jabber
  - Long lived connection
  - Events are sent out / come in asynchronously
- Different mindsets!



Code Example

Echo bot



Echo bot



- Bots

Echo bot



- Bots
  - Unmanned clients

Echo bot



- Bots
  - Unmanned clients
  - Connect to an XMPP server, and wait for commands / send events

Echo bot

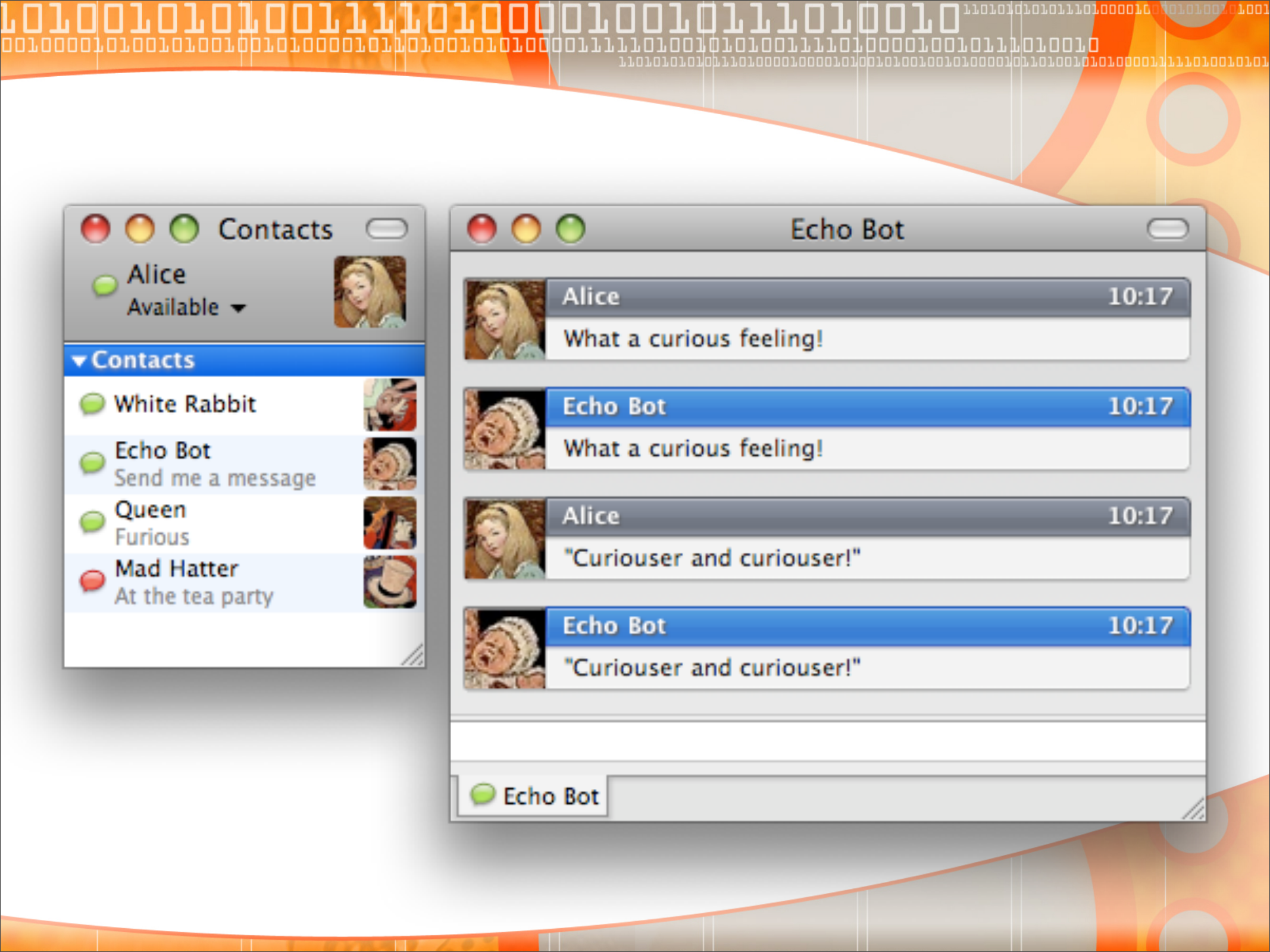


- Bots
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Echo bot



- Bots
  - Unmanned clients
  - Connect to an XMPP server, and wait for commands / send events
- Echo bot
  - Echoes back every message that it receives


Contacts
Alice
Available
Contacts
White Rabbit
Echo Bot
Send me a message
Queen
Furious
Mad Hatter
At the tea party
Echo Bot
Alice 10:17
What a curious feeling!
Echo Bot 10:17
What a curious feeling!
Alice 10:17
"Curiouser and curiouser!"
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"Curiouser and curiouser!"
Echo Bot

Writing the Echo Bot



Writing the Echo Bot



- Select a language to work in

Writing the Echo Bot



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  - e.g. Python

Writing the Echo Bot



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Writing the Echo Bot



- Select a language to work in
  - e.g. Python
- Select an XMPP library to do the low-level XMPP work
  - e.g. SleekXMPP
- Start coding

SleekXMPP Python Echo Bot




```
class EchoBot :
  def __init__(self, jid, password) :
    self.xmpp = sleekxmpp.ClientXMPP(jid, password)
    self.xmpp.add_event_handler("session_start", self.handleXMPPConnected)
    self.xmpp.add_event_handler("message", self.handleIncomingMessage)

  def run(self) :
    self.xmpp.connect()
    self.xmpp.process(threaded=False)

  def handleXMPPConnected(self, event):
    self.xmpp.sendPresence(pstatus = "Send me a message")

  def handleIncomingMessage(self, message) :
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def main() :
  bot = EchoBot("echobot@wonderland.lit/HelloWorld", "mypass")
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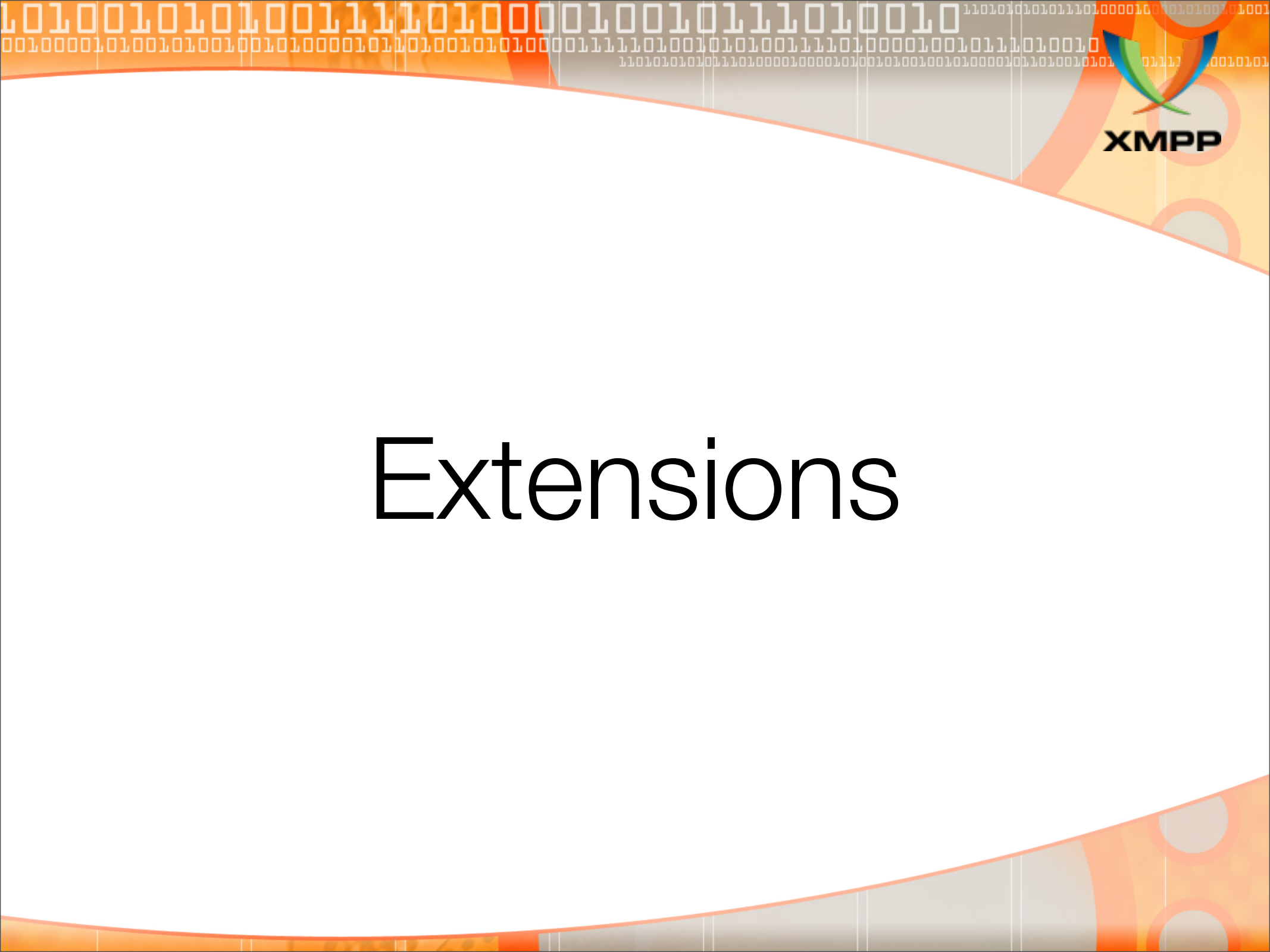

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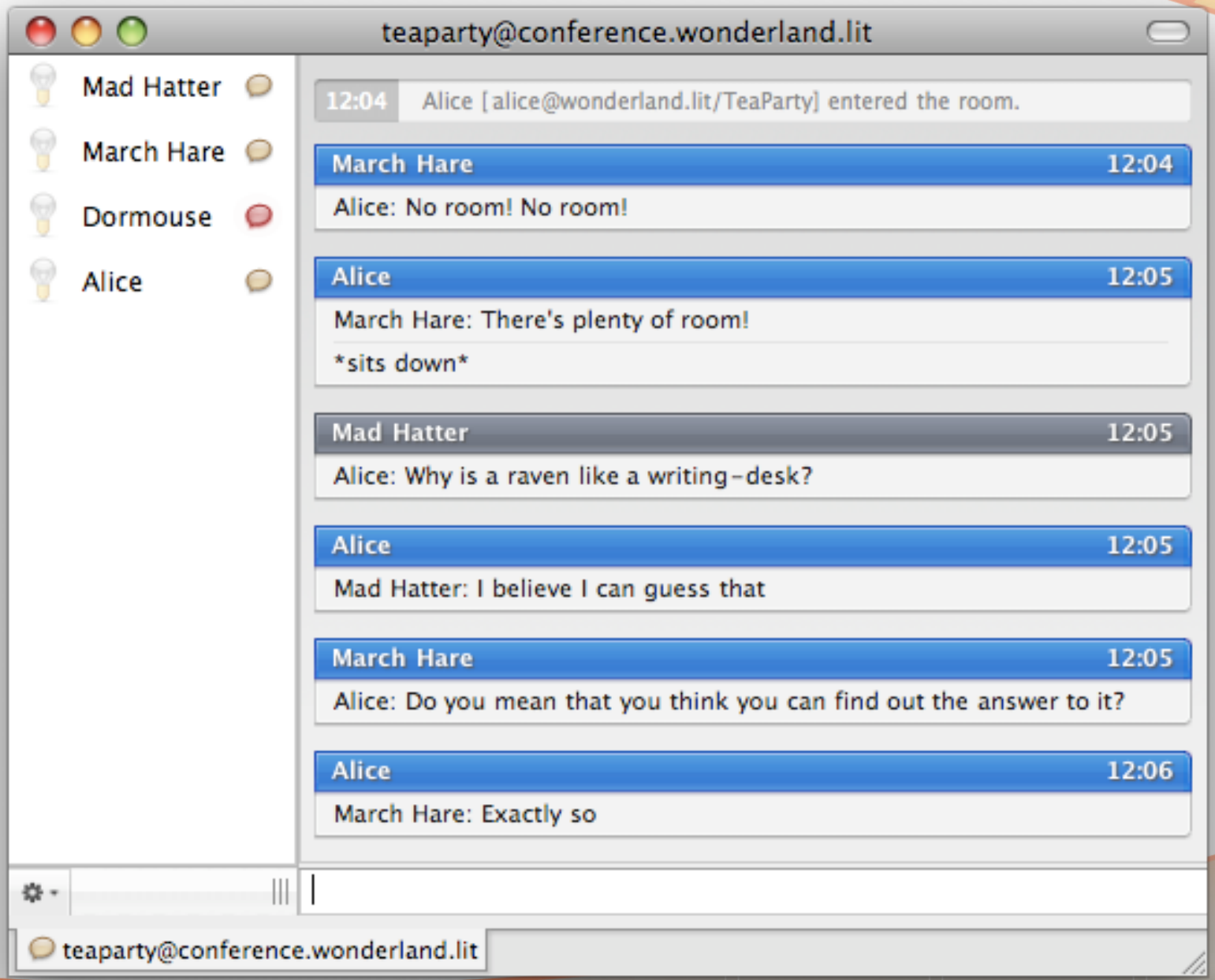
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Extensions

Multi-User Chat



Multi-User Chat



Multi-User Chat



- Conversation with multiple users

Multi-User Chat



- Conversation with multiple users
- Shared roster (with presence from all participating users)

Multi-User Chat



- Conversation with multiple users
- Shared roster (with presence from all participating users)
- Crowd control

Multi-User Chat



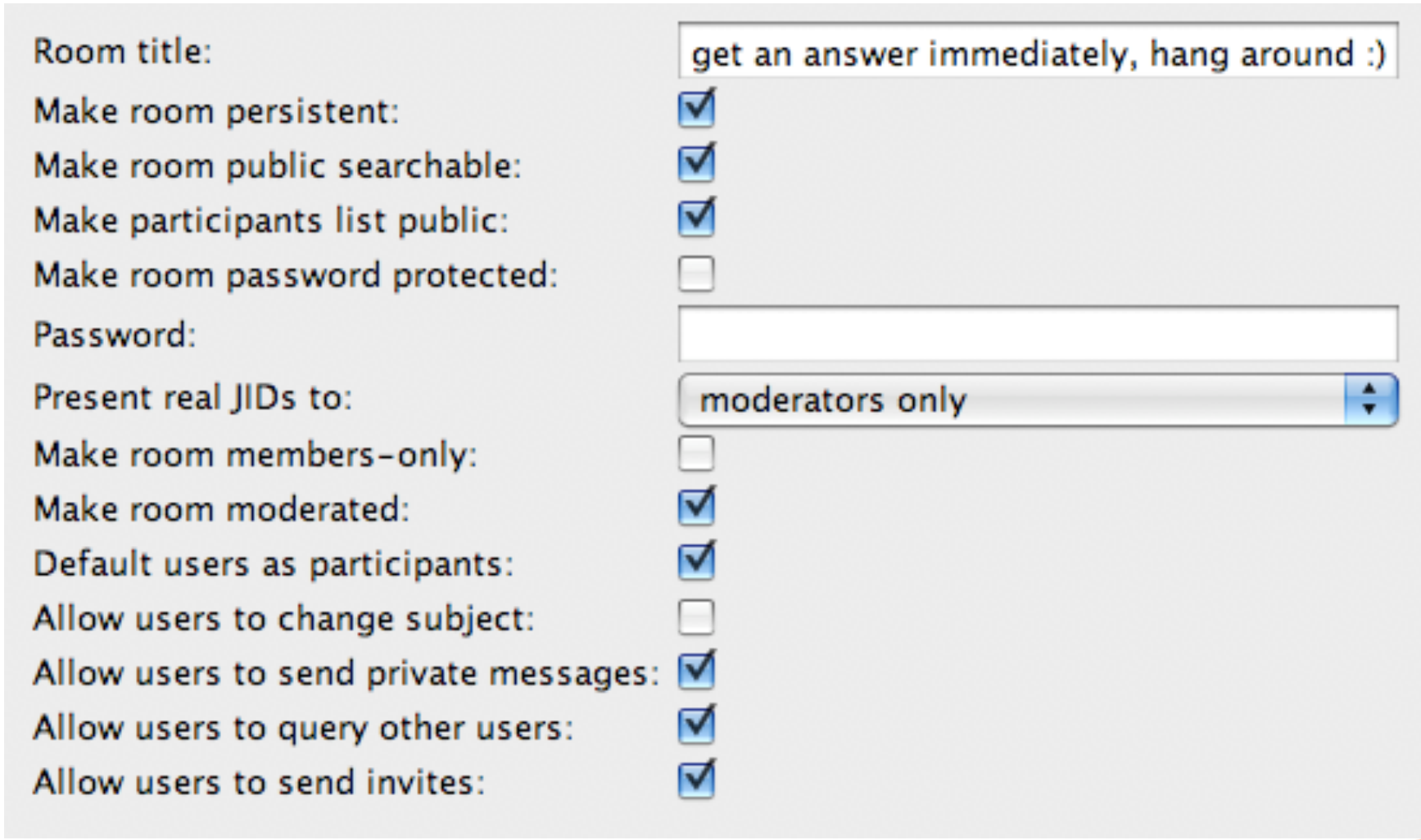
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- Privacy

Multi-User Chat



- Conversation with multiple users
- Shared roster (with presence from all participating users)
- Crowd control
- Privacy
- Configurable

Multi-User Chat Configuration



PubSub: Polling vs PubSub



Polling

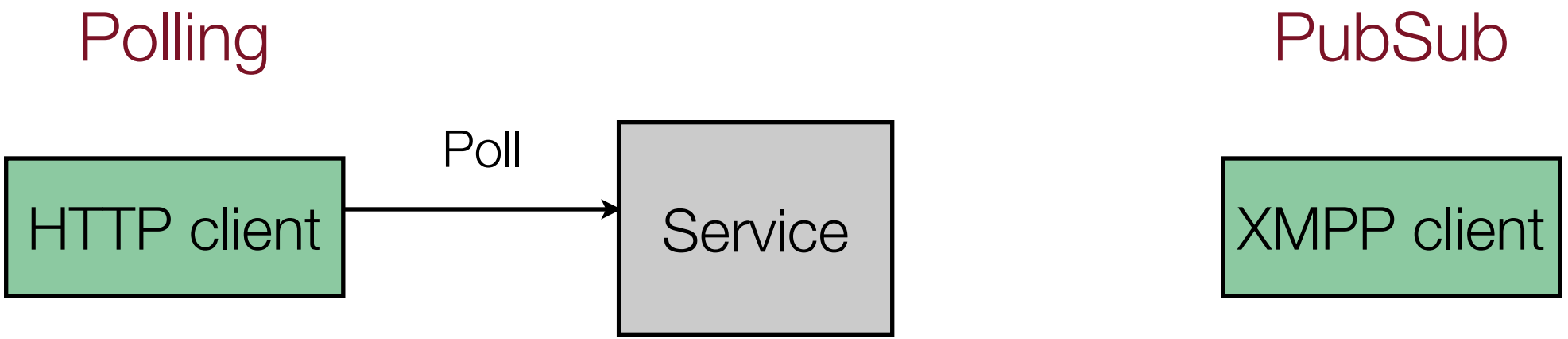
PubSub

HTTP client

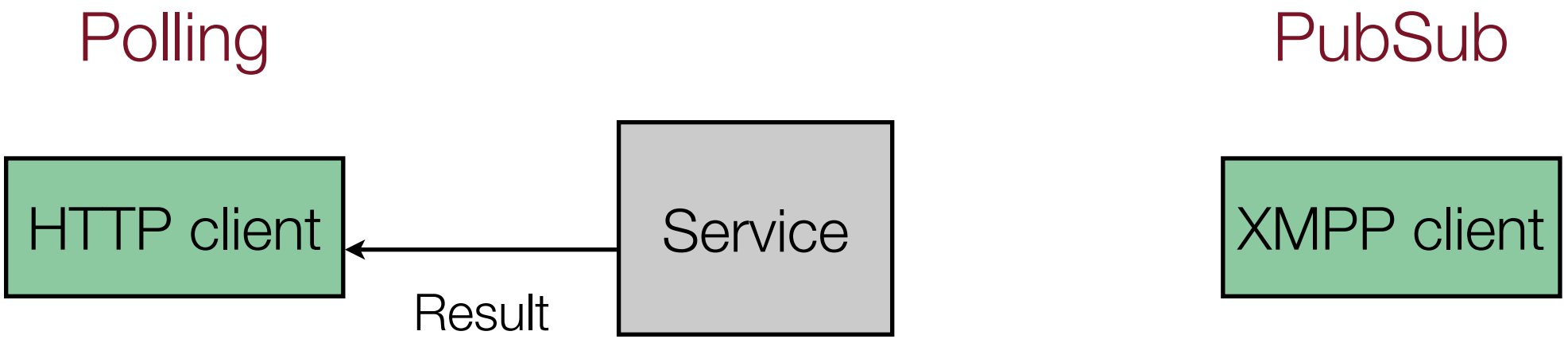
Service

XMPP client

PubSub: Polling vs PubSub



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Polling

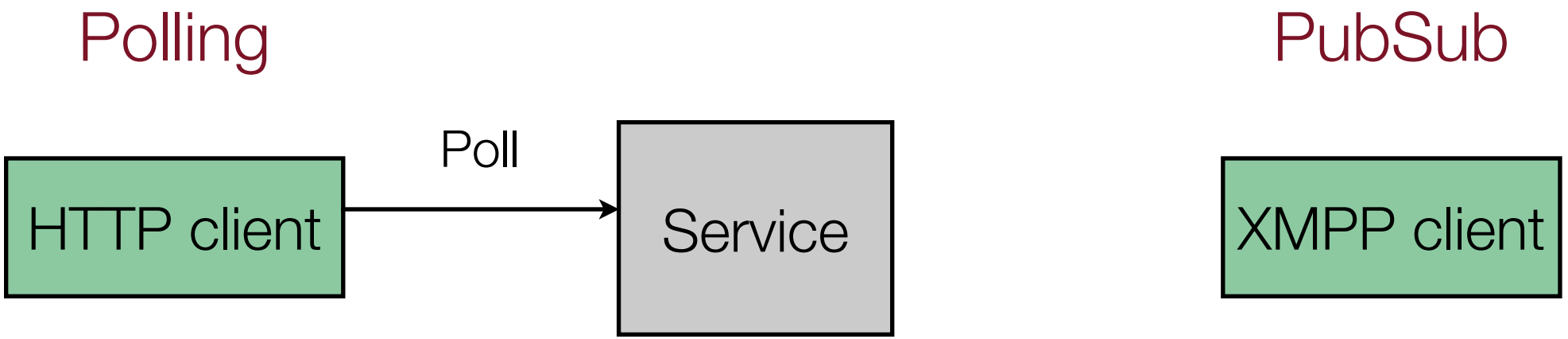
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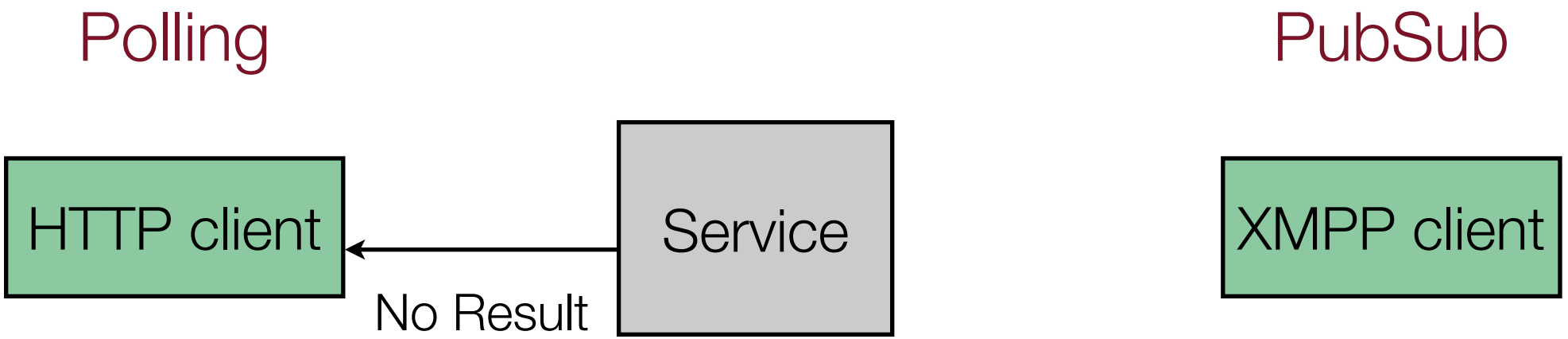
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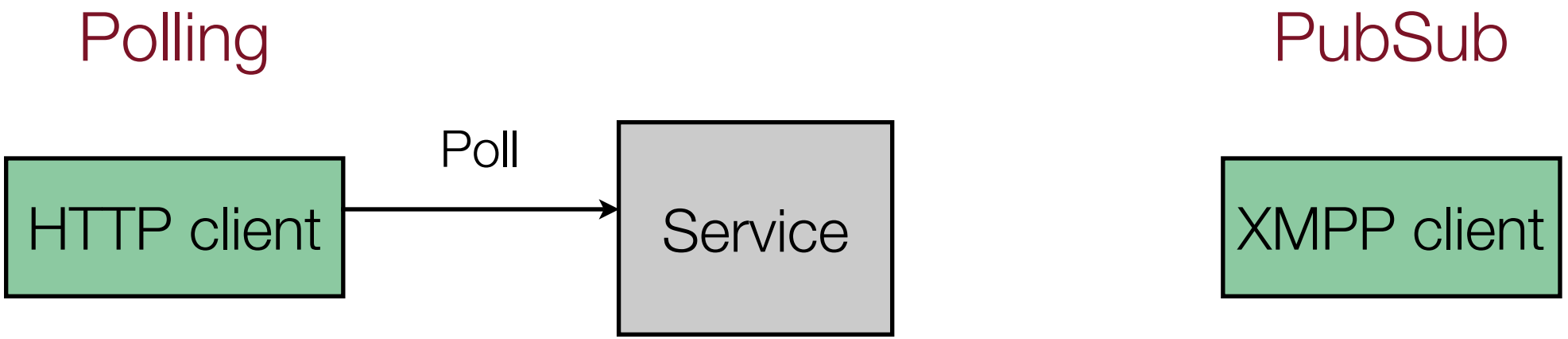
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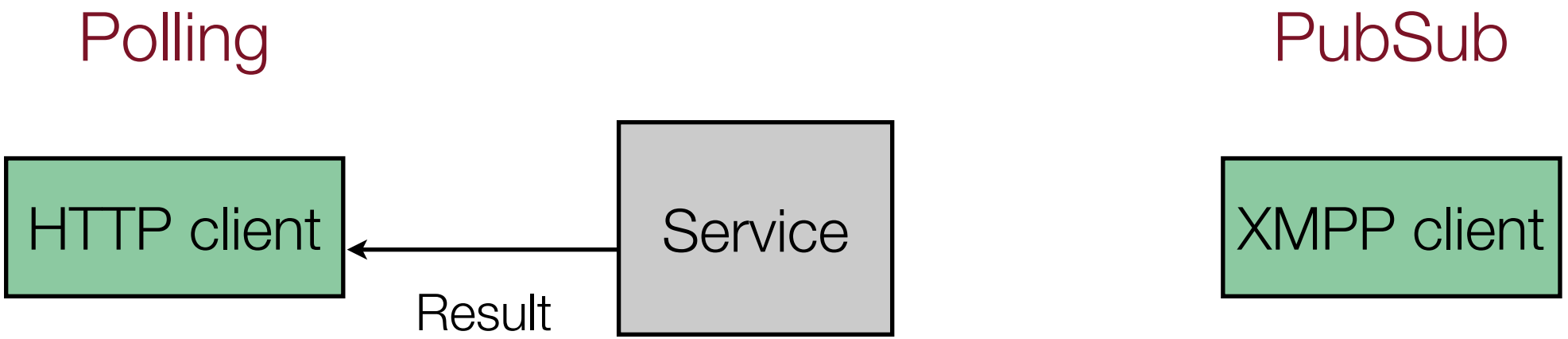
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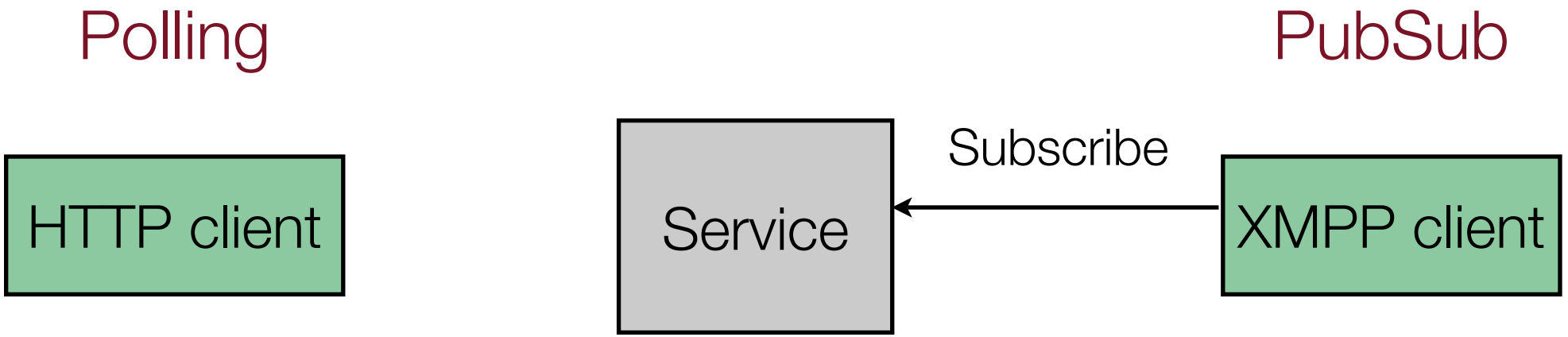
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PubSub: Polling vs PubSub



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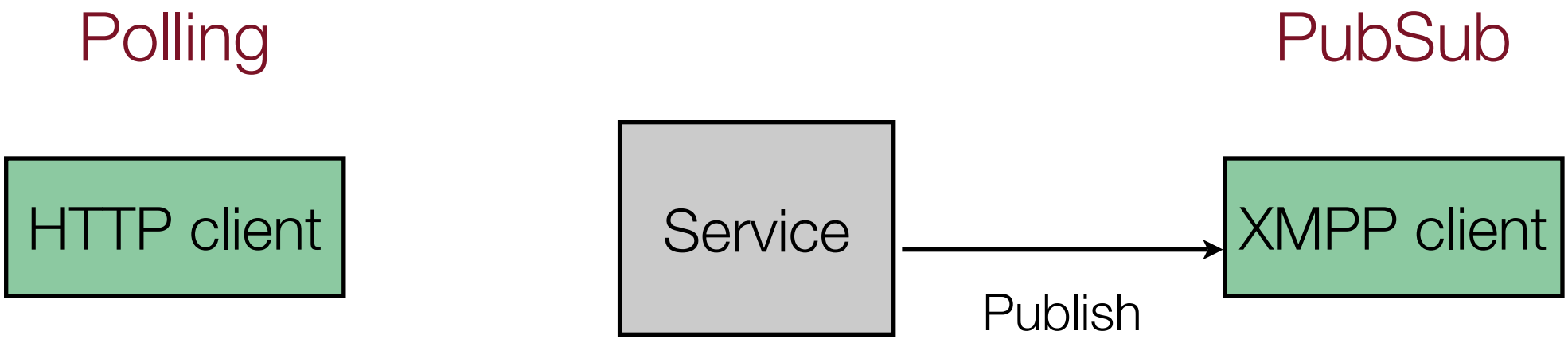
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PubSub



- Protocol to subscribe and publish any kind of information

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- Avoids needless polling for new information
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- Extensible: Payload can be any type
- Configurable

PubSub: Subscribing

```
<iq from="alice@wonderland.lit/rabbithole"
    id="gh921nx3"
    to="notify.wonderland.lit"
    type="set">
  <pubsub xmlns="http://jabber.org/protocol/pubsub">
    <subscribe node="queenly_proclamations"
               jid="alice@wonderland.lit"/>
  </pubsub>
</iq>
```

PubSub: Publishing events




```
<iq from="queen@wonderland.lit/croquetlawn"
    id="ma019r58"
    to="notify.wonderland.lit"
    type="set">
  <pubsub xmlns="http://jabber.org/protocol/pubsub">
    <publish node="queenly_proclamations">
      <item>
        <entry xmlns="http://www.w3.org/2005/Atom">
          <title>A new thought</title>
          <summary>Off with their heads!</summary>
          <link rel="alternate" type="text/html"
                href="http://wonderland.lit/1865/"/>
          <id>tag:wonderland.lit,1865:entry-42</id>
          <published>1865-12-13T18:30:02Z</published>
          <updated>1865-12-13T18:30:02Z</updated>
        </entry>
      </item>
    </publish>
  </pubsub>
</iq>
```

PubSub: Receiving events




```
<message from="notify.wonderland.lit" to="alice@wonderland.lit">
  <body>A new thought: off with their heads!</body>
  <event xmlns="http://jabber.org/protocol/pubsub#event">
    <items node="queenly_proclamations"  id="bl38pahu98h">
      <item id="zi2ba967">
        <entry xmlns="http://www.w3.org/2005/Atom">
          <title>A new thought</title>
          <summary>Off with their heads!</summary>
          <link rel="alternate" type="text/html" h
                ref="http://wonderland.lit/1865/"/>
          <id>tag:wonderland.lit,1865:entry-42</id>
          <published>1865-12-13T18:30:02Z</published>
          <updated>1865-12-13T18:30:02Z</updated>
        </entry>
      </item>
    </items>
  </event>
</message>
```

Extended Presence

Extended Presence

- Publish extra information about yourself

Extended Presence



- Publish extra information about yourself
  - What music are you currently listening to?

Extended Presence



- Publish extra information about yourself
  - What music are you currently listening to?
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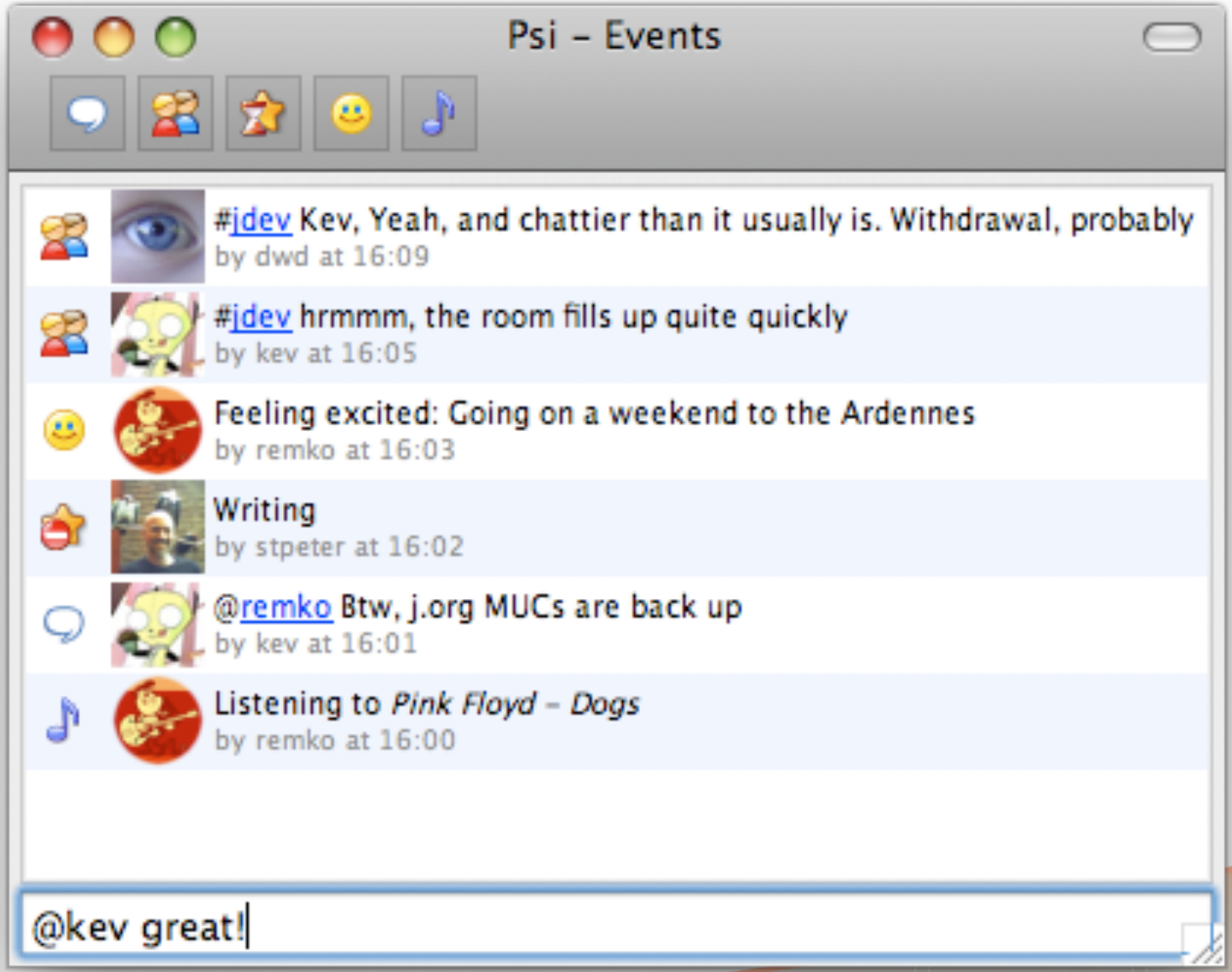


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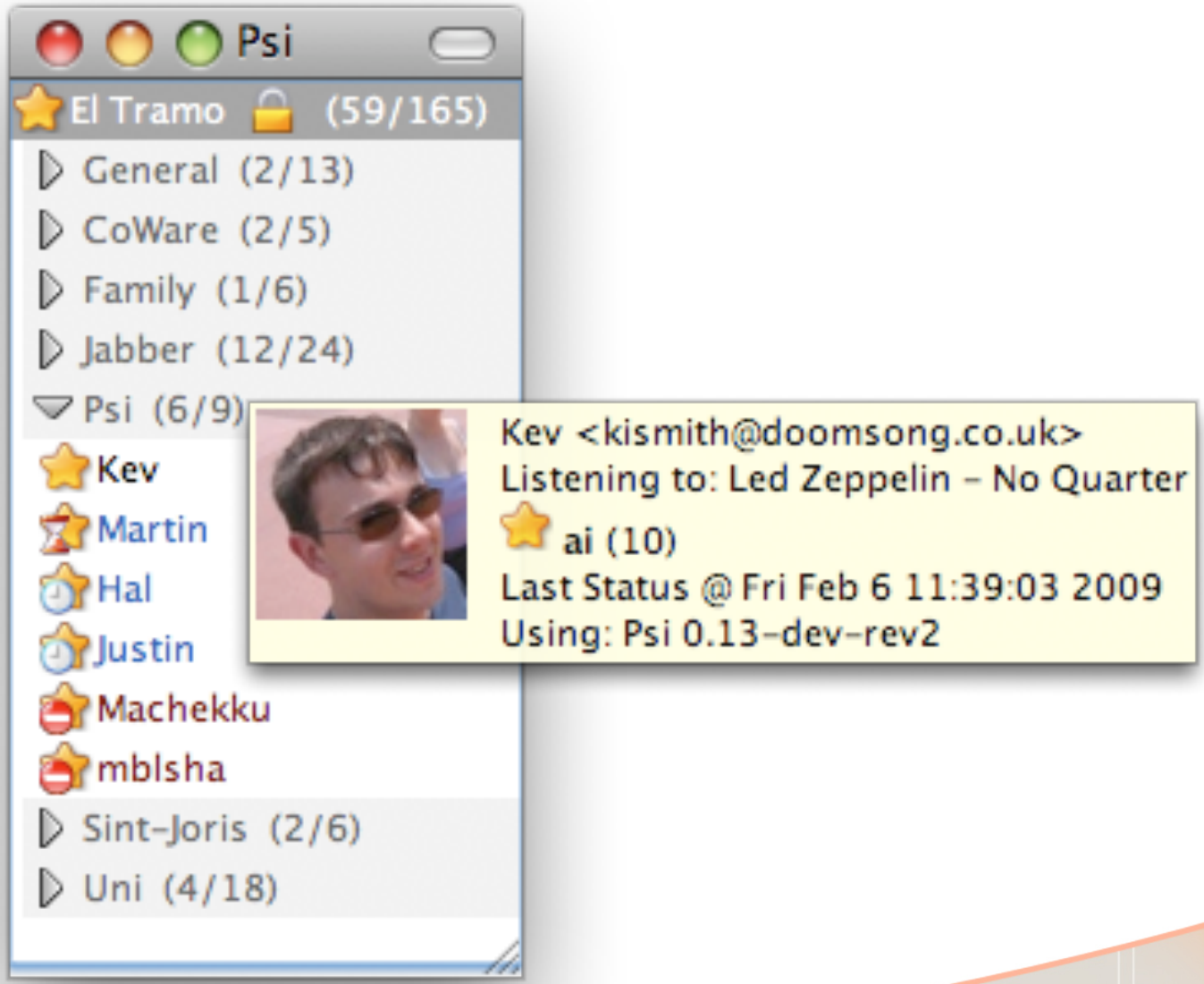
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  - Doesn't scale
  - 'Spams' people with unwanted information
- Implemented on top of PubSub

Extended Presence



Extended presence



Jingle

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- Voice, Video, Multimedia, P2P

Jingle



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File Transfer



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BOSH



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  - Piggyback incoming messages on HTTP response

BOSH




```
POST /webclient HTTP/1.1
Host: bosh.wonderland.lit
Content-Type: text/xml; charset=utf-8
Content-Length: 205

<body rid="90029205" sid="3m1ts1htd1s"
      xmlns="http://jabber.org/protocol/httpbind">

  <message to="sister@realworld.lit" xmlns="jabber:client">
    <body>Help, I fell down the rabbit hole!</body>
  </message>

</body>
```

Serverless Messaging



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  - Remote location without internet

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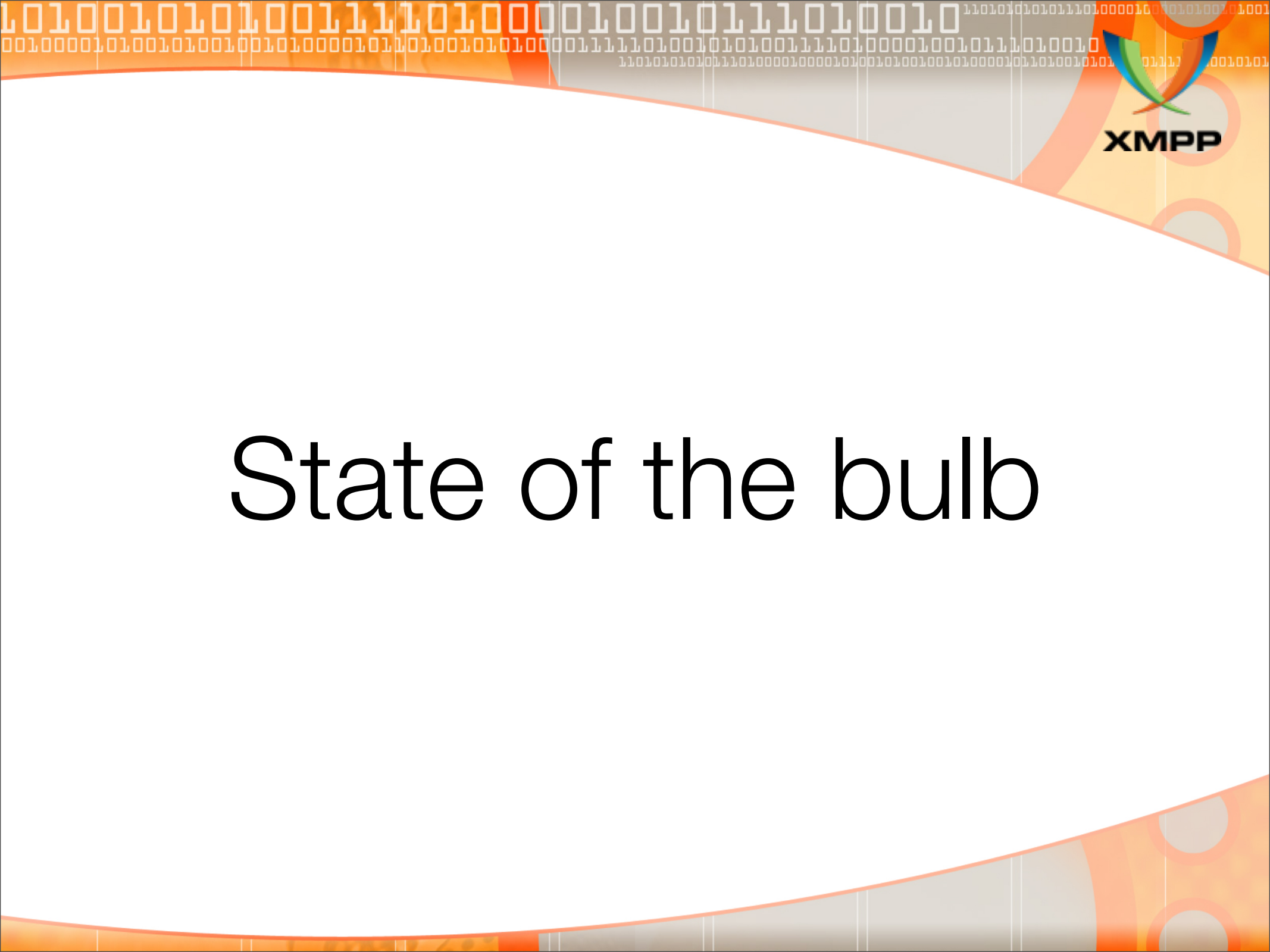


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- iChat's Rendez-vous/Bonjour



State of the bulb

What is the XSF working on?



What is the XSF working on?



- E2E security

What is the XSF working on?



- E2E security
- Whiteboarding

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- Whiteboarding
- File sharing / personal media networks

What is the XSF working on?



- E2E security
- Whiteboarding
- File sharing / personal media networks
- World domination



Conclusion

Join the conversation



- http://**xmpp.org**/
- mailto:**jdev@jabber.org**
- xmpp:**jdev@conference.jabber.org**
- [mailto:|xmpp:]**stpeter@jabber.org**
- [mailto:|xmpp:]**remko@el-tramo.be**
- Jabber/XMPP booth @ FOSDEM
- XMPP Summit on Monday

Conclusion

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- Build competitive advantage using open technologies

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More info inside

