Liberating Communication with Matrix

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What is Matrix?
An open decentralised conversation store and message bus.
Why?
To create a global communication meta-network that bridges all the existing silos & liberates our communication to be controlled only by us.
Matrix is for:
  Group Chat (and 1:1)
  WebRTC Signalling
  Bridging Comms Silos
  Internet of Things Data

...and anything else which needs to pubsub persistent data to the world.
Why not XMPP?

• We wanted a fresh start with a higher level of functionality in the baseline spec:
  – Decentralised conversation history as the first class citizen, not message passing / pubsub
  – Group conversation as a first class citizen
  – E2E crypto as a first class citizen (we’re not there yet though)
  – HTTP+JSON as the baseline API (but you can use other transports too!)
  – Stronger focus on defragmentation and bridging (hence the name “matrix”).
The Matrix Ecosystem

The Matrix Specification (Client/Server API)

Synapse (Reference Matrix Server)

Matrix Application Services and Bridges

Other Servers and Services

client-side

server-side

Matrix Web Console

Matrix iOS Console

MatrixKit (iOS)

Android Console

matrix-react-sdk

matrix-angular-sdk

matrix-js-sdk

matrix-ionic-sdk

matrix-ios-sdk

matrix-android-sdk

Other Clients
What do you get in the spec?

- Decentralised conversation history (timeline and key-value stores)
- Group Messaging
- VoIP signalling for WebRTC
- Server-side push notification rules
- Server-side search
- Read receipts, Typing Notifs, Presence
- Synchronised read state and unread counts
- Decentralised content repository
- “Account data” for users per room
- E2E Encryption (real soon now)
How does it work?

https://matrix.org/#about
Clients

• 20 matrix clients (that we know about)
  – Ranging from text UIs (Weechat, Emacs(!))
  – …to desktop apps (Tensor, Quaternion, Pidgin)
  – …to native mobile apps (Console)
  – …to glossy web clients (Vector)
  – …to protocol proxies (PTO)

• Over 10 client-side SDKs:
  – Official: JS, React, iOS, Android
  – Semi-official: Python, Perl5
  – Community: Erlang, Ruby, Lisp, Elixir, Haskell, Rust…
Home servers

• **Synapse**: the original reference Matrix home server implementation.
  – 30K lines of Python/Twisted.
  – Lots of perf and maintainability challenges…

• **Dendron**: next-generation reference impl
  – 480(!) lines of Golang (it’s 2 weeks old)
  – Wraps synapses, incrementally migrating endpoints
    Built for scalability, perf and maintainability.

• **BulletTime (Go)**, **Pallium (Go)**, **Ruma (Rust)**, **jSynapse (Java)** experiments from the community
Bridges and Integrations

Existing App

3rd party Clients

3rd party Server

Application Service

[Matrix]
Typical Bridging Stack

matrix-appservice-irc
matrix-appservice-slack
matrix-appservice-purple
matrix-appservice-bridge
matrix-appservice-node
matrix-js-sdk
Node JS
Matrix to IRC

IRC clients

ircd (e.g. Freenode)

matrix-appservice-irc

matrix
Matrix to slack

Slack clients

slack.com

matrix-appservice-irc

matrix
Matrix to SMS

The PSTN

OpenMarket SMS Gateway

OpenMarket Matrix Gateway
Matrix to Skype, Lync, Facebook, AIM, ICQ...?!
Matrix to Asterisk

SIP, IAX, H.323, PRI etc
Asterisk + chan_respoke
socket.io JSON-over-HTTP transport
matrix-appservice-respoke
matrix
Matrix to IOT...

Parrot Bebop Drone

Janus WebRTC Gateway (from MeetEcho)

Web Matrix example client (Firefox)

synapse (on laptop)

synapse (on laptop)
The end goal:

Skype

PSTN

Hangouts

...
Community Status

- Started out in Sept 2014
- Currently in late beta
- ~120K user accounts on the Matrix.org homeserver (many of these are bridged)
- ~100K messages per day
- ~300 federated servers
Community Status

Figure 0: Total messages per day on matrix.org

[Graph showing the increase in messages from September 14, 2014 to January 15, 2016]
What’s left?

• Rolling out End-to-end Encryption
• Threading
• Message tagging (e.g. “Like” support)
• Group ACLs
• File tagging and management
• Decentralised identity
• “Fixing spam”
End to End Encryption with Olm

• Apache License C++11 implementation of an Axolotl-style ratchet, exposing a C API.

• Axolotl is Open Whisper System's better-than-OTR cryptographic ratchet, as used by TextSecure, Pond, WhatsApp etc.

• Supports encrypted asynchronous group communication.

• 130KB x86-64 .so, or 208KB of asm.js
We need help!!
• We need people to try running their own servers and join the federation.
• We need people to run gateways to their existing services
• We need feedback on the APIs.
• Consider native Matrix support for new apps
• Follow @matrixdotorg and spread the word!
Thank you!

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http://matrix.org

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