[matrix]

Building an IoT Platform 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.

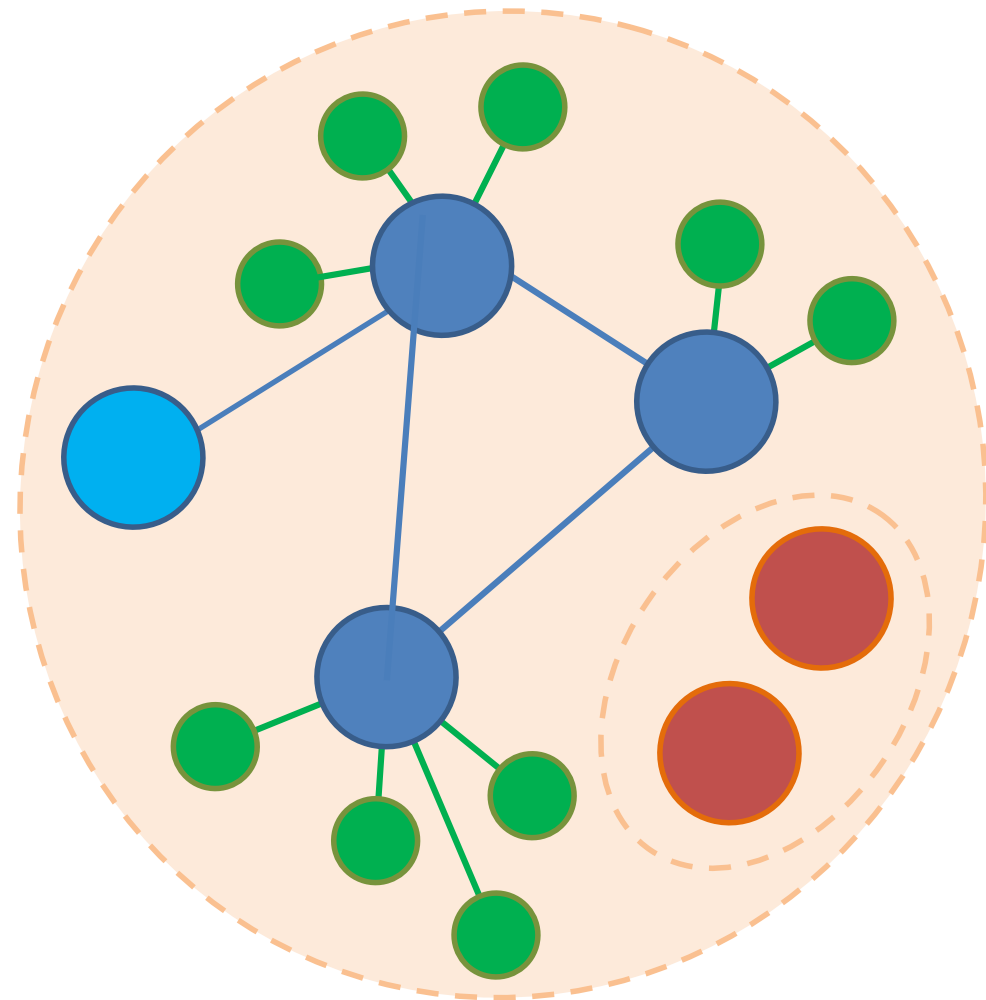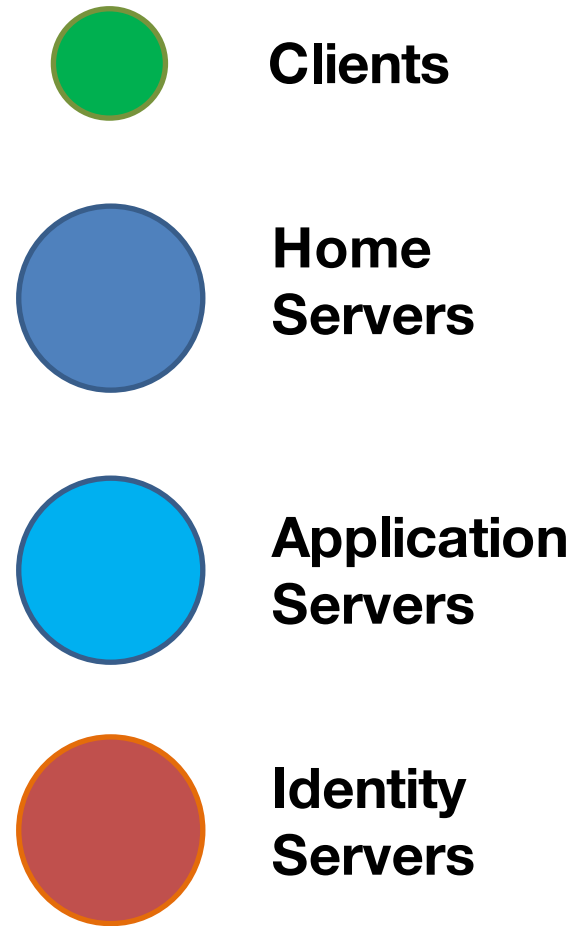# Matrix is for:
Group Chat (and 1:1)
WebRTC Signalling
Bridging Comms Silos
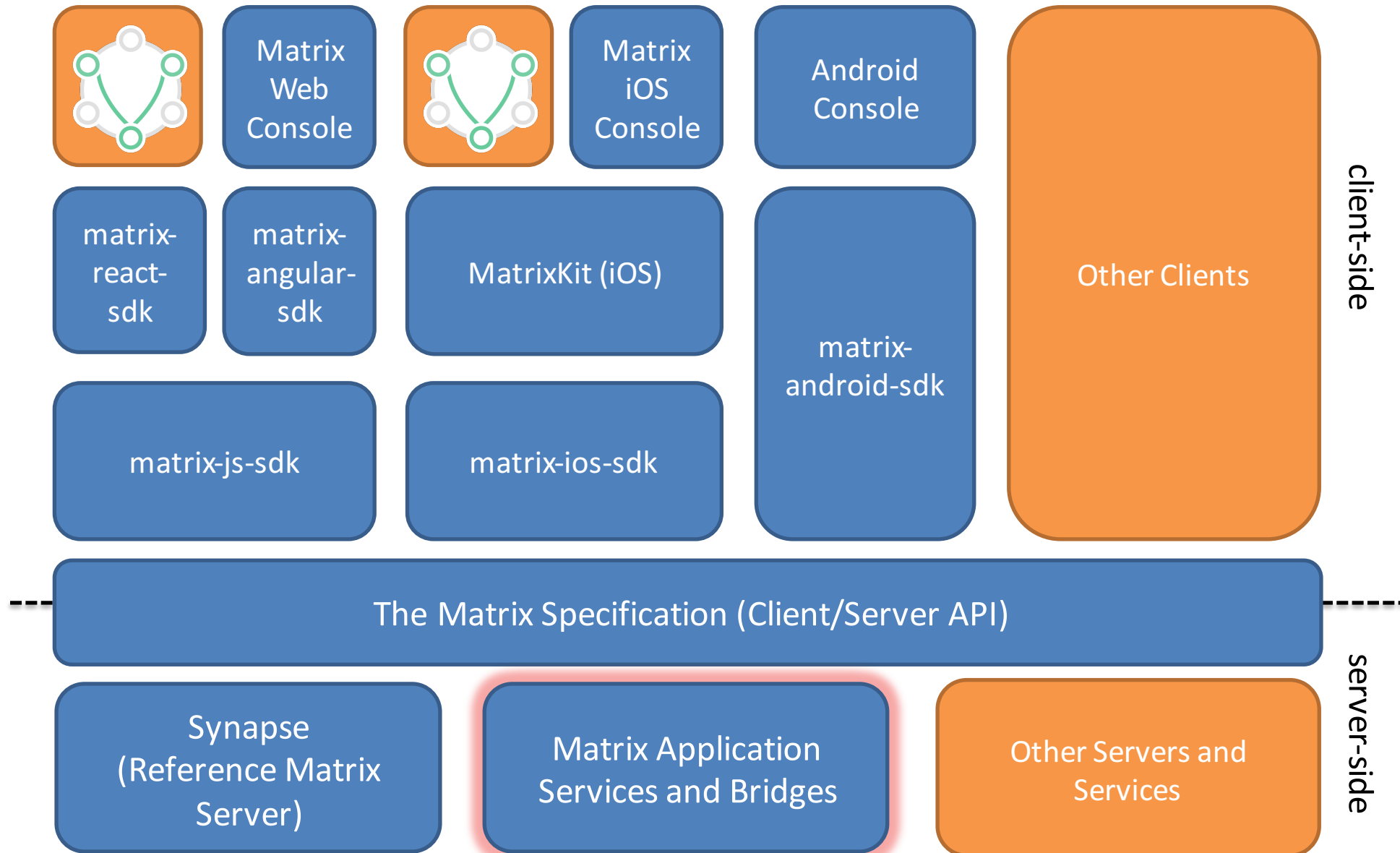## Internet of Things Data

…and anything else which needs to pubsub persistent data to the world.

Matrix Architecture

Clients

Home Servers

Application Servers

Identity Servers

The Matrix Ecosystem

[matrix]

matrix-react-sdk

Matrix Web Console

Matrix iOS Console

Android Console

Other Clients

matrix-angular-sdk

MatrixKit (iOS)

matrix-android-sdk

matrix-js-sdk

matrix-ios-sdk

The Matrix Specification (Client/Server API)

Synapse (Reference Matrix Server)

Matrix Application Services and Bridges

Other Servers and Services

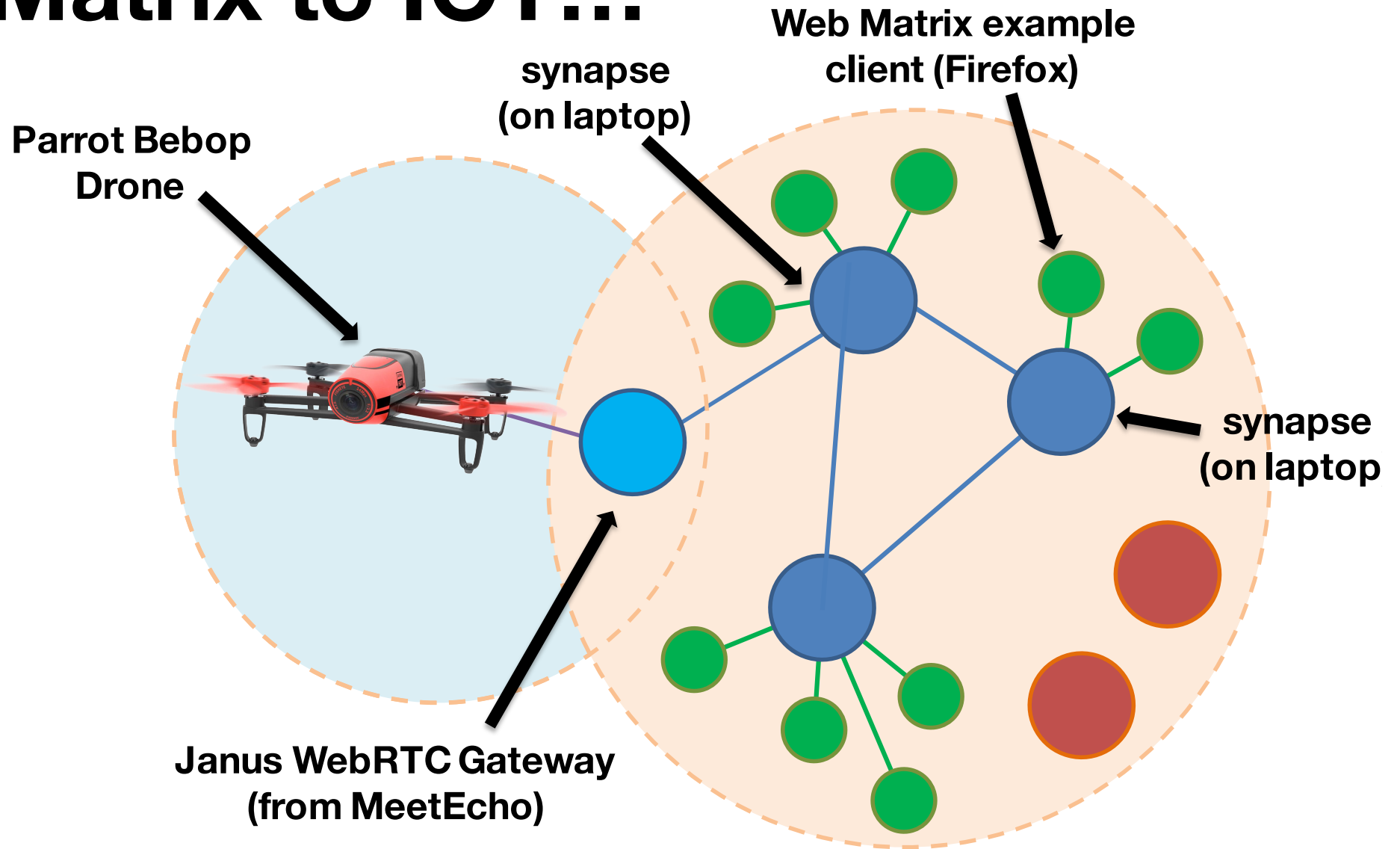# How does it work?

https://matrix.org/#about

Internet of Things

- Lots and lots of vendor silos.

- Lots of data that can be liberated into Matrix – both for control and telemetry.

- Matrix provides a trivial standard HTTP+JSON API for publishing or subscribing to data

- Supports arbitrary alternative transports and encodings too (CoAP+CBOR, MQTT, WebSockets etc)
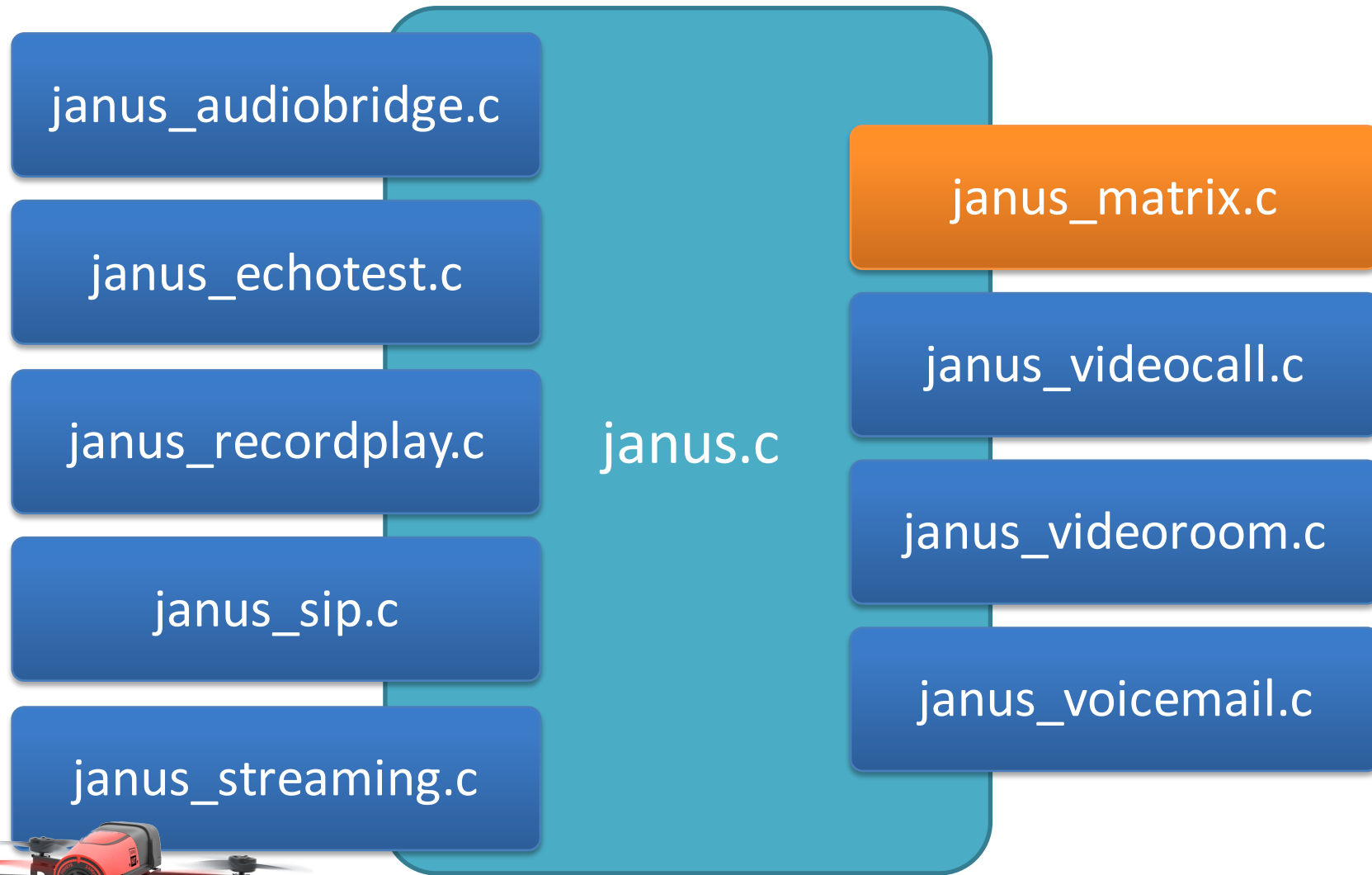
Let's bust some silos!

Matrix to IOT...

Parrot Bebop Drone

synapse (on laptop)

Web Matrix example client (Firefox)

synapse (on laptop

Janus WebRTC Gateway (from MeetEcho)

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Janus Architecture

janus_audiobridge.c

janus_echotest.c

janus_recordplay.c

janus_sip.c

janus_streaming.c

janus.c

janus_matrix.c

janus_videocall.c

janus_videoroom.c

janus_voicemail.c

Ryan Rix's IoT exploits

- [Lightrix: https://youtu.be/4YG9Fk5aP24](https://youtu.be/4YG9Fk5aP24)

- http://rix.si/blog/2015/09/13/body-computing-system-a-redux-and-a-dream

- http://rix.si/blog/2015/11/22/body-computing-system-continuations

A random CoAP example

```
echo '{"msgtype":"m.text", "body":"hello"}' |
perl -MCBOR::XS -MJSON -pe '$_=encode_cbor decode_json' |
coap-client -m post \
coaps://alice.com/_m/c/a/v1/r/ROOM_ID/s/m.room.message?a=
ACCESS_TOKEN
```
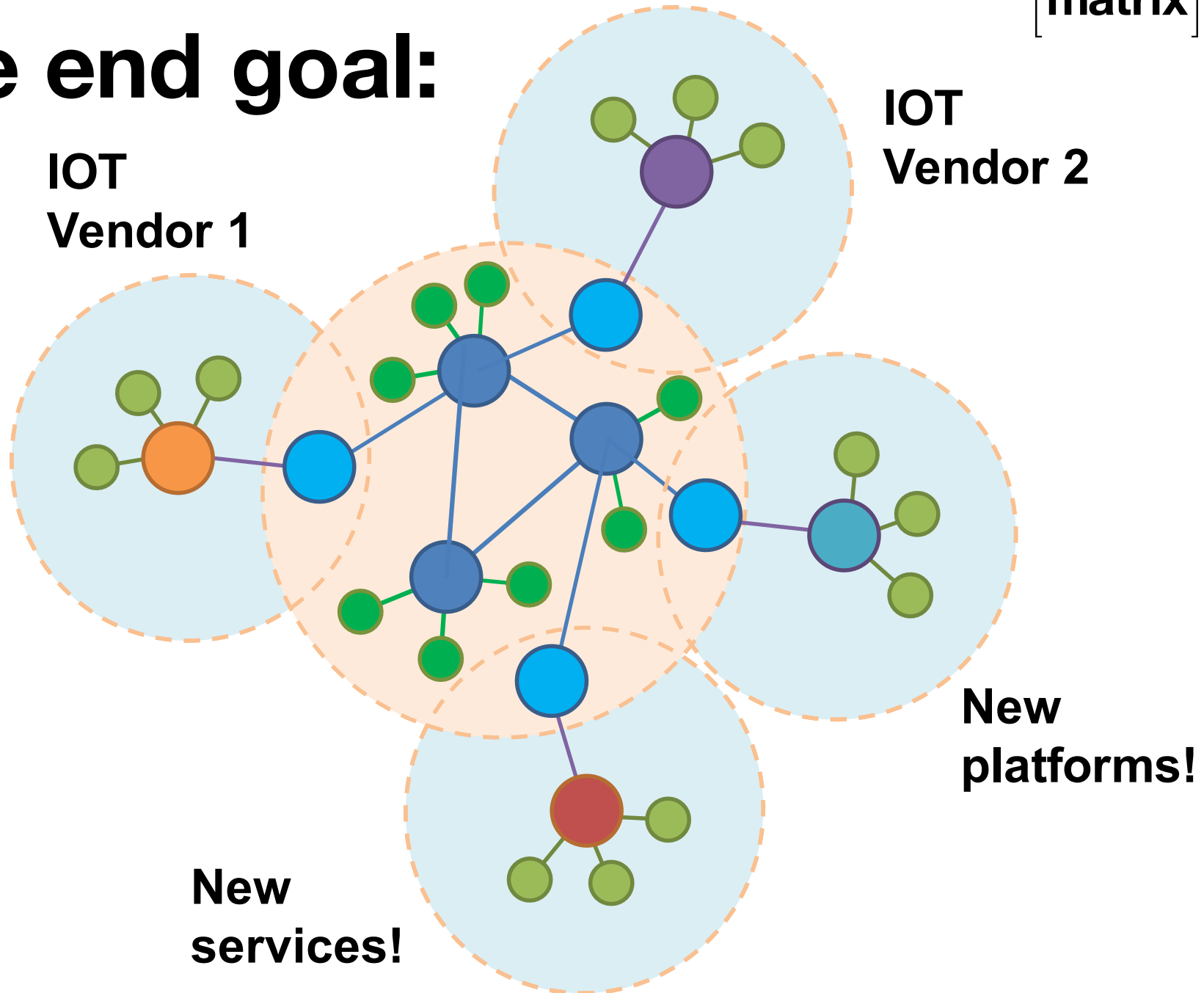
is the same as…

```
curl -XPOST -d '{"msgtype":"m.text", "body":"hello"}'
"https://alice.com:8448/_matrix/client/api/v1/rooms/ROOM_
ID/send/m.room.message?access_token=ACCESS_TOKEN"
```

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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

- https://matrix.org/git/olm

The end goal:

matrix

IOT
Vendor 1

IOT
Vendor 2

New
platforms!

New
services!

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What's left?

- Rolling out End-to-end Encryption
- Building more bridges
- Group ACLs
- File tagging and management
- Decentralised identity
- Abuse mitigation

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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!**

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Thank you!

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