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Presentation @ BBB World 24

BigBlueButton and the [matrix] Messenger Protocol -

a Challenging Relationship.

fairkom is an active developer of BigBlueButton extensions and Matrix clients and has experience with hosting both also for large scale.

An often demanded use case is to launch a video conference within an existing Matrix room. Many organizations already do have a solution for video conferencing (Jitsi, BBB, Zoom, …) and they do not want to host yet another video infrastructure that requires bandwidth and operations tasks.

The most often used Matrix messenger client "Element" does not allow to choose any other video conferencing infrastructure yet (see Timo Kandra's presentation) – it is bound to Element's SFU, which has to be considered in a beta stage. The integration manager "Dimension" is deprecated, which allowed to integrate Jitsi, but was not supported by all clients.

On the next pages we are sketching options to be discussed with partners and potential clients, that would financially support the development of a sustainably and flexible video conferencing service integration into Matrix. We will mainly look into integrating BigBlueButton, but also look into options that allow rooms in other conferencing systems to be launched.

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Option 1: Launch conference with bot

The simplest and most universal solution is a matrix-bot that can create BigBlueButton rooms that all users inside a matrix-room can use.

fairkom has developed a prototype written in typescript and which uses bigbluebutton-js and matrix-bot-sdk. A migration for GO is ready for being tested.

How to use:
When the bot is online, it will output "Bot started!" in the console. You can now invite it to a room, just like a regular matrix user. It will listen to room events and, when the command "!conf" is encountered, will create a BigBlueButton Room. The relevant data (join URLs for each participant) is then sent to the room.

PoC Source code node-js version: https://git.fairkom.net/hosting/chat/matrix-bigbluebutton-bot
PoC Source code GO version: https://git.fairkom.net/hosting/chat/matrix-bigbluebutton-bot-go

Advantages
client independent
easy to integrate
lightweight

Disadvantage
a matrix room needs some setup first (bot invite, commands)
not the best user experience (we may try to fetch the video button via a proxy)

Effort
deploy in a staging / production environment and gather experience in daily usage
check how and where functionality of bot could be explained / displayed in the UI or in room info text
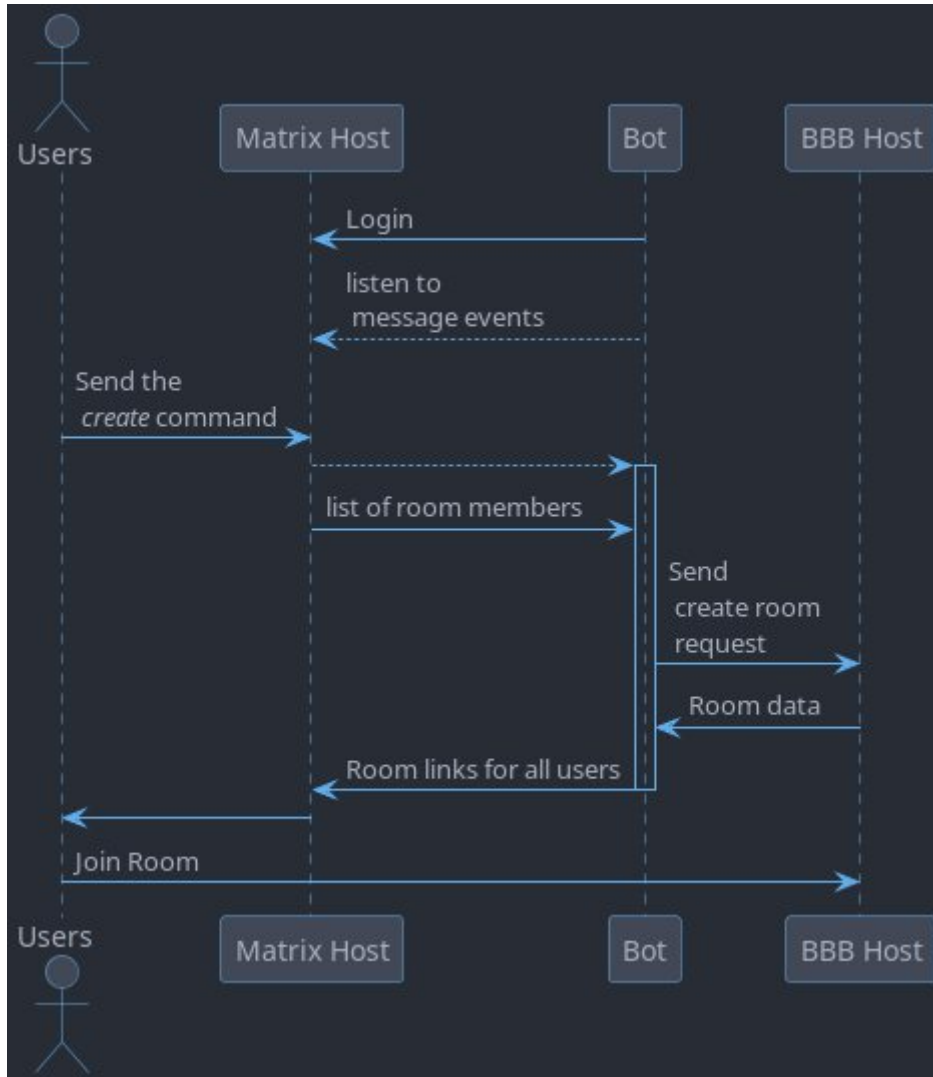
Workflow of starting a BBB meeting with a chat bot with *!conf*

Option 2: Integrate into Element

Integrate BBB directly into Element. When clicking the "videocall"-button (and there are more than 2 people in the same room), the video-widget should automatically start a BBB session which all users within the relevant matrix room can join. (Similar to how it is done with the existing Jitsi integration.)

Advantages:
nice user experience and ease of use
could be branded

Disadvantages:
only on web? (unless we show the join URL as a message additionally)
with Element we always have 3 code bases to maintain
regular rebasing and publishing
specialized know-how (rust) required
Element-X mobile versions not yet spec/feature complete

Effort
add customizable video button / widget
integrate BBB iFrame
build notification all group members on opened video conference
test on Android & iOS and publish on Google play / iOS store

Progress
BBB tech summit April 2024 – see also Timo's presentation at BBB world 2024
Partnership announcement

Partnership with BigBlueButton for Matrix-based virtual classroom

April 23, 2024   VIDEO CONFERENCING

We are excited to announce a ground-breaking collaboration between Element and BigBlueButton, marking a significant step forward in the realm of virtual classroom technology in the education sector. This partnership signifies our joint commitment to revolutionising online communication and collaboration, and we are ecstatic about the possibilities that lie ahead.

Big blue beginnings

BigBlueButton is a software platform to help educators teach effective virtual classes as measured in increased learning outcomes. BigBlueButton goes beyond traditional video conferencing capabilities to offer educators built-in tools for active learning and live analytics to ensure every student learns.

The collaboration began recently when Fred Dixon, co-founder of BigBlueButton Inc., approached Element with a vision to enhance their already impressive platform.

"We see the Matrix community and adoption of Element growing. For example, Moodle 4.4 just shipped with enhanced support for Matrix, and BigBlueButton is also built-in Moodle, so it's clear that many Moodle sites will be looking for synergies between our projects", says Fred Dixon. "The BigBlueButton project holds two developer summits each year, which brings together team members from around the world. We invited the Element team to join us at the
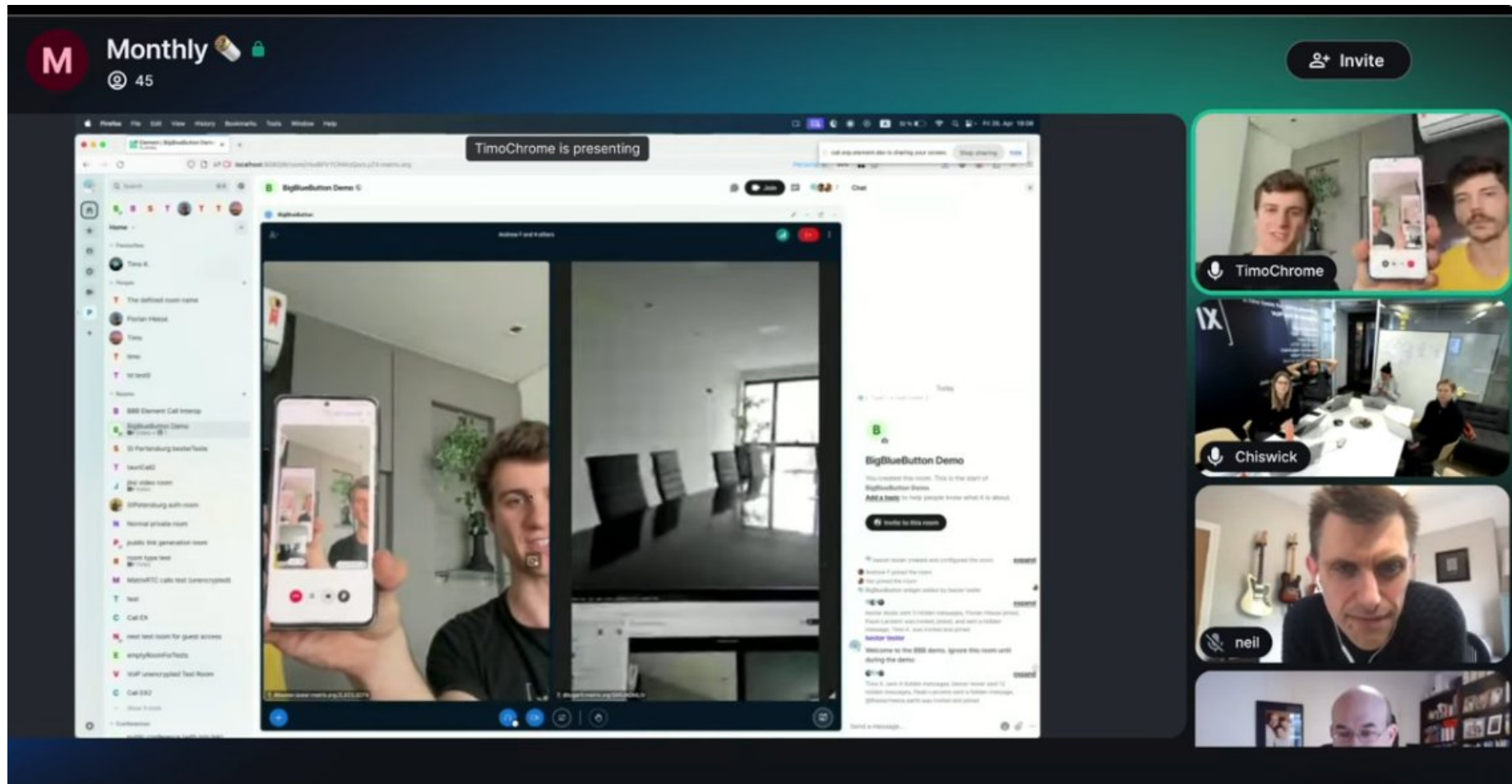
Element opening in BBB 3.0 live demo video

Open · 1 of 8 tasks · **Integrate BigBlueButton into the element.io matrix app** #20179

toger5 opened this issue on May 6 · 0 comments

- uses the `https://github.com/matrix-org/matrix-react-sdk#toger5/bigbluebutton` react sdk branch
  - has `big_blue_button.widget_url` configured.
  - has `feature_big_blue_button_calls` configured.
- `https://my-bbb-domain.com/service`
  - Started with the bbb secret and the domain: `https://my-bbb-domain.com`
- `https://my-bbb-domain.com/widget`
  - configured with the jwt bbb service url: `https://my-bbb-domain.com/service`
  - and optionally a livekit service url: `https://my-bbb-domain.com/optinal-livekit-jwt-service`

Open Todos:

- [ ] Make BBB work on chrome (It does not right now work in Iframes)
- [ ] Get the PR for element web Merged
  - [ ] writing tests
  - [x] Put BigBlueButton calls behind a feature flag
  - [ ] Auto approve the widget capabilities for the configured widget.
- [ ] Make the bbb service part of the default bbb docker container (Behind a feature flag. the service can create new meetings for valid matrix openId tokens. This should only be enabled if it is required).
- [ ] Make the widget spa part of the default bbb docker container. (this does not need a feature flag since its just a static page and does not pose any security issues)
- [ ] If livekit is enabled also host a livekit-service with the default bbb docker container which uses the BBB livekit SFU that is already part of the BBB container.

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🏷 🌐 **toger5** added the `type: enhancement` label on May 6

Element integration github issue at BBB project

Option 3: Integrate to FluffyChat

Fluffy chat based on Flutter and Dart has the big advantage that all clients (web, mobile, desktop) share the same code base. So an adaption needs to be made only once.

FluffyChats matrix feature set can be considered complete. Compared to Element it does not provide threading yet. However it offers multi-accounts.

Advantages:
only one codebase to maintain
faikom has know-how to adapt FluffyChat
direct connection to developers (know-how, branding, feature-wishlist)
alternative matrix clients strengthen the ecosystem
branding & theming

Disadvantages:
works well only with those clients (unless we show the join URL as a message additionally

Effort
fork FluffyChat (fairkom has the toolchain and pipelines for)
apply (generic) branding / design
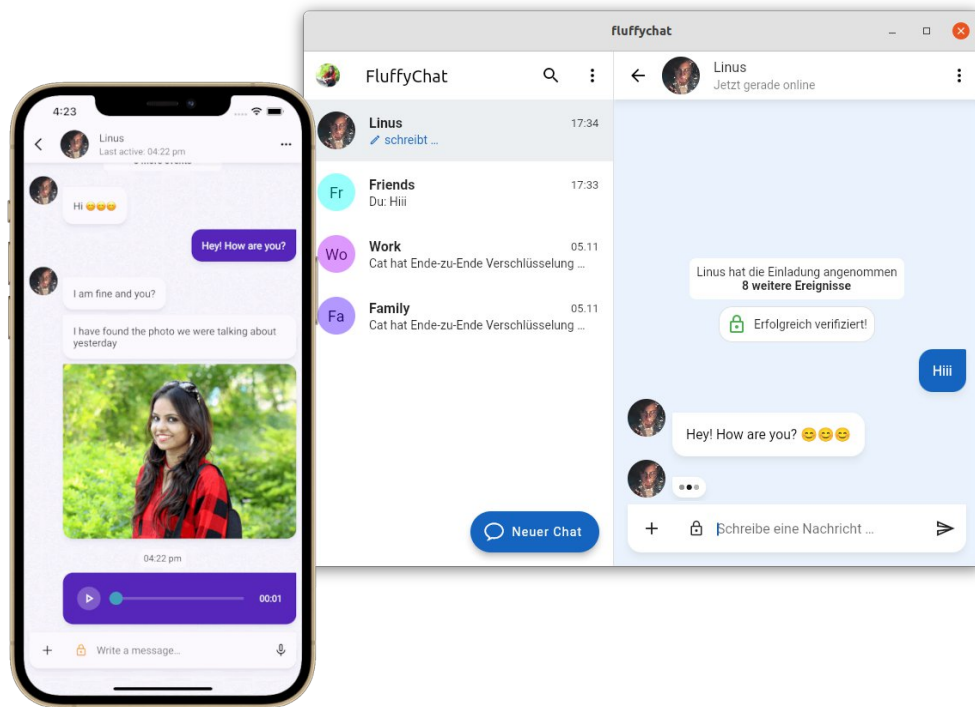integrate video button, integrate BBB window
build notification for all group members on opened video conference
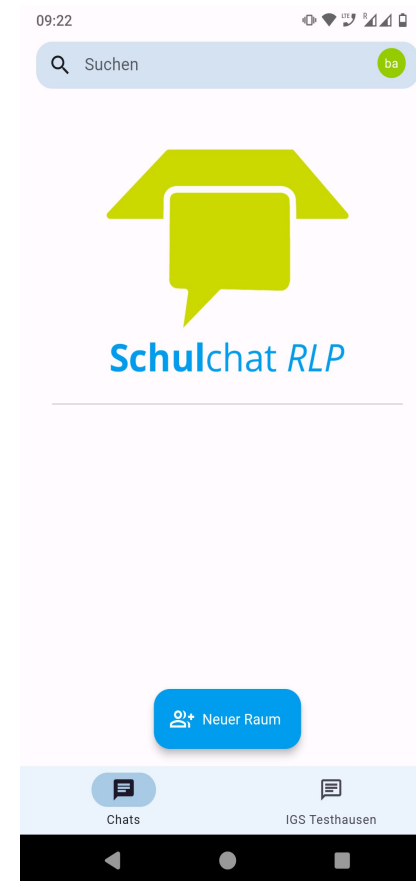test on all platforms (web, mobile, desktop)
publish on Google play / iOS store
check if this extension can be published upstream to FluffyChat as an option

FluffyChat screenshot

SchulchatRLP is also based on FluffyChat

Option 4: Pick up an Integration Manager

The previously existing widget integration manager dimension is unmaintained and there does not seem to be any viable alternative. There was already some groundwork being done for a BBB integration but it never got updated to work with newer BBB authentication. Therefore, it should be straight-forward to continue this work but it may be overkill to pick up the maintenance of this repo just for this one use case.

Advantage
easy to use for users and admins
customizations for someserver-admins
can manage other widgets (like etherpad or bots)
some work already done, would help many others
possible community support

Disadvantage
maintenance is a big responsibility
resource and knowledge intensive
only works for element based clients (so far, uncertain if element-x will ever support that)

Effort
check feasibility and discuss this option within matrix community
update BBB widget
fork dimension to dimension-x and upgrade libraries etc
convince client developers to further support dimension
add some more widgets to make dimension-x attractive also for other use cases

Option 5: (long term) Matrix Widget Specification

Widgets are still not part of the stable Matrix spec. Currently it's defined as a proposal in matrix-spec/285, therefore there can be no guarantees about client support or stability of the feature. A basic API exists but it is not (yet) recommended to develop for it, as there are still changes to be expected.
There are some attempts at creating a widget-API framework like done by nordeck and the matrix-hookshot

fairkom as a matrix foundation silver sponsor would need to be active in the specifications group .

A standard usually needs to be implemented with at least two clients to validate the specifications.

Advantages
one standard to rule them all
all clients can implement it
influence over specification

Disadvantages
long term project
unclear if successful

Effort
participate in standardisation process
active community work
implement widget-API server
work load to implement widgets in one or two clients
testing

Option 6: Intercept Jitsi call

A rather hacky approach which we had discussed lately is to sniff Element's traffic on its webserver and redirect the Jitsi call request to a service which connects to another video conferencing system and spits the join links into the Matrix room.

Advantages
may be easy to integrate into nginx
lightweight
could launch not only BBB, but also Zoom etc

Disadvantages:
not so nice UX

Effort
more detailed analysis of how Element calls Jitsi (via its API)
intercept test
create service that launches conference
if second person clicks on same video button it should be connected to same conference room
testing

Further discussion on the stub project https://git.fairkom.net/hosting/fairkom/jitsi-proxy/-/issues

Option 7: Bridging BBB chat with [matrix]

We have developed a proof-of-concept for forwarding messages from a matrix chat room to a BigBlueButton meeting, and vice versa.

It is an independent node.js service (based on nest.js) which can be launched on any BigBlueButton server.

The app subscribes to BigBlueButton's Redis server and to the matrix server. It will listen to any incoming messages in the matrix chat room and forward them to the BigBlueButton meeting, as well as subscribe to the BigBlueButton chat messages and forward them to matrix. No support for encrypted rooms yet.
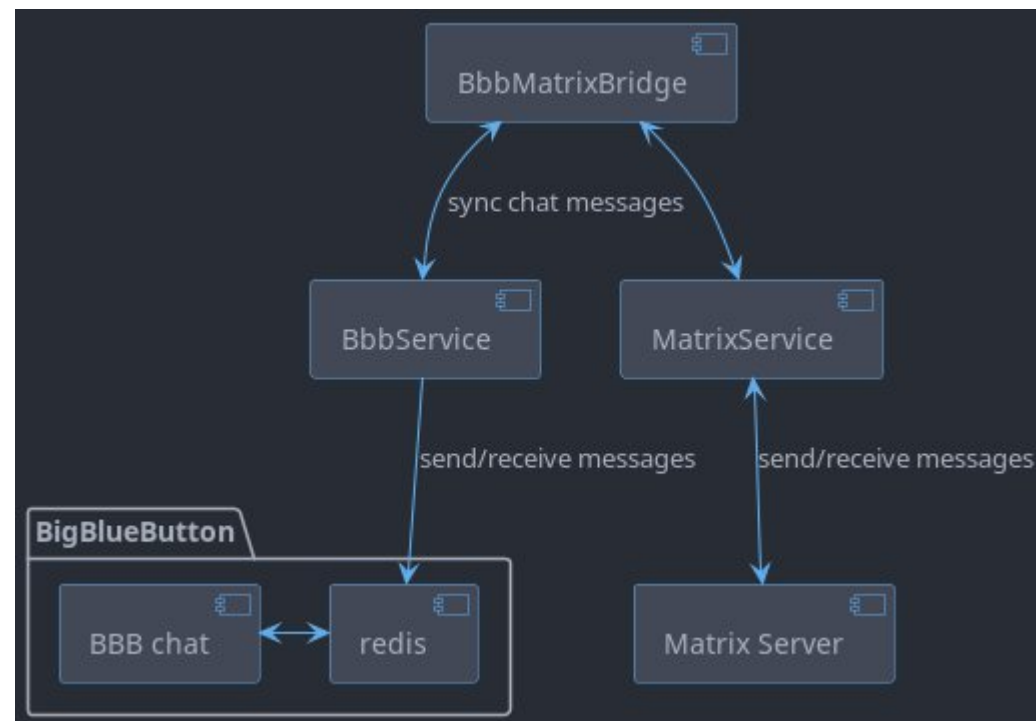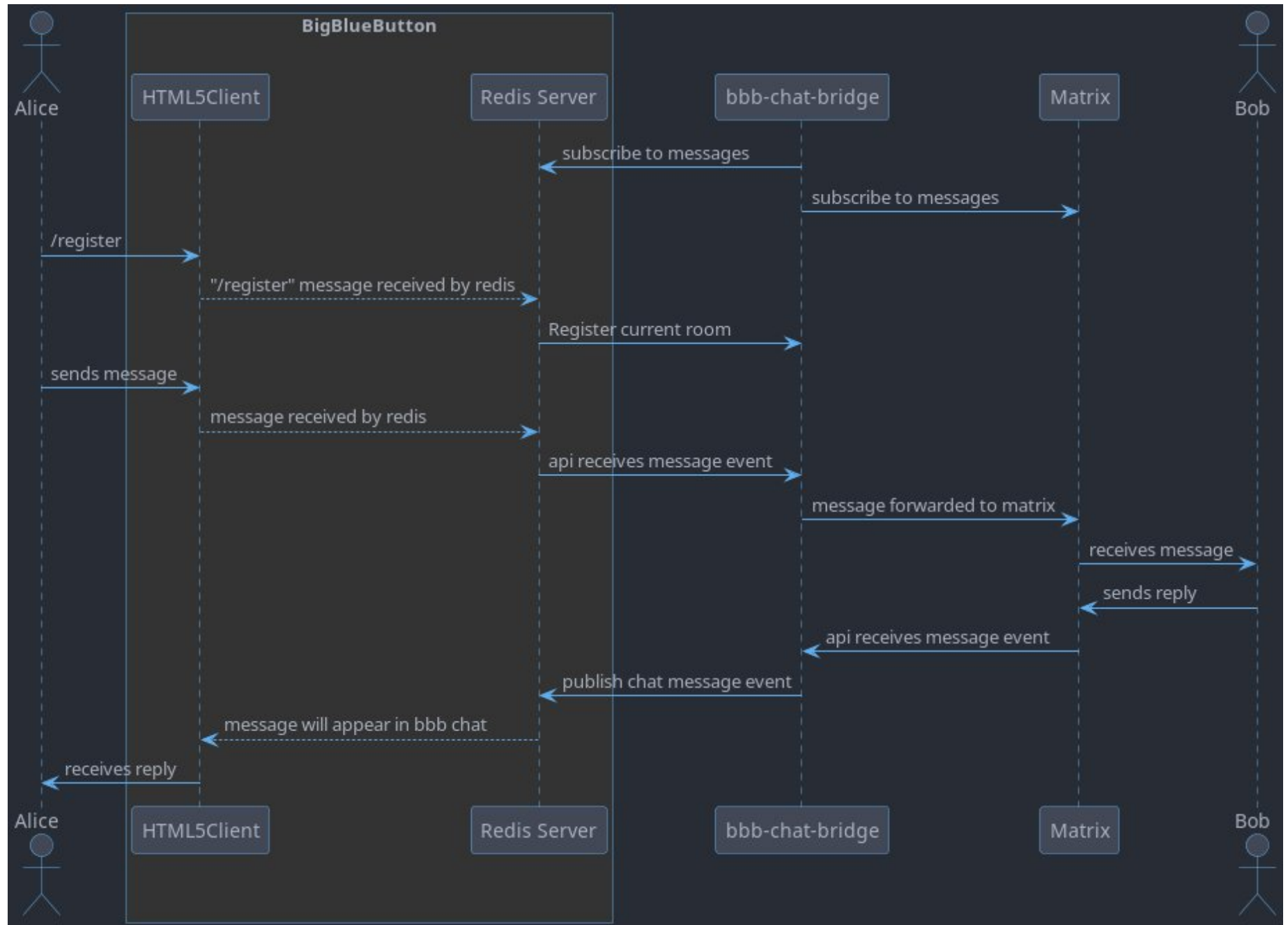
Summary: Bots as PoC available now
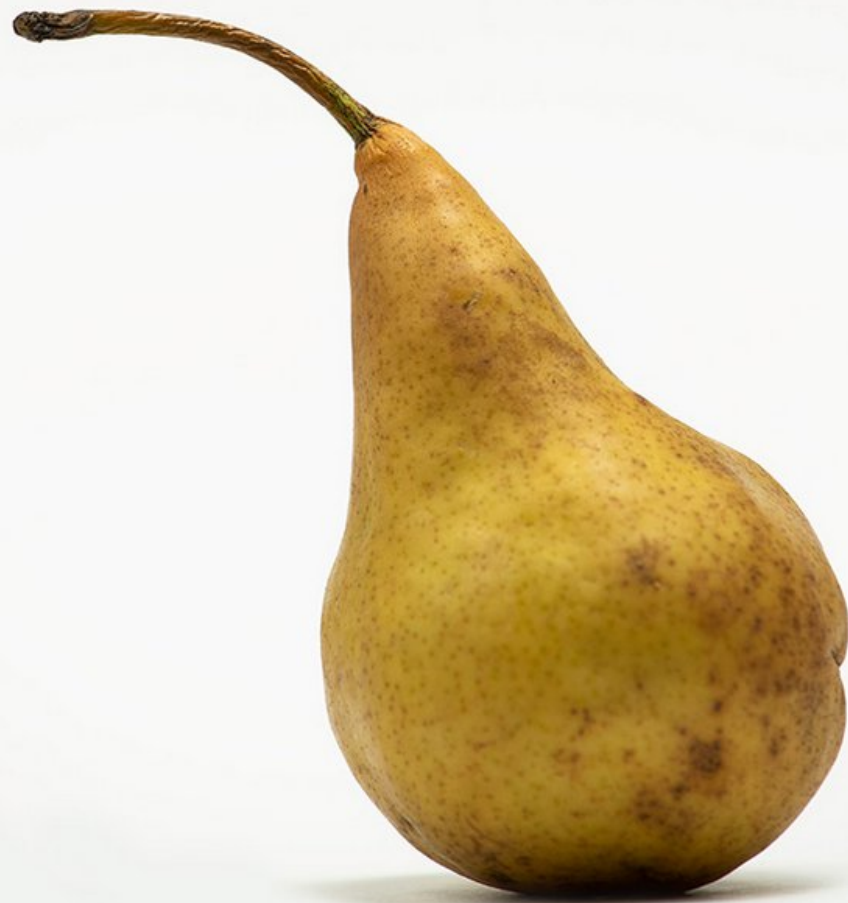
Start a BBB conference from a matrix room

!conf

Bridge chat with a matrix room

/bridge start

/bridge stop

/bridge pause

/bridge resume

It's organic
- just for the internet.

Open source applications for digital communication with single sign-on, one login for all services.

Solutions for video conferencing, chat platforms or data storage.

Consulting & tailor-made offers for your IT requirements.