# Setting Up the IRC Bridge

# Matrix IRC Bridge

The Matrix IRC Bridge is an IRC bridge for Matrix that will pass all IRC messages through to Matrix, and all Matrix messages through to IRC. Please also refer to the bridges' specific documentation for additional guidance.

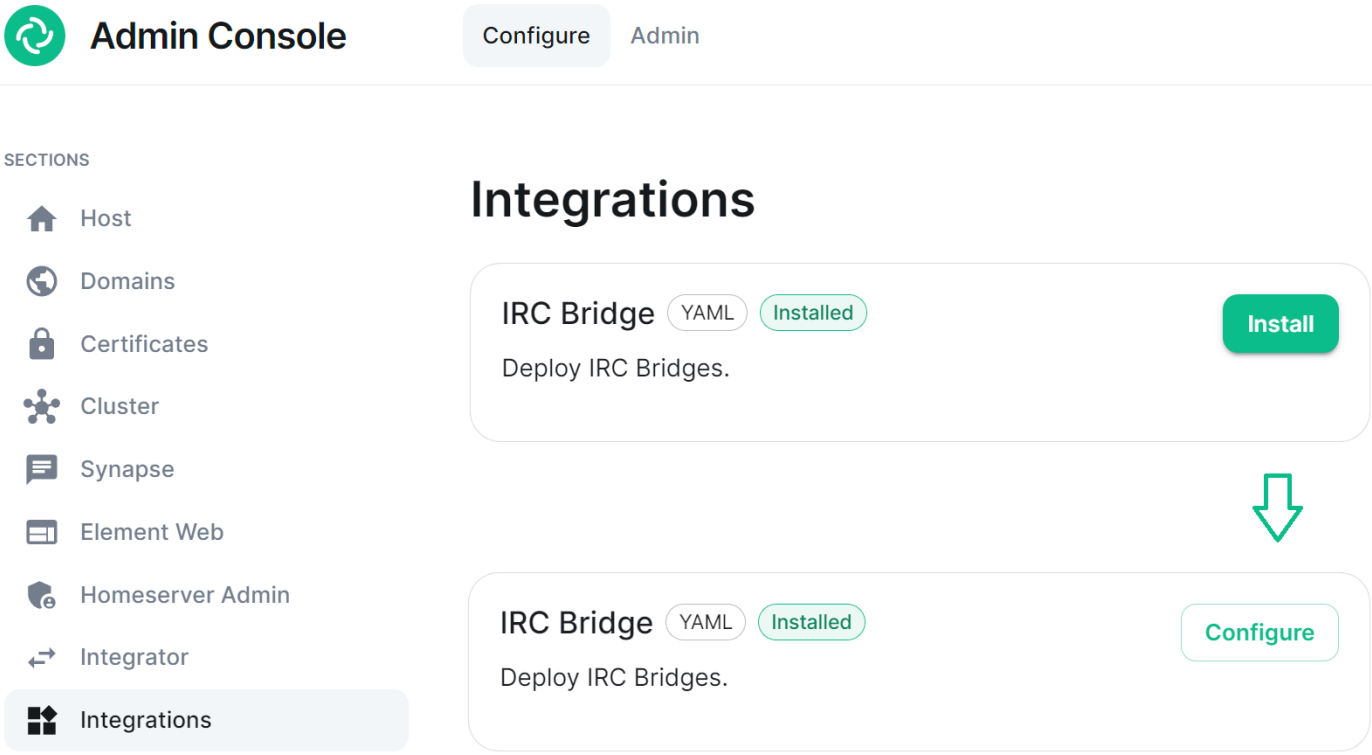
For usage of the IRC Bridge via it's bot user see Using the Matrix IRC Bridge documentation.

# Installation and Configuration

From the Installer's Integrations page find the `IRC Bridge` entry, and click `Install`.This will setup the IRC Bridges' config directory, by default this will be located:

```
~/.element-enterprise-server/config/legacy/ircbridge
```

You will initially be taken to the bridges configuration page, for any subsequent edits, the `Install` button will be replaced with `Configure`, indicating the bridge is installed.




There are two sections of the Matrix IRC Bridge configuration page, the `Bridge.yml` section, and a section to Upload a Private Key. We'll start with the latter as it's the simplest of the two, and is referenced in the first.

# Upload a Private Key

As the bridge needs to send plaintext passwords to the IRC server, it cannot send a password hash, so those passwords are stored encrypted in the bridge database. When a user specifies a password to use, using the admin room command `!storepass server.name passw0rd`, the password is encrypted using a RSA PEM-formatted private key. When a connection is made to IRC on behalf of the Matrix user, this password will be sent as the server password (PASS command).

Therefore you will need a Private Key file, by default called `passkey.pem`:

- If you have a Private Key file already, simply upload the file using this sections `Upload File` button, supplying a RSA PEM-formatted private key.


- If you don't already have one, per the instructions provided in the section itself, you should generate this file by running the following command from within the IRC Bridges' config directory:

```
penssl genpkey -out passkey.pem -outform PEM -algorithm RSA -pkeyopt rsa_keygen_bits:2048
```

# The `Bridge.yml` Section

The `Bridge.yml` is the complete configuration of the Matrix IRC Bridge. It points to a private key file (Private Key Settings), and both configures the bridges' own settings and functionality (Bridge Settings), and the specific IRC services you want it to connect with (IRC Settings).

## Private Key Settings

```
key_file: passkey.pem
```

By default this is the first line in the `Bridge.yml` config, it refers to the file either moved into the IRC Bridges' config directory, or generated in there using `openssl`. If moved into the directory ensure the file was correctly renamed to `passkey.pem`.

## Bridge Settings

The rest of the configuration sits under the `bridged_irc_servers:` section:

```
bridged_irc_servers:
```

You'll notice all entries within are initially indented ( ) so all code blocks will include this indentation. Focusing on settings relating to the bridge itself (and not any specific IRC connection) covers everything except the `address:` and associated `parameters:` sections, by default found at the end of the `Bridge.yml`.

### Postgres

If you are using `postgres-create-in-cluster` you can leave this section as-is, the default `ircbridge-postgres` / `ircbridge` / `postgres_password` values will ensure your setup works correctly.

```
 - postgres_fqdn: ircbridge-postgres
   postgres_user: ircbridge
   postgres_db: ircbridge
   postgres_password: postgres_password
```

Otherwise you should edit as needed to connect to your existing Postgres setup:

- `postgres_fqdn:` Provide the URL to your Postgres setup
- `postgres_user:` Provide the user that will be used to connect to the database
- `postgres_db:` Provide the database you will connect to
- `postgres_password:` Provide the password of the user specified above

You can uncomment the following to use as needed, note if unspecified some of these will default to the advised values, you do not need to uncomment if you are happy with the defaults.

- `postgres_data_path:` This can be used to specify the path to the postgres db on the host machine
- `postgres_port:` This can be used to specify a non-standard port, this defaults to `5432`.
- `postgres_sslmode:` This can be used to specify the sslmode for the Postgres connection, this defaults to `'disable'`, however `'no-verify'` and `'verify-full` are available options

For example, your Postgres section might instead look like the below:

```
- postgres_fqdn: https://db.example.com
  postgres_user: example-user
  postgres_db: matrixircbridge
  postgres_password: example-password
  # postgres_data_path: "/mnt/data/<bridged>-postgres"
  postgres_port: 2345
  postgres_sslmode: 'verify-full'
```

## IRC Bridge Admins

Within the `admins:` section you will need to list all the Matrix User ID's of your users who should be Admins of the IRC Bridge. You should list one Matrix User ID per line using the full Matrix User ID formatted like `@USERNAME:HOMESERVER`

```
  admins:
  - "@user-one:example.com"
  - "@user-two:example.com"
```

## Provisioning

Provisioning allows you to set specified rules about existing room when bridging those rooms to IRC Channels.

- `enable_provisioning:` Set this to `true` to enable the use of `provisioning_rules:`
- `provisioning_rules:` -> `userIds:` Use Regex to specify which User IDs to check for in existing rooms that are trying to be bridged
  - `exempt:` List any User IDs you do not want to prevent the bridging of a room, that would otherwise meet the match in `conflict:`
  - `conflict:` Specify individual User IDs, or use Regex
- `provisioning_room_limit:` Specify the number of channels allowed to be bridged

So the example `bridge.yml` config below will block the bridging of a room if it has any User IDs within it from the `badguys.com` homeserver **except** `@doubleagent:badguys.com`, and limit the number of bridged rooms to 50.

```
  enable_provisioning: true
  provisioning_rules:
```

```
  userIds:
    exempt:
      - "@doubleagent:badguys.com"
    conflict:
      - "@.*:badguys.com"
provisioning_room_limit: 50
```

## IRC Ident

If you are using the Ident protocol you can enable it usage with the following config:

- `enable_ident:` Set this to `true` to enable the use of IRC Ident
- `ident_port_type:` Specify either `'HostPort'` or `'NodePort'` depending on your setup
- `ident_port_number:` Specify the port number that should be used

```
enable_ident: false
ident_port_type: 'HostPort'
ident_port_number: 10230
```

## Miscellaneous

Finally there are a few additional options to configure:

- `logging_level:` This specifies how detailed the logs should be for the bridge, by default this is `info`, but `error`, `warn` and `debug` are available.
  - You can see the bridge logs using `kubectl logs IRC_POD_NAME -n element-onprem`
- `enable_presence:` Set to `true` if presence is required.
  - This should be kept as `false` if presence is disabled on the homeserver to avoid excess traffic.
- `drop_matrix_messages_after_seconds:` Specify after how many seconds the bridge should drop Matrix messages, by default this is `0` meaning no messages will be dropped.
  - If the bridge is down for a while, the homeserver will attempt to send all missed events on reconnection. These events may be hours old, which can be confusing to IRC users if they are then bridged. This option allows these old messages to be dropped.
  - **CAUTION:** This is a very coarse heuristic. Federated homeservers may have different clock times which may be old enough to cause *all* events from the homeserver to be dropped.
- `bot_username:` Specify the Matrix User ID of the the bridge bot that will facilitate the creation of rooms and can be messaged by admins to perform commands.
- `rmau_limit:` Set this to the maximum number of remote monthly active users that you would like to allow in a bridged IRC room.
- `users_prefix:` Specify the prefix to be used on the Matrix User IDs created for users who are communicating via IRC.
- `alias_prefix:` Specify the prefix to be used on room aliases when created via the `!join` command.

The defaults are usually best left as-is unless a specific need requires changing these, however for troubleshooting purposes, switching `logging_level` to `debug` can help identify issues with the bridge.

```
logging_level: debug
enable_presence: false
drop_matrix_messages_after_seconds: 0
bot_username: "ircbridgebot"
rmau_limit: 100
users_prefix: "irc_"
alias_prefix: "irc_"
```

## Advanced Additional Configuration

You can find more advanced configuration options by checking the config.yaml sample provided on the Matrix IRC Bridge repository.

You can ignore the `servers:` block as config in that section should be added under the `parameters:` section associated with `address:` that will be setup per the below section. If you copy any config, ensure the indentation is correct, as above, all entries within are initially indented ( ), so they are under the `bridged_irc_servers:` section.

# IRC Settings

The final section of `Bridge.yml`, here you specify the IRC network(s) you want the bridge to connect with, this is done using `address:` and `parameter:` formatted like so:

- `address:` Specify your desired IRC Network

```
address: irc.example.com
parameters:
```

Aside from the address of the IRC Network, everything is configured within the `parameters:` section, and so is initially indented , all code blocks will include this indentation.

## Basic IRC Network Configuration

At a minimum, you will need to specify the `name:` of your IRC Network, as well as some details for the bots configuration on the IRC side of the connection, you can use the below to get up and running.

- `name:` The server name to show on the bridge.
- `botConfig:`
  - `enabled:` Keep this set as `true`
  - `nick:` Specify the nickname of the bot user within IRC
  - `username:` Specify the username of the bot user within IRC
  - `password:` Optionally specify the password of the bot to give to NickServ or IRC Server for this nick. You can generate this by using the `pwgen 32 1` command

```
name: "Example IRC"
botConfig:
  enabled: true
  nick: "MatrixBot"
  username: "matrixbot"
  password: "some_password"
```

## Advanced IRC Network Configuration (Load Balancing, SSL, etc.)

For more fine-grained control of the IRC connection, there are some additional configuration lines you may wish to make use of. As these are not required, if unspecified some of these will default to the advised values, you do not need to include any of these if you are happy with the defaults. You can use the below config options, in addition to those in the section above, to get more complex setups up and running.

- `additionalAddresses:` Specify any additional addresses to connect to that can be used for load balancing between IRCDs
  - Specify each additional address within the `[]` as comma-separated values, for example:
    - `[ "irc2.example.com", "irc3.example.com" ]`
- `onlyAdditionalAddresses:` Set to `true` to exclusively use additional addresses to connect to servers while reserving the main address for identification purposes, this defaults to `false`
- `port:` Specify the exact port to use for the IRC connection
- `ssl:` Set to `true` to require the use SSL, this defaults to `false`
- `sslselfsign:` Set to `true` if the IRC network is using a self-signed certificate, this defaults to `false`
- `sasl:` Set to `true` should the connection attempt to identify via SASL, this defaults to `false`
- `allowExpiredCerts:` Set to `true` to allow expired certificates when connecting to the IRC server, this defaults to `false`
- `botConfig:`
  - `joinChannelsIfNoUsers:` Set to `false` to prevent the bot from joining channels even if there are no Matrix users on the other side of the bridge, this defaults to `true` so doesn't need to be specified unless `false` is required.

If you end up needing any of these additional configuration options, your `parameters:` section may look like the below example:

```
name: "Example IRC"
additionalAddresses: [ "irc2.example.com" ]
onlyAdditionalAddresses: false
port: 6697
ssl: true
sslselfsign: false
sasl: false
allowExpiredCerts: false
botConfig:
  enabled: true
  nick: "MatrixBot"
```

```
  username: "matrixbot"
  password: "some_password"
  joinChannelsIfNoUsers: true
```

## Mapping IRC user modes to Matrix power levels

You can use the configuration below to map the conversion of IRC user modes to Matrix power levels. This enables bridging of IRC ops to Matrix power levels only, it does not enable the reverse. If a user has been given multiple modes, the one that maps to the highest power level will be used.

- `modePowerMap:` Populate with a list of IRC user modes and there respective Matrix Power Level in the formate of `IRC_USER_MODE: MATRIX_POWER_LEVEL`

```
  modePowerMap:
    o: 50
    v: 1
```

## Configuring DMs between users

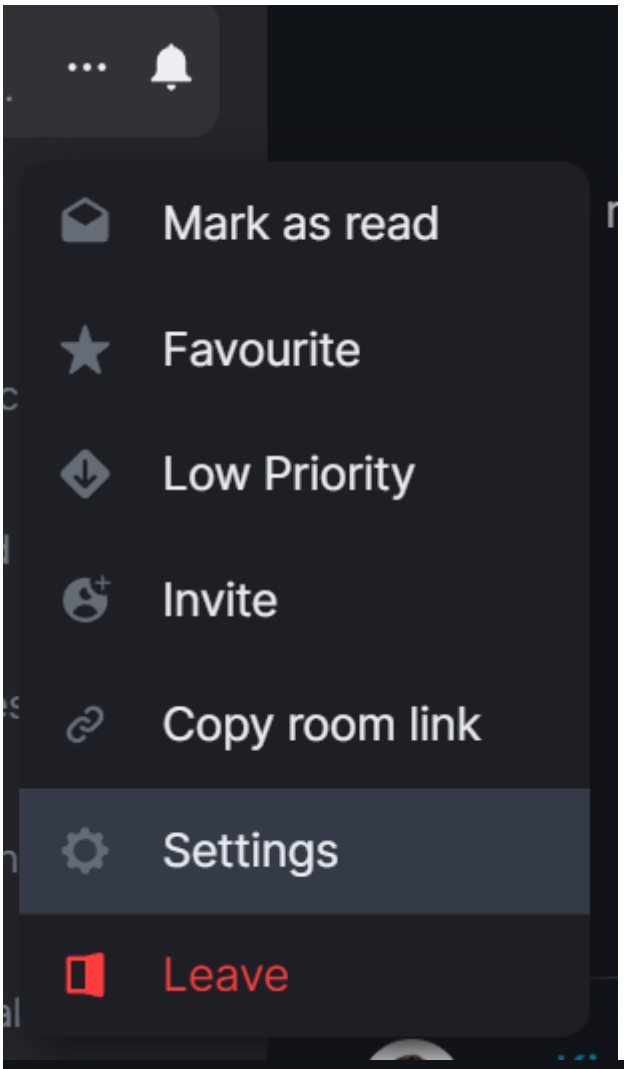
By default private messaging is enabled via the bridge and Matrix Direct Message rooms can be federated. You can customise this behaviour using the `privateMessages:` config section.

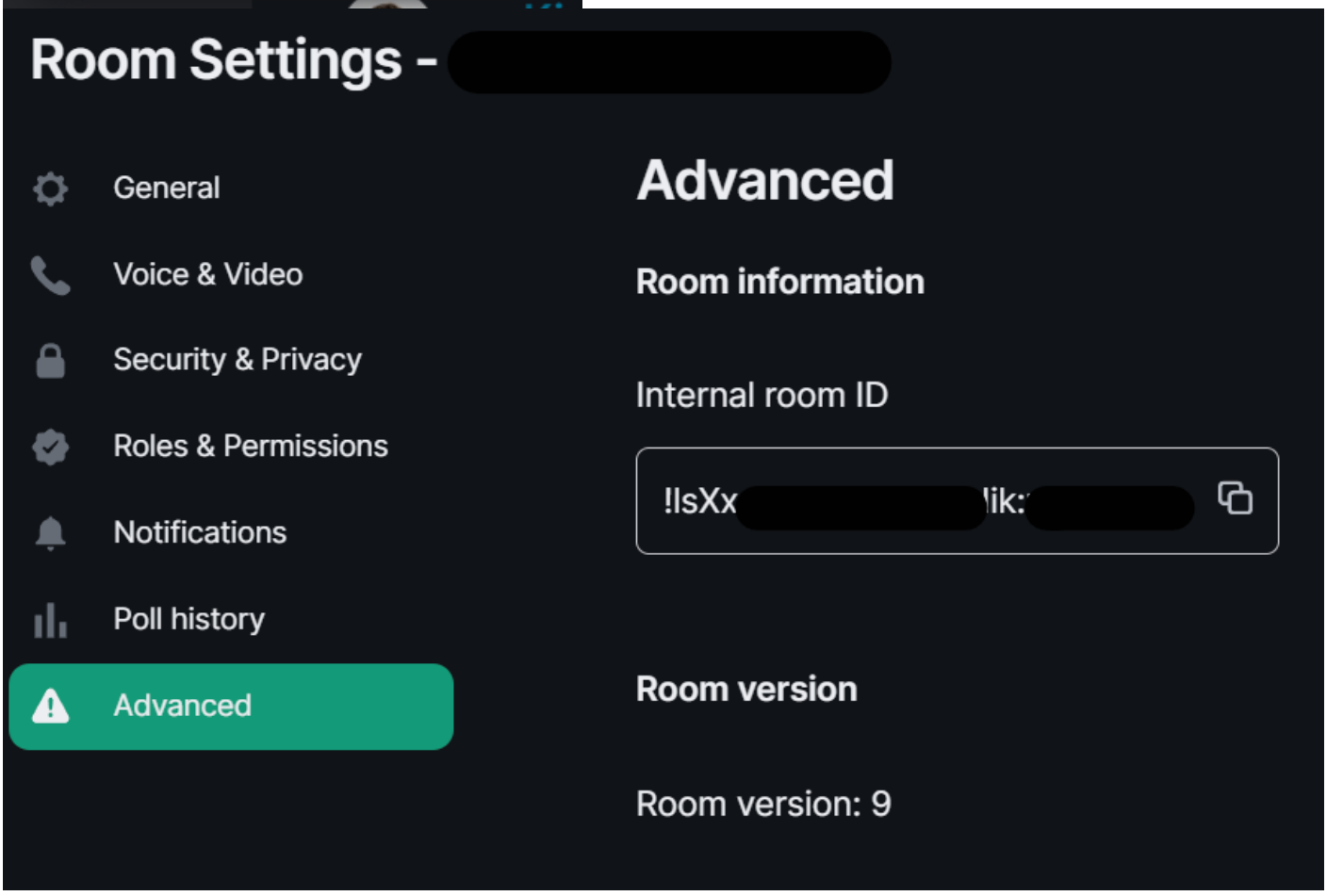
- `enabled:` Set to `false` to prevent private messages to be sent to/from IRC/Matrix, defaults to `true`
- `federate:` Set to `false` so only users on the homeserver attached to the bridge to be able to use private message rooms, defaults to `true`

```
  privateMessages:
    enabled: true
    federate: true
```

## Mapping IRC Channels to Matrix Rooms

Whilst a user can use the `!join` command (if Dynamic Channels are enabled) to manually connect to IRC Channels, you can specify mappings of IRC Channels to Matrix Rooms, 1 Channel can be mapped to multiple Matrix Rooms, up-front. The Matrix Room must already exist, and you will need to include it's Room ID within the configuration - you can get this ID by using the `3-dot menu` next to the room, and opening `Settings`.


Mark as read
Favourite
Low Priority
Invite
Copy room link
Settings
Leave


Room Settings -
General
Voice & Video
Security & Privacy
Roles & Permissions
Notifications
Poll history
Advanced
Advanced
Room information
Internal room ID
!lsXx
lik:
Room version
Room version: 9

- `mappings:` Under here you will need to specify an IRC Channel, then within that you will need to list out the required `roomIds:` in `[]` as a comma-separated list and provide a `key:` if there is a Channel key / password to us. If provided Matrix users do not need to know the channel key in order to join it.

```
mappings:
  "#IRC_CHANNEL_NAME":
    roomIds: ["!ROOM_ID_THREE:HOMESERVER", "!ROOM_ID_TWO:HOMESERVER"]
    key: "secret"
```

See the below example configuration for mapping the #welcome IRC Channel:

```
mappings:
  "#welcome":
    roomIds: ["!exampleroomidhere:example.com"]
```

## Allowing `!join` with Dynamic Channels

If you would like for users to be able to use the `!join` command to join any allowed IRC Channel you will need to configure `dynamicChannels:`.

> You may remember you set an alias prefix in the Miscellaneous section above. If you wish to fully customise the format of aliases of bridged rooms you should remove that `alias_prefix:` line. However the only benefit to this would be to add a suffix to the Matrix Room alias so is not recommended.

- `enabled:` Set to `true` to allow users to use the `!join` command to join any allowed IRC Channel, defaults to `false`
- `createAlias:` Set to `false` if you do not want an alias to be created for any new Matrix rooms created using `!join`, defaults to `true`
- `published:` Set to `false` to prevent the created Matrix room via `!join` from being published to the public room list, defaults to `true`
- `useHomeserverDirectory:` Set to `true` to publish room to your Homeservers' directory instead of one created for the IRC Bridge, defaults to `false`
- `joinRule:` Set to `"invite"` so only users with an invite can join the created room, otherwise this defaults to `"public"`, so anyone can join the room
- `whitelist:` Only used if `joinRule:` is set to `invite`, populate with a list of Matrix User IDs that the IRC bot will send invites to in response to a `!join`
- `federate:` Set to `false` so only users on the homeserver attached to the bridge to be able to use these rooms, defaults to `true`
- `aliasTemplate:` Only used if `createAlias:` is set to `true`. Set to specify the alias for newly created rooms from the `!join` command, defaults to `"#irc_$CHANNEL"`
  - You should not include this line if you do not need to add a suffix to your Matrix Room alias. Using `alias_prefix:`, this will default to `#PREFIX_CHANNEL_NAME:HOMESERVER`
  - If you are specifying this line, you can use the following variables within the alias:
    - `$SERVER` => The IRC server address (e.g. `"irc.example.com"`)
    - `$CHANNEL` => The IRC channel (e.g. `"#python"`), this must be used within the alias
- `exclude:` Provide a comma-separated list of IRC Channels within `[]` that should be prevented from being mapped under any circumstances

In addition you could also specify the below, though it is unlikely you should need to specify the exact Matrix Room Version to use.

- `roomVersion:` Set to specify the desired Matrix Room Version, if unspecified, no specific room version is requested.
  - If the homeserver doesn't support the room version then the request will fail.

```
dynamicChannels:
  enabled: true
  createAlias: true
  published: true
  useHomeserverDirectory: true
  joinRule: invite
  federate: true
  aliasTemplate: "#irc_$CHANNEL"
  whitelist:
    - "@foo:example.com"
    - "@bar:example.com"
  exclude: ["#foo", "#bar"]
```

## Exclude users from using the bridge

Using the `excludedUsers:` configuration you can specify Regex to identify users to be kicked from any IRC Bridged rooms.

- `regex:` Set this to any Regex that should match on users' Matrix User IDs
- `kickReason:` Set to specify the reason provided to users when kicked from IRC Bridged rooms

```
excludedUsers:
  - regex: "@.*:evilcorp.com"
    kickReason: "We don't like Evilcorp"
```

## Syncing Matrix and IRC Membership lists

To manage and control how Matrix and IRC membership lists are synced you will need to include `membershipLists:` within your config.

- `enabled:` Set to `true` to enable the syncing of membership lists between IRC and Matrix, defaults to `false`
  - This can have a significant effect on performance on startup as the lists are synced
- `floodDelayMs:` Syncing membership lists at startup can result in hundreds of members to process all at once. This timer drip feeds membership entries at the specified rate, defaults to `10000` (10 Seconds)

Within `membershipLists:` are the following sections, `global:`, `rooms:`, `channels:` and `ignoreIdleUsersOnStartup:`. For `global:`, `rooms:`, `channels:` you can specify `initial:`, `incremental:` and `requireMatrixJoined:` which all default

to `false`. You can configure settings globally, using `global:`, or specific to Matrix Rooms with `rooms:` or IRC Channels via `channels:`.

- What does setting `initial:` to `true` do?
  - For `ircToMatrix:` this gets a snapshot of all real IRC users on a channel (via NAMES) and joins their virtual matrix clients to the room
  - For `matrixToIrc:` this gets a snapshot of all real Matrix users in the room and joins all of them to the mapped IRC channel on startup
- What does setting `incremental:` to `true` do?
  - For `ircToMatrix:` this makes virtual matrix clients join and leave rooms as their real IRC counterparts join/part channels
  - For `matrixToIrc:` this makes virtual IRC clients join and leave channels as their real Matrix counterparts join/leave rooms
- What does setting `requireMatrixJoined:` to `true` do?
  - This controls if the bridge should check if all Matrix users are connected to IRC and joined to the channel before relaying messages into the room. This is considered a safety net to avoid any leakages by the bridge to unconnected users but given it ignores all IRC messages while users are still connecting it's likely not required.

The last section is `ignoreIdleUsersOnStartup:` which determines if the bridge should ignore users which are not considered active on the bridge during startup.

- `enabled:` Set to `true` to allow ignoring of idle users during startup
- `idleForHours:` Set to configure how many hours a user has to be idle for before they can be ignored
- `exclude:` Provide Regex matching on Matrix User IDs that should be excluded from being marked as ignorable

```
membershipLists:
  enabled: false
  floodDelayMs: 10000

  global:
    ircToMatrix:
      initial: false
      incremental: false
      requireMatrixJoined: false

    matrixToIrc:
      initial: false
      incremental: false

  rooms:
    - room: "!fuasirouddJoxtwfge:localhost"
      matrixToIrc:
        initial: false
        incremental: false
```

```
  channels:
    - channel: "#foo"
      ircToMatrix:
        initial: false
        incremental: false
        requireMatrixJoined: false

  ignoreIdleUsersOnStartup:
    enabled: true
    idleForHours: 720
    exclude: "foobar"
```

## Configuring how IRC users appear in Matrix

As part of the bridge IRC users and their messages will appear in Matrix as Matrix users, you will be able to click on their profiles perform actions just like any other user. You can configure how they are display using `matrixClients:`.

> You may remember you set a user name prefix in the Miscellaneous section above. If you wish to fully customise the format of your IRC users' Matrix User IDs you should remove that `users_prefix:` line. However the only benefit to this would be to add a suffix to the Matrix User ID so is not recommended.

- `userTemplate:` Specify the template Matrix User ID that IRC users will appear as, it must start with an `@` and feature `$NICK` within, `$SERVER` is usable
  - You should not include this line if you do not need to add a suffix to your IRC users' Matrix IDs. Using `users_prefix:`, this will default to `@PREFIX_NICKNAME:HOMESERVER`
- `displayName:` Specify the Display Name of IRC Users that appear within Matrix, it must contain `$NICK` within, `$SERVER` is usable
- `joinAttempts:` Specify the number of tries a client can attempt to join a room before the request is discarded. Set to `-1` to never retry or `0` to never give up, defaults to `-1`

```
  matrixClients:
    userTemplate: "@irc_$NICK"
    displayName: "$NICK"
    joinAttempts: -1
```

## Configuring how Matrix users appear in IRC

As part of the bridge Matrix users and their messages will appear in IRC as IRC users, you will be able to perform IRC actions on them like any other user. You can configure how this functions using `ircClients:`.

- `nickTemplate:` Set this to the template how Matrix users' IRC client nick name is set, defaults to `"$DISPLAY[m]"`

    - You can use the following variables within the template, you must use at least one of these.
        - $LOCALPART => The user ID localpart (e.g. `"alice"` in `@alice:localhost`)
        - $USERID => The user ID (e.g. `@alice:localhost`)
        - $DISPLAY => The display name of this user, with excluded characters (e.g. space) removed.
            - If the user has no display name, this falls back to $LOCALPART.
- `allowNickChanges:` Set to `true` to allow users to use the `!nick` command to change their nick on the server
- `maxClients:` Set the max number of IRC clients that will connect
    - If the limit is reached, the client that spoke the longest time ago will be disconnected and replaced, defaults to `30`
- `idleTimeout:` Set the maximum amount of time in seconds that a client can exist without sending another message before being disconnected.
    - Use `0` to not apply an idle timeout, defaults to `172800` (48 hours)
    - This value is ignored if this IRC server is mirroring matrix membership lists to IRC.
- `reconnectIntervalMs:` Set the number of millseconds to wait between consecutive reconnections if a client gets disconnected.
    - Set to `0` to disable scheduling i.e. it will be scheduled immediately, defaults to `5000` (5 seconds)
- `concurrentReconnectLimit:` Set the number of concurrent reconnects if a user has been disconnected unexpectedly
    - Set this to a reasonably high number so that bridges are not waiting an eternity to reconnect all its clients if we see a massive number of disconnect.
    - Set to 0 to immediately try to reconnect all users, defaults to `50`
- `lineLimit:` Set the number of lines of text to allow being sent as from matrix to IRC, defaults to `3`
    - If the number of lines that would be sent is > lineLimit, the text will instead be uploaded to Matrix and the resulting URI is treated as a file. A link will be sent to the IRC instead to avoid spamming IRC.
- `realnameFormat:` Set to either `"mxid"` or `"reverse-mxid"` to define the format used for the IRC realname.
- `kickOn:`
    - `channelJoinFailure:` Set to `true` to kick a Matrix user from a bridged room if they fail to join the IRC channel
    - `ircConnectionFailure:` Set to `true` to kick a Matrix user from ALL rooms if they are unable to get connected to IRC
    - `userQuit:` Set to `true` to kick a Matrix user from ALL rooms if they choose to QUIT the IRC network

You can also optionally configure the following, they do not need to be included in your config if you are not changing their default values.

- `ipv6:`
    - `only:` Set to `true` to force IPv6 for outgoing connections, defaults to `false`
- `userModes:` Specify the required IRC User Mode to set when connecting, e.g. `"RiG"` to set `+R`, `+i` and `+G`, defaults to `""` (No User Modes)
- `pingTimeoutMs:` Set the minimum time to wait between connection attempts if the bridge is disconnected due to throttling.
- `pingRateMs:` Set the rate at which to send pings to the IRCd if the client is being quiet for a while.
    - Whilst IRCd *should* sending pings to the bridge to keep the connection alive, sometimes it doesn't and ends up ping timing out the bridge.

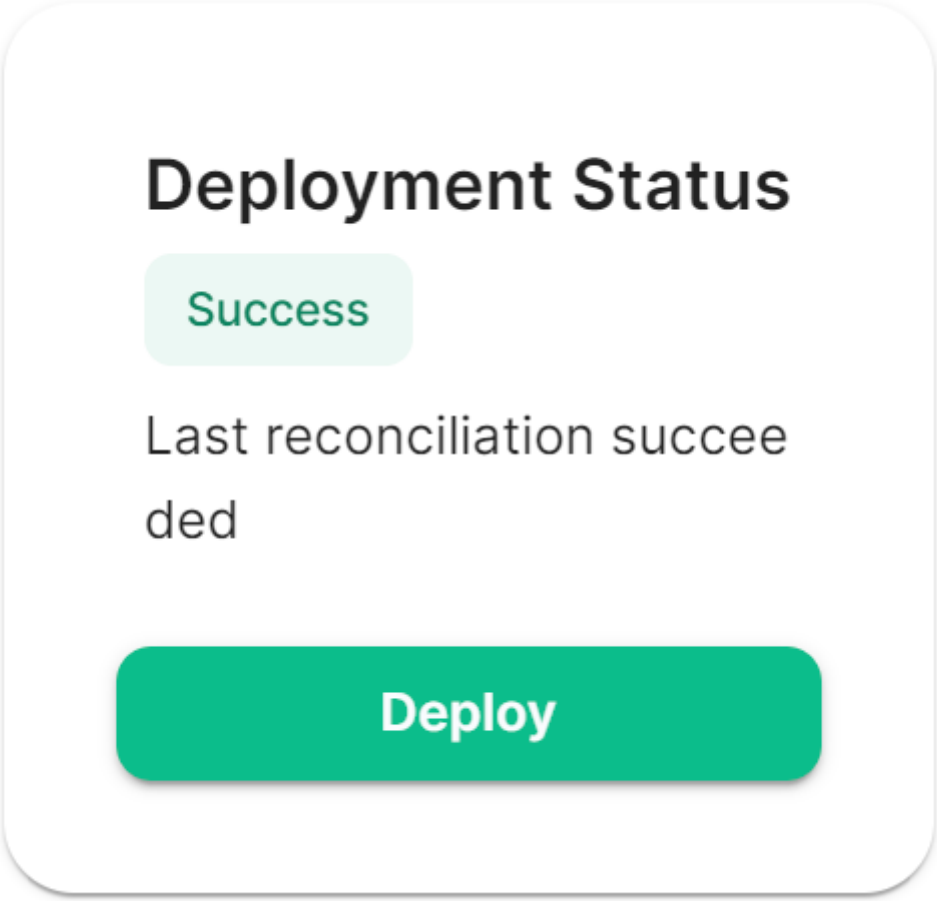
```
ircClients:
  nickTemplate: "$DISPLAY[m]"
```

```
allowNickChanges: true
maxClients: 30
# ipv6:
#   only: false
idleTimeout: 10800
reconnectIntervalMs: 5000
concurrentReconnectLimit: 50
lineLimit: 3
realnameFormat: "mxid"
# pingTimeoutMs: 600000
# pingRateMs: 60000
kickOn:
  channelJoinFailure: true
  ircConnectionFailure: true
  userQuit: true
```

# Deploying the IRC Bridge

Once you have make the required changes to your `Bridge.yml` configuration, make sure you find and click the `Save` button at the bottom of the IRC Bridge configuration page to ensure your changes are updated.


You will then need to re-Deploy for any changes to take effect, as above ensure all changes made are saved then click `Deploy`.




# Using the Bridge

For usage of the IRC Bridge via it's bot user see Using the Matrix IRC Bridge documentation, or for end user focused documentation see Using the Matrix IRC Bridge as an End User.

If you have setup mapping of rooms in your `Bridge.yml`, some rooms will already be connected IRC, users need only join the bridged room and start messaging. IRC users should see Matrix users in the Channel and be able to communicate with them like any other IRC user.

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Revision #19
Created 31 October 2022 17:02:07 by Karl Abbott
Updated 6 November 2024 13:20:02 by Kieran Mitchell Lane