

As

**a system
administrator**

I want to

**run Element
successfully**

**in my
organisation**

**in my
community**



Quentin Gliech

Software engineer at Element

@quenting:element.io



Quentin Gliech

Software engineer at Element
@quenting:element.io

2:15
PM
25min

Bringing MatrixRTC to the Matrix Ecosystem



Timo Kandra, Robin Townsend

Element Call already proves what is possible with MatrixRTC: decentralised, federated, end-to-end encrypted video and voice calls powered entirely by the Matrix protocol — but most of the Matrix ecosystem hasn't yet adopted it....

Next Gen Spec

Sofya



3:45
PM
25min

The cool thing



Quentin Gliech

I swear it's interesting

Matrix Inside



ERA: Epoch-Resolved Arbitration for Duelling Admins in Group Management CRDTs

Kegan Dougal
kegan@element.io
Element Creations Ltd

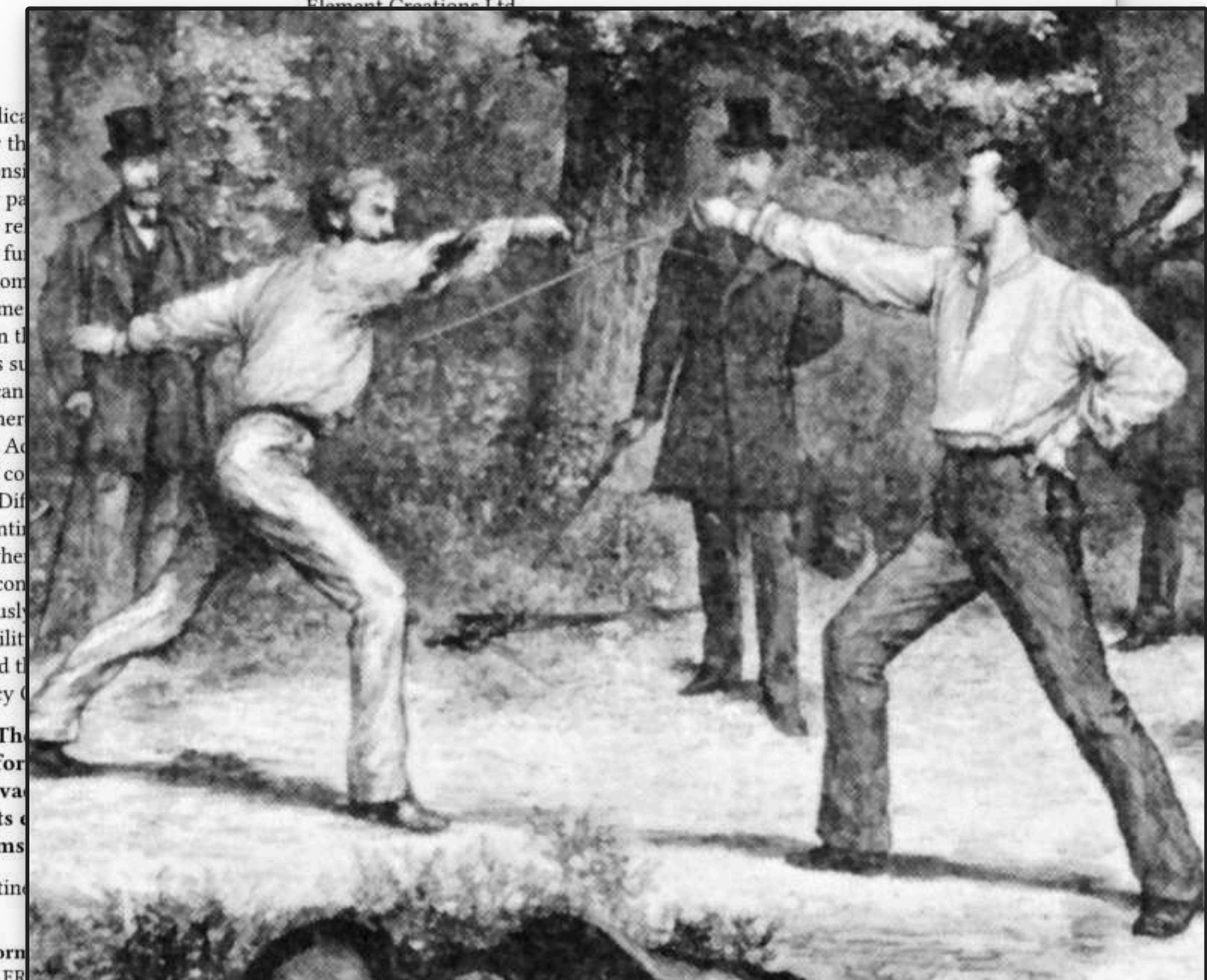
Abstract

Conflict-Free Replicated Data Types (CRDTs) provide a range of fields for the strong eventual consistency under partial order, and idempotent merge functions. Under some circumstances, this can occur when there are multiple events. When the group permissions system is used in applications, this can occur when there are multiple events. When the group permissions system is used in applications, this can occur when there are multiple events.

CCS Concepts: • Theory of computation
• Algorithms; • Information theory and security
• Security and privacy; • Software and its engineering
• Computer systems

Keywords: Byzantine Fault Tolerance
Stability

ACM Reference Format:
Kegan Dougal. 2026. ERA: Epoch-Resolved Arbitration for Duelling Admins in Group Management CRDTs. In Proceedings of the 2026 ACM Conference on Computer Systems (CCS '26), May 12–13, 2026, New York, NY, USA. 1–12.



Peter



3:15
PM
25min

Project Hydra federation protocol

Kegan Dougal

The federation protocol allows each other. In the network is true

Next Gen Spec

en

e

es...

ofya

matrix-authentication-service

QR code login

Personal
access tokens

Breaking
registrations for
everyone

Guest invite links

Element Admin

Delayed events

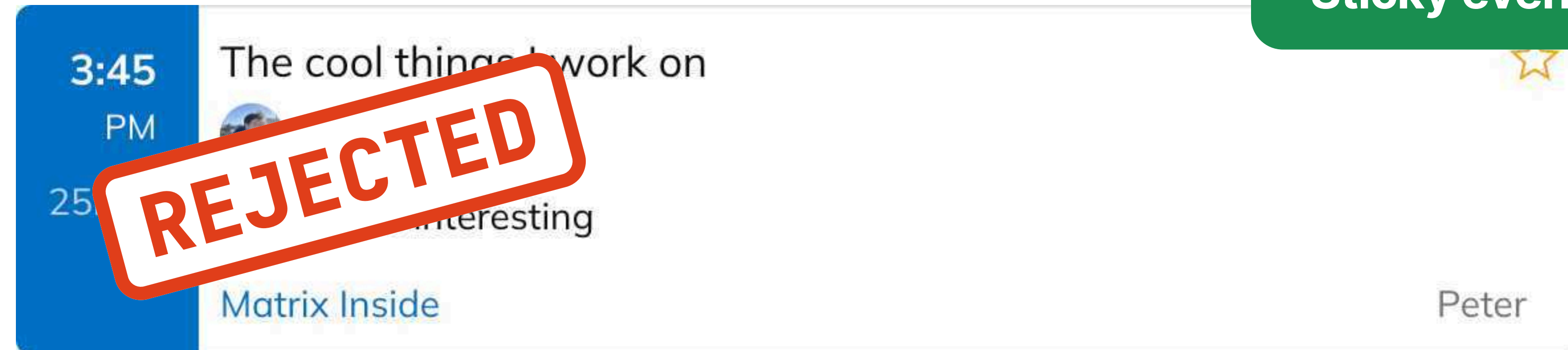
Sticky events



Quentin Gliech

Software engineer at Element

@quenting:element.io



syn2mas

Global extensible
profiles

User Status

This talk

ESS

Cool customer
project #35

Address book

Device limits

Restricted clients

Making sure
matrix.org
doesn't explode



As

**an engineer at
Element**

I want to

**tell about the cool
things I work on**

This talk



As

**an engineer at
Element**



As

**an engineer at
Element (Away)**

I want to

**tell my colleagues
I'm on holidays**



As

**an engineer at
Element**

I want to

**tell my colleagues
I'm on holidays**

User Status



Quentin
@quenting:element.io

 Away

Clear



Quentin Gliech

Software engineer at Element

@quenting:element.io

the “matrix authentication service” guy



As

**the auth and
identity “expert”**



Quentin Gliech

Software engineer at Element

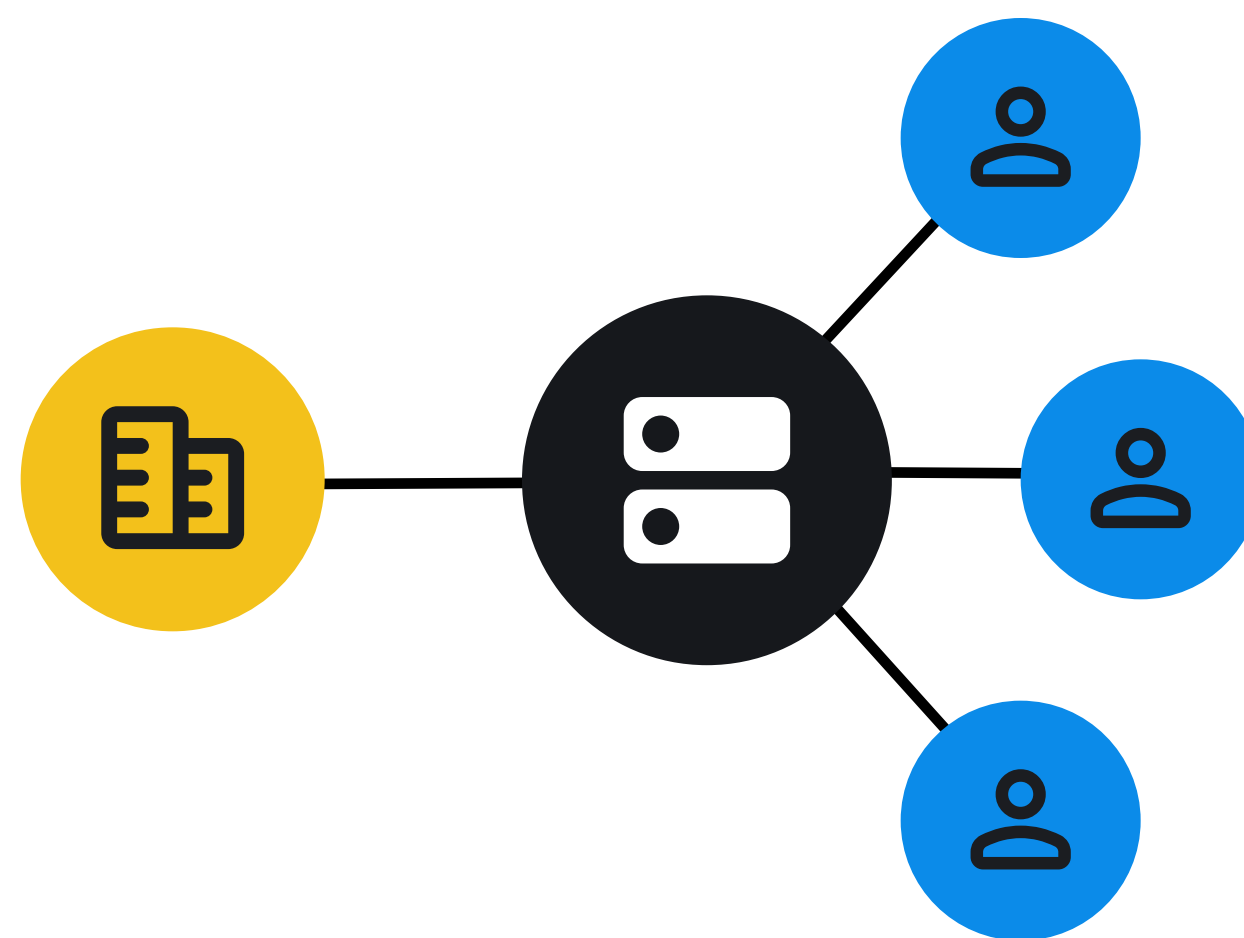
@quenting:element.io

As

**the auth and
identity “expert”**

I want to

**help connect ESS to
existing directories**



As I want to

**a system
administrator**

**run Element
successfully**

You chose Element, and had good reasons for it:

sovereignty

end-to-end encryption

open standards

As

I want to

one of your users

**talk to my
colleagues**

As

one of your users

I want to

**talk to my
colleagues**

get in

find my colleagues

reach people outside

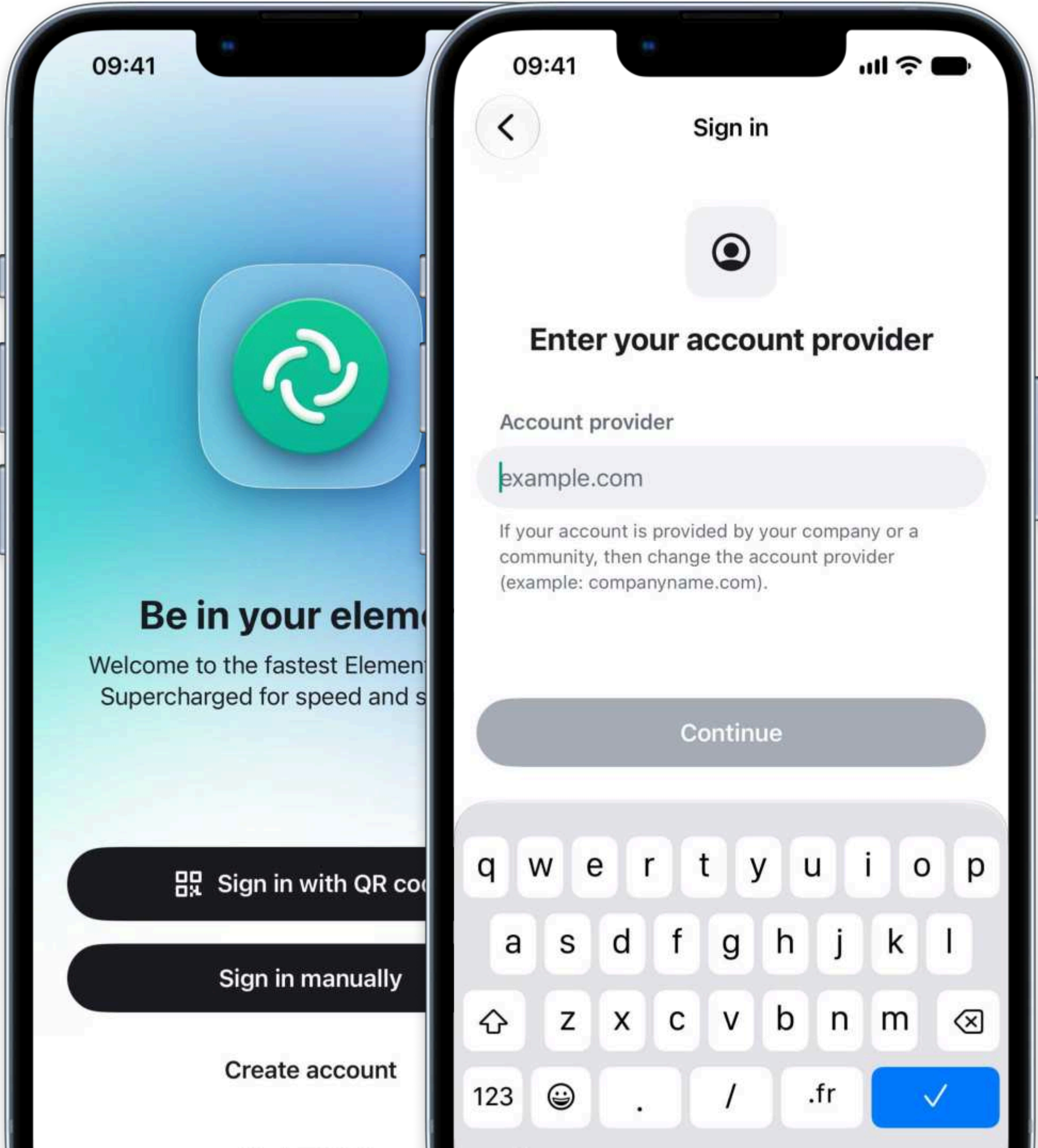
As one of your users, I want to

get in

find my colleagues

reach people outside

“I don’t know what to type on my phone.”



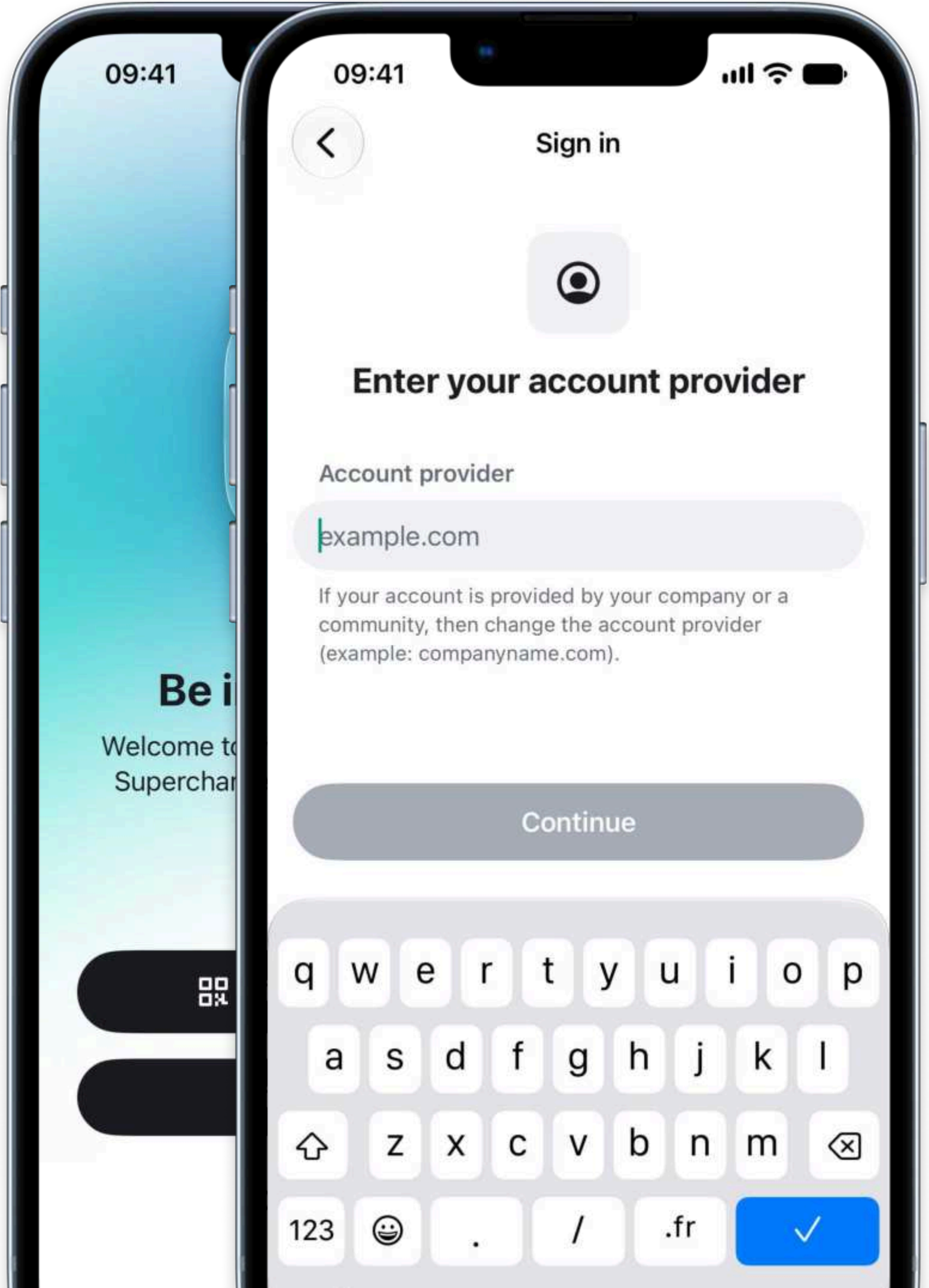
As one of your users, I want to

get in

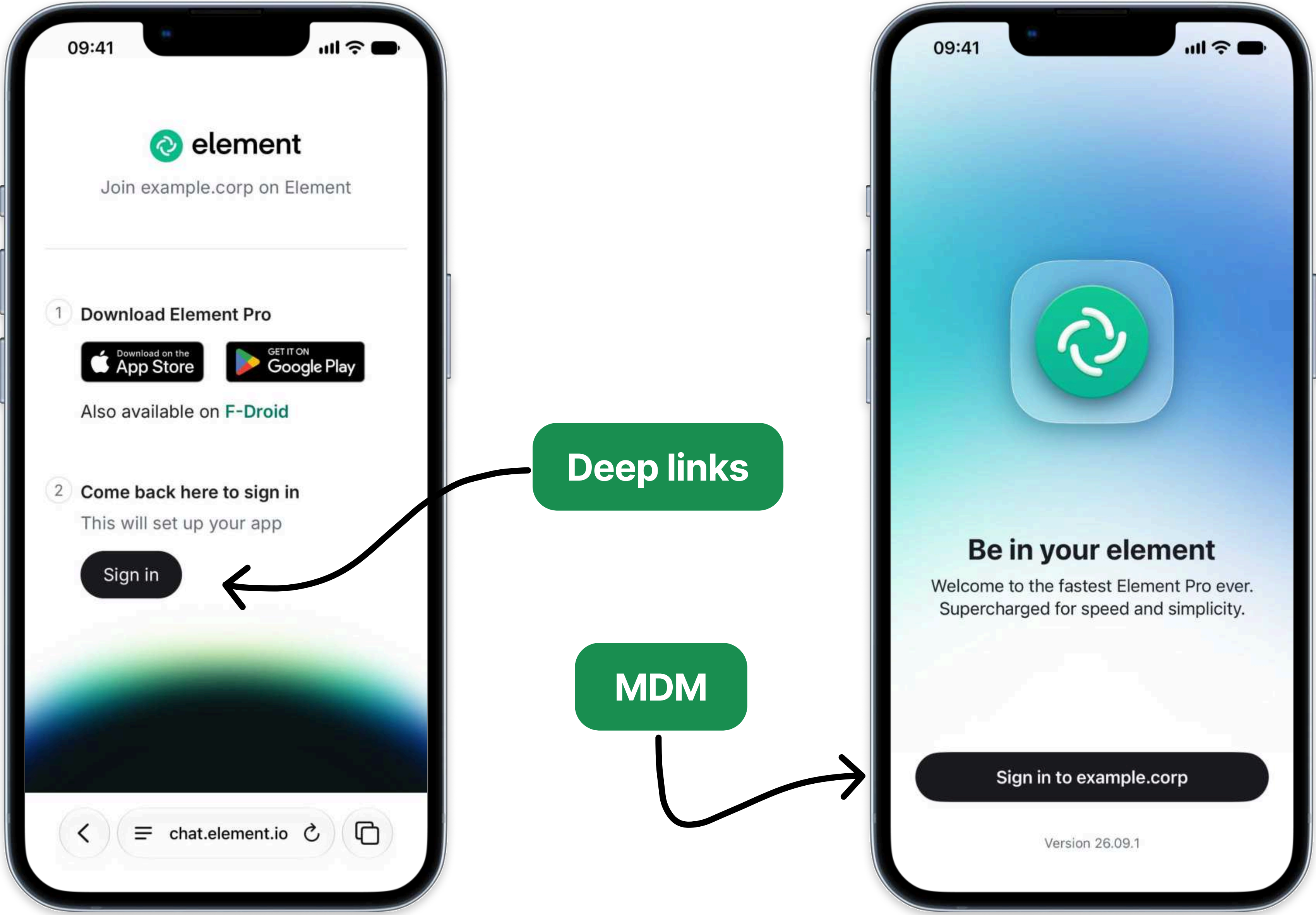
find my colleagues

reach people outside

don't know what to type on
phone."



As one of your users, I want to **get in** **find my colleagues** **reach people outside**

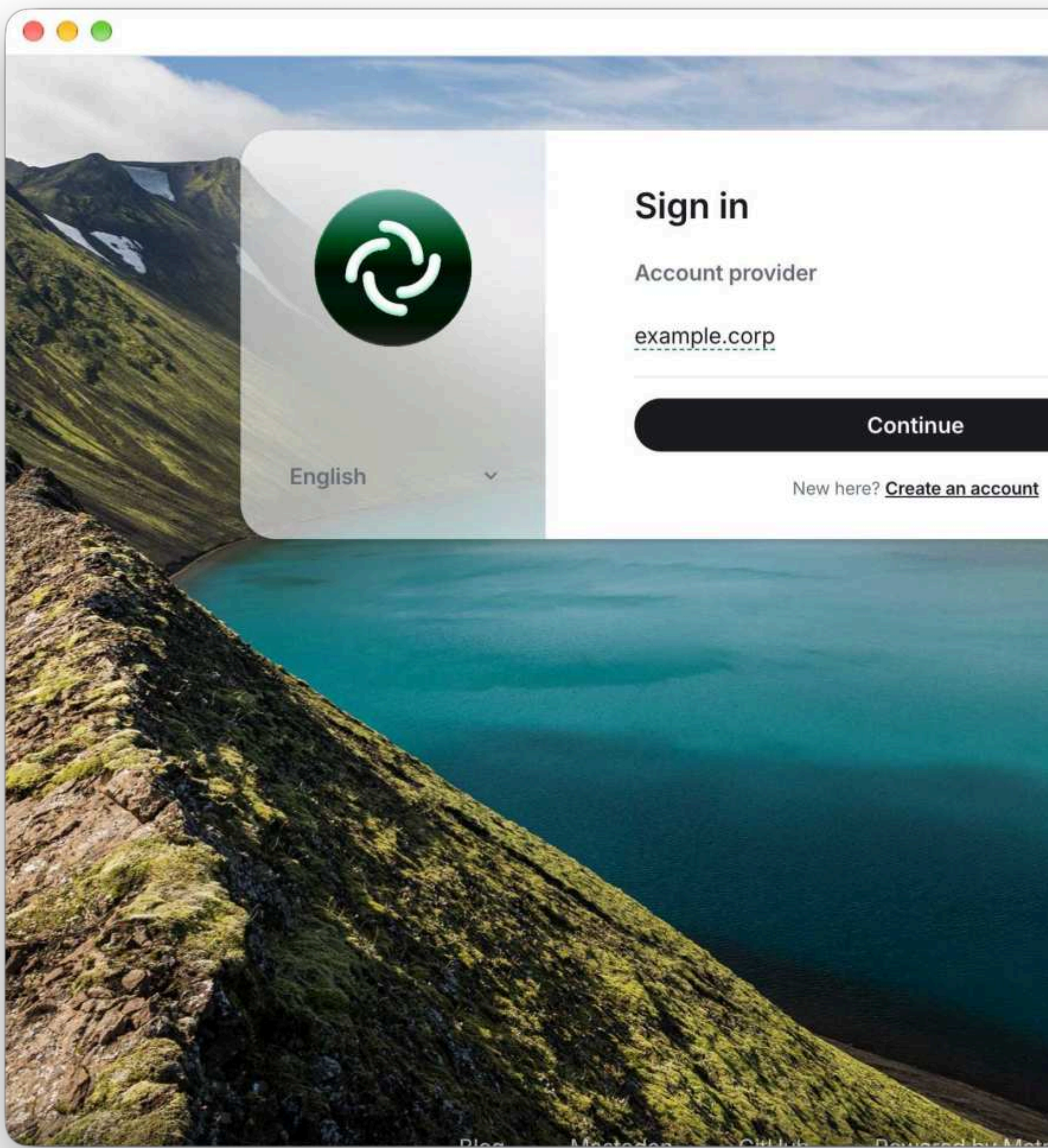
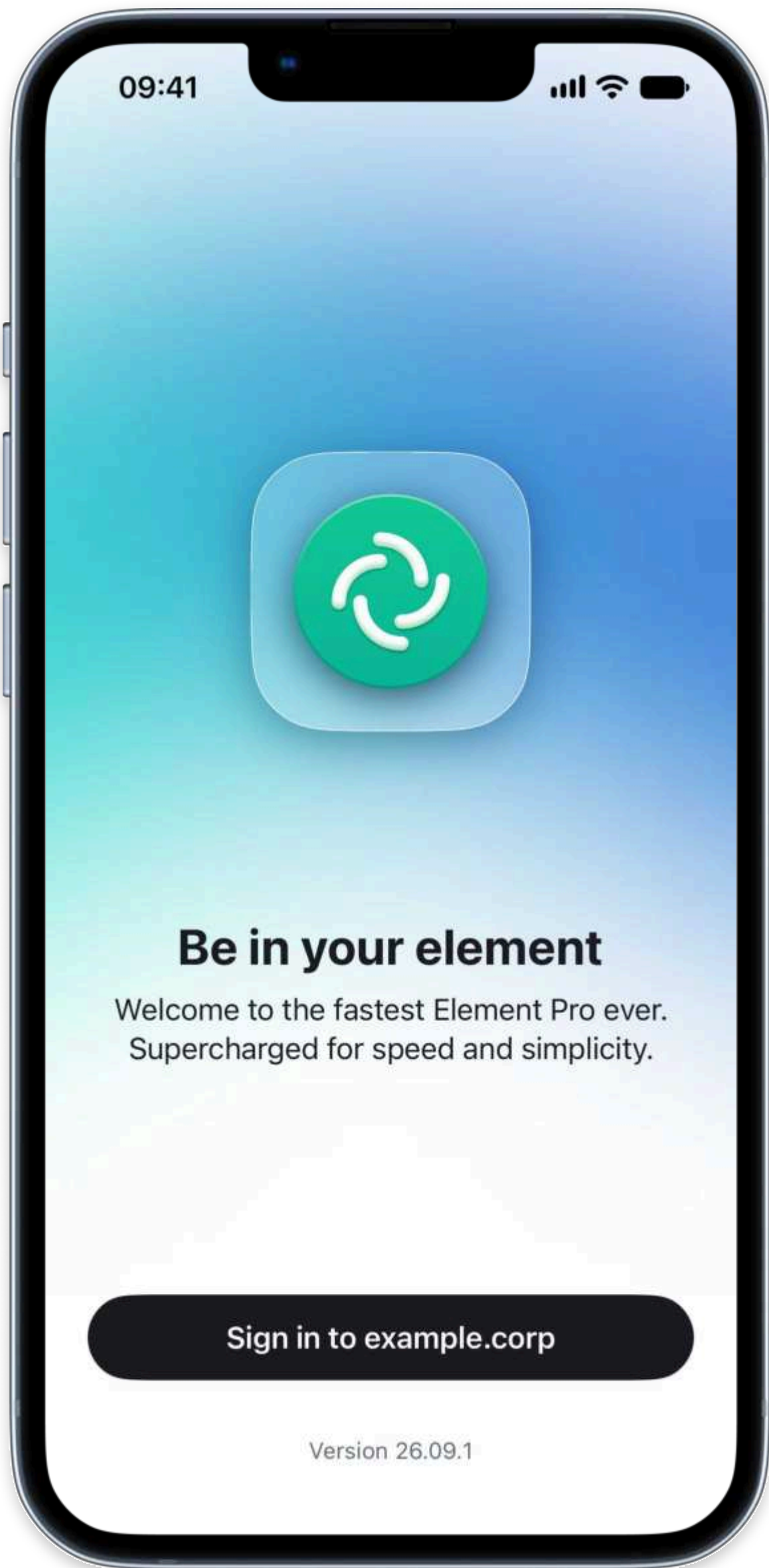
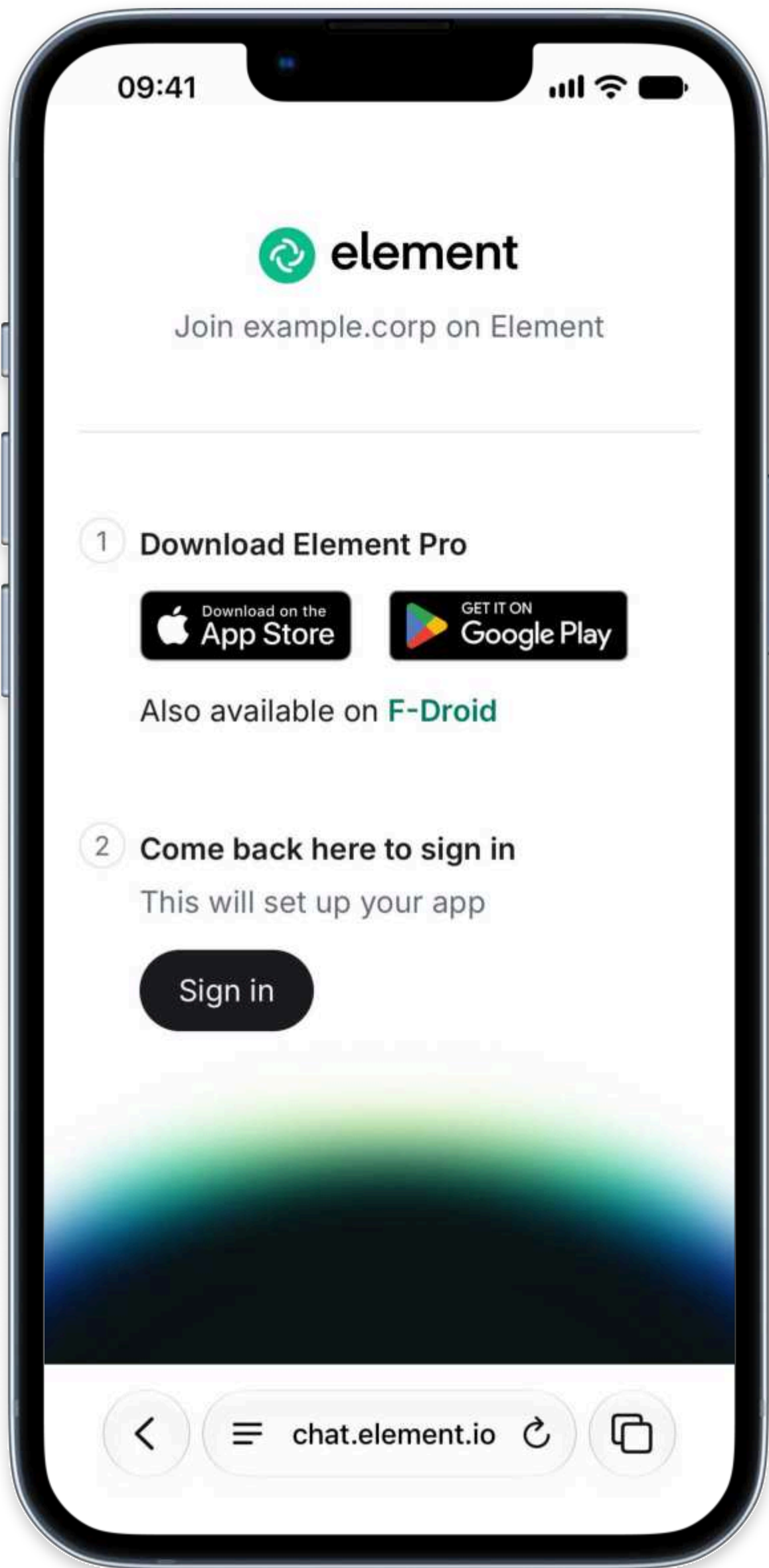


As one of your users, I want to

get in

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reach people outside

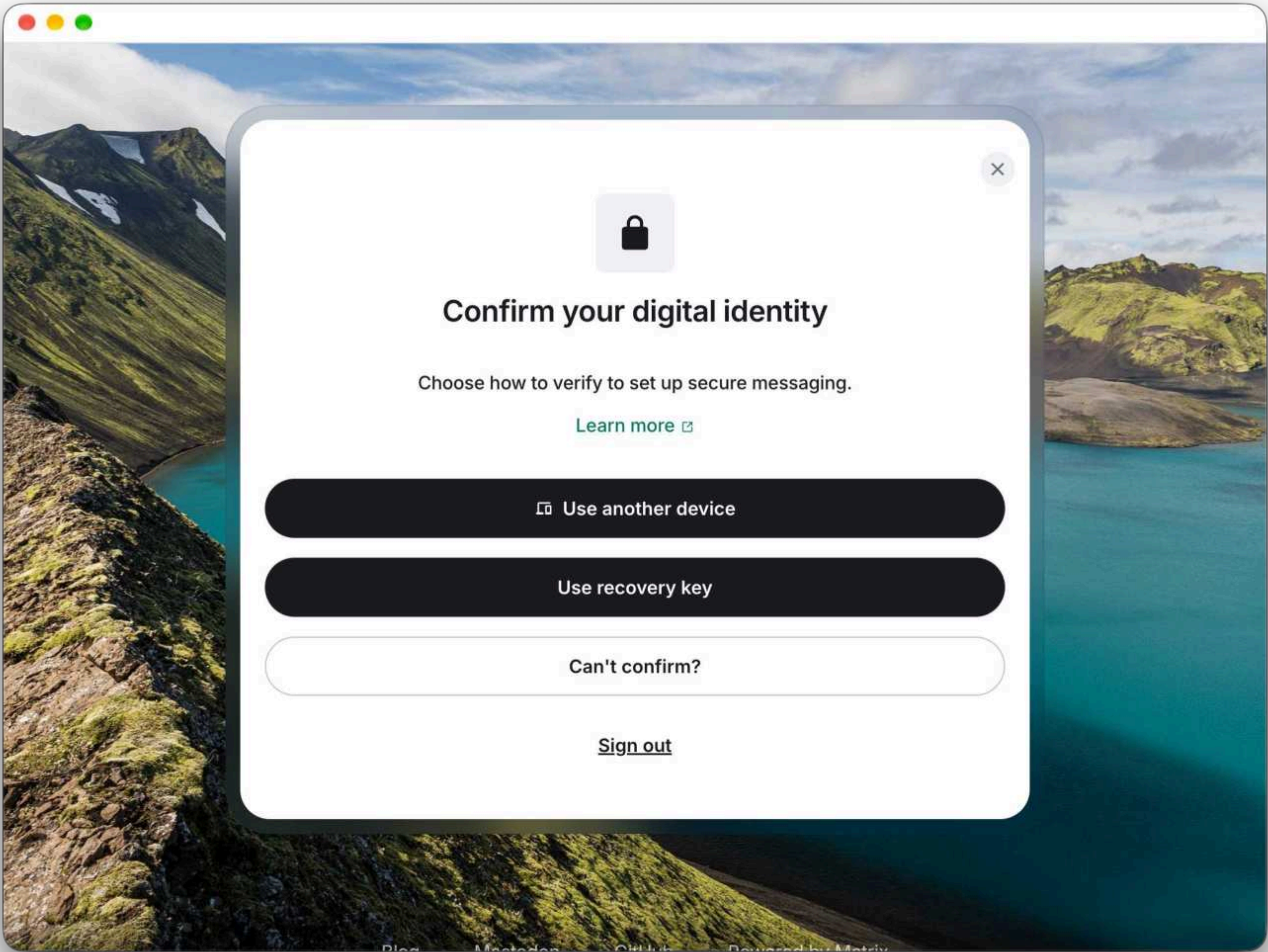
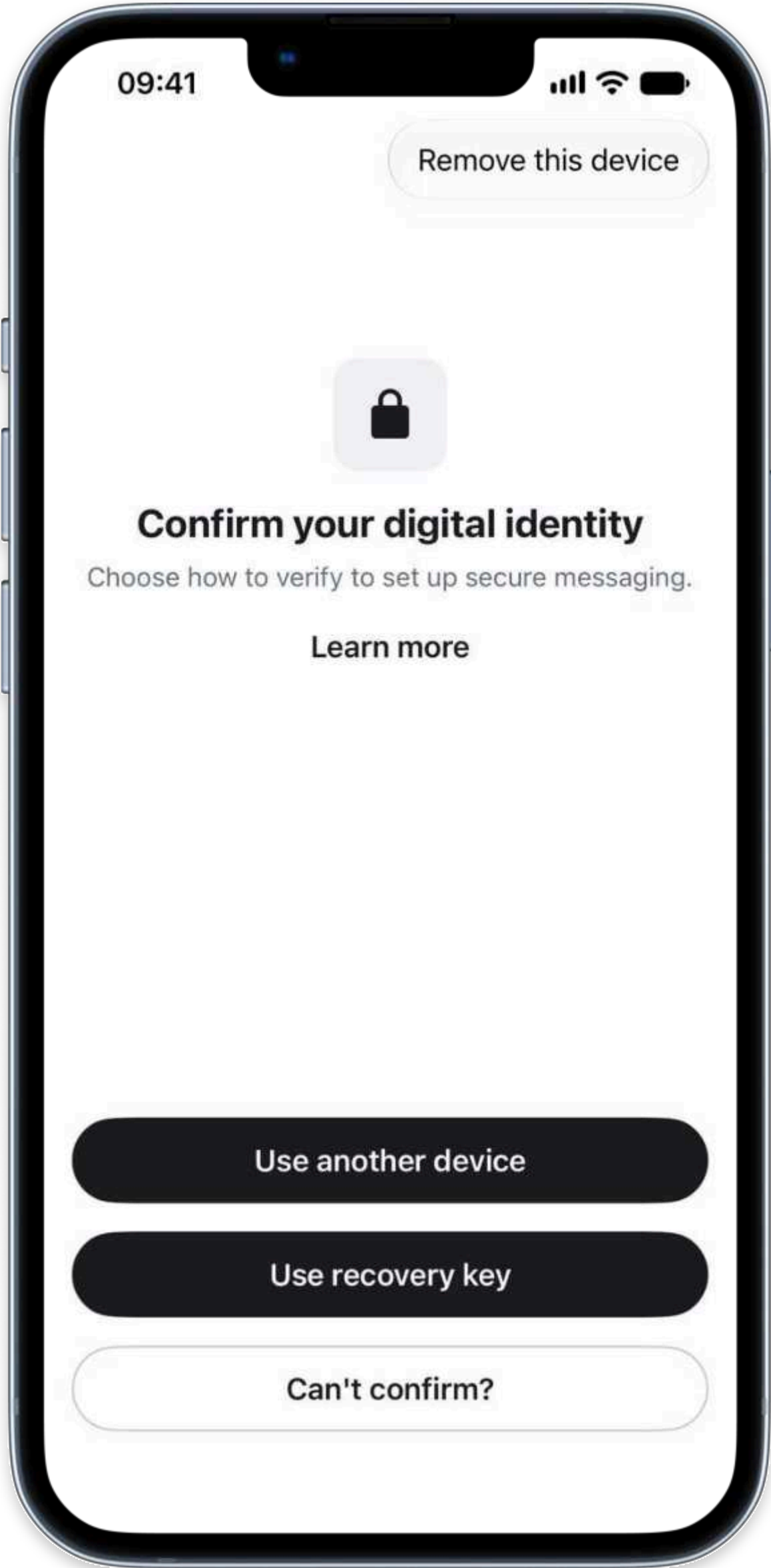


As one of your users, I want to

get in

find my colleagues

reach people outside



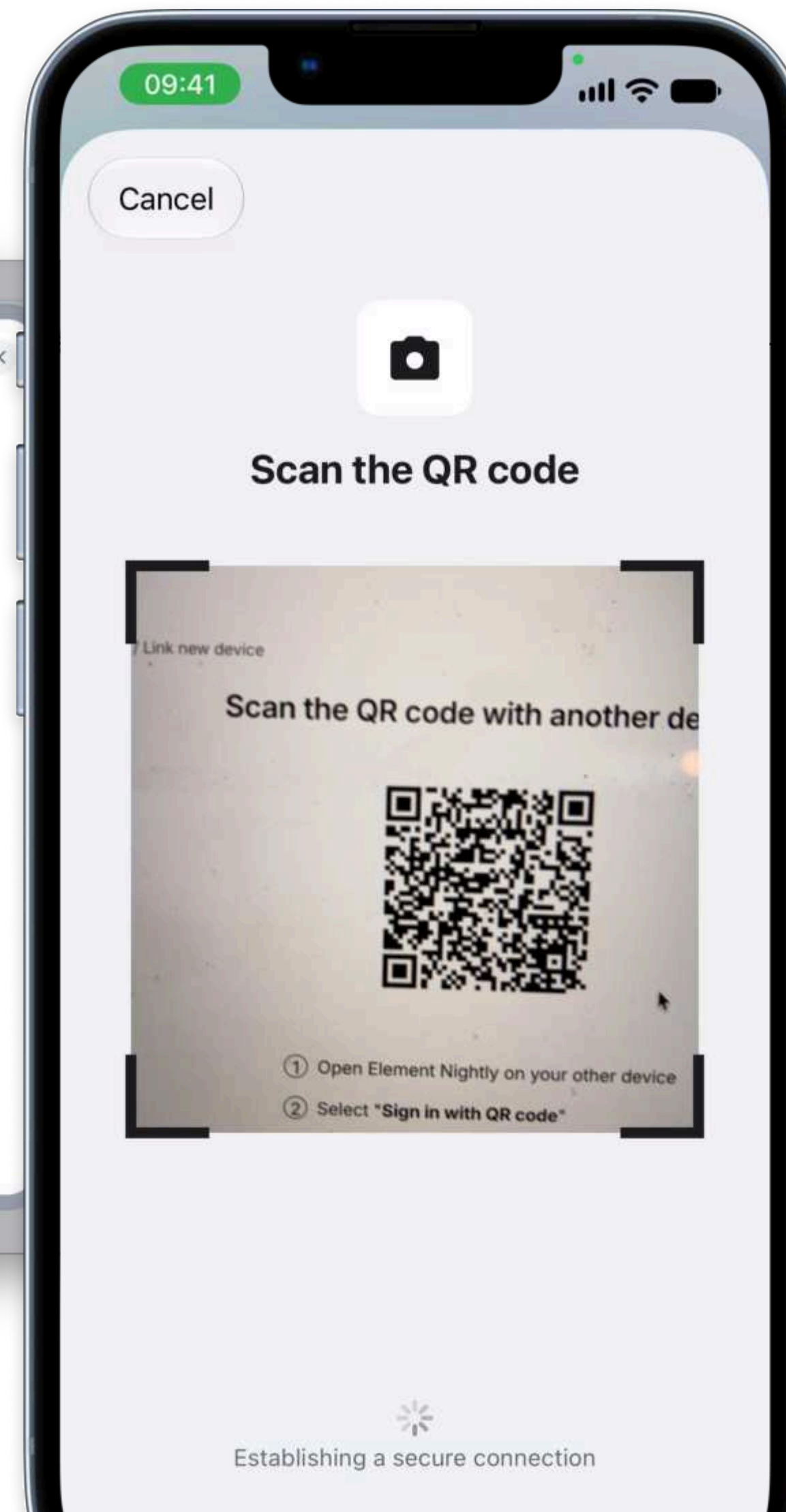
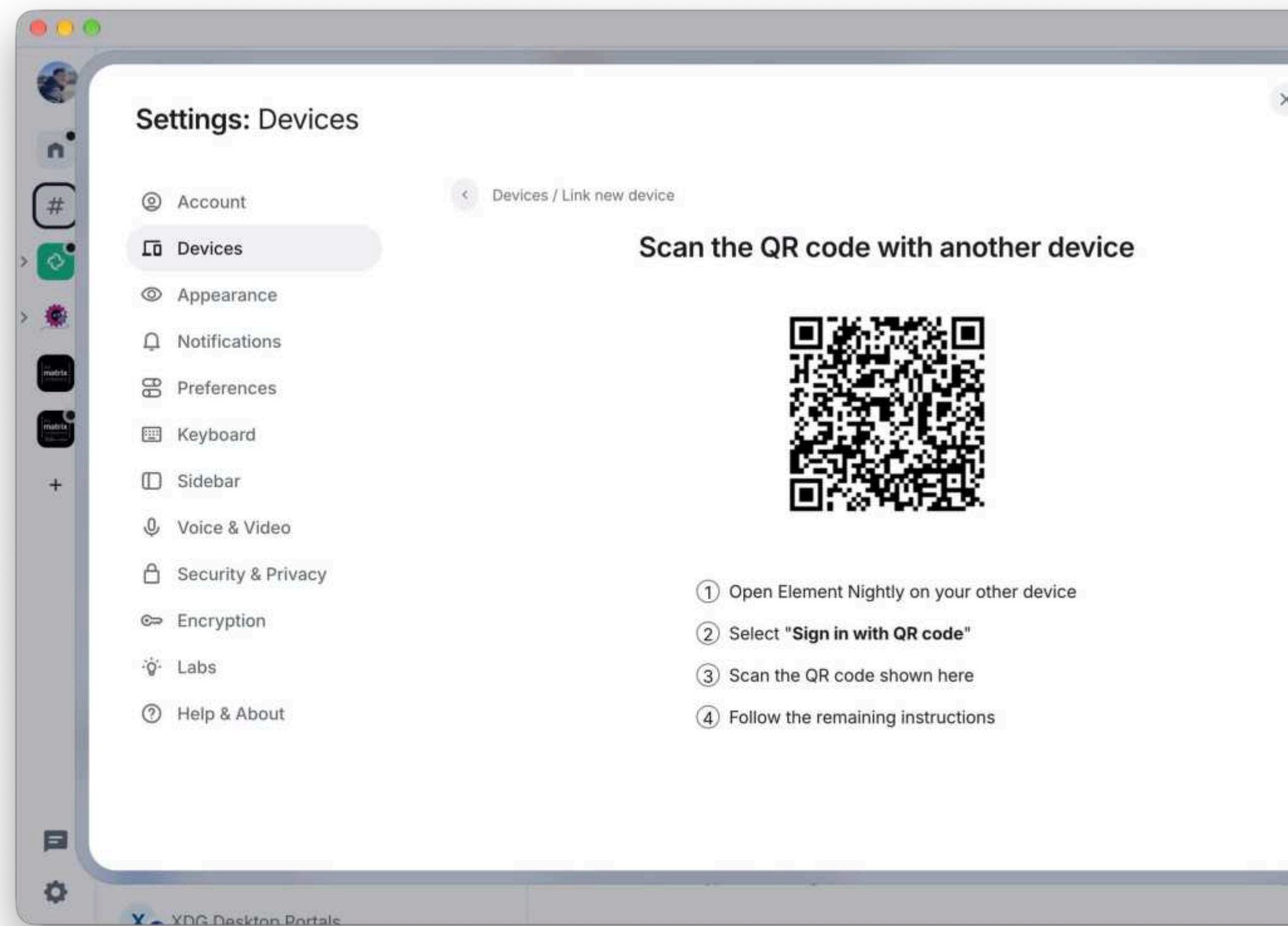
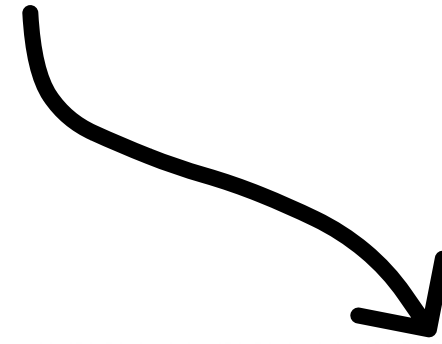
As one of your users, I want to

get in

find my colleagues

reach people outside

discovery + authentication + verification in one go



As one of your users, I want to

get in

find my colleagues

reach people outside

“I can’t find my colleague.”

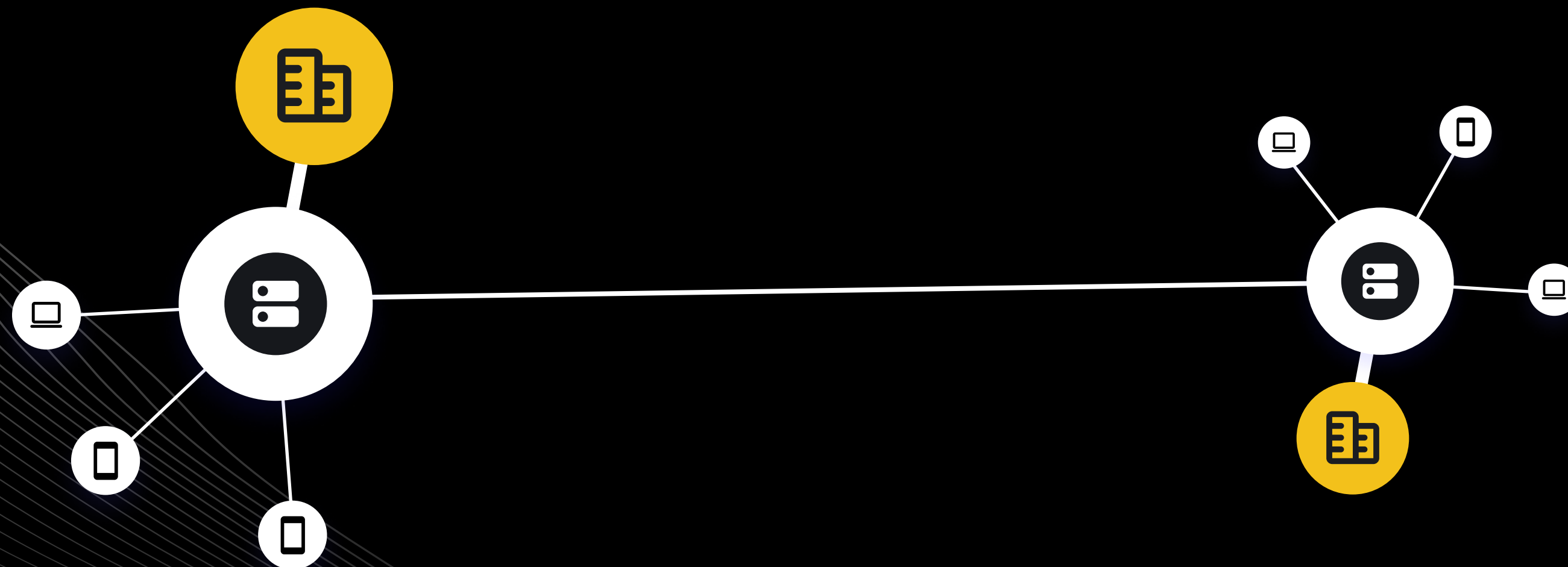
As one of your users, I want to

get in

find my colleagues

reach people outside

“I can’t find my colleague.”



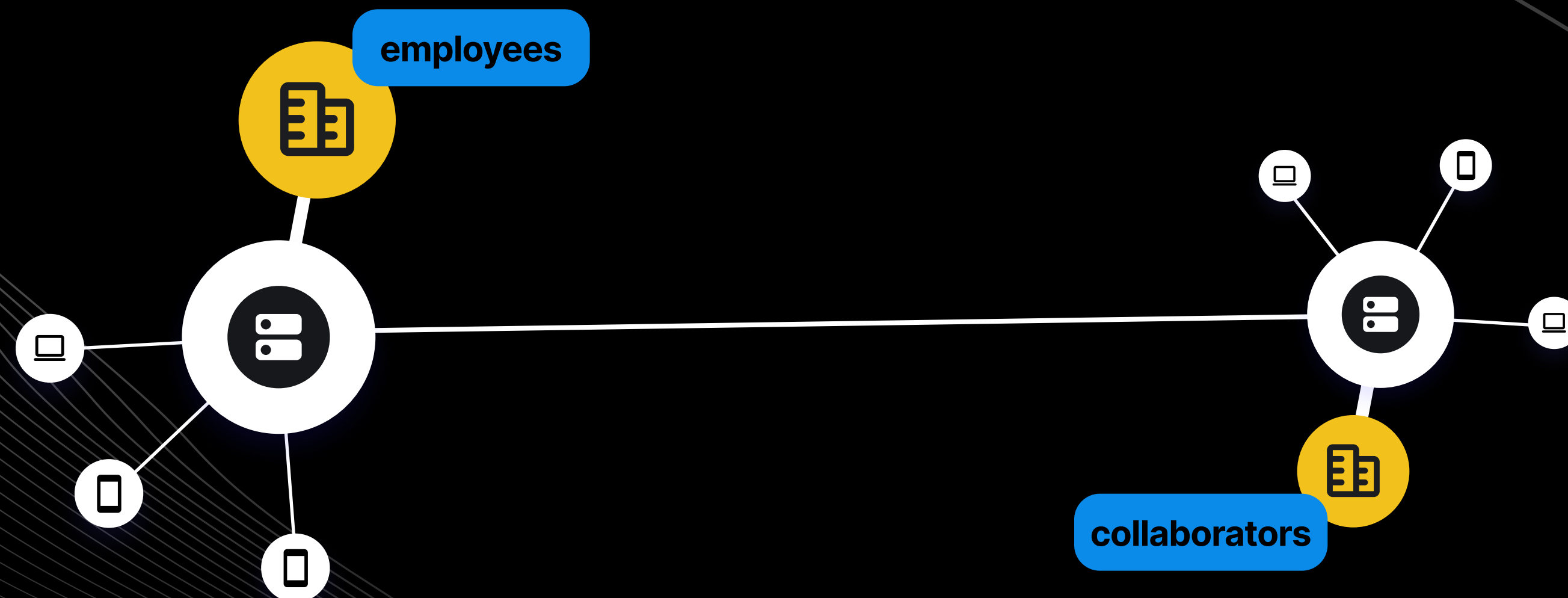
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find my colleagues

reach people outside

“I can’t find my colleague.”



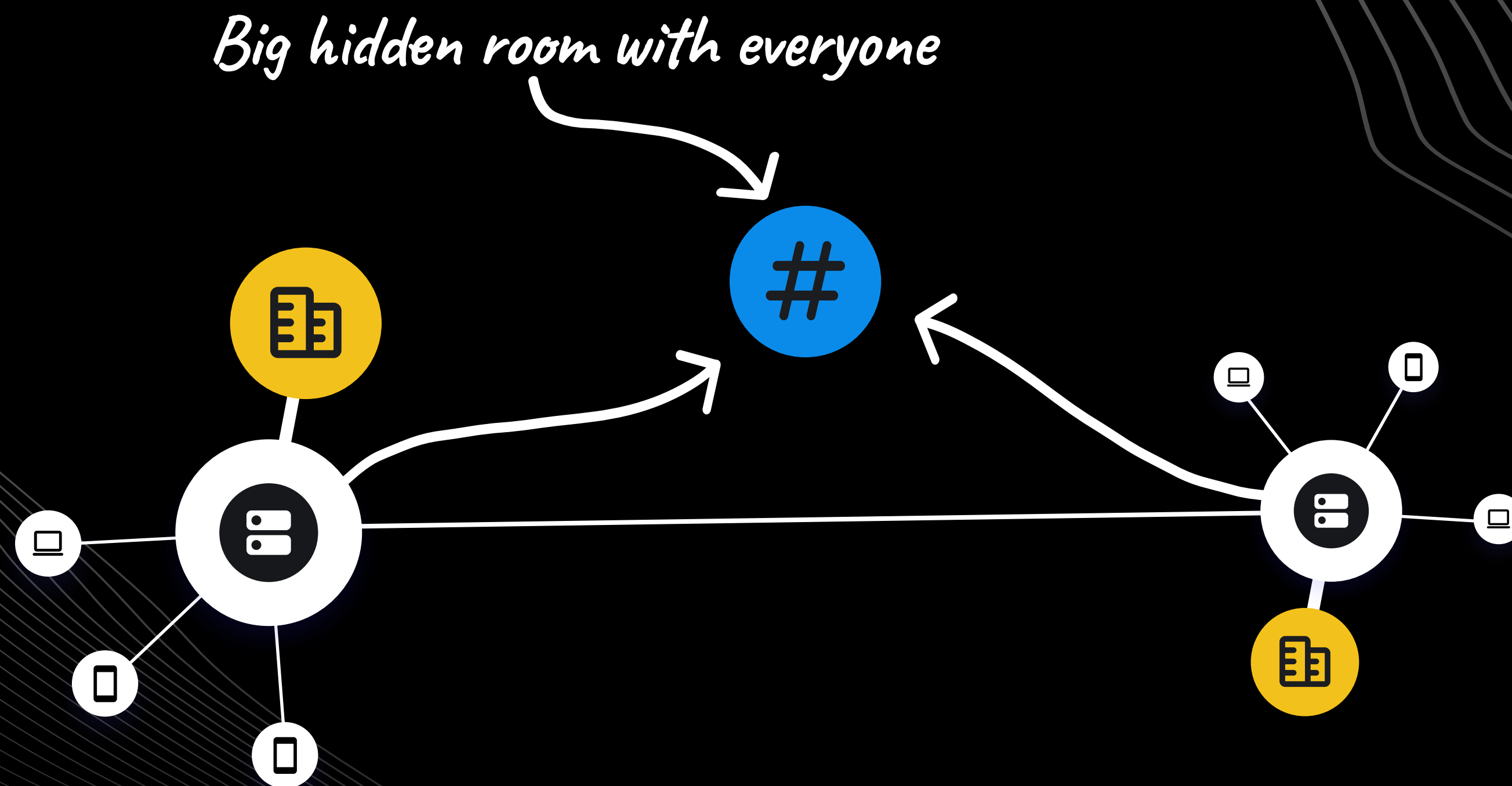
As one of your users, I want to

get in

find my colleagues

reach people outside

“I can’t find my colleague.”



Me: mom, can we have **a user directory** ?

Mom: no, we have **a user directory** at home

At home: **everyone in one hidden room**

As one of your users, I want to

get in

find my colleagues

reach people outside

User Status

As one of your users, I want to

get in

find my colleagues

reach people outside

User Status

built on

Extensible Profiles

As one of your users, I want to

get in

find my colleagues

reach people outside

User Status

built on

Extensible Profiles



Quentin

@quenting:element.io

As one of your users, I want to

get in

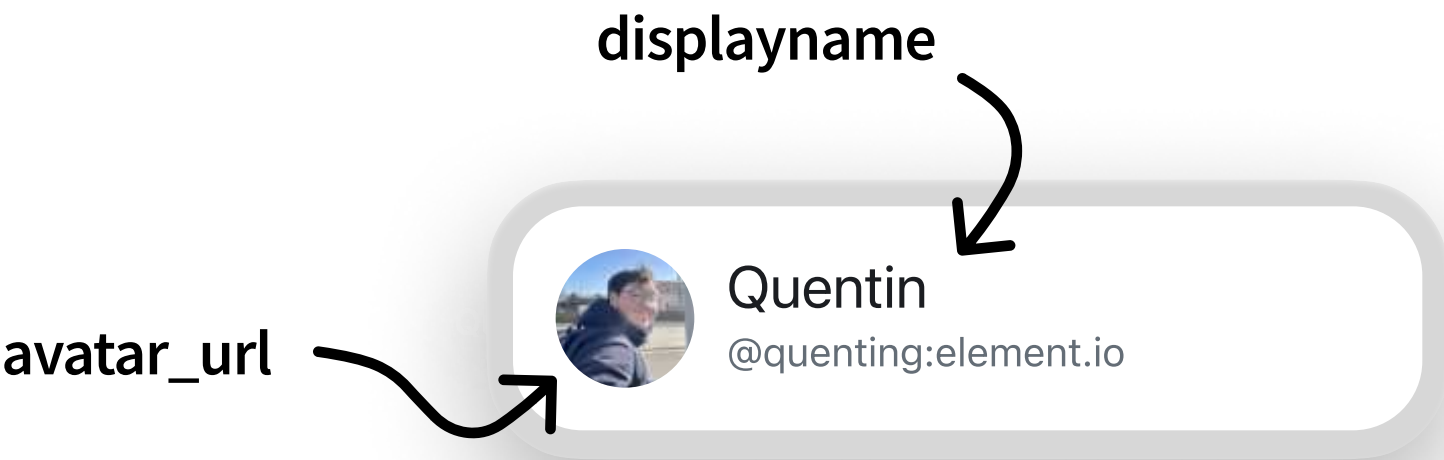
find my colleagues

reach people outside

User Status

built on

Extensible Profiles



As one of your users, I want to

get in

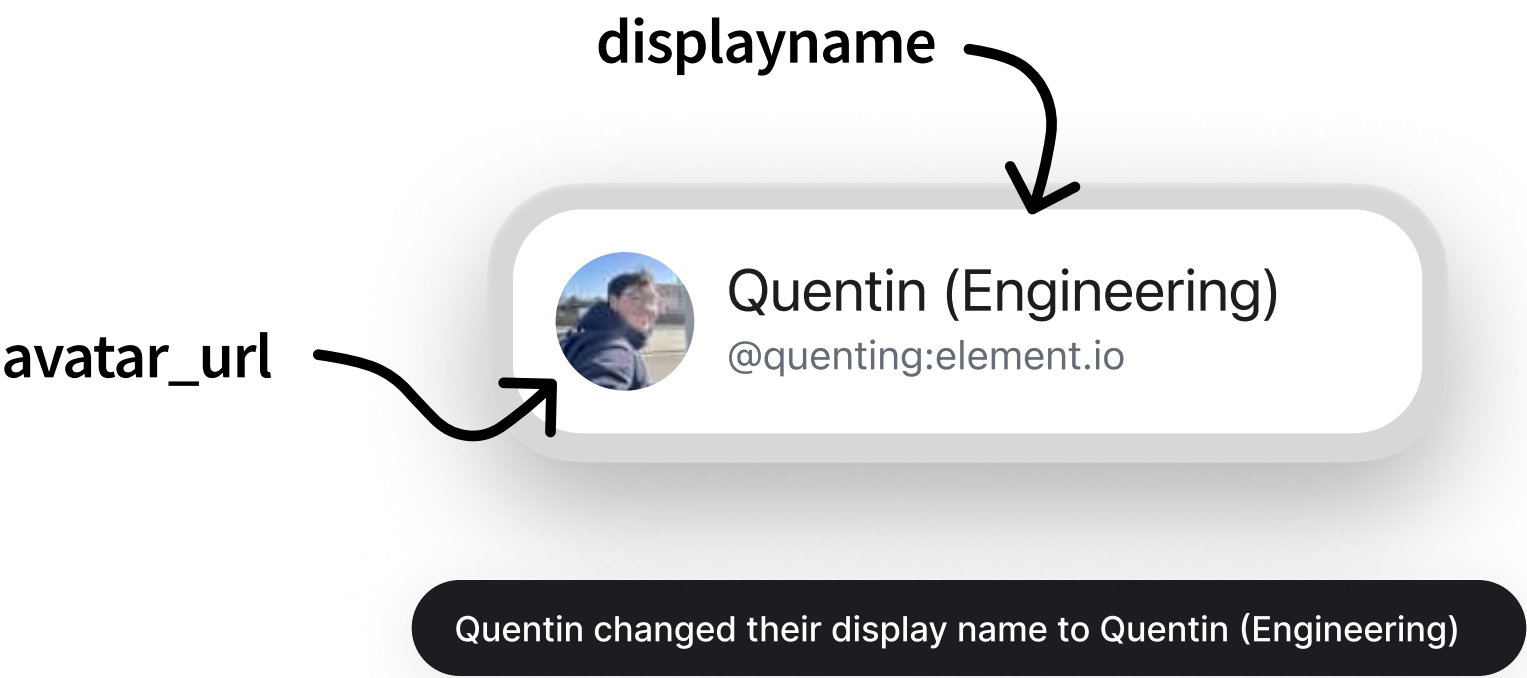
find my colleagues

reach people outside

User Status

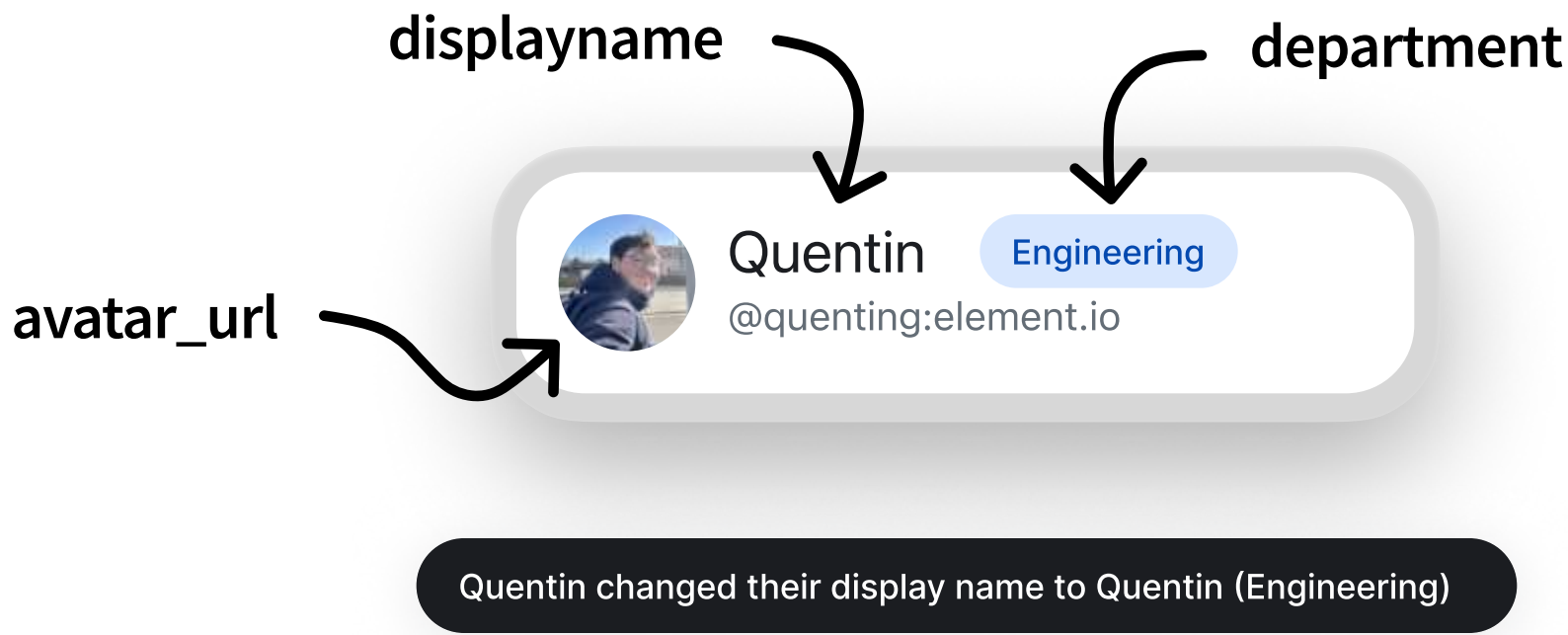
built on

Extensible Profiles



As one of your users, I want to

- get in
- find my colleagues
- reach people outside



As one of your users, I want to

get in

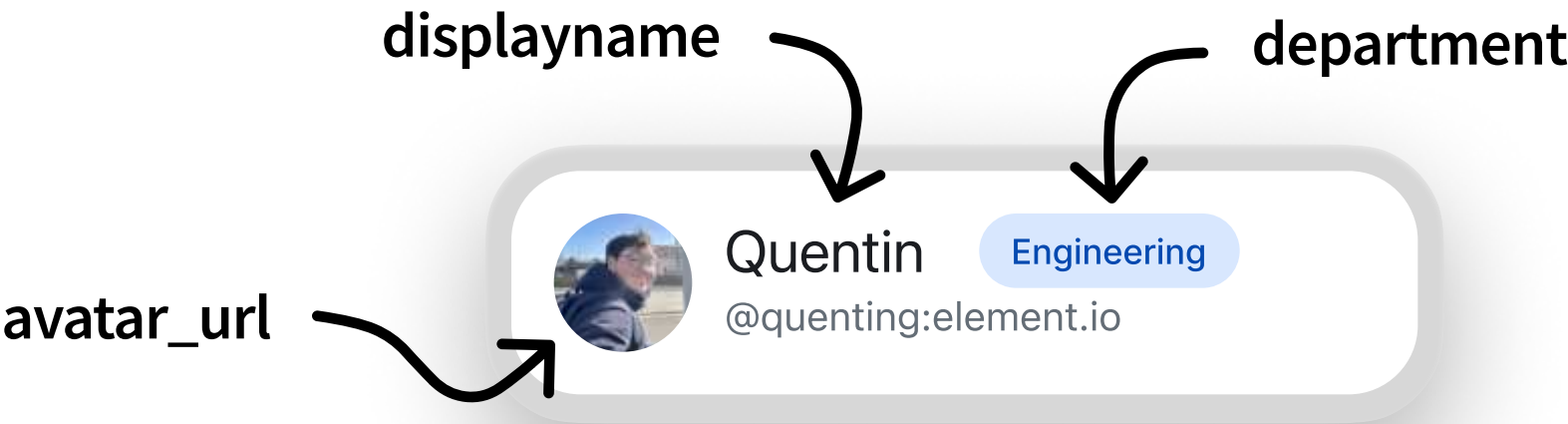
find my colleagues

reach people outside

User Status

built on

Extensible Profiles



As one of your users, I want to

get in

find my colleagues

reach people outside

User Status

built on

Extensible Profiles



Quentin

@quenting:element.io

 Away

Clear

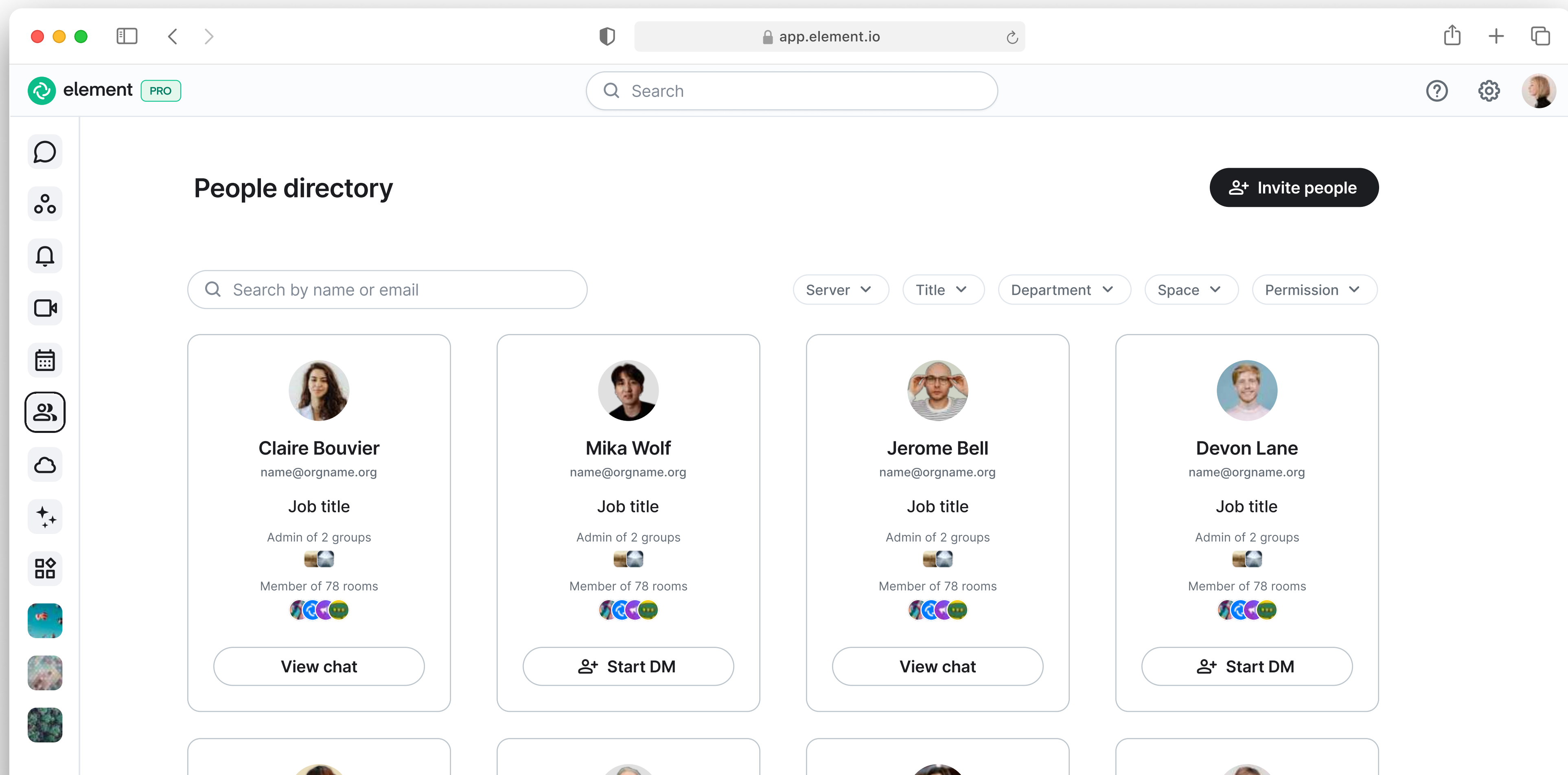
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reach people outside

“I can’t find my colleague.”



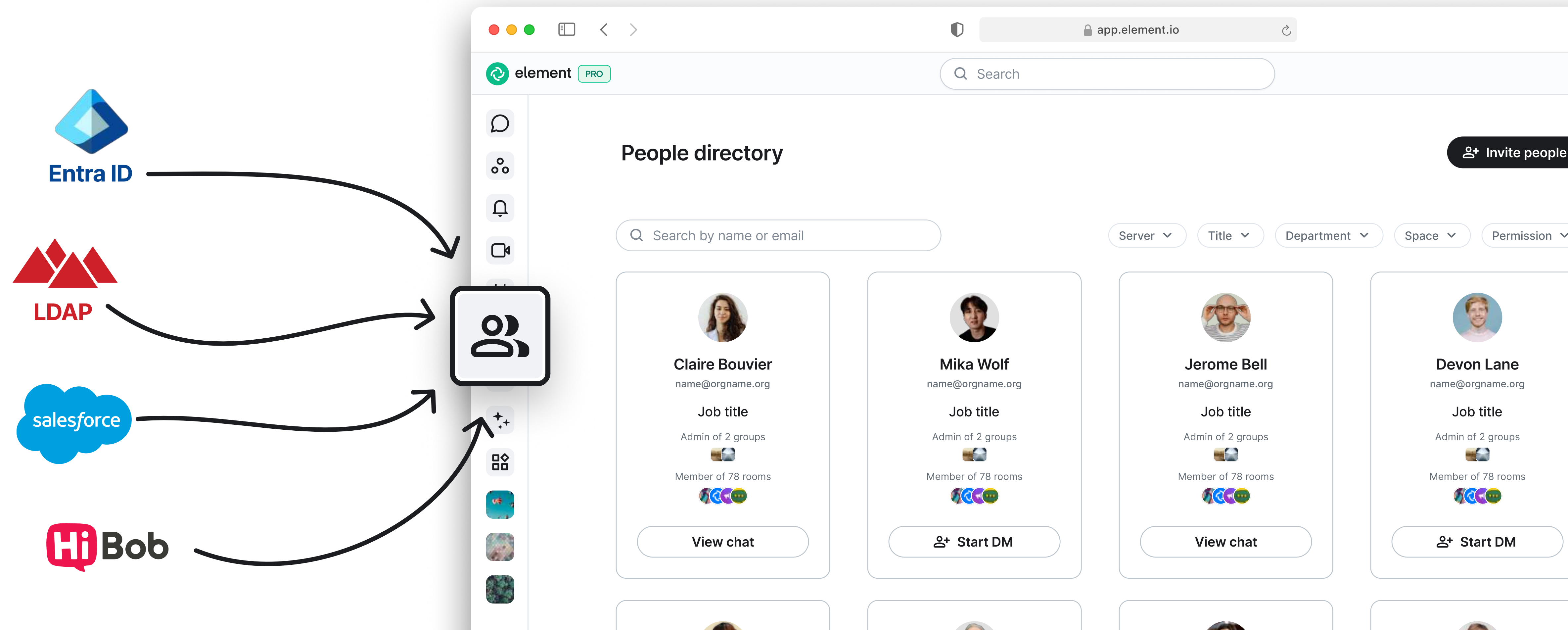
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“I can’t find my colleague.”



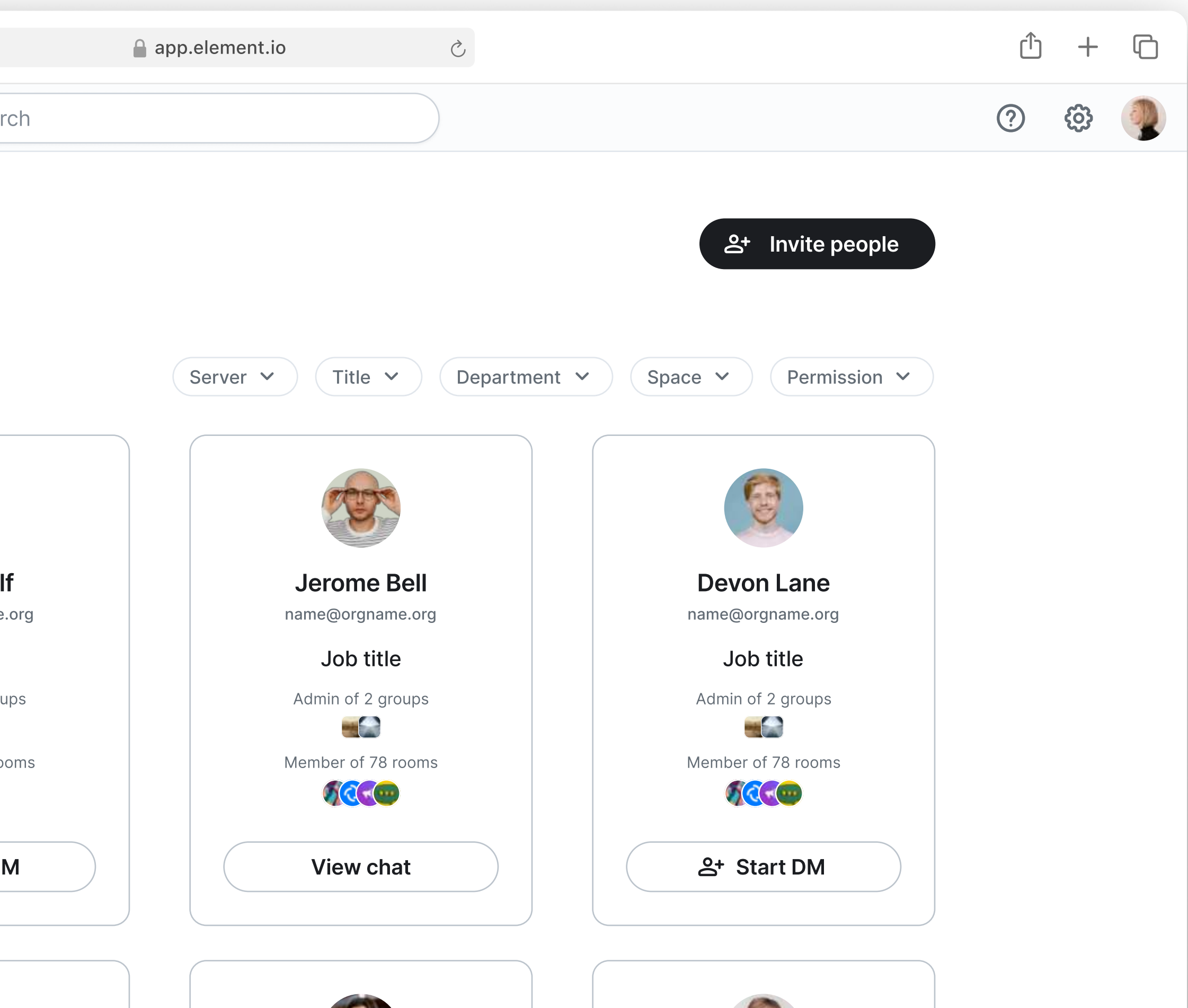
As one of your users, I want to

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find my colleagues

reach people outside

“I can’t find my colleague.”



The plan

Step 1

Make extensible profiles just work

Step 2

Figure out what to share with whom

Step 3

Use custom fields for everything

As one of your users, I want to

get in

find my colleagues

reach people outside



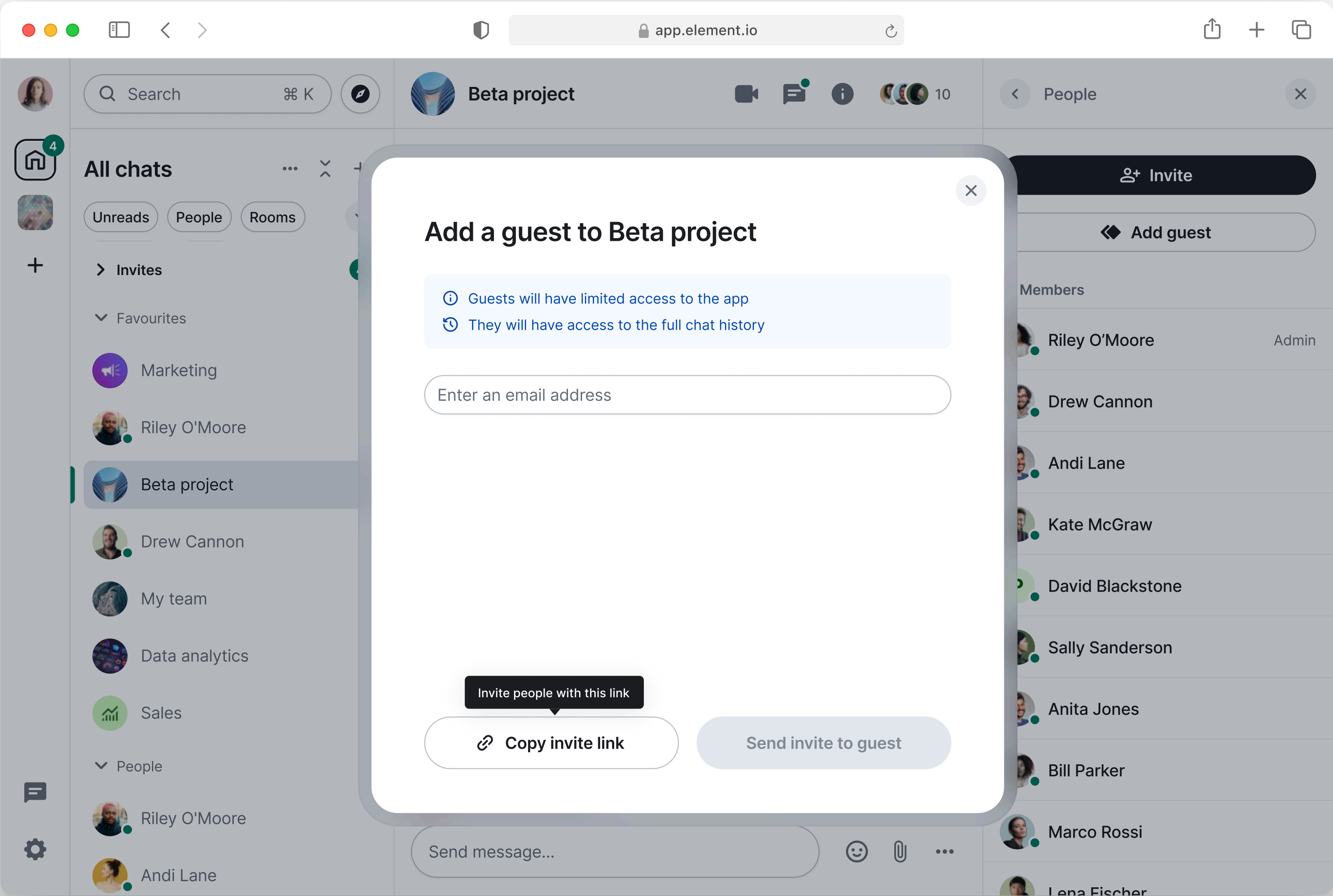
Invite people

As one of your users, I want to

get in

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reach people outside

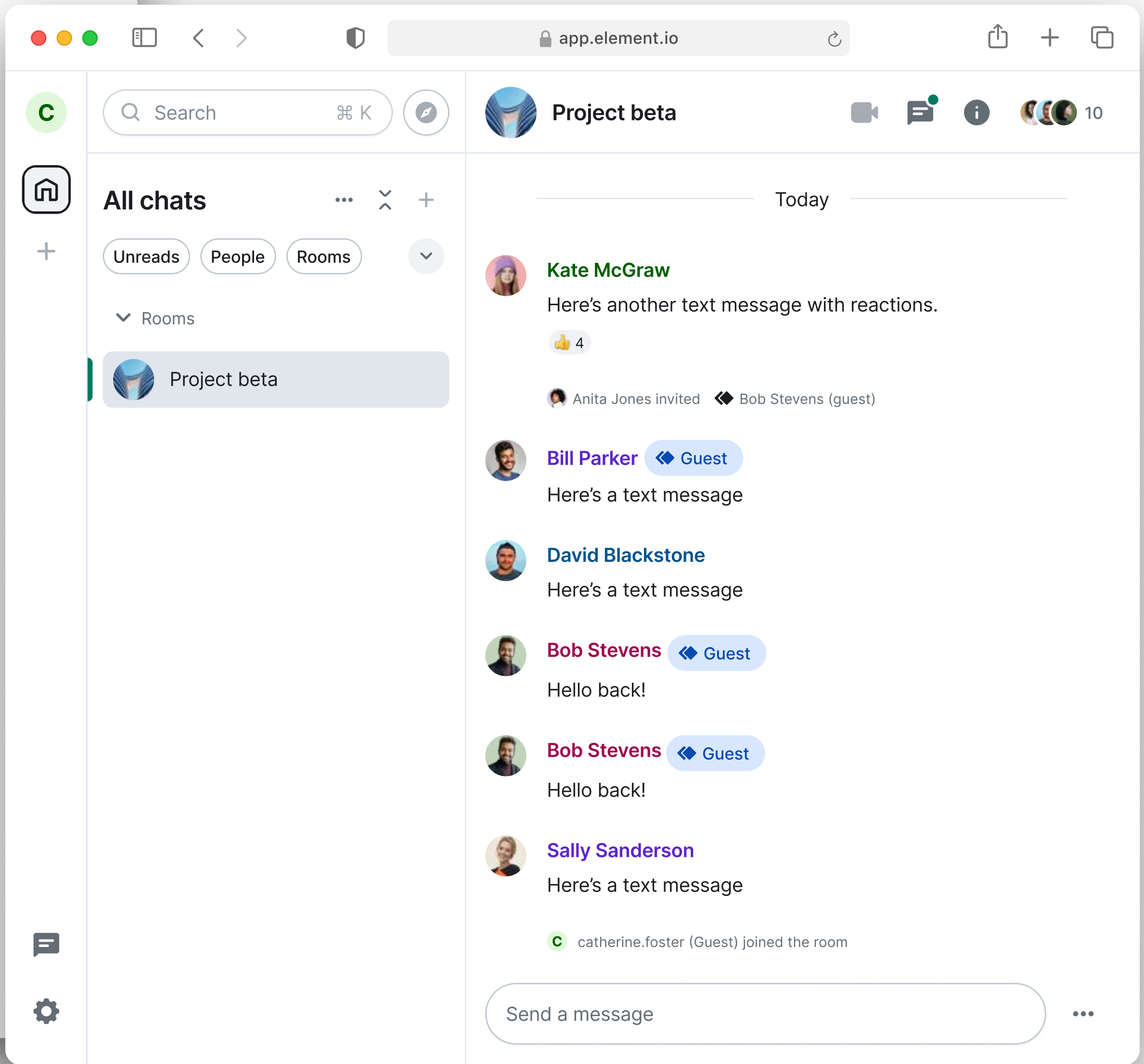
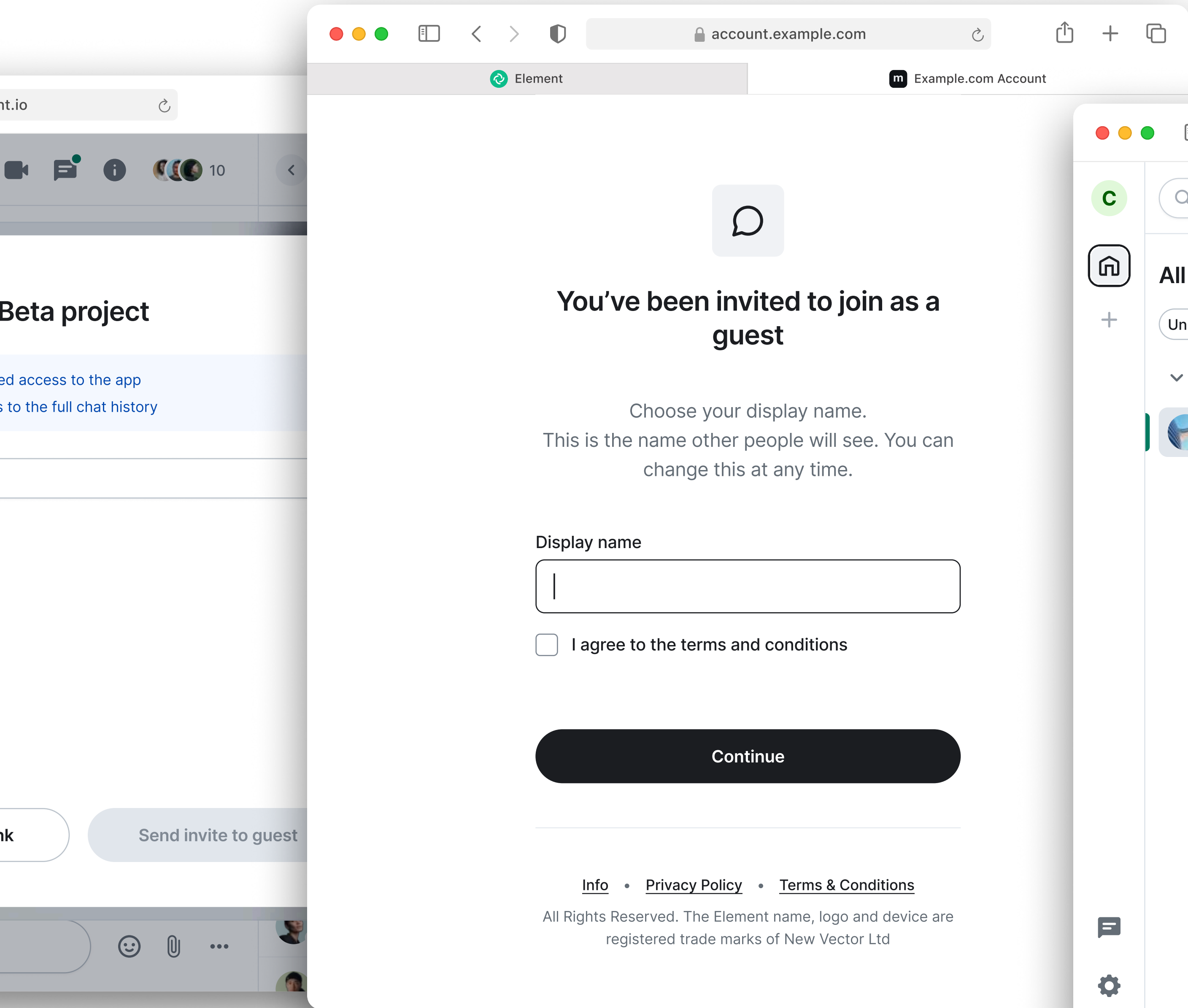


As one of your users, I want to

get in

find my colleagues

reach people outside



As one of your users, I want to

get in

find my colleagues

reach people outside

elementPRO

guest-invites.element.dev

A

Dashboard

Users

Rooms

Devices

Federation

Auditing

Supervision

Personal tokens

Invitations

Documentation

Afficher un menu

Invitations

41 invitations

+ Add

Filter

TOKEN	CREATED AT	VALID UNTIL	USES	STATUS
BnJn5MBso4lc	Oct 14, 2026 at 10:07 ...	Oct 21, 2026 at 10:07 ...	1 / 1	Used up
ynuxA5fpdq8Q	Oct 14, 2026 at 6:03 ...	Oct 21, 2026 at 6:03 ...	0 / 1	Active
JSUwAkZTfNT0	Oct 14, 2026 at 6:05 ...	Oct 21, 2026 at 6:05 ...	0 / 1	Active
PrVbNkkg3WMf	Oct 15, 2026 at 8:19 ...	Oct 22, 2026 at 8:19 ...	1 / 1	Used up
B4BkVJxfFYNK	Oct 15, 2026 at 8:43 ...	Oct 22, 2026 at 8:43 ...	1 / 1	Used up
jA6gk4BlgYZy	Oct 15, 2026 at 9:45 ...	Oct 22, 2026 at 9:45 ...	1 / 1	Used up
9Kb8eJw5WlnB	Oct 15, 2026 at 10:05 ...	Oct 22, 2026 at 10:05...	0 / 1	Active
KTgquuYqP2vM	Oct 15, 2026 at 11:09 ...	Oct 22, 2026 at 11:09...	1 / 1	Used up

BnJn5MBso4lc

Invite link

https://account.guest-invites.eleme

Share this link with the person you want to invite.

Status

Used up

Created at

Oct 14, 2026 at 10:07 AM

Expires at

Oct 21, 2026 at 10:07 AM

Usage count

1 / 1

Username

guest-k4wmagvpdkrk8zez6hs4aq4m9chzu...

Email address

test@example.com

Passwordless registration

Yes

ve been invited to j
guest

Choose your display nam
he name other people will s
change this at any time

ame

ee to the terms and conditions

Continue

Project beta

Kate McGraw

Here's another text

4

Anita Jones invited

Bill Parker

Here's a text messa

David Blackstone

Here's a text messa

Bob Stevens

Hello back!

Bob Stevens

Hello back!

Sally Sanderson

Here's a text messa

catherine.foster (Gue

As one of your users, I want to get in find my colleagues reach people outside

element

PRO

guest-invites.element.dev

Dashboard

Users

Rooms

Devices

Federation

Auditing

Supervision

Personal tokens

Invitations

Documentation

User devicesApplicationsLegacy devices

User devices

A device represents a single sign-in a user has on an application. Signing out a device revokes its access immediately.

29 devices

Filter

Newest first

Clear

DEVICE	APPLICATION	USER	STATUS
 Safari on macOS	 Element Admin https://admin.100...	 alice @alice:guest-invites....	Recently used
 Chrome on macOS dsSLHAqBX8	 Element Pro https://chat.guest...	 Matthew 3 @guest-zgfrzykcpah...	Recently used
 Chrome on macOS 12N5762V5u	 Element Pro https://chat.guest...	 Johan Johannes... @johan:guest-invite...	Recently used
 Chrome on macOS BlrguXue1L	 Element Pro https://chat.guest...	 alice @alice:guest-invites....	Recently used
 Chrome on macOS vfALTvnZU3	 Element Pro https://chat.guest...	 Patrick @guest-lqgdyxy0yn...	Recently used



Safari on macOS

Safari 27.0.1 · macOS

Recently used

 alice

@alice:guest-invites.element.dev

 Element Admin

https://admin.100do.se/

Signed in at

Oct 21, 2026 at 1:24 AM

Last active

Oct 21, 2026 at 1:34 AM

Last active IP

172.21.43.48

Technical details



Quentin Gliech

Sales person?

@quenting:element.io



Quentin Gliech

Tool crafter

@quenting:element.io

Guest invitations

Element Admin

User Status

Guest invitations

Element Admin

User Status

built on

Next-gen auth

Registration tokens

Knocking

Room summaries

Guest invitations

built on

Next-gen auth

Registration tokens

Knocking

Room summaries

Element Admin

built on

MAS admin API

Next-gen auth

User Status

Guest invitations

built on

Next-gen auth

Registration tokens

Knocking

Room summaries

Element Admin

built on

MAS admin API

Next-gen auth

User Status

built on

Extensible Profiles

...for /v3/sync

...for Sliding Sync

...federation updates



Quentin Gliech

Tool crafter

@quenting:element.io

As

**a system
administrator**

I want to

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successfully**

**in my
organisation**

**in my
community**



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Tool crafter

@quenting:element.io



Taking questions