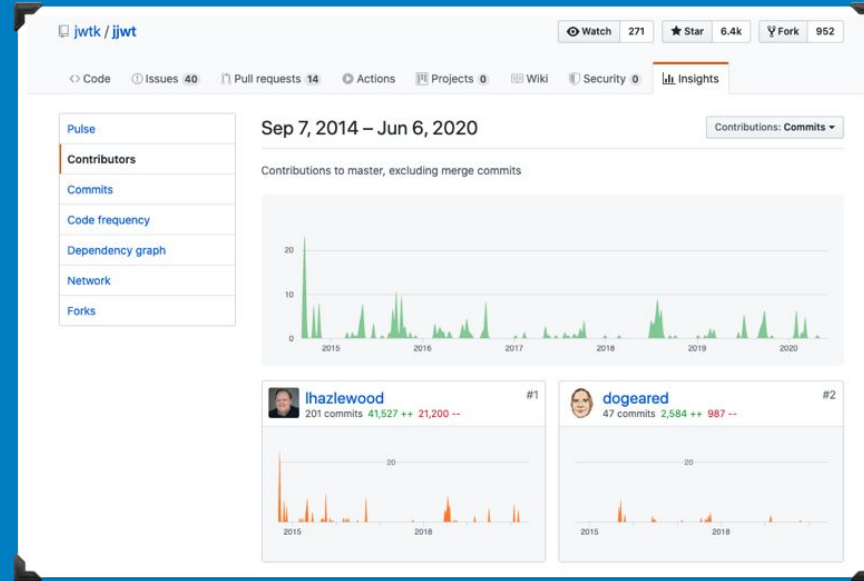
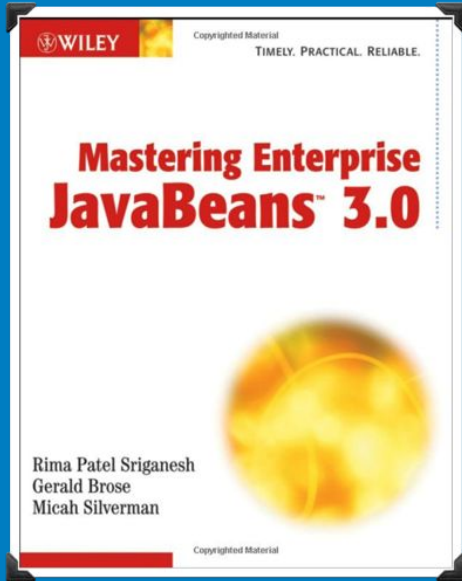
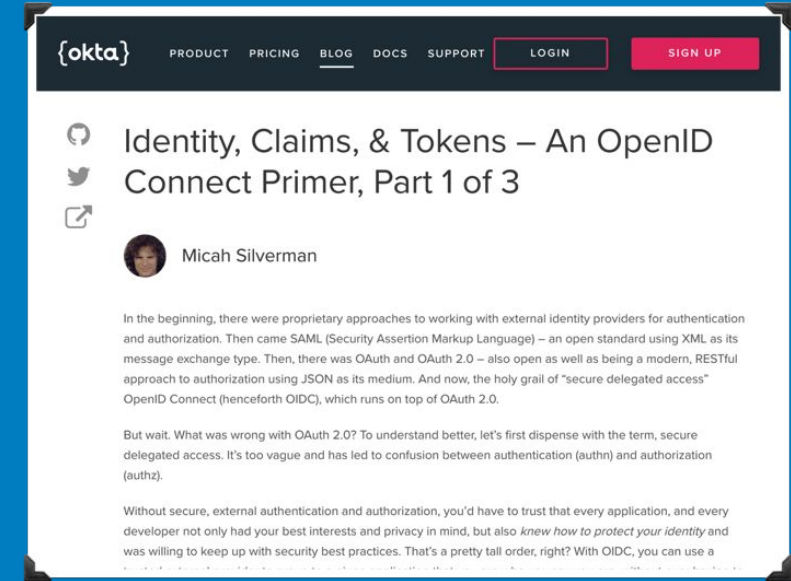


Hacking OAuth: Pitfalls and Remedies



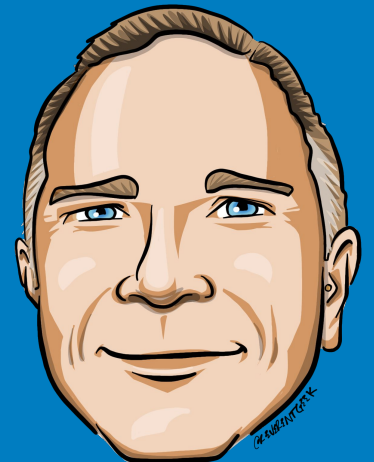
<https://github.com/jwtk/jjwt>



<https://bit.ly/OIDCPrimer>



MICAH SILVERMAN
Senior Security H@XOR
@AFITNERD
@OKTADEV



Identity use cases (circa 2007)

- ★ Simple login – forms and cookies
- ★ Single sign-on across sites – SAML
- ★ Mobile app login – ???
- ★ Delegated authorization – ???

Don't do it this way!

Are your friends already on Yelp?

Many of your friends may already be here, now you can find out. Just log in and we'll display all your contacts, and you can select which ones to invite! And don't worry, we don't keep your email password or your friends' addresses. We loathe spam, too.

Your Email Service



Your Email Address

(e.g. bob@gmail.com)

Your Gmail Password

(The password you use to log into your Gmail email)

[Skip this step](#)

Check Contacts

Don't do it this way!


Step 1
Find Friends

Step 2
Profile Information

Step 3
Profile Picture

Are your friends already on Facebook?


Many of your friends may already be here. Searching your email account is the fastest way to find your friends on Facebook.


 Gmail

Your Email:


Email Password:

Find Friends


 Facebook will not store your password.

 Yahoo!

Find Friends

 Windows Live Hotmail

Find Friends

 Other Email Service

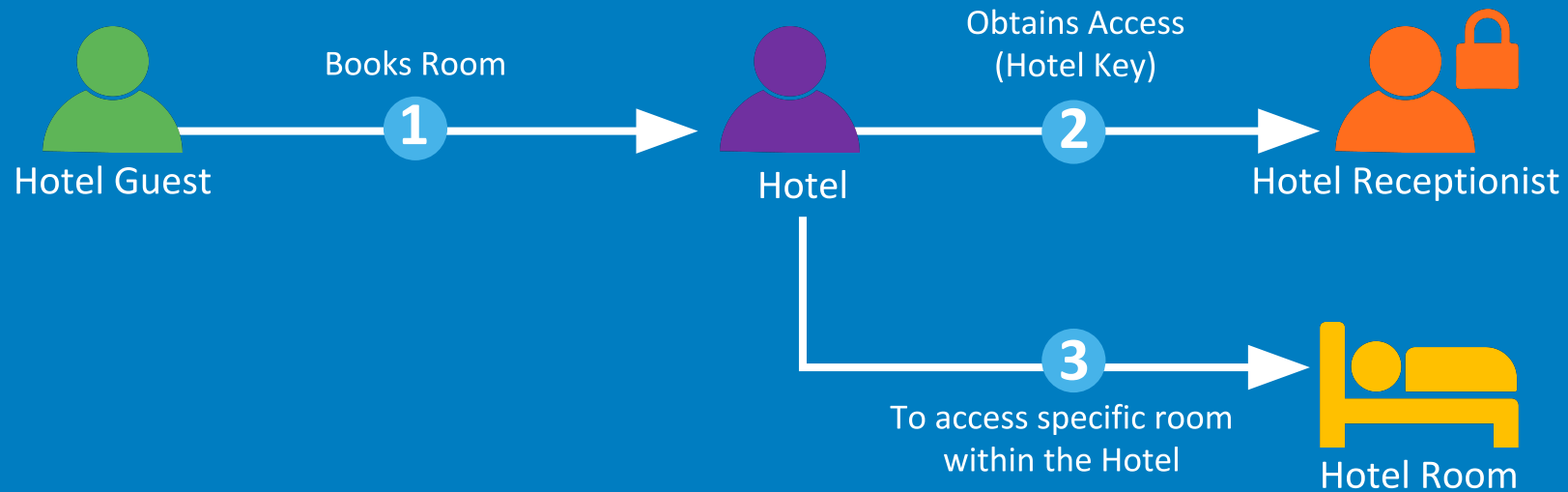
Find Friends

The delegated authorization problem
HOW CAN I LET A WEBSITE ACCESS
MY DATA, WITHOUT GIVING IT MY
PASSWORD?

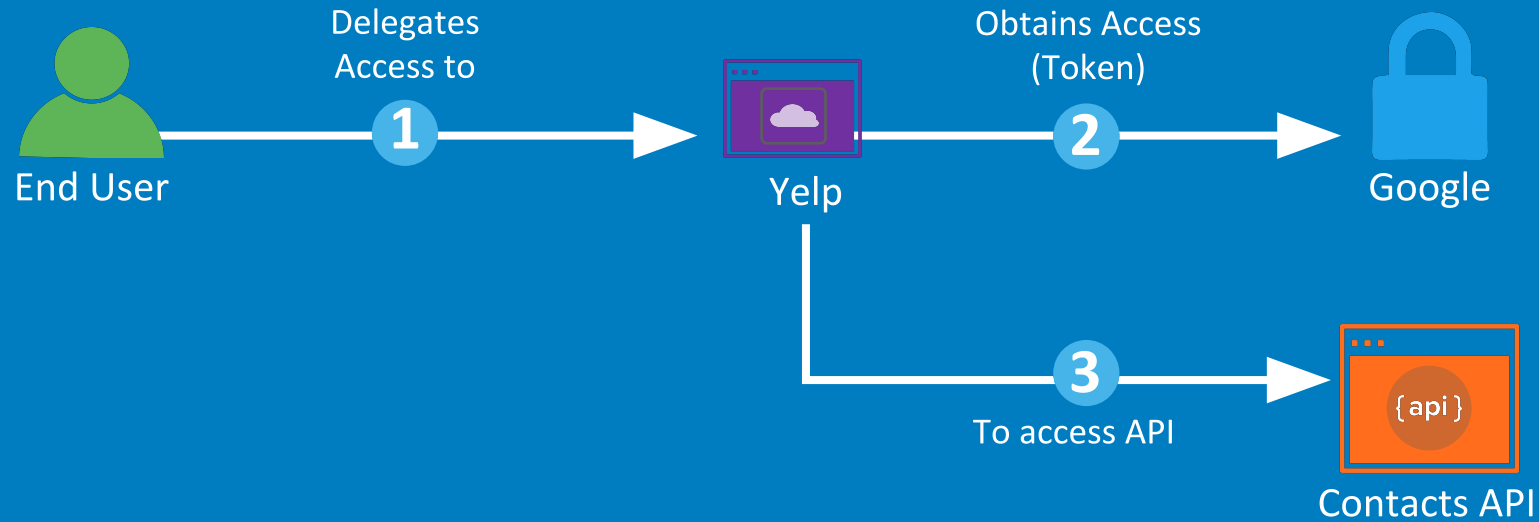
A lot of confusion around OAuth:

- ✗ Terminology and jargon
- ✗ Incorrect advice
- ✗ Hard to find a life-like example

Hotel Analogy



OAuth: App Scenario



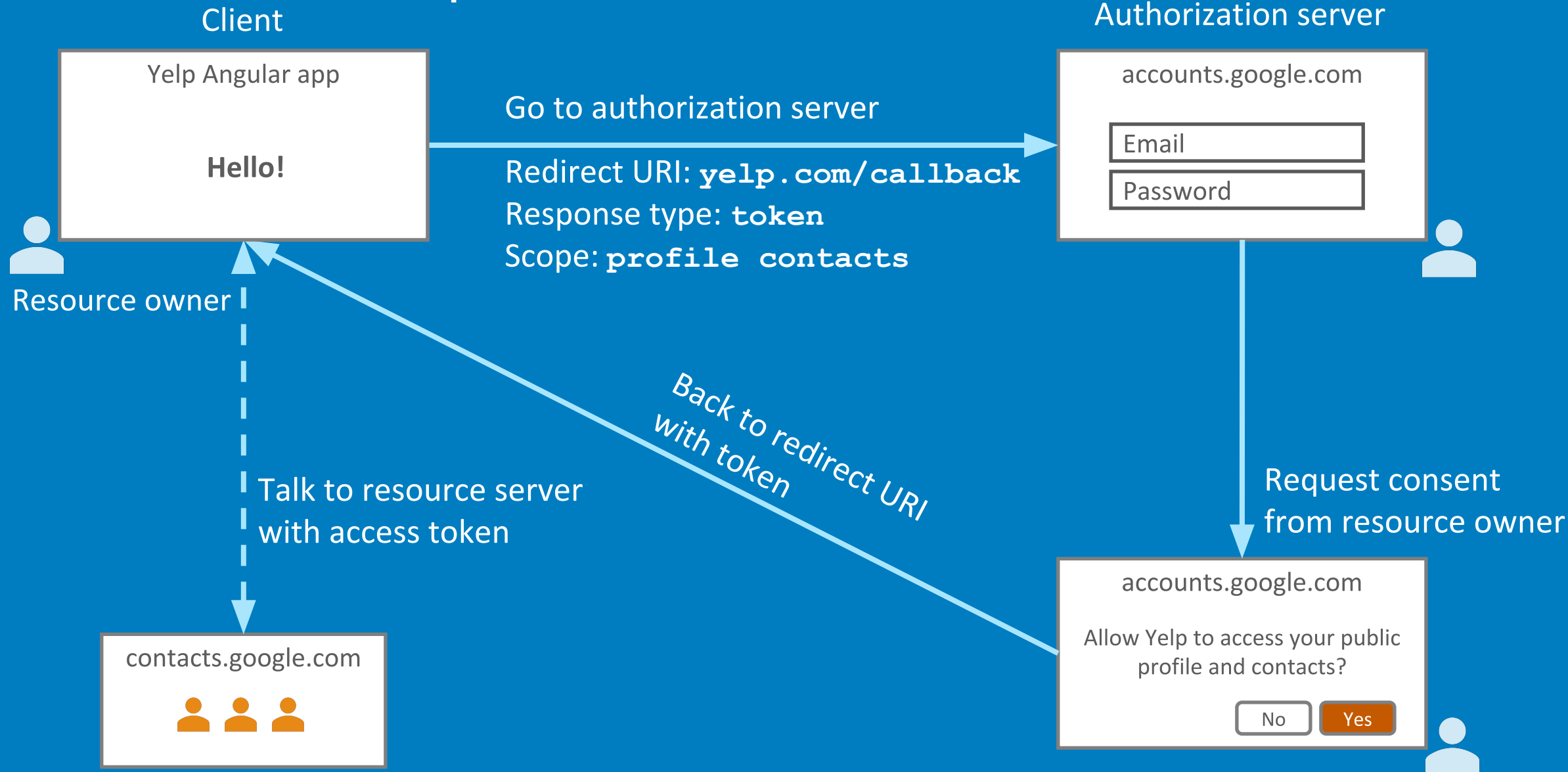
OAuth 2.0 Terminology

| Hotel | App | OAuth | Description |
|--------------------|--------------|----------------------|---|
| Hotel Guest | End User | Resource Owner | Wants a Client App to do something on their behalf |
| Hotel | Yelp | Client Application | Needs authorization to interact with an API on behalf of a user |
| Hotel Receptionist | Google | Authorization Server | Grants access (in the form of tokens) to an app |
| Hotel Room | Contacts API | Resource Server | Has an API that an app can use if presented with a token |

Delegated authorization with OAuth 2.0



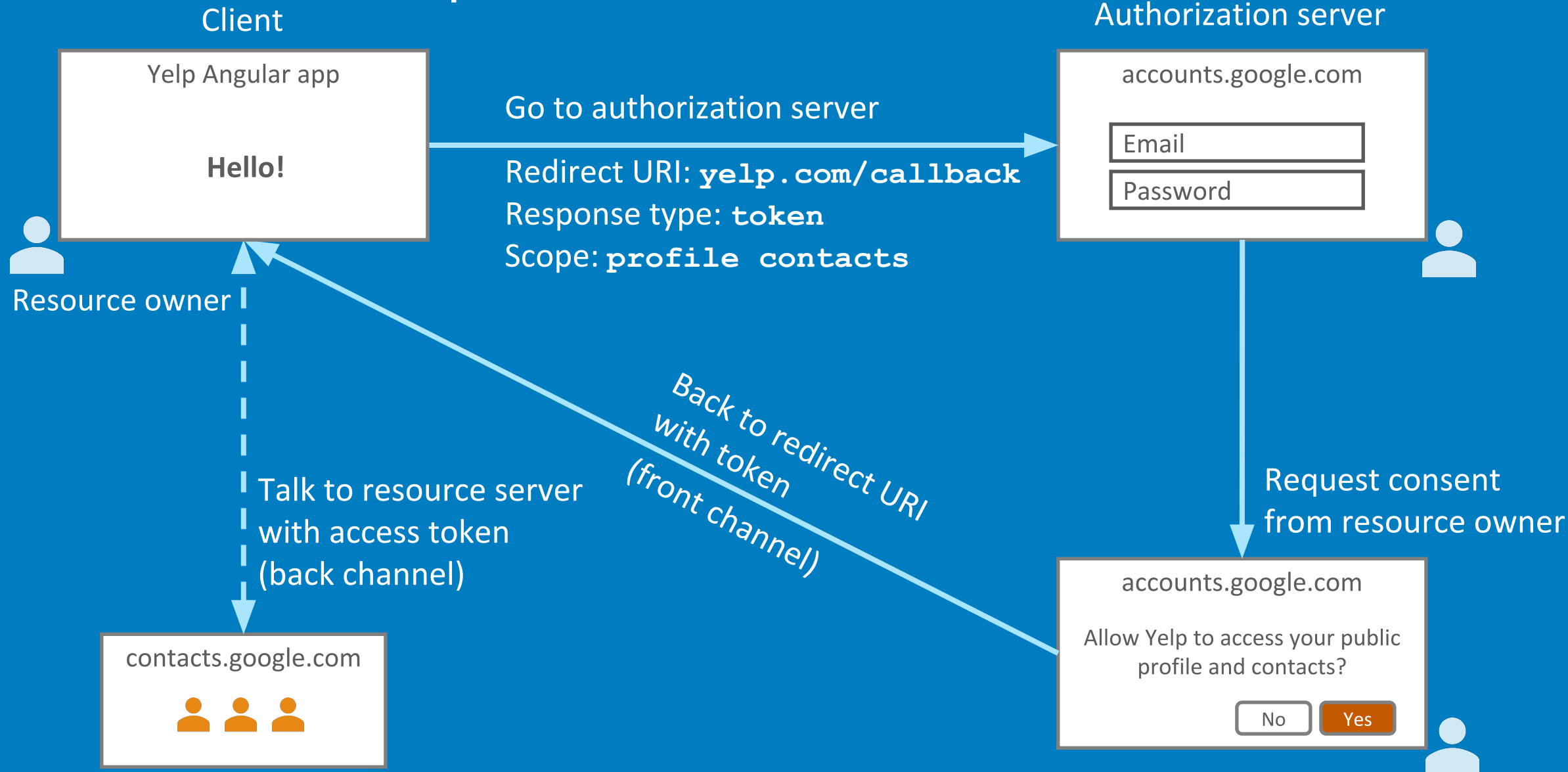
OAuth 2.0 implicit flow



More OAuth 2.0 terminology

- ★ Back channel (highly secure channel)
- ★ Front channel (less secure channel)

OAuth 2.0 implicit flow



DEMO

Implicit Flow Detector

Confidential Clients



Application running on a server

Has the ability to keep strings secret
since code is running in a trusted environment

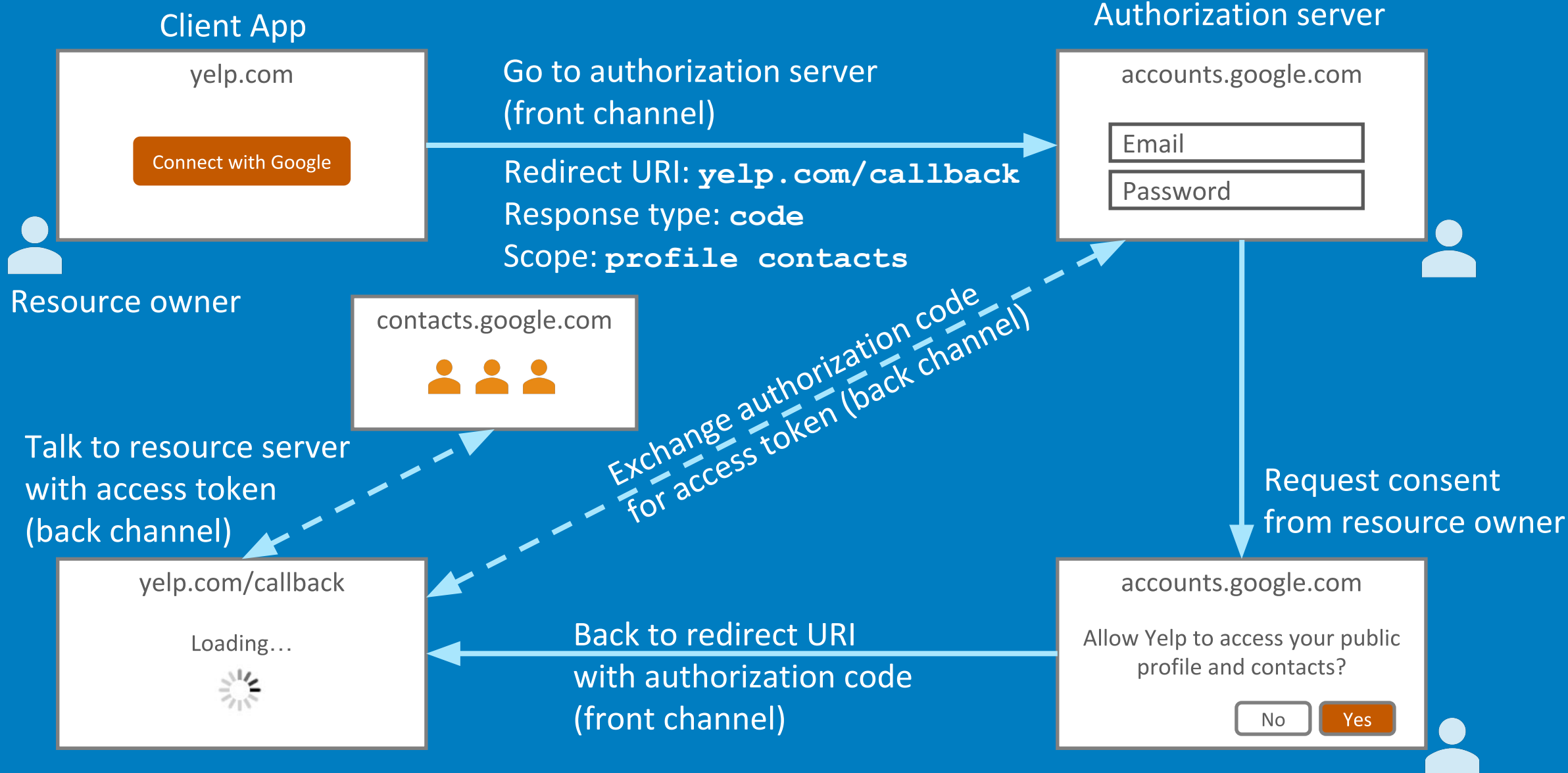
Public Clients



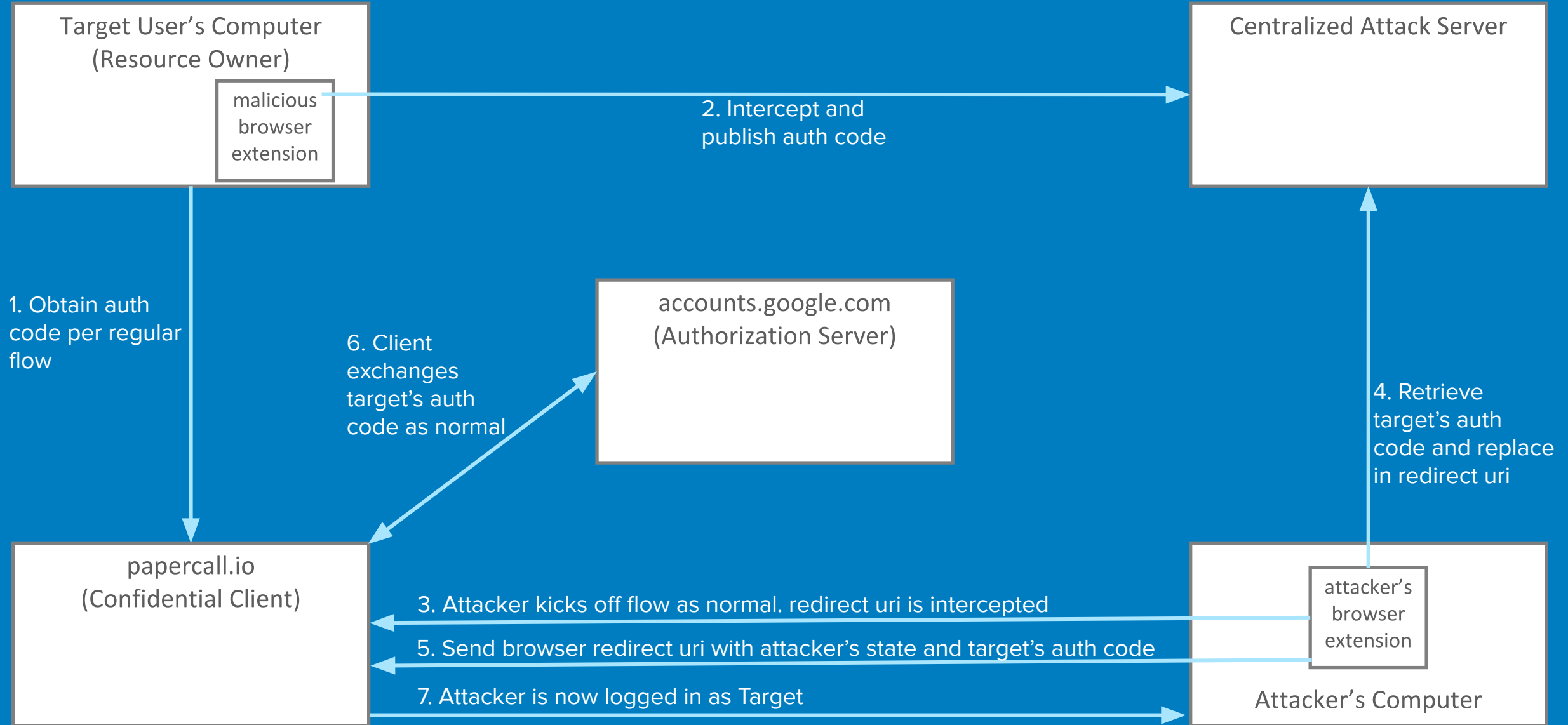
The application can't keep strings secret

Javascript/Single-Page apps: “view source”
Native apps: decompile and extract strings

OAuth 2.0 authorization code flow

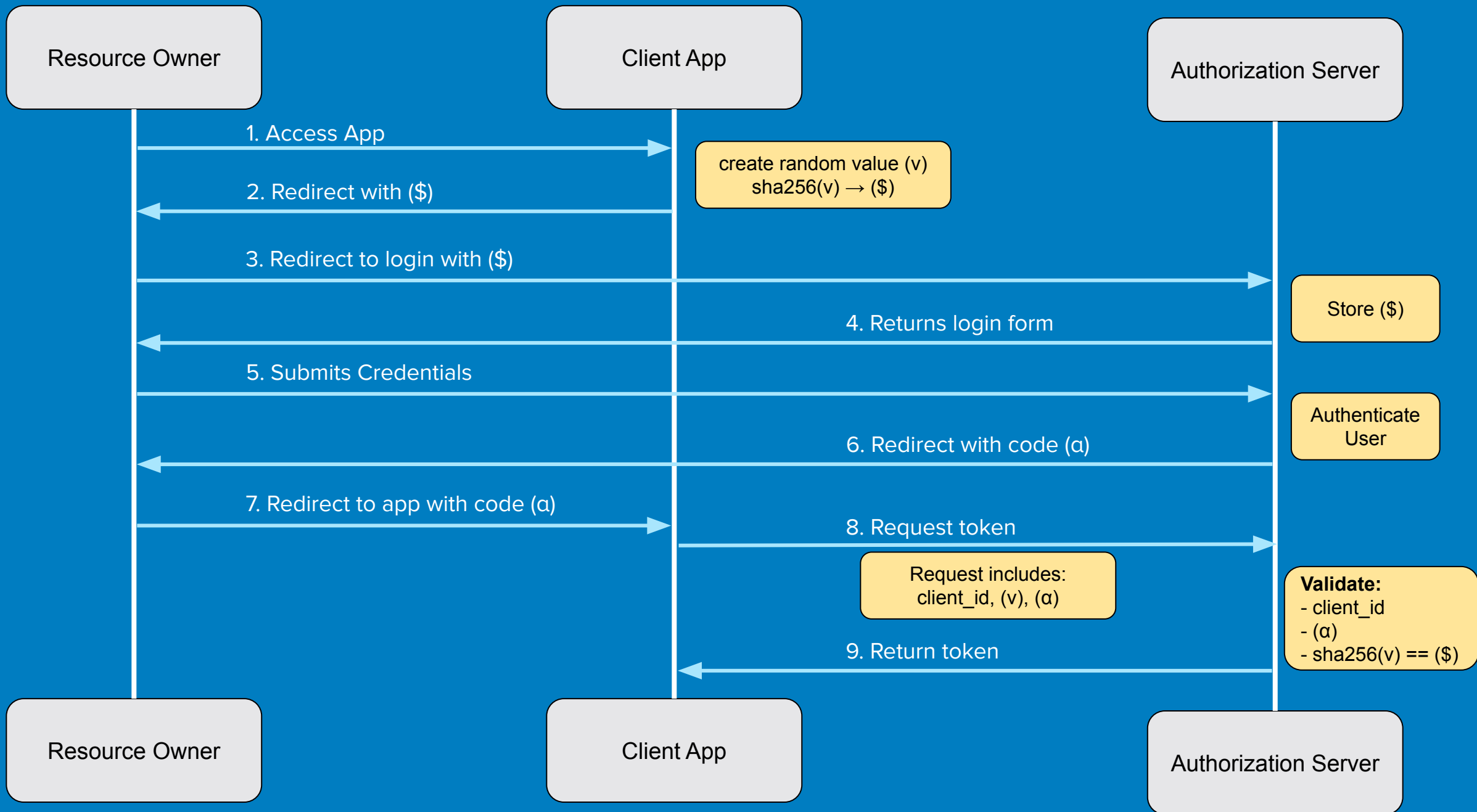


Authorization Code Injection Attack



DEMO

Auth Code Injection





DEMO

PKCE

Auth Code Injection: Foiled

Micah Silverman
@afitnerd

oauth.com
@oktadev



Free hosted authorization server:
developer.okta.com