OBJECT COMPUTING
HOME TO MICRONAUT®

SPAs with Svelte and Micronaut

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MICRONAUT®

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Agenda

- Introductions
- OAuth 2.0 OpenID Connect - Auth
- API Documentation
- API Versioning
- Svelte
- Q&A
- Resources

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OAuth 2.0 OpenID Connect Authentication

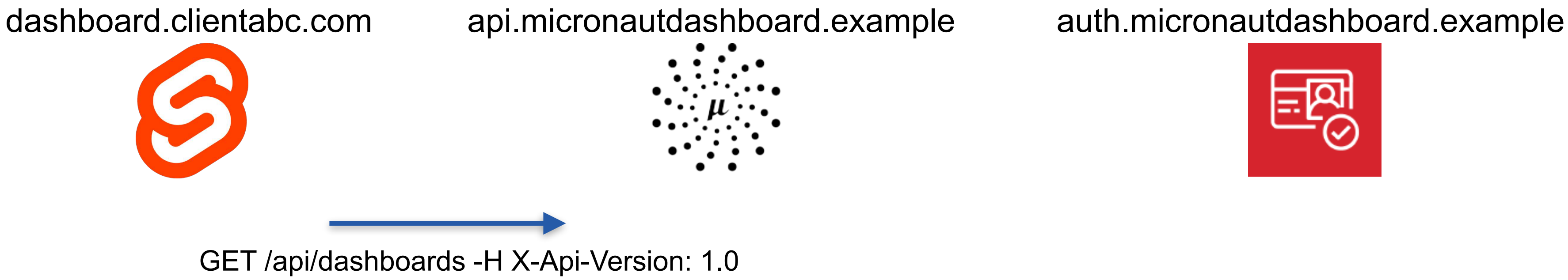
Amazon Cognito

Amazon Cognito User Pools is a standards-based Identity Provider and supports identity and access management standards, such as Oauth 2.0, SAML 2.0, and OpenID Connect.

dashboard.clientabc.com

api.micronautdashboard.example

auth.micronautdashboard.example

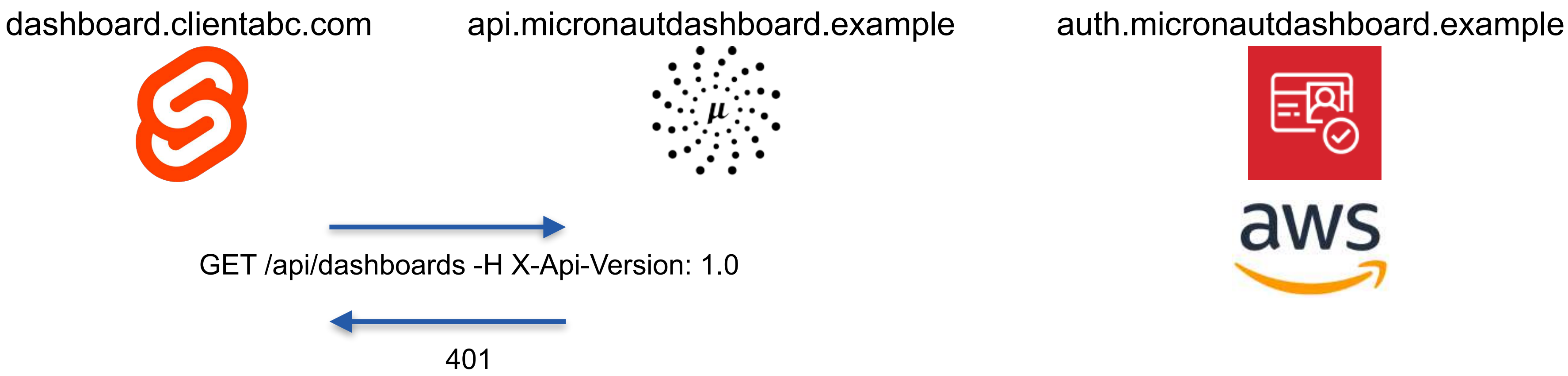


dashboard.clientabc.com

api.micronautdashboard.example

auth.micronautdashboard.example

GET /api/dashboards -H X-Api-Version: 1.0



dashboard.clientabc.com

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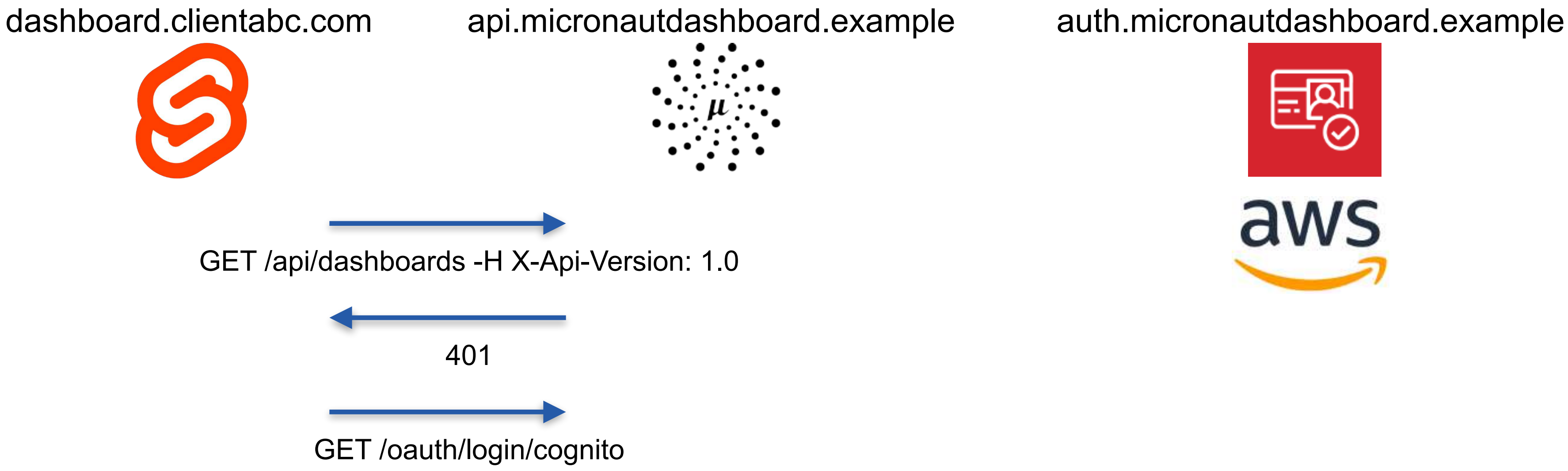
GET /api/dashboards -H X-Api-Version: 1.0

401



dashboard.clientabc.com

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auth.micronautdashboard.example

GET /api/dashboards -H X-Api-Version: 1.0

401

GET /oauth/login/cognito

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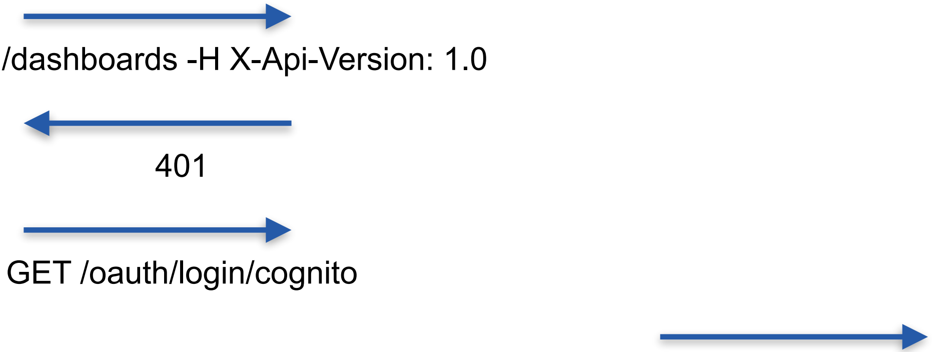
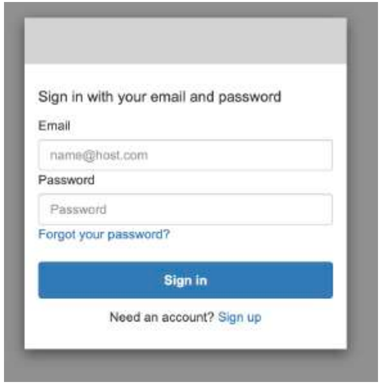


GET /api/dashboards -H X-Api-Version: 1.0

401

GET /oauth/login/cognito



Sign in with your email and password

Email

name@host.com

Password

Password

Forgot your password?

Need an account? Sign up

GET /login?scope=openid+email+profile&response_type=code&redirect_uri=...

dashboard.clientabc.com

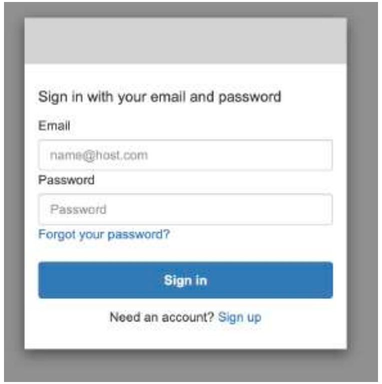
api.micronautdashboard.example

auth.micronautdashboard.example

GET /api/dashboards -H X-Api-Version: 1.0

401

GET /oauth/login/cognito



Sign in with your email and password

Email

name@host.com

Password

Password

Forgot your password?

Sign in

Need an account? Sign up

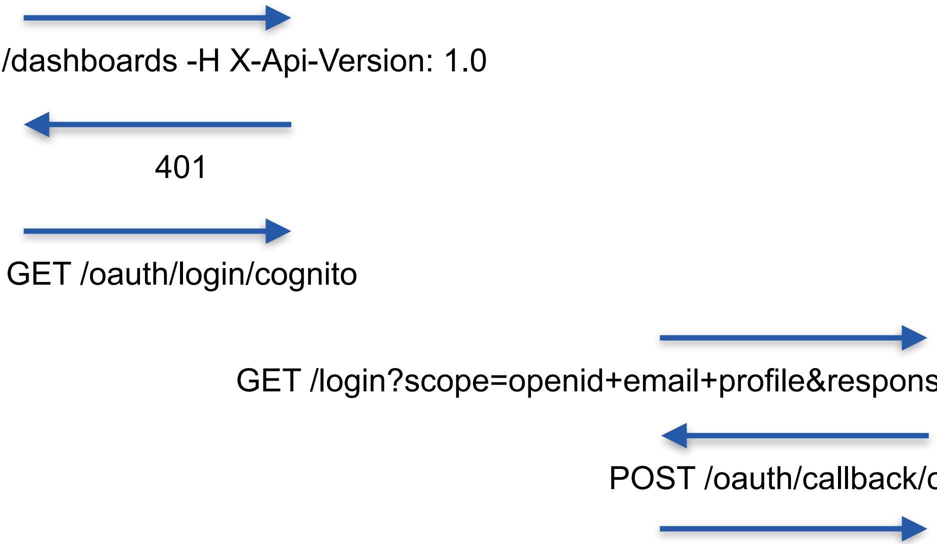
GET /login?scope=openid+email+profile&response_type=code&redirect_uri=...

POST /oauth/callback/cognito

dashboard.clientabc.com

api.micronautdashboard.example

auth.micronautdashboard.example



GET /api/dashboards -H X-Api-Version: 1.0

401

GET /oauth/login/cognito

GET /login?scope=openid+email+profile&response_type=code&redirect_uri=...

POST /oauth/callback/cognito

POST /oauth2/token

Sign in with your email and password

Email

name@host.com

Password

Password

Forgot your password?

Need an account? Sign up

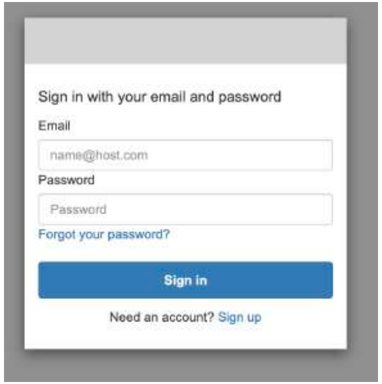
dashboard.clientabc.com | api.micronautdashboard.example | auth.micronautdashboard.example

→ GET /api/dashboards -H X-Api-Version: 1.0

← 401

→ GET /oauth/login/cognito

→ GET /login?scope=openid+email+profile&response_type=code&redirect_uri=...



Sign in with your email and password

Email

name@host.com

Password

Password

Forgot your password?

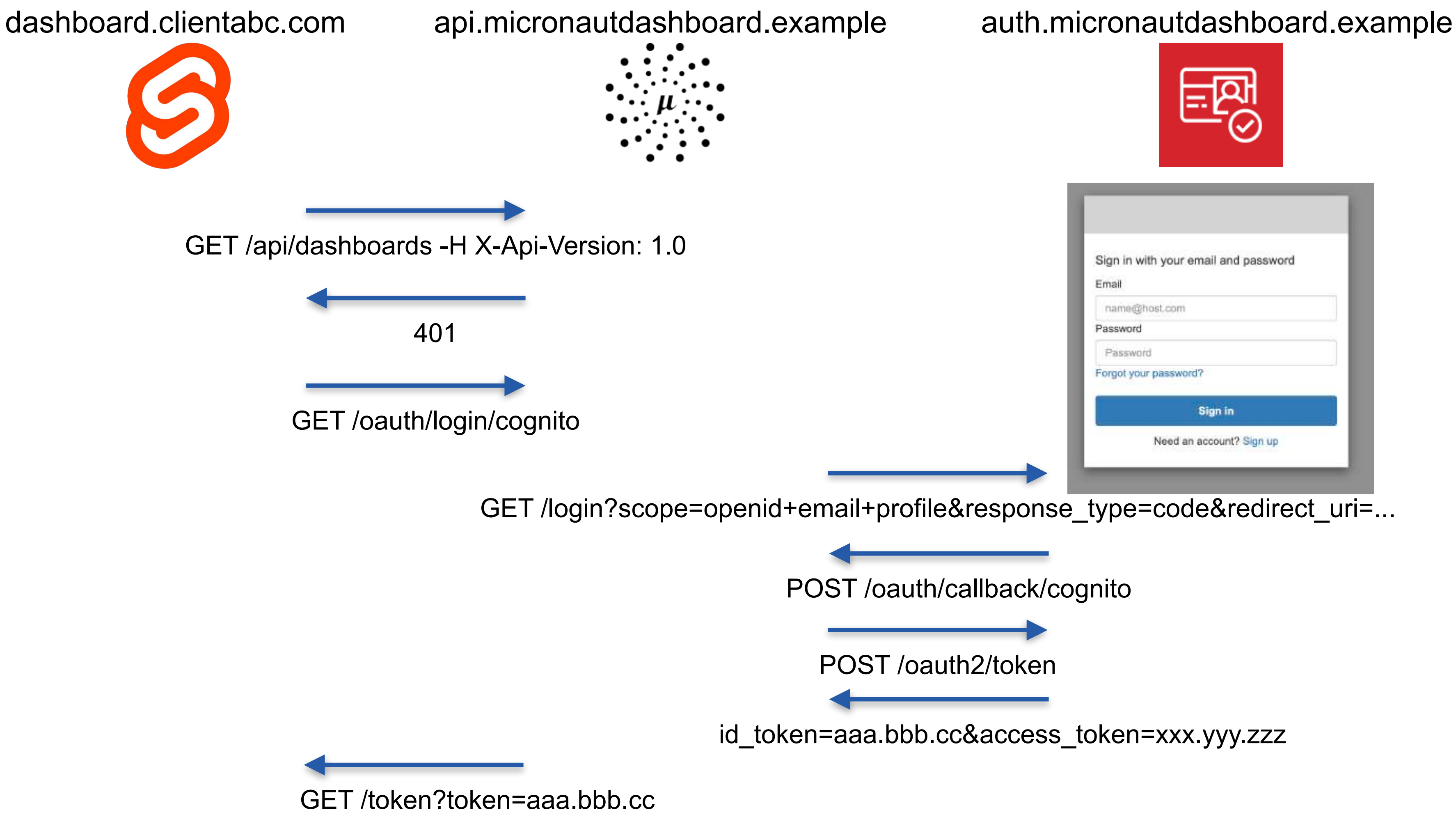
Sign in

Need an account? Sign up

← POST /oauth/callback/cognito

→ POST /oauth2/token

← id_token=aaa.bbb.cc&access_token=xxx.yyy.zzz



dashboard.clientabc.com

api.micronautdashboard.example

auth.micronautdashboard.example

GET /api/dashboards -H X-Api-Version: 1.0

401

GET /oauth/login/cognito

GET /login?scope=openid+email+profile&response_type=code&redirect_uri=...

POST /oauth/callback/cognito

POST /oauth2/token

id_token=aaa.bbb.cc&access_token=xxx.yyy.zzz

GET /token?token=aaa.bbb.cc

Sign in with your email and password

Email

name@host.com

Password

Password

Forgot your password?

Sign in

Need an account? Sign up

Bearer Token

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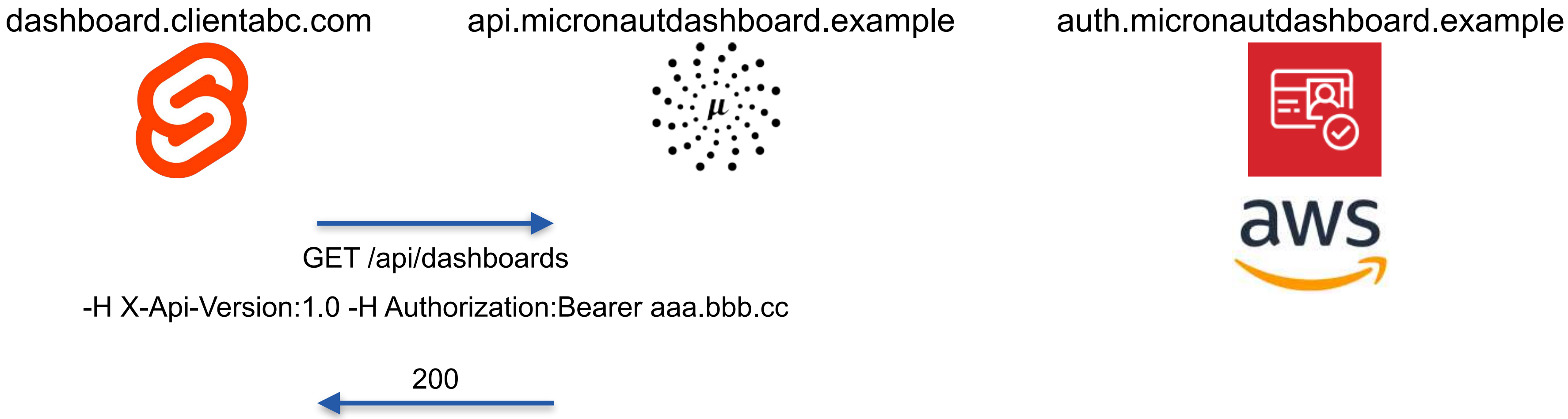


dashboard.clientabc.com

api.micronautdashboard.example

auth.micronautdashboard.example

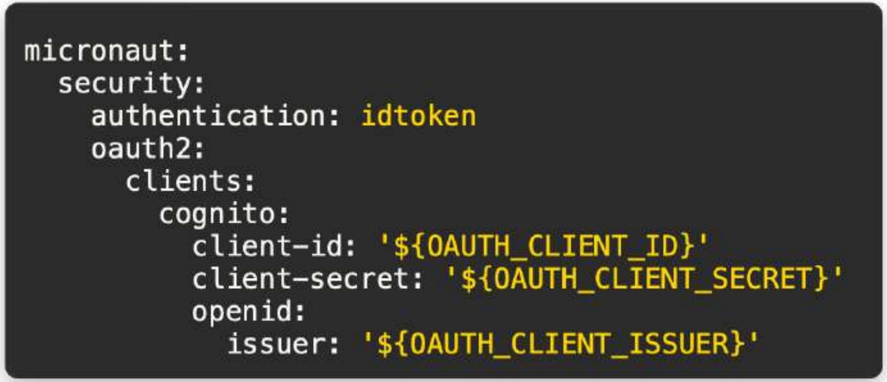
GET /api/dashboards

-H X-Api-Version:1.0 -H Authorization:Bearer aaa.bbb.cc

200

OAuth 2.0 - OpenID Connect

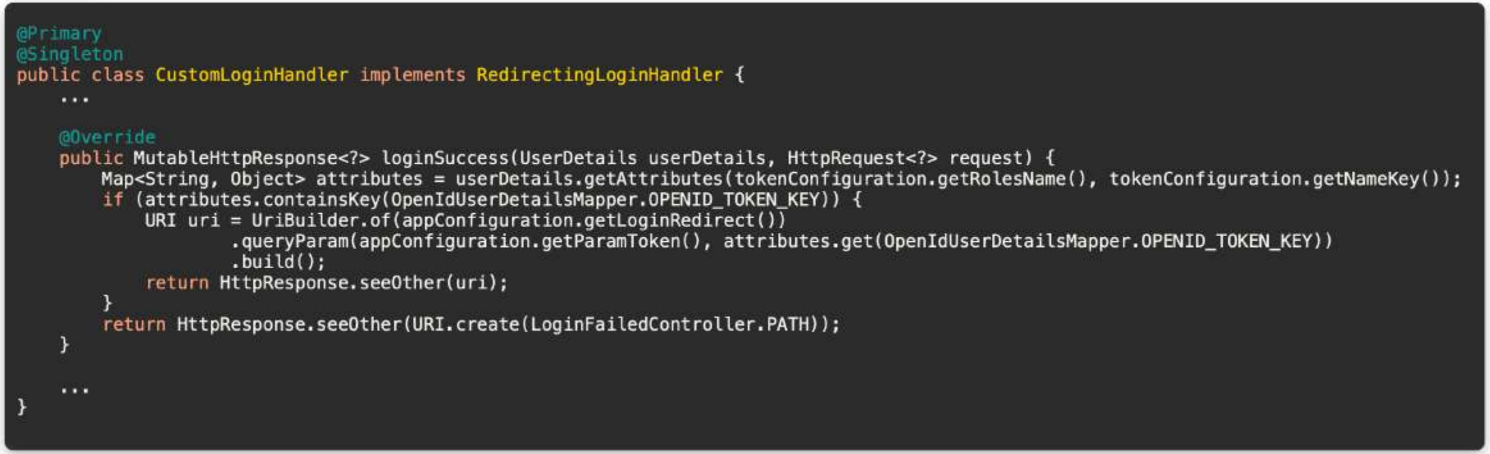
src/main/resources/application.yml



```
micronaut:
  security:
    authentication: idtoken
    oauth2:
      clients:
        cognito:
          client-id: '${OAUTH_CLIENT_ID}'
          client-secret: '${OAUTH_CLIENT_SECRET}'
          openid:
            issuer: '${OAUTH_CLIENT_ISSUER}'
```

OAuth 2.0 - OpenID Connect

src/main/resources/application.yml

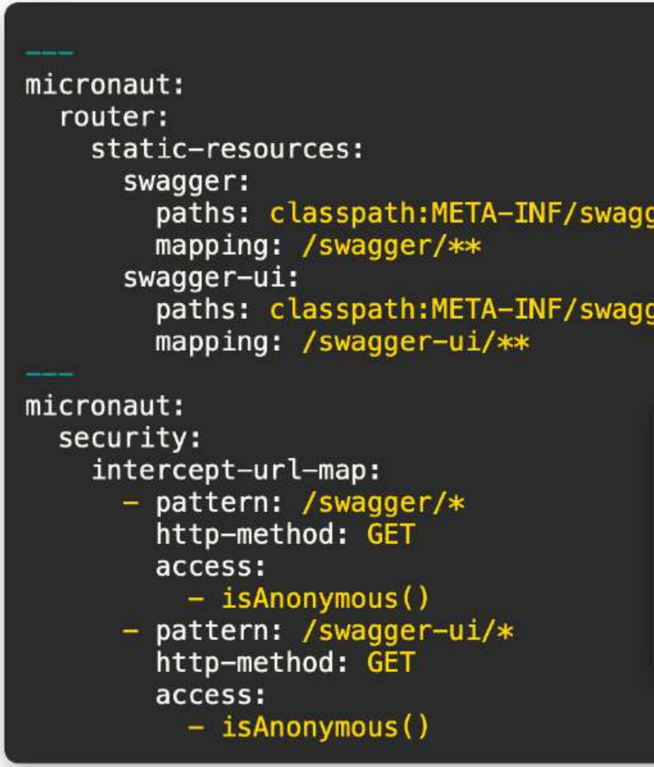


```
@Primary
@Singleton
public class CustomLoginHandler implements RedirectingLoginHandler {
    ...

    @Override
    public MutableHttpResponse<?> loginSuccess(UserDetails userDetails, HttpRequest<?> request) {
        Map<String, Object> attributes = userDetails.getAttributes(tokenConfiguration.getRolesName(), tokenConfiguration.getNameKey());
        if (attributes.containsKey(OpenIdUserDetailsMapper.OPENID_TOKEN_KEY)) {
            URI uri = UriBuilder.of(appConfiguration.getLoginRedirect())
                    .queryParam(appConfiguration.getParamToken(), attributes.get(OpenIdUserDetailsMapper.OPENID_TOKEN_KEY))
                    .build();
            return HttpResponse.seeOther(uri);
        }
        return HttpResponse.seeOther(URI.create(LoginFailedController.PATH));
    }

    ...
}
```

OPENAPI
INITIATIVE

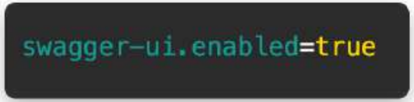
API Documentation - Swagger UI

src/main/resources/application.yml



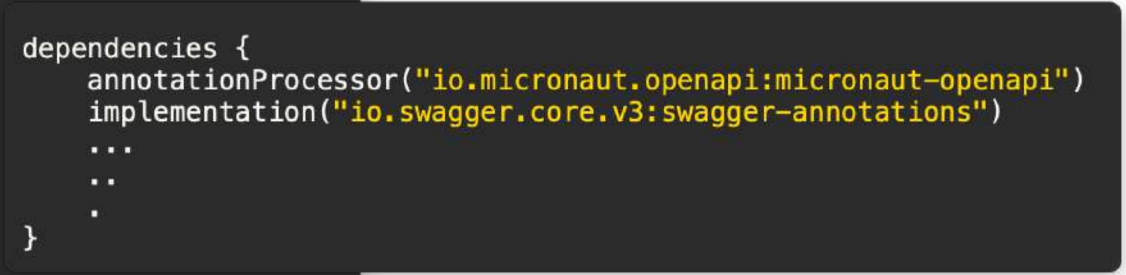
```
---
micronaut:
  router:
    static-resources:
      swagger:
        paths: classpath:META-INF/swagger
        mapping: /swagger/**
      swagger-ui:
        paths: classpath:META-INF/swagger/views/swagger-ui
        mapping: /swagger-ui/**
---
micronaut:
  security:
    intercept-url-map:
      - pattern: /swagger/*
        http-method: GET
        access:
          - isAnonymous()
      - pattern: /swagger-ui/*
        http-method: GET
        access:
          - isAnonymous()
```

openapi.properties

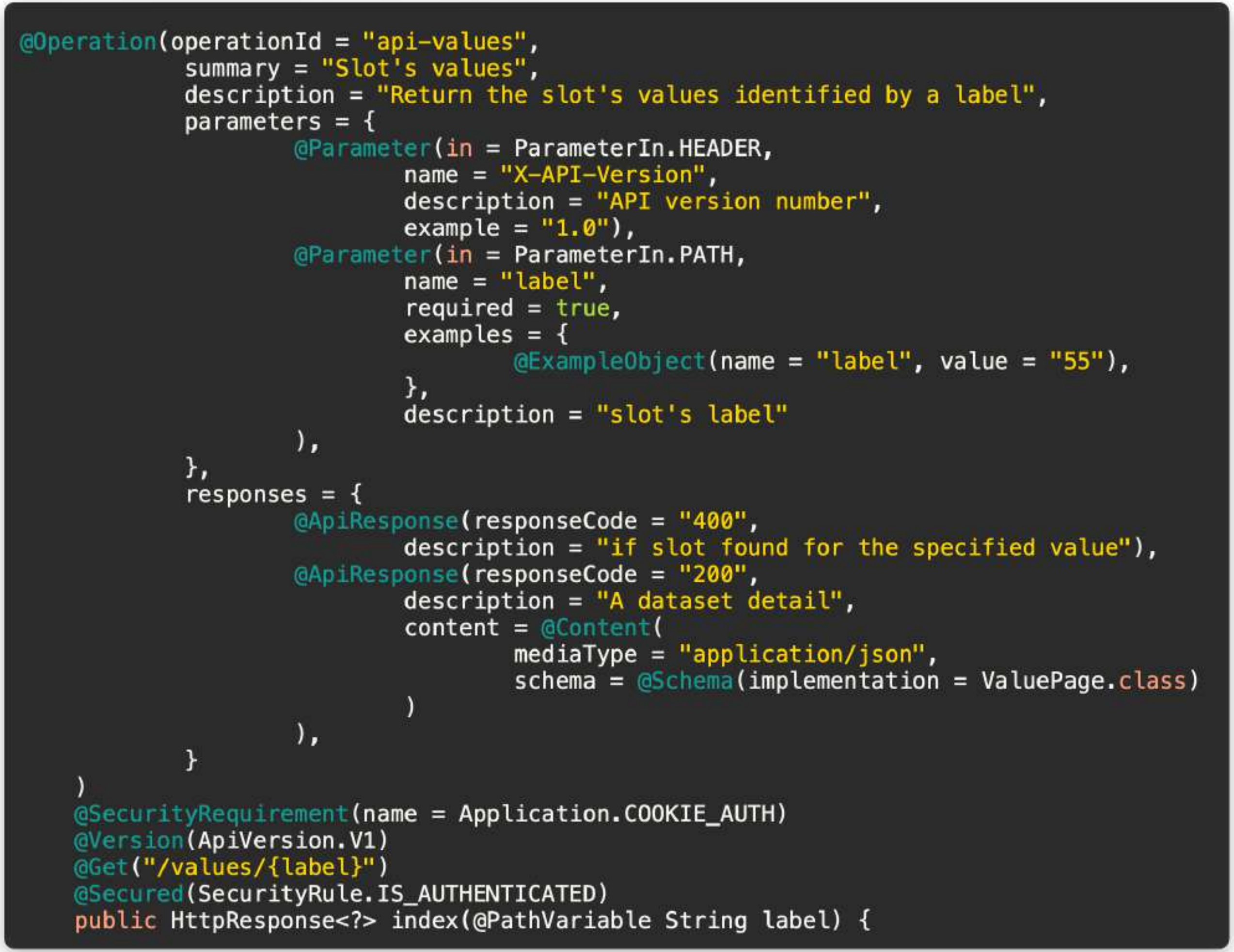


```
swagger-ui.enabled=true
```

build.gradle



```
dependencies {
    annotationProcessor("io.micronaut.openapi:micronaut-openapi")
    implementation("io.swagger.core.v3:swagger-annotations")
    ...
    ..
    .
}
```



```
@Operation(operationId = "api-values",
            summary = "Slot's values",
            description = "Return the slot's values identified by a label",
            parameters = {
                    @Parameter(in = ParameterIn.HEADER,
                            name = "X-API-Version",
                            description = "API version number",
                            example = "1.0"),
                    @Parameter(in = ParameterIn.PATH,
                            name = "label",
                            required = true,
                            examples = {
                                    @ExampleObject(name = "label", value = "55"),
                            },
                            description = "slot's label"
                    ),
            },
            responses = {
                    @ApiResponse(responseCode = "400",
                            description = "if slot found for the specified value"),
                    @ApiResponse(responseCode = "200",
                            description = "A dataset detail",
                            content = @Content(
                                    mediaType = "application/json",
                                    schema = @Schema(implementation = ValuePage.class)
                            )
                    ),
            }
    )
    @SecurityRequirement(name = Application.COOKIE_AUTH)
    @Version(ApiVersion.V1)
    @Get("/values/{label}")
    @Secured(SecurityRule.IS_AUTHENTICATED)
    public HttpResponse<?> index(@PathVariable String label) {
```

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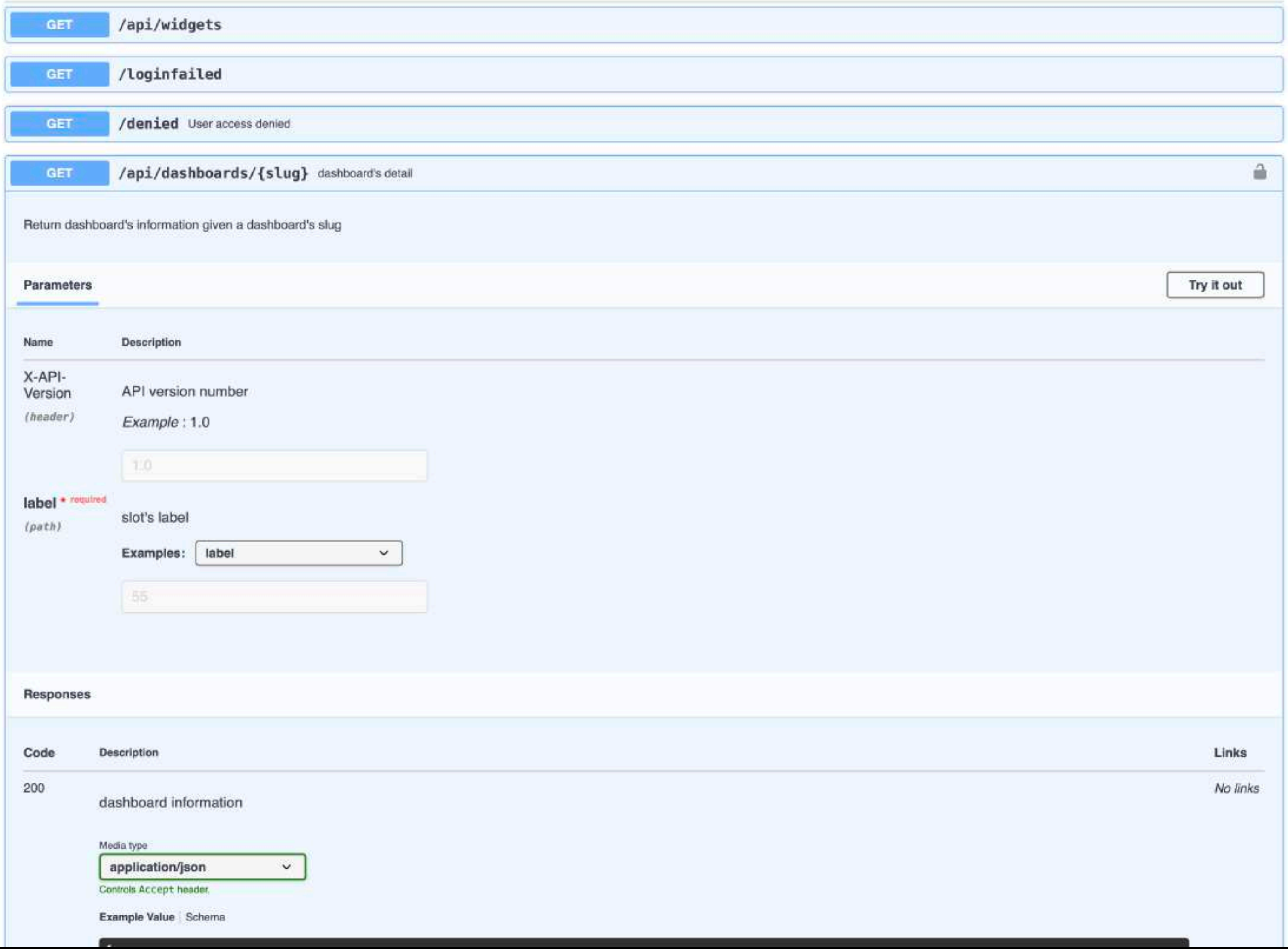


/api/widgets

/loginfailed

/denied User access denied

/api/dashboards/{slug} dashboard's detail

Return dashboard's information given a dashboard's slug

Parameters

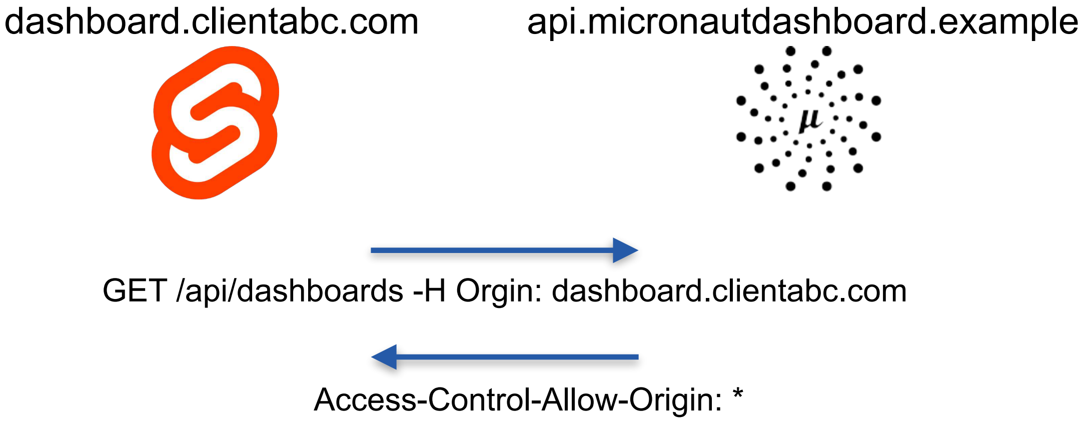
Name	Description
X-API-Version *(header)*	API version number *Example* : 1.0 1.0
label * required *(path)*	slot's label **Examples:** label 55

Responses

Code	Description	Links
200	dashboard information Media type application/json Controls Accept header. **Example Value** | Schema	*No links*

CORS

CORS - Cross Origin Resource Sharing



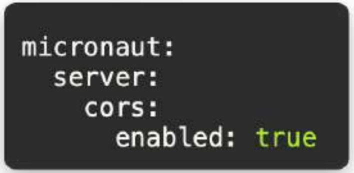
dashboard.clientabc.com

api.micronautdashboard.example

GET /api/dashboards -H Orgin: dashboard.clientabc.com

Access-Control-Allow-Origin: *

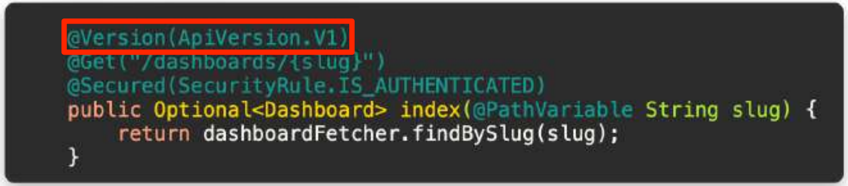
src/main/resources/application.yml



```
micronaut:
  server:
    cors:
      enabled: true
```

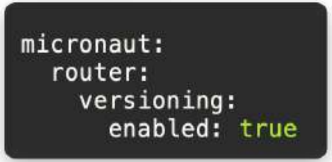
Versioning

Versioning



```java
@Version(ApiVersion.V1)
@Get("/dashboards/{slug}")
@Secured(SecurityRule.IS_AUTHENTICATED)
public Optional<Dashboard> index(@PathVariable String slug) {
    return dashboardFetcher.findBySlug(slug);
}
```

src/main/resources/application.yml



```yaml
micronaut:
  router:
    versioning:
      enabled: true
```

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What is Svelte?

- Alternative to web frameworks like React, Vue, and Angular
- A web application **compiler**, not a runtime library
  - implemented in TypeScript
  - compiles **.svelte** files to a single Javascript file
  - no Svelte runtime dependencies
- Doesn’t use a virtual DOM
- Develop by **Rich Harris**
  - formerly at “The Guardian”; currently at “The New York Times”
  - previously created **Ractive** web framework - https://ractive.js.org/
    - used at “The Guardian”
    - inspired parts of Vue
- created **Rollup** module bundler - https://rollupjs.org/
  - alternative to Webpack and Parcel

Top Svelte Features

- Requires less code
- Small bundle sizes
- File-based component definitions
- CSS scoped by default
- Clear place to put global CSS
  - `public/global.css`
- Two-way data bindings
  - between top-level variables and form elements or components
- Supports TypeScript

- Easy state management within components
  - using top-level variables and reactivity
  - using reactive statements - `$:`
- Easy state management across components
  - using stores which are an alternative to React Redux, Vue Vuex, and Angular NgRx
- Built-in support for animations
  - https://www.youtube.com/watch?v=wMpKD0IDiHc
- Can compile Svelte components to custom elements (web components)

Starting a New Svelte App

- Steps
  - `npx degit sveltejs/template app-name`
  - `cd app-name`
  - `npm install`
  - `npm run dev`
- Use same tools as for other kinds of web apps
  - ESLint, Prettier, Jest, svelte-testing-library, Cypress, Storybook, ...

Svelte Component Source Files

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src/ComponentName.svelte

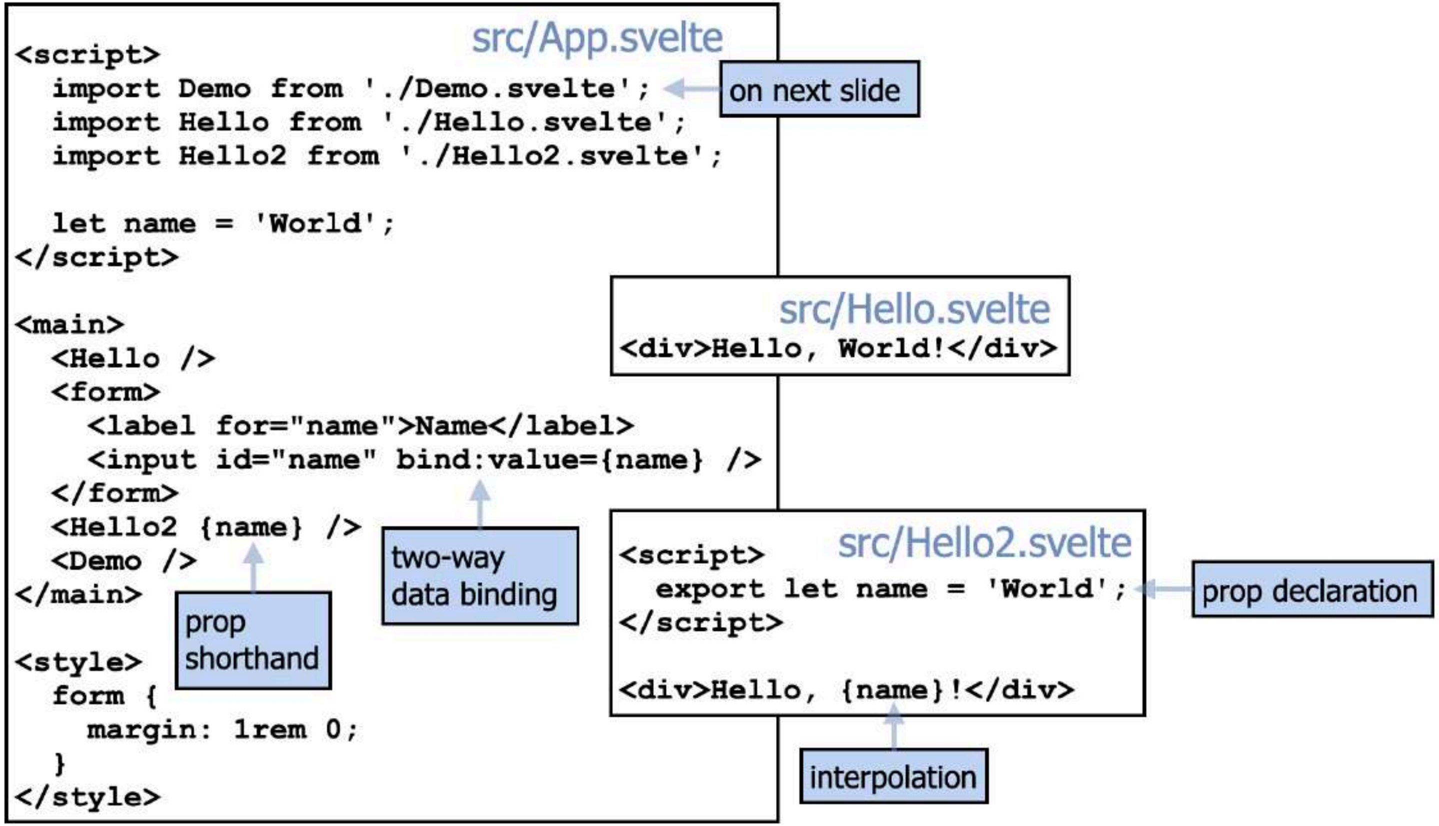
```
<script>
  // imports go here
  // prop declarations go here
</script>

<!-- HTML goes here, including
     interpolations and special block syntax. -->

<style>
  /* CSS goes here */
</style>
```

`script` and `style` elements are optional

Example components



src/App.svelte

```
<script>
  import Demo from './Demo.svelte';
  import Hello from './Hello.svelte';
  import Hello2 from './Hello2.svelte';

  let name = 'World';
</script>

<main>
  <Hello />
  <form>
    <label for="name">Name</label>
    <input id="name" bind:value={name} />
  </form>
  <Hello2 {name} />
  <Demo />
</main>

<style>
  form {
    margin: 1rem 0;
  }
</style>
```

on next slide

prop shorthand

two-way data binding

src/Hello.svelte

```
<div>Hello, World!</div>
```

src/Hello2.svelte

```
<script>
  export let name = 'World';
</script>

<div>Hello, {name}!</div>
```

prop declaration

interpolation

src/Demo.svelte

```
<script>
  let count = 0;
  $: tooMany = count >= 10;
</script>

<button class:danger={tooMany} on:click={() => count++}>
  Pressed {count} times
</button>
{#if tooMany}
  <p>You have pressed the button too many times!</p>
{/if}

<style>
  button {
    border: solid gray 1px;
    border-radius: 4px;
    margin-top: 1rem;
    padding: 0.5rem;
  }

  .danger {
    background-color: red;
    color: white;
  }
</style>
```

top-level variable

reactive statement

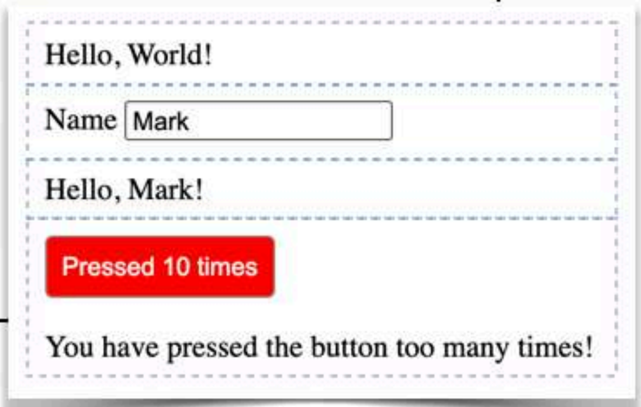
event handling

interpolation

Mustache-style markup

styles are scoped to this component

Top-level variables ARE the **component state** if used in HTML! When state changes, only the relevant parts of DOM are updated.



Hello, World!

Name Mark

Hello, Mark!

You have pressed the button too many times!

Svelte REPL

- Online tool for experimenting with Svelte
  - https://svelte.dev/repl/
  - don’t need to install anything
  - can download apps to continue development locally
- Login to GitHub account to enable saving and recalling named apps
- Select from list of saved apps to recall them
- Share unique app URLs with others
- Loan Calculator
  - great example of using reactive declarations and two way bindings
  - see https://tinyurl.com/svelte-loan and the next slide

Svelte REPL

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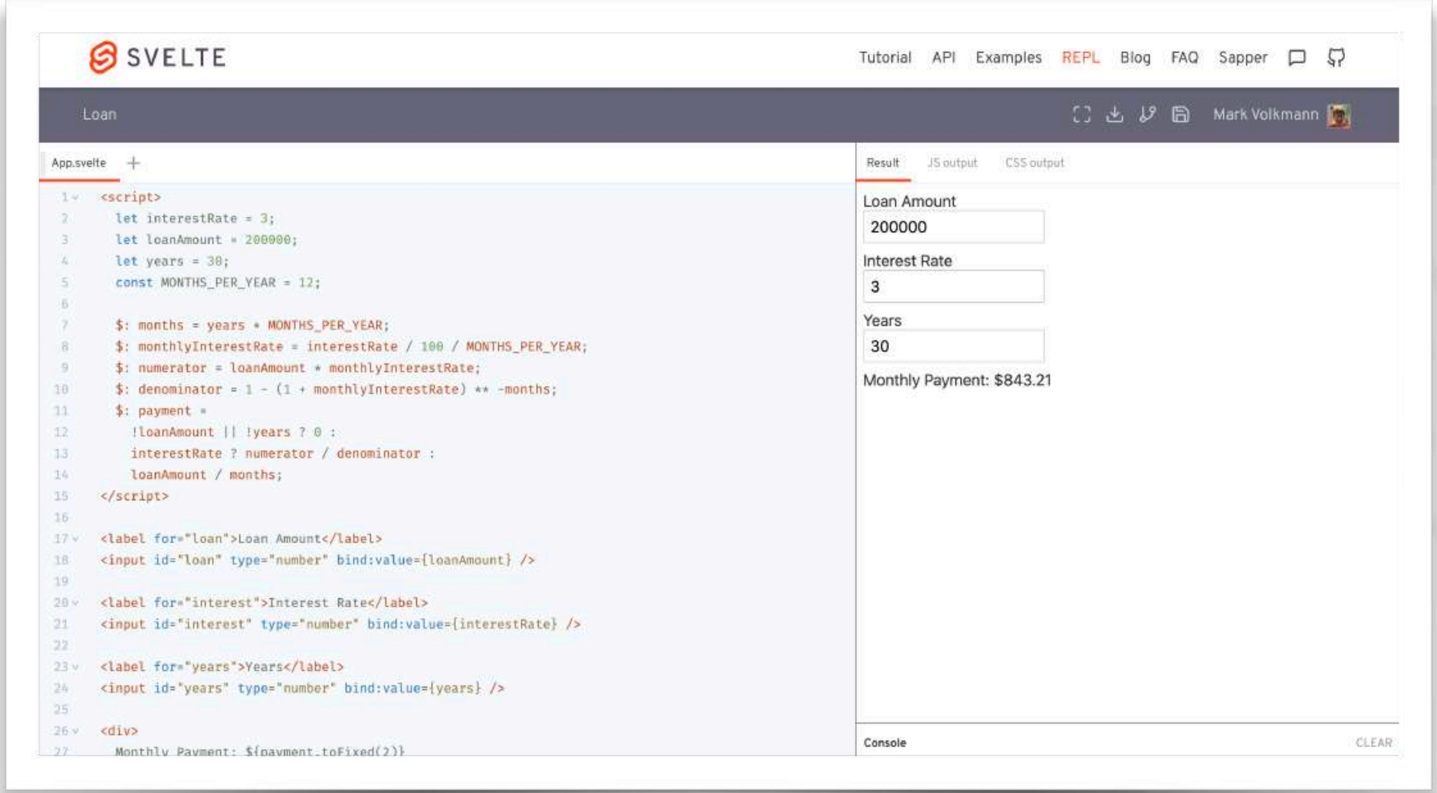


```
<script>
  let interestRate = 3;
  let loanAmount = 200000;
  let years = 30;
  const MONTHS_PER_YEAR = 12;

  $: months = years * MONTHS_PER_YEAR;
  $: monthlyInterestRate = interestRate / 100 / MONTHS_PER_YEAR;
  $: numerator = loanAmount * monthlyInterestRate;
  $: denominator = 1 - (1 + monthlyInterestRate) ** -months;
  $: payment =
    !loanAmount || !years ? 0 :
    interestRate ? numerator / denominator :
    loanAmount / months;
</script>

<label for="loan">Loan Amount</label>
<input id="loan" type="number" bind:value={loanAmount} />

<label for="interest">Interest Rate</label>
<input id="interest" type="number" bind:value={interestRate} />

<label for="years">Years</label>
<input id="years" type="number" bind:value={years} />

<div>
  Monthly Payment: ${payment.toFixed(2)}
```

Loan Amount
200000

Interest Rate
3

Years
30

Monthly Payment: $843.21

Kind of Stores

Our demo app doesn’t uses stores,
but they are an important feature of Svelte
and warrant some discussion.

- **Writable**
  - only kind that can be modified by components
  - methods
    - `set(newValue)`
    - `update(currentValue => newValue)`

calculates new value from current value

- **Readable**
  - handle computing their data, perhaps from a REST call
  - components cannot modify

- **Derived**
  - derive data from current values of other stores

- **Custom**
  - must implement `subscribe` method
  - can provide custom methods to update state and not expose `set` and `update` methods

Defining Writable Stores

src/stores.js

```
import {writable} from 'svelte/store';

export const dogStore = writable([]);
```

initial value

using optional second argument

```
export const fancyStore = writable(
  initialValue,
  async set => {
    // Called when subscriber count goes from 0 to 1.
    // Compute initial value and pass to set function.
    const res = await fetch('/some/url');
    const data = await res.json();
    set(data);

    return () => {
      // Called when subscriber count goes to 0.
    }
  }
);
```

Using Stores

- Option #1 - **subscribe** method - very verbose!
- Option #2 - **$** auto-subscription shorthand - much better!
  - variables whose names begin with **$** must be stores
  - automatically subscribes when first used
    and unsubscribes when removed from DOM

uses **subscribe** method

```
<script>
  import {onDestroy} from 'svelte';
  import {dogStore} from './stores.js';
  let dogs;
  const unsubscribe = dogStore.subscribe(value => dogs = value);
  onDestroy(unsubscribe);
</script>

<!-- Use dogs in HTML. -->
```

uses auto-subscription

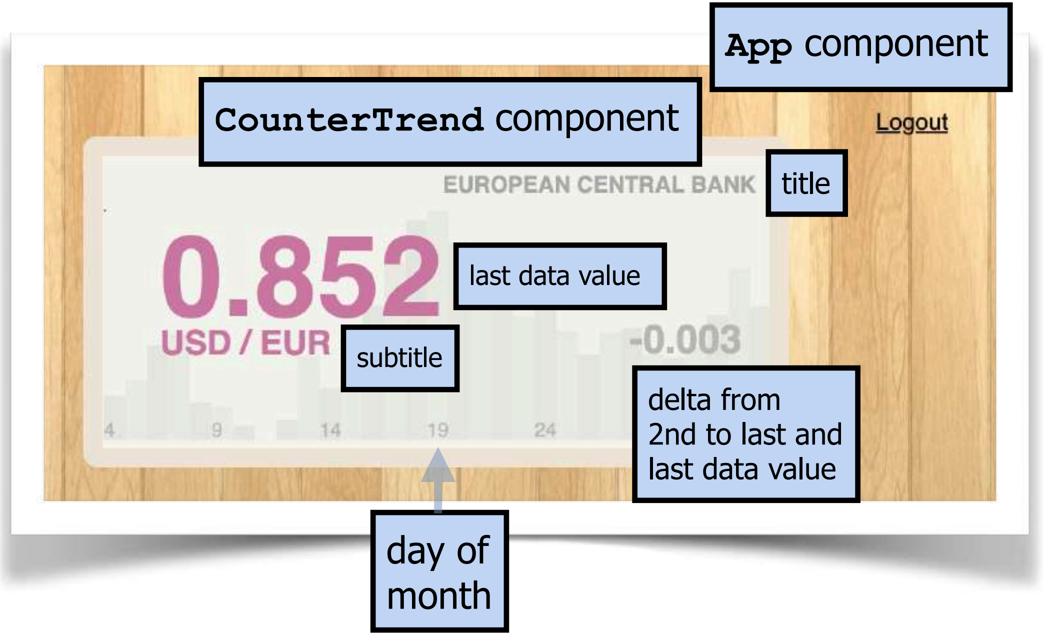
```
<script>
  import {dogStore} from './stores.js';
</script>

<!-- Use $dogStore in HTML. -->
```

Related Tools

- **Svelte VS Code extension**
- **Sapper** - https://sapper.svelte.dev/
  - “application framework powered by Svelte”
  - similar to Next and Gatsby
  - provides routing, server-side rendering, code splitting, and building static sites
- **Svelte Native** - https://svelte-native.technology/
  - for implementing native mobile apps
  - based on NativeScript
  - community-driven project
- **Svelte Testing Library** - https://testing-library.com/docs/svelte-testing-library/intro
- **Storybook** with Svelte - https://storybook.js.org/docs/guides/guide-svelte/

Svelte Resources

- **“Rethinking Reactivity” talk by Rich Harris**
  - delivered multiple times, most recently at “Shift Conference” June 20, 2019
  - explains issues with using virtual DOM (like React and Vue) and motivation for Svelte
- **Home page** - https://svelte.dev
  - contains **Tutorial**, **API Docs**, **Examples**, online **REPL**, **Blog**, and **Sapper** link
    - REPL is great for trying small amounts of Svelte code
    - REPL can save for sharing and submitting issues
- **Discord chat room** - https://discordapp.com/invite/yy75DKs
- **GitHub** - https://github.com/sveltejs/svelte
- **Awesome Svelte** - https://github.com/CalvinWalzel/awesome-svelte
- **Awesome Svelte Resources** - https://github.com/ryanatkn/awesome-svelte-resources



App component

CounterTrend component

title

last data value

subtitle

delta from 2nd to last and last data value

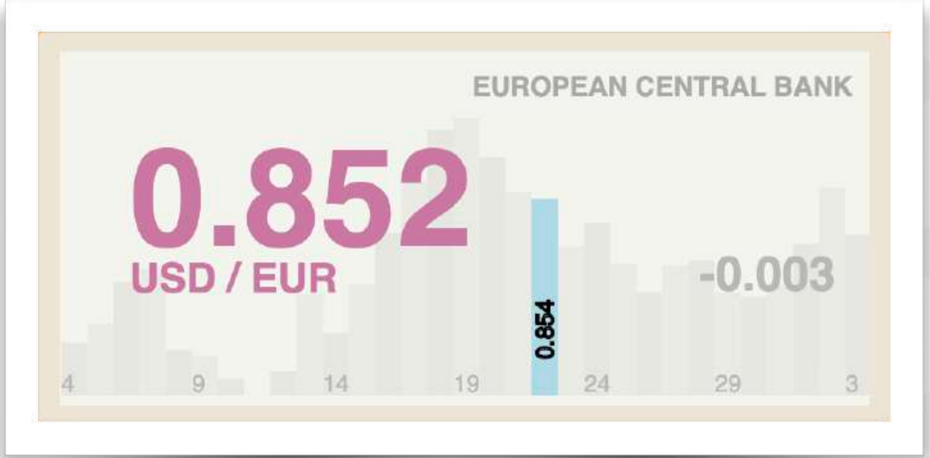
day of month

… Svelte and Micronaut Sample App

- Svelte app looks for token in query parameter or `sessionStorage`
- If no token, calls `/oauth/ogin/cognito` function
- If token, calls `loadData` function and passes data to `CounterTrend` component for rendering
- `loadData` function uses Fetch API to send HTTP requests to two REST services, both of which require `Authorization` header set to "`Bearer {token}`"
- Svelte `login` function just redirects to Cognito login URL
- After successful login, Cognito login page redirects back to Svelte app, including `token` query parameter
- Svelte app stores token in `sessionStorage`
- Svelte `logout` function removes token from `sessionStorage` and redirects to logout URL when renders login page again

CounterTrend Component

- Uses SVG `<rect>` and `<text>` elements to create a bar chart
- Hover over a bar to see its value
- In this demo it is used to show the change in exchange rate between USD and Euros



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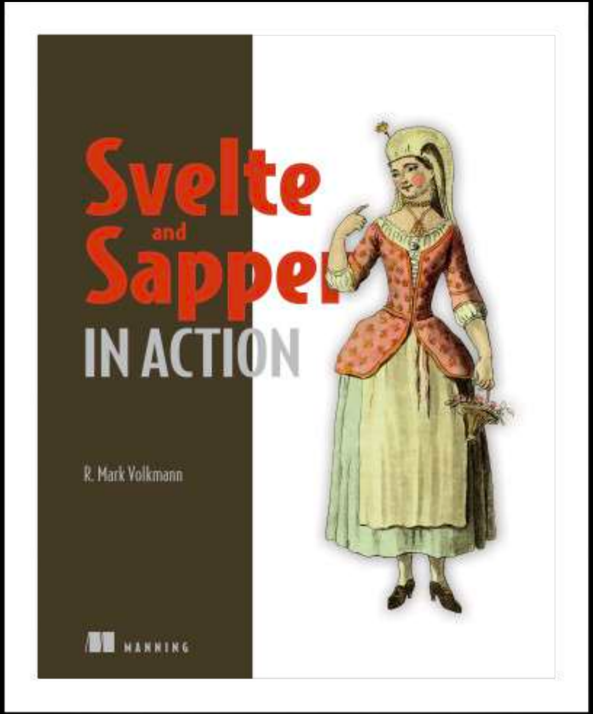
- **Svelte is a worthy alternative** to the current popular options of React, Vue, and Angular
- Check out my book, “Svelte and Sapper in Action”
  - https://www.manning.com/books/svelte-and-sapper-in-action



GRAILS® & GROOVY COMMUNITY RESOURCES

- @grailsframework
- Grails.org
- github.com/grails
- Grails-slack.cfapps.io
- grails.org/blog/index.html
- grails.org/foundation
- objectcomputing.com/products/grails/solutions
- objectcomputing.com/products/grails
- @ApacheGroovy
- groovy-lang.org
- github.com/apache/groovy
- groovy-community.slack.com
- Apache.org

Q&A

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MICRONAUT® COMMUNITY RESOURCES

- @micronautfw
- gitter.im/micronautfw
- micronaut.io/launch
- docs.micronaut.io
- micronaut.io/learn
- guides.micronaut.io
- micronaut.io/blog
- micronaut.io/faq
- micronaut.io/foundation
- github.com/micronaut-projects/micronaut-core
- objectcomputing.com/products/micronaut/solutions
- objectcomputing.com/products/micronaut
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THANK YOU!

LET'S STAY CONNECTED

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