

# BaaSed: Low code backend design with pocketbase

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# Talk structure

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# About Me

## Markus

- ▶ Student at JKU
- ▶ Java Full Stack Engineer since too long
- ▶ Discord: `#rnbwdsh#0022`
- ▶ Passionate about modern development tools and rapid prototyping
- ▶ Building efficient solutions with minimal overhead
- ▶ Template, talk and project under <https://github.com/rnbwdsh/socrates-fahrplan/>
- ▶ Project + doc is in `fahrplan` branch, main branch is a template

## Classic Backend Development: The Controller Layer

```
@RestController
@RequestMapping("/api/talks")
public class TalkController {
    @Autowired
    private TalkService talkService;

    @GetMapping
    public List<Talk> getAllTalks() {
        return talkService.findAll();
    }

    @PostMapping
    public Talk createTalk(@RequestBody Talk talk) {
        return talkService.save(talk);
    }
}
```

## Classic Backend Development: Service

```
@Service
public class TalkService {
    @Autowired
    private TalkRepository talkRepository;

    public List<Talk> findAll() {
        return talkRepository.findAll();
    }

    public Talk save(Talk talk) {
        validateTalk(talk);
        return talkRepository.save(talk);
    }
}
```

## Classic Backend Development: Repository

```
@Repository
public interface TalkRepository extends JpaRepository<Talk, Long> {
    List<Talk> findByRoomAndStartTimeBetween(
        String room, LocalDateTime start, LocalDateTime end);
}
```

## Classic Backend Development: Configuration Hell

```
@Configuration
@EnableWebSecurity
public class SecurityConfig {
    @Bean
    public SecurityFilterChain filterChain(HttpSecurity http) {
        return http.authorizeHttpRequests(auth ->
            auth.requestMatchers("/api/talks").authenticated()
                .oauth2Login(Customizer.withDefaults())
                .build();
    }
}
```

## Classic Backend Development: Even more

- ▶ Interfaces
- ▶ Unit tests
- ▶ Integration tests
- ▶ Configuration
- ▶ Logging
- ▶ Authorization and Authentication
- ▶ application.yml, pom.xml, Dockerfile, k8s manifests, CI/CD pipelines...



# Why Backend-as-a-Service for Developers

- ▶ **API Generation:** REST + GraphQL from schema definition
- ▶ **Database:** Integrated with automatic migrations
- ▶ **Authentication:** OAuth2, JWT, role-based access control
- ▶ **Real-time:** WebSocket subscriptions without manual setup
- ▶ **Developer Experience:** Focus on business logic, not boilerplate
- ▶ **Batteries Included:** Ready to use features out of the box

# FOSS BaaS Landscape

Product	Core Lang	Database	Notable
<b>Supabase</b>	TS / MDX	PostgreSQL	89k GitHub stars
<b>Appwrite</b>	PHP	MySQL/MariaDB	UI stuff
<b>Hasura</b>	Haskell	PostgreSQL	GraphQL-first
<b>Directus</b>	Node.js/TS	Any SQL	CMS focus
<b>Parse Platform</b>	Node.js	MongoDB/PostgreSQL	True FOSS
<b>Kuzzle</b>	Node.js	Elasticsearch	IoT/Analytics
<b>PocketBase</b>	Go	SQLite	Single executable, simple

## Standard Features

OAuth2, Real-time subscriptions, File uploads, Role-based permissions, Admin UI, Multiple frontend SDKs

Shut up and build a complete conference management system

## Step 1: Architecture: Frontend (SvelteKit)

- ▶ Responsive grid-based schedule view
- ▶ Real-time updates across all clients
- ▶ Views for talks and users
- ▶ Serverside + clientside favorite talks
- ▶ Talk editing for speakers
- ▶ User profiles
- ▶ Vibes

# Example: fahrplan.events.ccc.de

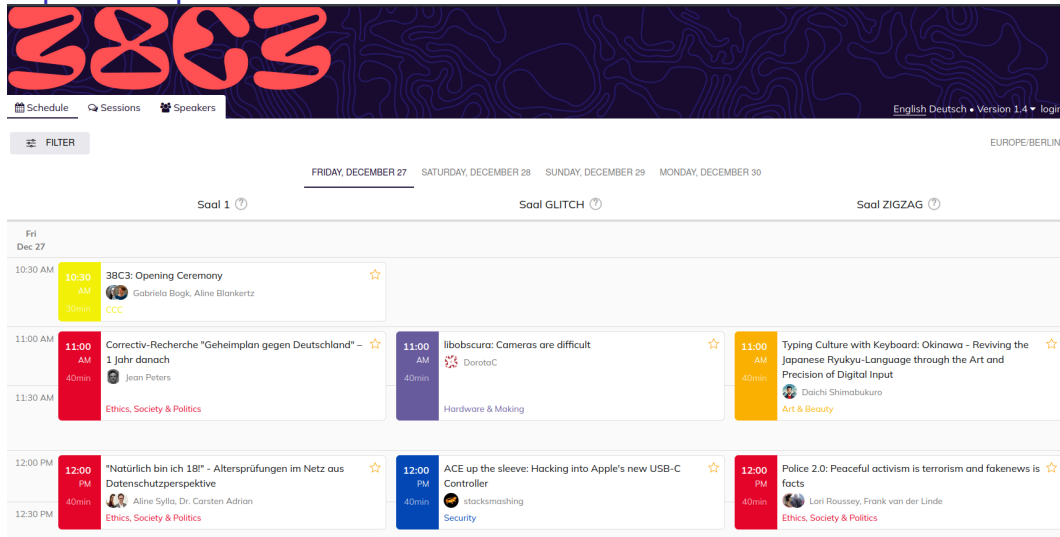


Figure 1: CCC Fahrplan

# Step 1: Architecture: Backend

## Pocketbase

- ▶ Golang is like non-stupid C
- ▶ SQLite is super fast and easy for a single server
- ▶ Svelte admin UI -> steal logic
- ▶ Made by some guy in Bulgaria (ganigeorgiev)

## Features

- ▶ RESTful API with permissions
- ▶ Real-time WebSocket subscriptions
- ▶ File uploads for talk materials
- ▶ Talks, Users/Speakers, Rooms, Tags
- ▶ Validation hooks to showcase custom logic

## DevOps:

- ▶ Build a docker-container, host with pocketbase webserver
- ▶ Automated data population scripts

## Step 2: Backend + Data Structure - Database Design with PocketBase

Created 4 main collections:

- ▶ **Room** {name, floor} - (read+list all)
- ▶ **Tag** {name} - (read+list all)
- ▶ **Talk** {name, description, duration, speaker, room, tags} - custom
- ▶ **User** standard + {bio, website, talksToVisit} + login with username - (default + secret)

You can set per-table, per-operation permissions, i.e.

- ▶ UPDATE permission on talk speaker ?~ @request.auth.id || speaker:length = 0
- ▶ CREATE permission on user @request.body.secret = 'socrates2025'

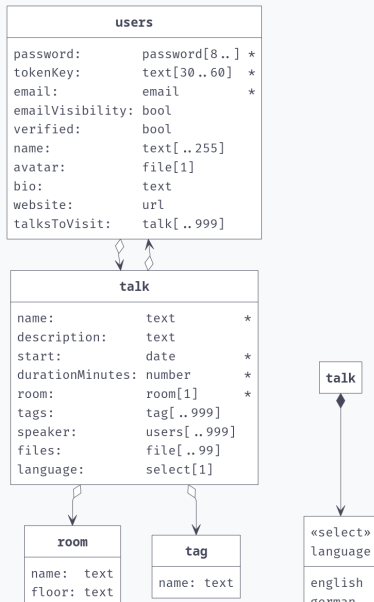
**Result:** Automatic REST API + Admin UI generated!

## Step 2: Generated Migrations from UI changes

```
func init() {
m.Register(func (app core.App) error {
jsonData := `{
    "createRule": "@request.auth.id != \"\"\"",
    "deleteRule": "speaker ?~ @request.auth.id || speaker:length =
    "fields": [
        {"name": "name", "type": "text", "required": true},
        {"name": "start", "type": "date", "required": true},
        {"name": "durationMinutes", "type": "number", "required":
        {"name": "room", "type": "relation", "required": true},
        {"name": "speaker", "type": "relation", "maxSelect": 999}
    ]
}`
})
}
```



## Step 2: Data Structure Visualization - Pocketbase-UML



## Step 3: Frontend Development: SvelteKit + Svelte 5 Runes

Simple CRUD API via Pocketbase JS SDK

```
await pb.collection('users').authWithPassword(email, password);
await pb.collection('users').create({email, password, passwordConfirm, sec
await pb.collection('users').getOne(pb.authStore.record.id);
await pb.collection('users').update(pb.authStore.record.id, {talksToVisit:
await pb.collection('talk').delete(id);
```

### Step 3: Typesafe fetching and expansion in `entity.expand`.

```
import type {TalkResponse} from '$lib/pocketbase-types';
export const talks = writable<TalkResponse[]>([]);

onMount(() => { ...
  const response = await pb.collection('talk').getList(1, 500,
    {expand: 'room,speaker,tags', sort: 'start'});
  talks.set(response.items);
  ...
});
```

## Step 3: Realtime Updates with WebSockets

```
pb.collection('talk').subscribe('*', (e) => {  
  if (e.action === 'create') {  
    talks.update((current) => [...current, e.record]);  
  } else if (e.action === 'update') {  
    talks.update((current) => current.map((talk) =>  
      (talk.id === e.record.id ? e.record : talk)));  
  } else if (e.action === 'delete') {  
    talks.update((current) => current.filter((talk) =>  
      talk.id !== e.record.id));  
  });  
});
```

## Excursion: Vibecoding for haters

- ▶ Have a rules.md, i.e.
  - ▶ Keep the codebase minimal, clean and readable. Don't comment obvious things, i.e. `// Store for all talks before export const talks = writable<TalkResponse[]>([]);`
  - ▶ Inline variables and functions that are only used once, but try to create helper functions for 3x+ repeating patterns.
- ▶ Plan your tasks in steps, i.e.
  - ▶ The base page should be visible to everyone, even when not logged in.
  - ▶ Non-logged in users can favourite talks to their `svelte-persisted-store`, logged in users can favourite talks to their `user.talksToVisit` field.
  - ▶ The login page needs a secret field.
- ▶ A good spec is half the documentation
- ▶ If possible, pull just the needed stuff into context, or let it refine the planning before starting.
- ▶ Still use git!

## Step 3: Screenshot

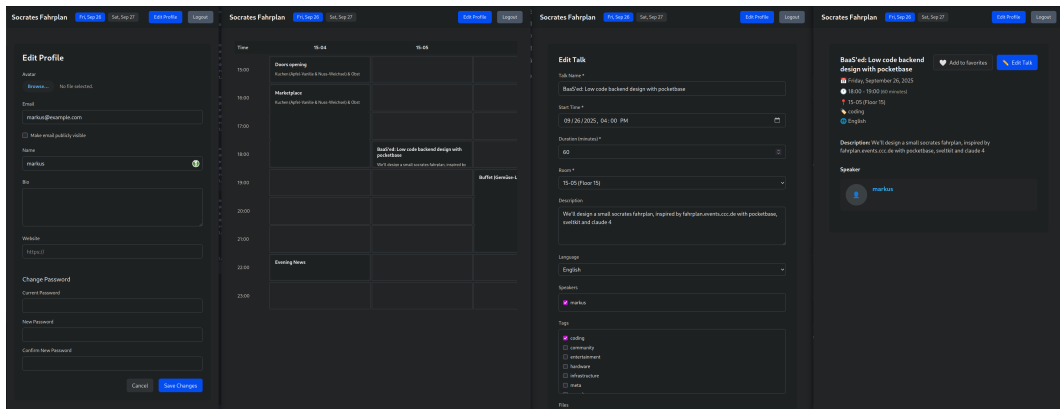


Figure 3: Screenshot

## Step 4: Data Population Scripts - Node.js Scripts for Data Management

```
import PocketBase from 'pocketbase';

const pb = new PocketBase('http://127.0.0.1:8090');

async function insertData() {
  await pb.admins.authWithPassword('admin@admin.at', 'adminadmin');
  const rooms = [
    {name: '15-04', floor: '15'},
    {name: '15-05', floor: '15'},
  ];
  for (const room of rooms) {
    await pb.collection('room').create(room);
  }
}
```

**Benefits:** Repeatable data setup, easy testing, version-controlled seed data

## Step 5: Advanced Validation Hooks - Go Hooks for Business Logic

```
app.OnRecordBeforeCreateRequest("talk").Add(func (e *core.RecordCreateEvent) {
    start := e.Record.GetDateTime("start")
    duration := e.Record.GetInt("durationMinutes")
    room := e.Record.GetString("room")

    existingTalks, err := app.Dao().FindRecordsByExpr("talk",
        dbx.HashExp{"room": room})

    for _, existing := range existingTalks {
        if hasTimeOverlap(start, duration, existing) {
            return errors.New("Talk conflicts with existing schedule")
        }
    }
    return e.Next()
})
```



## Step 6: Deployment - Docker or deploy\_yolo.sh

```
#!/bin/bash
TARGET=${TARGET:-markus@voidman.at}
set -ex
cd sveltekit && bun run build
mv -f build/* ../pocketbase/pb_public/
cd ../pocketbase && CGO_ENABLED=0 go build -o pocketbase main.go
ssh $TARGET 'pkill -f pocketbase; rm -f ~/pocketbase' || true
scp pocketbase $TARGET:~/pocketbase
ssh $TARGET 'nohup ./pocketbase serve --http=0.0.0.0:13337 </dev/null >/dev/null'
rm -rf pocketbase pb_public/_app pb_public/index.html pb_public/favicon.png
```

## Key Takeaways

- ▶ Full system in 1h backend, 2h frontend, 1h testing, 1h presentation / documentation
- ▶ Easily extendable with custom hooks or serverside-code for business logic
- ▶ No more boilerplate and json-shoveling
- ▶ There is a BaaS for you and your favourite language

Thank You!