OPENSCD
EVERYTHING EVERYWHERE ALL AT ONCE
SOFTWARE ENGINEER
LEAD OF DOMAIN DEVELOPMENT

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AGENDA

1. What is OpenSCD
2. Brief History
3. Challenges
4. A technical approach
What is OpenSCD?

**OPEN SUBSTATION COMMUNICATION DESIGNER**
OpenSCD is a platform to enable fully digital substations - from design and commissioning through to maintenance and replacement.

**IEC 61850 TOOL**
It allows you to create IEC 61850 compatible designs.

**PROGRESSIVE WEB APP**
The app and all plugins are cached so after the initial the first use, everything will work offline too. No install is necessary.

**PLATFORM**
The plugin system enables flexibility and interchangeability.
**Substation**

**Electrical Substation**

**IED**

**Intelligent Electronic Device**

**IEC 61850**

**Communication Protocol Definitions**

Left: Photo by American Public Power Association on Unsplash

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Brief History

- Prototype: Jakob Vogelsang’s Java App at Omicron
- PWA: Jakob Vogelsang and Christian Dinkel at Omicron
- Growing: Alliander, RTE, CoMPAS, Transpower, TransnetBW, SprintEins
- Scaling: New Maintainers, LF Energy and the future
EVERYTHING
In order to foster a common way of designing and specifying digital substations we need to provide all the tooling.

EVERYWHERENETour collective work needs to be available everywhere and to everybody. Only this way can a standard work.

ALL AT ONCE
As in every multi-stakeholder project, every stakeholder would like to prioritise their own need.
Our Approach

**WEB STANDARDS**
We depend on web standards, like custom elements, for flexibility, performance and long-term maintainability.

**PLUGINS**
Almost everything is a plugin. It helps to customise for many use-cases.

**DISTRIBUTION**
We enable distributions so you can configure your version as you deem fit.
Web Standards

**PROGRESSIVE WEB APP**
We offer offline usage. We cache OpenSCD and plugins so the engineers can browse and design their digital substation.

**CUSTOM ELEMENTS**
We use custom elements to provide the widest support of browsers and frontend technologies. We don't mind what you use. It only needs to be compiled to a custom element.

**TECHNOLOGY INDEPENDENT**
To reach a wider audience of developers. Quickly start with whatever you want.
The Plugin System

- Almost everything is a plugin
- Menu points, Editors, Validators
- We load and cache the source code of the plugins dynamically
Unregistered Custom Element

Dynamic Loading

Result
A plugin written in Svelte

```javascript
import Plugin from './plugin.svelte';
import * as pkg from '../package.json';

export default class NewPlugin extends HTMLElement {
    constructor() {
        super();
    }

    connectedCallback() {
        this.attachShadow({ mode: "open" });
        this.plugin = new Plugin({
            target: this.shadowRoot,
            props: {
                doc: this._doc
            }
        });

        const style = document.createElement("style");
        style.innerHTML = globalThis.pluginStyle[pkg.name];
        this.shadowRoot.appendChild(style);
    }

    private _doc: XMLDocument
    public set doc(newDoc: XMLDocument) {
        this._doc = newDoc;
        if (this.plugin) { return; }
        this.plugin.$set({ doc: newDoc });
    }

    <svelte:options tag={null} />

    <script lang="ts">
        import { NetworkExplorer } from "@oscd-plugins/ulib/src/lib/plugins/network-explorer";
        import * as pckg from "../package.json";

        // Inputs
        export let doc: XMLDocument;
    </script>

    {#if doc}
        <NetworkExplorer root={doc?.documentElement} />
    {/if}

    <input type="hidden" name="package-name" value="{pckg.name}" />
    <input type="hidden" name="package-version" value="{pckg.version}" />
    ```
YOUR OWN PLATFORM
You can deploy OpenSCD yourself in your own infrastructure.

YOUR OWN ADDONS
We provide the building blocks to create and customise your own distribution.

YOUR OWN PLUGINS
You can create your own plugins and use them in multiple distribution.
Thank you

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