# Electronic German Voting System

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## 1 Objectives

### 1.1 Must-Meet Criteria

The system must:

- manage votes electronically. This includes:
  - Providing an interface to receive single or batched votes.
  - Storing a single vote submitted by a voter or batched votes submitted by election officials.
- store all the data relevant to the 2017 and 2021 elections. This includes:
  - All cast votes
  - All parties and candidates participating in the elections
  - The result aggregates for the previous election on the region and state level
- calculate and display election results for a given year. The seat distribution in the parliament is calculated according to the Sainte-Lagüe method and takes into consideration:
  - Electoral Threshold (Sperrklausel)
  - Leveling and Overhang Seats (Ausgleichs- und Überhangsmandate)
  - Minority Parties (Minderheitsparteien)
- produce and display statistics regarding voting trends on the region, state, and country level.
- display comparative statistics between two elections regarding the seat distribution and voting trends between years on the region, state and country level.
- show party and candidacy information on the region, state, and country level.
- grant restricted permissions to election officials to add and modify party and candidacy information.
- allow exclusively eligible people to vote only once per election.
- protect the privacy of the data pertaining to the voters and their votes.

### 1.2 Should-Meet Criteria

The system should:

- scale to fit different screen sizes of mobile devices.
- provide interactive election results.

### 1.3 Can-Have Criteria

The system can:

- include in the detailed view of the candidates their photos.
- display a dotted graphical visualization of the election results showing the exact numbers of the seats distribution for each party in the parliament.
- provide an interactive map to filter statistics and information.

## 2 Technical Details

- `PostgreSQL` will be used as a `DBMS`. On top of that, `sqitch` will be used to manage schema migrations.
- `PostgREST` will be used to generate a *REST API*, that relies on *JSON* as a request-response format.
- If needed, `NginX` might be used as a reverse proxy or a web server.
- The fronted will be created in `TypeScript` using the `React` framework. `Bootstrap` will be used as a *CSS* framework.
- The whole system will be containerized using `Docker`.

## 3 Glossary

- **Direct seats:** seats that are won through first votes.
- **List seats:** seats that are won through second votes.
- **Overhang seats:** seats that result from a party winning more direct seats than the number of seats that it is entitled to from its share of the second votes.
- **Leveling seats:** seats that are given to compensate for overhang seats.
- **Electoral Threshold:** the condition for a party to receive leveling, consisting in a party winning 5% of the total second votes or getting 3 direct seats.