Project Title: 3D System Mapper & Interactive Editor

📅Phase 1: Core Viewer MVP

Goals:

- Render 3D nodes from YAML/JSON
- Show labels (sprites)
- Draw connections (Bezier curves)
- Add encapsulating bounding boxes
- Support basic camera controls and fog/depth cues

Deliverables:

- Three.js app scaffold
- YAML/JSON loader (with example files)
- Interactive OrbitControls camera
- Node renderer with size/label/color metadata
- Connection renderer (Bezier)
- Group renderer with wireframe boxes
- Fog + background scene effects
- Working build + docs

🔧Phase 2: User Interaction Layer

Goals:

- Select/move nodes in 3D (with grid snapping)
- Add/delete nodes and connections from UI
- Edit node properties (rename, resize, re-color)
- Connect nodes by dragging between I/O faces
- Draw bounding boxes interactively

Deliverables:

- Raycaster-based selection system
- TransformControls for dragging/moving objects
- Snapping mechanism to grid and fixed planes
- GUI panel (dat.GUI or custom overlay) to edit node/group/connection properties
- Drag-to-connect interface (anchor to face center)
- Right-click / toolbar to delete elements
- Real-time updates to in-memory data model

⚖️Phase 3: Bi-Directional YAML/JSON Editing

Goals:

- Load from YAML
- Reflect all 3D edits back to YAML
- Export current scene state (nodes/groups/connections) to YAML
- Optional live syncing or file watching

Deliverables:

- Parser/writer module
- Save button / keyboard shortcut to export YAML
- Bi-directional binding layer between scene objects and YAML structure
- Option to save/download/export file to disk or browser storage

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🪧Tech Stack

- **Three.js**: 3D rendering
- **OrbitControls / TransformControls**: Navigation + movement
- **js-yaml**: YAML parsing/stringifying
- **dat.GUI or Leva**: Editor overlay
- **Vite or Webpack**: Build system
- **TypeScript** (optional): Safer state handling

💼Repo Structure

```
3d-system-mapper/
├── public/
│   └── index.html
├── src/
│   ├── main.js              # App entry
│   ├── scene.js             # 3D scene setup
│   ├── loader.js            # YAML/JSON loading
│   ├── editor.js            # Selection + transform logic
│   ├── gui.js               # Properties panel
│   └── exporter.js          # YAML writer
├── data/
│   ├── nodes.yaml
│   ├── connections.yaml
│   └── groups.yaml
├── package.json
├── vite.config.js
└── README.md
```

🔗Developer Tasks

Frontend Dev

- Implement object rendering
- Hook up camera + controls
- Wire in label sprites and group boxes

UX Dev

- Implement GUI overlay
- Selection and manipulation layer
- Drag-to-connect logic

Backend / Infra

- YAML I/O integration
- Export pipeline
- Save/load tooling

⏳Timeline (3-4 devs)

Phase	Time Estimate
Phase 1	1.5 weeks
Phase 2	2 weeks
Phase 3	1 week
Polish / Docs	3-5 days

🩲GitHub-Ready Boilerplate

I'll now generate the repo and provide a downloadable zip + GitHub push instructions.