

# Project Overview

## Science Gateway

HPC-ED is the targeted Science Gateway. HPC-ED is a project to create and share metadata for HPC educational materials, making it easier to discover, access, and publish these resources through a federated catalog system.

## Goals

Our goal is to develop a form that allows users to input site URLs, which are then ingested and added to the HPC-ED (High-Performance Computing and Engineering Data) database. The form validates the input and processes the site data for storage and further analysis. An interactive graph visualization of the data is created using NetworkX and Pyvis.

## Use Cases

### Educational Resources Aggregation

Educators need a centralized database of HPC-related resources. The form allows users to add URLs of educational content to the HPC-ED database, making it easy to aggregate and access relevant materials.

### Research Collaboration

Researchers often struggle to find collaborators and related research tools. By submitting research-related sites, the HPC-ED database can help visualize connections between researchers, tools, and projects.

### Tool Repository

HPC practitioners need a comprehensive list of available tools. Users can add URLs of HPC tools to the database, creating a repository that can be visualized and explored interactively.

### Social Networking

Networking within the HPC community is fragmented. The form enables adding social and professional networking sites, helping to visualize and enhance community connections.

## Methodology

### Form Creation

- Developed an HTML form to collect URL, title, description, and category of sites.
- Technologies: HTML, CSS, JavaScript
- Functionality: The form validates user input and ensures all required fields are filled.

### Data Ingestion

- The form data is sent to a Flask server, which processes and stores the information in a JSON file.
- Technologies: Flask, Python
- Functionality: The server receives form submissions, validates and processes the data, and updates the JSON file.

### Graph Analysis

- The JSON data is read and used to create a graph using NetworkX.
- Technologies: NetworkX, Python
- Functionality: Nodes are created for each entry, with titles as identifiers and other data as attributes. Basic graph information is printed for analysis.

### Visualization

- The NetworkX graph is converted to a Pyvis graph for interactive visualization.
- Technologies: Pyvis, Python
- Functionality: The interactive graph is saved as an HTML file, allowing users to explore the data visually.

## Expansion Possibilities

### Enhanced Data Analysis

Implement advanced data analysis techniques to uncover hidden patterns and insights. Potential benefits include improved understanding of data relationships and trends.

### Integration with Other Databases

Connect the HPC-ED database with other related databases for a more comprehensive resource. Potential benefits include enhancing the scope of data available for users and enabling cross-database analysis.

### Mobile-Friendly Interface

Adapt the form and visualization tools to be mobile-friendly. Potential benefits include increasing accessibility and usability for users on different devices.

## Pandora's Programmers



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## Resources

Github  
NetworkX  
HPC-ED  
Globus