Enterprise Information Systems Lab

Linked Data Visualization and Exploration

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+Objectives of LinDaViz project

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Goal:

- supporting non-technical users in finding suitable visualizations for a specified subset of the data

Objective:

- development of a largely automatic visualization workflow which
guides users step by step through the process of creating visualizations

ember CLI

npm

express

POWERED BY VIRTUOSO

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+ Requirements

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Functional:

High priority:

- Display overview ✓
- Filtering ✓
- Searching ✓

Low priority:

- Hiding/Loading
- Sorting
- Export Data

Non-functional:

High priority:

- Data table scalability ✓
- Usability ✓
- Technical System Documentation ✓

Low priority:

- Backup
- Robustness ✓

ember CLI

npm

D3

node js

express

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+ Architecture

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The LinkDaViz tool is a JavaScript based web application

It receives as input data in RDF or tabular format.

The frontend module:

- a component for data selection,
- the visualization widgets library,
- a component for configuring a visualisation.

The backend module is in charge of computing visualization recommendations, acts as a data storage for visualization metadata and saved visualizations.

The triplestore contains the visualization ontology and the datasets.

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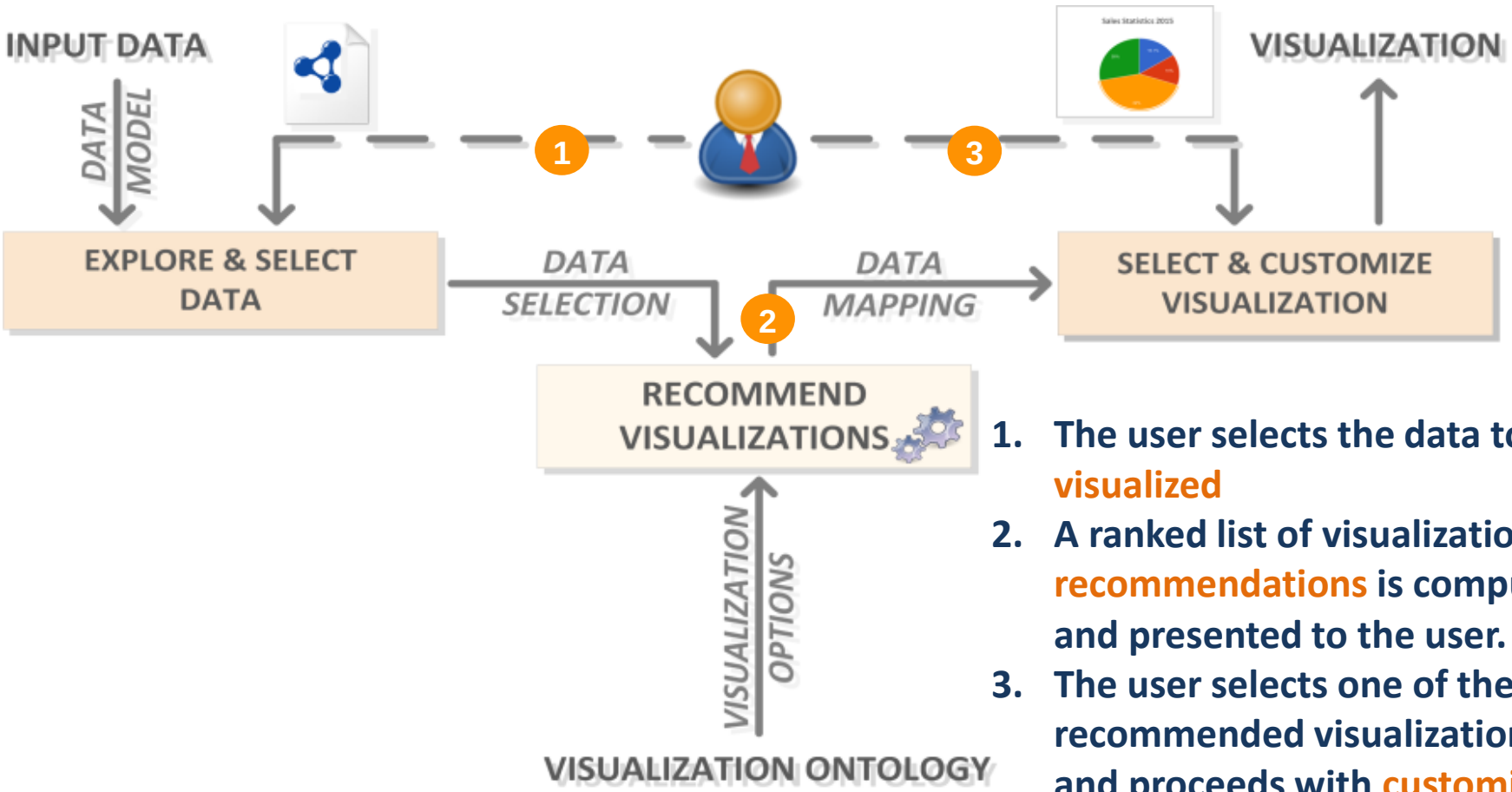
+ Visualization Workflow



1. The user selects the data to be visualized
2. A ranked list of visualization recommendations is computed and presented to the user.
3. The user selects one of the recommended visualizations and proceeds with customizing and consuming it.

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Before implementation:

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LinDaViz

Explore and Select Data

- Observation class
  - Precipitation Deviation number
    - type resource
  - Month number
  - dataSet resource
    - structure resource
    - type resource
    - label string
  - Quality Deviation number
- ComponentSpecification class
  - type resource
  - dimension resource
  - label string
  - measure resource
- DataStructureDefinition class
- MeasureProperty class
- DataSet class
- DimensionProperty class
- Ontology class

Preview Data Selection

Show 10 entries

Search:

Precipitation Deviation	Month	Quality Deviation
-1.118	8	-0.06
-0.999	7	-0.028
-0.569	6	0.011
-0.323	4	0.02
-0.195	10	-0.046
-0.092	9	-0.629
-0.085	5	0.029
0.005	12	0.05
0.01	11	0
0.117	1	-0.046

Showing 1 to 10 of 12 entries

Visualize

Previous 1 2 Next

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Lab Topic

NOW: the tree view for browsing and selecting data does not scale to large datasets.

Problem: If the dataset contains classes with lots of properties you won‘t be able to get an overview this way.

The lab topic refers to the improvement of data selection and exploration part of the visualization workflow.

Responsibilities:

Alina Arunova

- Keyword-based search in a tree
- Final presentation
- Documentation

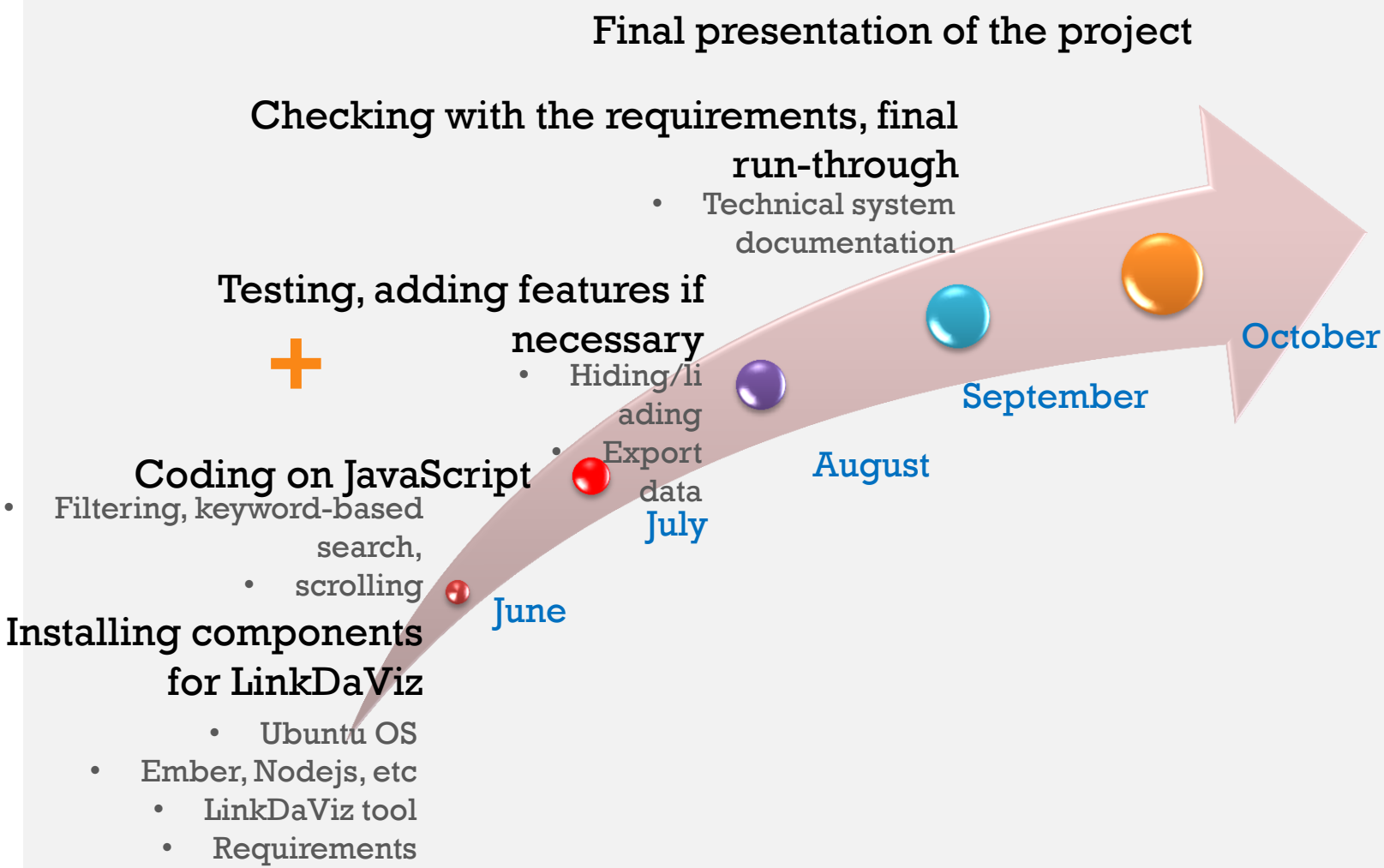
Tatiana Novikova

- Implementing filters for numerical values in a tree
- Final presentation
- Documentation
- Poster

David Ibhaluobe

- Horizontal scrolling
- Final presentation
- Documentation

Time plan


Final presentation of the project
Checking with the requirements, final run-through
• Technical system documentation
Testing, adding features if necessary
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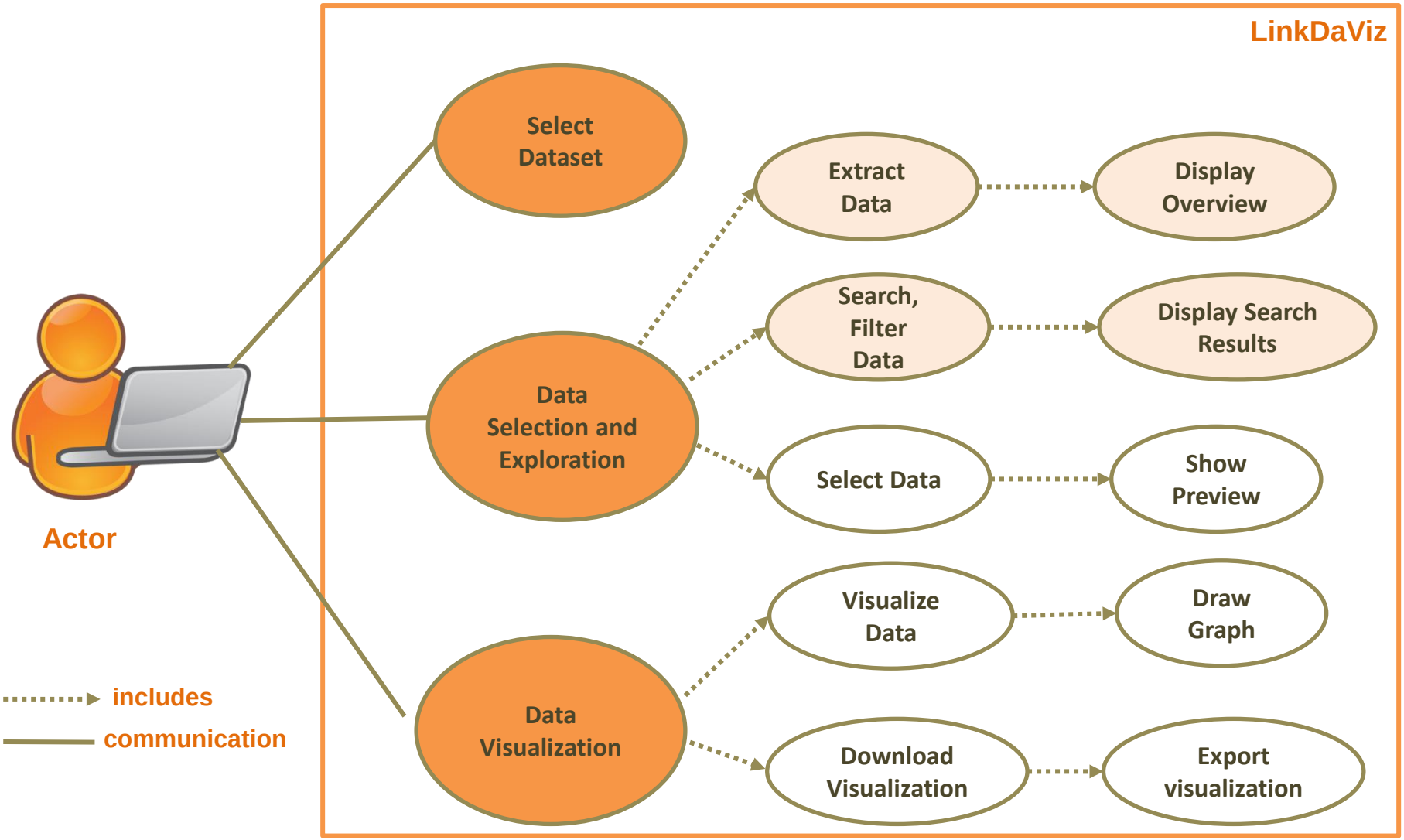
• Hiding/li ading
• Export data
Coding on JavaScript
• Filtering, keyword-based search,
• scrolling
Installing components for LinkDaViz
• Ubuntu OS
• Ember, Nodejs, etc
• LinkDaViz tool
• Requirements
June
July
August
September
October

Use Case Diagram



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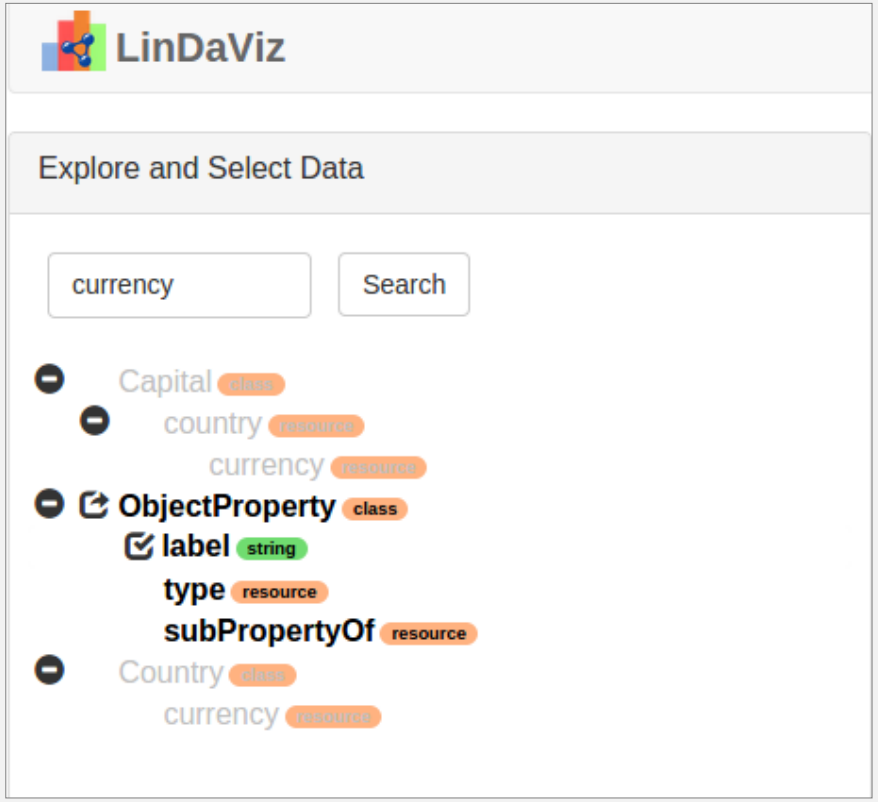
Required tools:

1. **Nodejs** - JavaScript runtime built on Chrome's V8 JavaScript engine;
2. **NPM** - package manager for JavaScript, and is the default for Node.js;
3. **Docker** - is an open platform for building, shipping and running distributed applications.
4. **Nodemon** – utility that will monitor for any changes in the source and automatically restart the server;
5. **Ember cli** - Ember.js command line utility, provides a powerful add-on system for extension;
6. **Virtuoso** - is a middleware and database engine hybrid.

Keyword-based search

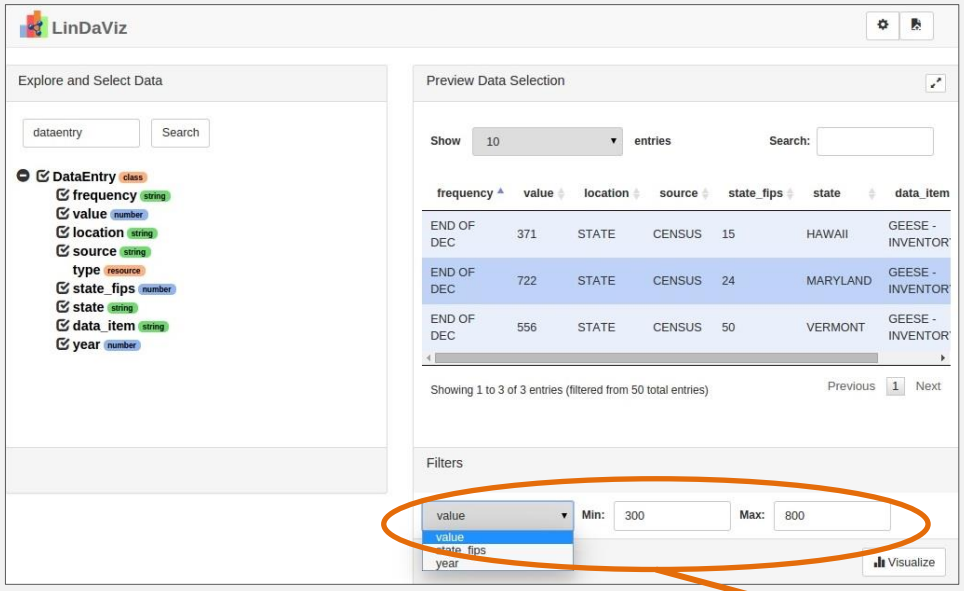


Challenges:

- Support of different **ontologies** and **vocabularies**;
- **Depth** of the search;

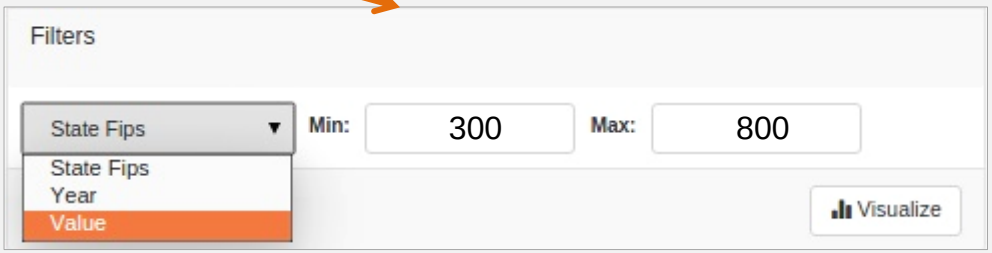
How it works: a user types a keyword in a text field and presses a button “search” if there is a such word in the dataset then a new tree with searched results will be displayed, otherwise “No matches” will be displayed. If the user enters too short word, a hint will be displayed

Filtering



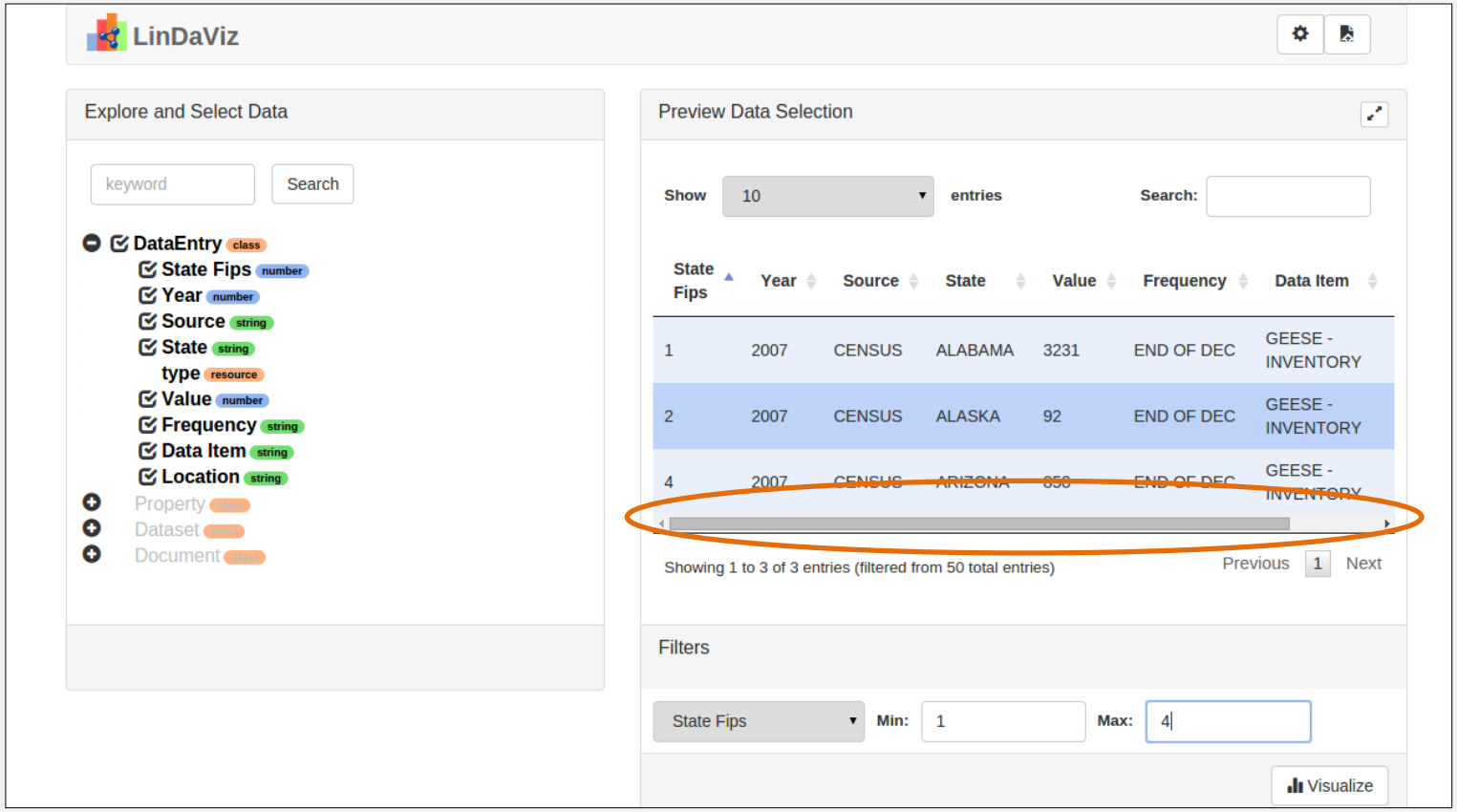
Challenges:

- Triggering of **any changes** inside the tree;
- The necessity of tracking only **numerical values** from the tree;
- **Automatic update** of the data table after applying of filters;



How it works: a user checks data which he wants to visualize, the data appears in a data table, and the filter is being filled with numerical values in a drop-down list. A user then chooses a list item, types in min and max values and sees how the table changes in real-time.

Horizontal Scrolling



How it works: a user selects a dataset for exploration and visualization then selects a data property. The more data the user selects the larger the table gets and grows out of proportion.

Test cases

№	Component	Expected Result	Test Result (passed/failed/blocked)
1	**Searching**	Possibility of seeking keywords through the tree (searching for a particular keyword inside the tree, added exceptions for non-found words and too short words);	Passed
2	**Filtering**	Filtering numeric data in the table (with min and max values, once the filters are chosen, the data table changes automatically);	Passed
3	**Scrolling**	Installed plug-in for the data table with ability to scroll large data sets	Passed

Challenges:

While using a new framework or API, the challenges are always the same: to learn about all the expectations and usage rules implicit in the API

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Datatables - Is a plug-in for the jQuery JavaScript library.

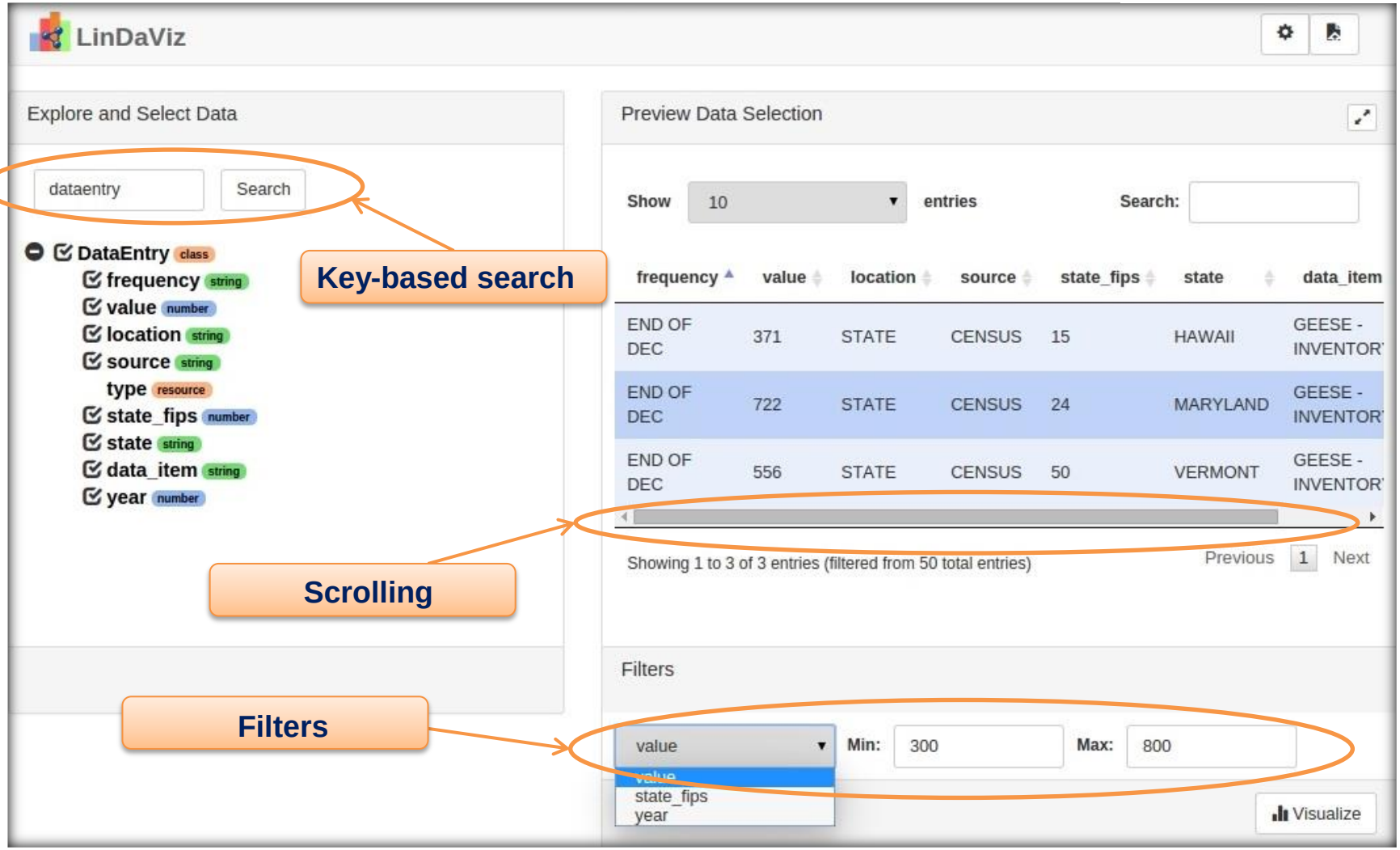
Many interconnected components to be installed on Ubuntu OS

New programming languages – JavaScript, HTML

CLI

Necessity of learning a new framework - Ember

Result after implementation:



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Thank you!