Enabling Software Architecture Comparison with ExplorViz

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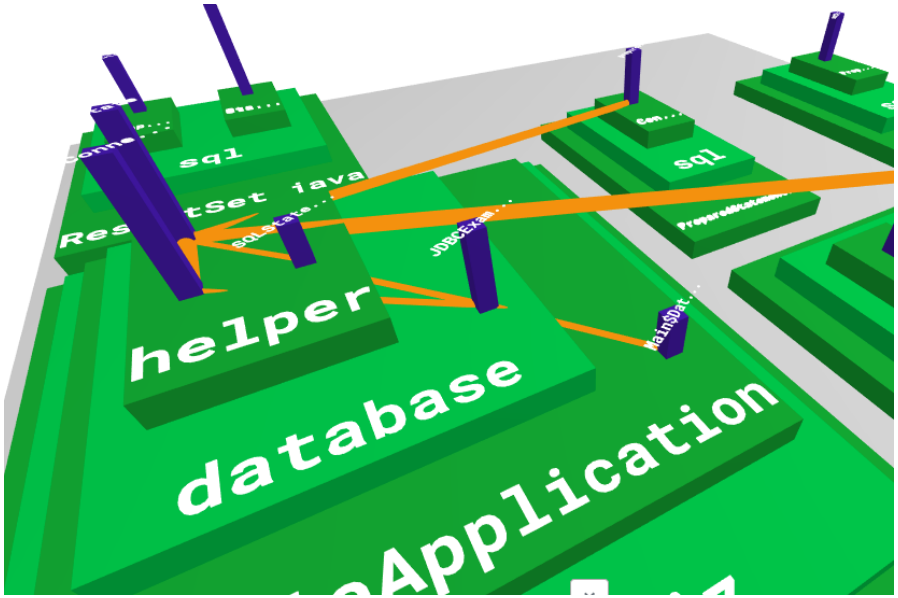
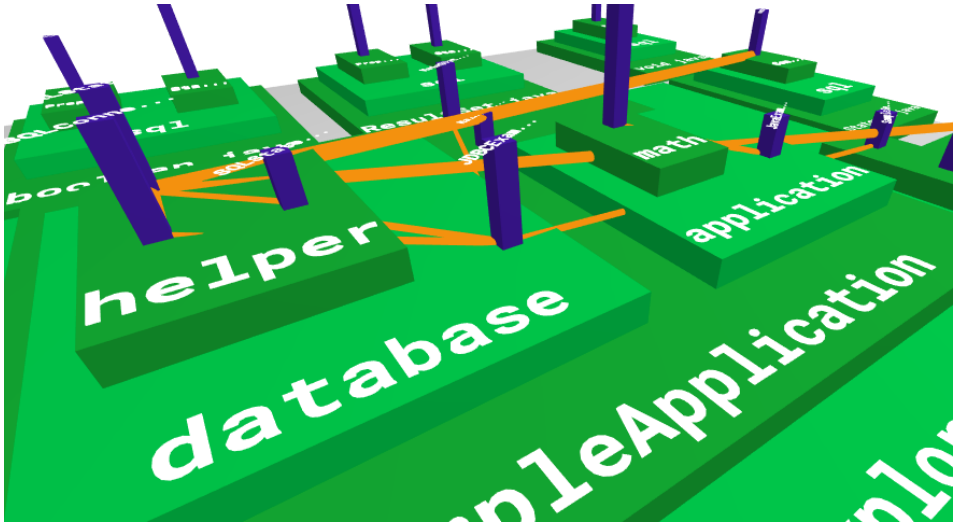
20.09.2019

Motivation

- Comparison of software architecture can be very useful in different scenarios
- Manual comparison by comparing code or the file structure
- Very slow and error prone


sql
helper
database
Application


helper
database
application
Math

Goals

- Develop an extension for ExplorViz
- Two functionalities
  - Comparing two landscapes with each other
  - Calculating a history between multiple landscapes
- Evaluate the implemented software

Expanding ExplorViz

- ExplorViz uses Microservice Architecture
- It is split into the frontend and the backend
- The frontend is extended via an ember addon
- The backend extension is its own server

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- Two resources for the features
- Changes are characterized through three attributes:
  - ADDED
  - DELETED
  - ORIGINAL

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- Gets two timestamps from frontend
- Landscapes are imported from ExplorViz's history service
- Compares exactly two landscapes with each other
- Every application, component, class and communication is compared with each other
- Changes are embedded into the landscape
- Uses full qualified name of entities

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sampleApplication	explorviz	1234	ADDED
		4567	DELETED
	sampleServer	1234	DELETED
		4567	ADDED
sampleServer	net	4563	ADDED
	explorviz	8969	DELETED
		2345	ADDED

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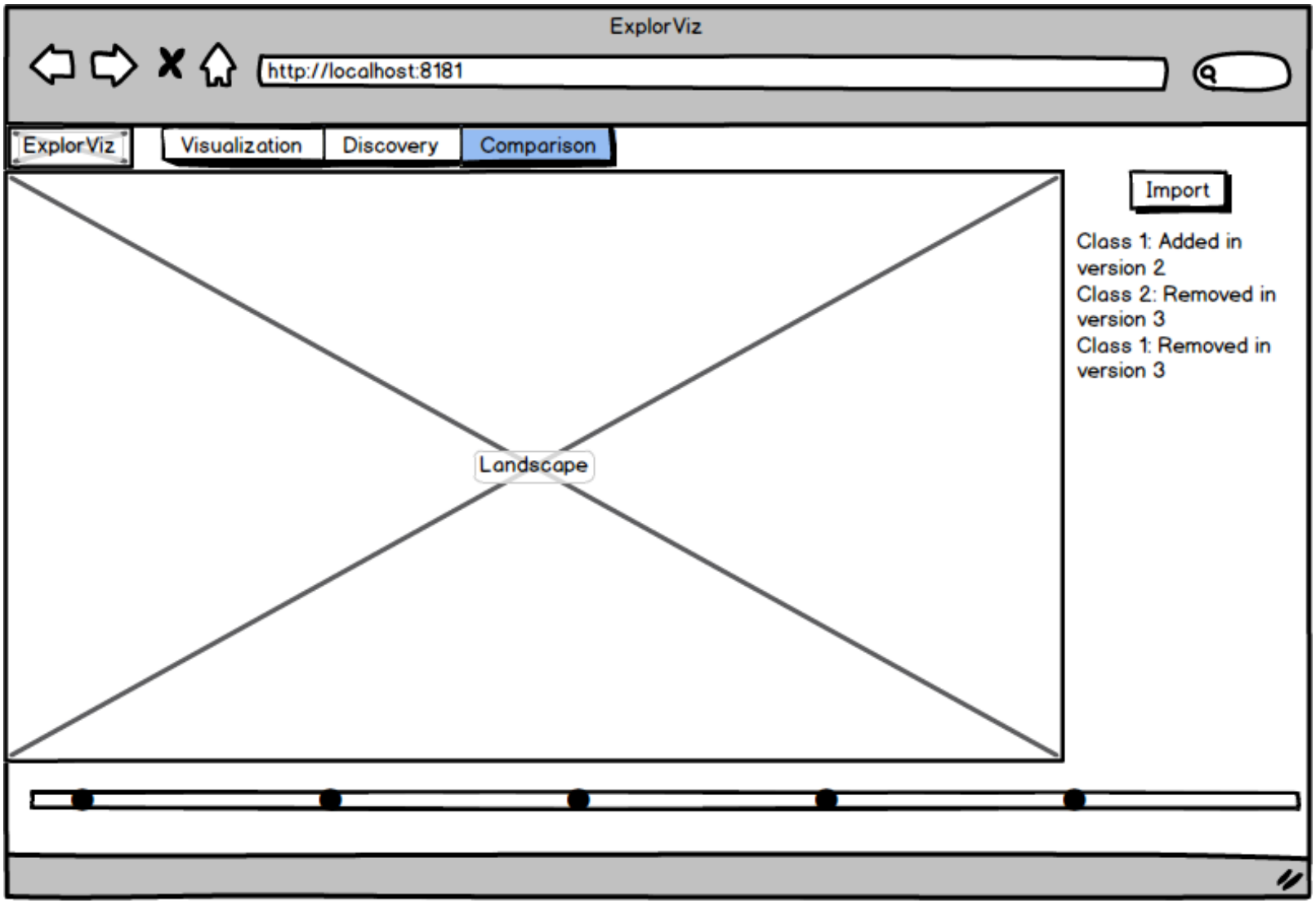

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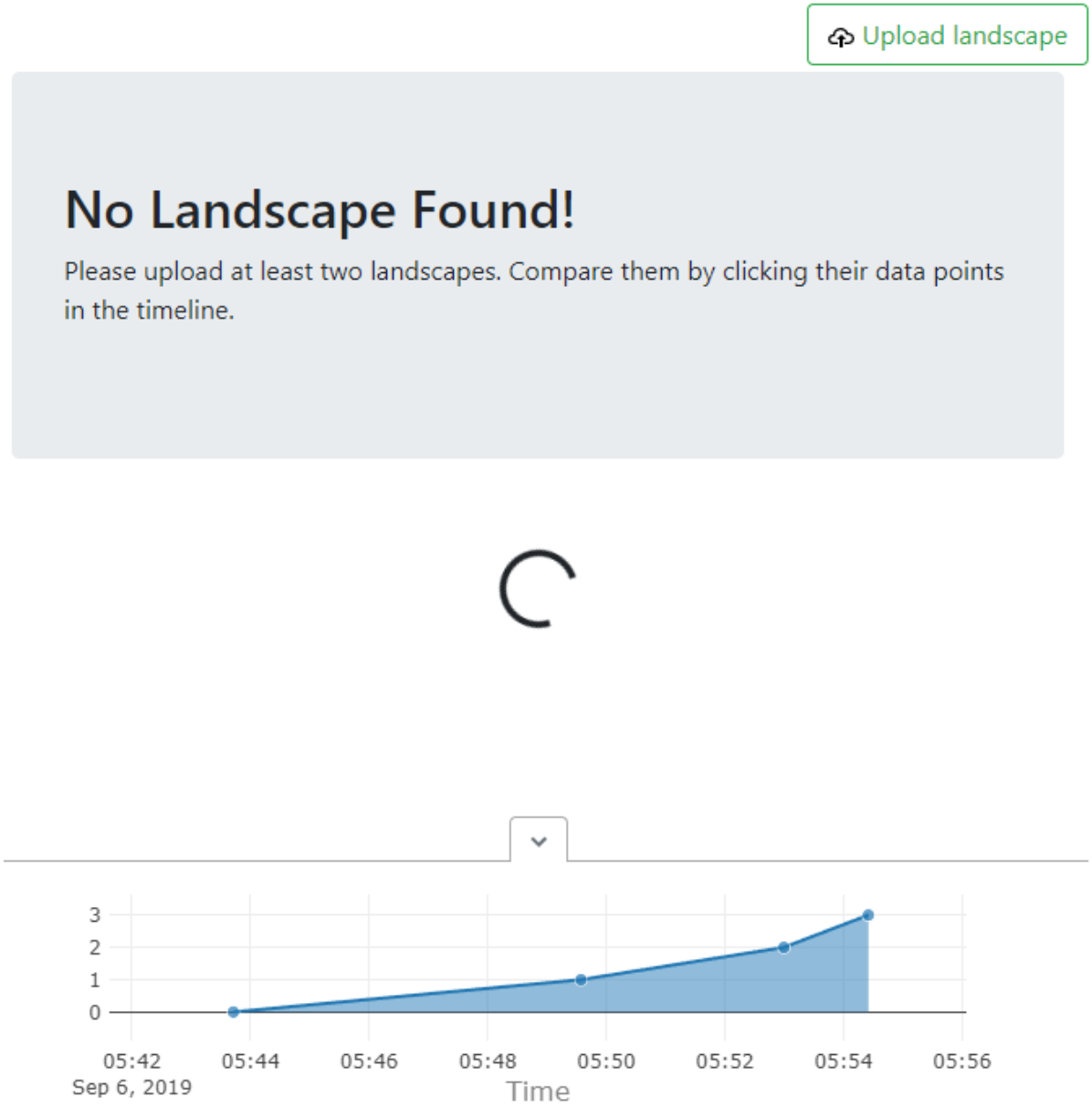
- User uploads multiple landscapes
- Extension extends landscape drawing components
- Checks status in the overridden methods and colors accordingly
- History is checked for the currently highlighted entity
- Appropriate entries are then displayed in a table


Upload landscape
No Landscape Found!
Please upload at least two landscapes. Compare them by clicking their data points in the timeline.
3
2
1
0
05:42
Sep 6, 2019
05:44
05:46
05:48
05:50
05:52
05:54
05:56
Time

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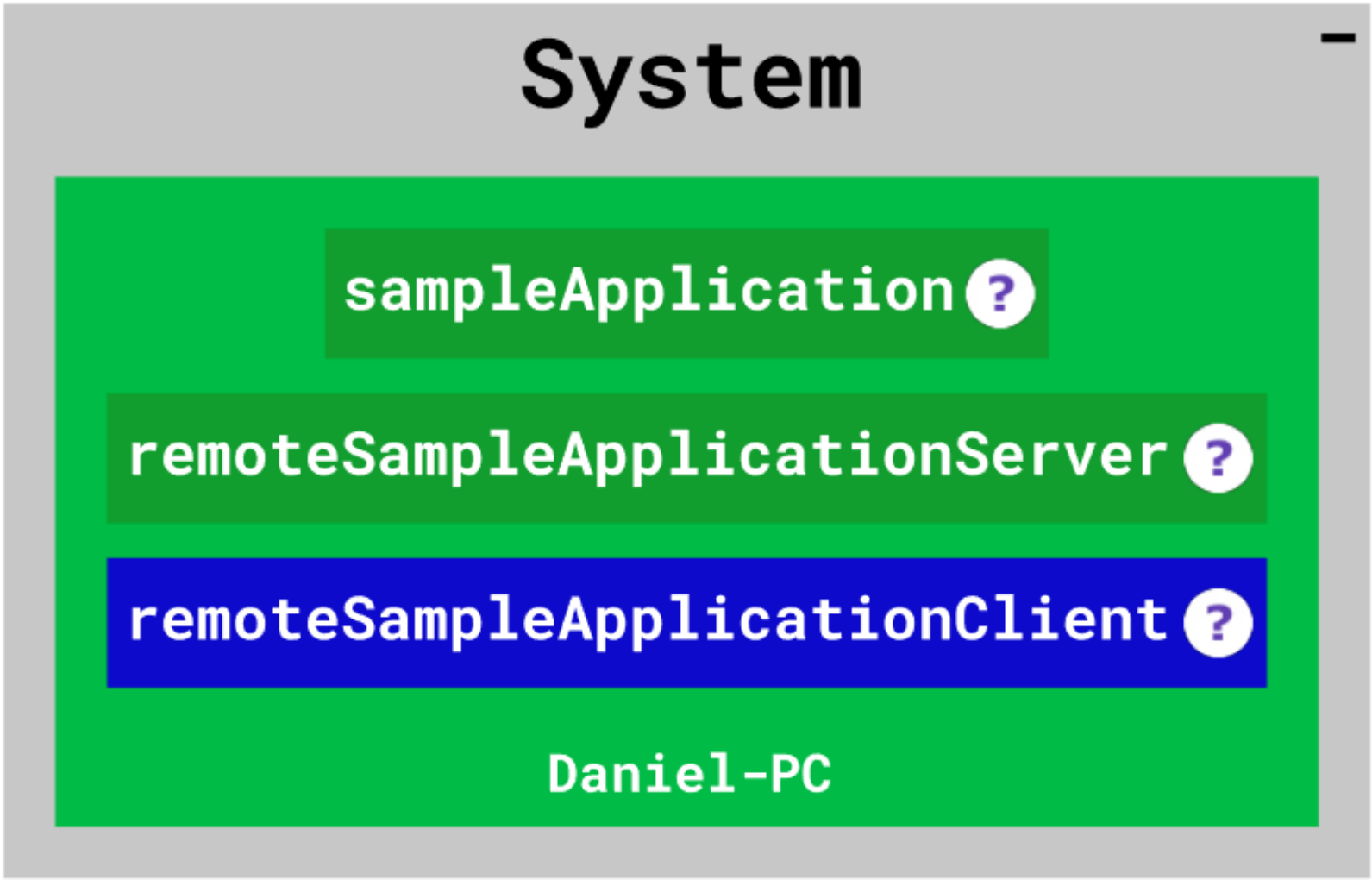

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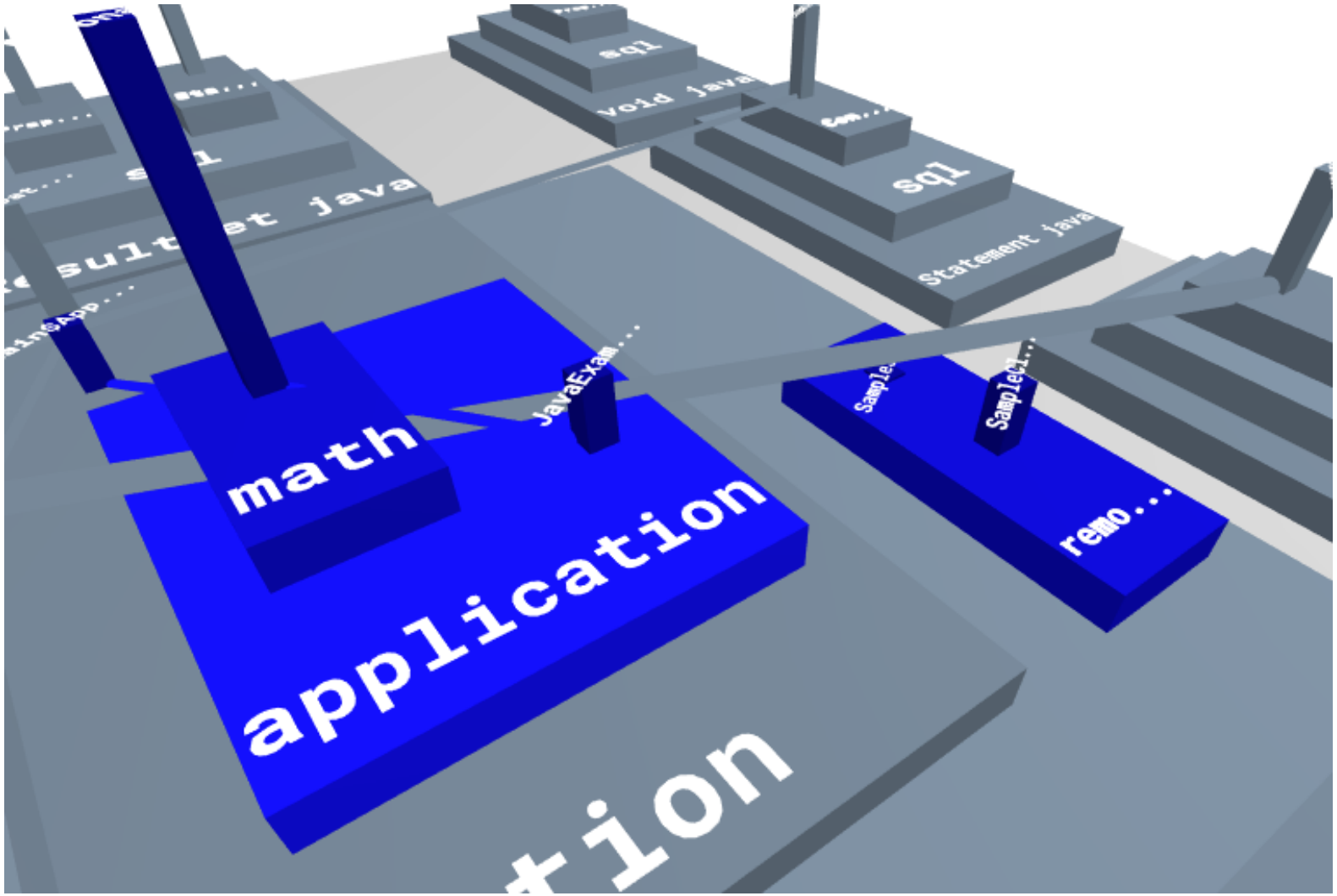

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History

Classes

Name	Timestamp	Change
Main$ApplicationTask	Fri Sep 06 2019 05:52:59 GMT+0200 (Mitteleuropäische Sommerzeit)	DELETED
JavaExample	Fri Sep 06 2019 05:52:59 GMT+0200 (Mitteleuropäische Sommerzeit)	DELETED

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Live Demonstration

Evaluation

- Goals
  - evaluate, how functional the tool is
  - evaluate the usability
- Questionnaire
  - Personal Information
  - Comparison Tasks
  - Debriefing Questions

Results

- High correctness of tasks
- Tasks were seen as easy
- Tool usage was also seen as easy
- History feature was perceived as useful
- Some UI problems discovered

Future Work

- Saving merged landscapes and history
- Landscapes not in timestamp order in timeline
- Other colors/customization of colors for merged landscapes