A customizable and extensible Tutorial Framework for improved Usability in ExplorViz

Helge Müller

June 28, 2019
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Motivation

- Instruct new users
Motivation

- Instruct new users
- Consistent instruction
Motivation

▶ Instruct new users
▶ Consistent instruction
▶ Learning by example
Motivation

- Instruct new users
- Consistent instruction
- Learning by example
- Expandable for further development
Goals

- G1: Literature / Tool research
Goals

- G1: Literature / Tool research
- G2: Develop a data model for tutorials
Goals

▶ G1: Literature / Tool research
▶ G2: Develop a data model for tutorials
▶ G3: Implement a modular Tutorial Extension
Goals

- G1: Literature / Tool research
- G2: Develop a data model for tutorials
- G3: Implement a modular Tutorial Extension
- G4: Implement a Tutorial-Management-Tool / Editor
Goals

- G1: Literature / Tool research
- G2: Develop a data model for tutorials
- G3: Implement a modular Tutorial Extension
- G4: Implement a Tutorial-Management-Tool / Editor
- G5: Evaluation
Java
Java

Ember
ExplorViz ▶ Technologies

- Java
- Ember
- JSON:API
Structure of ExplorViz

Structure of ExplorViz

- Frontend → Ember
Structure of ExplorViz

ExplorViz → Structure

- Frontend → Ember
- Backend → Services
Structure of ExplorViz

- Frontend → Ember
- Backend → Services
- Connections →
Structure of ExplorViz

- Frontend → Ember
- Backend → Services
- Connections →
  - Reverse Proxy → JSON:API
Structure of ExplorViz

- Frontend → Ember
- Backend → Services
- Connections →
  - Reverse Proxy → JSON:API
  - Kafka

New
Structure of ExplorViz

ExplorViz ⊳ Structure

Client

Frontend

API-Gateway / Reverse Proxy

NGINX

Monitored Server

Application

Discovery-Agent

Records

Processes

Analysis

TeeTime

Landscape

Jersey

mongoDB

Filesystem

Authentication & Authorization

Jersey

mongoDB

Data

Discovery

Jersey

Processes

Backend-Extension

Message Broker

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ExplorViz Extension

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ExplorViz Structure
ExplorViz Extension

ExplorViz ⊳ Structure

- Client
- Frontend
- API-Gateway / Reverse Proxy
- NGINX
- Monitoring Server
  - Application
  - Discovery-Agent
- Analysis
- Landscape
- Authentication & Authorization
- Discovery
- Backend-Extension

- Jersey
- mongoDB
- Filesytem
- Processes
- Records
- Traces
- Data

Message Broker

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ExplorViz Extension

Frontend
Ember
Frontend-Extension
explorviz-frontend-extension-tutorial

API-Gateway (JSON:API) / Reverse Proxy

Backend
landscape-service
tutorial-service

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Implement tutorial extensions
Implement tutorial extensions
  ▶ Frontend addon
Implement tutorial extensions
  - Frontend addon
  - Backend service
Approach

Tutorial Framework

▶ Necessary features

▶ Implement tutorial extensions
  ▶ Frontend addon
  ▶ Backend service
Approach

Tutorial Framework

- Necessary features
- Datastructure for tutorials
- Implement tutorial extensions
  - Frontend addon
  - Backend service
Approach

Tutorial Framework

- Necessary features
- Datastructure for tutorials
- Implement tutorial extensions
  - Frontend addon
  - Backend service
- Evaluate
Features Frontend

Tutorial Framework ▶ Features

- Execute tutorials
Features Frontend

Tutorial Framework ▶ Features

▶ Execute tutorials
▶ Display instructions
Features Frontend

Tutorial Framework ▶ Features

- Execute tutorials
- Display instructions
- Detect user action
Features Frontend

Tutorial Framework ▶ Features

- Execute tutorials
- Display instructions
- Detect user action
- Proceed to next instruction
Features Frontend

Tutorial Framework ▶ Features

- Execute tutorials
- Display instructions
- Detect user action
- Proceed to next instruction
- Reference landscapes
Create/Read/Update/Delete tutorials
▶ Create/Read/Update/Delete tutorials
▶ Select landscape
Features Editor

Tutorial Framework ▶ Features

- Create/Read/Update/Delete tutorials
- Select landscape
- Select targets for actions
Extensible and customizable

Tutorial Framework ▶ Extensible and customizable

▶ Expandable targeting mechanism
Extensible and customizable Tutorial Framework

- Expandable targeting mechanism
- Addon and service
Extensible and customizable

- Expandable targeting mechanism
- Addon and service
- No core dependencies
Tutorial

Datastructure

Implementation

▶ Tutorial
Tutorial

- Main element
Tutorial

- Main element
- Landscape reference
Tutorial
- Main element
- Landscape reference

Sequence
Datastructure

Implementation

▶ Tutorial
  ▶ Main element
  ▶ Landscape reference

▶ Sequence
  ▶ Provides additional structure
- Tutorial
  - Main element
  - Landscape reference
- Sequence
  - Provides additional structure
  - Optional landscape reference
Datastructure

Implementation

- Tutorial
  - Main element
  - Landscape reference
- Sequence
  - Provides additional structure
  - Optional landscape reference
- Step
Datastructure

Implementation

- Tutorial
  - Main element
  - Landscape reference
- Sequence
  - Provides additional structure
  - Optional landscape reference
- Step
  - Instructions
Datastructure

Implementation

- Tutorial
  - Main element
  - Landscape reference
- Sequence
  - Provides additional structure
  - Optional landscape reference
- Step
  - Instructions
  - Target and action
Tutorial/sequence/step classes
Tutorial Framework

Implementation ▶ Backend

- Tutorial/sequence/step classes
- Timestamp
Tutorial Framework

Implementation ▶ Backend

- Tutorial/sequence/step classes
- Timestamp
- Landscape
Persist landscapes in tutorial service
Persist landscapes in tutorial service
Avoid dependency to landscape service
Persist landscapes in tutorial service
Avoid dependency to landscape service
Save imported landscapes
Persist landscapes in tutorial service
Avoid dependency to landscape service
Save imported landscapes
from landscape / broadcast service
Persist landscapes in tutorial service
Avoid dependency to landscape service
Save imported landscapes
from landscape / broadcast service
to tutorial service database
ExplorViz Extension

Implementation ➤ Backend

Frontend

Ember

Frontend-Extension

explorviz-frontend-extension-tutorial

API-Gateway (JSON:API) / Reverse Proxy

Backend

landscape-service

tutorial-service

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Tutorial Framework

Implementation → Backend

- landscape-service
  - serialized Landscape
  - store
    - Visualization
  - JSON:API
  - tutorial-service
    - Jersey
    - landscape
    - Morphia
    - Mongo DB

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Tutorial Framework

Implementation ➔ Backend

Landscape
- timestamp

Timestamp
- timestamp

TutorialLandscape
serialized
Landscape
- id
- timestamp

TutorialTimestamp
- timestamp

TutorialTimestamp
- timestamp

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Tutorial Framework

Implementation ➔ Backend

- landscape-service
- serialized Landscape
- JSON:API
- tutorial-service
- Jersey
- serialized Landscape
- Mongo DB
- Morphia
- TutorialLandscape
  - id
  - timestamp
- TutorialTimestamp
  - id
  - timestamp
  - String: landscape
- normalizeResponse
- explorviz-frontend-extension-tutorial

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Models (TutorialLandscape = landscape)
Tutorial Framework

Implementation ➤ Frontend

- Models (TutorialLandscape = landscape)
- Services
Models (TutorialLandscape = landscape)
Services
Components
Tutorial Framework

Implementation ▶ Frontend

- Models (TutorialLandscape = landscape)
- Services
- Components
  - Type specific
Tutorial Framework

Implementation ➤ Frontend

- Models (TutorialLandscape = landscape)
- Services
- Components
  - Type specific
  - Side-form-layout
/tutorial/<type>/<id>

side-form-layout

visualization

<typename>-form
A customizable and extensible Tutorial Framework

Implementation ▶ Frontend

- landscape-service
  - open/close Application
  - landscapeinteraction
    - applicationinteraction
  - selectTarget
  - nextStep

- tutorial-service
  - selectTarget
  - activeStep

- side-form-layout
  - landscape-visualization
  - application-visualization
  - tutorial-form
  - sequence-form
  - step-form

- model
  - runmode

- route
Example Tutorial
Evaluation

Example Tutorial

Questionnaire
DEMONSTRATION
Tutorial Framework

Conclusion ➤ Evaluation

Evaluation:

- It was perfect
- Very intuitive
- Average intuitive
- Somewhat intuitive
- Not intuitive

Legend:
- **Blue**: tutorial
- **Red**: editor

Bar chart showing the distribution of user ratings for tutorial and editor.
Core application is changing
Tutorial Framework

Conclusion

irms

Core application is changing
Solutions for fundamental feature are developed
Core application is changing
Solutions for fundamental feature are developed
Successfully implemented tutorial framework
Future Work

▶ Landscape serializer fix / Kafka?
Future Work

- Landscape serializer fix / Kafka?
- Targeting elements outside visualization
Future Work

- Landscape serializer fix / Kafka?
- Targeting elements outside visualization
- Enhancing editor
Tutorial Framework

Conclusion ▶ Future Work

- Landscape serializer fix / Kafka?
- Targeting elements outside visualization
- Enhancing editor
- Strong guidance/experiment mode?