A customizable and extensible Tutorial Framework for improved Usability in ExplorViz

Helge Müller

June 28, 2019

Outline

1. Motivation
2. Goals
3. ExplorViz
   - Technologies
   - Structure
4. Tutorial Framework
   - Features
   - Extensible and customizable
5. Implementation
   - Backend
   - Frontend
6. Conclusion
   - Demonstration
   - Future Work

- Instruct new users

C A U
Christian-Albrechts-Universität zu Kiel
Technische Fakultät

- Instruct new users
- Consistent instruction

- Instruct new users
- Consistent instruction
- Learning by example

Motivation

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

- G1: Literature / Tool research

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

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

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

- 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

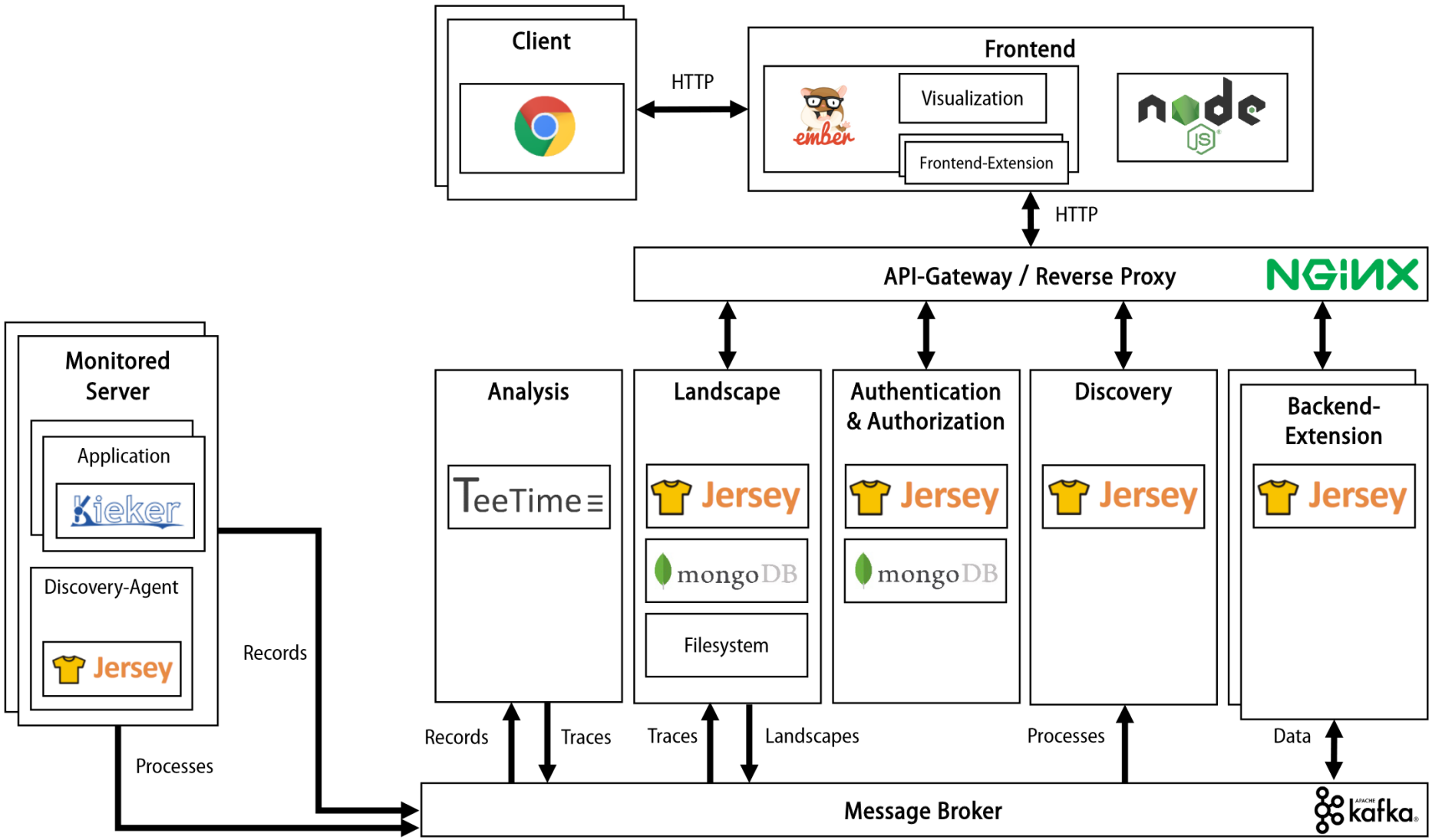
- Java

- Java
- Ember

- Java
- Ember
- JSON:API

Structure of ExplorViz

Image from "Modularization of Research Software for Collaborative Open Source Development" by Zirkelbach, Christian, Krause, Alexander and Hasselbring, Wilhelm (2019)



Structure of ExplorViz

- Frontend →Ember

Structure of ExplorViz

- Frontend →Ember
- Backend →Services

Structure of ExplorViz

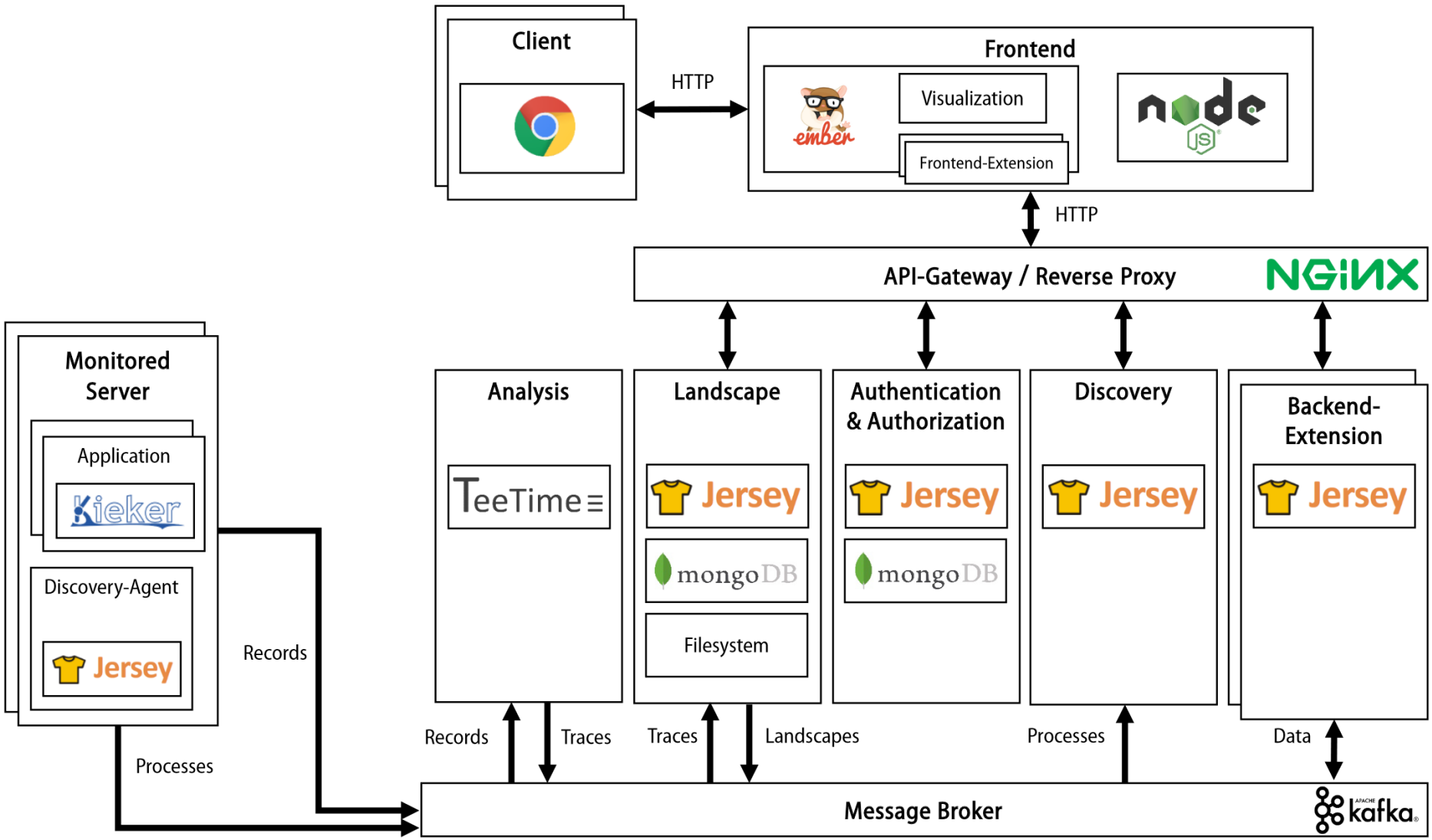
- Frontend →Ember
- Backend →Services
- Connections →

Structure of ExplorViz

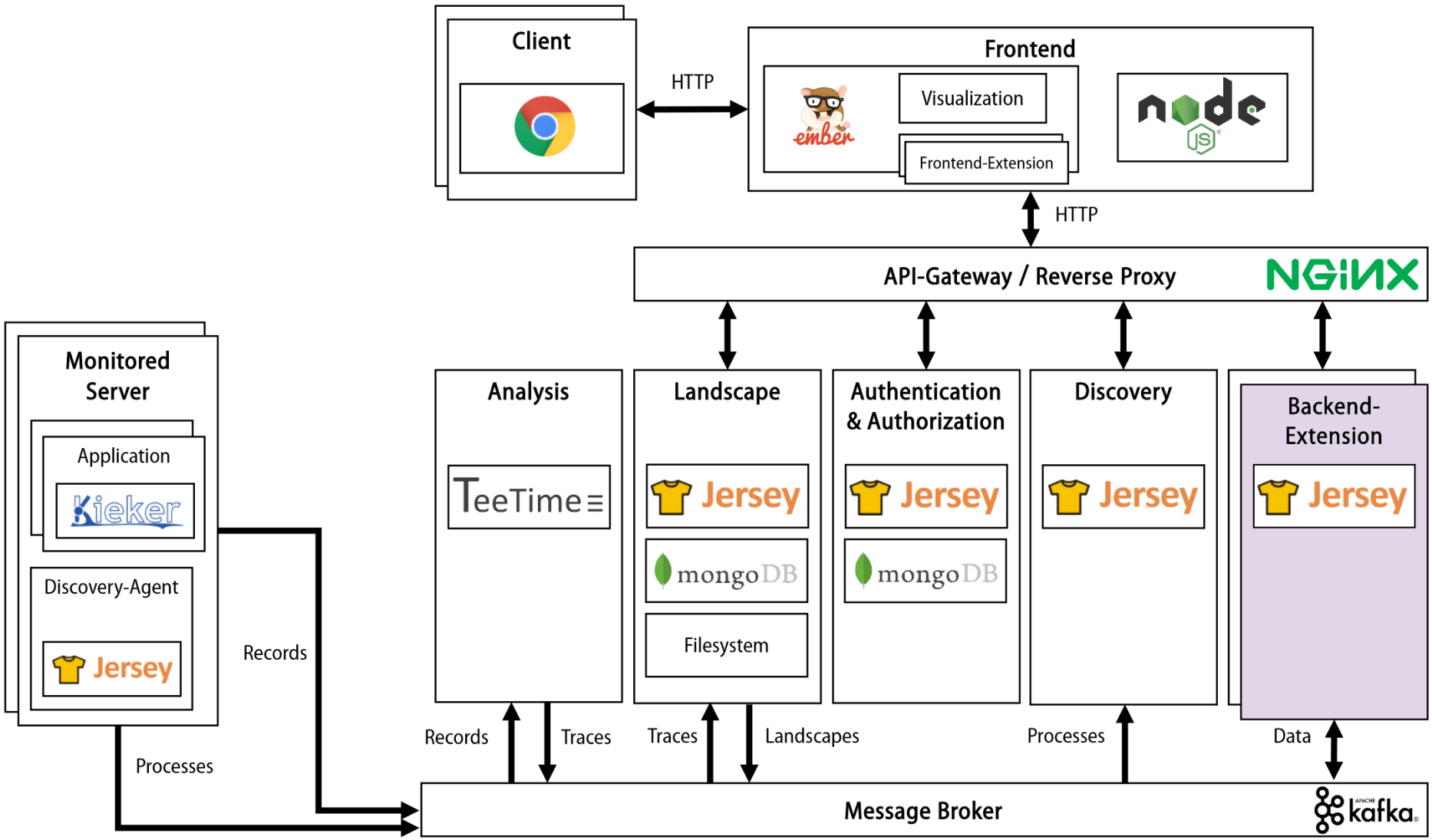
- Frontend →Ember
- Backend →Services
- Connections →
  - Reverse Proxy →JSON:API

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

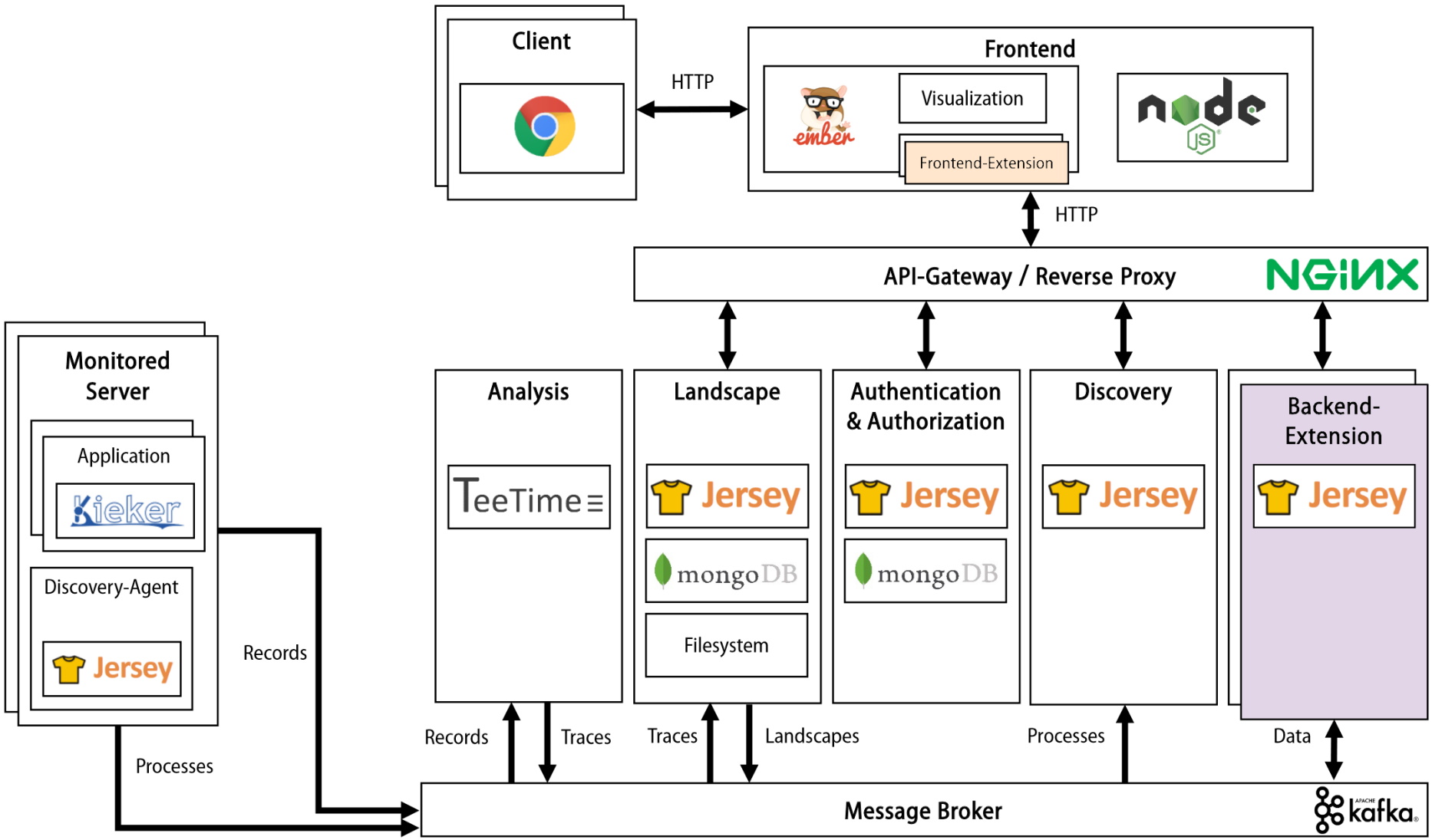
Structure of ExplorViz

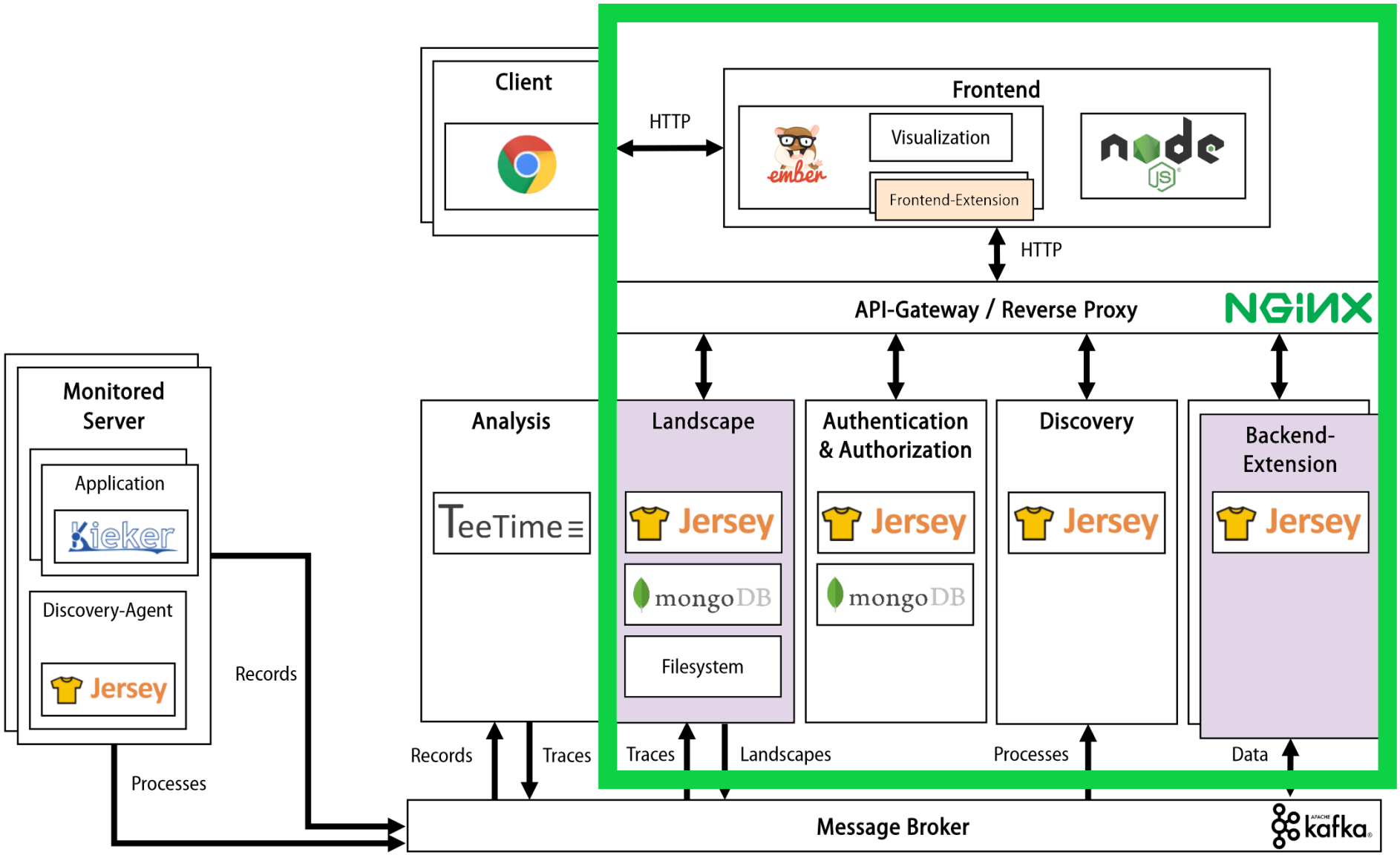


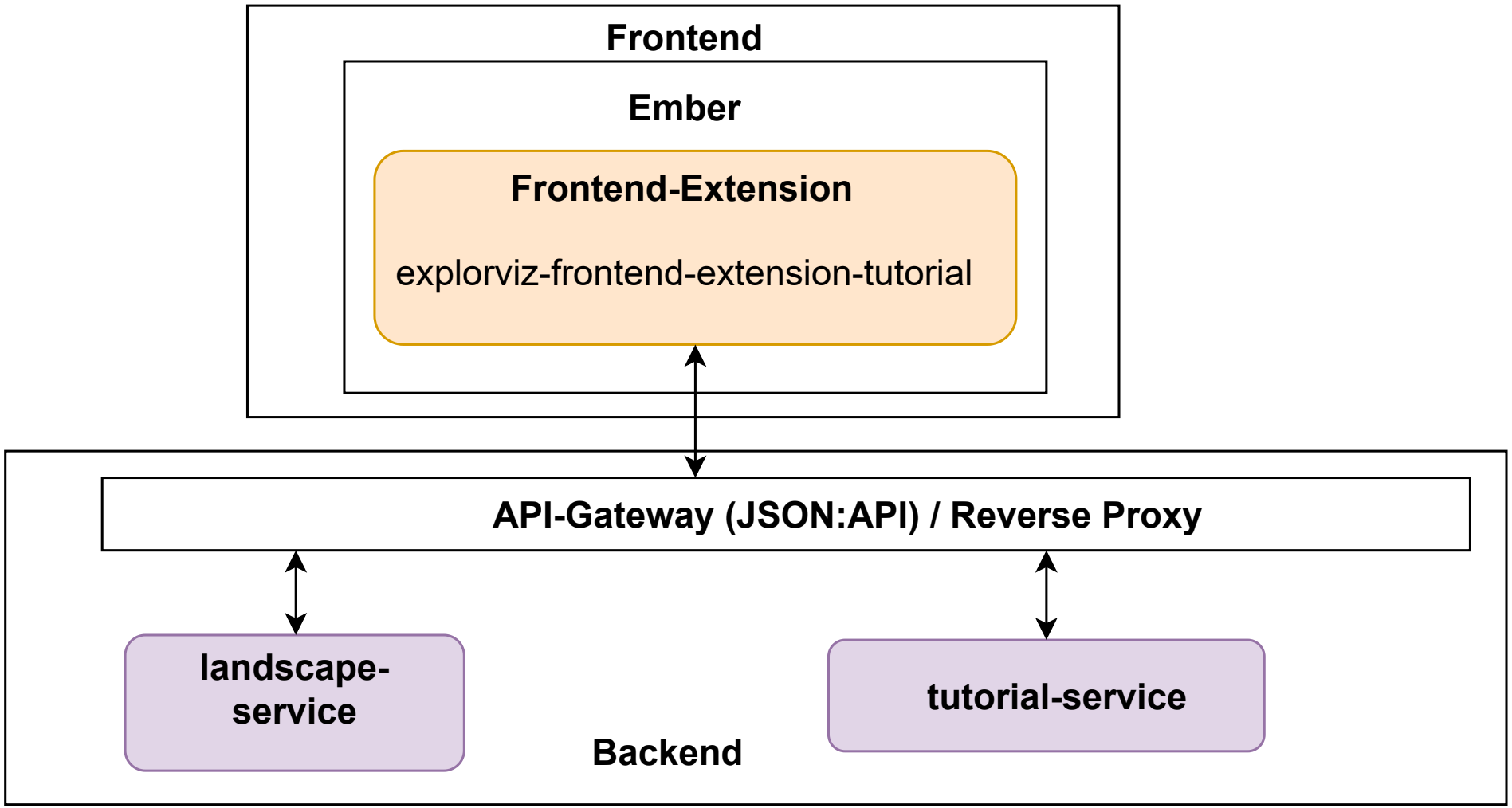
ExplorViz Extension



ExplorViz Extension




Client
HTTP
Frontend
Visualization
Frontend-Extension
HTTP
API-Gateway / Reverse Proxy
NGINX
Monitored Server
Application
Kieker
Discovery-Agent
Jersey
Analysis
TeeTime
Landscape
Jersey
mongoDB
Filesystem
Authentication & Authorization
Jersey
mongoDB
Discovery
Jersey
Backend-Extension
Jersey
Records
Processes
Records
Traces
Traces
Landscapes
Processes
Data
Message Broker
kafka


Frontend
Ember
Frontend-Extension
explorviz-frontend-extension-tutorial
API-Gateway (JSON:API) / Reverse Proxy
landscape-service
tutorial-service
Backend

- Implement tutorial extensions

- Implement tutorial extensions
  - Frontend addon

- Implement tutorial extensions
  - Frontend addon
  - Backend service

- Necessary features
- Implement tutorial extensions
  - Frontend addon
  - Backend service

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

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

- Execute tutorials

Features Frontend

- Execute tutorials
- Display instructions

- Execute tutorials
- Display instructions
- Detect user action

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

- 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

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

Extensible and customizable

- Expandable targeting mechanism

Extensible and customizable

- Expandable targeting mechanism
- Addon and service

Extensible and customizable

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

- Tutorial

- Tutorial
  - Main element

- Tutorial
  - Main element
  - Landscape reference

- Tutorial
  - Main element
  - Landscape reference
- Sequence

- Tutorial
  - Main element
  - Landscape reference
- Sequence
  - Provides additional structure

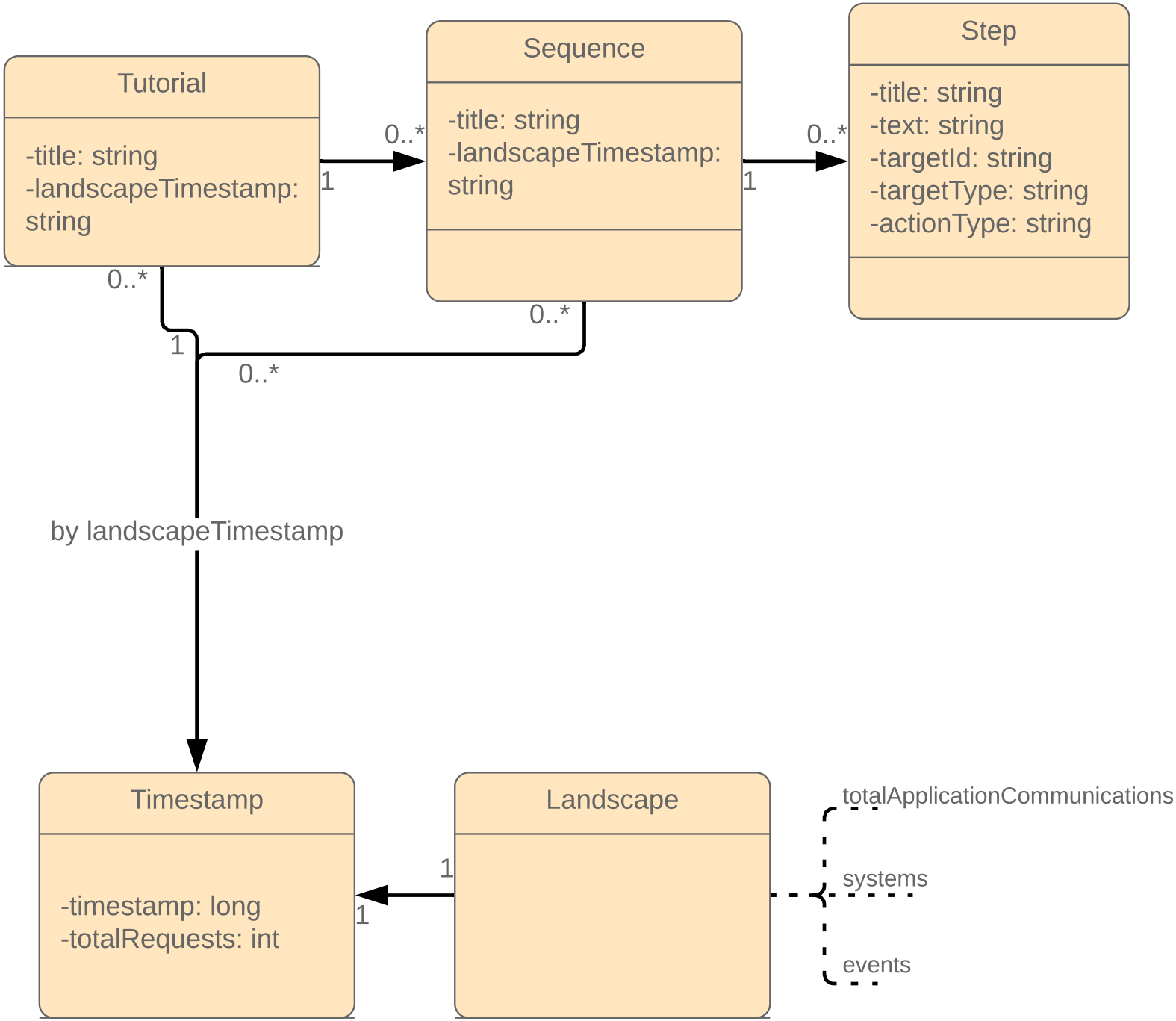
- Tutorial
  - Main element
  - Landscape reference
- Sequence
  - Provides additional structure
  - Optional landscape reference

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

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

- Tutorial
  - Main element
  - Landscape reference
- Sequence
  - Provides additional structure
  - Optional landscape reference
- Step
  - Instructions
  - Target and action

- Tutorial/sequence/step classes


Tutorial
-title: string
-landscapeTimestamp: string
Sequence
-title: string
-landscapeTimestamp: string
Step
-title: string
-text: string
-targetId: string
-targetType: string
-actionType: string
0..*
1
0..*
1
0..*
1
0..*
by landscapeTimestamp
Timestamp
-timestamp: long
-totalRequests: int
Landscape
1
1
totalApplicationCommunications
systems
events

- Tu

- Tutorial/sequence/step classes
- Timestamp

- 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

Serializing Landscapes

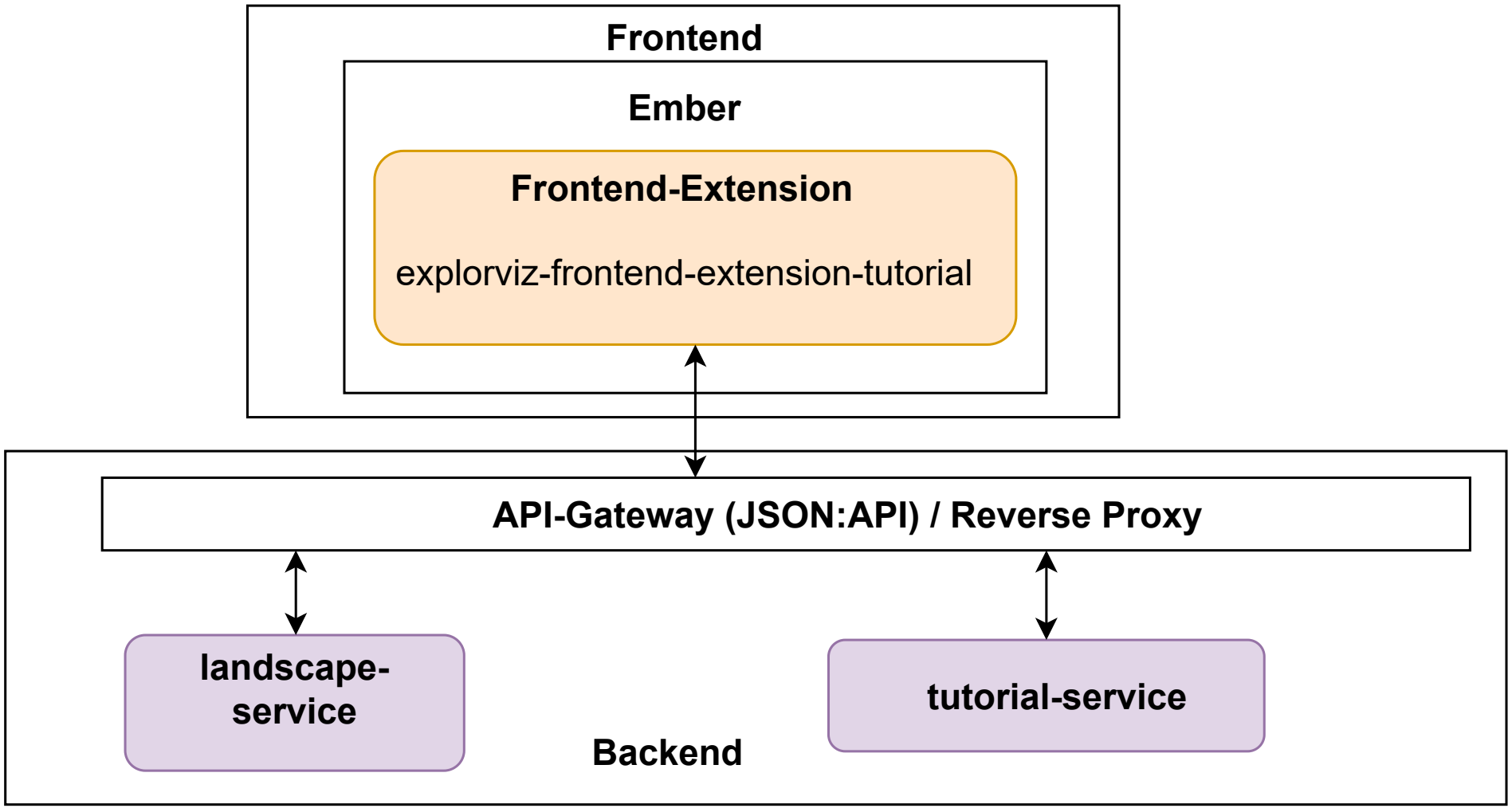
- Persist landscapes in tutorial service
- Avoid dependency to landscape service
- Save imported landscapes

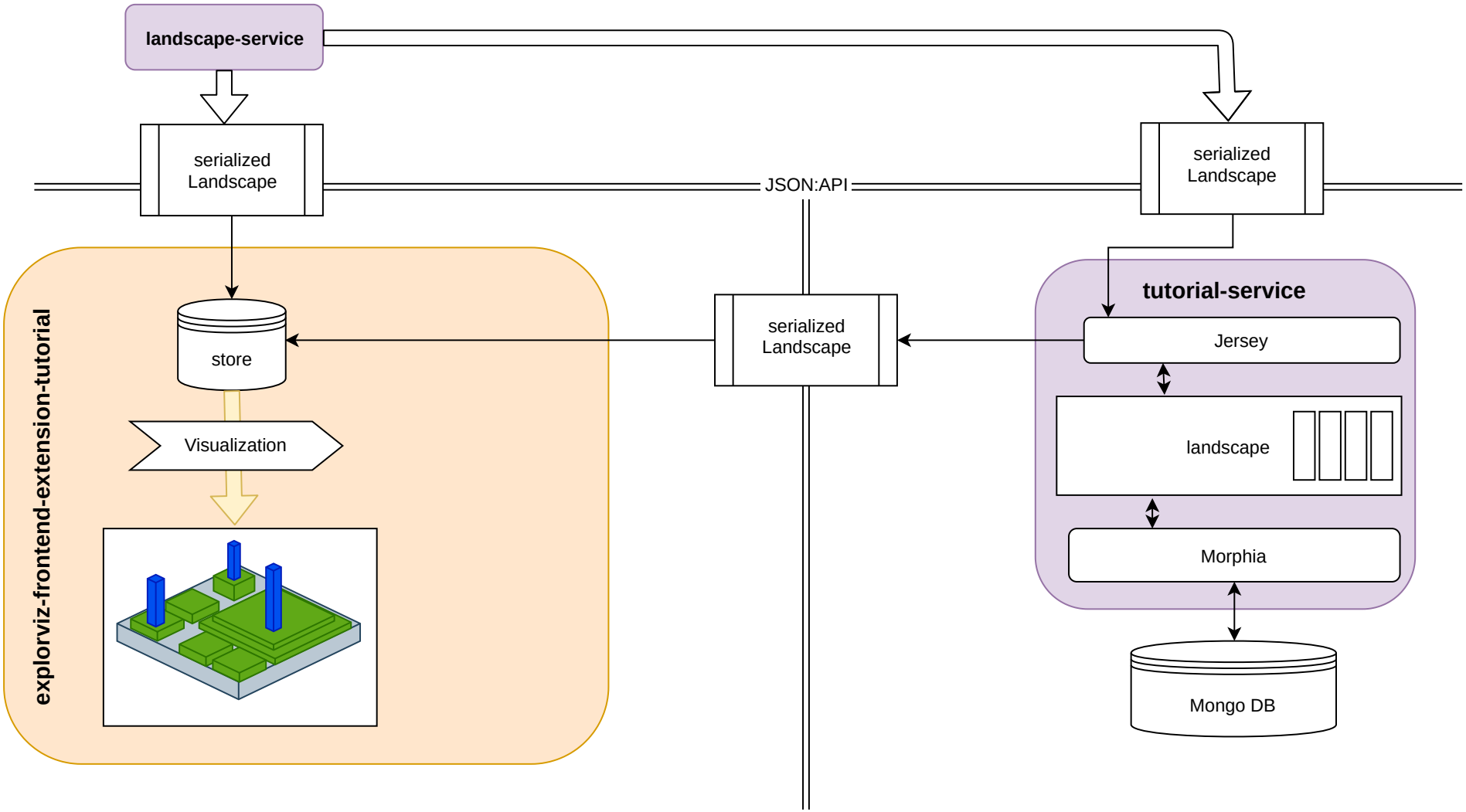
- from landscape / broadcast service

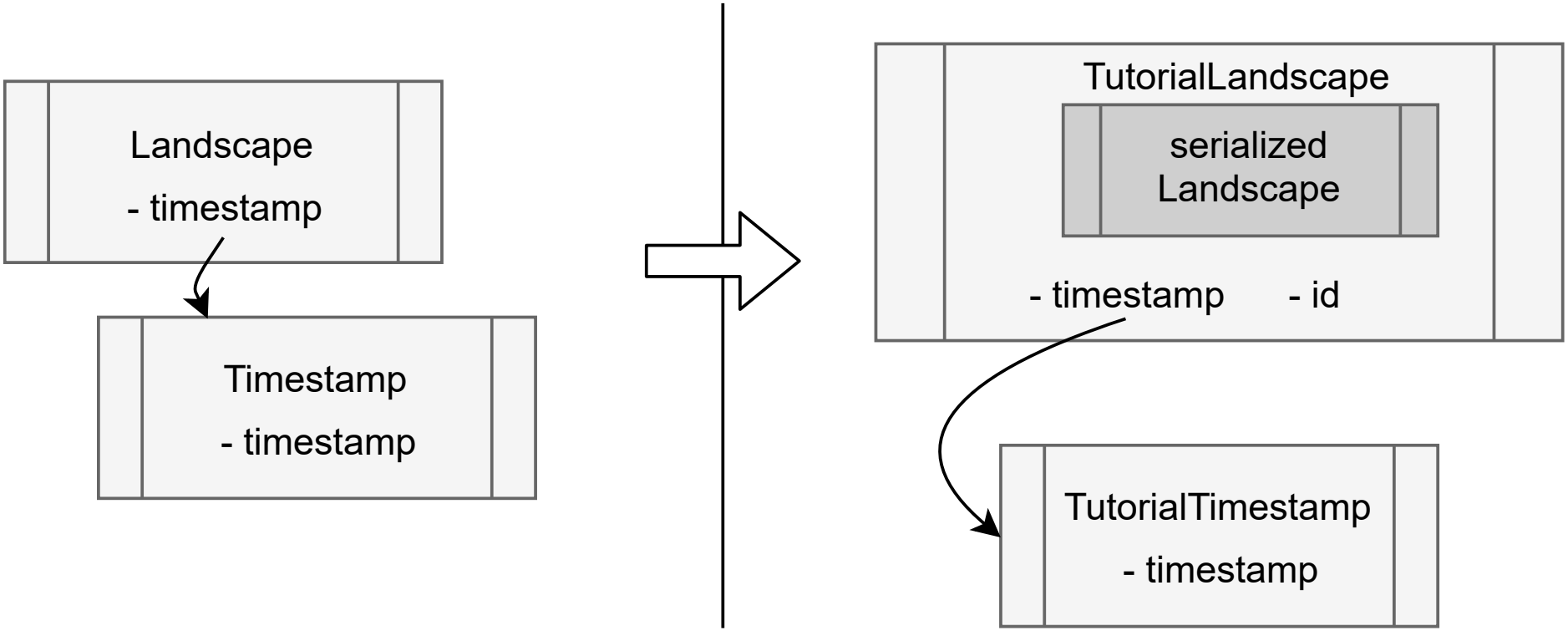
Serializing Landscapes

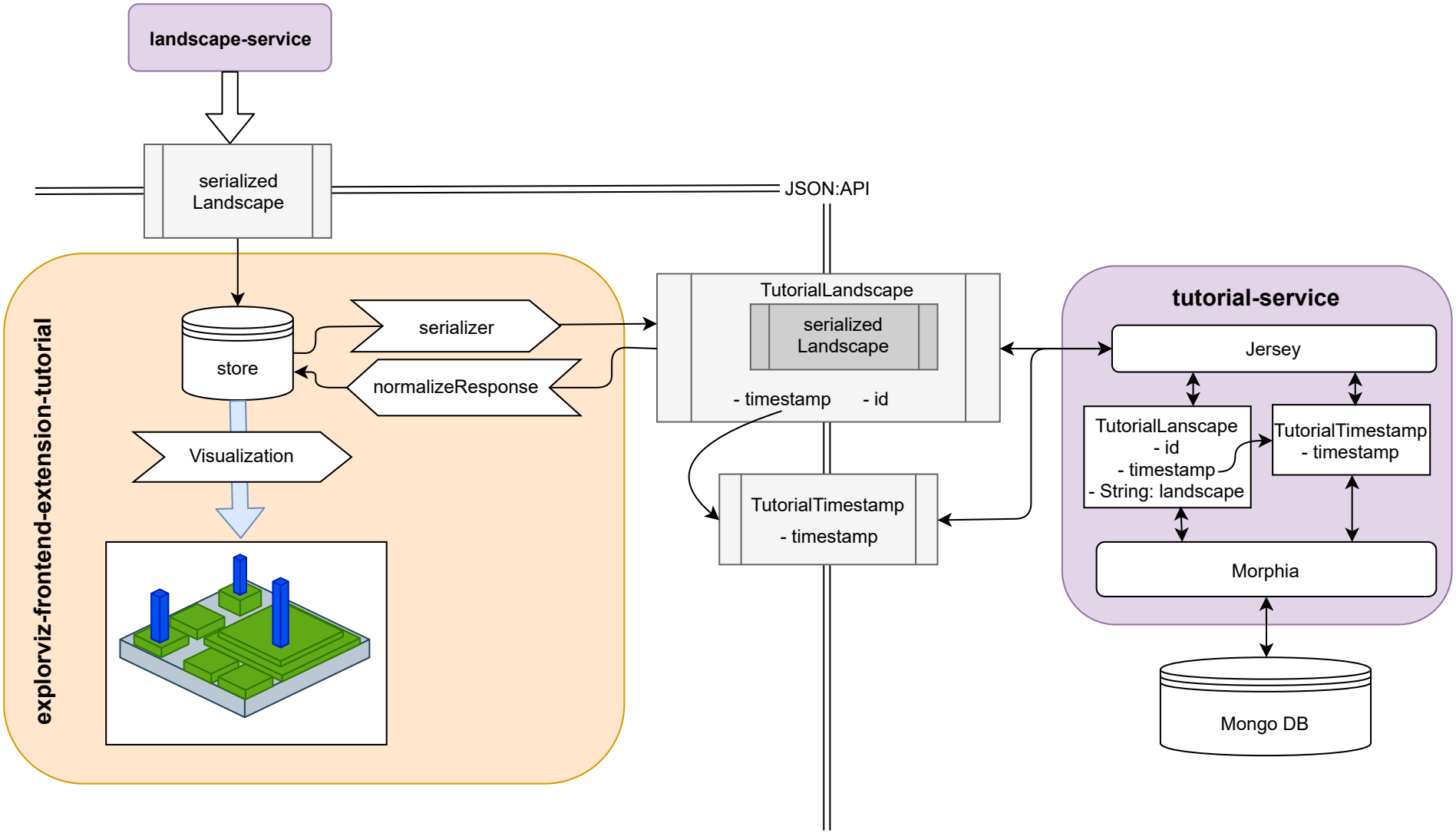
- Persist landscapes in tutorial service
- Avoid dependency to landscape service
- Save imported landscapes

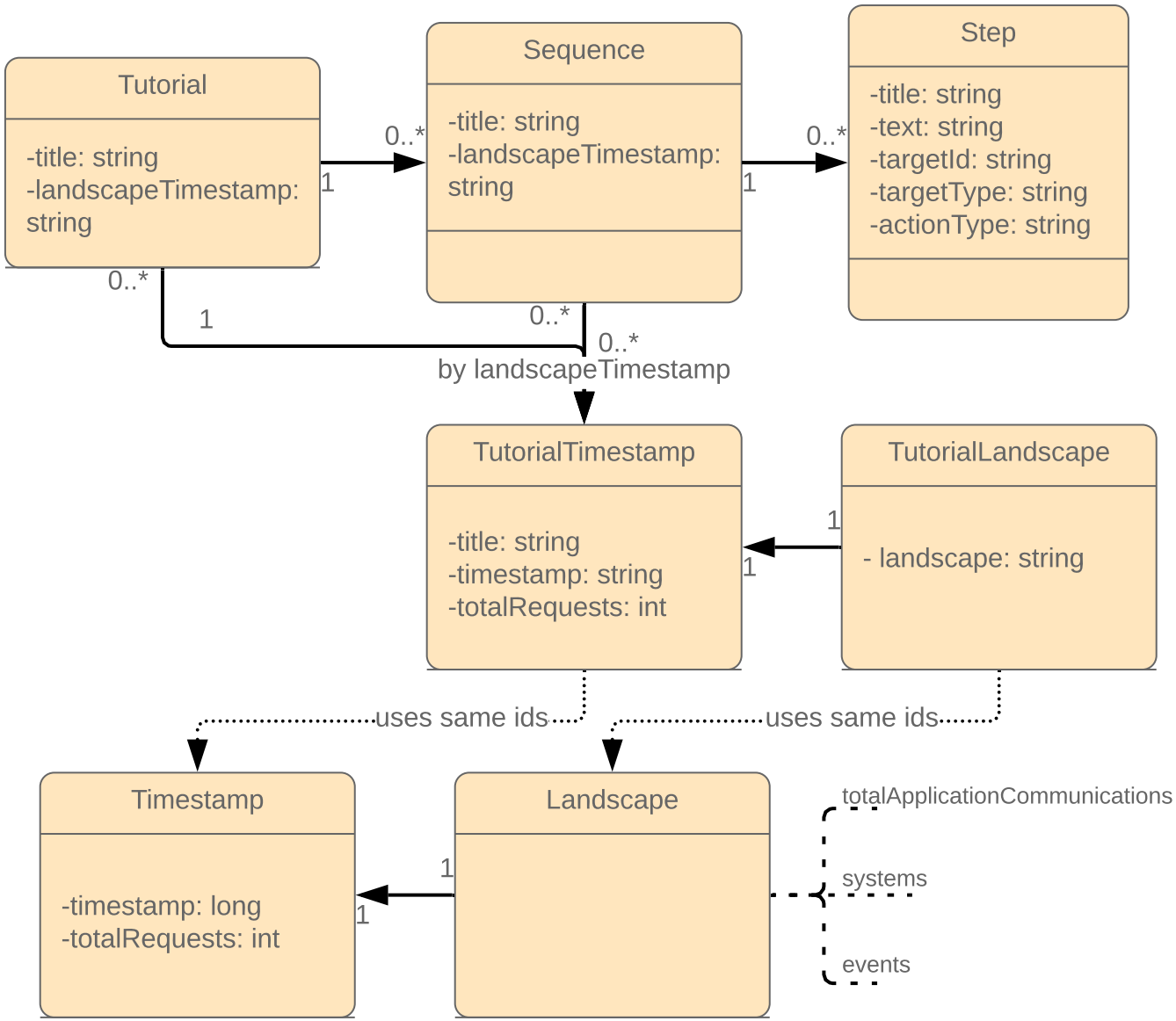
- from landscape / broadcast service
- to tutorial service database


Frontend
Ember
Frontend-Extension
explorviz-frontend-extension-tutorial
API-Gateway (JSON:API) / Reverse Proxy
landscape-service
tutorial-service
Backend


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


Landscape
- timestamp
Timestamp
- timestamp
TutorialLandscape
serialized
Landscape
- timestamp
- id
TutorialTimestamp
- timestamp


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


Tutorial
-title: string
-landscapeTimestamp: string
Sequence
-title: string
-landscapeTimestamp: string
Step
-title: string
-text: string
-targetId: string
-targetType: string
-actionType: string
0..*
1
0..*
1
0..*
1
0..*
0..*
by landscapeTimestamp
TutorialTimestamp
-title: string
-timestamp: string
-totalRequests: int
TutorialLandscape
- landscape: string
1
1
uses same ids
uses same ids
Timestamp
-timestamp: long
-totalRequests: int
Landscape
1
1
totalApplicationCommunications
systems
events

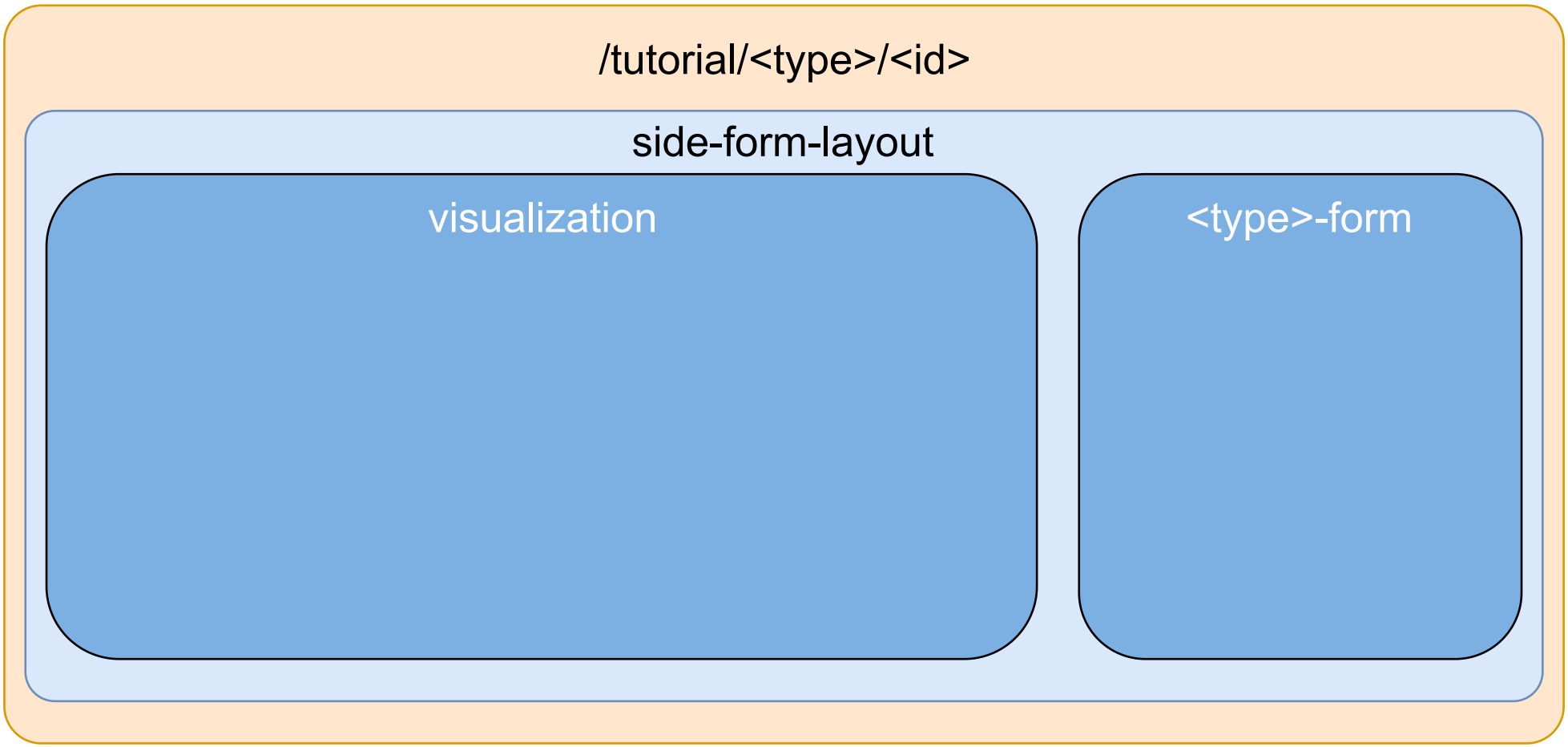
- Models (TutorialLandscape = landscape)

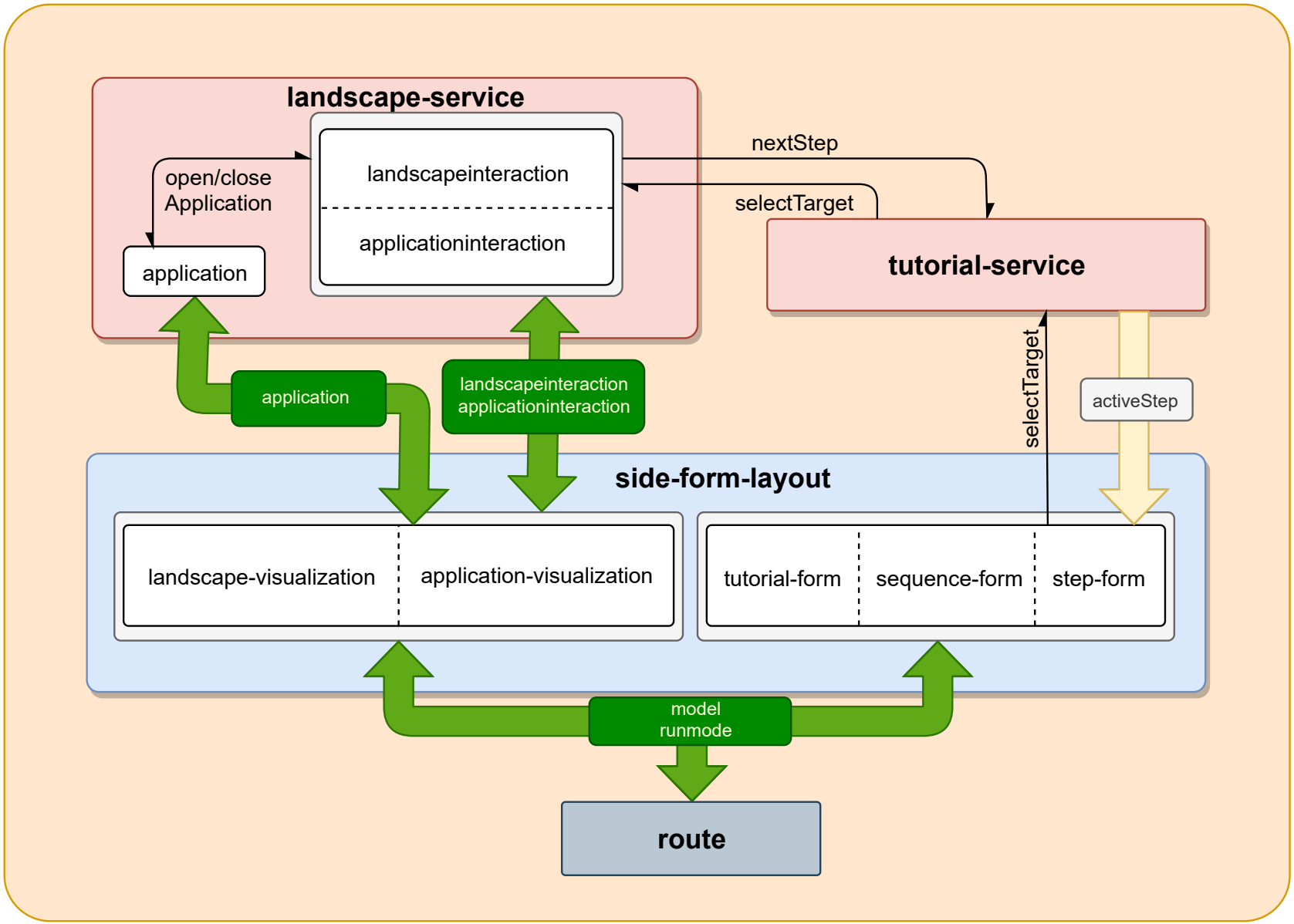
- Models (TutorialLandscape = landscape)
- Services

- Models (TutorialLandscape = landscape)
- Services
- Components

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

- Models (TutorialLandscape = landscape)
- Services
- Components
  - Type specific
  - Side-form-layout

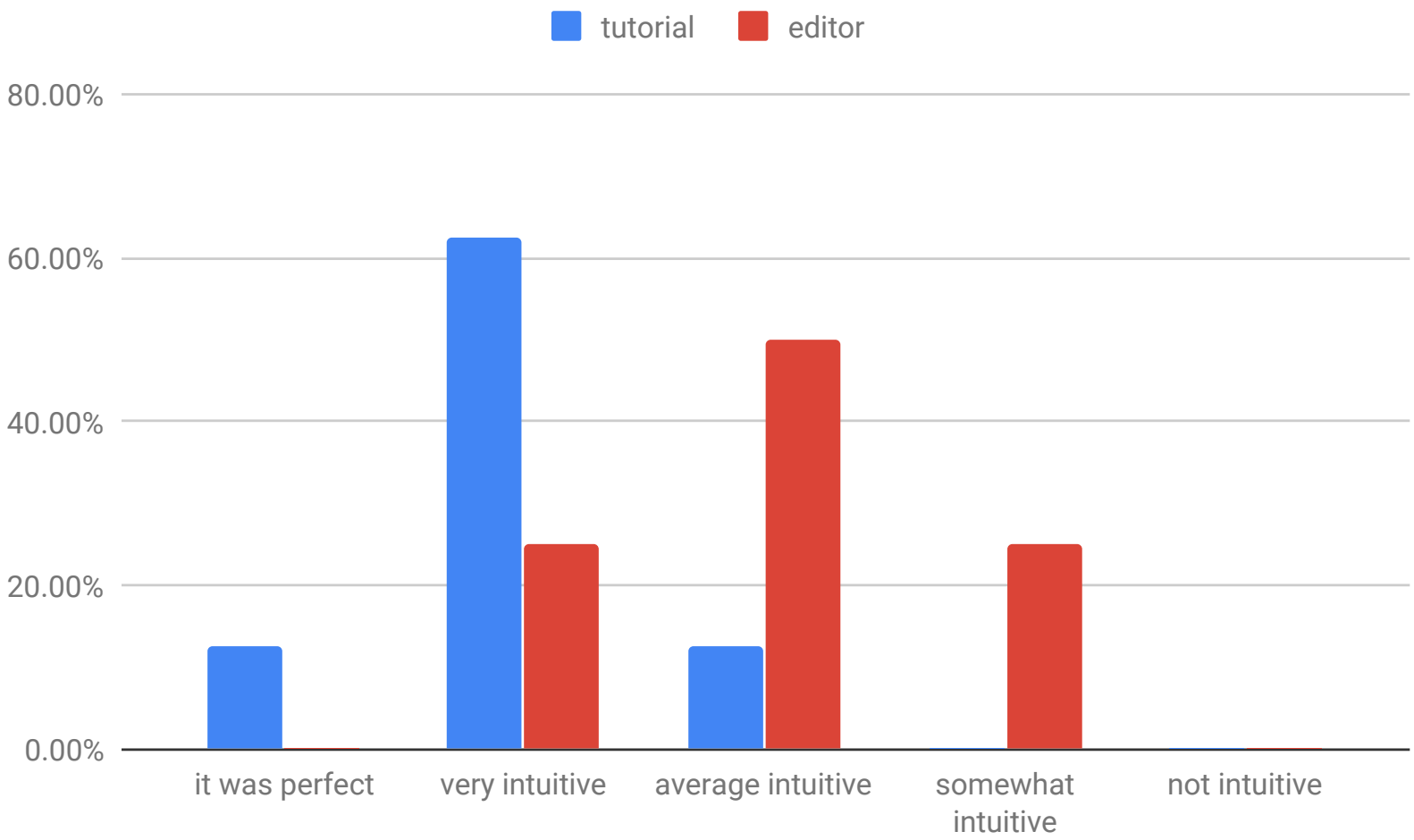

/tutorial/<type>/<id>
side-form-layout
visualization
<type>-form


landscape-service
landscapeinteraction
applicationinteraction
open/close Application
application
nextStep
selectTarget
tutorial-service
selectTarget
activeStep
application
landscapeinteraction
applicationinteraction
side-form-layout
landscape-visualization
application-visualization
tutorial-form
sequence-form
step-form
model
runmode
route

- Example Tutorial

- Example Tutorial
- Questionnaire

DEMONSTRATION


tutorial
editor
80.00%
60.00%
40.00%
20.00%
0.00%
it was perfect
very intuitive
average intuitive
somewhat intuitive
not intuitive

- Core application is changing

- Core application is changing
- Solutions for fundamental feature are developed

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

- Landscape serializer fix / Kafka?

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

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

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