Hands-On with Mendix 7

March 30 2017

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Mendix 7

- Smart Apps - Make your apps intelligent, proactive, and contextual
- Mendix Connector Kit - Defining integrations is now a breeze
- Mendix Web Modeler - Experience the value of collaborative development
- Native Mobile Experience – Anywhere, Always On
- Mendix Application Test Suite - Embed testing in your application life-cycle
- Mendix Application Performance Monitor - Get a grip on performance early on

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Mendix 7

- Resilient and scalable Apps – Stateless Mendix Runtime
- Smart Apps - Make your apps intelligent, proactive and contextual
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Mendix 7

- Resilient and scalable Apps – Stateless Mendix Runtime
  - Why a stateless runtime?
  - How does it work?
  - Best practices
- Migration to Mendix 7

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Mendix 7

- Resilient and scalable Apps – Stateless Mendix Runtime
  - Why a stateless runtime?
  - How does it work?
  - Best practices
- Migration to Mendix 7
- REST consume

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Why a Stateless Runtime?

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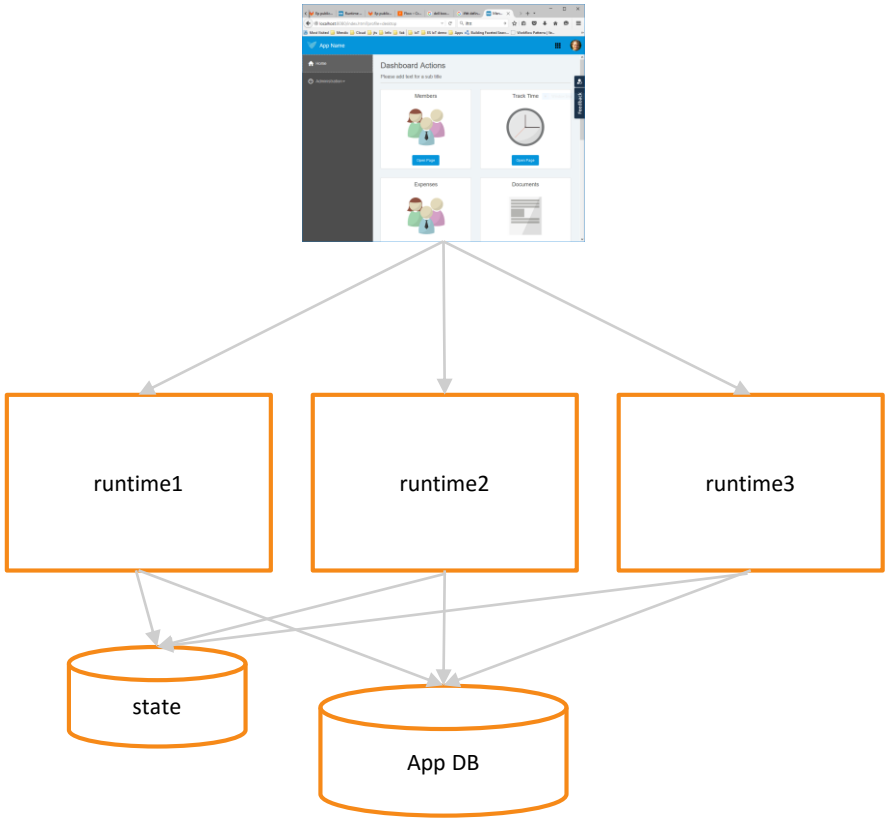
Mendix 6 – Shared State Database



- Runtime state shared in a state database: Redis
- Pros
  - Transparent to client
- Cons
  - Does not scale to large amounts of objects in session
  - Complex garbage collection
  - Complex infrastructure

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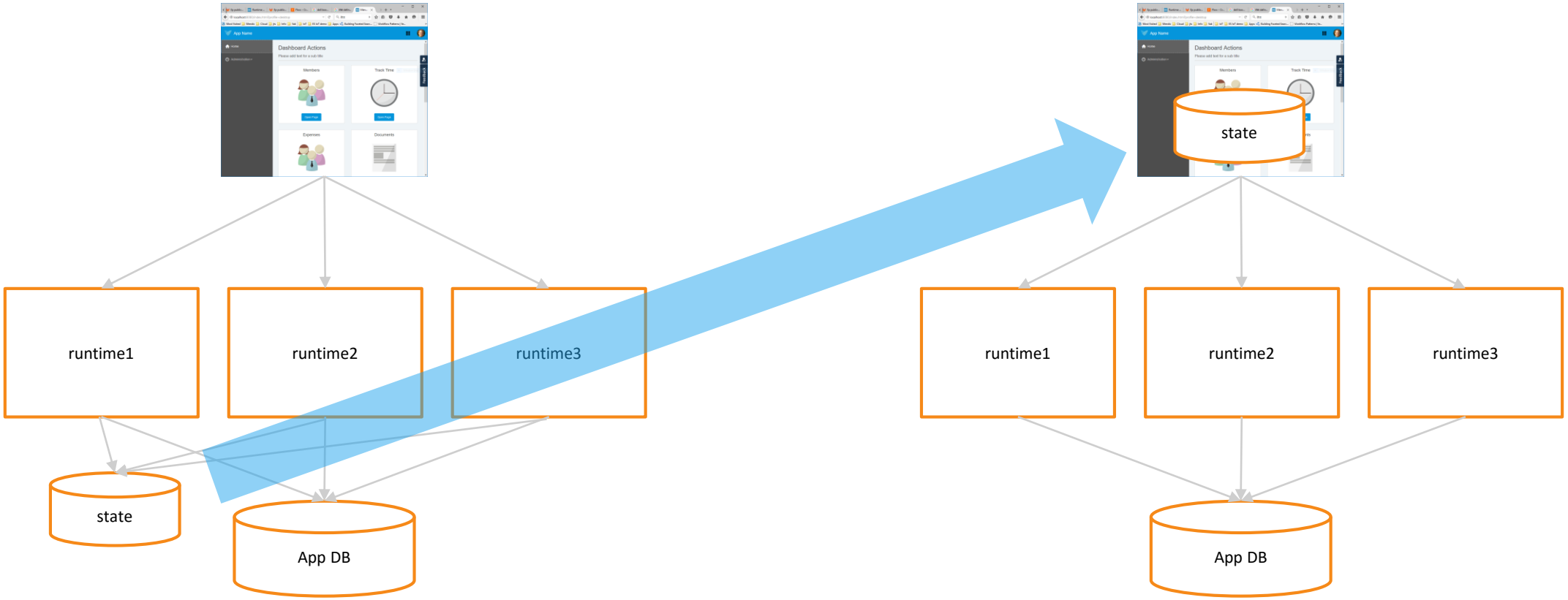
Mendix 7 - Stateless runtime



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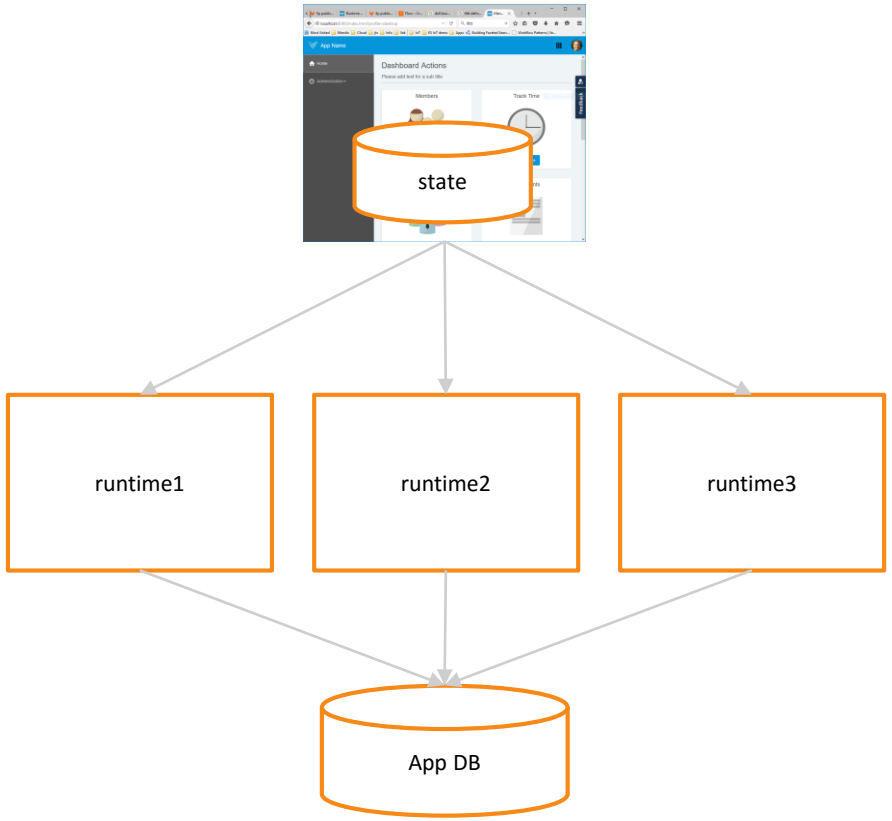
Mendix 7 - Stateless Runtime

- State is stored in client:
  - Objects in JavaScript memory
  - Garbage collected as soon as possible
  - Protected against changes of read-only data
  - Server communication optimized:
    - Minimal roundtrips
    - Minimal dataset needed by server
  - Model analysis to ensure server requests are as small as possible



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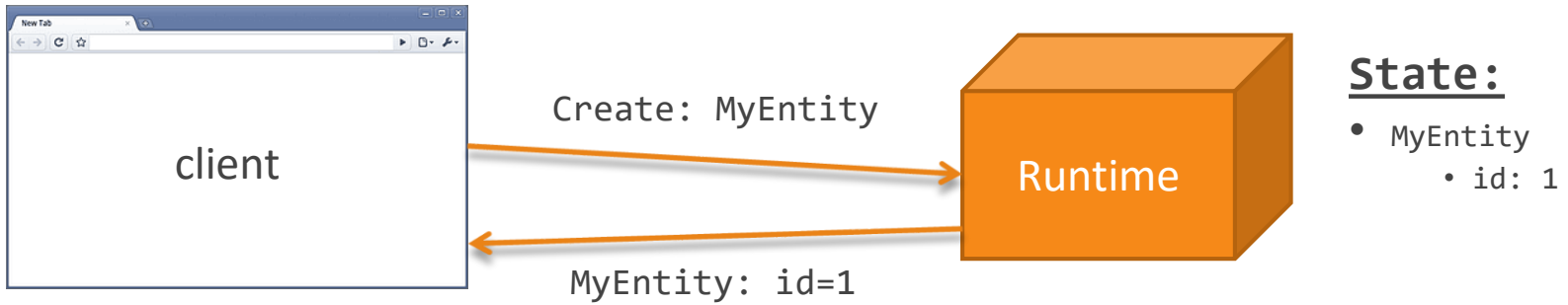
How Does This Work?

Important State Concepts

- What will be kept in state by client?
- What will be included in server communication?
- When to create association with session?

State in Mendix 6



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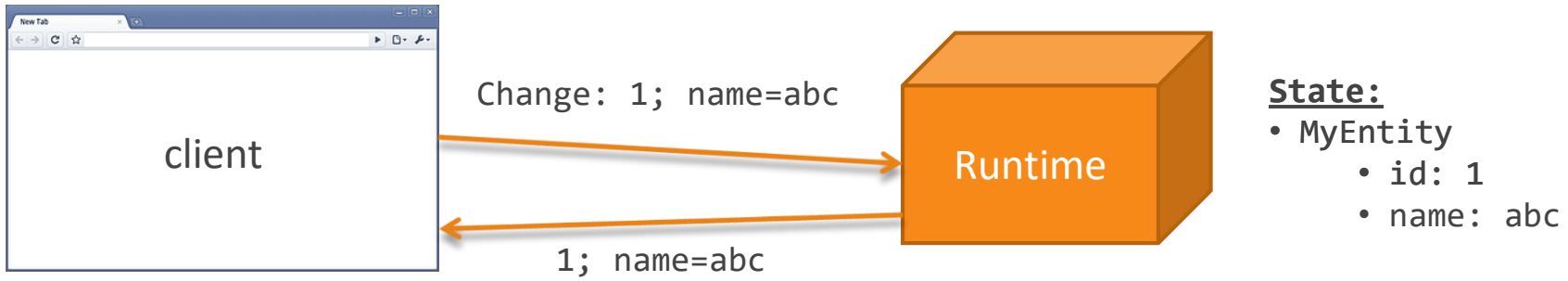

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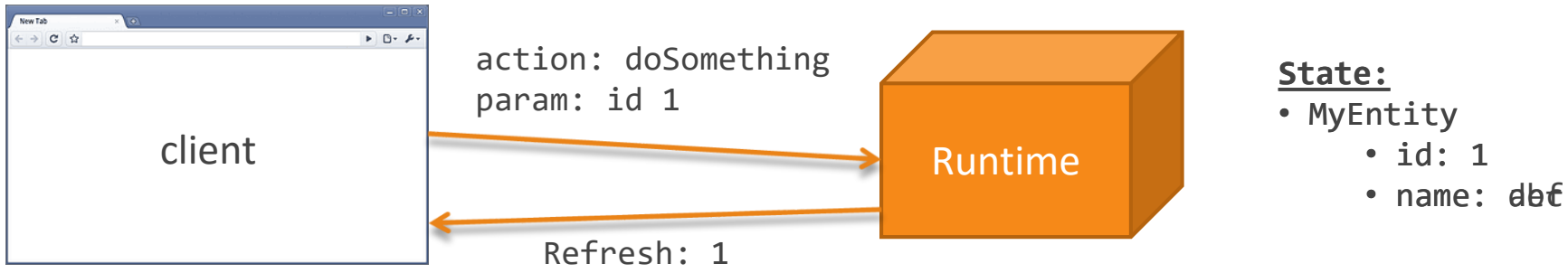

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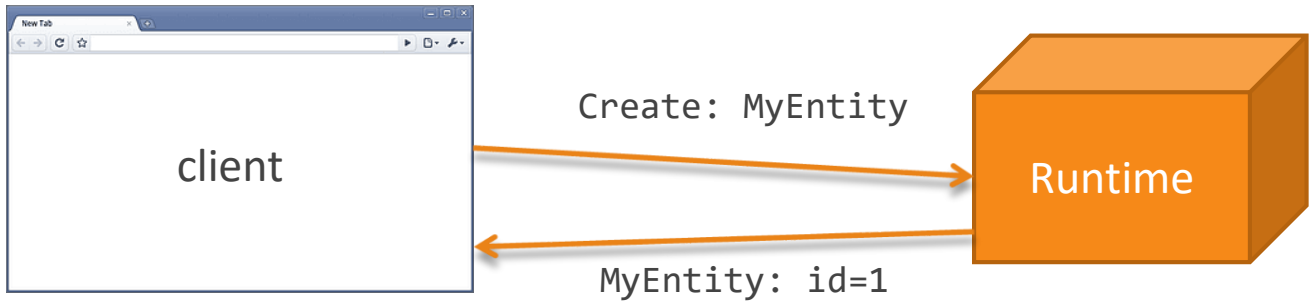
State in Mendix 6

- Session state stored server side
- Downsides
  - Scaling out (state synchronization)
  - Garbage collection
  - Chatty protocol
  - Runtime Memory usage

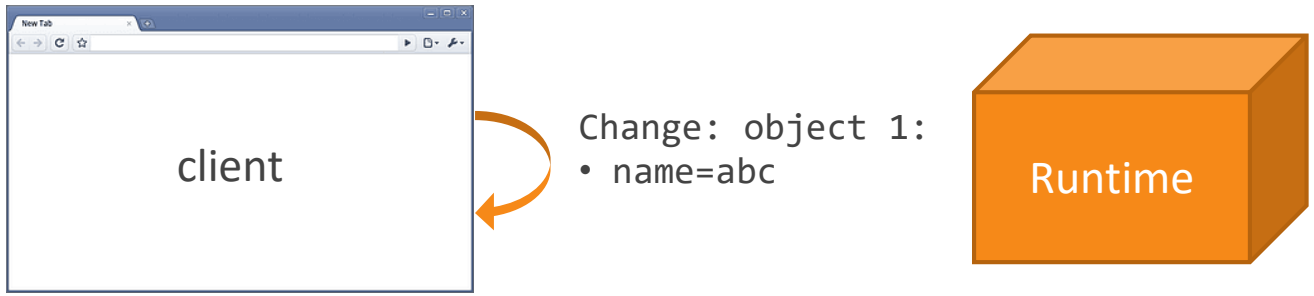
State in Mendix 7



State:

- MyEntity
  - id: 1

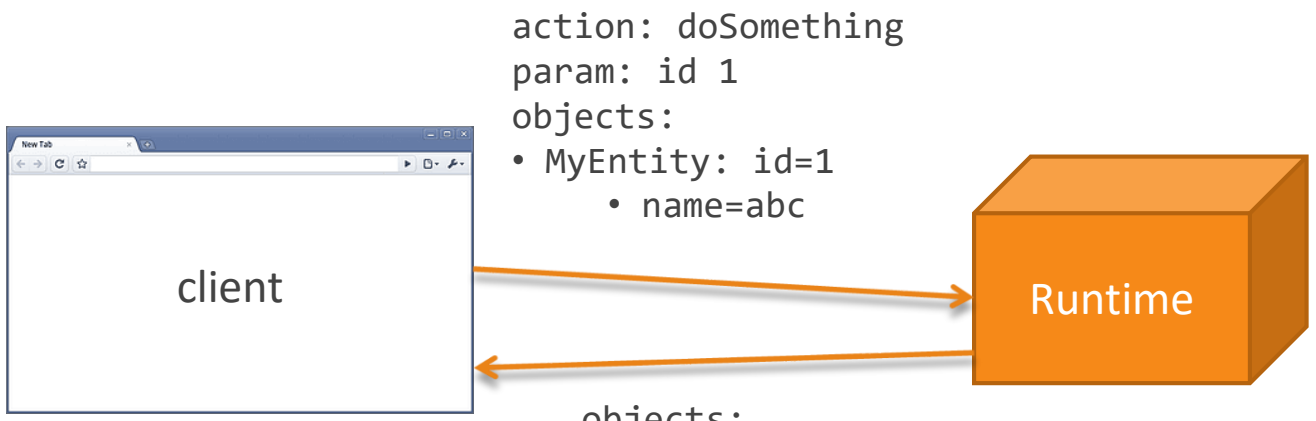
State in Mendix 7



State:

- MyEntity
  - id: 1
  - name: abc

State in Mendix 7



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State in Mendix 7

- All user session state stored client side
- Benefits
  - Fewer limitations on server scaling
  - Lower memory requirements in Runtime
  - Fewer roundtrips
  - More efficient garbage collection
  - Better insight for developers
- Potential side effects
  - Larger requests and responses
  - Due to optimizations in Mendix some apps actually have smaller requests!

Mendix 7: Impact on Your Projects

- Request input
  - What client state needs to be included when calling the server
- Reachable network
  - What client state can be accessed from pages

Mendix 7: Impact on Your Projects

- Request input calculated based on the reachable network of:
  - Request parameters (like microflow inputs and associations used in a microflow)
    - Optimizations are disabled for java actions and service calls
  - Current User object
  - Current Session object

- Reachable network is calculated based on objects available on the client
  - Garbage collection (GC) limits the reachable network
  - Static analysis of the model is used to determine server side data usage
  - GC keeps all reachable …
    - … *NPE objects* from current user, session and subscribed objects
    - … *changed objects* from current user, session and subscribed objects

Best Practices

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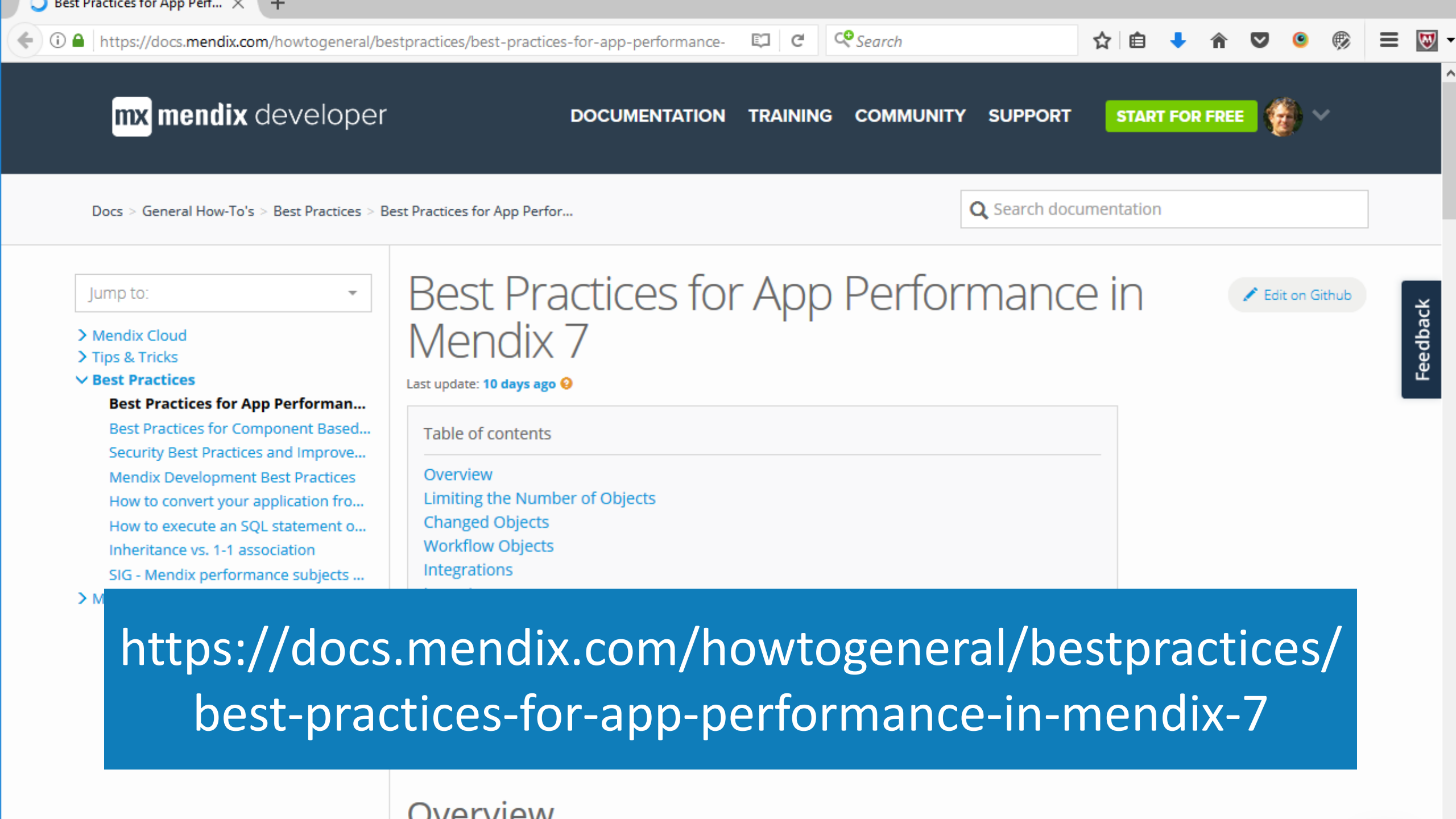
Best practice

- Minimize the number of in-use objects in your session
- Commit or roll back all changes to persistable objects before the end of the main microflow
- Link non-persistable objects that have long life spans to the current Session object
- Map only those parts of a web service integration that are necessary
- Delete any non-persistable objects as soon as they are no longer necessary
- Don’t use non-persistable objects in layouts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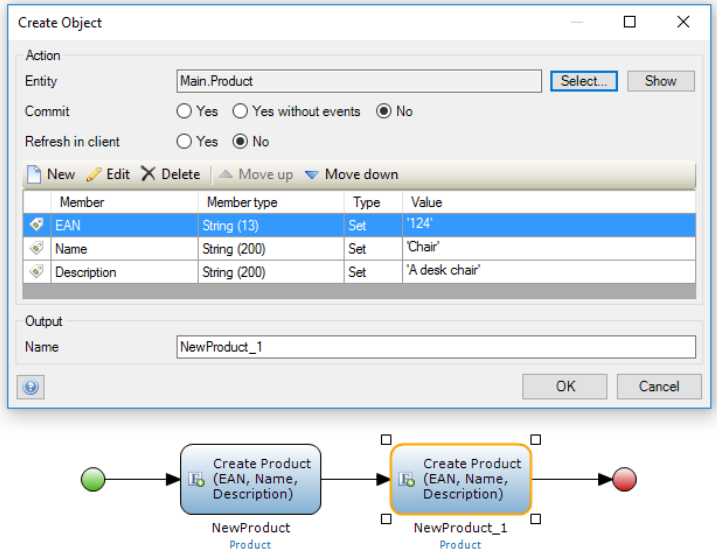
How to convert your application fro...
How to execute an SQL statement o...
Inheritance vs. 1-1 association
SIG - Mendix performance subjects ...
Best Practices for App Performance in Mendix 7
Edit on Github
Feedback
Last update: 10 days ago
Table of contents
Overview
Limiting the Number of Objects
Changed Objects
Workflow Objects
Integrations
https://docs.mendix.com/howtogeneral/bestpractices/best-practices-for-app-performance-in-mendix-7
Overview

Minimize In-Use Objects in Your Session

- In-use (dirty) objects cannot be garbage collected
  - Will increase memory usage of your client
  - May increase request size when calling server
- Consider
  - NPEs pointing to many objects used in layout
    - prevents GC as they stay reachable from subscribed object in layout
  - NPEs pointing to current user object and current session
    - they need to be manually deleted when no longer necessary

Minimize Dirty State at End of Microflow

- Dirty state (new or changed persistent objects) needs to be held by the browser until it's saved to the database
- Commit or roll back the changes to persistable objects before the end of the main microflow



Headers Preview Response Cookies Timing

```
▼{,…}
  actionResult: null
▼changes: {8444249301319781: {EAN: {value: "123"}, Description: {value: "A desk"}, Name: {value: "Table"}},…}
  ▼8444249301319781: {EAN: {value: "123"}, Description: {value: "A desk"}, Name: {value: "Table"}}
    ▶Description: {value: "A desk"}
    ▶EAN: {value: "123"}
    ▶Name: {value: "Table"}
  ▼8444249301319782: {EAN: {value: "124"}, Description: {value: "A desk chair"}, Name: {value: "Chair"}}
    ▶Description: {value: "A desk chair"}
    ▶EAN: {value: "124"}
    ▶Name: {value: "Chair"}
▼newpersistable: ["8444249301319781", "8444249301319782"]
    0: "8444249301319781"
    1: "8444249301319782"
▶objects: [{objectType: "Main.Product", guid: "8444249301319781",…},…]
```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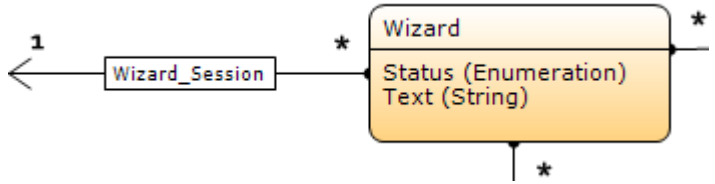
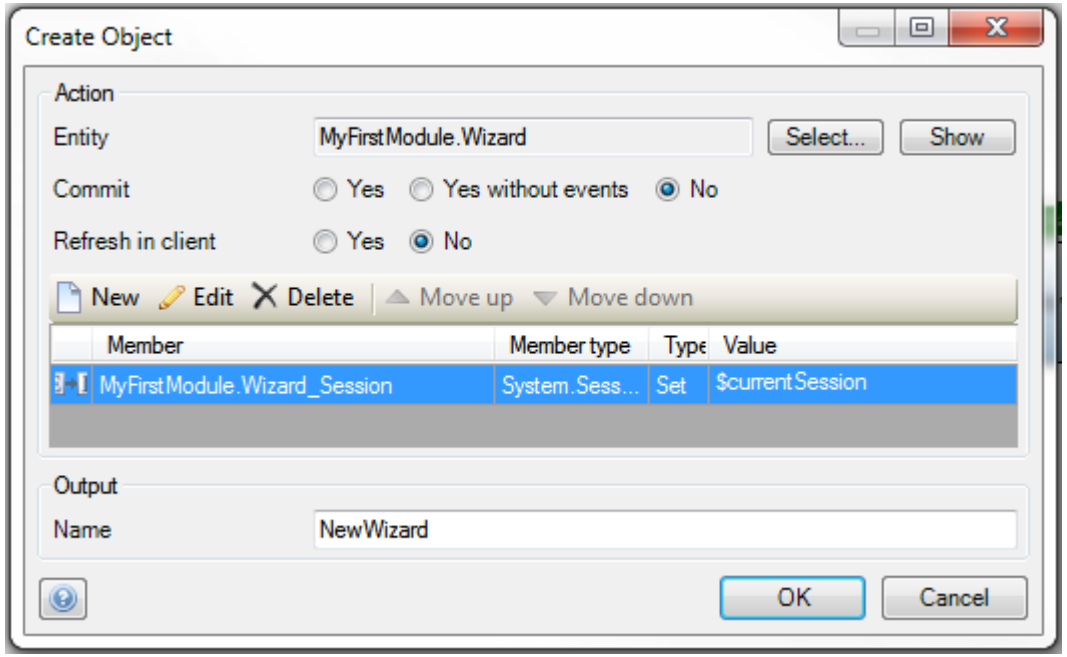
Link Long-Lived NPEs to Current Session

- By linking to $currentSession
  - Garbage collection knows it cannot be garbage collected
  - You can easily retrieve it
- Delete the NPE when no longer used





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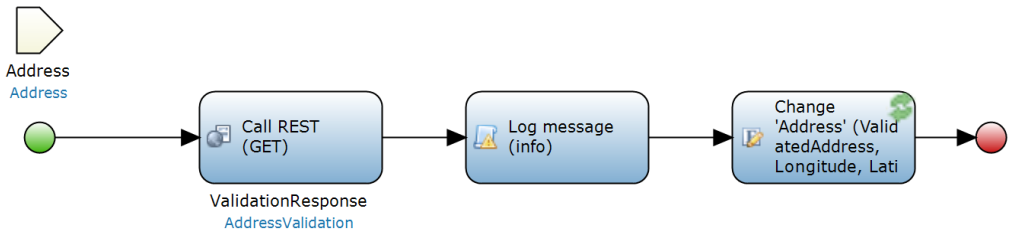
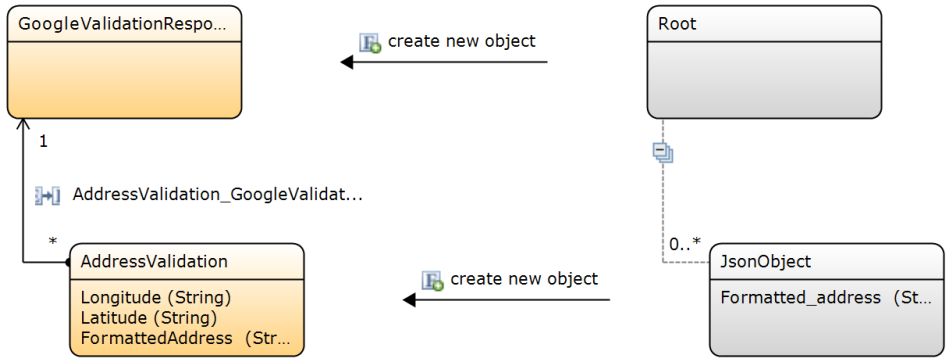
Integration: Calling Services

- NPEs resulting from a service call will all be sent to the browser



- Tips
  - Map only those parts of a web service integration that are necessary
  - Delete NPEs as soon as they are no longer necessary
  - Use database (persistent entities) to cache service call results



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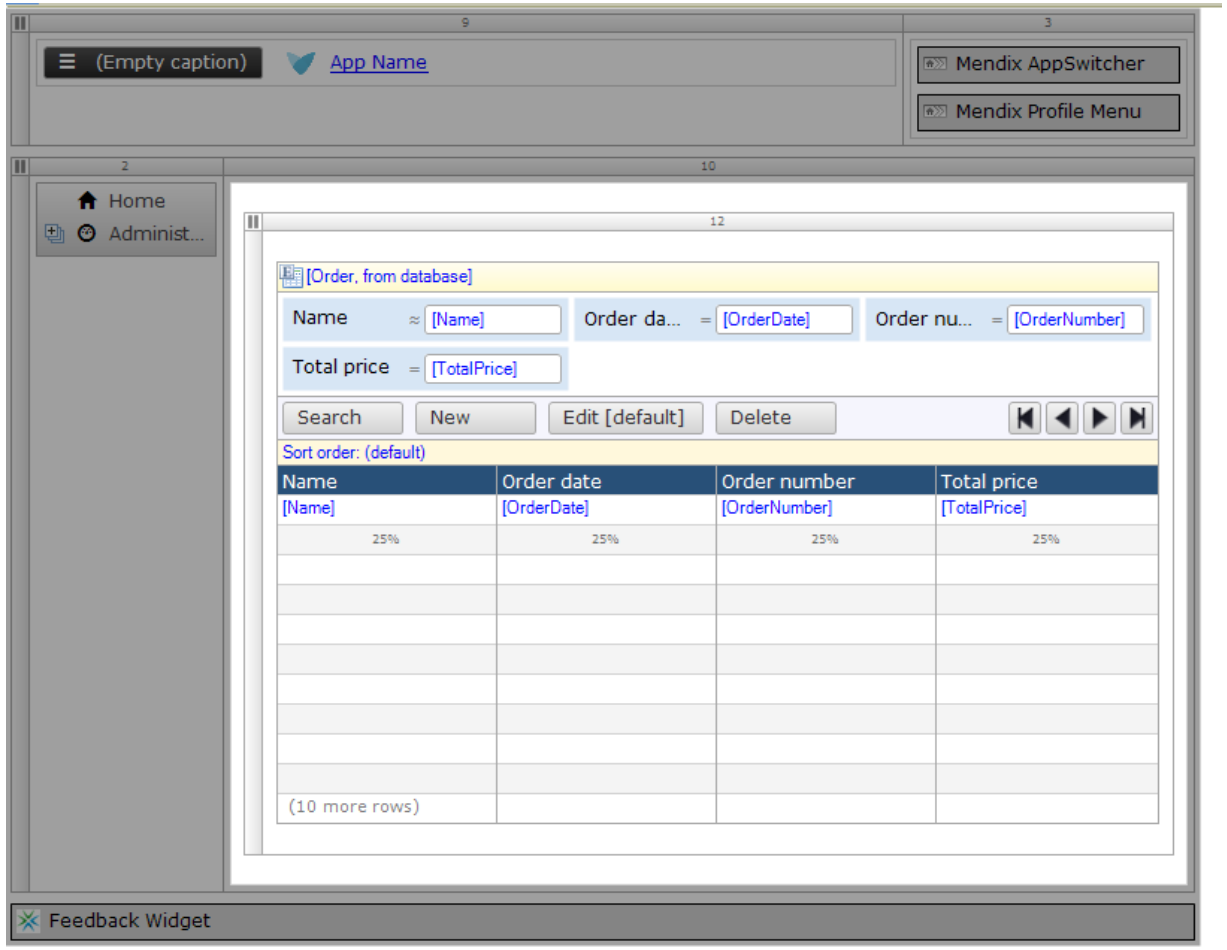
Don’t Use NPEs in Layouts

- Objects in layouts can be on the screen for a long time
- These will be sent back and forth between the client and Runtime very often



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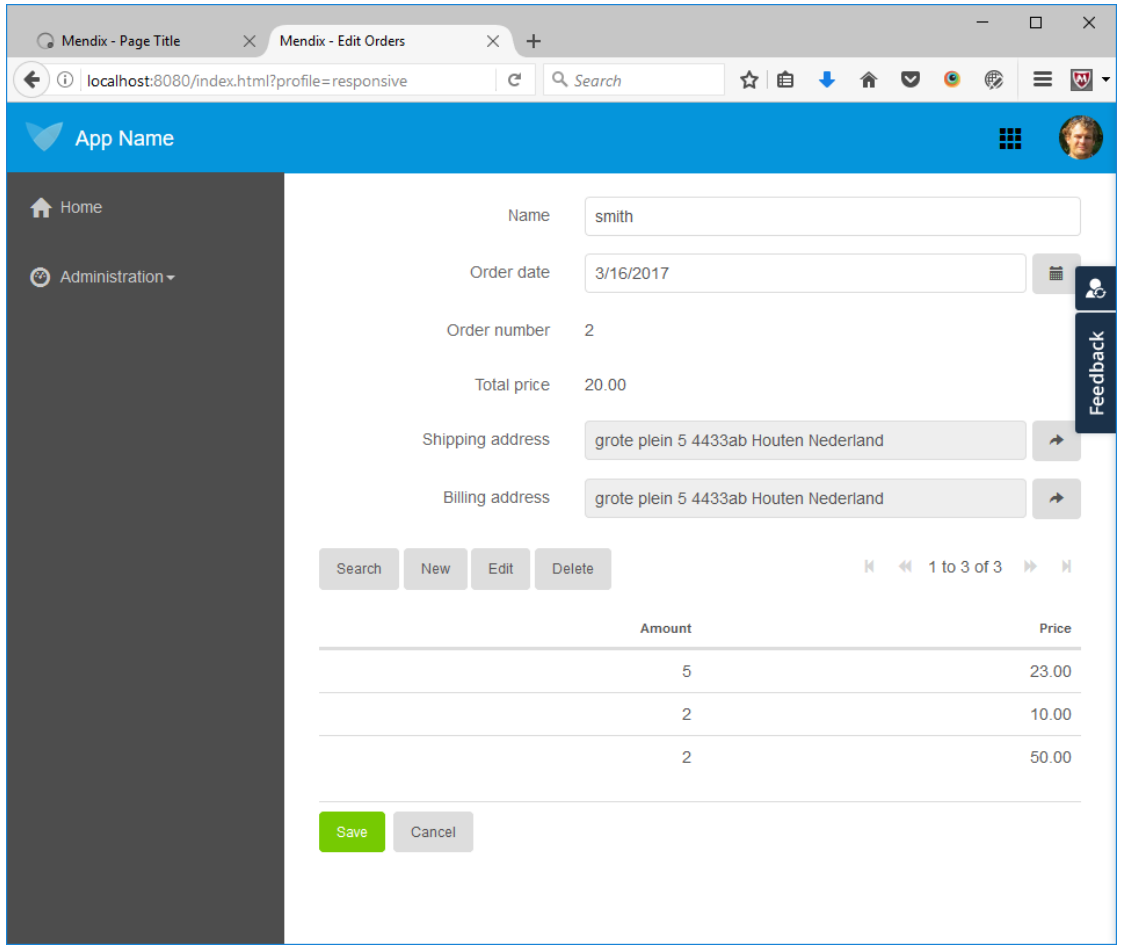
Browser State

- Browser refresh loses any unsaved changes
- Multiple browser tabs behave like separate browsers
  - Each browser tab has own client state



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Custom Widgets: Use widget.subscribe

- Objects with subscribed widgets will not be garbage collected
  - widget.subscribe will automatically unsubscribe if no longer used
  - data.subscribe needs manual data.unsubscribe
- More info:
  - https://apidocs.mendix.com/7/client/mx.data.html
  - https://apidocs.mendix.com/7/client/mxui_widget__WidgetBase.html

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Developer Support

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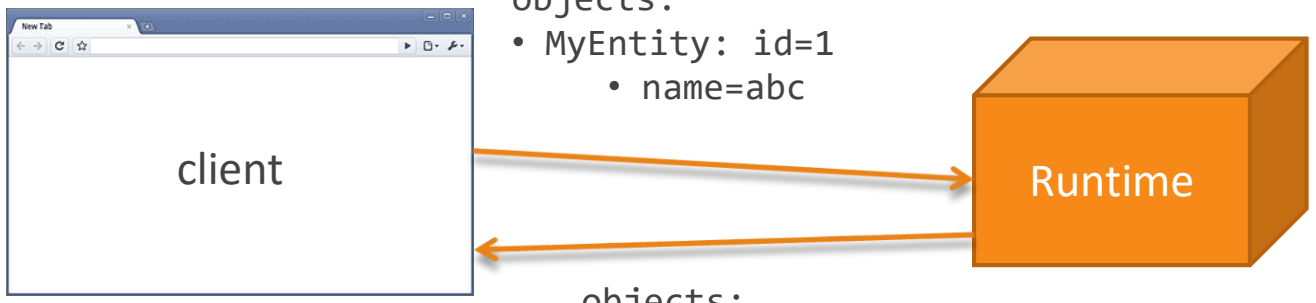
Monitoring Request Size in Server Log

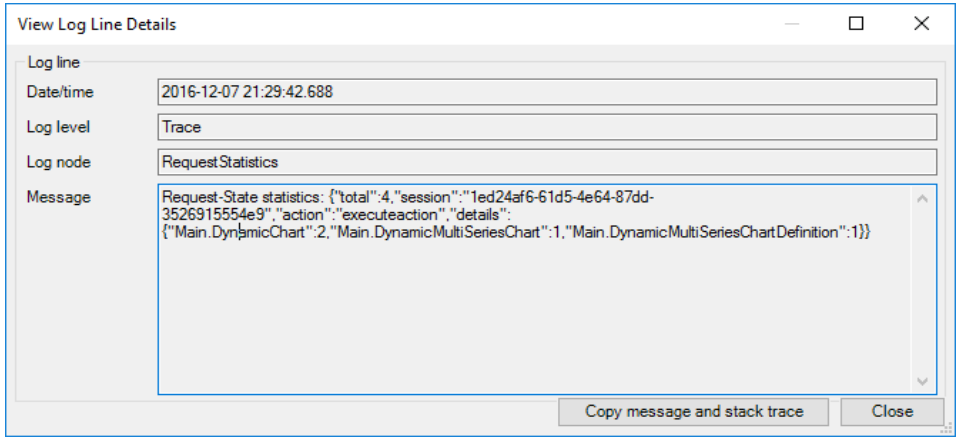



```
action: doSomething
param: id 1
objects:
• MyEntity: id=1
    • name=abc
```

```
objects:
• MyEntity: id=1
    • name=def
```

State:

- MyEntity
    - id: 1
    - name: def



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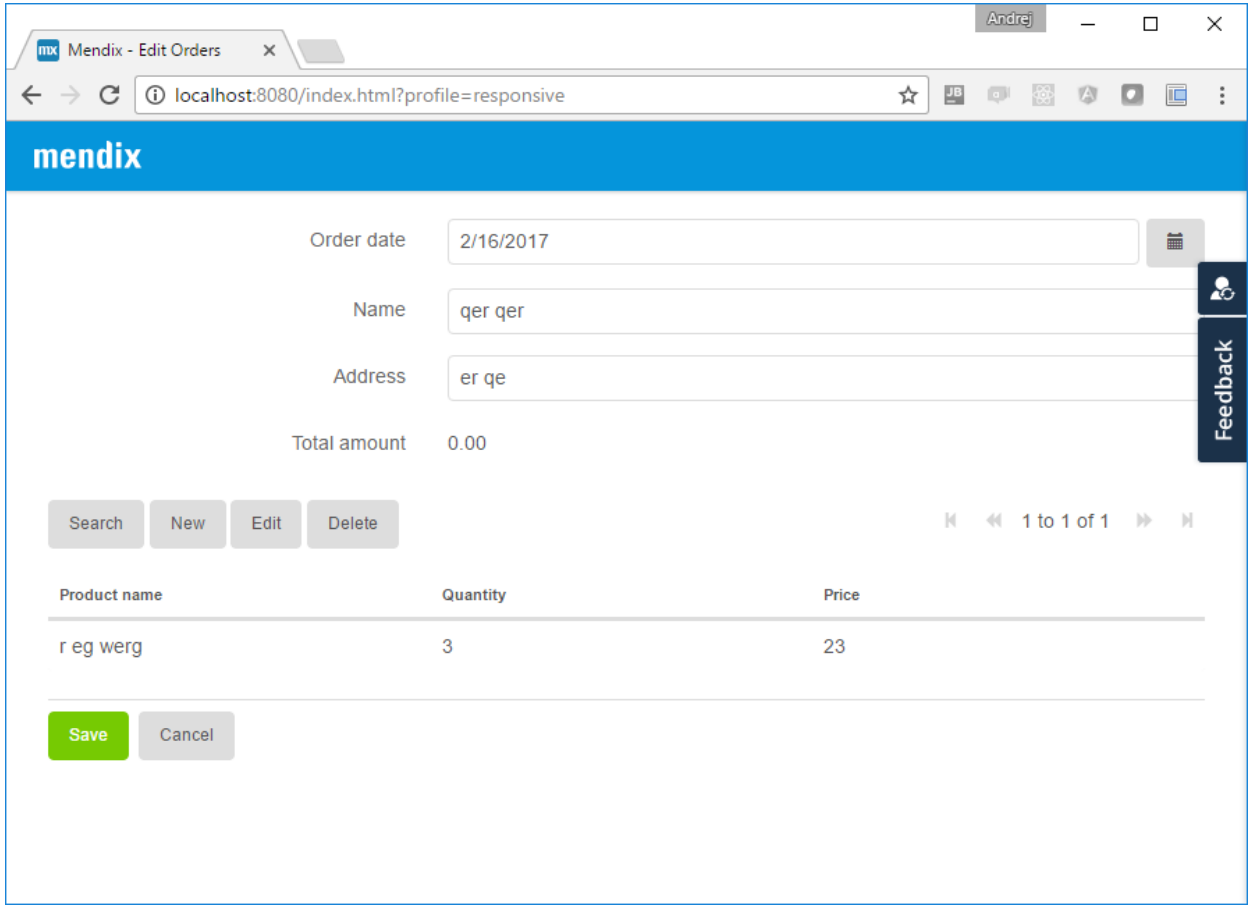
Browser Developer Tools



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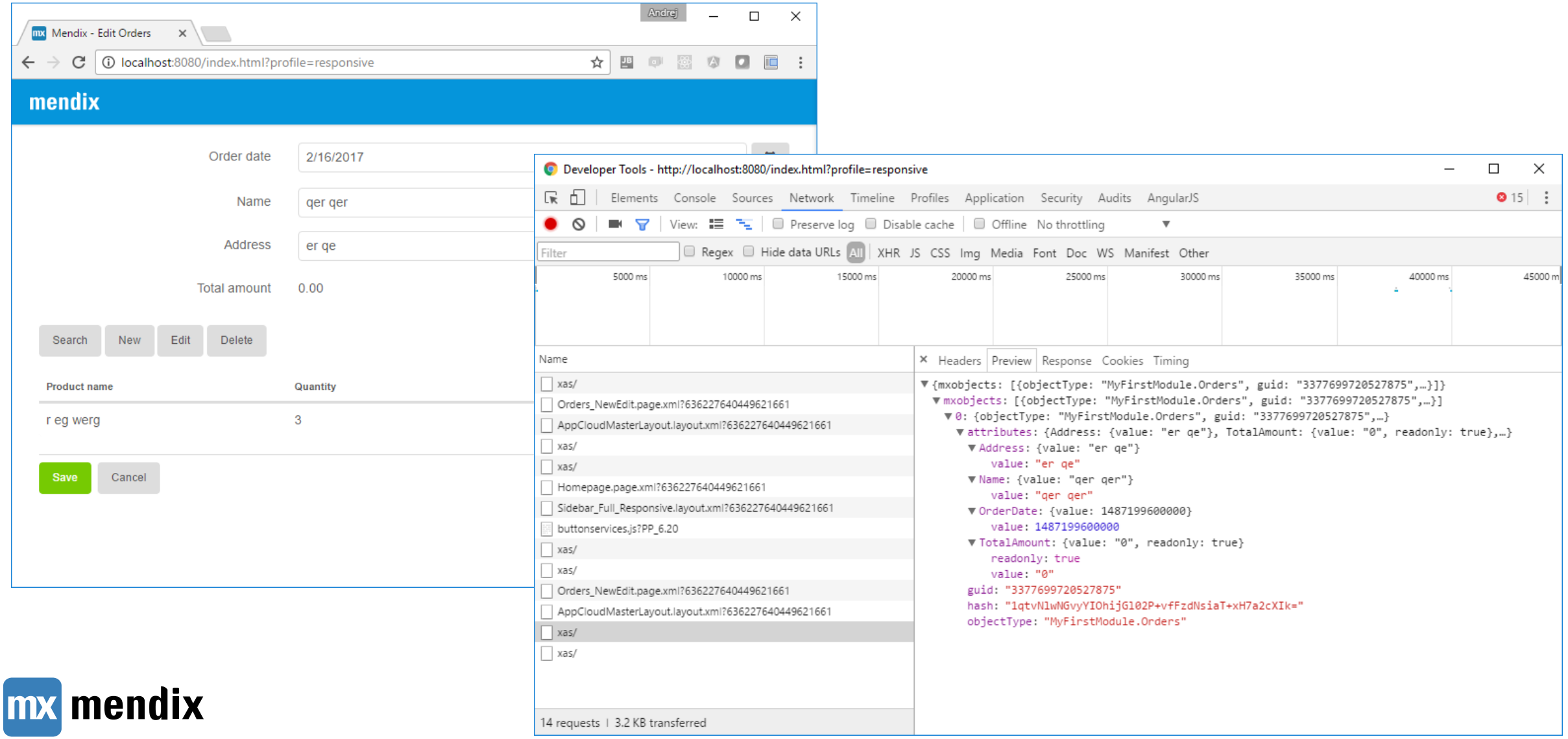

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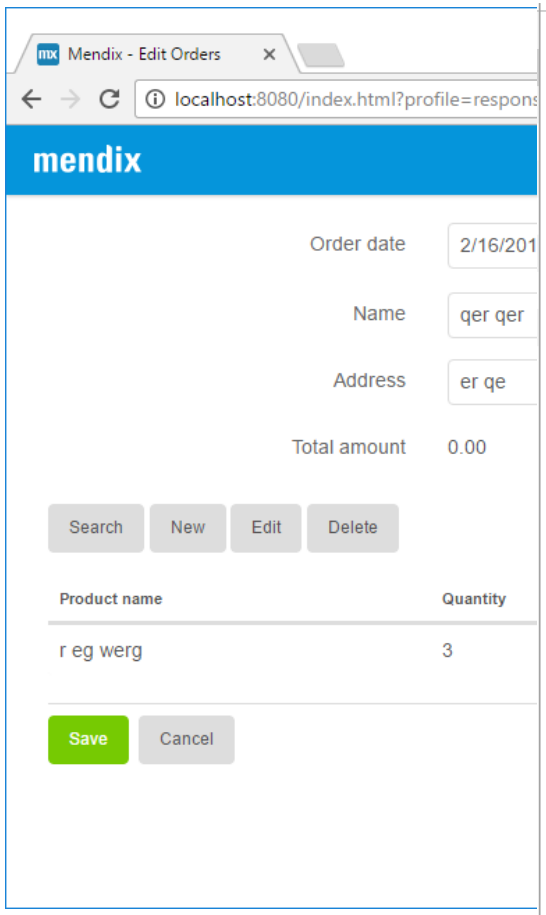

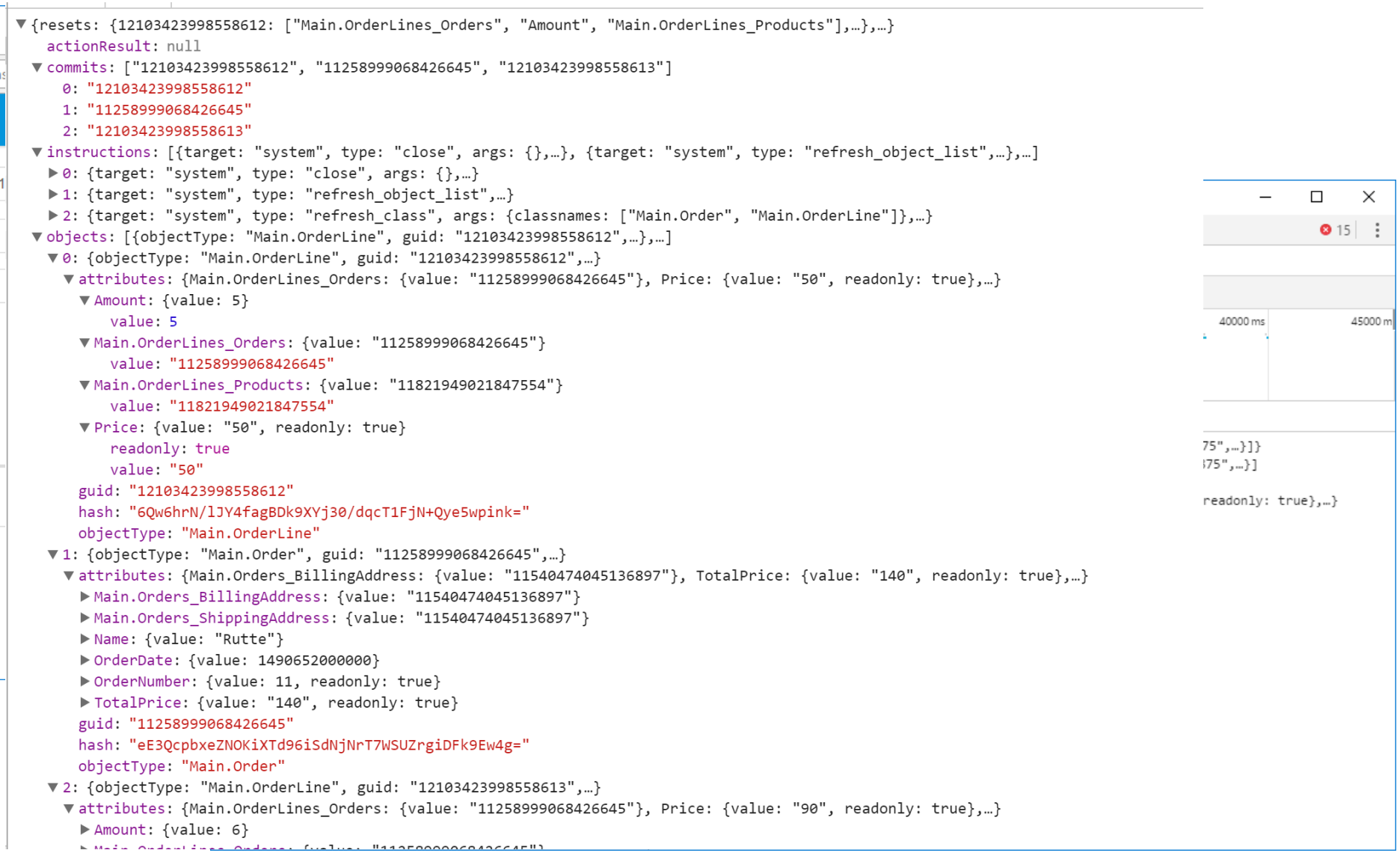

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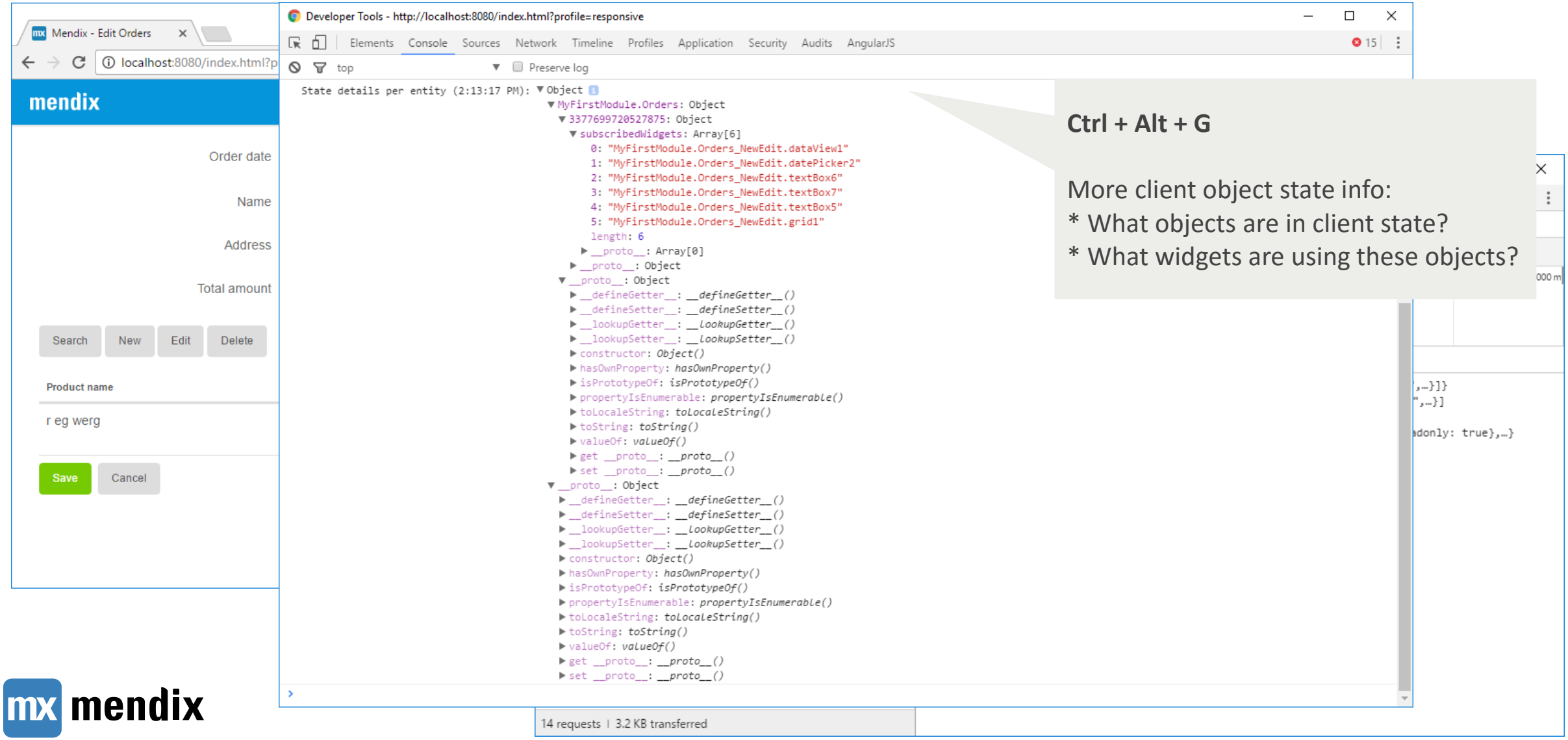

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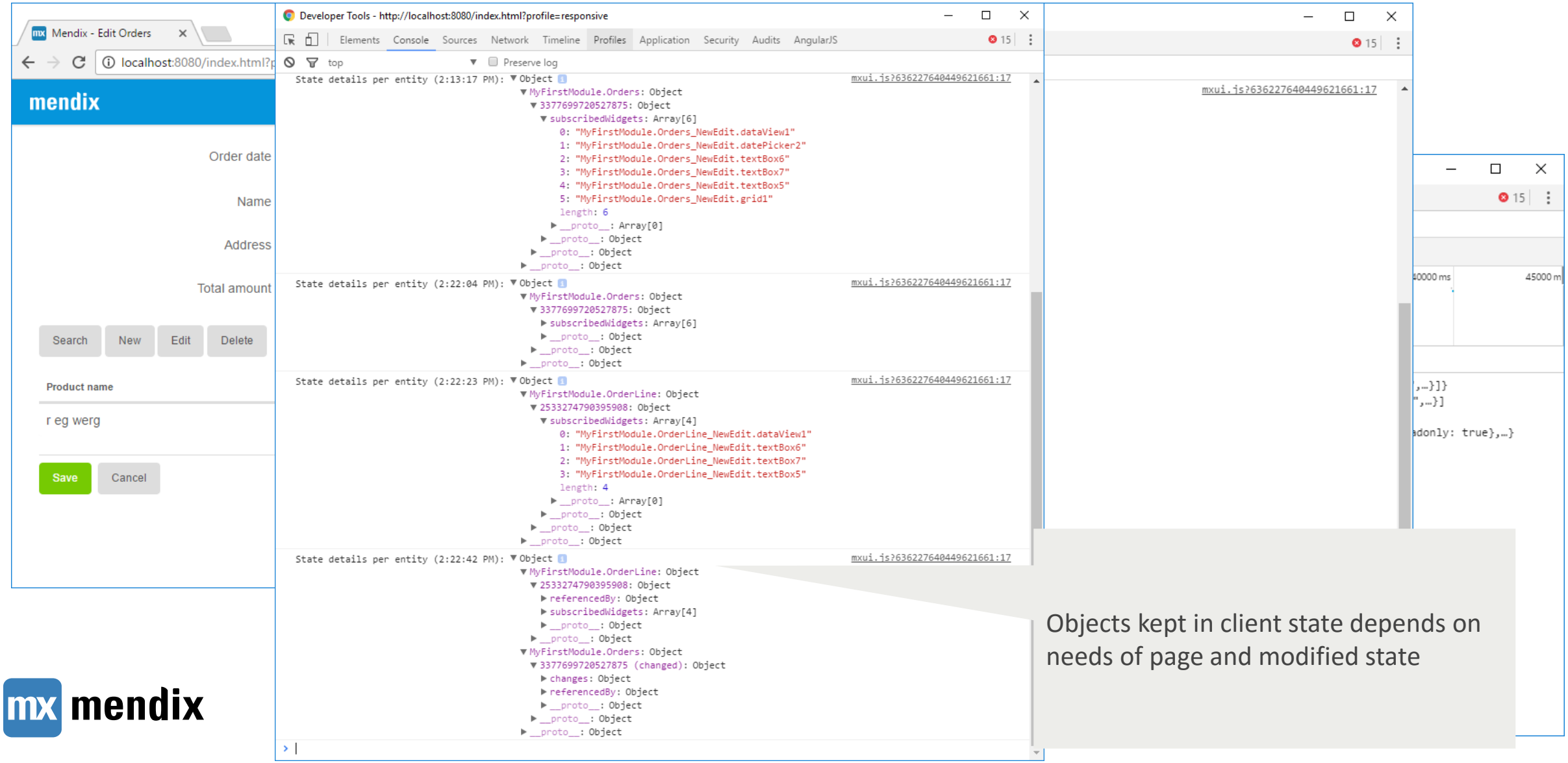

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Migrating to Mendix 7

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Migration

- Make sure you have a backup!

Migration

- Upgrade to the latest 6, i.e. 6.10.5
- Fix errors, warnings and deprecations
- Replace legacy layouts
- Upgrade App Store modules
  - Location of App Store modules in your project has moved to Project node
- Update your use of java APIs
  - Mendix API is more strict -> API may have been renamed or removed
  - Classloader is more strict -> You cannot use all the jars shipped with Mendix runtime, just the jars in userlib
  - Classloader only loads newest jar of a particular library

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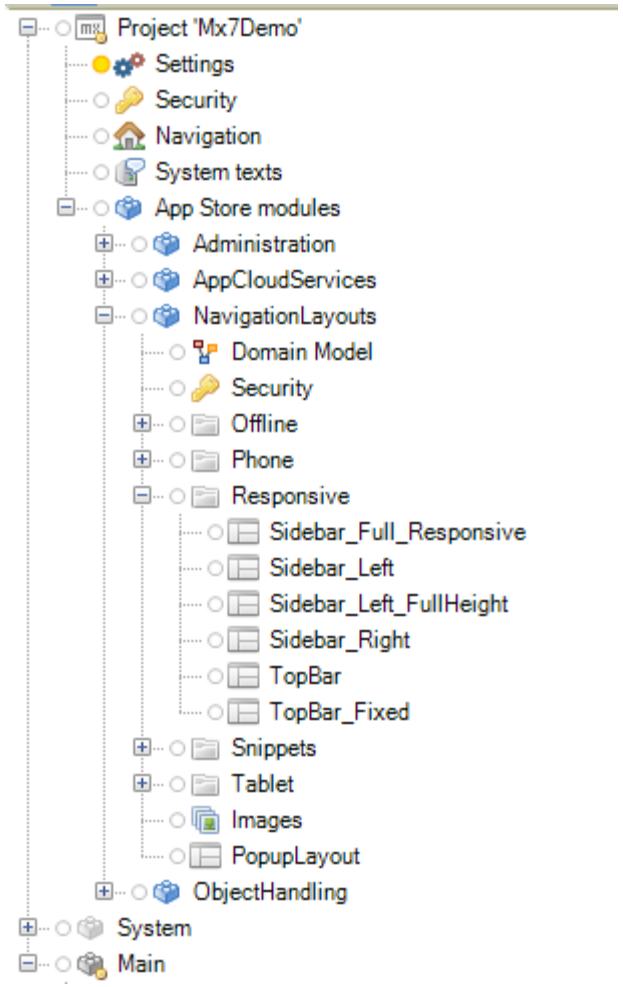

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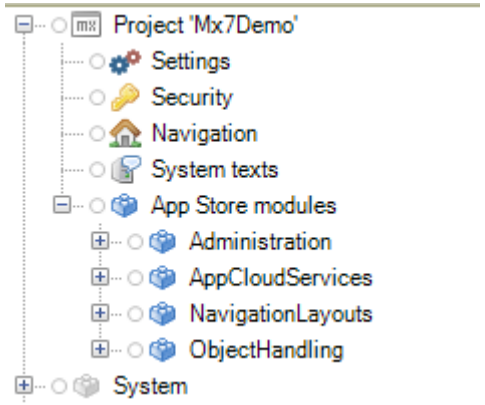

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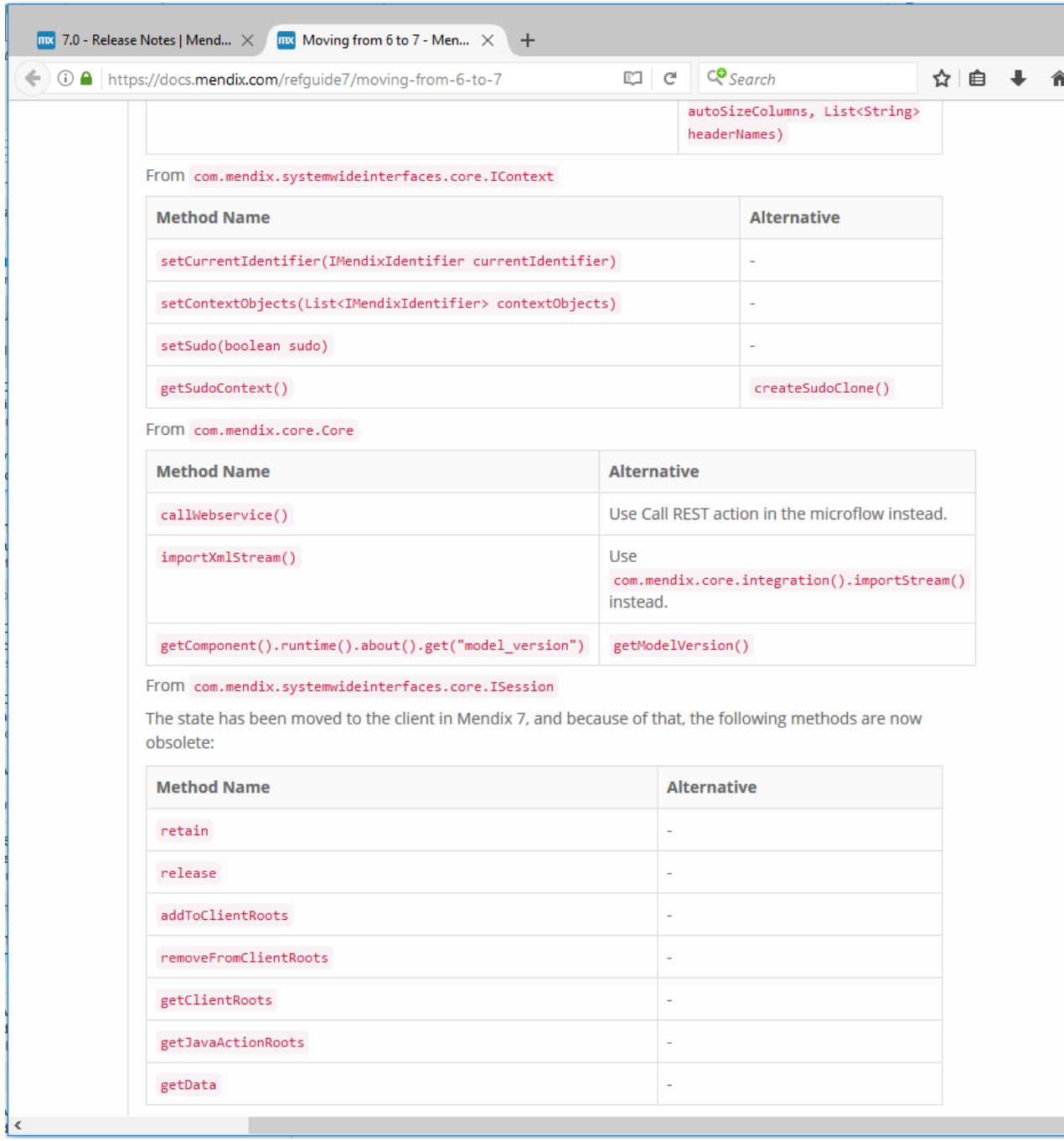

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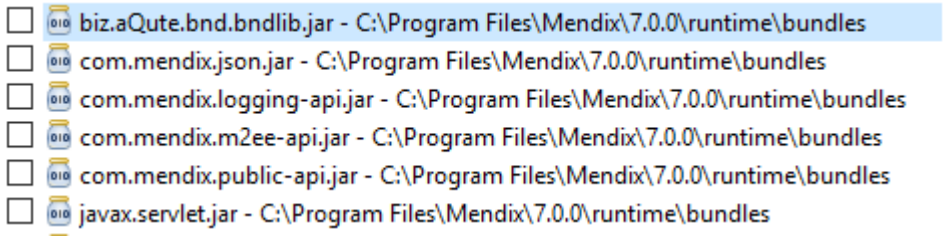

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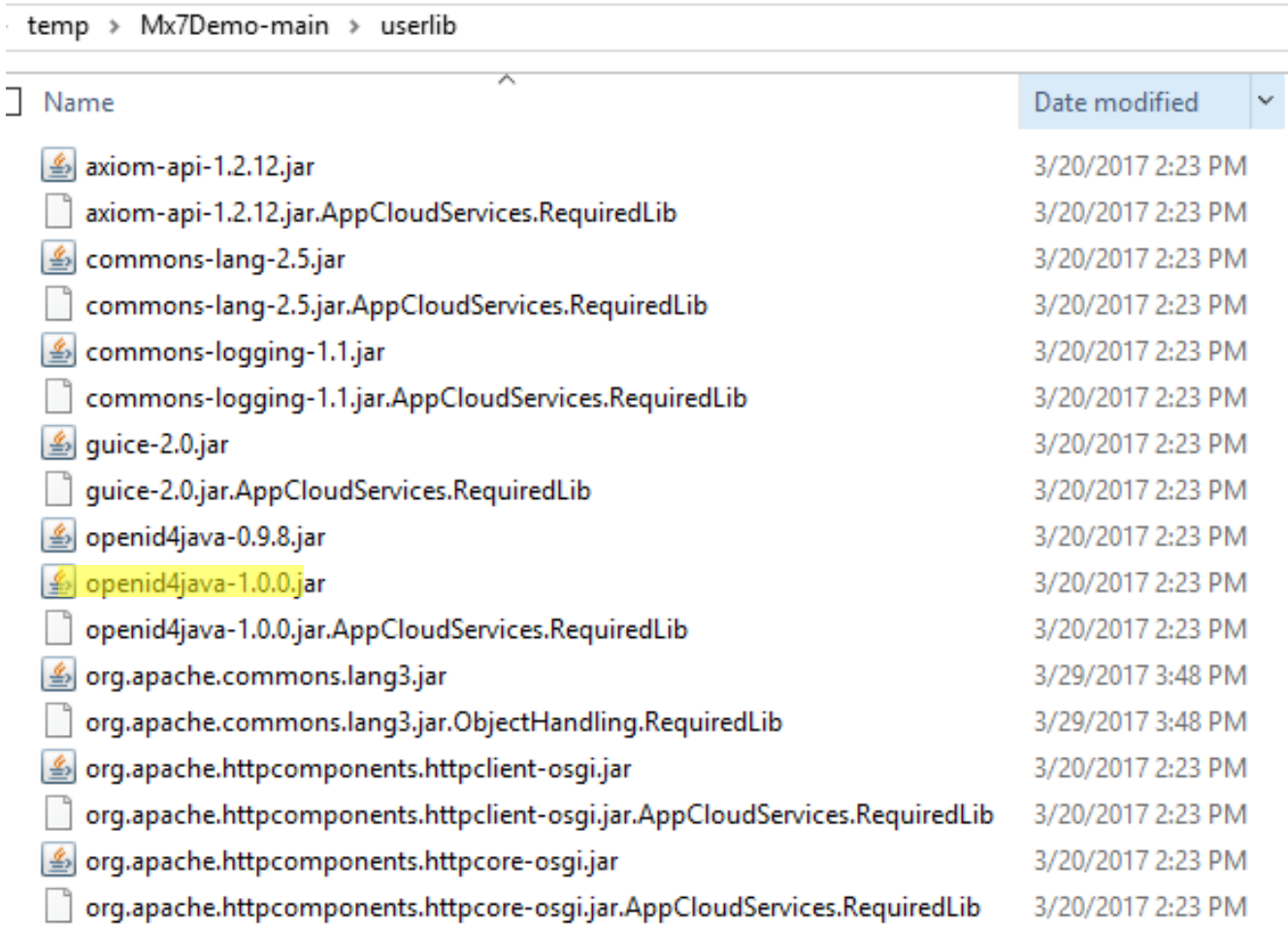

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Migration – Impact of Stateless Runtime

- Every session is a persistent session
  - After logout it may take up to 30 seconds before the logout is visible on all runtime instances
  - You can configure this using SessionValidationTimeout
- NPE attributes need to have read access
- Autocommitted objects not supported in system sessions
- Sign-in microflow has been removed

Rest

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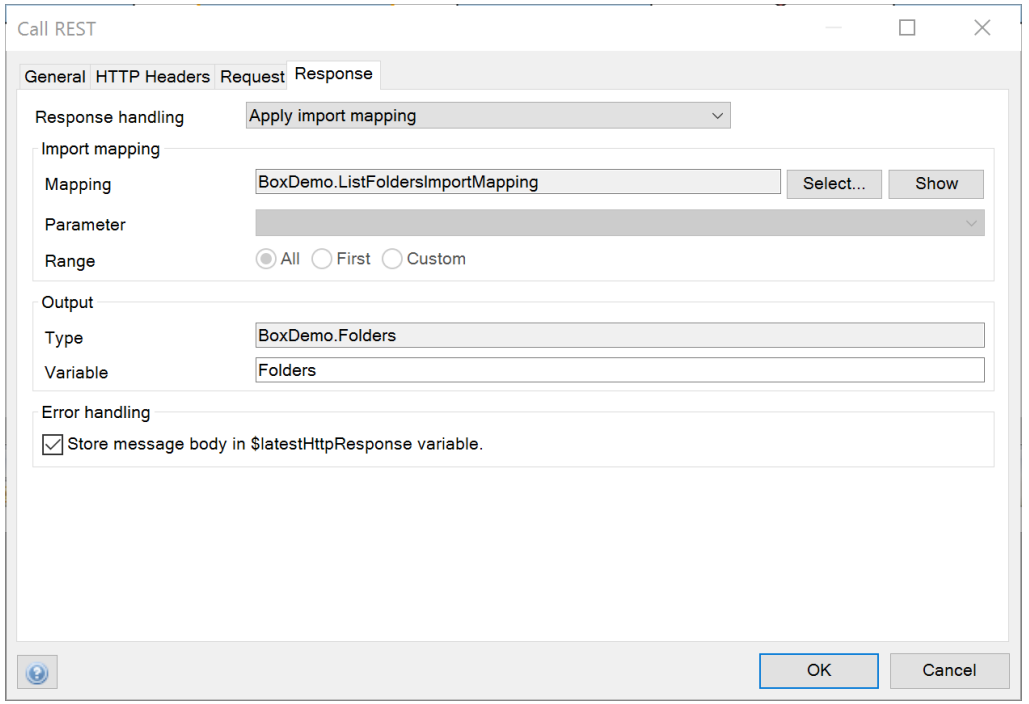
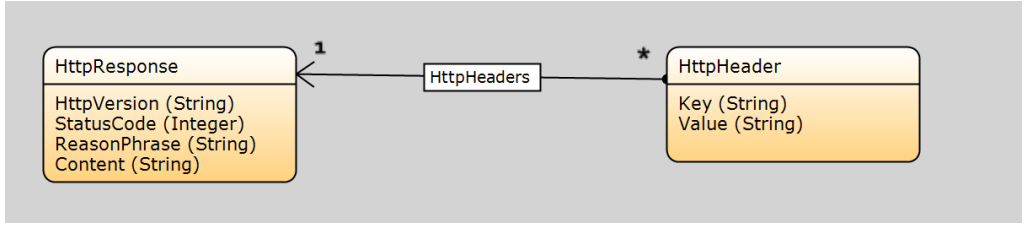
New Rest Features Mendix 7

- HTTP response metadata
- Optionally raw response payload
- **Access to headers**
- **Access to cookies (via headers)**
- **Access to status**
- urlEncode & urlDecode





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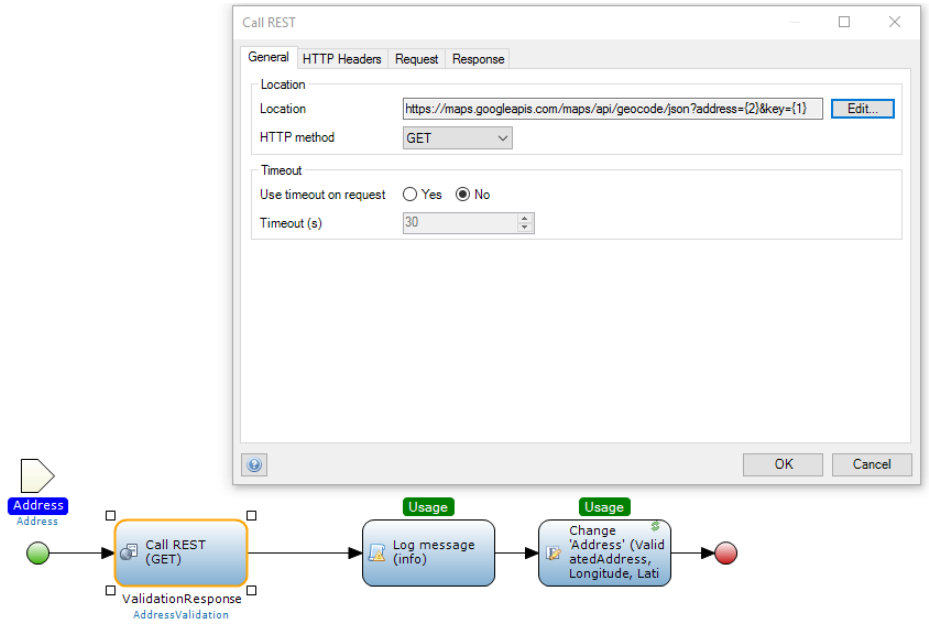

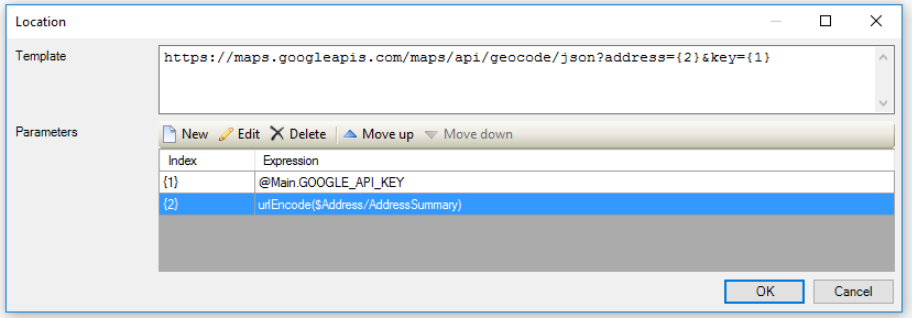

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More Info

More info

- https://docs.mendix.com/releasenotes/desktop-modeler/7.0
- https://docs.mendix.com/refguide7/moving-from-6-to-7
- https://docs.mendix.com/refguide7/clustered-mendix-runtime
- https://docs.mendix.com/howtogeneral/bestpractices/best-practices-for-app-performance-in-mendix-7

Thank You!

QUESTIONS?

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