# ZooNavigator Documentation

***Release 1.0.0***

**Lubos Kozmon**

**Aug 23, 2023**

# Contents:


**1 Quick Start** **3**
- 1.1 Docker . . . 3
- 1.2 Snap . . . 3

**2 Features** **5**
- 2.1 Compatibility . . . 5

**3 Docker** **7**
- 3.1 Configuration . . . 7
- 3.2 Preset Connections . . . 11
- 3.3 Auto Connect . . . 12
- 3.4 Custom build . . . 12

**4 Snap** **13**
- 4.1 Configuration . . . 13
- 4.2 Preset Connections . . . 17
- 4.3 Auto Connect . . . 17

**5 Development Guide** **19**

**6 Frequently Asked Questions** **21**
- 6.1 What should I fill in for Auth username and Auth password? . . . 21
- 6.2 How to enable Basic Authentication? . . . 21
- 6.3 I'm getting error that says "Unable to establish connection with ZooKeeper." . . . 21

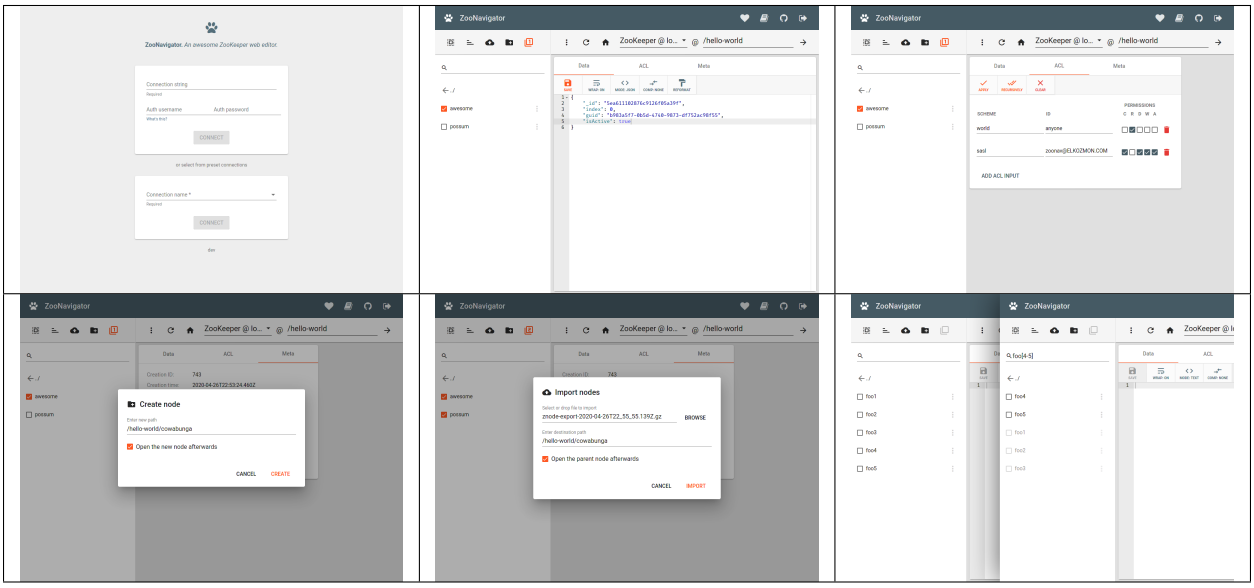
**7 Change Log** **23**
- 7.1 1.1.2 . . . 23
- 7.2 1.1.1 . . . 23
- 7.3 1.1.0 . . . 23
- 7.4 1.0.1 . . . 24
- 7.5 1.0.0 . . . 24
- 7.6 0.8.0 . . . 24
- 7.7 0.7.1 . . . 24
- 7.8 0.7.0 . . . 25
- 7.9 0.6.2 . . . 25
- 7.10 0.6.1 . . . 25
- 7.11 0.6.0 . . . 25

7.12 0.5.1 . . . . . 26
7.13 0.5.0 . . . . . 26
7.14 0.4.0 . . . . . 26
7.15 0.3.0 . . . . . 27

ZooNavigator is a **web-based ZooKeeper UI and editor/browser** with many features.

It is an open source project and the source code is available on GitHub.

If you like this project, please, consider supporting me by buying me a beer, thanks!



CHAPTER 1

# Quick Start

You can run ZooNavigator from:

- *Docker*
- *Snap*

## 1.1 Docker

Start Docker container with ZooNavigator Docker image:

```
docker run \
  -d \
  -p 9000:9000 \
  -e HTTP_PORT=9000 \
  --name zoonavigator \
  --restart unless-stopped \
  elkozmon/zoonavigator:latest
```

Go to http://localhost:9000.

**Note:**

If wanting to access ZooKeeper running locally on host machine (not in Docker container):

- **Linux** users may use `--net host` instead of exposing the port
- **Windows and Mac** users should follow this advice

## 1.2 Snap

Install ZooNavigator from Snap store:

```
sudo snap install zoonavigator
```

Go to http://localhost:9000.

CHAPTER 2

# Features

The main goal of this project is to provide a way to efficiently manage ZNodes.

This is a brief summary of what you get:

- **Manage multiple ZooKeeper clusters at once**
- **Advanced ZNode operations**
  - move, copy & paste
  - export & import
  - mass delete
  - regex search tool (currently limited to children nodes)
- **Smart ZNode data editor**
  - data validation, syntax highlighting and auto-formatting
  - edit binary data in base64 mode
  - edit compressed data (gzip)
- **Auth & security**
  - SASL and Auth scheme ZooKeeper authentication
  - ZNode ACL management (supports recursive changes)

## 2.1 Compatibility

ZooKeeper versions 3.4.x and 3.5.x are currently supported.

CHAPTER 3

# Docker

ZooNavigator is available at Docker image.

The following pages explain how to configure your Docker deployment.

## 3.1 Configuration

ZooNavigator's Docker image can be configured using **environment variables**.

Configuration options could be split into three groups:

- *ZooNavigator* - configures ZooNavigator and the web server
- *ZooKeeper client* - configuration related to ZooKeeper
- *Java* - configures the Java Virtual Machine

### 3.1.1 ZooNavigator

#### HTTP_PORT

*default*: `9000`

Tells the HTTP server which port to bind to. To disable HTTP set this variable to `disabled`.

#### HTTPS_PORT

If set, HTTPS server will bind to this port.

### SSL_KEYSTORE_PATH

The path to the keystore containing the private key and certificate, if not provided generates a keystore for you.

### SSL_KEYSTORE_PASSWORD

The password to the keystore, **defaults to a blank password**.

### SSL_KEYSTORE_TYPE

*default*: `JKS`

The key store type.

### SECRET_KEY

Secret key for Play Framework - used for signing session cookies and CSRF tokens. Defaults to 64 random characters generated from */dev/urandom*.

### BASE_HREF

*default*: */*

Sets base URL where ZooNavigator will be served. If you want ZooNavigator to be available at 'http://www.your-domain.com/zoonavigator' instead of 'http://www.your-domain.com' set this variable to */zoonavigator*.

---

**Note:** base href must start with '/'

---

### REQUEST_TIMEOUT_MILLIS

*default*: `10000`

Sets timeout for ZooNavigator requests. This value is in milliseconds.

### REQUEST_MAX_SIZE_KB

*default*: `10000`

Sets maximum request size. Important for large ZNode imports. This value is in kilobytes.

### CONNECTION_<MYZK>_NAME

Optional name for preset ZooKeeper connection *'<MYZK>'*

---

**Note:** environment variable name should consist only of uppercase letters, digits and underscores.

---

#### CONNECTION_<MYZK>_CONN

Connection string for preset ZooKeeper connection *'<MYZK>'*

**Note:** environment variable name should consist only of uppercase letters, digits and underscores.

#### CONNECTION_<MYZK>_AUTH_<MYAUTH>_SCHEME

Auth scheme for auth entry *'<MYAUTH>'* for preset ZooKeeper connection *'<MYZK>'*

**Note:** environment variable name should consist only of uppercase letters, digits and underscores.

#### CONNECTION_<MYZK>_AUTH_<MYAUTH>_ID

Auth id for auth entry *'<MYAUTH>'* for preset ZooKeeper connection *'<MYZK>'*

**Note:** environment variable name should consist only of uppercase letters, digits and underscores.

#### AUTO_CONNECT_CONNECTION_ID

If set, enables *Auto Connect* feature.

Set to `MYZK` to automatically connect to connection defined by `CONNECTION_MYZK_CONN` environment variable.

### 3.1.2 ZooKeeper client

#### ZK_CLIENT_TIMEOUT_MILLIS

*default*: `5000`

Sets inactivity timeout for ZooKeeper client. If user doesn't make any request during this period ZooKeeper connection will be closed and recreated for the future request if any. This value is in milliseconds.

**Note:** on client timeout user does not get logged out unlike in event of session timeout

#### ZK_CONNECT_TIMEOUT_MILLIS

*default*: `5000`

Sets timeout for attempt to establish connection with ZooKeeper. This value is in milliseconds.

### ZK_SASL_CLIENT

*default*: `true`

Set the value to `false` to disable SASL authentication.

### ZK_SASL_CLIENT_CONFIG

*default*: `Client`

Specifies the context key in the JAAS login file.

### ZK_SASL_CLIENT_USERNAME

*default*: `zookeeper`

Specifies the primary part of the server principal. Learn more here.

### ZK_SERVER_REALM

Realm part of the server principal.

**By default it is the client principal realm**.

### ZK_CLIENT_SECURE

If you want to connect to the server secure client port, you need to set this property to `true`. This will connect to server using SSL with specified credentials.

### ZK_SSL_KEYSTORE_PATH

Specifies the file path to a JKS containing the local credentials to be used for SSL connections.

### ZK_SSL_KEYSTORE_PASSWORD

Specifies the password to a JKS containing the local credentials to be used for SSL connections.

### ZK_SSL_TRUSTSTORE_PATH

Specifies the file path to a JKS containing the remote credentials to be used for SSL connections.

### ZK_SSL_TRUSTSTORE_PASSWORD

Specifies the password to a JKS containing the remote credentials to be used for SSL connections.

### 3.1.3 Java

#### JAVA_OPTS

Custom Java arguments.

#### JAVA_XMS

Sets initial Java heap size. This value is in bytes if no unit is specified.

#### JAVA_XMX

Sets maximum Java heap size. This value is in bytes if no unit is specified.

#### JAVA_JAAS_LOGIN_CONFIG

Path to JAAS login configuration file to use.

#### JAVA_KRB5_DEBUG

If set to `true`, enables debugging mode and detailed logging for Kerberos.

#### JAVA_KRB5_REALM

Sets the default Kerberos realm.

#### JAVA_KRB5_KDC

Sets the default Kerberos KDC.

## 3.2 Preset Connections

Instead of manually entering connection string every time you open ZooNavigator, you can preset your ZooKeeper clusters when starting the Docker image and then select which cluster to connect to from the drop-down in the Connect form.

### 3.2.1 Adding a Preset Connection

Each connection must have a unique id, which is part of the environment variable name.

To add a preset connection, you must enter a valid connection string as `CONNECTION_<ID>_CONN` environment variable.

Optionally, you can add a name to your preset connection using environment variable `CONNECTION_<ID>_NAME` which will be displayed in the UI instead of the id.

**Note:** Replace <ID> by any id string you choose. Keep in mind that environment variable name should consist only of uppercase letters, digits and underscores.

For example, if one wants to add a ZooKeeper cluster running at *localhost:2181*, name it "Local ZooKeeper" and give it id *LOCALZK*, then he/she would set the environment variables like so:

- `CONNECTION_LOCALZK_NAME` = **Local ZooKeeper**
- `CONNECTION_LOCALZK_CONN` = **localhost:2181**

### 3.2.2 Adding auth entry to a Preset Connection

Similarly, one can add auth entry to any Preset Connection.

Each auth entry also has to have a unique id (unique constraint only applies for auth entries for the same connection). To add auth entry you need to set these environment variables:

- `CONNECTION_<ID>_AUTH_<AUTHID>_SCHEME`
- `CONNECTION_<ID>_AUTH_<AUTHID>_ID`

## 3.3 Auto Connect

Auto connect is a feature that lets you skip the Connect form where you enter ZooKeeper server address and throws you directly into the Editor UI. This is useful when you only have a single (or preferred) ZooKeeper cluster.

To enable this feature, first add the ZooKeeper cluster you want to use as a *Preset Connection* to ZooNavigator.

Then simply set the `AUTO_CONNECT_CONNECTION_ID` environment variable to the id of that preset connection.

For example, if you added your ZooKeeper cluster using `CONNECTION_MYZK_CONN` environment variable, then you would set `AUTO_CONNECT_CONNECTION_ID` to `MYZK`.

That's it. When you open up ZooNavigator, it will automatically connect to your ZooKeeper cluster.

## 3.4 Custom build

If you want to build ZooNavigator Docker image yourself, you can do so like this:

```
git clone https://github.com/elkozmon/zoonavigator.git

cd zoonavigator

git submodule update --init --recursive

docker build \
  -t my-zoonavigator \
  -f build/docker/Dockerfile \
  --build-arg APP_VERSION=my-build \
  .
```

**Note:** Note that the *docker build* command is executed from within project's root directory

CHAPTER 4

# Snap

ZooNavigator is available at Snap store.

The following pages explain how to manage ZooNavigator Snap.

## 4.1 Configuration

ZooNavigator exposes Snap configuration options that could be split into three groups:

- *ZooNavigator* - configures ZooNavigator and the web server
- *ZooKeeper client* - configuration related to ZooKeeper
- *Java* - configures the Java Virtual Machine

### 4.1.1 ZooNavigator

#### zoonavigator.server.http.port

*default*: `9000`

Tells the HTTP server which port to bind to. To disable HTTP set this option to `disabled`.

#### zoonavigator.server.https.port

If set, HTTPS server will bind to this port.

#### zoonavigator.server.https.key-store.path

The path to the keystore containing the private key and certificate, if not provided generates a keystore for you.

### zoonavigator.server.https.key-store.password

The password to the keystore, **defaults to a blank password**.

### zoonavigator.server.https.key-store.type

*default*: `JKS`

The key store type.

### zoonavigator.secret-key

Secret key for Play Framework - used for signing session cookies and CSRF tokens. Defaults to 64 random characters generated from */dev/urandom*.

### zoonavigator.base-href

*default*: */*

Sets base URL where ZooNavigator will be served. If you want ZooNavigator to be available at 'http://www.your-domain.com/zoonavigator' instead of 'http://www.your-domain.com' set this option to */zoonavigator*.

---

**Note:** base href must start with '/'

---

### zoonavigator.request.timeout

*default*: `10000`

Sets timeout for ZooNavigator requests. This value is in milliseconds.

### zoonavigator.request.max-size

*default*: `10000`

Sets maximum request size. Important for large ZNode imports. This value is in kilobytes.

### zoonavigator.connection.<MYZK>.name

Optional name for preset ZooKeeper connection *'<MYZK>'*

### zoonavigator.connection.<MYZK>.connection-string

Connection string for preset ZooKeeper connection *'<MYZK>'*

### zoonavigator.connection.<MYZK>.auth.<MYAUTH>.scheme

Auth scheme for auth entry *'<MYAUTH>'* for preset ZooKeeper connection *'<MYZK>'*

#### zoonavigator.connection.<MYZK>.auth.<MYAUTH>.id

Auth id for auth entry '*<MYAUTH>*' for preset ZooKeeper connection '*<MYZK>*'

#### zoonavigator.auto-connect.connection-id

If set, enables *Auto Connect* feature.

Set to `MYZK` to automatically connect to connection defined by `zoonavigator.connection.MYZK.connection-string` configuration option.

---

### 4.1.2 ZooKeeper client

#### zookeeper.client.max-age

*default*: `5000`

Sets inactivity timeout for ZooKeeper client. If user doesn't make any request during this period ZooKeeper connection will be closed and recreated for the future request if any. This value is in milliseconds.

---

**Note:** on client timeout user does not get logged out unlike in event of session timeout

---

#### zookeeper.client.connect-timeout

*default*: `5000`

Sets timeout for attempt to establish connection with ZooKeeper. This value is in milliseconds.

#### zookeeper.sasl.client.enabled

*default*: `true`

Set the value to `false` to disable SASL authentication.

#### zookeeper.sasl.client.config

*default*: `Client`

Specifies the context key in the JAAS login file.

#### zookeeper.sasl.client.username

*default*: `zookeeper`

Specifies the primary part of the server principal. Learn more here.

#### zookeeper.server.realm

Realm part of the server principal.

**By default it is the client principal realm**.

#### zookeeper.client.secure

If you want to connect to the server secure client port, you need to set this property to `true`. This will connect to server using SSL with specified credentials.

#### zookeeper.ssl.key-store.location

Specifies the file path to a JKS containing the local credentials to be used for SSL connections.

#### zookeeper.ssl.key-store.password

Specifies the password to a JKS containing the local credentials to be used for SSL connections.

#### zookeeper.ssl.trust-store.location

Specifies the file path to a JKS containing the remote credentials to be used for SSL connections.

#### zookeeper.ssl.trust-store.password

Specifies the password to a JKS containing the remote credentials to be used for SSL connections.

---

### 4.1.3 Java

#### java.xmx

Sets initial Java heap size. This value is in bytes if no unit is specified.

#### java.xms

Sets maximum Java heap size. This value is in bytes if no unit is specified.

#### java.security.auth.login.config

Path to JAAS login configuration file to use.

#### java.security.krb5.debug

If set to `true`, enables debugging mode and detailed logging for Kerberos.

#### java.security.krb5.realm

Sets the default Kerberos realm.

#### java.security.krb5.kdc

Sets the default Kerberos KDC.

## 4.2 Preset Connections

Instead of manually entering connection string every time you open ZooNavigator, you can preset your ZooKeeper clusters when starting the Docker image and then select which cluster to connect to from the drop-down in the Connect form.

### 4.2.1 Adding a Preset Connection

Each connection must have a unique id, which is part of the configuration option name.

To add a preset connection, you must enter a valid connection string as `zoonavigator.connection.<id>.connection-string` configuration option.

Optionally, you can add a name to your preset connection using configuration option `zoonavigator.connection.<id>.name` which will be displayed in the UI instead of the id.

---

**Note:** Replace <id> by any id string you choose.

---

For example, if one wants to add a ZooKeeper cluster running at *localhost:2181*, name it "Local ZooKeeper" and give it id *localzk*, then he/she would set the configuration options like so:

```
snap set zoonavigator zoonavigator.connection.localzk.name=Local ZooKeeper
snap set zoonavigator zoonavigator.connection.localzk.connection-string=localhost:2181
```

### 4.2.2 Adding auth entry to a Preset Connection

Similarly, one can add auth entry to any Preset Connection.

Each auth entry also has to have a unique id (unique constraint only applies for auth entries for the same connection). To add auth entry you need to set these configuration option:

- `zoonavigator.connection.<connectionId>.auth.<authId>.scheme`
- `zoonavigator.connection.<connectionId>.auth.<authId>.id`

## 4.3 Auto Connect

Auto connect is a feature that lets you skip the Connect form where you enter ZooKeeper server address and throws you directly into the Editor UI. This is useful when you only have a single (or preferred) ZooKeeper cluster.

To enable this feature, first add the ZooKeeper cluster you want to use as a *Preset Connection* to ZooNavigator.

Then simply set the `zoonavigator.auto-connect.connection-id` configuration option to the id of that preset connection.

For example, if you added your ZooKeeper cluster using `zoonavigator.connection.myzk.connection-string` configuration option, then you would set `zoonavigator.auto-connect.connection-id` to `myzk` like so:

```
snap set zoonavigator zoonavigator.auto-connect.connection-id=myzk
```

That's it. When you open up ZooNavigator, it will automatically connect to your ZooKeeper cluster.

CHAPTER 5

# Development Guide

Development setup requires NPM and SBT to be installed on your machine.

ZooNavigator API handles communication with ZooKeeper while ZooNavigator Web is the front-end which in turn talks to the ZooNavigator API.

First, let's get ZooNavigator API running:

```
git clone https://github.com/elkozmon/zoonavigator-api.git
cd zoonavigator-api
sbt play/run
```

Play HTTP server should now be listening on port 9000. The default port is defined in `play/conf/application.conf`.

Next step is to start up ZooNavigator Web:

```
git clone https://github.com/elkozmon/zoonavigator-web.git
cd zoonavigator-web
npm install -g @angular/cli
npm install
npm run dev
```

This starts up Angular development server with proxy configured in `proxy.conf.json` that will forward API requests to http://localhost:9000 where ZooNavigator API should be running.

Once you've done all that open up http://localhost:4200 in your browser and you should see the Connect form.

CHAPTER 6

# Frequently Asked Questions

## 6.1 What should I fill in for Auth username and Auth password?

Auth username and password are optional, so feel free to leave those empty. Every username & password pair entered (you can enter many) serves as an extra ACL identity, so ZNodes can be given some permissions only for users logged in with certain credentials.

## 6.2 How to enable Basic Authentication?

At the moment there is no configuration option to enable Basic Auth out-of-the-box.

I suggest placing a proxy which supports Basic Auth in front of ZooNavigator. For example Traefik.

## 6.3 I'm getting error that says "Unable to establish connection with ZooKeeper."

ZooNavigator cannot find ZooKeeper host(s) using the connection string you entered in the connect form.

**Windows and Mac users using ZooNavigator in Docker:** If you're trying to access ZooKeeper running locally on host machine (not in Docker container), follow this advice.

CHAPTER 7

# Change Log

## 7.1 1.1.2

*March 31, 2022*

**Changes:**

- CVE-2021-4101 - Remove Log4j 1.2 dependency

## 7.2 1.1.1

*October 28, 2021*

**Changes:**

- Use custom Authorization header to allow auth in proxies

**Fixes:**

- Correctly handle HEAD HTTP requests

## 7.3 1.1.0

*November 03, 2020*

**Features:**

- Configurable applications base URL

## 7.4 1.0.1

*June 07, 2020*

**Fixes:**

- Custom base URL routing
- ZNode import

## 7.5 1.0.0

*May 16, 2020*

Adds capability to manage multiple ZooKeeper clusters at once for larger deployments

**Changes:**

- Add support for preset ZooKeeper connections
- Switch between ZooKeeper clusters in Editor UI
- Change Auto connect Docker configuration
- Remove Session info dialog
- Show build version on Connect page

## 7.6 0.8.0

*February 15, 2020*

**Changes:**

- Gzip exports (json imports are still supported)
- Enable Docker image to run under arbitrary user
- When using node filter, show non-matching nodes as semi-transparent
- Clear node filter when navigating to other node
- `PUT /api/znode/data` API endpoint accepts `application/json` instead of `text/plain`
- Add Donation link

**Fixes:**

- Fix SSL support for ZooKeeper 3.5.x
- Fix false warnings about discarding changes

## 7.7 0.7.1

*November 08, 2019*

Minor bug fixes.

**Changes:**

- Increase default ZNode import size limit to 10mb

**Fixes:**

- Fix `BASE_HREF` Docker build argument
- Fix app freezing after session expired
- Fix Docker healthcheck when `HTTP_PORT` is set to `disabled`

## 7.8 0.7.0

*September 18, 2019*

Release ZooNavigator as a single Docker image.

**Changes:**

- Single Docker image release
- Increase default session timeout to 1 hour

**Fixes:**

- Fix save button keyboard shortcut in editor

## 7.9 0.6.2

*June 20, 2019*

Allows to run ZooNavigator API's Docker image as an unprivileged user.

**Changes:**

- Docker container set to run under user *zoonavigator-api*

## 7.10 0.6.1

*April 13, 2019*

Allows to run ZooNavigator Web's Docker image as an unprivileged user.

**Changes:**

- Switched from official *Nginx* Docker image to *Nginxinc*

## 7.11 0.6.0

*January 24, 2019*

Implements several feature requests and fixes minor bugs.

**Features:**

- Export & import ZNode trees
- Read & write gzip compressed ZNode data

- Base64 editor mode for editing binary data
- Custom URLs using added `BASE_HREF` Dockerfile build argument

**Changes:**

- Turned off access logs on Dockers healthchecks

## 7.12 0.5.1

*November 01, 2018*

Decreases Dockers health-check interval so it doesn't cause startup delays in tools like Docker Swarm.

**Changes:**

- Decreases Dockers health-check interval to 30 seconds

## 7.13 0.5.0

*May 29, 2018*

Adds support for SASL authentication with ZooKeeper and HTTPS.

**Features:**

- SASL authentication with ZooKeeper
- HTTPS support

**Changes:**

- Changed editors font to Fira Code
- Base Docker images on Alpine
- Enable applying ACLs recursively without making any changes

**Fixes:**

- Prevent submitting editor via keyboard shortcut when save button is disabled

## 7.14 0.4.0

*April 02, 2018*

Adds auto-format feature and fixes some minor bugs.

**Features:**

- Auto-format feature in editor
- Remember editor options (wrap, mode) for each ZNode
- Log ZooNavigator version on Docker startup

**Changes:**

- Editor buttons got minor polishing
- Changed editors font to DejaVu Sans Mono

**Fixes:**

- Switching editor tabs between changes (to data or acl) causes 'Bad version' error
- When session expires two 'Session lost' dialogs spawn at once

## 7.15 0.3.0

*January 11, 2018*

Adds many new ZNode editor features.

**Features:**

- Move ZNode feature
- Duplicate ZNode feature
- Children ZNode list sorting
- Data editor text wrapping
- Address bar for manual navigation
- Auto connect feature - skip connect form and use preconfigured connection parameters
- Hotkey for submitting ZNode data changes (ctrl+s)
- JVM memory settings via environment variables (API Docker image)

**Changes:**

- UI changes, redesigned editor tabs