

# Design and Implementation of Clog 2.0

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**EPICS Collaboration Meeting 2022**

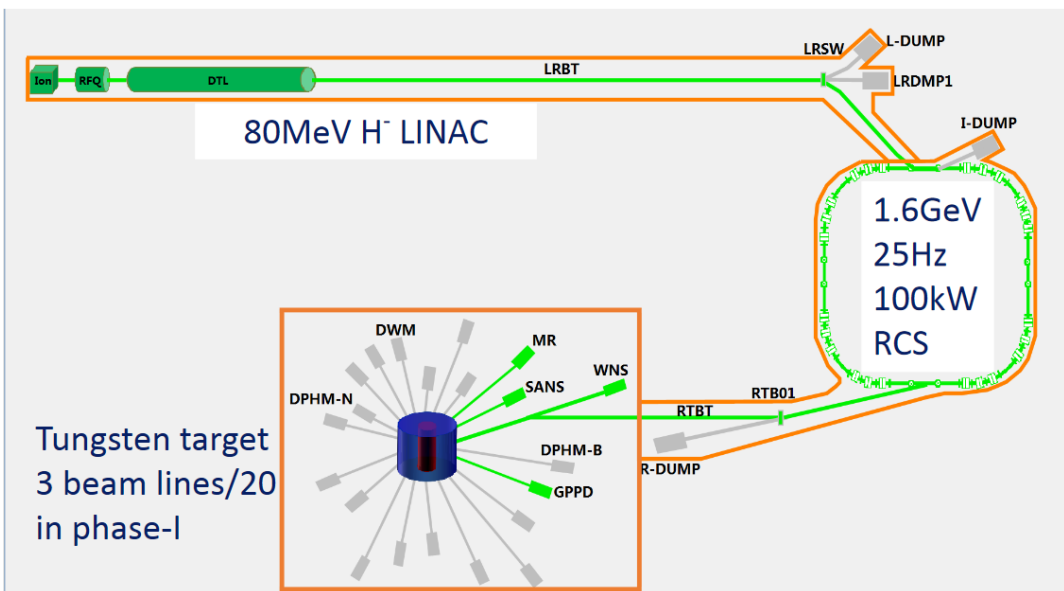
**19-23 September 2022, hosted by the Cosylab**



## Scenario

- **CSNS passed the national inspection and acceptance on August 2018**
  - Shifted from beam commissioning to reliable operation.
- **Around CSNS, new projects are still under construction by CSNS construction staff**
  - BNCT (Boron Neutron Capture Therapy), C-band electron gun test platform, etc.

## Bird's eye view of CSNS



The composition of CSNS



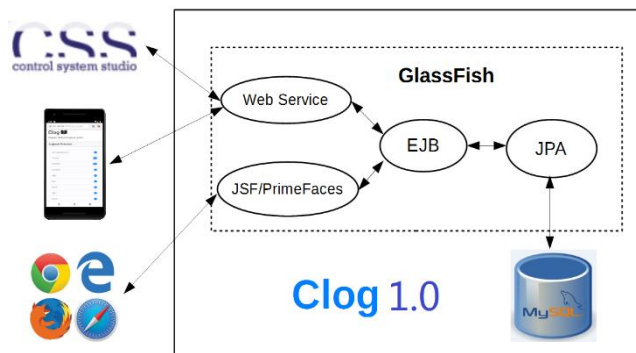
## Scenario

- Existing elogs in the community
  - PSI Elog <https://elog.psi.ch/elog/>
  - Olog <https://github.com/Olog>
  - Others probably
- Status of elogs at CSNS
  - CSNS uses PSI Elog
  - New projects also need elogs
    - BNCT Phase I
    - BNCT Phase II
    - C-band electron gun test platform
- Why develop a new one instead of using an existing one?
  - New projects expect elogs to be customizable according to user's requirement even after it is online in production.
  - Time cost for getting familiar with one product and being able to customize it may be longer than developing a brand new one.

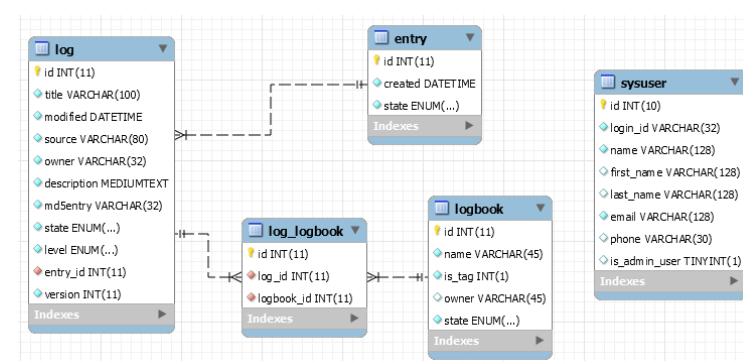
# History of Clog

- **Clog 1.0** has been developed on 2019.
- It has been used on **BNCT Phase I** project.
- It is developed based on **Olog 1.0** by simplifying its implementation.

- Replaced the HTML/Bootstrap/JQuery web UI with JSF/PrimeFaces.
- Removed BitemporalLog data type.
- Replaced the Jackrabbit attachment storage mechanism with plain file system.
- Replaced the JPA (Java Persistence API) Criteria API with JPQL (Java Persistence Query Language).
- Added “subject” field into log entry.
- Removed “property” table from the database.
- Removed Flyway database migration tool.



Clog 1.0 architecture



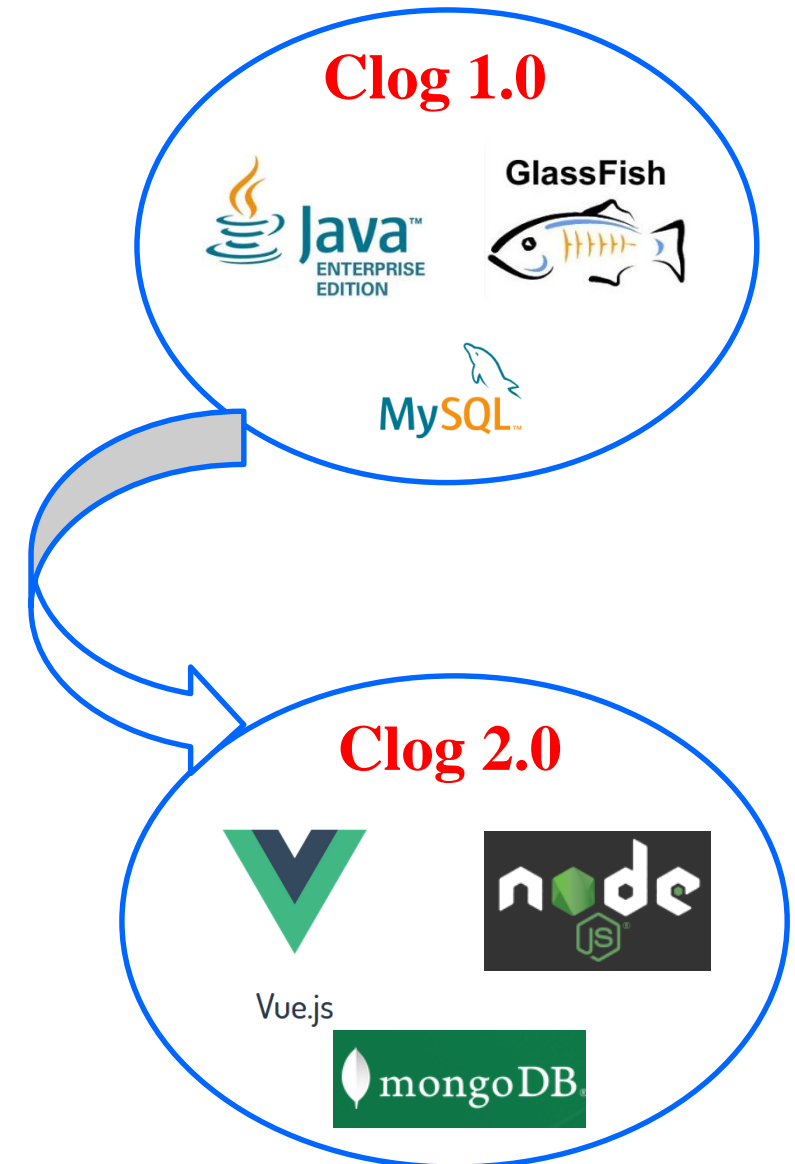
Clog 1.0 schema

Index	Date	Author	Author email	Category	Tag	Subject	Text
1	2019-09-09 09:10	王林	wanglin@ihep.ac.cn	Info	tag5	cs-studio client test	Create a log entry from cs-studio.
2	2019-09-09 08:59	王林	wanglin@ihep.ac.cn	Info	tag2 server	cs-studio attachment test	test 111
3	2019-09-09 08:55	王林	wanglin@ihep.ac.cn	Info	server	cs-studio test	test test test
4	2019-09-07 00:38	王林	wanglin@ihep.ac.cn	Info		标题	内容
5	2019-09-07 00:37	王林	wanglin@ihep.ac.cn	Info		subject	text
6	2019-09-07 00:31	王林	wanglin@ihep.ac.cn	Info		subject	text
7	2019-08-27 22:07	王林	wanglin@ihep.ac.cn	Info		test	test111
8	2019-06-17 16:18	用户1	user1@ihep.ac.cn	Info		attachment test 1	cs-studio test
9	2019-06-17 15:59	用户1	user1@ihep.ac.cn	Info		attachment test	test
10	2019-06-17 15:56	用户1	user1@ihep.ac.cn	Info		attachment test	test
11	2019-06-17 15:49	用户1	user1@ihep.ac.cn	Suggestion		attachment test	test
12	2019-06-17 15:41	用户1	user1@ihep.ac.cn	Suggestion		attachment test	test
13	2019-06-17 15:39	用户1	user1@ihep.ac.cn	Suggestion		attachment test	test
14	2019-06-15 19:05	管理员1	admin1@ihep.ac.cn	Suggestion		test test	test test
15	2019-06-14 10:06	王林	wanglin@ihep.ac.cn	Problem	tag2		test 100
16	2019-06-14 01:25	王林	wanglin@ihep.ac.cn	Info			olog test 222
17	2019-06-14 01:19	王林	wanglin@ihep.ac.cn	Info			olog test 111

Clog 1.0 log preview page

## History of Clog

- **Clog 2.0** is developed from scratch on 2022.
- It will used on two new projects around CSNS
  - **BNCT Phase II**
  - **C-band electron gun test platform**
- In order to improve efficiency of development and maintenance of Clog, it switches to light-weight solution based on the following considerations:
  - Single programming language
    - JavaScript implements full-stack web development.
  - Less data type conversions
    - All data types for storage and communication are JSON-like, compared to Java JAX-RS API and Java JPA ORM.
  - Flexibility of MongoDB database



# Technical solution of Clog 2.0

- **Frontend**

- PrimeVue UI component
- Vue.js framework

- **Backend**

- Node.js + Express.js + Mongoose

- **Database**

- MongoDB

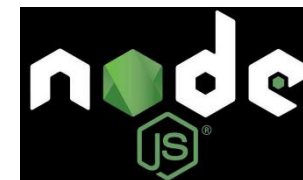
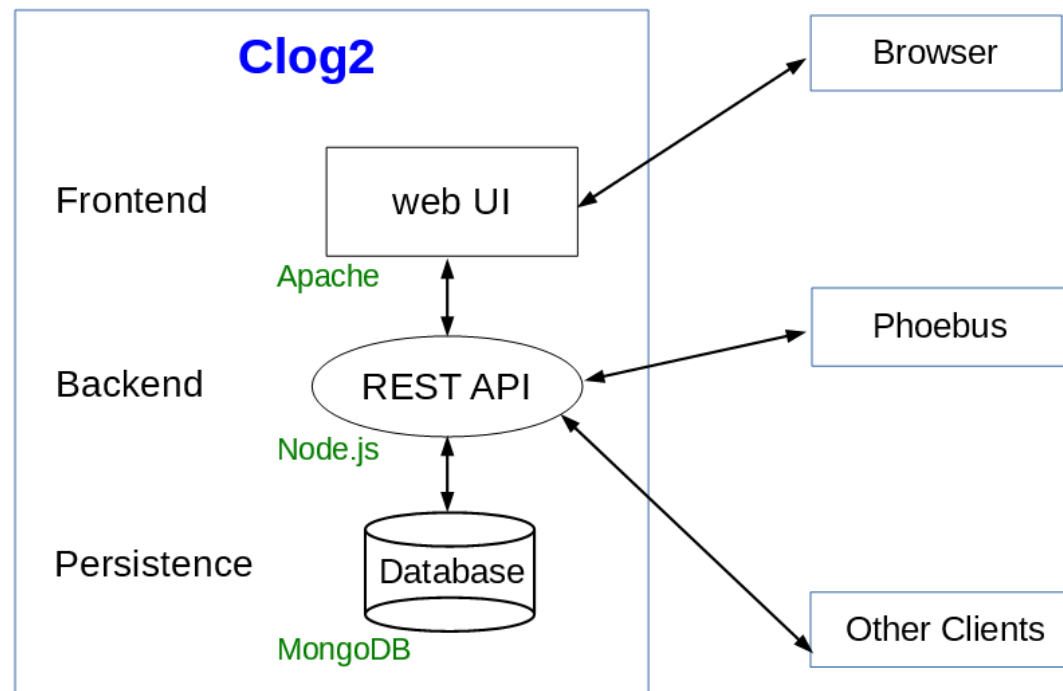
- **Session management**

- **Backend**

- REST API is stateless
- Generate JWT token containing user info

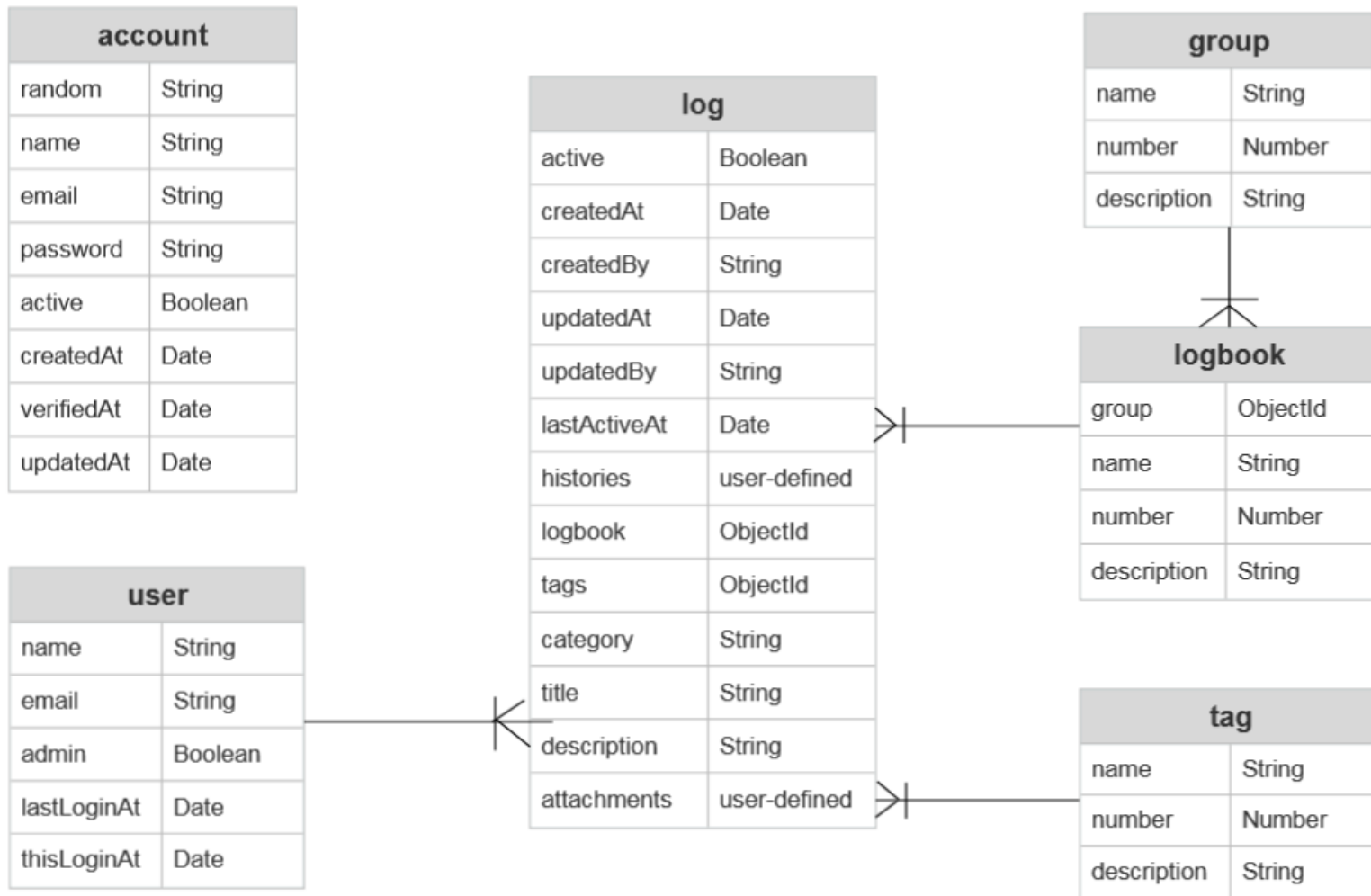
- **Frontend**

- JWT token is stored in LocalStorage
- User info is managed by Vuex



# Schema

- **6 collections in MongoDB database**
- **account:** username and password for local database authentication
- **user:** user information and permission
- **group:** grouping of logbook
- **logbook:** each log belongs to a logbook
- **tag:** each log may have multiple tags
- **log:** log information
  - Including attachment
  - Including modification histories
- **Attachments and modification histories are embedded in log collection in order to ensure atomic operations.**



MongoDB Schema

# Architecture

## REST APIs

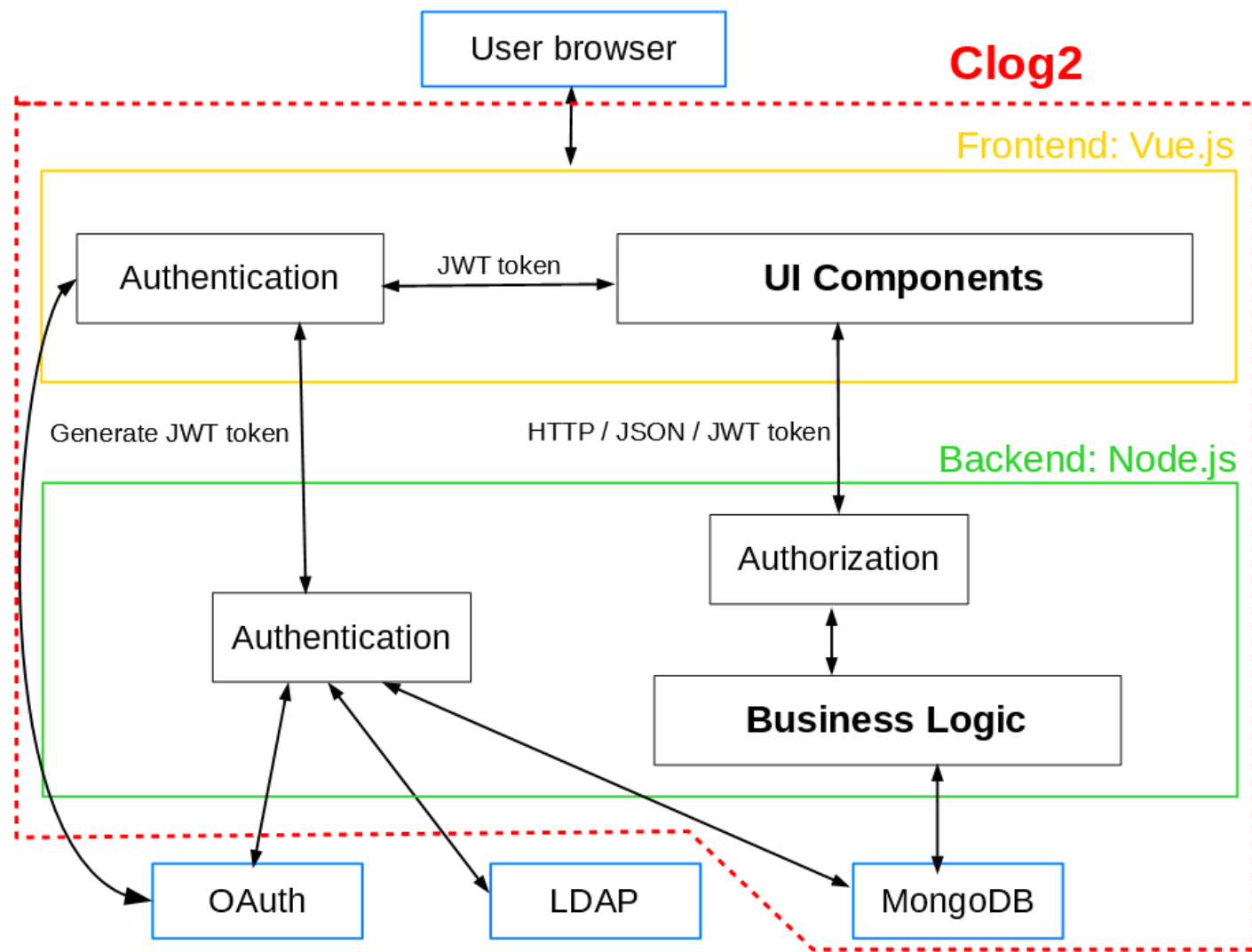
- Authenticate `http://localhost:3000/api/authenticate`
- Account `http://localhost:3000/api/accounts`
- Users `http://localhost:3000/api/users`
- Logbooks `http://localhost:3000/api/users`
- Tags `http://localhost:3000/api/tags`
- Groups `http://localhost:3000/api/groups`
- Logs `http://localhost:3000/api/logs`

## Authorization interface for web clients

- LocalStorage supported
- HTTP Bearer Auth `Authorization: Bearer <token>`

## Authorization interface for other clients

- LocalStorage NOT supported
- HTTP Basic Auth `Authorization: Basic userid:password`
- OAuth server does not provide username:password authentication API



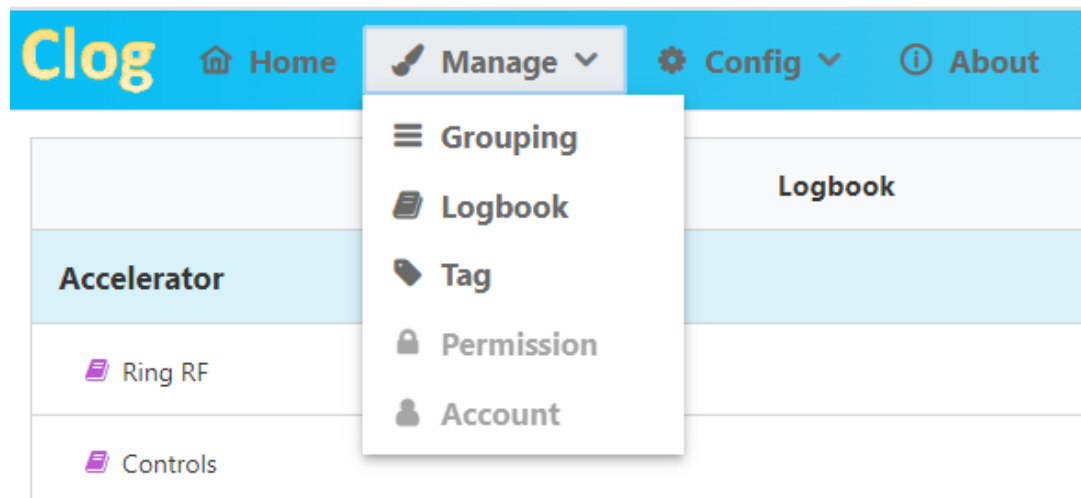
Architecture of Clog 2.0



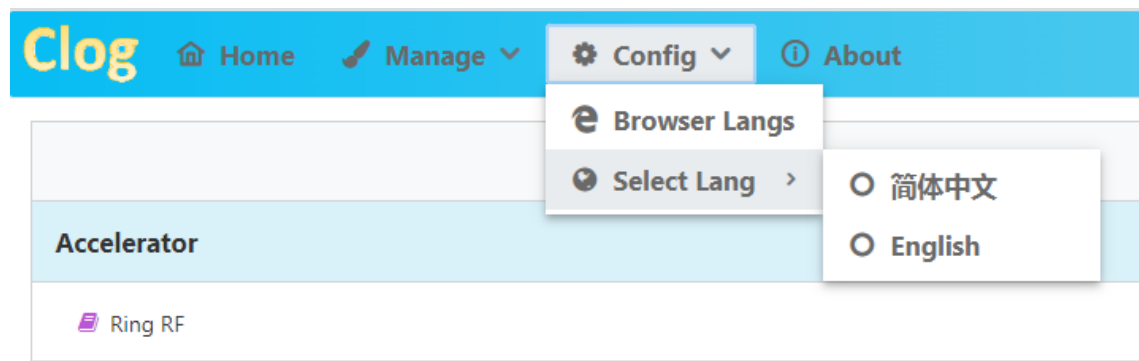
# Frontend

- **Menu Structure**

- Home **Logbook summary page**
- Manage
  - Grouping **Logbook grouping management**
  - Logbook **Logbook management page**
  - Tag **Tag management page**
  - Permission **User permission management page**
  - Account **Account management page**
- Config
  - Browser Langs **Show browser languages**
  - Select Lang **Select a language**
    - 简体中文
    - English
- About **Introduction to the software**



Menu Structure 1



Menu Structure 2

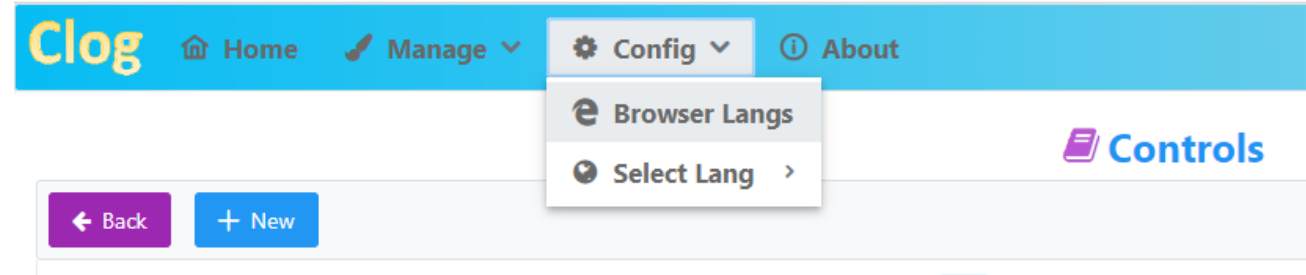
# Frontend

- **Internationalization**

- Uses vue-i18n plugin
- Extracts all text in frontend to locale files
  - frontend/src/locale/en.json
  - frontend/src/locale/zh.json
- Supports Chinese and English
- Initially, checks browser default language and set locale to it.

- **How to add a language**

- Add a new locale file to
  - frontend/src/locale
- Import the new locale file to
  - frontend/src/locale/index.js
- Add the new language to “Select Lang” menu options
  - frontend/src/App.vue



### Browser Languages

- en-US
- zh-CN
- en

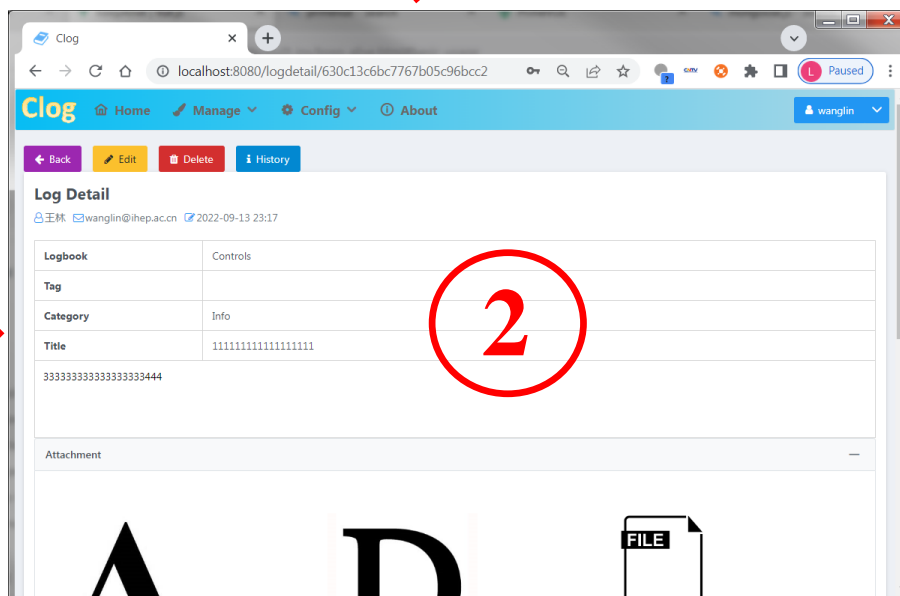
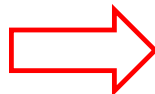
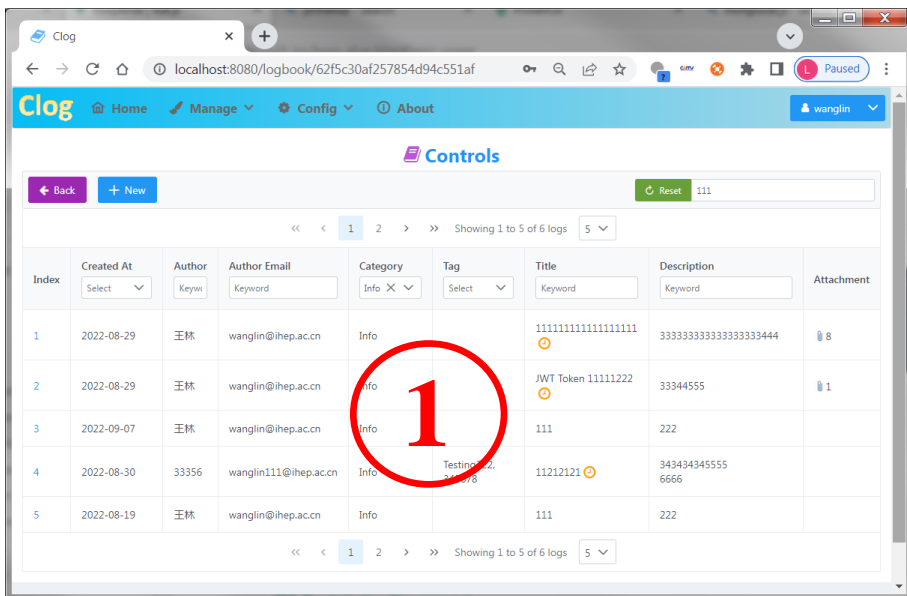
× Close

## Browser supporting languages

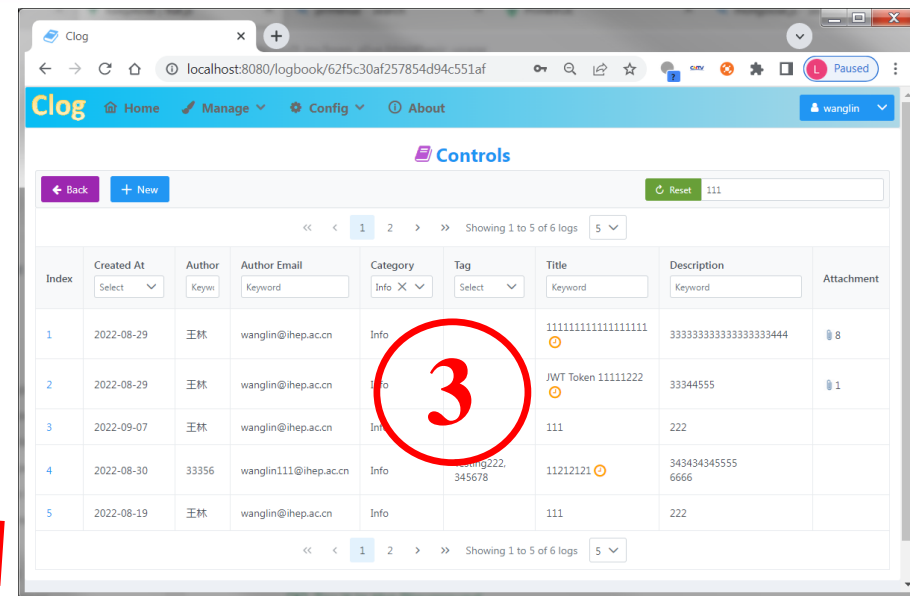
# Frontend

- **Page caching**
  - Uses VUE <KeepAlive> built-in component to cache the log preview page.
  - When switching back to log preview page, the page state will be persisted.
  - For other pages, state will be reset in every visit.

Log preview page



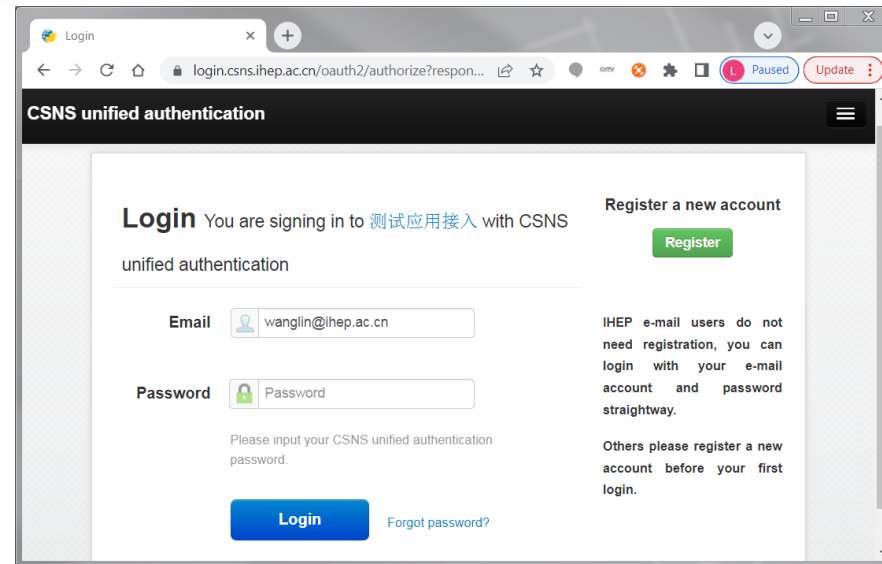
Log detail page



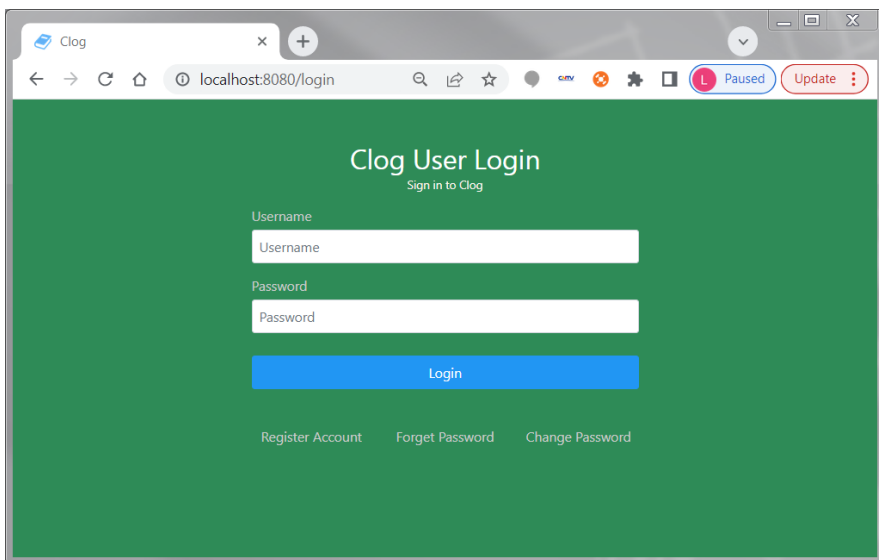
Log preview page

# Login

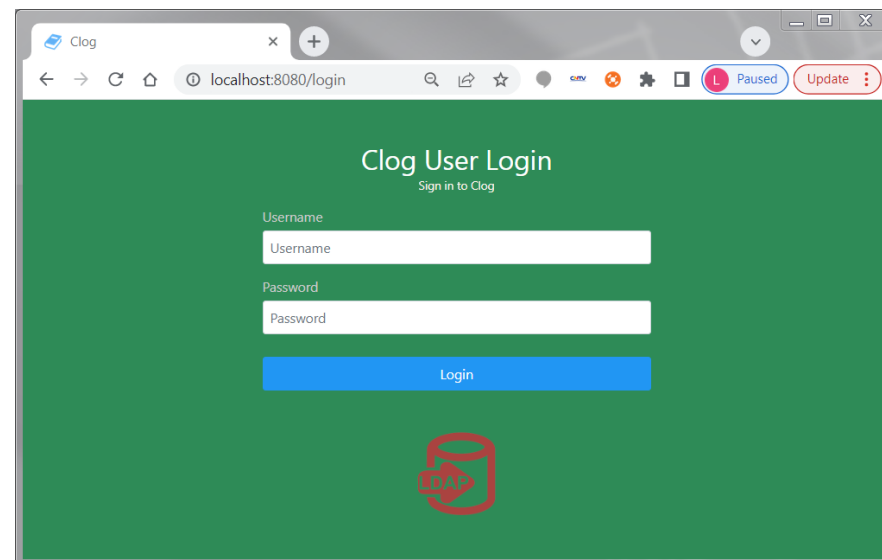
- **Three login methods supported**
  - Local, LDAP or OAuth2
  - Configured in
    - frontend/src/config/configuration.js
    - backend/config/login.js
  - Currently tested with
    - OpenLDAP, admin password needed
    - CSNS OAuth2 server



**Login via CSNS OAuth2**

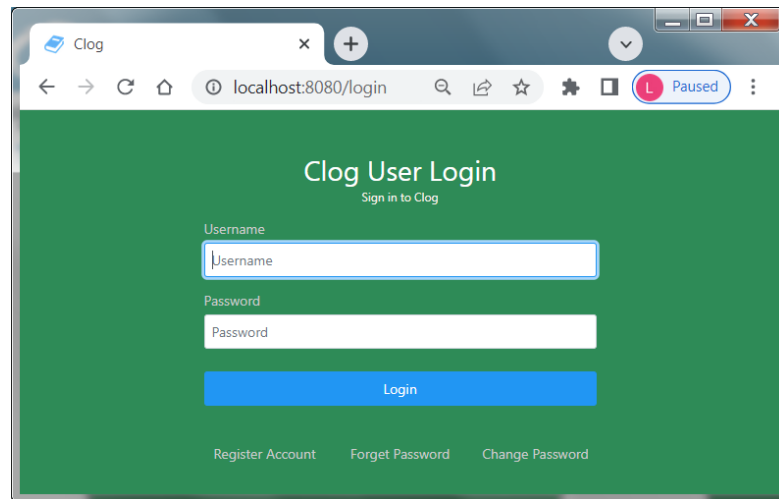


**Login via local database**

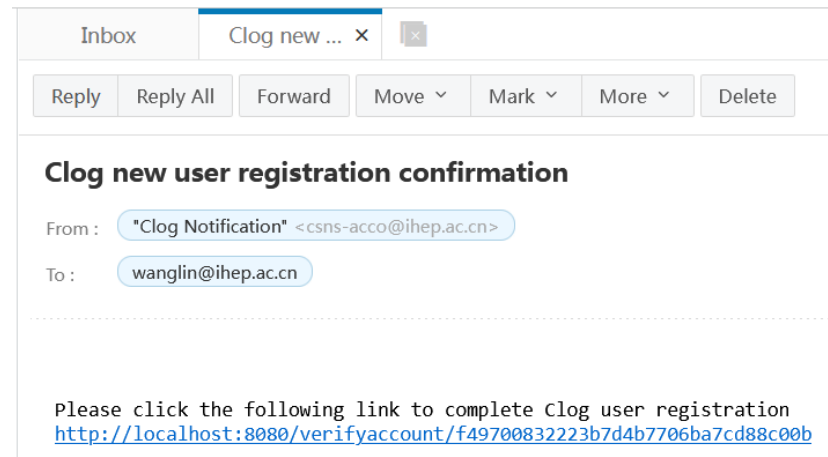


**Login via LDAP**

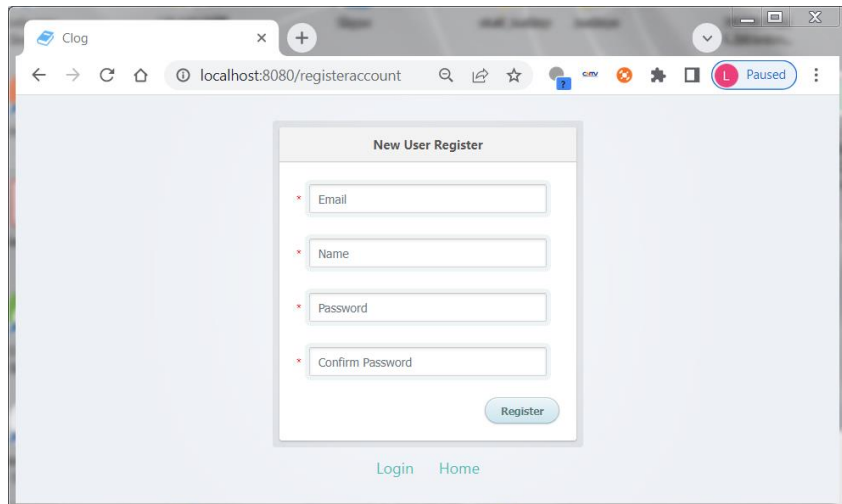
# Login via local database



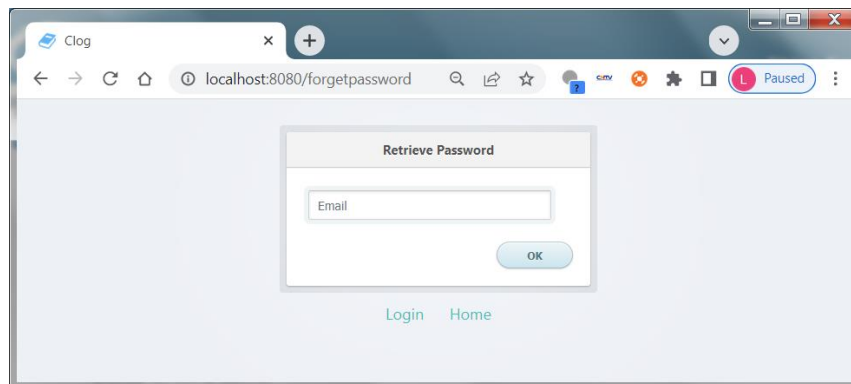
Local login page



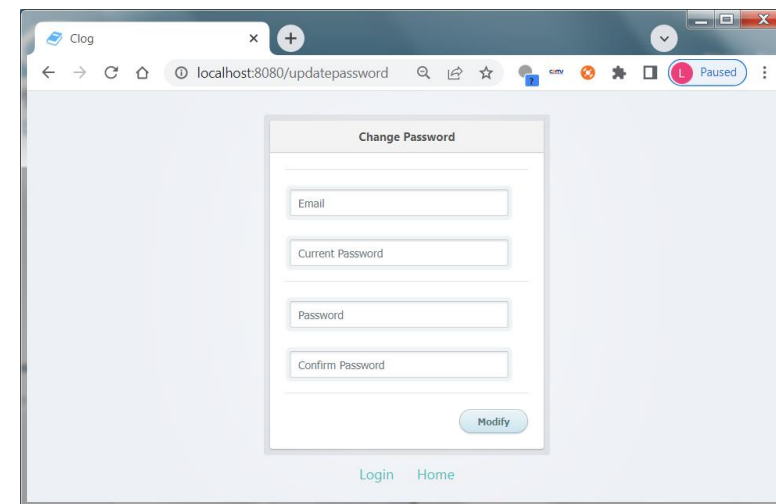
Email notification



Register page

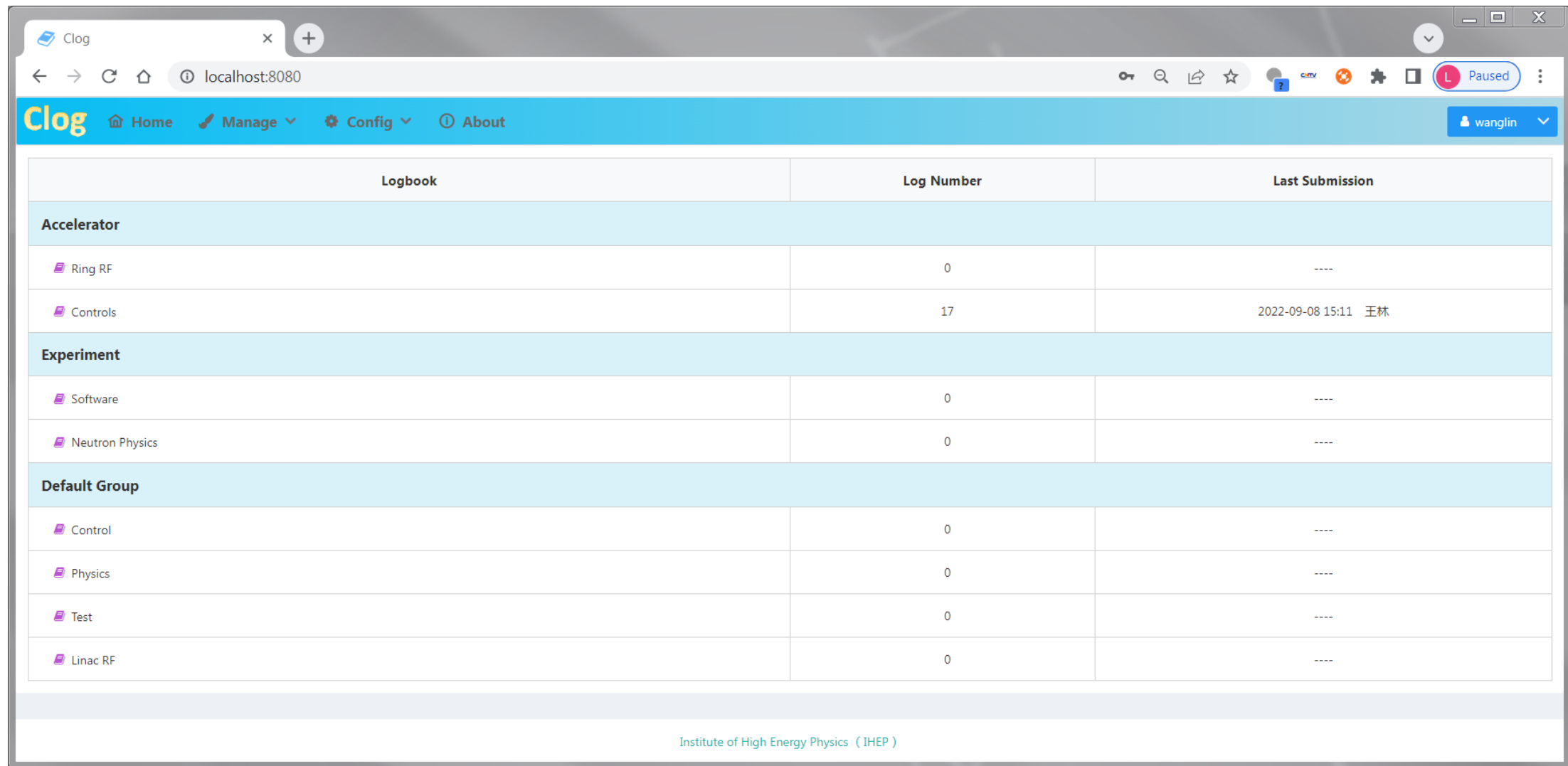


Forget password page



Change password page Page 13

Logbook summaries are displayed. This page is visible to all visitors.

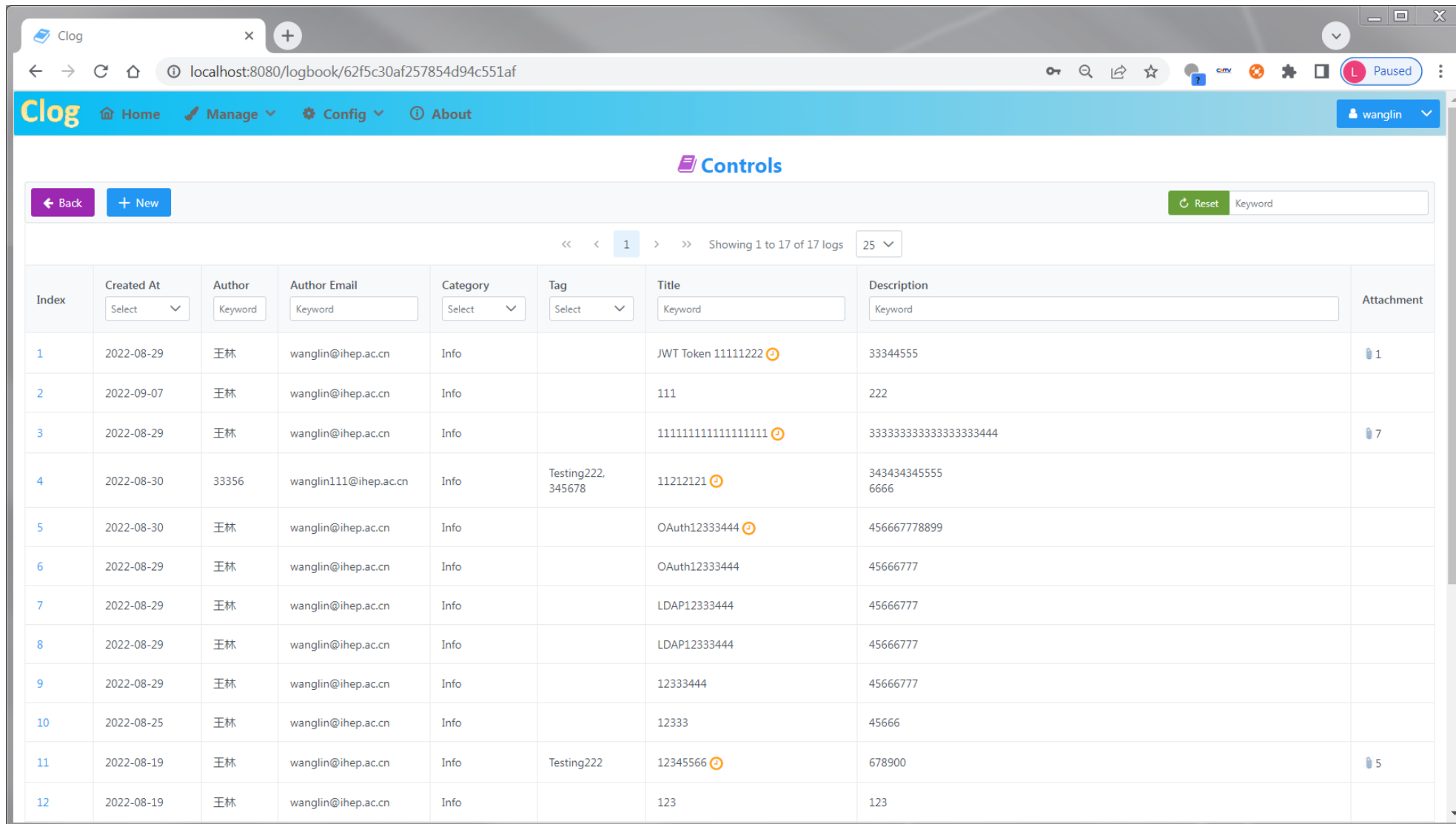


The screenshot shows a web browser window displaying the Clog application. The browser address bar shows localhost:8080. The application header includes the Clog logo and navigation links for Home, Manage, Config, and About. A user profile for 'wanglin' is visible in the top right. The main content area features a table with the following data:

Logbook	Log Number	Last Submission
<b>Accelerator</b>		
Ring RF	0	----
Controls	17	2022-09-08 15:11 王林
<b>Experiment</b>		
Software	0	----
Neutron Physics	0	----
<b>Default Group</b>		
Control	0	----
Physics	0	----
Test	0	----
Linac RF	0	----

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All logs in a logbook are displayed, and log filter function is provided. This page is visible to all visitors.

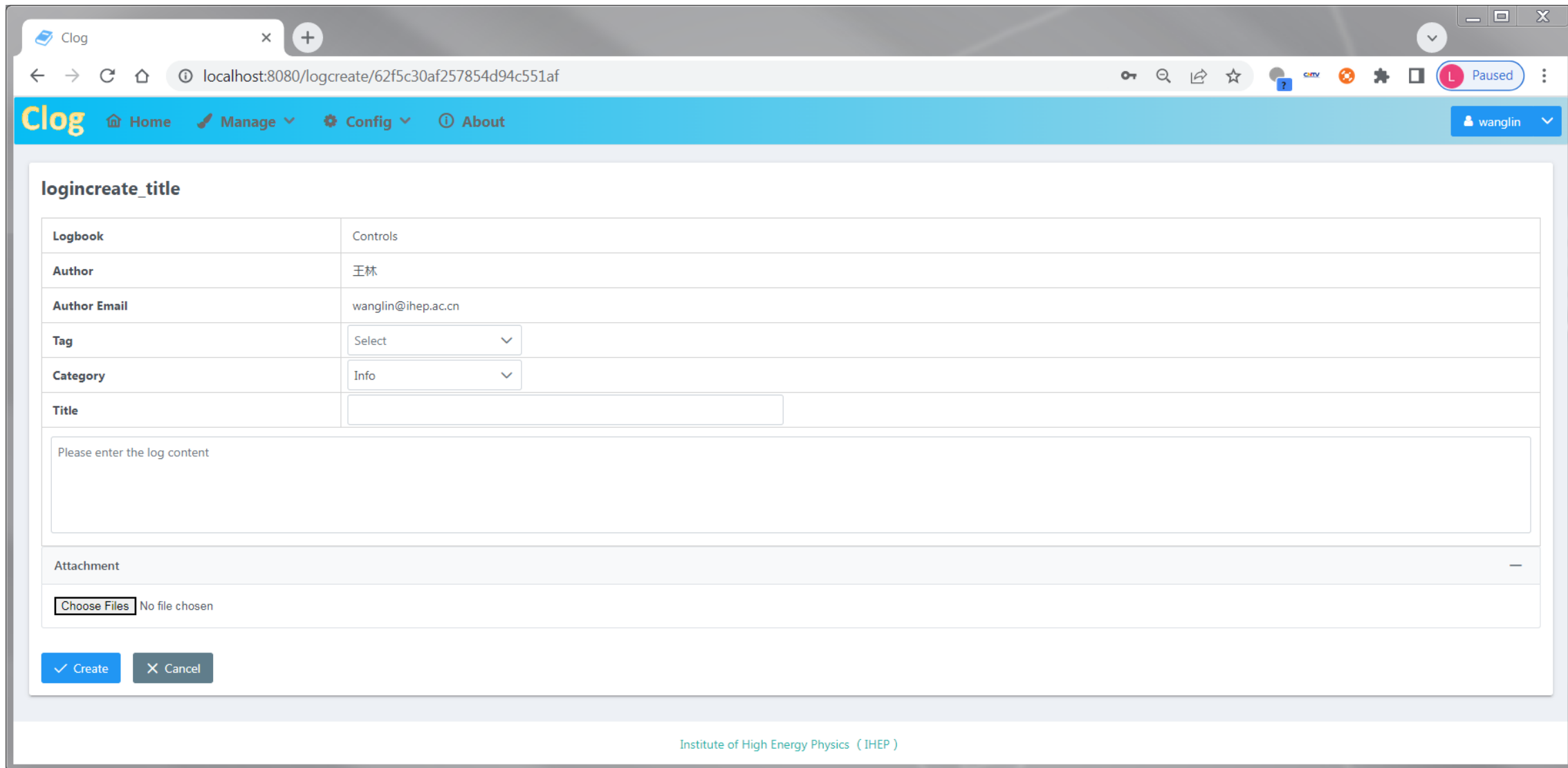


The screenshot shows a web browser window displaying the Clog logbook interface. The browser address bar shows the URL: localhost:8080/logbook/62f5c30af257854d94c551af. The interface includes a navigation bar with 'Home', 'Manage', 'Config', and 'About' links, and a user profile dropdown for 'wanglin'. Below the navigation bar is a 'Controls' section with a 'Back' button, a '+ New' button, and a 'Reset' button next to a 'Keyword' search input field. The main content area displays a table of logs, with the first page of 17 logs shown. The table has columns for Index, Created At, Author, Author Email, Category, Tag, Title, Description, and Attachment. The logs are sorted by Index, and the first log (Index 1) is selected.

Index	Created At	Author	Author Email	Category	Tag	Title	Description	Attachment
1	2022-08-29	王林	wanglin@ihep.ac.cn	Info		JWT Token 11111222	33344555	1
2	2022-09-07	王林	wanglin@ihep.ac.cn	Info		111	222	
3	2022-08-29	王林	wanglin@ihep.ac.cn	Info		11111111111111111111	333333333333333333444	7
4	2022-08-30	33356	wanglin111@ihep.ac.cn	Info	Testing222, 345678	11212121	343434345555 6666	
5	2022-08-30	王林	wanglin@ihep.ac.cn	Info		OAuth12333444	45667778899	
6	2022-08-29	王林	wanglin@ihep.ac.cn	Info		OAuth12333444	45666777	
7	2022-08-29	王林	wanglin@ihep.ac.cn	Info		LDAP12333444	45666777	
8	2022-08-29	王林	wanglin@ihep.ac.cn	Info		LDAP12333444	45666777	
9	2022-08-29	王林	wanglin@ihep.ac.cn	Info		12333444	45666777	
10	2022-08-25	王林	wanglin@ihep.ac.cn	Info		12333	45666	
11	2022-08-19	王林	wanglin@ihep.ac.cn	Info	Testing222	12345566	678900	5
12	2022-08-19	王林	wanglin@ihep.ac.cn	Info		123	123	

Log preview page

All logged-in users can create a new log. This page is visible to logged-in users.



The screenshot shows a web browser window with the URL `localhost:8080/logcreate/62f5c30af257854d94c551af`. The page title is "Clog" and the user is logged in as "wanglin". The main content area is titled "logincreate\_title" and contains a form with the following fields:

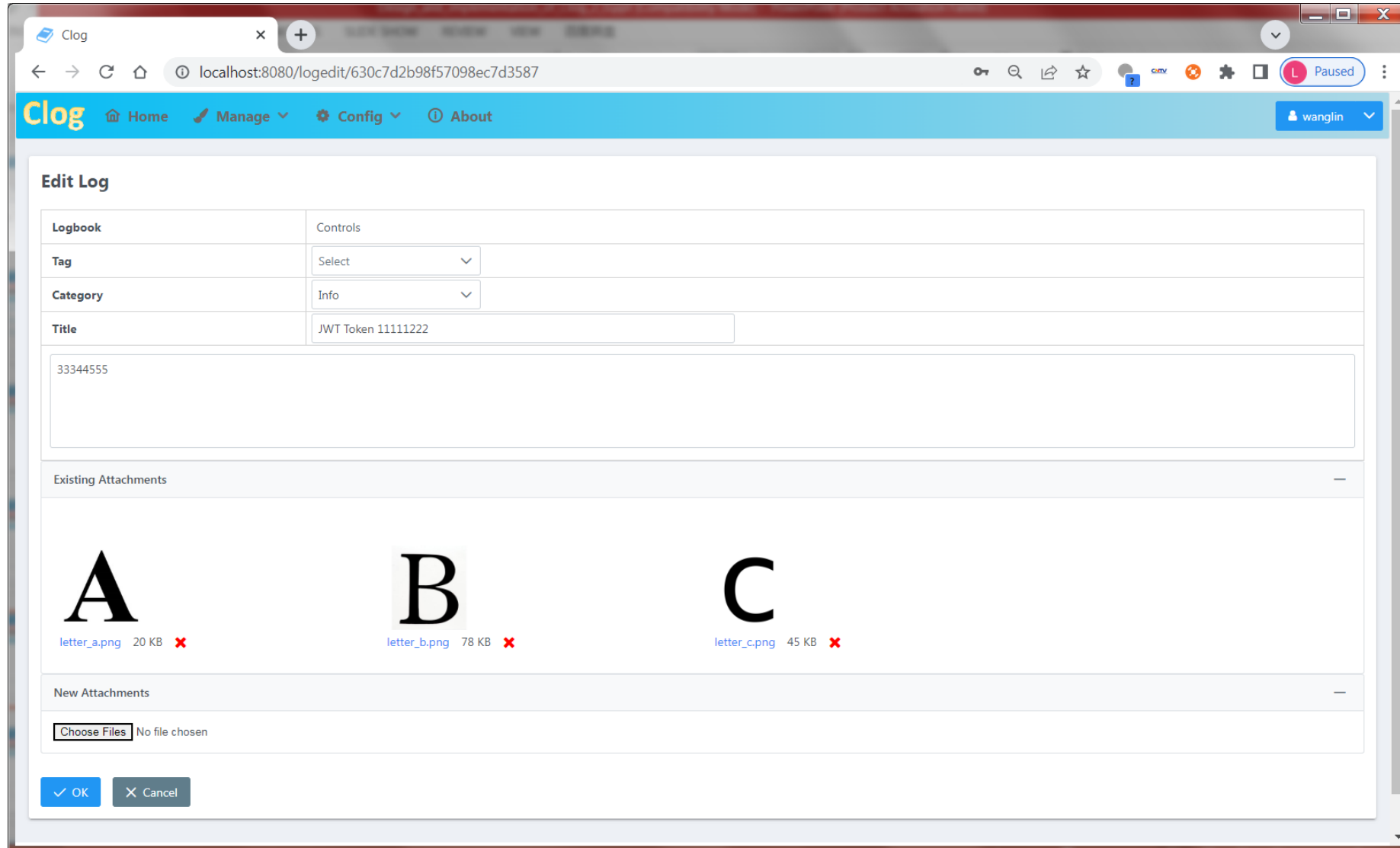
Logbook	Controls
Author	王林
Author Email	wanglin@ihep.ac.cn
Tag	Select
Category	Info
Title	<input type="text"/>

Below the form is a text area with the placeholder text "Please enter the log content". Underneath is an "Attachment" section with a "Choose Files" button and the text "No file chosen". At the bottom of the form are two buttons: "Create" and "Cancel".

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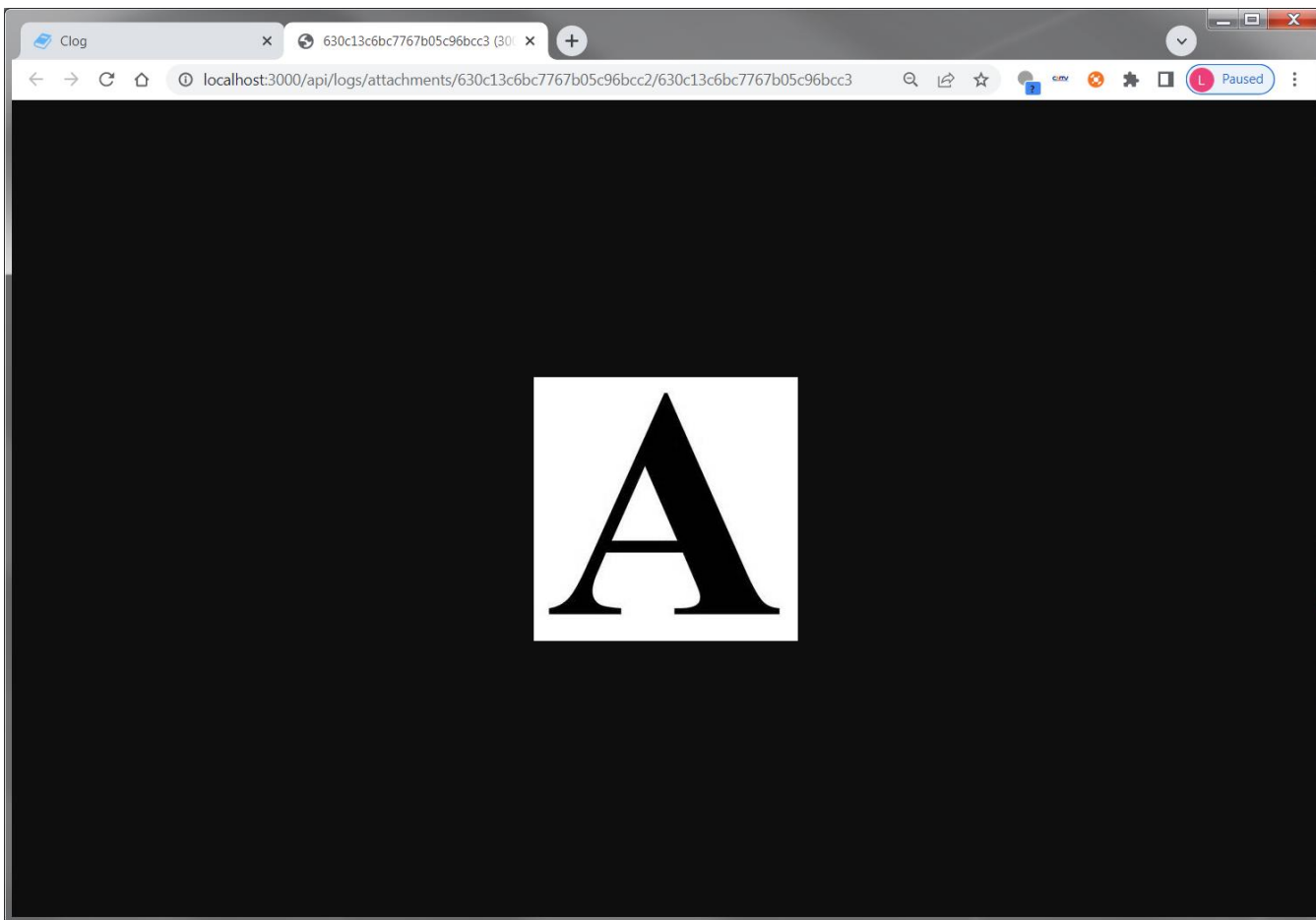
Log author or admin users can edit an existing log. This page is visible to log author or admin users.



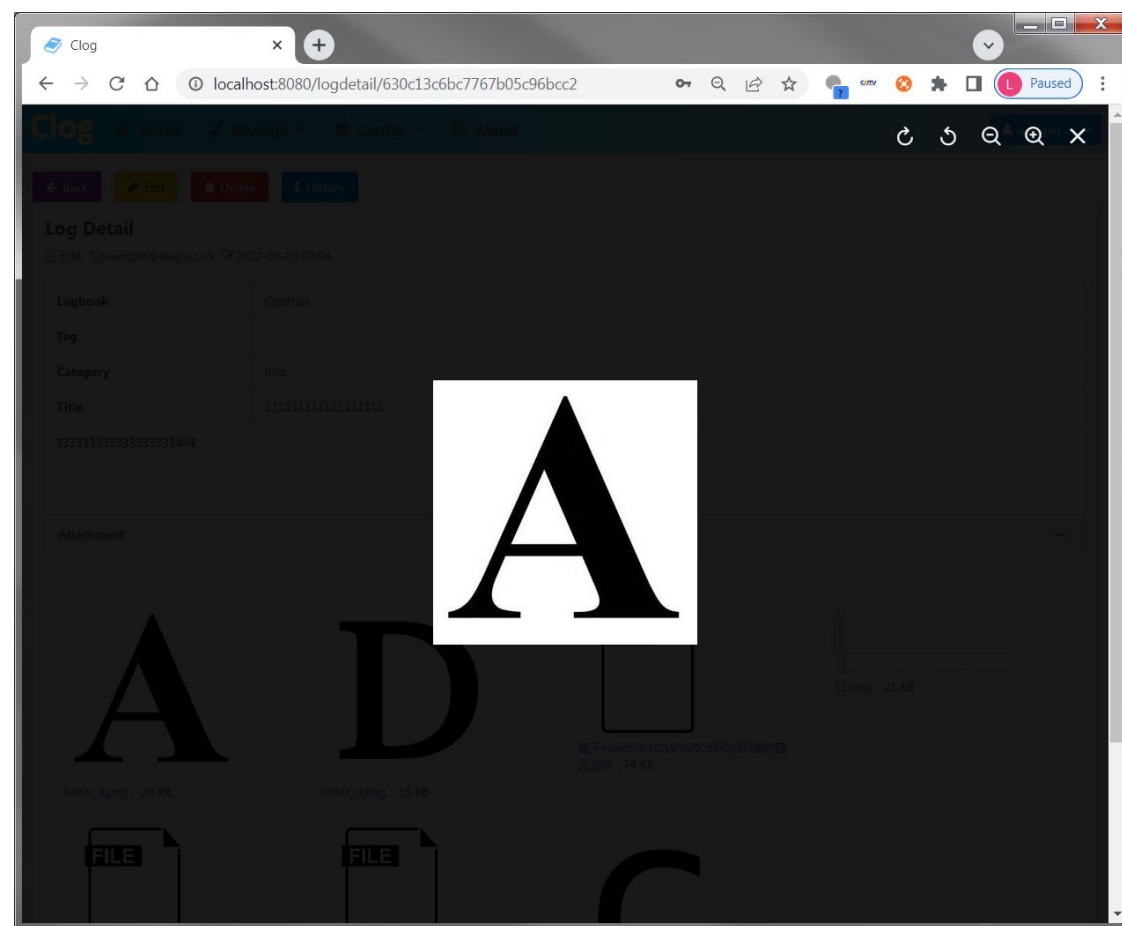
Log edit page



**Attachments can be accessed on log detail page. Attachments are visible to all visitors.**

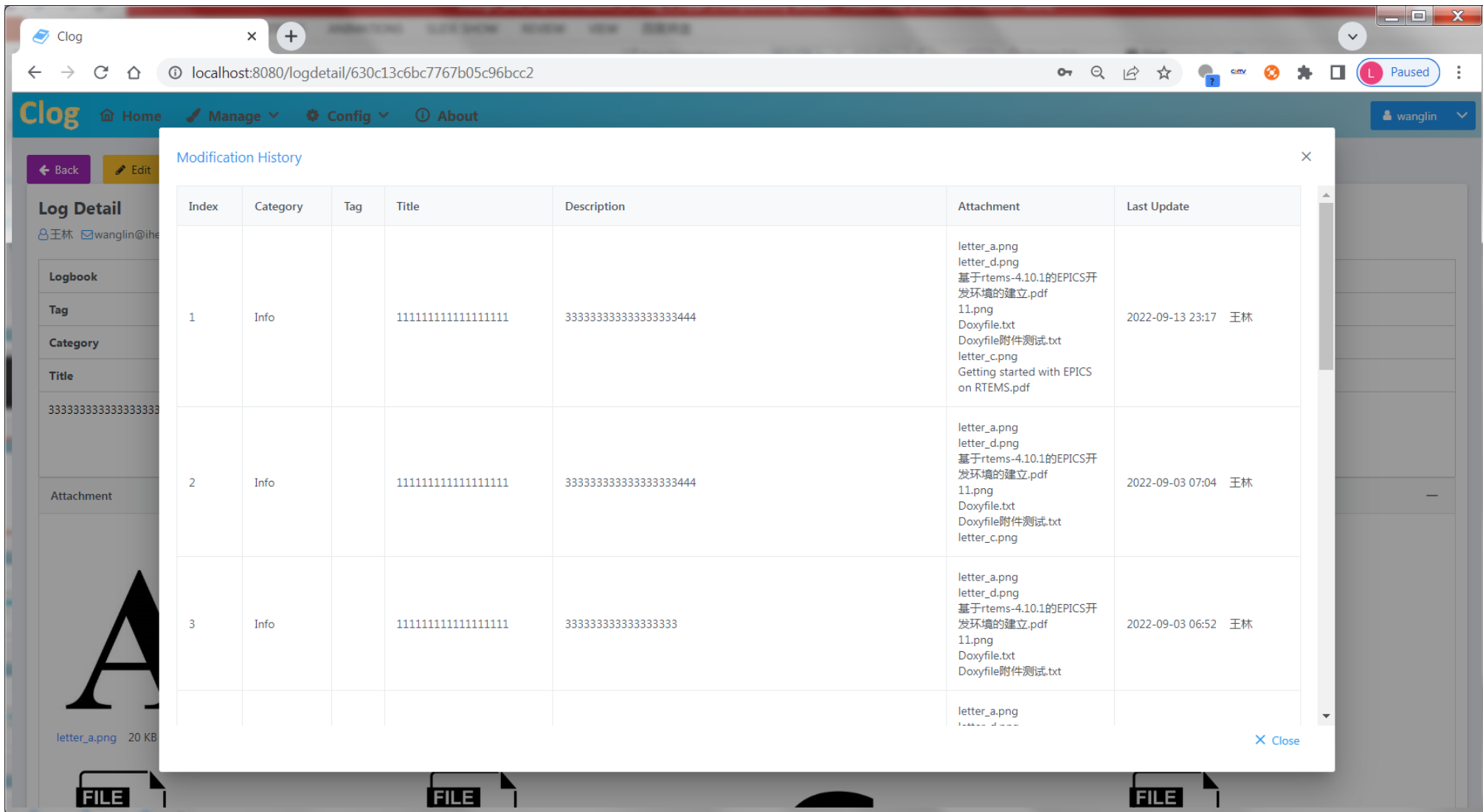


Attachment direct access



Attachment preview for image

**Modification history of a log can be displayed.**



Modification history dialog

**Admin users can create, edit or delete groupings. This page is visible to all visitors and editable to admins.**

Create Group

\*Name

\*Number

Cancel Create

Edit Group

\*Name

\*Number

Cancel Modify

Message

⚠ Are you sure you want to delete the following group?  
Name: Accelerator  
Number:

Cancel OK

Clog

localhost:8080/groupmanagement

Home Manage Config About wanglin

### Grouping Management

+ Add

Index	Name	Number	
1	group测试123		✏ ✖
2	Accelerator		✏ ✖
3	Experiment		✏ ✖
4	333		✏ ✖

**Admin users can create, edit or delete logbooks. This page is visible to all visitors and editable to admins.**

Create Logbook

\*Name

\*Grouping  
Select

\*Number

Cancel Create

Edit Logbook

\*Name  
Ring RF

\*Grouping  
Accelerator

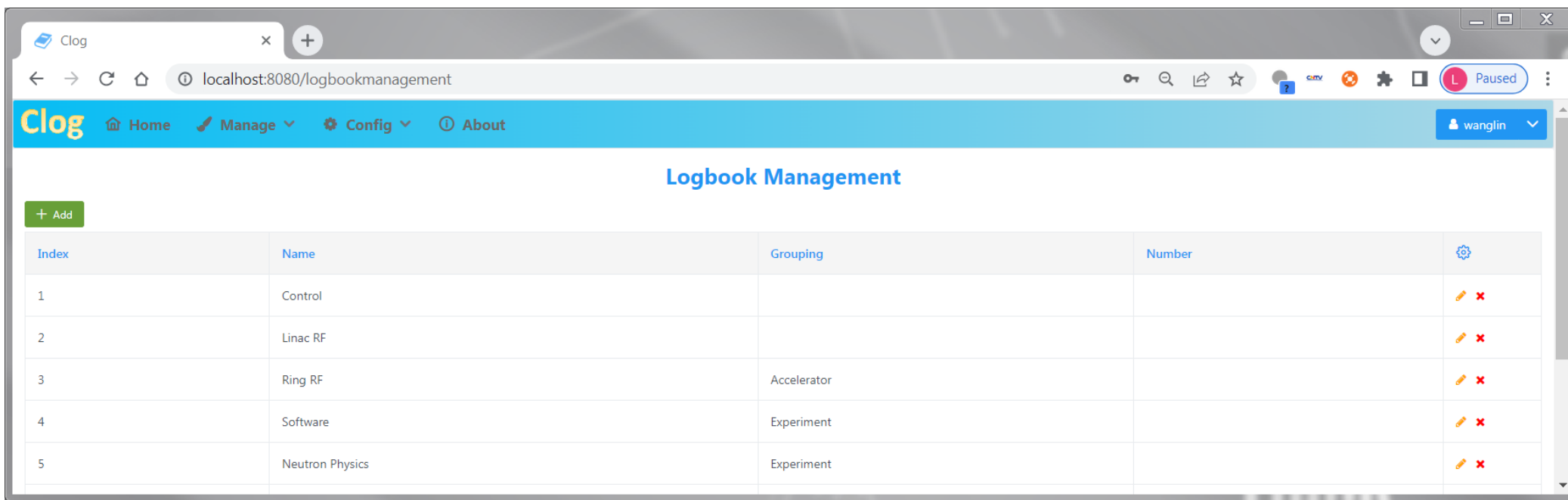
\*Number

Cancel Modify

Message

Are you sure you want to delete the following logbook?  
Name: Ring RF  
Grouping: Accelerator  
Number:

Cancel OK



Index	Name	Grouping	Number	
1	Control			
2	Linac RF			
3	Ring RF	Accelerator		
4	Software	Experiment		
5	Neutron Physics	Experiment		

Logbook management page

**Admin users can create, edit or delete tags. This page is visible to all visitors and editable to admins.**

New Tag

\*Name

\*Number

Edit Tag

\*Name

\*Number

Message

Are you sure you want to delete the following tag?  
Name: Testing222  
Number:

Tag Management

Index	Name	Number	
1	Testing222		
2	345678		
3	adfada		
4	22233	34	

Tag management page

**Admin users can manage user information and permission. This page is visible to all logged-in users and editable to admins.**

**Create User** ✕

\*Name

\*Email

Admin

✕ Cancel ✓ Create

**Edit User** ✕


\*Name

\*Email

Admin

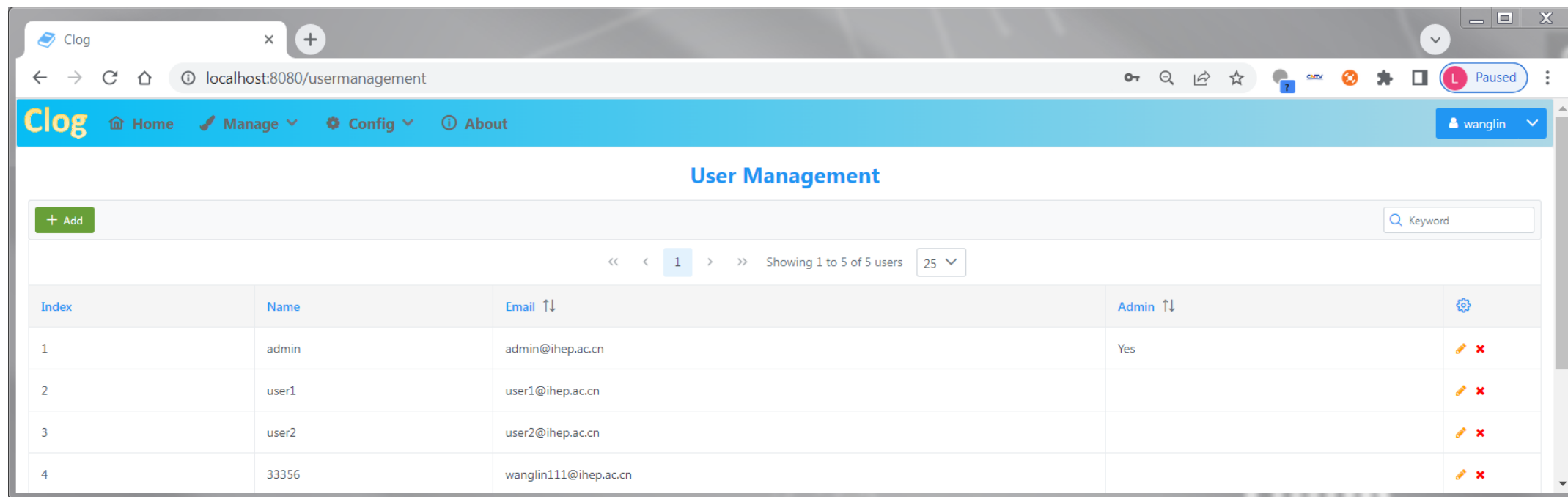
✕ Cancel ✓ Modify

**Message** ✕









 Are you sure you want to delete the following user??

Name: admin  
Email: admin@ihep.ac.cn  
Admin: Yes

✕ Cancel ✓ OK



The screenshot shows a web browser window with the URL localhost:8080/usermanagement. The page title is "User Management". It features a table with 5 users and a search bar. The user "admin" is highlighted in the table.

Index	Name	Email ↑↓	Admin ↑↓	
1	admin	admin@ihep.ac.cn	Yes	 
2	user1	user1@ihep.ac.cn		 
3	user2	user2@ihep.ac.cn		 
4	33356	wanglin111@ihep.ac.cn		 

User management page



**Admin users can manage account information, only useful for local database authentication.**

Create Account

\* Name

\* Email

\* Password

\* Confirm Password

Edit Account

\* Name

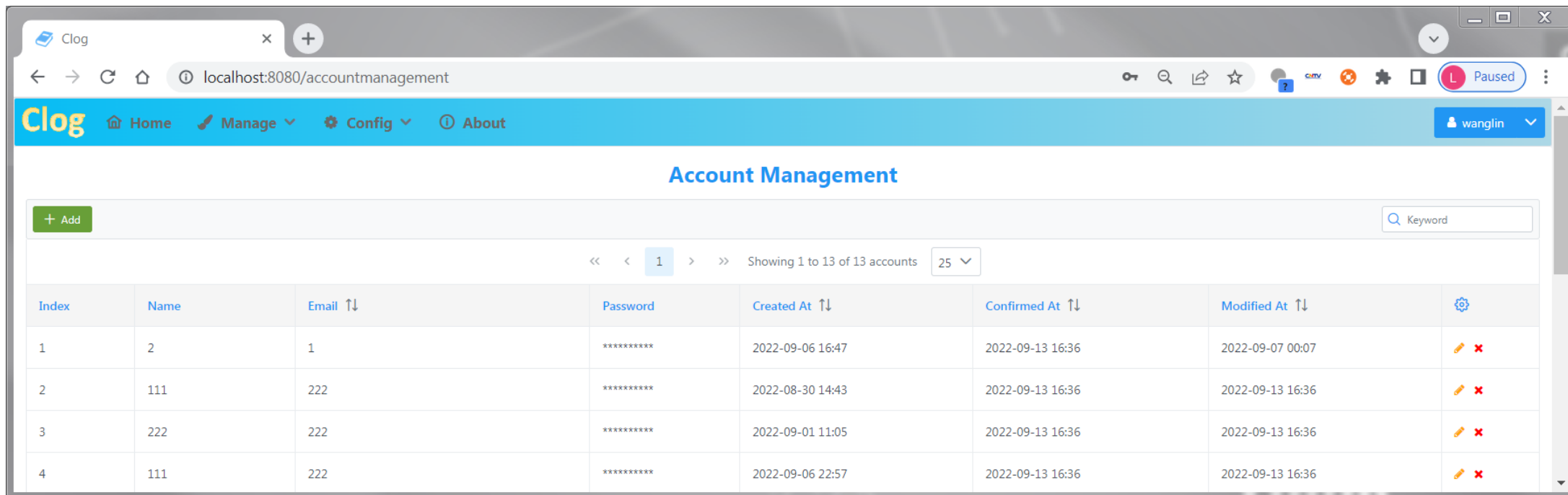
\* Email

\* Password

\* Confirm Password

Message

 Are you sure you want to delete the following account?  
Name: 111  
Email: 222



The screenshot shows a web browser window with the URL localhost:8080/accountmanagement. The page title is "Account Management" and it features a table with 4 columns: Index, Name, Email, Password, Created At, Confirmed At, Modified At, and a settings icon. The table contains 4 rows of account data.

Index	Name	Email	Password	Created At	Confirmed At	Modified At	
1	2	1	*****	2022-09-06 16:47	2022-09-13 16:36	2022-09-07 00:07	
2	111	222	*****	2022-08-30 14:43	2022-09-13 16:36	2022-09-13 16:36	
3	222	222	*****	2022-09-01 11:05	2022-09-13 16:36	2022-09-13 16:36	
4	111	222	*****	2022-09-06 22:57	2022-09-13 16:36	2022-09-13 16:36	

Account management page

## Get Clog up and running

- **Configuration**

- frontend/src/config/configuration.js
- backend/config/frontend.js
- backend/config/ldap.js
- backend/config/login.js
- backend/config/smtp.js

- **Development**

- \$ cd frontend; npm install
- \$ npm run serve
- \$ cd backend; npm install
- \$ npm run dev

- **Deployment**

- \$ cd frontend; npm install
- # cp -r dist/\* /var/www/html
- \$ cd backend; npm install
- \$ pm2 start server.js

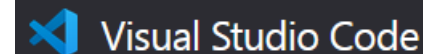
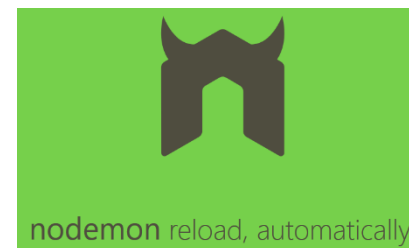
**.js are used for configuration instead of .json because .json is too strict**

- **.json does not support comment lines**
- **.json does not support comma in the last line**



Vue CLI

Standard Tooling for Vue.js Development



**Tools for development**



**Tools for deployment**

## Conclusion

- **Clog 1.0**
  - Development is completed in 2019.
  - It has been used on BNCT Phase I.
  - <https://accelconf.web.cern.ch/icalpcs2019/papers/mopha158.pdf>
- **Clog 2.0**
  - Development is completed in 2022.
  - It will be used on BNCT Phase II and C-band electron gun test platform.
  - <https://github.com/wanglin86769/clog2>
- **Development team**
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Thanks for your attention!

