

APACHE ZEPPELIN TRAINING



Session 2. Multi-user env & Advanced visualization

<http://bit.ly/2I1PnLX>

지난 시간에는 ..

1회차 (2018. 04. 28) - Apache Zeppelin Overview (1)

- Apache Zeppelin의 Data Science Life Cycle에서의 위치 및 역할
- Apache Zeppelin A to Z
 - Interpreter Settings
 - Job Management
 - Notebook Repositories
 - Credential Settings
 - Helium
 - Configurations
- Hands on Sessions
 - Notebook Versioning
 - Change notebook repository to AWS S3
 - Shiro Authentication
- Open source project 인 Apache Zeppelin, 어떻게 개발되고 운영될까요 ?

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 - Change notebook repository to AWS S3
 - ~~Shiro Authentication~~ 이 부분은 오늘 다를 예정이에요
- Open source project 인 Apache Zeppelin, 어떻게 개발되고 운영될까요 ?

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이 부분은 제가 강의 하는 동안 여유 시간이 된다면 다루도록

하겠습니다

- Open source project 인 Apache Zeppelin, 어떻게 개발되고 운영될까요?

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~~▪ Open source project인 Apache Zeppelin, 어떻게 개발되고 운영될까요?~~

2회차 (2018. 05. 12) - Apache Zeppelin Overview (2)

- Multi user environment in Zeppelin

- Shiro Authentication
- Notebook permission settings
- Interpreter permission settings
- Personalized mode

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2회차 (2018. 05. 12) - Apache Zeppelin Overview (2)

- Multi user environment in Zeppelin
 - Shiro Authentication
 - Notebook permission settings
 - Interpreter permission settings
 - Personalized mode
- Helium : pluggable system in Zeppelin
 - What is Helium ? Why it's proposed ?
 - Visualization type Helium package
 - Hands-on session : map / heatmap/ bubble chart로 그려보기

INDEX

1. Zeppelin 0.8.0
2. Multi-user environment
3. Helium - pluggable system in Zeppelin

드디어 Zeppelin 0.8.0 !

드디어 Zeppelin 0.8.0 !

안타깝게도 아직은 RC 랍니다..

[VOTE] Release Apache Zeppelin 0.8.0 (RC1)

Inbox x Apache Zeppelin/asf git x



Jeff Zhang zjffdu@gmail.com via zeppelin.apache.org
to dev

May 9 (2 days ago)

Hi folks,

I propose the following RC to be released for the Apache Zeppelin 0.8.0 release.

The commit id is 2745afe734f06558155e8e0af876fc1bbb62109 :

<https://git-wip-us.apache.org/repos/asf?p=zeppelin.git;a=commit;h=2745afe734f06558155e8e0af876fc1bbb62109>

This corresponds to the tag: v0.8.0-rc1

The release archives (tgz), signature, and checksums are here
<https://dist.apache.org/repos/dist/dev/zeppelin/zeppelin-0.8.0-rc1/>

The release candidate consists of the following source distribution archive
zeppelin-0.8.0.tgz

In addition, the following supplementary binary distributions are provided
for user convenience at the same location
zeppelin-0.8.0-bin-all.tgz

zeppelin-0.8.0-bin-netinst.tgz

The maven artifacts are here
<https://repository.apache.org/content/repositories/orgapachezeppelin-1079>
You can find the KEYS file here:
<https://dist.apache.org/repos/dist/release/zeppelin/KEYS>

Release notes available at
<https://issues.apache.org/jira/secure/ReleaseNote.jspa?projectId=12316221&version=12339144>

Vote will be open for next 72 hours (close at 11PM 11/May PDT).

- +1 approve
- 0 no opinion
- 1 disapprove (and reason why)

몇 일 전 RC(Release Candidate) 1 vote 가

야심차게 시작되었죠



Prabhjyot Singh prabhjyotsingh@gmail.com via zeppelin.apache.org

to dev ▾

-1

zeppelin-0.8.0-bin-netinst fails to start with below exception, however,
zeppelin-0.8.0-bin-all looks good

May 9 (2 days ago) ★



Belousov Maksim Eduardovich m.belousov@tinkoff.ru via zeppelin.apache.org

to dev ▾

-1

1. The autocomplete in JDBC doesn't work because of completionSupport.

You could set "completionSupport": false` in interpreter.json while Zeppelin is down, but settings is reverted to "true" after Zeppelin start.

We can set completionSupport to false before compilation or fix side effect of PR2885 [1].

Ipython autocomplete works well.

Minor:

2. Paragraph result export to Excel doesn't work. Enough to hide those buttons (see attach).

-1 폭격탄 (3)

3. The release notes can contain open unresolved issues because they checked only fix version field and don't check status "Resolved".

I have remove mentions of "0.8.0" in some open issues, but it's good to check filter.

1. <https://github.com/apache/zeppelin/pull/2885> - [ZEPPELIN-3001] Disable ace editor code completion when backend interpreter support completion



Renjith Kamath renjith.kamath@gmail.com via zeppelin.apache.org

to dev ▾

-1

zeppelin-0.8.0-bin-netinst failed

May 9 (2 days ago) ★

Thanks & Regards,
RK

[] 0 no opinion
[] -1 disapprove (and reason why)



Prabhjyot Singh prabhjyotsingh@gmail.com via zeppelin.apache.org

to dev ▾

-1

zeppelin-0.8.0-bin-netinst fails to start with below exception, however,
zennelin-0.8.0-bin-all looks good

May 9 (2 days ago) ★



Belousov Maksim Eduardovich m.belousov@tinkoff.ru via zeppelin.apache.org

to dev ▾

-1

4:40 PM (9 hours ago) ★



Jeff Zhang zjffdu@gmail.com via zeppelin.apache.org

to dev ▾

Thanks for the verifying. I decide to cancel this Vote and fix these issue
for the next RC

5:31 PM (8 hours ago)

이렇게 단시간에 -1을 몇개 연속으로 받은 적은 없었는데

말이죠

결국 바로 RC1 vote는 취소 되었답니다

Belousov Maksim Eduardovich <m.belousov@tinkoff.ru>于2018年5月10日周四下午3:40写道：

1. <https://github.com/apache/zeppelin/pull/2885> - [ZEPPELIN-3001] Disable ace editor code completion when backend interpreter support completion



Renjith Kamath renjith.kamath@gmail.com via zeppelin.apache.org

to dev ▾

-1

zeppelin-0.8.0-bin-netinst failed

May 9 (2 days ago) ★

Thanks & Regards,
RK

[] 0 no opinion
[] -1 disapprove (and reason why)

하지만, 발견된 버그들은
이번 데이터 시각화 CAMP 수업과는
무관합니다 :)

이틀전 이메일로 전달해드린대로
0.8.0 설치 되었나요 ?

이틀전 이메일로 전달해드린대로
0.8.0 설치 되었나요 ?
안되었다면...

아래 링크를 클릭해서 다운받고 설치해주세요

<https://dist.apache.org/repos/dist/dev/zeppelin/zeppelin-0.8.0-rc1/zeppelin-0.8.0-bin-all.tgz>

Multi-user Environment in Zeppelin

무려 3년전 Zeppelin 초창기로 거슬러 올라가...zeppelin

This repository Search Pull requests Issues Marketplace Explore

Unwatch 358 Star 3,550 Fork 1,823

Code Pull requests 102 Projects 0 Insights

Added Shiro security #53

Closed hayssams wants to merge 91 commits into apache:master from unknown repository

Conversation 46 Commits 91 Checks 0 Files changed 46 +1,036 -392

hayssams commented on Apr 27, 2015

Added shiro security. HTTP calls and websockets communications are both protected.

hayssams added some commits on Apr 27, 2015

- Added shirt dependencies
- default shiro configuration file
- The connected or anonymous user should get a ticket first from this API
- Shiro filter to protect access to the API. ...
- Very simple ticket container ...
- User name & ticket are now required to access the notebook api since
- Notes are now loaded from and stored in a subdirectory named after th... ...
- Web socket handlers require the username & ticket got through the ini... ...
- Notebooks are now user dependent. We still load all note in memory. ...
- Get ticket on startup
- Submit username & ticket on web socket requests
- add user & ticket to API calls
- Upgrade tests
- Message hold the username & ticket now
- Angular objects are attached specific to a user
- For an anonymous user, set ticket to anonymous to allow testing

Reviewers
No reviews

Assignees
No one assigned

Labels
None yet

Projects
None yet

Milestone
No milestone

Notifications
Unsubscribe
You're receiving notifications because you're watching this repository.

16 participants

<https://github.com/apache/zeppelin/pull/53>

결국 해당 PR에서 길고 긴 논의 끝에 “hayssams”는 다른

PMC & Contributor 들의 의견을 반영하여 새로 PR 을 열고

10개월만에 Zeppelin 의 master branch 로 들어가게 되었죠

Pull requests Issues Marketplace Explore



Unwatch 358 ★ Unstar 3,550 Fork 1,823

Code

Pull requests 102

Projects 0

Insights

Shiro security v2 #586

Closed

hayssams wants to merge 14 commits into apache:master from unknown repository

Conversation 28

Commits 14

Checks 0

Files changed 22

+557 -65



hayssams commented on Jan 1, 2016

Added Authentication.

Once authenticated, a user has access to all notes.

HTTP & Websocket channels are secured and require auth.

This PR is based on #53 which also implements user ownership on notes.

hayssams added some commits on Jan 1, 2016

Securing the HTTP channel only. ...

The Websocket channel is now as secure as the HTTP channel.

hayssams referenced this pull request on Jan 1, 2016

Added Shiro security #53

hayssams added some commits on Jan 1, 2016

exclude SECURITY-README from rat check

Remove cache optimization in shiro since it references stormpath and ...

Contributor +

Reviewers

No reviews

Assignees

No one assigned

Labels

None yet

e2affca

f9b1952



Projects

None yet

Milestone

No milestone

2017925

8eee51d

Notifications

Unsubscribe

<https://github.com/apache/zeppelin/pull/586>

Shiro Security ?



Security

[Apache Shiro](#) is a powerful and easy-to-use Java security framework that performs **authentication, authorization, cryptography, and session management**.



Security

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Apache Shiro is a powerful and easy-to-use Java security framework that performs ***authentication, authorization, cryptography, and session management.**

* 입증, 증명

쉽게 말해 “사용자 인증(로그인)” 기능을 말해요

<http://shiro.apache.org/authentication-features.html>



Welcome to Zeppelin!

Zeppelin is web-based notebook that enables interactive data analysis. You can make beautiful data-driven, interactive, collaborative documents.

Help

Get started with [Zeppelin documentation](#)

Community

Please feel free to help us to improve Zeppelin. Any contribution are welcome!

 Mailing list

 Issues tracking

 Github

Zeppelin에서 Shiro Authentication 을 activate 시켰을때의
모습이에요

Login

User Name

Password

[Login](#)

<http://shiro.apache.org/authentication-features.html>



Apache Shiro is a powerful and easy-to-use Java security framework that performs **authentication**, ***authorization**, **cryptography**, and **session management**.

* 권한, 허가

특정 기능에 대한 사용자 권한 설정이 가능하게
됩니다

<http://shiro.apache.org/authorization-features.html>



Security

Zeppelin Notebook Job Search admin

Map Visualization Test

Note Permissions (Only note owners can change)

Enter comma separated users and groups in the fields.
Empty field (*) implies anyone can do the operation.

“Note 권한 설정” 혹은

| | | |
|---------|---|---|
| Owners | <input type="text" value="admin"/> | Owners can change permissions,read, run and write the note. |
| Writers | <input type="text" value="user1"/> | Writers can read, run and write the note. |
| Runners | <input type="text" value="user1"/> | Runners can read and run the note. |
| Readers | <input type="text" value="user1"/> <input type="text" value="user2"/> | Readers can only read the note. |

Save Cancel

<http://shiro.apache.org/authorization-features.html>



Apache Shiro
performs aut

Interpreters

Manage interpreters settings. You can create / edit / remove settings. Note can bind / unbind these interpreter settings.

Repository + Create



spark %spark, %sql, %dep, %pyspark, %ipyspark, %r •

Option

The interpreter will be instantiated in process

Connect to existing process

Set permission

“Interpreter 권한 설정”

Enter comma separated users and groups in the fields.

Empty field (*) implies anyone can run this interpreter.

Owners

admin user1

Properties

| name | value | action |
|-----------------|------------|--------|
| args | | |
| master | local["*"] | |
| spark.app.name | Zeppelin | |
| spark.cores.max | | |

<http://shiro.apache.org/authorization-features.html>



Security

Apache Shiro is a powerful and easy-to-use Java security framework that performs **authentication**, **authorization**, ***cryptography**, and **session management**.

* 암호화

<http://shiro.apache.org/cryptography-features.html>



Security

[Apache Shiro](#) is a powerful and easy-to-use Java security framework that performs **authentication, authorization, cryptography, and session management.**

세션 관리

<http://shiro.apache.org/session-management-features.html>



Security and after that..

- [ZEPPELIN-2598] Securing Zeppelin with OpenID Connect ✓** 55
#2373 by andreaTP was closed on Jun 28, 2017
- Allow group/role based authentication using LdapRealm [ZEPPELIN-2539] ✗** 9
#2354 by sohaibiftikhar was closed on Jun 7, 2017 1 of 1
- [Zeppelin-1611] - Support PAM (System User) Authentication ✓** 9
#1589 by hkropp was closed on Nov 8, 2016 3 of 3
- [ZEPPELIN-1210] Run interpreter per user ✓** 58
#1265 by jongyoul was closed on Oct 19, 2016
- [Zeppelin-945] Interpreter authorization ✗** 35
#1257 by astroshim was closed on Aug 16, 2016
- [WIP Zeppelin-945] Interpreter authorization ✗** 5
#1223 by astroshim was closed on Aug 1, 2016 0 of 1
- Notebook Authorization ✓** 26
#681 by prasadwagle was closed on Feb 28, 2016 8 of 8
- Shiro security v2 ✓** 28
#586 by hayssams was closed on Jan 10, 2016
- Added Shiro security** 46
#53 by hayssams was closed on Dec 31, 2015

이를 기반으로 계속해서 Security관련

기능들이 추가되었어요

Why we needed this?

Web-based Notebook Environment

Confusion Matrix:

```
[[[ 970  0  1  0  0  2  2  1  4  0]
 [ 0 1127  3  0  2  0  1  1  1  0]
 [ 0  2 1022  1  2  0  4  1  0]
 [ 0  0  2 999  0  3  0  4  2  0]
 [ 0  0  0  9 950  0  0  0  0  0]
 [ 1  0  0  0  9 879  1  1  0  1]
 [ 4  2  1  0 12  8 931  0  0  0]
 [ 0  1  5  0  1  0 1018  1  2]
 [ 3  1  3  3  4  3  0  3  950  4]
 [ 1  4  0 18  3  0  6  2  974]]]
```

Task 0 last. Last updated by anonymous at March 22 2018, 11:04:01 AM.

Visualization of Weights and Layers

In trying to understand why the convolutional neural network can recognize handwritten digits, we will now visualize the weights of the convolutional filters and the resulting output images.

Helper-function for plotting convolutional weights

```
#!/usr/bin/python
# Python script for plotting convolutional weights
# Author: Sven Koenig (svenkoenig@gmail.com)
# License: MIT

def plot_conv_weights(weights, input_channel=0):
    # Assume weights are TensorFlow ops for 4-dim variables
    # e.g. weights_conv1 or weights_conv2.

    # Retrieve the values of the weight-variables from TensorFlow.
    # A feed-dict is not necessary because nothing is calculated.
    w = session.run(weights)

    # Get the lowest and highest values for the weights.
    # This is used to correct the colour intensity across
    # the images so they can be compared with each other.
    w_min = np.min(w)
    w_max = np.max(w)

    # Number of filters used in the conv. layer.
    num_filters = w.shape[3]
```

Why we needed this?

Web-based Notebook Environment

Confusion Matrix:

```
[ [ 970 0 1 0 0 2 2 1 1 4 0 ],
[ 0 1127 3 0 2 0 1 1 1 1 0 ],
[ 0 1122 1 2 0 0 4 1 1 0 ],
[ 0 0 2 995 0 3 0 4 2 0 ],
[ 0 0 0 990 0 0 0 0 0 0 ],
[ 1 0 0 0 0 9 1 879 1 1 12 ],
[ 4 2 1 0 12 8 931 0 0 0 ],
[ 0 1 5 0 1 0 0 1018 1 2 ],
[ 3 1 3 3 4 3 0 3 950 4 ],
[ 1 4 0 18 3 0 6 2 974 ] ]
```

Visualization of Weights and Layers

In trying to understand why the convolutional neural network can recognize handwritten digits, we can visualize the convolutional filters and the resulting output images.

Helper-function for plotting convolutional weights

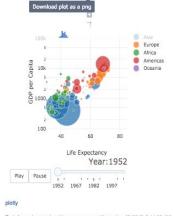
```
python
def plot_conv_weights(weights, input_channel=0):
    # Assume weights are TensorFlow ops for 4-Dim variables
    # e.g. weights_conv1 or weights_conv2.

    # Retrieve the values of the weights from TensorFlow.
    # A feed_dict is not necessary because nothing is calculated.
    w = session.run(weights)

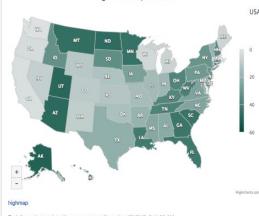
    # Get the lowest and highest values for the weights.
    # This is used to correct the colour intensity across
    # the images so they can be compared with each other.
    w_min = np.min(w)
    w_max = np.max(w)

    # Number of filters used in the conv. layer.
```

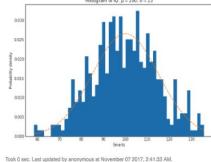
Plotly Example



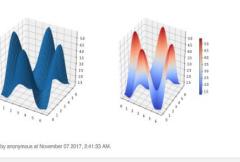
Highchart Example



Matplotlib Histogram Example

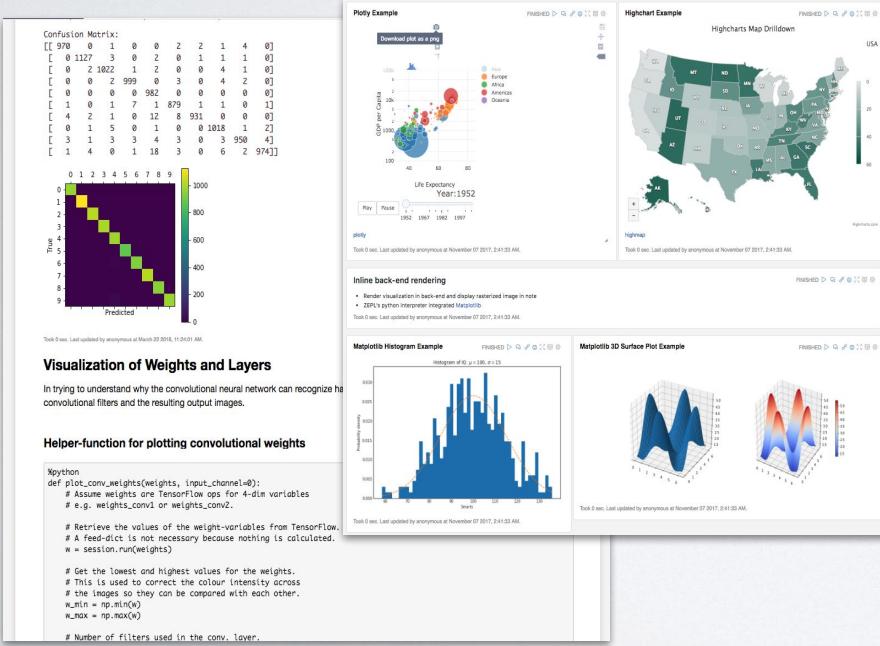


Matplotlib 3D Surface Plot Example



Why we needed this?

Web-based Notebook Environment



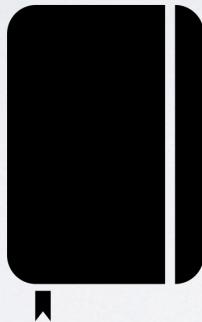
- Interactive
- Flexible
- Visualized
- Inline Description
- Story
- Shareable

Why we needed this?

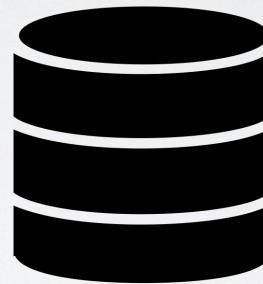
Multi-user environment 예선..



Why we needed this?



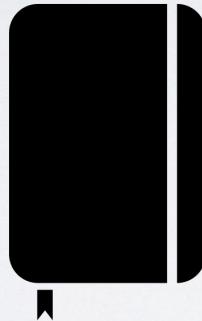
Notebook을
공유한다는 것은



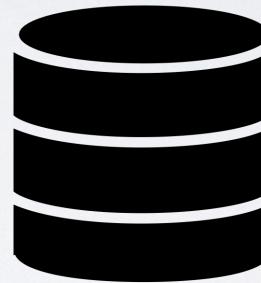
Notebook 내 분석결과는 물론,
load 된 데이터도 공유하는 것

Why we needed this?

이러한 환경에서 모든 사용자가
같은 권한을 가져서도, 가질 필요도 없죠



Notebook을
공유한다는 것은



Notebook 내 분석결과는 물론,
load 된 데이터도 공유하는 것

Activate Shiro Authentication

No more “anonymous”!

Basic Security Setup

Shiro.ini 파일 설정에 대해선 뒤에서 다시
다루겠습니다.

- Step1. Enable Shiro : conf/ 디렉토리 아래에 있는 shiro.ini.template 파일을 활성화 시켜 주세요.
앞으로의 대부분의 Shiro security 관련 설정은 shiro.ini 파일을 통해 이뤄집니다.

```
ahyoungryu at MacBook-Pro-6 in ~/Dev/zeppelin-bin/zeppelin-0.8.0-bin-all
$ cp conf/shiro.ini.template conf/shiro.ini
```

INI file format ? “The *INI file format* is an informal standard for configuration files for some platforms or software. *INI files* are simple text files with a basic structure composed of sections, properties, and values.” [from Wikipedia](#)

한마디로 설정 파일의 한 종류입니다 :)

Basic Security Setup

Websocket : Zeppelin에서 backend와 frontend 사이의 통신 방식 중

하나입니다

- Step2 . Secure Websocket Channel : conf/ 디렉토리 아래에 있는 zeppelin-site.xml 파일에 있는 zeppelin.anonymous.allowed 값을 true -> false 로 바꿔주세요. zeppelin-site.xml 가 아직 없다면 zeppelin-site.xml.template 으로 부터 copy해주세요

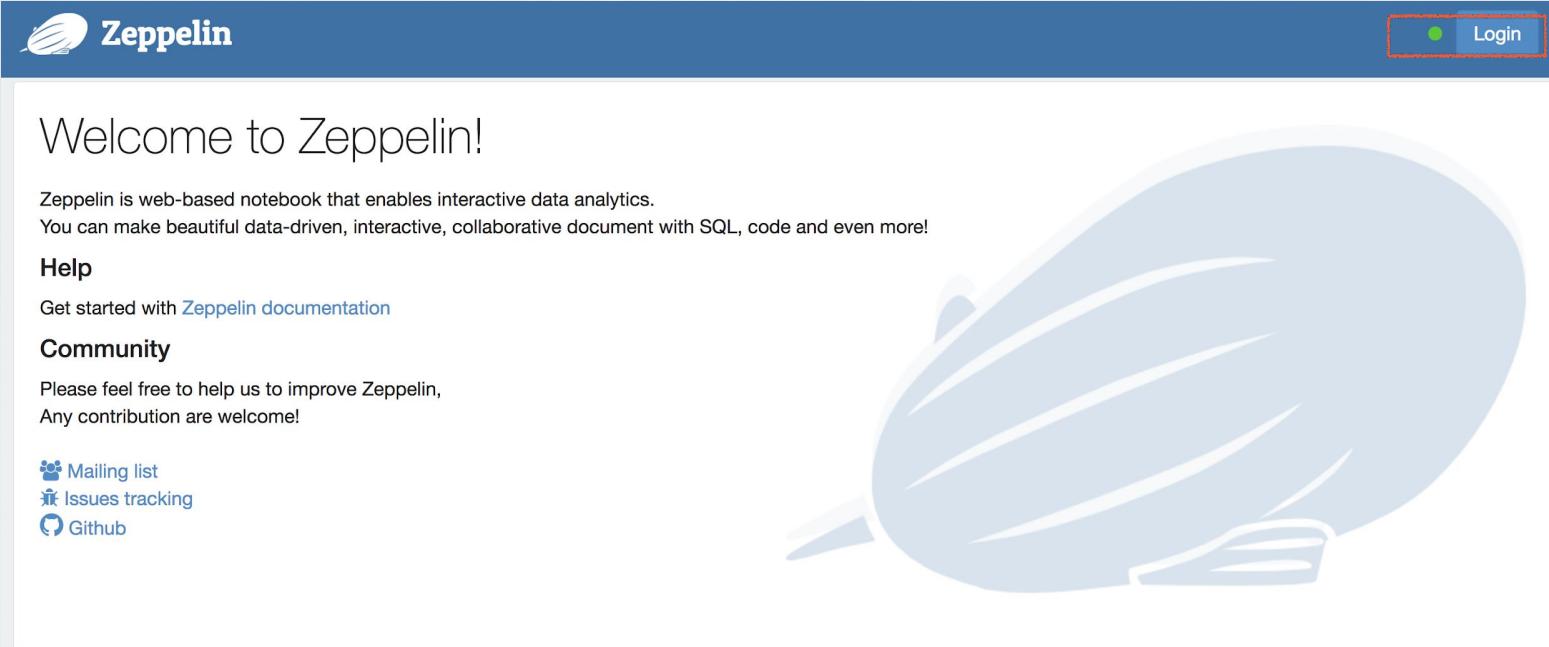
```
<property>
    <name>zeppelin.anonymous.allowed</name>
    <value>false</value>
    <description>Anonymous user allowed by default</description>
</property>
```

Basic Security Setup

- Step3. Zeppelin 재시작 후 Login : 아래와 같이 shiro.ini 파일의 [users] section에 있는 예시 username / password 조합을 이용해 로그인 할 수 있답니다.

```
18 [users]
19 # List of users with their password allowed to access Zeppelin.
20 # To use a different strategy (LDAP / Database / ...) check the shiro doc at http://shiro.
21 # To enable admin user, uncomment the following line and set an appropriate password.
22 admin = password1, admin
23 user1 = password2, role1, role2      Password 옆에 적힌 role 은 [roles]
24 user2 = password3, role3
25 user3 = password4, role2      section에서 찾을 수 있어요
```

Basic Security Setup



The screenshot shows the Apache Zeppelin landing page. At the top, there's a blue header bar with the Zeppelin logo (a stylized airship icon) and the word "Zeppelin". On the right side of the header is a "Login" button with a red outline. Below the header, the main content area has a white background. It features a large, semi-transparent graphic of a dirigible on the right side. The text "Welcome to Zeppelin!" is centered at the top of the content area. Below it, two paragraphs introduce Zeppelin: "Zeppelin is web-based notebook that enables interactive data analytics." and "You can make beautiful data-driven, interactive, collaborative document with SQL, code and even more!". Underneath these paragraphs are two sections: "Help" and "Community". The "Help" section contains a link to "Zeppelin documentation". The "Community" section encourages contributions and lists links for "Mailing list", "Issues tracking", and "Github".

Welcome to Zeppelin!

Zeppelin is web-based notebook that enables interactive data analytics.

You can make beautiful data-driven, interactive, collaborative document with SQL, code and even more!

Help

Get started with [Zeppelin documentation](#)

Community

Please feel free to help us to improve Zeppelin,
Any contribution are welcome!

 [Mailing list](#)

 [Issues tracking](#)

 [Github](#)

Basic Security Setup

The screenshot shows the Zeppelin web interface with a red box highlighting the top navigation bar. The bar includes the Zeppelin logo, a 'Notebook' dropdown menu, a 'Job' button, a search bar, and a 'anonymous' user indicator.

Welcome to Zeppelin!

Zeppelin is web-based notebook that enables interactive data analytics.
You can make beautiful data-driven, interactive, collaborative document with SQL, code and even more!

Notebook

- Import note
- Create new note
 - Filter
- NoteDirA
- Zeppelin Tutorial
- Map Visualization Test
- Untitled Note 1
- Trash

Help
Get started with [Zeppelin documentation](#)

Community
Please feel free to help us to improve Zeppelin,
Any contribution are welcome!

Mailing list
Issues tracking
Github

Shiro 가 켜지면 로그인 없이는
notebook 관련 어떤 기능도 할 수
없어요

Shiro authentication in Zeppelin

다시 shiro.ini파일로 돌아와서..

Shiro Configuration \w shiro.ini

```
# =====
# Shiro INI configuration
# =====

[main]
# Objects and their properties are defined here,
# Such as the securityManager, Realms and anything
# else needed to build the SecurityManager

[users]
# The 'users' section is for simple deployments
# when you only need a small number of statically-defined
# set of User accounts.

[roles]
# The 'roles' section is for simple deployments
# when you only need a small number of statically-defined
# roles.

[urlz]
# The 'urls' section is used for url-based security
# in web applications. We'll discuss this section in the
# Web documentation
```

- [main]
- [users]
- [roles]
- [urlz]

<http://shiro.apache.org/configuration.html#ini-sections>

Shiro authentication in Zeppelin

Shiro Configuration \w **shiro.ini**

[main] section

```
[main]
sha256Matcher = org.apache.shiro.authc.credential.Sha256CredentialsMatcher

myRealm = com.company.security.shiro.DatabaseRealm
myRealm.connectionTimeout = 30000
myRealm.username = jsmith
myRealm.password = secret
myRealm.credentialsMatcher = $sha256Matcher

securityManager.sessionManager.globalSessionTimeout = 1800000
```

- User groups & Permissions 설정 가능(optional)
- Realms 설정 가능(optional)
 - LDAP
 - Active Directory
 - PAM
 - ZeppelinHub (a.k.a ZEPL)

Shiro authentication in Zeppelin

Shiro Configuration \w **shiro.ini**

[users] section

```
[users]
admin = secret
lonestarr = vespa, goodguy, schwartz
darkhelmet = ludicrousspeed, badguy, schwartz
```

- A static set of user accounts
- Format : `username = password, roleName1, roleName2, ..., roleNameN`

Shiro authentication in Zeppelin

Shiro Configuration \w **shiro.ini**

[roles] section

```
[roles]
# 'admin' role has all permissions, indicated by the wildcard '*'
admin = *
# The 'schwartz' role can do anything (*) with any lightsaber:
schwartz = lightsaber:*
# The 'goodguy' role is allowed to 'drive' (action) the winnebago (type) wi
th
# license plate 'eagle5' (instance specific id)
goodguy = winnebago:drive:eagle5
```

- [users] section 에 user-pwd 조합과 함께 쓰여요
- Role name 과 함께 Permissions 과 함께 연결지어 사용 가능
- Format :

rolename = *permissionDefinition1, permissionDefinition2, ..., permissionDefinitionN*

Shiro authentication in Zeppelin

공식 문서에

의하면...

"Again, this is useful in environments with a small number of roles or where roles don't need to be created dynamically at runtime"

Shiro Configuration \w shiro.ini

[roles] section

```
[roles]
# 'admin' role has all permissions, indicated by the wildcard '*'
admin = *
# The 'schwartz' role can do anything (*) with any lightsaber:
schwartz = lightsaber:*
# The 'goodguy' role is allowed to 'drive' (action) the winnebago (type) wi-
th
# license plate 'eagle5' (instance specific id)
goodguy = winnebago:drive:eagle5
```

- [users] section 외 user-pwd 조합과 함께 쓰여요
- Role name 과 함께 Permissions 과 함께 연결지어 사용 가능
- Format :

rolename = permissionDefinition1, permissionDefinition2, ..., permissionDefinitionN

Shiro authentication in Zeppelin

Shiro Configuration \w **shiro.ini**

[urls] section

```
...
[urls]
/index.html = anon
/user/create = anon
/user/** = authc
/admin/** = authc, roles[administrator]
/rest/** = authc, rest
/remoting/rpc/** = authc, perms["remote:invoke"]
```

- 어떤 user의 website 내 특정 url 로의 접근을 막고자 할 때

- Format :

_URL_Ant_Path_Expression_ = _Path_Specific_Filter_Chain_

- Filter 가 여러개 일 때

filter1[optional_config1], filter2[optional_config2], ..., filterN[optional_

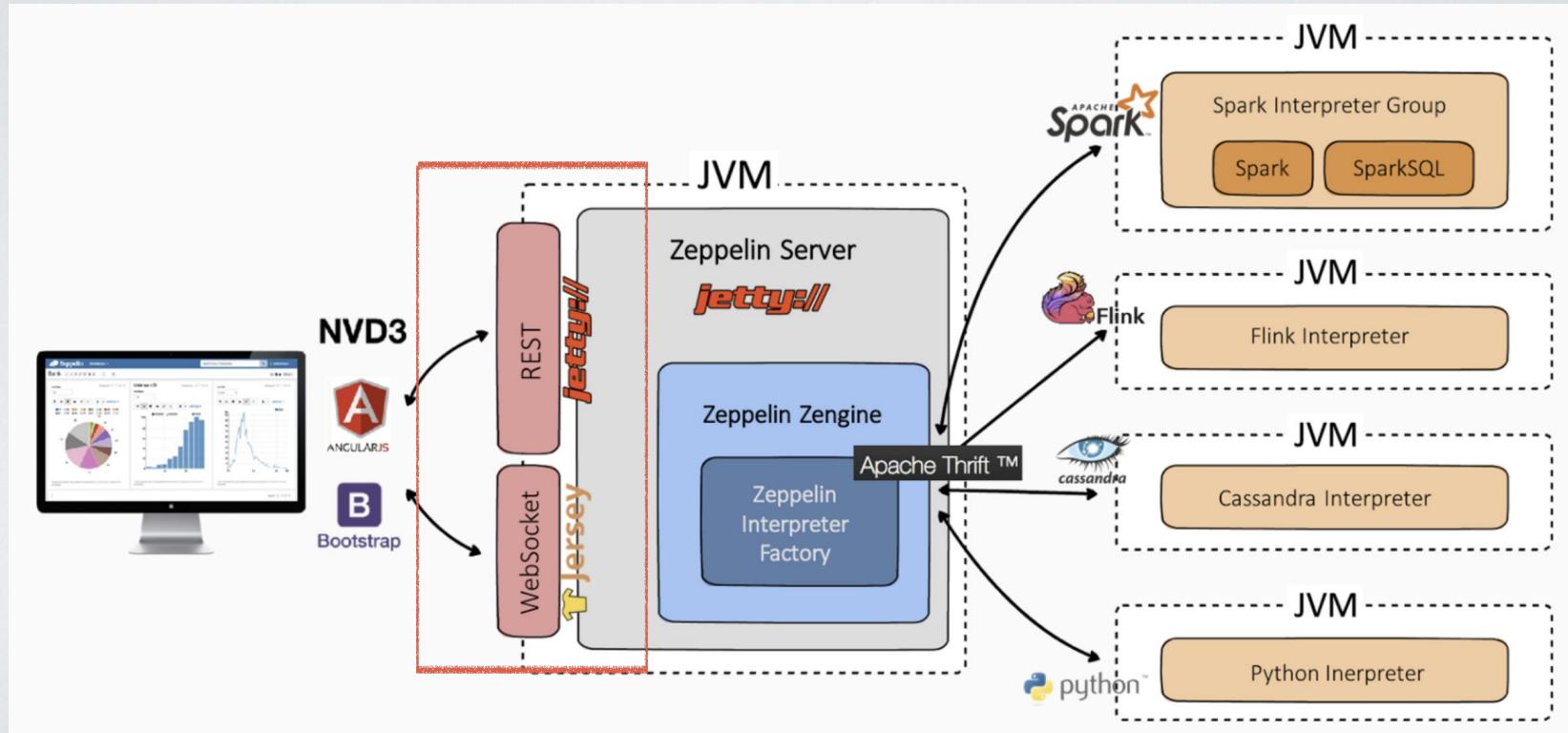
Shiro authentication in Zeppelin

E.g. Configuration 혹은 Credentials 페이지

```
[urls]
# This section is used for url-based security.
# You can secure interpreter, configuration and credential information by urls. Comment or uncomment the below urls that you want to hide.
# anon means the access is anonymous.
# authc means Form based Auth Security
# To enforce security, comment the line below and uncomment the next one
/api/version = anon
#/api/interpreter/** = authc, roles[admin]
#/api/configurations/** = authc, roles[admin]
#/api/credential/** = authc, roles[admin]
#/** = anon
/** = authc
```

0| URL 은 Zeppelin Rest api 의 endpoint입니다.

Recap: 한눈에 보는 Zeppelin Structure



Shiro authentication in Zeppelin

Zeppelin에서 사용되는 각 기능별 REST API 정보는 [Usage > REST API](#)에서 확인 가능 하답니다

The screenshot shows the Apache Zeppelin 0.8.0-SNAPSHOT documentation. The top navigation bar includes links for Quick Start, Usage, Setup, and Interpreter. The Usage dropdown is expanded, showing:

- User Impersonation
- Dependency Management
- Installing Interpreters
- Execution Hooks (Experimental)

The Other Features section includes:

- Publishing Paragraphs
- Personalized Mode
- Customizing Zeppelin Homepage
- Notebook Actions
- Cron Scheduler

The REST API section includes:

- Interpreter API
- Zeppelin Server API
- Notebook API
- Notebook Repository API
- Configuration API
- Credential API
- Helium API

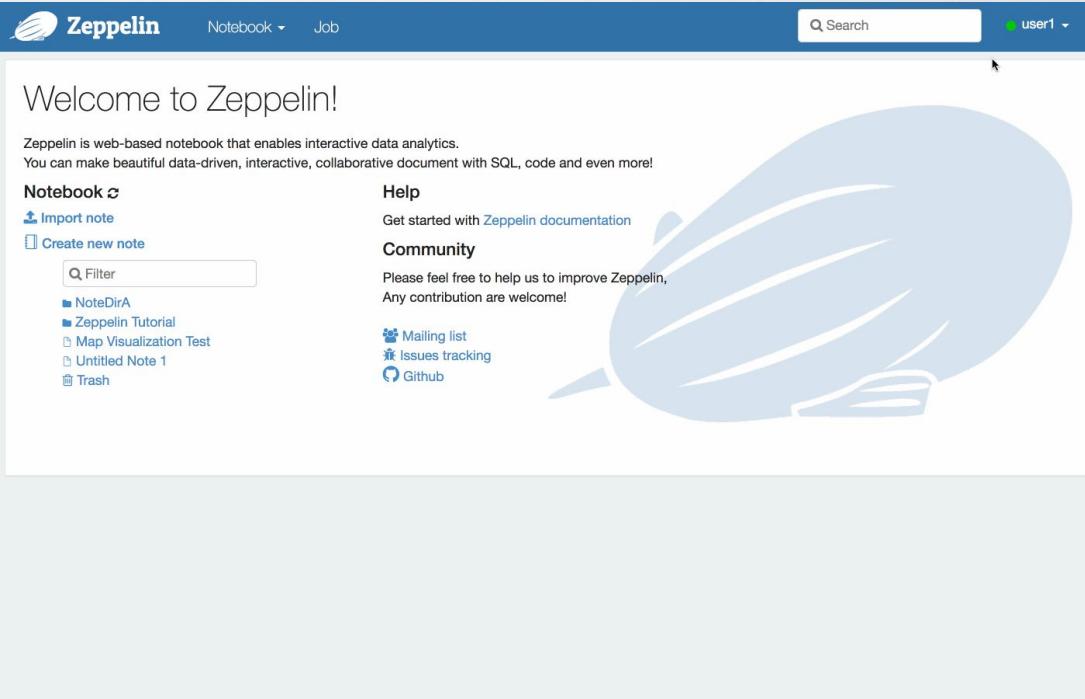
- Interpreter
- Zeppelin Server
- Notebook
- Notebook Repository
- Zeppelin Configuration
- Helium

Hands-on 1.

1. shiro.ini 파일의 [users] section에 있는 “admin”의 주석을 풀어주세요
2. [urls] section을 수정하여 “admin” role을 가진 사용자 이외 다른 user들의 아래페이지로의 접근을 막아주세요
 - Credential
 - Configuration
 - Interpreter
 - Notebook Repository
3. User1 (“role1”)로 로그인한 후 위 페이지로 접근해보세요

Hands-on 1. Result

e.g. Notebook Repository



The screenshot shows the Zeppelin web-based notebook interface. At the top, there is a blue header bar with the Zeppelin logo, a search bar, and a user dropdown for "user1". The main content area has a large, stylized graphic of a zeppelin on the right side. The left side features a sidebar with navigation links like "Notebook", "Import note", "Create new note", and a filter input field. Below the sidebar, there is a list of existing notebooks: "NoteDirA", "Zeppelin Tutorial", "Map Visualization Test", "Untitled Note 1", and "Trash". The central area contains a welcome message and a brief description of what Zeppelin is.

Welcome to Zeppelin!

Zeppelin is web-based notebook that enables interactive data analytics.
You can make beautiful data-driven, interactive, collaborative document with SQL, code and even more!

Notebook 

-  Import note
-  Create new note

Filter

-  NoteDirA
-  Zeppelin Tutorial
-  Map Visualization Test
-  Untitled Note 1
-  Trash

Help

Get started with [Zeppelin documentation](#)

Community

Please feel free to help us to improve Zeppelin,
Any contribution are welcome!

 Mailing list
 Issues tracking
 Github

Authorization in Zeppelin

Notebook & Interpreter

Notebook Authorization

Shiro 가 활성화 되어있다면 Lock icon > Note Permission setting menu를 열 수 있답니다

The screenshot shows the Zeppelin interface with the title "Map Visualization Test". At the top right, there is a "Note permissions" button. Below it, the "Note Permissions (Only note owners can change)" section is displayed. This section contains four fields: "Owners" (admin), "Writers" (user1), "Runners" (user1), and "Readers" (user1, user2). Each field has a descriptive text explaining the permission level. At the bottom left are "Save" and "Cancel" buttons.

Note Permissions (Only note owners can change)

Enter comma separated users and groups in the fields.
Empty field (*) implies anyone can do the operation.

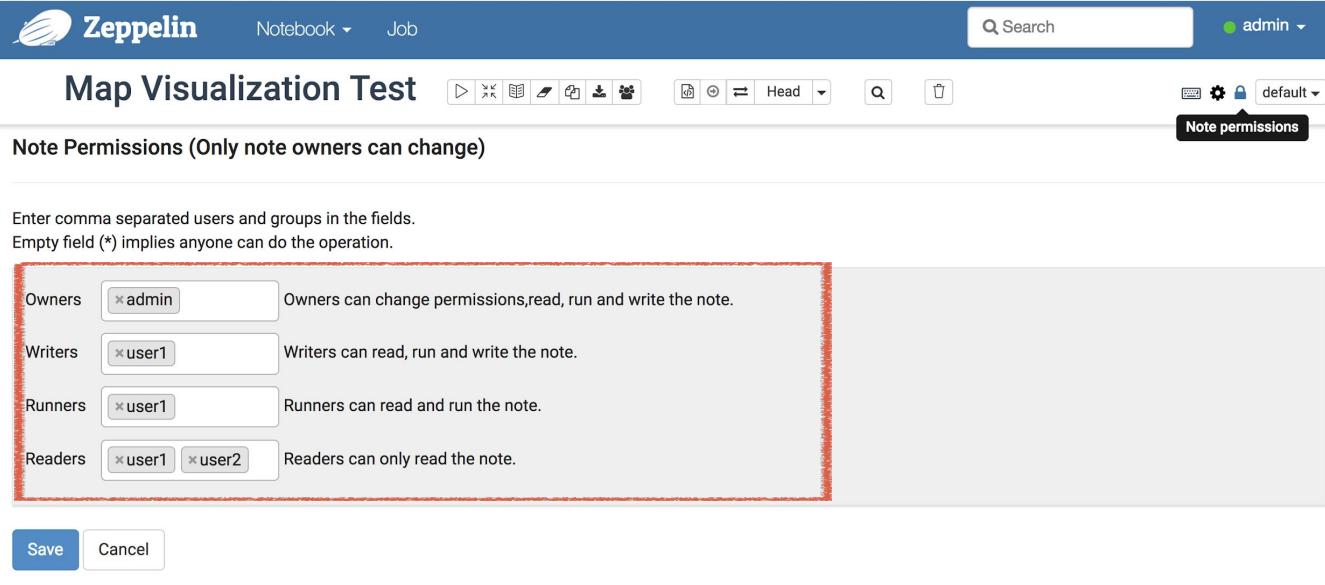
| Role | Users | Description |
|---------|-----------------|---|
| Owners | x admin | Owners can change permissions,read, run and write the note. |
| Writers | x user1 | Writers can read, run and write the note. |
| Runners | x user1 | Runners can read and run the note. |
| Readers | x user1 x user2 | Readers can only read the note. |

Save Cancel

https://zeppelin.apache.org/docs/0.8.0-SNAPSHOT/setup/security/notebook_authorization.html

Notebook Authorization

4 type of entities : Owners/ Writers/ Runners/ Readers



The screenshot shows the Zeppelin interface with the title "Map Visualization Test". The top navigation bar includes "Notebook" and "Job" dropdowns, a search bar, and a user dropdown for "admin". Below the title, there's a toolbar with various icons. A "Note permissions" button is highlighted with a black border. The main content area is titled "Note Permissions (Only note owners can change)". It contains instructions: "Enter comma separated users and groups in the fields. Empty field (*) implies anyone can do the operation." Below this, four sections define roles and their permissions:

- Owners**: Admin is listed. Description: "Owners can change permissions, read, run and write the note."
- Writers**: User1 is listed. Description: "Writers can read, run and write the note."
- Runners**: User1 is listed. Description: "Runners can read and run the note."
- Readers**: User1 and User2 are listed. Description: "Readers can only read the note."

At the bottom are "Save" and "Cancel" buttons.

https://zeppelin.apache.org/docs/0.8.0-SNAPSHOT/setup/security/notebook_authorization.html

Notebook Authorization

“Runners” 는 0.8.0 에 새로 추가된 entity

입니다

4 type of entities : Owners/ Writers/ Runners/ Readers

The screenshot shows the Zeppelin interface with the title "Map Visualization Test". The top navigation bar includes "Notebook", "Job", "Search", and a user dropdown for "admin". Below the title, there's a section titled "Note Permissions (Only note owners can change)". It contains instructions: "Enter comma separated users and groups in the fields. Empty field (*) implies anyone can do the operation." A red box highlights the "Owners" section, which lists "x admin" and the note: "Owners can change permissions,read, run and write the note." Other sections show "Writers" (x user1), "Runners" (x user1), and "Readers" (x user1, x user2) with their respective permissions: "Writers can read, run and write the note.", "Runners can read and run the note.", and "Readers can only read the note.". At the bottom are "Save" and "Cancel" buttons.

Notebook Authorization

4 type of entities : Owners/ Writers/ Runners/ Readers

The screenshot shows the Zeppelin interface with the title "Map Visualization Test". The top navigation bar includes "Notebook" and "Job" dropdowns, a search bar, and a user dropdown set to "admin". Below the title, there's a toolbar with various icons. A button labeled "Note permissions" is highlighted with a black border. The main content area is titled "Note Permissions (Only note owners can change)". It contains instructions: "Enter comma separated users and groups in the fields. Empty field (*) implies anyone can do the operation." Below this, there are four sections: "Owners" (with input box containing "xadmin"), "Writers" (with input box containing "xuser1"), "Runners" (with input box containing "xuser1"), and "Readers" (with input boxes containing "xuser1" and "xuser2"). Each section has a descriptive text next to it. At the bottom are "Save" and "Cancel" buttons. A red box highlights the "Owners" section. A purple box on the right contains Korean text: "각 input box 에 typing 하는 대로 shiro.ini 의 [users]에 정의된 user list 가 검색 결과로 나옵니다".

각 input box 에 typing 하는 대로 shiro.ini 의 [users]
에 정의된 user list 가 검색 결과로 나옵니다

Owners xadmin Owners can change permissions,read, run and write the note.

Writers xuser1 Writers can read, run and write the note.

Runners xuser1 Runners can read and run the note.

Readers xuser1 xuser2 Readers can only read the note.

Save Cancel

Notebook Authorization

권한 순서는 Owners > Writers > Runners > Readers

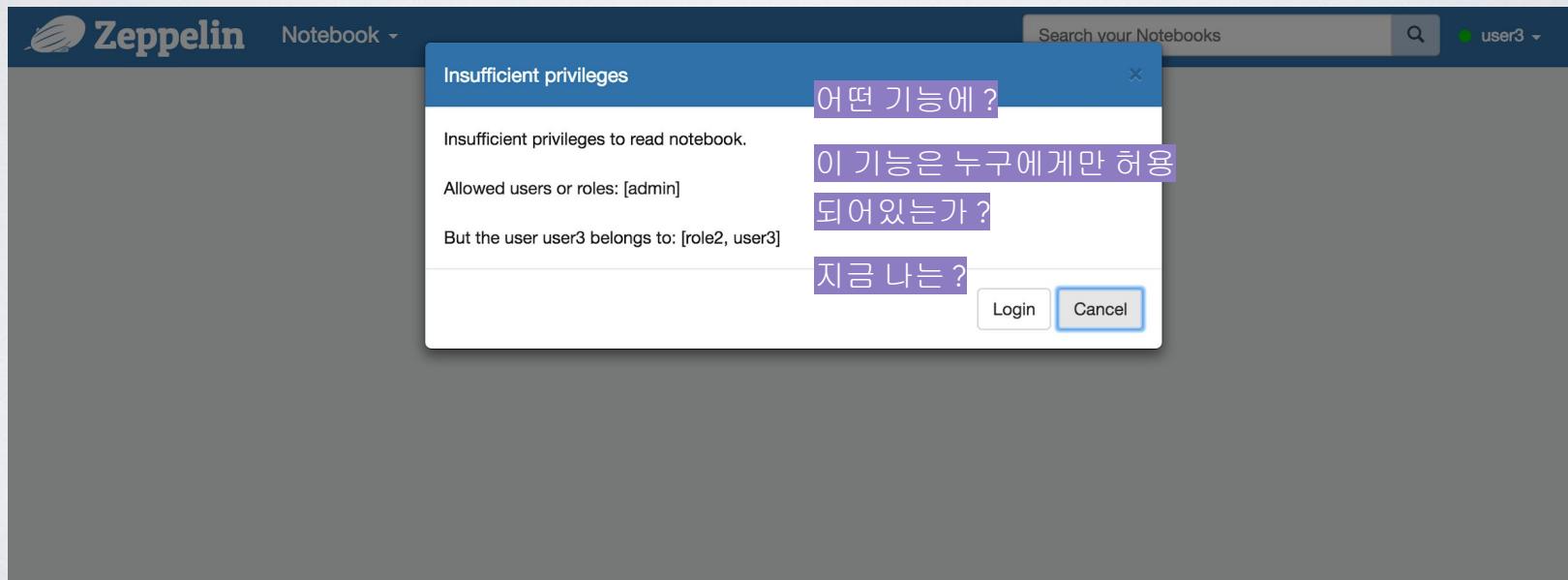
The screenshot shows the Zeppelin interface with the title "Map Visualization Test". The top navigation bar includes "Notebook" and "Job" dropdowns, a search bar, and a user dropdown for "admin". Below the title, there's a toolbar with various icons. A "Note permissions" button is highlighted with a black border. The main content area is titled "Note Permissions (Only note owners can change)". It contains instructions: "Enter comma separated users and groups in the fields. Empty field (*) implies anyone can do the operation." Below this, four permission levels are listed, each with a red rectangular box around it:

- Owners**: Admin is listed. Description: "Owners can change permissions, read, run and write the note."
- Writers**: User1 is listed. Description: "Writers can read, run and write the note."
- Runners**: User1 is listed. Description: "Runners can read and run the note."
- Readers**: User1 and User2 are listed. Description: "Readers can only read the note."

At the bottom are "Save" and "Cancel" buttons.

Notebook Authorization

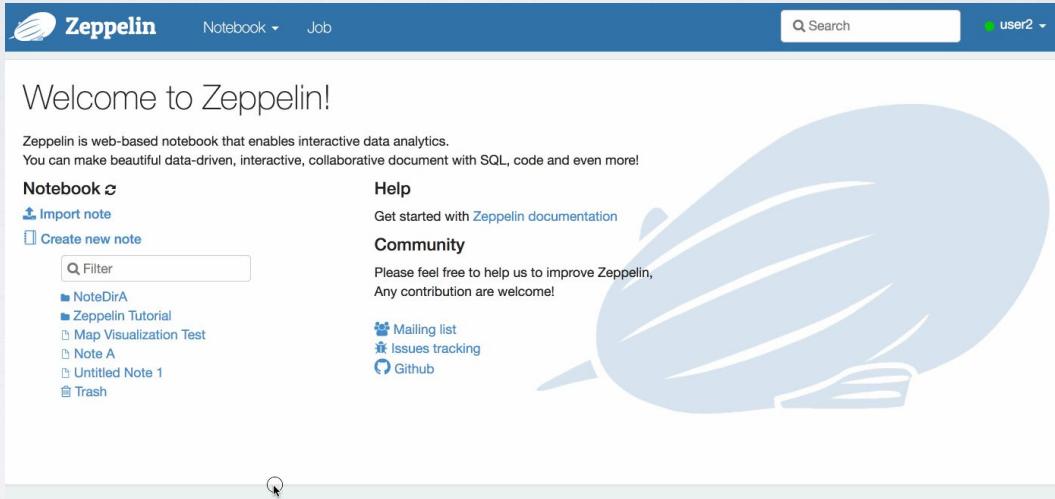
해당 user 가 특정 기능에 대해 권한이 없다면



Hands-on 2.

1. “user1” 으로 로그인하여 note A 를 만든 후, “user2” 에게 “Runner” 권한만 부여
2. “User2” 로 로그인 한 후 note A 에서 아래와 같은 write action 을 시도 해보세요
 - Paragraph 새로 추가
 - Paragraph width 변경
 - Code 수정
 - ...

Hands-on 2. Result



The screenshot shows the Zeppelin web-based notebook interface. At the top, there is a blue header bar with the Zeppelin logo, a search bar, and a user dropdown labeled "user2". Below the header, the main content area has a large title "Welcome to Zeppelin!" and a brief introduction: "Zeppelin is web-based notebook that enables interactive data analytics. You can make beautiful data-driven, interactive, collaborative document with SQL, code and even more!". On the left side, there is a sidebar titled "Notebook" with a "Filter" input field and a list of notebooks: "NoteDirA", "Zeppelin Tutorial", "Map Visualization Test", "Note A", "Untitled Note 1", and "Trash". To the right of the sidebar, there are sections for "Help" (link to documentation) and "Community" (links to Mailing list, Issues tracking, and Github). A large, semi-transparent graphic of a hot air balloon is overlaid on the right side of the main content area.

Interpreter Authorization

Manage interpreters settings. You can create / edit / remove settings. Note can bind / unbind these interpreter settings.

| name | value |
|------------------------|----------|
| master | local[*] |
| spark.app.name | Zeppelin |
| spark.cores.max | |
| spark.executor.memory | |
| zeppelin.R.cmd | R |
| zeppelin.R.image.width | 100% |

1. Edit an interpreter
2. Check “Set Permission”
3. Type user name
4. Save the change
5. Automatically restarted

Interpreter Authorization

권한이 없는 user 가 해당 interpreter 를 이용해 paragraph 를 실행시키려 하면

```
%spark  
sc.version  
user2 has no permission for spark
```

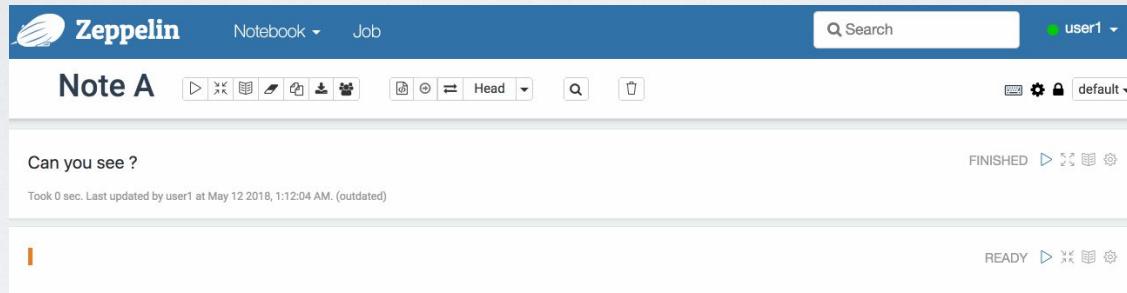
Took 0 sec. Last updated by user2 at May 12 2018, 12:58:08 AM.

Personalized Mode (Experimental)

팀원과 협업을 할때 내가 이런 저런 시도 해보는걸 보여주고 싶지 않다면 ?

Personalized Mode (Experimental)

Personalized mode 로 전환



The screenshot shows the Zeppelin web interface with the following elements:

- Header:** Zeppelin logo, Notebook dropdown, Job dropdown, Search bar, user1 dropdown.
- Notebook Area:** Title "Note A", toolbar with icons for back, forward, search, etc., Head dropdown, search bar, trash icon.
- Content Cells:**
 - Top cell: Text "Can you see ?" and status "FINISHED".
 - Bottom cell: Status "READY".
- Bottom Bar:** Navigation icons.

Personalized Mode (Experimental)

준비가 되었다면 다시 collaboration(default) mode로

The screenshot shows the Zeppelin web interface with the following elements:

- Header:** Zeppelin logo, Notebook dropdown, Job dropdown, Search bar, user1 dropdown.
- Notebook Panel:** Title "Note A", toolbar with icons for back, forward, search, etc., and a dropdown menu.
- Content Area:**
 - A note titled "Can you see ?" with status "FINISHED". It includes a timestamp: "Took 0 sec. Last updated by user1 at May 12 2018, 1:12:04 AM. (outdated)".
 - An empty note area with status "READY".
- Bottom:** A small cursor icon.

Helium

Pluggable system in Zeppelin

Helium ?

여기는 Apache Zeppelin 프로젝트에
제시하고 싶은 Proposal을 올리거나
혹은 추후 maintenance에 필요한
정보 (e.g. release process /
committer guide 등)들을 관리하는
곳 이랍니다

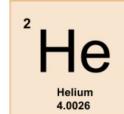
Pages / Zeppelin Home / Zeppelin Improvement Proposals 1 JIRA link

Helium proposal

Created by Lee moon soo, last modified on Mar 11, 2016

무려 2016년 3월 ...

Helium - Brings Zeppelin to data analytics application platform



Motivation

Zeppelin provides pluggable Interpreter architecture which results in a wide variety of the supported backend system. Each interpreter abstracts underlying computing framework complexity (eg. SparkInterpreter abstracts Spark cluster) with its own interface (eg. SparkInterpreter provides scala/sql/python for the interface).

Also there is a powerful feature called "Angular Display system" that enables user to create his own front-end interface that interacts with interpreter.

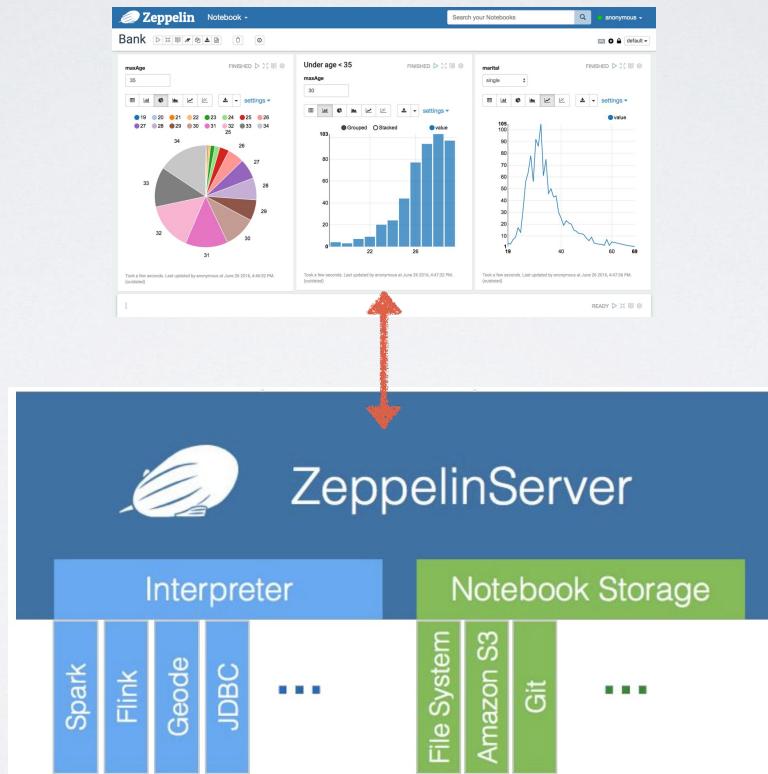
And there is a "dependency loader" that enables them to load libraries from remote repository.

Putting it all together, one could imagine a full application platform, on top of Apache Zeppelin.
So what I propose is a framework, code-named **Helium** that turns Zeppelin into a data analytics application platform by:

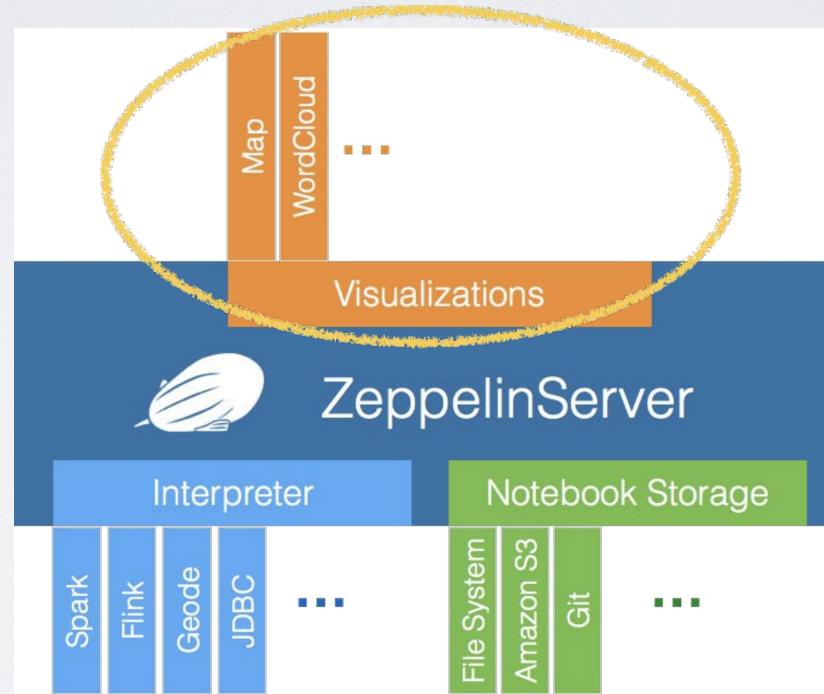
- Leveraging computing resources provided by Interpreters
- Generalizing dependency loader
- Providing SDK on top of Angular Display system
- adding a package repository

<https://cwiki.apache.org/confluence/display/ZEPPELIN/Helium+proposal>

Pluggable System ?



Pluggable System ?



Helium ?

Helium ?

Apache Zeppelin의 plugin system concept

Helium ?

Apache Zeppelin의 plugin system concept

4 가지 type 의 Helium Package

- **Application type** : runs on Interpreter process and displays its output inside of the notebook
- **Interpreter type** : Zeppelin interpreter
- **Visualization type** : adding new customized new chart type
- **Spell type**: frontend interpreter in Zeppelin

Helium ?

Apache Zeppelin의 plugin system concept

4 가지 type 의 Helium Package

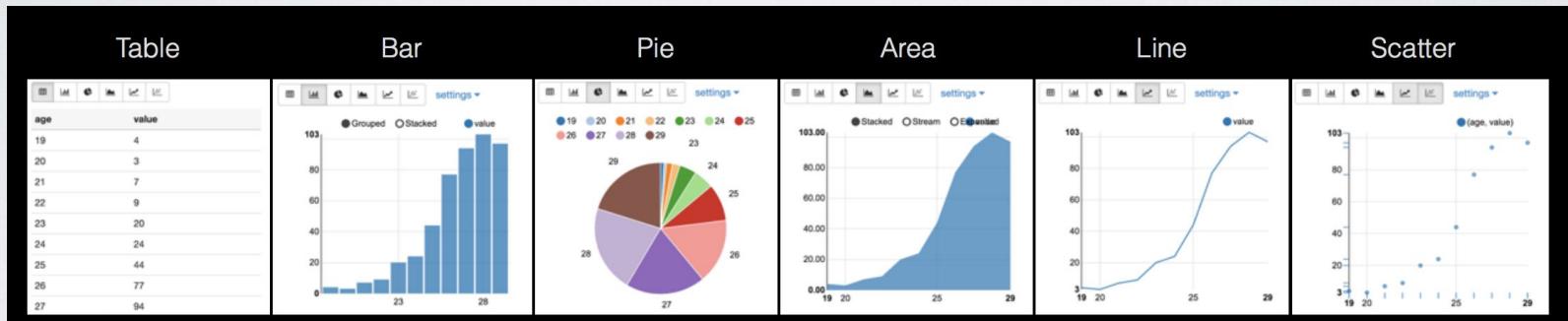
- Application type : runs on Interpreter process and displays its output inside of the notebook
- Interpreter type : Zeppelin interpreter
- **Visualization type : adding new customized new chart type**
- Spell : frontend interpreter in Zeppelin

Zeppelin 사용자들의 최대 관심사인 visualization
에

날개를 달아준 package type 이랍니다

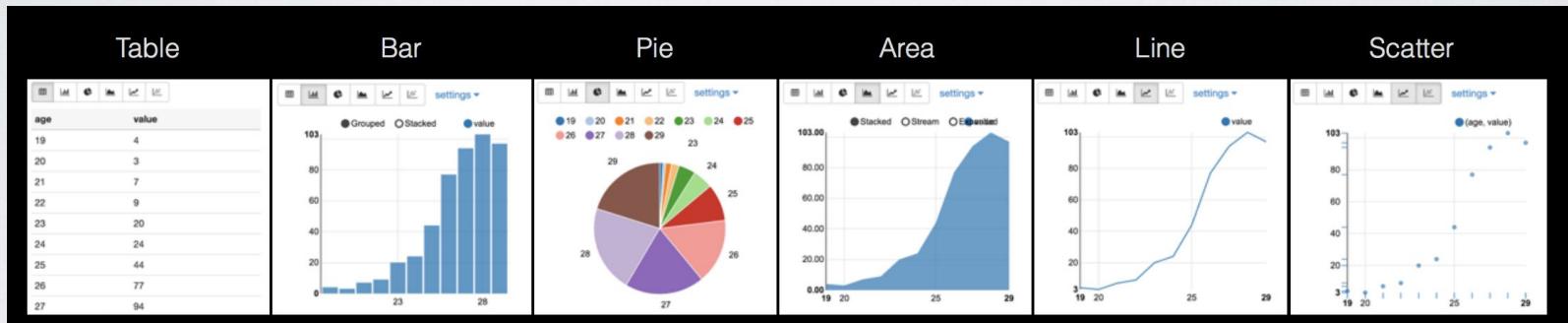
Helium : Visualization type

Zeppelin내 6가지 built-in chart type : [NVD3 \(Re-usable charts for d3.js\)](#)



Helium : Visualization type

Zeppelin내 6가지 built-in chart type : [NVD3 \(Re-usable charts for d3.js\)](#)



Zeppelin에서 다른 차트 종류 (e.g. heat-map / map / bubble ..) 혹은 다른 commercial 차트 라이브러리(e.g. [highcharts](#) / [amCharts](#))를 사용할수는 없을까 ?

Helium : Visualization type

Zeppelin 공식 문서에

의하면..

“Apache Zeppelin Visualization is a pluggable package that can be **loaded/unloaded on runtime** through Helium framework in Zeppelin. A Visualization is a javascript npm package and user can use them just like any other built-in visualization in notebook.”

Helium package 설치를 위해 Zeppelin server 를 재시작 하지 않아도
되죠

Helium : Visualization bundle

Zeppelin 공식 문서에

의하면..

“Apache Zeppelin Visualization
through Helium framework in
use them just like any other b

The screenshot shows the Apache Zeppelin Helium interface. At the top, there's a navigation bar with the Zeppelin logo, 'Notebook', 'Job', a search bar, and a user dropdown. Below the navigation bar, the title 'Helium' is displayed, followed by a note: 'Bundle package display order (drag and drop to reorder)'. A red box highlights the 'zeppegin-aggrid' entry. To the right of the title are buttons for 'VISUALIZATION', 'SPELL', 'INTERPRETER', and 'APPLICATION'. A note below says '* Local registry package's name is gray colored.' A yellow box highlights the 'zeppelin-highmaps' entry. On the right side of the interface, there are 'Enable' and 'Disable' buttons for each entry. The entries listed are:

- zeppegin-aggrid** VISUALIZATION
zeppelin-aggrid@0.1.1
Data visualization with Ag-Grid for Apache Zeppelin
Status: Enabled (green button)
- zeppelin-highmaps** VISUALIZATION
zeppelin-highmaps@1.0.0
Zeppelin plugin to visualize data using Highmaps
Status: Enabled (green button)
- ultimate-heatmap-chart** VISUALIZATION
ultimate-heatmap-chart@0.0.2
The Ultimate Heatmap Chart for Apache Zeppelin using highcharts
Status: Disabled (red button)
- ultimate-scatter-chart** VISUALIZATION
ultimate-scatter-chart@0.0.2
The Ultimate Scatter Chart for Apache Zeppelin using highcharts
Status: Disabled (blue button)
- ultimate-range-chart** VISUALIZATION
ultimate-range-chart@0.0.2
The Ultimate Range Chart for Apache Zeppelin using highcharts
Status: Enabled (green button)

https://zeppelin.apache.org/docs/0.8.0-SNAPSHOT/development/helium/writing_visualization_basic.html

Helium : Visualization type

“Apache Zeppelin Visualization is a pluggable package that can be **loaded/unloaded on runtime** through Helium framework in Zeppelin. A Visualization is **a javascript npm package** and user can use them just like any other built-in visualization in notebook.”

1. NPM package registry에 publish 될 수 있기 때문에 버전관리 / 사용자들 간 공유가 가능하고
2. Package 개발자가 직접 관리하기 때문에 Zeppelin 자체적으로는 commercial chart lib의 license를 걱정하지 않아도 됩니다

Helium · Visualization type

Zeppelin Notebook ▾ Job Search anonymous

Helium

Bundle package display order (drag and drop to reorder)

NPM registry에서 Zeppelin Helium 관련 package 들만 보여주는 Zeppelin 내 Helium online registry.

 **zeppelin-aggrid** VISUALIZATION  **zeppelin-highmaps** VISUALIZATION  **ultimate-heatmap-chart** VISUALIZATION  **ultimate-scatter-chart** VISUALIZATION

zeppelin-aggrid@0.1.1
Data visualization with Ag-Grid for Apache Zeppelin

zeppelin-highmaps@1.0.0
Zeppelin plugin to visualize data using Highmaps

ultimate-heatmap-chart@0.0.2
The Ultimate Heatmap Chart for Apache Zeppelin using highcharts

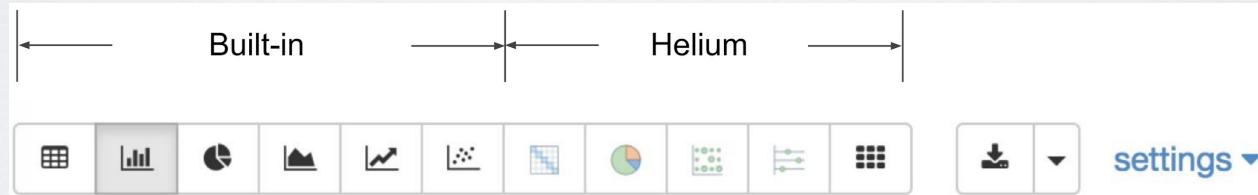
ultimate-scatter-chart@0.0.2
The Ultimate Scatter Chart for Apache Zeppelin using highcharts

Enable **Disable** **Enable** **Enable**

https://zeppelin.apache.org/docs/0.8.0-SNAPSHOT/development/helium/writing_visualization_basic.html

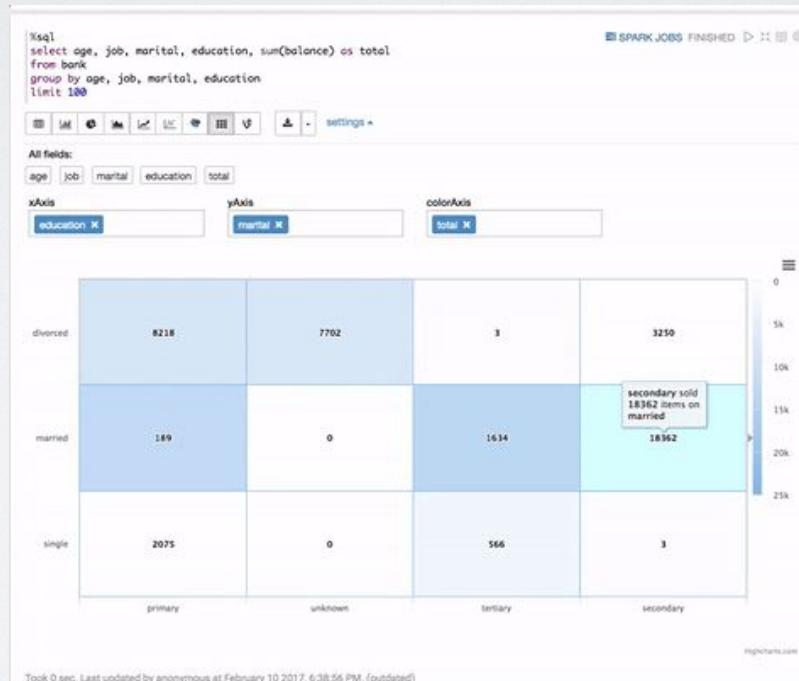
Helium : Visualization type

“Apache Zeppelin Visualization is a pluggable package that can be **loaded/unloaded on runtime** through Helium framework in Zeppelin. A Visualization is **a javascript npm package** and user can use them **just like any other built-in visualization** in notebook.”



Visualization pkg example

1. ultimate-heatmap-chart



<https://www.npmjs.com/package/zeppelin-highcharts-heatmap>

Visualization pkg example

2. Bubble chart

The screenshot shows a Zeppelin Notebook interface with a title bar "zeppelin-bubblechart". Below the title bar is a toolbar with various icons for file operations like save, copy, and search. The main area contains a table with the following data:

| age | job | marital | education | balance |
|-----|---------------|---------|-----------|---------|
| 30 | unemployed | married | primary | 1787 |
| 33 | services | married | secondary | 4789 |
| 35 | management | single | tertiary | 1350 |
| 30 | management | married | tertiary | 1476 |
| 59 | blue-collar | married | secondary | 0 |
| 35 | management | single | tertiary | 747 |
| 36 | self-employed | married | tertiary | 307 |
| 39 | technician | married | secondary | 147 |
| 41 | entrepreneur | married | tertiary | 221 |
| 43 | services | married | primary | -88 |
| 39 | services | married | secondary | 9374 |
| 43 | admin. | married | secondary | 264 |
| 36 | technician | married | tertiary | 1109 |
| 20 | student | single | secondary | 502 |
| 31 | blue-collar | married | secondary | 360 |

<https://www.npmjs.com/package/zeppelin-bubblechart>

Visualization pkg example

3. volume-leaflet



Zeppelin is web-based notebook that enables interactive data analytics.
You can make beautiful data-driven, interactive, collaborative document with SQL, code and even more!

Notebook 

 Import note

 Create new note

 Filter

 Zeppelin Tutorial   

 Trash

Help

Get started with [Zeppelin documentation](#)

Community

Please feel free to help us to improve Zeppelin,
Any contribution are welcome!

 Mailing list

 Issues tracking

 Github

1. Latitude(위도) / Longitude(경도) 가 column값에 포함되어 있어야 합니다.
2. <https://www.gps-coordinates.net/>

Visualization pkg example

3. volume-leaflet

Point Plotting Sample

```
%sh echo -e "%table
Name lt Point
Ahyoung's home \t37.48670329999995,126.9716629
ZEPL \t37.5119275,127.03252870000006
Fast Campus \t37.4955366,127.02935209999998
"
FINISHED > ✎ 🌐 ⏺
```

Available Fields

Name Point

coordinates tooltip popup gis_server

Point Name

Took 0 sec. Last updated by admin at May 11 2018, 2:19:03 AM. (outdated)

https://zeppelin.apache.org/docs/0.8.0-SNAPSHOT/development/helium/writing_visualization_basic.html

Hands-on 3.

원하는 package 를 사용법을 알아보고
설치 한 후 그래프를 그려보세요

Helium ?

참고 발표 자료

Zeppelin과 비슷한 다른 프로젝트엔 없는 개념이기 때문에, 이후에
Zeppelin의 미래 확장성에 대해 이야기하기 위해 Helium이라는
주제로 BigData 관련 conference에서 여러 발표도 있었죠

- <https://www.slideshare.net/HadoopSummit/apache-zeppelin-helium-and-beyond>
- https://www.slideshare.net/Hadoop_Summit/helium-makes-zeppelin-fly
- <https://www.slideshare.net/AhyoungRyu1/apache-zeppelin-070-helium>
- <https://www.slideshare.net/AhyoungRyu1/apache-zeppelin-and-helium-apachecon-2017-may-fl>

질문 있나요 ?

3시간 동안 수고 많으셨습니다 :)