



ELEGANCE: ELECTRONIC LAB NOTEBOOK ON CLOUD— DIGITIZE YOUR EXPERIMENTAL DESIGNS AND RESULTS INTO WISDOM FROM DISCOVERY TO PUBLICATION

雲端電子實驗記錄本之運用與維護



黃智偉



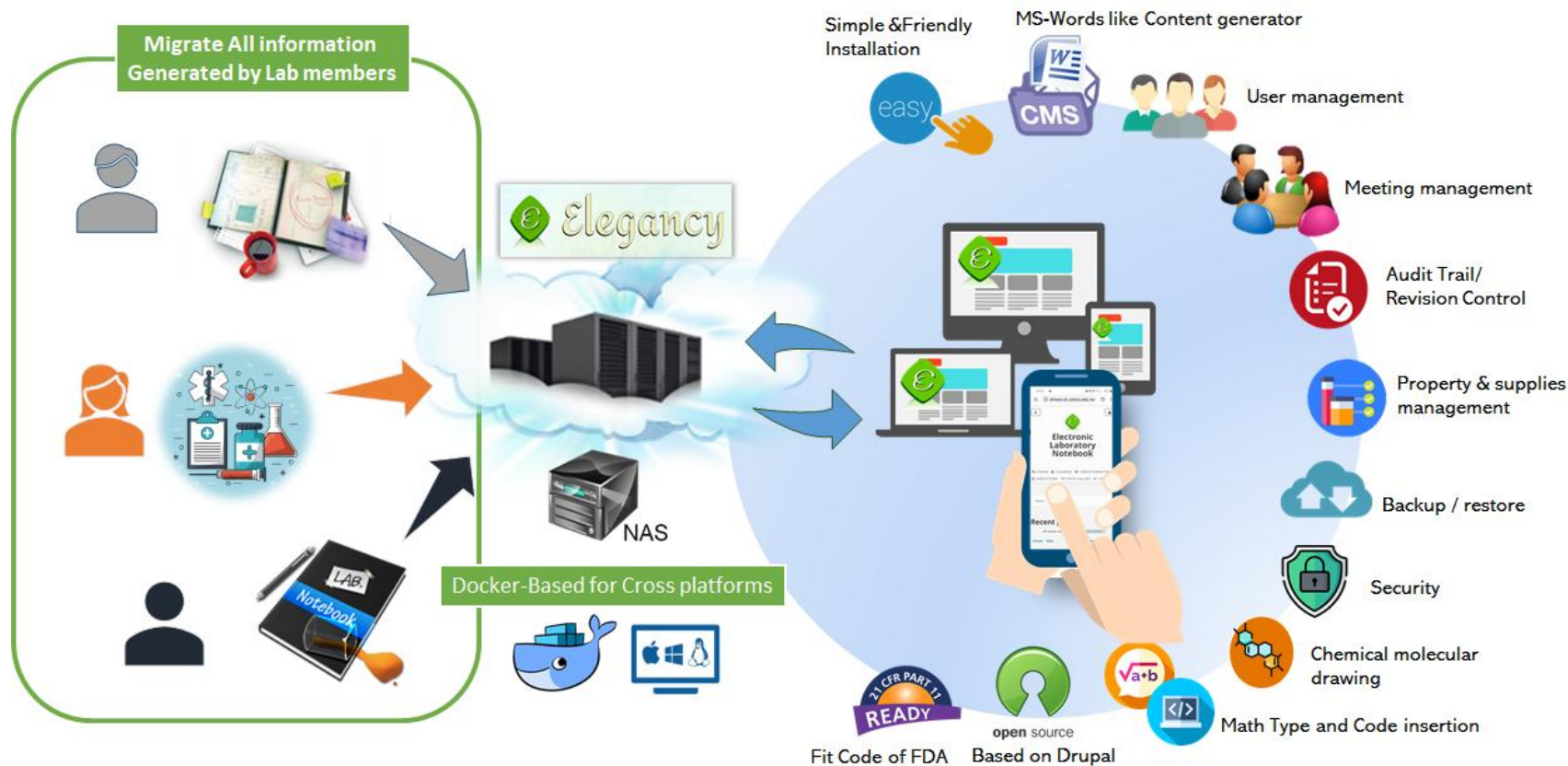
LAB OF System Biology & Network Biology

中央研究院資訊科學研究所

@iis, Academia Sinica, TAIWAN

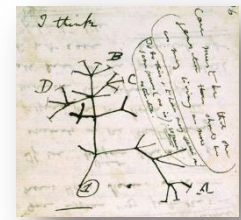
系統生物學與網路生物學實驗室

MOTIVATIONS (1/2)

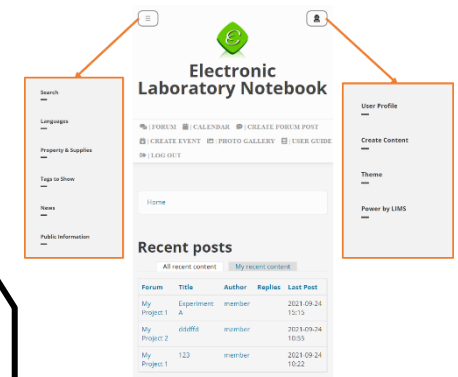
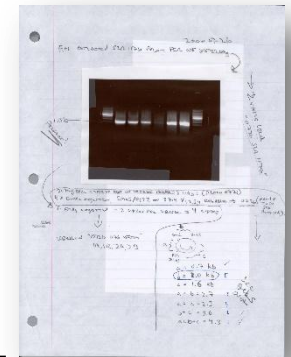


MOTIVATIONS (2/2)

From Charles Darwin's "B" Notebook, 1837.




























- Easy to install with smooth learning curves
- Open Source
- Digitalize
- Searching completely, Sharing for multiuser
- Audit trials and change logs with CFR21 part 11
- User friendly, easy control
- Security, Password administration
- Knowledge reconstruction
- Repository for ideas and knowledge
- All contents in one Portal



INTRODUCTION

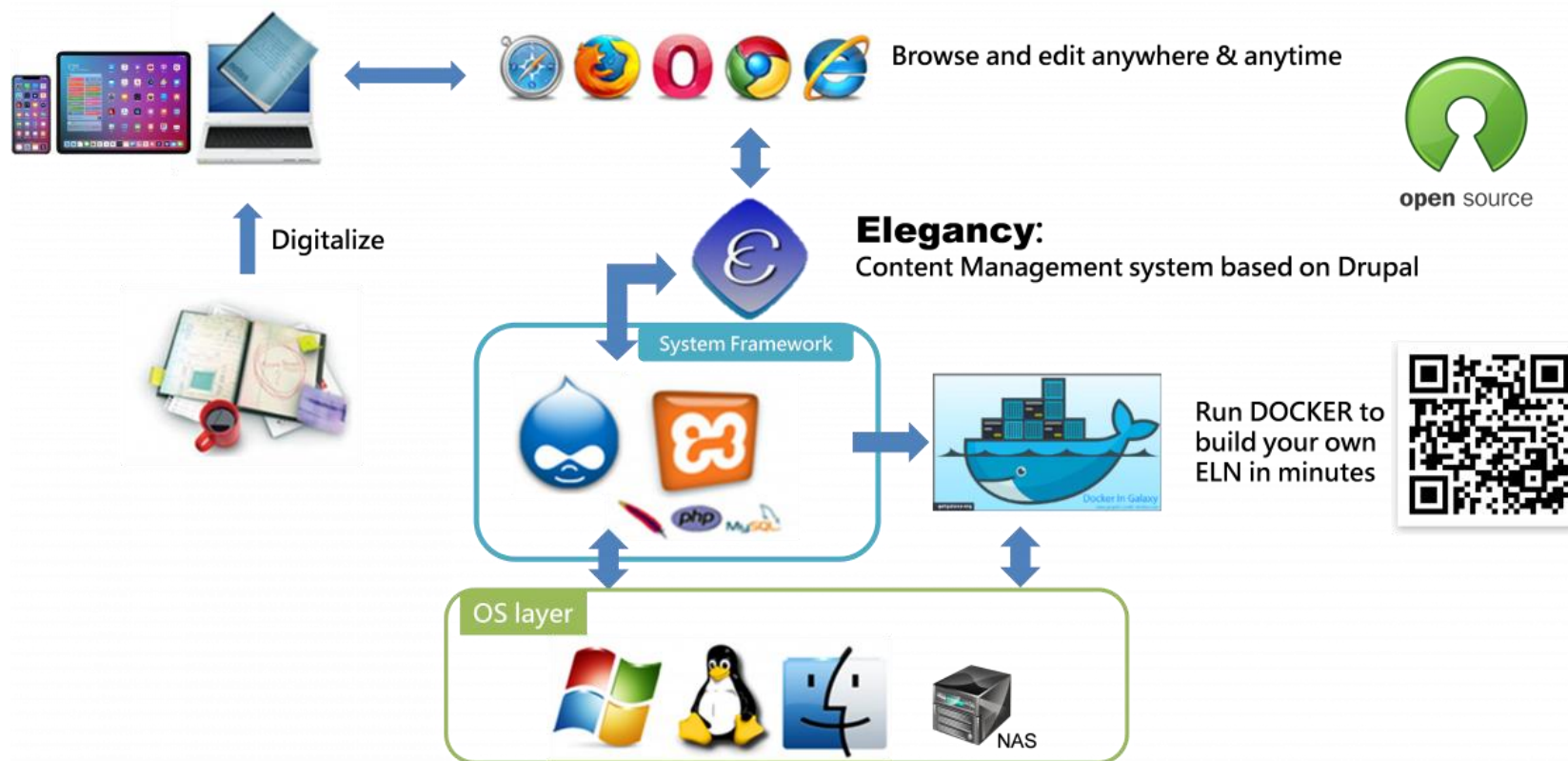
INTRODUCTION (1/3)

PLN vs. ELN

	Paper Lab notebook (PLN)		ELN	
Use	Easy		User-friendly interface	
Read	Handwriting can be problematic		Easy	
Annotation	Possible but space limitations		Easy	
Modify	Difficult		Easy	
Links within the pages	Unavailable		Just inserting hyperlinks	
Search	Reading page by page		Easy	
Sort	Unavailable		Sort by date, title, author...	
Share	Need photocopying or scanning		Easy	
Safety	Low control		Specific user permission	
Accessibility	Specific place		Everywhere through internet	
Long-term storage	Difficult		No problem	
Pages numbered	Yes		With Digital Fingerprint	

INTRODUCTION (2/3)

System Structure



INTRODUCTION (3/3)

Essential Functions in ELN



INTERFACE

ELN INTERFACE (1/5)

One Installation, Two Sites for Public and Private



External Site for public
Access/ Lab website

The screenshot shows the home page of the ELN Demo Site. At the top center is the logo, a green diamond with a white 'E' inside, followed by the text 'ELN Demo Site'. Below the logo is a horizontal navigation bar with links: RESEARCH, MEMBERS, RESOURCES, PHOTO GALLERY, CONTACT US, and USER GUIDE. Underneath is a 'Home' section with a sub-header 'Home' and a paragraph of text: 'ELN are software programs designed to replace paper laboratory notebooks. Compared with paper lab notebooks, ELNs bring many benefits, including improving search capability, supporting for discussion among many users, providing backup mechanism, and'.



Internal Site for private Access

The screenshot shows the user login page. At the top right is the 'Elegance Electronic Lab Notebook' logo. Below it is an orange banner with the text 'Internal Site for private Access'. The main content area is titled 'User login' and contains a form with 'Username' and 'Password' fields, each with a red asterisk. Below the password field is a link for 'Request new password' and a 'LOG IN' button. To the right of the form is an icon of three stylized people. A red arrow points from the 'LOG IN' button down to the next screenshot. The bottom screenshot shows the 'ELN Demo Site' home page with a forum section. The forum has a table with columns for 'Forum', 'Topics', 'Posts', and 'Last post'. The first row is 'Lab Bulletins' with a description in Chinese: '一般公告、常用資料、書單、安全資料、型錄等'.

ELN INTERFACE (2/5)

Typical Interface

The screenshot displays the Electronic Laboratory Notebook (ELN) interface. At the top center is the logo, a green diamond with a white 'E' inside. Below the logo is the title "Electronic Laboratory Notebook". The navigation bar includes links for FORUM, CALENDAR, CREATE FORUM POST, CREATE EVENT, PHOTO GALLERY, USER GUIDE, and LOG OUT. A search bar is located below the navigation bar. The main content area features a "Recent posts" section with a table of forum posts. Two sidebars are highlighted with orange boxes: the left sidebar contains links for Search, Languages, Property & Supplies, Tags to Show, News, and Public Information; the right sidebar contains links for User Profile, Create Content, Theme, and Power by LIMS.

Electronic Laboratory Notebook

FORUM | CALENDAR | CREATE FORUM POST | CREATE EVENT | PHOTO GALLERY | USER GUIDE | LOG OUT

Home

Recent posts

All recent content | My recent content

Forum	Title	Author	Replies	Last Post
My Project 1	Experiment A	member		2021-09-24 15:15
My Project 2	dddfdd	member		2021-09-24 10:55
My Project 1	123	member		2021-09-24 10:22

Search

Languages

Property & Supplies

Tags to Show

News

Public Information

User Profile

Create Content

Theme

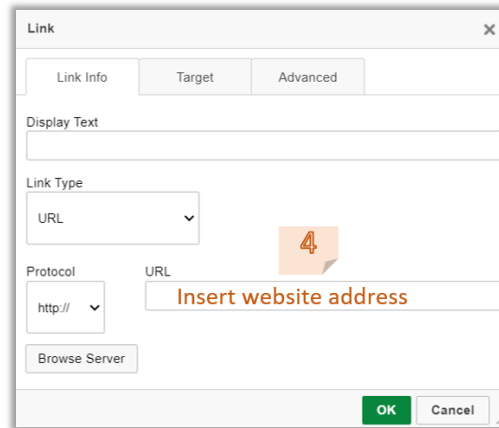
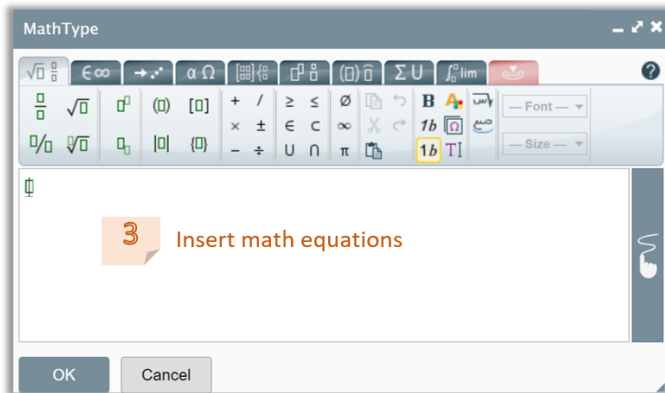
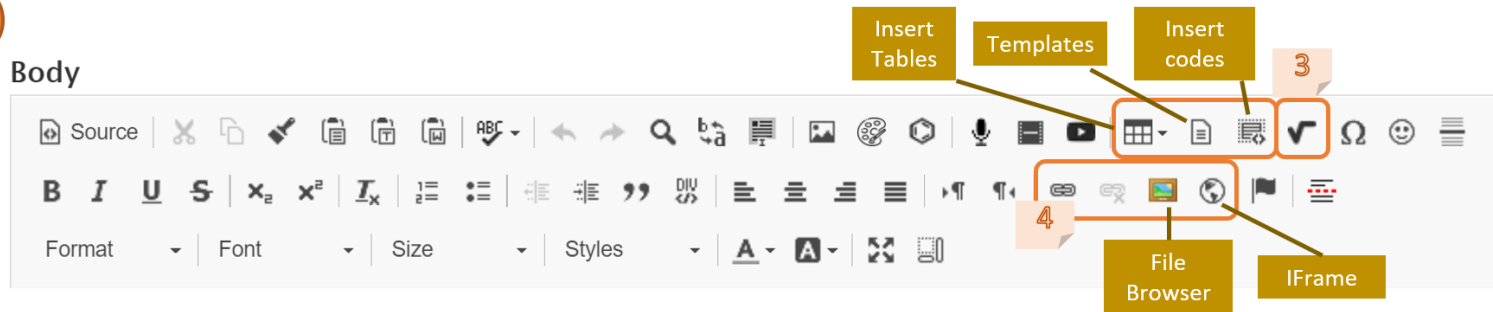
Power by LIMS

ELN INTERFACE (4/5)

Easy to editing content and appending table, image, file, YouTube video...

b

Body



ELN INTERFACE (5/5)

More simple and clear layout on mobile device

The desktop interface for the Electronic Laboratory Notebook (ELN) is shown. It features a header with the logo and title, followed by navigation links: FORUM, CALENDAR, CREATE FORUM POST, CREATE EVENT, PHOTO GALLERY, USER GUIDE, and LOG OUT. A search bar is located below the header. The main content area is titled 'Recent posts' and includes a table of forum entries. Two callout boxes are present: one on the left for navigation and one on the right for user profile and content creation options.

Navigation Menu:

- Search
- Languages
- Property & Supplies
- Tags to Show
- News
- Public Information

User Profile and Content Menu:

- User Profile
- Create Content
- Theme
- Power by LIMS

Forum	Title	Author	Replies	Last Post
My Project 1	Experiment A	member		2021-09-24 15:15
My Project 2	dddfd	member		2021-09-24 10:55
My Project 1	123	member		2021-09-24 10:22

The mobile view of the ELN interface is shown, demonstrating a simplified layout. The header includes the URL 'Incloud.iis.sinica.edu.tw' and navigation links: FORUM, CALENDAR, CREATE FORUM POST, CREATE EVENT, PHOTO GALLERY, USER GUIDE, and LOG OUT. The 'CREATE FORUM POST' button is highlighted with a red box. Below the header is a search bar and a text editor with various formatting options. The bottom of the screen shows a navigation bar with back, home, and menu icons.



INSTALLATION

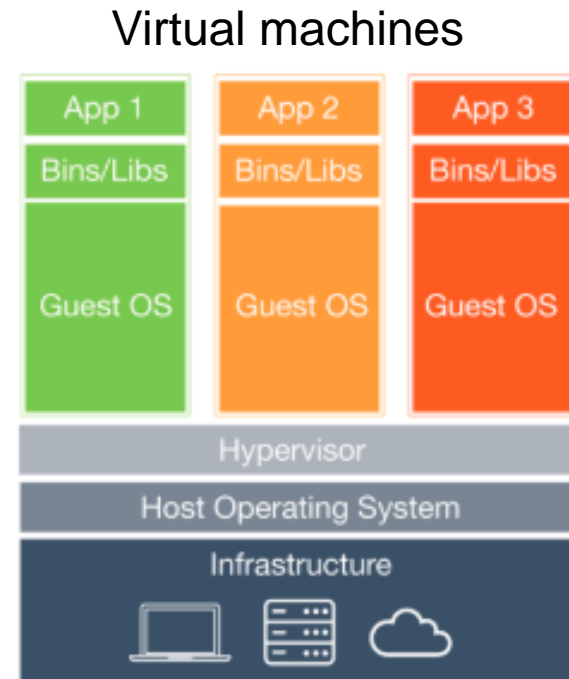
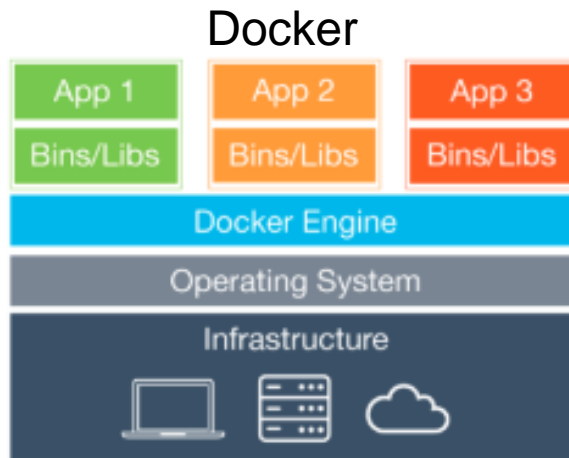
DOCKER OVERVIEW

What is Docker ?

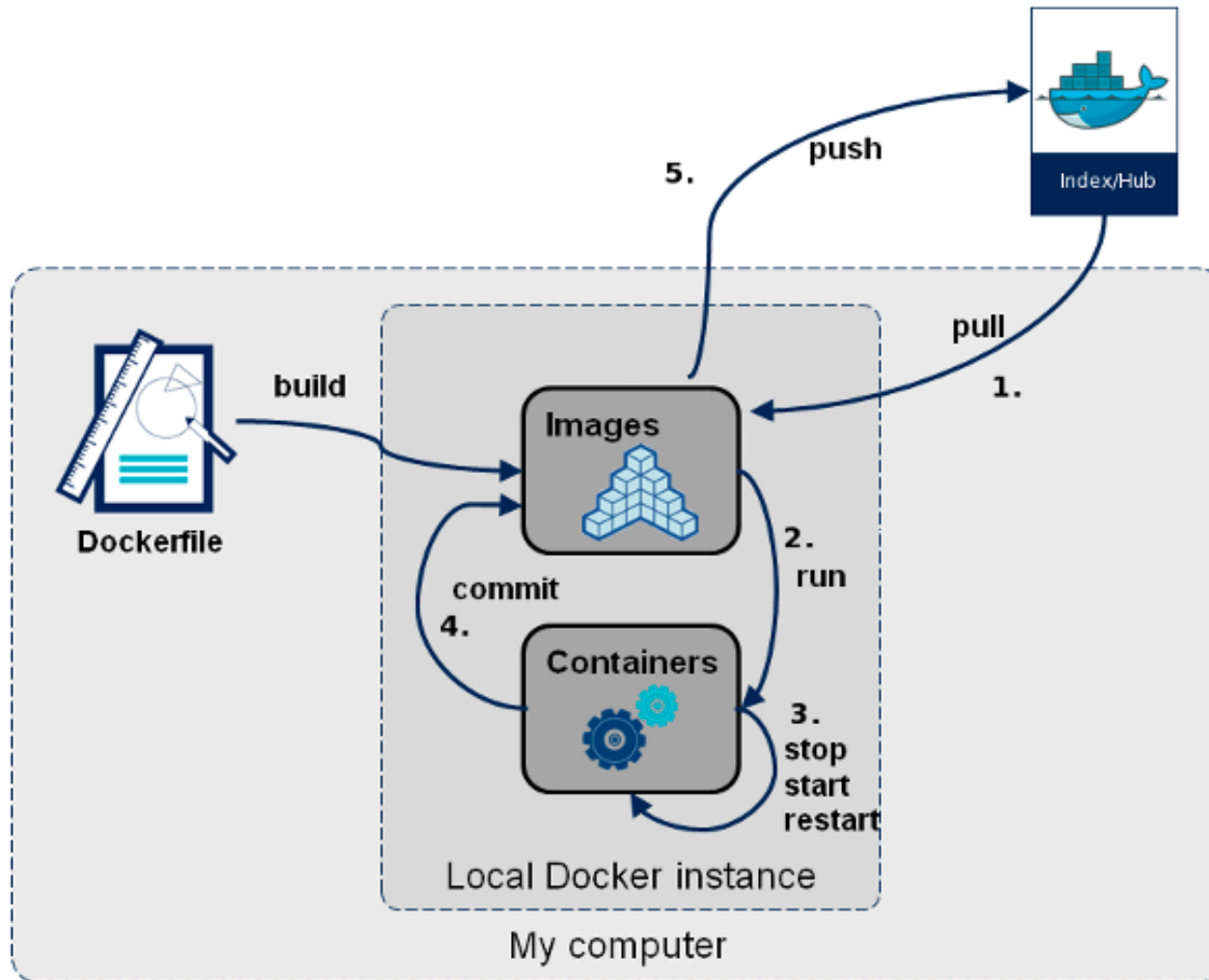
- An open platform for developing, shipping, and running applications

Why using Docker ?

- Flexible, Lightweight, Scalable and Secure



HOW DOCKER WORKS





INSTALL DOCKER

<https://docs.docker.com/get-docker/>



Docker Desktop for Mac

A native application using the macOS sandbox security model which delivers all Docker tools to your Mac.



Docker Desktop for Windows

A native Windows application which delivers all Docker tools to your Windows computer.



Docker for Linux

Install Docker on a computer which already has a Linux distribution installed.

Sometimes you will get WSL error when you install windows version

→ <https://docs.microsoft.com/zh-tw/windows/wsl/install>

DOCKER INSTRUCTION (1/2)

Instruction	Description
<code>docker search keyword</code>	Search “keyword” from Docker hub
<code>docker images</code>	Show images you have downloaded
<code>docker pull image_name</code>	Download image_name from Docker hub
<code>docker rmi image_id or image_name</code>	Delete image from you computer
<code>docker run container_name image_name</code>	Construct container from image
<code>docker stop/start/restart/rm container_id or container_name</code>	Stop container / Start container / Restart container / Delete container
<code>docker ps</code>	Show actived container
<code>Docker ps -a</code>	Show all container
<code>Docker exec container_id or container_name <instruction></code>	Container Execute <instruction>

DOCKER INSTRUCTION (2/2)

```
docker run --name=eln -dti -p 8080:80 -v /eln/data:/home/data lsbnb/eln bash
```

- --name=container_name -p = port -v = mount folder

```
docker cp eln:/var/lib/mysql /data
```

- Copy data from container to your computer

```
docker commit -m="eln" -a="Tima Huang" <container_id> lsbnb/eln
```

- Save container to image lsbnb/eln

```
docker tag <image_id> lsbnb/eln:3.2.2
```

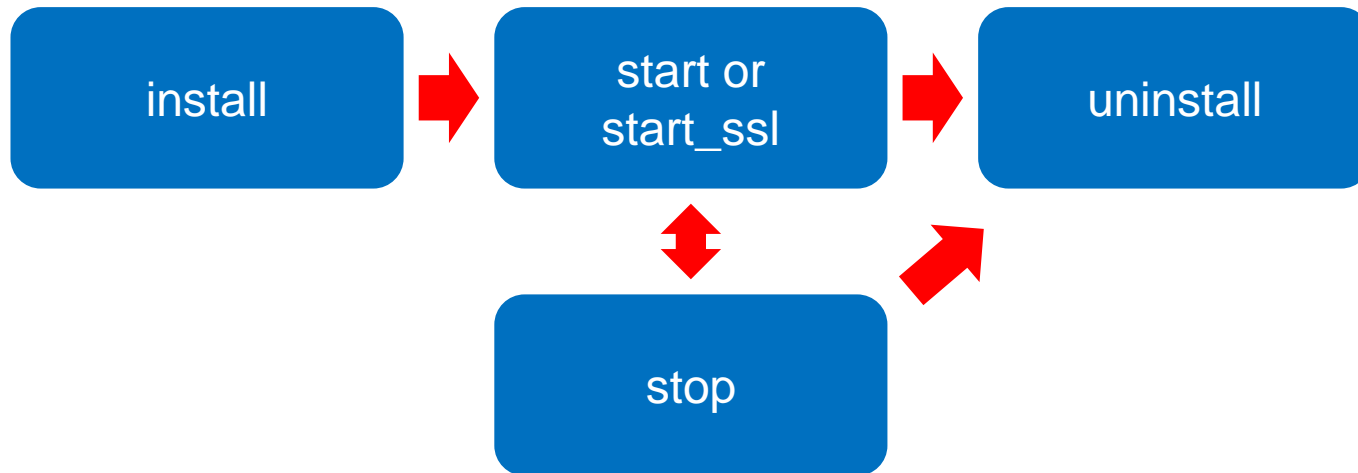
- Add version 3.2.2 for image lsbnb/eln

```
docker login
```

```
docker push lsbnb/eln
```

- Upload image lsbnb/eln to docker hub

ELN CONTROL SCRIPTS



Name	Function
install	Create “data” folder. Save database and files into your own Hard Disk.
start	Start ELN service.
start_ssl	After install SSL certificates, use this to start ELN service.
stop	Stop ELN service.
uninstall	Stop ELN service and delete all data in your Hard Disk.

GET ELN CONTROL SCRIPTS (IN LINUX)

- > docker pull lsbnb/elc
- > docker run --name=elc -dti lsbnb/elc bash
- > docker cp elc:/usr/local/bin/elcctl \$(pwd)
- > docker rm -f elc



Your data save here

```
lsbnb@elc2: ~/elc_docker/script_new
lsbnb@elc2:~/elc_docker/script_new$ ls -al
total 16
drwxrwxr-x 3 lsbnb lsbnb 4096 Jul 10 12:28 .
drwxrwxr-x 9 lsbnb lsbnb 4096 Mar  8 2018 ..
drwxrwxrwx 4 lsbnb lsbnb 4096 Jul 10 12:28 data
-rwxrwxr-x 1 lsbnb lsbnb 3248 Mar 15 2018 elcctl
lsbnb@elc2:~/elc_docker/script_new$ ./elcctl install
```

- Install ELN : `./elcctl install`
- Start ELN Service : `./elcctl start` or `./elcctl start_ssl`
- Stop ELN Service : `./elcctl stop`
- Uninstall ELN : `./elcctl uninstall`
- Show ELN Version : `./elcctl version`
- Show help : `./elcctl help`

GET ELN CONTROL SCRIPTS (IN WINDOWS)

Open PowerShell and type below instructions






```
> docker pull lsbnb/eln
```

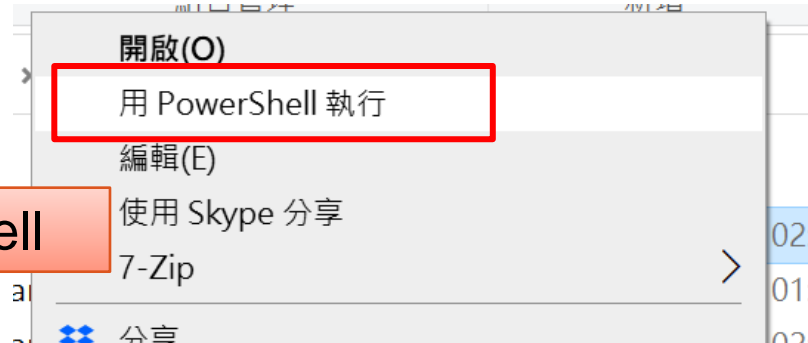
```
> docker run --name=eln -dti lsbnb/eln bash
```

```
> docker cp eln:/usr/local/bin/ELN_Win (Get-Location).path
```

```
> docker rm -f eln
```



 eln_install.ps1	2022/1/12 上午 02:02
 eln_start.ps1	2022/1/12 上午 01:34
 eln_start_ssl.ps1	2022/1/12 上午 02:07
 eln_stop.ps1	2022/1/12 上午 01:34
 eln_uninstall.ps1	2022/1/12 上午 01:55



Right click mouse and select use PowerShell

INSTALL FINISH OPEN YOUR BROWSER

Fill information when you first access ELN

Site Information

Lab Information:

Lab Name (*)

Gmail Account(*) (Some essential functions in eln are developed based on a "mailing" function, eg. reset user password, forward a content to friends, ...etc. We suggest you to get a free, dedicated email account from google[gmail] for this.)
@gmail.com

Password for Gmail (*)

Lab Address

Phone Number

Fax Number

Account Information:

Account for Site Manager(*)

Password for Site Manager(*)

Email for Site Manager(*)

Account for Lab Member(*)

Password for Lab Member(*)

Email for Lab Member(*)

USE ELN

PLEASE SEE ELN DOCUMENT FOR DETAIL CONTENT

https://elncloud.iis.sinica.edu.tw/eln_document

ROLE INTRODUCTION

Guest

- Only can view public content

Lab member

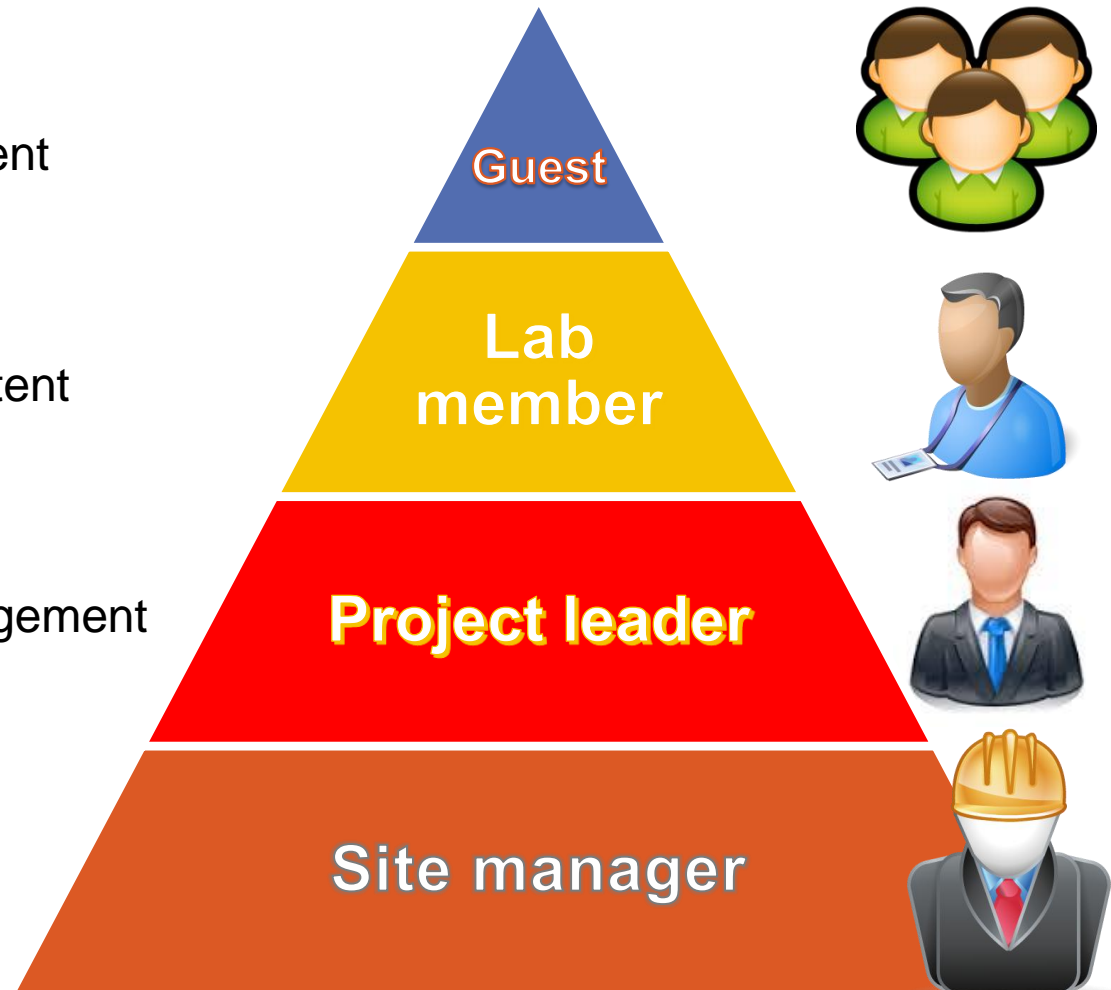
- View public content
- View and post private content

Project leader

- Functions of Lab member
- Content permission management

Site manager

- User, content and theme management



LAB MEMBER CAN DO..

- **Search**
- **Personalization**
- **Post and reply forum topics**
- **Share content**
 - Convert to printer-friendly version or PDF file
 - Email (hyperlink or full content)
- **See all reversions of content**
- **Calendar**
- **File management**
- **Bookmark management**
- **Photo galleries management**
- **Make meeting invitation to other members**
- **View properties and supplies in lab**



THE FUNCTIONS FOR PROJECT LEADER

Forum management

- Create, edit and delete forum topics
- Assign forums to privileged users
- Assign users to respective forums



THE FUNCTIONS FOR SITE MANAGER

Public information update

- News
- Home page, research topics, members information, resources
- Contact us (Show results, email list setting)

Site configuration

- Theme setting
- Upload setting
- Site information (Site name, footer message, ...)
- Maintenance mode
- Backup and restore

User management

- User and role

Content management

- Post and comment



HARDWARE

SYSTEM REQUIREMENT

CPU

- At least 1.6 GHz

Memory

- At least 4~8 GB

Hard disk

- A minimum installation requires 300 MB
- Suggest remaining 100 GB ~ 1TB free space for your files and images.



DEMO



FUTURE WORK

EIn control scripts for macOS



ELN online version



ELN NAS version



RELATED LINKS

ELN Docker hub

<https://hub.docker.com/r/lbsbnb/elN>

ELN Document

https://elNcloud.iis.sinica.edu.tw/elN_document

ELN Demo Site

<https://elNcloud.iis.sinica.edu.tw/elNmobile>

ELN Github

<https://github.com/lbsbnb/elN>

Issue report

<https://github.com/lbsbnb/elN/issues/new>

