Analysis Platform + DN7
AP+DN7

Getting Started (OSS)

AP+DN7 is an open source web application to import, connect and visualize factory IoT data. It helps to collect, link and integrate data from multiple data sources. Visualizations include DN7 (Digital Native QC7 Tools), which is designed especially suitable for data on manufacturing domain. Let's try data-driven process improvement by utilizing the data sleeping in the field.
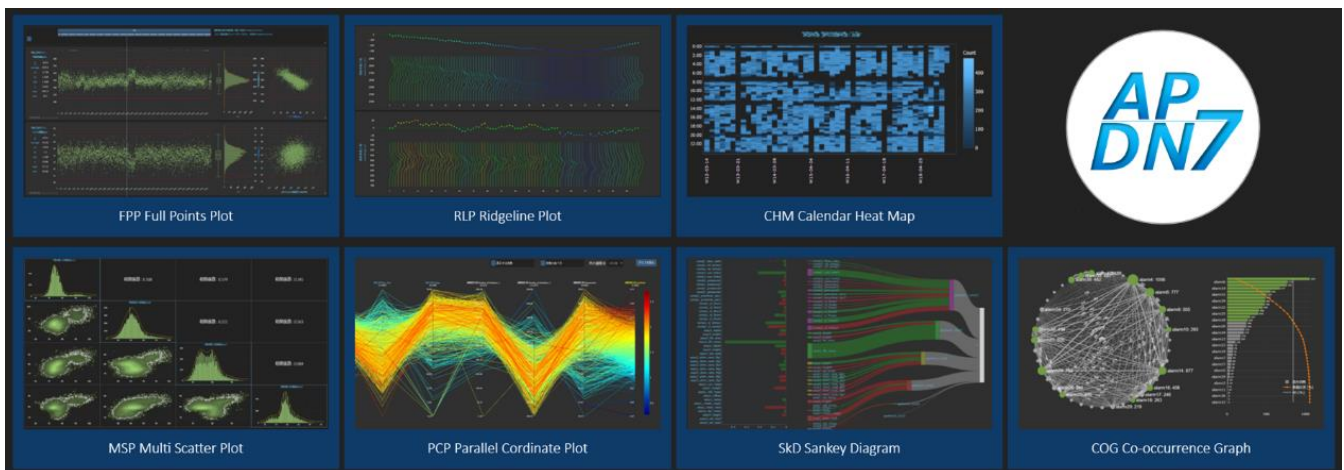
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1. Introduction

With the Analysis Platform, you can visualize/analyze data from multiple data sources. In most factories, the data is often stored in separate database/table/CSVs. For example, think of a case that we have to trace back to the previous process for a product which a complaint had occurred, to identify the root cause. In that case, if the data of each process is stored in separate data source, we have to spend a lot of time gathering and connecting the scattered data.

With this application, you can easily configure the data connection between processes on the browser. According to the settings, we can read / connect /visualize /analyze the data, and we hope that this accelerate on-site Kaizen activities.

Currently, we provide following functionalities.

Data source	SQLite, PostgreSQL, Microsoft SQL Server, Oracle Database, MySQL, CSV/TSV/SSV
Connection	Trace forward, trace back, tracing with multiple keys, auto-link, link by time
Visualization	Full points plot / Stratified plot / Ridgeline plot / Calendar heatmap / Multiple scatter plot / Parallel coordinates plot / Sankey diagram / Cooccurrence Graph / Aggregation Plot
Analysis	Principal Component Analysis (PCA)
Table viewer	Read and view some data from the databases.
Filtering	You can set filters of Lines, Machines, Product No, etc.
Master setting	Graph thresholds, in-process threshold, ymin/ymax of graphs.
Job list	List up the progress of data import / data connecting processes.

Note:
- Depending on the settings of the database to connect to,
  it may take some time to read the data, and the database may be overloaded.
- The Analysis Platform is designed to generate an internal database for buffers to enable high-speed access. Internal database of the application can reach several tens of GB when a large amount of process data is loaded.
  You don't have to worry about reading a single CSV, but for example when reading all manufacturing data of whole year, etc., please use a PC with enough free space.
- The Analysis Platform will give you a warning message if the free disk space is below a certain amount. Eventually, the Analysis Platform automatically stops importing the data according to the spaces left. In that situation, be careful that if will be difficult to transfer the application to another location.

2. Requirements

AP+DN7 is tested under the following condition:

OS	Windows10 Enterprise (64bit)
CPU	Intel Core i5-1245U 1.60 GHz
RAM	16GB
Disc capacity	235GB SSD (More than 10% free space is necessary. If not, AP+DN7 will stop importing data to avoid full disk capacity)
Browser	Microsoft Edge 128.0.2739.79 (Official Build) (64 ビット) (Also available on Google Chrome)

- We recommend Windows Server if many users will access AP+DN7

3. Installation

We recommend using installer for AP+DN7. Getting the latest version, unzipping the folder, and launching the application is performed automatically.

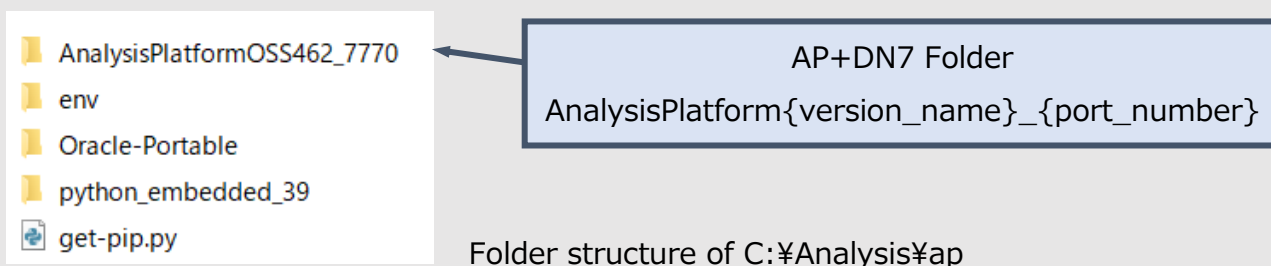| Get zip file | Expand Move folder | Activate AP+DN7 | Activate finished Terms of Use |
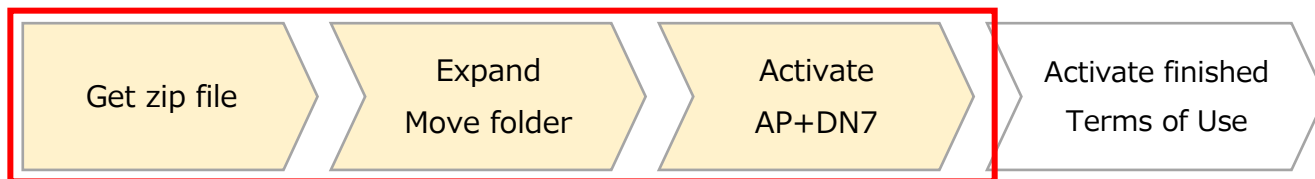
With installer, from getting AP+DN7 to activating AP+DN7 is automated.

- The first time you install AP+DN7, it will take a while to download and deploy the software required to run AP+DN7.
- If the installer does not work, please consider manual installation (see Troubleshooting).

By default, AP+DN7 is installed under C:¥Analysis¥ap

AP+DN7is the folder named "AnalysisPlatform{version number}_{port_number}. Setting file and batch file to activate AP+DN7 are stored here。Other folder and files include softwares required to run AP+DN7, hence please do not delete those.

AnalysisPlatformOSS462_7770
env
Oracle-Portable
python_embedded_39
get-pip.py

AP+DN7 Folder
AnalysisPlatform{version_name}_{port_number}

Folder structure of C:¥Analysis¥ap

3.1. Download AP+DN7 Installer

Open AP+DN7 GitHub repository.

https://github.com/apdn7/AnalysisPlatform

Then, click "APDN7_installer.zip" on the "Getting Started" section.
File APDN7_installer.zip will start downloaded.

Expand the APDN7_installer.zip. You will get three files: A file to specify settings for installation, and two files for running the installation.

Files inside APDN7_installer.zip

Description of the files

install.ini	A text file to specify settings for installation
install_AP+DN7_OSS.bat install_AP+DN7_OSS_ja.bat	Batch file to run installation. Select one of the two. If you use install_AP+DN7_OSS_ja.bat, default language of AP+DN7 will be set to ja (Japanese)

3.2. Run AP+DN7 Installer

You can specify some settings before the installation.

Especially, if you are accessing the Internet from a corporate network via a proxy server, you need to configure the proxy settings.

Settings (optional)

| 設定項目	説明	デフォルト値
path_main	A path to a directory where AP+DN7 is installed (Please specify a folder that is not synced with the OneDrive)	C:¥Analysis¥ap
path_data	Path to save CSV file, etc. to be loaded	C:¥Analysis¥data
langu	Language shown in UI	en (English) If you use install_AP+DN7_OSS_ ja.bat, setting is <u>forced</u> to ja (Japanese)
title	Title shown on console, Tabs in web browser and navigation bar in AP+DN7.	DX QC7Tools
proxy	HTTP proxy	(no setting)
proxys	HTTPS proxy	same value with proxy

To specify settings, right-click on the install.ini file and open it with Notepad or any text editor. After modifying the relevant items, save the changes.

```
12    ; Install Path (full path)                    ja:インストールパス
13    path_main=C:\Analysis\ap
14    path_data=C:\Analysis\data
15    ;; Database takeover source: new/latest/(path)   ja:データベース引継元
16    path_conf=latest
17    ;path_conf=C:\Analysis\ap\AnalysisPlatformOSS462
18    ;; ja:引継設定 new:引継なし latest:現状の最新(名前順) (path):実際のパス指定
19
20    ; Default StartUp Language                     ja:起動言語
21    langu=en
22    ;langu=jp
23    ;; Seleect from en, ja, it, es, vi, th, hu, pt, ... (choose from AP+DN7 Selection)
24
25    ; Subtitle   Note: Spaces are replaced with '_'  ja:サブタイトル
26    title=DX QC7Tools
27    ;;    123456789012  Recommend using a maximum length of 12 (Only ASCII7)
28    ;; ja:最大12文字(英数半角のみ)までを推奨。スペースは'_'で置き換えてください
29
30    ; Proxy  http                                  ja:プロキシ設定 http
31    ;proxy=no
32    ;; proxy=no      : Force to No Proxy
33    proxy=null
34    ;; proxy=null    : Default or No Proxy
35    ;; If you have proxy, delete rem below and set your proxy address:port.
36    ;proxy=192.0.2.0:1080
37    ;proxy=proxy.example.com:8080
38    ;;   proxy=xxx:80 : Force to use Proxy xxx with port 80
39    ;;   Domain Name is also possible. Ex. proxy.example.com:3128
40    ; Proxy  https                                 ja:プロキシ設定 https
41    proxs=http
42    ;proxs=no
```

You can edit install.ini to specify installation settings

After making the necessary settings, double-click on one of the following batch files to run the installation.

- install_AP+DN7_OSS.bat: Default language=en(English)
- install_AP+DN7_OSS_ja.bat: Default language =ja(Japanese)
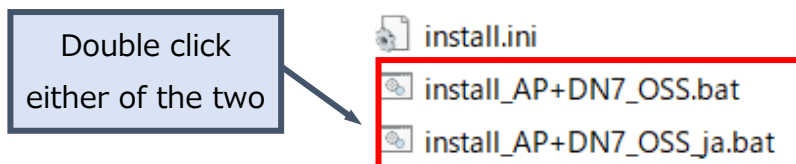
Due to the Windows security function, the following blue window may appear. In that case, do either one of the two:

- Click "More info" in the displayed blue window and press the "Run anyway" button displayed.
- Before double-clicking the "install_AP+DN7_OSS.bat" or "install_AP+DN7_OSS_ja.bat" file, change the security setting from the file properties as follows. First right click the batch file and select "Properties". Then, check "Unblock" and press "OK". Finally, double-click the batch file again to start the application.
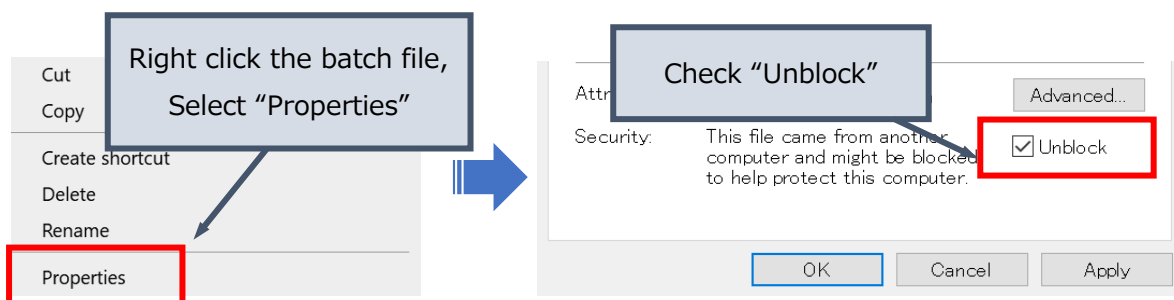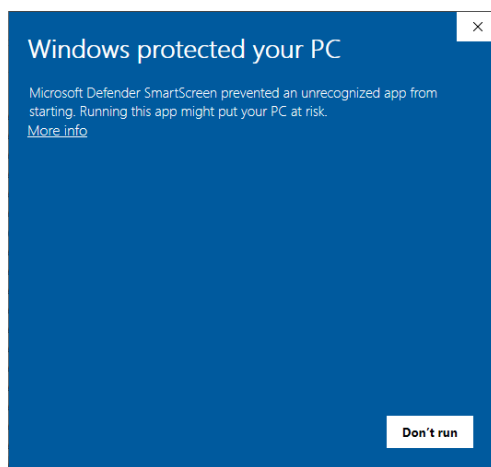
When the batch file starts executing, a black window (command prompt) will appear. Behind this screen, a set of files required to run AP+DN7 is being obtained and file expansion/configuration is taking place. After a while, a message "The initial sequence has finished and it is moving on to installation" appears and the screen will automatically close.

(wait for a while)

Finished successfully (this window will close automatically)

After the files have been successfully obtained and extracted, AP+DN7 will automatically activate. A black screen (console screen) and a web browser will appear as shown below. After a short wait, a startup screen will appear on the web browser. When AP+DN7 is launched for the first time, it will take some time to download the software/library necessary for the application to run. Once AP+DN7 has been launched, the screen will automatically switch to the new screen.

black window (command prompt) will appear
(One of them will close automatically)

AP+DN7 startup screen (shown on web browser)

When you start the application for the first time, a window regarding Windows security will be displayed. Please check the following checkmarks and press the "Allow access" button. For security reason, do not check "Public networks".
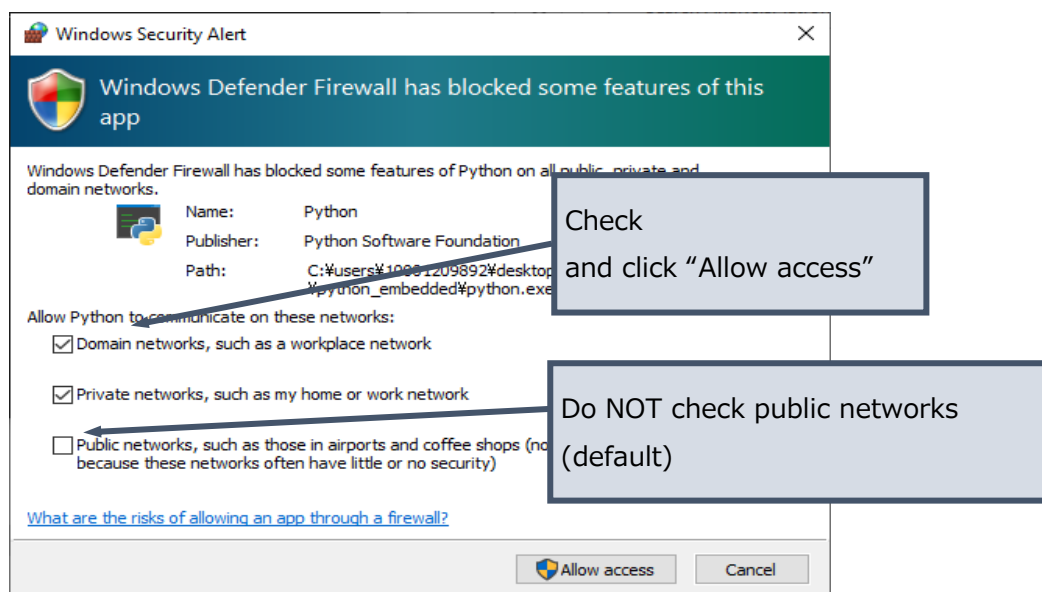
After a short wait, the screen of the launched web browser will switch to the application and you can start using AP+DN7. (If the screen does not switch automatically, please press the refresh button on your browser.) If your web browser is not running, please use Google Chrome or Microsoft Edge and open http://localhost:7770/ to connect to the activated AP+DN7. When you access the site for the first time or upgrade, a screen for the Terms of Use will appear. Please check the Terms of Use carefully and click the "I accept" button.
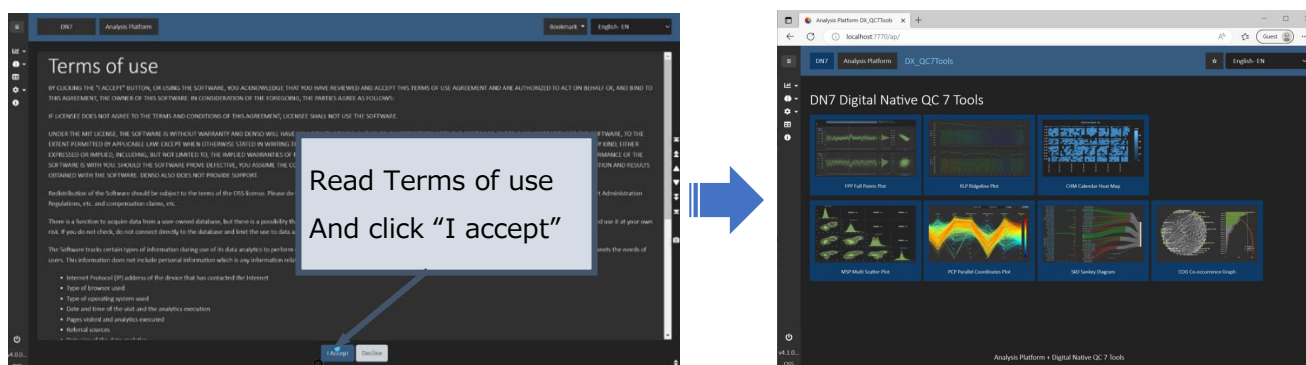
- You can use the IP address [e.g. http://123.456.7.89:7770] or domain name [e.g. http://my_pc.ap.com:7770] to access from other PC.
- AP+DN7 remains activated even if the browser is closed.

Shortcuts for "start_ap.bat" and Web browser

While the activation, the Analysis Platform automatically generates shortcuts of "start_ap.bat" and web browser on the desktop. There are three shortcuts of the web browser, each to access the application by localhost/IP address/PC name. From the next time, you can activate/access the application without opening the "AnalysisPlatform-master" folder.
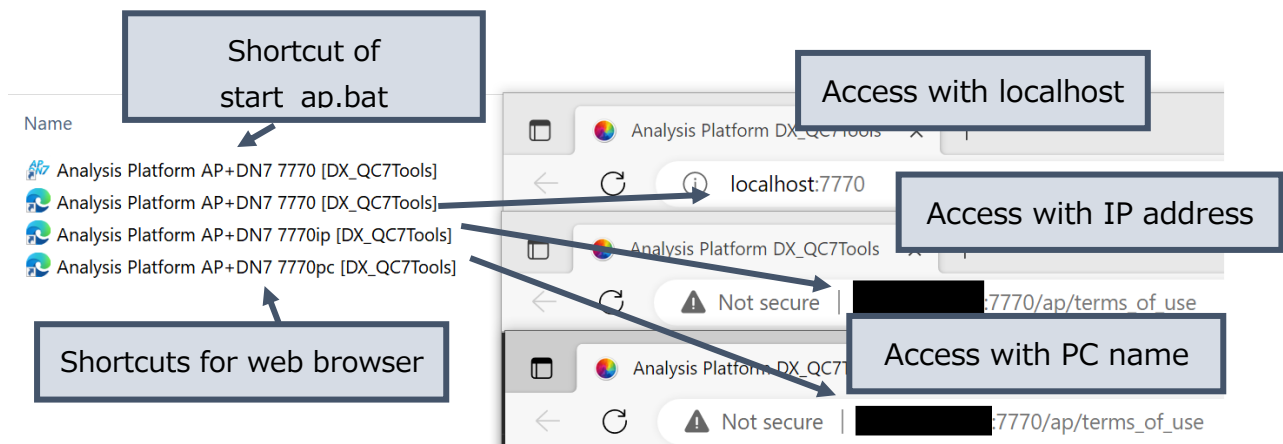
Shortcut to activate AP+DN7 (start_ap.bat)

- (AP+DN7 icon) Analysis Platform AP+DN7 7770 [DX_QC7Tools]

Shortcuts to access AP+DN7 (Web browser)

- Analysis Platform AP+DN7 7770 [DX_QC7Tools]
  - ➢ Access AP+DN7 from your PC.
- Analysis Platform AP+DN7 7770**ip** [DX_QC7Tools]
  - ➢ Access AP+DN7 from other PC.
    Use IP Address to access AP+DN7.
- Analysis Platform AP+DN7 7770**pc** [DX_QC7Tools]
  - ➢ Access AP+DN7 from other PC.
    Use PC name (e.g. my_pc) to access AP+DN7

Note: You can also use bookmark of web browser.

4. Activate/Shut down the application

4.1. Activate

Open the folder of AP+DN7 (Default: C:¥Analysis¥ap¥AnalysisPlatform…).

Double click start_ap.bat file to activate AP+DN7. From the second activation, you can also activate AP+DN7 by double-clicking the AP+DN7 icon generated on the desktop.


Note:

When you double-click "start_ap.bat" file, due to the Windows security function, the following blue window may appear.
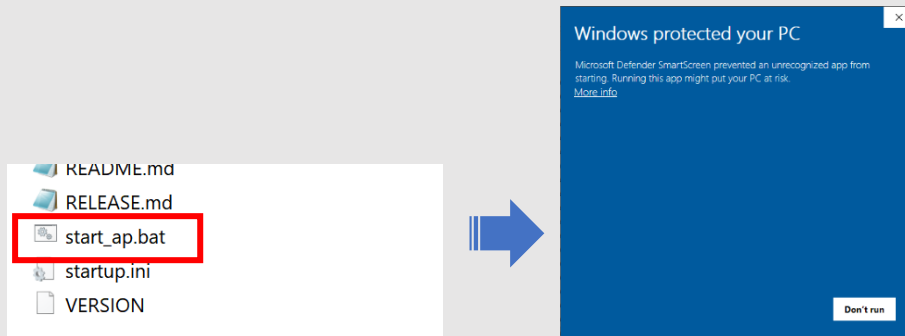

In that case, do either one of the two:

- Click "More info" in the displayed blue window and press the "Run anyway" button displayed.
- Before double-clicking the "start_ap.bat" file, change the security setting from the file properties as follows. First right click the "start_ap.bat" file and select "Properties". Then, check "Unblock" and press "OK". Finally, double-click the "start_ap.bat" file again to start the application.
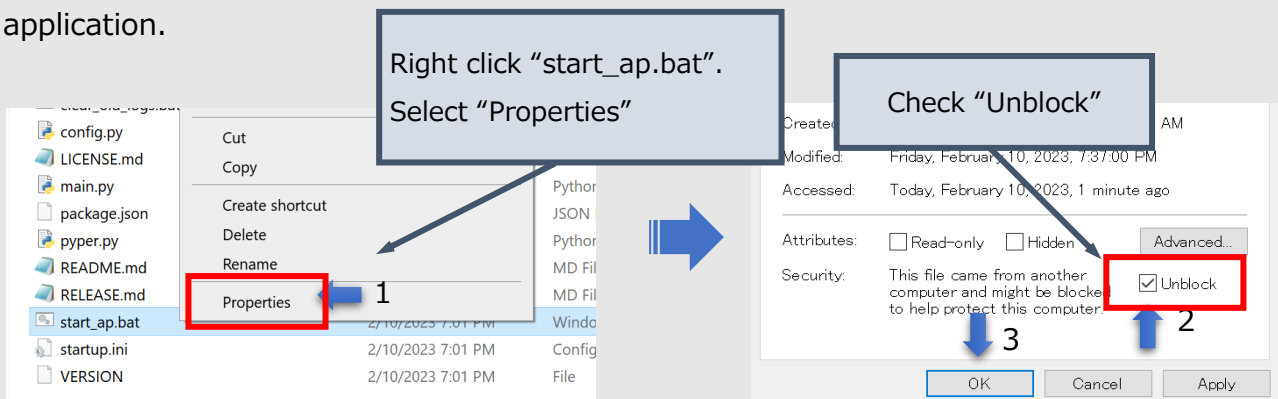
4.2. Shut down

There is a power icon at the bottom left of the page. This icon is only shown when it is accessed from the PC which the application is running. If you want to shut down the application, press the power button. A confirmation window will appear, and when you press the OK button, the application will shut down and the black window (console screen) will disappear automatically.
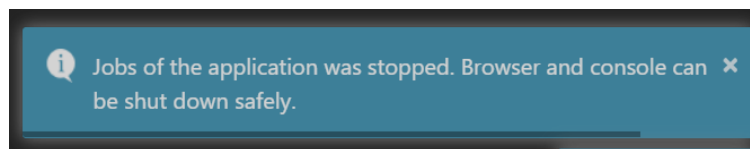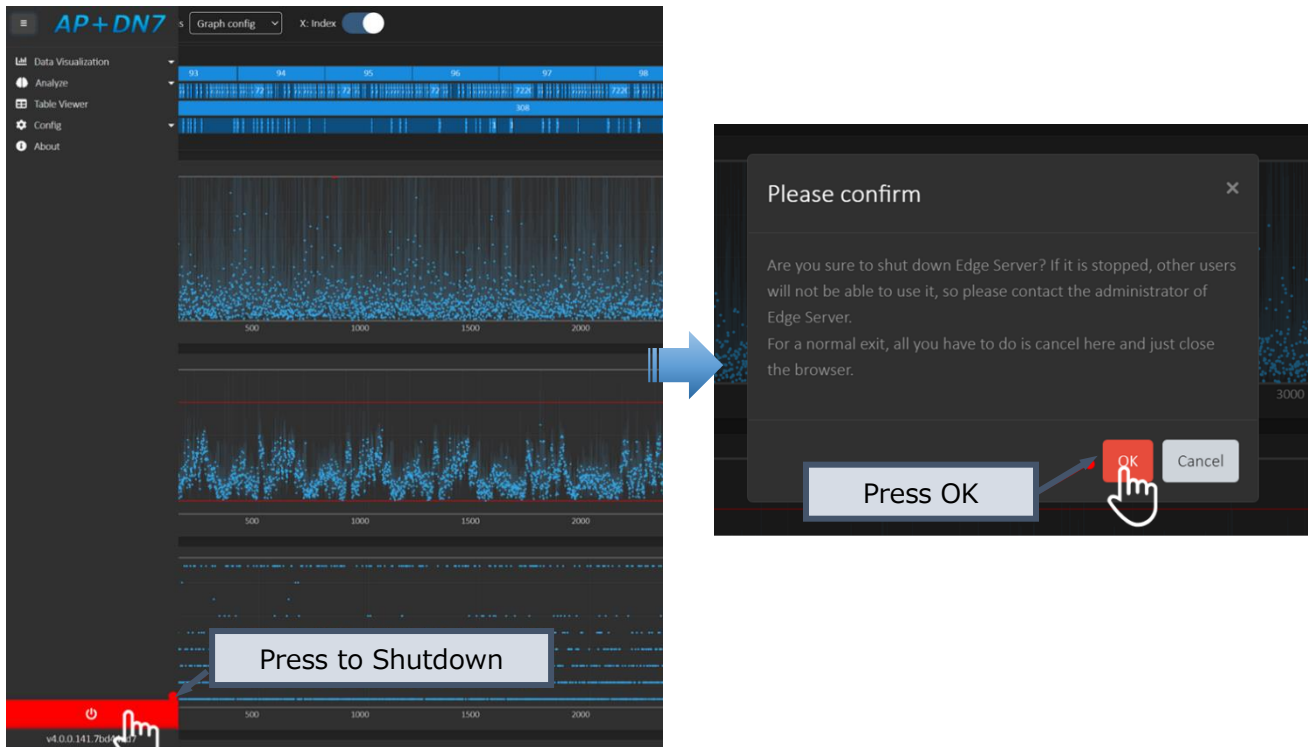
A message will be displayed in the web browser when shut down is successfully completed

If AP+DN7 does not stop after waiting for a while, right-click the command prompt icon on the taskbar and select "Close Window" to force AP+DN7 to close. In this case, the web browser will not close automatically, so please close the web browser manually.
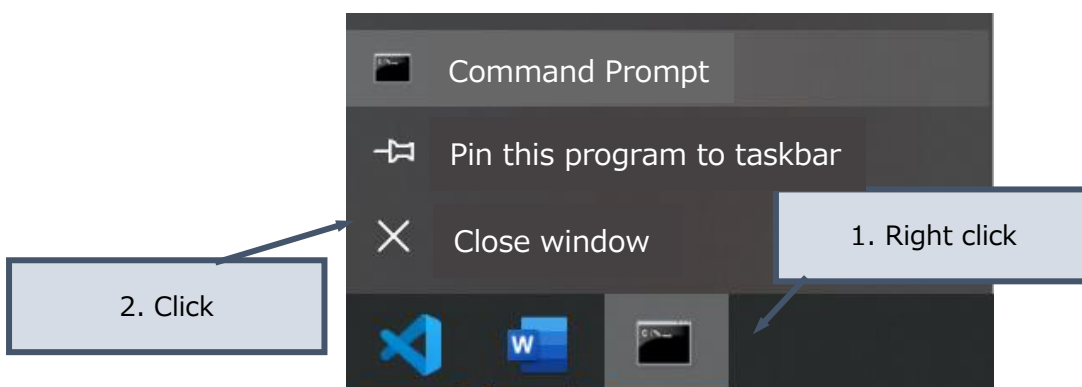
4.3. Proxy/Port number/Language Settings (Optional)

You can configure the activation settings of the Analysis Platform by editing "startup.ini" file.

Open the "startup.ini" file under the " C:¥Analysis¥ap¥AnalysisPlatform…" folder with a text editor.

Make sure that the Analysis Platform is not activated when you are editing the "startup.ini" file.

Proxy setting

If you use a proxy to connect the Internet and the corresponding address is not registered in the environment variables, you need to specify the address of the proxy server.

- HTTP proxy: Remove ";" from line 35 or 36, and rewrite to an appropriate value.
- HTTPS proxy: Remove ";" from line 47 or 48, and rewrite to an appropriate value.
  If you are using the same value as HTTP proxy, you can just remove ";" from line 41.

Port number setting

The Analysis Platform uses port 7770 by default. Edit line 14 if you want to change this value. The application will stop the activation if the port number is already in use, but just in case, if you are already activating other web application, check that the port number is not the same.

Language setting

Default language is set to en (English). You can change the language from the GUI of the
application, but if you want to change the default language, edit line 18 (e.g. es, it, ja).

```
17    ; Default StartUp Language
18    lang=en
19    ;;  lang=null   : Use default setting
20    ;lang=ja
21    ;; Selecet from en, ja, it, es, ... (choose from AP+DN7 Selection)
```

Browser activation / Shortcut generation setting

The Analysis Platform automatically generates shortcuts of "start_ap.bat" and web browser on the
desktop. You can change the corresponding line of line 50-64 to control this behavior.
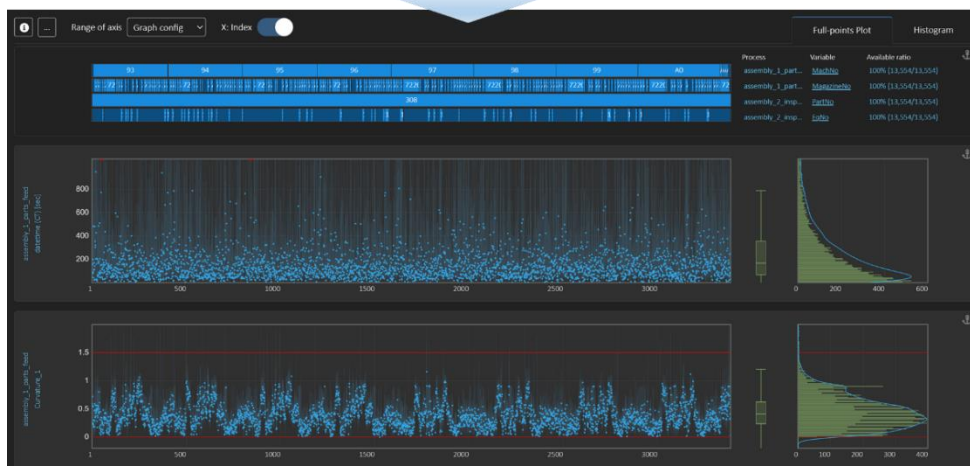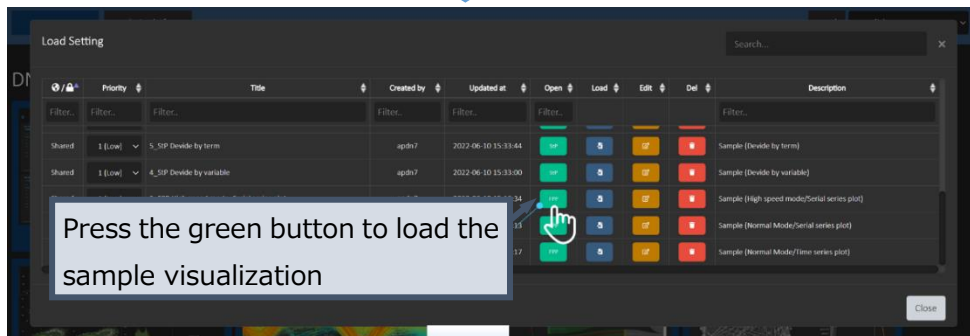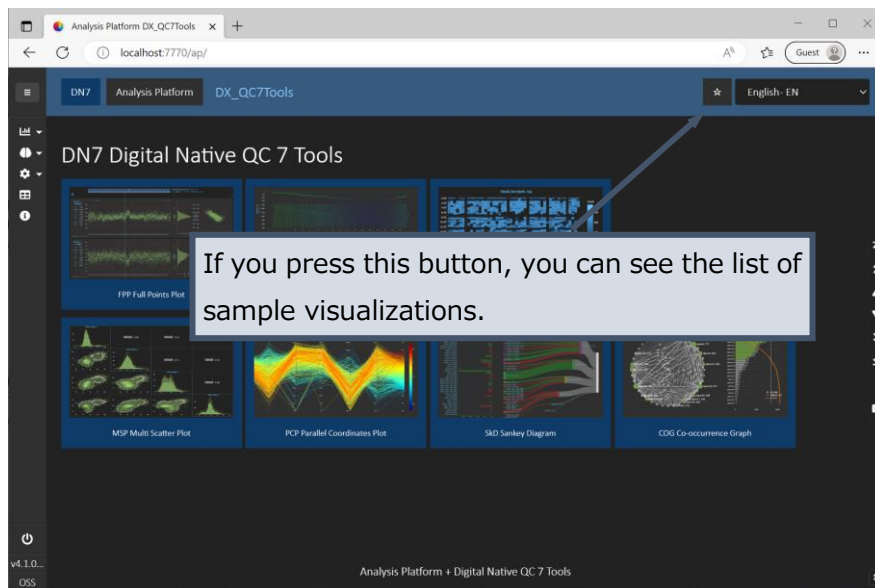
```
50    [BrowserLaunch]
51    ; Browser Launch  1:On  0:Off
52    launch_chrome=1
53    launch_edge=0                    Browser activation
54
55    [ShortcutAdd]
56    ; Make Shortcut on DeakTop  2:Everytime  1:Just Installation  0:Off
57    ;; Analysis Platform
58    shortcut_app=1
59    ;; localhost                     Shortcut generation
60    shortcut_web=1
61    ;; pc name    For access from external PC (recommended)
62    shortcut_web_pc=1
63    ;; ip addr    For access from external PC (when pc name access is not available)
64    shortcut_web_ip=1
```

5. Demo visualization

By pressing the star button on the top right corner of the page, you can read the sample settings of the sample data already included in the app. If you press green button in the "Load Setting" page, you can get the demo result of corresponding visualization tool.

If you press this button, you can see the list of sample visualizations.

Press the green button to load the sample visualization

6. Upgrade

You can easily upgrade AP+DN7 using the installer. You can migrate the settings (data source setting, process setting, trace setting, master setting, filter setting, bookmarks), so please try the latest Analysis Platform with additional functionalities and bug fixes.

Items those can/can not migrate to new version

Can migrate	Settings: Data source / Process / Trace / Filter / Graph / Bookmarks
Can not migrate	Imported Data → After upgrade, AP+DN7 will automatically start importing the data again 　　(If the data source folder is changed, you can not import the data) startup.ini: Port number, title, etc → After upgrade, refer "4.3.　Proxy/Port number/Language Settings (Option al)" section and change settings.

6.1. Condition

Before upgrade, check that following conditions are satisfied:

- Can connect to the internet (to get new files)
- AP+DN7 is stored under C:¥Analysis¥ap (Default)
  - ➢ If your AP+DN7 is installed under other folder, change "path_main" setting of install.ini.
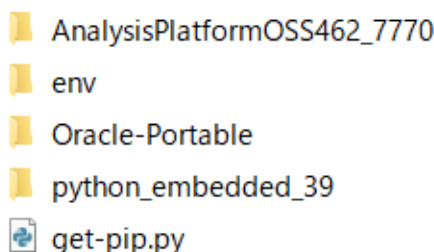
An example of folder structure under C:¥Analysis¥ap

6.2. Run upgrade

Follow same procedure as the installation.

Double-click on one of the following batch files to run the installation.

- install_AP+DN7_OSS.bat: Default language=en(English)
- install_AP+DN7_OSS_ja.bat: Default language =ja(Japanese)

When the batch file starts executing, a black window (command prompt) will appear. After a while, a message "The initial sequence has finished and it is moving on to installation" appears and the screen will automatically close.

(wait for a while)

Finished successfully (this window will close automatically)

After a short wait, the screen of the launched web browser will switch to the application and you can start using AP+DN7. (If the screen does not switch automatically, please press the refresh button on your browser). Please check the Terms of Use carefully and click the "I accept" button.
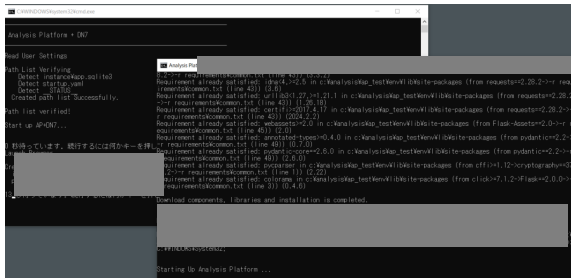
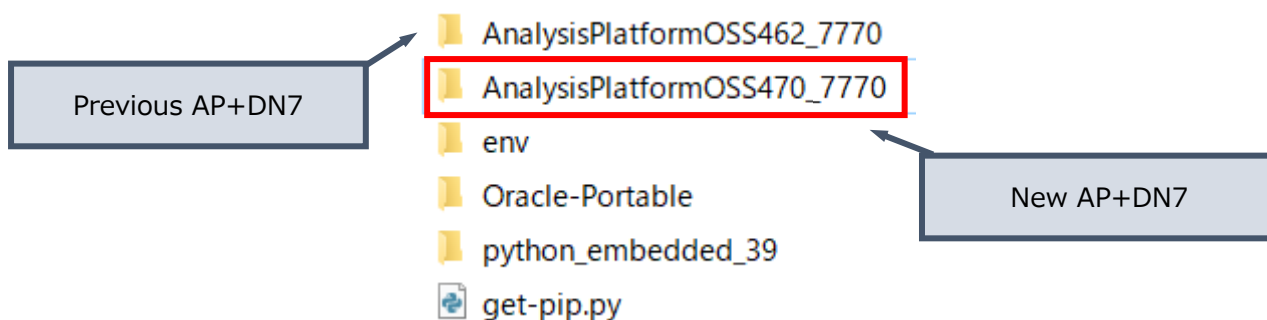Console window (Left) and AP+DN7 startup screen (Right)
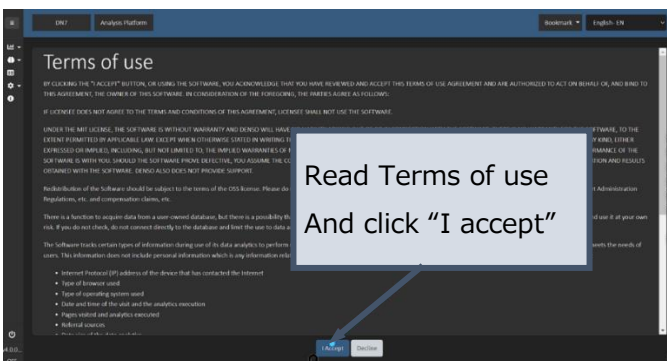
Read Terms of use
And click "I accept"
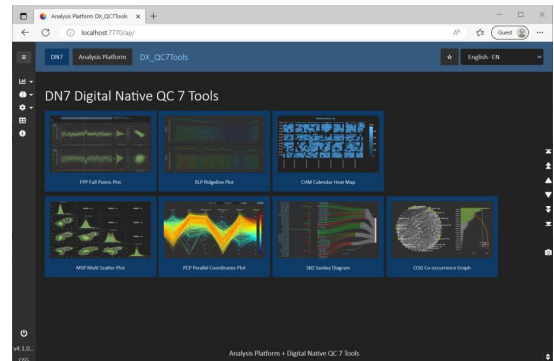
Folder name and port number after upgrade

After the upgrade, a new AnalysisPlatform folder is created under C:¥Analysis¥ap.

In this document, AnalysisPlatformOSS470_7770 is created.

If the current version is the latest version, a new folder is created with a different port number, such as AnalysisPlatform462_7771. Please use it when you want to separate the target data / usage.

!!注意

Previous AnalysisPlatform folder (in this case: AnalysisPlatformOSS462_7770) still contains settings and imported data. **Do NOT delete this folder until you confirm that the new AP+DN7 (AnalysisPlatformOSS470_7770) works correctly.**

An example of upgrade procedure

For example, let's say you have an AP+DN7 running on a desktop PC, and multiple stakeholders (end users) connect it from their laptops to analyze data. Here, we give an example of what an AP+DN7 administrator might do.

Connect with http://{PC 名}:7770/

Admin   DesktopPC   End users
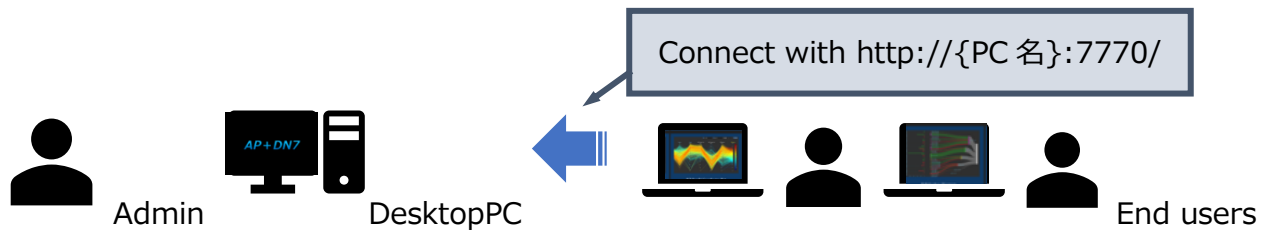
Situation

- Operating AP+DN7 version 4.6.2 with port number 7770 (http://localhost:7770/)
- Want to upgrade to version 4.7.0

Operation

1. Stop the old AP+DN7
2. Install new version using the installer.
3. New AP+DN7 activates with port number 7770 (http://localhost:7770/)
4. Wait until data is imported to the new version.
5. Test the new version (optional: end user can also test)
   If you want to use the previous AP+DN7, you can change the Port number.
6. You can delete the old version (AnalysisPlatformOSS462_7770). However, <u>we recommend keeping at least one precious version</u> just in case to revert when unexpected but critical bug occur in the new version.

7. Uninstall

To uninstall AP+DN7, you can simply remove all the files.

Environment variables and registry are not changed according to the installation of AP+DN7.

1. Delete shortcuts created on Desktop.

2. Delete all files in C:¥Analysis¥ap

3. Remove C:¥Analysis¥ap after you confirm that the folder is empty

    (If you installed AP+DN7 in the other folder, refer that folder)

📁 AnalysisPlatformOSS462_7770
📁 env
📁 Oracle-Portable
📁 python_embedded_39
📄 get-pip.py
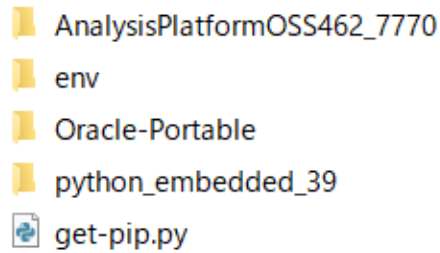
To uninstall, remove all the folder/files

8. Troubleshooting

8.1. Install AP+DN7 manually

You can get the ZIP file of the Analysis Platform from GitHub. This ZIP file contains source code of the Analysis Platform. After you had downloaded the ZIP file, unzip it.
https://github.com/apdn7/AnalysisPlatform

After the unzipping is finished, you will see a folder:
AnalysisPlatform-master

Place the "AnalysisPlatform-master" folder where OneDrive is not synchronized. We strongly recommend creating C:¥Analysis¥ap folder.
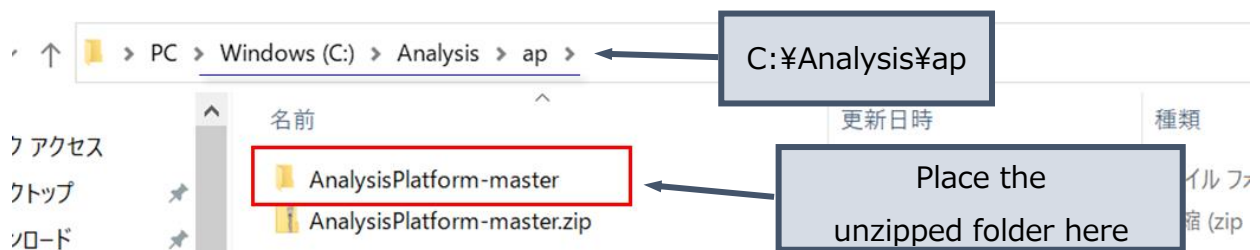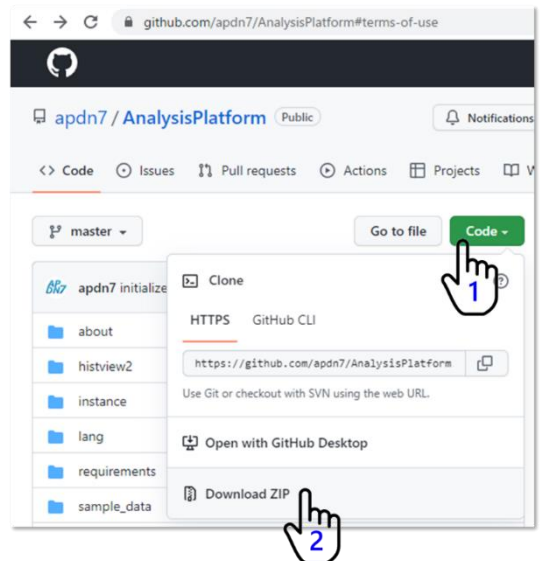

Refer Chapter4 for the activation.

Note:

Please place the extracted files in a place where **OneDrive is not synchronized**.

Do not synchronize with OneDrive, as it may cause problems (Please avoid places where OneDrive is synchronized, such as My Documents and the desktop, and set it in a place outside of synchronization)

Since the Analysis Platform generates a buffer database internally and accesses it at high frequency, if you place it in a synchronized folder of OneDrive, the operation will be extremely slow or the network will be overloaded.
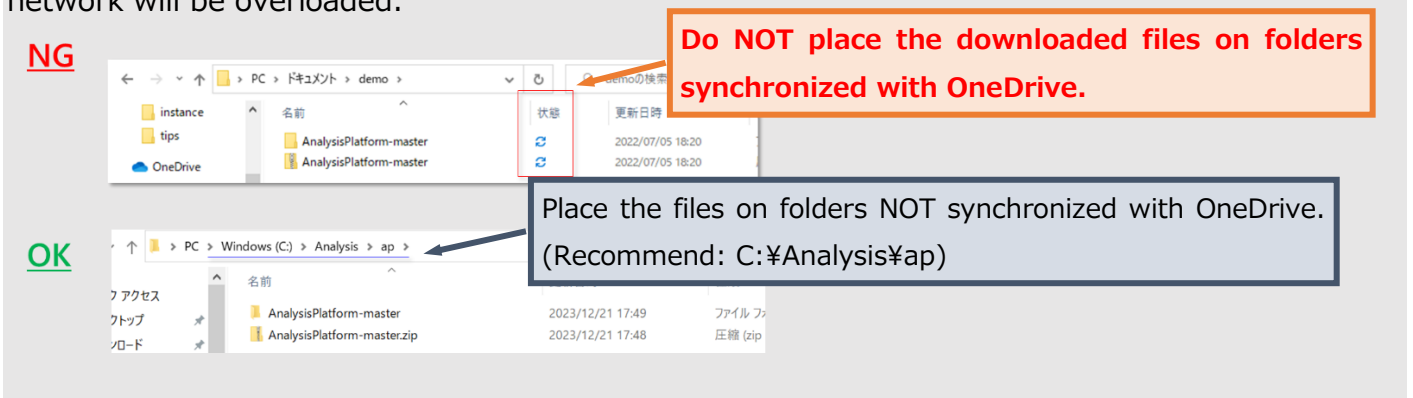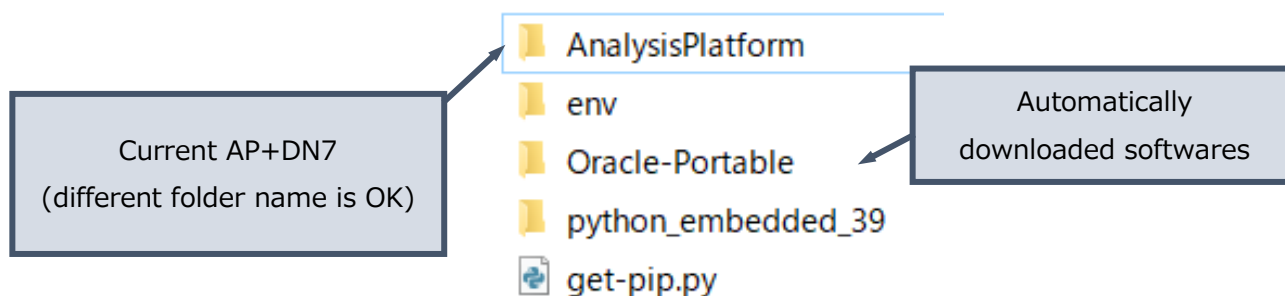
8.2. Upgrade AP+DN7 manually

8.2.1. Condition

Before upgrade, check that following conditions are satisfied:

- Can connect to the internet (to get new files)
- AP+DN7 is stored under C:¥Analysis¥ap (Default)
  - ➢ If your AP+DN7 is installed under other folder, change "path_main" setting of install.ini.
    - = Using the same install.ini for installation is peferred

An example of folder structure under C:¥Analysis¥ap

8.2.2. Get new files

Get the ZIP file of the Analysis Platform from GitHub.
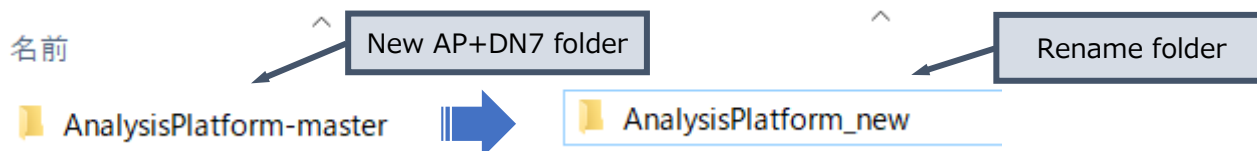
After you had downloaded the ZIP file, unzip it.

https://github.com/apdn7/AnalysisPlatform

After the unzipping is finished, you will see a folder:
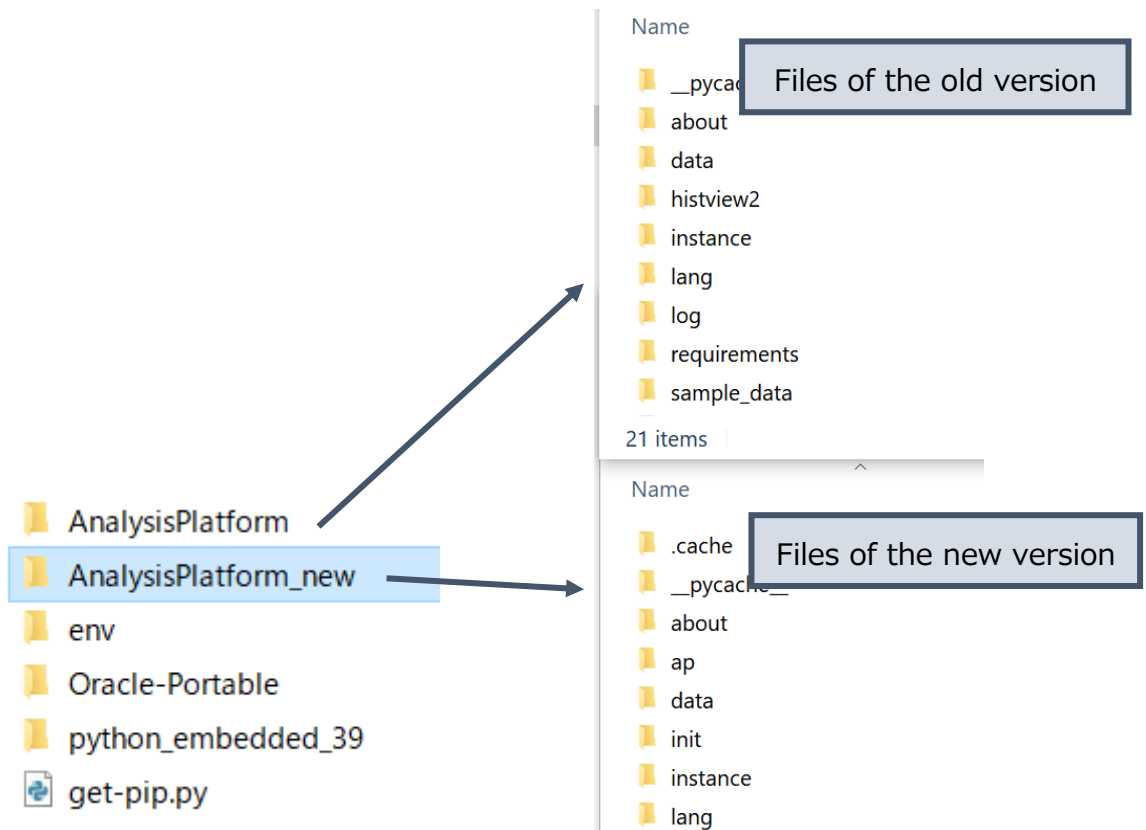
AnalysisPlatform-master

Here, we rename the new AP+DN7 folder to "AnalysisPlatform_new".

Then, move the new application folder "AnalysisPlatform_new" to the same folder with the old version.

AnalysisPlatform — Old version

AnalysisPlatform_new — New version

env

Oracle-Portable

python_embedded_39

get-pip.py
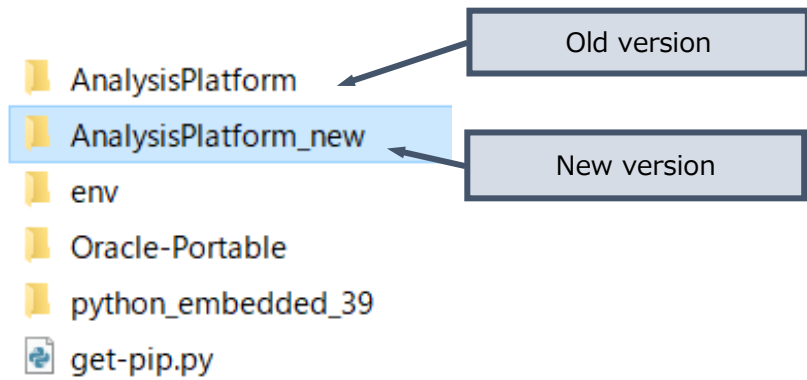
After you moved the new application folder, make sure that your folder structure is as shown below. Files of the old version are in the "AnalysisPlatform" folder, and the files of the new version are in the "AnalysisPlatform_new" folder.

Name

__pyca   Files of the old version
about
data
histview2
instance
lang
log
requirements
sample_data

21 items

AnalysisPlatform

AnalysisPlatform_new

env

Oracle-Portable

python_embedded_39

get-pip.py

Name

.cache   Files of the new version
__pycache__
about
ap
data
init
instance
lang

Migrate settings

This section explains how to migrate the settings (data source settings, process settings, link settings, filter settings, master settings, and bookmarks) from the old version to the new version.

The settings and the imported data are stored in the "instance" folder.

- app.sqlite3: settings (we are going to migrate this setting)
- universal.sqlite3: imported data

!!Note

For faster data processing and more efficient storage usage, the structure of "universal.sqlite3" sometimes change significantly. Therefore, we can not migrate "universal.sqlite3". AP+DN7 will automatically start importing the data based on the migrated settings after the activation.

First, make sure that the "instance" folder of the **new** version is empty.

If not, delete all files under "instance" folder. <u>Make sure you do not delete the files of the old version</u>
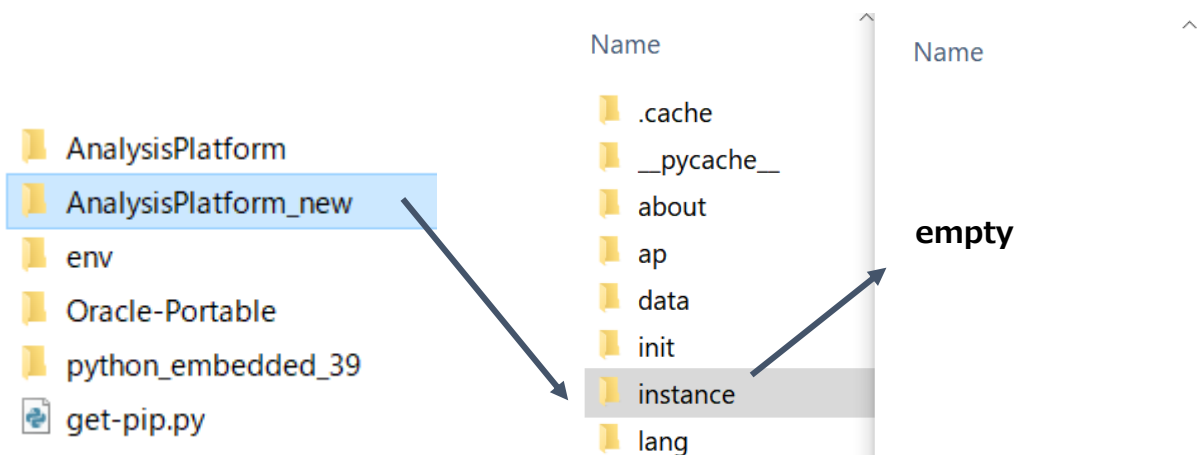
Then, copy the file "app.sqlite3" in the "instance" of the old version, and paste it to the "instance" folder of the new version.
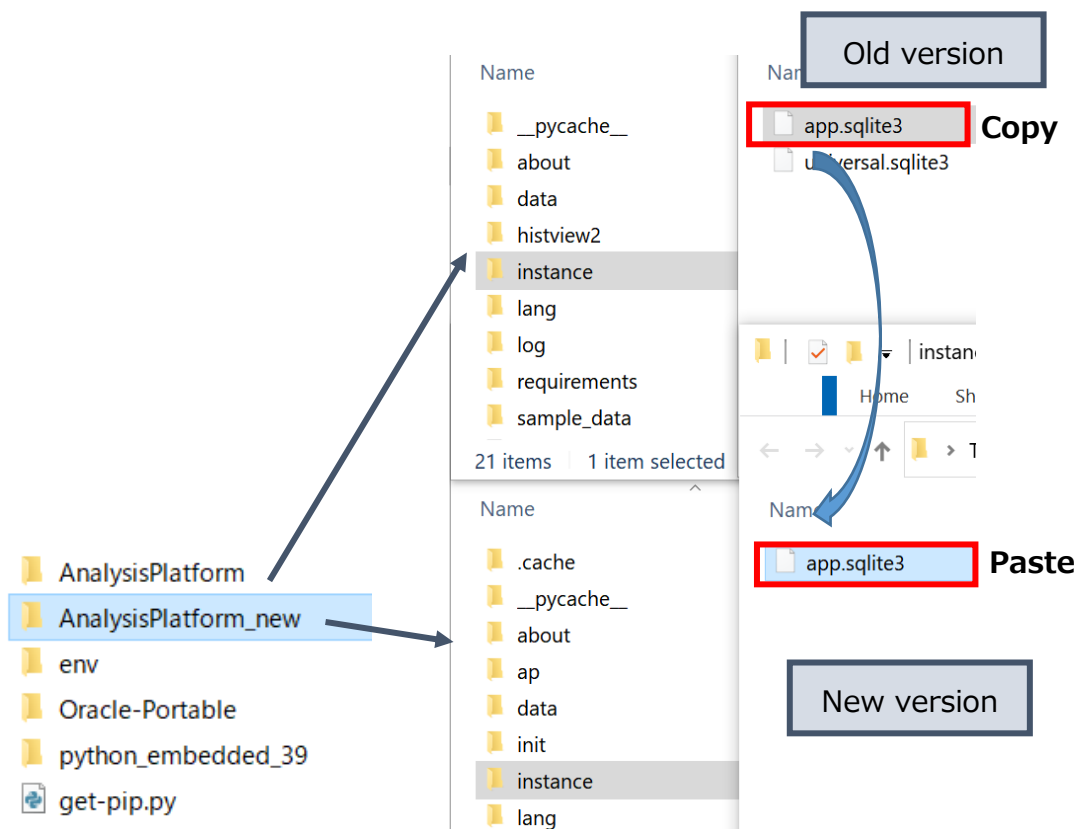

The migration of the settings is done.

Next, to migrate activation settings such as the port number / the default language / the proxy settings, transcribe the settings specified in "startup.ini", from old version to the new version. Please refer to the "Proxy/Port number/Language Settings (Optional)" section of the document "Getting Started" for details.

8.2.3. Activate new version

After you had finished migrating the settings, activate the new AP+DN7. Once activated, AP+DN7 will automatically start importing the data, based on the migrated settings. The progress of data import can be checked by opening the "Job list" in the sidebar > Config of the application.
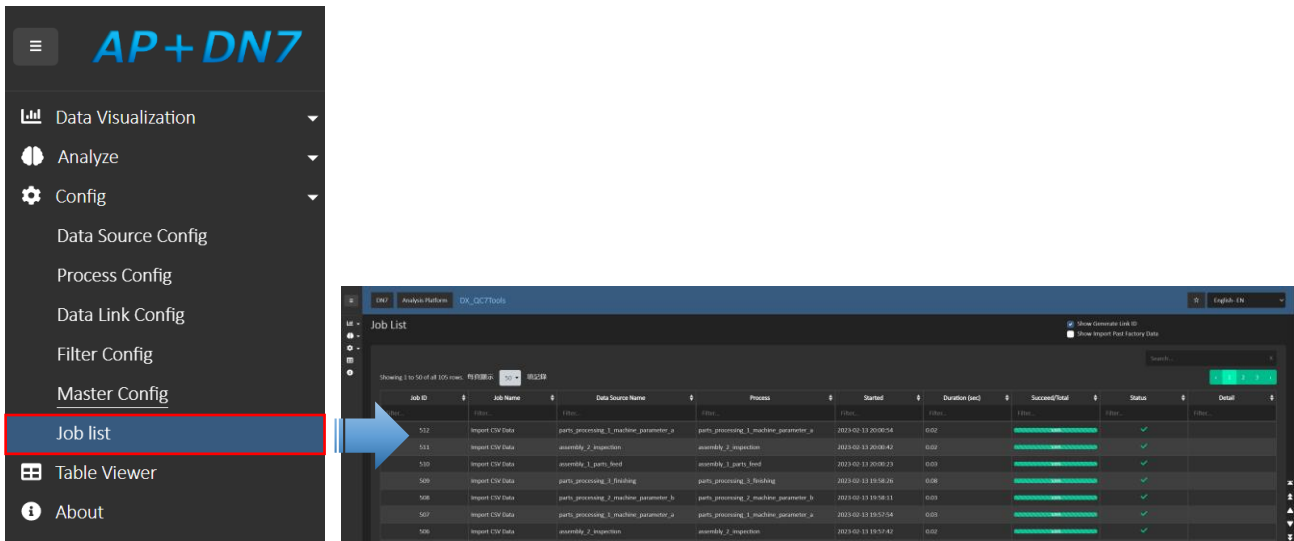
It may take some time to complete importing, depending on the amount of data.

!!Important
Do not delete the old version until you have sufficiently tested the new version.
For testing it is recommended to set different port numbers for the old version and the new version, and activate both after the data migration. It is safer to keep both versions running for a while so that you can use the older version whenever you encounter problems with the new version.

8.3. Troubles during activation

8.3.1. After the activation, a page with white background and only texts are shown

When starting AP+DN7, the following screen may be displayed on the browser. After waiting for a while (after AP+DN7 has started), click the refresh button on your browser to return to normal display. We have confirmed that this is caused by browser cache and may occur when AP+DN7 is restarted immediately after being stopped.

8.3.2. Error message "Port is not available" is shown

This occurs when multiple AP+DN7s are started with the same port number. Click OK on the "This port number is already used" screen and the newly launched black screen will disappear.

Common cases

- If AP+DN7 is started again even though it has already been started
  - ➢ You can continue to use the previously launched AP+DN7.
- If you want to launch multiple AP+DN7s on the same PC
  - ➢ Port number needs to be changed. Please refer to section 4.3 to change the settings.