Template for Application Repositories

Manual

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Chapter 1

General Documentation

This section contains the core documentation for setting up and starting with IO-TEMPLATE-APP. It covers everything from installation to basic and advanced configurations.

1.1 Introduction

TODO

1.2 Requirements

The required software is listed below. Regarding the corresponding software versions, you will find the detailed information in the Release Notes.

1.2.1 Operating System

The supported operating system is Ubuntu with the Bash shell.

1.2.2 Python

This project utilizes Python from version 3.10, which introduced significant enhancements in type hinting and type annotations. These improvements provide a more robust and clear definition of function parameters, return types, and variable types, contributing to improved code readability and maintainability. The use of Python 3.13 ensures compatibility with these advanced typing features, offering a more structured and error-resistant development environment.

1.2.3 Docker Desktop

The project employs PostgreSQL for data storage and leverages Docker images provided by PostgreSQL to simplify the installation process. Docker Desktop is used for its ease of managing and running containerized applications, allowing for a consistent and isolated environment for PostgreSQL. This approach streamlines the setup, ensuring that the database environment is quickly replicable and maintainable across different development setups.

1.2.4 Miniconda

Some of the Python libraries required by the project are exclusively available through Conda. To maintain a minimal installation footprint, it is recommended to install Miniconda, a smaller, more lightweight version of Anaconda that includes only Conda, its dependencies, and Python.

By using Miniconda, users can access the extensive repositories of Conda packages while keeping their environment lean and manageable. To install Miniconda, follow the instructions provided in the `scripts` directory of the project, where the operating system-specific installation script named

`run_install_miniconda` is available for Ubuntu (Bash shell).

Utilizing Miniconda ensures that you have the necessary Conda environment with the minimal set of dependencies required to run and develop the project efficiently.

1.2.5 DBeaver Community - optional

DBeaver is recommended as the user interface for interacting with the PostgreSQL database due to its comprehensive and user-friendly features. It provides a flexible and intuitive platform for database management, supporting a wide range of database functionalities including SQL scripting, data visualization, and import/export capabilities. Additionally, the project includes predefined connection configurations for DBeaver, facilitating a hassle-free and streamlined setup process for users.

1.3 Installation

1.3.1 Python

The project repository contains a `scripts` directory that includes operating system-specific installation scripts for Python, ensuring a smooth setup across various environments.

- **Ubuntu**: For users on Ubuntu, the `run_install_python.sh` script is provided. This Bash script is created to operate within the default shell environment of Ubuntu, facilitating the Python installation process.

1.3.2 AWS Command Line Interface

Within the project's `scripts` directory, you will find a set of scripts specifically designed for the installation of the AWS Command Line Interface (AWS CLI). These scripts facilitate the installation process on different operating systems, ensuring a consistent and reliable setup.

- **Ubuntu**: Ubuntu users should utilize the `run_install_aws_cli.sh` script. This script is a Bash script that simplifies the AWS CLI installation on Ubuntu systems by setting up the necessary repositories and installing the CLI via apt-get.

1.3.3 Miniconda

The `scripts` directory includes a collection of operating system-specific scripts named `run_install_miniconda` to streamline the installation of Miniconda. These scripts are designed to cater to the needs of different environments, making the setup process efficient and user-friendly.

- **Ubuntu Bash Shell**: Ubuntu users can take advantage of the `run_install_miniconda.sh` script. This Bash script is intended for use within the Ubuntu terminal, encapsulating the necessary commands to install Miniconda seamlessly on Ubuntu systems.

1.3.4 Docker Desktop

The `scripts` directory contains scripts that assist with installing Docker Desktop on macOS and Ubuntu, facilitating an automated and streamlined setup.

- **Ubuntu**: The `run_install_docker.sh` script is available for Ubuntu users. This Bash script sets up Docker Desktop on Ubuntu systems by configuring the necessary repositories and managing the installation steps through the system's package manager.

1.3.5 DBeaver - optional

DBeaver is an optional but highly recommended tool for this software as it offers a user-friendly interface to gain insights into the database internals. The project provides convenient scripts for installing

DBeaver on macOS and Ubuntu.

- **Ubuntu**: For Ubuntu users, the `run_install_dbeaver.sh` script facilitates the installation of DBeaver. This Bash script automates the setup process, adding necessary repositories and handling the installation seamlessly.

1.3.6 Python Libraries

The project's Python dependencies are managed partly through Conda and partly through pip. To facilitate a straightforward installation process, a Makefile is provided at the root of the project.

- **Development Environment**: Run the command `make conda-dev` from the terminal to set up a development environment. This will install the necessary Python libraries using Conda and pip as specified for development purposes.
- **Production Environment**: Execute the command `make conda-prod` for preparing a production environment. It ensures that all the required dependencies are installed following the configurations optimized for production deployment.

The Makefile targets abstract away the complexity of managing multiple package managers and streamline the environment setup. It is crucial to have both Conda and the appropriate pip tool available in your system's PATH to utilize the Makefile commands successfully.

1.4 Configuration IO-TEMPLATE-APP

1.4.1 .act_secrets

This file controls the secrets of the `make action` functionality. This file is not included in the repository. The file `.act_secrets_template` can be used as a template.

The customisable entries are:

Parameter	Description
GLOBAL_USER_EMAIL	The global email address for GitHub

Examples:

```
GLOBAL_USER_EMAIL=a@b.com
```

1.4.2 .settings.io_aero.toml

This file controls the secrets of the application. This file is not included in the repository. The file `.settings.io_aero_template.toml` can be used as a template.

The customisable entries are:

Parameter	Description
postgres_password	Password of the database user
postgres_password_admin	Password of the database administrator

The secrets can be set differently for the individual environments (`default` and `test`).

Examples:

```
[default]
postgres_password = "..."
postgres_password_admin = "..."

[test]
```

```
postgres_password = "postgres_password"
postgres_password_admin = "postgres_password_admin"
```

1.4.3 settings.io_aero.toml

This file controls the behaviour of the application.

The customisable entries are:

Parameter	Description
check_-value	`default` for productive operation, `test` for test operation
is_verbose	Display progress messages for processing

The configuration parameters can be set differently for the individual environments (`default` and `test`).

Examples:

```
[default]
check_value = "default"
is_verbose = true

[test]
check_value = "test"
```

1.5 Configuration Logging

In **IO-TEMPLATE-APP** the Python standard module for logging is used - details can be found here.

The file `logging_cfg.yaml` controls the logging behaviour of the application.

Default content:

```
version: 1

disable_existing_loggers: False

formatters:
  simple:
    format: "%(asctime)s [%(name)s] [%(module)s.py  ] %(levelname)-5s
 %(funcName)s:%(lineno)d %(message)s"
  extended:
    format: "%(asctime)s [%(name)s] [%(module)s.py  ] %(levelname)-5s
 %(funcName)s:%(lineno)d \n%(message)s"

handlers:
  console:
    class: logging.StreamHandler
    level: INFO
    formatter: simple
  file_handler:
    class: logging.FileHandler
    level: INFO
    filename: logging_io_aero.log
    formatter: extended

root:
  level: DEBUG
  handlers: [ console, file_handler ]
```

1.6 First Steps

To get started, you'll first need to clone the repository, which contains essential scripts for various operating systems. After cloning, you will use these scripts to install the necessary foundational software. Finally, you will complete the repository-specific installation to set up your environment correctly. Detailed instructions for each of these steps are provided below.

1.6.1 Cloning the Repository

Start by cloning the *io-template-app* repository. This repository contains essential scripts and configurations needed for the project.

```
git clone https://github.com/io-aero/io-template-app
```

1.6.2 Install Foundational Software

Once you have successfully cloned the repository, navigate to the cloned directory.

To set up the project on an Ubuntu system, the following steps should be performed in a terminal window within the repository directory:

a. Grant Execute Permission to Installation Scripts

Provide execute permissions to the installation scripts:

```
chmod +x scripts/*.sh
```

b. Install Python and pip

Run the script to install Python and pip:

```
./scripts/run_install_python.sh
```

c. Install AWS Command Line Interface

Execute the script to install the AWS CLI:

```
./scripts/run_install_aws_cli.sh
```

d. Install Miniconda and the Correct Python Version

Use the following script to install Miniconda and set the right Python version:

```
./scripts/run_install_miniconda.sh
```

e. Install Docker Desktop

This step is not required for WSL (Windows Subsystem for Linux) if Decker Desktop is installed in Windows and this is configured for WSL 2 based engine.

To install Docker Desktop, run:

```
./scripts/run_install_docker.sh
```

f. Install Terraform

To install Docker Desktop, run:

```
./scripts/run_install_terraform.sh
```

g. Optionally Install DBeaver

If needed, install DBeaver using the following script:

```
./scripts/run_install_dbeaver.sh
```

h. Close the Terminal Window

Once all installations are complete, close the terminal window.

1.6.3 Repository-Specific Installation

After installing the basic software, you need to perform installation steps specific to the *io-template-app* repository. This involves setting up project-specific dependencies and environment configurations. To perform the repository-specific installation, the following steps should be performed in a command prompt or a terminal window (depending on the operating system) the repository directory.

To begin, you'll need to set up the Python environment using Miniconda, which is already pre-installed. You can use the provided Makefile for managing the environment.

a. For production use, run the following command:

```
make conda-prod
```

b. For software development, use the following command:

```
make conda-dev
```

These commands will create and configure a virtual environment for your Python project, ensuring a clean and reproducible development or production environment. The virtual environment is automatically activated by the Makefile, so you don't need to activate it manually.

Minor Adjustments for GDAL

The installation of the GDAL library requires the following minor operating system-specific adjustments:

In Ubuntu, the GDAL library must be installed as follows:

```
sudo apt-get install gdal-bin libgdal-dev
```

System Testing with Unit Tests

If you have previously executed *make conda-dev*, you can now perform a system test to verify the installation using *make test*. Follow these steps:

a. Run the System Test:

Execute the system test using the following command:

```
make tests
```

This command will initiate the system tests using the previously installed components to verify the correctness of your installation.

b. Review the Test Results:

After the tests are completed, review the test results in the terminal. Ensure that all tests pass without errors.

If any tests fail, review the error messages to identify and resolve any issues with your installation.

Running system tests using *make tests* is a valuable step to ensure that your installation is working correctly, and your environment is properly configured for your project. It helps identify and address any potential problems early in the development process.

Downloading Database Files (Optional)

Database files can be downloaded from the IO-Aero Google Drive directory *io_aero_data/TO DO /database/TO DO* to your local repository directory *data*. Before extracting, if a *postgres* directory exists within the *data* directory, it should be deleted.

Follow these steps to manage the database files:

a. Access the IO-Aero Google Drive Directory:

Navigate to the IO-Aero Google Drive and locate the directory *io_aero_data/TO DO/database/TO DO*.

b. Download Database Files:

Download the necessary database files from the specified directory to your local repository directory *data*.

c. Delete Existing *postgres* Directory (if present):

If a directory named *postgres* already exists within the *data* directory, you should delete it to avoid conflicts.

d. Extract Database Files:

The downloaded database files are in an archive format (ZIP) and should be extracted in the *data* directory. After completing these steps, the database files should reside in the *data* directory of your local repository and will be ready for use.

Creating the Docker Container with PostgreSQL DB

To create the Docker container with PostgreSQL database software, you can use the provided *run_io_template_app* script. Depending on your operating system, follow the relevant instructions below:

```
./scripts/run_io_template_app.sh s_d_c
```

This command will initiate the process of creating the Docker container with PostgreSQL database software.

1.7 Advanced Usage

TODO

Chapter 2

API Documentation

Here, you will find detailed API documentation, which includes information about all modules within the IO-TEMPLATE-APP, allowing developers to understand the functionalities available.

2.1 iotemplateapp

2.1.1 iotemplateapp package

Submodules

iotemplateapp.glob_local module

iotemplateapp.templateapp module

Module contents

Chapter 3

About

This section provides additional context and legal information about IO-TEMPLATE-APP, including release notes and licensing details.

3.1 Release Notes

3.1.1 Version 2.0.0

Release Date: dd.mm.2024

New Features

- TODO

Modified Features

- TODO

Deleted Features

- TODO

Applied Software

Software	Version	Remark	Status
DBeaver - optional	24.2.3		
Docker	27.3.1		
Miniconda	24.9.2		
Python	3.13.0		

3.2 End-User License Agreement

3.2.1 End-User License Agreement (EULA) of IO-Aero Software

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4.1 Repository

Link to the repository for accessing the source code and contributing to the project:
IO-TEMPLATE-APP GitHub Repository

4.2 Version

This documentation is for IO-TEMPLATE-APP version unknown.