



MSA SDK - FastAPI based Microservice Architecture Development Kit

To build PoC's, MVP's, API's with CRUD and Dashboards fast and consistent.

Build on top of FastAPI, SQLAlchemy, Amis and many other bullet proofed libraries.

Features

- **Build connected distributed applications faster:** Ready for [Dapr](#)..
- **Consistency:** With sometimes 10s or 100s of Micro Services, the SDK helps to easy version control and provides a stable Dapr Basis.
- **High performance:** Based on [FastAPI](#). Enjoy all the benefits.
- **High efficiency:** Perfect code type hints. Higher code reusability.
- **Support asynchronous and synchronous hybrid writing:** `ORM` is based on `SQLModel` & `Sqlalchemy` . Freely customize database type. Asynchronous mode. Strong scalability.
- **Front-end separation:** The front-end is rendered by `Amis` , the back-end interface is automatically generated by `MSA SDK - Admin` . The interface is reusable.
- **Strong scalability:** The background page supports `Amis` pages and ordinary `html` pages. Easily customize the interface freely.
- **Automatic api documentation:** Automatically generate Interface documentation by `FastAPI` . Easily debug and share interfaces.

Dependencies

- [FastAPI](#)
- [SQLModel](#) combined with [SQLAlchemy](#) and [Pydantic](#), with all their features .
- [Amis](#): Vue Frontend

Usage example is in the app module `__init__.py`

```
# -*- encoding: utf-8 -*-
"""
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"""
__version__ = "0.0.1"

from typing import Optional
from sqlmodel import SQLModel
from msaSDK.admin.utils.fields import Field
from msaSDK.models.service import get_msa_app_settings
from msaSDK.service import MSAApp
from msaSDK.utils.scheduler import MSATimers, MSATimerEnum

# example async function to be executed by a timer
async def test_timer_min():
    app.logger.info("MSA SDK Test Timer Async Every Minute")

# example sync/blocking function to be executed by a timer
def test_timer_five_sec():
    app.logger.info("MSA SDK Test Timer Sync 5 Second")

# SQLModel class to be used for auto API CRUD and/or Admin Site Web UI
class TestArticle(SQLModel, table=True):
    id: Optional[int] = Field(default=None, primary_key=True, nullable=False)
    title: str = Field(title='ArticleTitle', max_length=200)
    description: Optional[str] = Field(default='', title='ArticleDescription',
max_length=400)
    status: bool = Field(None, title='status')
    content: str = Field(title='ArticleContent')

# SQLModel class to be used for auto API CRUD and/or Admin Site Web UI
class TestCategory(SQLModel, table=True):
    id: Optional[int] = Field(default=None, primary_key=True, nullable=False)
    title: str = Field(title='ArticleTitle', max_length=200)
    description: Optional[str] = Field(default='', title='ArticleDescription',
max_length=400)
    status: bool = Field(None, title='status')
    content: str = Field(title='ArticleContent')

# get the MSA app setting, clear the cache, set some settings
get_msa_app_settings.cache_clear()
```

```

settings = get_msa_app_settings()
settings.title = "SPK.ai - MSA/SDK MVP"
settings.version = "SPK.0.0.1"
settings.debug = True

# Create some timers with a MSATimer instance, define the interval and set the handler
my_timers: MSATimers = MSATimers()
my_timers.create_timer(MSATimerEnum.every_minute, test_timer_min)
my_timers.create_timer(MSATimerEnum.on_the_5_second, test_timer_five_sec)

# Create the main app instance, like the FastAPI but provide a Setting Definition
Instance
# Optional the Classes of your SQLModels
# Define if the optional Admin Site gets mounted automatically, if False you need to
Mount in your own Startup MSAUIEvent Handler
# Optional the MSATimers instance
app = MSAApp(settings=settings, timers=my_timers, auto_mount_site=True,
             sql_models=[TestArticle, TestCategory],
             contact={"name": "MSA SDK", "url": "http://u2d.ai", "email":
"stefan@u2d.ai"},
             license_info={"name": "MIT", "url": "https://opensource.org/licenses/MIT",
})

# use the internal logger of app
app.logger.info("Initialized " + settings.title + " " + settings.version)

# Optional use startup event
# Mount the Admin Site here if enabled and the auto mount option was False
@app.on_event("startup")
async def startup():
    app.logger.info("MSA SDK Own Startup MSAUIEvent")
    # app.mount_site()

# Optional use shutdown event
@app.on_event("shutdown")
async def shutdown():
    app.logger.info("MSA SDK Own Shutdown MSAUIEvent")

```

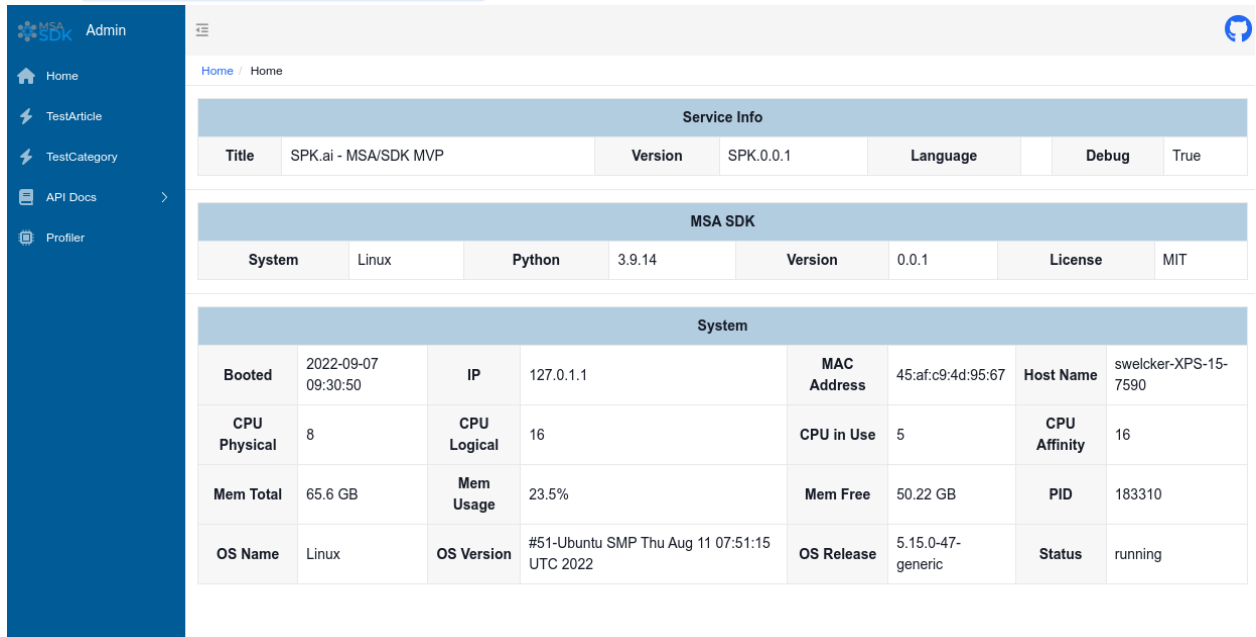
Typical Run Log

```
Run: /home/sweLcker/U2D_MSA_SDK/venv/bin/python /home/sweLcker/U2D_MSA_SDK/u2d_msa_sdk/run.py
2022-09-09 15:34:34.072 | INFO | __main__:<module>:10 - Starting MSA SDK Services...
2022-09-09 15:34:35.924 | INFO | u2d_msa_sdk.service:__init__:195 - Enable UVLoop
2022-09-09 15:34:35.924 | INFO | u2d_msa_sdk.service:__init__:203 - Add Handler ValidationError
2022-09-09 15:34:35.924 | INFO | u2d_msa_sdk.service:__init__:209 - Add Handler HTTPException
2022-09-09 15:34:35.924 | INFO | u2d_msa_sdk.service:__init__:216 - Add Middleware Starception
2022-09-09 15:34:35.925 | INFO | u2d_msa_sdk.service:__init__:227 - DB - Init: sqlite+aiosqlite:///msa_sdk.db?check_same_thread=True
2022-09-09 15:34:35.933 | INFO | u2d_msa_sdk.service:__init__:231 - DB - Register/CRUD SQL Models: [<class 'app.TestArticle'>, <class 'app.TestCategory'>]
2022-09-09 15:34:36.049 | INFO | u2d_msa_sdk.service:__init__:247 - Excluded GraphQL
2022-09-09 15:34:36.049 | INFO | u2d_msa_sdk.service:__init__:250 - Init Healthcheck
2022-09-09 15:34:36.049 | INFO | u2d_msa_sdk.service:__init__:256 - Start Healthcheck Thread
2022-09-09 15:34:36.051 | INFO | u2d_msa_sdk.service:__init__:265 - Include Sysrouter
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:271 - Add Middleware CORS
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:283 - Excluded Middleware HTTPSRedirect
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:289 - Excluded Middleware GZip
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:295 - Excluded Middleware Session
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:298 - Add Middleware CSRF
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:307 - Excluded Middleware MSGPack
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:316 - Excluded Middleware Context
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:325 - Excluded Middleware Profiler
2022-09-09 15:34:36.090 | INFO | u2d_msa_sdk.service:__init__:331 - Excluded Middleware Timing
2022-09-09 15:34:36.091 | INFO | u2d_msa_sdk.service:__init__:339 - Excluded Limiter Engine
2022-09-09 15:34:36.091 | INFO | u2d_msa_sdk.service:__init__:342 - Include Servicrouter
2022-09-09 15:34:36.115 | INFO | u2d_msa_sdk.service:__init__:357 - Mount MSAStatic
2022-09-09 15:34:36.115 | INFO | u2d_msa_sdk.service:__init__:366 - Excluded Pagination Engine
2022-09-09 15:34:36.115 | INFO | u2d_msa_sdk.service:__init__:369 - Init Jinja Template Engine
2022-09-09 15:34:36.115 | INFO | u2d_msa_sdk.service:__init__:375 - Add Pages Router
2022-09-09 15:34:36.116 | INFO | u2d_msa_sdk.service:__init__:386 - Prometheus Instrument and Expose App
2022-09-09 15:34:36.117 | INFO | u2d_msa_sdk.service:__init__:392 - Events - Add Internal Handlers
2022-09-09 15:34:36.117 | INFO | u2d_msa_sdk.service:__init__:397 - Add Scheduler Timers: 11
2022-09-09 15:34:36.117 | INFO | app:<module>:57 - Initialized SPK.ai - MSA/SDK MVP SPK.0.0.1
2022-09-09 15:34:36.117 | INFO | uvicorn.server:serve:75 - Started server process [150540]
2022-09-09 15:34:36.118 | INFO | uvicorn.lifespan.on:startup:45 - Waiting for application startup.
2022-09-09 15:34:36.118 | INFO | u2d_msa_sdk.service:startup_event:417 - MSA SDK Internal Startup Event
2022-09-09 15:34:36.120 | INFO | u2d_msa_sdk.service:startup_event:425 - DB - Create Meta All: sqlite+aiosqlite:///msa_sdk.db?check_same_thread=True
2022-09-09 15:34:36.124 | INFO | u2d_msa_sdk.service:startup_event:433 - Add Admin Site with Auth
2022-09-09 15:34:36.524 | INFO | u2d_msa_sdk.service:mount_site:456 - Mount Admin Site
2022-09-09 15:34:38.209 | INFO | u2d_msa_sdk.service:startup_event:451 - Scheduler - Start All Timers
2022-09-09 15:34:38.209 | INFO | app:startup:62 - MSA SDK Own Startup Event
2022-09-09 15:34:38.223 | INFO | uvicorn.lifespan.on:startup:59 - Application startup complete.
2022-09-09 15:34:38.224 | INFO | uvicorn.server:log_started_message:206 - Uvicorn running on http://127.0.0.1:8090 (Press CTRL+C to quit)
2022-09-09 15:34:40.533 | INFO | app:test_timer_five_sec:22 - MSA SDK Test Timer Sync 5 Second
2022-09-09 15:34:42.135 | INFO | uvicorn.server:shutdown:252 - Shutting down
2022-09-09 15:34:42.236 | INFO | uvicorn.lifespan.on:shutdown:64 - Waiting for application shutdown.
2022-09-09 15:34:42.236 | INFO | u2d_msa_sdk.service:shutdown_event:462 - MSA SDK Internal Shutdown Event
2022-09-09 15:34:42.236 | INFO | u2d_msa_sdk.service:shutdown_event:464 - Stop Scheduler Timers: 11
2022-09-09 15:34:43.238 | INFO | u2d_msa_sdk.service:shutdown_event:466 - Cancel Scheduler Timers: 11
2022-09-09 15:34:43.238 | INFO | u2d_msa_sdk.service:shutdown_event:475 - End Scheduler
2022-09-09 15:34:43.238 | INFO | u2d_msa_sdk.service:shutdown_event:480 - Stopping Site
2022-09-09 15:34:43.238 | INFO | u2d_msa_sdk.service:shutdown_event:484 - Stopping Healthcheck Thread
2022-09-09 15:34:43.239 | INFO | u2d_msa_sdk.service:shutdown_event:489 - DB - Dispose Connections: sqlite+aiosqlite:///msa_sdk.db?check_same_thread=True
2022-09-09 15:34:43.239 | INFO | app:shutdown:86 - MSA SDK Own Shutdown Event
2022-09-09 15:34:43.239 | INFO | uvicorn.lifespan.on:shutdown:75 - Application shutdown complete.
2022-09-09 15:34:43.240 | INFO | uvicorn.server:serve:85 - Finished server process [150540]
```

Interface Preview

Home Screen with System Info

- Open `http://127.0.0.1:8090/admin/` in your browser:



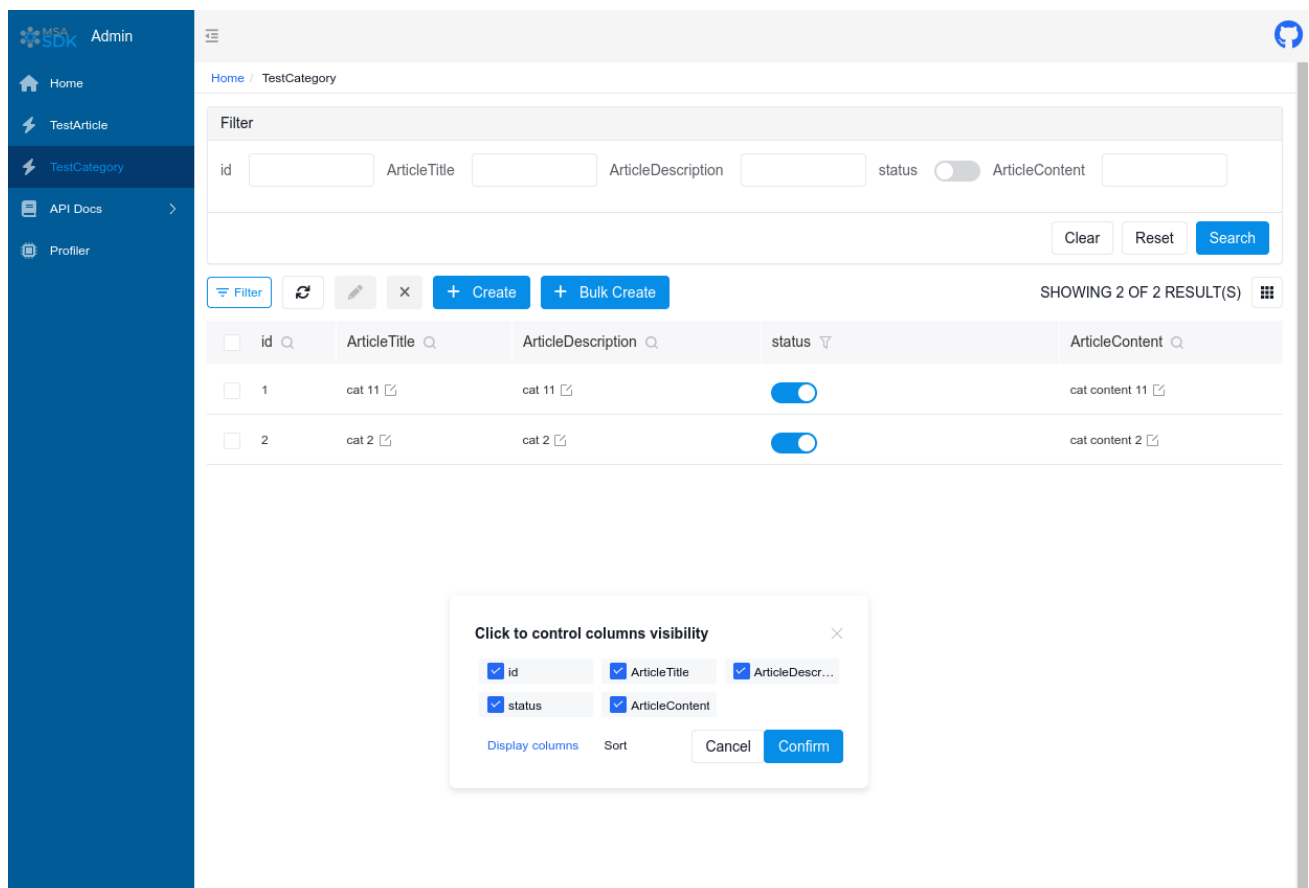
The screenshot shows the MSA SDK Admin interface. The left sidebar contains links to Home, TestArticle, TestCategory, API Docs, and Profiler. The main content area displays three tables:

Service Info					
Title	SPK.ai - MSA/SDK MVP	Version	SPK.0.0.1	Language	
				Debug	True

MSA SDK					
System	Linux	Python	3.9.14	Version	0.0.1
				License	MIT

System							
Booted	2022-09-07 09:30:50	IP	127.0.1.1	MAC Address	45:af:c9:4d:95:67	Host Name	swelcker-XPS-15-7590
CPU Physical	8	CPU Logical	16	CPU in Use	5	CPU Affinity	16
Mem Total	65.6 GB	Mem Usage	23.5%	Mem Free	50.22 GB	PID	183310
OS Name	Linux	OS Version	#51-Ubuntu SMP Thu Aug 11 07:51:15 UTC 2022	OS Release	5.15.0-47-generic	Status	running

CRUD of SQLModels Screen



The screenshot shows the MSA SDK Admin interface for the CRUD of SQLModels screen. The left sidebar contains links to Home, TestArticle, TestCategory, API Docs, and Profiler. The main content area displays a table with columns: id, ArticleTitle, ArticleDescription, status, and ArticleContent. The table shows two rows of data. A modal dialog is open, titled "Click to control columns visibility", with checkboxes for id, ArticleTitle, ArticleDescription, status, and ArticleContent. The "status" checkbox is checked. The modal also has a "Display columns" button, a "Sort" button, and "Cancel" and "Confirm" buttons.

id	ArticleTitle	ArticleDescription	status	ArticleContent
1	cat 11	cat 11	<input checked="" type="checkbox"/>	cat content 11
2	cat 2	cat 2	<input checked="" type="checkbox"/>	cat content 2

Login Screen

- Open `http://127.0.0.1:8090/admin/auth/form/login` in your browser:

User Login



Login

MSA SDK Admin - Login

* Password

* Username

Sign up

Sign in

-

OpenAPI Interactive Documentation (Swagger) Screen

- Open `http://127.0.0.1:8090/#/admin/docs` in your browser:

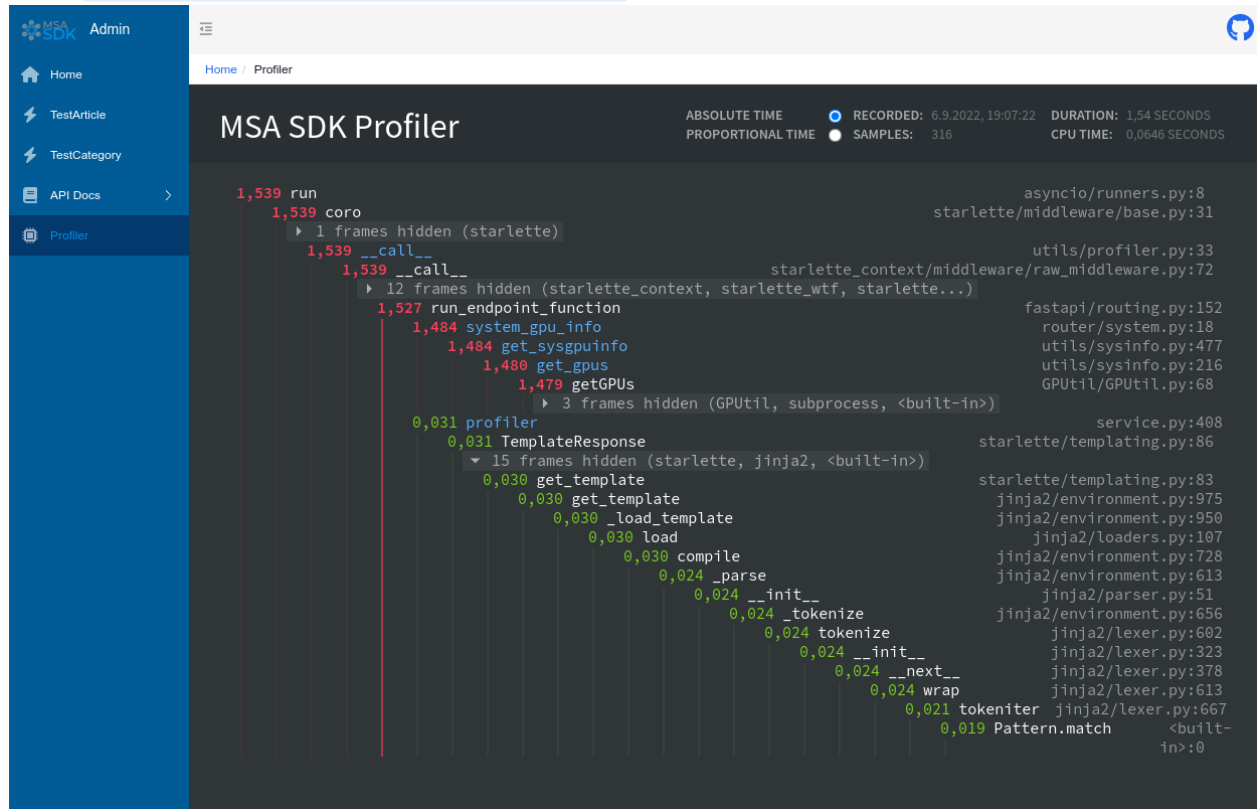
The screenshot displays the MSA SDK Admin interface. On the left is a dark blue sidebar with the 'Admin' header and a menu containing: Home, TestArticle, TestCategory, API Docs (expanded), OpenAPI (selected), Redocs, and Profiler. The main content area is titled 'OpenAPI' and shows a list of endpoints grouped by category. Each endpoint is represented by a colored bar indicating the HTTP method, the path, and a brief description. Expandable arrows are on the right of each bar.

Category	Method	Path	Description
testcategory	POST	/testcategory/list	List
	GET	/testcategory/item/{item_id}	Read
	PUT	/testcategory/item/{item_id}	Update
	DELETE	/testcategory/item/{item_id}	Delete
	POST	/testcategory/item	Create
service	GET	/healthcheck	Get Healthcheck
	GET	/scheduler	Get Scheduler Status
	GET	/status	Get Services Status
	GET	/definition	Get Services Definition
	GET	/settings	Get Services Settings
	GET	/metrics	Metrics
system	GET	/sysinfo	System Info
	GET	/sysgpuinfo	System Gpu Info
	GET	/syserror	System Test Error
openapi	GET	/schema	Get Services Openapi Schema
	GET	/info	Get Services Openapi Info
pages	GET	/profiler	Profiler

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Profiler Screen

- Open `http://127.0.0.1:8090/#/admin/profiler` in your browser:



License Agreement

- `MSA SDK` Based on `MIT` open source and free to use, it is free for commercial use, but please clearly show the copyright information about MSA SDK - Auth Admin in the display interface.

How to create the documentation

We use mkdocs and mkdocsstring. The code reference and nav entry get's created virtually by the triggered python script `/docs/gen_ref_pages.py` while `mkdocs serve` or `mkdocs build` is executed.

Requirements Install for the PDF creation option:

PDF Export is using mainly weasyprint, if you get some errors here pls. check there documentation. Installation is part of the MSA SDK, so this should be fine.

We can now test and view our documentation using:

```
mkdocs serve
```

Build static Site:


```
mkdocs build
```