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, SQLModel, 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

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

from typing import Optional
from sqlmodel import SQLModel
from u2d_msa_sdk.admin.utils.fields import Field
from u2d_msa_sdk.models.service import get_msa_app_settings
from u2d_msa_sdk.service import MSAApp
from u2d_msa_sdk.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
```

```python
# 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")
```
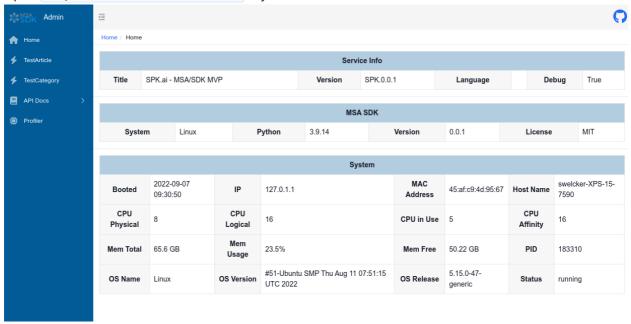
Typical Run Log

```
Run:  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 Servicerouter
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]
```
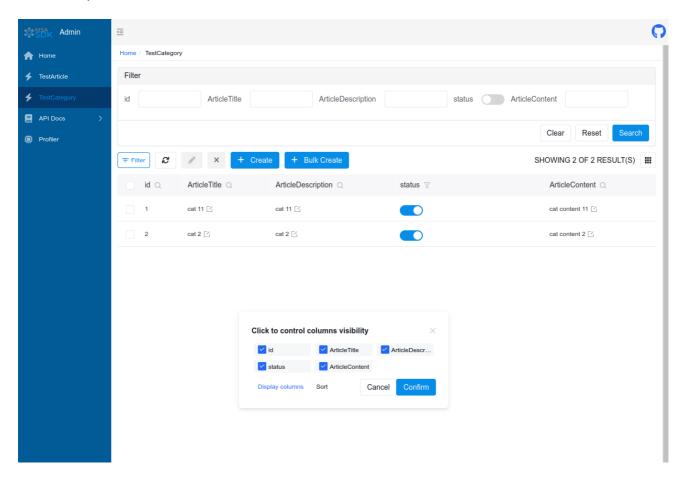
Interface Preview

Home Screen with System Info

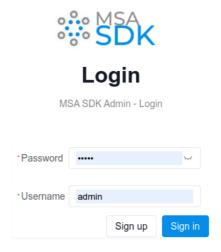- Open `http://127.0.0.1:8090/admin/` in your browser:
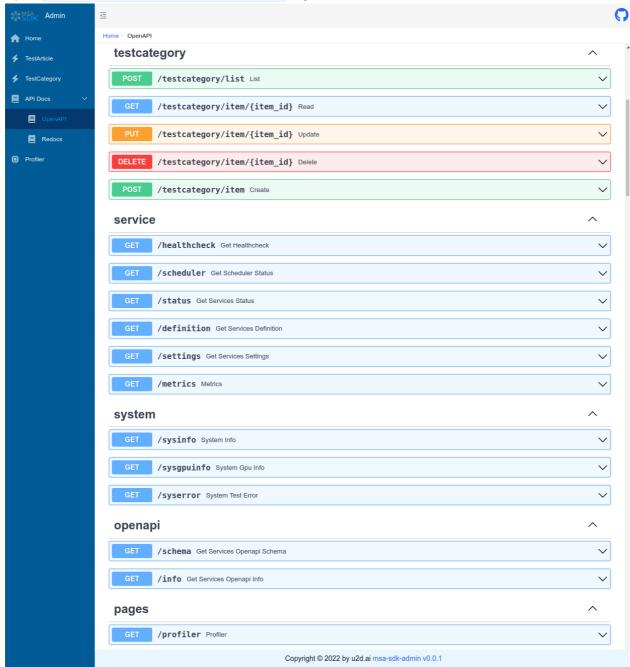

CRUD of SQLModels Screen

Login Screen

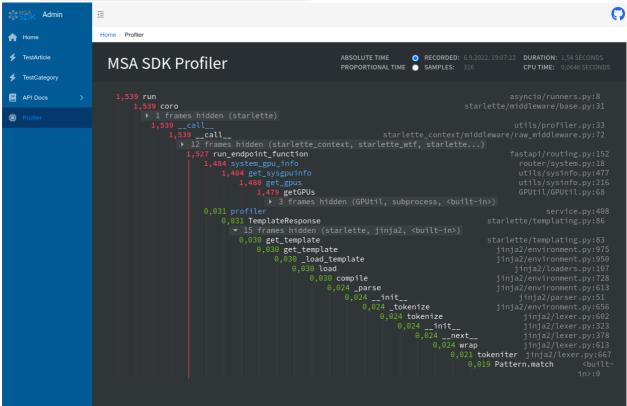- Open `http://127.0.0.1:8090/admin/auth/form/login` in your browser:

  User Login

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OpenAPI Interactive Documentation (Swagger) Screen

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

  User Login

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

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 `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
```