Speakers

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Today session

How do you extend the API & UI in Airflow 3. (with code samples)

Deep dive into a more complex use case, the edge provider

Discussion / Q&A

Why new plugins?

We rebuilt entirely the API and UI.

In 3.1 we wanted to leverage React and FastAPI to bring new functionality

Legacy plugins are still supported

Ways to plug into Airflow in 3.1 (API)

- FastAPI Subapps
- Middlewares

Both mounted on the api server root application.

Ways to plug into Airflow in 3.1 (UI)

Different ways and destinations are supported:

- External links (Nav bar only)
- Embedded iframes (Nav bar and Details tab)
- React Apps (Nav bar, Details Tab, Dashboard page)

Demo

3.0

AIRFLOW SUMMIT

FastAPI Sub Application

```python
from fastapi import FastAPI, Request

analytics_app = FastAPI()


@analytics_app.get("/hello")
async def root():
    return {"message": "Hello World from FastAPI plugin"}
```

```python
class AirflowTestPlugin(AirflowPlugin):
    """A simple Airflow plugin."""

    # A list of dicts contanning a FastAPI created from fastapi.FastAPI and some metadata.
    # See example below.
    fastapi_apps = [
        {
            "app": analytics_app,
            "url_prefix": "/analytics-plugin",
            "name": "Analytics SubApp",
            "extra": "something",
        },
    ]
```

Welcome to Your New React App!

This project was bootstrapped with the Airflow React Plugin tool.

Toggle Theme

Welcome

Stats

❌ 0 Failed Dags ›   📄 5 Dag Import Errors ›   ⚡ 0 Running Dags ›   ⚡ 2 Active Dags ›

⭐ First 10 favorite Dags

No favorites yet. Click the star icon next to a Dag in the list to add it to your favorites.

Health
✓ MetaDatabase   ✓ Scheduler   ✓ Triggerer   ✓ Dag Processor

⬦ Pool Slots
Manage Pools

✓ 128

History

📅 Last 24 Hours ⌄   2025-10-01 15:18:23 - 2025-10-02 15:18:23

📊 1 Dag Run	
▣ 0 Queued	0.00%
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📄 0 Asset Events	Newest First ⌄
No Asset Events found.	

📄 1 Task Instance	
✓ 1 Success	100.00%

FastAPI Root Middlewares

```python
class InjectIndexAlertMiddleware(BaseHTTPMiddleware):
    """Middleware to inject a script into the index page."""

    async def dispatch(self, request: Request, call_next):
        response = await call_next(request)

        print(request.url.path)

        if "text/html" in response.headers.get("content-type", []):
            if request.url.path == "/":
                response = StreamingResponse(inject_script(response.body_iterator), media_type="text/html")
        return response
```

```python
class AirflowTestPlugin(AirflowPlugin):
    """A simple Airflow plugin."""

    # A list of dictionaries contanning FastAPI middleware factory object and some metadata.
    # See example below.
    fastapi_root_middlewares = [
        {
            "middleware": InjectIndexAlertMiddleware,
            "args": [],
            "kwargs": {},
            "name": "Inject Alert Middleware",
        }
    ]
```

Search Dags

Advanced Search   ⌘+K

All   Failed   Queued   Running   Success   Required Actions

All ⌄   Filter by tag ⌄   All ⌄

109 Dags   5

Sort by Display Name (A-Z) ⌄

48670_bug

Schedule	Latest Run	Next Run
📅 0 0 * * *	2025-10-01 17:00:00 ✓	2025-10-02 17:00:00

49316_bug

Schedule	Latest Run	Next Run

49316_bug_af2

Schedule	Latest Run	Next Run

49316_bug_alias

Schedule	Latest Run	Next Run

49316_bug_alias_af2

Schedule	Latest Run	Next Run

53817_bug

Schedule	Latest Run	Next Run
🗄 0 of 2 assets updated		

53998_bug

UI Plugins

Iframe

```python
# Creating an external view that will be rendered in the Airflow UI.
external_view_with_metadata = {
    # Name of the external view, this will be displayed in the UI.
    "name": "Name of the External View",
    # Source URL of the external view. This URL can be templated using context variables, depending on the
location where the external view is rendered
    # the context variables available will be different, i.e a subset of (DAG_ID, RUN_ID, TASK_ID, MAP_INDEX).
    "href": "https://example.com/{DAG_ID}/{RUN_ID}/{TASK_ID}/{MAP_INDEX}",
    # Destination of the external view. This is used to determine where the view will be loaded in the UI.
    # Supported locations are Literal["nav", "dag", "dag_run", "task", "task_instance"], default to "nav".
    "destination": "dag_run",
    # Optional icon, url to an svg file.
    "icon": "https://example.com/icon.svg",
    # Optional dark icon for the dark theme, url to an svg file. If not provided, "icon" will be used for both
light and dark themes.
    "icon_dark_mode": "https://example.com/dark_icon.svg",
    # Optional parameters, relative URL location for the External View rendering. If not provided, external view
will be rendeded as an external link. If provided
    # will be rendered inside an Iframe in the UI. Should not contain a leading slash.
    "url_route": "my_external_view",
    # Optional category, only relevant for destination "nav". This is used to group the external links in the
navigation bar.  We will match the existing
    # menus of ["browse", "docs", "admin", "user"] and if there's no match then create a new menu.
    "category": "browse",
}
```

```python
class AirflowTestPlugin(AirflowPlugin):
    """A simple Airflow plugin."""

    external_views = [external_view_with_metadata]
```

Welcome to Your New React App!

This project was bootstrapped with the Airflow React Plugin tool.

[Toggle Theme]

Welcome

Stats

| ✕ 1 | Failed Dags › | 📄 5 | Dag Import Errors › | 〰 0 | Running Dags › | ⚡ 2 | Active Dags › |

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⊕ Health

✓ MetaDatabase   ✓ Scheduler   ✓ Triggerer   ✕ Dag Processor

⊕ Pool Slots

Manage Pools

✓ 128

History

📅 Last 24 Hours ⌄   2025-09-29 10:20:37 - 2025-09-30 10:20:37

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📄 0 Asset Events

Newest First ⌄

No Asset Events found.

📄 1 Task Instance

| ✕ 1 Failed | 100.00% |

Home
Dags
Assets
Browse
Admin
Security
Plugins
Docs
User

External Links

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This project was bootstrapped with the Airflow React Plugin tool.

Toggle Theme

Welcome

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Manage Pools

✓ 128

⊞ History

📅 Last 24 Hours ⌄ | 2025-09-29 10:25:00 - 2025-09-30 10:25:00

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🗐 0 Asset Events

Newest First ⌄

No Asset Events found.

📄 1 Task Instance

| ❌ 1 Failed | 100.00% |

Home

Dags

Assets

Browse

Admin

Security

Plugins

Docs

User

NavBar Categories

- Create a new menu on navbar
- Add to existing menu

Welcome to Your New React App!

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Toggle Theme

Welcome

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🕮 History

📅 Last 24 Hours ⌄   2025-09-29 10:27:26 - 2025-09-30 10:27:26

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🗎 0 Asset Events	Newest First ⌄
No Asset Events found.	

🗎 1 Task Instance	
✕ 1 Failed	100.00%

React Apps
(experimental)

```python
# Note: The React app integration is experimental and interfaces might change in future versions.
react_app_with_metadata = {
    # Name of the React app, this will be displayed in the UI.
    "name": "Name of the React App",
    # Bundle URL of the React app. This is the URL where the React app is served from. It can be a static file
    # or a CDN. This URL can be templated using context variables, depending on the location where the external
    # view is rendered, the context variables available will be different,
    # i.e a subset of (DAG_ID, RUN_ID, TASK_ID, MAP_INDEX).
    "bundle_url": "https://example.com/static/js/my_react_app.js",
    # Destination of the react app. This is used to determine where the app will be loaded in the UI.
    # Supported locations are Literal["nav", "dag", "dag_run", "task", "task_instance"], default to "nav".
    # it can also be put inside of an existing page, the supported views are ["dashboard", "dag_overview",
    # "task_overview"]. You can position
    # element in the existing page via the css `order` rule which will determine the flex order.
    "destination": "dag_run",
    # Optional icon, url to an svg file.
    "icon": "https://example.com/icon.svg",
    # Optional dark icon for the dark theme, url to an svg file. If not provided, "icon" will be used for both
    # light and dark themes.
    "icon_dark_mode": "https://example.com/dark_icon.svg",
    # URL route for the React app, relative to the Airflow UI base URL. Should not contain a leading slash.
    "url_route": "my_react_app",
    # Optional category, only relevant for destination "nav". This is used to group the react apps in the
    # navigation bar. We will match the existing
    # menus of ["browse", "docs", "admin", "user"] and if there's no match then create a new menu.
    "category": "browse",
}
```

```python
class AirflowTestPlugin(AirflowPlugin):
    """A simple Airflow plugin."""

    react_apps = [react_app_with_metadata]
```

Welcome to Your New React App!

This project was bootstrapped with the Airflow React Plugin tool.

Toggle Theme

Welcome

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📄 1 Task Instance

✕ 1 Failed	100.00%

🗄 0 Asset Events

Newest First ▾

No Asset Events found.

Sidebar

Home
Dags
Assets
Browse
Admin
Security
Plugins
Docs
User

Destinations

- Add a NavBar item
- Add to Dashboard (React)
- Add a new Dag/Dag Run/Task/Task Instance tab (React & Iframe)

Welcome to Your New React App!

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Toggle Theme

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⊕ Pool Slots

Manage Pools

✓ 128

History

📅 Last 24 Hours ▾   2025-09-29 10:28:57 - 2025-09-30 10:28:57

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✕ 1 Failed	100.00%

▣ 0 Asset Events

Newest First ▾

No Asset Events found.

🗋 1 Task Instance

✕ 1 Failed	100.00%

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Welcome

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Health

✓ MetaDatabase ✓ Scheduler ✓ Triggerer ✓ Dag Processor

Pool Slots

Manage Pools

✓ 128

History

Last 24 Hours ▾   2025-09-29 10:28:57 - 2025-09-30 10:28:57

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✕ 1 Failed	100.00%

🗋 1 Asset Events

Newest First ▾

No Asset Events found.

🗋 1 Task Instance

| ✕ 1 Failed | 100.00% |

Edge Executor UI Plugin Example

3.1

Edge Executor UI

What we did
to make it happen

Checklist (reference PR #53563)

- Bootstrap Plugin via
  `dev/react-plugin-tools/bootstrap.py`

- Add Plugin With

  - Register `react_apps` + `fastapi_apps`

  - FastAPI Mounting `dist` files

  - Add content-type for `cjs` files!

  - Add needed API routes + authentication

  - Generate API stub code via axios

- Develop your pages
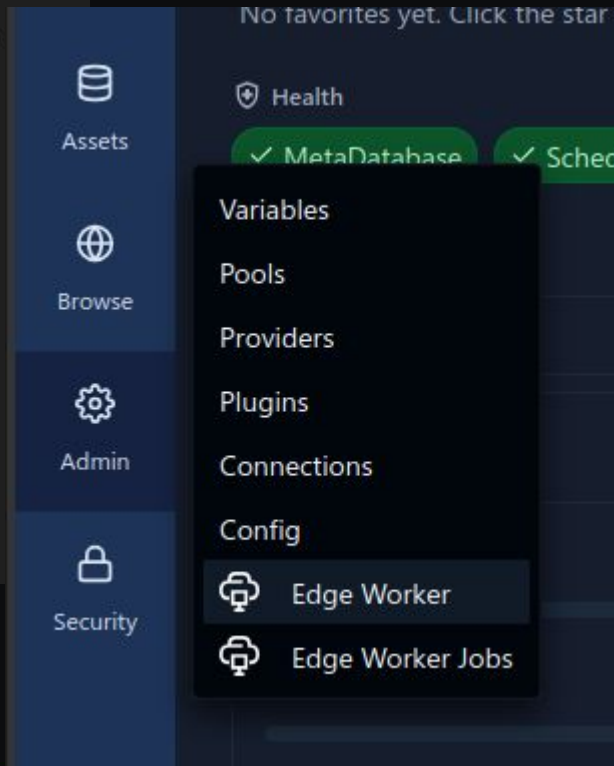
Bootstrap Plugin via `dev/react-plugin-tools/bootstrap.py`

```
(airflow) jscheffl@hp860g9:~/Workspace/airflow$ cd dev/react-plugin-tools/
(airflow) jscheffl@hp860g9:~/Workspace/airflow/dev/react-plugin-tools$ python bootstrap.py edge-plugin --dir providers/edge3/src/airflow/providers/edge3/plugins/www
Creating React plugin project: edge-plugin
Target directory: /home/jscheffl/Workspace/airflow/dev/react-plugin-tools/providers/edge3/src/airflow/providers/edge3/plugins/www4
Template directory: /home/jscheffl/Workspace/airflow/dev/react-plugin-tools/react_plugin_template
Copying template files...
  Created: .gitignore
  Created: .prettierignore
  Created: .prettierrc
  Created: eslint.config.js
  Created: index.html
  Created: testsSetup.ts
  Created: tsconfig.app.json
  Created: tsconfig.json
  Created: tsconfig.lib.json
  Created: tsconfig.node.json
  Created: README.md
  Created: package.json
  Created: pnpm-lock.yaml
  Created: vite.config.ts
  Created: src/dev.tsx
  Created: src/main.tsx
  Created: src/vite-env.d.ts
  Created: src/theme.ts
  Created: src/pages/HomePage.tsx
  Created: src/context/colorMode/index.ts
  Created: src/context/colorMode/useColorMode.tsx
  Created: src/context/colorMode/ColorModeProvider.tsx

✅ Successfully created edge-plugin!

Next steps:
  cd providers/edge3/src/airflow/providers/edge3/plugins/www4
  pnpm install
  pnpm dev

Happy coding! 🚀
```

Register react_apps + fastapi_apps

```python
class EdgeExecutorPlugin(AirflowPlugin):
    """EdgeExecutor Plugin - provides API endpoints for Edge Workers in Webserver.

    name = "edge_executor"
    if EDGE_EXECUTOR_ACTIVE and RUNNING_ON_APISERVER:
        if AIRFLOW_V_3_1_PLUS:
            fastapi_apps = [_get_api_endpoint()]
            react_apps = [
                {
                    "name": "Edge Worker",
                    "bundle_url": "/edge_worker/static/main.umd.cjs",
                    "destination": "nav",
                    "url_route": "edge_worker",
                    "category": "admin",
                    "icon": "/edge_worker/res/cloud-computer.svg",
                    "icon_dark_mode": "/edge_worker/res/cloud-computer-dark.svg",
                }
```

No favorites yet. Click the star

Assets

Browse

Admin

Security

Health

✓ MetaDatabase   ✓ Sched

Variables

Pools

Providers

Plugins

Connections

Config

Edge Worker

Edge Worker Jobs

FastAPI Routes & Content Type

```python
ui_router = AirflowRouter(tags=["UI"])



@ui_router.get(
    "/worker",
    dependencies=[
        Depends(requires_access_view(access_view=AccessView.JOBS)),
    ],
)
def worker(
    session: SessionDep,
) -> WorkerCollectionResponse:
    """Return Edge Workers."""
    query = select(EdgeWorkerModel).order_by(EdgeWorkerModel.worker_name)
    workers: list[EdgeWorkerModel] = session.scalars(query)
    ...
```

Do not forget authentication!

```python
ui_router = AirflowRouter(tags=["UI"])


@ui_router.get(
    "/worker",
    dependencies=[
        Depends(requires_access_view(access_view=AccessView.JOBS)),
    ],
)
def worker(
    session: SessionDep,
) -> WorkerCollectionResponse:
    """Return Edge Workers."""
    query = select(EdgeWorkerModel).order_by(EdgeWorkerModel.worker_name)
    workers: list[EdgeWorkerModel] = session.scalars(query)
    ...
```

The Outcome - A Fully Integrated View

Edge Executor UI

Learnings

Learnings / Future Improvements

- Always use the Bootstrapping tool

- Improvements for Shared Components

- Dev Env with Vite needs improvement

- Build NPM during package needs hatchling

- Internal Links needed fix → Airflow 3.1.1

- Pop-ups/Toaster need fix

- Tight coupling React+DOM → Plugin Deps

- React Integration is Experimental

Breakout Group Discussion

Future Improvements:

- Expose utility code from Airflow Core to Plugins
- Increase the surface covered by possible destinations