

A blue-tinted photograph of a conductor leading an orchestra. The conductor is in the center, facing the orchestra, holding a baton. The orchestra members are visible in the foreground and background, playing various instruments. The image is used as a background for the title slide.

Temporal: Bulletproof Workflows

Ruslan Korniiichuk | 10.12.2024

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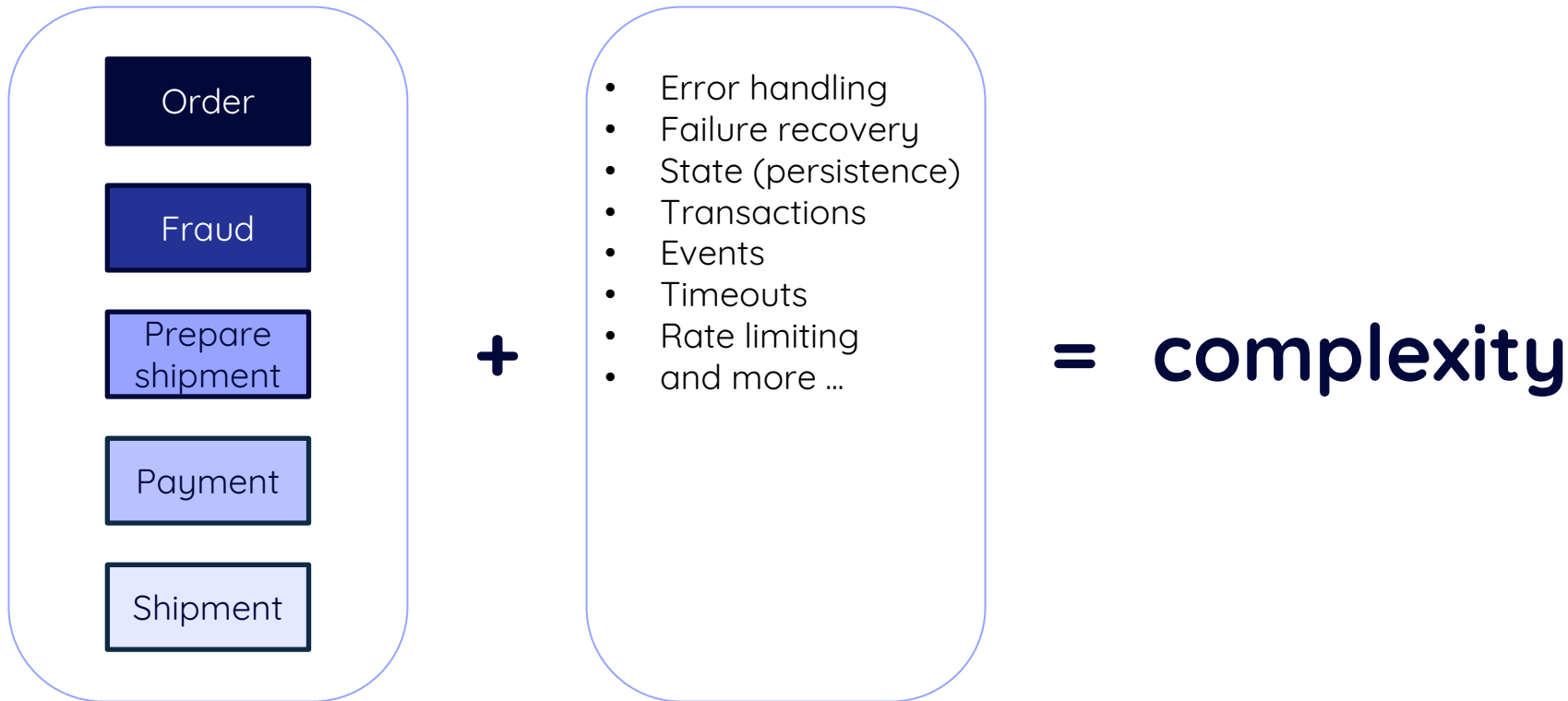
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Temporal demo

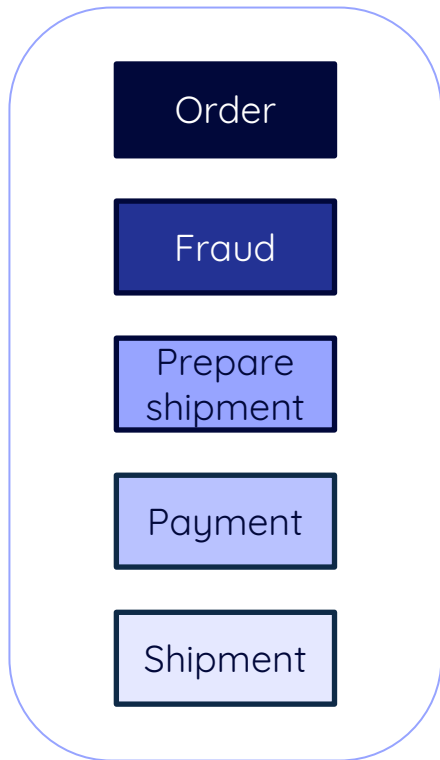
01

Problem statement

Problem statement



Problem statement



+

- Error handling
- Failure recovery
- State (persistence)
- Transactions
- Events
- Timeouts
- Rate limiting
- and more ...



Temporal

= **resiliency**

02

Introduction to Temporal

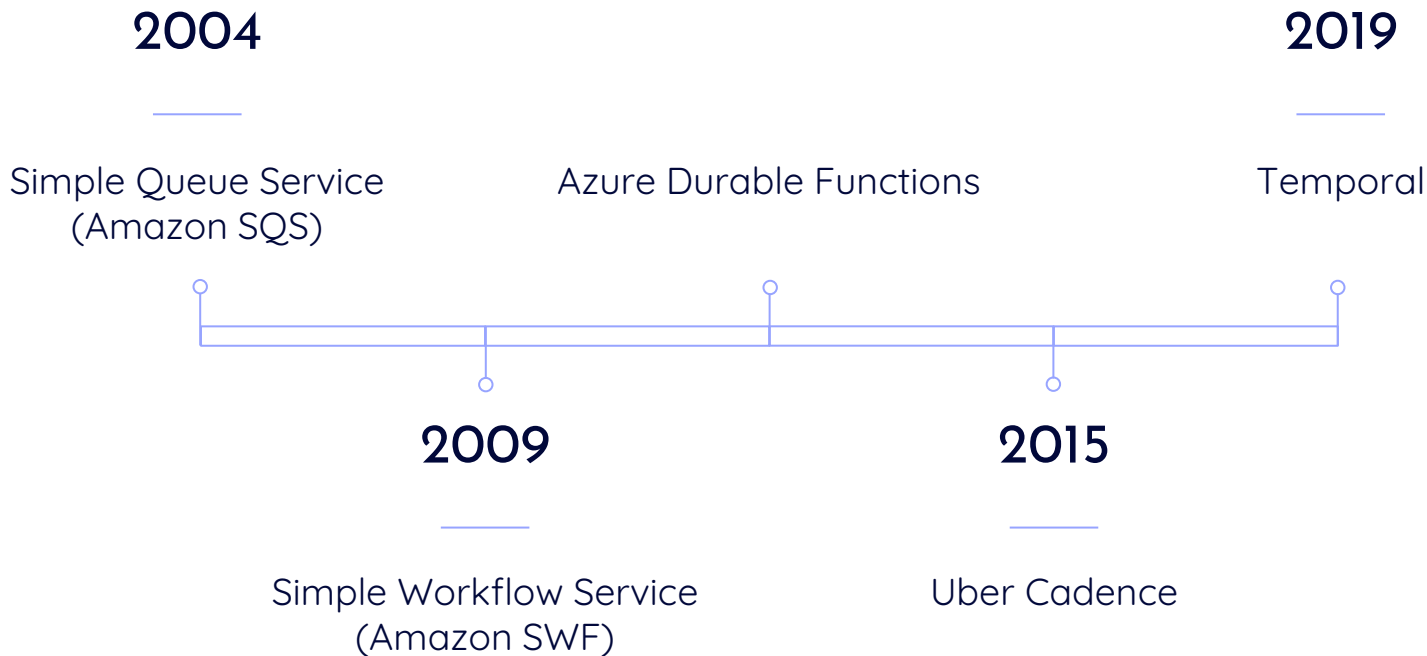
Introduction to Temporal

Temporal is an open source, distributed, and scalable workflow orchestration platform designed to execute mission-critical business logic with resilience.

Temporal:

- orchestration (not choreography)
- execution guarantee (aka Temporal Durable Execution)
- long-term workflows rather than real-time
- Python SDK
- used by Netflix, Airbnb, Stripe, Snap, HashiCorp, Box
- community

History



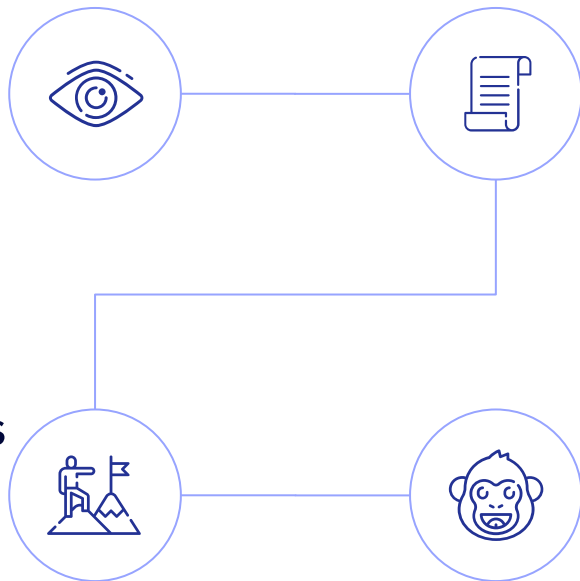
Evolution

BPMN

- Camunda
- Camunda Zeebe

Programming langs

- Uber Cadence
- Temporal



DSL

- Netflix Conductor

Low-code

- Windmill
- Pipedream
- Retool
- Superblocks

Introduction to Components

Concepts

Console

Modeler

Web Modeler

Desktop Modeler

BPMN

BPMN in Modeler

BPMN primer

BPMN coverage

Data flow

Tasks

Gateways

Events

Subprocesses

Markers

DMN

FEEL expressions

Camunda Forms

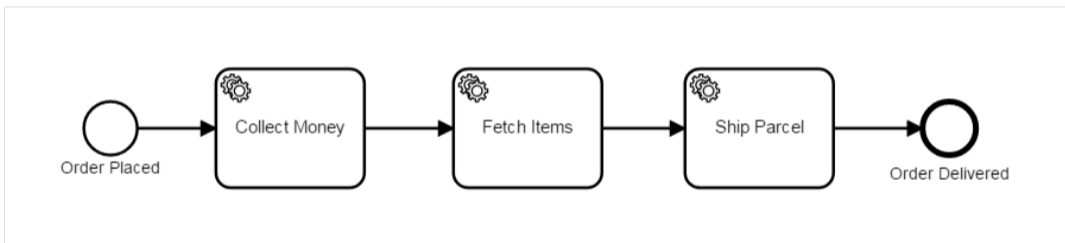
Data handling

Home > Modeler > BPMN > BPMN primer

Version: 8.6

BPMN primer

Business Process Model and Notation 2.0 (BPMN) is an industry standard for process modeling and execution. A BPMN process is an XML document that has a visual representation. For example, here is a BPMN process:



▼ The corresponding XML

```
<?xml version="1.0" encoding="UTF-8"?>
<bpmn:definitions xmlns:bpmn="http://www.omg.org/spec/BPMN/20100524/MODEL" xmlns:bpmndi="http:
  <bpmn:process id="Process_1" isExecutable="true">
    <bpmn:startEvent id="StartEvent_1" name="Order Placed">
      <bpmn:outgoing>SequenceFlow_1bq1azi</bpmn:outgoing>
    </bpmn:startEvent>
    <bpmn:sequenceFlow id="SequenceFlow_1bq1azi" sourceRef="StartEvent_1" targetRef="Task_1f47
    <bpmn:sequenceFlow id="SequenceFlow_09hqi9g" sourceRef="Task_1f47b9v" targetRef="Task_1109
```

Modeling BPMN diagrams

BPMN elements

Sequence flow: Controlling the flow of execution

Tasks: Units of work

Gateways: Steering flow

Events: Waiting for something to happen

Subprocesses: Grouping elements

Additional resources

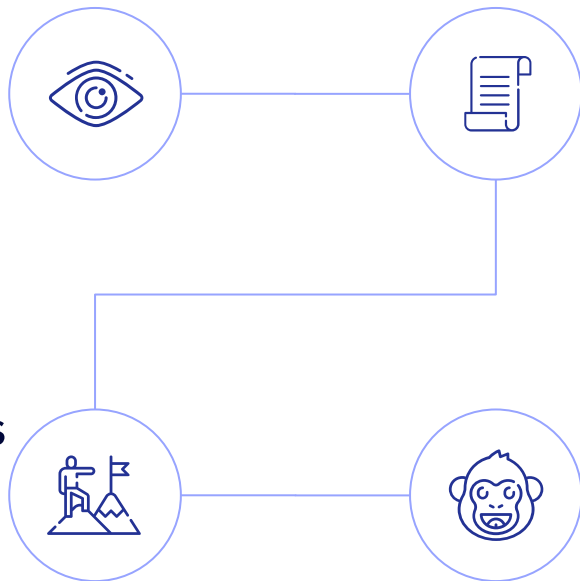
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Hello World Application Using Conductor

In this section, we will create a simple "Hello World" application that executes a "greetings" workflow managed by Conductor.

Step 1: Create Workflow

Creating Workflows by Code

Create [greetings_workflow.py](#) with the following:

```
from conductor.client.workflow.conductor_workflow import ConductorWorkflow
from conductor.client.workflow.executor.workflow_executor import WorkflowExecutor
from greetings_worker import greet

def greetings_workflow(workflow_executor: WorkflowExecutor) -> ConductorWorkflow:
    name = 'greetings'
    workflow = ConductorWorkflow(name=name, executor=workflow_executor)
    workflow.version = 1
    workflow >> greet(task_ref_name='greet_ref', name=workflow.input('name'))
    return workflow
```



(Alternatively) Creating Workflows in JSON

Create `greetings_workflow.json` with the following:

```
{
  "name": "greetings",
  "description": "Sample greetings workflow",
  "version": 1,
  "tasks": [
    {
      "name": "greet",
      "taskReferenceName": "greet_ref",
      "type": "SIMPLE",
      "inputParameters": {
        "name": "${workflow.input.name}"
      }
    }
  ]
}
```



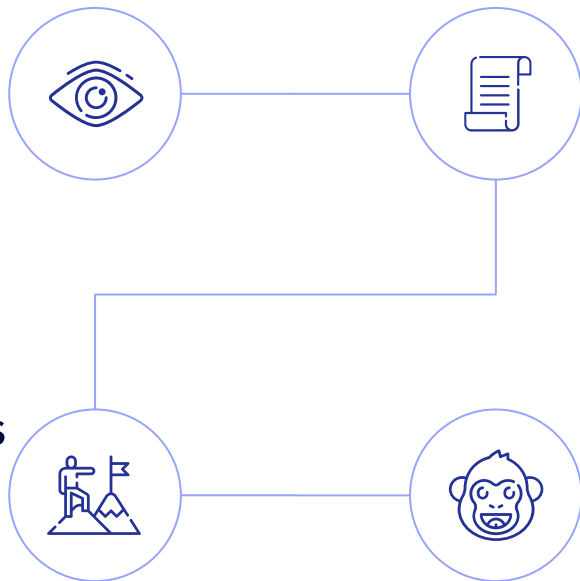
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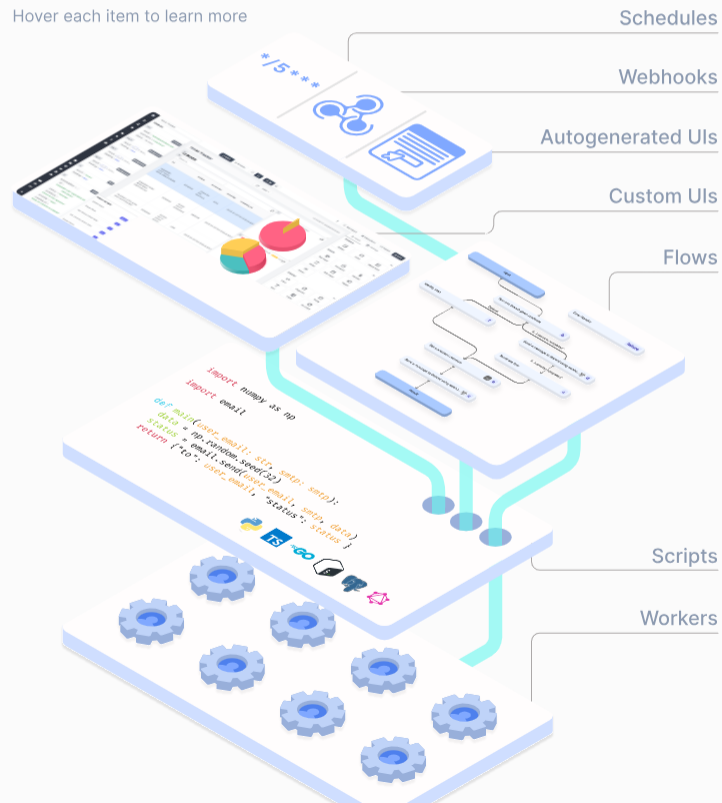
Open-source developer platform and workflow engine

Turn scripts into auto-generated UIs, APIs and cron jobs.
Compose them as workflows or data pipelines.
Build complex, data-intensive apps with ease.

Write and deploy software 10x faster, and run it with the highest reliability and observability on the [fastest self-hostable job orchestrator](#).

[Try Windmill cloud](#)[Self-host in 3 mins →](#)

Hover each item to learn more



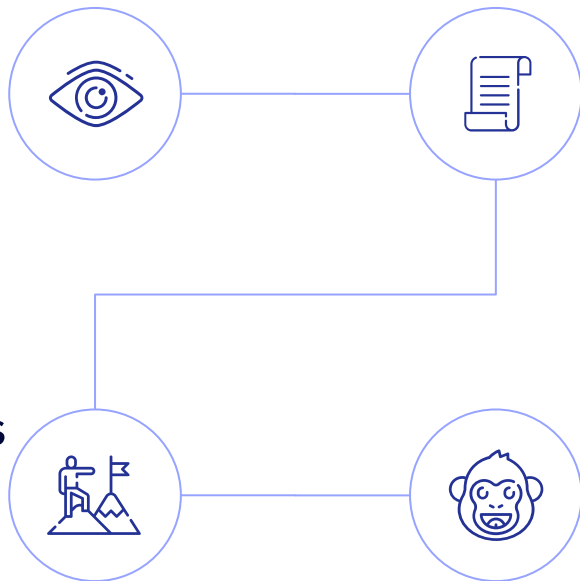
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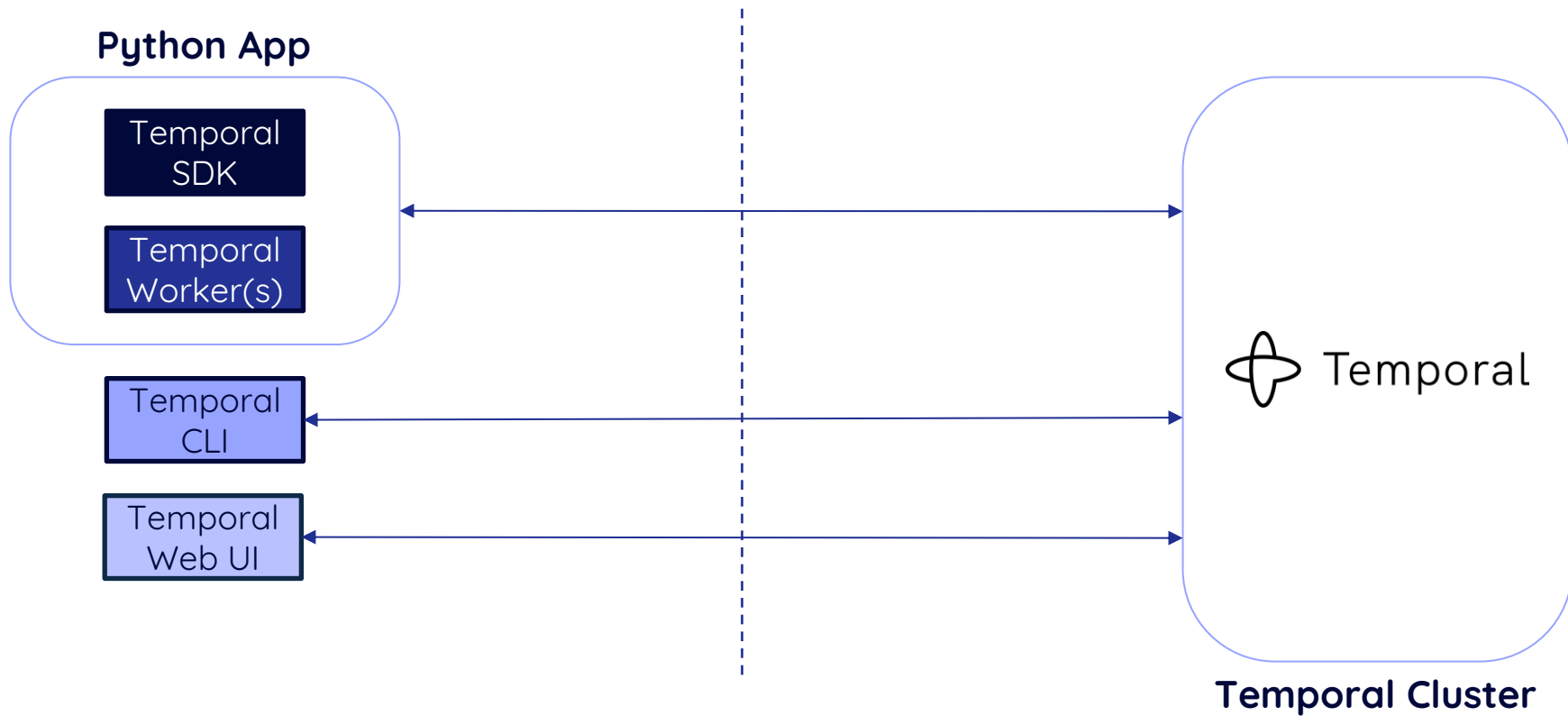
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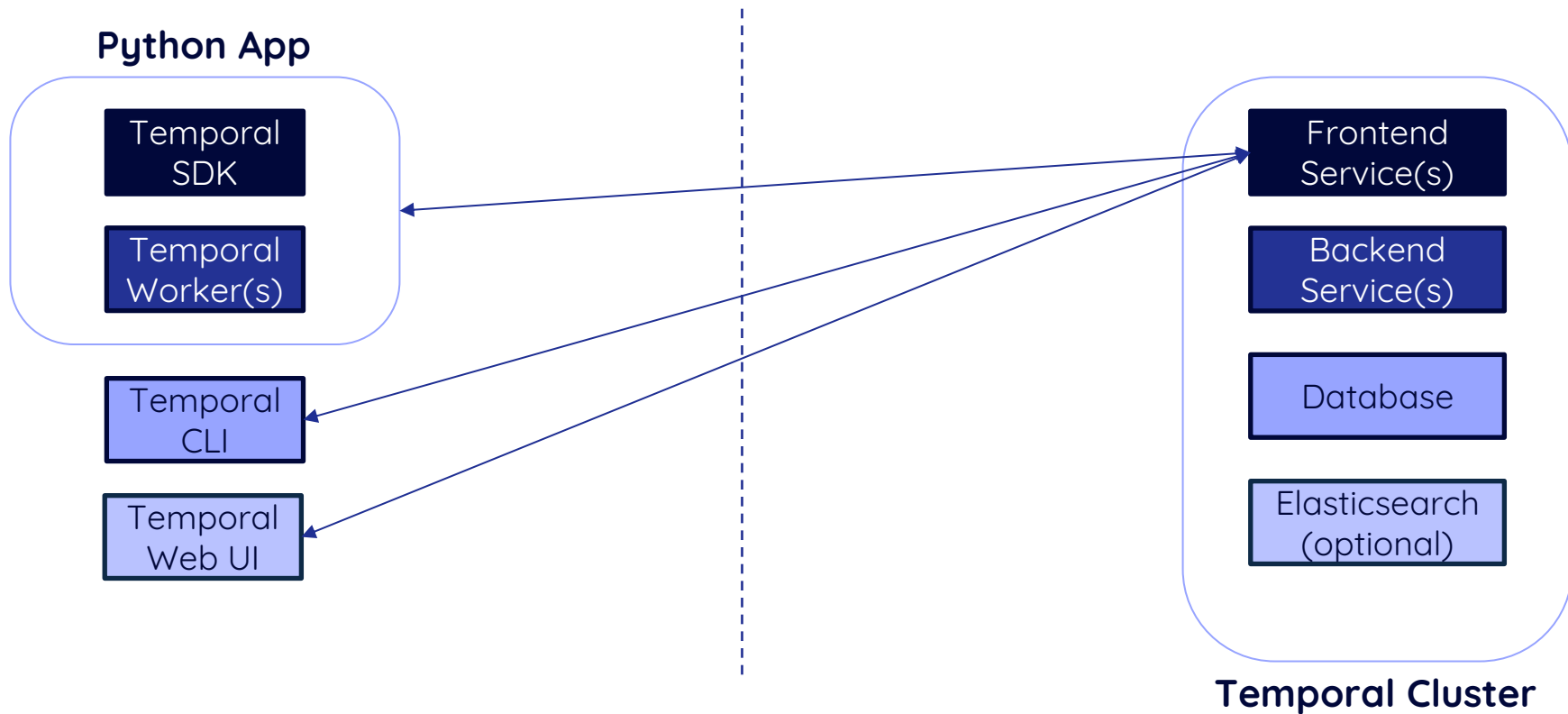
Temporal use cases

- Business process automation (e.g., client lifecycle, order processing, payments)
- Microservice orchestration
- Infrastructure provisioning
- CI/CD, data and ML pipelines
- Engine for low-code/no-code

03

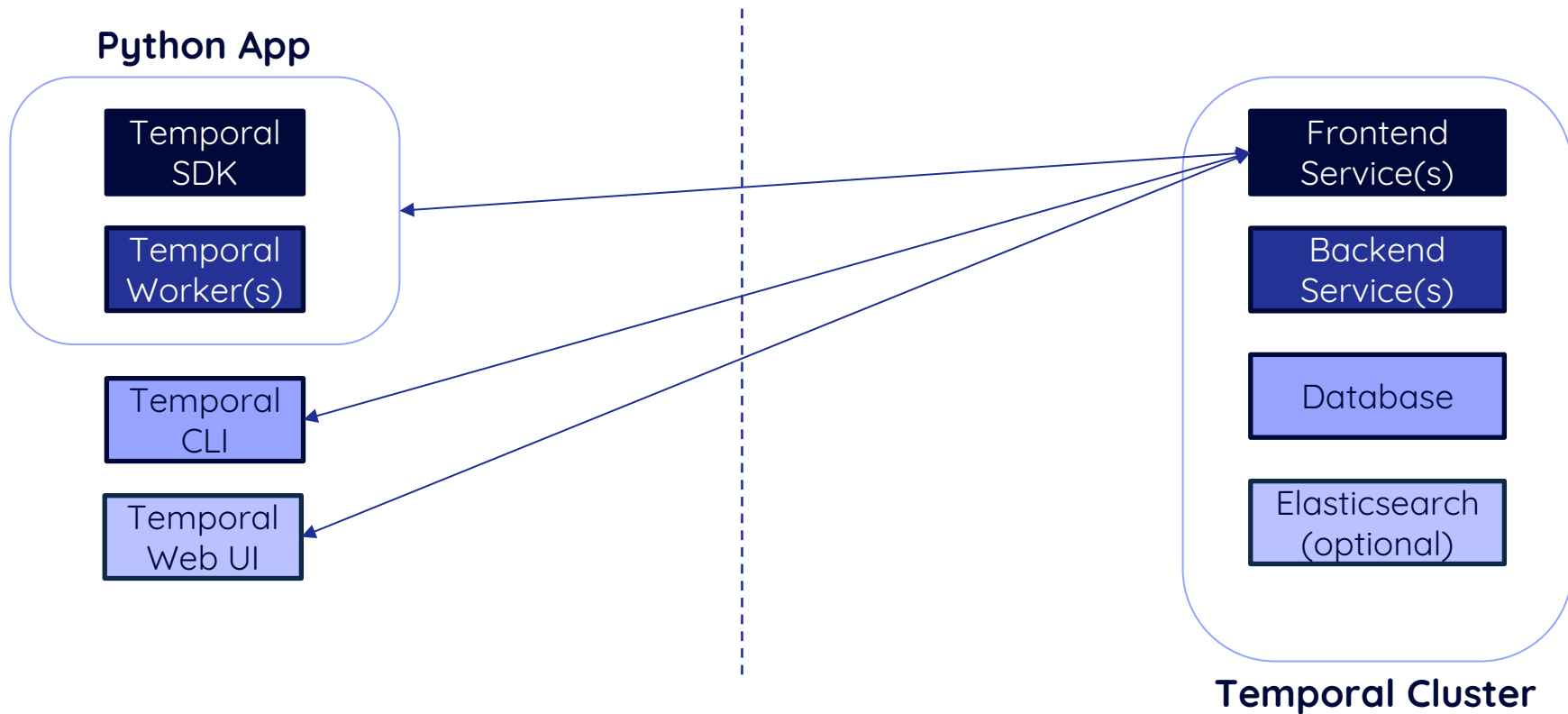
Temporal
architecture





The role of Temporal Cluster

- Manages and tracks tasks related to Temporal Workflows and Temporal Activities
- Maintains and durably persists the Event History for each execution
- Does NOT run Python app code
- Does NOT have access to Python app code



The role of Temporal Worker

- Responsible for executing Temporal Workflow and Temporal Activity code
- Polls for tasks and communicates status via network with the Temporal Cluster
- Is provided by the Temporal Python SDK and configured by the engineer

One platform, two options for using it

- **Option 1:** Self-hosted deployment
 - Run the Temporal ourself
- **Option 2:** Temporal Cloud
 - Fully-managed cloud service

04

Temporal Workflow and Activity

Temporal Workflow and Activity



Temporal Workflow vs Activity

Workflow

Workflow must be deterministic. You can view determinism as a requirement that each execution of a given Workflow must produce the same output, given the same input.

Activity

Any operation that introduces the possibility of failure (e.g., calling microservice, querying database, writing to file) should be done as part of an **Activity**. Activities retry if they fail.



Home

Get started with Temporal

Courses

Temporal 101: Introducing the Temporal Platform

Temporal 101 with Go

Temporal 101 with Java

Temporal 101 with Python

Temporal 101 with TypeScript

Temporal 102: Exploring Durable Execution

Crafting an Error Handling Strategy

Versioning Workflows

Securing Application Data

Interacting with Workflows

Introduction to Temporal Cloud

Project-based Tutorials



Courses



Temporal 101: Introducing the Temporal Platform



Temporal 101 with Python

Temporal 101 with Python

Last updated on **Mar 11, 2024**

Tags:

[courses](#)

[Python](#)



Estimated time: ~🕒 2 hours, self-paced.

Cost: Free

Description



Ask AI



Durable Execution

Temporal 102: Exploring Durable Execution with Go

Temporal 102: Exploring Durable Execution with Java

Temporal 102: Exploring Durable Execution with Python

Temporal 102: Exploring Durable Execution with TypeScript

Crafting an Error Handling Strategy

Versioning Workflows

Securing Application Data

Interacting with Workflows

Introduction to Temporal Cloud

Project-based Tutorials

Example applications

Zines

Dev guide

Documentation



[Courses](#)

[Temporal 102: Exploring Durable Execution](#)

[Temporal 102: Exploring Durable Execution with Python](#)

Temporal 102: Exploring Durable Execution with Python

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[courses](#)

[Python](#)



Estimated time: ~🕒 4 hours, self-paced.

Cost: Free



Ask AI

05

Temporal demo

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📁 img	Add images to readme	15 minutes ago
📄 .gitignore	Initial commit	1 hour ago
📄 LICENSE	Initial commit	1 hour ago
📄 README.md	Add images to readme	15 minutes ago
📄 app.py	Initial commit	31 minutes ago
📄 example.py	Initial commit	31 minutes ago
📄 worker.py	Initial commit	31 minutes ago

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✎

☰

🔗 Temporal: Bulletproof Workflows

Step 1/4: Installation

Install Temporal CLI

To install the Temporal CLI, download the version for your architecture:

About

Temporal: Bulletproof Workflows

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Languages

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Suggested workflows

Based on your tech stack

SLSA Generic

Configure

tinyurl.com/PYTEMPORAL





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