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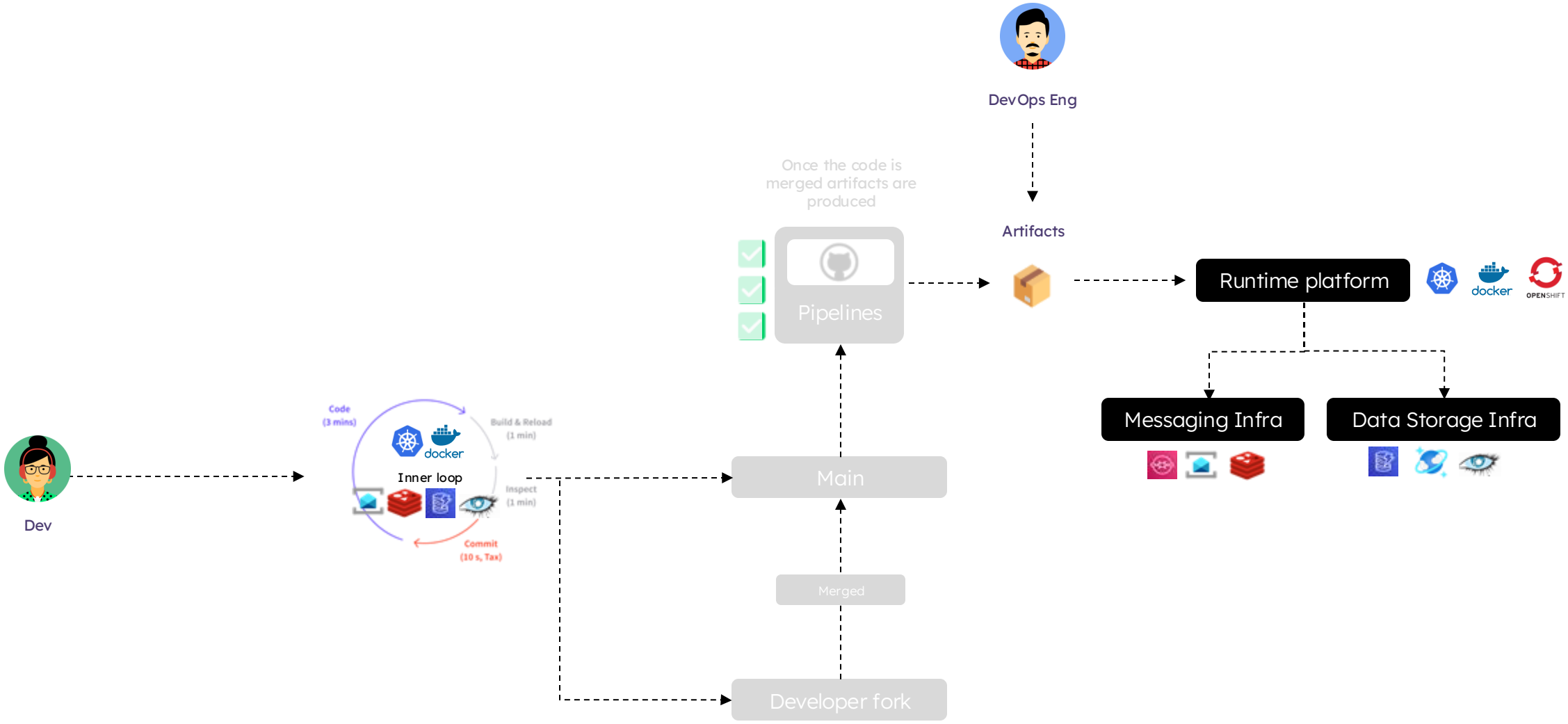
Dapr + Score

Mixing the Perfect Cocktail for an Enhanced Developer Experience

Kendall Roden - PM @ Diagrid
Mathieu Benoit - CSE @ Humanitec

Platform and infrastructure concerns are **increasing cognitive load** and **decreasing productivity** for developers



Setting the stage

Kendall
Application Engineer

Full-stack developer focused on business logic and **delivering features**

Wants to spend **less time on infrastructure** concerns and boilerplate code

Values consistency, simplicity, and **productivity**

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Mathieu
Platform/DevEx Team

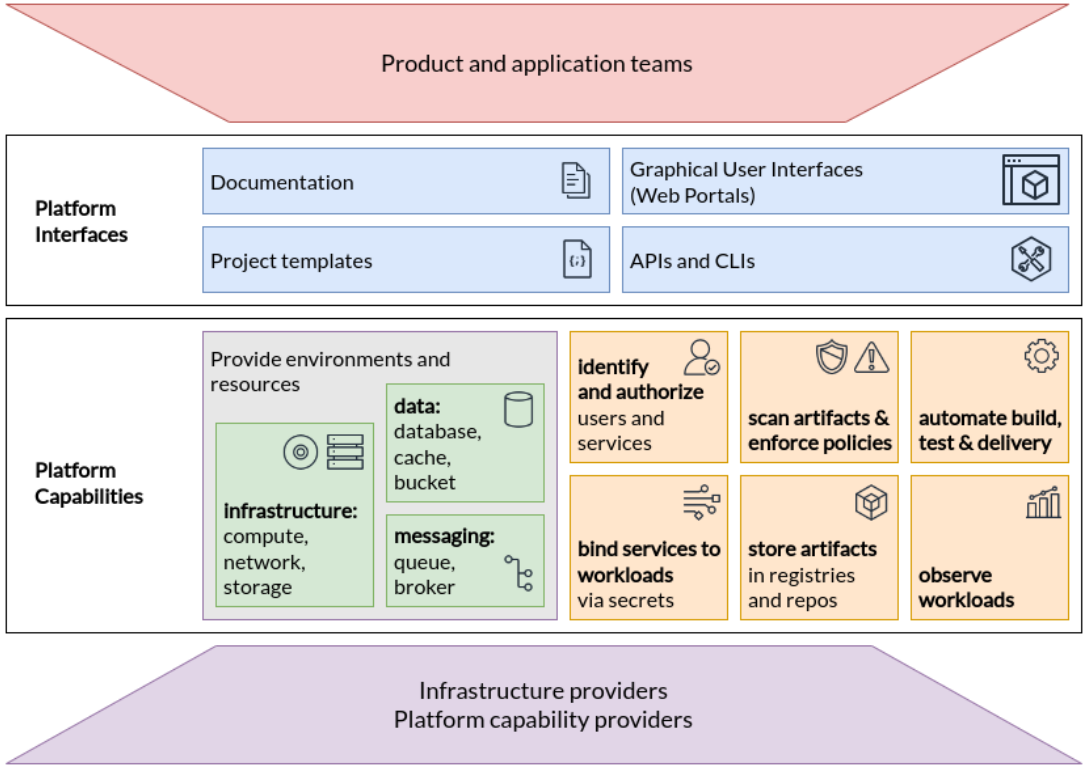
Responsible for building and maintaining the standardized interfaces that form his company's **developer platform**

Focuses on **standardization**, security, and operational excellence

Wants to **enable developers** to work quickly and efficiently while maintaining governance

Building Internal Platforms for Enablement

Capabilites of Platforms



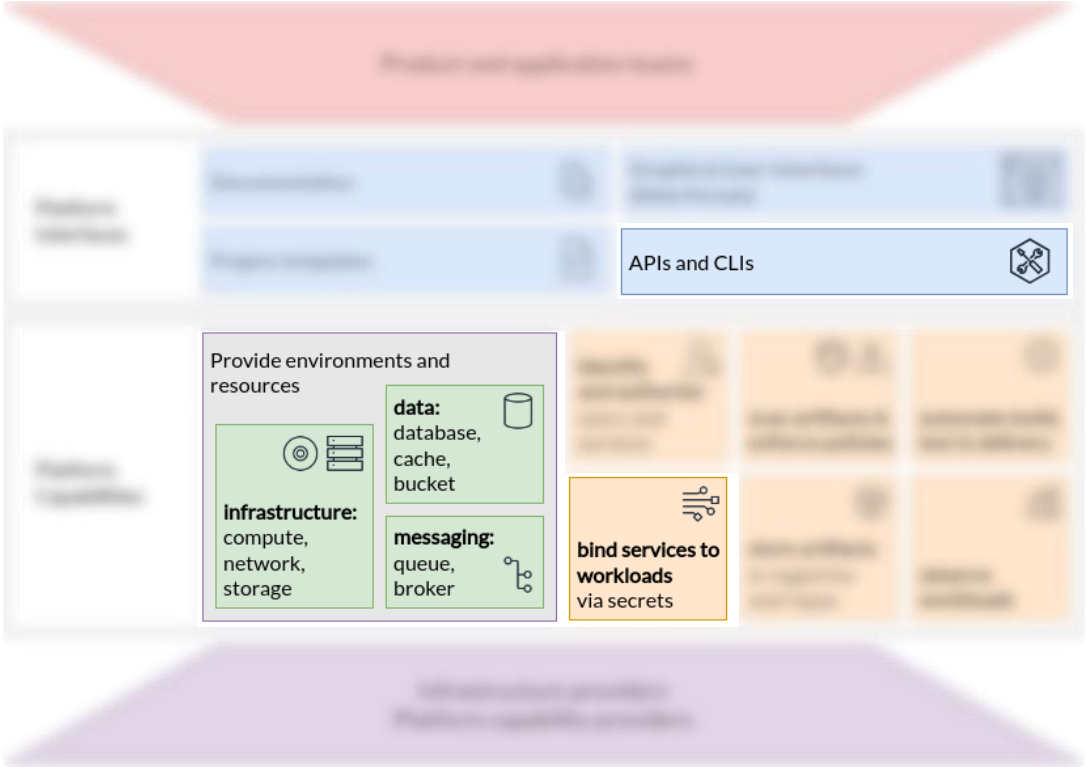
Platform Engineering Maturity Model

ASPECT		PROVISIONAL	OPERATIONAL	SCALABLE	OPTIMIZING
Investment	*How are staff and funds allocated to platform capabilities?*	Voluntary or temporary	Dedicated team	As product	Enabled ecosystem
Adoption	*Why and how do users discover and use internal platforms and platform capabilities?*	Erratic	Extrinsic push	Intrinsic pull	Participatory
Interfaces	*How do users interact with and consume platform capabilities?*	Custom processes	Standard tooling	Self-service solutions	Integrated services
Operations	*How are platforms and their capabilities planned, prioritized, developed and maintained?*	By request	Centrally tracked	Centrally enabled	Managed services
Measurement	*What is the process for gathering and incorporating feedback and learning?*	Ad hoc	Consistent collection	Insights	Quantitative and qualitative

Source: [CNCF Platforms Working Group White Paper]

CNCF Platform Interfaces

Capabilites of Platforms



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Enabling workload-centric development

Platform Interfaces

Product/Application Team

Product/Application Team

Product/Application Team

dapr Dapr APIs & SDKs

Score Specification

Enabling workload-centric development

Platform Interfaces

Platform Capabilities

Product/Application Team

Product/Application Team

Product/Application Team

dapr Dapr APIs & SDKs

Score Specification

Platform Engineering Team

- **Self-service tools** & frameworks
- **Automate processes** to streamline development

dapr Dapr Components

Score Implementations

Infrastructure

Azure aws Google Cloud

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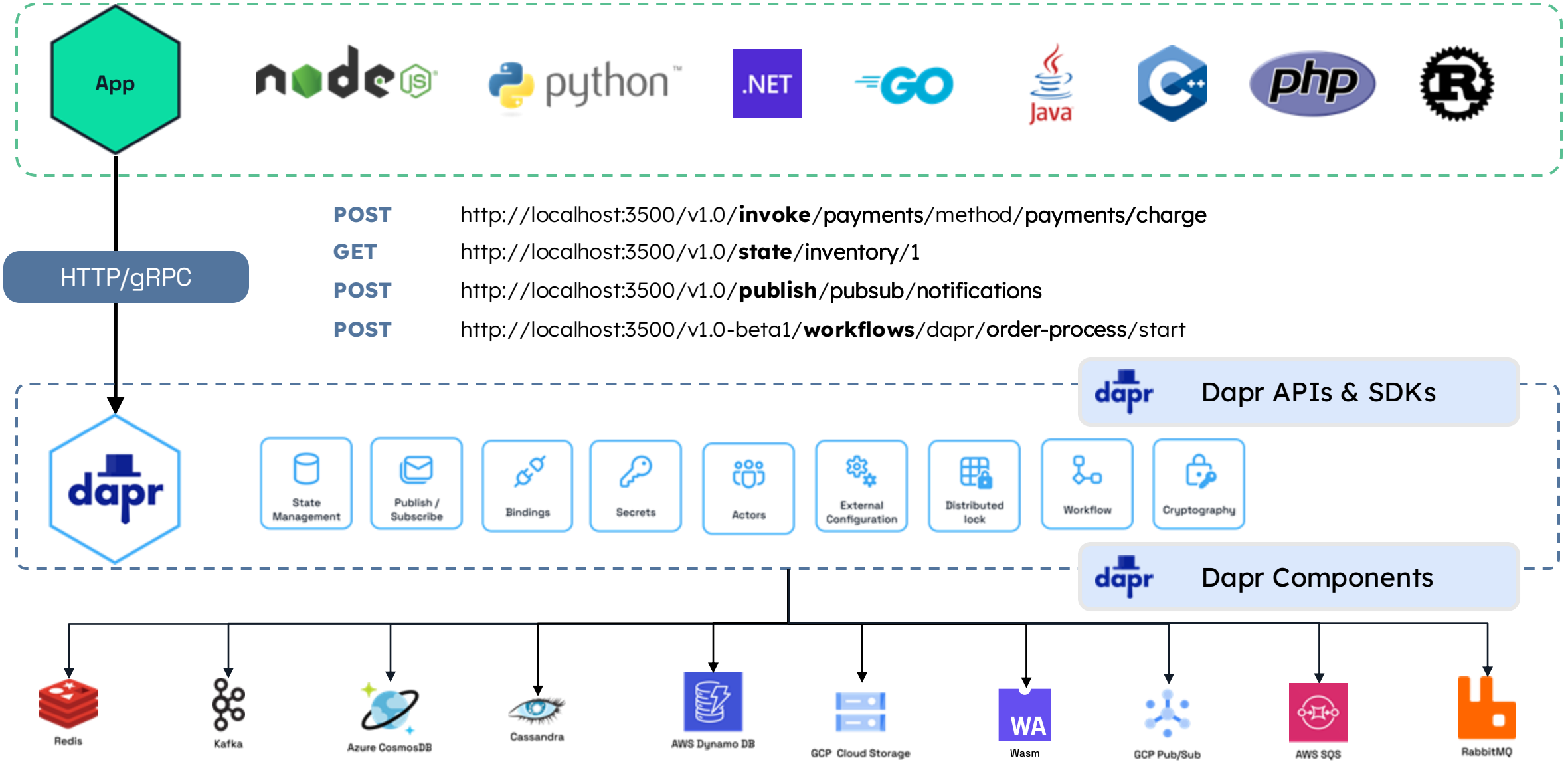
Europe 2025

Dapr + Score

A practical walk-through

Dapr overview



Standardizing on Dapr

1

Author apps using Dapr locally

Use the Dapr SDKs or the HTTP/GRPC APIs

2

Configure resources for your Dapr sidecars

Connect your applications to infrastructure

3

Run with local Dapr tooling and CLI for inner loop development

Get up and running quickly with your apps and dependencies

```python
# 1. Import Redis package
import redis
import json
from datetime import datetime

# 2. Function to save message
def save_message(key, message):
    try:
        # 3. Connect to Redis with detailed configuration
        r = redis.Redis(
            host='redis-server',
            port=6379,
            password='your-password',
            decode_responses=True,
            socket_timeout=5,
            retry_on_timeout=True
        )

        # 4. Prepare data
        payload = {
            'content': message,
            'timestamp': datetime.now().isoformat()
        }

        # 5. Save to Redis
        r.set(key, json.dumps(payload))

        # 6. Must close connection
        r.close()

        return {"status": "success"}

    except redis.RedisError as e:
        print(f"Redis error: {e}")
        raise Exception("Failed to save message")
```

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```python
# 1. Import Dapr client
from dapr.clients import DaprClient
from datetime import datetime

# 2. Function to save message
def save_message(key, message):
    try:
        # 3. Create Dapr client - no connection details!
        with DaprClient() as client:
            # 4. Prepare data
            payload = {
                'content': message,
                'timestamp': datetime.now().isoformat()
            }

            # 5. Save to state store
            client.save_state(
                store_name="statestore",
                key=key,
                value=payload
            )

            # No connection management needed!

            return {"status": "success"}

    except Exception as e:
        print(f"Dapr error: {e}")
        raise Exception("Failed to save message")
```

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```yaml
apiVersion: dapr.io/v1alpha1
kind: Component
metadata:
  name: statestore
  namespace: default
spec:
  type: state.redis
  version: v1
  metadata:
    - name: redisHost
      secretKeyRef:
        name: redis-secrets
        key: host
    - name: redisPassword
      secretKeyRef:
        name: redis-secrets
        key: password
    - name: enableTLS
      value: "true"
    - name: redisDB
      value: "0"
    - name: redisMaxRetries
      value: "5"
    - name: redisMaxConnections
      value: "30"
    - name: keyPrefix
      value: "app:"
auth:
  secretStore: kubernetes
```

```python
# 5. Save to state store
client.save_state(
    store_name="statestore",
    key=key,
    value=payload
)
```

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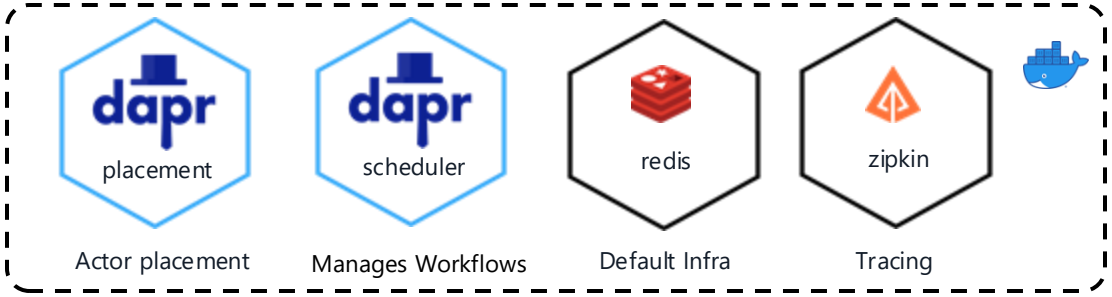
Get up and running quickly with your apps and dependencies

`dapr init`

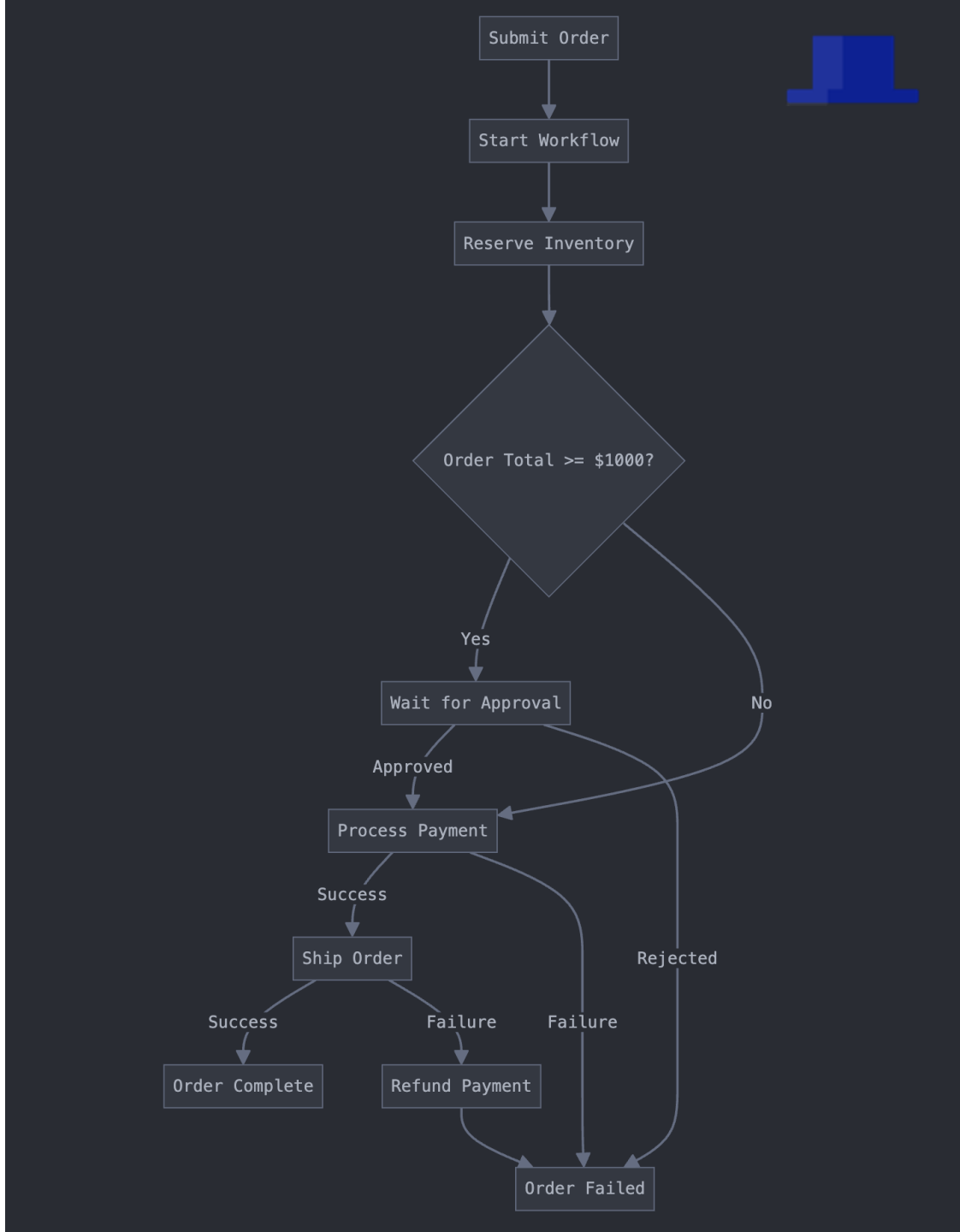


`dapr run -f .`

dapr.yaml > { } common

```yaml
version: 1
common:
  logLevel: info
  appLogDestination: "console"
  daprdLogDestination: "console"
  resourcesPaths: ["./components"]
apps:
  - appId: inventory…
  - appId: notifications
    appPort: 3001
    appDirPath: ./services/notifications
    command: ["python3", "app.py"]
    env:
      PYTHON_DEBUG: "true"
      DEBUG_PORT: "5679"
      SERVICE_NAME: "notifications"
  - appId: order-processor
    appPort: 3000
    appDirPath: ./services/order-processor
    command: ["python3", "app.py"]
    env:…
  - appId: payments…
  - appId: shipping…
```

Demo: Local Dapr Application



Emerging challenges

Kendall
Application Engineer

How can I make sure that my workloads once **containerized** will still successfully work/run?

How to promote in Dev, Staging and **Prod environments**?

Do I need to learn and write **Docker Compose** files or **Kubernetes manifests**?

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How to promote in Dev, Staging and **Prod environments**?

Do I need to learn and write **Docker Compose** files or **Kubernetes manifests**?

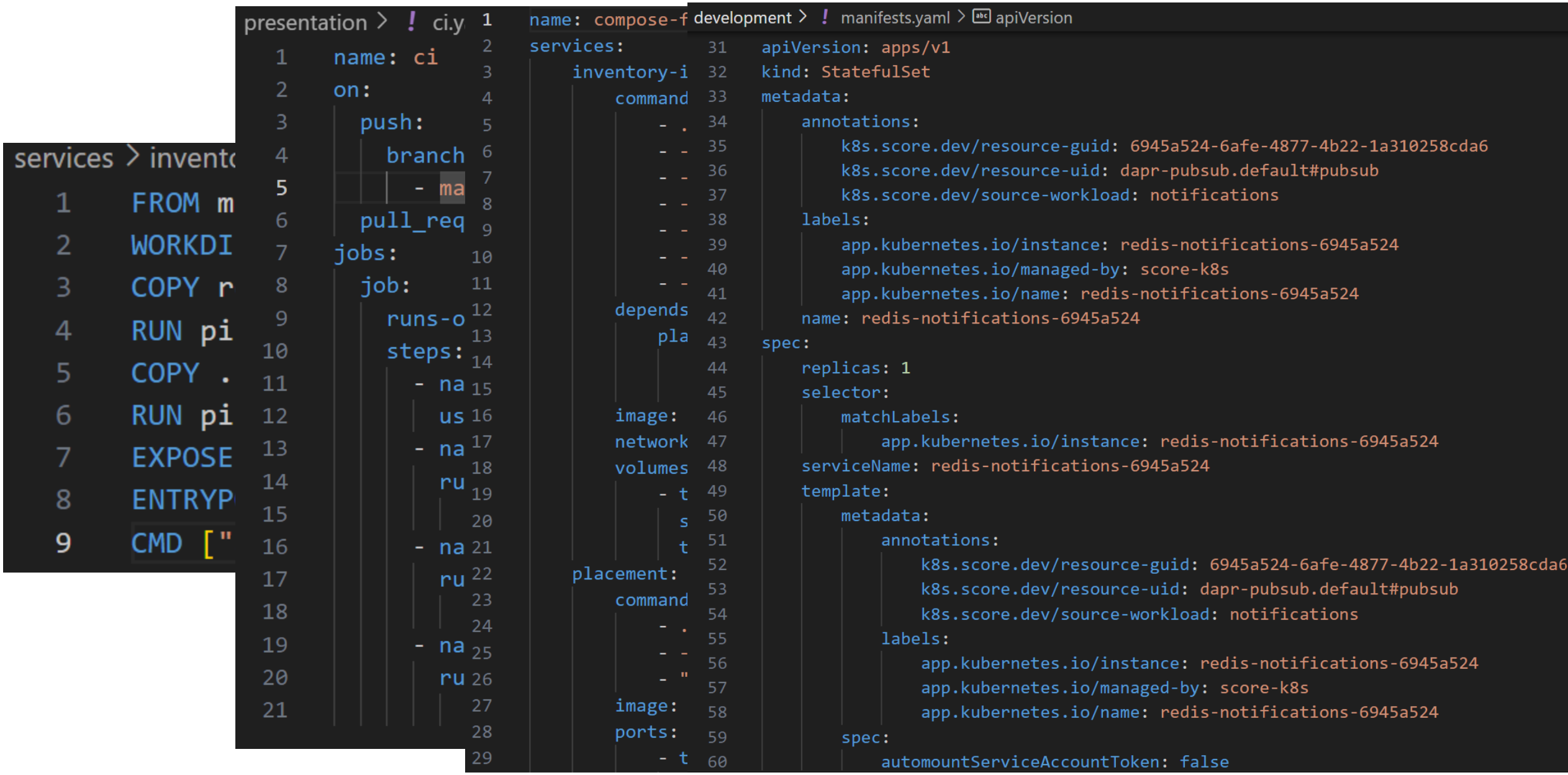
Mathieu
Platform/DevEx Team

How can I avoid the "**It works on my machine**" effect? Can I define integration tests as early as possible in their Continuous Integration pipelines and fail fast if needed?

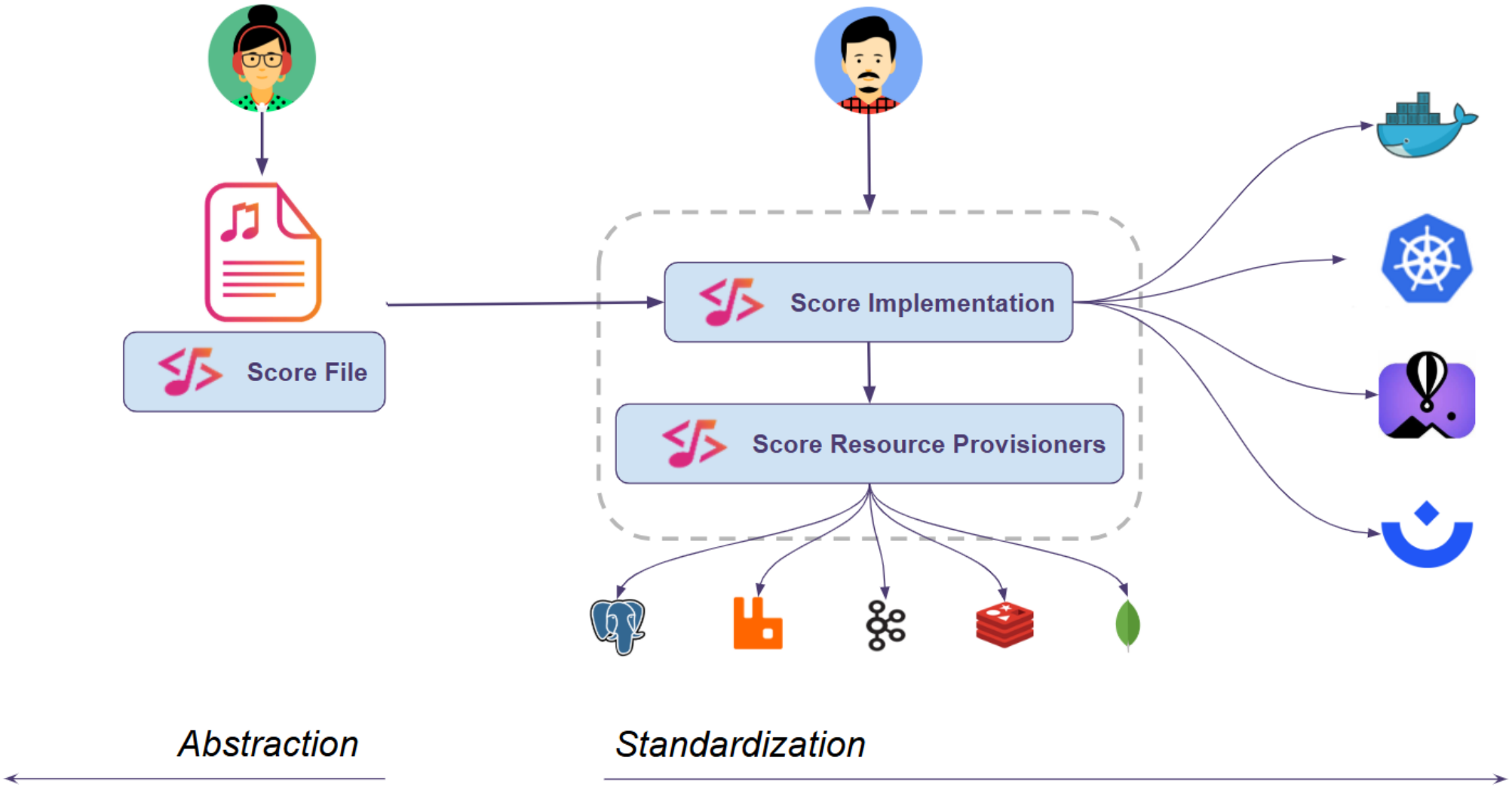
How can I support the Devs with their definition of Components? How can I make sure I will be able to **support them in Production**?

How can I standardize Components recipes **with well supported recipes** to use Enterprise-ready Redis, RabbitMQ, etc.?

Hosting your app on Kubernetes in Production?



Score overview



Standardizing with Score

1

Author Score file

*Describe your **Workload and its dependencies**.*

Agnostic to the Platform/Runtime and the Environment.

score.yaml U

score.yaml > { } resources > { } state-store > abc type

Score schema - Score workload specification (score-v1b1.json)

```yaml
apiVersion: score.dev/v1b1
metadata:
  name: my-app
  annotations:
    dapr.io/enabled: "true"
containers:
  main:
    image: .
    variables:
      APP_PORT: "3002"
      STATESTORE_NAME: "${resources.state-store.name}"
resources:
  state-store:
    type: dapr-state-store
```

Standardizing with Score

1

Author Score file

*Describe your **Workload and its dependencies**.*

Agnostic to the Platform/Runtime and the Environment.

2

Configure resources provisioning templates and Dapr Components for target platform

*Use **Score implementation** and author resource provisioners.*

Score Implementations

```
- op: set
  path: services.placement
  value:
    image: ghcr.io/dapr/placement:latest
    command: ["./placement", "--port", "50006"]
    ports:
    - target: 50006
      published: "50006"
- op: set
  path: services.scheduler
  value:
    image: ghcr.io/dapr/scheduler:latest
    command: ["./scheduler", "--port", "50007", "--etcd-data-dir", "/data"]
    ports:
    - target: 50007
      published: "50007"
    user: root
    volumes:
    - type: bind
      source: ./dapr-etcd-data/
      target: /data
{{ range $name, $cfg := .Compose.services }}
{{ if dig "annotations" "dapr.io/enabled" false $cfg }}
- op: set
  path: services.{{ $name }}-sidecar
  value:
    image: ghcr.io/dapr/daprd:latest
    command: ["./daprd", "--app-id={{ dig "annotations" "dapr.io/app-id" "" $cfg }}", "--app-port=
    network_mode: service:{{ $name }}
    volumes:
    - type: bind
      source: .score-compose/mounts/components/
      target: /components
    depends_on:
      placement:
        condition: service_started
        required: true
{{ end }}
{{ end }}
```

Standardizing with Score

1

Author Score file

*Describe your **Workload and its dependencies**.*

Agnostic to the Platform/Runtime and the Environment.

2

Configure resources provisioning templates and Dapr Components for target platform

*Use Score implementation and author **resource provisioners**.*

Score Resource provisioners

redis-dapr-state-store.yaml U

redis-dapr-state-store.yaml > {} 0 > abc files

```yaml
# Downloaded from https://raw.githubusercontent.com/score-spec/community-
- uri: template://community-provisioners/redis-dapr-state-store
  type: dapr-state-store
  description: Generates a Redis Service and a Dapr StateStore Component
  init: |
    port: 6379
    randomServiceName: redis-{{ randAlphaNum 6 }}
    randomPassword: {{ randAlphaNum 16 | quote }}
  state: |
    serviceName: {{ dig "serviceName" .Init.randomServiceName .State | qu
    password: {{ dig "password" .Init.randomPassword .State | quote }}
  outputs: |
    name: {{ .State.serviceName }}
  files: |
    components/{{ .State.serviceName }}.yaml: |
      apiVersion: dapr.io/v1alpha1
      kind: Component
      metadata:
        name: {{ .State.serviceName }}
      spec:
        type: state.redis
        version: v1
        metadata:
        - name: redisHost
          value: {{ .State.serviceName }}:{{ .Init.port }}
        - name: redisPassword
          value: {{ .State.password }}
  services: |
    {{ .State.serviceName }}:
      labels:
        dev.score.compose.res.uid: {{ .Uid }}
      image: redis:7-alpine
      restart: always
      entrypoint: ["redis-server"]
```

Standardizing with Score

1

Author Score file

Describe your Workload and its dependencies.

2

Configure resources provisioning templates and Dapr Components bindings

Use Score implementation and author resource provisioners.

3

Deploy to a specific Environment and Platform

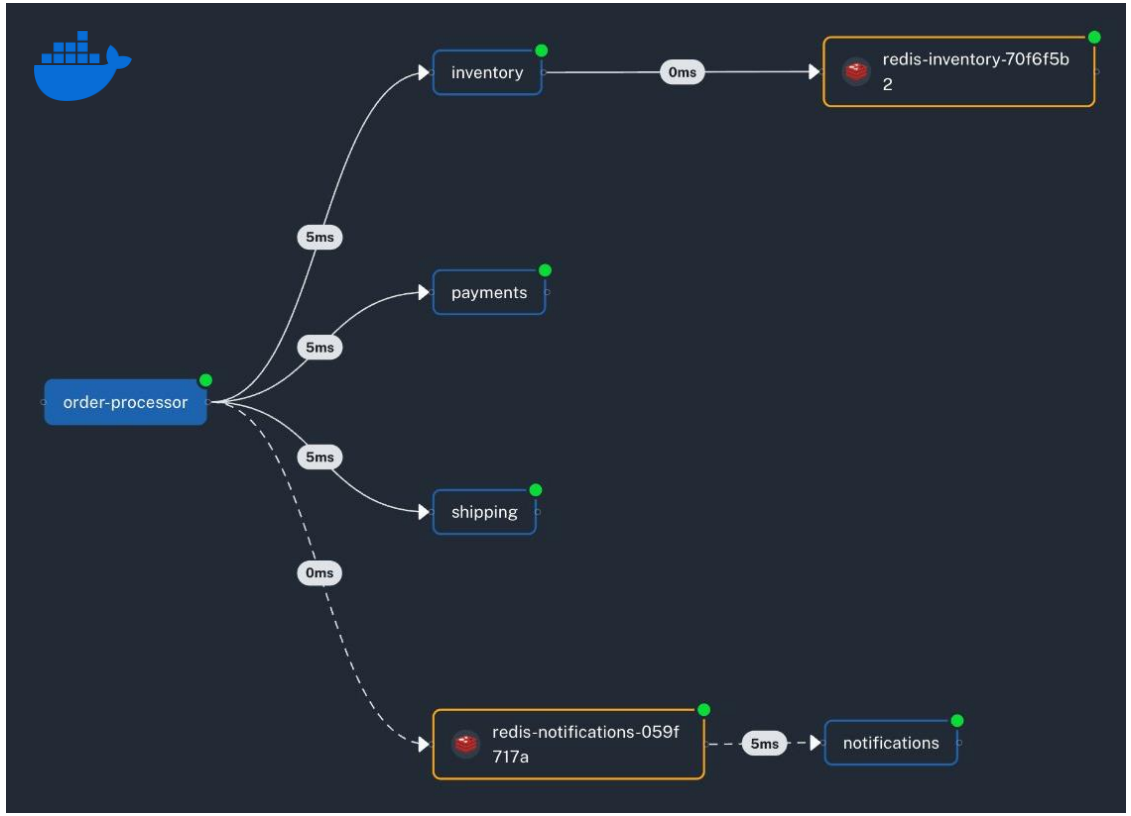
Generate manifests for the Score files based on the Score implementation and provisioners. And trigger the deployment.

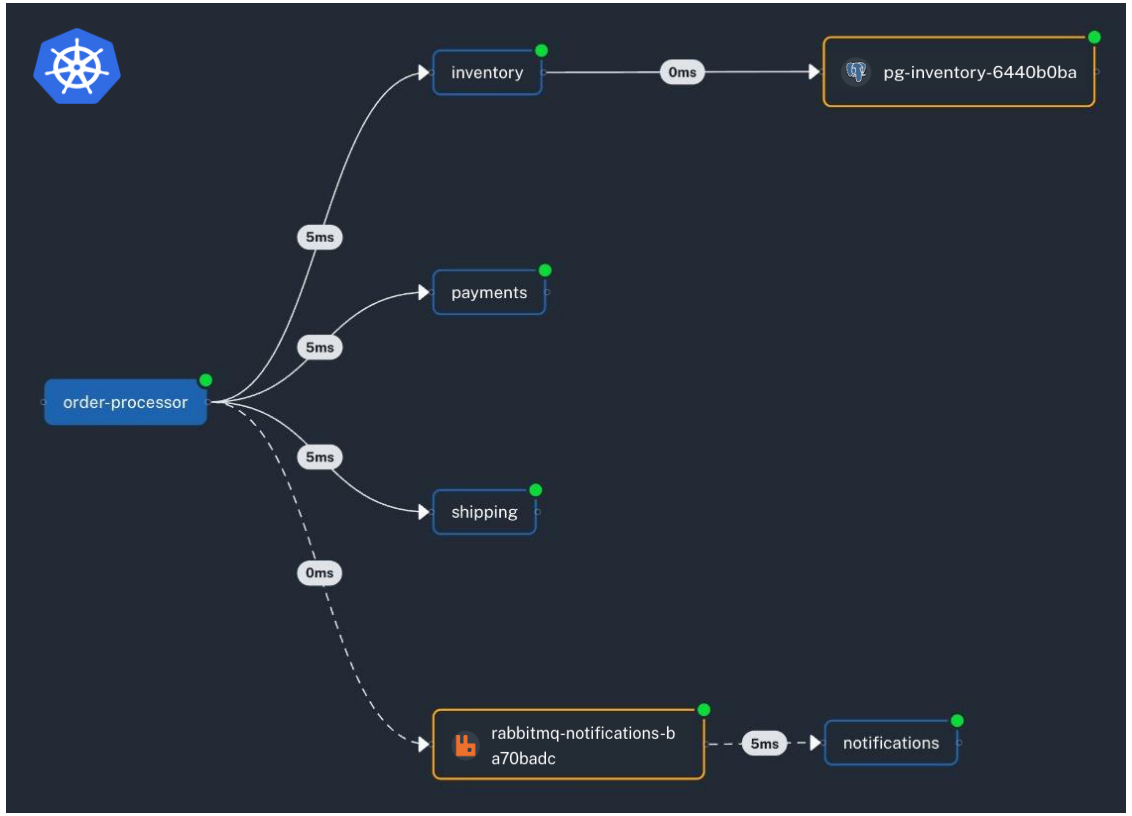
$ deploy-compose.sh U

$ deploy-compose.sh

```
score-compose init \
    --provisioners dapr.yaml \
    --patch-templates dapr-compose.tpl

score-compose generate \
    services/inventory/score.yaml \
    services/notifications/score.yaml \
    services/order-processor/score.yaml \
    services/payments/score.yaml \
    services/shipping/score.yaml

docker compose up \
    --build \
    -d

CONTAINER ID   IMAGE            COMMAND
160e6bc87981   shipping         "python app.py"
1fd80bfb202b   payments         "python app.py"
f857d0eac3fd   inventory        "python app.py"
3f109e8075f7   notifications    "python app.py"
118843c88755   processor        "python app.py"
fcd3b30d7f3d   redis:7-alpine   "redis-server /usr/l…"
81626e9493a4   redis:7-alpine   "redis-server /usr/l…"
ce48349b4615   dapr/placement   "./placement --port …"
837d3ab25629   dapr/daprd       "./daprd --app-id=sh…"
837d3ab25629   dapr/daprd       "./daprd --app-id=pa…"
837d3ab25629   dapr/daprd       "./daprd --app-id=in…"
837d3ab25629   dapr/daprd       "./daprd --app-id=no…"
837d3ab25629   dapr/daprd       "./daprd --app-id=pr…"
```

Demo: Deploying Dapr App using Score





That’s a wrap!

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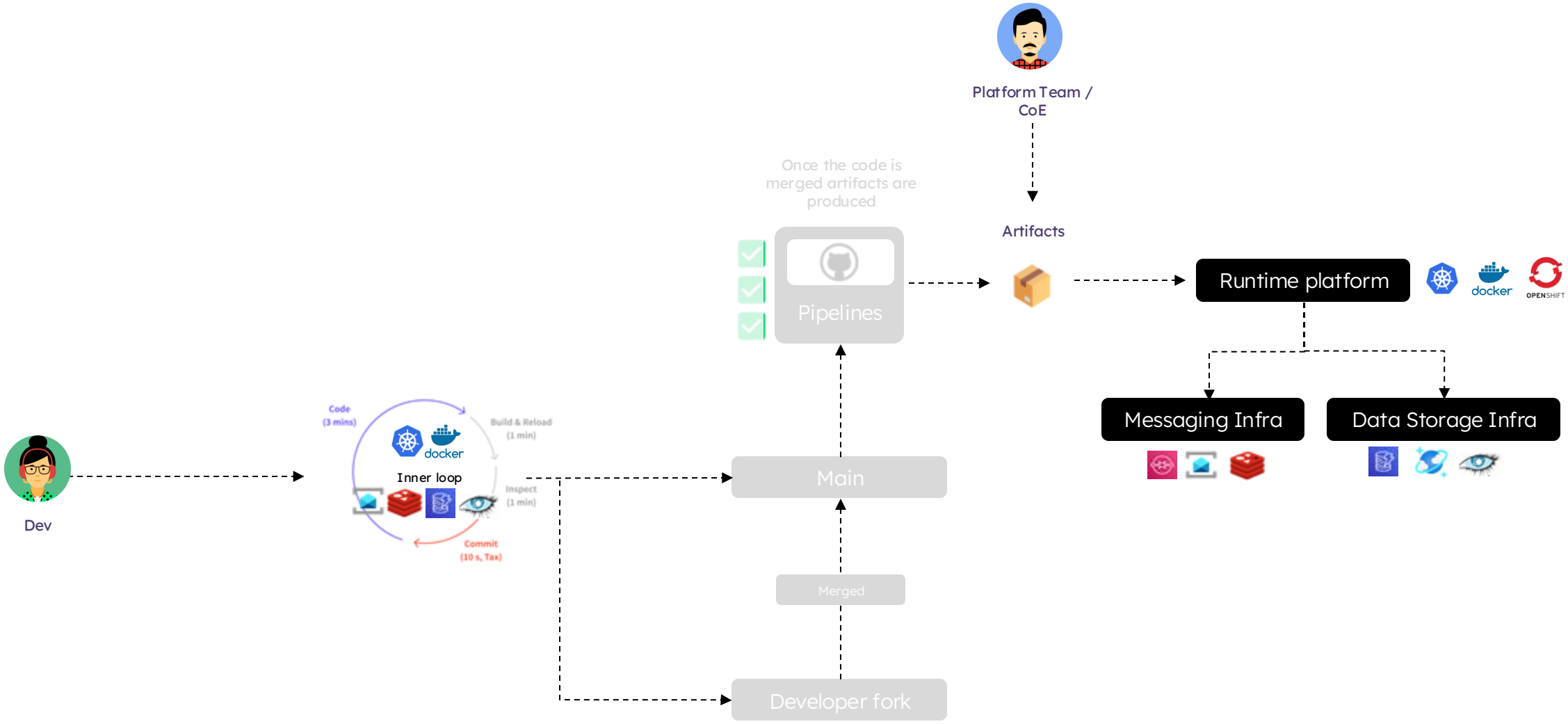
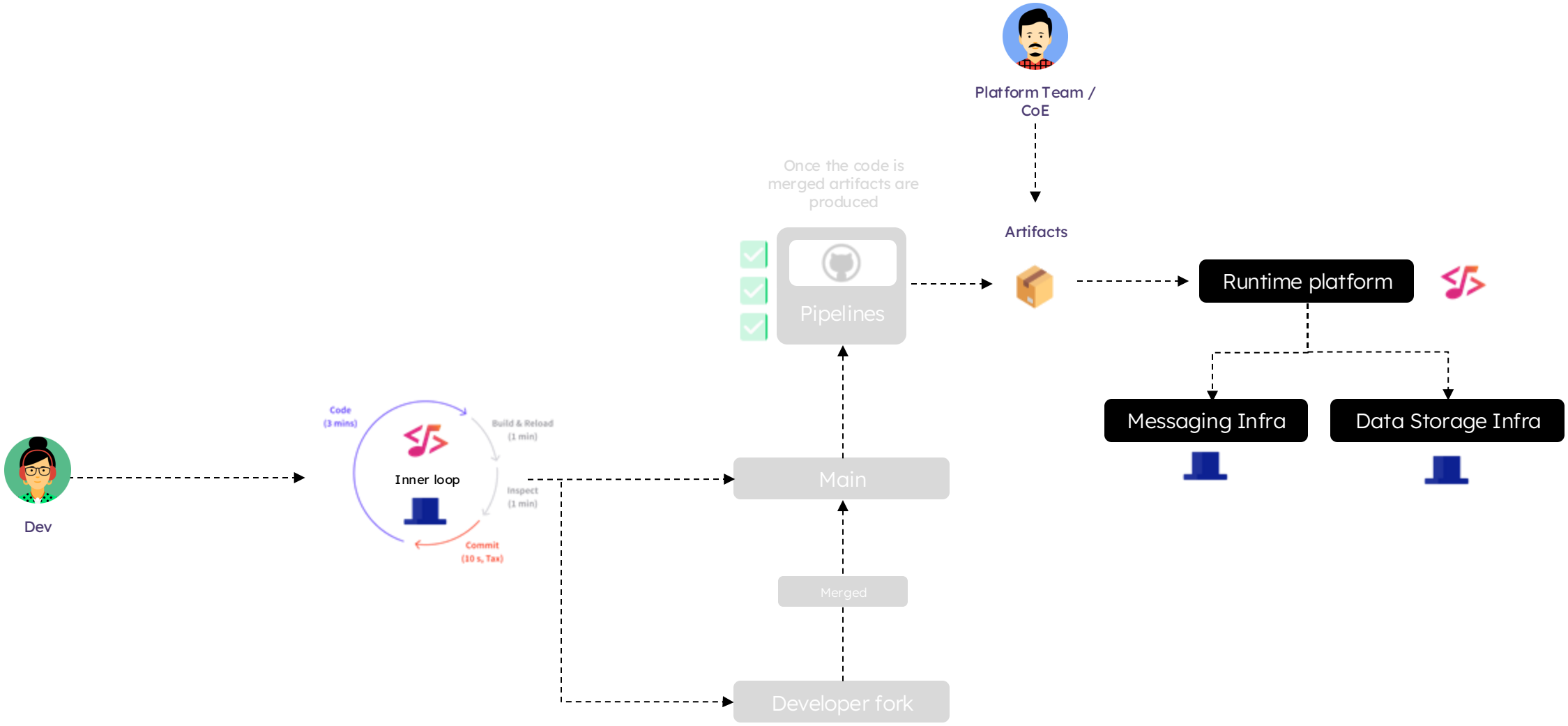
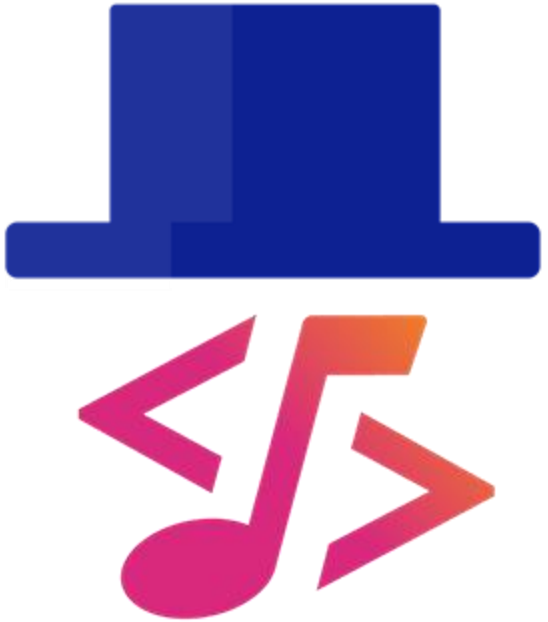


Solving complexity with consistent abstraction interfaces



Next steps

- Demo's source code: kendallroden/kubecton-dapr-score-demo
- **Dapr Kiosk: 8A**
  - *More about Dapr at KubeCon.*
- **Score Kiosk: 2A** (Thu April 3rd - 10:30-13:30)
  - *More about Score at KubeCon.*



Evaluate the session, please!

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