Site Reliability Engineering, Troubleshooting, and Canary Deployments with Istio

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- Dynamicity of microservice-based cloud applications: how does a new version of a microservice affect the entire app?
  - ➢ Need for fine-grain, holistic canary comparisons
- Modern cloud architectures: platform—application separation is blurred
  - ➢ Need for help distinguishing app and infrastructure problems: who is to blame? the cloud or the app?

Istio

Version-aware routing

- Istio splits traffic between two versions of a microservice: **current** and **canary**

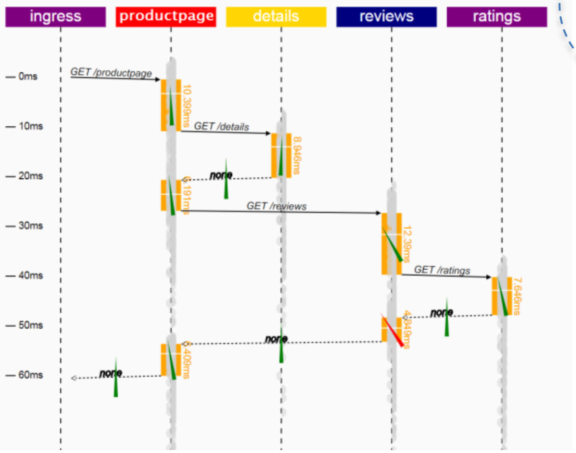
Application-level telemetry

- Inter-service calls latency, errors, and timeouts
- Application-topology discovery

Istio Analytics: fine-grain canary comparisons

- Separates **communication** from **processing**
- Statistically aggregates inter-service calls
- Statistically compares **canary** against **baseline**
- Helps distinguish **app** and **infra** problems

On-demand infrastructure data collection for suspicious endpoints



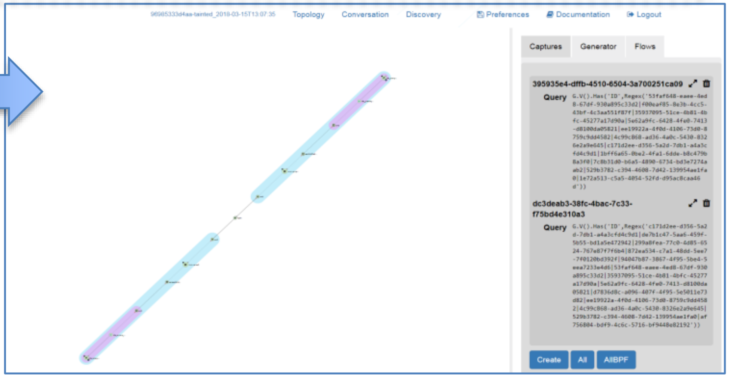
Skydive

Infrastructure-level telemetry

- Low-level network metrics
- Comprehensive cross-layer network topology

Detailed latency analysis

- Cross-layer bottleneck analysis given two endpoints



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529b3782-c394-4608-7d42-139954ae1fa0|af
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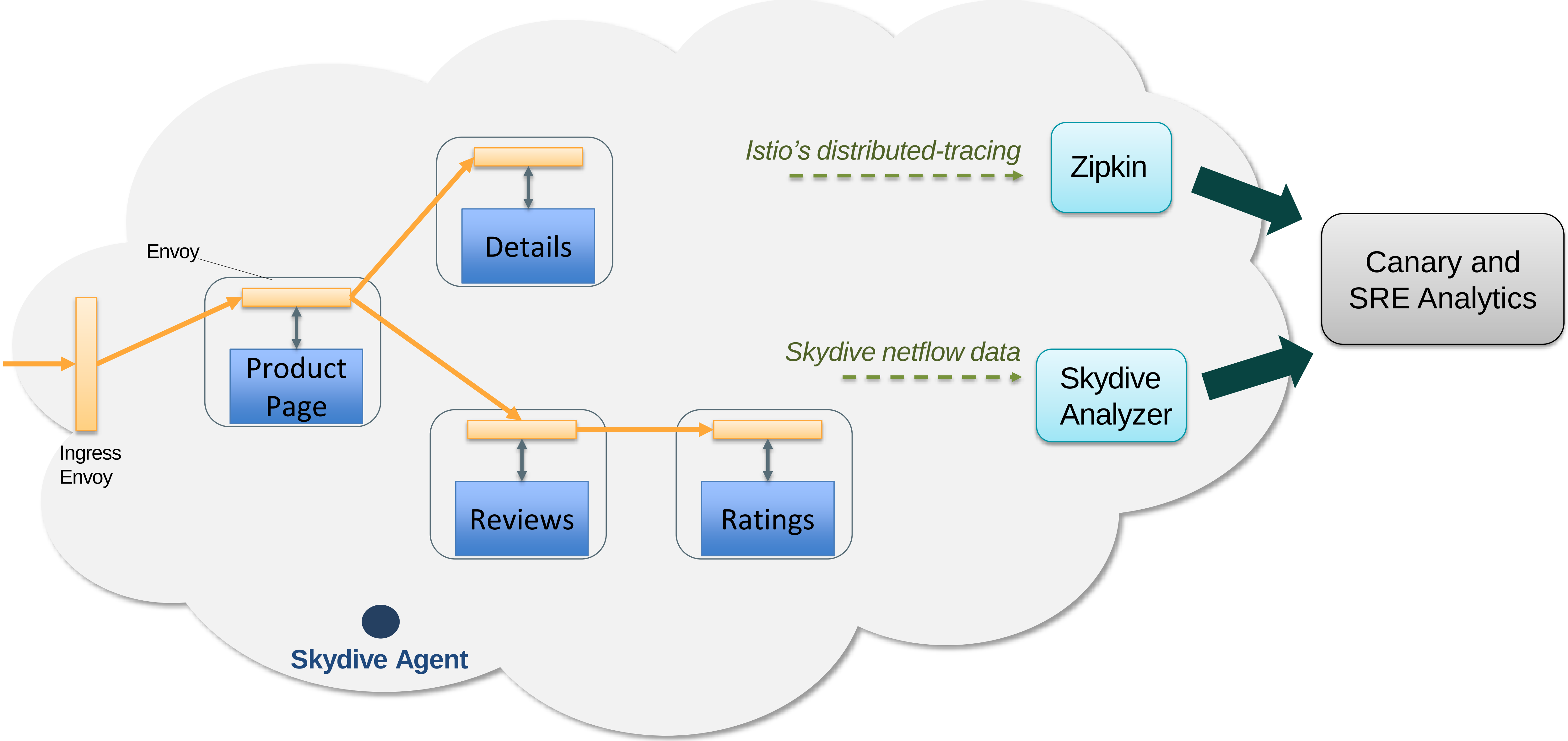
Application running on IBM Cloud Private with Istio



Demo Scenario

- The user deploys a new version of the “reviews” microservice (“v3”) as a **canary**

- Istio is used to split the traffic 50/50 between versions “v3” and “v2” of the “reviews” microservice

- User resorts to our ***Canary and SRE Analytics*** tool
    - Goal: compare the behavior of the entire application
        - “reviews v3” (**canary**) *against* “reviews v2” (**baseline**)
        - Does the code of “reviews v3” is at least as good as that of “v2” (performance and correctness)?
        - Is there any infrastructure problem affecting “reviews v3”?

- Our Canary and SRE Analytics tool helps the user see that:
    - Canary’s code seems ok, but there is a slow down on the network path “productpage”→ “reviews v3”, but not on the path “productpage” → “reviews v2”
    - The network link connecting the Kubernetes pod of “reviews v3” to a logical interface on its host has **high latency**

Demo Scenario 2

- The user deploys a new version of the “reviews” microservice (“v4”) as a **canary**

- Istio is used to split the traffic 50/50 between versions “v4” and “v2” of the “reviews” microservice

- User resorts to our ***Canary and SRE Analytics*** tool
  - Goal: compare the behavior of the entire application
    - “reviews v4” (**canary**) *against* “reviews v2” (**baseline**)
    - Does the code of “reviews v4” is at least as good as that of “v2” (performance and correctness)?
    - Is there any infrastructure problem affecting “reviews v4”?

- Our Canary and SRE Analytics tool helps the user see that:
  - Canary’s code seems slower than the baseline’s. In particular, the time it takes “reviews-v4” to process responses from “ratings” is significantly slower