HashiCorp

Nomad

Nomad 0.10

Secure Service-to-Service Traffic with Consul Connect Integration.

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HashiCorp

Agenda.

Secure Service-to-Service Traffic with Consul Connect Integration.

1. New features in 0.10
2. Network namespaces
3. Consul Connect integration
4. Questions?

New features in Nomad 0.10.

Host Volumes.

Host Volumes.

Define a host volume in the Nomad client configuration.

/etc/nomad.d/client.hcl

```
host_volume "mysql" {
  path = "/opt/mysql/data"
  read_only = false
}
```

Host Volumes.

Then use that volume in your Nomad jobs.

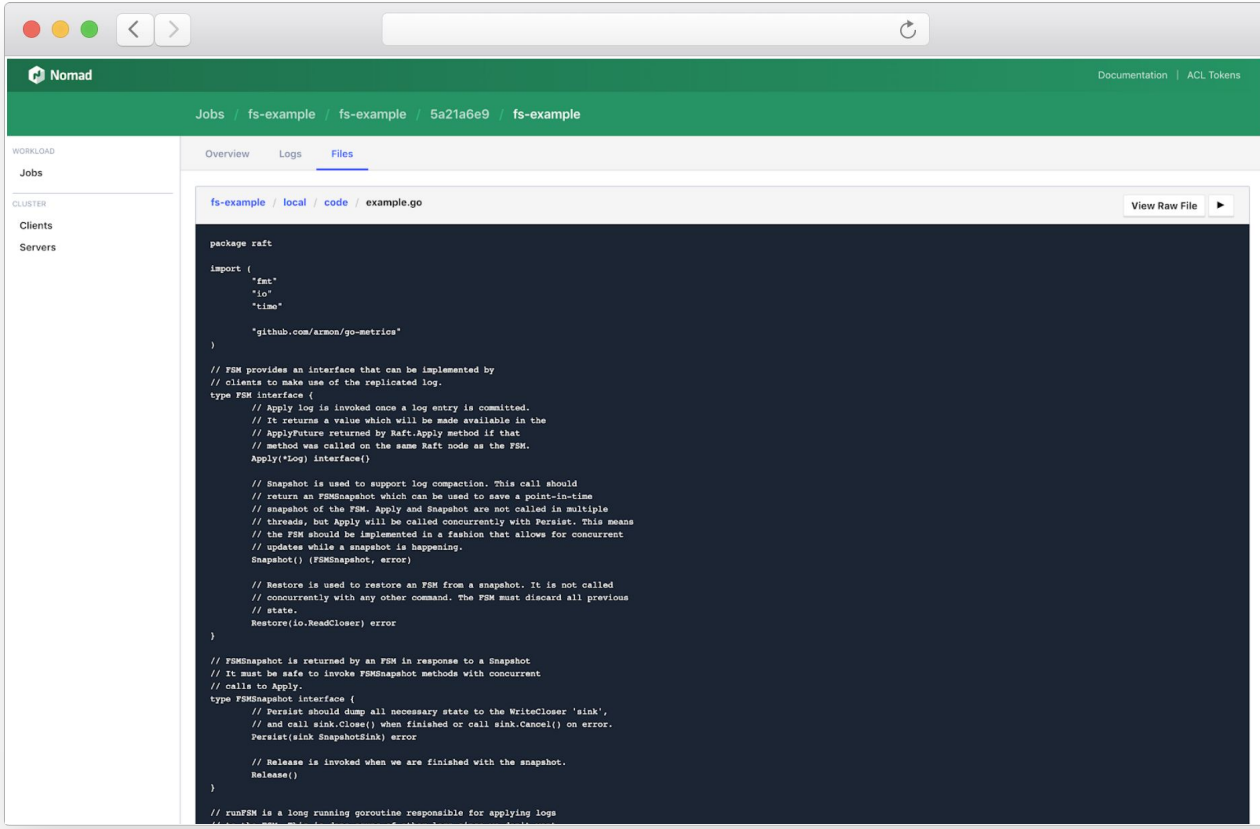
jobs/mysql.hcl

```
job "mysql-server" {
  ...
  group "mysql-server" {
    ...
    volume "mysql" {
      type = "host"
      source = "mysql"
      read_only = false
    }

    task "mysql-server" {
      ...
      volume_mount {
        volume = "mysql"
        destination = "/var/lib/mysql"
        read_only = false
      }
    }
  }
}
```

Allocation File Explorer.

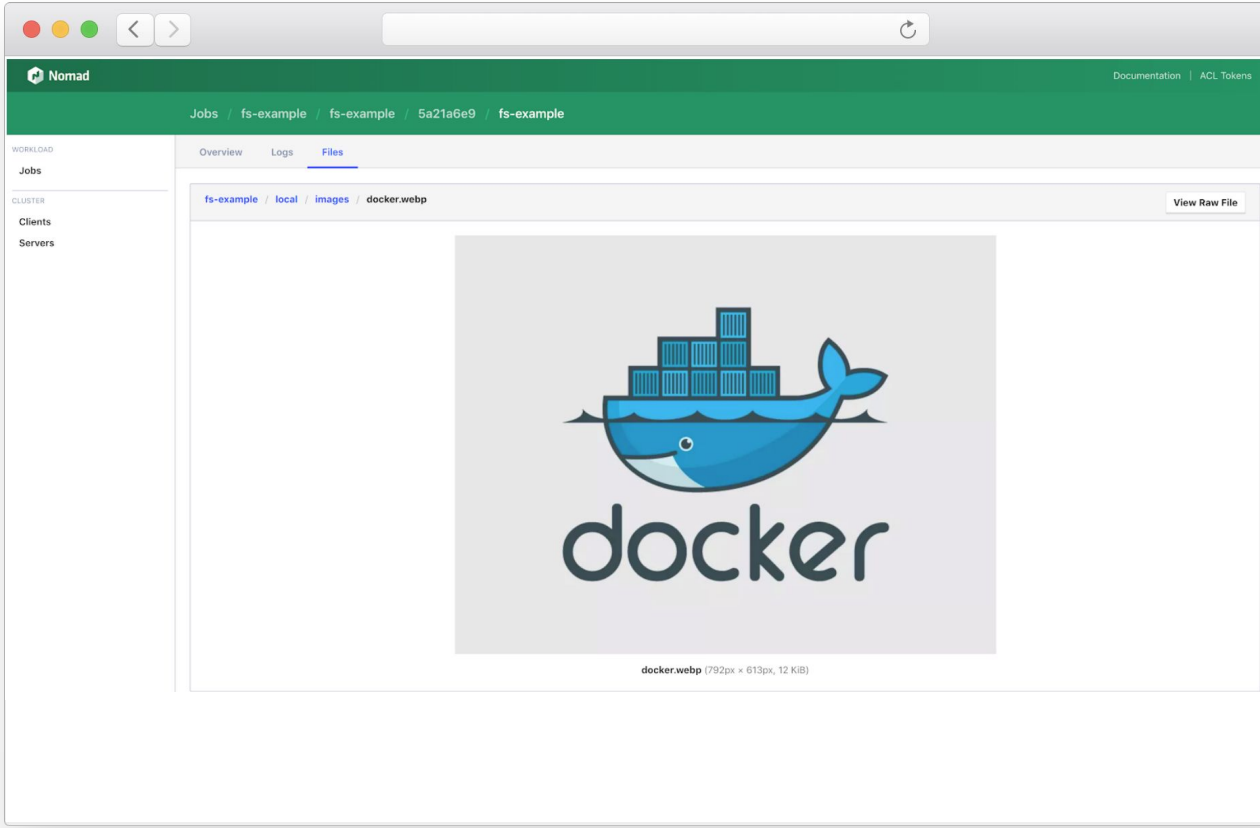
Allocation File Explorer.

Explore code and log files from within the Nomad UI.



Allocation File Explorer.

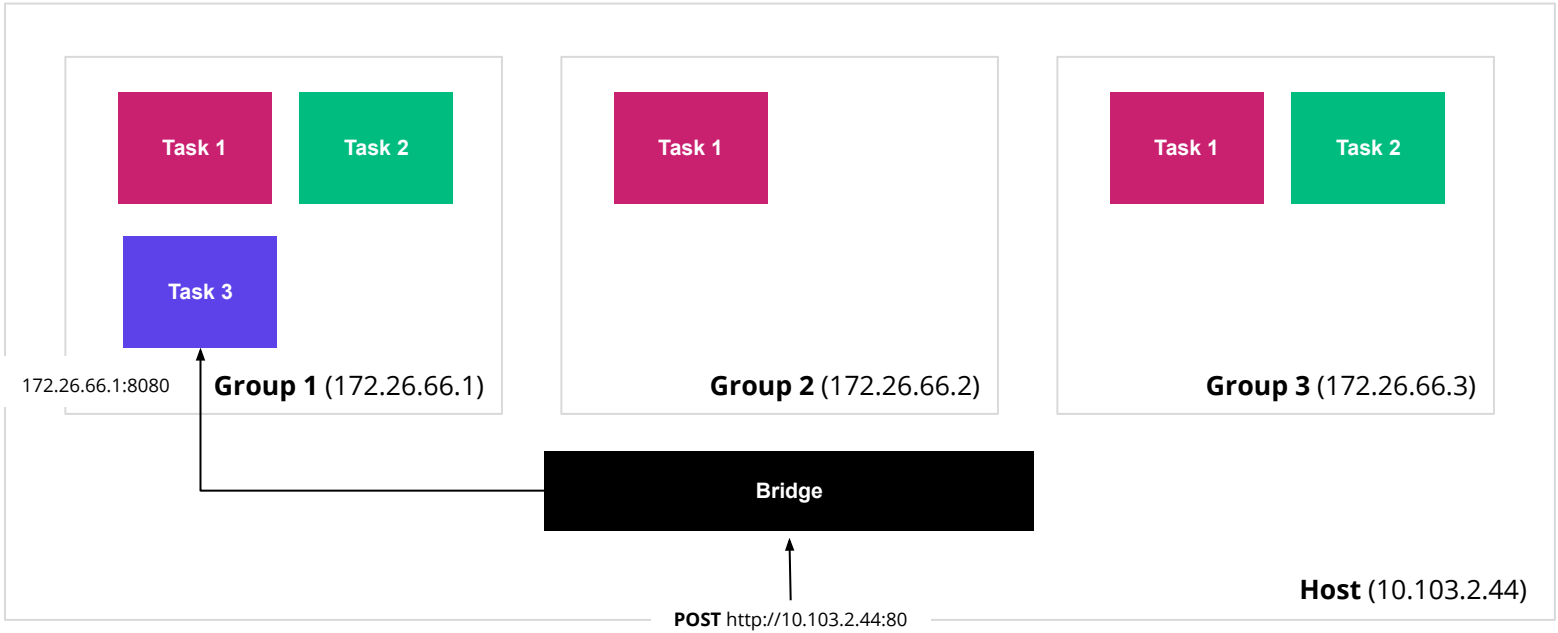
Browse rich media files from within the Nomad UI.



Network namespaces.

Network namespaces.

Shared networking among tasks of an allocation.



Network Modes.

bridge

- Shared network stack
- Virtual interface to host bridge
- Egress NAT rules
- Ingress port mapping

host

- Host network stack
- No port mapping

none

- Shared network stack
- No egress/ingress
- Loopback only

Network Stanza.

Specify the network stanza at the group level and set the mode to bridge.

jobs/api.hcl

```
job "api" {
  ...
  group "api" {
    ...
    network {
      mode  = "bridge"
    }
  }
}
```

Network Stanza.

Ports can be exposed on the host machine by specifying a static local port and a destination inside the namespace.

jobs/api.hcl

```
job "api" {
  ...
  group "api" {
    ...
    network {
      mode  = "bridge"

      port "http" {
        static = "9090"
        to = "9090"
      }
    }
  }
}
```

Network Stanza.

Each task will join the host network namespace and a shared network namespace is not created.

jobs/api.hcl

```
job "api" {
  ...
  group "api" {
    ...
    network {
      mode  = "host"
    }
  }
}
```

Network Stanza.

The network stack can be shared across multiple drivers that support it.

Demo.

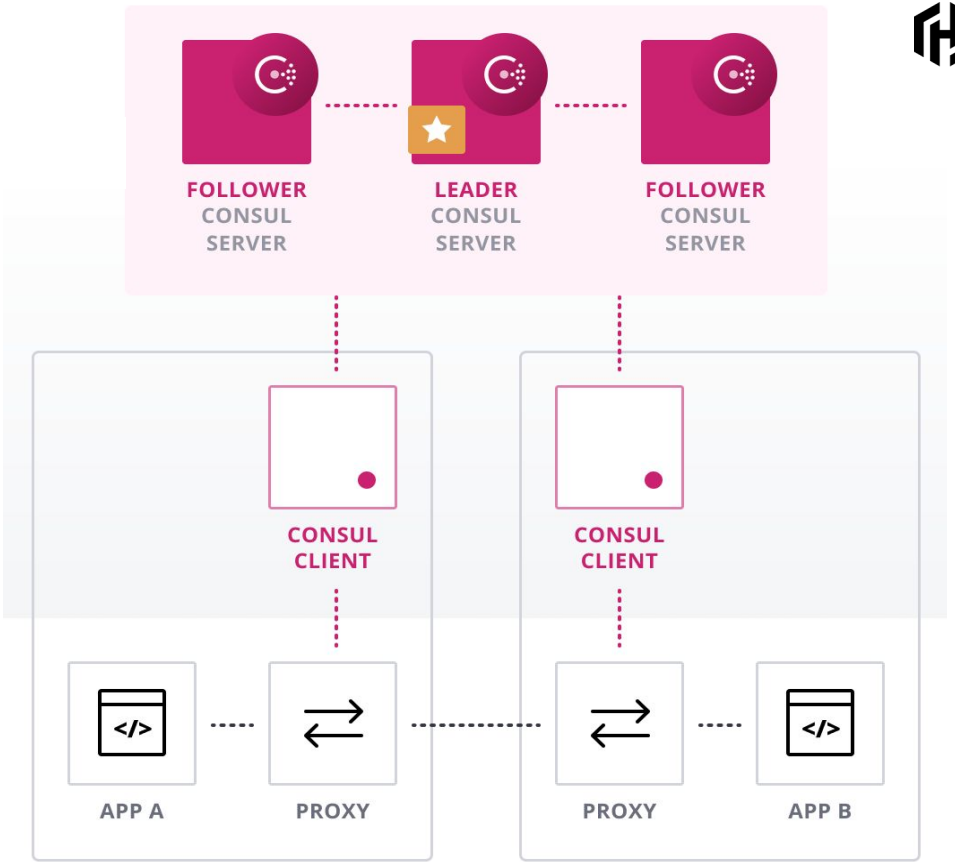
Consul Connect integration.

Connect.

Service Mesh

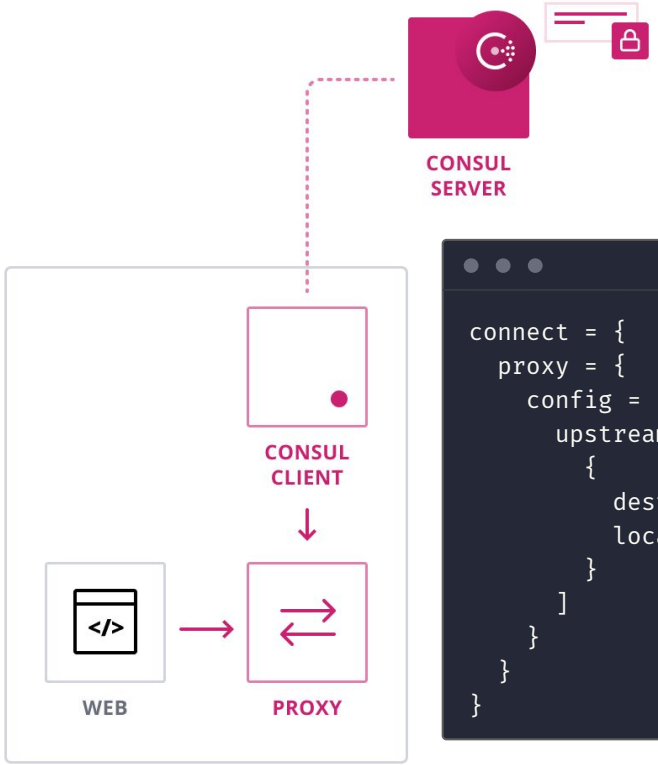
The **Control Plane** is responsible for Service Discovery, Authorization and configuring the proxies of the Data Plane.

The **Data Plane** is responsible for connecting services and routing data between them.



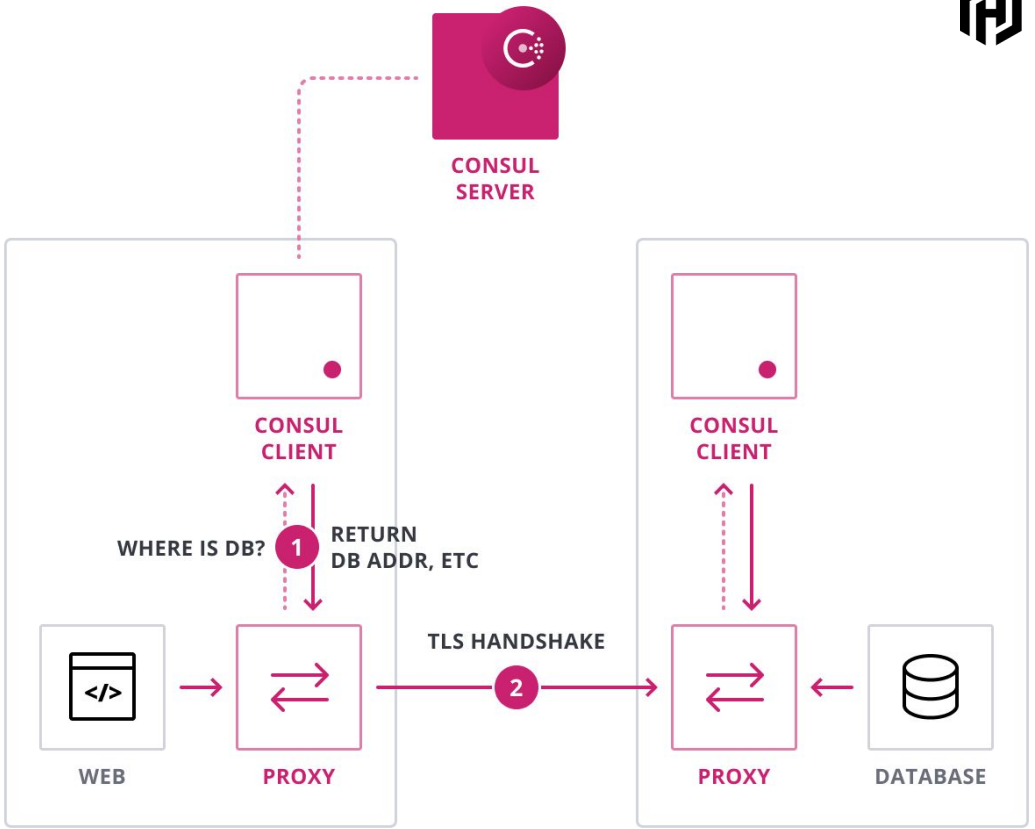
Configuration

- A proxy is **co-located** with the service instance that proxies inbound traffic.
- The Client agent **instantiates** the proxy and **registers** it as a service.
- The proxy is **configured** with a port that is used for the service and ports for any upstream destination that the service wants to connect to.



Service Discovery

- The proxy of the web service uses service discovery to **request the location** of the DB.
- The local agent **returns the proxy's IP address/port** of a healthy DB instance.



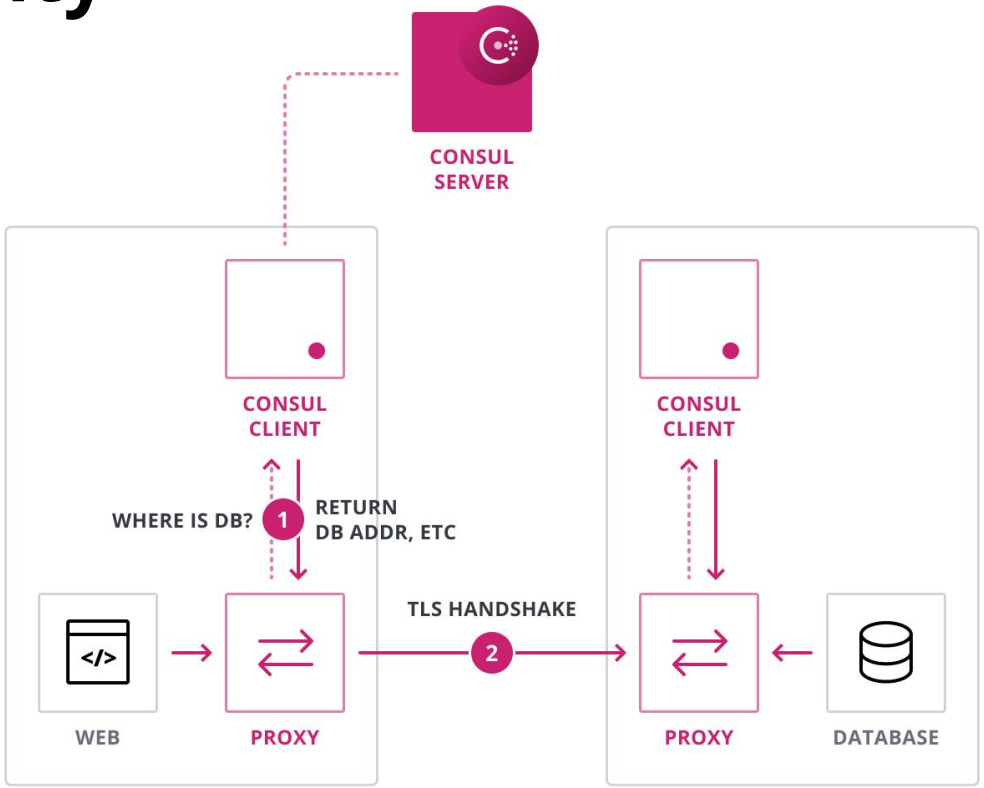
Service based security.

Intentions

The service access graph defines which services are **allowed or denied from communicating through intentions**.

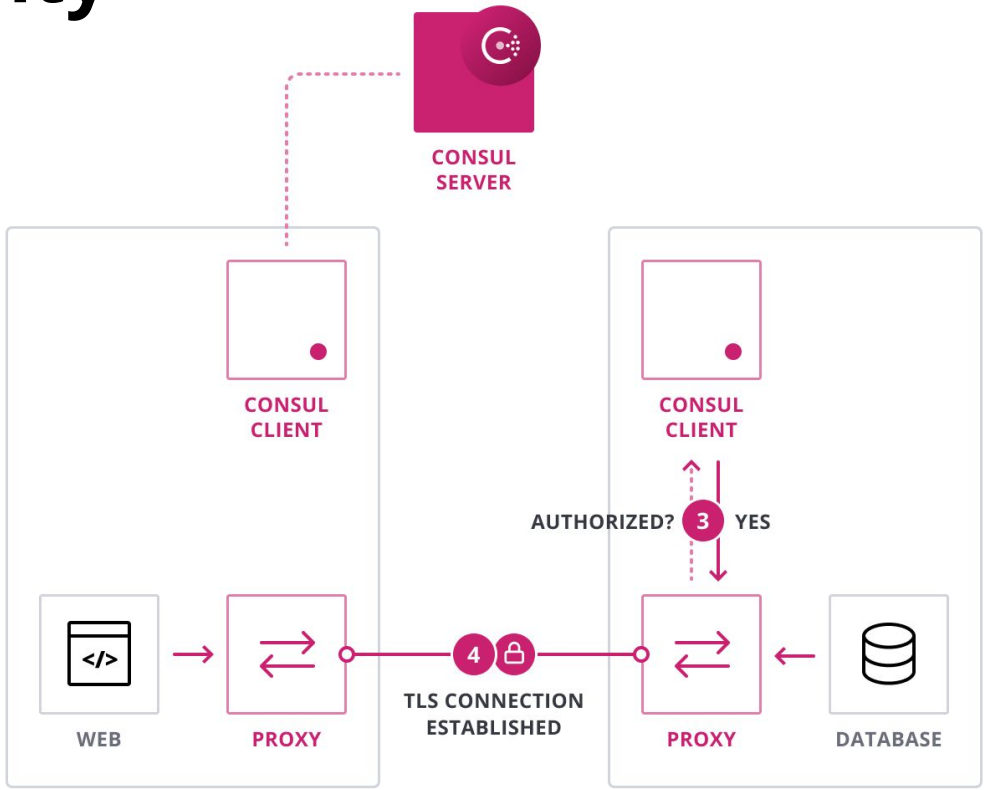
Service based security

- The local agent also returns the URI for the **expected identity** of the service it is connected to.
- Proxies between web and database start TLS handshake to **authenticate the identity**.



Service based security

- The DB proxy sends the **authorization request** to its local agent.
- The local agent **authorizes the connection** based on locally cached intention.
- **Mutual TLS** is established.



Service Stanza.

Service Stanza.

The service stanza can now be defined on a task group.

Use the **connect** and **sidecar_service** stanza to inject a sidecar proxy into your task group.

jobs/api.hcl

```
job "api" {
  ...
  group "api" {
    ...
    service {
      name = "api"
      port = 9090

      connect {
        sidecar_service {}
      }
    }
  }
}
```

Service Stanza.

Upstreams can be defined on the sidecar service to allow communication between connect enabled services.

jobs/api.hcl

```
job "api" {
  ...
  group "api" {
    ...
    service {
      name = "api"
      port = 9090

      connect {
        sidecar_service {
          proxy {
            upstreams {
              destination_name = "payments"
              local_bind_port = 9091
            }
          }
        }
      }
    }
  }
}
```

Service Stanza.

Extra **proxy configuration** can be defined that's opaque to Nomad and is passed directly to Consul.

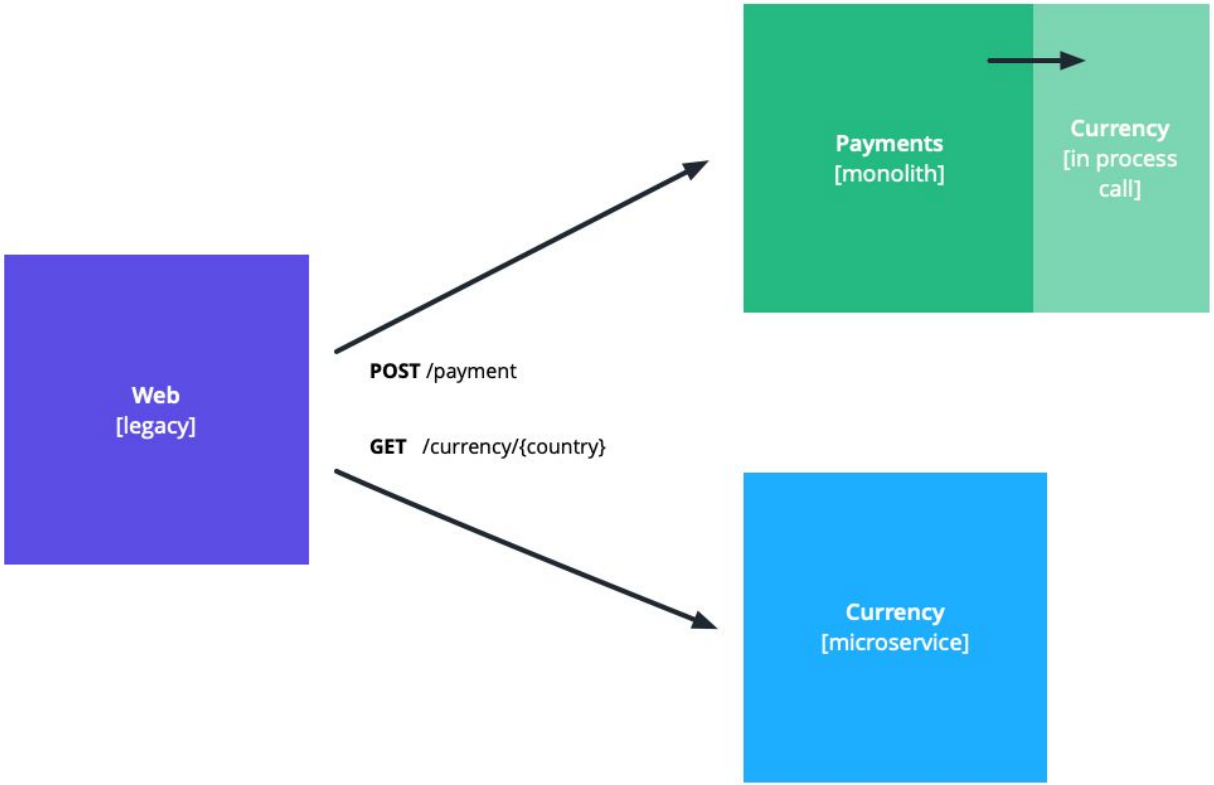
jobs/api.hcl

```
job "api" {
  ...
  group "api" {
    ...
    service {
      name = "api"
      port = 9090

      connect {
        sidecar_service {
          proxy {
            upstreams {
              destination_name = "payments"
              local_bind_port = 9091
            }

            config {
              protocol = "http"
              envoy_dogstatsd_url = "udp://127.0.0.1:9125"
            }
          }
        ...
```

Migrate from monolith to microservices.

Current state

Desired state



Discovery Chain

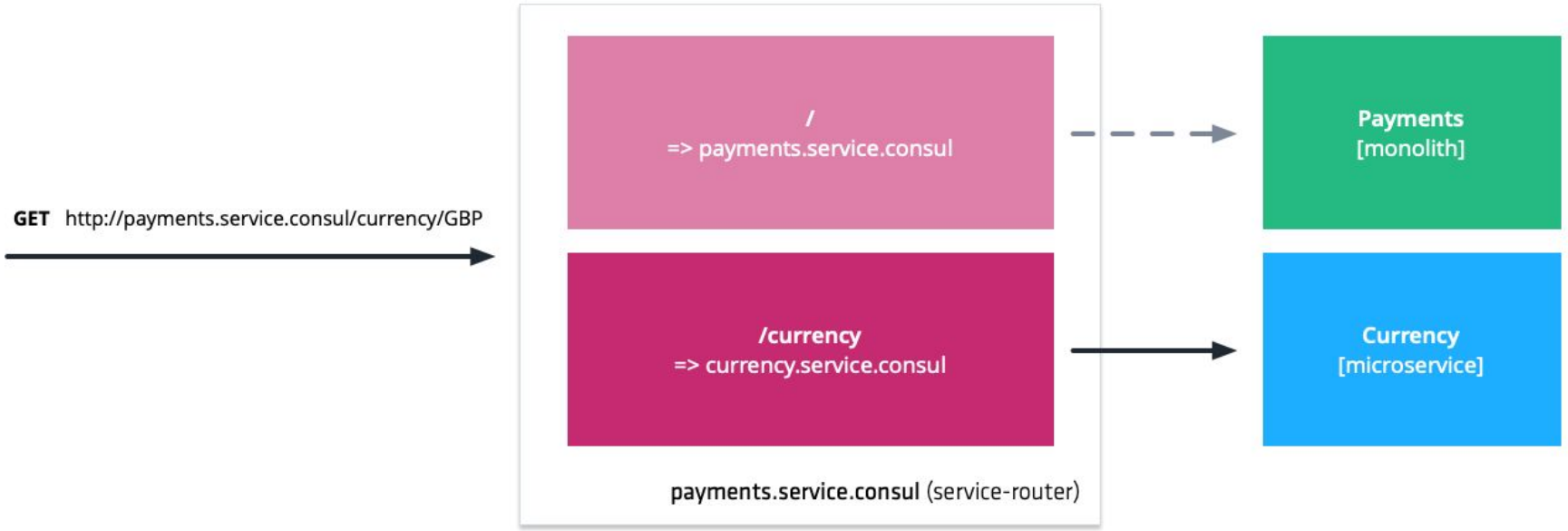
Use L7 criteria such as **path prefixes** or **http headers**, and send traffic to a different service or service subset.

Split incoming requests across **different subsets** of a single service, or across **different services**.

Define which instances of a service should **satisfy discovery requests** for the provided name.

Traffic Routing

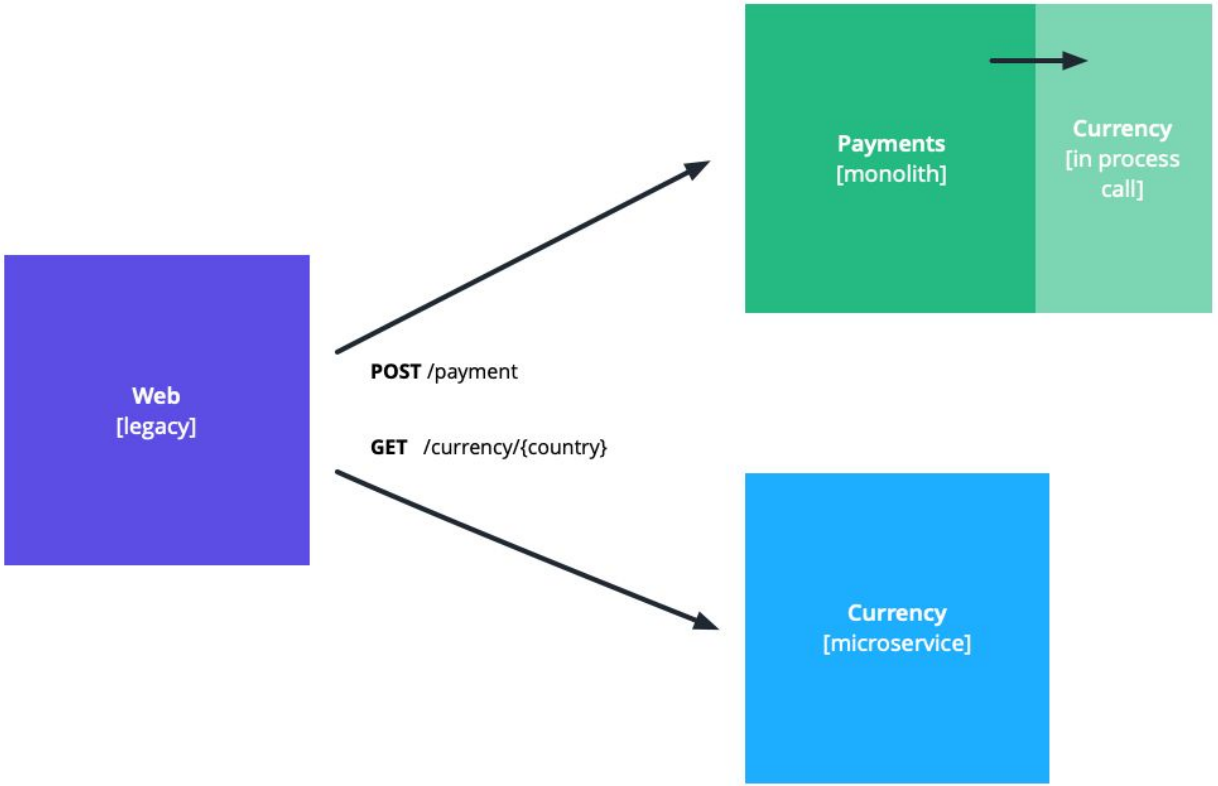
Service Router



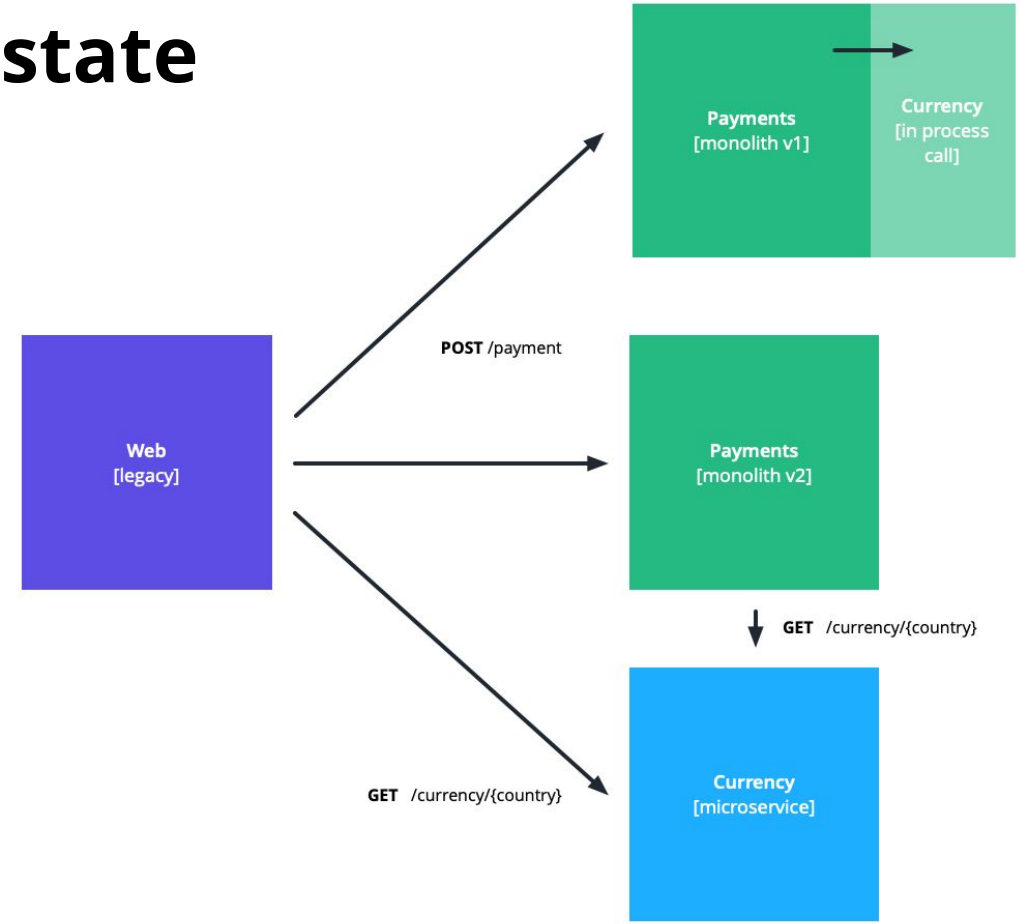
Demo.

A/B testing.

Current state

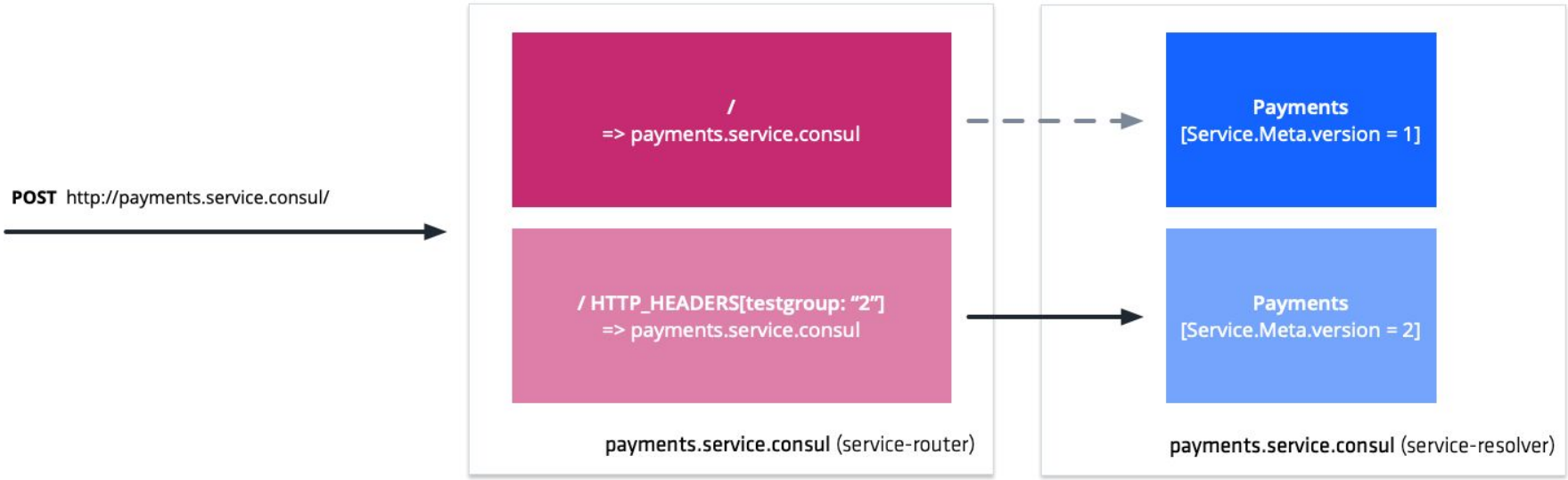


Desired state



Traffic Resolver

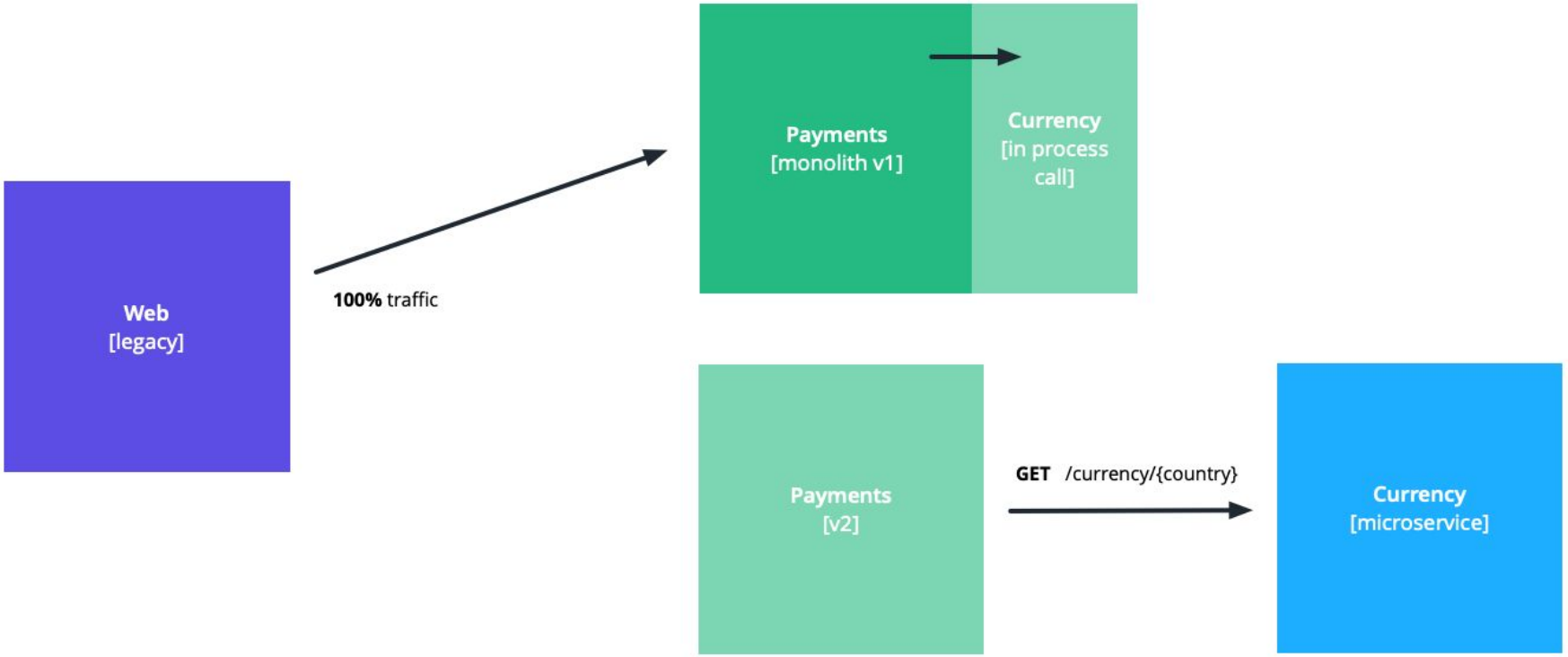
Service Router



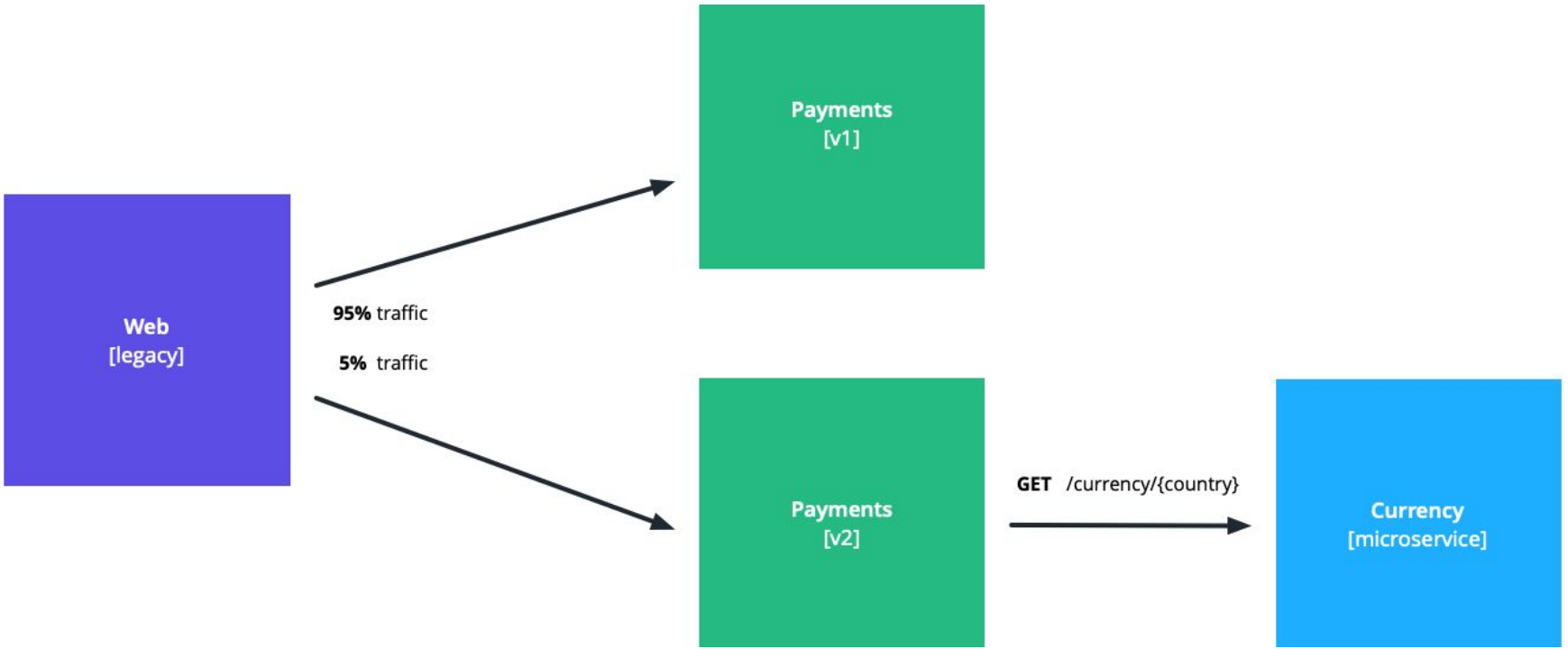
Demo.

Canary release.

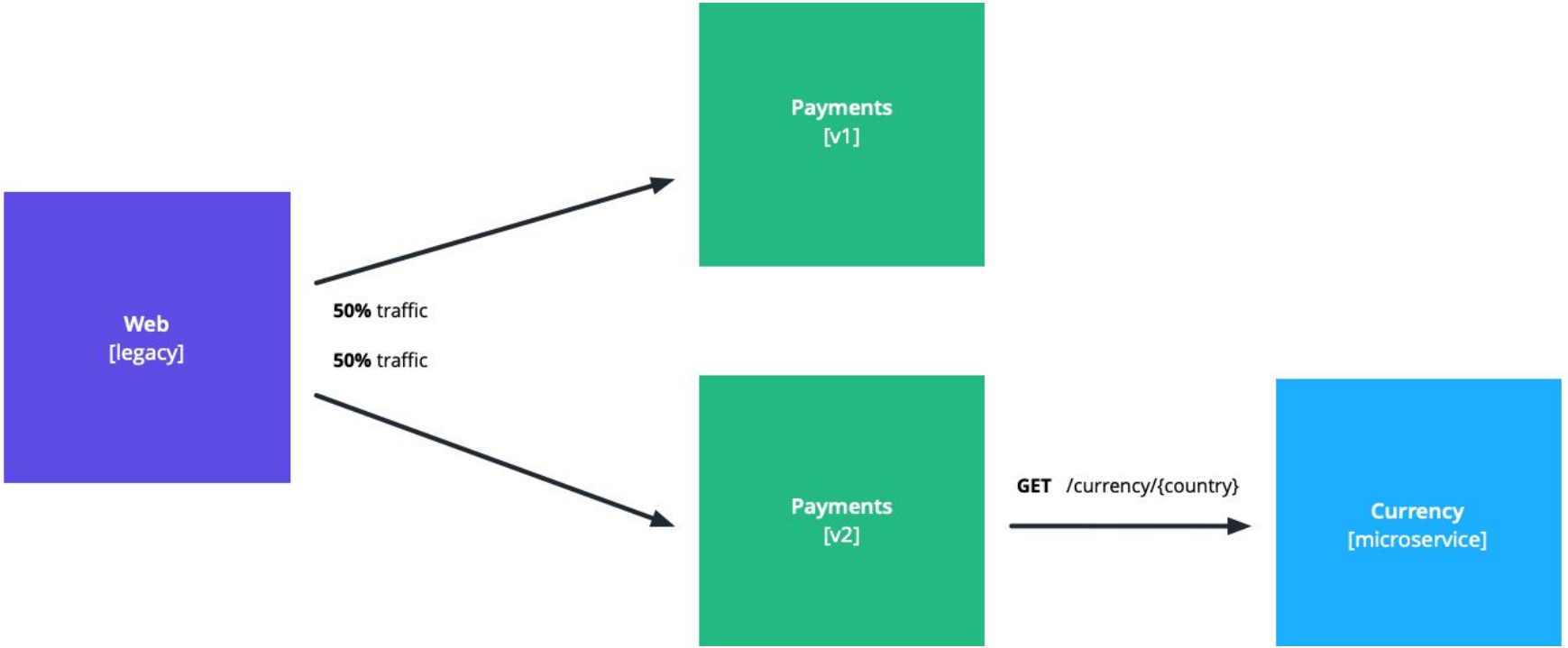
Current state



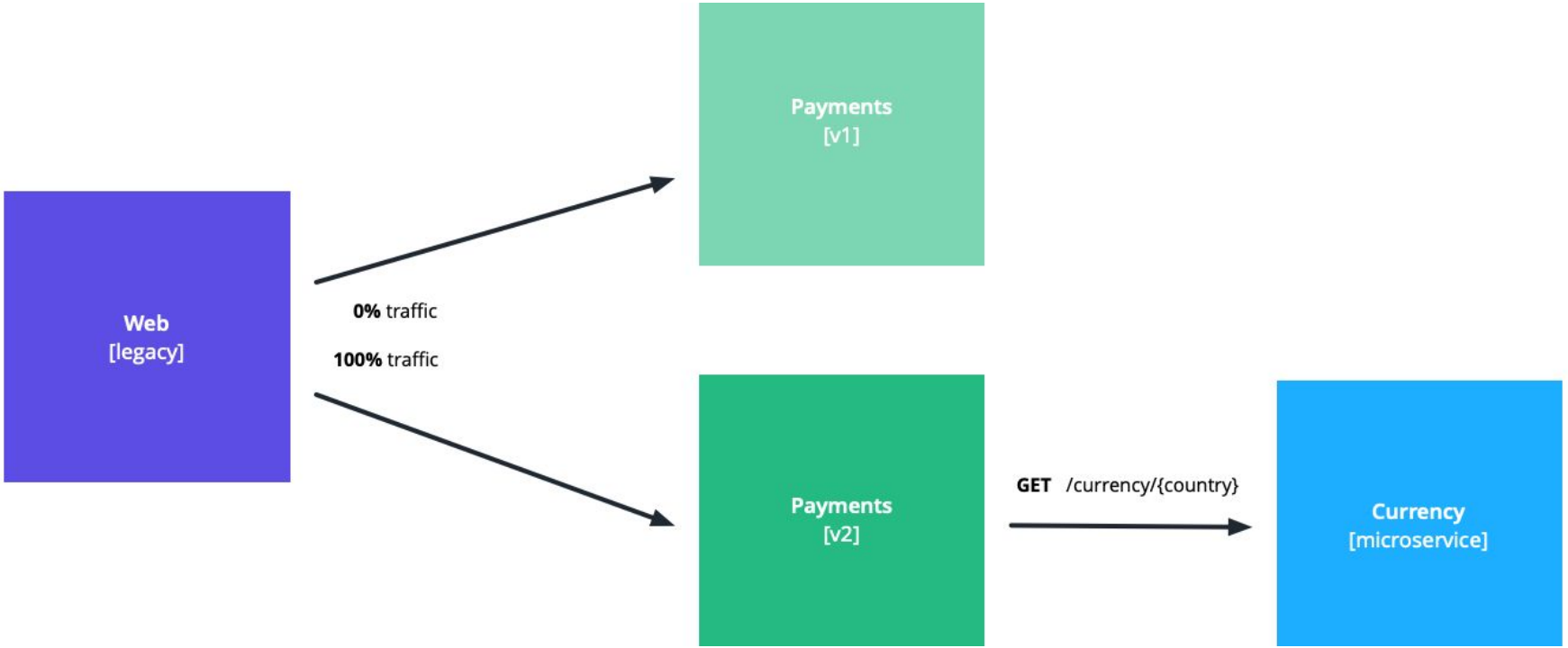
Desired state



Desired state

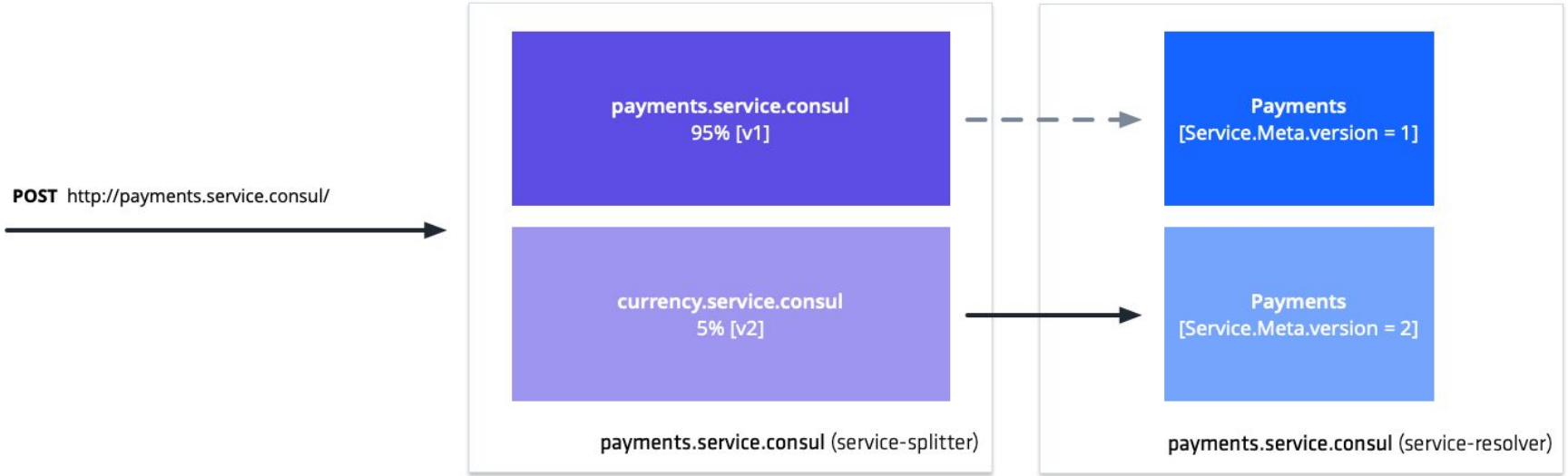


Desired state



Traffic Splitting

Service Splitter



Demo.

Thank You

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Questions?