KPLABS Course

HashiCorp Certified: Consul Associate

Service Discovery

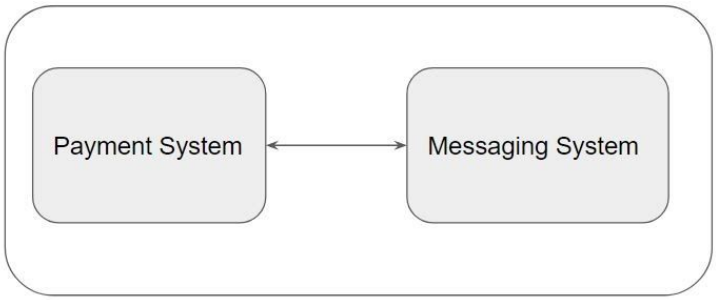
ISSUED BY
Zeal

REPRESENTATIVE
instructors@kplabs.in

Module 1: Overview of Service Discovery

1.1 Service Discovery in Monolithic Application

If two sub-systems in a monolithic application want to communicate with each other, it is very straight forward.



Complete Application

1.2 Service Discovery in Distributed Systems

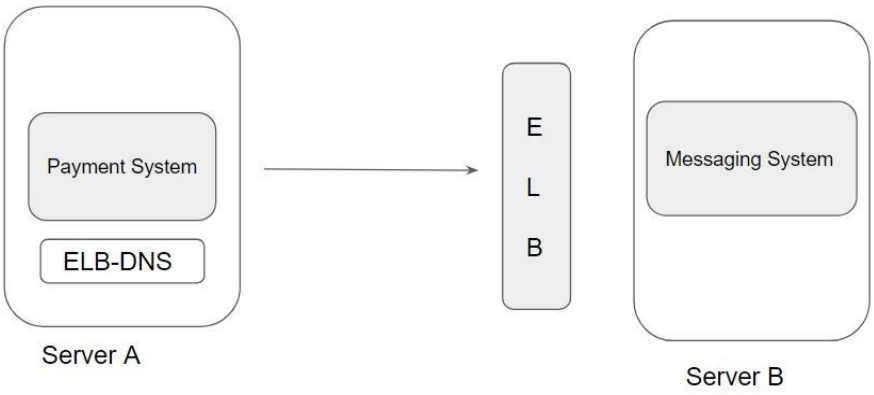
Since services are no longer part of the same application, there is a challenge involved in discovering other services.

There is also latency that is involved as networking comes into the picture.

1.3 Traditional Solution - Load Balancers

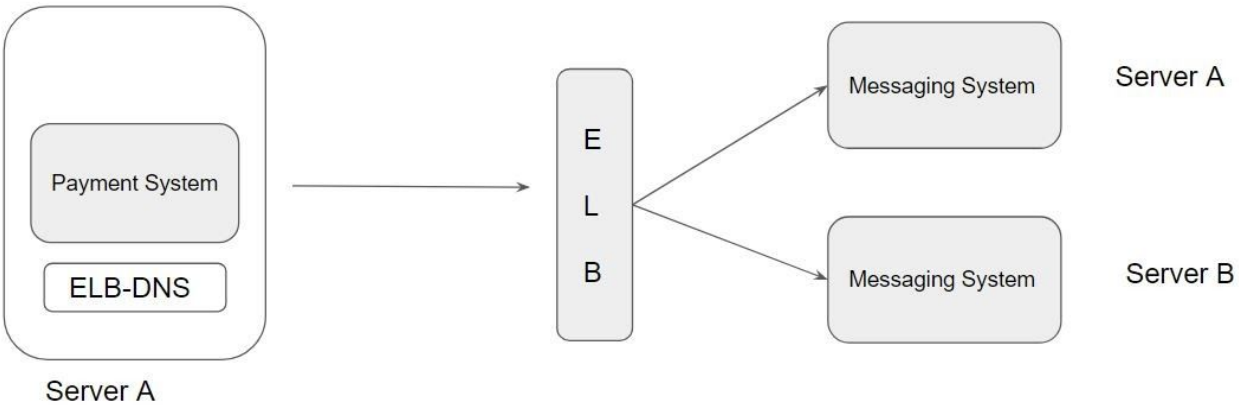
Load Balancers are used in-front of each service.

The caller service has details of the DNS of the Load balancer of the destination service.



1.4 Benefits of Load Balancers

Load Balancer based architecture also comes with various benefits like the ability to scale service, SSL termination at ELB, and others.



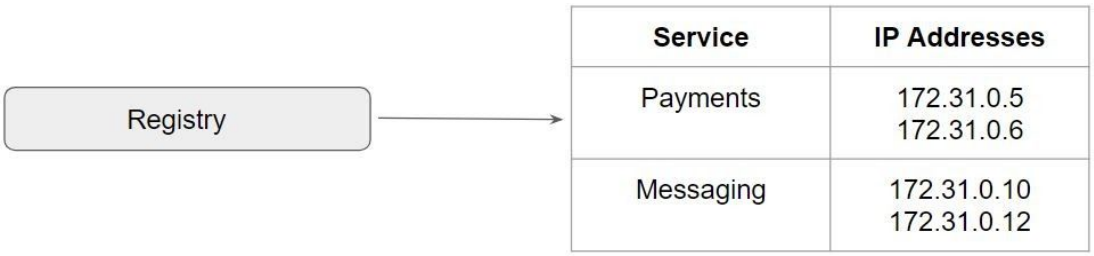
1.5 Challenges with Load Balancers

- Load Balancer needs to be managed for each individual service.
- Single Point of Failure
- Increased Latency

1.6 Consul for Service Discovery

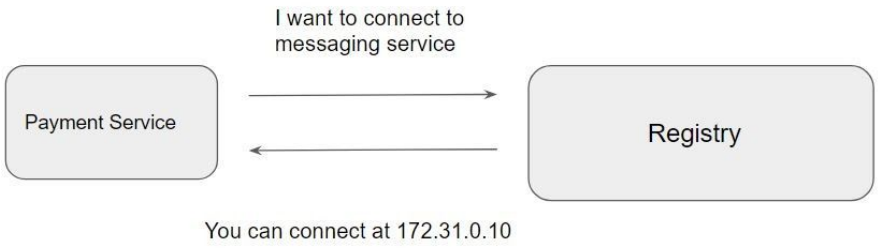
With the Consul service discovery feature, there is a registry that is maintained.

This registry contains all the information about other services.



1.7 Payments Service to Messaging Communication

If a service wants to connect to a messaging service, it can query the registry and find the latest set of IP addresses for the messaging service.



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Module 2: Implementing Service Discovery

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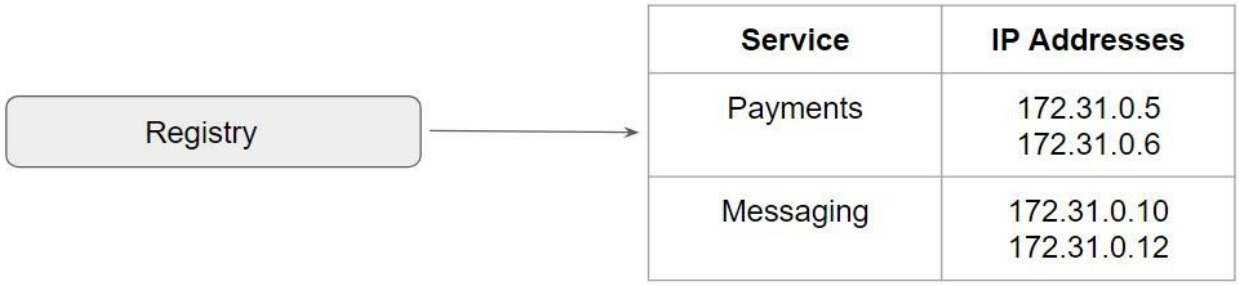


2.1 2 Areas to Service Discovery

There are three key areas in the overall service discovery process:

- Registering a service
- Finding services
- Monitoring services.

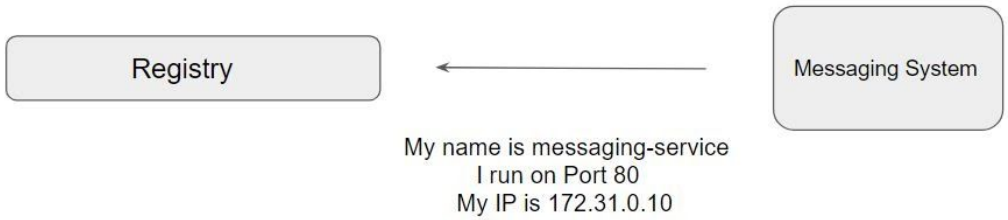
We need to get all these areas right for a perfect service discovery feature. And, it's easy :)

Step 1: Registering A Service

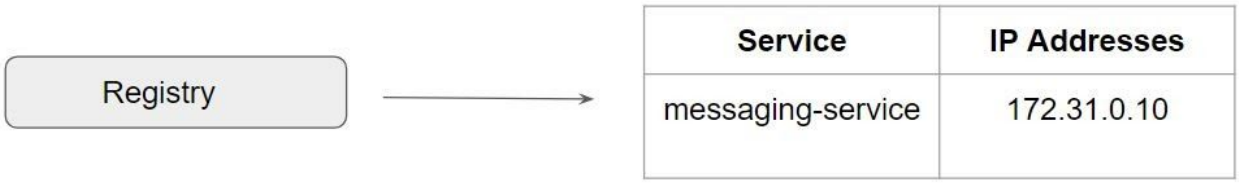
One of the main goals of service discovery is to provide a catalog of available services.

We have to write a simple service definition file to declare the availability of a service.

Consul Agent will forward the information to the Server.



After you have written a service definition file, consul agent will communicate with the cluster so that the service is registered.



Step 2: Finding Services

One of the primary query interfaces for Consul is DNS.

```
[root@consul-01 ~]# dig @localhost -p 8600 messaging-service.service.consul

; <<>> DiG 9.11.13-RedHat-9.11.13-6.el8_2.1 <<>> @localhost -p 8600 messaging-service.service.consul
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 58801
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;messaging-service.service.consul. IN   A

;; ANSWER SECTION:
messaging-service.service.consul. 0 IN  A       206.189.135.92
```

Module 3: Service Health Checks

One of the primary roles of the agent is the management of system-level and application-level health checks.

A health check is considered to be application-level if it is associated with a service

Health Check Types	Description
Script + Interval	These checks depend on invoking an external application that performs the health check, exits with an appropriate exit code, and potentially generates some output.
HTTP + Interval	These checks make an HTTP GET request to the specified URL, waiting the specified interval amount of time between requests The status of the service depends on the HTTP response code: any 2xx code is considered passing
TCP + Interval	These checks make a TCP connection attempt to the specified IP/hostname and port, waiting interval amount of time between attempts

3.1 Script Checks

A check script is generally free to do anything to determine the status of the check.

The only limitations placed are that the exit codes must obey this convention:

Exit Code	Description
0	Check is passing
1	Check is warning
Any other code	Check is failing

3.2 Important Pointer - Service Health Checks

Consul will only return hosts that are healthy.