Service Discovery

In this lesson, we'll study service discovery with Consul.

WE'LL COVER THE FOLLOWING

Consul is a service discovery technology that ensures microservices can communicate with each other.

Distinguishing features

Consul has some features that set it apart from other service discovery solutions.

HTTP REST API & DNS support

Consul has an *HTTP REST API* and supports **DNS**.

- DNS (Domain Name System) is the system that maps host names such as www.innoq.com to IP addresses on the Internet.
- In addition to returning IP addresses, it can return ports at which a service is available.

- This is a feature of the SRV DNS records.

Configuration file generation

With Consul Template, Consul can generate configuration files.

- The files may contain IP addresses and ports of services registered in Consul.
- *Consul Template* also provides Consul's service discovery to systems that cannot access Consul via the API.
- The systems have to use some kind of configuration file, which they often already do anyway.

Health checks

Consul can perform **health checks** and exclude services from service discovery when the health check fails.

- For example, a health check can be a request to a specific HTTP resource to determine whether the service can still process requests.
- A service may still be able to accept HTTP requests, but it may not be able to process them properly due to a database failure.
- The service can signal this through the health check.

Replication

Consul supports **replication** and can ensure high availability.

If a Consul server fails, other servers with replicated data take over and compensate for the failed server.

Multiple data centers

Consul also supports **multiple data centers**.

- Data can be replicated between data centers to further increase availability and protect Consul against the failure of a data center.
- The search for services can be limited to the same data center.
- Services in the same data center usually deliver higher performance.

Service configuration

Finally, Consul can be used not only for service discovery, but for the **configuration of services**.

- Configuration has different requirements.
- Availability is important for service discovery.
- Faulty information can be tolerated.
- If the service is accessed and is not available, it doesn't matter. You can simply use another instance of the service.
- However, if services are configured incorrectly, this can lead to errors.
- **Correct information is more important** for configuration than for service discovery.

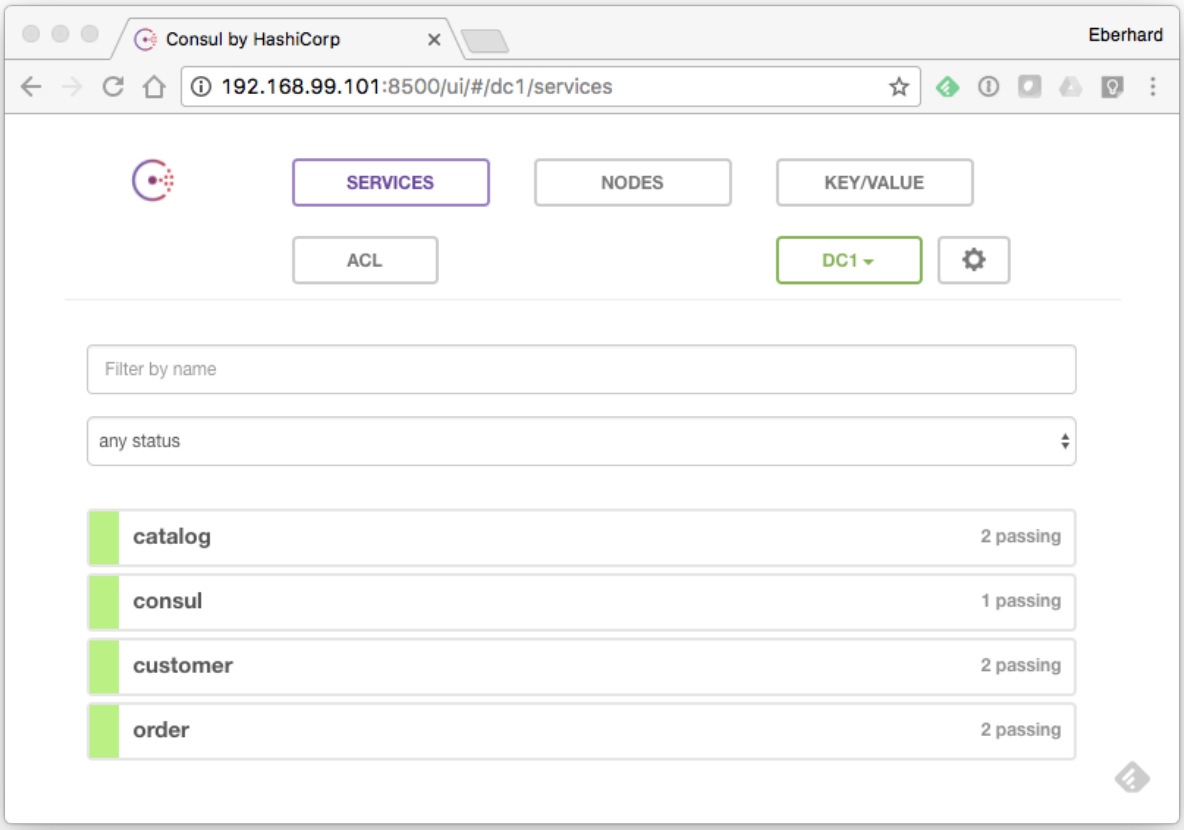
Consul dashboard

Access to the information about registered microservices is provided by Consul in its **dashboard**, see the screenshot below.

It shows **all services** that have registered at the Consul server and the result of their **health checks**.

In the example, all microservices are healthy and can accept requests.

In addition to the registered services, it displays the **servers on which Consul is running** and the **contents of the configuration database**. Access to the dashboard is possible at port `8500` on the Docker host.



Consul Dashboard

Reading data with DNS

It is also possible to access the data from the Consul server via DNS. This can be done, for example, with the tool `dig`. `dig @localhost -p 8600 order.service.consul.` returns the IP address of the order microservice if the Docker containers run on the local computer `localhost`.

Communication to the Consul DNS server takes place via the UDP port 8600. `dig @localhost -p 8600 order.service.consul. SRV` returns the IP address and the port at which the service is available. DNS SRV records are used for this purpose; they are part of the DNS standard and allow you to specify a port for services in addition to the IP address.

Consul Docker image

The example uses a Consul Docker image directly from the manufacturer Hashicorp. It is configured so that Consul only stores the data in the main memory and runs on a single node. This simplifies the setup of the system and reduces resource consumption.

reduces resource consumption.

This configuration is **unsuitable for a production environment** because data can be lost, and a failure of the Consul Docker container would bring the entire system to a standstill. In production, a cluster of Consul servers should be used, and the data should be stored persistently.

QUIZ

1

How can Consul implement a health check on a microservice that lists customers?

COMPLETED 0%

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In the next lesson, we'll discuss Apache httpd.