Pattern: Single Service Instance per Host

Context

You have applied the Microservice architecture pattern (/patterns/microservices.html) and architected your system as a set of services. Each service is deployed as a set of service instances for throughput and availability.

Problem

How are services packaged and deployed?

Forces

- Services are written using a variety of languages, frameworks, and framework versions
- Each service consists of multiple service instances for throughput and availability
- Service must be independently deployable and scalable
- Service instances need to be isolated from one another
- You need to be able to quickly build and deploy a service
- You need to be able to constrain the resources (CPU and memory) consumed by a service
- You need to monitor the behavior of each service instance
- You want deployment to reliable
- You must deploy the application as cost-effectively as possible

Solution

Deploy each single service instance on its own host

Examples

Resulting context

The benefits of this approach include:

- Services instances are isolated from one another
- There is no possibility of conflicting resource requirements or dependency versions
- A service instance can only consume at most the resources of a single host
- Its straightforward to monitor, manage, and redeploy each service instance

The drawbacks of this approach include:

- Potentially less efficient resource utilization compared to Multiple Services per Host (multiple-services-per-host.html) because there are more hosts

Related patterns

- The Multiple Service Instances per Host pattern (multiple-services-per-host.html) is an alternative solution
- The Service Instance per VM pattern (service-per-vm.html) is a refinement of this pattern
- The Service Instance per Container pattern (service-per-container.html) is a refinement of this pattern

- The Serverless deployment pattern (/patterns/deployment/serverless-deployment.html) is an alternative solution.

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