Securing Microservices Using WAF

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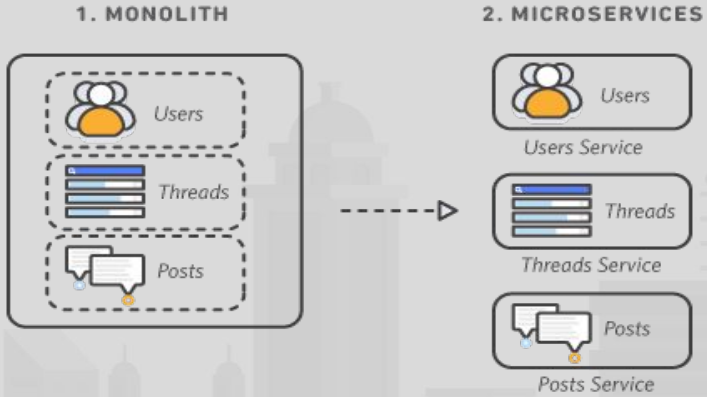
Spring 1401

Microservices

Microservices - also known as the microservice architecture - is an architectural style that structures an application as a collection of services that are:

- Highly maintainable and testable
- Loosely coupled
- Independently deployable
- Organized around business capabilities
- Owned by a small team



The microservice architecture enables the rapid, frequent and reliable delivery of large, complex applications.

Securing Microservices

- Checking for common cluster configuration errors
- Configuring encryption for cluster components
- Using trusted container image repositories
- Configuring access controls to the cluster components
- Checking for common security issues in code during build
- Controlling container privilege
- Encrypting inter-microservice traffic
- …

What is missed?

- Controlling East/West traffic (layers 3 and 4) between Pods within the cluster (aka micro-segmentation)
- Deep inspection of the application traffic (layer 7) between Pods within the cluster (aka IPS or WAF)

The attack surface area can include vulnerabilities buried deep inside the application architecture that can be exploited. These include well-known OWASP top 10 web application attacks such as Cross-site Scripting (XSS), SQL Injection, Remote Code Execution (RCE), API attacks, and more.

ModSecurity

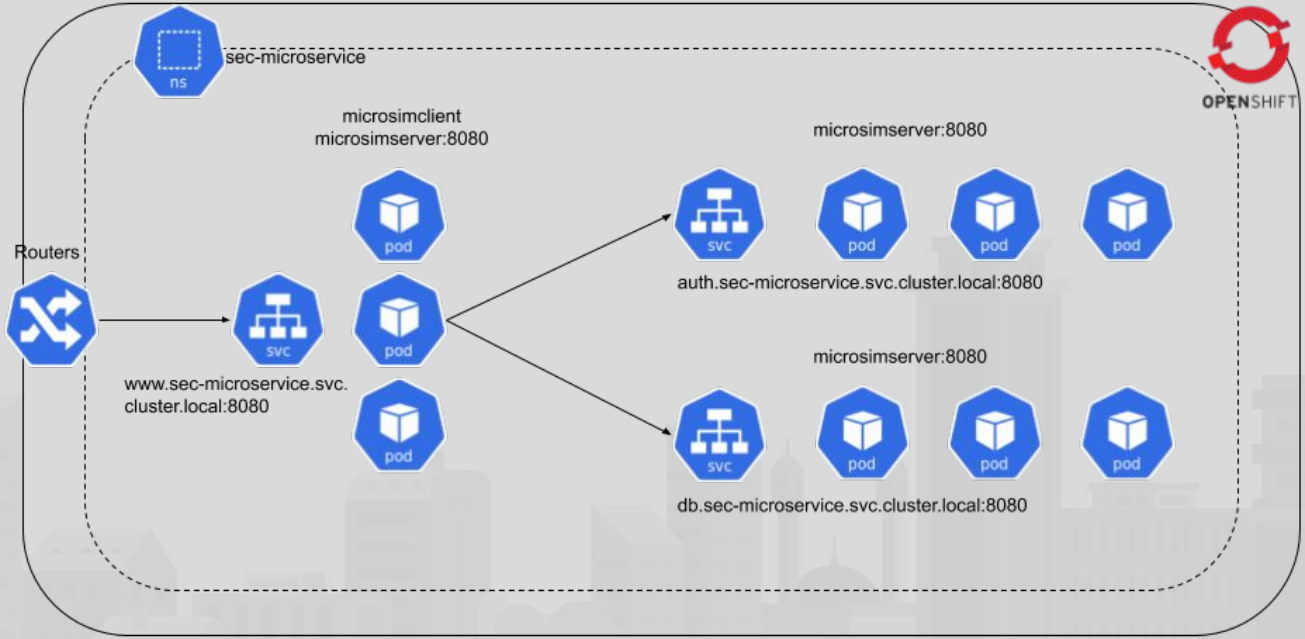
What can ModSecurity do?

- Real-time application security monitoring and access control
- Virtual Patching
- Full HTTP traffic logging
- Continuous passive security assessment
- Web application hardening

Main functionalities:

- Parsing
- Buffering
- Logging
- Rule Engine

Insecure Design Pattern



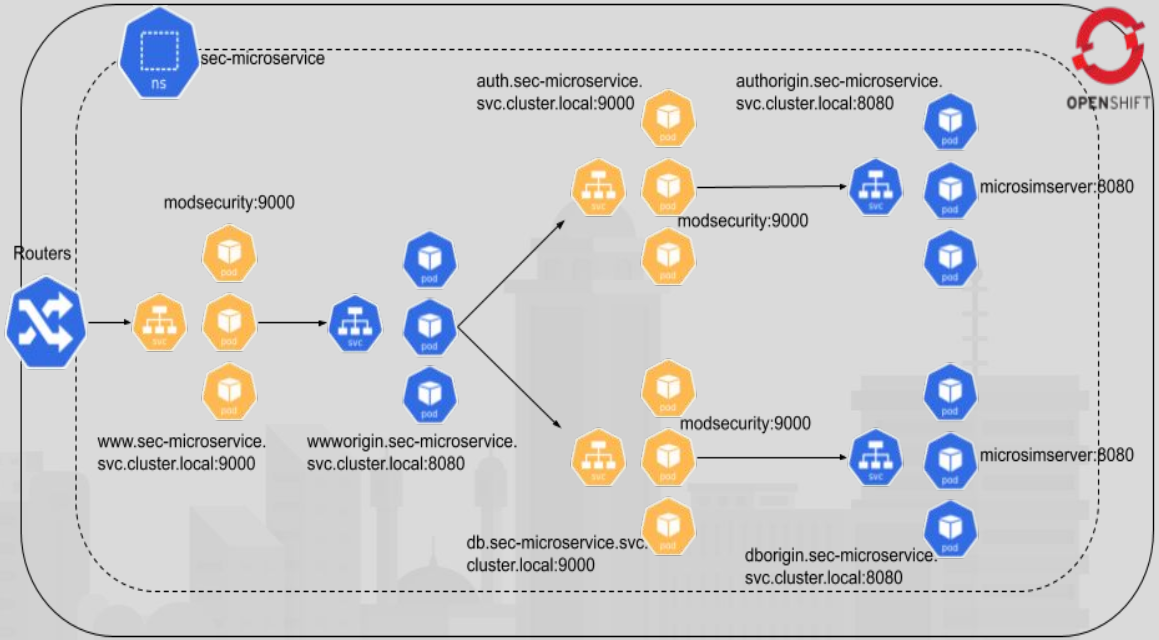
Service Layer Pattern

Pros:

- Allows scaling of the security tiers independent of the microservices they are protecting
- Treats application security as a microservice
- No need to change microservice ports

Cons:

- Creates additional services in the cluster
- Adds traffic flow complexity
- Requires more micro-segmentation rules



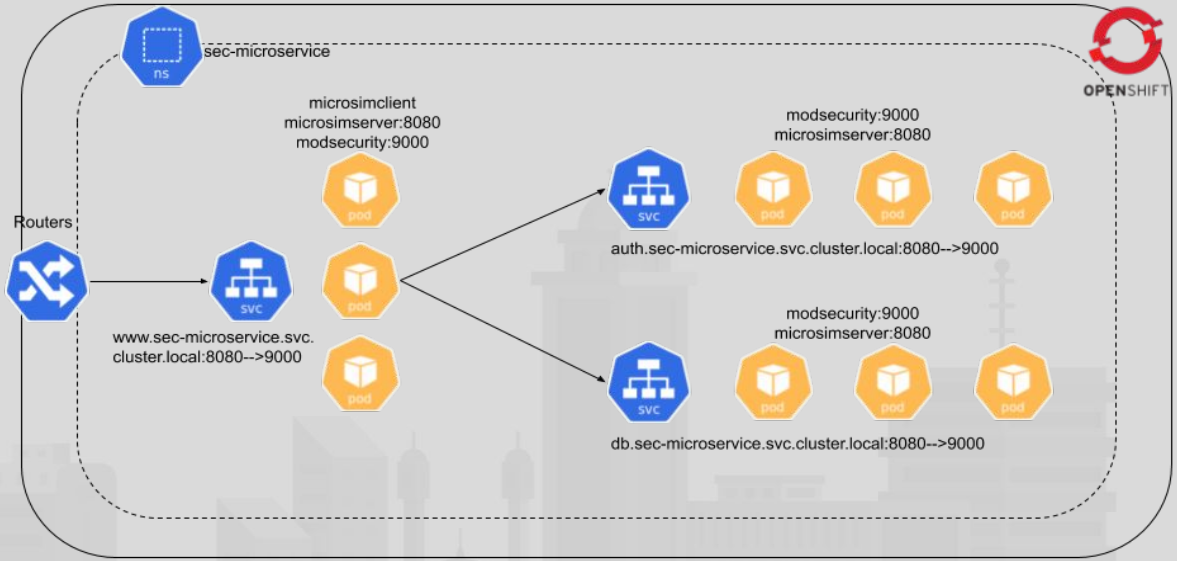
Sidecar Pattern

Pros:

- Unifies the scaling of the security and application microservices
- The security proxy can be automatically injected into the Pod
- Works with an existing Service Mesh using the Sidecar on Sidecar pattern
- Requires fewer micro-segmentation rules

Cons:

- Requires the Security container and Application container to run on different TCP ports within the Pod
- May result in over-provisioning of the security layer resources



Reference

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