IN401- Cloud Computing

Lab 3- Cloud-Native Applications

Netflix Cloud-Native Architecture

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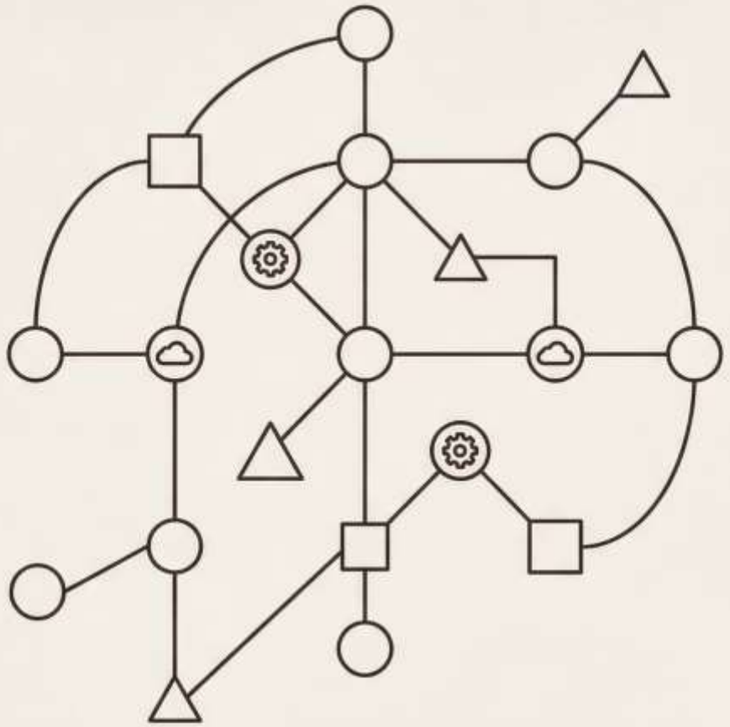


What is Netflix?

Global Streaming Platform

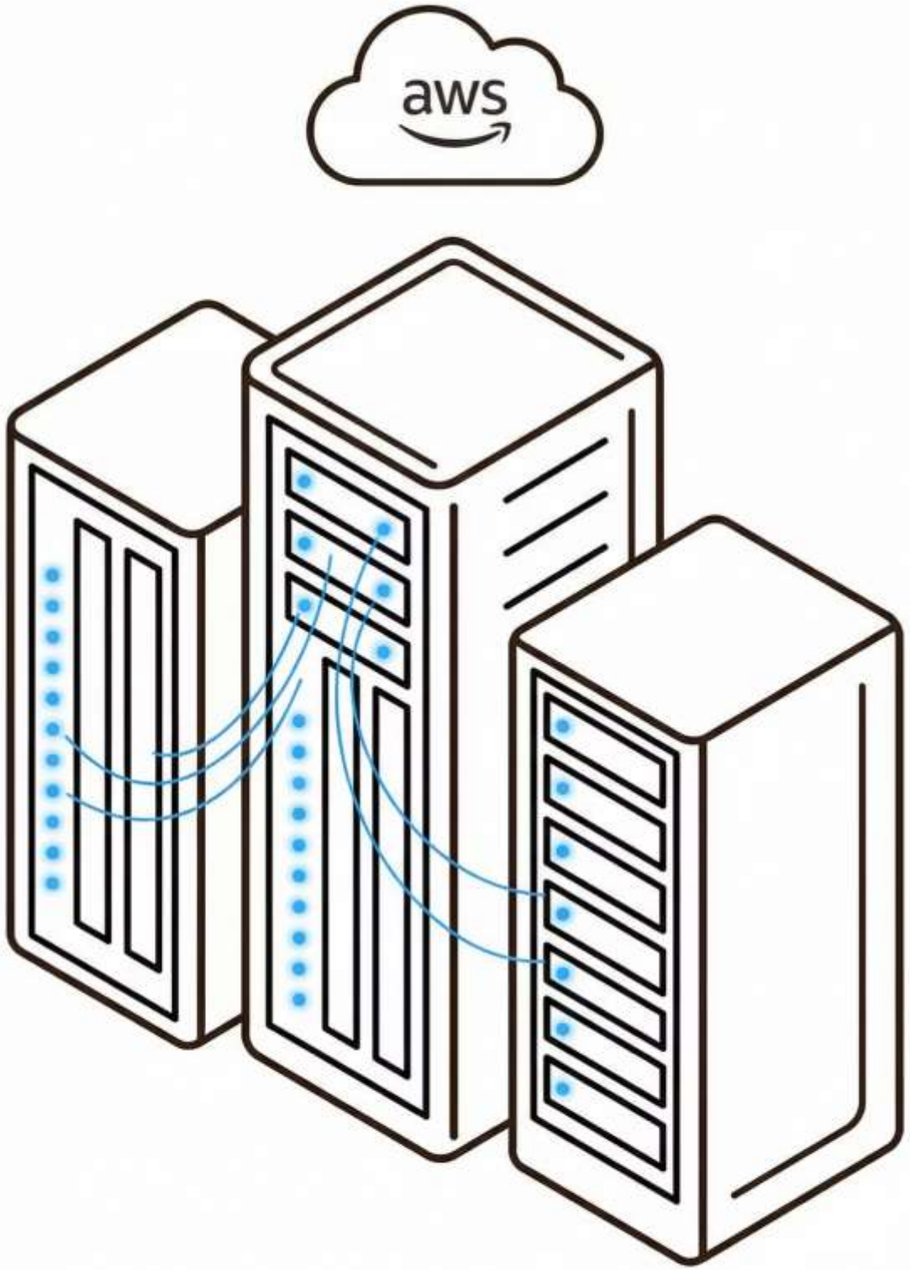
Millions of users worldwide access a vast library of content.

Concurrent Users

Designed to support millions of simultaneous streams.

Cloud-Based Infrastructure

Entirely hosted on public cloud services for agility and reach.



Why Netflix is Cloud-Native

→ Built on AWS Cloud Infrastructure

Leverages Amazon Web Services for global reach and elasticity.

→ Microservices Architecture

Decentralized structure for independent development and deployment.

→ Designed for Scalability & Resilience

Achieves high availability and performance under extreme load.

→ Automation Driven

Extensive automation for deployment, operations, and recovery.

Cloud-Native Concepts Overview

Microservices

Small, independent services with specific functions.

Containers

Lightweight, portable packages for applications and dependencies.

Orchestration

Automated management of containerized applications.

Auto-scaling

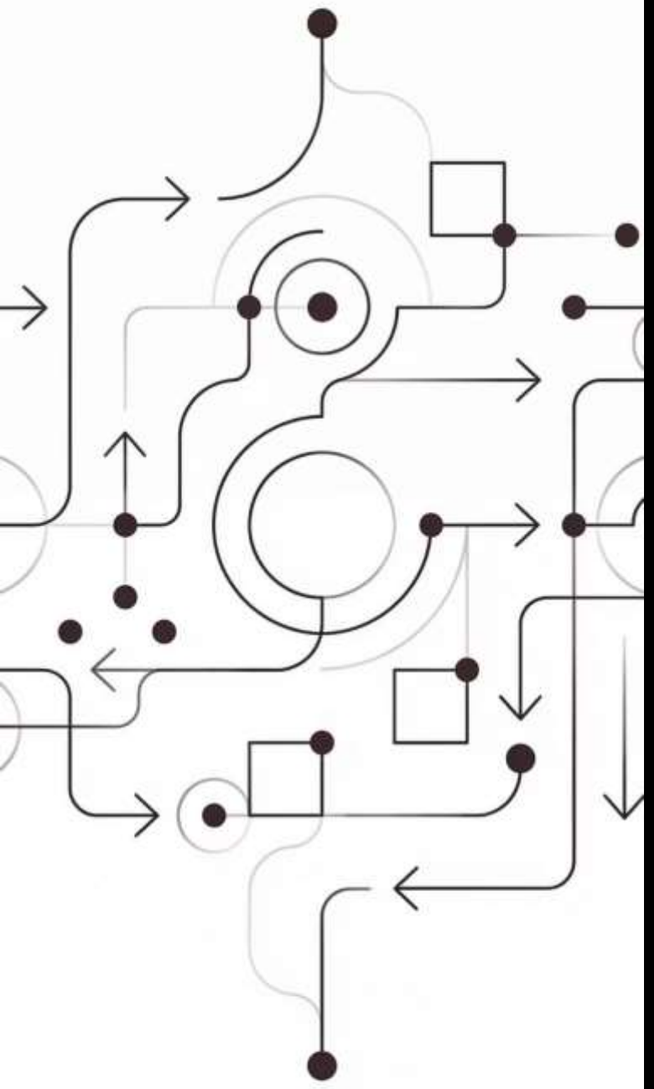
Dynamically adjusts resources based on demand.

Fault Tolerance

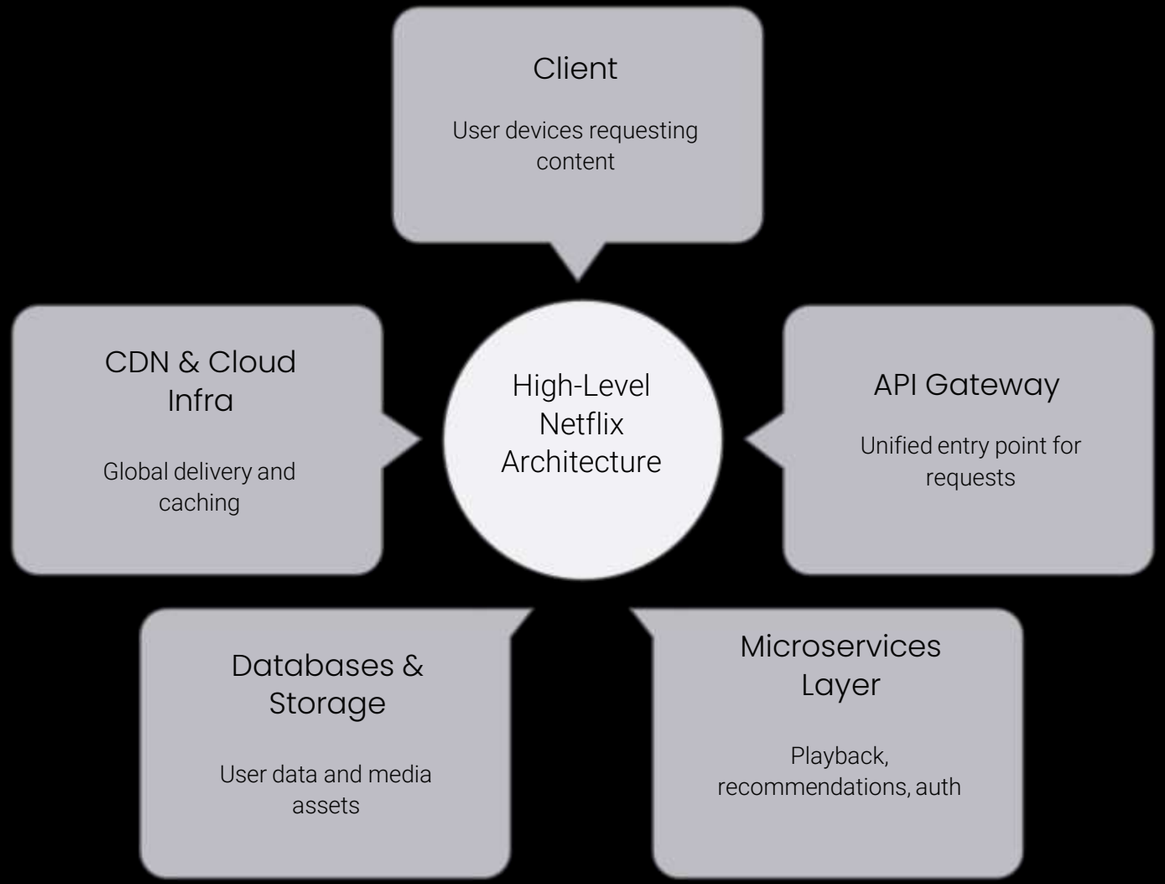
System's ability to continue operating despite component failures.

Observability

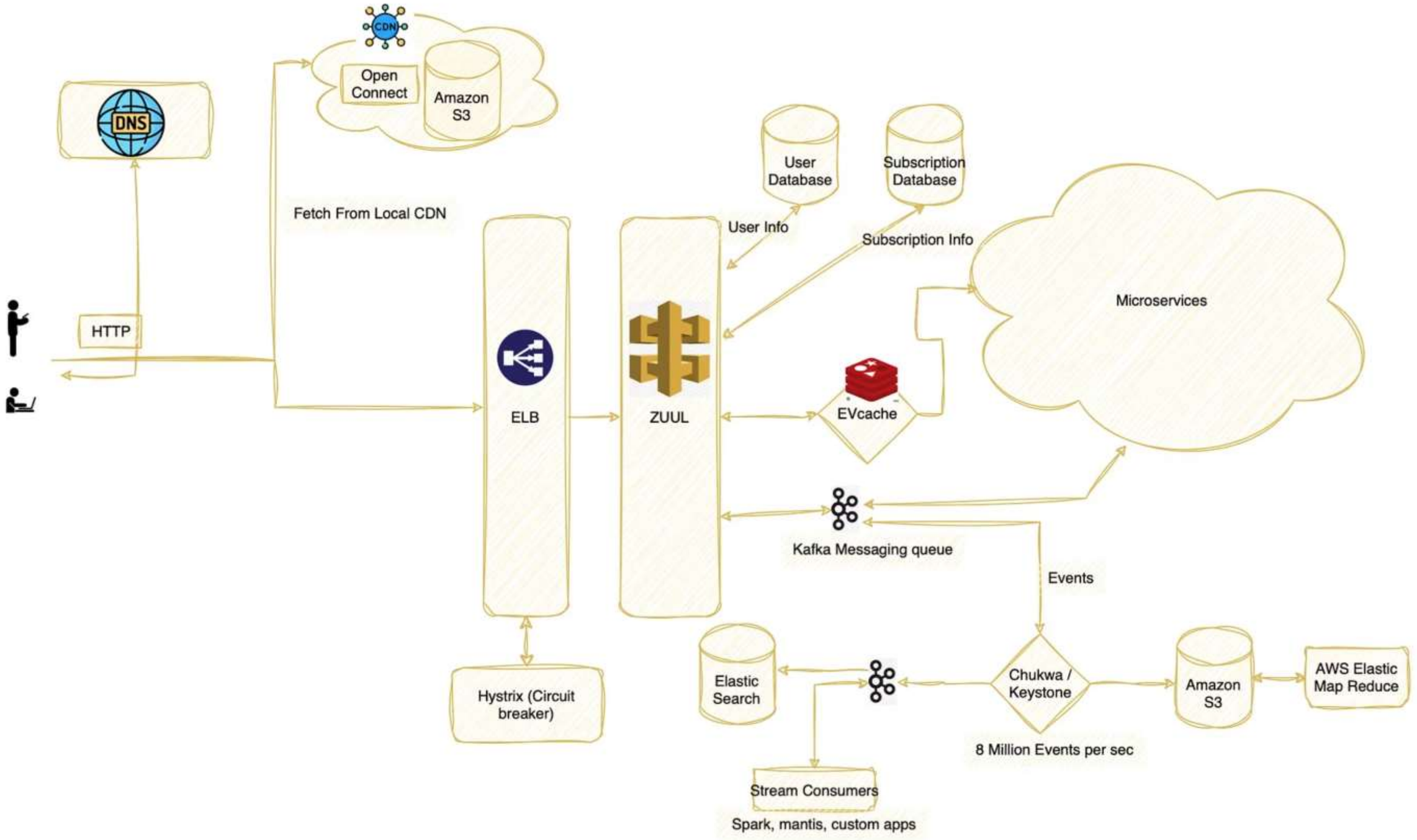
Understanding system state through metrics, logs, and traces.



High-Level Netflix Architecture



This simplified view illustrates the core components interacting to deliver content efficiently and reliably.


CDN
Open Connect
Amazon S3
DNS
User Database
Subscription Database
Fetch From Local CDN
User Info
Subscription Info
Microservices
HTTP
ELB
ZUUL
EVcache
Kafka Messaging queue
Events
Hystrix (Circuit breaker)
Elastic Search
Chukwa / Keystone
Amazon S3
AWS Elastic Map Reduce
8 Million Events per sec
Stream Consumers
Spark, mantis, custom apps

Microservices in Netflix

Independent Services

Thousands of loosely coupled services.

Single Responsibility

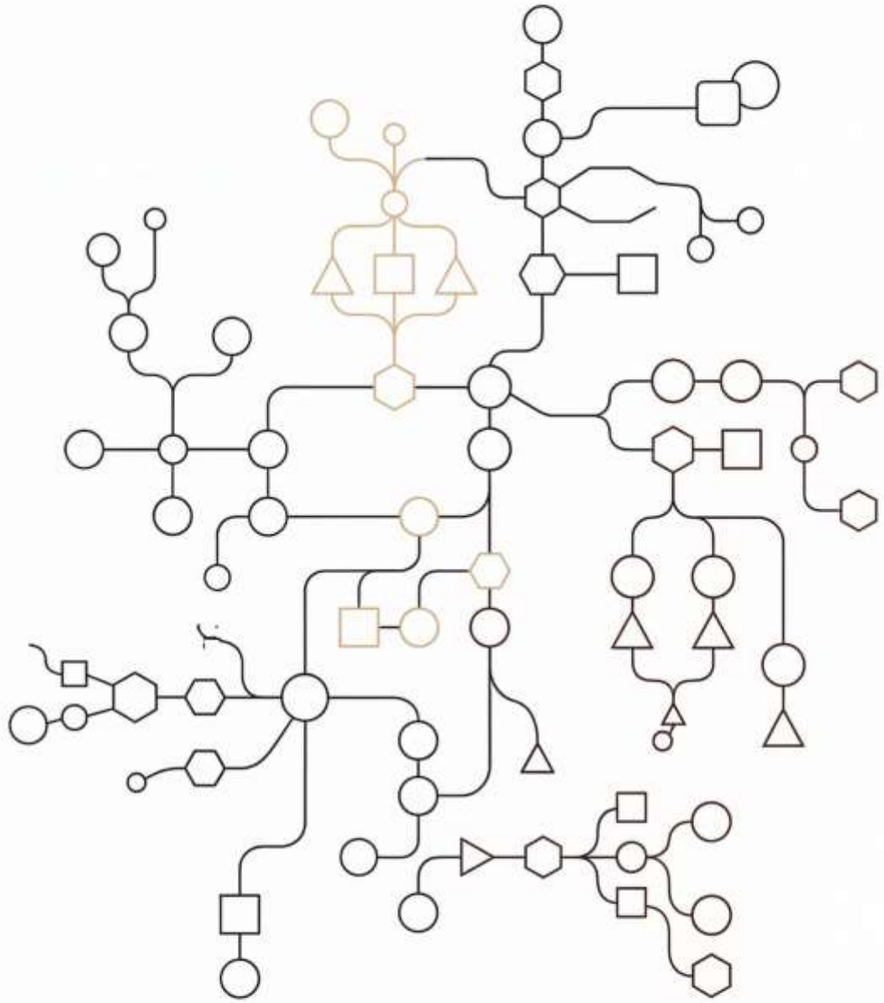
Each service focuses on a specific business capability.

API Communication

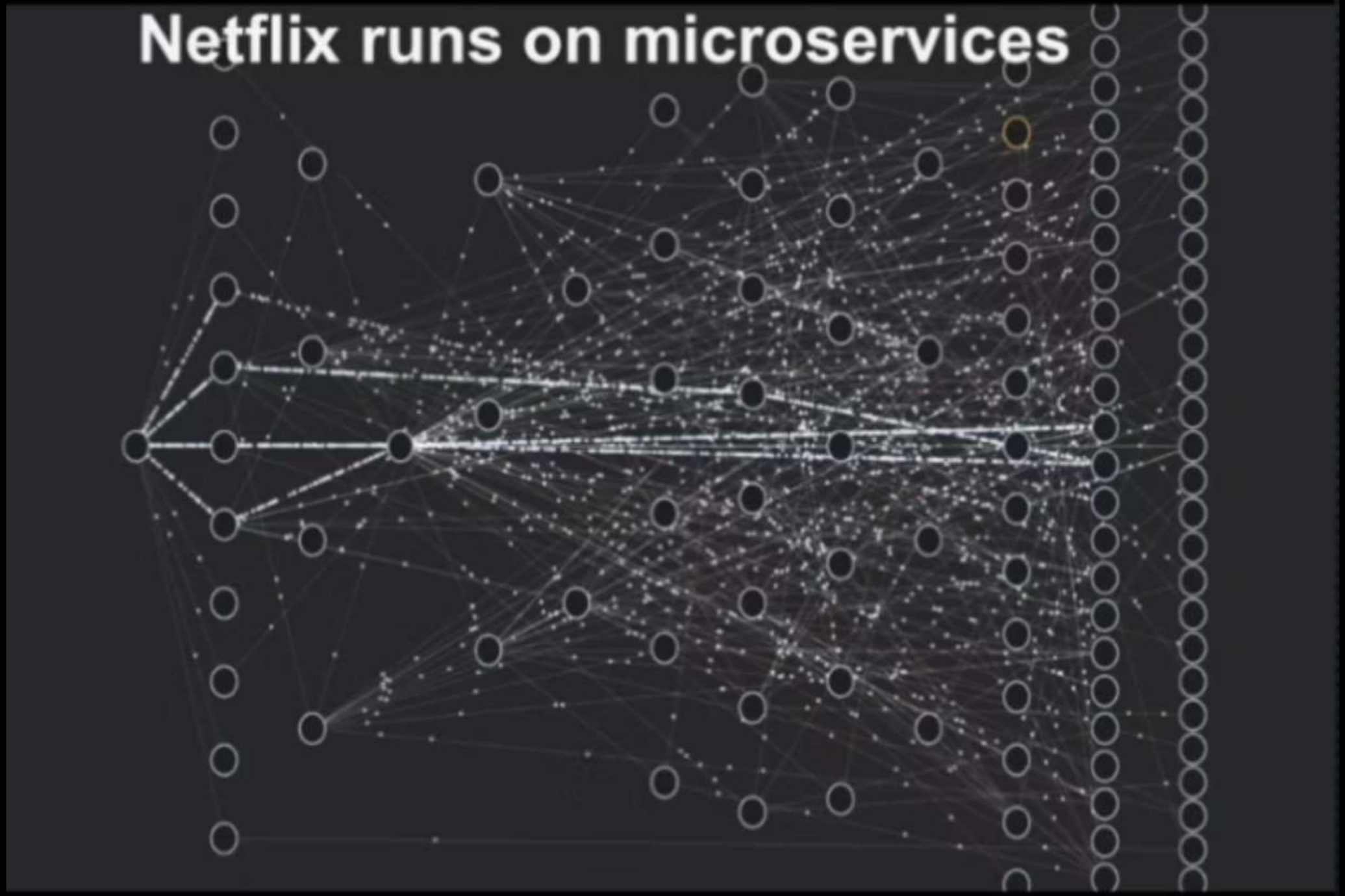
Services interact through well-defined APIs.

Autonomous Teams

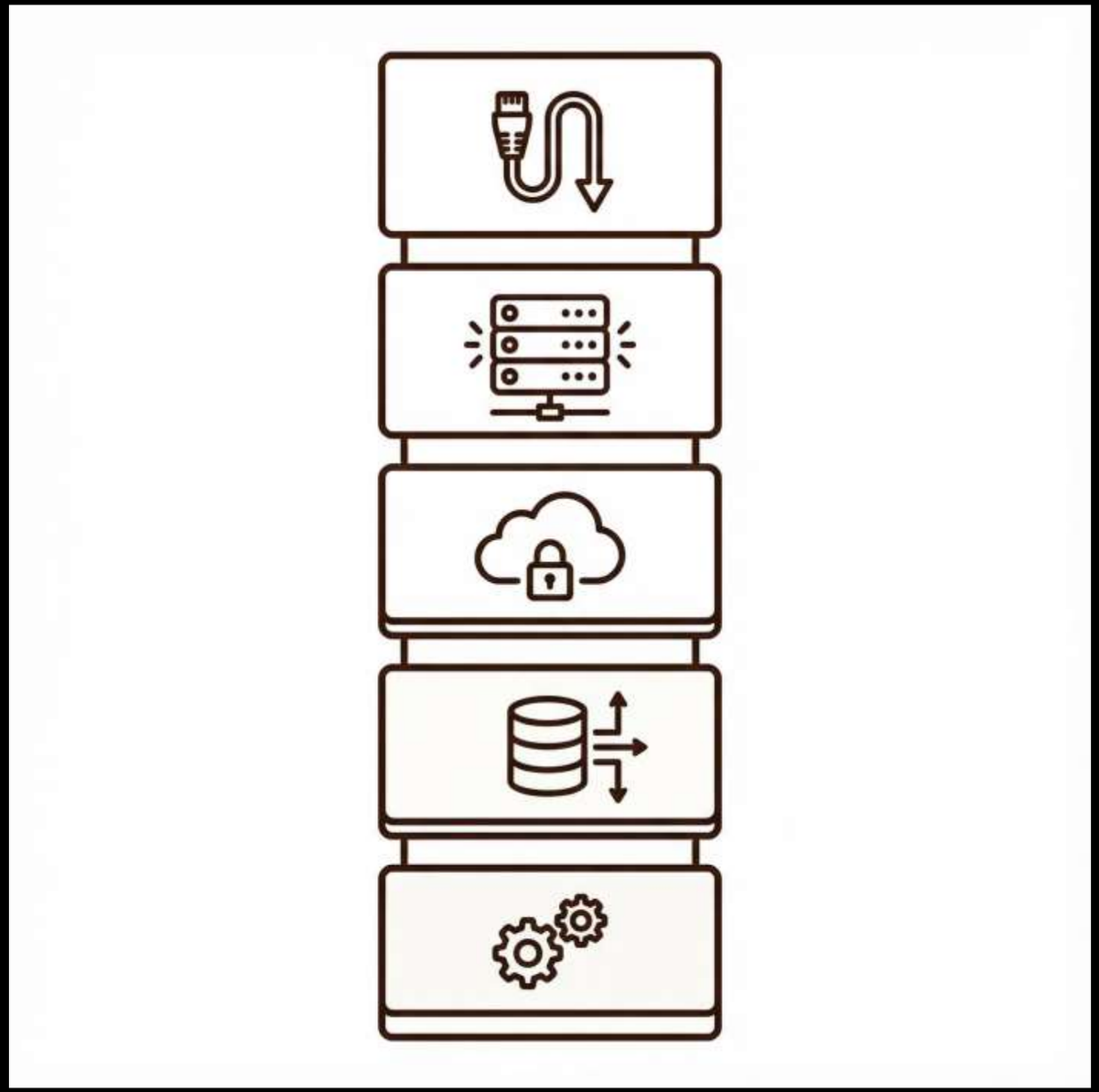
Enables parallel development and rapid deployment.



Netflix runs on microservices



Containers & Orchestration



Enables Rapid Scaling

Quickly provision and deprovision resources.

Resource Isolation

Containers prevent interference between services.

Automated Deployments

Streamlined and consistent software releases.

Efficient Resource Utilization

Optimizes use of underlying cloud infrastructure.

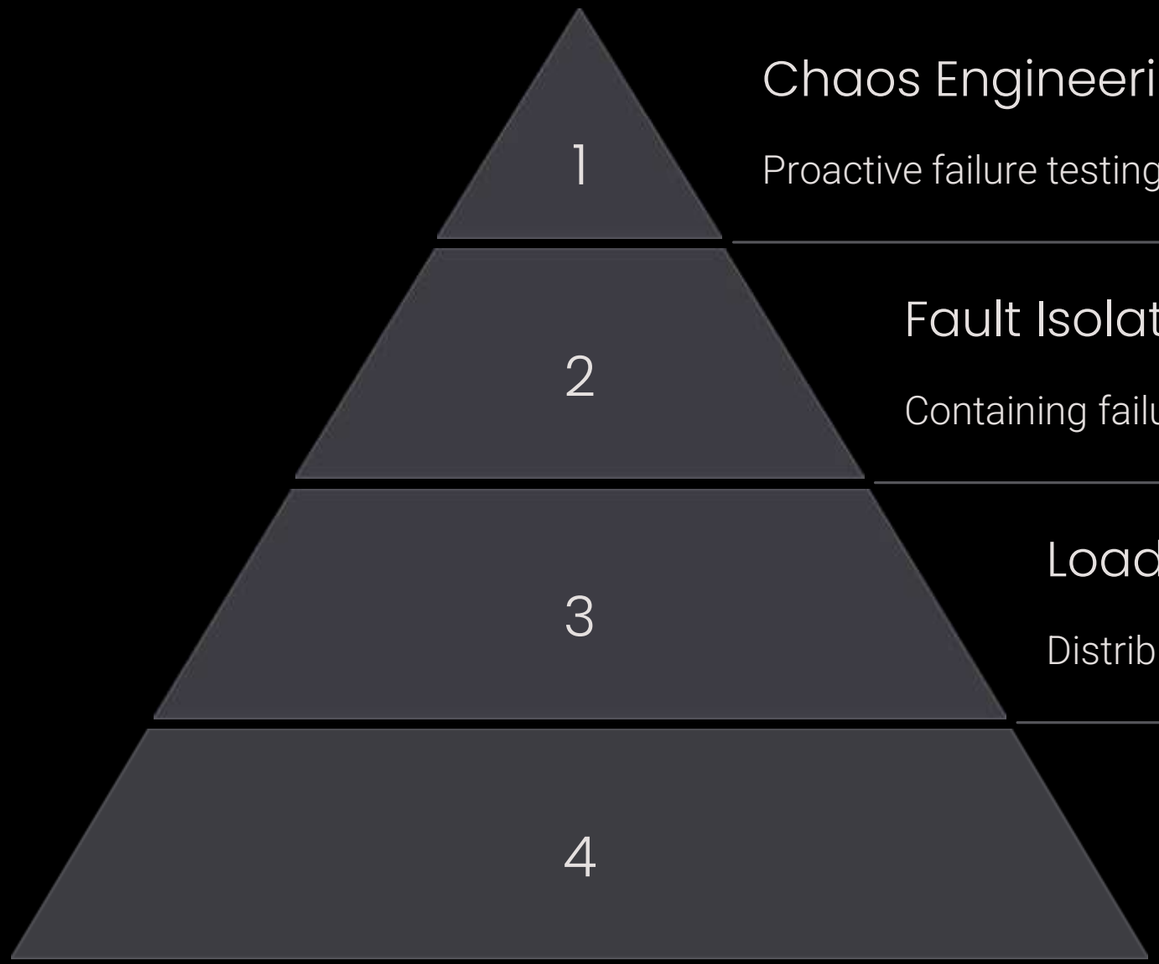
Containerized Services

Applications and their dependencies packaged in Docker containers.

Netflix Titus Orchestration

Netflix's custom container management platform.

Scalability & Resilience



Chaos Engineering

Proactive failure testing with tools like Chaos Monkey.

Fault Isolation

Containing failures to prevent cascading outages.

Load Balancing

Distributing traffic to prevent overload.

Auto-scaling

Dynamic adjustment of resources to match demand.

Observability

Monitoring Metrics

Tracking performance and resource utilization in real-time.

Logging & Tracing

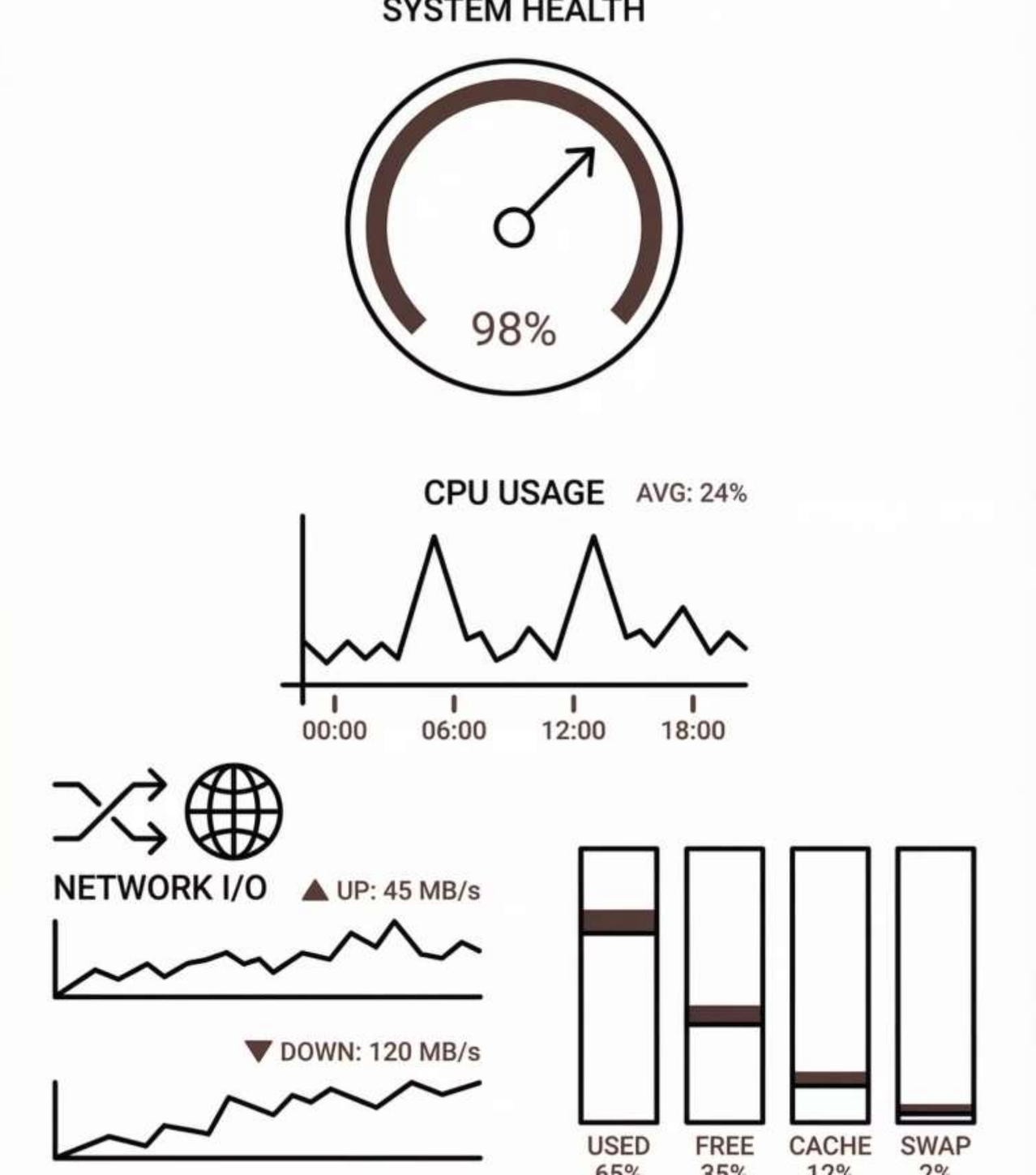
Collecting detailed events and following request paths.

Proactive Detection

Identify issues before they impact user experience.

Performance Insight

Optimize system behavior and troubleshoot problems efficiently.



Benefits of Cloud-Native Design

High Availability

Minimized downtime ensures continuous service.

Elastic Scalability

Adapts to fluctuating demand seamlessly.

Faster Deployments

Rapid iteration and feature delivery.

Enhanced Fault Tolerance

Resilient architecture withstands failures.

Improved Efficiency

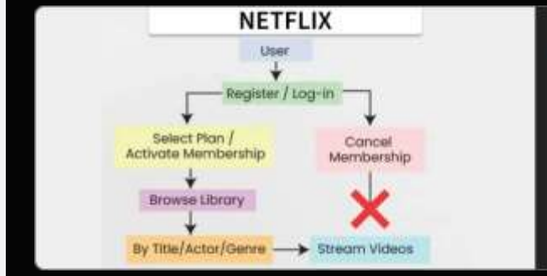
Optimized resource utilization and cost management.

Conclusion

Netflix stands as a premier example of a successful, large-scale cloud-native system, demonstrating the power of these principles in a real-world context.

References

GeeksforGeeks Tech Blog



GeeksforGeeks

System Design Netflix | A Complete Architecture - GeeksforGee

Your All-in-One Learning Portal: GeeksforGeeks is a comprehensive educational platform that empowers learners across domains-spanning

Santosh P. | Medium

Medium

System Design Of Netflix

Netflix is a subscription-based streaming service that allows our members to watch TV shows and movies on an internet-connected device.

AWS Netflix Case Study

Amazon Web Services, Inc.

Netflix Case Study

Online content provider Netflix can support seamless global service by using Amazon Web Services (AWS). AWS enables Netflix to quickly deploy thousands of servers and terabytes of storage within minutes. Users can stream Netflix shows and