DEVCONF.IN

Clean Code, Green Code

Strategies for Sustainable and Secure Software Development

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Off the grid? Catch me just soaking up **nature** to recharge for the next big idea.

AGENDA

1. Introduction to yours truly
2. Whats Clean Code
3. Code vs Value
4. Whats Green Code
5. Case Study

What Clean Code?

- **Readable:**
  Meaningful Names to functions and variables
  Formatting, Indentation
- **Maintainable:**
  Function : Single Responsibility Principle and DRY
- **Efficient :** Algorithms The power of choosing O(n) instead of O(n^2)
- **Bug Free**

Just Meaningful Names to variables NAH !!


Modern problems require modern solutions

What’s MVP ?

Code vs Value

Don’t make a Minimal Viable Product but better switch to being a **Most Valuable Programmer**

- **Code is a liability** : reviewing., maintaining, documenting. Debugging, refactoring !!
- Less the code, you need to solve a problem , the better you get in adding value and ultimately achieving MVP

The more problems you solve the more value you deliver

Rather than

The more code you deliver the more burden you become


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Writing a Clean code is not just a set of rules but a mindset and a discipline

Anonymous

Whats Green Code?

Achieving "Green by Design" in software development—where sustainability and security go hand in hand.

Let snow deep dive to memory footprints and Co2 emissions

Use case

Guess who AM I ?

"I’m the king of the screen, offering shows and streams,

From drama to comedy, I fulfill your dreams.
With a red logo, I rule the night,
And my library is vast, filled with endless delight.
Who am I?"

NETFLIX

Let's Discover Netflix’s secret sauce something none of us ever see

Amazing Stats

- Video streaming industry accounts for **approximately 4%** of global greenhouse gas emissions, **2x (emissions of the airline industry.)**
- Netflix's shift to renewable energy credits (**RECs**) helped offset over **90%** of their cloud emissions, reducing their **carbon footprint significantly.**
- Netflix Streaming CO_2 Emissions in 2014
  - **0.5g CO_2e per hour** of streaming on Netflix infrastructure.
  - Comparison: The average **human breathes about 40g CO_2 per hour**, which is **nearly 100 times** more than what Netflix infrastructure emitted per hour of streaming.
- Netflix’s streaming infrastructure, **is incredibly carbon-efficient**

Energy-Efficient Streaming with Open Connect

- **Netflix has Client-Backend-CDN Architecture**
- The **client** could be a **mobile app, web browser, or smart TV app**.
- The **backend** runs on **AWS**, handling tasks like content personalization and payment processing.
- The **CDN**, specifically **Netflix's custom Open Connect Appliance (OCA)**, stores and streams videos.
- Lesson: A **clear separation of responsibilities** across client, backend, and CDN components ensures **efficient handling of tasks and scalability**.

Netflix High level Diagram

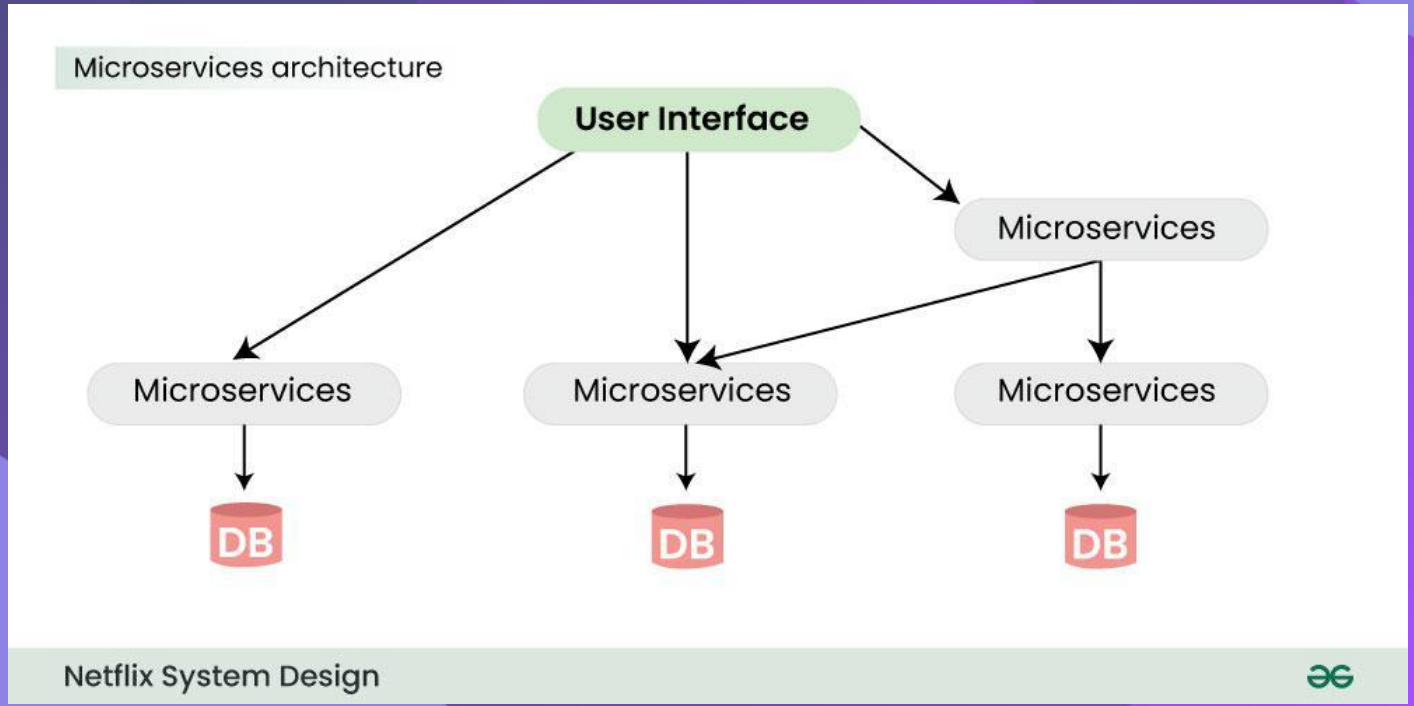
Open Connect CDN

- **Custom Open Connect Appliance (OCA):** OCAs are installed at ISPs to keep them close to users, reducing latency and improving streaming quality.
- **Memcache** : Local Caching at ISPs: Reduces network traffic by storing popular content closer to users.
- Lower Infrastructure Costs: **Fewer data center resources** are needed, improving energy efficiency.
- **Reduced Latency:** Speeds up content delivery, improving user experience while saving energy.
- Impact : Significantly lowers power consumption by **avoiding long-distance data transfers.**

MicroService Architecture

- Netflix operates around **700 microservices**, utilizing databases like DynamoDB and Cassandra.
- **Loosely Coupled Services :** Each service can be scaled independently, minimizing resource waste.
- **Stateless Servers**: Elastic scaling reduces energy consumption, ensuring optimal use of resources.
- Impact : Microservices architecture **enhances scalability, fault isolation, and development agility.**

Microservice Architecture towards Green Design



Renewable Energy Credits (RECs)

- Netflix uses RECs to offset its cloud emissions, making its operations **carbon-neutral.**
- **Use Geographical Redundancy for Reliability:** Geographical redundancy enhances system reliability and minimizes the impact of regional failures.

Security through Digital Rights Management

- Netflix adds DRM to video files to **encrypt content and prevent piracy**, ensuring secure delivery of premium content.
- Implementing DRM **protects intellectual property and ensures compliance** with content licensing agreements.

" To entertain the world, we need a habitable world to entertain."

Netflix

Sustainability as a Habit not a Choice

Connect with me 🤦‍♀️

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Thank You DEVCONF.IN

Until Next time