Testing Multiuser Applications

Functional Tests

- **E2E: Cypress**
  - Fixtures allow easy E2E testing with multiple roles

- **Component: Postman**
  - Collection Runner can test
    complex sequences of endpoint calls

- DB Stress-Testing:
  - PGBench for Postgres
  - Apache jMeter for concurrent calls

Non-Functional Testing

E.g. using Lighthouse

- Highly depends on the Application but can include:
    - Accessibility
    - Performance (Speed, Load, Volume)
    - Security
    - SEO

Postman

A Closer Look

- Save multiple API calls in a **collection**
- Save multiple users / parameters as **collection variables**
- Evaluate responses using **test scripts** (also using variables)
- **Run collections** to test typical workflows

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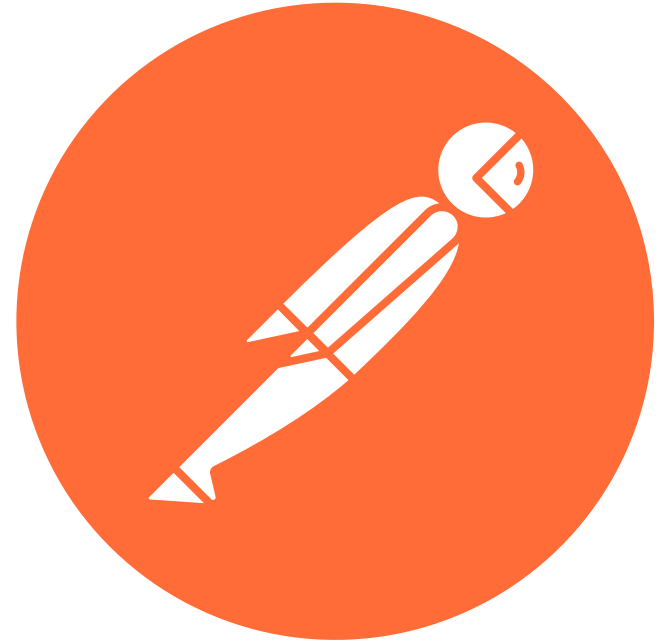
Postman
Advanced

- Use integrated **random variables** for testing

- Loop over / Repeat tests

- Integrate Postman with **automated tools**
  - scheduler, newman, github actions

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Documenting Transactions

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Common Strategies

- Logging transactions in Spring: **Log4J & custom logging**

```
2012-08-22 18:50:00,031 TRACE - Getting transaction for
[com.MyClass.myMethod]
[my own log statements from method com.MyClass.myMethod]
2012-08-22 18:50:00,142 TRACE - Completing transaction for
[com.MyClass.myMethod]
```

- In DBMS: **Write-Ahead Log (WAL)**
  - First write to log, then to DB

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