The Dimensions of DevOps

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Introduction

Background

- Continuous and frequent deployments, a trend for most Internet companies
- DevOps
  - collaboration between software development and operations activities
  - Aims to facilitate continuous deployment
- No common understanding of what DevOps constitutes

Research contribution

- To identify and describe main elements that characterize the DevOps phenomenon
- Build an initial DevOps conceptual framework

* https://gofore.com/ohjelmistokehitys/devops-sovelluskehittajan-roolin-evoluutio/*
Research Approach

**Research Approach**: Literature review complemented with interviews

**Literature Search**
- Searched 'DevOps' in 6 databases, 187 items retrieved, 22 relevant scientific papers selected

**Interviews**
- Semi-structured interviews with 4 practitioners actively involved in DevOps movement

**Data Analysis**
- Coding scheme: (1) problems addressed by DevOps (2) actions taken/elements (3) impact of the actions

**DevOps conceptual framework**
- Based on the analysed data

* ACM (34), ISI Web of Science (2), Science Direct (10), IEEE Xplore (13), Scopus (28) and Google Scholar (100).
*(a) relevance to topic, (b) peer reviewed, (c) a scientific journal or in conference proceedings
Dimensions of DevOps

- An initial DevOps conceptual framework with four elements describing DevOps
  - Collaboration
  - Automation
  - Measurement
  - Monitoring

**Problems addressed by DevOps**

a) Poor communication  
b) Manual operations processes, e.g. deployment, configuration management  
c) Performance of development and QA are not supported by data  
d) Monitoring data is segregated and voluminous

**Elements of DevOps**

- Collaboration
- Automation
- Measurement
- Monitoring

**Outcomes of DevOps**

a) Shared responsibility; one team responsible for entire service or product  
b) Continuous deployment of functionality and infrastructure provisioning  
c) Operational data to also measure performance of development  
d) Consolidated view of operational data as feedback
Dimensions of DevOps

Collaboration

Culture of collaboration between software development and operations.

– Problems
  • Systems designed with incomplete knowledge, visibility or support for their operational profile

– Outcomes
  • Increased feedback loops, shared responsibilities, broadening of skillset, shifting responsibilities
Automation

Automation of development and operations activities. ‘Infrastructure as Code’

- Problems
  - To keep up with the pace of Agile software development
  - Manual processes in Operations

- Outcome
  - Automated deployment tools
  - Infrastructure and functionality are provisioned and deployed repeatedly and fast in cloud environment
Measurement to help put ‘efficiency and process into perspective’. Going beyond QA to system performance data in real environment

– Problems
  • Quality measures before deployment are not aligned with after deployment

– Outcome
  • Software development efforts are effectively measured
Dimensions of DevOps

Monitoring

Fast and effective monitoring of systems and infrastructure after deployment

– Problems
  • Logs are voluminous, time consuming to allocate problems when the systems are designed not to expose relevant information
  • Monitored data is not consolidated and effectively used and shared

– Outcome
  • Consolidated view of operational data as feedback to development
  • Systems designed to expose relevant information
Conclusion

• DevOps
  – A relatively a new phenomenon that is not commonly understood in academia and practitioners’ communities

• Contributions
  – Four elements of DevOps: collaboration, automation, measurement and monitoring.
  – A DevOps conceptual framework

• Future works
  – Need for empirical research that investigates the phenomenon.
  – For this study, works to validate and enhance the presented conceptual framework.
THANK YOU!

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