

Chapter 20

Current Trends in Integrating the Internet of Things Into Software Engineering Practices

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ABSTRACT

The chapter summarizes the concepts and challenges of DevOps in IoT, DevSecOps in IoT, integrating security into IoT, machine learning and AI in IoT of software engineering practices. DevOps is a software engineering culture and practice that aims at unifying software development (Dev) and software operation (Ops). The main characteristic of DevOps is the automation and monitoring at all steps of software construction, from integration, testing, releasing to deployment and infrastructure management. DevSecOps is a practice of integrating security into every aspect of an application lifecycle from design to development.

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INTRODUCTION

IoT is on the edge of a huge rise in the market, where the number of machines that are connected to the internet has increased by three times and present day over 12 billion of devices are connected to the internet according to Cisco . Due to a sudden change in the using, the IoT technologies in both home and office leads to the impact in the global market, suppose if the price of the device is reduced and performance is increased then the IoT adoption increases. According to the survey conducted by the Economist Intelligence unit ^[1], for conducting the business based on the IoT. They found that 46% of respondents told the existing business model will change due to IoT, 30% respondents told IoT will unlock new revenue opportunities from the existing product or services and 29% told that IoT will inspire new business process. Now the concepts and challenges of DevOps in IoT, DevSecOps in IoT, Integrating security into IoT, Machine Learning and AI in IoT of software engineering practices will discussed in detail.

- **DevOps** (a clipped compound of “development” and “operations”) is a culture, movement or practice that emphasizes the collaboration and communication of both software developers and other IT professionals while automating the process of software delivery and infrastructure changes. It aims to establish a culture and environment where building, testing and releasing software can happen rapidly, automatically and more reliably.
- **DevSecOps** movement builds on the idea that everyone is responsible for security and inherently accepts that retrofitting current solutions is no longer sufficient as hackers have changed the rules and also enjoy the advantage of being on the offensive.
- **Machine learning** is a field of computer science that often uses statistical techniques to give computers the ability to “learn” (i.e., progressively improve performance on a specific task) with data, without being explicitly programmed.^[1]
- **Artificial intelligence (AI, also machine intelligence, MI)** is intelligence demonstrated by machines, in contrast to the **natural intelligence (NI)** displayed by humans and other animals. In computer science AI research is defined as the study of “intelligent agents”: any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals.^[2]

DevOps

DevOps is a set of practices intended to reduce the time between committing a change to a system and the change being placed into normal production, while ensuring high quality.^[3]

The history of DevOps, at 2008 Agile Toronto conference, Andrew Shafer and Patrick Debois introduced the term in their talk on “Agile Infrastructure”.^[4] From 2009, the DevOps term has been steadily promoted and brought into more mainstream usage through a series of “devopsdays”,^[5] which started in Belgium and has now spread to other countries

- **DevOps** (a clipped compound of “development” and “operations”) is a software engineering culture and practice that aims at unifying software development (Dev) and software operation (Ops). The main characteristic of the DevOps movement is to strongly advocate automation and monitoring at all steps of software construction, from integration, testing, releasing to deployment and infrastructure management. DevOps aims at shorter development cycles, increased deployment frequency, and more dependable releases, in close alignment with business objectives.

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