

# Infrastructure as Code

March 14, 2022

Brae Webb

Presented for the Software Architecture course  
at the University of Queensland



THE UNIVERSITY  
OF QUEENSLAND  
AUSTRALIA

---

## 1 Introduction

Configuration management can be one of the more challenging aspects of software development. In sophisticated architectures there are roughly two layers of configuration management; machine configuration and stack configuration.

**Machine configuration** encompasses software dependencies, operating system configuration, environment variables, and every other aspect of a machines environment.

**Stack configuration** encompasses the configuration of an architectures infrastructure resources. Infrastructure includes compute, storage, and networking resources.

Infrastructure includes compute, storage, and networking resources. In a sense, machine configuration is a subset of the stack configuration, however, stack configuration is a higher level of abstraction. In this course, when we refer to infrastructure as code, we are primarily discussing the stack configuration. Section ?? discusses how infrastructure as code can also be used to manage machine configuration.

## 2 Brief History

Infrastructure as Code (IaC) began to take hold in the software community thanks to the uptake of virtualization. In the 'Iron Age' of computing, installing a new server was rate limited by how quickly you could shop for and order a new physical machine. Once the machine arrived at your company, some number of weeks after the purchase, someone was tasked with setting it up, configuring it to talk to other machines, installing the software it needed. Compared to the weeks it takes to aquire the machine, a day of configuration is not so bad. With virtualization one physical machine can be the home of numerous virtual machines. Each one of these machines requires configuration. Now, with new machines available within minutes a day of configuring is out of the question.

Infrastructure as code can be simple. A shell script which installs dependencies is infrastructure as code. Such a shell script would be an imperative implementation of infrastructure as code. In a pinch, this works fine but it is more common to use a declarative variant. Declarative IaC is a specification of our ideal world. We specify our idealized world and our IaC tool shapes the real world to match.

## 3 Stack Configuration

## References