

# Course Overview

## *Software Architecture*

Richard Thomas

February 24, 2025

*University of Queensland*



What is the course about?

- Well, *software architecture*.

## What is the course about?

- Well, *software architecture*.
- Designing and building software systems.

## What is the course about?

- Well, *software architecture*.
- Designing and building software systems.
  - Multiple *software components* that work together.

## What is the course about?

- Well, *software architecture*.
- Designing and building software systems.
  - Multiple *software components* that work together.
- Using *architecture patterns* to structure software systems to be *maintainable*.

## What is the course about?

- Well, *software architecture*.
- Designing and building software systems.
  - Multiple *software components* that work together.
- Using *architecture patterns* to structure software systems to be *maintainable*.
- How to build software that is *reliable* and *fault tolerant*.

## What is the course about?

- Well, *software architecture*.
- Designing and building software systems.
  - Multiple *software components* that work together.
- Using *architecture patterns* to structure software systems to be *maintainable*.
- How to build software that is *reliable* and *fault tolerant*.
- How to build software that is *scalable*.

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.

## Case Studies

## Practicals

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.
- Learn tools and techniques for *designing* and *implementing* software systems.

## Case Studies

## Practicals

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.
- Learn tools and techniques for *designing* and *implementing* software systems.
- Learn the principles for working with *distributed systems*.

## Case Studies

## Practicals

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.
- Learn tools and techniques for *designing* and *implementing* software systems.
- Learn the principles for working with *distributed systems*.

## Case Studies

- Work on *case studies* that implement architectural patterns.

## Practicals

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.
- Learn tools and techniques for *designing* and *implementing* software systems.
- Learn the principles for working with *distributed systems*.

## Case Studies

- Work on *case studies* that implement architectural patterns.
- Hands-on practice with the tools and techniques for *designing* and *implementing* software systems.

## Practicals

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.
- Learn tools and techniques for *designing* and *implementing* software systems.
- Learn the principles for working with *distributed systems*.

## Case Studies

- Work on *case studies* that implement architectural patterns.
- Hands-on practice with the tools and techniques for *designing* and *implementing* software systems.

## Practicals

- Develop stateless and persistent *RESTful web APIs*.

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.
- Learn tools and techniques for *designing* and *implementing* software systems.
- Learn the principles for working with *distributed systems*.

## Case Studies

- Work on *case studies* that implement architectural patterns.
- Hands-on practice with the tools and techniques for *designing* and *implementing* software systems.

## Practicals

- Develop stateless and persistent *RESTful web APIs*.
- Package software components into *Docker* containers.

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.
- Learn tools and techniques for *designing* and *implementing* software systems.
- Learn the principles for working with *distributed systems*.

## Case Studies

- Work on *case studies* that implement architectural patterns.
- Hands-on practice with the tools and techniques for *designing* and *implementing* software systems.

## Practicals

- Develop stateless and persistent *RESTful web APIs*.
- Package software components into *Docker* containers.
- Deploy containers to cloud platforms using *Terraform*.

# What will we be doing?

## Lectures

- Learn common *architecture patterns*.
- Learn tools and techniques for *designing* and *implementing* software systems.
- Learn the principles for working with *distributed systems*.

## Case Studies

- Work on *case studies* that implement architectural patterns.
- Hands-on practice with the tools and techniques for *designing* and *implementing* software systems.

## Practicals

- Develop stateless and persistent *RESTful web APIs*.
- Package software components into *Docker* containers.
- Deploy containers to cloud platforms using *Terraform*.
- Use cloud platform tools to *monitor* and *scale* applications.

# *§ Assessment*

# Assessment

Project Proposal 5%

Cloud Infrastructure Assignment 35%

    API Functionality 10%

    Deployed to Cloud 10%

    Scalable Application 15%

Architecture Presentation 25%

Capstone Project 35%

(Delivering Quality Attributes Project)

# *Building a Scalable Architecture*

1. Build a *RESTful web API* according to our specification.
2. *Test* that the API satisfies the specification.
3. *Deploy* the API to a cloud platform.
4. *Scale* the API to handle *high loads*.

# *Capstone Project*

1. *Propose* a *software system* that you would like to build.
2. Vote on other proposals on which you would like to work.
3. Teams will be assigned to work on selected projects.
4. *Design* and *implement* the project.

# *Architecture Presentation*

- Team presents details of project architecture.
  - *Everyone* presents.
- *Individuals* present on different sets of questions.
  - Compare and contrast with another architectural pattern.
  - Pros and cons of architecture.
  - Implementation characteristics of design.
  - Potential security risks of architecture.
- *Everyone* is expected to understand entire architecture.
  - Questions can be directed to *anyone*.

# *§ You and Us*

## *Who are we?*



Richard Thomas



Guangdong Bai



Vy Ho



Zaidul Alam



Thuy Dao



Nimesh Garg

*Question*

Who are *you*?

## *Course Website*

All course material is hosted on the course website:

<https://csse6400.uqcloud.net>

If you find any *errors* or have any *improvements*, please submit a pull request on GitHub:

<https://github.com/CSSE6400/software-architecture>

# GitHub Username Registration Form: 4pm on Feb. 24<sup>1</sup>

You need access to the CSSE6400 organisation on GitHub.

- *Practicals* – Access to code
- *Assessment* – Most submissions



<https://tiny.cc/csse6400reg>

---

<sup>1</sup>Yes, that is *today*.