Contents

[Background 2](#_Toc517525081)

[Motivation 2](#_Toc517525082)

[Aims, Objectives and Scope 2](#_Toc517525083)

[Outline 3](#_Toc517525084)

[Chapter one - Introduction 3](#_Toc517525085)

[Chapter two 3](#_Toc517525086)

[Chapter Three – Project Planning 3](#_Toc517525087)

[Chapter Four – Prototype 3](#_Toc517525088)

[Analysis 3](#_Toc517525089)

[Design 3](#_Toc517525090)

[Implementation 4](#_Toc517525091)

[Testing 4](#_Toc517525092)

[Evaluation 4](#_Toc517525093)

[Chapter Five – Conclusions 4](#_Toc517525094)

[Chapter Six – References 4](#_Toc517525095)

[Chapter Seven - Appendices 4](#_Toc517525096)

[References 5](#_Toc517525097)

# Background

Traditionally, software applications/systems are developed using the Monolithic Architecture – a unified model of the design of a software program (Rouse, 2016). They are designed to be self-contained: components of the program are interconnected and interdependent. For this tightly coupled architecture to work, each component and dependent component’s must be present for the code to compiled or executed. If any component is missing, there is a high chance the program will not work correctly.

The rapid increase of software systems has changed the shape of how businesses function in today’s world. As businesses have expanded and added new products/services, problems arose where the software systems used became too large, too monolithic to maintain and update successfully.

For the past thirty years, the software industry has been moving every closer to a service-orientated approach (Judith Hurwitz, 2009). This evolution has resulted in a closer bond between businesses and IT. Instead of businesses making decisions controlled or constrained by software, they now make decision supported by software.

Service Orientated Architectures (SOA) where the first realisation of transforming monolithic systems into small building blocks – components – that work together to create applications that are easier to maintain and expand upon. A service is defined as: a function that is well-defined, self-contained, and does not depend on the context or state of other services (Barry, 2000).

Around seven years ago, at a workshop of architects in Venice, the participants saw a common architectural style they had all been recently exploring. The term “Microservices” was created (Fowler, 2014). It describes a particular way of designing software applications as suites of independently deployable services.

This project investigates and evaluates relevant terms and topics related to microservices alongside the technologies used to implement this architecture. To produce a prototype to demonstrate this, open-source platforms/technologies will be used such as docker and an Integrated Development Environment (IDE).

# Motivation

# Aims, Objectives and Scope

The aim of this project is to explore how a microservice-based approach can be used to develop flexible E-commerce systems. Also finding out the flexibility such an architecture provides and how this can be used to allow developers to maintain/update such systems in the fast-paced environment of today’s business world.

These aims are achieved by examining the literature on Microservices, the principles involved to enforce the Microservice Architecture, the technologies available to create this architecture design for developing software to define research questions and find relevant topics. A software development environment is then chosen to implement this architecture in a prototype system.

Literature research will include: academic white papers, professional journals, lectures, online articles and software books. The collected/researched information will be used to answer the questions and provide the necessary understanding to develop a prototype using the microservice architecture. Following this, the project is evaluated, considering the literary review.

The scope of the background is limited to the investigation of using a microservice architecture for E-commerce systems due to the time constraints. Although microservice Architecture can be applied to many different business systems, E-commerce systems is preferred.

# Outline

This dissertation is structured as follows:

## Chapter one - Introduction

Introduces the topic of microservices, names the aims and objectives and outlines the scope and constraints for this project.

## Chapter two

**Literature Review**

This will encompass all the subjects and terms that are related/representative of a microservice architecture. It will go into detail about why Microservices are being used, why it is preferred over Service-orientated architecture and the technologies currently in use and those being developed. This chapter will also provide a critical & objective analysis of these subjects.

## Chapter Three – Project Planning

This chapter will provide an overview of the management of the project. With use of a Gantt chart. The methodologies used during the development cycle will also be described. With justification. This chapter will also include a description of the high level functionality needed for the project using the project management tool MoSCoW.

## Chapter Four – Prototype

### Analysis

This chapter will describe the requirements for the development of a prototype. And an analysis of the high-level design of the prototype. Including a diagram of the service interaction.

### Design

This chapter will provide a detailed design of the structure of the protype – UI designs, Class diagrams, E-R models etc.

### Implementation

This chapter will detail the actual development of the prototype. Each staged will be documented. All issues/problems will also be documented along with the solutions. Also, providing a reference for all sources used. Screenshots of the development stages will be provided via appendices.

### Testing

This chapter will consist of all testing documentation and testing conducted on the prototype. With a description of the testing methodologies used.

### Evaluation

This chapter will provide a critical and objective analysis of the developed prototype. Providing a detailed description of its success/failure.

## Chapter Five – Conclusions

This chapter will discuss the project, how effective Microservices architecture is etc. And going forward what further research etc. will be done/required.

## Chapter Six – References

This chapter will contain all references used throughout this document.

## Chapter Seven - Appendices

This chapter will house all the appendices. This includes Gantt charts, UML diagrams, testing documentation and screenshots of: development progress at various stages and working prototype.

# References

Barry, D. k., 2000. *Service Architecture.* [Online]   
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Rouse, M., 2016. *Monolithic Architecture.* [Online]   
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