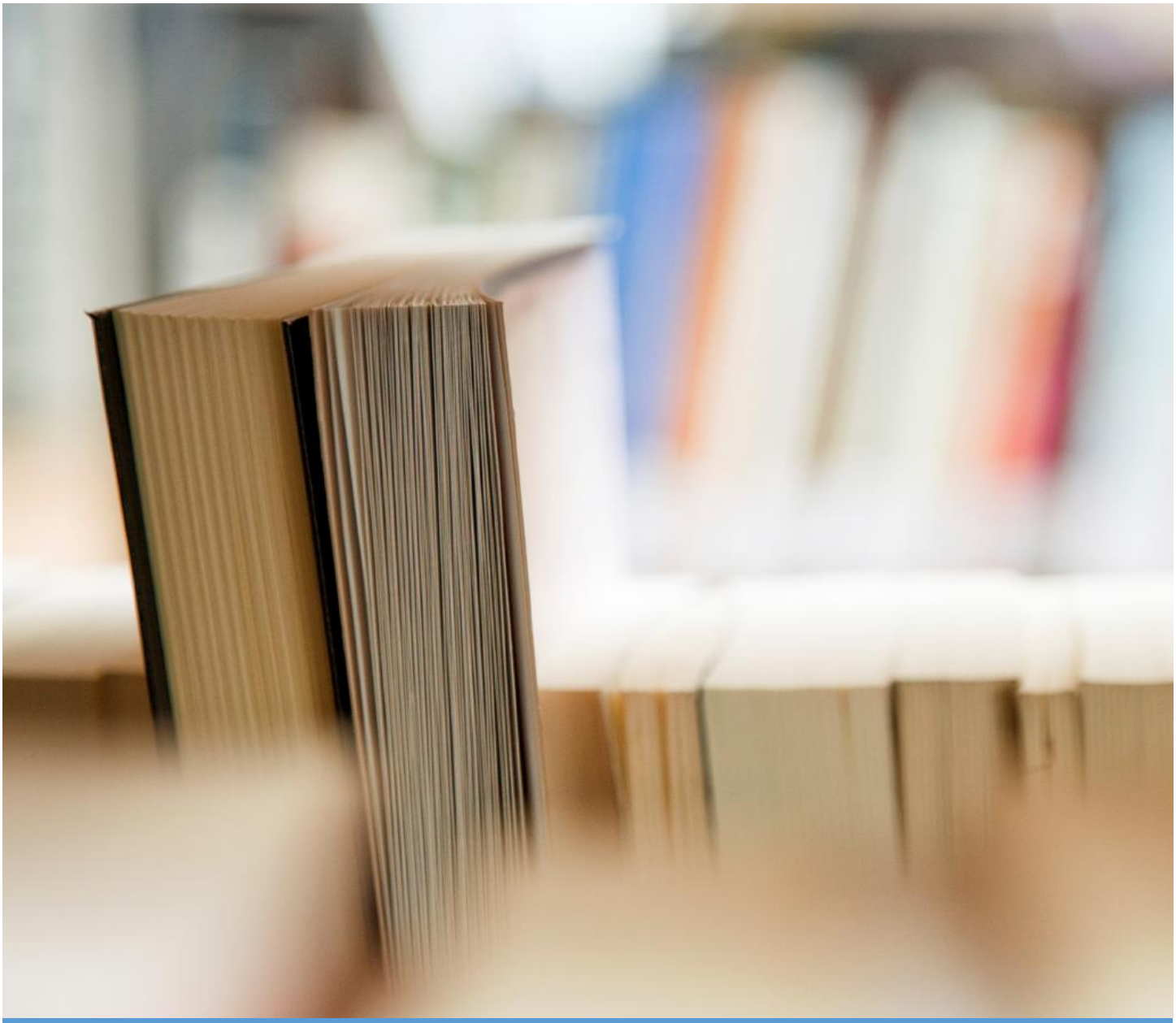

Software Design and Architecture

Lab Asssignment

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4/1/24

SDA

Here are five real-life examples of software systems that changed their architecture due to architecture problems:

1. Twitter

- **Before:** Monolithic Architecture
- **After:** Microservices Architecture
- **Problem:** As Twitter grew, its monolithic architecture became a bottleneck. The system struggled with scaling, and any small change or issue could affect the entire platform.
- **Change:** Twitter transitioned to a microservices architecture to improve scalability, fault tolerance, and maintainability. This allowed different parts of the system to scale independently.
- **Version Details:**
    - **Before Change:** Early versions up to 2010
    - **After Change:** Microservices began to be implemented around 2010, with significant changes in architecture by 2013.

2. Facebook

- **Before:** Monolithic Architecture
- **After:** Service-Oriented Architecture (SOA)
- **Problem:** Facebook's monolithic design made it difficult to add new features and scale efficiently as the platform grew.
- **Change:** Facebook moved towards a service-oriented architecture, breaking down the system into services like messaging, notifications, and search, each of which could be developed and scaled independently.
- **Version Details:**
    - **Before Change:** Early versions up to 2006
    - **After Change:** Service-oriented architecture started to evolve around 2006.

3. Netflix

- **Before:** Monolithic Architecture
- **After:** Microservices Architecture
- **Problem:** Netflix faced performance issues, especially during peak traffic times. The monolithic architecture was unable to handle the massive scale required for global streaming.
- **Change:** Netflix adopted microservices to enhance scalability and resilience. This allowed the platform to handle millions of users simultaneously and recover from failures quickly.
- **Version Details:**
    - **Before Change:** 2007-2011 (Monolithic)
    - **After Change:** Transition to microservices began in 2011, with full implementation by 2014.

4. Amazon

- **Before:** Monolithic Architecture
- **After:** Service-Oriented Architecture (SOA) / Microservices
- **Problem:** As Amazon grew, its monolithic architecture created problems in scaling and flexibility, making it difficult to add new features and services quickly.
- **Change:** Amazon moved to a service-oriented architecture, and later adopted microservices. This change allowed Amazon to scale more effectively and offer a wide variety of services independently.
- **Version Details:**
    - **Before Change:** Early years (1994-2000)
    - **After Change:** Transition to SOA began in the early 2000s, and microservices were adopted around 2011.

5. eBay

- **Before:** Monolithic Architecture
- **After:** Microservices Architecture
- **Problem:** eBay's monolithic system caused performance bottlenecks and scaling issues, especially during high-traffic events like Black Friday.
- **Change:** eBay transitioned to microservices to improve scalability, fault tolerance, and the ability to deploy new features more quickly.
- **Version Details:**
    - **Before Change:** Early versions until 2009
    - **After Change:** Microservices architecture started being implemented around 2009 and became fully functional by 2013.

These examples highlight how companies transitioned from monolithic or service-oriented architectures to microservices to overcome the challenges of scalability, performance, and flexibility.