# Exploring the Implementation of Domain-Driven Design in the Context of .NET and Azure: A Case Study

Authors

## Abstract

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## Introduction

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## Literature Review & Previews Work

Within the dynamic realm of cloud computing, there is a fundamental classifications, show on fig 1. Each category represents a discrete level of abstraction and service provision customized to meet unique operational requirements.



Fig 1. hierarchical distribution of responsibilities across the fundamental cloud service types

Of these options, Platform as a Service (PaaS) emerges as the central focus for DDD. PaaS provides a framework that enables users to conceptualize, implement, and oversee applications, therefore removing the complexities involved with developing and maintaining the underlying infrastructure. The framework has an innate capability to effectively handle a wide range of complex components, including networking, storage, servers, virtualization, operating systems, middleware, and runtime environments. Therefore, the responsibility for developers is managing the applications and data components. The prominence of DDD concepts becomes evident inside this particular setting. The principles and principles of DDD are inherently aligned with the app and data components, enhancing the effectiveness of cloud-based solutions and strengthening the relationship between DDD and cloud paradigms.

Todo: microservices and DDD

## Methodology & Data Collection

The goal of this study is the exploration and in-depth understanding of the complex development of DDD, CQRS and ES via .NET and Azure. In order to reach this goal, the selection of an appropriate research approach is an important step. This section will present details with regard to research process, data collection and analysis procedure. The literature review and previews work have shown high uncertainty and a lag of research with regard to the implementation of the DDD concepts. The goal of this study is to fill this gap and show strong and reliable development processes. To approach this goal, case study research was deemed as an appropriate reseatch method. Case studies, representing qualitative research methods, are commonly used within the computer and social science. According to XXZ, the case study design may be chosen when the selected case represents a critical case in testing a well-formulated theory with clearly defined propsitions, which is going to be shown in the 3rd sub-section of this chapter. The nature of the current case study is confirmative (explanative). The purpose is testing the DDD theories that have been deducted from the previews literature and terminological foundations.

### 3.1. Tools & Technologies

The .NET is widely acknowledged as a prominent option for developing scalable and robust corporate applications. Based on statistics provided by Techempower [], it has been observed that ASP.NET exhibits superior efficiency and performance compared to several alternative web application platforms and full-stack frameworks. Microsoft has outlined a strategic plan [] for the future development and maintenance of .NET, guaranteeing regular upgrades and expanded library support until the year 2026. The framework of .NET is highly regarded due to its ability to seamlessly integrate with many programming languages, such as C#, F#, and VB, all of which have prominent positions on the Tiobe index []. According to research conducted by Statista [], C# has emerged as a prominent programming language used by developers for microservices. One of the factors contributing to this is the lightweight Minimal API [], which is a framework component specifically designed for microservices. Additional factors include the use supplemental libraries such as EntityFramework, MediatR, Optional, Marten, SignalR, AutoMapper, Serilog, Stylecop, Swagger, FluentValidation, xUnit, Autofixture, Moq and Shouldly. This interoperability further enhances the esteemed status of .NET.

Microsoft Azure, a well-known provider of cloud services, offers extensive support for .NET applications via features like the Visual Studio Integrated Development Environment (IDE). This integration enhances the development experience and ensures interoperability within the broader Microsoft ecosystem. The figure 2 obtained from the "Flexera's 2023 State of the Cloud Report," [] showcases the use trends of different public cloud providers across enterprises.



Fig 2. cloud service providers used by organizations in the public sector. Source: Flexera 2023 State of the Cloud Report

The findings, derived from a sample of 750 participants, apparent that Azure has emerged as a prominent participant, as indicated by the fact that 41% of firms are using its platform to execute considerable workloads, namely 30%, are using it for certain tasks, and arround 13%, are now in the period of testing.

Based on the data obtained from Gather in 2023, Azure has shown a substantial growth rate of 47% in Cloud Infrastructure and Platform Services [], establishing its position as the leading public cloud platform. Azure has solidified its position as a dominant entity with its extensive network of more than 60 data centers. This surpasses the offerings of other cloud providers. Notably, Azure boasts major clients such as BMW, ASOS, and HP.

Based on the collected data, it can be deduced that the use of .NET and Azure is a favorable choice for performing a thorough analysis of the implementation of DDD within a particular technical stack.

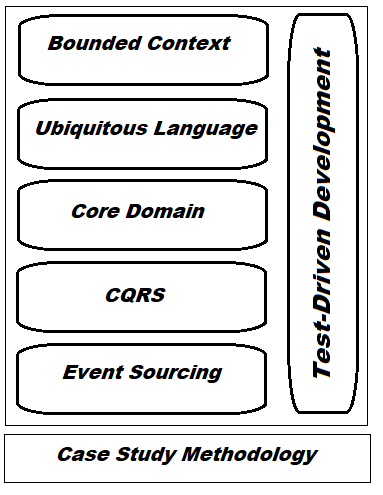
### 3.2. Case Selection & Data Collection

Explaining the case study approach, detailing how data was collected and analyzed.

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| --- | --- | --- |
| Case | System | Description |
|  |  |  |
|  |  |  |
|  |  |  |

### 3.3. Theoretical Framework

Model of BC, UL, CQRS, ES, TDD



## Implementation of DDD principles in .NET

Recapitulate key principles of DDD outlined in your previous work that are pertinent to the current case study.

### 4.1. Applying Bounded Contexts to Microservice Architecture

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### 4.2. CQRS in Practice

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### 4.3. Ubiquitous Language via Functional Programming

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### 4.4. Referencing the Event Sourcing

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### 4.5. Integrated Test-Driven Siute

Discuss the role of TDD in the development cycle, and how it contributed to the robustness and reliability of the application.

## Architectural Decisions in the Microsoft Azure Ecosystem

Detail the architectural choices made in the .NET and Azure environment.

## Discussion

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### 6.1. Interpretation of Results

Analyzing the results in relation to the research questions and theoretical framework.

### 6.2. Challenges and Limitations

Discussing the challenges encountered and what lessons can be drawn for future DDD implementations.

### 6.3 Implications and Recommendations

Provide actionable insights for researchers and practitioners Discuss the broader implications of these findings for practitioners and academics.

## Conclusion and Future Work

Summary of Findings

Recap the key findings of this empirical study.

Future Research Avenues

Suggest topics or questions for future research, possibly as further extensions of your own work.

## TODO