WIS Architecture Report



**Group Number:** C1.037  
**Repository:** <https://github.com/DP2-C1-037/Acme-ANS-D01>

**Workgroup Members:**

Student 1: Ignacio Gutiérrez Serrera - [igngutser@alum.us.es](mailto:igngutser@alum.us.es)

Student 2: Adrián Chabrera Rubio - [adrcharub@alum.us.es](mailto:adrcharub@alum.us.es)

Student 3: Miguel Álvarez Raya - [migalvray@alum.us.es](mailto:migalvray@alum.us.es)

Student 4: Salma El Hakimy - [salel@alum.us.es](mailto:salel@alum.us.es)

Student 5: Alejandro González Macías- [alegonmac@alum.us.es](mailto:alegonmac@alum.us.es)

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# Executive Summary

This report provides an analysis of Web Information Systems (WIS), particularly in the context of what was known prior to taking this course. A Web Information System is a type of software architecture that facilitates information management and business processes over the internet. The report explores the fundamental concepts of WIS, including their purpose, characteristics, and key components. Additionally, it reflects on prior knowledge related to WIS and identifies academic subjects where similar concepts were encountered. The introduction presents the motivation behind this study, while the conclusion summarizes key findings and the evolution of understanding throughout this learning experience. The content is structured into two main parts: the first offering a detailed examination of WIS, and the second serving as a structured framework to map relevant academic experiences.

# Revision Table

|  |  |  |
| --- | --- | --- |
| **Revision Number** | **Date** | **Description** |
| 1.0 | 19/02/2025 | Initial version |
| 2.0 | 20/02/2025 | Final version |

# Introduction

In the digital era, web-based technologies have become an essential component of modern business operations, information dissemination, and interactive communication. Among these technologies, Web Information Systems (WIS) play a crucial role in managing and processing data over the internet. These systems integrate different functionalities such as data storage, user interaction, business logic, and security measures, providing companies and institutions with a scalable and efficient way to handle digital information.

A Web Information System is essentially an application designed to facilitate the collection, processing, storage, and distribution of information via web-based platforms. It extends beyond simple websites, incorporating database management, user authentication, and automated processes to improve efficiency and user experience. Examples of WIS include e-commerce platforms, enterprise resource planning (ERP) systems, online banking applications, and digital content management systems.

Before undertaking this course, knowledge of Web Information Systems was largely limited to practical exposure through web development projects and general discussions in courses related to databases, software engineering, and networking. While I was aware that web applications rely on a combination of front-end and back-end technologies, the architectural design and the systematic methodology behind WIS were not entirely clear to me. I understood that applications such as online stores and management platforms required structured databases and interactive elements, but I lacked a deep understanding of their underlying architecture, including how data flow, security protocols, and server-client interactions are orchestrated within such systems.

This report aims to document my prior understanding of WIS and consolidate knowledge from various academic disciplines where relevant concepts were previously introduced. By analyzing WIS in detail, I seek to bridge the gap between previous fragmented knowledge and a more structured comprehension of how these systems function. Additionally, this report will highlight the multidisciplinary nature of WIS by mapping their foundational aspects to subjects that have contributed to my understanding, such as database management, computer networks, and software architecture.

The report is divided into two main sections. The first section provides a comprehensive explanation of Web Information Systems, outlining their characteristics, components, and relevance. It will discuss how WIS differ from traditional information systems and highlight their benefits in various applications. The second section presents a structured template to link the concepts of WIS to different academic courses where related topics were studied. This format allows for an organized comparison between theoretical knowledge and real-world applications.

By the end of this report, I aim to clarify our pre-existing knowledge, identify areas that required further exploration, and establish a strong foundation for understanding Web Information Systems in greater depth.

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## Content 1

A Web Information System (WIS) is a software application designed to handle and process information through web technologies. Unlike standalone information systems, WIS operate over the internet, leveraging web-based interfaces to interact with users and databases. They consist of multiple components, including a user interface, application logic, database management system, and networking infrastructure.

1. **Key Characteristics of WIS**
2. **Web-Based Architecture:** WIS are accessed through web browsers, eliminating the need for local installations and allowing remote access from any device with an internet connection.
3. **Database Integration:** These systems rely on databases to store, retrieve, and manage information efficiently, ensuring data consistency and security.
4. **Scalability and Flexibility:** WIS can be expanded or modified to accommodate increasing user demands and evolving business requirements.
5. **Multi-Tiered Structure:** A typical WIS consists of three layers: the presentation layer (front-end), the business logic layer (back-end processing), and the data layer (database).
6. **Interactivity and Automation:** They support dynamic content generation, user authentication, and automated workflows to enhance user experience and operational efficiency.
7. **Security Measures:** WIS implement authentication, authorization, encryption, and secure communication protocols to protect sensitive data from cyber threats.
8. **Comparison with Traditional Information Systems**

Traditional information systems are often restricted to a specific network or require dedicated software installations. In contrast, WIS offer greater accessibility, real-time data updates, and improved collaboration through web-based platforms. Additionally, the deployment of WIS does not necessitate high-end hardware, making them cost-effective and accessible to a broader audience.

1. **Examples of WIS in Different Sectors**

* **E-commerce:** Platforms like Amazon and eBay manage transactions, inventory, and customer interactions through web applications.
* **Online Banking:** Financial institutions offer web-based portals for secure fund transfers, account management, and transaction tracking.
* **Healthcare Systems:** Electronic health records (EHR) enable medical professionals to access and update patient data remotely.
* **Enterprise Solutions:** ERP systems integrate multiple business functions such as HR, finance, and supply chain management through a centralized WIS.

## 4.2 Content 2

In previous subjects, we have learned different aspects of a web application, which have a lot in common with WIS architecture-based applications.

In Operating Systems, we learnt how to deploy a web app into the cloud, taking scalability and availability into account, using Docker and Kubernetes.

In Introduction to Software Engineering and Information Systems II we learnt how to code our first web application, one about restaurants, using Javascript with Sequelize for the backend and React Native for the frontend.

In Desing and Testing I we learnt how to code a relatively complex web application using Java Spring and Javascript React, while also including diverse features such as web sockets or the ability to generate ephemeral http links available through the internet.

All these subjects have given us a better understanding of web applications, and, since applications need to manage information, it can be said that we have gotten acquaintance with the technology used to develop and deploy WIS architecture-based applications.

# 5 Conclusions

Prior to this course, our understanding of Web Information Systems was fragmented and largely based on practical exposure rather than theoretical knowledge. While I was aware of the existence and purpose of WIS in business environments, our comprehension of their architecture, security protocols, and integration strategies was limited. I had encountered several key concepts in other subjects, such as database management, cybersecurity, and software engineering, but I lacked a holistic view of how these elements converge to form an effective WIS.

Through this reflection, I have identified the specific gaps in my knowledge, particularly regarding best practices in WIS development, advanced security measures, and enterprise integration techniques. We anticipate that this course will provide a structured framework for understanding WIS in depth, covering aspects such as scalability, performance optimization, and regulatory compliance. By the end of this course, I expect to have a more comprehensive grasp of how WIS operate in real-world scenarios and how they can be designed to meet the evolving demands of modern enterprises.

# 6 Bibliography

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