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Management of Network Platforms

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Sidney Hook

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✳ *Dedication* ✳

To my beloved father, whose love, sacrifices, and wisdom continue to guide me, even in his absence. This work stands as a testament to his enduring presence in my life, dedicated with profound gratitude and everlasting remembrance.

To my mother, my silent pillar of strength, and to my brother, my lifelong confidant, thank you for bringing light to my days, even in moments of uncertainty. You are my strength and my reason to keep moving forward.

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This achievement is the reflection of your belief in me.

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List of abreviation

- **API** : Application Programming Interface

- **CAPEX** : Capital Expenditures

- **CRM** : Customer Relationship Management

- **CSS** : Cascading Style Sheets

- **DDoS** : Distributed Denial of Service

- **DNS** : Domain Name System

- **DOM** : Document Object Model

- **DoS** : Denial of Service

- **GDPR** : General Data Protection Regulation

- **HTML** : HyperText Markup Language

- **HTTP** : HyperText Transfer Protocol

- **IDS** : Intrusion Detection System

- **IPS** : Intrusion Prevention System

- **IoT** : Internet of Things

- **IT** : Information Technology

- **JS** : JavaScript

- **NIST** : National Institute of Standards and Technology

- **OPEX** : Operating Expenses

- **PSS** : Product-Service System

- **QoS** : Quality of Service

- **ROI** : Return on Investment

- **SaaS** : Software as a Service

- **SDN** : Software-Defined Networking

- **SEO** : Search Engine Optimization

- **SQL** : Structured Query Language

- **SRE** : Site Reliability Engineering

- **TCO** : Total Cost of Ownership

- **VS Code** : Visual Studio Code

- **W3C** : World Wide Web Consortium

- **WAF** : Web Application Firewall

General Introduction

Network platforms represent a critical backbone of the digital era, enabling seamless communication, cloud-based services, and advanced technologies such as the Internet of Things (IoT) and 5G [7]. These platforms consist of complex ecosystems that integrate hardware components, software interfaces, and standardized communication protocols to ensure the reliable exchange of data across vast and diverse environments [33]. In Algeria, the accelerating deployment of fiber optic infrastructure offers new opportunities to modernize connectivity, especially in underserved regions. As telecommunications services expand, the management of network platforms becomes essential for sustaining performance, ensuring security, and responding to evolving user expectations [1].

While large-scale platforms often rely on sophisticated back-end systems and dynamic services, even simple web-based tools can play a strategic role in improving the accessibility, visibility, and operational coordination of such systems. In particular, static websites can serve as lightweight interfaces for client interaction, corporate communication, and service presentation. They represent a cost-effective solution for organizations that seek to establish a digital presence without the complexity of real-time systems. However, their usefulness depends on thoughtful design, user experience, and minimal security measures to inspire trust and ensure basic integrity [2].

This thesis investigates how a static website can support the operational and strategic management of a network platform in a telecommunications context. Through the case of Opticonnect, a fictional Algerian company specializing in fiber optic solutions, we designed and implemented a front-end interface that meets communication needs while adhering to fundamental security standards. The website, built with React.js and TypeScript, reflects modern development practices while remaining accessible and easily maintainable. It offers a structured presentation of the company's values, ser-

vices, and contact channels, demonstrating how digital tools can strengthen customer engagement and reinforce corporate identity.

The manuscript is organized into three chapters, each addressing a specific dimension of our work :

The first chapter, *Fundamentals of Network Platform Management*, lays the theoretical groundwork of the study. It introduces the concept of network platforms, detailing their evolution, core components, and typologies. Special attention is given to management principles as applied to technological infrastructures, including definitions, functions, and managerial roles. This chapter also explores how management practices intersect with the architecture and operation of digital platforms, establishing the basis for our case study.

The second chapter, *Strategic Dimensions : Security, Cost and Human Resources*, addresses key challenges faced in managing network platforms. It focuses on three critical aspects : cybersecurity, operational costs, and the role of human resources. The chapter highlights the types of digital threats that network systems may encounter, such as malware and injection attacks, as well as preventive strategies. It also explores the economic considerations related to infrastructure deployment and maintenance, alongside the strategic involvement of personnel in ensuring platform reliability and service qualit.

The third chapter, *Opticonnect Website Development : Practical Application*, presents the design and implementation of the static website developed as part of this project. It describes the development environment, selected tools and technologies (HTML, CSS, React.js, TypeScript), and the structure of the site. The chapter provides an overview of the website's pages (Home, About, Services, Contact), and discusses how the site aligns with platform management goals such as accessibility, clarity, and client interaction. It concludes with an evaluation of the site's functionality, its current limitations, and suggestions for future improvements, including the potential addition of a dynamic client portal.

Through this work, we aim to demonstrate how even modest digital tools can contribute to the effective management of network platforms, particularly in emerging contexts such as Algeria's telecommunications sector. The project provides insights into the intersection between technology and management, and offers a practical example of how design, security, and usability can be balanced in support of strategic organizational objectives.

Fundamentals of Network Platform Management

1.1 Introduction

This chapter describes the foundations of management, tracing its development from ancient civilizations to contemporary digital strategies. It distinguishes between management and administration, highlighting their respective roles in decision-making and operational efficiency. It then examines network platforms, their various categories, specificities, and constituent elements, before examining the impact of management on their effectiveness by reviewing the challenges encountered and effective strategies. These concepts help organizations develop network infrastructures that are more secure, efficient, and scalable.

1.2 History and evolution of management

Management has continuously evolved through different economic and technological revolutions. While its methods and structures have changed, its fundamental purpose remains the same : optimizing resources and improving organizational performance.

1.2.1   Ancient management practices (Antiquity, Middle Ages) :

The origins of management can be traced back to antiquity, where large-scale construction projects and empires required structured organization. These early management practices relied on rigid top-down structures, heavily influenced by military and religious hierarchies.

During the Middle Ages, management took the form of guilds and trade corporations, which structured artisanal and commercial activities. Early forms of accounting and planning emerged, facilitating trade and economic exchanges.[28]

1.2.2   Industrial revolution and scientific management :

With industrialization, management emerged as a formal and independent discipline :

- Frederick Taylor (1900) – Scientific Management : Introduced task specialization, standardization, and performance optimization.

- Henri Fayol (1916) – Administrative Management : Defined principles of planning, organizing, and controlling.

- Max Weber – Bureaucratic Management : Established a hierarchical structure and a clear division of authority.

These approaches shaped industrial organizations by emphasizing productivity, efficiency, and formalized structures.[28]

1.2.3   Modern approaches and digital Era

Throughout the 20th century, management theories increasingly focused on human dynamics and organizational behavior :

- Human Relations Movement (Mayo, Maslow) : Highlighted employee motivation, well-being, and workplace satisfaction.

- Management by Objectives (Drucker) : Emphasized performance, goal-setting, and innovation.

- Systems Theory (Simon, Cyert & March) : Viewed organizations as dynamic, adaptive systems requiring continuous decision-making.

In the 21st century, the digital revolution has profoundly transformed management. Network platforms, powered by artificial intelligence and big data, have adopted agile and collaborative models. Modern management now prioritizes interconnectivity, flexibility, and continuous innovation to adapt to an ever-evolving business environment. These new approaches highlight the importance of cybersecurity, data management, and system reliability, which make them essential considerations for platform management.[28]

1.3   Definition and Role of Management

Management is a cornerstone of success for organizations and businesses, regardless of their size or sector. It drives efficiency, fosters growth, and ensures that goals are met through strategic coordination and resource optimization.

1.3.1   Definition of management

At its core, management is about guiding an organization toward its objectives by strategically planning, organizing, leading, and controlling its resources. It encompasses a range of practices that integrate administration, operations, and human resources to maximize productivity and achieve desired outcomes. Effective management ensures that people, processes, and tools work in harmony to deliver results.

The definition of management can vary depending on a manager's perspective or priorities. For some, it centers on strategic vision and long-term planning, while others prioritize quick decision-making or problem-solving. Regardless of focus, management plays a vital role in nurturing talent, building cohesive teams, and fostering a motivated workforce, all of which contribute to organizational success. [10]

Management typically revolves around four key functions :

- **Planning :** Setting clear goals and determining the best way to achieve them by assessing available resources. This function provides a roadmap for short-, medium-, and long-term success.

- **Organizing :** Structuring tasks, assigning responsibilities, and ensuring resources are allocated effectively. It also involves creating systems to monitor progress and evaluate outcomes.

- **Leading :** Inspiring and directing teams through clear communication and sound decision-making to align efforts with the organization's vision.

- **Controlling :** Tracking performance, identifying gaps, and taking corrective actions to maintain accountability and drive continuous improvement.

These functions are interdependent and fundamental to organizational effectiveness and efficiency[10].

Fig. 1.1 : Functions of Management[21]

1.3.2   Management vs Administration

Management is simply the process of achieving tasks with the help of others. The term is frequently confused with administration, but the roles are fundamentally different. Management is the function of overseeing and managing daily operational activities to improve efficiency and achieve results ; in contrast, administration is how policies are determined and the organization's mission is set.

Criterion	Management	Administration
Definition	Operational and strategic management of resources to achieve set objectives.	Development of policies, strategic planning, and definition of long-term directions.
Focus	Execution of plans, tactical decision-making, team and daily operations management.	Defining long-term objectives, ensuring regulatory compliance, and overall governance.
Hierarchical Level	Mid-level and operational managers (IT managers, project leaders).	Senior executives and board members (CEO, board of directors).
Example in a Fiber Optic Company	A **manager** supervises the installation of a fiber optic network, manages technical teams, and ensures the project is completed on time and within budget.	The **administration** decides on long-term investments in fiber optic infrastructure, negotiates contracts, and defines quality standards.
Example in a Network Platform (Cloud, SaaS, Cybersecurity, etc.)	An **IT manager** ensures server optimization, data security, and incident management on a cloud platform.	The **administration** establishes cybersecurity policies, terms of service, and compliance strategies (e.g., GDPR, ISO 27001).

Tab. 1.1 : Comparison Between Management and Administration

1.3.3 Role of a Manager

A manager plays a vital role in ensuring the organization works smoothly. More than just overseeing work, managers coordinate work, make organizational-level decisions, and guide employees to accomplish organizational goals.[3]

- Defining and Communicating Goals A manager must clearly define the organization's goals and ensure that employees understand them. Effective communication helps align individual efforts with the company's overall mission.

- Ensuring Growth and Stability Managers analyze both internal and external factors that may impact the organization's growth. By identifying risks and

opportunities, they implement strategies that contribute to long-term stability and success.

- Optimizing Efficiency Proper resource management is essential to avoid waste and improve productivity. Managers ensure that time, finances, and human resources are utilized efficiently to achieve the best results.

- Encouraging Innovation Innovation is key to staying competitive. A manager fosters a culture that encourages employees to propose new ideas and solutions, ensuring continuous improvement in processes and operations.

- Leading and Motivating Teams Leadership is a fundamental aspect of management. A manager must inspire and motivate employees, ensuring a positive work environment that enhances performance and job satisfaction. For example if there is a cyberattack on a SaaS platform (such as Google Drive), the manager must quickly mobilize their team to identify the security breach, notify users of the attack, and implement security patches to limit the threat.

1.4 Network Platforms

Network platforms are the backbone of modern digital connectivity, enabling seamless interactions and data sharing across diverse users and systems.

1.4.1 Definition of network platforms

A network platform is a digital infrastructure that integrates hardware, software, management policies, and open APIs. It relies on advanced technologies such as telemetry, automation, and a user-friendly interface to ensure seamless communication, efficient data exchange, and optimized service management among various stakeholders. These platforms play a crucial role in enhancing business operations, developing digital ecosystems, and ensuring efficient resource allocation (Cisco, n.d.).

In a broader sense, a platform refers to an environment that enables the management and use of application services. This includes marketplaces, social networks, search engines, collaborative platforms, comparison websites, and mobile applications.

Therefore, a network platform can be defined as a technological ecosystem that enables interaction, connectivity, and data processing between different entities by

leveraging network protocols, cloud computing, and security mechanisms to ensure reliable and scalable communication.

1.4.2 Types of Network Platforms

Network platforms can be categorized based on their function, architecture, and technological purpose. These platforms serve as digital ecosystems that facilitate communication, data exchange, and resource sharing across various industries. The main types of network platforms include[24] :

Communication and Social Networking Platforms

These platforms are designed to enable interaction, collaboration, and content sharing among users. They play a crucial role in digital marketing, knowledge dissemination, and virtual communities . **Examples :** Facebook, LinkedIn, Twitter, WhatsApp.

Cloud-Based Platforms

Cloud platforms provide on-demand computing resources, including storage, processing power, and networking services. These platforms enhance business scalability and reduce infrastructure costs . **Examples :** Amazon Web Services (AWS), Microsoft Azure, Google Cloud.

Enterprise Networking Platforms

Enterprise networking platforms ensure secure communication and efficient data management within organizations. They integrate remote work capabilities, IT infrastructure management, and workflow automation . **Examples :** Cisco DNA Center, Microsoft Teams, Zoom.

Internet of Things (IoT) Platforms

IoT platforms manage interconnected smart devices and enable automation across various sectors, including healthcare, manufacturing, and smart cities . **Examples :** Google IoT Core, IBM Watson IoT, AWS IoT.

E-commerce and Marketplace Platforms

These platforms support online transactions and digital commerce, enabling global business operations. They integrate customer relationship management (CRM), logistics, and AI-driven recommendations . **Examples :** Amazon, Alibaba, Shopify.

Content Delivery and Streaming Platforms

Streaming platforms optimize the distribution of digital media, ensuring low-latency content delivery through adaptive streaming technologies. **Examples :** Netflix, YouTube, Spotify.

Blockchain and Decentralized Platforms

Blockchain platforms facilitate secure and decentralized transactions, eliminating the need for intermediaries. These platforms are widely used in finance, supply chain management, and smart contracts . **Examples :** Ethereum, Hyperledger, Binance Smart Chain.

1.4.3 Attributes of a Network Platform

A network platform must be designed to simplify IT and network management so that the network can scale with the evolving needs of a digital business. To achieve this, it must possess the following basic attributes :[7]

Integrated visibility

This is necessary for network performance monitoring and analysis, as well as end-user experiences. Visibility telemetry needs to be fed into an analytics engine that can quickly ascertain network performance or security problems and aid with guided or automated remediation. This greater visibility and automation also builds lucrative pools of data which can employ open APIs to integrate with third-party IT and network management systems. [31]

Extensibility

An extensible and modular network platform must be so that new services such as identity services, policy management, location services, and assurance can be added incrementally. Likewise, the platform should be able to incrementally expand from one domain to multiple domains to create a cohesive network platform. [31]

Support for cloud operating models

A network platform must support and enable cloud operating models so that the network can leverage cloud principles for managing IT resources. When organizations utilize cloud operating models for their networks, they gain scalability, simplicity of management, and feature velocity. Network platforms should allow IT and network administrators to enjoy more consolidated control and management experiences regardless of whether their network management system is on premise, cloud hosted, or part of a hybrid management style.[31]

Unified platform capabilities

By adopting a networking platform that can stretch across more than one domain, organizations gain benefits from standardized management, confirmation, data gathering/analytics, and improved team collaboration. Expanding into a single platform also helps IT to track, protect, and ensure the end-to-end common digital experience within one system and interface. The key components of an integrated network platform are unified control, management, and automation for areas of the network. [31]

1.4.4 Components of a Network Platform

A network platform integrates multiple components to enable connectivity, data exchange, and efficient management. These components are broadly categorized into hardware, software, and functional systems, each contributing to the platform's operational success. The main components are described below :

Networking Hardware Devices

Hardware provides the physical foundation for a network platform, supporting connectivity, traffic routing, and security.

- **Routers** : These devices connect multiple networks, directing data packets to enable communication within and between organizations.

- **Switches** : Switches link devices within a network, ensuring efficient data packet delivery to intended destinations.

- **Hardware Firewalls** : Dedicated firewall devices monitor and filter incoming and outgoing traffic based on security rules, protecting the network from unauthorized access and threats.

- **Wireless Access Points (WAPs)** : WAPs provide wireless connectivity, allowing mobile devices to join the network without cables.

These hardware elements create a robust, secure, and scalable infrastructure essential for modern enterprise network management [33].

Software-Defined Network Resources

Software-Defined Networking (SDN) transforms network management by decoupling control from physical hardware, enabling centralized, flexible, and automated management. SDN enhances scalability, resource allocation, and operational efficiency, critical for managing network platforms. Key SDN features include :

- **Virtual Networks** : SDN creates isolated virtual networks over shared physical infrastructure, improving security and workload segmentation.

- **Load Balancing** : This optimizes traffic distribution, ensuring high application performance and availability.

- **Software-Based Security** : SDN integrates advanced security tools, such as :

  - Virtual firewalls for dynamic traffic monitoring and control.

  - Intrusion Detection and Prevention Systems (IDS/IPS) for real-time threat detection and mitigation.

  - AI-driven automation for proactive threat identification and response.

By leveraging automation and software-based controls, SDN enhances the efficiency, adaptability, and security of network platforms, aligning with modern management demands

Monitoring and management tools

Network monitoring and management solutions play a significant role in ensuring the reliability, security, and performance of network platforms.

- Network Monitoring Tools : Track latency, packet loss, and abnormal traffic patterns to enable real-time issue detection and resolution for maximum network health.

- Configuration Management Tools : Enable centralized management and automated configuration of network appliances, ensuring policy consistency and reducing manual intervention.

- Network Analytics Platforms : Monitor traffic patterns, user behavior, and security risks to enable data-driven decision-making and overall network optimisation.

  By integrating these tools, network platforms acquire real-time visibility, automation, and better security, ensuring stable and optimised performance.[33]

1.5 Advantages of Management in Network Platforms

Network platform management done right has several advantages in terms of cost effectiveness, scalability, security, and performance. Here are the main benefits : [1]

Maximizing Uptime and Reducing Downtime

- Continuous Monitoring : Sophisticated network management software facilitates 24/7 real-time monitoring, enabling the detection and resolution of connectivity problems before they become serious disruptions.

- Proactive Maintenance : Proactive maintenance measures reduce downtime to a minimum, maintaining service continuity and minimizing losses in productivity.

Optimizing Network Performance

- Efficient Resource Utilization : Network management software detects and removes bottlenecks, optimizing data flow and ensuring smooth operations.

- Scalability : Through effective management, there is simple expansion of network infrastructure to allow businesses to expand without interruption of services.

Enhancing Security and Compliance

- Proactive Threat Detection : Continuous monitoring identifies vulnerabilities, enabling timely application of security patches to prevent cyber threats.

- Enforcement of Security Policies : Ensures consistent application of security controls across all network locations, improving the overall security stance.

Streamlining Administration and Operations

- Automation of Tasks : Automated processes, such as configuration updates and backup of the systems, reduce manual intervention and optimize operational efficiency.

- Centralized Control : A single management interface allows network supervision, troubleshooting, and decision-making, improving administrative control.

Boosting Productivity and Cost Efficiency

- Stable Network Environment : Uniform management ensures consistent network performance, preventing operational disruptions.

- Rapid Problem Solving : Rapid problem identification and solving reduce downtime, making the overall workflow more efficient.

- Better Resource Utilization : Smart management allows for effective utilization of network resources, preventing ineffectiveness through underutilization or overloading of infrastructure.

- Reduced Costs : Outsourcing network management to skilled service providers can reduce operational costs without affecting high performance.

1.6 Impact of Management on Network Platform Performance

Network platform management is of utmost importance to their overall functionality, immediately affecting efficiency, productivity, and system robustness. Properly managed, they can provide optimum resource usage, prevent probable failure, and improve service availability.[4]

1.6.1 Influence on Efficiency and Productivity

A well-structured network performance management (NPM) strategy consists of several key components that contribute to optimal network operations :

- Monitoring and Analysis : Real-time tracking of network devices and data flows enables anomaly detection, predictive maintenance, and performance optimization.

- Traffic Management : Techniques such as load balancing and Quality of Service (QoS) policies regulate data flow, preventing congestion and ensuring smooth operations.

- Fault Management : Rapid identification and resolution of network failures minimize downtime and enhance service continuity.

- Automation and Predictive Analytics : AI-driven automation enhances network reliability by reducing the need for manual intervention and enabling proactive issue resolution.

  Effective management of network performance leads to :

- Increased network availability, reducing system downtime and service disruptions.

- Higher productivity, as employees benefit from a stable and high-performing network.

- Optimized resource utilization, ensuring better scalability and long-term sustainability.

- Cost reduction, through proactive maintenance and efficient resource allocation.

1.6.2 Challenges and Best Practices

Despite its advantages, network performance management presents several challenges :[4]

- Latency and Productivity Loss : Poorly managed networks can slow down business processes, reducing overall efficiency.

- Network Congestion and Configuration Issues : Ineffective management may lead to frequent failures, impacting service reliability and user satisfaction.

- Security and Compliance Risks : Ensuring compliance with Service Level Agreements (SLAs) and protecting against cyber threats requires continuous monitoring and updates.

- High Operational Costs : Inefficient network resource allocation can lead to financial losses, especially in cases of prolonged outages.
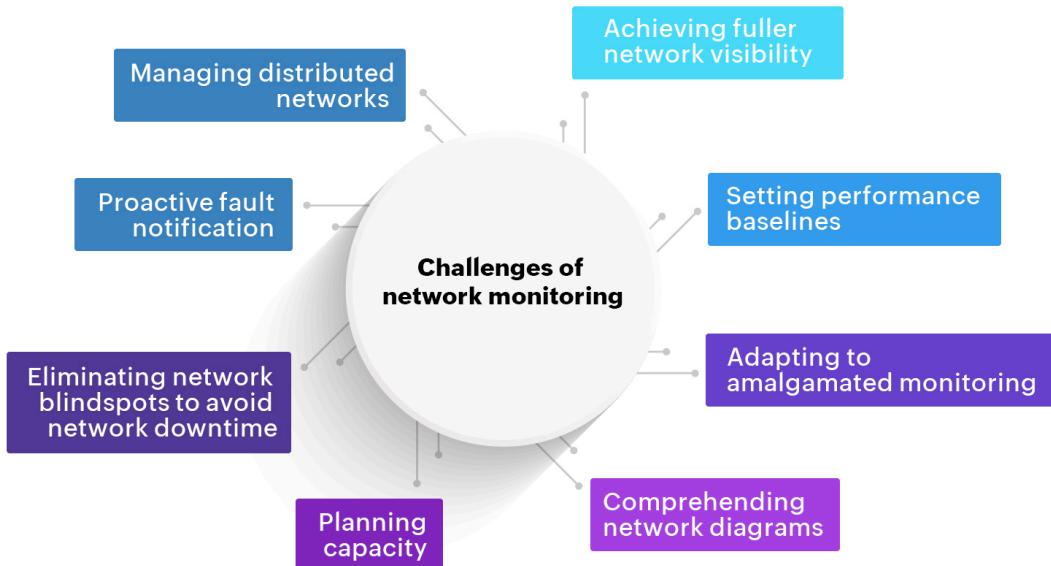

Fig. 1.2 : Challenge of Network Management[18]

To overcome these challenges, best practices in network performance management include : [4]

- Automating monitoring and maintenance processes to improve responsiveness and reduce human errors.

- Implementing data traffic optimization techniques such as QoS to prioritize critical applications.

- Integrating cybersecurity measures to safeguard network infrastructure against threats.

- Leveraging historical data analysis to predict future trends and adjust resources accordingly.

1.7 Conclusion

In summary, management is needed to ensure the efficiency, security, and scalability of network platforms. This chapter has provided a complete overview of management principles, charted their history and differentiated them from administration. It has also set forth various types of network platforms, their basic attributes, and the role of management in maximizing their performance.

By the execution of best management practices, companies are capable of improving productivity, reducing downtime, and reducing security threats and ensure the long-term sustainability of their network infrastructure. Nevertheless, latency problems, cyber threats, and operation costs must be faced on an ongoing basis with the help of automation, planning, and monitoring.

As the online world continues to evolve, so does the need for flexible and innovative management approaches. The subsequent chapters will delve deeper into cost, security, and human resource management, further solidifying the understanding of how to effectively manage network platforms in today's ever-changing technology environment.

Strategic Management of Network Platforms : Security, Costs, and Human Resources

2.1 Introduction

Effective network platform management requires not only a robust technical infrastructure, but also a well-thought-out financial strategy, robust security measures, and strict coordination of human resources. This chapter examines three fundamental elements that ensure the stability and efficiency of network systems : security, expense control, and personnel management. Together, these elements form the operational pillar of any contemporary network platform.

2.2 Security in network platforms

Security is a fundamental pillar in the management of network platforms. As these systems increasingly support critical services and handle sensitive data, they become prime targets for cyberattacks. Ensuring a secure environment involves protecting the platform's infrastructure, data, and users from a wide range of threats, while complying with industry standards and regulatory frameworks.[6]

2.2.1   Network Security : Threats and Vulnerabilities

In the world of network platforms, organizations are constantly faced with the need to overcome threats and vulnerabilities that present significant challenges. As digital infrastructures expand and become more interconnected, they become more attractive to malicious entities and more vulnerable to systemic failures.

Threats

A threat is anything that has the potential to damage a system, including data theft, file damage, or service interruption. It typically exploits a vulnerability and may come from hackers, malware, or system failure. These threats manifest in several common forms described below.

- **Malware Attacks :** Malicious programs (viruses, worms, ransomware) designed to damage systems, steal data, or gain unauthorized access.
  Example : A worm that spreads through backdoors and launches a DDoS attack.

- **Social Engineering :** Psychological manipulation of users to obtain confidential data.
  Example : Phishing emails that trick users into giving away login credentials.

- **Supply Chain Attacks :** Target the software or hardware development process to inject malicious code before it reaches the final user.
  Example : A compromised software update affecting thousands of users.

- **Denial-of-Service (DoS) Attacks :** Flood systems with traffic to make them unavailable.
  Example : An HTTP flood paralyzing a server's ability to respond.

- **Injection Attacks :** Insert malicious code into input fields (like forms) to access or manipulate databases.
  Example : SQL injection in login forms to bypass authentication.

Vulnerabilities

Vulnerabilities are internal weaknesses found in software, hardware, or system configurations, which can be exploited by attackers to gain unauthorized access or

disrupt normal operations. These weaknesses are often caused by poor design, outdated components, or insufficient security practices. The most common types include :

- **System Misconfigurations :** Errors in system setup can expose networks to attacks. These are frequent, especially during the deployment of new technologies.

- **Unpatched Software :** Failure to apply updates leaves systems vulnerable to known exploits. A robust patch management policy is crucial.

- **Weak Credentials :** Use of simple or reused passwords facilitates brute-force attacks. Cybersecurity training helps reduce this risk.

- **Insider Threats :** Authorized users may unintentionally or deliberately leak sensitive data. Segmentation and access control mechanisms are essential preventive measures.

- **Poor Encryption :** Unencrypted or weakly encrypted data can be intercepted and manipulated, leading to serious breaches and compliance violations.

- **Zero-Day Vulnerabilities :** These unknown flaws are exploited before patches exist. Continuous system monitoring is key to mitigating their impact.

Addressing these vulnerabilities is critical to ensuring strong network security and regulatory compliance. [32]
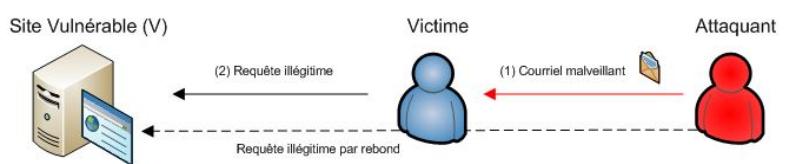

Fig. 2.1 : The attacker sends an email that causes an illegitimate request [2]
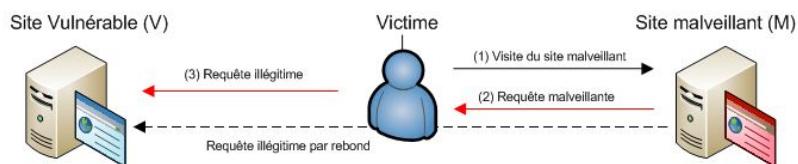
Fig. 2.2 : Visiting a malicious site causes an illegitimate request to be sent [2]

2.2.2 Cybersecurity Measures and Standards

Cybersecurity standards and practices are essential frameworks and techniques that protect sensitive data, shield enterprises from cyberattacks, and ensure regulatory compliance. These frameworks encompass organizational, legal, and technical aspects of security.

Types of Cybersecurity Standards

Cybersecurity standards can be categorized into three main types, each addressing different aspects of security implementation and compliance within an organization's infrastructure.

Technical Standards : Technical standards in cybersecurity specify controls, best practices, and procedures to mitigate IT infrastructure risks and protect critical resources.

These guidelines help create a secure environment for companies operating in the digital sphere. By following these recommendations, organizations can effectively manage cyber threats and ensure the availability, confidentiality, and integrity of their data and services.[8]

Organizational Standards : Organizational standards aim to establish clear policies, procedures, and auditing mechanisms to ensure alignment with industry best practices and cybersecurity requirements.

They serve as a strategic foundation for protecting sensitive data, structuring internal operations, and reinforcing an organization's resilience against cyberattacks. Audit processes embedded in these standards enable continuous monitoring and improvement.[8]

2.2.3 Data privacy and compliance

Data privacy compliance refers to the adherence to national and international laws, standards, and internal policies that protect personal information. It ensures that all data collected, stored, and processed by organizations respects individuals' rights to privacy and safeguards organizations from legal and reputational risks. [23][29]

Personal data includes any information that can identify a specific person, such as full name, email address, telephone number, IP address, or physical address.

In Algeria, companies must comply with Law 18-07, which regulates the collection, storage, and processing of personal data and requires explicit consent, data minimization, and breach notification protocols.[13]

Example : A telecom operator managing a client database must encrypt all stored information and restrict access to authorized personnel only.

Privacy compliance is not only legal—it also builds trust and supports cybersecurity strategy by requiring secure data architecture, access controls, encryption, and continuous auditing mechanisms.

2.3   Costs Management

Cost management involves the planning, controlling, and monitoring of an organization's or project's budget. It includes cost estimation, budget development, and the regulation of expenditures to ensure financial efficiency and adherence to budget constraints . [11]

2.3.1   Types of Costs

Understanding the distinction between Capital Expenditures (CAPEX) and Operating Expenses (OPEX) is essential for managing the financial aspects of network platforms. This knowledge aids in making strategic investment decisions and ensures sustainable and profitable operations .[11]

CAPEX

Capital expenditures (CAPEX) refer to the funds a company invests in acquiring, upgrading, or maintaining physical assets. These are significant, long-term investments—far beyond everyday office supplies. CAPEX typically includes purchases such as buildings, machinery, equipment, vehicles, or advanced technology systems.

Unlike OPEX, capital expenditures are not fully expensed in the year they are incurred. Instead, they are capitalized and recorded on the balance sheet, meaning the cost is allocated over the useful life of the asset . [11]

Example : Purchase of machinery, buildings, vehicles, or IT infrastructure.

OPEX

Operating expenses (OPEX) refer to the recurring, day-to-day costs necessary for running a business. These include items such as employee salaries, office rent, utility bills, marketing campaigns, routine maintenance, and procurement of supplies.

OPEX are more flexible and can vary monthly, quarterly, or annually. They are vital to maintaining the operational efficiency and continuity of the organization . [5]

**Example :** Salaries, rent, utilities, maintenance, and marketing expenses.
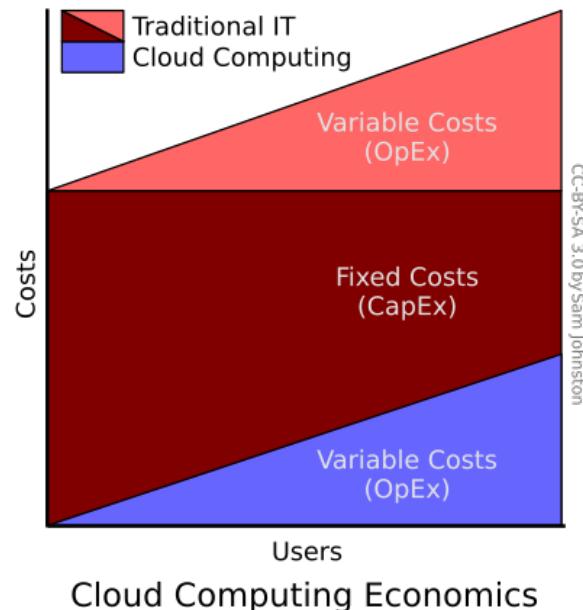
Fig. 2.3 : Cost Dynamics in Network Infrastructure Management[16]

Difference between Capex and Opex

Tab. 2.1 : Key Differences Between CAPEX and OPEX

Aspect	CAPEX (Capital Expenditures)	OPEX (Operating Expenditures)
Definition	Expenditures for acquiring or upgrading long-term assets.	Expenditures for daily operational activities.
Accounting Treatment	Recorded as assets and depreciated over time.	Recorded as expenses in the income statement.
Time Horizon	Benefits last more than one year (long-term).	Benefits are consumed within the current period (short-term).
Tax Treatment	Deductible over time through depreciation.	Fully deductible in the year incurred.
Cash Flow Impact	Large upfront investment.	Continuous, smaller payments over time.
Flexibility	Less flexible due to long-term commitment.	More flexible and adaptable to change.

2.3.2 Licensing, Maintenance, and Scalability Costs

For software solutions, licensing, maintenance, and scalability represent critical components of the Total Cost of Ownership (TCO).By understanding these costs, organizations can better plan their software budgets and make more cost-effective investments. [34]

Licensing Costs

Licensing costs refer to the fees an organization must pay to legally use software, as defined by the terms set forth by the software provider. These costs vary significantly depending on the licensing model employed. [5]

Organizations typically choose from several common license types :

- **Perpetual License :** One-time purchase that grants indefinite usage rights. High initial cost but no recurring fees.

- **Subscription License :** Recurring monthly or annual payments. Offers flexibility and access to regular updates and support.

- **Concurrent License :** Allows a limited number of users to access the software simultaneously. Suitable for shared usage environments.

- **Open Source License :** Generally free to use and modify, though organizations may incur costs for integration, support, or customization.

Selecting the appropriate licensing model helps balance costs with operational needs, especially in scalable or cloud-based network environments.

Maintenance Costs

Software maintenance costs refer to the ongoing expenses required to keep software secure, functional, and up-to-date after deployment.

In network platform management, the Product-Service System (PSS) model combines the delivery of physical infrastructure with essential services like maintenance, monitoring, and technical support. This approach ensures stable system performance while controlling costs and maximizing value for the customer. [30]

Maintenance expenses can be categorized into three main components :

- **Initial Maintenance Costs** : Include transportation of the product or its components to a maintenance center and the execution of scheduled maintenance tasks.

- **Additional Transport Costs** : Occur when specific parts require specialized servicing at external facilities due to technical limitations at the original site.

- **Location-Adjusted Maintenance Costs** : Calculated based on the operational expenses of each facility, including labor, equipment, and logistics.
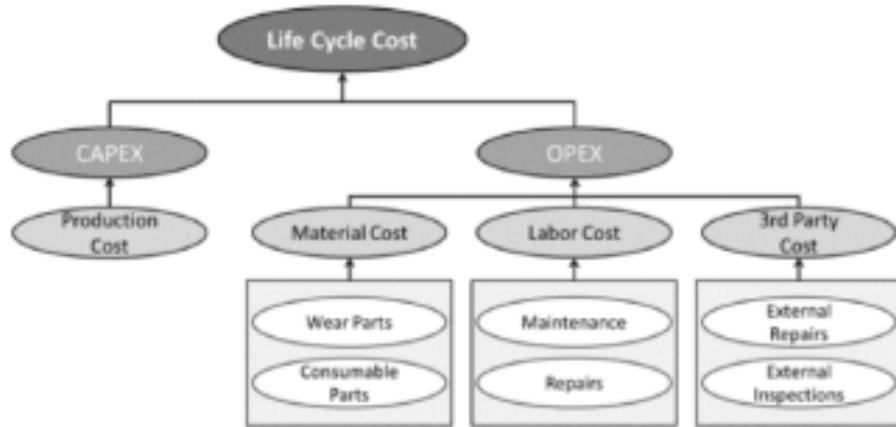
Fig. 2.4 : Life cycle costs composition [30]

Scalability Costs :

Scalability costs refer to the expenses needed to expand a software system or IT infrastructure to support more users, data, or activity as the business grows. These costs can be both direct and indirect, and optimizing them is crucial to allow growth without compromising performance or exceeding the budget.[26]

Elements of Scalability Costs :

- **Infrastructure Expansion** : Includes costs for additional hardware, cloud storage, or servers to meet rising demand. Cloud computing offers elastic scalability in terms of storage, processing, and service capacity.

- **Licensing and Subscription Fees** : As usage increases, so can the associated licensing or subscription costs. Flexible licensing models help align these costs with real usage.

- **Development and Integration Costs** : Building scalable systems often requires early investment in software development, integration, and adaptation for future growth.

- **Operational and Maintenance Costs** : More complex systems require higher levels of monitoring, preventive maintenance, and performance tuning, all of which increase ongoing operational costs.

- **Downtime and Switching Fees** : Non-scalable systems can suffer from down-
  time and performance issues. Transitioning to a scalable solution often incurs
  additional costs, such as training, migration, or temporary service interruptions.
  [26]

2.3.3 ROI and TCO

Return on Investment (ROI) and Total Cost of Ownership (TCO) are essential
financial metrics for evaluating IT investments. ROI measures the profitability of a
solution by comparing the net gain to its cost, considering productivity, cost savings,
and strategic value. TCO accounts for the full lifecycle costs of a system, including
acquisition, implementation, training, maintenance, and end-of-life expenses. [34]

$$\text{ROI} = \left(\frac{\text{Net Gain}}{\text{Investment Cost}} \right) \times 100 \qquad \text{TCO} = \text{Initial Cost} + \text{Maintenance} + \text{End-of-Life Costs}$$

These two metrics help organizations evaluate both short-term gains and long-term
sustainability when adopting network platforms or IT solutions.

2.4 Human Resource Involvement in Network Platform Management

The success of a network platform hinges not only on its technical infrastructure
but also on the expertise and dedication of the human resources tasked with its ma-
nagement. Human capital plays an indispensable role in ensuring that the platform
operates seamlessly, remains secure, scales effectively, and aligns with the strategic
goals of the organization. By leveraging a combination of specialized skills, collabora-
tive efforts, and strategic oversight, these professionals create a robust foundation for
the platform's sustained performance. [25]

2.4.1 Skills and Roles in Platform Management

The effective management of a network platform relies on a multidisciplinary team,
bringing together system administrators, network engineers, cybersecurity specialists,

and IT project managers. Each role contributes unique expertise to ensure the platform's functionality, security, and alignment with organizational objectives. Network engineers design and maintain the infrastructure, focusing on scalability and reliability. Cybersecurity experts implement robust measures to protect data integrity. IT project managers oversee the integration of technical efforts with strategic business goals. This collaborative interplay of roles enables a comprehensive approach to platform management, addressing both operational and strategic imperatives. The success of these roles depends on a combination of soft and technical skills, which are critical for navigating the complexities of modern platform ecosystems. [20]

Soft Skills

The soft skills required for platform management are essential for fostering effective collaboration and leadership within multidisciplinary teams. These skills enable professionals to manage projects, communicate effectively, and adapt to evolving technological landscapes.[20]

- Project Management : The ability to define clear objectives, allocate resources efficiently, and monitor project progress is highly valued, particularly in leadership positions. These skills ensure that platform initiatives align with organizational priorities and are delivered on time.

- Attention to Detail : A meticulous approach is crucial for maintaining system stability, conducting thorough testing, and producing comprehensive documentation, such as process records, runbooks, and architectural diagrams, to support team collaboration.

- Collaboration and Communication : Strong interpersonal skills are vital for working with cross-functional teams. Professionals must articulate complex technical concepts clearly to both technical and non-technical stakeholders, fostering effective collaboration.

- Adaptability and a Learning Mindset : In a rapidly evolving technological environment, the capacity to embrace new tools and stay informed about industry trends is essential. A commitment to continuous learning ensures relevance and innovation.

Technical Skills

The technical skills required for platform management encompass a core set of widely recognized expertise, enabling professionals to design, automate, and secure network platforms. These skills are fundamental to ensuring operational efficiency and system reliability. [25]

- Programming Languages : Proficiency in widely used languages such as Java, C++, Python, and Bash is necessary for platform development, automation, and scripting, facilitating efficient system management and customization.

- Cloud Computing : Expertise in leading platforms like AWS, Azure, and GCP is essential for provisioning and managing resources, including virtual machines, containers, storage, and networking, to support scalable infrastructure.

- Infrastructure as Code (IaC) : Familiarity with Terraform allows for the automation of infrastructure deployment and management, streamlining operations and reducing manual effort.

- Container Orchestration : Knowledge of Kubernetes is critical for managing containerized workloads and ensuring application scalability, a cornerstone of modern platform architectures.

- Operating Systems and Networking : Competence in Linux administration, alongside mastery of standard protocols such as TCP/IP, DNS, and HTTP, underpins effective system and network security management.

- Security and Compliance : Skills in managing access controls, encryption, vulnerability mitigation, and adherence to industry standards are essential for maintaining a secure and compliant platform.

2.4.2 Responsibilities of Platform Management Roles

The responsibilities of platform management teams encompass the design, implementation, and continuous optimization of network platform infrastructure and operations. This includes building the necessary hardware and software environments with a focus on disaster recovery to ensure service continuity. Managing cloud resources (AWS, Azure, GCP) is critical for balancing performance and cost-efficiency.

Automation plays a key role by using tools like Infrastructure as Code and CI/CD pipelines to minimize manual work and improve deployment reliability. Monitoring and observability are essential for rapid incident detection and maintaining system performance.

Security is integrated throughout all processes, involving access management, encryption, and regular patching to mitigate vulnerabilities. Collaboration with development teams is crucial to provide standardized tools and workflows that streamline their operations. Continuous improvement through performance testing, proactive incident management, and comprehensive documentation ensures the platform's robustness and adaptability over time.[25]

2.4.3 Team Structure

The organization of platform management teams is designed to deliver robust, scalable, and efficient platforms that underpin development, operations, and business functions. These teams bring together different roles to handle the complex needs of modern digital systems, promoting innovation and stable operations.[9]

- Platform Team Lead / Manager : This role oversees team coordination, aligns platform objectives with organizational priorities, manages stakeholder relationships, and promotes the adoption of platform solutions across the organization, ensuring strategic coherence.

- Platform Engineers : Responsible for designing, building, and maintaining the core infrastructure, platform engineers focus on automation, reliability, and scalability to empower internal development teams with efficient tools and systems.

- Site Reliability Engineers (SREs) : SREs concentrate on ensuring system availability and performance, implementing monitoring systems, managing incident responses, and driving continuous improvements in platform reliability.

- DevOps Specialists : These specialists facilitate collaboration between development and operations, managing CI/CD pipelines, automating workflows, and supporting secure and consistent deployment processes to streamline software delivery.

- Security Engineers : Security engineers integrate security practices throughout the platform lifecycle, conducting risk assessments, ensuring compliance with regulatory requirements, and mitigating vulnerabilities to maintain a resilient platform.

- Product Managers / Product Owners : Serving as the bridge between platform users (typically internal developers) and the technical team, product managers gather requirements, prioritize features, and guide the platform's roadmap to align with organizational goals.

- Additional Specialists : Depending on organizational needs, roles such as Quality Assurance (QA) Engineers ensure platform reliability through systematic testing, Infrastructure Engineers optimize physical or cloud-based environments, Database Administrators manage and secure data storage and access, and UX/UI Designers develop user-friendly interfaces for internal tools. [9]

These teams integrate diverse roles to meet the multifaceted demands of modern digital ecosystems, fostering innovation and operational stability.
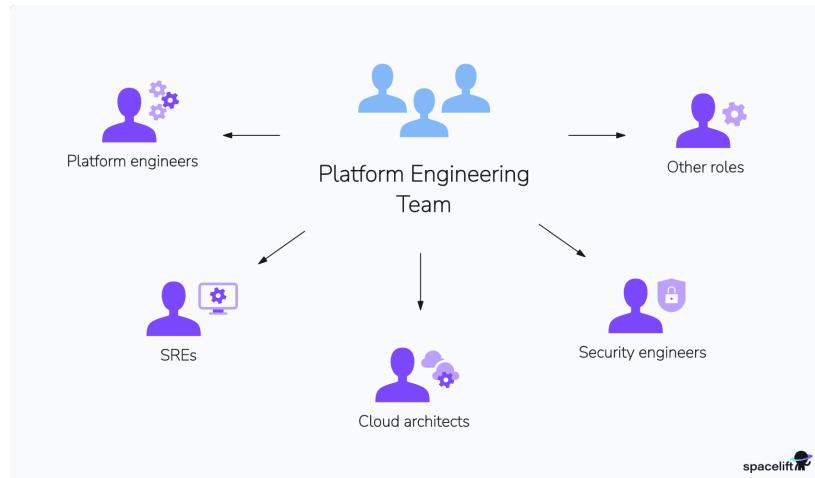

Fig. 2.5 : Team structure of platform engeneering [9]

2.4.4 Practical Example : Squarespace's Platform Coordination

Squarespace, a renowned website-building platform, illustrates network platform management through its sleek web interface [**?**]. A team of developers, designers, and

project managers collaborated to create a site that connects users with tools for crafting professional websites [25]. Developers ensured a scalable back-end, while designers built an intuitive interface with templates and drag-and-drop features, enhancing user engagement. Project managers coordinated efforts to align with business objectives, such as client acquisition. This teamwork enabled Squarespace to promote its services efficiently, akin to static websites streamlining client communication in telecommunications (Section 3.5.4). Such coordination highlights the importance of human resources in network platform management .

2.5   Conclusion

This chapter analyzed the three fundamental pillars of network platform management : security, cost control, and human resource management. We explored various security threats such as malware, social engineering, and denial-of-service attacks, along with their related vulnerabilities. Ensuring compliance with cybersecurity standards and data privacy regulations is crucial for protecting network infrastructures. In terms of cost control, distinguishing between CAPEX and OPEX, and applying ROI and TCO analyses, supports smarter investment decisions. Finally, successful platform management depends on effective team organization and a balanced mix of technical and soft skills.

The next chapter will introduce the company and focus on the practical development of its website, showcasing how these management principles are applied in a real-world context.

Company Presentation and Website Development

3.1 Introduction

Business development in today's network platform industry must be guided by a clear and coherent strategy at both the organizational and digital levels. This chapter presents the provision of fiber optic services and introduces a new business plan aimed at both professionals and individual clients, in a context where connectivity and high-speed data transfer have become essential.

Creating a website is a fundamental starting point to raise awareness and ensure effective communication from the outset. This chapter lays the foundation for the business project and outlines the key stages in the development of a website, an essential component for market positioning and future business growth.

It explores how the website supports the company's market positioning and long-term expansion. In today's era, a company's website is not only a communication tool; it also communicates its values, identity, and the quality of its services. From the beginning, it contributes to building credibility and establishing a strong market presence.

3.2 Overview of the Company

Opticonnect is a young and dynamic company that specializes in the manufacture, installation, and maintenance of fiber optic solutions. In response to the growing

demand for reliable high-speed connectivity, Opticonnect is committed to providing top-tier technical services that meet the evolving needs of businesses, government institutions, and private clients.

Its mission is to provide network systems that combine performance, reliability, and scalability. By offering a comprehensive range of services—from fiber optic cable production to the deployment of turnkey network infrastructures—Opticonnect aims to become a key player in the national telecommunications landscape.

Innovation is at the core of Opticonnect's development strategy. The company invests continuously in emerging technologies and strengthens its expertise to ensure the highest standards of quality and performance. Thanks to its dynamic and skilled teams, it delivers personalized services tailored to the specific requirements of each client, fostering long-term relationships based on trust and satisfaction.

Though still in its early stages, Opticonnect is driven by bold ambitions : to become a benchmark in the fiber optics sector by offering innovative connectivity solutions that contribute to the digital transformation of society.

3.3   Objective of the Project : Website Creation

One of the main activities of my Final Year Project (FYP) was to design and develop a website for Opticonnect. The main objectives of the website were :

- **To introduce the company**, its activities and core values, by offering a brief and professional presentation to visitors.

- **To promote the services and products** offered by Opticonnect, highlighting the company's expertise and innovation potential in the fiber optics area.

- **To improve the company's image and visibility on the market** by providing a credible and professional web presence to attract new clients and collaborators.

This website serves not only as a communication tool but also as a strategic asset aligned with Opticonnect's long-term digital development goals.

3.4 Development Environment and Technologies Used

For the development of the Opticonnect website, we chose a modern and flexible front-end stack to ensure a smooth user experience, easy maintenance, and room for future growth. In this section, we will take a closer look at the main technologies and tools we used throughout the development process.

3.4.1 Hardware used

As part of our creation and design of the site, we used a personal PC which includes the following characteristics :

- Brand : DELL

- Device Name : DESKTOP-N2O3B6D

- Processor : Intel(R) Pentium(R) Silver N5000 CPU

- Processor Speed : 1.10 GHz

- OS : Windows 10

- Hard Drive ROM : 256 GB SSD

- RAM : 8 GB

- Available Connectivity : HDMI, USB 3.2, Wifi, Bluetooth

3.4.2 Development Environment

The development environment was based on **Visual Studio Code**, an open-source code editor intended to support core development tasks like debugging, task running, and version control. It is maintained by Microsoft and runs on Windows, Linux, and macOS. Its primary goal is to deliver developers only the features needed for a quick code-edit-debug cycle, reserving more sophisticated workflows for full-featured integrated development environments (IDEs).
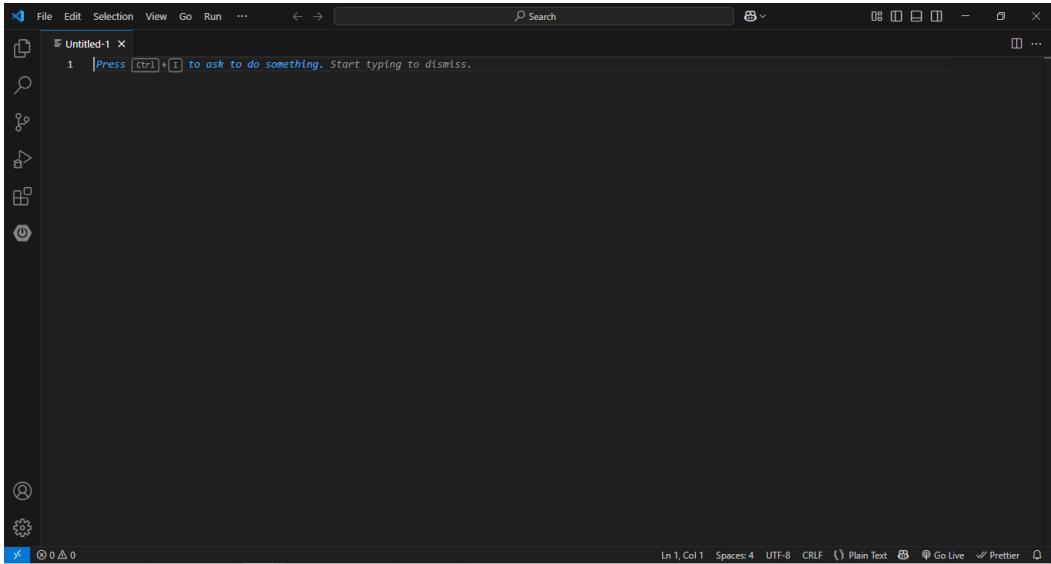
Fig. 3.1 : Visual Studio Code interface on Windows 10

3.4.3 Technologies Used

HTML

HTML (HyperText Markup Language) is a descriptive computer language used primarily on the Internet to format and organize web pages. It not only facilitates the building of hypertext but also the embedding of multimedia content in web documents. Developed by the W3C (World Wide Web Consortium) and WHATWG (Web Hypertext Application Technology Working Group), HTML first surfaced during the early 1990s and has since been revised several times, with the more comprehensive HTML5 specification being released in 2014.

HTML is built upon a syntax of tags which can be applied to define subheadings, headings, bold, paragraphs, and other elements of text as well as interactive components such as images, videos, and links. HTML is easier for spiders to read than JavaScript, and thus it's an essential element of content display and enhancing interaction with web pages.[17]

```
<!DOCTYPE html PUBLIC "-//IETF//DTD HTML 2.0//EN">
<html>
 <head>
  <title>
   Exemple de HTML
  </title>
 </head>
 <body>
  Ceci est une phrase avec un <a href="cible.html">hyperlien</a>.
  <p>
   Ceci est un paragraphe où il n'y a pas d'hyperlien.
  </p>
 </body>
</html>
```

Fig. 3.2 : Structure of an HTML document

CSS

CSS (Cascading Style Sheets) is a computer language used to specify the appearance and structure of web pages. Similar to HTML or XML, it is an industrial standard supported by the World Wide Web Consortium (W3C).

Its basic goal is to separate the content of a web page (which is in HTML) from its presentation. HTML works on the structure of a page, whereas CSS works on how this content will be controlled : colors, fonts, spacing, and positioning.

With CSS and HTML, it becomes less time-consuming to have and modify websites. The HTML document contains the content and structure, while the CSS document dictates the look. This division makes cleaner, more organized, and more professional looking sites.[12]

```
# style.css > header
 1   body {
 2     font-size: large;
 3     font-family: Tahoma, sans-serif;
 4     line-height: 30px;
 5     margin: 0;
 6     padding: 0;
 7     background-image: url("images/background.jpg.jpeg");
 8     background-size: cover;
 9     background-repeat: no-repeat;
10     background-position: center;
11     background-attachment: fixed;
12   }
13
14   /* En-tête */
15   header {
16     background-color: blue;
17     color: white;
18     opacity: 0.8;
19     padding: 30px;
20     text-align: center;
21   }
```

Fig. 3.3 : Example of a CSS File Styling the Body and Header of a Web Page

React.js
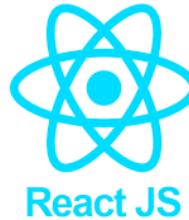
React is a JavaScript library developed by Facebook for building user interfaces. It's built around reusable components that each manage their own state, making it easier to build complex applications.

The main advantage of React is its virtual DOM. Instead of directly changing elements on the webpage (which slows things down), React creates a copy in memory and only updates what actually changed. This makes interfaces much smoother and more responsive.

For Opticonnect, this approach offers several practical benefits : better user experience, easier code maintenance, and the ability to scale the platform without major rewrites. React fits well with the needs of a business that wants a modern, adaptable web solution.

Essentially, React helps create fast, well-organized web applications - exactly what a professional digital platform needs[19].

TypeScript

TypeScript is Microsoft's extension of JavaScript that adds static typing and better object-oriented features. For Opticonnect, using TypeScript is a smart choice because it catches errors before the code even runs, which means fewer bugs in production.

What makes TypeScript really valuable isn't just bug prevention - it's how much easier it makes development. Developers get better autocomplete suggestions, clearer documentation, and safer code refactoring. When you're working on a team, these features make collaboration much smoother.

This is especially important for business applications like Opticonnect's platform. Enterprise projects need code that's reliable and easy to maintain over time. TypeScript helps achieve both by making the codebase more predictable and easier to work with as it grows.

In practical terms, TypeScript means faster development, fewer production issues, and code that's easier to update and expand - all crucial for a professional platform that needs to evolve with business needs[27].

Npm (Node Package Manager)

The Node Package Manager (npm) serves as the backbone of modern JavaScript development, acting as the primary tool for managing dependencies in Node.js projects.

Through npm, developers can easily access thousands of third-party libraries, including essential technologies like React.js and TypeScript, plus countless utility packages and frameworks.

Beyond simple package installation, npm plays a crucial role in version management, dependency resolution, and automating build processes. Its ability to ensure consistent dependency versions across different development environments helps eliminate the "it works on my machine" problem and supports smooth continuous integration workflows. This standardization of project dependencies is particularly valuable for distributed development teams, where maintaining code consistency across multiple developers and environments is essential for successful project delivery and long-term maintenance[22].

3.5 General Structure of the Website

The Opticonnect website is a static platform designed to showcase the company's services and expertise in the fiber optics industry. Its architecture is grounded in user-centric design principles, ensuring intuitive navigation, optimal accessibility, and cross-platform compatibility. By leveraging CSS media queries, the site dynamically adapts to various screen sizes, delivering a seamless experience across desktops, tablets, and smartphones.

Developed using the React.js framework, the website employs a modular, component-based structure with reusable components, facilitating maintenance and future scalability. A fixed navigation bar at the top of each page provides quick access to the main sections, enhancing the coherence of the user experience.

The site's aesthetic embraces a minimalist design, featuring a neutral color palette inspired by the technological precision of fiber optics. Subtle animations, smooth scrolling, and carefully selected icons enrich the interface, making navigation both functional and visually appealing. This approach ensures accessibility for a diverse audience, from industry professionals to casual visitors, while effectively conveying Opticonnect's brand identity and value proposition.

The website is structured around several key sections, each designed to fulfill a specific purpose, as detailed in the subsections below.

3.5.1 Home Page

The home page serves as the primary entry point, crafted to immediately capture visitors' attention. A prominent hero section dominates the layout, incorporating a bold headline, a slogan reflecting Opticonnect's mission, and a call-to-action (CTA) button encouraging further exploration of the site's offerings.
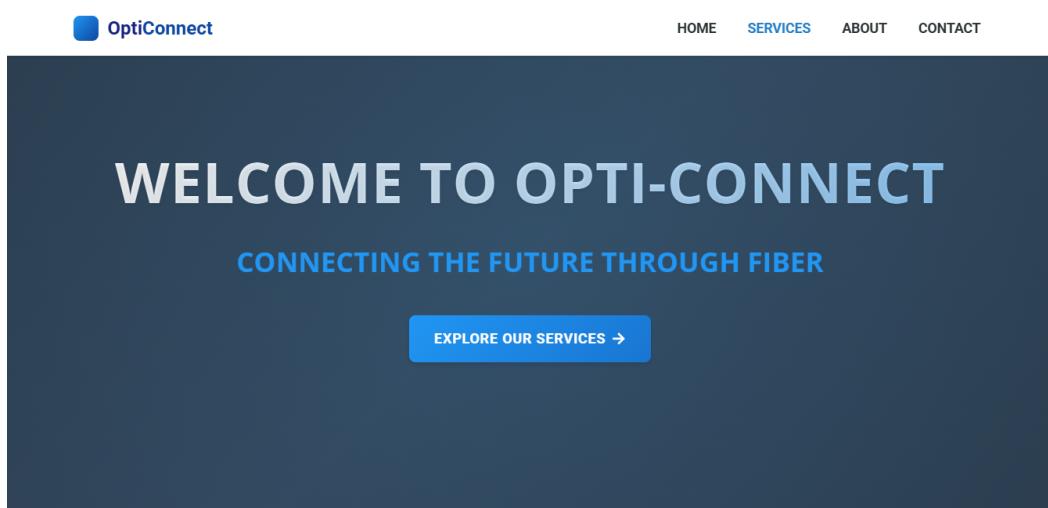

Fig. 3.4 : Home Page of the Opticonnect Website

3.5.2 Services Page

This section provides a detailed overview of Opticonnect's core services, including fiber optic installation, maintenance, and consulting. Each service is presented with concise descriptions and accompanied by distinctive visual icons, ensuring accessibility for both technical and non-technical audiences.
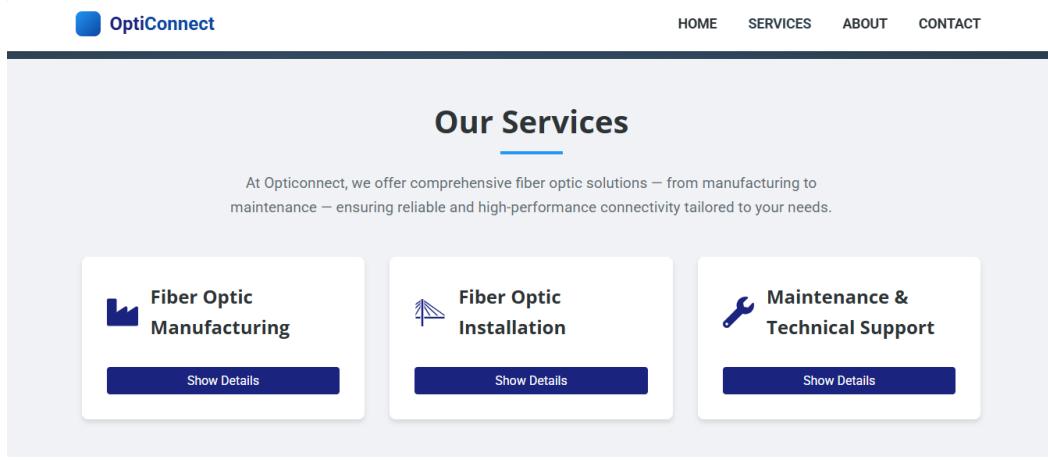
Fig. 3.5 : Services Page of the Opticonnect Website

3.5.3 About Us Page

The About Us page highlights Opticonnect's mission, vision, and core values, emphasizing its leadership and commitment to innovation in the fiber optics industry. This section fosters credibility by providing insight into the company's strategic objectives and operational ethos.
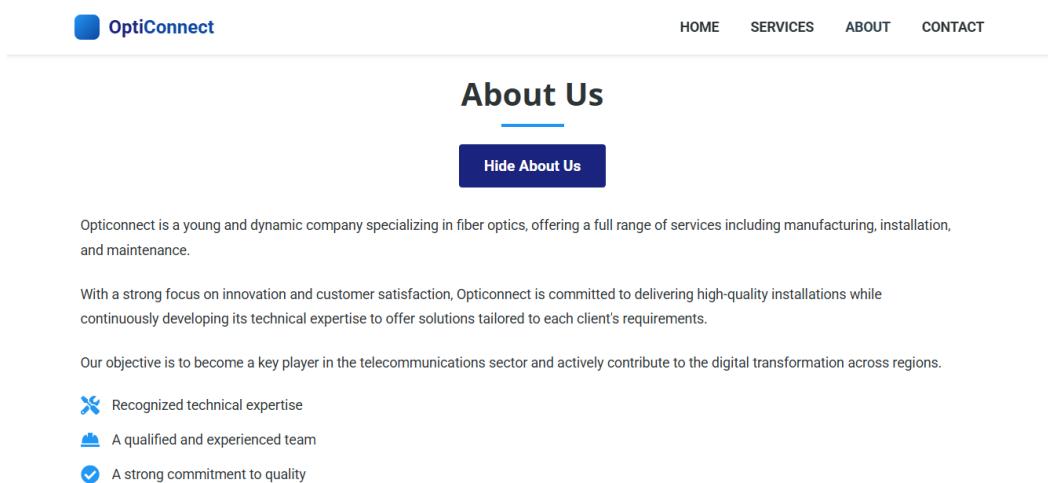

Fig. 3.6 : About Us Page of the Opticonnect Website

3.5.4 Contact Page

The contact page facilitates seamless interaction with Opticonnect through an intuitive inquiry form, supplemented by essential contact details such as email, phone

number, and physical address. The design prioritizes accessibility, enabling visitors to connect with the company effortlessly.
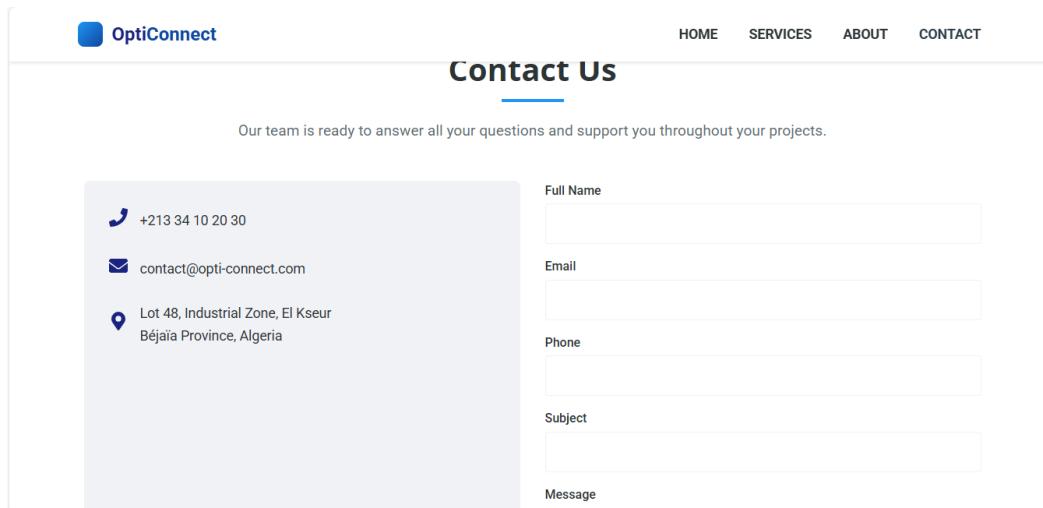

Fig. 3.7 : Contact Page of the Opticonnect Website

3.5.5 Footer Section

The footer, present on all pages, serves as a functional anchor, consolidating links to key sections, additional contact information, and relevant company details, reinforcing Opticonnect's commitment to transparency and accessibility.
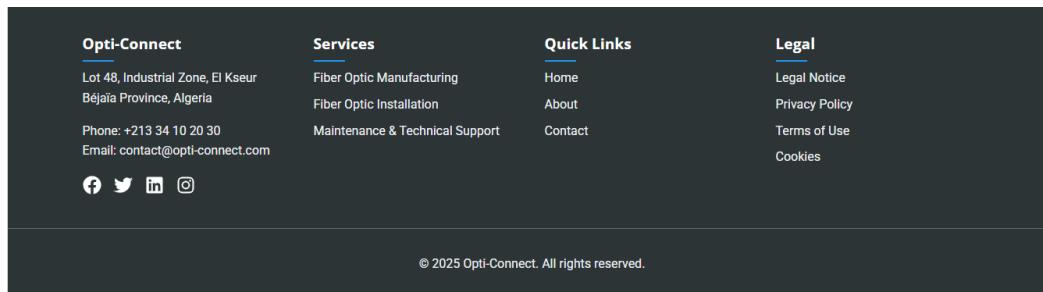
Fig. 3.8 : Footer of the Opticonnect Website

3.5.6 Integration with Platform Network Management

The Opticonnect website serves as a strategic digital interface for platform network management, supporting the company's operations in the fiber optics industry. Platform network management involves coordinating network infrastructure and stakeholder interactions to deliver reliable connectivity solutions. The website contributes by promoting Opticonnect's services, enabling efficient communication, and providing

a scalable platform for future enhancements.

The website highlights Opticonnect's fiber optic services, fostering visibility among clients and partners in the network ecosystem. Its intuitive contact form and accessible navigation facilitate stakeholder engagement, streamlining inquiries and project coordination essential for network management.

The site's modular design supports scalability, allowing future integration of features like client portals or project tracking tools. These enhancements would strengthen Opticonnect's ability to manage network-related operations, aligning with the dynamic needs of platform network management.

By establishing a professional online presence, the website reinforces Opticonnect's leadership in the fiber optics sector, supporting its strategic goals in the platform network ecosystem.

3.6 Testing and Validation

To ensure the Opticonnect website operates effectively as a digital platform for promoting fiber optic services, a testing process was conducted to validate its cross-browser compatibility. This step was critical to confirm the site's reliability and accessibility, aligning with Opticonnect's goal of delivering professional network solutions within the platform network management ecosystem.

The website was tested on major web browsers, specifically Google Chrome, Mozilla Firefox, and Apple Safari, to verify consistent rendering and functionality. Each browser was evaluated to ensure that the site's layout, content, and interactive elements (e.g., navigation bar, call-to-action buttons) displayed correctly without errors. Minor rendering issues, such as alignment discrepancies in Safari, were identified and resolved to guarantee a uniform user experience across platforms.

The successful completion of these tests confirms that the website is accessible and functional across widely used browsers, supporting its role as a reliable communication tool for Opticonnect's network services. This validation enhances the site's effectiveness in promoting the company's expertise in the fiber optics industry.

3.7   Limitations and Future Perspectives

While the Opticonnect website successfully meets its core objectives of presenting the company's services and establishing a professional online presence, certain constraints emerged during its development. As a static platform, the site lacks dynamic features, such as real-time data updates or user authentication, limiting its interactivity with clients seeking network services. Additionally, search engine optimization (SEO) was not prioritized, which may hinder the site's visibility to potential customers in the competitive fiber optics market. The development process, constrained by the scope of a final year project, also focused solely on browser compatibility, leaving aspects like mobile responsiveness and accessibility for diverse users unaddressed.

Looking ahead, several enhancements could strengthen the website's role in supporting Opticonnect's network management goals. Integrating a back-end system would enable dynamic content, such as a client portal for submitting service requests or tracking project progress, enhancing operational efficiency. Adding multilingual support could broaden the site's reach to international clients, aligning with the global nature of network infrastructure projects. Implementing robust SEO strategies would improve online discoverability, attracting more businesses needing fiber optic solutions. Finally, conducting comprehensive testing for responsiveness and accessibility would ensure the site serves a wider audience, reinforcing Opticonnect's commitment to reliable communication in the network ecosystem.

These improvements, though beyond the current project's scope, highlight the website's potential to evolve into a more robust tool for managing network-related interactions, positioning Opticonnect for future growth in the fiber optics industry.

3.8   Conclusion

This chapter introduced Opticonnect, a dynamic company specializing in fiber optic solutions, and detailed the development of its official website. Designed as a strategic tool, the site enhances the company's visibility and professionalism. Built with modern technologies like React.js and TypeScript, it delivers a responsive and scalable user experience. By clearly showcasing services through an intuitive interface, the website supports Opticonnect's business growth and strengthens its position in the network platform sector.

General Conclusion

This thesis focused on the management of network platforms, a central concern in the evolution of modern telecommunications, particularly within the Algerian context. It sought to explore how foundational management principles can be applied to complex technical infrastructures, while also addressing key challenges related to cybersecurity, operational costs, and human resource coordination.

On the theoretical level, the work provided a structured overview of the concept of network platforms. By examining various types (cloud, IoT, e-commerce) and core managerial functions (planning, organizing, leading, controlling), it laid the groundwork for a deeper strategic analysis. The second part of the study expanded on this foundation by focusing on three critical aspects : security, infrastructure-related expenses, and human capital involvement. These elements proved essential for ensuring stability, performance, and stakeholder confidence within digital platforms.

On the practical side, the development of a static website for the company Opticonnect served as a simple yet concrete illustration of platform-related management principles. Built with React.js and TypeScript, the site presents the company's services and functions as a basic client-facing interface. Although limited by its static nature and lacking dynamic features or database integration, it successfully fulfilled its role as a demonstration prototype. It offers a foundation for future extensions, including the addition of a client portal with enhanced interactivity and security.

The perspectives opened by this work are numerous. In the short term, technical improvements such as SEO optimization, accessibility, and the integration of dynamic forms could enrich the platform. Over the longer term, the project could be expanded into a broader reflection on the digital transformation of telecommunications companies in Algeria—potentially integrating concepts such as network process automation (via SDN), real-time monitoring, or artificial intelligence-driven decision support.

Ultimately, this thesis has shown how even a simple web interface can contribute meaningfully to the broader strategy of network platform management. It does not claim to address all the complexities of the field, but it represents a first step toward a more integrated approach—where management and technology work hand in hand to support digital transformation.

Bibliography

[1] Agio. Benefits of network management, September 2024. `https://agio.com/benefits-of-network-management/`.

[2] ALTEN. Développeur web : guide des bonnes pratiques en cybersécurité, 2024. `https://www.alten.com/fr/developpeur-web-guide-bonnes-pratiques-cybersecurite/`.

[3] Apptivo. Who is a manager ? what are the roles and responsibilities of a manager ?, 2023. `https://www.apptivo.com/blog/who-is-a-manager-what-are-the-roles-and-responsibilities-of-a-manager/`.

[4] L. Ballejos. Complete guide : exploring network performance management, November 2024. `https://www.ninjaone.com/blog/what-is-network-performance-management/`.

[5] R. Botha. A comprehensive guide to evaluating software licensing costs for enterprises, 2024. `https://renierbotha.com/2024/08/07/a-comprehensive-guide-to-evaluating-software-licensing-costs-for-enterprises/`.

[6] Broadcom Inc. Platform security – Broadcom, 2024. `https://www.broadcom.com/topics/platform-security`.

[7] B. Butler. How a network platform approach is becoming an imperative for IT and business agility. Technical report, IDC Research, Inc., December 2023. Sponsored by Cisco, `https://www.idc.com/getdoc.jsp?containerId=PRF005027`.

[8] DataGuard. Cyber security standards – an overview of the most important standards, 2024. `https://www.dataguard.com/cyber-security/standards/`.

[9] F. Dinu. How to build a platform engineering team, 2025. `https://spacelift.io/blog/how-to-build-a-platform-engineering-team`.

[10] EDC Paris Business School. Qu'est-ce que le management ? fonctions et rôle, 2025. `https://www.edcparis.edu/fr/blog/quest-ce-que-le-management-fonctions-role`.

[11] Finance Alliance. Capex vs opex : differences, examples, and importance, 2025. `https://www.financealliance.io/capex-vs-opex/`.

[12] Futura Sciences. CSS – cascading style sheet – feuille de style, 2021. `https://www.futura-sciences.com/tech/definitions/internet-css-4050/`.

[13] Government of Algeria. Law no. 18-07 of 25 ramadan 1439 corresponding to june 10, 2018, relating to the protection of natural persons in the processing of personal data, June 2018. Official Journal of the People's Democratic Republic of Algeria, No. 34, `https://www.joradp.dz`.

[14] IBM. Types of cyber threats, 2024. `https://www.ibm.com/think/topics/cyberthreats-types`.

[15] Imperva. Cybersecurity threats, 2024. `https://www.imperva.com/learn/application-security/cyber-security-threats/`.

[16] S. Johnston. Cloud computing economics, 2008. `https://fr.wikipedia.org/wiki/Fichier:Cloud_computing_economics.svg`.

[17] La Rédaction. HTML (hypertext markup language) : définition, traduction, 2019. `https://www.journaldunet.fr/web-tech/dictionnaire-du-webmastering/1203255-html-hypertext-markup-langage-definition-traduction/`.

[18] ManageEngine. Challenges of network monitoring, 2020. `https://www.manageengine.com/network-monitoring/challenges-of-network-monitoring.html`.

[19] Meta Platforms, Inc. Introducing react – official documentation, 2024. https ://react.dev/learn/introducing-react.

[20] Mogenius. What is a platform team and how to build one (2024 update), 2024. `https://mogenius.com/blog-posts/building-a-platform-team`.

[21] Motion Blog. The four functions of management explained with examples, 2023. `https://www.usemotion.com/blog/four-functions-of-management`.

[22] npm, Inc. About npm, 2024. https ://docs.npmjs.com/about-npm.

[23] Osano. Data privacy compliance : what you need to know, 2024. `https://www.osano.com/articles/data-privacy-compliance`.

[24] G. Parker. *Platform revolution : How networked markets are transforming the economy and how to make them work for you.* W, 2024.

[25] Port.io. Platform engineer : job description, skills, responsibilities, salary, October 2024. `https://www.port.io/blog/platform-engineer`.

[26] Rhapsody Health. The cost of scalability, 2024. `https://rhapsody.health/blog/the-cost-of-scalability/`.

[27] Steve Fenton Rosen. *Pro TypeScript : Application-Scale JavaScript Development.* Apress, 2021.

[28] G. Rostan. *Théorie des organisations.* Conservatoire National des Arts et Métiers de Lyon, 2006.

[29] Salesforce. What is data privacy compliance ?, 2024. `https://www.salesforce.com/platform/data-privacy-compliance/what-is-data-privacy-compliance/`.

[30] J. A. Schneider, I. Mozgova, and R. Lachmayer. Life cycle cost impact of maintenance networks for product-service system fleets. *Procedia CIRP*, 105:525–529, 2022.

[31] ScienceDirect. The persistence of platforms : the role of network, platform, and complementor attributes, 2023. `https://www.sciencedirect.com`.

[32] SecurityScorecard. What is a cybersecurity vulnerability ? definition and types, 2023. `https://securityscorecard.com/blog/what-is-a-cybersecurity-vulnerability-definition-and-types/`.

[33] Tata Communications. Core components of network infrastructure, 2024. `https://www.tatacommunications.com/knowledge-base/core-components-of-network-infrastructure/`.

[34] Video Storage Solutions. Value sheet – TCO and ROI, March 2021. BCD International, Inc., `https://videoappliances.com`.

[35] Wikipédia. Hypertext markup language, 2025. `https://fr.wikipedia.org/wiki/Hypertext_Markup_Language`.

Abstract

This thesis, entitled *Management of Network Platforms*, examines the fundamental principles and challenges of managing platforms in the telecommunications sector, supported by a practical project: the development of a website for *Opticonnect*, a company specializing in fiber optic solutions.

The first chapter provides the theoretical foundation, reviewing the evolution of management and its core functions—planning, organizing, leading, and controlling. It also introduces major types of network platforms and highlights their role in performance optimization and service continuity.

The second chapter adopts a strategic perspective by analyzing three key dimensions: cybersecurity, cost management, and human resources, with a case example drawn from Squarespace.

The third chapter presents the implementation of a static website for *Opticonnect*, developed using React.js and TypeScript. The site includes key sections and is intended as a foundational prototype for future improvements.

Résumé

Ce mémoire, intitulé *Gestion des plateformes réseau*, examine les principes fondamentaux et les défis liés à la gestion des plateformes numériques dans le secteur des télécommunications. Il s'appuie sur un projet pratique : la création d'un site web pour *Opticonnect*, une entreprise spécialisée dans les solutions en fibre optique.

Le premier chapitre présente les fondements théoriques du management, en retraçant son évolution et ses fonctions essentielles : planification, organisation, direction et contrôle. Le deuxième chapitre adopte une approche stratégique en analysant trois dimensions clés : la cybersécurité, la gestion des coûts et les ressources humaines, avec un exemple de cas tiré de la plateforme Squarespace.

Le troisième chapitre décrit le développement d'un site web vitrine statique à l'aide de React.js et TypeScript, structuré autour de sections essentielles. Ce projet constitue une base fonctionnelle destinée à évoluer dans le cadre de futurs développements.

ملخص

يتناول هذا البحث، بعنوان إدارة منصات الشبكات، المبادئ الأساسية والتحديات المتعلقة بإدارة المنصات الرقمية في قطاع الاتصالات، ويستند إلى مشروع تطبيقي يتمثل في تطوير موقع إلكتروني لشركة *Opticonnect*، المتخصصة في حلول الألياف البصرية.

يعرض الفصل الأول الأسس النظرية للإدارة، متناولًا تطورها ووظائفها الأساسية مثل التخطيط والتنظيم والتوجيه والرقابة. أما الفصل الثاني، فيتناول ثلاث ركائز استراتيجية مهمة: الأمن السيبراني، إدارة التكاليف، والموارد البشرية، من خلال دراسة حالة مستمدة من منصة Squarespace.

ويُخصص الفصل الثالث لعرض تنفيذ موقع إلكتروني ثابت باستخدام تقنيتي React.js وTypeScript، كمنصة أولية قابلة للتطوير تهدف إلى دعم التواصل الرقمي وتعزيز حضور الشركة على الإنترنت.