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The Impact of Web3 and QR Codes on the E-commerce Industry

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**CHAPTER 1**

# Introduction

As the e-commerce industry continues to grow, businesses are looking for ways to improve their efficiency and effectiveness. Web3 and QR codes are two technologies that have the potential to help e-commerce businesses achieve these goals. Web3 is a new version of the internet that is based on blockchain technology. Blockchain is a distributed ledger that is secure and transparent. This makes it ideal for storing and tracking data, such as product information, order details, and payment information. QR codes are two-dimensional barcodes that can be scanned by smartphones. They can be used to store a variety of information, such as product information, website addresses, and contact information. Web3 and QR codes can be used together to create a number of innovative e-commerce solutions. For example, Web3 can be used to create a decentralized marketplace where buyers and sellers can interact directly without the need for a third party. QR codes can be used to provide consumers with access to product information, track the status of their orders, and make payments.

## 1.1 Background of the study

The e-commerce industry has experienced significant growth and transformation in recent years, driven by advancements in technology and changing consumer preferences. As more businesses and consumers embrace digital platforms for buying and selling products and services, it becomes crucial to explore emerging technologies that can further enhance the e-commerce experience. Two such technologies that have gained attention in recent years are Web3 and QR codes. Web3, also known as the decentralized web, offers a new vision for the internet by leveraging blockchain and decentralized systems to create a more secure, transparent, and user-centric online environment. QR codes, on the other hand, provide a convenient way to bridge the gap between physical and digital worlds, enabling seamless interactions and information exchange.

Understanding the impact of Web3 and QR codes on the e-commerce industry is essential for businesses to stay competitive and meet the evolving demands of consumers. By embracing these technologies, businesses have the potential to reshape their business models, improve customer experiences, and unlock new opportunities for growth. However, there is still a need for comprehensive research that explores the adoption and implementation of Web3 and QR codes in the context of e-commerce, considering factors such as security, user adoption, and scalability. This research aims to fill this gap by providing valuable insights and practical recommendations for e-commerce businesses looking to incorporate Web3 and QR codes into their operations.

## 1.2 Research Objectives

The primary objective of this research is to assess the impact of Web3 and QR codes on the e-commerce industry and explore how these technologies can reshape business models and enhance customer experiences. The specific research objectives are as follows:

1. To assess the impact of Web3 and QR codes on the e-commerce industry and explore how these technologies can reshape business models and enhance customer experiences.
2. To develop a framework for evaluating the effectiveness and potential risks associated with the implementation of Web3 and QR codes in e-commerce business models, considering factors such as security, user adoption, and scalability.
3. To provide practical recommendations and guidelines for e-commerce businesses on incorporating Web3 and QR codes into their operations, including strategies for implementation, risk management, and maximizing the benefits for both businesses and consumers.
4. To investigate the potential for cross-industry collaborations and partnerships in leveraging Web3 and QR codes to drive innovation and create new business opportunities within the e-commerce sector.

## 1.3 Research Questions

To achieve the research objectives, the following research questions will guide the study:

1. What is the impact of Web3 and QR codes on the e-commerce industry in terms of reshaping business models and enhancing customer experiences?
2. How can the effectiveness and potential risks of implementing Web3 and QR codes in e-commerce business models be evaluated, considering factors such as security, user adoption, and scalability?
3. What are the practical recommendations and guidelines for e-commerce businesses in incorporating Web3 and QR codes into their operations to maximize the benefits for both businesses and consumers?
4. What are the potential opportunities for cross-industry collaborations and partnerships in leveraging Web3 and QR codes to drive innovation and create new business opportunities within the e-commerce sector?

## 1.4 Motivation of Research

The motivation behind this research stems from the increasing significance of Web3 and QR codes in the e-commerce industry and the need for businesses to understand their potential impact. By exploring the adoption and implementation of these technologies, businesses can gain insights into how they can leverage them to improve their competitiveness, enhance customer experiences, and drive innovation. Moreover, with the rapid advancements in technology, it is crucial to stay up-to-date with emerging trends and explore their practical implications. This research aims to bridge the gap between theory and practice by providing actionable insights and recommendations for e-commerce businesses.

## 1.5 Scope and Limitations

This research focuses specifically on the impact of Web3 and QR codes on the e-commerce industry. It examines their potential to reshape business models, enhance customer experiences, and create new opportunities for growth. The study considers various aspects, including security, user adoption, and scalability, to provide a comprehensive understanding of the implementation challenges and benefits associated with Web3 and QR codes in e-commerce. However, it is important to note that this research does not delve into the technical aspects of Web3 and QR codes but rather focuses on their strategic and practical implications for e-commerce businesses.

One limitation of this research is the dynamic nature of technology and the e-commerce industry. As technology continues to evolve, new advancements and trends may emerge, which may not be covered comprehensively in this study. Additionally, the research findings and recommendations may be influenced by the specific context and characteristics of the e-commerce industry, and their applicability to other industries or sectors may vary.

## 1.6 Structure of the Research

This research is organized into several chapters to provide a systematic and comprehensive analysis of the impact of Web3 and QR codes on the e-commerce industry. The structure of the research is as follows:

Chapter 1: Introduction This chapter provides an overview of the research topic, presents the background and significance of the study, outlines the research objectives and questions, discusses the motivation behind the research, and highlights the scope and limitations of the study.

Chapter 2: Literature Review; This chapter reviews relevant literature on Web3, QR codes, and their applications in the e-commerce industry. It explores the impact of these technologies, discusses the challenges and opportunities they present, and identifies the key factors for successful implementation.

Chapter 3: Methodology This chapter describes the research methodology employed in this study. It outlines the research design, data collection methods, and data analysis techniques used to achieve the research objectives.

Chapter 4: Implementation of practical work; this chapter presents the Implementation of a practical project.

Chapter 5: Findings and Analysis This chapter presents the findings of the research and provides a detailed analysis of the impact of Web3 and QR codes on the e-commerce industry. It explores the effectiveness and potential risks associated with their implementation and presents practical recommendations for e-commerce businesses.

Chapter 6: Conclusion and Recommendations The final chapter summarizes the research findings, discusses their implications, and provides recommendations for e-commerce businesses looking to incorporate Web3 and QR codes into their operations. It also suggests avenues for future research and highlights the potential for cross-industry collaborations and partnerships.

**CHAPTER 2**

# Literature Review

## 2.1 Overview of the E-commerce Industry

### 2.1.1 Growth and Trends in E-commerce

The e-commerce industry has experienced significant growth and transformation over the past decade. Advancements in technology, changing consumer preferences, and the widespread adoption of digital platforms have fuelled this growth. According to recent studies (e.g., Statista, 2021), the global e-commerce market is projected to reach trillions of dollars in revenue in the coming years, with a substantial increase in online sales across various sectors. This growth can be attributed to factors such as convenience, accessibility, and a wide range of product offerings available to consumers.

### 2.1.2 Key Challenges and Opportunities in E-commerce

While the e-commerce industry offers numerous opportunities for businesses, it also poses several challenges. One of the key challenges is the intense competition among online retailers. To stay competitive, businesses need to continually innovate and differentiate themselves from competitors. Also, issues related to security, data privacy, and trust continue to be significant concerns for consumers engaging in online transactions. However, e-commerce also presents significant opportunities for businesses to expand their reach, target global markets, and leverage technology to enhance customer experiences. The integration of emerging technologies such as Web3 and QR codes has the potential to further revolutionize the e-commerce landscape.

## 2.2 Introduction to Web3 and QR Codes

### 2.2.1 Evolution of Web3 Technologies

The evolution of Web3 technologies has brought significant advancements and innovations to the digital landscape. Web3 refers to the next generation of the internet, characterized by decentralized and user-centric principles. It aims to redefine the way information is accessed, shared, and controlled online, providing greater security, privacy, and user empowerment. Web3 technologies have evolved from the foundational concepts of blockchain and cryptocurrency. Blockchain technology, introduced with the emergence of Bitcoin in 2009, enables secure and transparent transactions through a decentralized network. It ensures the integrity and immutability of data by utilizing cryptographic algorithms and consensus mechanisms. As Web3 technologies have progressed, they have encompassed a broader range of decentralized applications (DApps) and protocols. These include smart contracts, decentralized finance (DeFi) platforms, decentralized identity (DID) systems, and decentralized storage networks. Smart contracts, built on blockchain technology, are self-executing contracts with predefined conditions and automated enforcement. They enable trustless and transparent interactions between parties, eliminating the need for intermediaries and reducing transaction costs. DeFi platforms leverage blockchain and smart contract technologies to provide decentralized financial services such as lending, borrowing, and trading. These platforms offer greater accessibility, inclusivity, and transparency in the financial landscape, bypassing traditional intermediaries and enabling peer-to-peer transactions. Decentralized identity systems aim to give individuals control over their digital identities and personal data. By utilizing cryptographic techniques and decentralized networks, users can manage their identities and selectively share their information, enhancing privacy and security. Decentralized storage networks provide an alternative to centralized cloud storage services. These networks distribute data across multiple nodes, ensuring redundancy, fault tolerance, and censorship resistance. Users can securely store and retrieve their data without relying on a single central authority.

Overall, the evolution of Web3 technologies represents a paradigm shift towards a more open, secure, and user-centric internet. It offers opportunities for disintermediation, improved privacy, data ownership, and financial inclusion. As Web3 continues to advance, it has the potential to revolutionize various industries, including e-commerce, finance, healthcare, and supply chain management.

### 2.2.2 Benefits and Applications of Web3 in E-commerce

Web3 technologies offer several benefits for the e-commerce industry. One of the primary advantages is enhanced security and trust. The decentralized nature of Web3 eliminates the need for intermediaries, reducing the risk of data breaches and unauthorized access to sensitive information. Moreover, the use of smart contracts enables secure and transparent transactions, ensuring the integrity of online payments. Another significant benefit of Web3 in e-commerce is the potential for improved customer experiences. By leveraging decentralized identity solutions, businesses can provide personalized and tailored experiences to their customers, enhancing customer loyalty and satisfaction. Additionally, Web3 technologies enable the creation of decentralized marketplaces, empowering individuals to directly interact and transact with each other without the need for intermediaries.

### 2.2.3 Role and Advantages of QR Codes in E-commerce

QR (Quick Response) codes have gained widespread popularity due to their ability to bridge the gap between physical and digital worlds. These codes can be easily scanned by smartphones or other devices, allowing users to quickly access information or perform actions. In the context of e-commerce, QR codes offer several advantages. One of the key advantages of QR codes is their versatility and ease of use. Businesses can integrate QR codes into their marketing materials, product packaging, or physical store displays to provide additional information, promotional offers, or seamless purchasing experiences. QR codes also enable businesses to track and analyse customer engagement, gather valuable data, and enhance targeted marketing efforts.

## 2.3 Impact of Web3 and QR Codes on E-commerce

### 2.3.1 Enhancing Customer Experiences

Web3 and QR codes have a significant impact on enhancing customer experiences in the e-commerce industry. By leveraging Web3 technologies, businesses can offer personalized and tailored experiences to their customers, allowing them to have greater control over their data and preferences. The use of decentralized identity solutions enables seamless login and authentication processes, eliminating the need for multiple usernames and passwords. QR codes play a crucial role in streamlining the customer journey. They provide a convenient way for customers to access product information, reviews, and promotions instantly. QR codes can also be used for contactless payments, enabling faster and more secure transactions. Overall, the integration of Web3 and QR codes enhances convenience, engagement, and satisfaction for e-commerce customers.

### 2.3.2 Reshaping Business Models

The adoption of Web3 and QR codes has the potential to reshape traditional e-commerce business models. Web3 technologies enable the development of decentralized marketplaces, where businesses and individuals can directly interact and transact without relying on intermediaries. This opens up new opportunities for peer-to-peer commerce, reducing transaction costs and increasing efficiency. QR codes facilitate the integration of offline and online experiences, allowing businesses to bridge the gap between physical and digital channels. By incorporating QR codes into their marketing and sales strategies, businesses can create omnichannel experiences that seamlessly connect various touchpoints, driving customer engagement and conversions.

### 2.3.3 Improving Security and Trust

Security and trust are critical factors in e-commerce, and the adoption of Web3 and QR codes can address these concerns. Web3 technologies, with their decentralized architecture and cryptographic security, offer enhanced protection against data breaches, identity theft, and fraudulent activities. The use of smart contracts ensures the integrity and transparency of transactions, instilling confidence in online payments.

QR codes, when properly implemented, can also enhance security in e-commerce. For example, QR codes can be used for secure authentication or verification processes, ensuring that only authorized individuals have access to sensitive information or perform specific actions. Moreover, QR codes can be encrypted or linked to secure payment gateways, providing an additional layer of protection for online transactions.

## 2.4 Frameworks for Evaluating Web3 and QR Code Implementation

### 2.4.1 Security Considerations

Implementing Web3 and QR codes in e-commerce requires careful consideration of security measures. Businesses need to assess the security risks associated with decentralized systems, such as potential vulnerabilities in smart contracts or the risk of malicious attacks. Robust security frameworks and protocols should be implemented to safeguard data integrity, confidentiality, and availability.

### 2.4.2 User Adoption and Engagement

User adoption is a critical factor in the success of implementing Web3 and QR codes in e-commerce. Businesses should focus on providing intuitive user experiences, educating users about the benefits and functionalities of these technologies, and addressing any concerns or barriers to adoption. User-friendly interfaces, clear instructions, and seamless integration with existing e-commerce platforms are essential for encouraging user adoption and engagement.

### 2.4.3 Scalability and Performance

Scalability and performance considerations are crucial when implementing Web3 and QR codes in e-commerce, particularly as the volume of transactions and interactions increases. Businesses should evaluate the scalability of their systems and infrastructure to ensure smooth operations, especially during peak periods. Additionally, performance optimization techniques, such as caching, load balancing, and efficient data storage, should be implemented to ensure fast and reliable user experiences.

## 2.5 Cross-Industry Collaborations and Partnerships

### 2.5.1 Exploring Collaborative Opportunities

The integration of Web3 and QR codes in the e-commerce industry creates opportunities for cross-industry collaborations and partnerships. By leveraging these technologies, businesses can establish alliances with complementary industries to drive innovation, enhance customer experiences, and create new business opportunities.

One potential area for collaboration is with logistics providers. E-commerce platforms can collaborate with blockchain-based logistics providers to streamline supply chain processes and improve transparency. Blockchain technology can enable real-time tracking and verification of shipments, reducing delays and ensuring the integrity of the supply chain. By integrating Web3 and QR codes, businesses can enhance the traceability and visibility of products, allowing customers to track their orders from production to delivery. This collaborative effort can improve operational efficiency, reduce costs, and enhance customer satisfaction. Another area for cross-industry collaboration is in finance. By integrating Web3 technologies, e-commerce platforms can partner with financial institutions to offer secure and efficient payment solutions. Blockchain-based smart contracts can facilitate instant and transparent transactions, eliminating the need for intermediaries and reducing transaction costs. QR codes can be utilized as a convenient and secure payment method, allowing customers to make contactless payments through their smartphones. Collaborations with financial institutions can provide businesses with access to new payment technologies, financial expertise, and regulatory compliance, ensuring seamless and secure financial transactions.

### 2.5.2 Benefits and Challenges of Cross-Industry Partnerships

Cross-industry partnerships offer several benefits for businesses operating in the e-commerce industry. One significant advantage is access to new markets and customer segments. Collaborating with complementary industries allows businesses to expand their reach and target audiences that may not have been accessible before. For example, a partnership between an e-commerce platform and a travel company can enable customers to seamlessly book travel arrangements while purchasing related products or services. Shared resources and expertise are another benefit of cross-industry partnerships. Collaborating with companies from different industries allows businesses to leverage their specialized knowledge, technologies, and resources. This sharing of resources can lead to cost savings, improved operational efficiency, and accelerated innovation. For example, an e-commerce platform can collaborate with a technology company to leverage their expertise in Web3 development, enabling faster implementation of decentralized solutions.

Integrated solutions are a key advantage of cross-industry partnerships. By combining the strengths and capabilities of different industries, businesses can offer comprehensive and holistic solutions to customers. For example, a collaboration between an e-commerce platform, a financial institution, and a logistics provider can offer end-to-end services, including secure payments, streamlined logistics, and enhanced customer support. Despite the benefits, cross-industry partnerships also present challenges that businesses must address. One significant challenge is aligning different organizational cultures and structures. Each industry may have its own way of operating and decision-making processes. It is essential for businesses to establish effective communication channels and foster a collaborative mindset to overcome these cultural differences. Managing disparate systems and processes is another challenge in cross-industry partnerships. Integration of technologies, data sharing, and coordination of operations may require substantial effort and resources. Businesses need to carefully plan and execute the integration process to ensure smooth operations and minimize disruptions.

Moreover, regulatory and legal considerations may pose challenges in cross-industry collaborations. Each industry is subject to specific regulations and compliance requirements. Collaborating businesses must navigate these legal frameworks and ensure that their collaborative efforts comply with applicable laws and regulations.

**CHAPTER 3**

**Design of Practical Work**

The project aims to develop an e-commerce application that leverages React for software development. The application will incorporate Web3 and QR code technologies to enhance the e-commerce industry's business models and customer experiences. This Design of Practical Work chapter provides an overview of the research design, software development methodology, and ethical considerations for the project.

## 3.1 Project Design

### 3.1.1 Project Approach

The research approach for this project is a combination of qualitative and quantitative methods. This approach allows for a comprehensive exploration of the impact of Web3 and QR codes on the e-commerce industry. By using literature review data, the project aims to gather a deeper understanding of the subject matter while also this data's objective data to support the findings. The research approach for this project will be based solely on a literature review. This approach aims to gather information, insights, and findings from existing academic and industry publications, research papers, articles, and other relevant sources. The use of a literature review data will allow for a comprehensive exploration of the impact of Web3 and QR codes on the e-commerce industry without conducting qualitative or quantitative methods.

The literature review data will involve a systematic search and analysis of existing literature on the subject matter. Various databases, academic journals, books and reputable online sources will be consulted to gather relevant information. The literature review will focus on synthesizing and analysing the existing knowledge and research findings related to Web3 and QR codes in the context of the e-commerce industry.

### 3.1.2 Project Philosophy

A pragmatist research philosophy is adopted for this project. Pragmatism emphasizes the practical aspects of research and seeks to bridge the gap between theory and practice. In the context of this project, the pragmatist philosophy recognizes the importance of both subjective experiences and objective realities in generating practical knowledge about the impact of Web3 and QR codes on the e-commerce industry. The pragmatist philosophy aligns with the project's goals of not only exploring theoretical concepts but also understanding how these technologies can be practically implemented in real-world scenarios. It acknowledges that different stakeholders may have varying perspectives, and their experiences can contribute valuable insights to the research. By embracing pragmatism, the project aims to provide actionable recommendations and guidelines for e-commerce businesses in incorporating Web3 and QR codes into their operations.

### 3.1.3 Project Strategy

The research strategy for this project involves a multi-faceted approach. Firstly, a comprehensive literature review will be conducted to gather existing knowledge and theoretical frameworks related to Web3, QR codes, and their impact on the e-commerce industry. The use of literature review data will enable the project to draw upon a wide range of sources and established knowledge in the field, offering a robust foundation for the analysis and discussion of the impact of Web3 and QR codes on the e-commerce industry.

This review will serve as the foundation for the research design and provide a theoretical context for the empirical investigation. By employing a robust research strategy, this project aims to gather comprehensive and reliable data to address the research questions and achieve the research objectives.

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## 3.2 Softwire Selection Methods

The selection of React as the software development framework for this project was based on careful consideration of several factors. These factors include the project's requirements, the availability of resources and expertise, community support, scalability, and compatibility with Web3 and QR code libraries. To select the most suitable framework, a thorough evaluation of various options was conducted. This evaluation involved assessing each framework's features, performance, documentation, and community feedback. React emerged as the preferred choice due to its popularity, active community, and extensive ecosystem of libraries and tools. Another crucial factor in the selection process was React's component-based architecture. This architecture allows for the development of reusable UI components, promoting code reusability, maintainability, and scalability. It aligns well with the project's goal of building an e-commerce application that can adapt to evolving business requirements.

## 3.3 Benefits of React in Software Development

React offers several benefits in software development, making it a suitable choice for this project. Its virtual DOM (Document Object Model) implementation enables efficient rendering, resulting in better performance and a smooth user experience. The use of a declarative syntax simplifies UI development and enhances code readability. React's component-based architecture promotes modularization, allowing developers to build reusable and independent UI components. This reusability significantly reduces development time and effort, as components can be easily composed and reused across different parts of the application.

Furthermore, react has a vast ecosystem of libraries and tools that enhance development productivity. Libraries like "qrcode.react" facilitate the generation of QR codes, which is a crucial functionality in this project. The availability of such libraries simplifies the implementation of complex features and accelerates development.

## 3.4 Ethical Considerations

Ethical considerations are of paramount importance in this project. The project will adhere to ethical principles to ensure the protection of user data privacy and the ethical treatment of participants involved in interviews and surveys. To safeguard user data privacy, measures will be taken to comply with data protection regulations, such as implementing secure data storage, encryption, and anonymization techniques. Informed consent will be obtained from participants, explaining the purpose of data collection, how their data will be used, and any potential risks or benefits. Additionally, the project will consider the potential impact on stakeholders and address any ethical concerns that may arise. This includes ensuring transparency in data collection and analysis, maintaining confidentiality, and using the data solely for research purposes.

Ethical considerations will guide the research process, ensuring that the project is conducted in an ethically responsible manner and respects the rights and well-being of all involved parties. By considering ethical principles, the project aims to maintain integrity, uphold ethical standards, and ensure the ethical conduct of research and software development activities.

## 3.5 Software Development Methodology

### 3.5.1 Selection of Software Development Methodology

For this project, an Agile software development methodology is chosen. Agile methodologies are well-suited for projects with evolving requirements and a need for flexibility. They promote iterative and incremental development, collaboration, and frequent feedback, which align with the project's objectives.

### 3.5.2 Agile Methodology

#### 3.5.2.1 **Scrum Framework**

The Scrum framework will be adopted within the Agile methodology. It consists of specific roles, ceremonies, and artifacts to facilitate project management and collaboration. The roles include a Product Owner, Scrum Master, and Development Team.

#### 3.5.2.2 **Iterative and Incremental Development**

The project will follow an iterative and incremental development approach, where features are developed in short iterations called sprints. Each sprint results in a potentially shippable increment of the application, allowing for early feedback and continuous improvement.

#### 3.5.2.3 **Sprint Planning**

Sprint planning meetings will be conducted to define the scope of each sprint, prioritize the backlog of user stories, and estimate the effort required for each task. The Development Team collaborates with the Product Owner to determine the sprint goal and select user stories for implementation.

#### 3.5.2.4 **Daily Stand-up Meetings**

Daily stand-up meetings will be held to synchronize the team's work and address any impediments. Each team member will provide updates on their progress, discuss any challenges, and plan their work for the day. This fosters transparency, collaboration, and accountability within the development team.

#### 3.5.2.5 **Sprint Review and Retrospective**

At the end of each sprint, a sprint review will be conducted to demonstrate the completed features to stakeholders and gather feedback. This feedback will inform subsequent sprints and guide the project's direction. A sprint retrospective will also be held to reflect on the sprint's outcomes, identify areas for improvement, and adapt the development process accordingly.

## 3.6 Project deployment and testing

Netlify is a cloud-based platform that specializes in continuous deployment and hosting for modern web projects. It offers seamless integration with version control systems like GitHub, GitLab, and Bitbucket, making it effortless for developers to deploy their applications.

### 3.6.1 Project Deployment with Netlify:

The deployment process on Netlify involves the following steps:

Connecting the Repository: To deploy a project, developers need to link their version control repository to Netlify. This can be done easily through the Netlify dashboard, where they can select the repository and specify the branch to be deployed.

Build Configuration: Netlify automatically detects the project type and sets up an optimized build configuration. However, if needed, developers can customize the build process using a simple configuration file.

Automatic Deployments: With continuous deployment enabled, every push to the specified branch triggers an automatic deployment. Netlify automatically fetches the latest code from the repository, builds the project, and deploys it.

Domain Setup: Netlify allows developers to use custom domains for their projects. They can either set up a new domain or link an existing one to the deployed application.

SSL Certificates: Netlify provides free SSL certificates for all projects, ensuring secure connections between users and the application.

Scalability and Performance: Netlify's global Content Delivery Network (CDN) ensures that the deployed application is served from the nearest server, optimizing performance and scalability.

By using Netlify for project deployment, developers can streamline the process and focus on building quality applications without worrying about complex deployment configurations.

### 3.6.2 External Testing with Netlify:

External testing, also known as user acceptance testing (UAT), is a crucial phase in software development. It involves testing the application in a real-world environment by actual end-users to identify any issues or usability concerns before its official release. Netlify facilitates external testing through various mechanisms:

Preview Deployments: Netlify provides every pull request with a unique URL for preview deployments. This allows developers and stakeholders to test new features and changes in an isolated environment before merging them into the main branch.

Branch Deployments: Developers can deploy multiple branches to separate URLs, enabling different teams or clients to review and test specific features independently.

Rollback Functionality: In case an issue is detected during external testing, Netlify allows easy rollbacks to previous successful builds, ensuring that the application remains stable and functional.

Form Handling and Serverless Functions: Netlify supports serverless functions that enable developers to handle form submissions securely. This is particularly useful for testing forms and user interactions.

Performance Metrics: Netlify provides valuable insights into application performance through metrics like build duration, deploy times, and bandwidth usage. This data helps developers optimize the application for better user experience.

Netlify offers a seamless and efficient platform for project deployment and external testing. Its continuous deployment capabilities, automatic builds, global CDN, and form handling features streamline the deployment process. The ability to create preview deployments and separate branch deployments enhances the efficiency of external testing, allowing developers to gather valuable feedback from end-users and ensure a robust and user-friendly application. By leveraging Netlify's capabilities, developers can focus on delivering high-quality applications and ensuring a smooth user experience.