



Redefining Enterprise Web Scalability: O&B's Containerization Strategy for PJ Lhuillier's Kanegosyo Center Microfinance Portal

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KEY TAKEAWAYS

- Cebuana Lhuillier's Ka Negosyo Center website, developed by Orange and Bronze (O&B), innovatively integrates WordPress with containerization and Kubernetes for enhanced scalability and complexity management.
- This project exemplifies a strategic approach to web development, marrying WordPress's simplicity with Kubernetes's robust scalability for enterprise-level applications.
- Containerization of WordPress, coupled with Kubernetes and VMware's Tanzu Application Platform, elevates performance and scalability, setting a new standard in web infrastructure.
- The initiative demonstrates the potential of traditional platforms like WordPress to evolve into user-friendly, scalable enterprise solutions when combined with modern technologies.
- Beyond technical prowess, the Ka Negosyo Center website aligns with Cebuana Lhuillier's mission, serving as a strategic business tool to support Filipino entrepreneurs.



Introduction

In the ever-evolving world of web development, adapting to new technologies and methodologies is not just a choice, but a necessity for staying relevant and competitive. The field is characterized by its dynamic nature, where traditional methods are constantly being re-evaluated and redefined to align with the emerging needs of businesses and the market at large. A remarkable example of this evolution is the project undertaken by Orange and Bronze (O&B) for Cebuana Lhuillier's Ka Negosyo Center website. This initiative stands as a testament to innovation in web development, particularly in the realm of integrating cutting-edge technologies with established platforms. WordPress, a powerhouse in content management systems, is celebrated for its ease of use and flexibility and is a good example of one of the long-term established platforms. However, it presents unique challenges when it comes to integrating custom code and adapting to more complex, scalable systems. Traditionally, WordPress has been confined to simpler, less dynamic web applications, primarily due to its limitations in handling extensive customizations and advanced operational requirements. The challenge intensifies when considering the integration of WordPress with Kubernetes, an orchestration platform for automating the deployment, scaling, and management of containerized applications. Kubernetes, while robust and powerful, introduces a level of complexity that is often at odds with the straightforward nature of WordPress.

Background

The Ka Negosyo Center, a business centric platform of Cebuana Lhuillier, mirrors the overarching mission and vision of the company, the PJ Lhuillier Group of Companies. Since its formal establishment in 1988, the company has evolved into a dynamic entity, leading in the Philippine financial services sector, particularly through its flagship brand, Cebuana Lhuillier. This evolution is grounded in a commitment to innovation, integrity, and a heartfelt service ethos, striving to be the most trusted financial partner for Filipinos.

The Ka Negosyo Center website is an embodiment of the group's mission and vision. Cebuana Lhuillier Finance Corporation aims to empower Filipinos, helping them realize their dreams by making loans accessible. The vision to be the preferred provider for Filipino MSMEs' financing needs aligns perfectly with the Ka Negosyo Center's goal to support budding entrepreneurs. The mission to revolutionize access to financing for Filipinos starting or growing a business reflects in the website's emphasis on providing comprehensive resources and financial solutions. Ultimately, the platform serves as a catalyst for realizing the dreams and aspirations of Filipinos through easy, accessible, and fair financing solutions, mirroring the corporation's purpose. This integration of Cebuana Lhuillier's core values into the Ka Negosyo Center website underlines its commitment to fostering entrepreneurial growth and financial well-being in the Philippines. It's a direct response to the identified market gap for a comprehensive



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platform catering to the needs of modern Filipino entrepreneurs. This innovative digital hub, offering practical resources, expert coaching, and tailored financial solutions, is designed to be more than just an informational site. It aims to be a pivotal tool in fueling business growth and empowering entrepreneurs with the knowledge, skills, and financial support necessary to navigate the competitive business landscape.

Ka Negosyo Center simplifies the entrepreneurial journey, particularly for those new to the business world. Recognizing the numerous challenges in entrepreneurship, the platform serves as a centralized hub to demystify the process, providing valuable insights and tangible support. From its inception, Ka Negosyo Center was crafted to address the real-world difficulties faced by Filipino entrepreneurs, offering a unique blend of educational content, expert advice, and financial services. This initiative enables users to start, manage, and grow their businesses confidently, aligning seamlessly with the company's vision of nurturing market-leading businesses and a growing clientele.

In essence, the Ka Negosyo Center is not just a product but a strategic extension of Cebuana Lhuillier's mission to be a steadfast financial ally for Filipinos, fostering an environment where entrepreneurial dreams can be pursued with confidence and support.

Development Journey

This case study explores how O&B overcomes these challenges by containerizing a WordPress website – a method that until this project was largely unexplored and under-utilized in mainstream web development. The decision to containerize WordPress was not just a technological choice, but a strategic move to harness the best of both worlds: the simplicity and user-friendliness of WordPress and the scalability and robustness of Kubernetes.

Interestingly, the concept of containerizing WordPress wasn't entirely uncharted territory. A few players in the industry had attempted similar implementations, though these were few and far between. These early attempts laid the groundwork, offering insights and learning experiences that were instrumental in shaping the approach of O&B. However, the team's endeavour was unique in its scale and the specific challenges it aimed to address. By integrating WordPress with Kubernetes, they were not only looking to improve the website's performance and scalability but also aiming to revolutionize how WordPress could be utilized for more complex, enterprise-level applications.

In this context, the project by O&B emerges as a ground-breaking effort, pushing the boundaries of traditional web development practices. It showcases a successful marriage of a widely-used content management system with an advanced container orchestration tool, marking a significant leap in the capabilities and potential applications of



WordPress websites. This case study delves into the details of this unique implementation, highlighting the challenges faced, the innovative solutions employed, and the broader implications for the field of web development.

Technology Integration

The challenge of a traditional WordPress setup is that it is known for its user-friendly content management system but hasn't been aligned with containerization technologies. As Czeide Avanzado the lead software engineer remarked, their initial setup of WordPress was traditional, lacking containerization. This traditional setup posed limitations, especially when integrating with third-party services like Amazon Cognito. Recognizing the need for a more modernized approach, the team came up with unique solutions to containerize WordPress. Bedrock, a modern WordPress stack, played a crucial role in this transformation. It provided a structured and maintainable approach to WordPress development, making the platform more compatible with modern development practices like version control and containerization.

Containerization and Kubernetes

In the context of the innovative approach undertaken for Cebuana Lhuillier's Ka Negosyo Center, it is pivotal to understand the fundamental technologies that facilitated this transformation. Containerization, a cornerstone of this project, encapsulates applications in a way that isolates them from the environment in which they run. This isolation ensures consistency across various computing environments, addressing the often-encountered discrepancy in software performance due to varying operational settings. Containers are lightweight, making them a more efficient alternative to traditional virtual machines. They hold the necessary components, including libraries, frameworks, and other dependencies, ensuring that the application operates uniformly whether it's on a local developer's machine or in a complex cloud environment.

Kubernetes, a significant player in this technological revolution, serves as an orchestrator for these containers. It manages the lifecycle of containers, from their deployment and scaling to their eventual termination. In our project, Kubernetes played an instrumental role in harmonizing the simplicity of WordPress with the robust, scalable infrastructure required for enterprise-level applications. It enabled O&B to automate various operational aspects, such as load balancing, service discovery, and health monitoring, ensuring high availability and resilience of the Ka Negosyo Center website. Kubernetes' ability to manage containers effectively mitigates the complexity introduced by integrating multiple service layers, making it an indispensable tool in modern web development, especially for platforms demanding high scalability and reliability.



In summary, the integration of containerization and Kubernetes represents a strategic advancement, marrying the user-friendly nature of WordPress with the dynamic, scalable capabilities required for contemporary digital solutions. This alignment not only enhances operational efficiency but also paves the way for innovative web development approaches, setting a new standard in the industry. For further reading and a deeper understanding of these technologies, these concepts are explained further in the Kubernetes official website (<https://kubernetes.io/>) and Docker's explanation of containerization (<https://www.docker.com/resources/what-container>).

VMware Tanzu Application Platform

The Kanegosyo Center project leveraged VMware Tanzu for Applications Platform to significantly enhance the deployment and management of its web application infrastructure. VMware Tanzu provided a streamlined and unified approach to container orchestration, allowing the O&B development team to efficiently manage the lifecycle of containerized applications. The platform's robust features facilitated smooth integration with Kubernetes, ensuring seamless scalability and high availability of the KNC web application. This was pivotal in handling dynamic traffic loads and maintaining consistent performance across the platform. By integrating VMware Tanzu, the O&B team could capitalize on its advanced capabilities in application service management and microservices architecture. Tanzu's built-in tools for monitoring, logging, and troubleshooting empowered the team to proactively manage application health and optimize performance. This integration was crucial in providing a resilient and scalable infrastructure that could adapt to the evolving needs of the KNC project. The use of Tanzu also streamlined the CI/CD pipeline, enhancing the team's agility in deploying updates and new features, thereby accelerating the project's time-to-market and improving overall operational efficiency.

The journey to integrate containerization with WordPress presented substantial challenges, necessitating a deep dive into the technology. As highlighted by Czeide, the team embarked on extensive research and experimentation to not only grasp the nuances of WordPress but also to understand how to effectively integrate it with Kubernetes and VMware's Tanzu Application Platform. This exploration was critical, given the lack of existing models for deploying WordPress in such a sophisticated setup. Beyond just containerizing WordPress, the team utilized a suite of advanced technologies, including Amazon Aurora for database management, load balancers, and ElastiCache. These technologies were instrumental in enhancing the website's performance and showcasing the team's capability to integrate and manage multiple, complex technology layers. This endeavour not only improved the website's overall functionality but also set a precedent in the innovative combination of traditional content management systems with advanced operational technologies.



Implementation and Deployment

One significant advantage of this project was the realization of WordPress's potential when integrated with other third-party software. The ability to manage content through a drag-and-drop interface significantly simplified the content management process, allowing non-developers to easily handle it. This approach meant that developers could focus more on the integration aspects, thus optimizing resource utilization. Marco Enrico Alviar, the expert WordPress developer on the team, highlighted the project's success in achieving what was initially thought to be a challenging feat – developing an enterprise-grade web application using WordPress. This success marked a significant milestone, demonstrating the feasibility of using a platform that is typically associated with simpler blog structured websites, for more complex and scalable enterprise applications.

A critical aspect of the development process for the Ka Negosyo Center website was ensuring its reliability and robustness, particularly in handling high traffic volumes without experiencing server downtime or crashes. To achieve this, the team employed strategic load testing and capacity planning, which played a pivotal role in the website's seamless performance. Load testing was a key component of the team's strategy. By simulating real-world traffic scenarios, the team could assess how the website would perform under various levels of user load. This testing was not just a one-time event but an ongoing process that helped identify potential bottlenecks and performance issues. By pushing the website to its limits, the team gained valuable insights into its scalability and resilience, enabling them to make necessary adjustments and optimizations. This proactive approach was crucial in ensuring that the website could handle sudden surges in traffic, which are common in the dynamic online business environment.

Complementing load testing, capacity planning was integral to the project. This process involved analyzing current and anticipated future usage patterns to determine the necessary infrastructure and resources. The team meticulously planned the server capacity, ensuring that the website had enough resources to function optimally under various load conditions. This foresight was particularly important given the expected growth and increasing popularity of the Ka Negosyo Center platform especially during marketing campaigns and caravans where user volume would spike in planned intervals.

By integrating these techniques into their development and deployment processes, the team effectively minimized the risk of server downtime and crashes. Their efforts in load testing and capacity planning ensured that the website remained stable and responsive, even during peak usage times, thereby providing a reliable and efficient platform for entrepreneurs to access vital business resources. This meticulous approach to load management and resource allocation not only enhanced user experience but also instilled confidence in the platform's reliability and long-term viability.



Future Prospects

The strategic implications of successfully integrating containerization with a WordPress website, as demonstrated in the case of Cebuana Lhuillier's Ka Negosyo Center, are far-reaching and indicative of a significant shift in web development practices. From a strategic standpoint, this approach offers a competitive edge in digital transformation. Companies can now consider WordPress, a platform traditionally reserved for less demanding web solutions, for larger-scale, more dynamic projects. This shift can lead to cost efficiencies, as the need for developing custom solutions from scratch is reduced. Additionally, the ability to integrate WordPress with modern containerization technologies like Kubernetes opens avenues for enhanced performance, streamlined development processes, and a significant reduction in time-to-market for digital products.

The key insight of this case study is the potential to transform and modernize web infrastructure without discarding familiar and proven systems. By embracing such innovative integrations, businesses can stay ahead in a digital landscape that demands both flexibility and robustness, ensuring their online presence is not only efficient and scalable but also aligns seamlessly with their evolving digital strategy. This case study exemplifies how traditional tools, when reimaged with contemporary technologies, can lead to ground-breaking solutions, setting new benchmarks in the industry.

Conclusion

The project's innovative approach has opened doors for similar future endeavours. The team's research and development efforts have paved the way for other projects seeking to utilize WordPress in a more advanced, containerized environment. Their success in this project proves that with the right expertise and innovative thinking, traditional platforms like WordPress can be transformed to meet contemporary enterprise needs.

The case of containerizing WordPress for Cebuana Lhuillier's Ka Negosyo Center website is more than just a technical achievement; it's a testament to the power of innovation in the face of new challenges. The project exemplifies how traditional methods can be reimaged and aligned with modern technologies to create solutions that are not only efficient but also scalable and secure. As businesses continue to evolve in the digital age, such pioneering efforts in technology will pave the way for more advanced and user-friendly web solutions.





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