John Carlo D. Bagus

WordPress: A content management system to advance publishing.

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PREFACE

Moving from a different region to a completely different environment has been really-like a roller coaster ride, lots of ups and downs but glad to see myself still standing. Studying this course and developing this thesis, added more flavour and interesting experiences to my personal, and professional life. Being one of the youngest students in the class, I always thought that I started my masters at a very young age, I thought that my experience wasn't enough to accept and take this course. But along the way, I realized that you don't really need extensive experience to accomplish this journey, but what you need is passion, commitment, hard work, and a willing heart. I never thought that I would get this far, but here I am, proud author of this entire thesis.

I would like to take this opportunity to say thank you to all my professors and classmates for being part of this incredible thesis writing journey. To our head of department Ville, and my thesis advisor Sami for patiently guiding me to properly write this thesis. To my workmates, and bosses who also contributed a lot in writing, and helped me realized that I could finish this course and help me to develop myself to be a better professional, big thank you for also allowing me to be part of the company/family.

Last but not the least, my family who have been very supportive to me since the beginning of this journey, thank you for being the first that believes in me.

I won't be here without all your help, motivation, and support because of that I am forever grateful.

Espoo Finland, 04 May 2023
John Carlo Bagus

Abstract

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Building web applications from scratch time consuming considering the numerous stages develop theme setups, plugin installation, writing code, constructing content management system (CMS). WordPress pre-built themes are designed with basic front-end and back-end .

To improve productivity and maintain organized website projects, solution is to create custom-built templates and blocks that can be and reused using WordPress CMS. A custom theme that can optimize code by building only the essential features, with unlimited web functionalities that can also protect site's security.

The goal of this thesis is to create a responsive custom-made WordPress website and CMS that can optimize Norr Design's project development using plugins like Lazy Block, Guttenberg, Advanced Custom Fields, and Duplicator. Ensuring quality products, web solutions, avoid redoing multiple web tasks, and eliminate the manual development process that can cause delayed output.

As a result of the work, a custom theme with selected plugins that can be reused in different web projects was implemented

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List of Abbreviations

CMS	Content Management System cPanel Control Panel
CSS	Cascading Style Sheets
DB	Database
GPL	General Public License
FTP	File Transfer Protocol
HTML	Hypertext Markup Language
JS	JavaScript
PHP	Hypertext Processor
SCSS	Sassy Cascading Style Sheets
SQL	Structured Query Language
WP	WordPress

1 Introduction

The main topic of this research is about WordPress content management system and its fundamental web design and development. The research's objective is to give aspiring ideas and analysis that includes the core concepts of WordPress and Web Designing. WordPress is a well-known free and open-source content management system (CMS). Although it was first introduced as a personal blog platform, it is now used for a wide range of websites, including professional media publications, online websites or e-commerce websites.

Norr Design, a client-based company in Helsinki, focuses on providing digital and software solutions to numerous clients. They face challenges in meeting timelines and delivering projects on time. The company's credibility and commitment to standardized work make them a valuable partner for clients. Developing WordPress from scratch requires so much work, considering the amount of time that is needed in choosing the themes for the site, adjusting the design according to requirements, writing extensive codes, among other requirements. Not to mention that these steps are required for every project. Thus, it is a time consuming method, and needs improvement.

Working in client-based companies like in Norr Design requires fast and efficient development, especially in web designing. Responsive design, interactive UI, user-friendly content management system are only a few of numerous requirements to meet the client satisfaction. Handling multiple clients and different websites is one of the major issues in the case company.

Custom WordPress development is a combination of personalized front-end, back-end, and design services. The goal is to create a custom-template that is targeted to Norr Design clients current and future demands or new projects. That will also allow Norr Design to reduce the amount of work in provisioning web solutions. In this context, the term "custom" is practically synonymous with

"flexible". A flexible custom-made template that will make the web development process less hassle.

This article discusses optimizing Norr Design's project development, ensuring quality content while maintaining a strict web security, and avoiding redoing tasks. It highlights the use of WordPress and its powerful tools, such as Lazy Block, Guttenberg, Advanced Custom Fields, Wordfence, and Duplicator. These plugins can speed up the web development process, reducing tasks, pre-production setups and reducing the time spent choosing the right theme or template.

The thesis concludes by demonstrating how WordPress, may be used to create a website for posting information and introducing new items. This enables users to quickly create and manage websites that adhere to accessibility standards without placing an undue burden on web designers regarding their knowledge of these standards. The advantages of having custom-built templates over pre-built themes are also discussed.

This document is structured to first describe WordPress its History, and its philosophy. Second part is Theoretical Background, and Technology Used. The latter part of the work focuses on Current State Analysis, followed by Implementation. At the end, the Results and Conclusion finalize the document.

2 WordPress: A content management system

WordPress is an open-source Website System that runs on PHP and MySQL. It is typically used with the MySQL or MariaDB DB servers, but it can also run on the SQLite database engine. It is distributed under the terms of the GNU Public General License. WordPress is the most widely used website administration system. "*WordPress started in 2003 when Matt Mullenweg and Mike Little forked the b2 blogging platform and created the first version of WordPress. WordPress is an open-source project released under GPL (GNU General Public License) v2.0 (or later). Mullenweg started the WordPress Foundation in 2010 (inspired by the Free Software Foundation and Mozilla Foundation) to further support WordPress's sustainability and promote the project.* [1]"

2.1 WordPress and History

"*In 2003, the idea of "Web 2.0" was a shrouded-in-mystery trend that was sweeping the web software industry. At the time, a small but handful collection of individuals committed to the open-source philosophy published what is now regarded as one of the world's most powerful CMS solutions.* [16]"

One reason for the massive publicity and widespread use of WordPress are the WordCamps. WordCamps are community-organized events that take place all over the world and cover everything WordPress-related, from how to use WordPress more efficiently to building plugins and themes to safeguarding WordPress sites and more. The first WordCamp was hosted in San Francisco in 2006, with over 500 individuals in attendance. Every year, hundreds of WordCamps are hosted around the globe. WordCamps events help WordPress users to connect and collaborate with each other, and also to maintain the reputation and relevance of WordPress.

WordPress 2.1, named after Ella Fitzgerald, introduced widgets in 2007. This enabled users to personalize their sidebar widget. A sidebar widget area used by WordPress themes to display information that is not a part of the main

content. The first blog showcasing WordPress Widgets had the tagline, "Lorelle calls them Sidebar Accessories," (Lorelle VanFossen is a founding member of the WordPress community) because she was so outspoken about Widgets being restricted to the sidebar. Within two years, widget access expanded beyond the toolbar, making its way into footers and headers, even though a complete site could be created entirely with widgets. Matt Mullenweg was designated number 16 on the list of "The 50 Most Important People on the Web" in 2007 for his contributions to WordPress, venture funding, and free expression. WordPress, as well as its creator, has received numerous accolades since 2007 and up to this date. This is the system's intuitive design, as well as the system's constant growth and development based on the requirements and requests of the users.

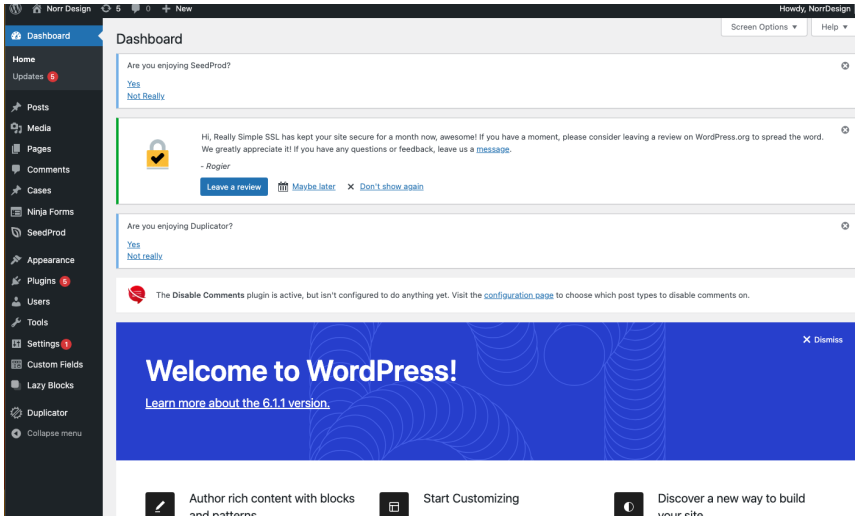

Figure 1: WordPress dashboard version 6.1.1

WordPress is still one of the leading open-source CMS and the most relevant website builders in the market today.

2.2 Content Management System

Content Management Systems (CMSs) is a software application that enables users to create, edit, publish and store digital content. A content management

system (CMS) is a tool that allows related workers to administer a standardized web interface without the need for technical expertise.

"*A content management system is a software that helps us make websites easier, faster, browser compatible and responsive websites in a very short time with the powerful inbuilt features. The basic advantages of the most popular CMS are the following: Security, Usability, Documentation / Support, Expansion and correction, Easy administration / installation.* [2]"

There are presently many kinds of content management systems, including business content management systems, product content management systems, etc., but this paper will only cover web content management systems and how it can help to speed up developing websites for a multiple client or a business to business.

2.2.1 CMS advantages in businesses

CMS implementation provides numerous business benefits, including an efficient authorization process, visible consistency, better site navigation, improved security, reduced content duplication, increased growth capacity, lower upkeep costs, and greater site freedom.

CMS is a tool that makes it easier to publish web content on websites. It enables content producers to contribute content without having to be proficient in HTML (hypertext markup language) or file upload. It is more contemporary approach to managing online material than the older methods. Since many of the technical team members are no longer required to regularly update web information, the business processes and necessary resources have been greatly simplified. Developing website with CMS can also save so much time since there's thousands of plugins available that can support any design and layout of any website you want to achieve, such as Lazy Blocks, Advanced Custom Fields, and a responsive drag and drop website builder Elementor. In

this research we will only discuss selected plugins that are proposed in this system.

2.2.2 Construction and process of CMS

By creating templates, CMS enables designers to concentrate on design. Subject matter experts create material in a separate setting. The server extracts the information, puts it into the appropriate template, and transmits it all to end users neatly wrapped.

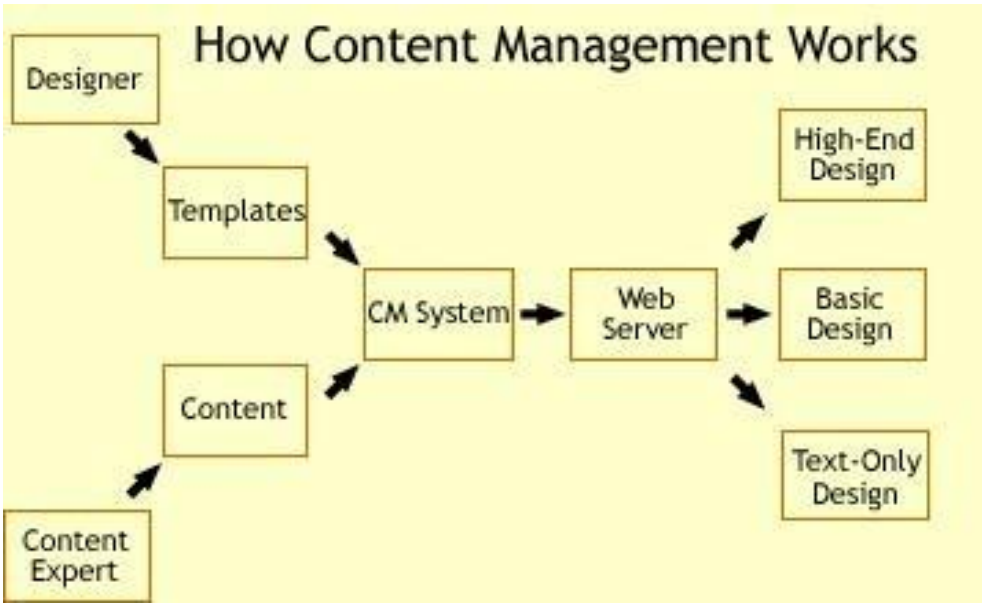

Figure 2: How content management works [6].

But that is only the technological aspect of CMS devices. Another element of CMS is how it handles the workload. While it is beneficial to isolate the design from the content, CMS wishes to streamline the process by which your designs are accepted and placed on the website.

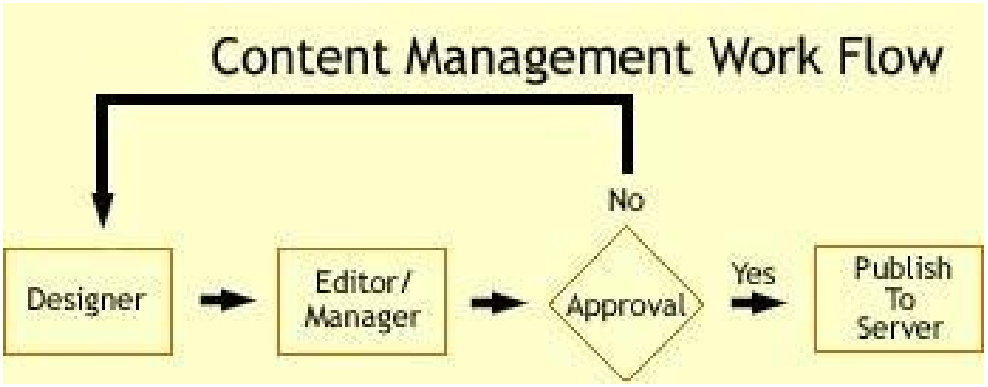

Figure 3: Content Management Workflow [6].

A content management workflow is a series of tasks that a team completes in order to finalize and guarantee the publication of a piece of content on time (for your own brand or a client). A content management workflow may be straightforward or intricate, depending on the kind of content being produced, project's scope, goals, and budget.

3 Theoretical background

Both theoretical and applied study served as the foundation for this thesis. This topic focused on the fundamental principles of web architecture and its structure. It also investigated WordPress' systematic framework and workflow for developing websites.

3.1 Technologies Used

WordPress is powered by a database system that allows you to add, alter, and organize files, themes, plugins, and any other form of material. Each WordPress user gets access to the dashboard, which allows them to administer their website from a single location. In this section, it will explain each technology programming languages, databases, etc can run a WordPress website.

3.1.1 Programming Languages

WordPress is mainly run by four programming languages: HTML, CSS, JavaScript, and PHP. The first three are performed in the browser, whereas PHP generates and serves the HTML, CSS, and JavaScript used by the browser on a web server. As a result, we consider PHP to be the main programming language for the server because it operates on a distant server, whereas JavaScript is "client-side" because it runs on the machine of whoever is viewing the site.

HTML

HTML stands for hypertext markup language. It is employed in the creation of web-based sites. Hyperlinks are a sequence of connections accessible on each website to another. Every single web website on the internet employs one or more versions of html code. The html code offers a format for pictures and texts on a website, based on which a cascading style sheet is put to alter its look.'

CSS

“Cascading Style Sheets (CSS) is a stylesheet language used to describe the presentation of a document written in HTML or XML (including XML dialects such as SVG, MathML or XHTML). CSS describes how elements should be rendered on screen, on paper, in speech, or on other media. [13]”

“CSS is among the core languages of the open web and is standardized across Web browsers according to W3C specifications. Previously, the development of various parts of CSS specification was done synchronously, which allowed the versioning of the latest recommendations. You might have heard about CSS1, CSS2.1, or even CSS3. There will never be a CSS3 or a CSS4; rather, everything is now CSS without a version number. [13]”

PHP

According to its creators, "PHP is a server-side, cross-platform, HTML embedded scripting language." *“It is essentially a programming language and script-parsing engine that work in unison to provide a way for Web developers.* [14]*”* PHP is the programming language used to create WordPress. PHP, like WordPress, is an open-source project. PHP is a server-side language, which means it operates on the server where you store your website. When someone views your website, their computer sends a request to your server.

JAVASCRIPT

The JavaScript computer language is enjoyable and adaptable. It is a fundamental web programming technology that can be used on both the front-end and the back end.

3.1.2 My SQL Databases

MySQL is one of the world's most popular open-source database management systems. is a collection of facts. The database system oversees managing files and connecting them to software. For example, a MySQL database can be used to power a website created with a database-based computer language.

3.2 Web hosting

Web hosting services utilize data centers' computer systems and storage devices to create and distribute websites, with a control panel for submission and access by users.

Online hosting offers numerous benefits, including reduced website building costs, the ability to split a host into multiple virtual hosts, and high efficiency. This improves website creation efficiency, but may take longer if users run the operating system and software themselves.

Hosting companies rent website space to clients, ensuring safe and continuous operation. Owners can host their websites on their own computers, requiring significant technological skills. “*Web applications offer great benefits for organizations and users. That can provide functions such as shopping, social network, banking, web search, web mail, interactive information, etc. Almost all web applications are implemented based on the client-server architecture.* [4]”

3.3 Domain name

A domain name is the identity of a computer or collection of computers made up of a series of dot-separated names. It is used to determine the computer's electronic path during data transfer. In brief, Internet users can reach the website via the domain name's address. People find it difficult to recall a series of digits, such as computer IP addresses. As a result, the growth of domain names, rather than IP addresses, is advantageous for individual identity. “A

domain name is the identity of a computer or collection of computers made up of a series of dot-separated names. It is used to determine the computer's electronic path during data transfer. In brief, Internet users can reach the website via the domain name's address. People find it difficult to recall a series of digits, such as computer IP addresses. As a result, the growth of domain names, rather than IP addresses, is advantageous for individual identity. "*Domain Name data is an important resource that can be used as an essential data asset for some departments of a country or enterprises, playing an important role in ensuring network service and security. Each domain name is essentially a path of a large reverse tree called Domain Namespace which is huge and difficult to be enumerated: the DNS tree can have any number of branches on each node, with a depth of up to 127 layers.* [5]" Each component had a text identifier that could be up to 63 characters long. The overall layout is comparable to that of a file system.

As an instance, www.norr.fi is a domain name, and the associated IP address is 0.1.2.3. DNS is analogous to an automated telephone listing. Instead of the telephone number—IP address, a person can contact Norr by name. When a user directly calls the website's name, DNS will transform the user-friendly name, such as www.google.com, into an IP address, such as 0.1.2.3, which is useful for system recognition.

The domain name can be a random mix of characters and digits, and the different domain name extensions, such as .fi, .eu, .org, .com can be combined into the domain name. After being registered, the domain name becomes valid, and it is unique, so that no other similar domain name will appear at the exact course of time.

3.4 cPanel

"*cPanel or Web hosting panel is a cheap approach to hosting a website. Web hosting providers would share user access of a single machine to the clients.*

Clients could login to the web hosting interface, then upload a website file. They also could use existing services for their requirement with their given accounts, such as MySQL database and mail server. Clients only could customize an available configuration in the web hosting interface. [7]"

cPanel is a recognized control panel that allows you to administer your web hosting server through a user-friendly online interface. It's particularly common among shared hosts, where it's the de facto option offered by most low-cost hosting providers.

You would need technical expertise to handle your websites/server without cPanel. However, with cPanel, you can adjust using a graphical interface – no technological expertise is needed.

3.5 Customised theme and plugins

The primary goal was to build an interactive WordPress theme, and blocks using WordPress. "Norr Blocks" is the moniker of the bespoke theme. "Norr Blocks" theme is designed for creating interactive designed templates and blocks that will save the workflow, time, and avoid hassle in recreating blocks and templates. The initial plan was to create a website and then modify it using the customization using high-powered WordPress plugins such as, lazy blocks, and ready-made designed PHP files powered by advanced custom fields.

3.5.1 WordPress Theme

A theme is a set of files that define the framework and style of your website.

A theme is made up of template files (index.php, header.php, and so on) that govern the structure and layout of your pages, as well as cascading style sheets (CSS) files (style.css) that specify the colours, fonts, and styles and make everything appear fantastic. "*By separating content Using WordPress as a Library Content Management System from the*

structure and design (controlled by themes), WordPress and other CMSs provide a flexible framework for website development. If you want to tweak the look of your site, just make changes to the theme files. [15]"

The theme must include these two important files.

• **index.php:** "*the default template file that specifies what information to include on the page and where to display it. Most themes include additional template files for pages that need a different layout.* [15]"

• **style.css:** "*the CSS code that makes your content look good. This code includes information about colors, fonts, sizes, margins, background colors, etc.* [15]"

Other PHP files such as the header, footer, and etc Each of these files includes code for displaying a specific section of a WordPress website. And they all contribute to the content you see on your website.

3.5.2 WordPress Plugins

A WordPress plugin is software that enables you to extend the functionality of your WordPress website. It enables you to add new functionality to your website or improve current functionality.

WordPress plugins, in other terms, are extensions intended to expand the powers of WordPress. They operate on top of your WordPress theme and assist you in adding any new features to your website.

Part of the fun of extending WordPress as a CMS is finding the best mix of plugins to meet your content objectives and administrative requirements.

When looking for extensions, you can use one of five distinct filters:

1. By relevance
2. By newest added to the repository
3. By recently updated
4. By most popular
5. By highest rated

Not all this filter will surely help you in finding the right plugins for you, but it has an advantage to see which plugins are relevant and being trusted by the majority of WordPress users.

4 Current State Analysis

Norr Design currently employs a manual method for web solution implementation, requiring time and workloads. This beginner-friendly approach involves setting up themes, selecting plugins, and writing lengthy scripts. This method is not practical for simultaneous projects, as it involves redoing installation and scripting multiple times.

In Norr Design, they use the old method of deploying wordpress websites, in this section, it will introduce the step by step process on how they deploy WordPress site and CMS projects.

Preparation

There are few lists of preparation list to guarantee a smooth deployment to minimize the risk of any unexpected obstacles during the process:

- Hosting and domain account.
- Internet connection
- Upgrade to the most recent PHP version;
- FTP client
- Source code editor (e.g., Visual Studio Code)
- Web browser (e.g., Google Chrome, Internet Explorer etc.)

4.1 Setting up domain and server

The process will begin by selecting web hosting and domain name. Purchasing a domain and server from the same provider simplifies the process. Norr Design chose Webbinen for their main server provider due to their excellent customer service, quick response times, affordable packages, and reliable security.

Hosting provider will provide cPanel account and ftp credentials for hosting and domain name as well as ftp credentials that will be pointed to the file server of your site which is the “public_html”.

4.2 Setup New Database on cPanel

Deploy NorrDesign Block files package by establishing a new database on a hosting server using cPanel.

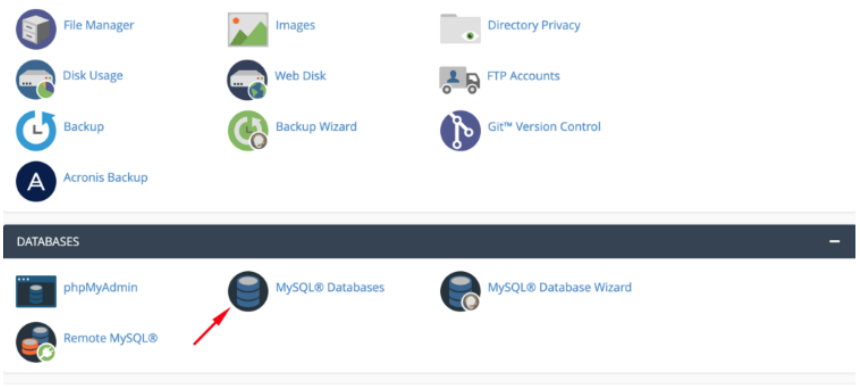

Figure 6: cPanel Tools

Log in to your cPanel to build a database. Select MySQL Databases from the primary menu's databases section.

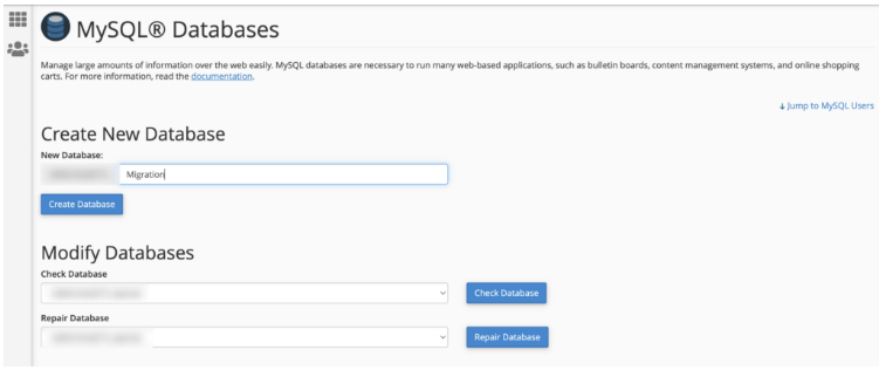

Figure 7: MySQL Database

Create a unique name and password.

To make database changes, create a new account, enter login and password, and add yourself by selecting the account and database from the dropdowns.

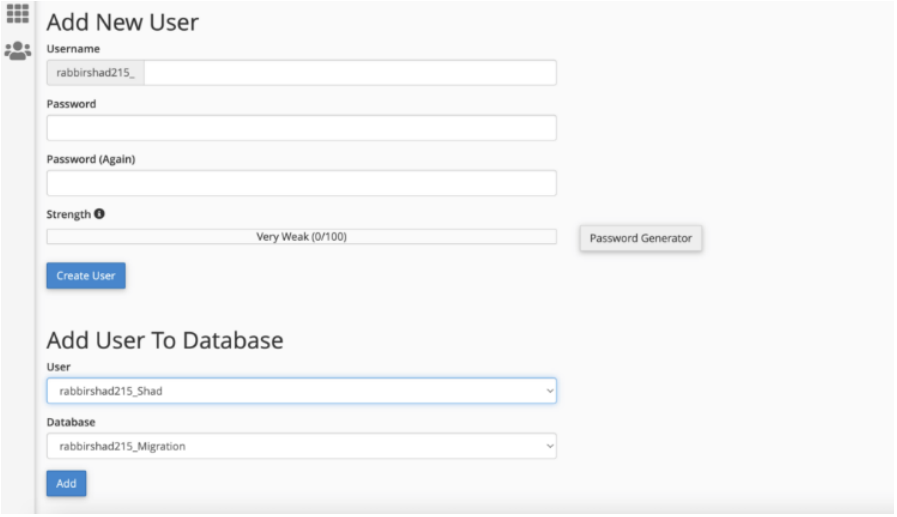

Figure 8: MySQL Database User creation

This is where you create your user name and password.

Select "All Privileges" in Manage User Privileges and make changes.

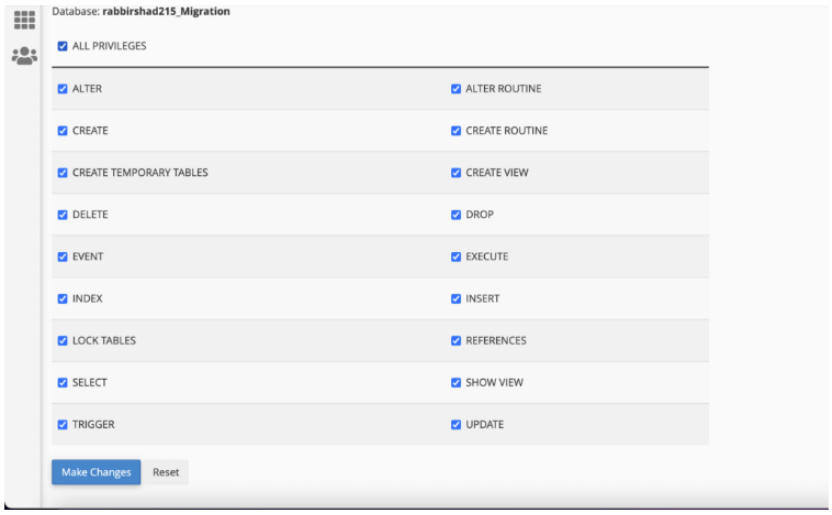

Figure 9: MySQL Database user privileges

Mark all privileges, so that the system can alter, edit, and use all the functions of the database system.

Furthermore, Download the latest version of WordPress from wordpress.org, Unzip the file and upload it to the public_html (or similar) directory and then run the package.

4.3 WordPress Template

Pre-built template-based websites are those that are created using a template or theme that can be purchased. They are referred to as "themes" in WordPress. Because many themes come pre-built with features and functionality, building websites with those themes or templates can save money on website design and HTML development.

In Norr Design, they spend so much time searching for the right theme for all the projects. Pre-built themes are widely adopted for website styling, offering front-end styling without code, including layout, font, and color customization. Determine if this option is right for the client.

Pre-Built template is a good option for 1 specific web project, since it has its own identity, meaning you need to change a lot of the content and website construction if you want to use the same theme for two websites.

5 Proposed System

The main topic of this thesis “Norr Blocks (Norr Design, named this system as Norr Blocks)” implementation portion will be presented in this chapter. Norr Design faces a problem of redoing tasks and not meeting client deadlines. The proposed system streamlines WordPress installation, plugin selection, code writing, and development.

Norr Blocks is a pre-made template with customizable blocks, powered by WordPress plugins like Lazy Block, Advanced Custom Fields, and Duplicator. It's user-friendly and enables non-programmer users to create and deploy posts or pages.

When creating a website from the beginning, you begin with a blank page that you can fill with any image, video, article section, and other features to give the website a clean, appealing appearance. When the front end code is created from scratch, the website's speed and performance improves. The proposed system prioritize client needs, making it easy for site owners or users to manage the backend. It’s suitable for small and enterprise-level businesses.

The proposed system offers flexibility in designing pages, allowing customization of web element attributes, and eliminating the need for manually installation of WordPress and spending time choosing the right theme that suits the requirements.

The concept of themes is one of the most essential selling features of WordPress. A single theme significantly improves the aesthetic and operation of the website. However, some websites use different designs on different pages. WordPress themes enhance website aesthetics and functionality, while some use different designs across pages.

The following chapter will cover the process on how to use the proposed system, from preparation, setting up domain, creating database, and installation of Norr Blocks.

Similar to the process of the existing system, you also need to purchase your own domain, hosting provider and set up your database, but instead of downloading the WordPress package, the Norr Blocks comes as a package (.php and zip file) built by Duplicator plugin similar to the downloaded file from the WordPress website.

5.1 Upload and install Norr Blocks

Once the database is complete, you can also upload your duplicator file. There will be no manual WordPress installation in this process. The Duplicator plugin will handle everything.

Return to the cPanel. Upload the website copy and installer file to the file's manager's base location.

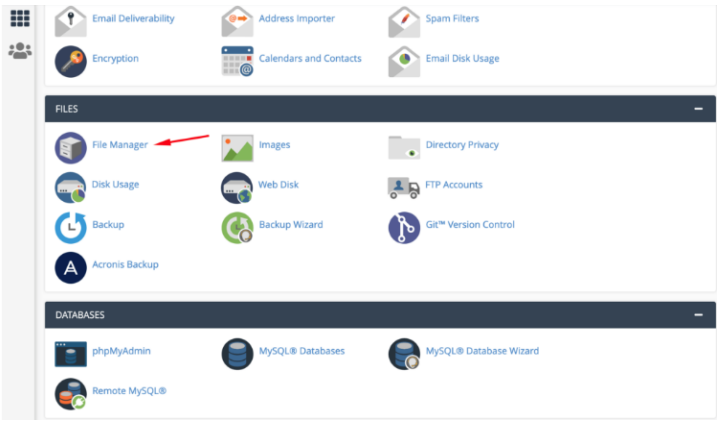

Figure 10: cPanel tool
This is main board of the cPanel

Now, with your server operating, open your browser and navigate domain.com/installer.php.

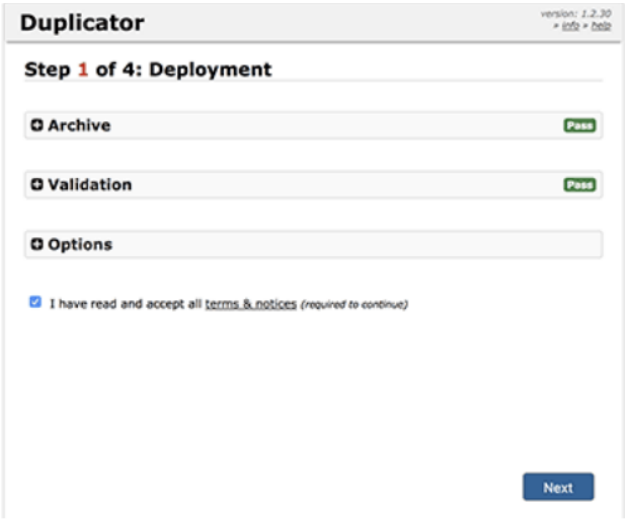

Figure 11: Duplicator Step 1 of 4

The installed package will run a few tests to confirm that everything is working accordingly. To proceed, check the terms and conditions box and click the Next button.

The next step is to enter your MySQL host, database name, username, and password.

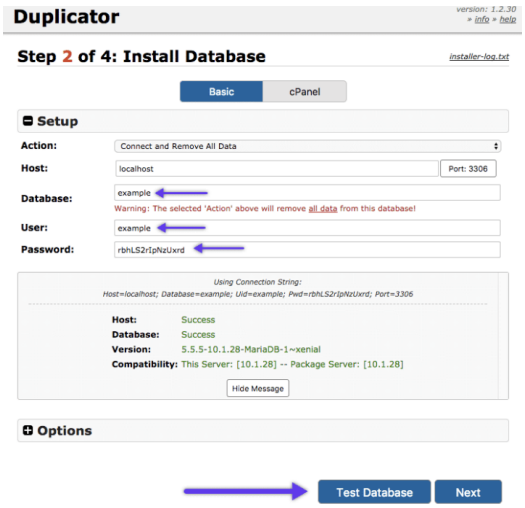

Figure 12: Duplicator Step 2 of 4

Create a local server and enter database details. Verify accuracy by clicking Test Database, and check if Duplicator communicates with the database to display Pass or Connection Problem information.

Finally, the duplicator will complete the final stages and display the login button.

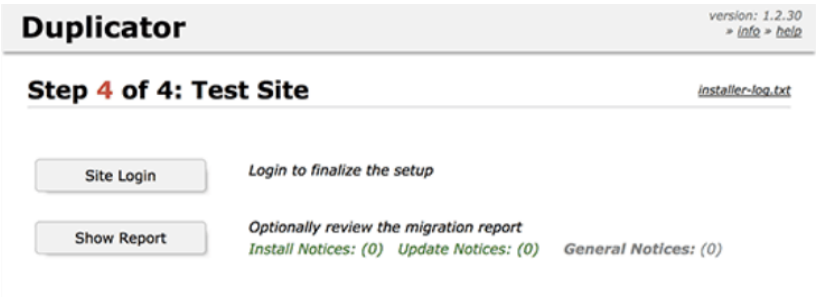

Figure 13: Duplicator Step 4 of 4

You can verify the recently migrated site to see if everything is functioning properly.

Login to Norr Design's admin and get a fully-functional WordPress website and CMS in 8 minutes, saving 1 day of workload. This method includes multiple blocks, plugins, bootstrap, and jquery, saving time and effort.

5.2 How does it works?

In this section it will cover the process on how to use the ready-made blocks and templates. Custom Built WordPress websites are designed from scratch, following every aspect of the design and development process. Customized WordPress websites offer the freedom to build websites that relate to their brand or business functioning. Developing a new WordPress website from scratch requires technical knowledge and experience, so businesses prefer to partner with experienced companies. Building a website from scratch allows for easy customization of elements like images, videos, sidebars, and featured articles, resulting in increased website speed and performance.

Templates

WordPress template file, page.php, handles website appearance, requires HTML, CSS, and PHP knowledge. To use a custom template page, navigate to WordPress Admin Panel, Pages, Add New, and find the frontpage.php file.

Lazy Blocks is a WordPress plugin that enables creating Gutenberg blocks and custom web blocks. It allows for custom meta fields, output HTML, and editor controls. The plugin also creates post templates for various page types and types.

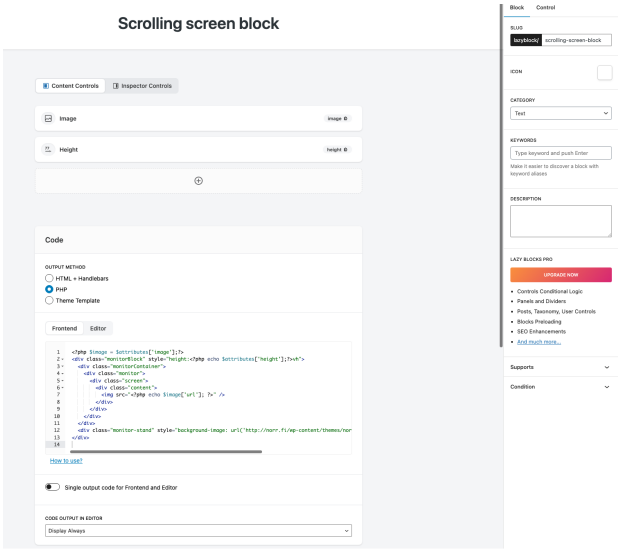

Figure 14: Lazy block panel

The image displays PHP codes and fields for creating a customize block, handling attributes and fields. Lazy blocks offer features like saving meta, exporting blocks to PHP/JSON, and inspecting them.

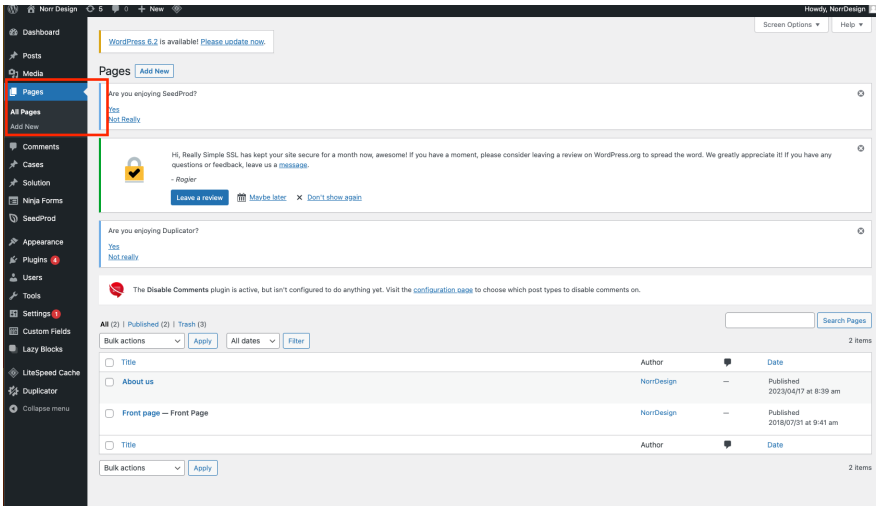

Figure 15: WordPress CMS pages

To create a page, click add pages, or click pages if there's already an existing page.

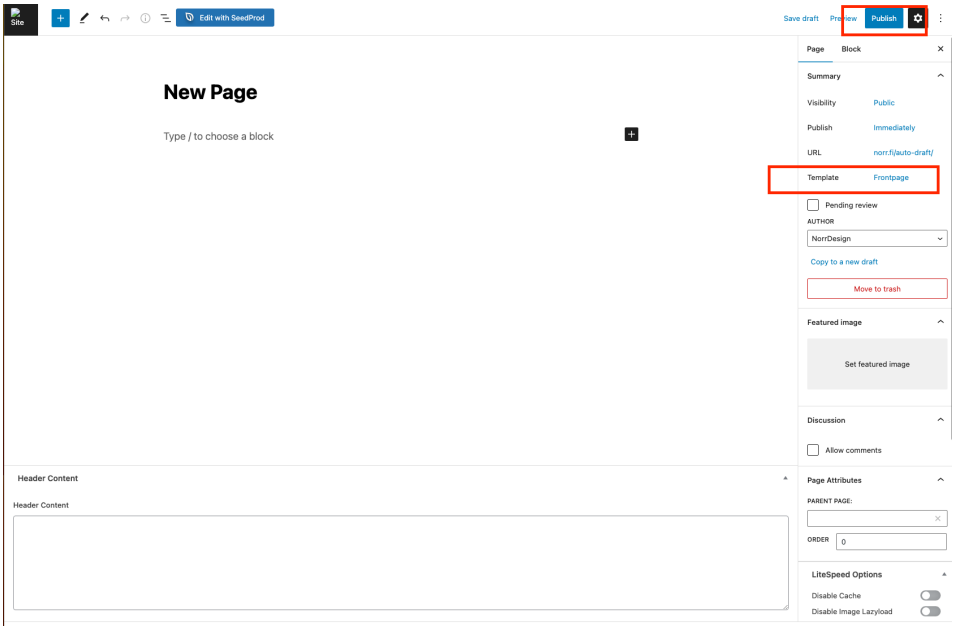

Figure 16: Publishing page

Create a new page using Frontpage template, publish, and view as a blank page with header and footer.

Blocks

In this section, the process of adding the blocks to the site will be introduced. Using the plugin called Lazy Blocks, Norr Design has numerous ready-made blocks or design templates such as image, a paragraph etc. You can even search what blocks do you need and adjust the attribute and design of each block.

If you click the plus sign in the CMS empty page.

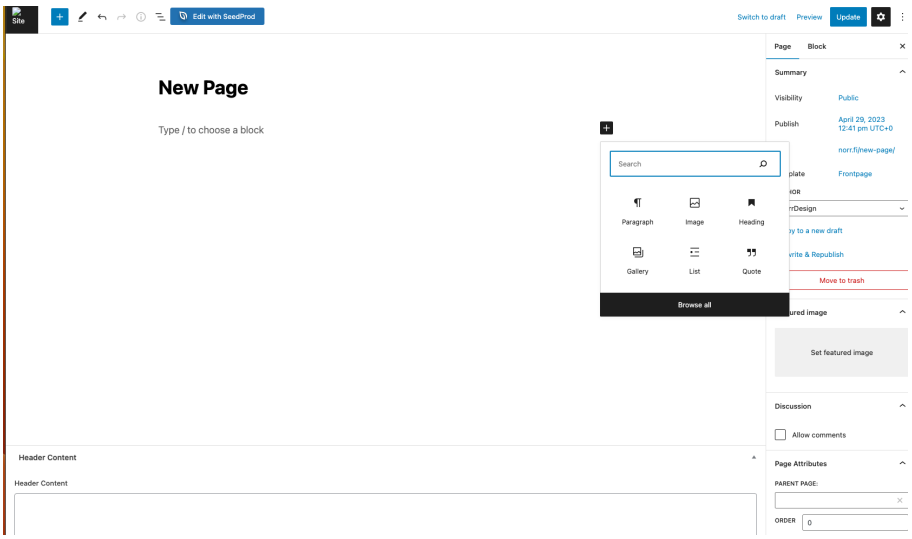

Figure 17: Choose a block.

In the search bar, you will see so many selections of blocks that are already created, all you need to do is to add the content of the page.

5.3 Norr Block CMS and Published Page

In this section, it shows the actual CMS of the current Norr Design website and its published pages using some of the customized blocks.

CMS

Digital design

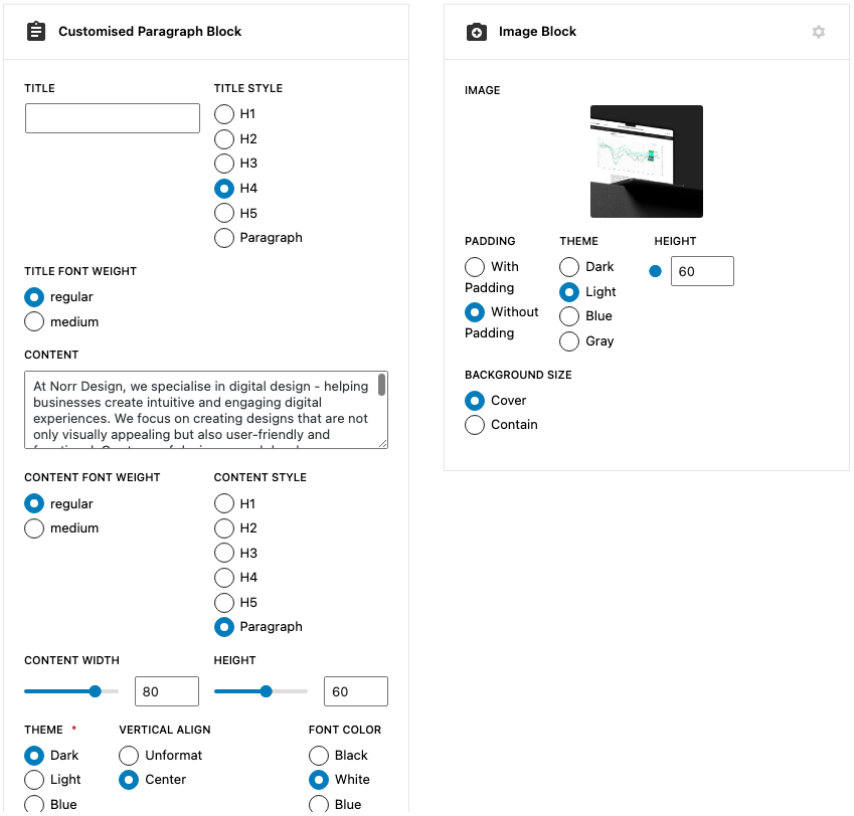

Figure 18: Frontpage CMS 1

This is what the Digital Design CMS page looks like with two selected blocks.

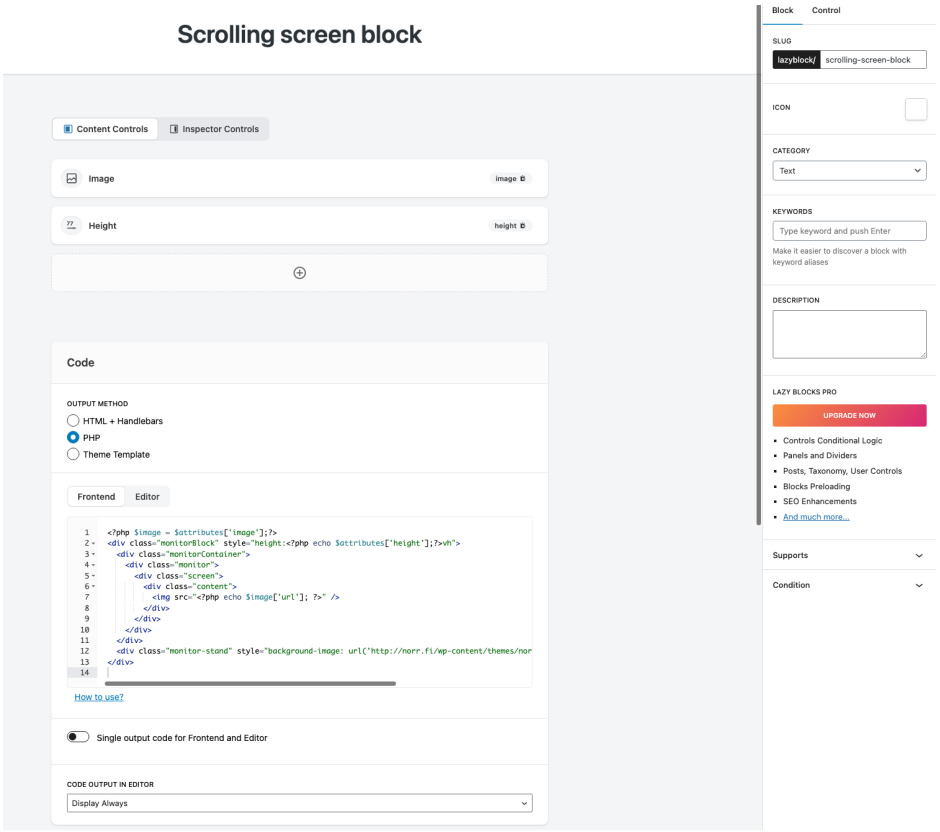

Figure 19: Lazy block edit page

In this section you will see the content control of the block “Scrolling Screen Block”, in this dashboard you can manipulate and touch the PHP or HTML of the block, if there’s something that needs to be fixed or to be added.

As you can see in the Content Controls there are two fields, image, and height. The image and height field will be in the page CMS, once you select this block. Whatever you put in those fields, it will reflect in the page once you publish it.

Published Page

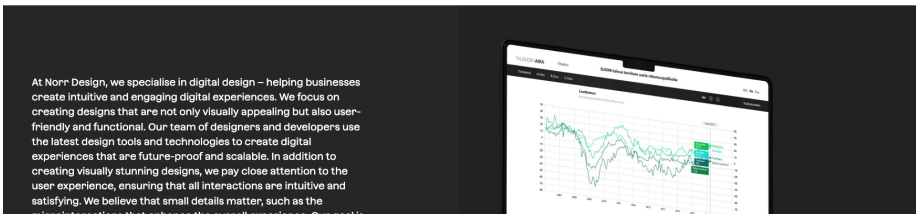

Figure 20: Post page 1

In this figure you will see the Solution template, with two selected block, Image Block and Customized Paragraph Block.

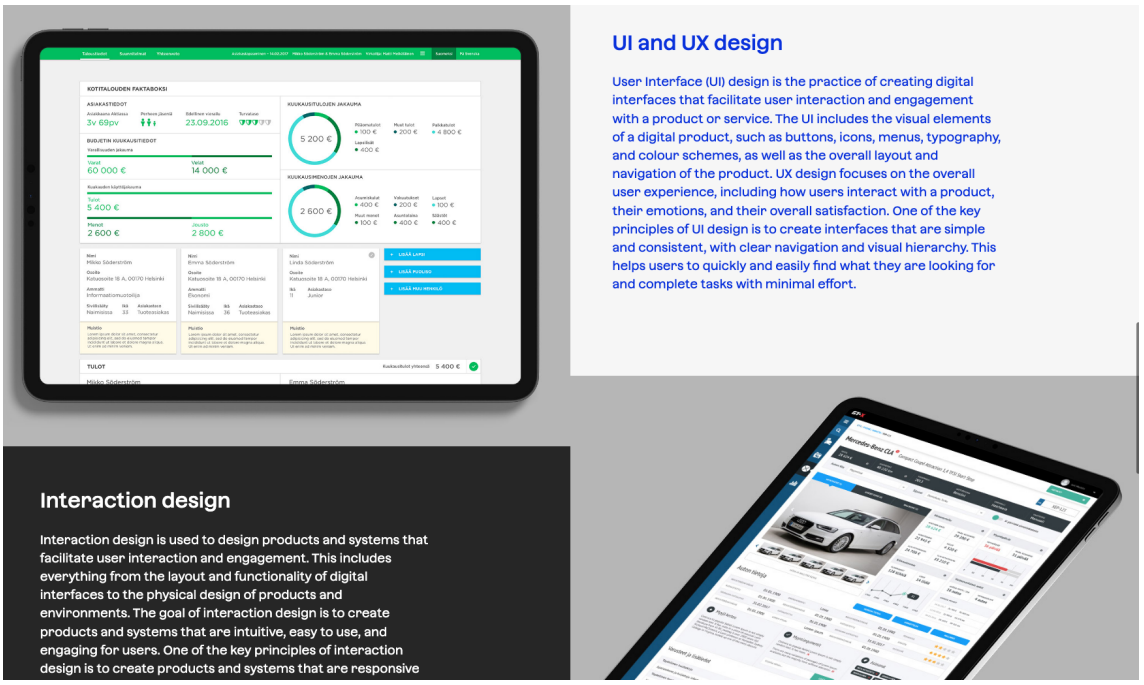

Figure 21: Post page 2

In this figure you will see the Solution template, with four selected blocks, two Image Blocks on top left, and bottom right and two Customized Paragraph Block.

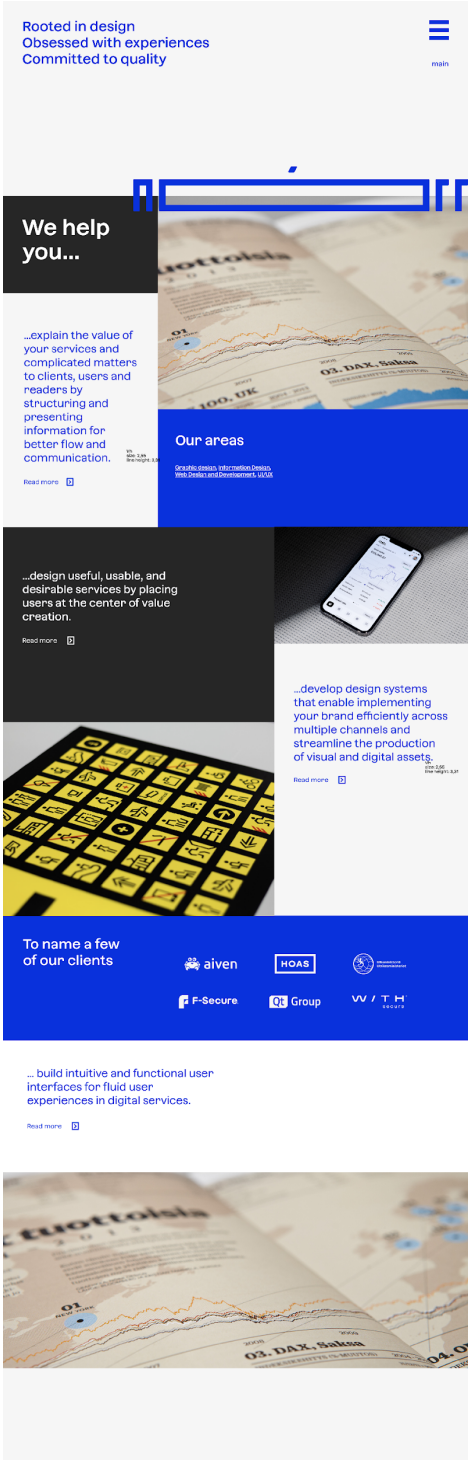

Figure 22: Landing Page

This is the actual look of the front page with some of its selected blocks.

6 Comparison of Existing System and Norr Blocks

In today's competitive marketplace, competing with pre-existing websites can be challenging. However, with this research, businesses can outperform competitors and create a strong online presence. Choosing the right WordPress website design from experts can prevent mistakes and ensure a successful website. Before starting the design and development process, it's crucial to determine whether a custom-built or pre-built design is right for the website. Most website owners prefer pre-built templates, but after encountering difficulties, they may opt for a custom-coded WordPress website.

Norr Design is using a pre-built template, while the proposed system is using the custom coded method or the Norr Blocks.

The two methods: custom-coded and pre-built template will be discussed in this article.

Category	Existing System	Norr Blocks
Budget Friendly	WordPress offers both free and premium themes, with free themes being the most preferred. Premium themes are cheaper and more cost-effective, especially for beginners starting a business with a tight budget.	Custom-coded WordPress websites are more expensive due to planning and research involved. However, the proposed system features and flexibility has advantages that make it worth the investment.
Hassle Free	Pre-built WordPress themes enable users to create functional websites quickly	Custom design involves every element of web development from scratch,

	and easily. Premium themes come with pre-built demos that can be customized to meet specific needs. Pre-built themes require less setup time, as the design and pattern are already developed. Once customized, content can be added using the CMS, making the website ready for users and search engines.	requiring patience and a minimum of 2-4 months. But once it's done, it can be reused for other websites depending on how flexible the system was built. The proposed system has the capability to recreate new websites without rewriting codes or selecting new themes.
Full Control	Pre-built themes offer advanced customization features for websites, but they are pre-coded and come with pre-installed plugins, limiting design and functionality. Businesses need a website that communicates their message and meets customer expectations. While they offer elements, typography, background images, and videos, they can be challenging to customize every aspect of the pre-set design.	Norr Blocks offer full control over design, content structure, layout, and more. Using selected high-powered and useful plugins, it can create websites that meet the business requirements. It can be more flexible and achieve the client’s branding.
Performance	Pre-built WordPress themes can help get started, but they can slow website speed and performance. Premium	Norr Blocks load faster and perform better than pre-built themes due to its pre-planned structure and

	themes with advanced features can be heavily coded, affecting both the front and back end. Instead, opt for a lightweight theme or a custom-coded WordPress website that prioritizes speed and performance. Aside from that, it may require extensive follow up code writing since the pre-built website doesn't really match the requirements needed.	focus on business requirements. It was developed with clean, lightweight code, reducing server response time and improving website load time. Installed with most important WordPress plugins ensures a website with limited features that meet business requirements, resulting in improved performance.
Security	Pre-built WordPress themes are not recommended for websites dealing with user data or payment gateways. Lack of security features, making the website vulnerable to hackers. WordPress is a secure platform, but third-party add-ons increase the risk of cyber attacks. Prioritize security when selecting a theme and ensure it offers a secure environment.	In today's digital world, privacy and security are crucial for businesses, particularly in ecommerce and subscription selling models. Norr Blocks prioritize security, making it less vulnerable to threats. It has built-in security features powered by the most relevant security plugins in WordPress.
Flexibility	If the design does not match the client's brand, it needs to have further adjustments to the code. Pre-built premium	With the use of plugins such as Lazy Blocks and Advanced Custom fields, the proposed system has

	themes that are freely available to the public can be used by any of competitors. The appearance of the themes can be changed by customizing them, but the layout and other structures remain the same. That is why most businesses prefer to use custom-built WordPress websites. In Norr Design, they spend nearly 2-3 weeks or even a month in developing one Web Project depending on scope and requirements. Redoing all of the processes in every project will put the company to many project delays.	adjustable blocks, It can change all the necessary attributes of an image, paragraph, blocks, etc. Aside from that, it has a selection of custom made blocks that can be reused in all pages or posts that meets client satisfaction.

Table 1. Comparison of Existing System and Norr Blocks

Prebuilt WordPress themes offer numerous customization options, including layout, navigation, sidebar placement, and footer. Premade WordPress themes are affordable, partially customizable, and easy to set up. It doesn't require too much code, making them easy to implement without special skills or knowledge. These themes are suitable for those with computer skills. "*There are free themes built right into WordPress that are still partially customizable. They are much faster to set up than custom themes. If you're working within a short timeframe, using a premade WordPress theme saves lots of time—nothing needs to be coded, and all you have to do is plug in*

what you need. Finally, premade WordPress themes are easy to implement and don't require special skills or knowledge. If you know how to use your computer, you can probably set up a premade WordPress theme. [18]"

Custom websites create uniqueness and can align with any business brand. Designers can adapt and scale the theme to match the business needs, while SEO-friendly WordPress themes ensure alignment with search engines. They scale with the business and build in necessary technologies for growth. According to the research of Catie Leary of SiteCare, "*With a custom website, your imagination is the limit. Having a website designed for you from scratch gives you complete creative control of your brand's digital face. Going the custom route allows you to dictate your wants and needs on a granular level — not just adjusting colors and fonts, but the actual structure and features of your site, as well. While using a premade WordPress theme can turn out gorgeous, you ultimately have to be okay working with what the theme allows*. [18]" A custom designed website is ideal for businesses with complex features or template types that cannot be addressed with a premade theme. An expert design and development team can create a unique website that allows for endless creativity and greater scalability and flexibility. Custom sites also offer flexibility for future features and template types, ensuring no limitations on the template theme.

"With pre-built themes, there are functions that come with the theme that you might never use but they are part of the solution and cannot be removed. This unnecessary extra code that you might never use only becomes an issue for your site and could potentially cause problems in the future. [19]"

"Custom themes can also reduce any possible conflicts with plugins as the plugins that you need are the only plugins that are added. This also makes any updates more reliable in the future, enhancing your site even more. Pre-built themes possess plugins that are included in the package and any updates could cause issues especially if the version upgrade is major. [19]"

A lot of companies need a website, but knowing how to get started can be intimidating. In small client-based companies like Norr Design, owning a WordPress theme will help them achieve flexible websites, it can also help them to accelerate their production of developing websites. The proposed system can be reused in multiple projects. Websites that will be released from this system will have the same orgranize layout and construction. Thus, it will also give the company its own development strategy and identity.

7 Testing and Results

Four Norr Design employees participated in a system analysis, including two developers and two graphic designers. The authors prepared three important tasks that will validate the technicality, usability, and site performance.

Developer P = The Proposed System

Developer X = Current State

Technicality

To test the technicality of the proposed system, the author asked two of the developers to deploy both systems using the existing method and proposed system. One developer will perform the current state method which is manually downloading and installing WordPress, while the other one will deploy the Norr Block using the duplicator package.

> Developer X managed to deploy the WordPress package in 26 minutes, the Developer X took a while because of the manual method, specially in setting up the email, password etc. While Developer P who deployed the proposed system finished the task in 9 minutes, it has an advantage due to customization, therefore it doesn't need to do any setup since it’s already built in the system.

Usability

The usability of the proposed system will be split into two parts, one is the comparison of the existing method against the proposed system. The first task was assigned to the two developers, the goal is to create a single page website that has the Norr Design logo in the center of the page. This test will allow us to compare which method can perform efficiently.

The Developer P, managed to do the task in 3 minutes, Developer P used the image block to perform the task.

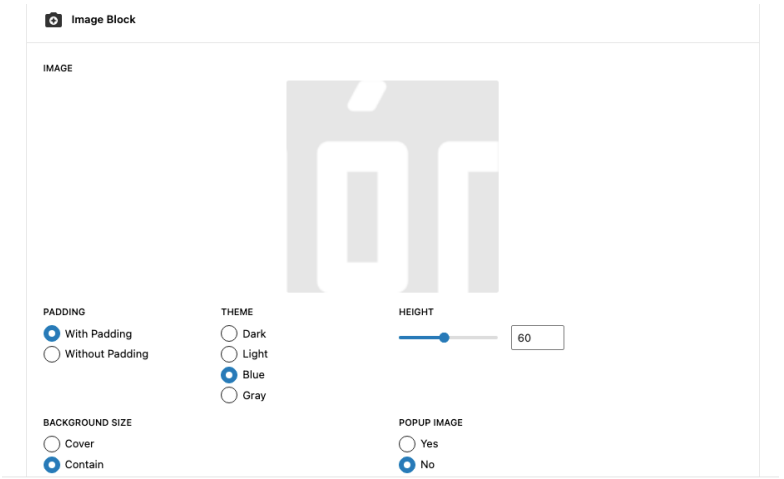

Figure 23: Developer P CMS solution to perform the task.

Figure 24: The output of Developer P.

In this test, Developer X didn't manage to do it since it required him to do some customization and small coding to align and set up the height and width of the image. While Developer P performed better by adjusting the elements thru cms.

The second task was assigned to the four employees, where they needed to publish two different pages using the custom made blocks. This test will give us an idea if the system is user-friendly and easy to use.

The graphic designers took a while to understand the block creation process, creating rows and columns is confusing for both of them since they are not that familiar with CMS, but they can understand clearly the design attribute requirements of each block. While the developers manage to perform the task easily, the only concern that they have is that the WordPress CMS dashboard is too small to handle multiple blocks.

The two developers completed the tasks, stating the system's potential and future usefulness. The other two designers struggled with understanding the content of the website, but quickly grasped the concept.

Site Performance

The performance will be tested using google lighthouse, in this test we will see a comparison on how the proposed custom-made system performs compared to a pre-built wordpress website with twentytwentyone as theme. Google Lighthouse is a free Google service that can assist in improving the quality of your websites. The tool examines pages performance, accessibility, SEO, and other factors.

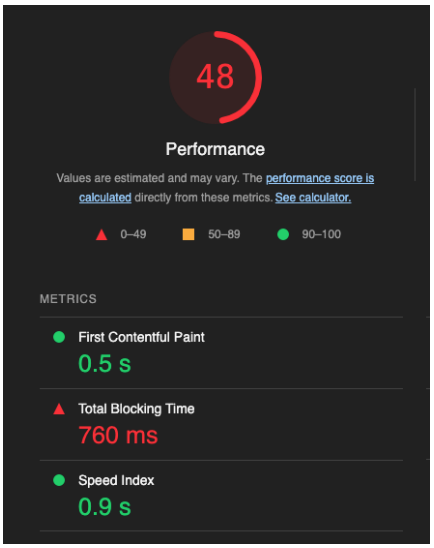

Figure 25: Result of pre-built wordpress website

The result of the pre-built wordpress website got 48, due to its multiple third party javascript it affects the site performance.

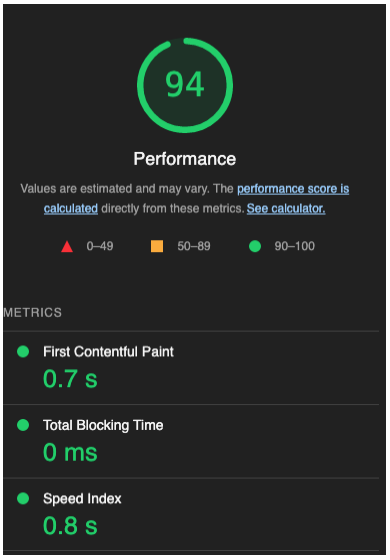

Figure 26: Result of proposed system

The proposed system performed better than the pre-built website. The proposed system has a high-powered plugin that eliminates unused javascript and enables cache to avoid loading more scripts that can lead to a slow performance.

Overall, the proposed system performed well in all tests compared to the current state method. With the result of the test, it clearly shows that the proposed system or custom-made theme can produce websites more efficiently. On the other hand, the proposed system has some user interface issues in the CMS when there's multiple blocks installed, but still manageable to perform the tasks. In the last test, the pre-built website got a 48 score from google lighthouse, while the proposed system got 94 points. It means that the proposed system can run and load faster than the pre-build site.

8 Conclusions

Norr Design employees and web developers evaluated the proposed WordPress CMS, describing it as an easy-to-use tool for web accessibility criteria. However, more effort is needed to make it accessible to users with special needs. The system also allows non-programmer employees to create and adjust design attributes according to their needs.

Employees at Norr Design appreciate the user-friendly capability of the proposed system, as it requires no programming knowledge and allows users to express their thoughts. The thesis discusses constructing an accessible CMS and assessing usability using a modified WCMS, requiring fewer development resources. They appreciate the control over design and the flexible capability of WordPress CMS. The plugins installed in the proposed system are useful enough to protect websites from hackers. The efficiency and its performance will contribute a lot to Norr Design web development projects.

However, one of the drawbacks of this system is its lack of stability. Because it is an open-source platform, it relies heavily on plugins and themes created by various individuals and businesses, and there is no one to track them. It is quite likely to include bugs or dangerous programs.

In the future work, Norr Design plans to incorporate web developers' ideas for a future revision of the system, including security plugins and a library for finding needed blocks. The system requires further configuration to handle templated blocks and WordPress versions. Norr Design is committed to investing more effort in making the tool more powerful.

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