Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Information Engineering

Bachelor Thesis

Building a web-store using Prestashop CMS and third-party services integration

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

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Informatics

Thesis title

Building a web-store using Prestashop CMS and third-party services integration

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Objectives of thesis

The goal is to create an online store for clothes selling in the Czech Republic:
1. User interface prototyping and graphical design creation;
2. Bitnami LAMP Stack setup and Prestashop CMS installation;
3. Prestashop CMS configuration;
4. Graphical design implementation;
5. Adding goods, setting up delivery methods, connecting a payment system;
6. Connecting analytics systems (installing Google Analytics via Google Tag Manager and Facebook pixel);
6.1. Third-party services integration:
6.2. Zbozi.cz;
6.3. Heureka.cz;
6.4. Glami.cz;
6.5. Google Shopping.
7. Search engine optimization.

Methodology

The methodology of the bachelor's thesis is based on a detailed analysis of existing resources, which will be performed on the basis of the study of professional literature and existing software solutions. The knowledge acquired by the study will be evaluated and on the basis of them the current state of electronic shops, their pros and cons will be defined. Comparing the differences and shortcomings of current e-business will create a list of functionalities that the new business should enable. Implement and verify the e-shop. Based on the results of the verification, an overall evaluation will be performed and possible modifications of the solution will be proposed.
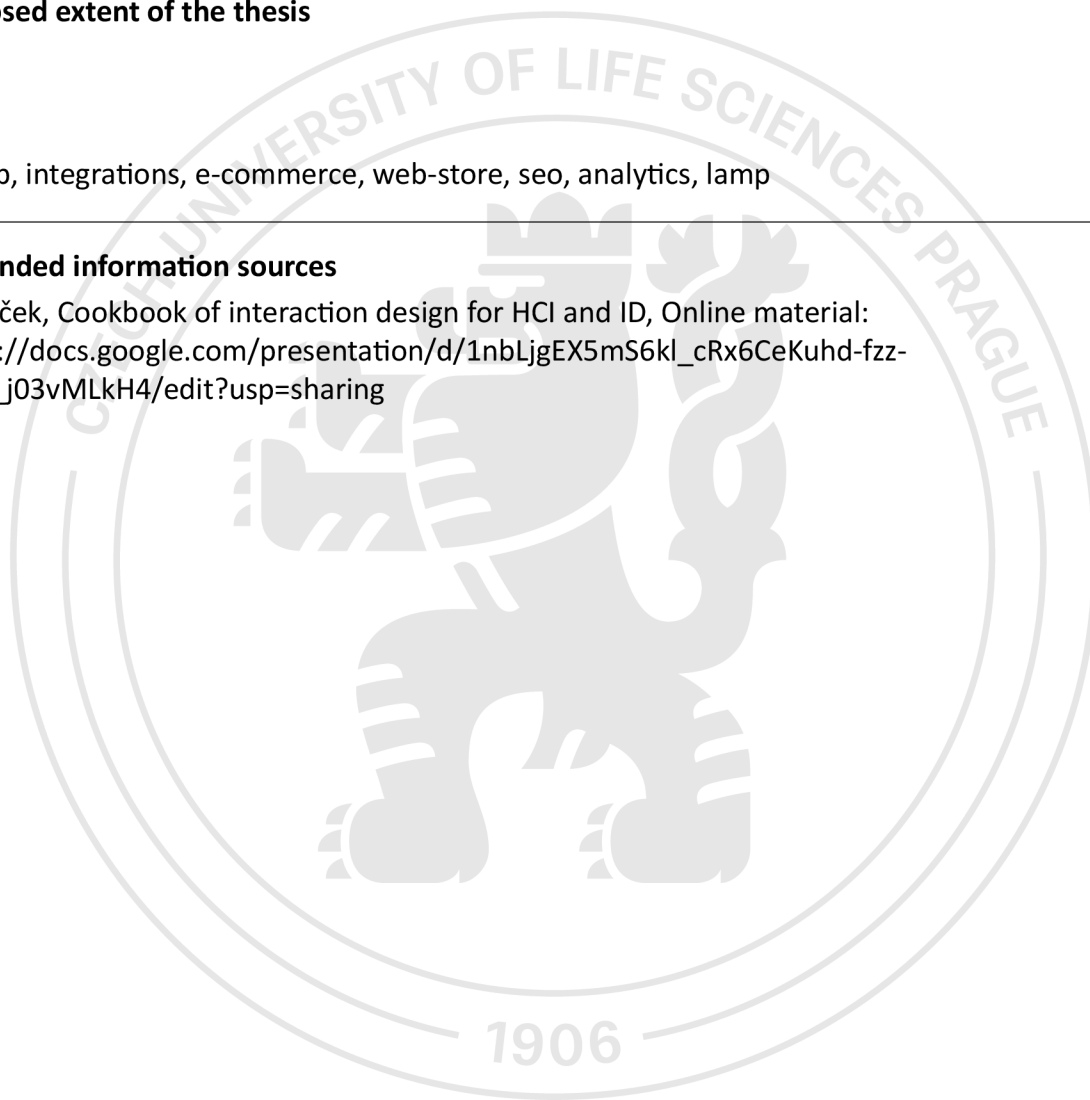
The proposed extent of the thesis

30-40

Keywords

prestashop, integrations, e-commerce, web-store, seo, analytics, lamp

Recommended information sources

Josef Pavlíček, Cookbook of interaction design for HCI and ID, Online material:
https://docs.google.com/presentation/d/1nbLjgEX5mS6kl_cRx6CeKuhd-fzz-
kyYn_j03vMLkH4/edit?usp=sharing

Expected date of thesis defence

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Electronic approval: 1. 11. 2021

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Head of department

Electronic approval: 23. 11. 2021

Ing. Martin Pelikán, Ph.D.

Dean

Prague on 15. 11. 2023

Declaration

I declare that I have worked on my bachelor thesis titled "Building a web-store using Prestashop CMS and third-party services integration" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on date of submission   15.11.2023

Building a web-store using Prestashop CMS and third-party services integration

Abstract

The methodology of the bachelor's thesis is based on a detailed analysis of existing resources, which will be performed on the basis of the study of professional literature and existing software solutions. The knowledge acquired by the study will be evaluated and on the basis of them the current state of electronic shops, their pros and cons will be defined. Comparing the differences and shortcomings of current e-businesses will create a list of functionalities that the new business should enable. Implementation and verification of the e-shop. Based on the results of the verification, an overall evaluation will be performed and possible modifications to the solution will be proposed.

Based on the study, the way of creating and setting up a new e-shop, as well as integrating with services to increase the number of sales will be described in the thesis.

Building a web-store using Prestashop CMS and third-party services integration

Abstrakt

Metodologie bakalářské práce se zakládá na podrobné analýze existujících zdrojů, která bude prováděna na základě studia odborné literatury a existujících softwarových řešení. Získané poznatky z průzkumu budou hodnoceny a na jejich základě bude definován současný stav elektronických obchodů, jejich výhody a nevýhody. Porovnáním rozdílů a nedostatků současných e-obchodů bude vytvořen seznam funkcí, které by měl nový obchod umožnit. Realizace a ověření e-shopu. Na základě výsledků ověření bude provedeno celkové hodnocení a navržena možná úprava řešení.

Na základě průzkumu bude v práci popsán způsob vytvoření a nastavení nového e-shopu, stejně jako integrace s službami pro zvýšení počtu prodejů.

Klíčová slova:

Prestashop, integrací, e-commerce, web-store, SEO, Google Analytics, LAMP

Table of content

1 Introduction

Gadgets have become an integral part of our lives. From smartphones and computers to smartwatches, people rely on these devices daily. Additionally, the popularity of online shopping continues to grow as it eliminates the need to visit physical stores and allows for convenient delivery straight to one's front door.

The COVID-19 pandemic in early 2020 caused a significant increase in e-commerce sales.[1] The closure of brick-and-mortar stores and increased strain on those that remained open contributed to a significant growth in online shopping. In the Czech Republic, the percentage of people who made an online purchase at least once every three months jumped from 39% in 2019 to 54% in 2020.[2] This trend of increasing online shopping has been evident for several years, with only 3% of people making online purchases in 2005[3].

The COVID-19 pandemic has not only led to a rise in e-commerce sales, but also an increase in the number of online stores. Small and medium-sized businesses have been compelled to adapt their operations to remain viable and sustain their businesses.

It is my belief that this work holds utility for both individuals or entities engaged in e-commerce or contemplating such ventures, as well as for my own personal online store, established during the COVID-19 pandemic, which serves as a clear exemplar of the expansion of distribution channels through internet sales.

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[1] ALCEDO, Joel, Alberto CAVALLO, Bricklin DWYER, Prachi MISHRA and Antonio SPILIMBERGO. DP17001 *E-commerce During Covid: Stylized Facts from 47 Economies. CEPR Press Discussion Paper No. 17001* [online]. 2022, January 2022, 2022(17001), 18 [cit. 2022-09-29]. Available at: https://cepr.org/publications/dp17001
[2] *Využívání informačních a komunikačních technologií v domácnostech a mezi jednotlivci - 2020: Nakupování přes internet* [online]. 2020(14), 1 [cit. 2022-09-29]. Available at: https://www.czso.cz/csu/czso/14-pouzivani-vybranych-financnich-sluzeb-online
[3] *Využívání informačních a komunikačních technologií v domácnostech a mezi jednotlivci - 2020: Nakupování přes internet* [online]. 2020(14), 1 [cit. 2022-09-29]. Available at: https://www.czso.cz/csu/czso/14-pouzivani-vybranych-financnich-sluzeb-online

2 Objectives and Methodology

2.1 Objectives

The purpose of this work is to conduct an examination of the extant content management systems for electronic commerce. Given the breadth of the topic of e-commerce, the focus of this work is on the Business-to-Consumer sector and the development of an e-commerce platform. In pursuit of this objective, the following subgoals have been established: identification and integration of existing distribution channels for products, through the creation of advertising campaigns and the publication of advertisements on the internet; and the implementation of an analytics system for tracking conversion sources, with the aim of optimizing advertising campaigns.

2.2 Methodology

The methodology of this bachelor's thesis is founded upon an in-depth analysis of existing resources, which will be conducted through the examination of professional literature and existing software solutions. The information obtained through this study will be evaluated and used to establish the current state of electronic commerce platforms, including their advantages and limitations.

Upon completion of the verification process, an overall evaluation will be conducted and recommendations for modifications to the proposed e-commerce solution will be presented. These modifications will pertain to the following aspects of the platform: content management systems, web hosting solutions, and content delivery systems. In order to ensure the visibility of the e-commerce platform on the internet, an analysis of existing channels for selling products online, integration with third-party services, and the creation of advertising campaigns for promoting online sales of products was conducted.

In an effort to enhance the visibility of the e-commerce platform in search engines, I have conducted an analysis of a set of strategies for internal and external optimization of the website. These measures aim to improve the ranking of the website in search engine results for specific user queries, with the ultimate goal of increasing network traffic and, subsequently, sales.

3 Literature Review

The literature review was compiled through the examination of internet articles, official documentation of various services, as well as professional literature in Czech, English, and other languages. This component of the thesis provides a description of the technologies utilized in the development of websites and e-commerce platforms.

3.1 Explanation of the main terms

The **World Wide Web** (WWW), as defined by the World Wide Web Consortium, is a domain of information space wherein objects (or resources) are identified by global identifiers known as Uniform Resource Identifiers (URIs). These internet resources can be accessed via Uniform Resource Locators (URLs), which are a specific form of URIs that identify the web address or location of a particular resource.

The World Wide Web comprises an extensive number of web servers[4]. The structure of WWW pages is primarily constructed using various languages such as HyperText Markup Language (HTML), eXtensible Hypertext Markup Language (XHTML), Cascading Style Sheets (CSS), and JavaScript (JS). A website is comprised of one or multiple pages that are interconnected by hyperlinks. Web browsers are utilized to download and display web pages.

E-business. E-business encompasses a wide range of activities that are designed to enhance the efficiency of business processes through utilization. In the past, e-business was limited to online stores and reservation systems, which are now considered to be a part of e-commerce.[5]

E-business encompasses a broader scope and encompasses a greater number of processes and tools than e-commerce. If we limit our focus to commercial activities, we are then referring to electronic commerce, which is commonly executed through an online store or e-shop platform.[6]

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[4] *Web mechanics: What is a web server* [online]. MDN [cit. 2023-02-22]. Available at:
https://developer.mozilla.org/en-US/docs/Learn/Common_questions/Web_mechanics/What_is_a_web_server
[5] SUCHÁNEK, Petr. *Podnikání na Internetu: distanční studijní text.* Karviná: Slezská univerzita, Obchodně podnikatelská fakulta v Karviné, 2019. ISBN 978-80-7510-366-6.
[6] SUCHÁNEK, Petr. *Podnikání na Internetu: distanční studijní text.* Karviná: Slezská univerzita, Obchodně podnikatelská fakulta v Karviné, 2019. ISBN 978-80-7510-366-6.

E-commerce. The concept of e-commerce has undergone changes over time as technology and the digitalization of business progress. There are various definitions of e-commerce found in the literature.

Dr. Amir Manzoor, MD defines e-commerce as a subset of electronic business that encompasses the sale, purchase, transfer, or exchange of products, services, and/or information, including business-to-business (B2B) and business-to-consumer (B2C) interactions. More recent literature defines e-commerce, also written as eCommerce, as the trading of goods and/or services via the internet.[7]

E-shop. An online store, also known as an e-shop, serves as the intermediary interface between merchants and customers for electronic commerce. Depending on their functionality, technology, and architecture, online stores are classified as web portals.[8]

In the realm of e-commerce, web portals that primarily focus on displaying products, including features such as product searching, comparison, wish list creation, upselling, and cross-selling, cart, and checkout pages for placing orders with various shipping and payment options, including bank transfers, bank card payments through a payment gateway, etc.[9]
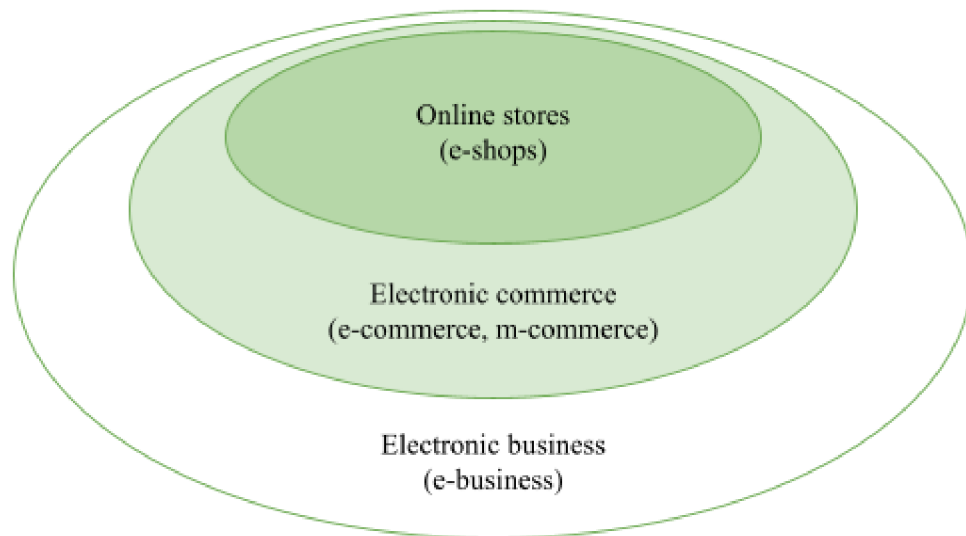
Figure 1: Hierarchy of electronic business (e-business)

[7] GRAF, Alexander. *The E-Commerce Book: About a channel that became an industry*. Frankfurt: dfv Mediengruppe Fachbuch, 2016. ISBN 9783866415058.
[8] SUCHÁNEK, Petr. *Podnikání na Internetu: distanční studijní text*. Karviná: Slezská univerzita, Obchodně podnikatelská fakulta v Karviné, 2019. ISBN 978-80-7510-366-6.
[9] SUCHÁNEK, Petr. *Podnikání na Internetu: distanční studijní text*. Karviná: Slezská univerzita, Obchodně podnikatelská fakulta v Karviné, 2019. ISBN 978-80-7510-366-6.

3.2 Content Management Systems

The concept of a content management system (CMS) is broader in scope than a digital content management system, which is only a component of it. A CMS is a software package that automates the tasks necessary for managing content effectively.

It is server-based software that interacts with end-users and content stored in a repository on a server, which can be located on the same server or in a separate repository. A CMS enables users to create and edit content, as well as make it accessible for others to utilize. Additionally, it organizes the content in an intuitive and user-friendly manner, allowing end-users to access and operate it easily, without programming knowledge.

3.2.1   The history of Content Management Systems

The need for a systematic approach to organizing and categorizing content for improved accessibility has existed since the inception of the content itself. The concept of a Content Management System (CMS) has been in existence for a similarly prolonged period.

One of the earliest documented instances of content management was implemented at the Library of Alexandria, which existed from approximately 300 BC to 273 AD.[10] The Library of Alexandria preserved the contents in the form of papyrus scrolls and codices, thus the librarians of that time can be considered the first content managers.

As technology progressed, the rate of creation and accumulation of information has grown significantly over the course of a few millennia. The traditional methods of content management became insufficient to keep pace with this growth, leading to the emergence of researchers in the early 20th century who focused on addressing this issue. These individuals include Paul Otlet, S.R. Ranganathan, Claude Shannon, and Melvil Dewey, the creator of the widely adopted Dewey Decimal System.[11,12]

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[10] BARKER, Deane. *Web content management: systems, features, and best practices*. Boston: O'Reilly, 2016. ISBN 978-1491908129.

[11] BARKER, Deane. *Web content management: systems, features, and best practices*. Boston: O'Reilly, 2016. ISBN 978-1491908129.

[12] DEWEY, Melvil. A *Classification and Subject Index for Cataloguing and Arranging the Books and Pamphlets of a Library [Dewey Decimal Classification]* [online]. Project Gutenberg, 2004 [quote 2022-10-04]. Available at: https://www.gutenberg.org/files/12513/12513-h/12513-h.htm

The development of the World Wide Web in the early 1990s[13] did not create the need for content management, but rather it accelerated the existing process.

3.2.2 Types of Content Management Systems

Before delving into a specific type of Content Management System, it is beneficial to first discuss the various types of content management systems to gain a broader understanding of the subject.

There are various types of Content Management Systems, including:[14]

1. **Web Content Management (WCM)** is a software suite primarily created for the purpose of creating, editing, managing, and organizing web pages and delivering content. This software package is used for developing websites such as blogs, forums, personal pages, and online stores;

2. **Enterprise Content Management (ECM)** is designed to manage digital documents and other forms of content, as well as their storage, processing, delivery, and/or consumption within an organization;

3. **Digital Asset Management (DAM)** is necessary for collecting, managing, and manipulating various digital assets such as metadata, images, audio, and video for use in other forms of media;

4. **Records management (RM)** encompasses the creation, storage, management, protection, and destruction of records generated as a result of business operations.

3.2.3 Web Content Management System

A Content Management System (CMS) is a system utilized for managing the content of a website, which includes procedures for managing workflow in a collaborative environment. Typically, a Web Content Management System (WCMS) comprises two primary components:[15]

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[13] CONNOLLY, Dan. A Little History of the World Wide Web. *World Wide Web Consortium (W3C)* [online]. 2000 [quote 2022-10-04]. Available at: https://www.w3.org/History.html

[14] BARKER, Deane. *Web content management: systems, features, and best practices.* Boston: O'Reilly, 2016. ISBN 978-1491908129.

[15] KUMAR SRIVASTAV, Manoj Kumar a Asoke NATH. *WEB CONTENT MANAGEMENT SYSTEM* [online]. 2016. International Journal of Innovative Research in Advanced Engineering (IJIRAE), 2016 [quote 2022-10-04]. ISSN 2349-2763. Available at: https://www.researchgate.net/publication/299438184_WEB_CONTENT_MANAGEMENT_SYSTEM

1. **Content Management Application (CMA)** is a web interface that enables users to add, modify, and remove content from a website. These applications are designed to be user-friendly and do not require expertise in web development or knowledge of Hypertext Markup Language (HTML);

2. **Content Delivery Application (CDA)** is responsible for compiling and updating website content. These applications extract content components and utilize meta content to display them to website users.
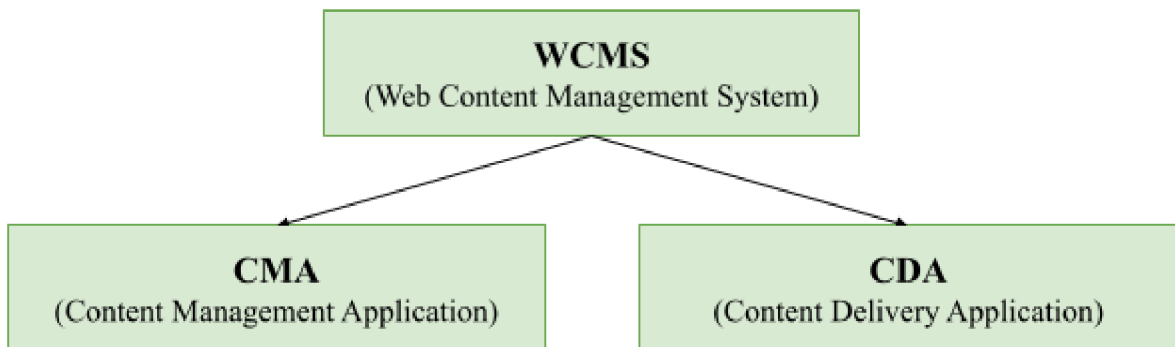

Figure 2: Main components of Web Content Management System (WCMS)

3.2.4   Reasons to use a Content Management System

Content Management Systems (CMS) facilitate the management of content in a more streamlined, efficient, and effective manner. The primary benefits of utilizing a CMS include[16]:

1. **Content control**. A CMS grants users control over their content and maintain a record of its location, structure, accessibility, and relationship to other content through features such as permissions, version control, dependency management, search, and organization;

2. **Content reuse**. Allows for the utilization of content in multiple locations, eliminating the need for duplication and enabling changes to be made in a single location;

3. **Content automation and aggregation**. With content stored in a central location and structured accordingly, management becomes more manageable, and additional

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[16] WHITE, Martin S. The content management handbook. London: Facet Publishing, 2005. ISBN 978-1856045339.

functionality can be implemented to better serve the needs of visitors through filtering, sorting, and various forms of content display;

4. **Editorial efficiency improvement**. The platform used can greatly impact the speed and accuracy of content creation and editing. The effectiveness of editors is enhanced through a user-friendly system, formatting tools, and an intuitive interface for quick editing, workflow management, and collaboration.

3.2.5   Non-open-source e-commerce solutions

- **Shopify** is a user-friendly eCommerce platform that is easy to set up and manage but has limitations on customization options[17];

- **BigCommerce** is a feature-rich eCommerce platform that offers a wide range of customization options, but also has a higher cost and limitations on access to the code[18];

- **Volusion** is a user-friendly eCommerce platform that is easy to set up and manage, but has limitations on customization options[19];

- **3dcart** is a feature-rich eCommerce platform that offers a wide range of customization options, but also has a higher cost and limitations on access to the code[20];

- **Salesforce** Commerce Cloud is a feature-rich eCommerce platform that offers a wide range of customization options, but also has a higher cost and limitations on access to the code[21].

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[17] *Shopify* [online]. [cit. 2023-01-19]. Available at: https://www.shopify.com/
[18] *BigCommerce* [online]. [cit. 2023-01-19]. Available at: https://www.bigcommerce.com/
[19] *Volusion* [online]. [cit. 2023-01-19]. Available at: https://www.volusion.com/
[20] *3dcard* [online]. [cit. 2023-01-19]. Available at: https://www.shift4shop.com/index2.html
[21] *Saleforce* [online]. [cit. 2023-01-19]. Available at: https://www.salesforce.com/eu/

Open-Source E-commerce Solution	Strengths	Weaknesses	Opportunities	Threats
Shopify	User-friendly interface and easy to set up.	Limited customization options and design templates.	A large market for small and medium-sized businesses.	High competition with other eCommerce platforms.
BigCommerce	Rich set of features and customization options.	Higher costs and limitations on access to the code.	The ability to integrate with other enterprise software.	High competition with other eCommerce platforms.
Volusion	User-friendly interface and easy to set up.	Limited customization options and design templates.	Large market for small and medium-sized businesses.	High competition with other eCommerce platforms.
3dcart	Rich set of features and customization options.	Higher costs and limitations on access to the code.	The ability to integrate with other enterprise software.	High competition with other eCommerce platforms.
Salesforce CC	Robust feature set and scalability, Integration with Salesforce CRM.	High costs and requires technical expertise to set up and use.	Potential for growth in the enterprise market and integration with Salesforce products.	High competition with other eCommerce platforms and high costs.

Table 1: SWOT analysis of non-open-source e-commerce platforms

In summary, non-open-source eCommerce solutions like Shopify, BigCommerce, Volusion, 3dcart, and Salesforce Commerce Cloud have strengths such as user-friendly interfaces and rich feature sets, but also have weaknesses like limited customization

options and high costs. These solutions have opportunities in the market, but also have to face the threat of high competition.

3.2.6 Open-source e-commerce solutions

There are several open-source e-commerce solutions available, each with its own set of features and capabilities. Some popular options include:

1. **Magento** is a highly customizable and flexible e-commerce platform that is widely used by small and medium-sized businesses. It offers a wide range of features, including multi-language and multi-currency support, SEO, and integration with various payment gateways and shipping providers[22];

2. **WooCommerce** is a popular e-commerce plugin for the WordPress content management system. It is easy to use and set up and offers a wide range of features such as inventory management, tax options, and integration with various payment gateways[23];

3. **OpenCart** is a lightweight e-commerce platform that is easy to install and set up. It offers a wide range of features, including integration with various payment gateways and shipping providers, multi-language support, and SEO optimization[24];

4. **PrestaShop** is a free and open-source e-commerce solution that offers a wide range of features, including inventory management, tax options, and integration with various payment gateways and shipping providers. It also offers a large number of add-ons and plugins that can be used to extend the functionality of the platform[25];

5. **OsCommerce** is one of the oldest open-source e-commerce solutions and it is still popular for its flexibility and ease of use. It is a self-hosted platform, offering a wide range of features, including inventory management, tax options, and integration with various payment gateways and shipping providers[26].

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[22] *Magneto* [online]. [cit. 2023-01-19]. Available at:
https://business.adobe.com/products/magento/magento-commerce.html
[23] *WooCommerce* [online]. [cit. 2023-01-19]. Available at: https://woocommerce.com/
[24] *OpenCart* [online]. [cit. 2023-01-19]. Available at: https://www.opencart.com/
[25] *Prestashop* [online]. [cit. 2023-01-19]. Available at: https://www.prestashop.com/en
[26] *OsCommerce* [online]. [cit. 2023-01-19]. Available at: https://www.oscommerce.com/

Open-Source E-commerce Solution	Strengths	Weaknesses	Opportunities	Threats
Magento	Customizable and flexible, easy connection to many accounting, financial, and business applications.	Complex to set up and use, very demanding on server (hosting) performance.	Large community and ecosystem for support and additional features.	Limited scalability for large enterprises.
WooCommerce	Easy to set up and use, a large number of WordPress specialists.	Limited scalability, not suitable for larger e-shops.	Large community and ecosystem for support and additional features.	Limited enterprise-level features.
OpenCart	Lightweight and easy to set up, has low demands on server performance.	Limited scalability, and many add-ons are paid.	Large community and ecosystem for support and additional features.	Limited enterprise-level features.
PrestaShop	Wide range of features, and low demands on server performance.	Limited scalability, many add-ons are paid.	Large community and ecosystem for support and additional features.	Limited enterprise-level features.
OsCommerce	Flexibility and ease of use.	Limited scalability.	Large community and ecosystem for support and additional features.	Limited enterprise-level features.

Table 2: SWOT analysis of open-source e-commerce platforms

In summary, open-source eCommerce content management systems, such as Magento, WooCommerce, PrestaShop, OpenCart, and OsCommerce, offer more flexibility and customization options, but require more technical expertise to use. Non-open-source eCommerce content management systems, such as Shopify, BigCommerce, Volusion, 3dcart, and Salesforce Commerce Cloud, have a lower barrier to entry and are easier to use, but have limitations on customization options and access to the code.

Note: It's important to mention that the table is a simplified representation of the solutions and it's a general comparison. Every business has different needs and should evaluate the solutions accordingly.

3.3 Prestashop content management system

3.3.1 Introduction

PrestaShop is a free, open-source e-commerce platform that is widely used for building online stores. The software is written in the PHP programming language and is built on top of the Symfony framework.[27,28] The platform was first released in 2007 by the company Prestashop S.A. and has since then gained popularity among small and medium-sized businesses[29]. According to a study by BuiltWith, as of 2023, Prestashop is used by over 290,000 websites worldwide[30].

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[27] An e-commerce project using Symfony components. Symfony [online]. [cit. 2023-01-16]. Available at: https://symfony.com/projects/prestashop

[28] Core Reference *Prestashop documentation: Coding standards* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/development/coding-standards/#php-code-conventions

[29] From idea to success. In: , Prestashop.com. Prestashop.com [online]. 2021, p. 3-3 [cit. 2023-01-19]. Available at: https://content.prestashop.com/hubfs/Brochures%20Corporate%20PrestaShop%202021/brochure-EN-2021.pdf

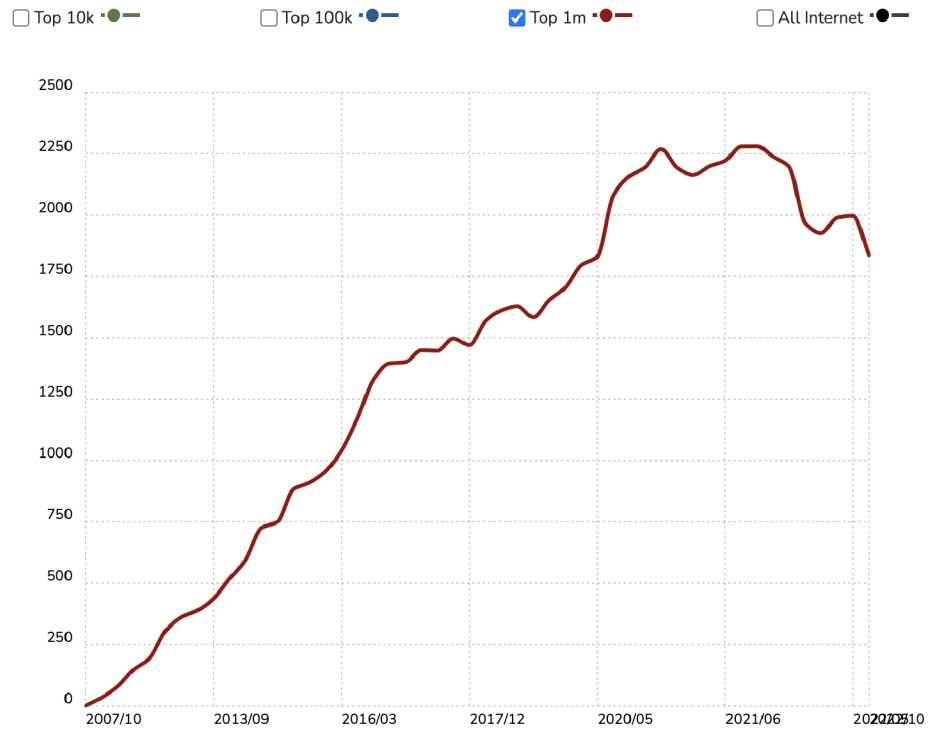[30] PrestaShop Usage Statistics. *Builtwith* [online]. [cit. 2023-01-16]. Available at: https://trends.builtwith.com/shop/PrestaShop

Figure 3: Prestashop usage statistics[31]

Prestashop provides a range of features such as product management, order management, customer management, and marketing tools, which makes it a comprehensive solution for creating an online store[32].

One of the key advantages of Prestashop is its ease of use. The platform has a user-friendly interface, which makes it easy for non-technical users to set up and manage their online store.[33] Additionally, Prestashop is highly customizable, allowing users to tailor the look and feel of their store to match their brand.

Another advantage of Prestashop is its scalability. The platform can handle a large number of products and customers, making it suitable for businesses of all sizes.[34]

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[31] PrestaShop Usage Statistics. *Builtwith* [online]. [cit. 2023-01-16]. Available at: https://trends.builtwith.com/shop/PrestaShop
[32] Basics. *Prestashop documentation: Introduction* [online]. [cit. 2023-01-19]. Available at: https://devdocs.prestashop-project.org/1.7/basics/introduction/
[33] Basics. *Prestashop documentation: Introduction* [online]. [cit. 2023-01-19]. Available at: https://devdocs.prestashop-project.org/1.7/basics/introduction/
[34] Scale. Prestashop documentation [online]. [cit. 2023-01-19]. Available at: https://devdocs.prestashop-project.org/1.7/scale/

Additionally, Prestashop is SEO-friendly, which helps improve the visibility of the store in search engines[35].

In conclusion, Prestashop is a widely used open-source e-commerce platform that provides a comprehensive set of features for creating and managing an online store. Its ease of use, scalability, and SEO-friendliness make it an attractive option for small and medium-sized businesses.

3.3.2   Advantages and features

PrestaShop is an open-source e-commerce content management system (CMS)[36] that offers a number of advantages over other similar platforms. One of the main advantages of PrestaShop is its flexibility and customization capabilities. The platform allows users to easily create and manage an online store with a wide range of features and functionalities, including product management, order processing, and customer management. Additionally, PrestaShop offers a large selection of templates and add-ons that can be used to enhance the design and functionality of a store[37].

Another advantage of PrestaShop is its scalability. The platform is designed to handle large amounts of traffic and can be easily scaled to accommodate growing businesses. This makes it an ideal choice for small businesses as well as large enterprises.

PrestaShop also offers a range of SEO and marketing tools that can help businesses increase their visibility and reach a larger audience. These tools include support for meta tags, sitemaps, and social media integration.[38]

Another advantage of PrestaShop is its user-friendly interface. The platform is designed to be easy to use, even for those with little to no technical experience. This makes it a great option for small business owners who may not have the resources to hire a developer to manage their online store. The platform's backend is easy to navigate and has

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[35] SEO and URLs. *Prestashop documentation: User Guide* [online]. [cit. 2023-01-19]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/configuring-shop/shop-parameters/traffic/seo-and-urls

[36] Prestashop. *Github* [online]. [cit. 2023-02-22]. Available: https://github.com/PrestaShop/PrestaShop

[37] The official marketplace for all PrestaShop modules and templates. *Prestashop* [online]. [cit. 2023-02-22]. Available at: https://addons.prestashop.com/en/

[38] SEO and URLs. *Prestashop documentation: User Guide* [online]. [cit. 2023-01-19]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/configuring-shop/shop-parameters/traffic/seo-and-urls

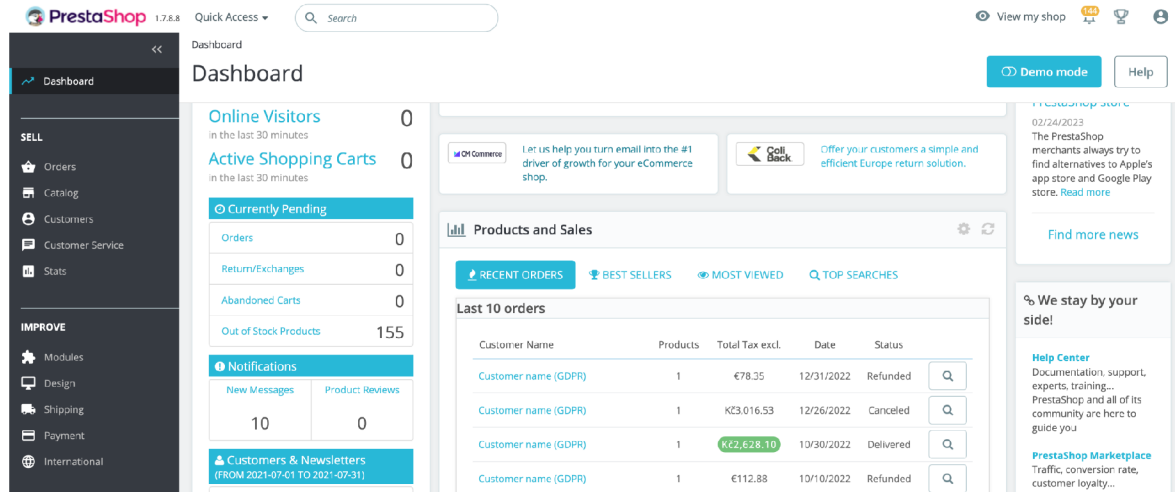a logical structure, making it simple to find and manage important features and functionalities.

Figure 4: Prestashop back office interface[39]

In addition to its ease of use, PrestaShop also offers a high level of security. The platform is PCI compliant, which means that it meets the security standards required for accepting and processing credit card payments. Additionally, it has a built-in security system that includes password encryption, anti-fraud tools, and regular security updates.[40]

PrestaShop also provides a wide range of payment and shipping options, making it easy for businesses to offer their customers a seamless checkout experience. It supports a variety of popular payment gateways, including PayPal and Stripe, and has built-in support for shipping methods such as FedEx, UPS, and DHL[41].

The e-commerce CMS has a strong and active community of developers and users, so businesses can easily find support and resources when needed. The community offers a variety of resources, including forums, documentation, and tutorials, which can help businesses get the most out of the platform.

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[39] Connecting to the PrestaShop back office. *Prestashop documentation: User Guide* [online]. [cit. 2023-01-16]. Available at:
https://docs.prestashop-project.org/1.7-documentation/user-guide/connecting-back-office
[40] PrestaShop Releases. *Github* [online]. [cit. 2023-01-16]. Available at:
https://github.com/PrestaShop/PrestaShop/releases
[41] Shipping modules. *Prestashop addons marktplace* [online]. [cit. 2023-02-22]. Available at:
https://addons.prestashop.com/en/search?id_category=520&search_query=shipping

PrestaShop has built-in functionality to help users comply with the General Data Protection Regulation (GDPR)[42]. The PrestaShop software provides features such as data export, data deletion, and data anonymization, which can help users comply with the various requirements of GDPR. Additionally, the PrestaShop software provides a GDPR compliance module which can be added to the platform to further help users comply with the regulation[43].

It's important to note that even though the software has some built-in functionality to help with GDPR compliance, it's still the responsibility of the website owner or operator to ensure that their website is fully compliant with the regulation. They need to ensure that all necessary steps are taken, such as appointing a DPO, conducting a Data Protection Impact Assessment, Privacy policy, and so on.

In conclusion, PrestaShop is a powerful and flexible e-commerce CMS that offers many features and functionalities, including scalability, customization capabilities, and marketing tools. Its user-friendly interface, high level of security, and wide range of payment and shipping options make it an ideal choice for businesses of all sizes. The active community of developers and users provides support and resources to help businesses get the most out of the platform.

3.3.3 Architecture

From the perspective of a full-stack developer, PrestaShop is a powerful open-source e-commerce platform that can be used to create and manage online stores.

The **Front-end** of PrestaShop is built using HTML, CSS, and JavaScript. It can be customized using themes, modules, and templates. Themes control the overall layout and design of the storefront, while modules add additional functionality to the frontend. Templates are used to create custom pages and layouts[44].

The **Backend** of PrestaShop is built using PHP, and it can be customized using modules. It includes an administration panel, product management, order management, and

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[42] Complying with the GDPR. *Prestashop documentation: User Guide* [online]. [cit. 2023-01-19]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/gdpr
[43] Complying with the GDPR. *Prestashop documentation: User Guide* [online]. [cit. 2023-01-19]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/gdpr
[44] Core Reference. *Prestashop documentation: Architecture* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/development/architecture/introduction/#front-end

customer management. It uses the Model-View-Controller (MVC)[45] architectural pattern, which separates the application logic into three interconnected components: the model, the view, and the controller. Here's what each component means:[46]

- The **Model** represents the underlying logic and functionality of the application, including data processing and database interactions. It contains or describes the data processed by the application and is responsible for managing and ensuring the integrity of that data;

- The **View** is the user interface through which the user interacts. Its primary function is to present the data provided by the model. Additionally, it handles all user interactions such as mouse clicks, selections, and button presses, and forwards them to the controller. The view does not perform any calculations, it only displays the results of the calculations done by the model and interacts with the user.

- The **Controller** is responsible for coordinating the communication between the Model and the View and updating them as necessary. It captures all user interactions and initiates the corresponding actions.
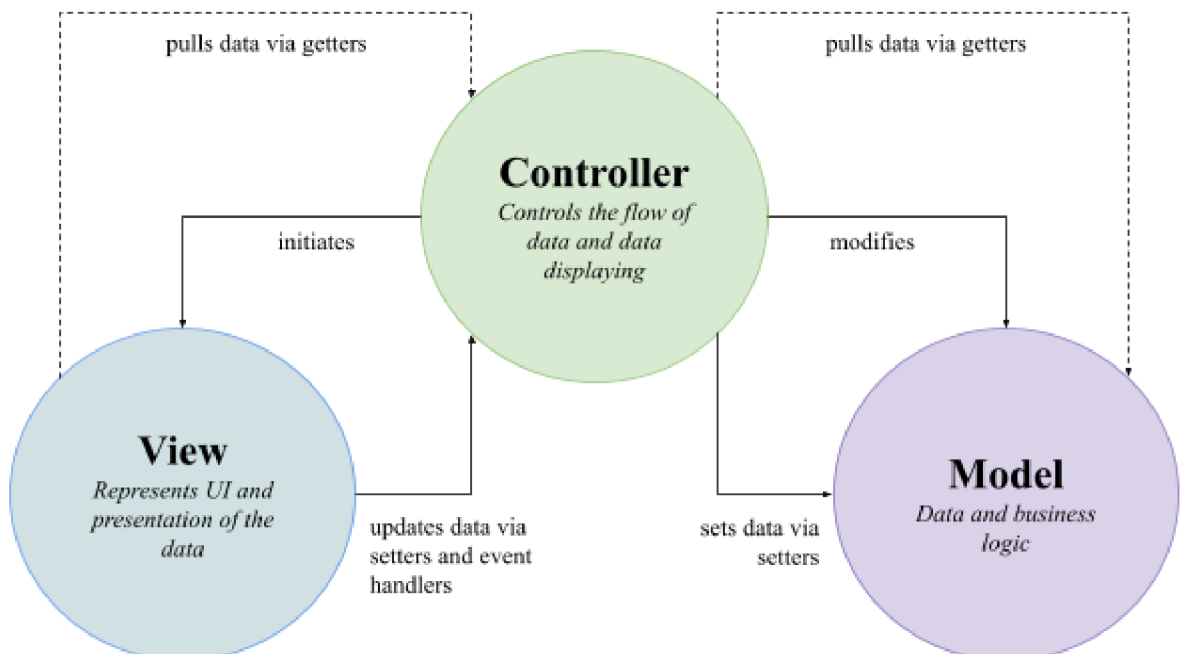

Figure 5: MVC architecture pattern

[45] Modules. *Prestashop documentation: Controllers* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/modules/concepts/controllers/
[46] Basics. *Prestashop documentation: PrestaShop's technical architecture* [online]. [cit. 2023-01-19]. Available at: https://devdocs.prestashop-project.org/1.7/modules/concepts/controllers/

The structure of Prestashop folders includes the following main directories[47]:

- "admin" - contains the files for the back-end or administrative area of the Prestashop store;
- "cache" - stores cached files used by the system to improve performance;
- "classes" - contains the core classes used by the Prestashop system;
- "config" - includes the configuration files for the store;
- "controllers" - has the front-end controllers that handle user requests;
- "docs" - contains documentation for the Prestashop system;
- "img" - stores images used by the store;
- "install" - includes the files for the installation process;
- "localization" - contains language files for the store;
- "modules" - has the modules that add functionality to the store;
- "override" - used for overriding core classes and controllers;
- "pdf" - stores PDF files generated by the store;
- "themes" - has the themes used to customize the appearance of the store;
- "translations" - includes translation files for the store;
- "upload" - stores files uploaded by users;
- "vendor" - contains third-party libraries used by the store;
- "webservice" - includes files for the web service API of the store.

PrestaShop uses the Smarty template engine[48], which is a template engine for PHP, it separates the presentation of the data from the logic of the application. This allows for a clear separation of concerns and makes it easy for designers to work on the frontend without needing to understand the backend code.

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[47] Themes. *Prestashop documentation: Theme organization* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/themes/getting-started/theme-organization/#directory-structure
[48] Core reference. *Prestashop documentation: Smarty Extensions* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/development/components/smarty-extensions/

In terms of development, the platform uses Composer[49] as a dependency manager, and the codebase follows PSR standards,[50] which makes it easy for developers to understand the codebase and contribute to it.

The PrestaShop Core is built using PHP and it is responsible for handling the communication between the frontend and the backend, it also includes the business logic of the system such as the shopping cart and the checkout process. It uses the Object-Relational Mapping (ORM)[51] pattern to interact with the database, which allows it to work with the database using objects rather than SQL queries.
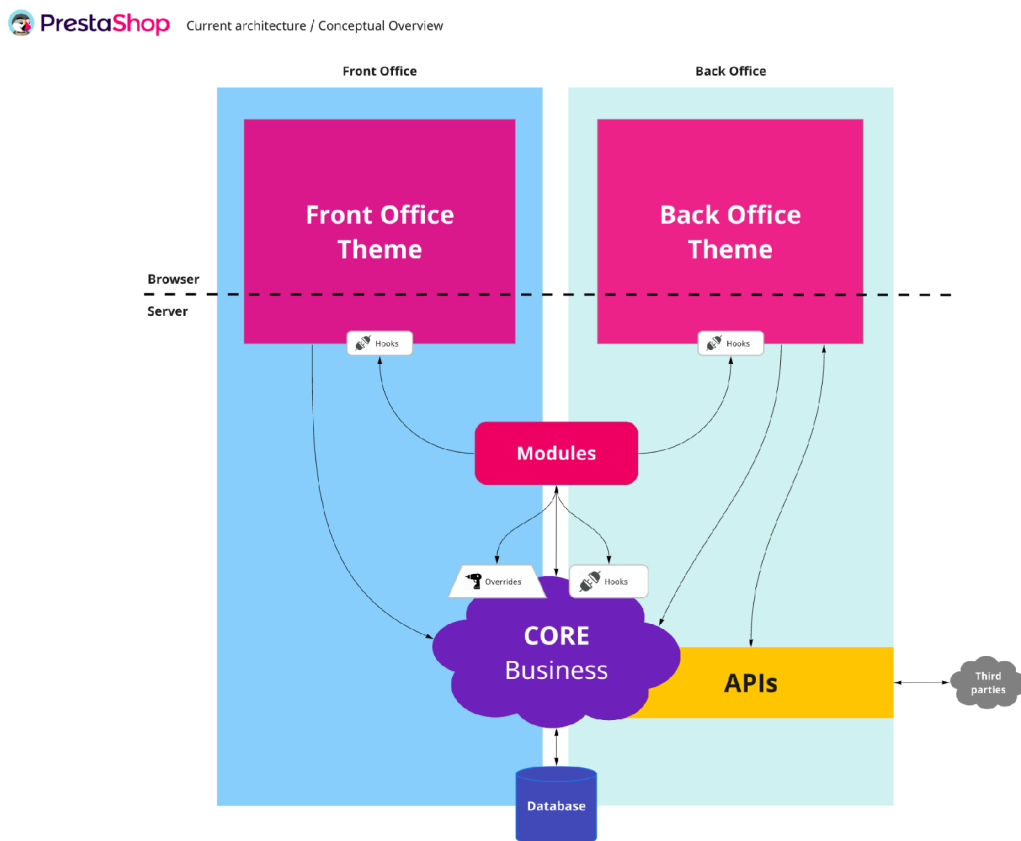
Figure 6: Basic overview of PrestaShop 1.7's architecture. Conceptual overview[52]

[49] Modules. *Prestashop documentation: Composer* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/modules/concepts/composer/

[50] Core Reference *Prestashop documentation: Coding standards* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/development/coding-standards/#php-code-conventions

[51] Modules. *Prestashop documentation: Hooks* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/modules/concepts/hooks/use-hooks-on-modern-pages/

[52] Core Reference. *Prestashop documentation: Architecture* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/development/architecture/introduction/

The front office theme displays data to customers, the back office theme displays data to store owners, modules add functionality, the core business handles the logic of the store, the database stores data and API allows external systems to interact with it:

- In Prestashop, the **front office theme** is responsible for displaying the website to customers. It retrieves data from the back office theme, modules, and core business, and displays it to the user in the website's layout[53];

- The **back office theme** is responsible for displaying the administrative interface of the website, where store owners can manage their products, orders, and other aspects of their online store[54];

- **Modules** are additional functionalities that can be added to the website, such as payment gateways, shipping methods, and more. They interact with the core business to add or modify functionality[55];

- The **core business** is the heart of the Prestashop system, it handles all the logic of the store, such as products, orders, and customer management[56];

- Data is stored in a **database**, and the Prestashop API allows external systems to interact with the data stored in the database and core business[57].

In Prestashop, **hooks and overrides** are used to modify the behavior and appearance of the website without modifying the core files of the system:

- **Hooks** are a way to insert custom code into specific points of the system's execution flow, called "hook points." Hooks allow developers to add or modify functionality without modifying the core files of the system. For example, a

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[53] Browsing the front office. *Prestashop documentation: User Guide* [online]. [cit. 2023-01-19]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/browsing-front-office

[54] Connecting to the PrestaShop back office. *Prestashop documentation: User Guide* [online]. [cit. 2023-01-16]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/connecting-back-office

[55] Modules Selection. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-17]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/managing-modules/modules-and-services/modules-selection

[56] Discovering the Administration Area. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-17]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/discovering-administration-area

[57] Core reference. *Prestashop documentation: Maintaining the database* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/development/database/structure/

developer could use a hook to add a custom button to the product page or to display a custom message on the checkout page[58];

- **Overrides**, on the other hand, are a way to replace or extend the functionality of existing classes and controllers in the system. This allows developers to modify the behavior of the website without modifying the core files directly. For example, a developer could use an override to change the way product prices are calculated or to add custom validation to the checkout process[59].

In summary, hooks are used to insert custom code into specific points of the system's execution flow, while overrides are used to replace or extend the functionality of existing classes and controllers. Both of these features allow developers to modify the behavior and appearance of the website without modifying the core files of the system.

3.3.4 Themes

Based on the Prestashop 1.7 official documentation, themes are used to customize the appearance of an online store. They can be installed and configured through the back-office, under the "Design" menu[60].

Themes include the templates, CSS, and JavaScript that define the layout and style of a store. Prestashop 1.7 comes with a default theme called "Classic", but additional themes can be purchased or downloaded from the Addons marketplace[61].

The Prestashop 1.7 official documentation provides a detailed guide on how to install, configure and customize a theme. The documentation covers the different types of themes available, such as the core themes that come with Prestashop and the themes available on the Addons marketplace in addition to downloading themes from the Prestashop Addons marketplace[62]. They can also be obtained from other sources such as third-party websites.

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[58] Modules. *Prestashop documentation: Hooks* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/modules/concepts/hooks/
[59] Modules. *Prestashop documentation: Overrides* [online]. [cit. 2023-01-17]. Available at: https://devdocs.prestashop-project.org/1.7/modules/concepts/overrides/
[60] Customizing your store design. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-19]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/customizing-store-design
[61] Theme and logo. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-19]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/customizing-store-design/theme-and-logo
[62] The official marketplace for all PrestaShop modules and templates. *Prestashop* [online]. [cit. 2023-02-22]. Available at: https://addons.prestashop.com/en/

The documentation also provides information on how to create a theme[63], which can be used to customize a store to meet specific needs. The documentation covers different topics related to the development of themes, such as the structure of a theme, the available templates, and the theme's settings.

Additionally, the documentation also provides information on how to use the Web Service to manage themes, which can be helpful for automating the management of the themes.

3.3.5   Modules

According to the Prestashop 1.7 official documentation, modules are add-ons that can be used to add new features or functionality to an online store. They can be installed and configured through the back-office, under the "Modules" menu[64].

Modules can be used to add new payment methods, improve the checkout process, add new shipping options, and much more. There are different types of modules available, such as payment modules, shipping modules, or modules that add new features to the front or back office.

The Prestashop 1.7 official documentation provides a detailed guide on how to install, configure and manage the modules. The documentation covers the different types of modules available, such as the core modules that come with Prestashop and the modules available on the Addons marketplace. Modules can also be obtained from other sources such as third-party websites

The documentation also provides information[65] on how to create modules, which can be used to customize a store to meet specific needs. The documentation covers different topics related to the development of modules, such as the structure of a module, the available hooks, and the module's settings.

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[63] Creating a child theme. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-19]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/customizing-store-design/theme-and-logo#themeandlogo-creatingachildtheme
[64] Modules Selection. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-17]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/managing-modules/modules-and-services/modules-selection
[65] Modules. *Prestashop documentation: Creating your first module* [online]. [cit. 2023-02-17]. Available at: https://devdocs.prestashop-project.org/1.7/modules/creation/tutorial/

Additionally, the documentation also provides[66] information on how to use the Web Service to manage modules, which can be helpful for automating the management of the modules.

3.3.6 Shipping

Based on the Prestashop 1.7 official documentation, delivery refers to the process of shipping products to customers. Prestashop supports multiple carriers, which are companies that handle the delivery of products, such as FedEx, UPS, or the postal service. Each carrier can have multiple shipping methods, such as standard or express delivery.

To set up delivery in Prestashop, we need to configure the carriers and shipping methods in the back-office, under the "Carriers" menu[67]. It's possible to create new carriers and shipping methods, edit existing ones, and set up shipping costs based on weight, price, or quantity.

The documentation provides[68] a detailed guide on how to create a carrier and configure it by setting the shipping range, weight and price, and handling charges. Additionally, it's possible to set up shipping zones, which allow to define of different shipping costs based on the customer's location.

It's also possible to set up the delivery options, such as the availability of delivery on certain days or at certain times. We are able to set up the carrier's tracking URL and set up a template for the tracking information to be sent to the customers via email.

Another feature provided by Prestashop is the ability to manage returns and refunds[69]. It's possible to set up return policies, create return slips, and manage the return process.

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[66] Webservice API. *Prestashop documentation: Getting started* [online]. [cit. 2023-02-17]. Available at: https://devdocs.prestashop-project.org/1.7/webservice/getting-started/

[67] Managing shipping. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/managing-shipping

[68] Carriers. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/managing-shipping/carriers

[69] Creating returns and refunds. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/selling/managing-orders/order-page-management/creating-returns-and-refunds

3.3.7 Payment

According to the Prestashop 1.7 official documentation, payment refers to the process of collecting payments from customers for the products they have ordered. Prestashop supports a wide variety of payment methods, such as credit cards, PayPal, bank transfers, and cash on delivery[70].

To set up payment in Prestashop, it is possible to configure the payment methods in the back-office, under the "Payments" menu. It's possible to enable or disable different payment methods, configure settings, and set up fees and restrictions. Additionally, we can install additional payment modules from the Addons marketplace[71].

The documentation provides a detailed guide on how to add, configure and manage the different payment methods available in the back office. For example, we are able to configure the different credit card types and set up fraud detection systems[72].

Prestashop also supports different types of payments such as off-line payments, like cash on delivery or bank transfer. It is possible to configure the order statuses, fees, and restrictions for each payment method, as well as set up the different currencies and languages for each payment method[73].

Overall, the Prestashop 1.7 official documentation provides a comprehensive guide on how to configure and manage the payment options for an online store. It covers all the aspects of payments, including payment methods, order statuses, fees, and fraud detection. Additionally, it provides information on how to customize the payment options available in the front office, which can improve the user experience for customers.

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[70] Managing Payments. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/managing-payments
[71] Payment modules. *Prestashop addons marktplace* [online]. [cit. 2023-02-18]. Available at: https://addons.prestashop.com/en/search?id_category=0&search_query=payment%20gateway
[72] Managing Payments. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/managing-payments
[73] Payment Preferences. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/managing-payments/payment-preferences

3.3.8 Order statuses

An order status refers to the current state of the order. Prestashop supports several different order statuses, including "Payment accepted", "Payment error", "Awaiting bank wire payment", "Awaiting cheque payment", etc[74].

The order statuses can be configured in the back-office, under the "Orders" menu. It is possible to create new order statuses, edit existing ones, and assign them to different order states, such as "Payment accepted" or "Payment error"[75].

The official documentation provides a detailed guide on how to create and manage order statuses in the back-office. It covers how to add, edit and delete order statuses, how to assign them to the different order states, and how to use the Web Service to manage the order statuses.

The documentation also provides information on how to customize the order statuses available in the front-office, such as the order confirmation page and the order history page.

Additionally, order statuses are also closely related to the payment and shipping process, as they allow tracking and managing the different steps of the order. It's possible to configure the order statuses to change automatically based on the payment and shipping methods selected by the customer.

3.3.9 Email and notification system

The email system is used to send automated emails to customers and administrators. These emails can include order confirmations, shipping confirmations, and account creation confirmations.

The email system in Prestashop can be configured in the back-office, under the "Emails" menu. It's possible can customize the templates of the different emails and

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[74] Statuses. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/configuring-shop/shop-parameters/order-settings/statuses

[75] Order page management. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/selling/managing-orders/order-page-management

choose which emails to send and when. Additionally, we are able to configure the SMTP settings to send emails via an external server[76].

The official documentation provides a detailed guide on how to configure the email system, including how to customize the templates of different emails such as order confirmation, shipping confirmation, and account creation. It also covers how to configure the SMTP settings to use an external email server.

Additionally, the documentation also provides information on how to customize the email options available in the front-office, such as the email address and the sender's name[77].

3.3.10 Search engine optimization

Prestashop is an e-commerce platform that features a built-in Search Engine Optimization (SEO) system[78]. This system allows users to optimize their online store for search engines, with the goal of increasing visibility and driving more traffic to their website. The built-in SEO system includes a variety of tools and features that allow users to optimize their store's content, structure, and technical elements.

One of the key features of the Prestashop SEO system is the ability to easily edit and optimize page titles, meta descriptions, and URLs. This allows users to ensure that their store's pages are accurately represented in search engine results and to include relevant keywords for better visibility.

Additionally, the Prestashop SEO system includes tools for monitoring and analyzing website traffic, including the ability to track search engine ranking and identify which keywords are driving traffic to the site. This information can be used to make informed

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[76] Email. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/configuring-shop/advanced-parameters/email

[77] Email theme. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/improving-shop/customizing-store-design/email-theme#emailtheme-emailthemes

[78] SEO and URLs. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/configuring-shop/shop-parameters/traffic/seo-and-urls

decisions about optimizing the store's content and structure to improve visibility and drive more traffic[79].

The Prestashop SEO system also includes technical optimization features, such as the ability to generate an XML sitemap[80] and verify website ownership with search engines. These tools help ensure that the store's pages are indexed and correctly represented in search engine results.

Overall, the Prestashop SEO system is a comprehensive and user-friendly solution for e-commerce store owners looking to improve their store's visibility and drive more traffic through search engines.

3.3.11 Performance

In Prestashop, a caching system is implemented to improve website performance and reduce server load. The caching system stores frequently accessed data in the cache memory to serve it faster to users, without having to retrieve it from the database every time.

When a user accesses a page on a Prestashop website, the caching system first checks if the page is already stored in the cache memory. If the page is found, it is served directly to the user, without any additional processing. However, if the page is not in the cache memory, the caching system retrieves the data from the database and stores it in the cache memory for future use.

Prestashop includes several caching mechanisms to improve website performance and reduce server load. These caching mechanisms work by storing frequently accessed data in cache memory, which allows for faster retrieval of data without the need to query the database every time. The following performance mechanisms are available in Prestashop[81]:

- **Caching mechanisms**: Prestashop offers several caching mechanisms, such as page cache, server cache, client cache, and database query cache, that can be

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[79] Search Engines. *Prestashop documentation: User Guide* [online]. [cit. 2023-02-18]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/configuring-shop/shop-parameters/traffic/search-engines

[80] Google sitemap module. *Prestashop addons marktplace* [online]. [cit. 2023-02-22]. Available at: https://addons.prestashop.com/en/seo-natural-search-engine-optimization/7501-google-sitemap.html

[81] Perfomance. *Prestashop documentation: User Guide* [online]. [cit. 2023-03-01]. Available at: https://docs.prestashop-project.org/1.7-documentation/user-guide/configuring-shop/advanced-parameters/performance

utilized to store frequently accessed data in memory, resulting in reduced server load and improved website performance;

- **CCC (Combine, Compress, and Cache) options**: These options allow the system to combine and compress JavaScript and CSS files and cache them in memory, resulting in faster page load times and reduced bandwidth usage;
- **Media servers**: Prestashop provides the option to distribute static files, such as images, across multiple media servers to improve website performance and reduce server load;
- **Smarty cache**: This cache stores compiled templates in memory, allowing for faster rendering of pages and reduced server load.

Overall, the mechanisms in Prestashop are essential tools for optimizing website performance and delivering a fast and responsive user experience. By storing frequently accessed data in memory, the system can quickly serve data to users without the need to query the database every time, resulting in improved website performance and reduced server load.

3.4 Web hosting

A web hosting service is a type of service that allows individuals and organizations to make their websites accessible on the internet. The hosting service provides the necessary technology and support for the website to be viewed on the World Wide Web[82].

3.4.1 Introduction

When a website is created, the files and data associated with the site need to be stored on a server[83]. A hosting service provides this server space and the associated technology to make the website accessible to internet users. The hosting service also provides an internet connection, so that when a user types in the website's URL or clicks a link to the site, the server can send the requested data to the user's device.

Having a hosting service is crucial for any website that needs to be publicly accessible, as it allows the website to be viewed by anyone with an internet connection.

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[82] POLLOCK, Peter. *Web hosting for dummies*. Hoboken, NJ: John Wiley & Sons, [2013]. --For dummies. ISBN 978-1118540572.
[83] *Web mechanics: What is a web server* [online]. MDN [cit. 2023-02-22]. Available at:
https://developer.mozilla.org/en-US/docs/Learn/Common_questions/Web_mechanics/What_is_a_web_server

Without hosting, the website would only be accessible on the computer where it was created and stored[84].
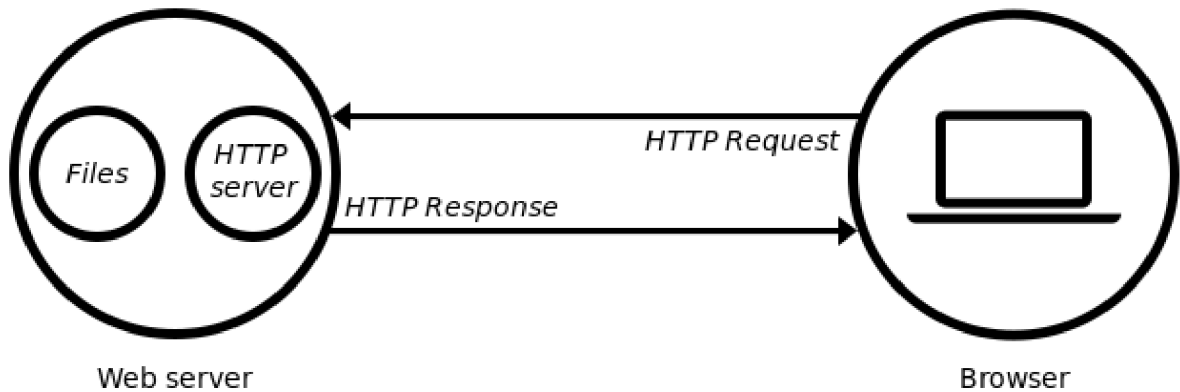
Figure 7: Communication with web server[85]

Additionally, hosting services can provide various features and tools such as email hosting, database management, and security measures to enhance website functionality, performance, and security[86]. This can include backups, server-side caching, and content delivery networks, which can help improve website performance and reduce the risk of data loss[87].

In summary, hosting is a necessary service for making a website accessible on the internet, by providing server space and an internet connection to store and serve the website's files and data. Hosting services also provide various features and tools to enhance website functionality, performance, and security.

3.4.2   Shared hosting and Virtual Private Server (VPS)

Shared hosting and Virtual Private Server (VPS) hosting are both types of web hosting services, but they differ in terms of the resources and level of control they provide to users.

Shared hosting is a cost-effective solution for small to medium-sized websites. In this type of hosting, multiple websites are hosted on a single server, and the server resources

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[84] *Special-Use Domain Names: Domain Name Reservation Considerations for "localhost."* [online]. IETF [cit. 2023-02-22]. Available at: https://www.rfc-editor.org/rfc/rfc6761#section-6.3

[85] *Web mechanics: What is a web server* [online]. MDN [cit. 2023-02-22]. Available at: https://developer.mozilla.org/en-US/docs/Learn/Common_questions/Web_mechanics/What_is_a_web_server#summary

[86] *Amazon Web Services* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/

[87] POLLOCK, Peter. *Web hosting for dummies*. Hoboken, NJ: John Wiley & Sons, [2013]. --For dummies. ISBN 978-1118540572.

are shared among all the websites[88]. The server resources include CPU, RAM, storage, and bandwidth. Shared hosting is ideal for personal websites, small blogs, and small e-commerce sites. However, since the resources are shared, there may be limitations on the amount of traffic a website can handle and the level of customization that can be done.

On the other hand, VPS hosting provides a higher level of control and resources than shared hosting. In VPS hosting, virtualization technology is used to create multiple virtual servers on a single physical server. Each virtual server acts as a separate server, and the user has full control over the virtual server's resources, including CPU, RAM, storage, and bandwidth[89]. VPS hosting is ideal for medium to large-sized websites, such as e-commerce sites, forums, and blogs. The user has more control over the server resources, and the website can handle more traffic.ll to medium-sized websites, while VPS hosting provides more control and resources for medium to large-sized websites[90].

In summary, shared hosting is an affordable and suitable option for suitable for medium to large-sized websites such as e-commerce sites, forums, and blogs.

Hosting type	Strengths	Weaknesses	Opportunities	Threats
Shared hosting	Low-cost.	Limited resources and control.	Suitable for small and medium-sized businesses and personal websites	Limited scalability and reliability.
VPS	Greater control and customization.	Higher cost and technical expertise are required.	Suitable for larger businesses and websites with high traffic and resource requirements.	Possible security vulnerabilities if not properly configured and maintained.

Table 3: SWOT analysis of shared and VPS web hostings

[88] *What is Shared Hosting and What you need to know* [online]. [cit. 2023-02-22]. Available at: https://www.academia.edu/34706811/What_is_Shared_Hosting_and_What_you_need_to_know
[89] KARAYIANNIS, Christos. *Linux Web Server Development*. CreateSpace [2015]. ISBN 978-1511993135.
[90] POLLOCK, Peter. *Web hosting for dummies*. Hoboken, NJ: John Wiley & Sons, [2013]. --For dummies. ISBN 978-1118540572.

3.4.3   Amazon Web Services (AWS)

Amazon Web Services (AWS) is a collection of remote computing services (also called web services) that make up a cloud computing platform, offered by Amazon.com. These services operate from 31 geographical regions[91] across the world. They are designed to make web-scale cloud computing easier for developers.

AWS provides a wide range of services that can be used to build and run websites, including:

- **Elastic Compute Cloud (EC2)** which allows users to rent virtual machines on which to run their own computer applications[92];
- **Simple Storage Service (S3)** which provides object storage through a web service interface[93];
- **CloudFront** which is a web service that speeds up distribution of static and dynamic web content, such as HTML, CSS, JavaScript, and images[94];
- **Route 53** which is a domain name system (DNS) service that routes end users to Internet applications by translating domain names into IP addresses[95].

Benefits of using AWS for websites include[96]:

- **Scalability**: AWS allows for the easy scaling of resources, such as storage and computing power, to accommodate changes in traffic to a website;
- **High availability**: AWS offers a range of services that can be used to create a highly available website, including load balancers and auto-scaling groups;
- **Cost-effectiveness**: Using AWS can be cost-effective as users only pay for the resources they use, rather than having to invest in expensive hardware;
- **Security**: AWS provides a range of security services, including identity and access management, to help secure a website and protect sensitive data;

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[91] *AWS Global Infrastructure* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/about-aws/global-infrastructure/

[92] *Amazon EC2* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/ec2/

[93] *Amazon S3* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/s3/

[94] *Amazon CloudFront* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/cloudfront/

[95] *Amazon Route 53* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/route53/

[96] *Benefits at a Glance* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/application-hosting/benefits/

- **Global reach**: With 31 geographical regions, AWS allows users to easily deploy their websites globally and provide a fast and consistent experience to users worldwide.

Overall, using Amazon Web Services for websites can provide cost-effective, scalable, secure, global reach, and high availability, making it a popular choice for website developers and businesses.

3.4.4 Amazon Lightsail

Amazon Lightsail is a fully managed web hosting platform that makes it easy to set up, deploy, and manage websites and web applications. It is a simplified version of Amazon Web Services (AWS) that is specifically tailored for small businesses, developers, and digital agencies.

Benefits of using Amazon Lightsail for web sites include[97]:

- **Simplicity**: Lightsail offers a simple and easy-to-use interface that makes it easy to set up and manage web sites, without the need for deep technical expertise;
- **Performance**: Lightsail provides high performance web hosting that is optimized for web sites and web applications;
- **Security**: Lightsail includes security features such as automatic backups, SSL certificates, and a firewall, to help keep web sites secure;
- **Scalability**: Lightsail allows for easy scaling of resources, such as storage and computing power, to accommodate changes in traffic to a web site;
- **Cost-effectiveness**: Lightsail offers a pay-as-you-go pricing model that is designed to be cost-effective for small businesses and individuals;
- **Global reach**: Lightsail is available in multiple regions worldwide, allowing users to easily deploy their web sites globally and provide a fast and consistent experience to users worldwide;
- **Managed Services**: Lightsail offers managed services like database, load balancer, and email services which are fully managed by Amazon and eliminates the need for additional administration and management;

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[97] *Amazon Lightsail features* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/lightsail/features/

41

- **Built-in monitoring**: Lightsail includes built-in monitoring and performance analysis tools that can help users identify and troubleshoot issues with their web sites.

Overall, Amazon Lightsail is an easy-to-use, cost-effective, and fully managed web hosting platform that is optimized for websites and web applications. It is tailored for small businesses and developers who want to quickly set up and manage websites, without the need for deep technical expertise.

3.4.5 Operating systems on Amazon Lightsail

Amazon Lightsail offers the following operating systems[98]:

- **Ubuntu**: A popular open-source operating system based on the Debian Linux distribution[99];
- **Debian**: A free operating system based on the Linux kernel[100];
- **CentOS**: A popular open-source operating system based on the Red Hat Enterprise Linux distribution[101];
- **Fedora**: A free, open-source operating system sponsored by Red Hat[102];
- **Windows Server**: A server operating system developed by Microsoft[103].

Prestashop is a PHP-based e-commerce platform that is compatible with most popular operating systems, including Linux and Windows. However, the recommended operating system for running Prestashop is Linux, specifically, a LAMP[104] (Linux, Apache, MySQL, PHP) stack.

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[98] *Operating system & application templates* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/lightsail/features/#Operating_system_.26_application_templates
[99] *Ubuntu community: Debian* [online]. Ubuntu [cit. 2023-02-22]. Available at: https://ubuntu.com/community/governance/debian
[100] *About Debian* [online]. Debian [cit. 2023-02-22]. Available at: https://www.debian.org/intro/about
[101] *What is CentosOS* [online]. Red Hat [cit. 2023-02-22]. Available at: https://www.redhat.com/en/topics/linux/what-is-centos
[102] *The Fedora Project* [online]. Red Hat [cit. 2023-02-22]. Available at: https://www.redhat.com/en/open-source/articles/fedora-project-open-source-evolved
[103] *Investing in your success with Windows Server* [online]. Microsoft [cit. 2023-02-22]. Available at: https://www.microsoft.com/en-us/windows-server
[104] U.V., Ramana a Tadinada PRABHAKAR. *Some experiments with the performance of LAMP architecture* [online]. 2005, 916-920 [cit. 2023-02-22]. Available at: doi:10.1109/CIT.2005.169

This is because Linux is an open-source operating system[105] that is known for its stability, security, and flexibility. It also has a large community[106] of developers who contribute to its development, making it a popular choice for running web-based applications like Prestashop.

In terms of specific Linux distributions, the most commonly used and recommended distributions for Prestashop are Ubuntu, Debian, and CentOS. These distributions are known for their stability, security, and compatibility with the LAMP stack, making them ideal for running Prestashop.

In summary, while Prestashop can run on both Linux and Windows operating systems, it is recommended to use Linux, specifically a LAMP stack, for stability, security, and compatibility reasons. The most commonly used and recommended Linux distributions for Prestashop are Ubuntu, Debian, and CentOS.

3.4.6   LAMP and LEMP stacks

LAMP and LEMP are two popular open-source software stacks used for building and deploying dynamic web-based applications.

LAMP[107] stands for Linux, Apache, MySQL, and PHP. It is a popular software stack that includes the Linux operating system, Apache web server, MySQL database server, and PHP scripting language[108]. The LAMP stack is commonly used for building dynamic web-based applications, such as blogs, forums, and e-commerce websites[109].

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[105] *Why is Linux?* [online]. Red Hat [cit. 2023-02-22]. Available at:
https://www.redhat.com/en/topics/linux/what-is-linux
[106] *Linux forum* [online]. Linux.org [cit. 2023-02-22]. Available at: https://www.linux.org/forums/
[107] *What is LAMP stack?* [online]. IBM [cit. 2023-02-22]. Available at:
https://www.ibm.com/topics/lamp-stack
[108] U.V., Ramana a Tadinada PRABHAKAR. *Some experiments with the performance of LAMP architecture* [online]. 2005, 916-920 [cit. 2023-02-22]. Available at:10.1109/CIT.2005.169
[109] MCCLURE, Steve. *How to build a LAMP project: Home Automation / Home Security*. CreateSpace Independent Publishing Platform, [2015]. ISBN 978-1515215943.

Name	Description
Strengths	• Widely used and well-established, with a large community of developers and users; • Has a rich set of features and functionalities, including support for a variety of programming languages and databases; • Offers good compatibility with different operating systems and web hosting environments; • Has a robust security architecture and a large number of plugins and modules for enhancing security.
Weaknesses	• Can be slow and resource-intensive, especially under heavy traffic conditions; • Has a complex configuration process, making it challenging for novice users; • Can have stability issues, such as crashes and server downtime.
Opportunities	• Open-source nature allows for continuous improvement and innovation by the community; • Can be easily integrated with other open-source tools and technologies; • Can be customized to meet the specific needs of individual projects.
Threats	• Can be vulnerable to security threats, especially if not configured and maintained properly; • Competition from other web server solutions, such as Nginx and IIS; • Dependence on third-party plugins and modules for certain features and functionalities, which can impact reliability and security.

Table 4: SWOT analysis of LAMP web stack

LEMP, on the other hand, stands for Linux, Nginx, MySQL, and PHP. Like the LAMP stack, it includes the Linux operating system, MySQL database server, and PHP scripting language. However, instead of Apache, it uses Nginx[110] (pronounced "engine X") as the web server. Nginx is a popular alternative to Apache, known for its performance and scalability, especially in high-traffic environments.

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[110] Kunda, Douglas and Chihana, Sipiwe and Muwanei, Sinyinda. *Web Server Performance of Apache and Nginx: A Systematic Literature Review* [online]. 2017, 43-52 [cit. 2023-02-22]. Available at: https://www.researchgate.net/publication/329118749_Web_Server_Performance_of_Apache_and_Nginx_A_Systematic_Literature_Review

Name	Description
Strengths	- High performance and scalability, making it well-suited for high-traffic environments; - Has a lightweight and streamlined configuration, making it easier for novice users to set up; - Has a strong security architecture, with features for protecting against common web-based threats; - Supports a variety of programming languages and databases, making it flexible for different types of projects.
Weaknesses	- Has a smaller community of developers and users compared to the LAMP stack, making it more challenging to find support and resources; - Can have compatibility issues with certain operating systems and hosting environments; - May have limited support for certain types of web-based applications, such as dynamic content management systems.
Opportunities	- Continuously growing popularity and adoption, especially in high-traffic environments; - Potential for further innovation and improvement, as the community continues to grow; - Can be integrated with other open-source tools and technologies.
Threats	- Competition from other web servers solutions, such as Apache and IIS; - Dependence on third-party plugins and modules for certain features and functionalities, which can impact reliability and security; - Can be vulnerable to security threats, especially if not configured and maintained properly.

Table 5: SWOT analysis of LEMP web stack

In summary, the main difference between the LAMP and LEMP stacks is the web server software. LAMP uses Apache, while LEMP uses Nginx. Both stacks are widely used for building and deploying dynamic web-based applications, and the choice between them often comes down to personal preference and the specific requirements of the project.

3.5 Content Delivery Network (CDN)

3.5.1 Introduction

A Content Delivery Network (CDN) is a system of distributed servers that are used to deliver web content to users based on their geographic location[111]. The content is cached on servers that are strategically placed in multiple locations around the world so that users can access it from a server that is physically close to them. This helps to improve the speed and performance of websites and applications.

Benefits of using a CDN for websites include[112]:

- **Improved performance**: CDNs help to improve the speed and performance of websites by caching content on servers that are physically close to users. This reduces the distance that data needs to travel, which results in faster load times;

- **Increased scalability**: CDNs can handle large amounts of traffic and can easily scale to accommodate changes in traffic to a website;

- **Increased availability**: CDNs are designed to be highly available and can help to ensure that web sites are always accessible to users, even in the event of a server failure or other issue;

- **Improved security**: CDNs can help to improve the security of web sites by providing features such as SSL certificates, DDoS protection, and web application firewalls;

- **Reduced costs**: CDNs can help to reduce the cost of delivering web content by reducing the load on web servers and by reducing the bandwidth costs associated with delivering content;

- **Global reach**: CDNs allow users to easily deliver web content globally and provide a fast and consistent experience to users worldwide;

- **Improved SEO**: CDN also help to improve the SEO of the website by reducing the load time and improving the user experience.

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[111] HELD, Gilbert. *A Practical Guide to Content Delivery Networks. 2nd edition.* London: CRC Press, 2010. ISBN 978-1439835883.
[112] HELD, Gilbert. *A Practical Guide to Content Delivery Networks. 2nd edition.* London: CRC Press, 2010. ISBN 978-1439835883.

Overall, a Content Delivery Network (CDN) is a system of distributed servers that can help to improve the speed, performance, scalability, availability, security, cost-effectiveness, and global reach of websites[113]. They are widely used by website owners, developers, and businesses to deliver web content to users in an efficient and reliable way.

Name	Description
Strengths	**Improved performance**: CDNs help to improve the speed and performance of web sites by caching content on servers that are physically close to users, reducing the distance that data needs to travel and resulting in faster load times; **Increased scalability**: CDNs can handle large amounts of traffic and can easily scale to accommodate changes in traffic to a web site; **Increased availability**: CDNs are designed to be highly available and can help to ensure that web sites are always accessible to users, even in the event of a server failure or other issue; **Improved security**: CDNs can help to improve the security of web sites by providing features such as SSL certificates, DDoS protection, and web application firewalls; **Reduced costs**: CDNs can help to reduce the cost of delivering web content by reducing the load on web servers and by reducing the bandwidth costs associated with delivering content; **Global reach**: CDNs allow users to easily deliver web content globally and provide a fast and consistent experience to users worldwide.
Weaknesses	**Complexity**: CDNs can be complex to set up and manage, and may require specialized knowledge and expertise; **Dependence on third-party**: CDNs are dependent on third-party providers, which can create risks in terms of reliability and security; **Limited control**: CDNs can limit the level of control that website owners have over the delivery of their content, which can be a drawback for some organizations.
Opportunities	**Growing demand**: The demand for CDNs is growing as more and more organizations move their content and applications to the cloud; **Advancement of the technology**: Advancements in technology are providing new opportunities for CDN providers to improve

[113] HELD, Gilbert. *A Practical Guide to Content Delivery Networks. 2nd edition.* London: CRC Press, 2010. ISBN 978-1439835883.

	their services and offer new features;
	• **Diversification**: CDN providers can diversify their offerings by expanding into other markets, such as cloud computing and security.
Threats	• **Competition**: There is a lot of competition among CDN providers, which can make it difficult for new providers to enter the market; • **Substitution**: Other technologies, such as edge computing, may substitute CDNs in the future; • **Changes in regulations**: Changes in regulations or policies regarding data privacy and security can have an impact on CDN providers' operations.

Table 6: SWOT analysis of Content Delivery Networks (CDN)

Overall, while CDN services have many strengths that can improve website performance and security, they also have weaknesses such as complexity and dependence on third-party providers. CDN providers have opportunities to grow and diversify their offerings and to adapt to the advancements in technology, but they also face competition and the possibility of being replaced by new technologies or changes in regulations.

3.5.2   Content Delivery Network providers

When comparing CDN providers, there are several companies that stand out in the market, such as:

- **Akamai Technologies**: Akamai is one of the largest and most well-established CDN providers in the market. They have a global network of over 215,000 servers in more than 130 countries with 900+ Tbps edge capacity[114] and offer a wide range of features including DDoS protection, Web Application Firewall, and Image optimization;

- **Cloudflare**: Cloudflare is a web performance and security company that offers a range of services including CDN, DDoS protection, and web application firewall. They have a global network of data centers in 285 cities & 100 countries[115] and offer a user-friendly interface for easy setup and management;

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[114] *Power and protect life online* [online]. Akamai [cit. 2023-02-22]. Available at:
https://www.akamai.com/why-akamai
[115] *CDN* [online]. Cloudflare [cit. 2023-02-22]. Available at: https://www.cloudflare.com/cdn/

- **Amazon CloudFront**: Amazon CloudFront is a web service that is part of Amazon Web Services (AWS). It integrates with other AWS services, such as S3 and EC2, and offers features like DDoS protection and support for custom SSL certificates[116];

- **Fastly**: Fastly is a CDN provider that focuses on real-time content delivery and offers features like real-time analytics and the ability to make changes to content in seconds. They have a global network of data centers and offer a wide range of customization options[117];

- **Edgio, Inc., formerly Limelight Networks, Inc**: Limelight Networks offers a range of services including CDN, video streaming, and cloud storage. They have a global network of data centers and offer features like DDoS protection and live streaming support[118].

Each of these providers has its own strengths and weaknesses, and the best one for a particular website will depend on the specific needs of the website. Therefore, it is recommended to evaluate each of them based on the features, pricing, ease of use, support, and global coverage that fits the needs of the website.

3.5.3 CloudFlare

Cloudflare is a web performance and security company that provides a range of services to help improve the speed, performance, and security of websites. Cloudflare's services are built on a global network of data centers, which are strategically placed in locations around the world to help ensure fast and reliable delivery of web content.

Benefits of using Cloudflare for websites include[119]:

- **Improved performance**: Cloudflare's services can help to improve the speed and performance of websites by caching content on servers that are physically close to users, reducing the distance that data needs to travel, which results in faster load times;

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[116] *Amazon CloudFront* [online]. AWS [cit. 2023-02-22]. Available at: https://aws.amazon.com/cloudfront/
[117] *Fastly CDN: Deliver fast, personalized experiences globally* [online]. Fastly [cit. 2023-02-22]. Available at: https://www.fastly.com/products/cdn
[118] *App and API Performance* [online]. Edgio [cit. 2023-02-22]. Available at: https://edg.io/app/performance/
[119] *What is Cloudflare?* [online]. Cloudflare [cit. 2023-02-22]. Available at: https://www.cloudflare.com/what-is-cloudflare/

- **Increased security**: Cloudflare provides a range of security services to help protect websites from a variety of threats, including DDoS attacks, malware, and spam;

- **Reduced costs**: Cloudflare can help to reduce the cost of delivering web content by reducing the load on web servers and by reducing the bandwidth costs associated with delivering content;

- **Improved availability**: Cloudflare's services are designed to be highly available and can help to ensure that websites are always accessible to users, even in the event of a server failure or other issue;

- **Easy integration**: Cloudflare can be easily integrated with existing websites and can be used with a variety of different platforms and technologies;

- **Global reach**: Cloudflare's services are built on a global network of data centers, which are strategically placed in locations around the world to help ensure fast and reliable delivery of web content globally;

- **Advanced analytics**: Cloudflare provides detailed traffic and performance analytics that can help website owners and developers to better understand and optimize the performance of their websites;

- **Advanced features**: Cloudflare provides advanced features such as Web Application Firewall (WAF) and Content Delivery Network (CDN) that can be used to improve the performance, security, and scalability of the website.

Overall, Cloudflare is a web performance and security company that provides a range of services to help improve the speed, performance, and security of websites. It can help to improve performance, reduce costs, improve availability, provide advanced analytics and features, and ensure fast and reliable delivery of web content globally.

3.6 Integration with third-party services

3.6.1 Introduction

E-commerce websites need integration with third-party marketplaces for several reasons:

- **Increased visibility**: Integrating with third-party marketplaces can increase the visibility of an e-commerce website by exposing its products to a larger audience. This can lead to more sales and revenue for the website;

- **Increased sales**: Third-party marketplaces, such as Amazon and eBay, have large customer bases and can help e-commerce websites to increase their sales by making their products available to these customers;

- **Increased brand awareness**: Integrating with third-party marketplaces can help e-commerce websites to increase their brand awareness by exposing their products to a larger audience;

- **Improved product discovery**: Third-party marketplaces often have advanced search and product discovery features, which can make it easier for customers to find the products they are looking for;

- **Increased customer trust**: Third-party marketplaces often have established reputations for customer trust and satisfaction, which can help e-commerce websites to increase customer trust in their products;

- **Increased customer loyalty**: Integrating with third-party marketplaces can help e-commerce websites to increase customer loyalty by providing customers with a wider range of products and services;

- **Increased revenue**: Integrating with third-party marketplaces can help e-commerce websites to increase their revenue by making their products available to a larger audience and by providing customers with a wider range of products and services.

Overall, integration with third-party marketplaces can provide e-commerce web solutions with many benefits such as increased visibility, sales, brand awareness, improved product discovery, and increased.

3.6.2 Third-party marketplaces in the Czech market

There are several third-party marketplaces that could be integrated with e-commerce web solutions in the Czech market. Some examples include:

- **Heureka** is the most popular price comparison website in the Czech Republic. It allows customers to compare prices and read customer reviews, and e-commerce websites can integrate with it to make their products available to Heureka's large customer base[120];

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[120] *Služby obchodům* [online]. Heureka.cz [cit. 2023-02-22]. Available at: https://sluzby.heureka.cz/

- **Zbozi.cz** is the second most popular price comparison website in the Czech Republic. It allows customers to compare prices and read customer reviews, and e-commerce websites can integrate with it to make their products available to Zbozi's customer base[121];

- **Mall.cz** is one of the largest e-commerce marketplaces in the Czech Republic. It offers a wide range of products from various categories, and e-commerce websites can integrate with it to make their products available to Mall's customer base[122];

- **Amazon** is a global e-commerce giant that also operates in the Czech market. E-commerce websites can integrate with Amazon to make their products available to Amazon's large customer base and benefit from its reach, features, and customer base[123];

- **Google Merchant Center** is a service that allows customers to search and compare products from various e-commerce websites. E-commerce websites can integrate with Google Shopping by Merchant Center to make their products available to customers searching on Google[124];

- **Alza.cz** is one of the most popular e-commerce websites in the Czech Republic. It offers a wide range of products from various categories, and e-commerce websites can integrate with it to make their products available to Alza's customer base[125].

Overall, there are many third-party marketplaces that e-commerce websites can integrate with the Czech market. The best options will depend on the specific products and services offered by the e-commerce website and its target audience. By integrating with these marketplaces, e-commerce websites can increase their visibility, reach new customers, and increase sales and revenue.

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[121] *Začínáme inzerovat* [online]. Zbozi.cz [cit. 2023-02-22]. Available at: https://napoveda.zbozi.cz/zaciname-inzerovat/
[122] *MALL Partner* [online]. Mall.cz [cit. 2023-02-22]. Available at: https://partners.mallgroup.com/en
[123] *Start selling with Amazon* [online]. Amazon.com [cit. 2023-02-22]. Available at: https://sellercentral.amazon.com/
[124] *Google Merchant Center* [online]. Google.com [cit. 2023-02-22]. Available at: https://www.google.com/retail/solutions/merchant-center/
[125] *Listing z XML feedu na Alza Marketplace* [online]. Alza.cz [cit. 2023-02-22]. Available at: https://www.alza.cz/listing-z-xml-feedu

3.6.3 Integration between e-commerce CMS and marketplaces

The most common file type used for product integration between e-commerce CMS and marketplaces is an XML (Extensible Markup Language) file[126]. This is because XML is a versatile data format that allows for the easy and efficient transfer of structured data between systems.

XML files are used for product integration because they provide a standardized format for exchanging product information, including product names, descriptions, prices, images, and other relevant details. The XML file can be automatically generated by the e-commerce CMS, making it easy to keep the data up-to-date and accurate.

In addition to XML, other file formats that are used for product integration include CSV (Comma-Separated Values) and TSV (Tab-Separated Values). These file formats are simpler than XML, but still provide a way to transfer structured data between systems.

In summary, XML is the most commonly used file type for product integration between e-commerce CMS and marketplaces due to its versatility, ease of use, and ability to transfer structured data in a standardized format.

3.6.4 Google Merchant Center

Google Merchant Center (GMC)[127] is a platform that allows e-commerce businesses to showcase their products to shoppers on Google Shopping and other Google surfaces. By integrating an e-commerce store using an XML feed, e-commerce businesses can easily showcase their products on Google Shopping and reach more potential customers[128].

The advantages of integrating Prestashop with Google Merchant Center through an XML feed include:

- **Increased visibility**: Integrating with GMC allows e-commerce businesses to showcase their products on Google Shopping, one of the largest shopping platforms

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[126] *XML Introduction* [online]. W3Schools [cit. 2023-02-22]. Available at: https://www.w3schools.com/xml/xml_whatis.asp
[127] *Google Merchant Center* [online]. Google.com [cit. 2023-02-22]. Available at: https://www.google.com/retail/solutions/merchant-center/
[128] *Success stories* [online]. Google Shopping [cit. 2023-02-23]. Available at: https://shoppingsolutions.withgoogle.com/success-stories/

in the world. Google Shopping is available in more than 90 countries worldwide[129]. This increases visibility and can drive more traffic to the business's website;

- **Improved product data**: An XML feed allows e-commerce businesses to provide accurate and up-to-date product information, such as prices, availability, and product descriptions, to GMC[130]. This helps ensure that shoppers see accurate information when searching for products on Google Shopping;

- **Increased efficiency**: Automating the product data upload process through an XML feed saves time and reduces the risk of manual errors, making it easier and more efficient to manage product data in GMC;

- **Enhanced targeting**: GMC provides advanced targeting options, such as location-based targeting[131] and bid adjustments, which can be used to reach the right audience for a business's products.

Additionally, integrating with GMC through an XML feed also helps businesses monitor their product performance on Google Shopping and make data-driven decisions to improve their results. GMC provides detailed performance metrics, such as impressions, clicks, and conversions, which can be used to assess the effectiveness of a business's product listings and make informed changes to improve their results.

Moreover, integrating with GMC allows businesses to take advantage of Google's powerful machine learning algorithms[132], which use data to continuously optimize product listings and show them to the right people, at the right time. This helps ensure that product listings are highly relevant and personalized to each shopper, increasing the likelihood of a successful transaction.

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[129] *Supported languages and currencies* [online]. Google Merchant Center Help [cit. 2023-02-23]. Available at: https://support.google.com/merchants/answer/160637

[130] **Product data specification* [online]. Google Merchant Center Help [cit. 2023-02-23]. Available at: https://support.google.com/merchants/answer/7052112

[131] *Target ads to geographic locations* [online]. Google Merchant Center Help [cit. 2023-02-23]. Available at: https://support.google.com/google-ads/answer/1722043

[132] *Create a Smart Shopping campaign* [online]. Google Ads Help [cit. 2023-02-23]. Available at: https://support.google.com/google-ads/answer/7674740

3.7 Web analytics tools

3.7.1 Introduction

An **analytics tool** for a website is a set of tools and technologies that are used to track and collect data about how users interact with a website[133]. The data is then analyzed and used to understand user behavior, website performance, and the effectiveness of marketing efforts.

An **analytics tool** typically includes[134]:

- **Tracking code**: A small piece of code that is added to the website's pages to track user interactions, such as page views, clicks, and other events;

- **Data collection**: The tracking code collects data on user interactions and sends it to a central server where it can be analyzed and stored;

- **Data analysis**: Analytic systems provide various analysis tools that can help website owners understand the data they collect. This includes visualizing data in charts, graphs, and reports, as well as creating custom reports and analysis;

- **Dashboard**: A web interface that allows website owners to view and analyze the data collected by the analytic system. The dashboard typically provides a range of reports and analysis tools that can be used to understand user behavior, website performance, and marketing efforts;

- **Integration**: Some analytic systems can integrate with other tools, such as marketing automation software, CRM tools, and e-commerce platforms, to provide a more complete view of the data.

There are many analytics tools available, such as *Google Analytics, Adobe Analytics, Piwik, Matomo*, etc. They offer different features and capabilities, and the best one for a particular website will depend on the specific needs of the website.

3.7.2 Reasons to use analytics tool

A website needs an **analytics tool** for several reasons:

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[133] KELSEY, Todd. *Introduction to Google Analytics: A Guide for Absolute Beginners*. Wheaton, Illinois, USA: Apress, 2017. ISBN 978-1484228289.
[134] *Predefined user dimensions* [online]. Firebase Help [cit. 2023-02-23]. Available at: https://support.google.com/firebase/answer/9268042

- **Understanding user behavior**: Analytic systems track and collect data on how users interact with a website, such as what pages they visit, how long they stay on the website, and what actions they take. This information can help website owners understand user behavior and make informed decisions about how to improve the website's usability and user experience[135];

- **Identifying areas of improvement**: Analytic systems can provide insight into areas of the website that may be underperforming or causing user frustration. This information can help website owners identify areas that need improvement and make changes to the website to address these issues[136];

- **Measuring website performance**: Analytic systems provide a way to measure website performance, such as the number of visitors, the bounce rate, and conversion rate. This information can help website owners understand how well the website is performing and make changes to improve performance[137];

- **Monitoring SEO**: Analytic systems can provide information on how users find the website and what keywords they use to find it. This information can help website owners monitor their SEO efforts and make changes to improve the website's search engine rankings[138];

- **Identifying traffic sources**: Analytic systems can identify where website visitors are coming from such as what search engines, social media platforms, referral websites, etc. This information can help website owners understand which marketing channels are driving the most traffic to the website and can guide them to invest more resources in the most effective channels[139];

- **Making data-driven decisions**: Analytic systems provide website owners with a wealth of data that can be used to make data-driven decisions about the website. This information can help website owners understand what is working well, what is

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[135] *About the Behavior Flow report* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/2785577

[136] KELSEY, Todd. *Introduction to Google Analytics: A Guide for Absolute Beginners*. Wheaton, Illinois, USA: Apress, 2017. ISBN 978-1484228289.

[137] *About the Behavior Flow report* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/2785577

[138] *About Google Search Console* [online]. Google Search Console [cit. 2023-02-23]. Available at: https://search.google.com/search-console/about

[139] *Traffic source dimensions* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/1033173

not working, and what changes should be made to improve the website's performance.

Overall, analytic systems are an essential tool for website owners as they provide valuable insights into user behavior, website performance, and marketing efforts which can be used to make data-driven decisions that improve the website's performance, conversion rate, and revenue.

3.7.3 Google Analytics and Google Tag Manager

Google Analytics is a web analytics service offered by Google that tracks and reports website traffic. It is used to understand how users interact with a website, such as how many visitors a site receives, how long they stay, and what pages they visit. It also allows tracking specific events on a website, such as clicks on buttons or links, and conversion goals, such as form submissions or e-commerce transactions[140].

Google Analytics provides a wide range of features to help gain insights into the website's performance. Some of these features include:

- **Real-time data**: Google Analytics provides real-time data on how many visitors are currently on a website, which pages they are viewing, and where they are coming from[141];

- **Audience data**: Google Analytics allows to segment of visitors by demographics, interests, and behavior, which can help understand who users are and what they are looking for on a website[142];

- **Acquisition data**: Google Analytics provides data on how users are finding a website, such as through organic search, paid advertising, or referral traffic[143];

- **Behavior data**: Google Analytics allows track how users interact with a website, such as which pages they visit and how long they stay on each page[144];

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[140] *How Google Analytics works* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/12159447

[141] *About Real-Time* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/1638635

[142] *The Audience report* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/7162572

[143] *Traffic acquisition report* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/12923437

[144] *About the Behavior Flow report* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/2785577

- **Conversion data**: Google Analytics allows track and analyze conversion rates, such as form submissions, e-commerce transactions, and phone calls[145].

Google Tag Manager (GTM) is a tag management system offered by Google that allows to add and manage marketing and analytics tags to the website without requiring changes to the website's code. This allows adding, removing, or editing tags for services such as Google Analytics, Google Ads, and more without having to involve a developer[146]. GTM also allows create and test different versions of tags before publishing them, making it easier to troubleshoot and optimize the website's tracking.

Some of the benefits of using GTM include

- **Tag management**: GTM allows easy add and remove tracking and marketing tags on a website, such as Google Analytics, Google Ads, and more;
- **Version control**: GTM allows the creation and test different versions of tags before publishing them, making it easier to troubleshoot and optimize tracking[147];
- **Simplified deployment**: With GTM, it is possible to deploy tags on a website without having to make changes to the website's code[148].

By using Google Analytics and Google Tag Manager together, gain a more complete understanding of a website's performance and user behavior. This can help to make data-driven decisions about how to improve and increase conversions.

3.7.4   Google Universal Analytics and Google Analytics 4

In **Google Universal Analytics (GA3)**, goals are used to track specific actions or conversions that you want visitors to complete on the website, such as making a purchase or filling out a form. Events, on the other hand, are used to track specific interactions on a website, such as clicks on a button or a video play. It's possible to set up both goals and events in GA3 to track user behavior and measure the success of a website.

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[145] *About Google Analytics conversions* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/9267568
[146] *Tag Manager overview* [online]. Tag Manager Help [cit. 2023-02-23]. Available at: https://support.google.com/tagmanager/answer/6102821
[147] *Publishing, versions, and approvals* [online]. Tag Manager Help [cit. 2023-02-23]. Available at: https://support.google.com/tagmanager/answer/6107163
[148] *Set up and install Tag Manager* [online]. Tag Manager Help [cit. 2023-02-23]. Available at: https://support.google.com/tagmanager/answer/6103696

Google Universal Analytics (GA3) is the previous version of Google Analytics, which was released in 2012[149]. GA3 offers some features that GA4 doesn't have such as support for cross-domain tracking, customized segments, and more. Although GA3 is still (before July 1, 2023[150]) available and supported, GA4 is the future and will have more new features and improvements over time.

According to Google's official documentation, **Universal Analytics (GA3)** will no longer process new data in standard properties beginning July 1, 2023[151]. This means that after that date, data collection for these properties will be discontinued, and users will no longer be able to access their data or reports.

In **GA4**, goals and events have been combined into a single system called "conversions."[152] Conversions are used to track specific actions that visitors take on a website or in an app, such as making a purchase or completing a form. It's possible to set up conversion events in **GA4** to track these actions, and then use them to optimize marketing and user experience.

Google Analytics 4 (GA4) is the latest version of Google Analytics, which was announced in October 2020 and is currently in beta. GA4 offers several new features and improvements over version 3 (**Google Universal Analytics**), include

- **Cross-platform and app tracking**: GA4 allows tracking user interactions across multiple platforms and devices, including web, apps, and other connected devices. This can help gain a more complete understanding of users' behavior across different touchpoints[153];

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[149] *Re-imagining Google Analytics to support the versatile usage patterns of today's users* [online]. Analytics Google Blog [cit. 2023-02-23]. Available at:
https://analytics.googleblog.com/2012/10/universal-analytics.html
[150] *Universal Analytics will be going away* [online]. Analytics Help [cit. 2023-02-23]. Available at:
https://support.google.com/analytics/answer/11583528
[151] *Universal Analytics will be going away* [online]. Analytics Help [cit. 2023-02-23]. Available at:
https://support.google.com/analytics/answer/11583528
[152] *[UA→GA4] Conversions in Google Analytics 4* [online]. Analytics Help [cit. 2023-02-23]. Available at:
https://support.google.com/analytics/answer/11053133
[153] *[GA4] Measure activity across platforms with User-ID* [online]. Analytics Help [cit. 2023-02-23].
Available at: https://support.google.com/analytics/answer/9213390

- **Improved data collection and processing**: GA4 uses machine learning and artificial intelligence to automatically collect and process data, making it easier to analyze and understand user behavior[154];

- **Enhanced user-centric data**: GA4 allows to collect and analyze data at the user level, which can help understand how users interact with a website over time and across different devices[155];

- **More robust events tracking**: GA4 allows to track a wider range of events, including user interactions with specific elements on a page, such as clicks on buttons or links[156];

- **Built-in analysis tools**: GA4 includes a range of built-in analysis tools, such as funnel analysis and user journey analysis, which can help gain insights into user behavior and conversions[157].

Overall, **Google Analytics 4 (GA4)** offers a number of new and enhanced features compared to Universal Analytics, including cross-platform and app tracking, improved data collection and processing, enhanced user-centric data, more robust events tracking, and built-in analysis tools. These new features and improvements can help to gain deeper insights into a website's performance and user behavior.

Google is encouraging users to switch over to a Google Analytics 4 property (GA4) before this date in order to ensure continuity of data collection and access to new features and improvements. Setting up and switching over to a GA4 property will require some work, such as creating a new property, updating the tracking code, and migrating existing data and configurations.

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[154] *[GA4] Data collection* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/11593727
[155] *[GA4] Reporting identity* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/10976610
[156] *[GA4] About events* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/2785577
[157] *[GA4] Explorations: user journeys through your content* [online]. Analytics Help [cit. 2023-02-23]. Available at: https://support.google.com/analytics/answer/9355653

3.8 General Data Protection Regulation

3.8.1 Introduction

The General Data Protection Regulation (GDPR) is a regulation by the European Union (EU) that aims to strengthen and unify data protection for all individuals within the EU. It applies to all organizations operating within the EU, as well as organizations outside of the EU that offer goods or services to individuals in the EU[158].

The GDPR establishes a set of standard data protection regulations for all member states to follow and replaces the 1995 EU Data Protection Directive. The current version (to date) of the General Data Protection Regulation (GDPR) is the original version that was adopted by the European Union (EU) on April 27, 2016, and came into effect on May 25, 2018[159]. To date, there have been no significant updates or changes made to the GDPR[160].

The GDPR aims to give individuals more control over their personal data and how it is processed by companies and organizations. The regulation also aims to harmonize data protection laws across the EU and ensure a high level of protection for individuals regardless of where their data is processed.[161]

3.8.2 Implementation process

The implementation process of the General Data Protection Regulation (GDPR) to e-commerce websites involves several steps, including

1. **Awareness and understanding**: Familiarize with the GDPR and its requirements, as well as the specific data protection needs of an e-commerce website;

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[158] *General Data Protection Regulation (GDPR): Official Legal Text* [online]. EU Consilium [cit. 2023-02-23]. Available at:
https://www.consilium.europa.eu/en/policies/data-protection/data-protection-regulation/#gdpr
[159] *General Data Protection Regulation (GDPR): Official Legal Text* [online]. EU Consilium [cit. 2023-02-23]. Available at:
https://www.consilium.europa.eu/en/policies/data-protection/data-protection-regulation/#gdpr
[160] *General Data Protection Regulation (GDPR): Official Legal Text* [online]. Intersoft Consulting [cit. 2023-01-30]. Available at: https://gdpr-info.eu/
[161] *General Data Protection Regulation (GDPR): Official Legal Text* [online]. Intersoft Consulting [cit. 2023-01-30]. Available at: https://gdpr-info.eu/

2. **Conduct a data protection impact assessment (DPIA)**: Evaluate and document the risks associated with the processing of personal data on an e-commerce website; [162]

3. **Update privacy policy**: Update privacy policy to reflect the requirements of the GDPR, such as explaining what data that collects and for what purposes, and informing users of their rights;

4. **Obtain consent**: Ensure that obtain is clear, unambiguous, and informed consent from users for the collection and processing of their personal data;

5. **Implement technical measures**: Implement technical and organizational measures to secure personal data and protect it from unauthorized access, theft, or loss;

6. **Designate a Data Protection Officer (DPO)**: Appoint a DPO if required, depending on the size and complexity of an e-commerce website, and the risks associated with processing personal data; [163]

7. **Monitor and review**: Regularly monitor and review compliance with the GDPR to ensure that you are adhering to its requirements and making any necessary changes to processes and systems.

4 Practical part

In the digital age, establishing an e-commerce store is a key aspect of a business's overall strategy. However, creating an online store can be a challenging process, especially for organizations that lack technical proficiency or have budgetary constraints. Fortunately, Content Management Systems (CMS) like Prestashop have streamlined the process by providing businesses with an efficient and user-friendly solution for building and managing online stores.

The practical part offers an in-depth guide on building an e-commerce store using Prestashop CMS and integrating it with third-party services. The first step is to establish the CMS on a stable and scalable infrastructure such as Amazon Web Services (AWS) with LAMP stack, which provides a robust and efficient hosting environment for the web store. Once the infrastructure is in place, we dive into the process of configuring the CMS,

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[162] *General Data Protection Regulation (GDPR): Personal Data* [online]. Intersoft Consulting [cit. 2023-01-30]. Available at: https://gdpr-info.eu/issues/personal-data/

[163] *General Data Protection Regulation (GDPR): Data Protection Officer* [online]. [cit. 2023-01-30]. Available at: https://gdpr-info.eu/issues/data-protection-officer/

including adding products, setting up product attributes and features, and configuring payment and shipping options.

Localization is critical for businesses that want to reach a global audience. We explore the process of localizing the web store for specific markets, such as the Czech and English markets, ensuring that the store's content and messaging are culturally relevant and appealing. Additionally, we emphasize the significance of Search Engine Optimization (SEO) and building pages that are optimized for search engines to improve the store's online visibility and attract more traffic.

Finally, we examine the integration of third-party services such as Google Analytics, Google Merchant Center, Zbozi.cz, and Heureka.cz. These services provide valuable insights into the web store's performance, streamline operations, and increase sales. By the end of this thesis, readers will have a comprehensive understanding of how to create an e-commerce store using Prestashop CMS and integrate it with third-party services to optimize their store's performance and drive sales.

4.1 Hosting environment

4.1.1   Creating an instance

Amazon Web Services (AWS) Lightsail is a cloud-based service that provides an easy-to-use platform for creating and managing virtual servers, storage, and networking resources. It simplifies the process of launching and managing virtual private servers (VPS) for businesses and developers of all levels of expertise. Lightsail offers pre-configured machine images, including a LAMP stack, which is a popular software bundle that includes Linux as the operating system, Apache as the web server, MySQL as the database, and PHP as the scripting language.

To rent the AWS instance we need to do the following steps:

1. Navigate to the AWS Lightsail homepage: https://aws.amazon.com/lightsail/;
2. Click on the "Get started for free" button;
3. Once we are logged in to the AWS console, we can begin setting up the Lightsail instance. Click the "Create instance" button;
4. In this step we need to select the instance location, which is the geographical region where we want to launch the instance. In our concrete case, we would select the

Frankfurt region, since the closer the instance is to users, the less latency they will experience;
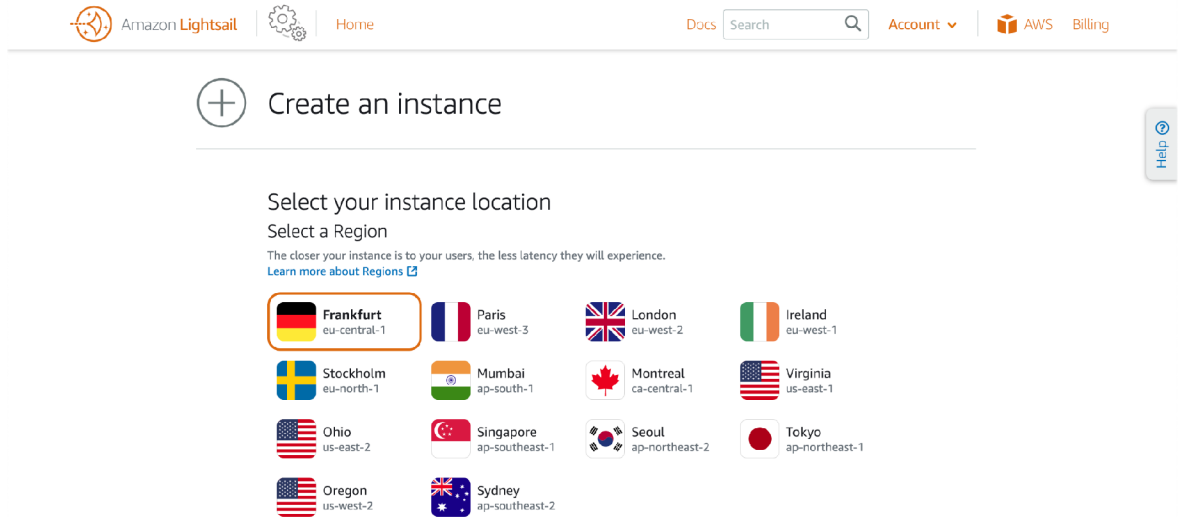
Figure 8: Instance region selection

5. Before a blueprint selection, we have to check Prestashop requirements to meet them:

    a. System requirements for PrestaShop 7 (https://devdocs.prestashop-project.org/1.7/basics/installation/system-requirements/):

        i. System: Unix, Linux, or Windows;

        ii. Web server: Apache Web Server 2.2 or any later version (Nginx 1.0 or later);

        iii. PHP: It's recommended to run on PHP 7.1 or later. See the compatibility chart below for more details;

        iv. MySQL: 5.6 minimum, a recent version is recommended;

        v. Server RAM: minimum of 256M.

PrestaShop Version	PHP Version											
	≤ 5.1	5.2	5.3	5.4	5.5	5.6	7.0	7.1	7.2	7.3	7.4	≥ 8.0
1.6.1.x								✔				
1.7.0 ~ 1.7.3								✔				
1.7.4								✔				
1.7.5 ~ 1.7.6									✔			
1.7.7										✔		
1.7.8											✔	

Legend:

✔ = Recommended version ▮ = Supported ▮ = Not supported

Figure 9: PrestaShop 1.7. PHP compatibility chart

b. System requirements for PrestaShop 8

(https://devdocs.prestashop-project.org/8/basics/installation/system-requirements/):

   i.   System: Unix, Linux, or Windows;

   ii.   Web server: Apache Web Server 2.2 or any later version (Nginx 1.0 or later);

   iii.   PHP: It's recommended to run PHP 7.2.5 or later. See the compatibility chart below for more details;

   iv.   MySQL: 5.6 minimum, a recent version is recommended;

   v.   Server RAM: minimum of 256M.

	PHP Version						
PrestaShop Version	**≤ 7.1**	**7.2**	**7.3**	**7.4**	**8.0**	**8.1**	**≥ 8.2**
8.0						✔	

Legend:

✔ = Recommended version ▢ = Supported ▢ = Not supported

Figure 10: PrestaShop 1.8. PHP compatibility chart

6. After that, we can select our instance image, which is the operating system and software configuration we want to run on our instance. Select one of the pre-configured images. I will choose LAMP (PHP 7), since Prestashop 8 had been released on October 26, 2022, and has not been well tested to run in on PHP 8;
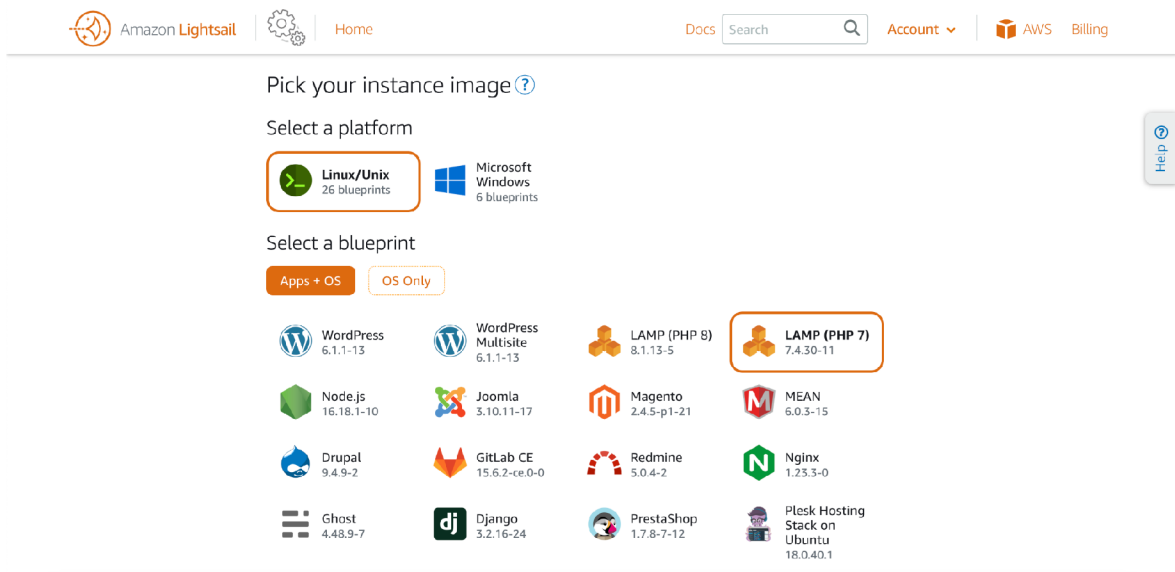
Figure 11: Picking up instance image

7. In this step, we choose the instance plan, which determines the number of resources, such as CPU, RAM, and storage, allocated to the instance. Based on the CMS requirements, we can use the first from the list:

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Figure 12: Picking up instance plan

8. By clicking on "Create instance" the Lightsail instance would be launched;

9. The instance is running and we can access it through the AWS console or through a Secure Shell (SSH) client.

Once the Amazon Lightsail instance was launched, it was assigned a dynamic IP address by default. A dynamic IP address means that the IP address can change each time the instance is stopped and restarted. However, if we would hosting a website, it's important to have a consistent IP address for DNS and SSL purposes.

Here's how to attach a static IP address to an Amazon Lightsail instance:

1. Select the instance to attach a static IP address to;

2. Click on the "Networking" tab and then select "Create static IP";

3. Choose the availability zone and select "Allocate New IP";

4. Give the static IP address a unique name and click "Create;";

5. Once the static IP address is created, click on the "Attach" button next to the IP address.

Attaching a static IP address to the Lightsail instance ensures that a website always has the same IP address, which makes it easier to configure DNS and SSL certificates. Additionally, it can also provide increased security, as a static IP address is less likely to be blacklisted or flagged as malicious.

4.1.2 LAMP software bundle configuration

After the Lightsail instance has been launched and a static IP address has been attached, the next step is to configure the instance. One way to do this is by using SSH (Secure Shell), which is a protocol that allows to connect to the instance remotely and execute commands in a secure manner.

To configure the Lightsail instance using SSH:

1. Connect to the Lightsail instance using SSH. To do this, use the following command:

```
                                                                        SSH

> ssh username@instance-ip
```

2. Configure Apache by editing the configuration file located at /etc/apache2/apache2.conf. We can use a text editor such as nano (alternatively vi) to edit this file:

```
                                                                      SHELL

> sudo nano /etc/apache2/apache2.conf
```

In this file, it's possible to configure settings such as the server name, server admin email address, and more;

3. Save changes to apache2.conf by pressing Ctrl+O, then exit nano by pressing Ctrl+X;

4. Restart Apache to apply the changes:

```
                                                                      SHELL

> sudo service apache2 restart
```

5. Configure MySQL by running the following command:

```
SHELL
> sudo mysql_secure_installation
```

This command will prompt to set the root password for MySQL, as well as to configure some security settings.

6. Configure PHP by editing the configuration file located at /etc/php/7.4/apache2/php.ini. Again, use nano (alternatively vi) to edit this file:

```
SHELL
> sudo nano /etc/php/7.4/apache2/php.ini
```

In this file, we can configure settings such as memory limits, error reporting, and more;

7. Save changes to php.ini by pressing Ctrl+O, then exit nano by pressing Ctrl+X;

8. Restart Apache again to apply the changes:

```
SHELL
> sudo service apache2 restart
```

The LAMP stack instance have been configured. Now we will proceed with installing Prestashop CMS.

4.1.3   Prestashop CMS installation

After the LAMP stack has been configured, the next step is to install the Prestashop CMS. To install the Prestashop CMS using SSH:

1. Download the latest version of Prestashop CMS from the official website by running the following command:

```
SHELL
> wget
https://download.prestashop.com/download/releases/prestashop_1.7.
8.8.zip
```

This will download the Prestashop CMS package to the home directory;

2. Unzip the Prestashop CMS package using the following command:

```
                                                          SHELL
> unzip prestashop_1.7.7.2.zip
```

This command will create a new directory called prestashop in the home directory;

3. Move the prestashop directory to the Apache web root directory /opt/bitnami/apache2/htdocs/ using the following command:

```
                                                          SHELL
> sudo mv ~/prestashop /opt/bitnami/apache2/htdocs/
```

This will move the prestashop directory to the correct location for Apache to serve it;

4. Set the appropriate permissions for the Prestashop files and directories using the following commands:

```
                                                          SHELL
> sudo chown -R bitnami:daemon
/opt/bitnami/apache2/htdocs/prestashop
> sudo chmod -R g+w /opt/bitnami/apache2/htdocs/prestashop
```

The ownership of the prestashop directory and its contents, appropriate permissions would be given to the Apache web server user (daemon);

5. Create a new MySQL database for Prestashop to use by running:

```
                                                          SHELL
> mysql -u root -p
```

This will open the MySQL command-line interface. Enter the MySQL root password when prompted;

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6. Once we are inside the MySQL prompt, create a new database for Prestashop:

```SQL
> CREATE DATABASE `prestashop`;
```

7. Next, a new user could be created and permissions would be granted to the new database by running the following commands:

```SQL
> CREATE USER `prestashop`@`localhost` IDENTIFIED BY `password`;
> GRANT ALL PRIVILEGES ON prestashop.* TO
`prestashop`@`localhost`;
> FLUSH PRIVILEGES;
```

Replace password with a strong, secure password for the new MySQL user;

8. Exit the MySQL prompt by running the following command:

```SHELL
> exit
```

After completing the installation process via the command line, it's possible to access the Prestashop installation page in the web browser by visiting the following URL: http://server_ip/prestashop/

On the Prestashop installation page we have a language selection screen where we can choose a preferred language for the installation process.

On the next screen, we need to accept the Prestashop software license agreement. After reviewing the agreement, check the box next to "I agree to the above terms and conditions" and click the "Next" button to continue.

The next screen will prompt to enter the database information. Fill in the following information:

- Database server address: `localhost`;
- Database name: `prestashop`;
- Database login: `prestashop`;

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- Database password: (enter the password that has been created for the Prestashop MySQL user earlier).

Click the "Test your database connection now!" button to ensure that the information is correct and the connection is successful. The next screen will be prompted to enter the store information, including the store name, activity sector, and administrator account details.

Finally, a screen confirming the installation settings would be shown. Click the "Install" button to start the installation process. After a few minutes, the Prestashop installation will be complete, and we will be directed to the Prestashop login screen. By using the administrator account details that was entered earlier, log in and begin customizing and configuring the new Prestashop web store.
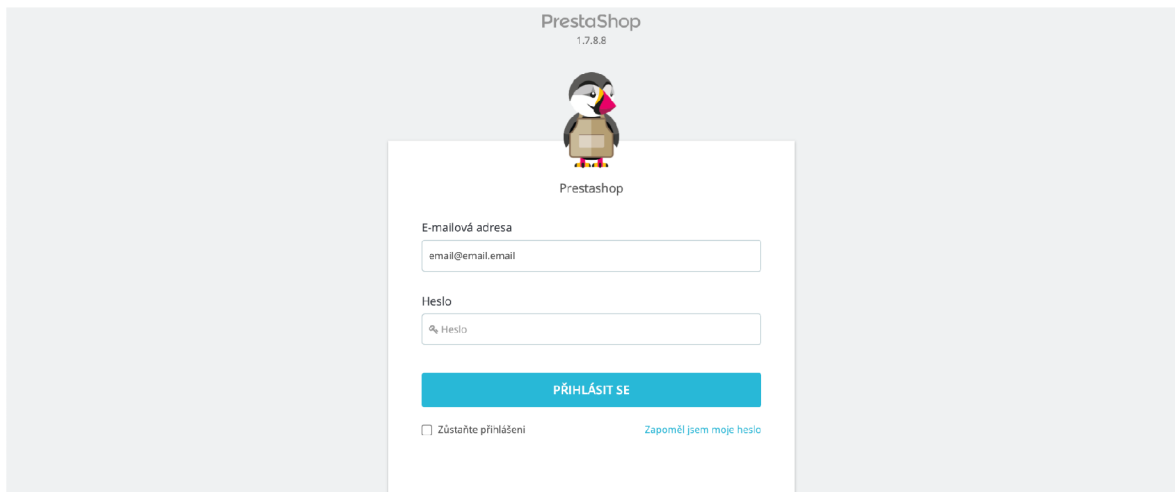
Figure 13: Prestashop login screen

4.2 Prestashop CMS configuration

To configure Prestashop CMS we need to log in to the admin panel. Enter the administrator account credentials that were set up during the installation process to access the back office (dashboard).

4.2.1   Basic settings

Prestashop 1.7 requires basic configuration in order to function properly. This configuration includes setting up the shop's name and logo, defining the main store URL, and specifying the default country and currency for the shop.

To configure basic settings in Prestashop 1.7, follow the steps below:

1. Navigate to the "Shop Parameters" tab in the left-hand menu. Select the "General" sub-tab to access basic shop information settings. To set the shop's name and logo, navigate to the "Design" tab;

2. Select the "Theme & Logo" sub-section to upload a new logo and adjust its dimensions in the "Design" tab. To set the shop's name, address, and contact information, select the "Contacts" tab in the "Shop Parameters" tab;

3. To configure default product settings, navigate to the "Catalog" tab in the left-hand menu. Select the "Products" sub-tab to access product settings. Use the "Product Settings" sub-tab in the "Shop Parameters" tab to configure default product settings, such as display type and sorting options;

4. To configure shipping settings, navigate to the "Shipping" tab in the left-hand menu. Select the "Carriers" sub-tab to configure shipping carriers and their associated fees. Use the "Preferences" sub-tab to define shipping zones, currencies, and available carriers;

5. To configure payment settings, navigate to the "Payment" tab in the left-hand menu. Select the "Payment Methods" sub-tab to configure available payment methods and associated fees. Use the "Preferences" sub-tab to configure available currencies and exchange rates.

4.2.2 Theme

Installing a custom theme in Prestashop can provide several benefits:

- **Unique Design**: Using a custom theme can help to give a Prestashop store a unique look and feel that is tailored to the brand and target audience;

- **Enhanced Functionality**: Custom themes often come with additional functionality and features that are not available in the default Prestashop themes. This can help to improve the user experience and increase conversions;

- **Branding**: A custom theme can help to reinforce the brand identity by incorporating logo, colors, and other brand elements throughout the store;

- **Competitive Advantage**: Having a custom theme can give competitive advantage by setting store apart from others that use the default Prestashop themes.

To install the "Warehouse" theme (this theme has been chosen because if it's functionality and flexibility), navigate to "Theme & Logo" in the left-hand menu. Here, it's possible to upload the theme package in ZIP format since it has been downloaded from a third-party website.
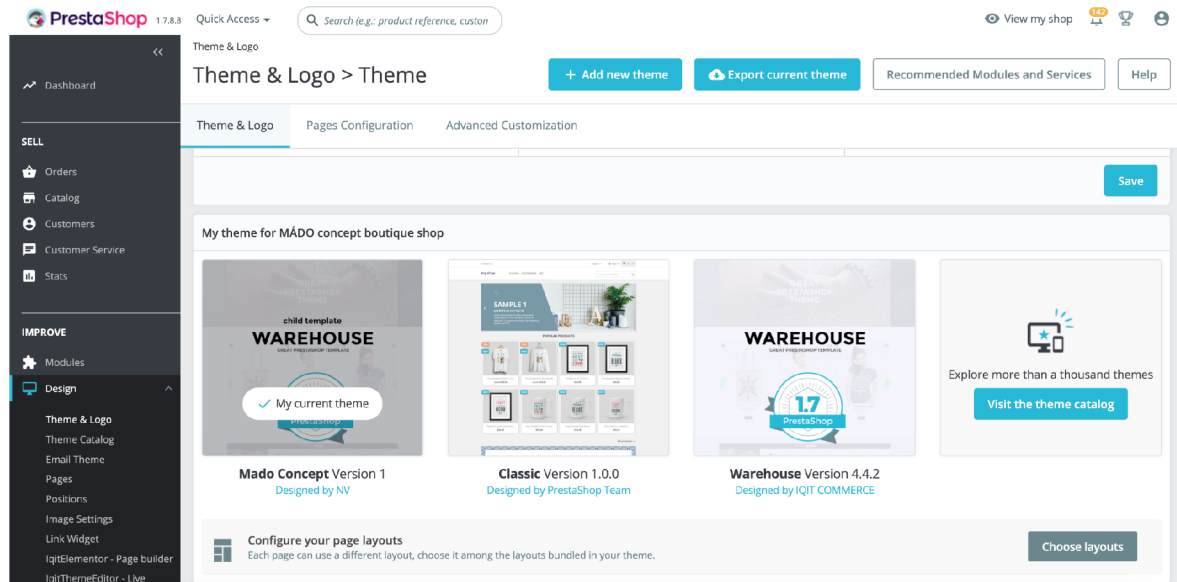
Figure 14: Design. Theme & logo

In Prestashop, a child theme is a theme that inherits the styles and functionality of a parent theme but allows one to make modifications without affecting the parent theme. Here are some reasons why to use a child theme in Prestashop:

- **Customization**: A child theme allows to customize the look and functionality of the store without modifying the parent theme directly. This can help to make the modifications easier to manage and update over time;

- **Updates**: When updating the parent theme in Prestashop, any modifications made will be lost. Using a child theme allows to update of the parent theme while keeping the modifications intact;

- **Maintenance**: Using a child theme can help to keep a store's code organized and easy to maintain. By separating the modifications from the parent theme, it's possible more easily identify and troubleshoot any issues that arise;

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- **Testing**: A child theme can be used for testing modifications to a store's design or functionality without affecting the live site. This can be helpful for ensuring that the modifications work as intended before rolling them out to the public.

To install the Warehouse child theme, navigate to the "themes" directory of the Prestashop installation (/themes/). Create a new directory named "warehouse-child". Inside this directory, create a file named "theme.yml". In this file, add the following code:

```yaml
name: Warehouse Child
version: 1.0
parent: warehouse
```

Save the file, and then create a new file named "index.php" in the same directory. In this file, add the following code:

```php
<?php
define('_PS_THEME_DIR_', __DIR__);
include __DIR__.'/../warehouse/index.php';
```

To add custom .css and .js files that would override current the assets of the parent theme, we need to create a new folder in the child theme directory called "assets". Inside the "assets" folder, create two new folders called "css" and "js". Add a custom CSS and JavaScript files to the corresponding "css" and "js" folders.

Re-open the "theme.yml" file in the child theme directory and add the following code there:

```yaml
assets:
  css:
    all:
      - assets/css/styles.css
  js:
    all:
      - assets/js/scripts.js
```

After, navigate back to the "Themes" page in the Prestashop admin panel. The Warehouse Child theme would be listed as an option. By clicking "Install", the child theme would be installed.

4.2.3   Modules

Custom modules extend the functionality of the Prestashop CMS and allow store owners to add new features or customize existing ones to better suit their specific needs. They provide various benefits, such as improving user experience, increasing efficiency, and generating more sales.

To install a module from https://addons.prestashop.com/, the store owner can search for the desired module, purchase and download it, and then upload it to the "Modules" section in the back office. Alternatively, third-party websites can offer free or paid modules that can be downloaded and installed manually or through a module manager.
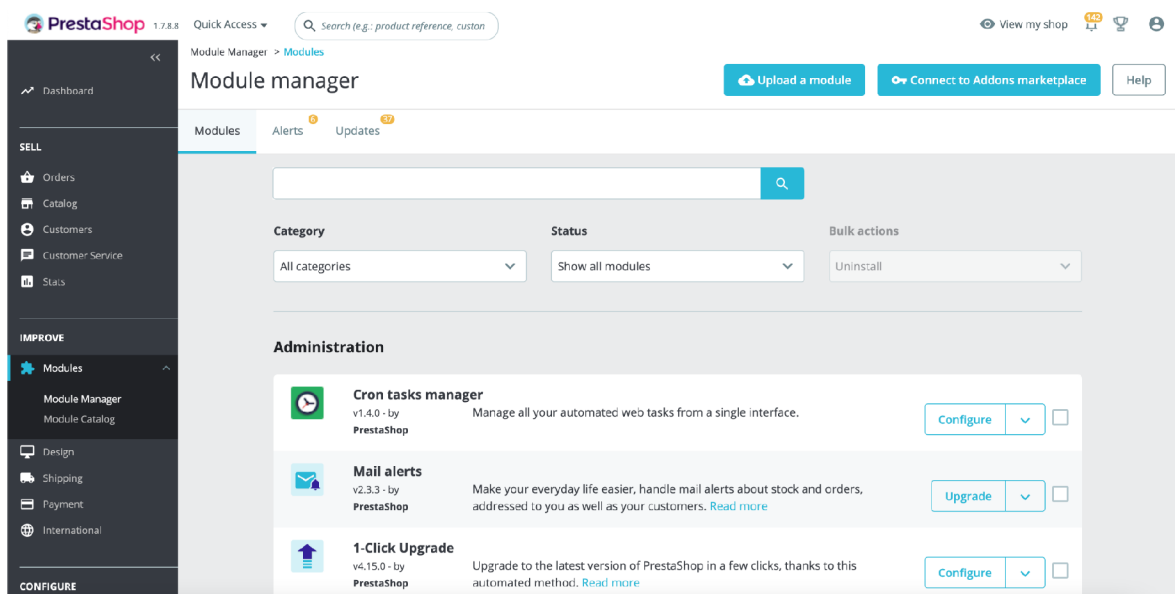
Figure 15: Modules. Module manager

It's important to note that installing modules from third-party sources can present security risks, so it's crucial to only download modules from reputable sources and check their compatibility with the version of Prestashop being used. Additionally, it's

recommended to create a backup of the website before installing any new modules to prevent potential data loss or website downtime.

4.2.4 Localization

To offer a store in multiple languages or currencies, the "International" section in the left-hand menu can be navigated, followed by selecting the "Localization" and "Currencies" sub-sections respectively.

To localize a Prestashop e-shop for the Czech Republic, the Localization section of the back office should be accessed and the language set to Czech. This will result in the core elements of the e-shop, such as buttons and menus, being translated into Czech.
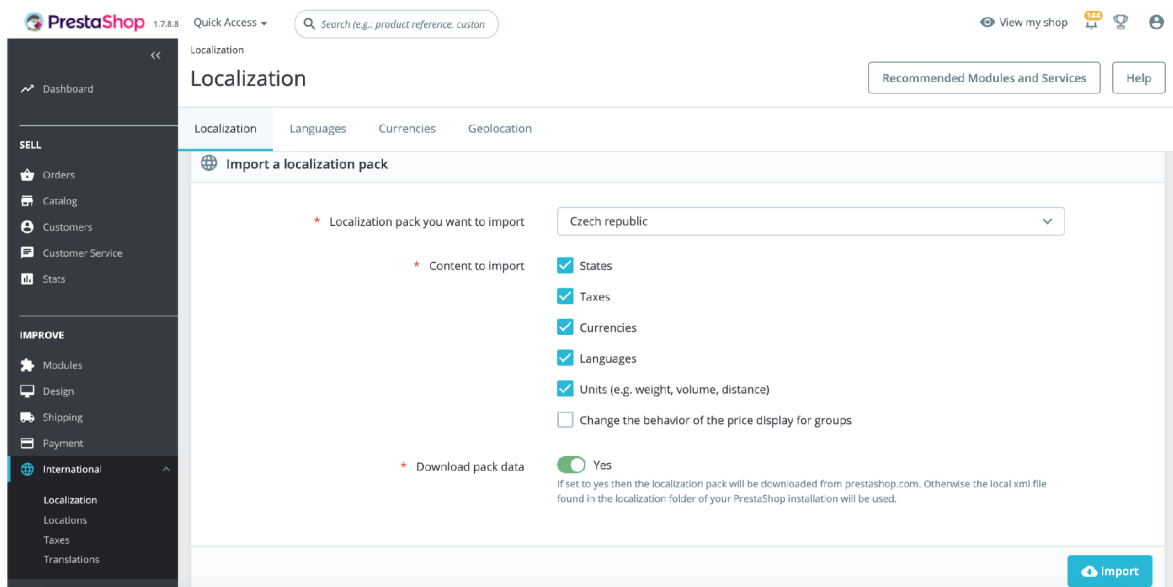
Figure 16: Localization

Secondly, the default currency should be set to Czech koruna (CZK) in the Currency section of the back office. This ensures that all prices are displayed in CZK and that customers can pay using this currency.
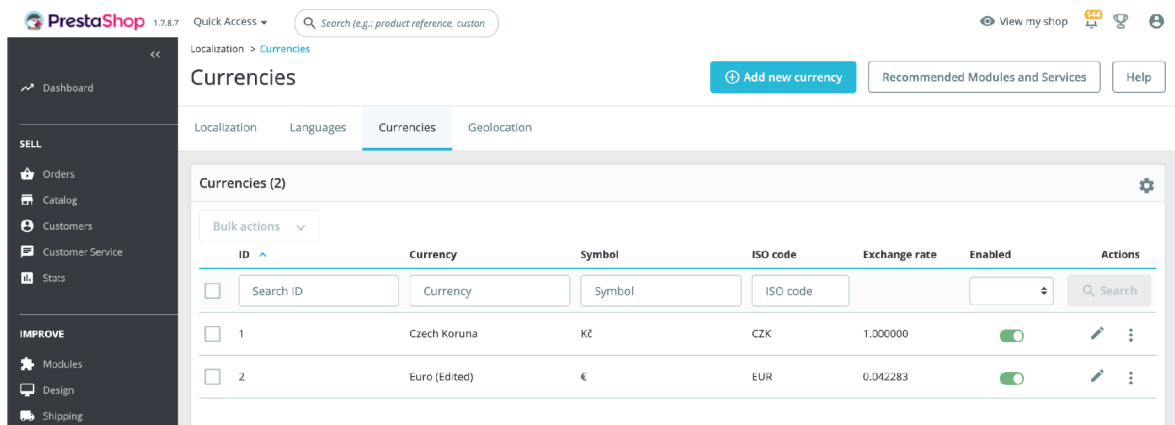
Figure 17: Localization. Currencies

Thirdly, the tax rules must be set up in the "Taxes" and "Taxes" -> "Tax Rules" section of the back office. The standard VAT rate in the Czech Republic is 21%, but there are also reduced rates of 15% and 10%. These rates should be set up accordingly to ensure that the correct amount of tax is applied to each product.
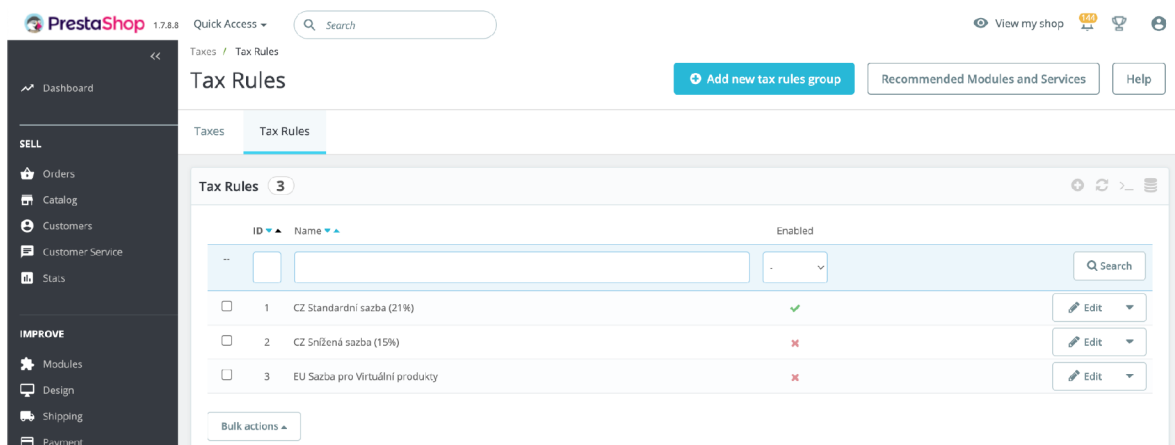
Figure 18: Taxes. Tax rules

Fourthly, the translations of the product names, descriptions, and attributes should be added or edited to reflect the correct Czech language. This can be done in the Translation section of the back office.
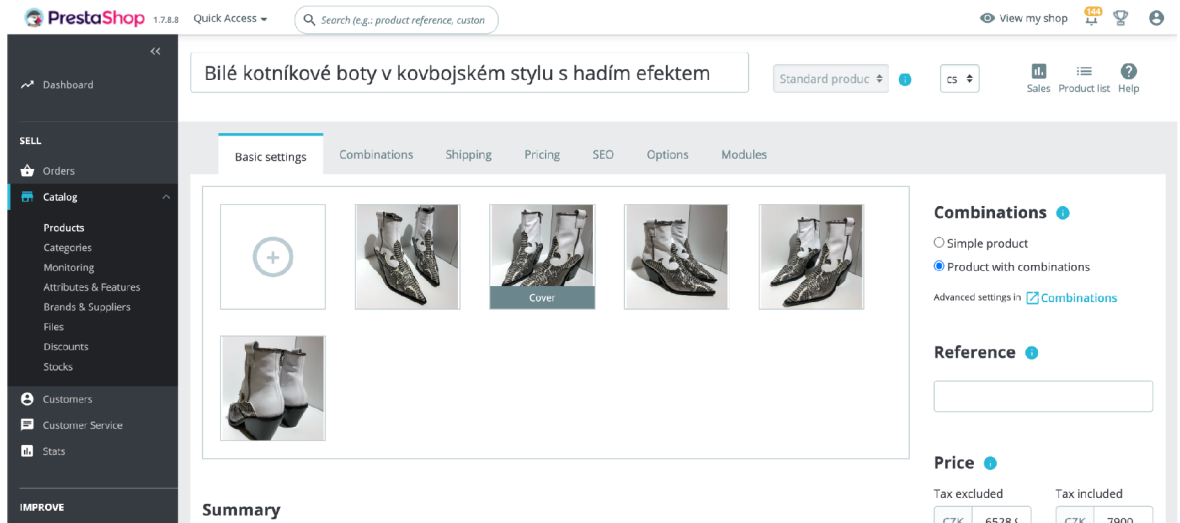
Figure 19: Taxes. Tax rules

Fifthly, it involves the translation of strings. This can be done by navigating to the International -> Translations section of the back office. The translations can be done manually or by importing a translation file. Various translation files are available online or can be obtained from third-party services. It is important to ensure that all strings are translated accurately and consistently throughout the website. The translations should also be reviewed regularly to ensure they remain up-to-date and accurate.
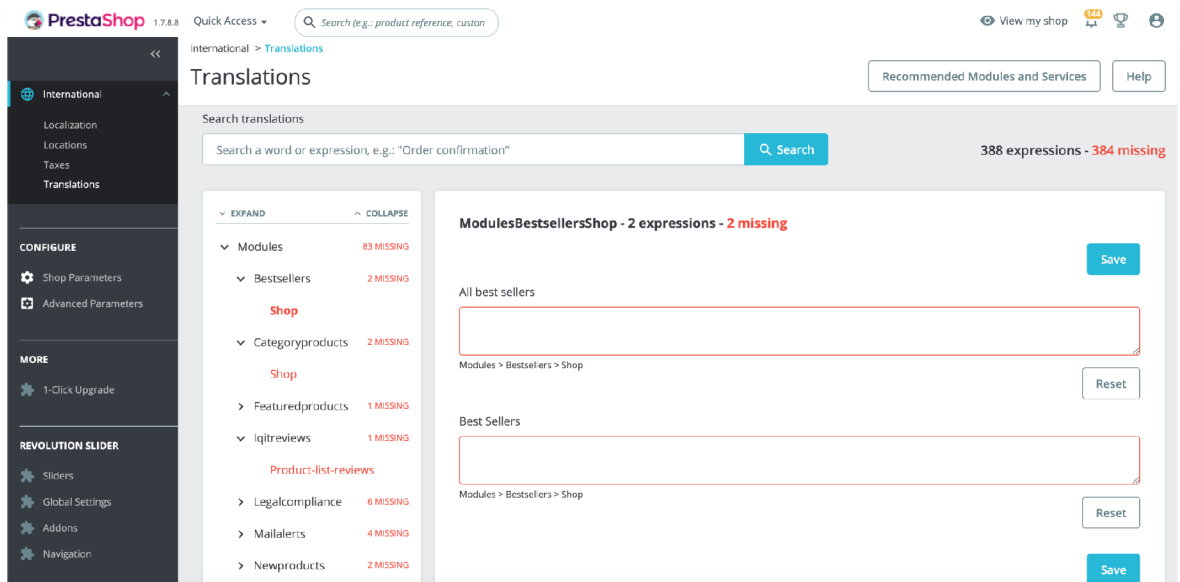
Figure 20: International. Translations

Finally, the shipping carriers and payment methods should be set up to reflect the options available in the Czech Republic. For example, Česká pošta (Czech Post) and DPD are popular shipping carriers in the Czech Republic, while payment methods such as bank transfer, payment on delivery, and online payment gateways like GoPay, GP Webpay and PayU are commonly used.

4.2.5 Attributes and features

Attributes and features in Prestashop are important elements that need to be configured before products are added. The difference between attributes and features lies in their purpose. Attributes are used to describe the characteristics of a product, such as its size, color, and material, while features are used to highlight the product's key selling points and benefits.
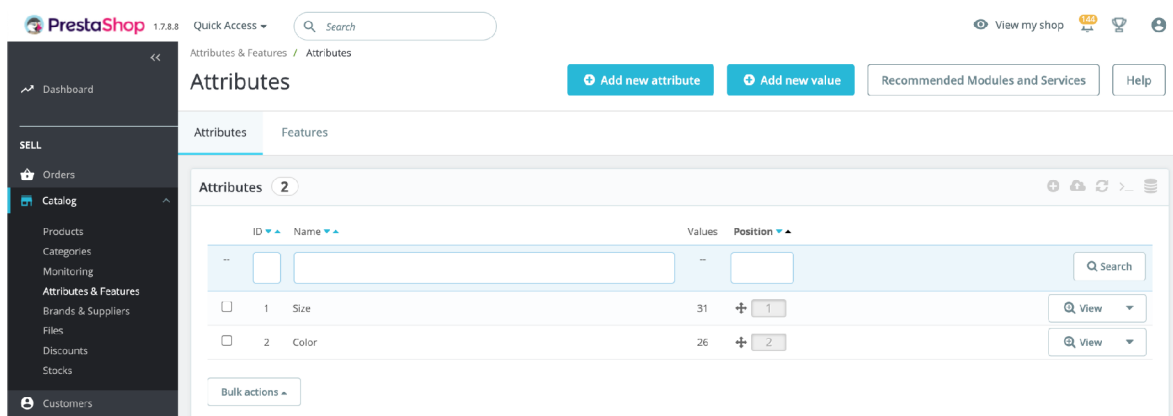
Figure 21: Catalog. Attributes & features. Attributes
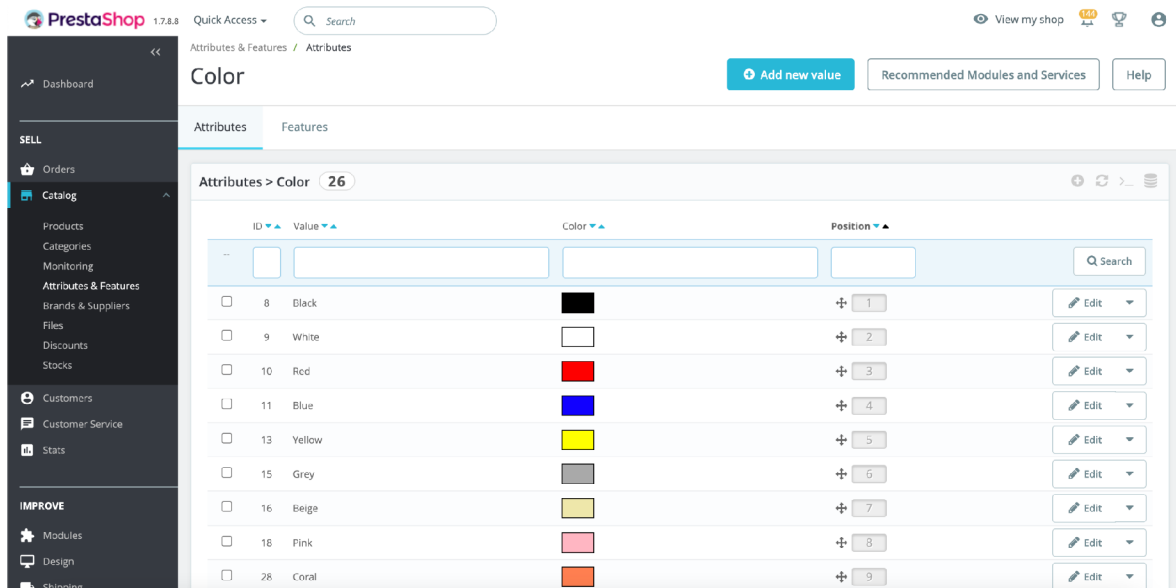
Figure 22: Catalog. Attributes & features. Attributes. Color
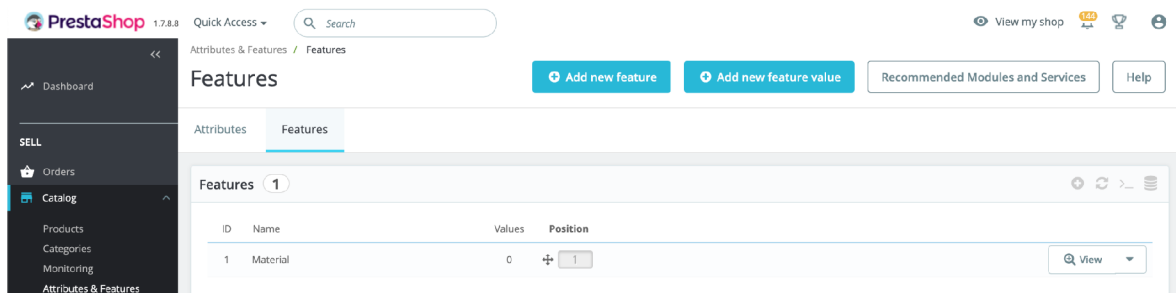
Figure 23: Catalog. Attributes & features. Features

Before adding products, it is necessary to configure attributes and features to ensure that the product information is accurate and complete. This can be done in the back office by accessing the "Attributes" and "Features" sections respectively. By configuring attributes and features, merchants can provide customers with detailed and informative product descriptions, which can help increase sales and customer satisfaction.

4.2.6 Products

To add products in Prestashop, the first step is to navigate to the "Catalog" section in the back office. From there, click on the "New product" button to begin the product creation process.
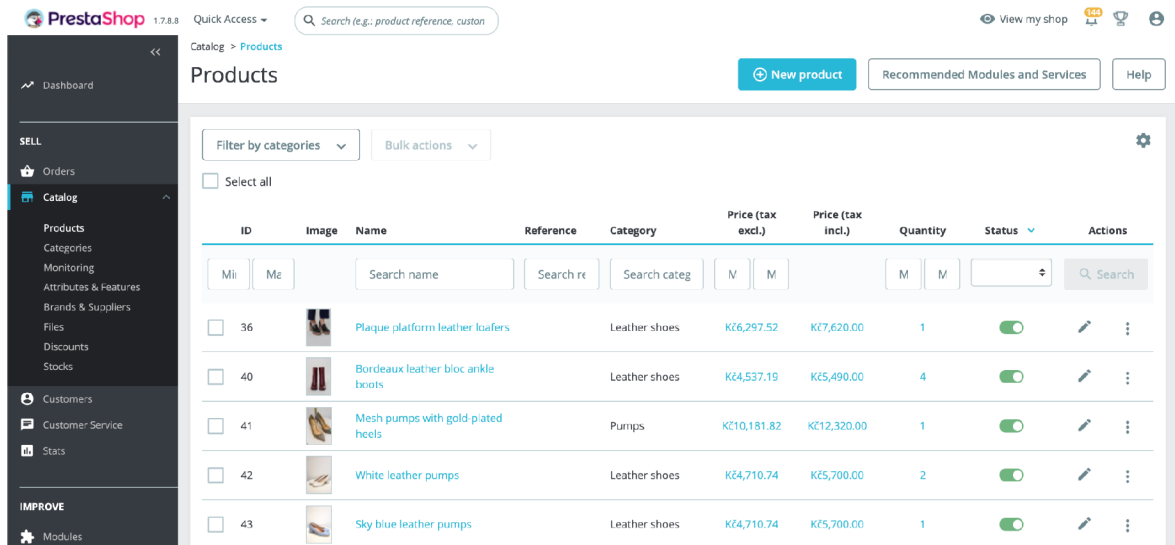
Figure 24: Catalog. Products

In the "Basic settings" tab, enter the product name, reference number, and product category. Next, add the product description, short description, and product image in the "Summary" and "Description" sections on the same tab. There are several types of products that can be added, such as simple products, products with variations, virtual products, and pack products. Simple products are products that do not have any variations, whereas products with variations have different attributes that can be selected by the customer, such as size or color.
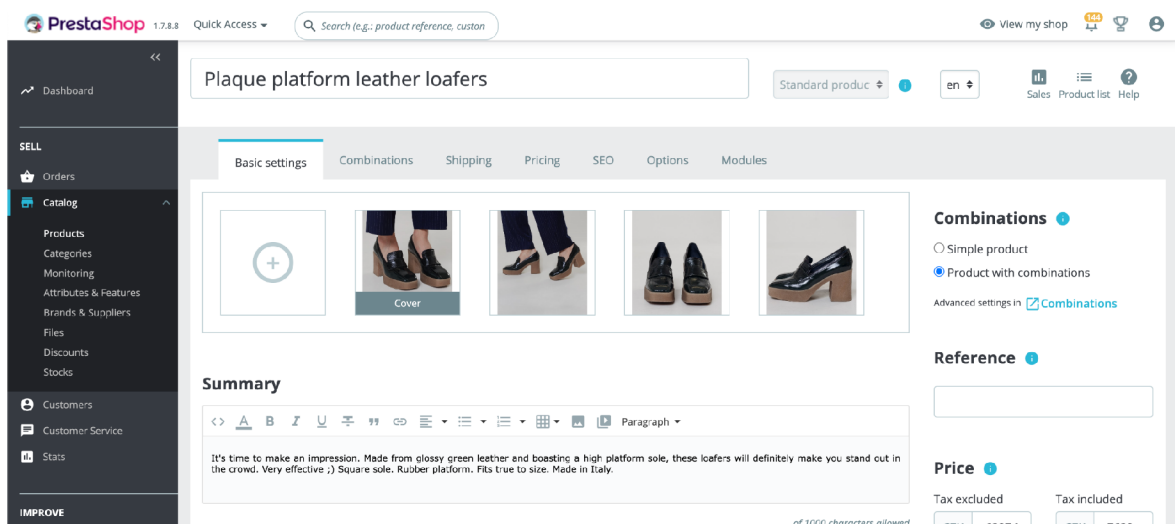
Figure 25: Catalog. Product edit page. Basic settings

To add additional information about the product, such as features and attributes, navigate to the "Features" and "Associations" sections respectively. Here, it's possible to add specific features and attributes for the product, such as size, color, and material. Also it's possible to select a category/categories.
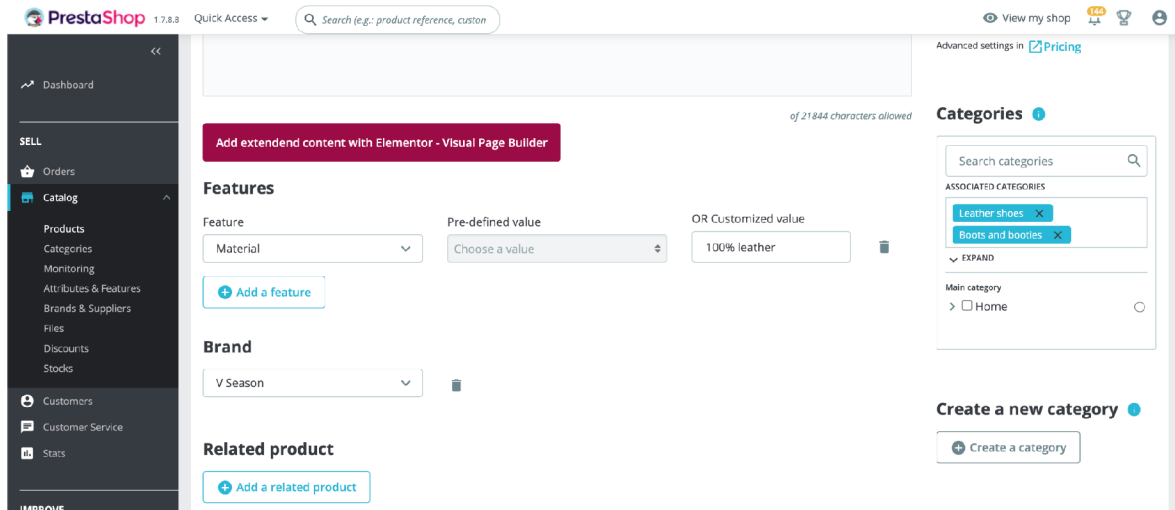
Figure 26: Catalog. Product edit page. General

In the case of a product with combinations, open the "Combinations" tab, select the combinations needed and click on the "Generate" button.
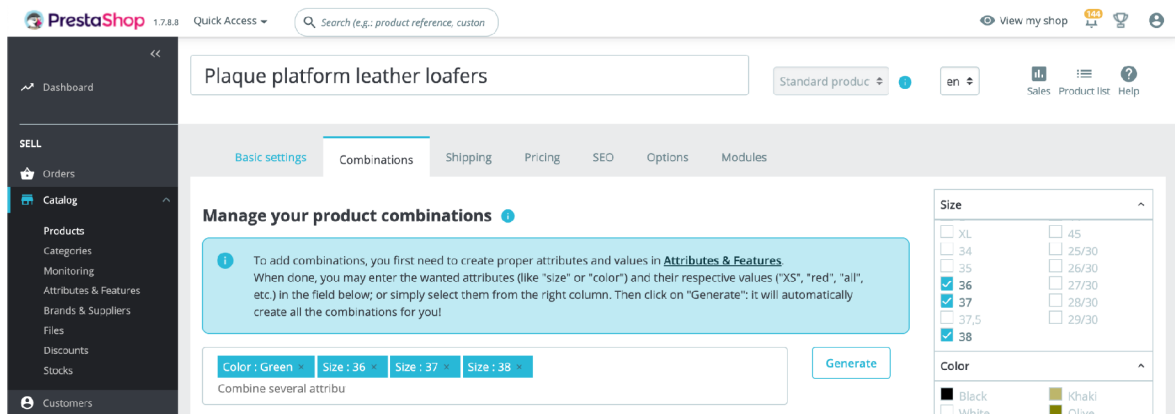
Figure 27: Catalog. Product edit page. Combinations

After that, it's possible set the product price, tax rules, select images, and discounts if applicable for each combination.
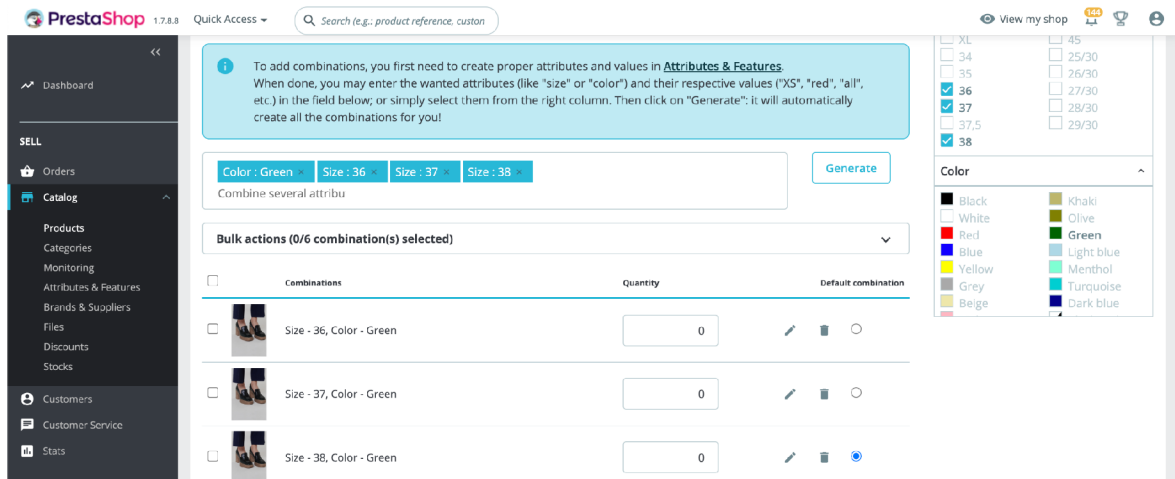
Figure 28: Catalog. Product edit page. Combinations. Generated combinations

The "SEO" tab in Prestashop allows for the optimization of product visibility and search engine rankings. It can be accessed by clicking on the "SEO" tab within the product editing page. Various fields can be filled in to optimize the product, such as the meta title and description, keywords, and URL. The meta title and description should be concise and accurately describe the product, while the URL should be readable and contain relevant keywords. Other fields such as friendly URLs, robots.txt rules, and canonical URLs can also be configured in the SEO tab.
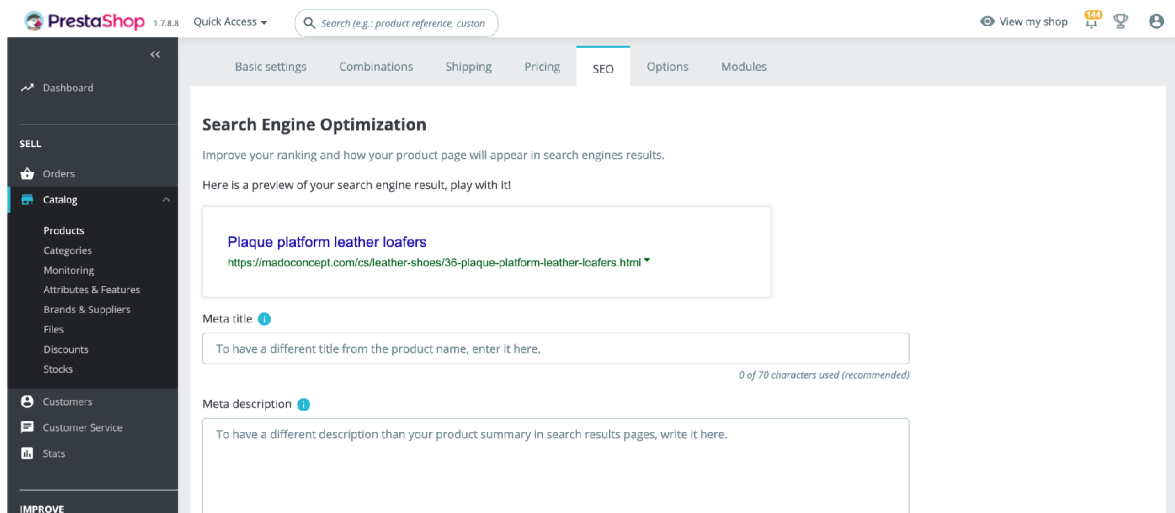
Figure 29: Catalog. Product edit page. SEO

4.2.7 Payment

To set up payment methods in Prestashop, several steps should be taken. First, navigate to the "Payment" section in the back office, where various payment options are available:

- To set up the "Cash on delivery" payment method, select it from the list and enable it. Configure the settings for this method, such as the fee amount or minimum and maximum order amount;
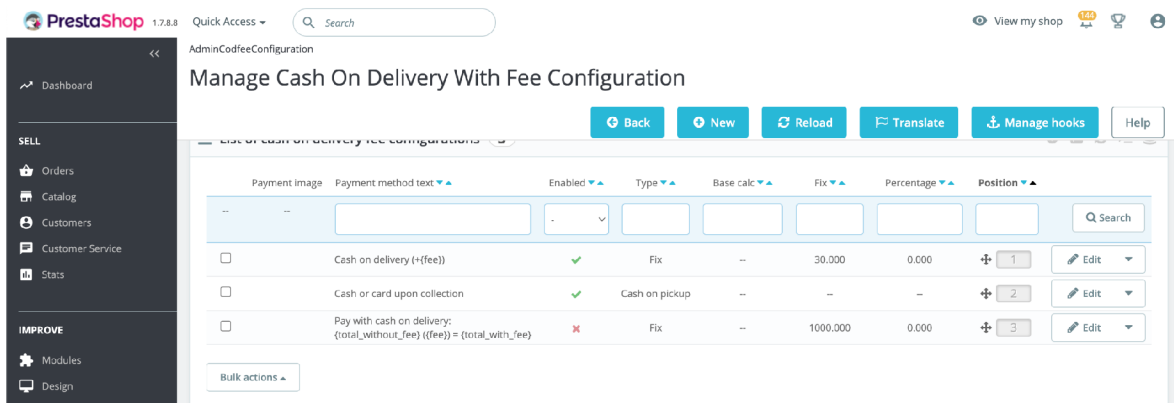
Figure 30: Payment. Modules. AdminCodfeeConfiguration

- To set up the "GP Webpay" payment gateway, select it from the list and enable it. Configure the settings for this method, such as the merchant ID or shared secret;
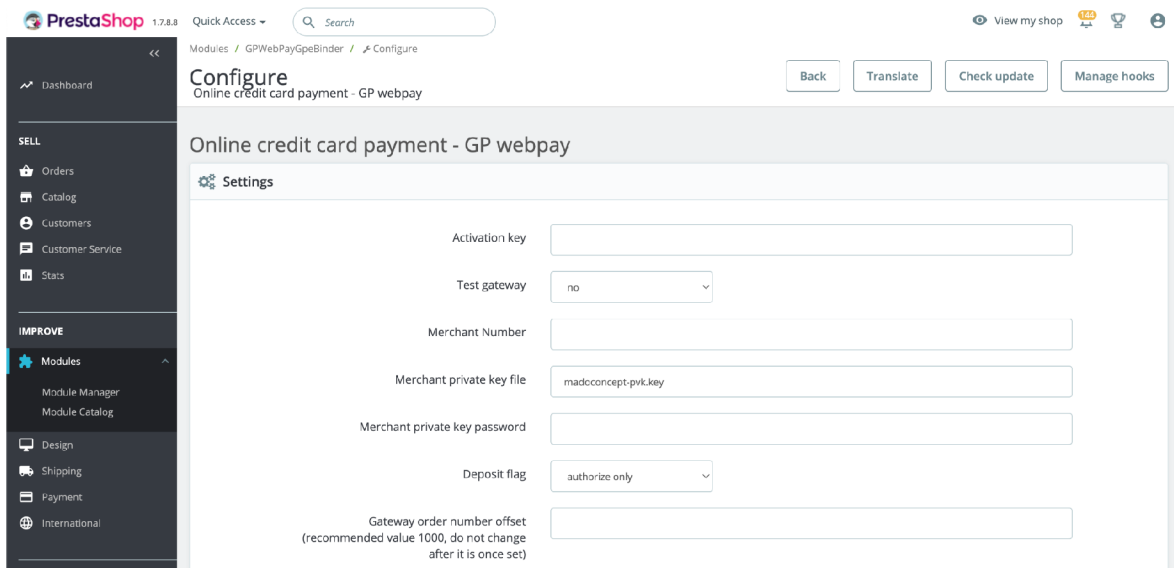
Figure 31: Payment. Modules. GPWebPayGpeBinder

- There are also could be other payment options based on the modules that we have installed, activated and configured.
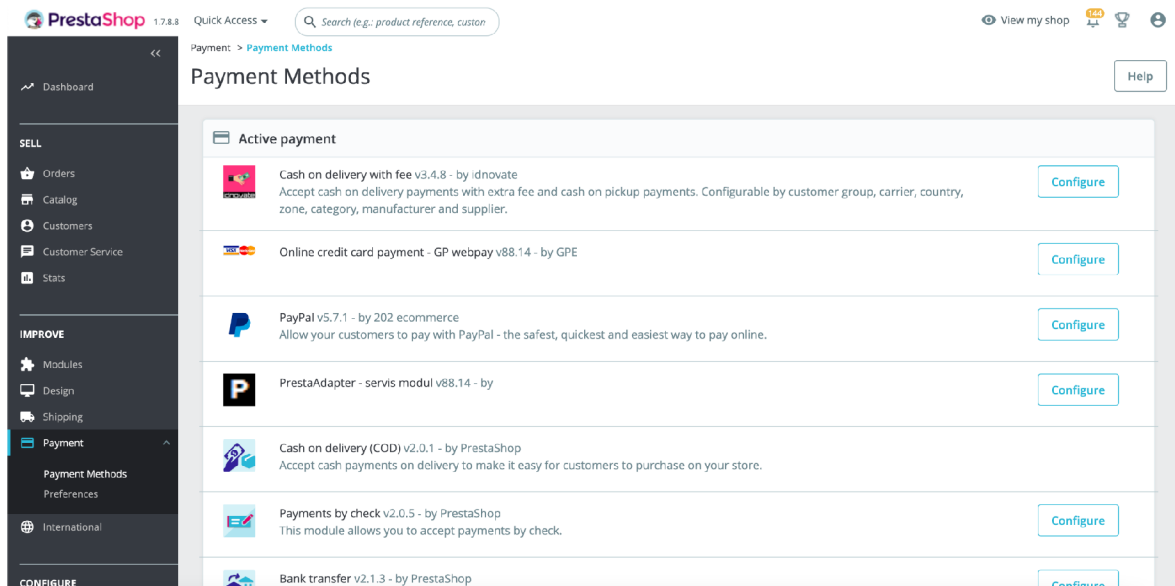
Figure 32: Payment. Payment methods

It is important to ensure that the payment methods are compatible with the store's location and target market, as well as with any applicable laws and regulations. Testing the payment methods before going live is also recommended to ensure that they are functioning properly.

4.2.8 Shipping

The shipping configuration in Prestashop can be set up in the back office by navigating to the "Shipping" section in the left-hand menu. From there, the user can configure carriers, zones, and shipping costs for each zone.

To configure carriers in Prestashop, several steps should be taken. Firstly, the carrier must be created in the "Carriers" section of the back office. This involves providing basic information such as the carrier name, transit time, and shipping price. Additionally, shipping zones and carrier groups must be set up.
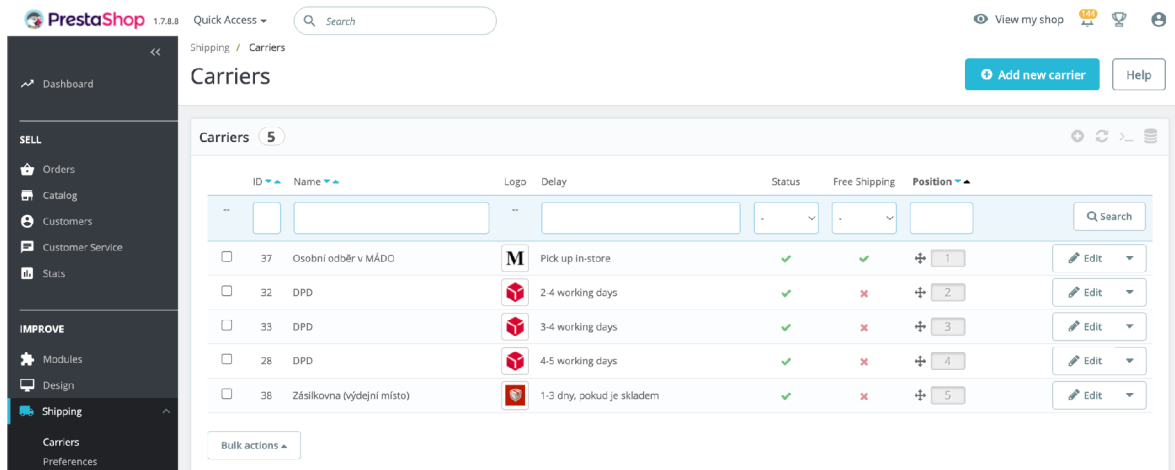
Figure 33: Shipping. Carriers

Shipping zones are geographical regions where the carrier will operate. They can be defined by country, state, or zip (PSČ) code range. Carrier groups, on the other hand, are used to group carriers together for specific shipping methods or customers.
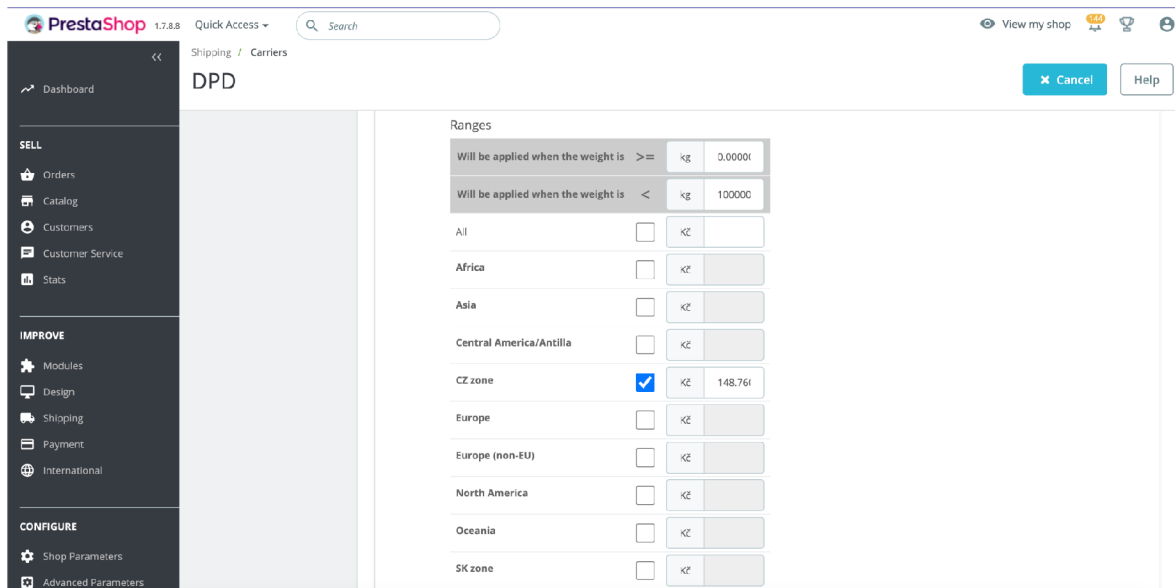
Figure 34: Shipping. Carriers. Locations

Once the carriers have been set up, they can be associated with shipping methods such as free shipping, flat rate, or weight-based shipping. These methods can be further customized with rules such as minimum order amounts or weight thresholds.

In addition to basic carrier configuration, Prestashop also offers advanced shipping features such as carrier tax rules and shipping cost rules based on product attributes or

order history. These features allow for greater flexibility and customization in the shipping process.
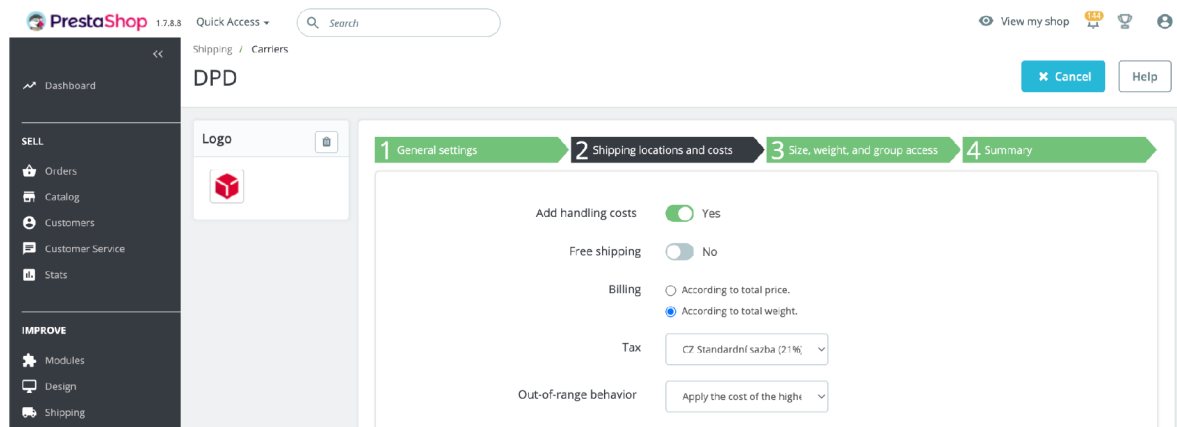
Figure 35: Shipping. Carriers. Costs

Zones can also be added and configured based on geographic regions, and shipping costs can be set up based on weight, price, or quantity. The shipping configuration can be customized to meet the specific needs of the e-shop, such as offering free shipping or providing shipping discounts for certain products or customers. Additionally, shipping modules can be installed to offer more advanced shipping options, such as real-time carrier rates or shipping tracking.

4.2.9 Search engine optimization

To configure SEO in Prestashop, various settings can be adjusted within the "SEO & URLs" ("Traffic & SEO") tab. These settings include adding meta titles, meta descriptions, and meta keywords to individual CMS pages;
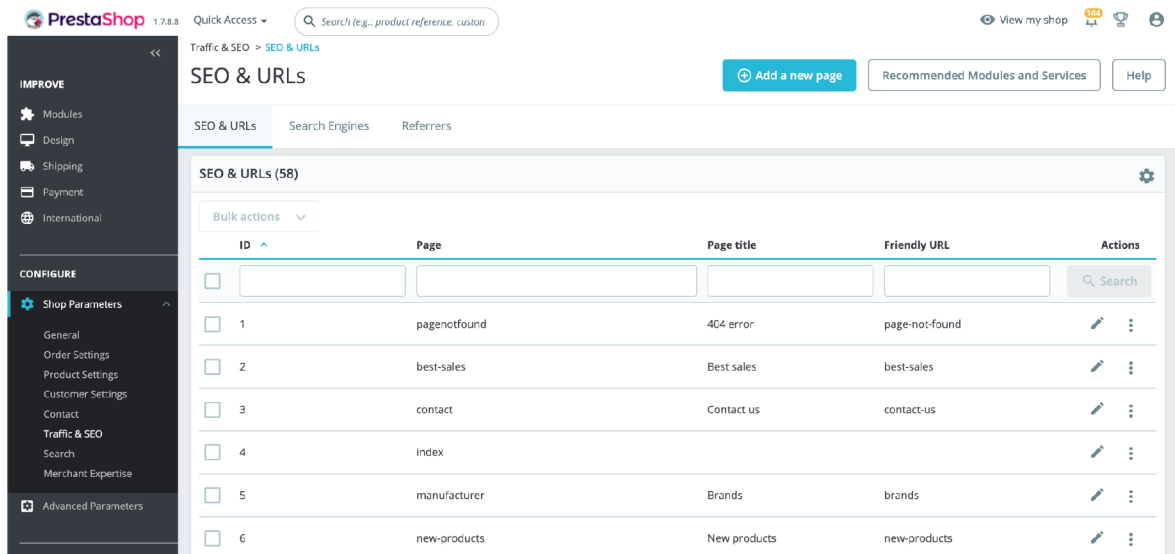
Figure 36: Shop parameters. SEO & URLs

It is also possible also to configure SEO for each product separately in Prestashop. When creating or editing a product, the "SEO & URLs" tab allows for the customization of the product's URL, meta title, meta description, and meta keywords. By providing unique and relevant information for each product, the site's overall SEO can be improved, potentially leading to increased traffic and sales. The SEO settings can also be configured for product combinations, allowing for further optimization.

Furthermore, the "Friendly URL" option allows for the creation of user-friendly URLs that include relevant keywords for improved search engine rankings. The "URLs setup" option allows for the customization of URLs for each language and shop. Additionally, the "Schema.org" option enables the use of structured data markup for improved search engine visibility.
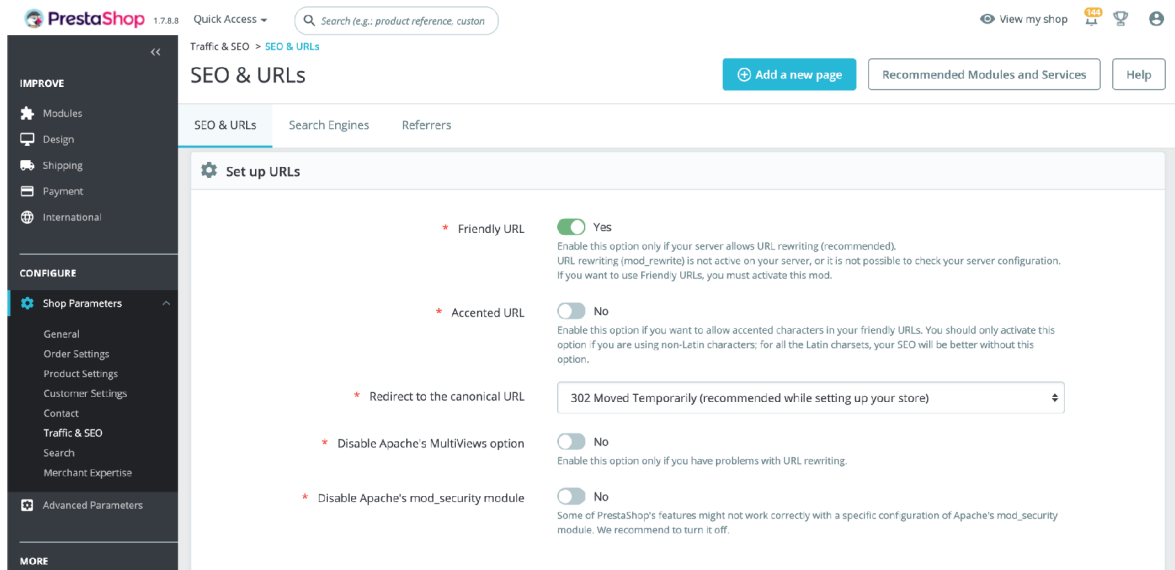
Figure 37: Shop parameters. SEO & URLs. Set up URLs

It's important to note that the configuration of SEO settings in Prestashop requires a thorough understanding of search engine optimization principles and best practices. As such, it's recommended to consult with an SEO specialist or conduct research before making any significant changes to the SEO configuration.

4.2.10 Performance

To configure performance options in Prestashop 1.7, users can access the "Performance" tab in the "Advanced Parameters" section of the back office. By configuring caching mechanisms, CCC options, media servers, Smarty cache, profiling, minification, and GZIP compression, users can optimize their Prestashop 1.7 website for improved performance and a better user experience:

- **Accessing Performance settings**: To configure performance options, navigate to the "Advanced Parameters" section of the back office, and then click on the "Performance" tab;
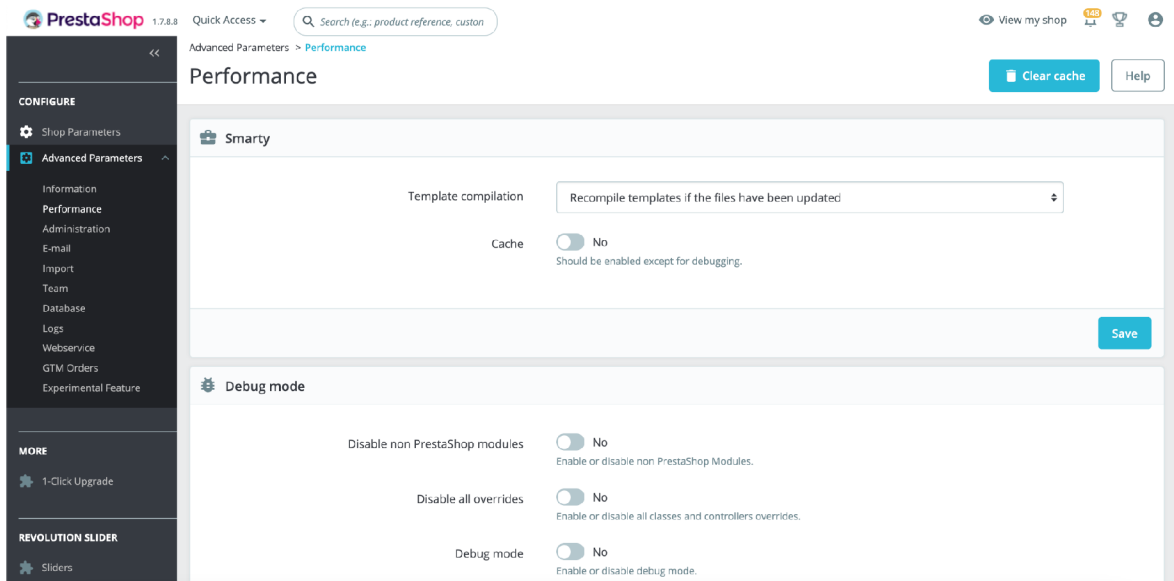
Figure 38: Advanced parameters. Performance

- **Caching options**: Users can enable or disable caching mechanisms by selecting the appropriate options in the "Caching" section of the Performance tab;
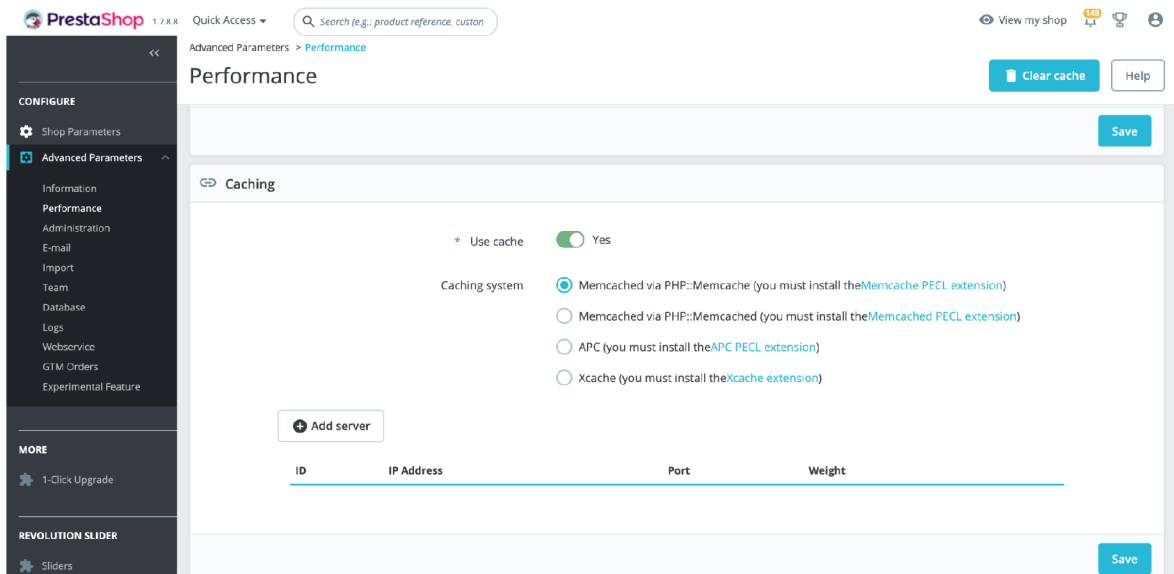
Figure 39: Advanced parameters. Performance. Caching

- **CCC options**: Navigate to the "CCC (Combine, Compress, and Cache)" section of the Performance tab, and select the appropriate options for combining, compressing, and caching JavaScript and CSS files;
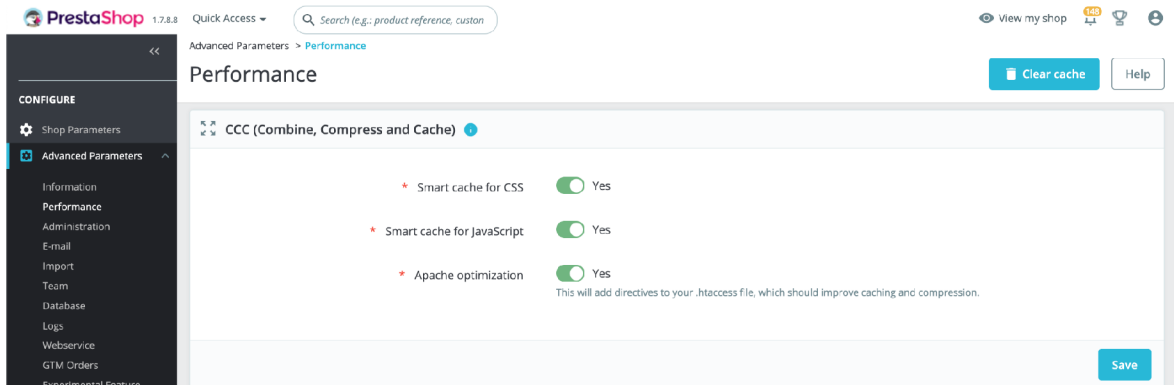
Figure 40: Advanced parameters. Performance. CCC

- **Media servers**: Users can configure media servers in the "Media servers" section of the Performance tab, by specifying the server hostname, IP address, and URL of the directory where static files are stored;

- **Smarty cache**: To enable or disable Smarty cache, users should navigate to the "Smarty" section of the Performance tab, and select the appropriate option;
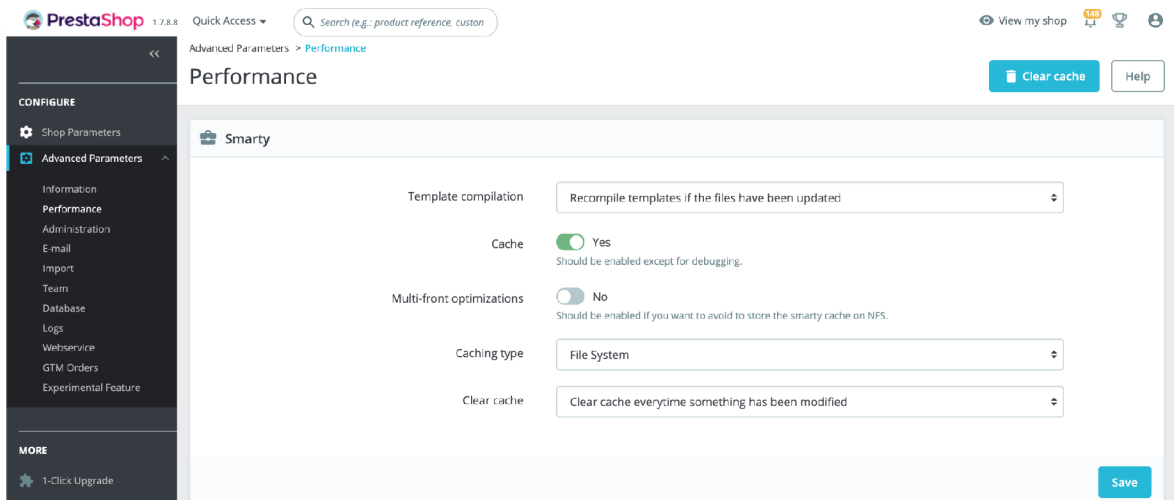
Figure 41: Advanced parameters. Performance. Smarty

By configuring these performance options, users can optimize their Prestashop 1.7 website for improved performance and a better user experience.

4.3 Integrations

In Prestashop, users can integrate their online store with various third-party services and platforms to enhance functionality and improve performance. This section would be

described the integrations available for marketplaces, Google Analytics 4, and CloudFlare. By integrating with these services, sellers can benefit from additional features and insights, such as streamlined order processing, increment in the number of orders, advanced analytics tracking, and enhanced website security and performance.

4.3.1   Google Analytics 4

Google Analytics 4 is a powerful analytics tool that provides valuable insights into user behavior and website performance. By integrating Google Analytics 4 with Prestashop, users can track and analyze key metrics such as traffic sources, user demographics, and conversion rates. In this section, we will describe the process for setting up Google Analytics 4 in Prestashop. This will include creating a Google Analytics 4 property, configuring the integration settings in Prestashop, and verifying that tracking is properly set up. By following these steps, users can gain a deeper understanding of their website's performance and make data-driven decisions to improve an online business.

Here is an overview of the process to set up Google Analytics 4 in Prestashop 1.7:

1. **Create a Google Analytics 4 property** - first, create a new Google Analytics 4 property in the Google Analytics account. This will generate a unique measurement ID that will be used to link the Google Analytics account to the Prestashop website;
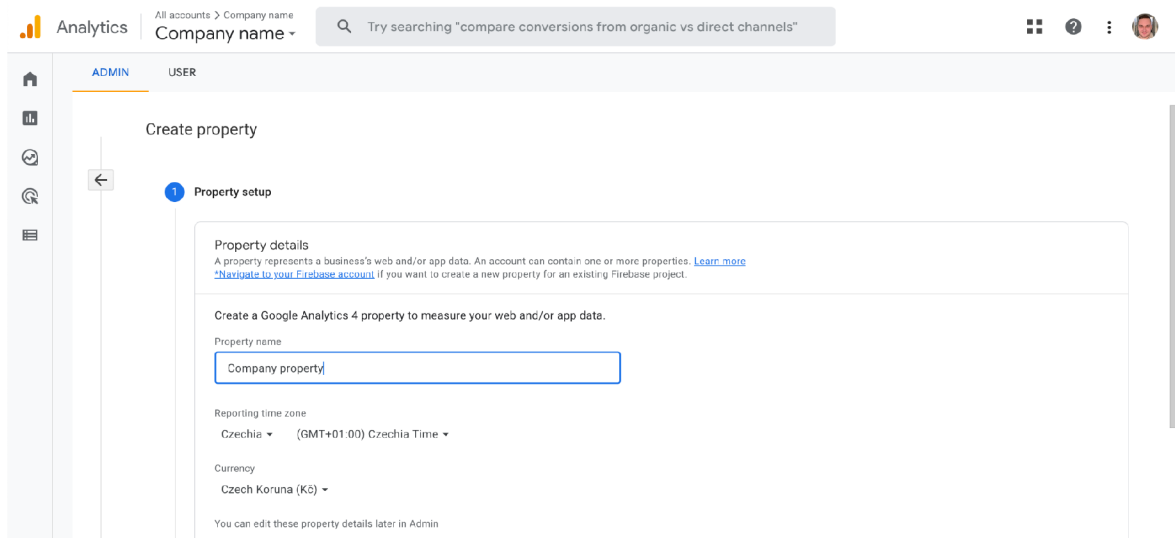
Figure 42: Google Analytics. Property creation
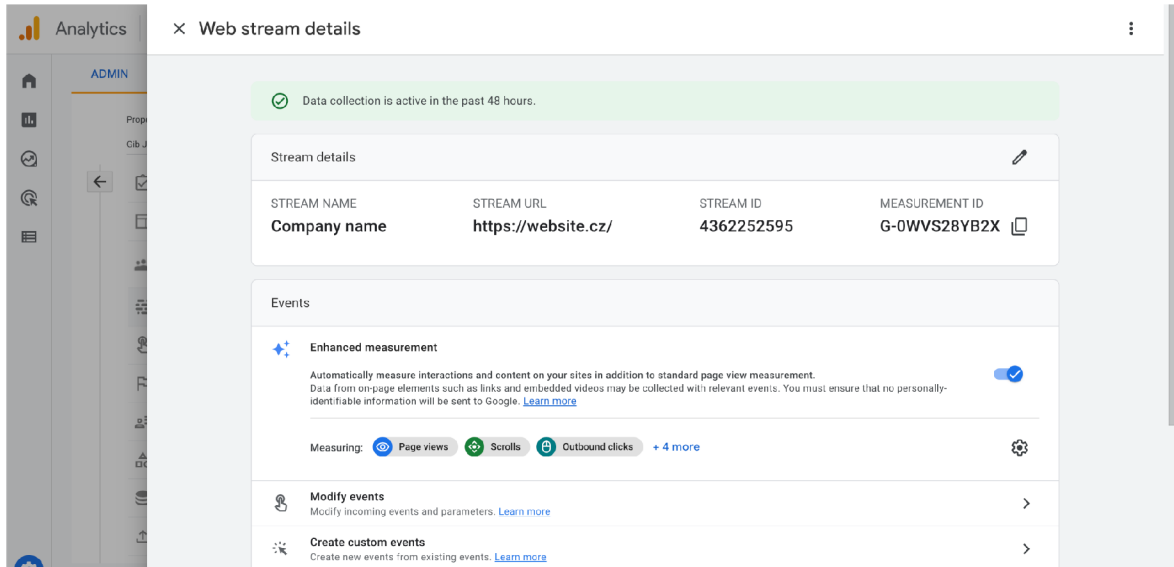
Figure 43: Google Analytics. Web stream details

2. **Install and configure the "PrestaShop Metrics Module" addon** - Prestashop users can install the official "PrestaShop Metrics Module" addon from the Prestashop marketplace. Once installed, users can configure the module settings by entering their Google Analytics measurement ID and selecting other tracking options as desired;
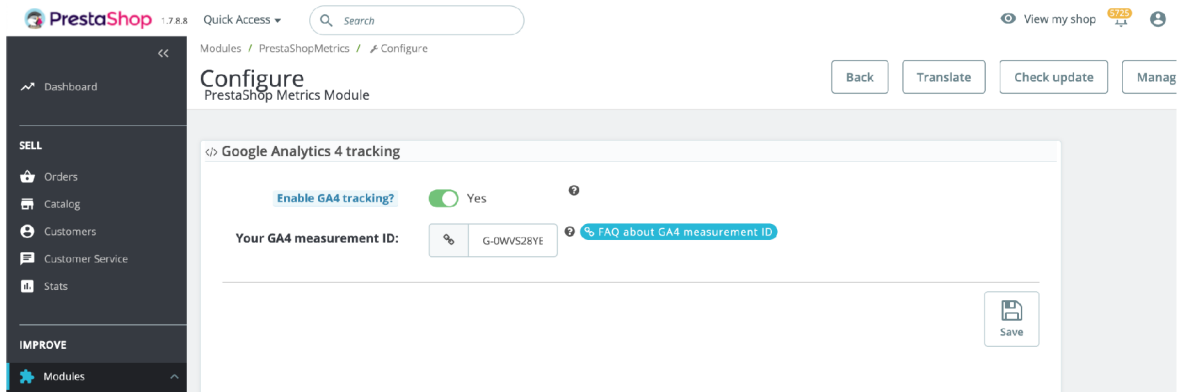
Figure 44: Google Analytics. Set up measurement ID

3. **Verify the tracking is set up** - after configuring the module settings, users should verify that tracking is properly set up and data is being collected. This can be done by navigating to the Google Analytics 4 dashboard and checking for new data or by using tools such as Google Tag Assistant to confirm tracking is working.
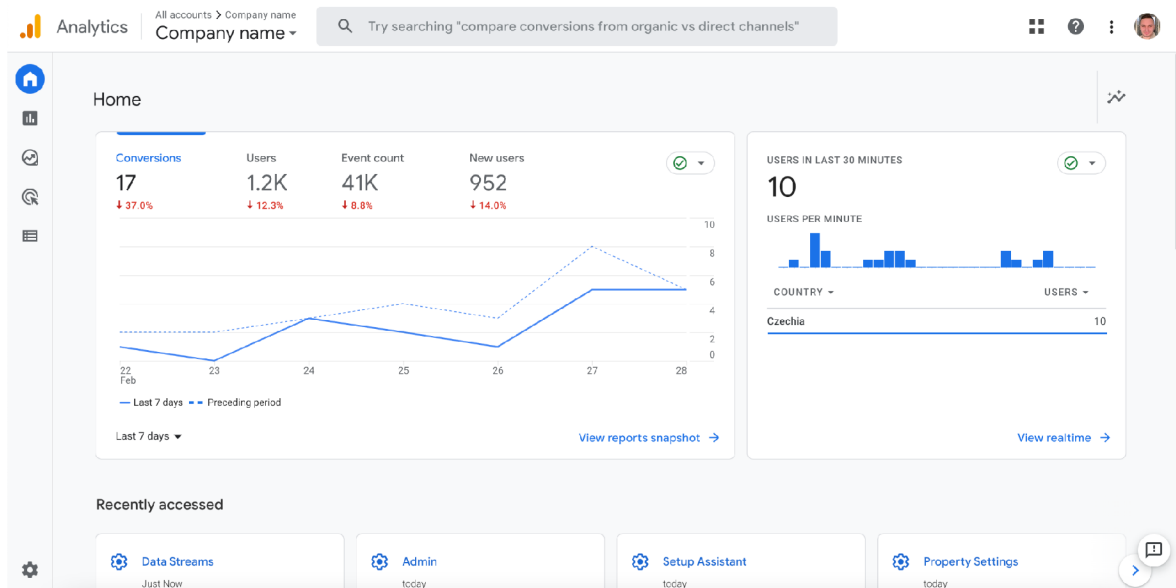
Figure 45: Google Analytics. Dashboard

The "Ecommerce purchases" section in Google Analytics 4 provides insights into the performance of online purchases made through a website. This section can track metrics such as total revenue, average order value, products purchased, products that were added to the cart, and conversion rate. By analyzing these metrics, website owners can gain a deeper understanding of their customer's behavior and make data-driven decisions to improve an online business.
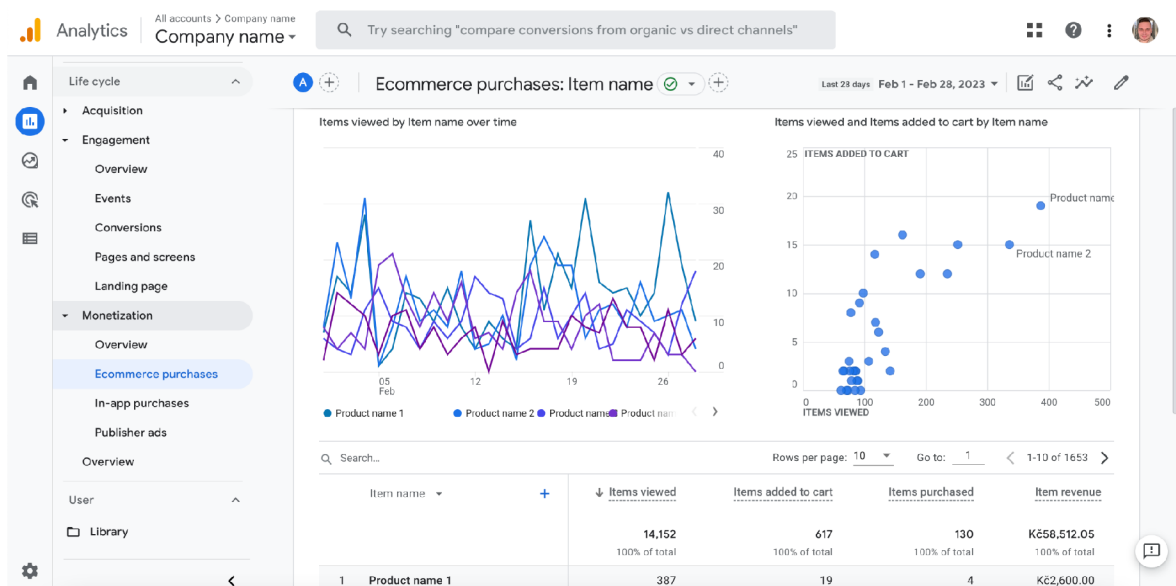
Figure 46: Google Analytics. Ecommerce purchases

In conclusion, setting up Google Analytics 4 in Prestashop 1.7 involves creating a new property in the Google Analytics account and installing and configuring an addon from the Prestashop marketplace to enable tracking. It's also could be done by inserting a script with measurement ID.

Once set up, Google Analytics 4 can provide valuable insights into website performance, including metrics such as revenue, average order value, and conversion rate. By regularly monitoring these metrics, users can make data-driven decisions to improve website performance and increase online sales.

Additionally, Google Analytics 4 can help users identify areas of the website that are performing well, as well as areas that need improvement. Overall, setting up Google Analytics 4 is an important step towards achieving online success and optimizing website performance.

4.3.2 Heureka.cz

We will explore the integration of Prestashop with Heureka.cz, a popular online marketplace in the Czech Republic. By integrating with Heureka.cz, users can increase their online visibility and reach a wider audience, potentially resulting in increased online sales. The integration process involves setting up an account on Heureka.cz, configuring the integration settings in Prestashop, and verifying that products are properly synced with Heureka.cz.

The process of integrating Prestashop with Heureka.cz involves several steps:

1. **Create an account on Heureka.cz**: First, create an account on Heureka.cz and register an online store. This involves providing basic information about the store, such as its name, URL, and location;

Figure 47: Heureka.cz. Company information

2. **Configure the integration settings in Prestashop**: Once the Heureka.cz account is set up, install and configure the third-party addon in Prestashop. This addon provides a connection between the Prestashop store and Heureka.cz, allowing for the syncing of product data and other important information;

Figure 48: XML export for Heureka

3. **Categories pairing**: Refers to the hierarchical structure of categories that a product belongs to in an online store. In an XML feed, this information is often required by third-party services, such as shopping comparison websites, to properly categorize

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and display products. The Category Path typically includes the names of all parent categories that a product belongs to, separated by a delimiter such as a forward slash (/). For example, if a product belongs to the "Shoes" category, which is a child of the "Clothing" category, the Category Path would be "Clothing/Shoes". This information helps shopping comparison websites display the product in the correct category and helps users find what they are looking for more easily;
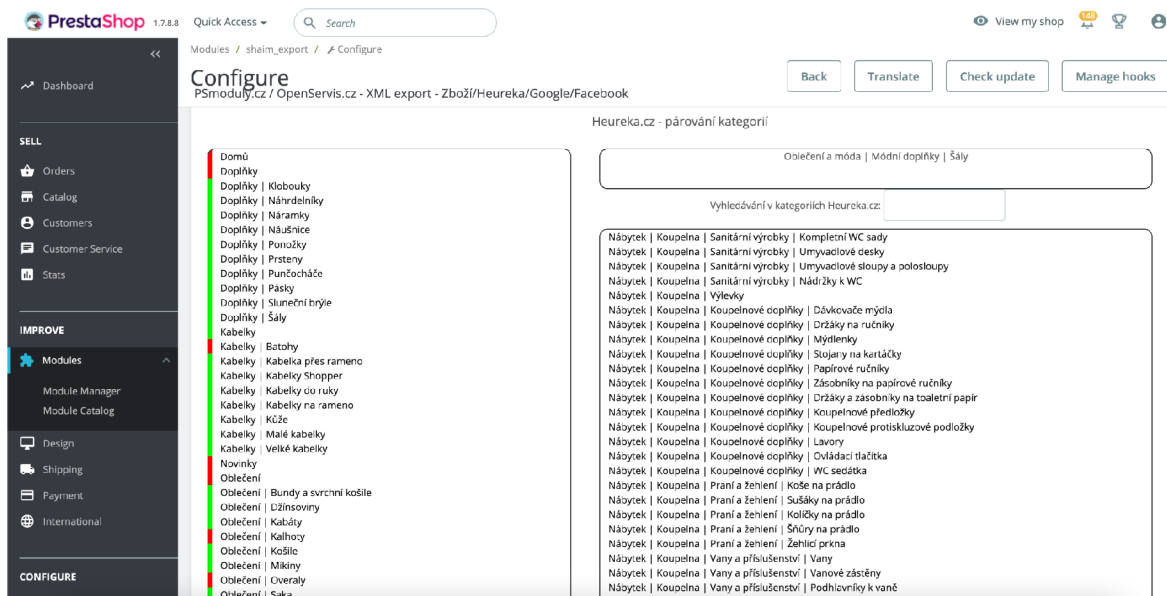
Figure 49: XML export for Heureka. Categories pairing

4. **XML feed link:** After that .xml feed would be generated and accessible by the following endpoint (https://madoconcept.com/xml/heureka_cz.xml);
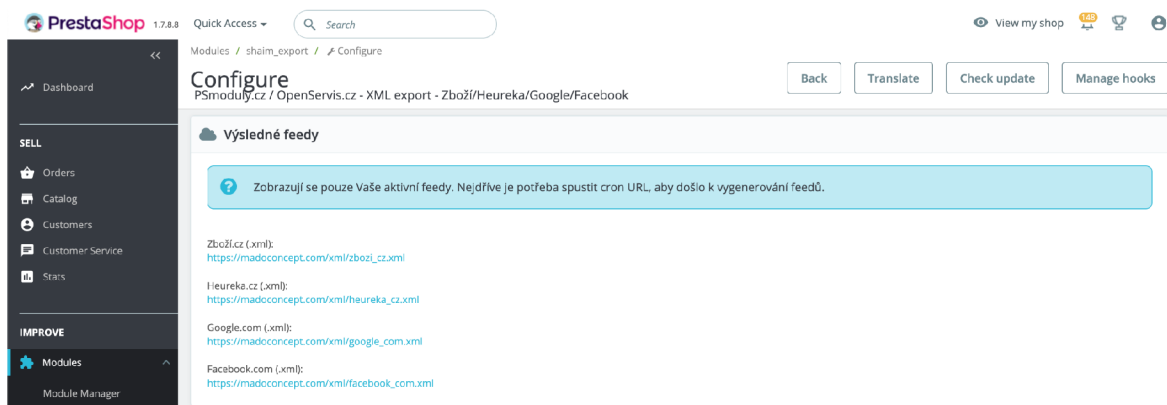
Figure 50: XML export for Heureka. Feed link

5. **Verify product sync**: After configuring the integration settings, verify that products are properly synced with Heureka.cz. This involves checking that all product data, such as name, description, price, and image, are accurately displayed on Heureka.cz.
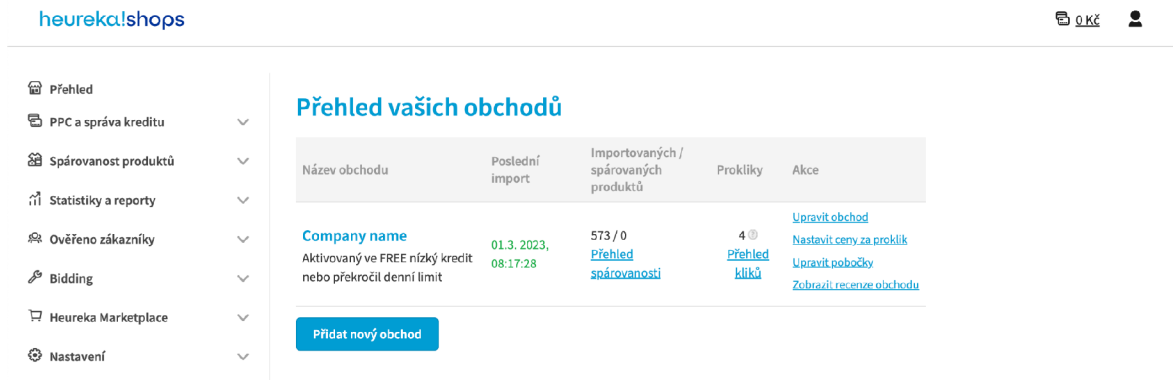
Figure 51: XML export for Heureka. Dashboard

6. **Enable Heureka.cz features**: In addition to syncing product data, Heureka.cz offers several features that can help increase visibility and sales. These include product reviews, price comparisons, and advertising. Enable these features in the Heureka.cz account to take full advantage of the integration.

7. **Monitor performance**: Once the integration is complete, regularly monitor the Heureka.cz account and track important metrics, such as traffic, conversions, and revenue. Use this data to make data-driven decisions and optimize the store's performance on Heureka.cz.

In conclusion, integrating with Heureka.cz can help increase the visibility and sales of an online store by exposing products to a wider audience on a popular shopping comparison website. The integration process involves setting up a Heureka.cz account, configuring the necessary settings in the back office of the online store and generating and submitting an XML feed containing product information to Heureka.cz. By following these steps and maintaining the integration, an online store can benefit from increased traffic and sales from Heureka.cz platform.

4.3.3 Google Merchant Center

In the world of e-commerce, it is essential to optimize product listings to drive traffic and sales. One effective way to do this is by integrating the online store with Google Merchant Center and Google Shopping. This integration allows products to appear in Google search results and reach a broader audience. In this section, we will explore the process of integrating the Prestashop store with Google Merchant Center and Google Shopping, using the third-party module.

To integrate Google Merchant Center and Google Shopping with Prestashop using the official Prestashop addon "PrestaShop Marketing with Google Module", the following steps can be followed:

1. Install the "PrestaShop Marketing with Google Module" addon in the Prestashop back office;
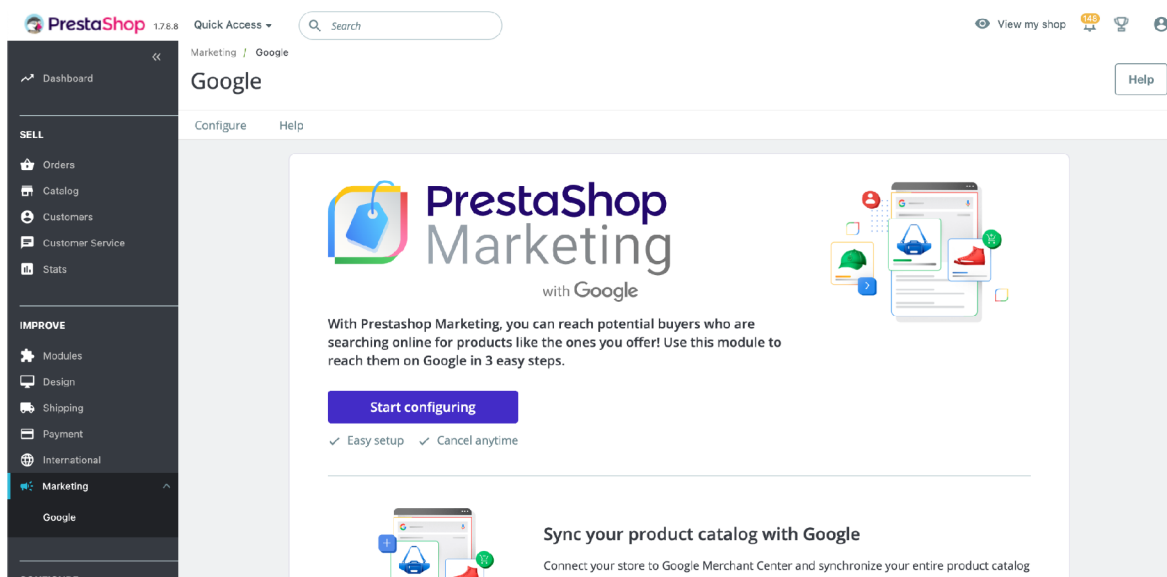
Figure 52: PrestaShop Marketing with Google Module. Dashboard

2. Associate the shop with the PrestaShop account;
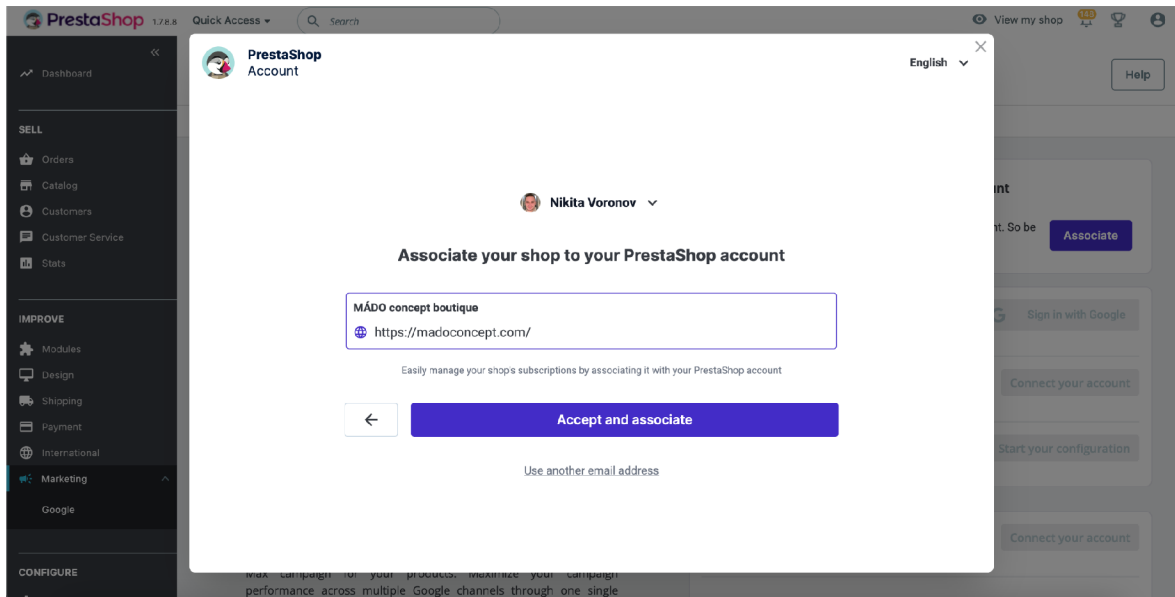
Figure 53: PrestaShop Marketing with Google Module. Association

3. Go to the Google Merchant Center and create an account or sign in to an existing account;

4. Set up a new product feed by following the instructions. It's needed to have a Merchat Center account to process the synchronization;
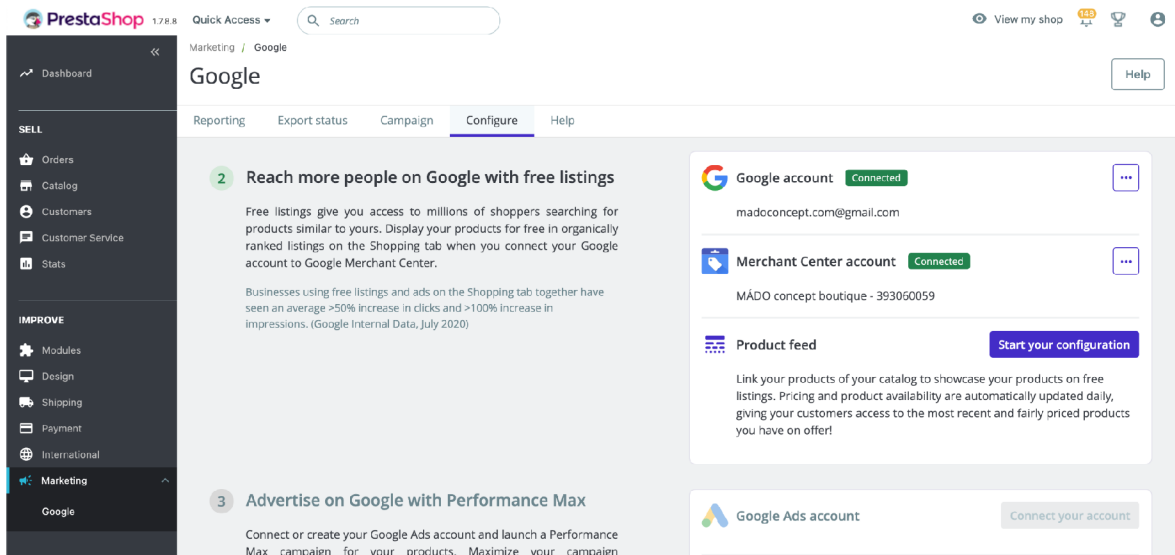
Figure 54: PrestaShop Marketing with Google Module. Association

5. Configure the product feed settings, including the target country and language.
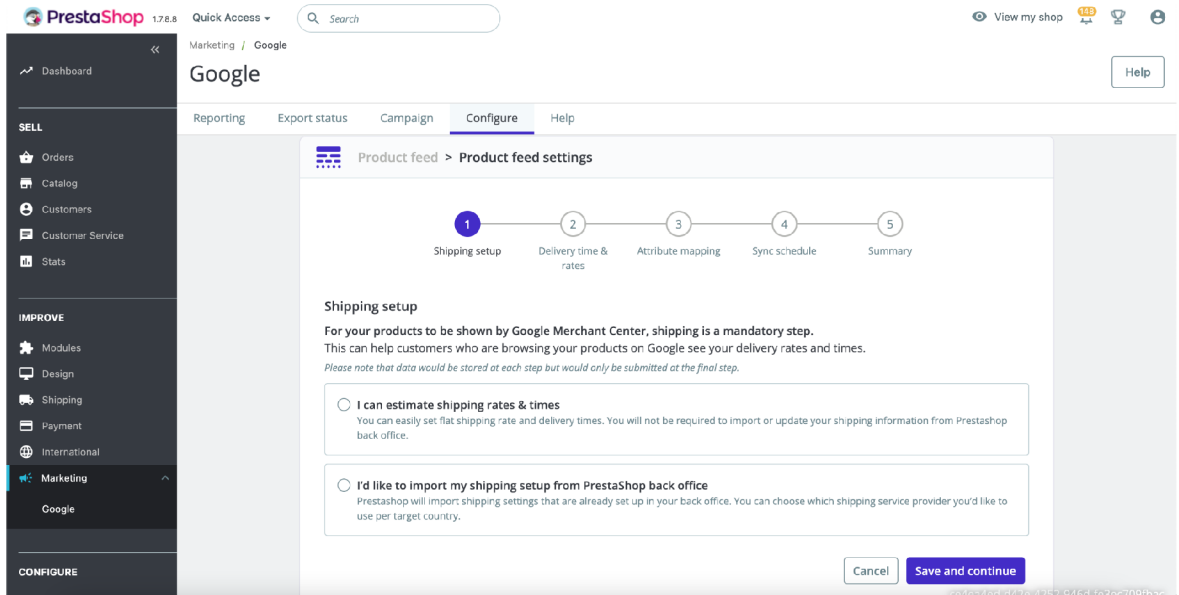
Figure 55: PrestaShop Marketing with Google Module. Product feed settings

6. Map the product attributes in the Prestashop store to the corresponding Google Merchant Center attributes using the mapping tool in the "PrestaShop Marketing with Google Module";

7. Test the product feed by submitting it to the Google Merchant Center and reviewing any errors or warnings;
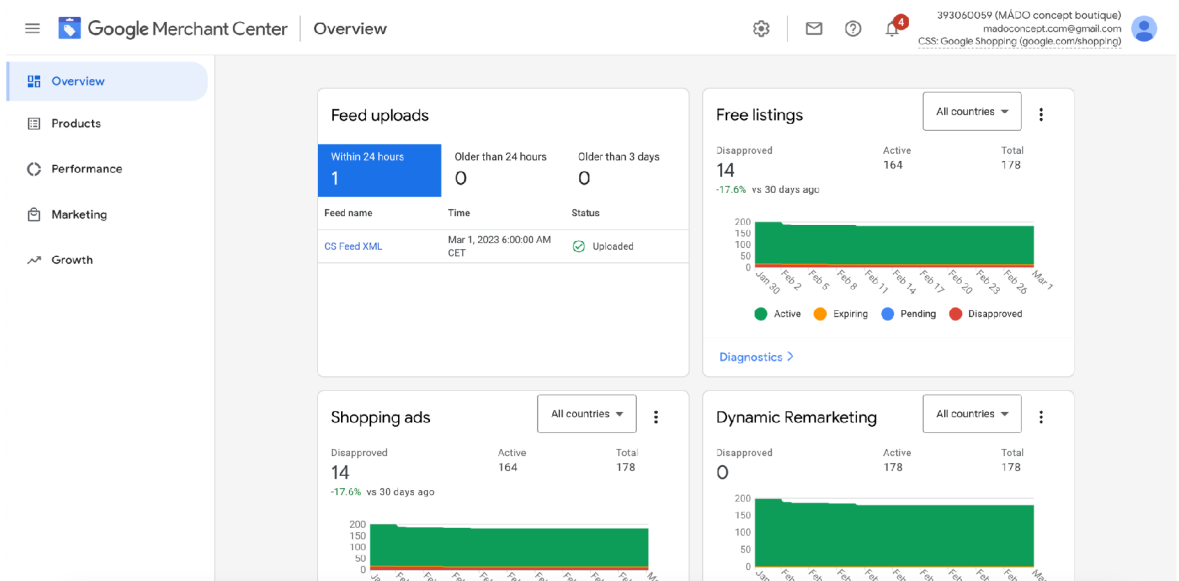
Figure 56: Google Merchant Center. Dashboard

8. Once the product feed is working correctly, enable automatic updates to ensure that the product information in the Google Merchant Center stays up-to-date with the Prestashop store.
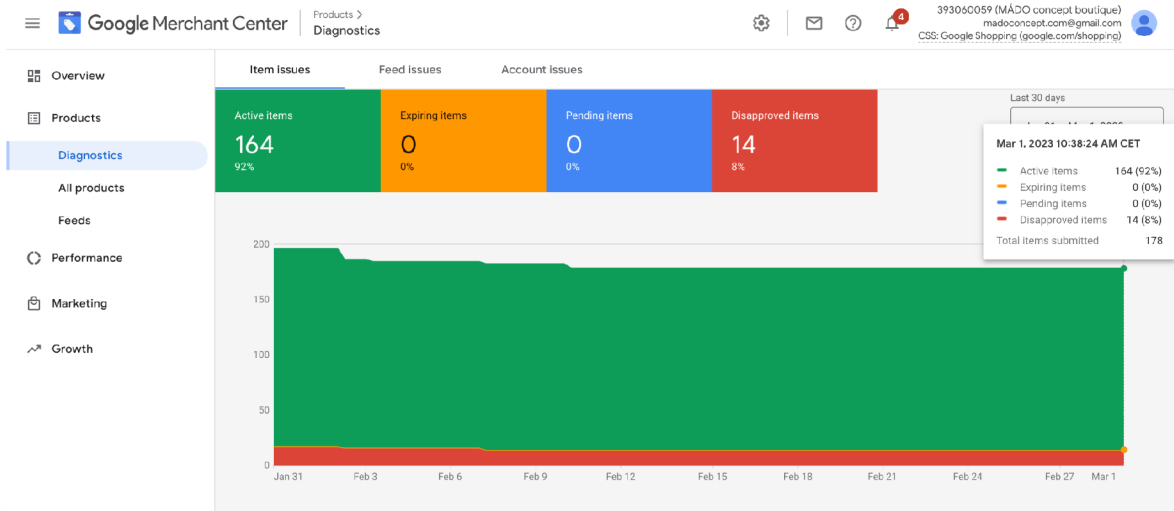
Figure 57: Google Merchant Center. Products. Diagnostics

4.3.4   CloudFlare

Connecting an online store to Cloudflare can offer a range of benefits, such as improved website performance, increased security, and better availability. Cloudflare is a content delivery network (CDN) that uses a global network of servers to cache and deliver website content to visitors from a server location that is closest to them. This can lead to faster page load times and a better user experience. Additionally, Cloudflare provides a range of security features such as DDoS protection, web application firewall, and SSL encryption, which can help protect online stores from malicious attacks and improve website security. This section will describe the process of connecting an online store to Cloudflare and configuring the necessary settings.

Here are the steps to connect Cloudflare to a website hosted on an Amazon Lightsail LAMP stack with a static IP address assigned to the instance:

1. Log in (or sign up) to the Cloudflare account;

2. Enter the domain name that needs to be connected to Cloudflare;
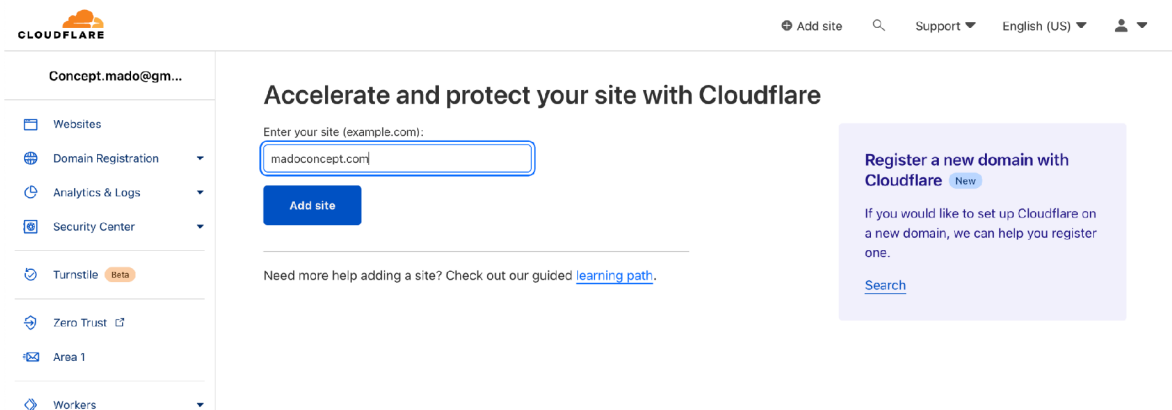
Figure 58: Cloudflare. Adding a new website

3. Access the DNS settings for the selected domain;

4. Locate the A record for the domain in the DNS settings;

5. Change the IP address of the A record to the static IP address assigned to the Lightsail instance;
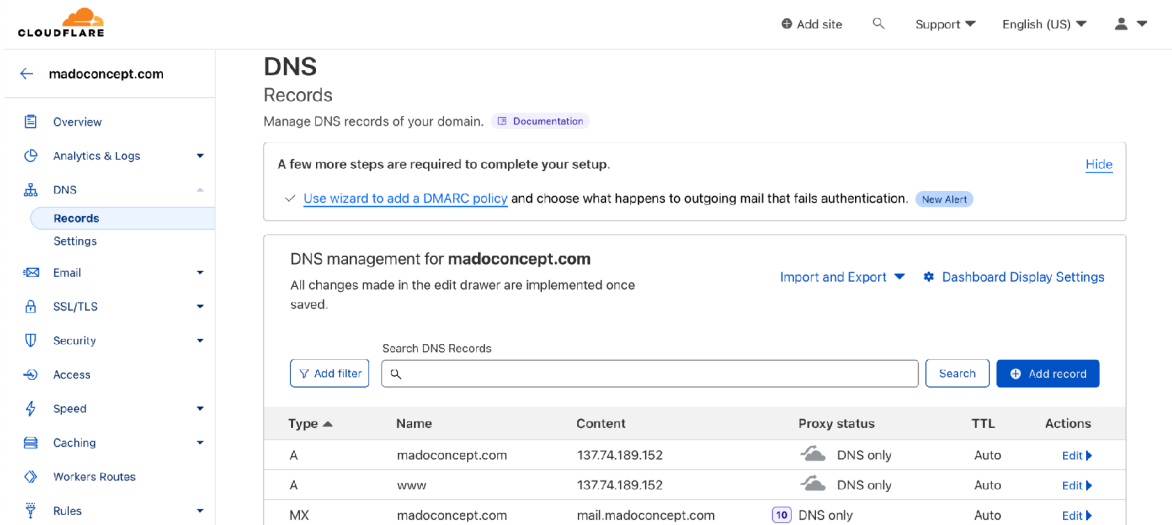
Figure 59: Cloudflare. DNS

6. Cloudflare will start proxying traffic to the website;

7. Take advantage of additional features provided by Cloudflare, such as caching, security, and performance optimization.
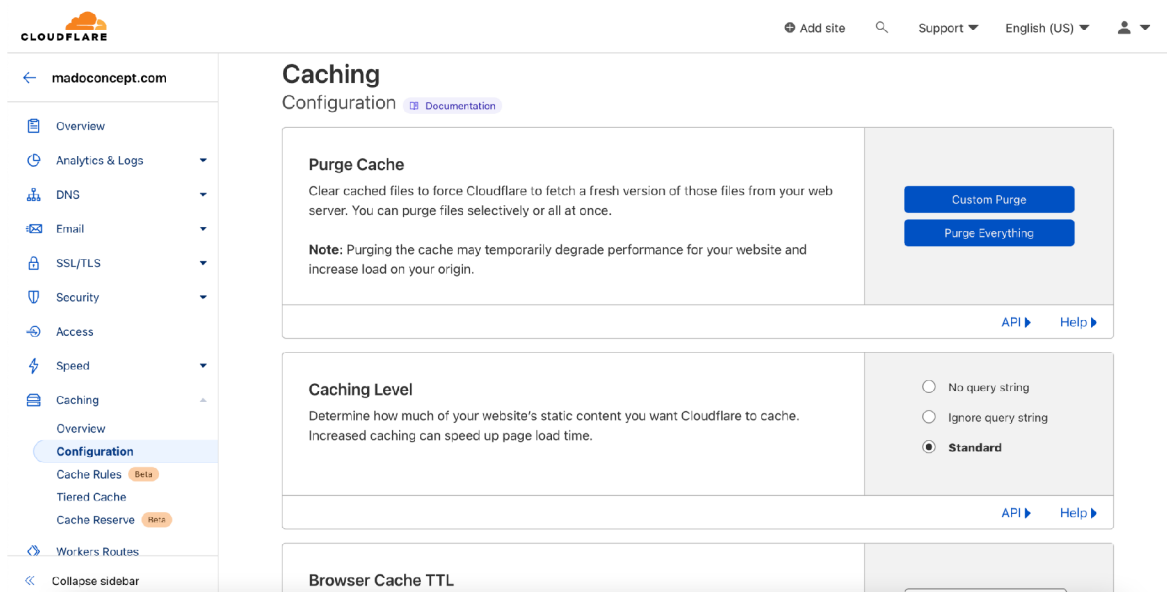
Figure 60: Cloudflare. Caching
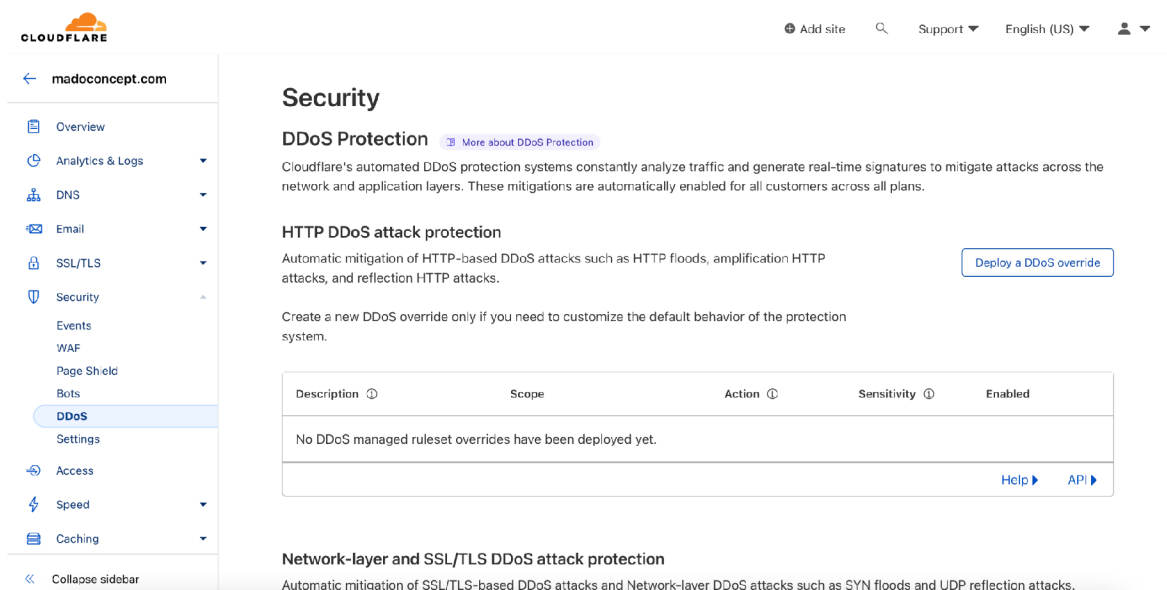
Figure 61: Cloudflare. Security

By following these steps, the website will be connected to Cloudflare and will benefit from improved performance and security.

5   Conclusion

In conclusion, building a web store using Prestashop CMS and integrating it with third-party services can significantly enhance the functionality, performance, and user experience of an online store. With the use of various integrations, such as Google Analytics, Cloudflare, Heureka.cz, and Google Merchant Center/Google Shopping, an online store can become more visible, optimized, and profitable. By carefully selecting the right third-party services and integrating them into the Prestashop web store, businesses can gain a competitive advantage in the online market.

Overall, the research conducted in this bachelor thesis provides a comprehensive guide for building a web store using Prestashop CMS and integrating it with various third-party services. This information will be valuable for businesses looking to establish an online presence and take advantage of the many benefits that come with e-commerce.

The real project could be accessed by the following URLs:

- https://madoconcept.com/cs/ - Czech version;
- https://madoconcept.com/en/ - English version.

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8   List of abbreviations

- **AD**: AD stands for "Anno Domini" which is Latin for "in the year of our Lord". It is used to denote years after the birth of Jesus Christ;

- **API**: API stands for "Application Programming Interface". It is a set of protocols, routines, and tools for building software applications;
- **A-record**: An A-record is a type of DNS record that maps a domain name to an IP address;
- **AWS**: AWS stands for "Amazon Web Services". It is a cloud computing platform that provides a wide range of services including computing, storage, and databases;
- **B2B**: B2B stands for "business-to-business". It refers to commerce between businesses rather than between businesses and individual consumers;
- **B2C**: B2C stands for "business-to-consumer". It refers to commerce between businesses and individual consumers;
- **CMS**: CMS stands for "Content Management System". It is a software application that allows users to create, manage, and publish digital content, typically for websites.
- **CMA**: CMA stands for "Content Management Application". It is the front-end user interface of a CMS that allows users to create, edit, and manage digital content;
- **CDA**: CDA stands for "Content Delivery Application". It is the back-end component of a CMS that delivers digital content to users;
- **COVID-19**: COVID-19 is an abbreviation for "Coronavirus Disease 2019". It is a respiratory illness caused by the SARS-CoV-2 virus;
- **CSS**: CSS stands for "Cascading Style Sheets". It is a style sheet language used for describing the presentation of a document written in HTML or XML;
- **DAM** (Digital Asset Management): DAM stands for "Digital Asset Management". It is a system used for storing, organizing, and retrieving digital assets such as images, videos, and documents;
- **DNS**: DNS stands for "Domain Name System". It is a system used for translating domain names into IP addresses;
- **DDoS**: DDoS stands for "Distributed Denial of Service". It is a type of cyber-attack where multiple compromised systems are used to flood a target website or server with traffic, making it unavailable;
- **DPIA**: DPIA stands for "Data Protection Impact Assessment". It is a process used to identify and mitigate risks to individuals' data privacy;

- **DPO**: DPO stands for "Data Protection Officer". It is a role within an organization responsible for ensuring compliance with data protection regulations such as GDPR;
- **EC2**: EC2 stands for "Elastic Compute Cloud". It is a service provided by AWS that allows users to rent virtual computers on which to run their own computer applications;
- **ECM**: ECM stands for "Enterprise Content Management". It is a strategy for managing an organization's digital content across its entire lifecycle, from creation to disposal;
- **GA**: GA stands for "Google Analytics". It is a web analytics service provided by Google that tracks and reports website traffic;
- **GA3**: GA3 is a legacy version of Google Analytics, which has been replaced by GA4;
- **GA4**: GA4 is the latest version of Google Analytics, which provides a more advanced tracking and reporting capabilities compared to GA3;
- **GMC**: GMC stands for "Google Merchant Center". It is a platform provided by Google for managing product data and running shopping campaigns;
- **GTM**: GTM stands for "Google Tag Manager". It is a platform provided by Google for managing website tags and tracking codes;
- **GZIP**: GZIP is a compression format used for reducing the size of files for faster transmission over a network;
- **HTML**: HTML stands for "Hypertext Markup Language". It is a markup language used for creating web pages;
- **HTTP**: HTTP stands for "HyperText Transfer Protocol". It is a protocol used for transferring data over the internet, commonly used for web browsing;
- **HTTPS**: HTTPS stands for "HyperText Transfer Protocol Secure". It is an extension of HTTP that encrypts data transmitted between a web server and a web browser for increased security.
- **ID**: ID stands for "Identification". It is a unique identifier used to distinguish an individual or object from others;

- **IP**: IP stands for "Internet Protocol". It is a protocol used for routing data packets between devices connected to the internet;

- **JS**: JS stands for "JavaScript". It is a programming language used for creating dynamic and interactive web content;

- **LAMP**: LAMP is an acronym for a software stack that includes Linux, Apache, MySQL, and PHP. It is commonly used for creating and deploying web applications;

- **LEMP**: LEMP is an acronym for a software stack that includes Linux, Nginx, MySQL, and PHP. It is an alternative to LAMP and is commonly used for creating and deploying web applications;

- **MVC**: MVC stands for "Model-View-Controller". It is a software architecture pattern used for separating an application's concerns into three interconnected components: the model, view, and controller;

- **MySQL**: MySQL is an open-source relational database management system used for storing and managing data;

- **ORM**: ORM stands for "Object-Relational Mapping". It is a technique used for connecting object-oriented programming languages to relational databases;

- **PSR**: PSR stands for "PHP Standards Recommendations". It is a set of standards and recommendations for writing PHP code, developed by the PHP Framework Interoperability Group;

- **RAM**: RAM stands for "Random Access Memory". It is a type of computer memory used for storing data that is currently being used by a program or application;

- **RM**: RM stands for "Records Management". It is the practice of managing an organization's records throughout their lifecycle, from creation to disposal;

- **SEO**: SEO stands for "Search Engine Optimization". It is the practice of optimizing a website or web page to increase its visibility and ranking on search engine results pages;

- **SMTP**: SMTP stands for "Simple Mail Transfer Protocol". It is a protocol used for sending email messages over the internet;

- **SSH**: SSH stands for "Secure Shell". It is a network protocol used for securely accessing a remote computer or server;
- **SSL**: SSL stands for "Secure Sockets Layer". It is a security protocol used for encrypting data transmitted between a web server and a web browser;
- **SWOT**: SWOT stands for "Strengths, Weaknesses, Opportunities, and Threats". It is a strategic planning tool used for identifying an organization's internal and external factors that may impact its success;
- **TSV**: TSV stands for "Tab-Separated Values". It is a file format used for storing and exchanging data, where each value is separated by a tab character;
- **URI**: URI stands for "Uniform Resource Identifier". It is a string of characters used to identify a name or a resource on the internet;
- **URL**: URL stands for "Uniform Resource Locator". It is a type of URI used for specifying the location of a resource on the internet;
- **VAT**: VAT stands for "Value Added Tax". It is a tax levied on the value added to a product or service at each stage of production and distribution;
- **VPS**: VPS stands for "Virtual Private Server". It is a type of web hosting service that provides a virtualized server environment on a shared physical server;
- **WAF**: WAF stands for "Web Application Firewall". It is a type of firewall used for protecting web applications from attacks and unauthorized access;
- **WCM**: WCM stands for "Web Content Management". It is a system that allows businesses and organizations to manage their website content easily, including creating, editing, publishing, and archiving content;
- **WCMS**: WCMS stands for "Web Content Management System". It is a software application that provides a suite of tools to manage digital content, usually for websites, including content creation, editing, publishing, and version control;
- **WWW**: WWW stands for "World Wide Web". It is a global network of interconnected documents and resources, accessed via the internet, that can be viewed using a web browser;
- **XHTML**: XHTML stands for "Extensible HyperText Markup Language". It is a markup language that uses XML syntax and is designed to be an extension of HTML, adhering to strict XML rules;

- **XML**: XML stands for "Extensible Markup Language". It is a markup language used for encoding documents in a format that is both human-readable and machine-readable;
- **YAML**: YAML stands for "YAML Ain't Markup Language". It is a human-readable data serialization format used for configuration files and data exchange between programming languages. It is often used in conjunction with Ruby on Rails, Python, and other programming languages.