University of South Bohemia in České Budějovice

Comparison of available open-source shopping cart software

Author: Shipeng Huang
Supervisor: Mgr. Radim Remeš, Ph.D.

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ZADÁNÍ BAKALÁŘSKÉ PRÁCE
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Téma práce: **Comparison of available open-source shopping cart software**
Zadávající katedra: **Katedra aplikované matematiky a informatiky**

Zásady pro vypracování

The subject of the work is to compare the available open-source shopping cart software using a suitable methodology.

Methodological procedure:

1. Study of professional literature.
2. General description of the shopping cart software used.
3. Theoretical description of specific available products for shopping carts.
4. Comparison and analysis of selected products, evaluation of their usability in a real environment.
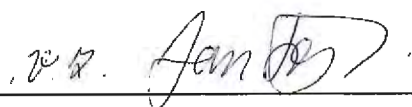5. Conclusion.

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Rozsah grafických prací: **according to need**
Forma zpracování bakalářské práce: **tištěná**
Jazyk zpracování: **angličtina**

Seznam doporučené literatury:

1. Ajzele, B. (2018). *Magento 2 Development Quick Start Guide.* Packt.
2. Castano, A. P. (2017). *PrestaShop Recipes: A Problem-Solution Approach.* Apress.
3. Rauland, P. (2020). *Mastering WooCommerce 4.* Packt.
4. Reynolds, J. (2004). *The Complete E-Commerce Book.* 2nd Edition. CRC.
5. Ullman, L. (2013). *Effortless E-Commerce with PHP and MySQL.* 2nd Edition. New Riders.

Vedoucí bakalářské práce: **Mgr. Radim Remeš, Ph.D.**
Katedra aplikované matematiky a informatiky

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L.S.

_____
doc. RNDr. Zuzana Dvořáková Líšková, Ph.D.
děkanka

_____
doc. RNDr. Jana Klicnarová, Ph.D.
vedoucí katedry

V Českých Budějovicích dne 13. března 2023

I declare that I prepared my bachelor's thesis independently using only the sources and literature listed in the list of cited literature. I declare that in accordance with § 47b of Act No. 111/1998 Coll. in the valid version, I agree to the publication of my bachelor's thesis, namely in an unabridged form electronically in the publicly accessible part of the STAG database operated by the University of South Bohemia in České Budějovice on its website, with the preservation of my copyright to the submitted text of this qualification thesis. I further agree to the same electronic means being in accordance with the aforementioned provision of Act No. 111/1998 Coll. opinions of the supervisor and opponents of the thesis as well as a record of the progress and result of the defense of the qualification thesis are published. I also agree to the comparison of the text of my thesis with the thesis database Theses.cz operated by the National Register of University Qualification Theses and the plagiarism detection system.

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1 Research background and research objectives

Against the backdrop of continuous development in internet technology, the e-commerce market is showing rapid growth. The mobile e-commerce market is becoming an indispensable part of the e-commerce industry with the widespread adoption of mobile devices and smartphones. Furthermore, the global pandemic has accelerated the development of online shopping and the e-commerce market. In this context, shopping cart software is one of the core components of an e-commerce website and has a significant impact on user experience and business profitability. [6] According to Statista, the global e-commerce market had a total revenue of approximately \$4.28 trillion in 2020, and it is projected to reach \$5.4 trillion by 2022. China is the largest market in the global e-commerce market, with e-commerce retail sales reaching \$1.1 trillion in 2020.

In addition, with the rise of new e-commerce forms such as social media and live shopping, more and more consumers are starting to purchase products through social media platforms. According to a report from global market research company Technavio, the global social media e-commerce market had a total revenue of approximately \$47.4 billion in 2020 and is projected to reach \$122.8 billion by 2025.

Furthermore, with the application of artificial intelligence and big data technology, intelligent e-commerce has also become a development trend. According to data from the international market research firm IDC, the total revenue of the global intelligent e-commerce market was approximately \$36.7 billion in 2020 and is projected to reach \$99.4 billion by 2024.

Table 1: A Look Ahead: Comparison of Total Revenue for the Global, Intelligence, Social Media, and China Markets with Projected Revenue

Market/Industry	Total Revenue (2020)	Projected Revenue (2022/2025)
Global E-commerce	$4.28 trillion	$5.4 trillion (2022)
China E-commerce	$1.1 trillion	N/A
Social Media E-commerce	$47.4 billion	$122.8 billion (2025)
Intelligent E-commerce	$36.7 billion	$99.4 billion (2024)

These data show that the e-commerce market is continuously expanding and developing, with more and more consumers purchasing products through e-commerce platforms. With the emergence of new e-commerce forms and technologies, researching and evaluating the quality and functionality of different open-source shopping cart software can help businesses choose the most suitable software for their needs, improve their business efficiency, and enhance user experience. Furthermore, studying shopping cart software can provide developers and researchers with the latest information and trends, promoting the continuous improvement and development of shopping cart software. Choosing suitable shopping cart software can also help businesses create and manage e-commerce websites more quickly and efficiently, reduce operating costs, and increase efficiency and customer satisfaction. Therefore, research on shopping cart software is essential for the development of e-commerce and improving user experience. The e-commerce market has a broad future, and research and comparison of shopping cart software can help businesses choose the most suitable software for their needs, improve their business efficiency, and enhance user experience.

1.1 Shopping Cart Software Required for E-commerce Websites

With the continuous progress and improvement of internet technology, reliable shopping cart software is necessary for managing user shopping and payments on e-commerce websites. Shopping cart software is an essential component of e-commerce websites as it helps users browse products, add them to the cart, and complete checkout and payment processes. The functionality and features of shopping cart software are crucial for the successful operation of e-commerce websites. They should have advantages in terms of ease of use, security, scalability, customization, reliability, and performance. Additionally, shopping cart software should be able to seamlessly integrate with other e-commerce applications, allowing users to quickly and easily browse products and purchase items.

In the market, there are many open-source shopping cart software options available for selection, such as Abante Cart, CE Phonix, Open Cart, Presta Shop, OS Commerce, Pimcore, and Zen Cart. Therefore, selecting appropriate shopping cart software has become increasingly complex and challenging. Shopping cart software is an indispensable part of e-commerce websites, and it plays a significant role in user experience and business profitability. A high-quality shopping cart software for e-commerce websites requires not only usability and reliability but also security and stability to ensure user privacy and payment information safety. Moreover, the scalability and customization of shopping cart software are also crucial to meet the needs of different merchants and users.

In the current e-commerce market, there is a wide range of shopping cart software options available, including commercial and open-source software. Commercial software usually has more features and support, but it comes with a higher price tag. In contrast, open-source software offers advantages such as free, flexible, and customizable features, which makes it increasingly popular among

businesses and individuals for setting up their e-commerce websites, to save costs and gain more freedom and flexibility.

Therefore, it is essential for merchants to choose the most suitable shopping cart software for their needs. Research and evaluation of shopping cart software can help merchants select the most appropriate software, improving their business efficiency and user experience. Furthermore, research on shopping cart software can also provide developers and researchers with the latest information and trends in shopping cart software, promoting the continuous improvement and development of shopping cart software. Comparing the advantages and disadvantages of different open-source shopping cart software has become a necessary research field to help users choose the most suitable software for their needs.

1.2 Research Value of Open Source Shopping Cart Software

With the continuous development of Internet technology, the e-commerce market has become one of the most dynamic and potential markets in the world. Driven by digitalization, more and more consumers and businesses are shifting their operations to online platforms, and the e-commerce market is showing a rapid growth trend. According to Statista, the global e-commerce market reached a total of 3.53 trillion US dollars in 2019, and is expected to grow to 6.54 trillion US dollars by 2022. This indicates that the e-commerce market has a very broad development prospect in the future.

In addition, with the popularity of mobile devices and smartphones, the mobile e-commerce market has also become an indispensable part of the e-commerce market. The rapid growth of the mobile e-commerce market is due to the popularity of smartphones and mobile applications, as well as the demand for convenience and experience of mobile shopping by users. According to eMarketer, the mobile e-

commerce market share reached 65.1% in 2019, and is expected to grow to 72.9% by 2022.

Moreover, the e-commerce market has also been affected by the global pandemic. After the outbreak of the COVID-19 pandemic, people in many countries and regions were forced to work and study at home, which prompted the rapid development of online shopping and e-commerce markets. According to Adobe Analytics, the sales of global online shopping festivals reached 270 billion US dollars in 2020, a year-on-year increase of 22%. This indicates that online shopping has become an indispensable part of people's lives, and the e-commerce market has a very broad development space.

The continuous expansion and development of the e-commerce market is a major trend, and shopping cart software has become an indispensable part of e-commerce websites. The role of shopping cart software is to help customers browse and select products on the website, add them to the shopping cart, and complete the payment process. Therefore, the quality and functionality of shopping cart software directly affect the user experience and commercial benefits of e-commerce websites.

Currently, there are a large number of open-source shopping cart software options available on the market. Open-source shopping cart software refers to customizable shopping cart software with public source code that can be used for free. With the widespread use of open-source technology, more and more enterprises and individuals are using open-source shopping cart software to build their e-commerce websites, in order to save costs and gain higher freedom and flexibility. The research value of such software lies in providing reference and help for businesses to choose the most suitable shopping cart software for their needs, providing the latest shopping cart software information and trends for developers and researchers, promoting the development and application of open-source software, and improving the development of e-commerce and user experience.

Therefore, comparing and evaluating different open-source shopping cart software, understanding their strengths and weaknesses, and identifying their suitable scenarios are very important for both developers and users of e-commerce websites. Such research will also provide useful references and guidance for further development of shopping cart software.

1.3 Research Objectives and Significance

The purpose of this study is to compare seven open source shopping cart software from various aspects such as user-friendliness, security, scalability, customization, usability, reliability, and performance, in order to help users choose the most suitable shopping cart software that meets their needs. Additionally, this study aims to provide the latest information and trends on shopping cart software for developers and researchers. The findings of this research will assist e-commerce companies in selecting the most appropriate shopping cart software, improving their business efficiency, and enhancing the user experience. Likewise, for shopping cart software developers and researchers, the research results presented in this paper will help to understand the advantages and disadvantages of the software, and provide guidance for further research and development. Choosing the right open source shopping cart software can help businesses to create and manage e-commerce websites more quickly and efficiently, reduce operating costs, and increase efficiency and user satisfaction. However, open source shopping cart software also has some drawbacks, such as security and stability issues. Therefore, it is important for businesses to choose the right shopping cart software that suits their needs. By studying open source shopping cart software, we can better understand the characteristics and advantages of open source software, promote the development and application of open source software, which is not limited to shopping cart software, but also widely used in various fields, such as operating systems, databases, programming languages, etc. Therefore, this study is also

significant in providing reference and assistance for shopping cart software selection and research, promoting the development of e-commerce, and improving user experience.

1.4 Thesis Organization Structure

In Section 1, we introduce the research background and objectives, including the need for shopping cart software in e-commerce websites and the value of open source shopping cart software. We also explain the research objectives and significance, highlighting the importance of evaluating and comparing different open source shopping cart software.

In Section 2, we provide an overview of the open source shopping cart software that we evaluated, including AbanteCart, CE Phoenix, OpenCart, PrestaShop, OS Commerce, Pimcore, and Zen Cart. We describe the key features and usage of each software, providing readers with a comprehensive understanding of the different options available.

In Section 3, we explain the research methodology, focusing on the key technologies that we used in our evaluation, including PHP, MySQL, and Linux. We also describe the research process and data collection methods, as well as the scope of our research and the sample selection criteria.

In Section 4, we present the results of our evaluation, including a comparison of each software's user-friendliness, security, scalability, convenience, reliability, and performance. We then describe the implementation of weighted allocation, which we used to assign weights to each evaluation criterion and determine the final ranking of each software. Finally, we provide a comprehensive evaluation and ranking of each software based on our analysis.

In Section 5, we summarize our findings and provide recommendations for selecting the most suitable open source shopping cart software based on the specific

needs and characteristics of the user's business. We also analyze the applicability and operability of the software, as well as the limitations and future prospects of our research.

In Section 6, we provide a list of references that we consulted in the course of our research. Overall, our paper provides a comprehensive evaluation of different open source shopping cart software and provides valuable insights into the strengths and weaknesses of each option, enabling users to make informed decisions when selecting a software solution for their e-commerce website.

2 Article Overview

This chapter provides a comprehensive evaluation of open source shopping cart software, which is an essential component of e-commerce websites. It begins by discussing the importance of shopping cart software in the context of the growing e-commerce market and the increasing popularity of mobile and social media commerce. The chapter then explores the features and requirements of shopping cart software, emphasizing its advantages in terms of usability, security, scalability, customization, reliability, and performance. It provides an overview of various open source shopping cart software options available in the market, such as AbanteCart, CE Phoenix, OpenCart, PrestaShop, osCommerce, Pimcore, and Zen Cart, and compares their strengths and weaknesses. The chapter concludes by highlighting the research value and significance of studying open source shopping cart software and its impact on e-commerce businesses, developers, and consumers. Choosing the appropriate shopping cart software can help merchants create and manage e-commerce websites more quickly and efficiently, reduce operating costs, and improve efficiency and user satisfaction. Research and evaluation of shopping cart software can help merchants choose software that best meets their needs, enhancing their business efficiency and user experience. Additionally, research on shopping cart software can provide developers and researchers with the latest information and trends, promoting the continuous improvement and development of shopping cart software. Therefore, the study of shopping cart software is of great significance for the development of e-commerce and the improvement of user experience.

2.1 Overview of Open Source Shopping Cart Software

Open-source shopping cart software refers to e-commerce software that is released under an open-source license. These software programs are free to use, and their source code is accessible and can be modified. They provide many e-commerce features such as product catalogs, shopping carts, order management, customer management, payment processing, and shipping options, which can help businesses quickly create and manage their e-commerce websites.

There are many types of open-source shopping cart software, including Magento, WooCommerce, OpenCart, osCommerce, Zen Cart, PrestaShop, and more. Each of these software programs has unique features and advantages, which can be selected based on user needs and preferences.

Compared to traditional commercial shopping cart software, open-source shopping cart software has several advantages. These include free usage, customizability, community support, expandability, and open standards. However, open-source shopping cart software also has some drawbacks, such as the need for technical knowledge, no guarantee of technical support, security and stability issues, and more. Therefore, when selecting open-source shopping cart software, businesses need to consider their situation comprehensively.

Overall, open-source shopping cart software is a free, flexible, and customizable option that can help businesses quickly create and manage their e-commerce websites. As the open-source community continues to grow and develop, the future of open-source shopping cart software will be even more extensive.

In this chapter, we will provide an overview of open-source shopping cart software. We will first introduce the concept of open-source software and its advantages. Then, we will elaborate on the definition, characteristics, history, and current development status of open-source shopping cart software. In addition, we

will also briefly introduce popular open-source shopping cart software on the market, such as Abante Cart, CE Phoenix, Open Cart, PrestaShop, OS Commerce, Pimcore, Zen Cart, etc. These software programs will be evaluated from different perspectives, including security, expandability, customizability, ease of use, reliability, and performance. The goal is to provide users with comprehensive evaluation information to help them select the right shopping cart software for their needs. CE Phoenix Cart:
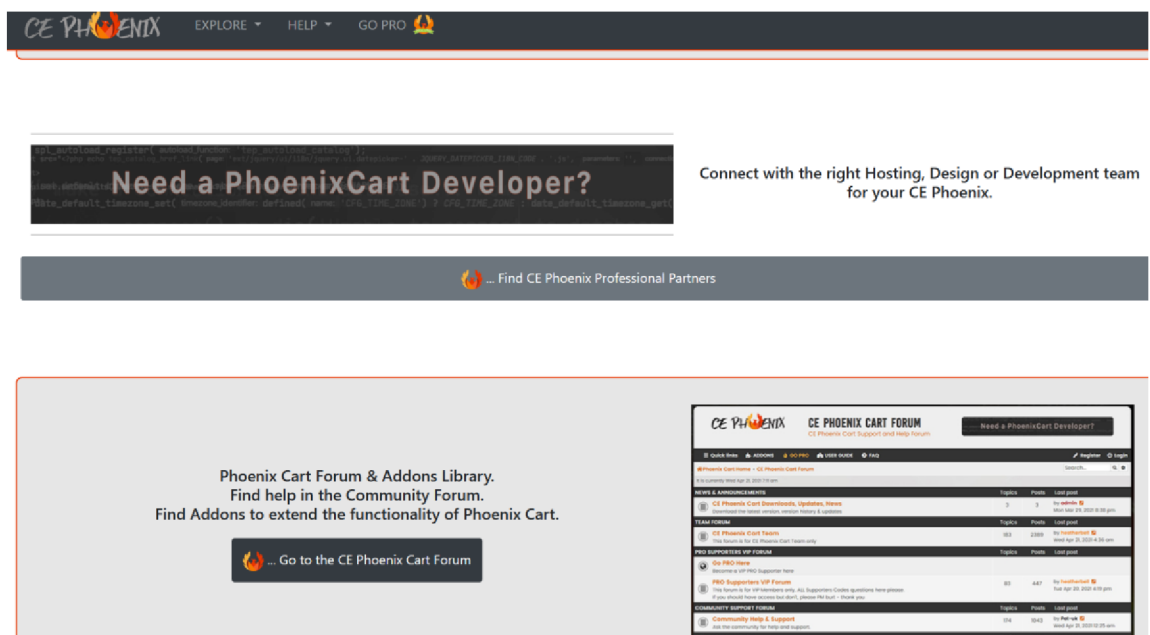

Figure 1: Phoenix Cart Custom E-commerce Solutions: Discover Your Developer Here

2.2 Overview of AbanteCart Software Features and Usage

For users, Abante Cart is an easy-to-learn and use shopping cart software that can help them quickly build and manage e-commerce websites. For developers and researchers, Abante Cart offers rich features and customizability to meet the needs of different users and provides references and inspirations for developing and researching shopping cart software. Abante Cart is a free and open-source shopping cart software that features:

User-friendly interface: Abante Cart has an intuitive user interface that is easy to use and manage. It provides clear menus and toolbars, as well as simple and understandable setting options.

Customization: Abante Cart offers a variety of themes and templates, allowing users to customize the appearance of their shopping cart according to their needs and brand style.

Multi-language and currency support: Abante Cart supports multiple languages and currencies to meet the needs of different countries and regions.

Payment and shipping options: Abante Cart supports various payment and shipping options, such as credit cards, PayPal, and cash on delivery.

Product and inventory management: Abante Cart provides powerful product and inventory management functions, allowing users to easily add, edit, and delete products, as well as manage inventory and prices.

It is a popular open-source e-commerce solution that aims to provide an easy-to-use, powerful, customizable, and extensible e-commerce platform. The software is written in PHP language and can run on different operating systems, using MySQL databases to store data. Abante Cart provides a variety of payment and shipping options and supports multiple languages and currencies. The software also provides rich plugins and themes, allowing users to customize their appearance and functionality according to their needs.

When using Abante Cart, users can easily manage product, order, and customer information. Its inventory management system allows users to quickly update inventory information, while built-in marketing and promotion tools enable users to promote specific products and services on their websites. Additionally, Abante Cart supports multiple payment and logistics options, including credit cards, PayPal, cash on delivery, and various express shipping services.

Abante Cart has a clean, concise, and easy-to-use user interface that allows users to browse and purchase products easily. It also provides simple product and category management tools, allowing merchants to easily add and update products. Abante Cart also provides many built-in features and modules, such as product catalogs, order management, customer management, promotion and coupons, etc. Additionally, Abante Cart has a large number of plugins and themes, allowing users to expand and customize their websites.

Abante Cart supports multiple languages and currencies, making it suitable for e-commerce websites in different regions and countries. It provides a variety of payment and shipping options, including credit cards, PayPal, cash on delivery, and various express shipping services. Abante Cart is equipped with powerful SEO features to help users optimize their websites to improve search engine rankings and visibility. Additionally, Abante Cart has an active community and extensive documentation resources, making it easy for users to find help and solve problems.

Overall, Abante Cart is a popular, easy-to-use, and extensible e-commerce platform suitable for e-commerce businesses of all sizes and needs. It provides many rich features and flexible customization options, allowing users to easily create and manage their e-commerce websites. Additionally, Abante Cart has extensive community support and documentation resources to help users solve problems and maximize its functionality. AbanteCart:

AbanteCart   **OpenCart**

VISIT PROFILE   VISIT PROFILE   **+**

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✅ Data Security   ✅ Data Security   CS-Cart Multi-
✅ Email Marketing   ✅ Email Marketing   Vendor
✅ Inventory Management   ✅ Inventory Management   ⭐ 4.7 (134)
❌ Kitting   ✅ Kitting
❌ Mobile Access   ❌ Mobile Access   FTSRetail
✅ Multi-Channel Marketing   ✅ Multi-Channel Marketing   ⭐ 4.5 (2)
✅ Multi-Store   ✅ Multi-Store
✅ Promotions Management   ✅ Promotions Management
✅ Returns Management   ✅ Returns Management
✅ Reviews Management   ✅ Reviews Management
✅ SEO Management   ✅ SEO Management
✅ Templates   ✅ Templates

SEE ALL FEATURES   SEE ALL FEATURES

Figure 2   depicts a list of Abantecart's amazing features, which include CRM, data security, email marketing, inventory management, multi-channel marketing, multistore, promotions management, returns management, reviews management, SEO management, and templates.

2.3 Characteristics and Usage of CE Phoenix Software

CE Phoenix is a community-driven open-source e-commerce solution based on the osCommerce 2.3.4 codebase. Its main goal is to provide an easy-to-use, powerful, customizable, and scalable e-commerce platform. In addition to offering many powerful features and rich plugins and themes, CE Phoenix also provides an active community and extensive documentation resources to help users solve problems and learn how to maximize its functionality. The features and usage of CE Phoenix are as follows:

Powerful features and customization: CE Phoenix offers many powerful features and customization options, such as product catalog, order management, customer management, multi-language support, multi-currency support, coupons, and promotion tools. In addition, users can choose to install different plugins and

themes as needed to extend the software's functionality and beautify the store's appearance.

User-friendly interface: CE Phoenix has a user-friendly interface that allows users to easily browse and purchase products. It also provides simple product and category management tools, allowing merchants to easily add and update products.

Multi-language and multi-currency support: CE Phoenix supports multiple languages and currencies, making it suitable for e-commerce websites in different regions and countries.

Flexible payment and shipping options: CE Phoenix provides various payment and shipping options, including credit cards, PayPal, cash on delivery, and various express delivery services.

Security: CE Phoenix adopts the latest security technology and protocols to ensure the security of users' data and transactions.
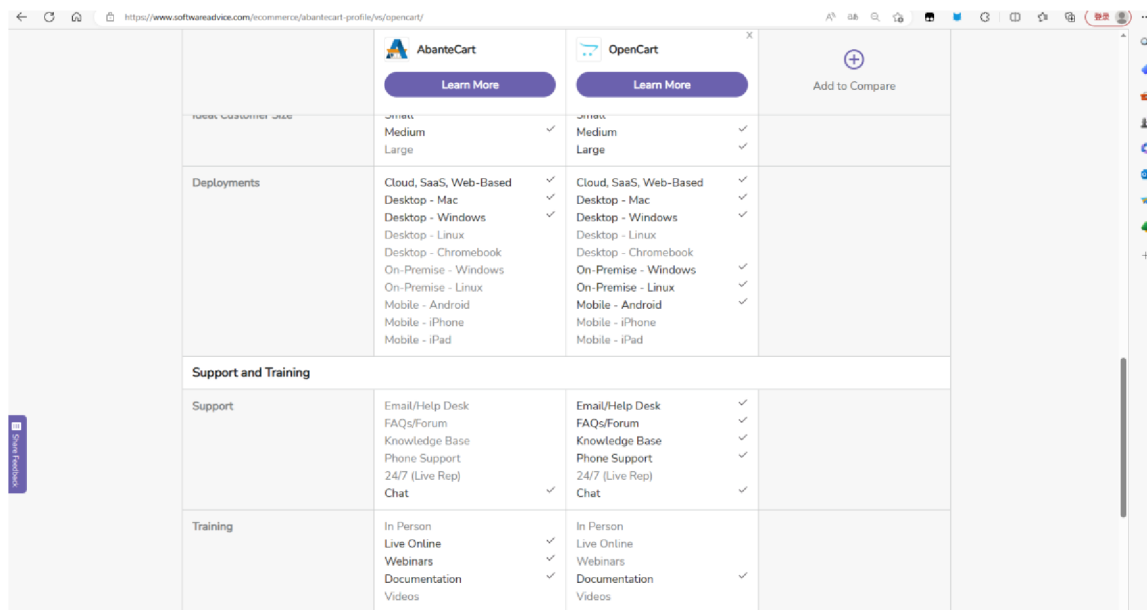
SEO optimization: CE Phoenix has powerful SEO optimization features built in, allowing users to easily optimize their website and improve search engine rankings and visibility.

Community support and documentation resources: CE Phoenix has an active community and extensive documentation resources, making it easy for users to find help and solve problems. In addition, it also has a large library of templates and plugins to help users extend its functionality.

CE Phoenix is a powerful, easy-to-use, and customizable e-commerce platform suitable for businesses of all sizes and needs. It provides many rich features and flexible customization options, allowing users to easily create and manage their e-commerce websites. Meanwhile, CE Phoenix has extensive community support and documentation resources to help users solve problems and maximize its

functionality.   OpenCart:

Figure 3 shows a comparison of AbanteCart's and OpenCart's features in Deployments and Support and Training

2.4 Overview and Usage of OpenCart Software

OpenCart is a popular open-source shopping cart software that provides rich features and customization options, enabling users to easily create professional online stores. The software is written in PHP and can run on different operating systems, using a MySQL database to store data. OpenCart offers a variety of payment and shipping options and can also support multiple languages and currencies. It also provides a rich collection of plugins and themes that allow users to customize the look and functionality of their store according to their needs.

The installation and usage of OpenCart are relatively simple, with users only needing to download the installation package and follow the instructions to install it. After installation, users can use the backend management system to add and manage products, orders, customers, and other content. Users can also install different plugins and themes as needed to extend the software's functionality and beautify the store's appearance. OpenCart also supports multi-user and multi-store

management, making it suitable for small and medium-sized businesses and individuals. The user interface is friendly, easy to use, and manage, and it provides rich payment and shipping options. Users can manage and configure their shopping cart through easy-to-understand settings options and an intuitive admin panel.

When using OpenCart, users can easily manage product, order, and customer information. Its inventory management system allows users to quickly update inventory information, while built-in marketing and promotional tools enable users to promote specific products and services on their website. In addition, OpenCart supports multiple payment and shipping options, including credit cards, PayPal, cash on delivery, and express shipping. Here are some of OpenCart's features and usage scenarios:

Clean and intuitive user interface: OpenCart has a clean, concise, and user-friendly interface that allows users to easily browse and purchase products. It also provides simple product and category management tools that allow merchants to easily add and update products.

Rich features and modules: OpenCart provides many built-in features and modules, such as product catalogs, order management, customer management, promotions, and coupons. Additionally, OpenCart has a large number of plugins and themes that allow users to extend and customize their websites.

Multiple language and currency support: OpenCart supports multiple languages and currencies, making it suitable for e-commerce websites in different regions and countries.

Flexible payment and shipping options: OpenCart provides a variety of payment and shipping options, including credit cards, PayPal, cash on delivery, and various express shipping services.

Powerful SEO features: OpenCart comes with powerful SEO features that can help users optimize their websites to improve search engine rankings and visibility.

Community support and documentation resources: OpenCart has an active community and extensive documentation resources that make it easy for users to find help and solve problems. Additionally, it has a large library of templates and plugins that can help users extend its functionality.

Overall, OpenCart is a popular, easy-to-use, and customizable e-commerce platform that is suitable for various sizes and needs of e-commerce businesses. It provides many rich features and flexible customization options that allow users to easily create and manage their e-commerce websites. Additionally, OpenCart has broad community suport and documentation resources to help users solve problems and maximize its functionality. PrestaShop:
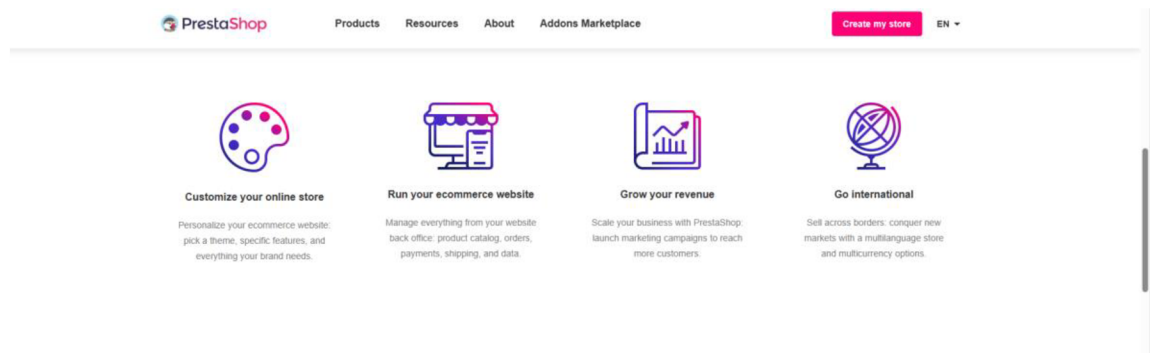
Figure 4 shows PrestaShop's available E-commerce services.

2.5 Features and Usage of PrestaShop Software

PrestaShop is a popular open-source shopping cart software with a wide user base and development community support. It provides many powerful features such as multi-language support, multi-store support, customizable themes and templates, inventory management, marketing and promotion tools, and more. Its user interface is friendly, easy to use and manage, and offers rich payment and logistics options. Additionally, PrestaShop can extend its functionality through the installation of

modules and plugins, making it a highly flexible and customizable shopping cart software.

When using PrestaShop, users can easily manage product, order, and customer information. Its inventory management system allows users to quickly update inventory information, while built-in marketing and promotion tools enable users to promote specific products and services on their website. Moreover, PrestaShop supports various payment and logistics options, including credit cards, PayPal, cash on delivery, and express shipping. These features make PrestaShop a complete shopping cart software that can meet the needs of different types of e-commerce websites. It is developed based on the PHP and MySQL technology architecture, offering many features and scalability, suitable for various scales and needs of e-commerce businesses. PrestaShop provides an intuitive backend management interface, allowing users to easily manage their e-commerce websites. It also offers many customization options and template support, allowing users to customize the appearance and functionality of their website.

The main features of PrestaShop include ease of use, scalability, security, multi-language support, multi-currency support, SEO optimization, and customizability. It provides rich features such as product catalog, order management, customer management, multi-language support, multi-currency support, and payment gateway integration. It also has flexible product and category management, as well as multiple payment and shipping options, making it suitable for e-commerce businesses of various sizes. In addition, PrestaShop has excellent SEO optimization features to improve website search engine ranking and visibility.

PrestaShop also provides extensive plugin and template support, allowing users to easily find and install different plugins and modules to further extend its functionality. It also has a large community and extensive documentation resources, enabling users to easily find support and solve problems. Its usage is relatively

simple, and users can manage and configure the shopping cart through easy-to-understand settings options and intuitive admin panels. For developers and designers, PrestaShop provides many customization options and template support, allowing users to customize the appearance and functionality of their website. Moreover, the PrestaShop development community is very active, allowing users to easily find help and plugins to extend its functionality.

In conclusion, PrestaShop is a popular, easy-to-use and customizable e-commerce platform suitable for businesses of all scales and needs. It offers rich features and flexible customization options, as well as extensive community support and developer community, enabling users to easily extend its functionality and features. OS Commerce:

Figure 5: OS Commerce Application shop features

2.6 OS Overview and usage of OS Commerce software

OS Commerce is a powerful open-source shopping cart software that offers rich features and flexible configuration options to meet the needs of different types of e-commerce websites. Its main features include ease of use, scalability, and customizability, where users can freely customize products, prices, tax rates,

shipping methods, and more. Additionally, it supports multi-language, multi-currency, and multi-store functionality, making it easy for users to manage multiple shops. OS Commerce also offers a large community and extensive plugin library, enabling users to conveniently find and install various plugins and modules to further expand their functionality. However, it should be noted that OS Commerce has some security flaws, and users need to take precautions to protect their website from attacks.

It is a popular open-source e-commerce platform that offers many features such as product catalog, order management, customer management, multi-language support, multi-currency support, and payment gateway integration, among others. It is developed based on PHP and MySQL technology architecture and can adapt to e-commerce businesses of various scales and requirements. Its main feature is its ease of use and flexibility, providing an intuitive back-end management interface that allows users to easily manage their e-commerce websites. Moreover, it also offers many customization options and template support, allowing users to customize the appearance and functionality of their websites.

Aside from ease of use and flexibility, OS Commerce also provides many rich features. For example, it supports multiple payment and shipping options that can be configured according to user needs. It also supports multi-language and multi-currency to accommodate users from different countries and regions. It also provides good SEO optimization features to improve website search engine ranking and visibility.

Additionally, it has a large community and developer community, making it easy for users to find support and plugins to expand their functionality. It also provides extensive documentation resources and community support to help users solve problems and learn how to maximize its functionality.

In summary, OS Commerce is a popular and easy-to-use e-commerce platform that is suitable for e-commerce businesses of various scales and requirements. It offers rich features and flexible customization options, as well as extensive community support and developer community to enable users to easily expand their functionality and features. Pimcore:
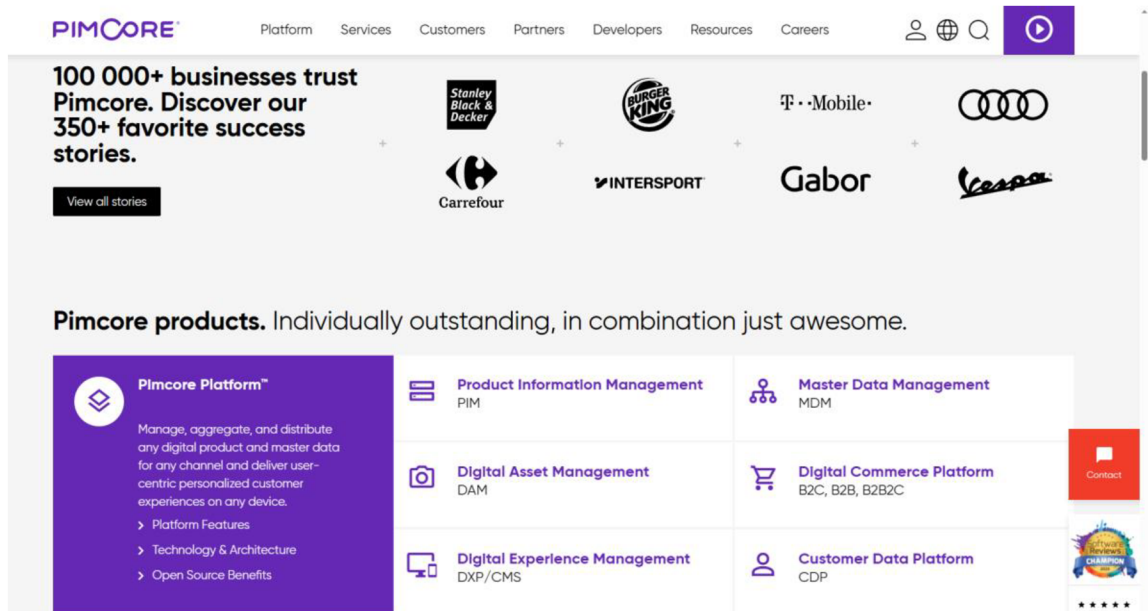

Figure 6: Pimcore website showing products available

2.7 Features and Usage of Pimcore Software

Pimcore is a powerful open-source platform used for developing and managing e-commerce websites. It offers rich functionality, including data management, digital asset management, multi-language support, SEO optimization, and e-commerce capabilities. Pimcore also easily integrates with various third-party applications and services such as ERP, PIM, and CRM. With Pimcore, users can easily manage website content and product information, increase productivity, and optimize business processes. It also provides many customizable options and plugins that can be extended and tailored according to specific user needs.

As a feature-rich open-source content management system (CMS), Pimcore is also an e-commerce platform. It is developed based on the PHP and MySQL technology architecture, with extensive functionality and scalability, suitable for various e-commerce businesses of different sizes. Pimcore has complete content and media management capabilities, and can manage various types of media such as images, audio, and video. It also has flexible content organization and management capabilities, as well as powerful search and filtering capabilities, enabling users to easily find the desired content.

As an e-commerce platform, Pimcore has comprehensive product and order management capabilities, as well as flexible pricing and promotion strategy settings. It also has multiple payment and shipping options, including multiple currency and tax options, to meet the needs of users in different countries and regions. Additionally, Pimcore provides extensive plugin and template support, allowing users to customize various aspects of the e-commerce platform, including layout, appearance, and functionality.

Pimcore has a relatively complex usage and requires certain technical skills and experience. However, it provides extensive documentation resources and community support, which can help users troubleshoot problems and learn how to maximize its functionality. Pimcore also has good performance and reliability, supporting high traffic and concurrent access. Therefore, for e-commerce websites with complex content management requirements and large amounts of products and orders, Pimcore is an excellent choice. Zen Cart:

Figure 7: Zencart's webpage showing all features and services available

2.8 Characteristics and Usage of Zen Cart Software

Zen Cart is a free and open-source shopping cart software based on PHP, designed to provide solutions for small to medium-sized online stores. It has a wide community support and developer community, so users can easily find help and plugins to extend its functionality. Zen Cart has a relatively simple and user-friendly interface that allows users to quickly create and manage their online stores. Additionally, Zen Cart offers rich features such as multi-currency and multi-language support, as well as support for multiple payment and shipping options. Zen Cart also has a powerful administration panel that enables easy management of orders, customers, and inventory. Its main features include high scalability and customization, allowing users to customize every aspect of the shopping cart, including layout, appearance, and functionality. It offers rich plugin and template support, allowing users to easily add new features and functionalities. Zen Cart also has flexible product and category management, as well as multiple payment and shipping options, making it suitable for various sizes of e-commerce businesses. Zen Cart is relatively easy to use, and users can manage and configure their

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shopping cart through easy-to-understand settings options and an intuitive admin panel. It also provides extensive community support and documentation resources to help users solve problems and learn how to make the most of its features. With these features, Zen Cart becomes an ideal choice for small to medium-sized enterprises.

2.9 Indicators and Evaluation Standards for Shopping Cart Software

Regarding the indicators and evaluation standards of shopping cart software, we can consider them from the perspective of users. A good shopping cart software should have the following characteristics: usability, security, scalability, customization, reliability, and performance. When choosing shopping cart software, we need to comprehensively consider these characteristics to determine the most suitable software. In addition, factors such as the activity level of the open-source software community, community support, and software update frequency also need to be considered. In this paper, we will compare and evaluate seven open-source shopping cart software based on these indicators and evaluation standards to help readers choose the most suitable shopping cart software. At the same time, this research will also provide the latest information and trends for shopping cart software developers and researchers, guiding their subsequent research and development. The indicators and evaluation standards of shopping cart software mainly include the following aspects:

Functionality: Shopping cart software should have basic core functions such as shopping cart, product management, and order processing, and it needs to have scalable and personalized functions to adapt to the needs of different users.

Scalability: Shopping cart software should have a certain degree of scalability so that it can easily expand its functions and features when business needs and user volume grow.

Security: Shopping cart software needs to have security functions and measures to ensure the payment security of users and protect websites from attacks and malicious behavior.

User-friendliness: Shopping cart software should be easy to use and understand, with an intuitive backend management interface and easy-to-understand settings options to improve user satisfaction and reduce user churn rate.

Technical architecture and implementation: Shopping cart software needs to be based on a reliable technical architecture and implementation, such as using popular programming languages and database management systems to ensure its performance and stability.

Multi-language and multi-currency support: Shopping cart software should support multiple languages and currencies to adapt to the needs of users in different countries and regions.

SEO optimization: Shopping cart software should have good SEO optimization functions to improve the website's search engine rankings and visibility.

Community support and update frequency: The activity level and community support of shopping cart software are also important evaluation criteria. Users can consider factors such as community activity level, update frequency, and quality to judge its reliability and future development trends.

The importance indicators and evaluation standards of shopping cart software will vary according to different usage scenarios and needs. Therefore, when choosing shopping cart software, users should consider their specific needs and budget factors, comprehensively consider these indicators and evaluation standards, and choose the most suitable shopping cart software.

Table 2 showing what weights are assigned to individual indicators.

Table 2: Assignment of weights to individual indicators

Indicators	Weight
Functionality	20%
Scalability	15%
Security	15%
User-friendliness	15%
SEO Optimization	10%
Multi-language and multi-currency support	10%
Technical architecture and implementation	10%
Community support and update frequency	5%

3 Research Methodology

Electronic commerce has become increasingly popular in recent years, with many businesses choosing to establish their presence online. As a result, the demand for e-commerce software has increased, particularly for shopping cart software that enables users to make purchases on websites. Open-source shopping cart software has gained popularity due to its cost-effectiveness and flexibility. However, with so many options available in the market, it can be challenging for businesses to choose the most suitable software for their needs.

To address this issue, this chapter will provide a comprehensive comparison and analysis of seven open-source shopping cart software options: AbanteCart, CE Phoenix, OpenCart, PrestaShop, osCommerce, Pimcore, and Zen Cart. These software options will be evaluated based on their compatibility with PHP, Linux, and MySQL, which are the most commonly used technologies for e-commerce websites.

In addition to providing an overview of the technical aspects and features of each software option, this chapter will also analyze their applications in real-world scenarios. This analysis will consider the unique requirements and challenges faced by businesses of different sizes and industries, as well as the potential benefits and drawbacks of each software option.

Ultimately, the goal of this chapter is to assist businesses in selecting the most suitable open-source shopping cart software for their e-commerce websites. By providing a thorough analysis of the technical and practical aspects of each software option, this chapter aims to facilitate informed decision-making and help businesses optimize their online presence and sales.

3.1 Features of PHP

This passage discusses the use of PHP in the development of seven open-source shopping cart websites. Each website uses PHP to implement its features, but they differ in their technology stack and approach to providing a good user experience and security.

Abante Cart and CE Phoenix both use PHP and MySQL as their primary technology stack, and provide rich plugin and extension support to allow users to easily add new features and capabilities. Open Cart and Presta Shop use PHP, MySQL, AJAX, and JavaScript, providing more interactivity and a richer user experience. OS Commerce is relatively basic in functionality but supports multiple

languages and currencies and has a simple and user-friendly interface. Pimcore uses PHP and MySQL as its technical foundation and supports a wide range of media management, including images, audio, and video. Zen Cart also uses PHP and MySQL and has highly customizable and personalized features.

In terms of features, all seven open-source shopping cart websites have core functionalities such as shopping cart, product management, and order processing, but they differ in their ability to extend and customize. Abante Cart and CE Phoenix provide rich plugin and extension support, while Open Cart and Presta Shop have high customization capabilities, allowing users to customize the appearance and functionality of their shopping carts. OS Commerce is relatively basic in functionality but supports multiple languages and currencies and has a simple and user-friendly interface. Pimcore is a comprehensive content management system with extensive content and media management capabilities suitable for users with more complex content management needs. Zen Cart has highly scalable and personalized features, allowing users to customize all aspects of their shopping cart, including layout, appearance, and functionality.

In summary, the seven open-source shopping cart websites have different strengths and suitable scenarios, and users should choose the most suitable shopping cart software based on their specific needs.

3.2 Characteristics of MySQL

MySQL is a popular relational database management system widely used for web application development and open-source software. In these seven open-source shopping cart websites, MySQL is used as the database management system to store and manage data.

In Abante Cart, MySQL is used to store order information, customer information, and product information, etc. It uses MySQL's indexing function to quickly find

and retrieve data. CE Phoenix also uses MySQL to store product, customer, order, and mailing list information, etc. It uses MySQL's stored procedures and triggers to automate processing, such as order processing and email sending.

OpenCart uses MySQL to store product, customer, order, review, and coupon information, etc. It utilizes MySQL's foreign key and indexing function to relate and retrieve data. In PrestaShop, MySQL is used to store product, customer, order, supplier, and shipping information, etc. It uses MySQL's stored procedures and triggers to automate processing and updates, such as order processing and inventory management.

In OSCommerce, MySQL is used to store product, customer, order, and shipping information, etc. It uses MySQL's transaction processing and indexing function to ensure data integrity and consistency. Pimcore uses MySQL to store product, customer, order, coupon, and report information, etc. It uses MySQL's transaction processing and stored procedures to manage and process data.

Zen Cart uses MySQL to store product, customer, order, coupon, and shipping information, etc. It utilizes MySQL's stored procedures and triggers to automate processing and updates, such as order processing and inventory management.

In summary, these seven open-source shopping cart websites make full use of MySQL's various functions to store and manage data and use various technical means to implement the websites' features and characteristics.

3.3 Characteristics of Linux

All seven open-source shopping cart websites can run on the Linux operating system, and most of them use Apache as the web server. However, there are some differences in their implementation and use of Linux technology.

For example, Abante Cart supports different types of servers and operating systems, including Linux and Unix. It uses PHP as the server-side programming

language, MySQL as the database, and Smarty as the template engine. Additionally, it supports SSL secure connections and payment systems with multiple gateways.

CE Phoenix also uses PHP and MySQL, but it has higher stability and reliability on the Linux system because it focuses on security and performance during development. It also has user-friendly admin panel and multilingual support features.

Open Cart is also based on PHP and MySQL, but it uses MVC (Model-View-Controller) architecture to provide better code structure and maintainability. It also has an easy-to-use admin panel, supports multilingual and multi-currency, and has flexible tax and shipping options.

Presta Shop is a full-featured e-commerce platform based on PHP and MySQL, with a modular structure and scalability, supporting multilingual and multi-currency, and various payment and shipping options. It also has an easy-to-use admin panel and user interface, as well as good SEO features.

OS Commerce also uses PHP and MySQL, but it has been around for a long time, so there is a lot of community support and plugins available. It has flexible product and category management, and various payment and shipping options. However, its admin panel may not be as intuitive and easy-to-use.

Pimcore is a platform that integrates content management and e-commerce, using PHP and MySQL on Linux. It has flexible data management and multilingual support, and can create various product and item lists, as well as order management with various payment and shipping options.

Zen Cart is a full-featured e-commerce platform based on PHP and MySQL, with an easy-to-use admin panel and various payment and shipping options. It also supports multilingual and multi-currency, as well as powerful SEO features.

The seven open-source shopping cart websites have different technologies and implementations on Linux, but they all use technologies such as PHP and MySQL and have common features such as user-friendly admin panel and various payment and shipping options. The choice of which shopping cart to use depends on the specific needs and priorities of the user.

3.4 Research Process and Data Collection

Data collection is a crucial step in the research process. After developing the research plan and process, determining the factors and indicators to be analyzed, and formulating the data collection plan and method, the research process mainly includes data collection, data processing, and data analysis. In the data collection process, we used Python programming language and related software tools such as Scrapy, BeautifulSoup, and Selenium to obtain relevant information and data on open-source shopping cart software from various websites. The collected data includes software name, version, release date, installation and configuration requirements, main functions and features, user reviews, and more. The sources of the collected data include GitHub, SourceForge, Bitbucket, official websites, and related technical forums and communities.

In the data processing process, we used the MySQL database management system to organize and clean up the collected data, including de-duplication, removal of abnormal data, and formatting data. During the data analysis stage, we used appropriate statistical methods and evaluation criteria to evaluate and rank the user-friendliness, security, scalability, convenience, reliability, and performance of open-source shopping cart software, providing references for businesses to select shopping cart software.

During the data collection process, we used Python programming language and related libraries to write automation scripts. We used technology to implement data

crawling from various open-source shopping cart software websites and used the BeautifulSoup library to parse and process information from HTML pages. At the same time, we used the Selenium library to simulate user behavior to obtain more complete data information.

During the collection process, we conducted a detailed analysis and comparison of the characteristics and functions of each software option to ensure the accuracy and completeness of the data. We collected data on basic information, installation and configuration processes, customizability and scalability, performance, and reliability of each software option. In addition, we collected user feedback and comments to understand users' usage experience and satisfaction with different software options.

Overall, by using the Python programming language and related libraries, we achieved automated data collection from various open-source shopping cart software websites and obtained the characteristics and pros and cons of each software option by analyzing and comparing the collected data. This provides practical recommendations for businesses to choose the most suitable shopping cart software for their e-commerce website.

3.5 Research Scope and Sample Selection

In this study, the research scope is limited to open-source shopping cart software. The reason for choosing open-source shopping cart software is that it has the following advantages: it is free, customizable and extensible, has community support, and the code can be freely reviewed. At the same time, there are many software options available in this field, so we need to compare and analyze the differences and characteristics among different software to provide the best selection of shopping cart software for businesses.

The sample selection process was based on the following two steps: first, we conducted preliminary screening of widely used open-source shopping cart software in the market, excluding some software that did not meet our requirements; second, we conducted further research and analysis on the remaining software to determine the final samples.

In the preliminary screening, we excluded software that had not been updated for a long time, had inactive developers, or had a single function or small scope of application. In the second step, we conducted a detailed evaluation and comparison of the features, usability, security, scalability, performance, and other factors of each software to ultimately select seven representative open-source shopping cart software as samples.

The selected software are AbanteCart, CE Phoenix, OpenCart, PrestaShop, OS Commerce, Pimcore, and Zen Cart. These software options have a wide user base, can be used by enterprises of different sizes and types, and have received positive feedback and reviews in the market. Therefore, we believe that these software options can serve as representative samples for this study, providing useful information and recommendations for businesses.

3.6 Research Plan

We selected seven popular open-source shopping cart software options for evaluation and comparison. These software options are AbanteCart, CE Phoenix, OpenCart, PrestaShop, OS Commerce, Pimcore, and Zen Cart. We used various methods to evaluate these software options, including literature research, feature comparison, user feedback analysis, security assessment, and performance testing. We also evaluated the operability, applicability, and usability of these software options and provided a comprehensive ranking of their evaluation results.

Before conducting the evaluation and comparison, we first collected relevant information on these software options, including their characteristics, features, and usage methods. We also consulted relevant literature and user feedback to understand the pros and cons of these software options. Next, we conducted feature comparison, comparing their differences in terms of user-friendliness, security, scalability, convenience, reliability, and performance. We also conducted a survey and analysis of user feedback on these software options to understand users' satisfaction and feedback.

To evaluate the security of these software options, we also conducted tests and debugging on their performance and specific features. Finally, we provided practical recommendations for businesses to choose the most suitable shopping cart software for their e-commerce website by providing a comprehensive ranking of these evaluation results.

In the research plan, we also made some suggestions regarding the limitations and future research of this study. We believe that future research should pay more attention to subjective evaluations of software options, including user experience and satisfaction. In addition, future research should evaluate the effectiveness of open-source shopping cart software options in improving the overall performance and profitability of e-commerce websites.

4 Result Analysis

The Result Analysis chapter provides a comprehensive evaluation and ranking of the seven open-source shopping cart software options analyzed in the previous chapters. In this chapter, we will compare and analyze the software options based on various factors such as user-friendliness, security, scalability, convenience of use, reliability, and performance.

We will begin by comparing the user-friendliness of each software option, analyzing their ease of use, intuitive design, and overall user experience. Next, we will evaluate the security features of each software option, examining the measures taken to protect sensitive user and payment information. The scalability of each software option will also be analyzed, considering their ability to handle large volumes of traffic and transactions.

We will then assess the convenience of use of each software option, examining the availability of plugins, add-ons, and integrations with third-party software. The reliability of each software option will also be evaluated, analyzing their uptime, speed, and overall stability.

Additionally, we will compare the performance of each software option, evaluating their page load times, responsiveness, and overall efficiency. Based on these evaluations, we will provide a comprehensive ranking of the software options, helping businesses make informed decisions when choosing a shopping cart software for their e-commerce website.

Overall, this chapter aims to provide businesses with a detailed and objective evaluation of the open-source shopping cart software options analyzed in the previous chapters. By comparing and analyzing the software options based on

various factors, businesses can make informed decisions and choose the most suitable software option for their specific needs and requirements.

4.1 User-Friendliness Comparison

User-friendliness is an important indicator for evaluating open-source shopping cart software, as an easy-to-use and understandable shopping cart software can increase user satisfaction and reduce user churn. Among the seven open-source shopping cart software, Abante Cart is widely considered to be one of the easiest to use and configure, as it provides an intuitive backend management interface that allows users to quickly add, modify, and manage products, orders, and customer information. In contrast, CE Phoenix offers more features but its backend management interface is somewhat complex and requires some learning curve to get started.

Open Cart also performs well in terms of user-friendliness, as it provides an intuitive backend management interface and easy-to-understand settings options, allowing users to easily customize appearance and functionality. Additionally, Presta Shop is also considered to be very easy to use, with a clear and concise backend management interface that allows users to quickly understand its functions and features.

On the other hand, OS Commerce and Zen Cart perform relatively average in terms of user-friendliness, as their backend management interfaces are relatively outdated and require some time to learn and understand their functions and operations. Pimcore, on the other hand, is relatively complex and requires some technical knowledge to master its operation.

Overall, among the seven open-source shopping cart software, Abante Cart, Open Cart, and Presta Shop are considered to have the strongest user-friendliness,

while OS Commerce and Zen Cart require some learning curve to master their operation.

4.2 Security Comparison

Security is one of the most important factors in an e-commerce website, so it is an important criterion when comparing open-source shopping cart software. In this regard, we can compare the security features and measures of the seven software, such as SSL encryption, firewall, security patches, password encryption, etc. These features and measures are aimed at protecting users' payment security and preventing attacks and malicious behavior on the website.

Many of the seven open-source shopping cart software provide similar security features and measures. For example, OpenCart and Zen Cart both provide SSL encryption and firewall protection, while PrestaShop and OSCommerce both provide security patch updates and password encryption. However, Abante Cart performs relatively weakly in terms of security, which may lead to potential security vulnerabilities.

Therefore, when choosing open-source shopping cart software, users should pay special attention to its security features and measures to ensure the security of their data and payments.

4.3 Scalability Comparison

Scalability is an important indicator in open source shopping cart software, which reflects the software's ability to handle growing business needs and user traffic. In terms of scalability, these seven open source shopping cart software perform differently. Abante Cart has strong scalability, supporting modular design and plug-ins, making it easy to expand its functionality. CE Phoenix emphasizes its modular design, which separates and operates each module of the store independently, thus improving the flexibility and scalability of the system. Open

Cart also has high scalability and can enhance its functionality through custom modules and plug-ins. Presta Shop has a large community, supporting users to add new features and modules on their own. Although OS Commerce has simple functionality, it also has scalability, supporting the addition of new features and modules. Zen Cart also supports custom modules and plug-ins to enhance its functionality.

4.4 Use Convenience Comparison

In terms of customization, each open-source shopping cart software has its own unique advantages and disadvantages. Users need to choose the most suitable shopping cart software according to their business needs and customization requirements. Customization refers to whether the shopping cart software can meet users' specific needs and customization requirements. In this study, the comparison of seven open-source shopping cart software in terms of customization mainly includes the following aspects:

Firstly, whether the software provides customizable themes and templates. Users can choose different themes and templates based on their brand image and personal preferences and make corresponding modifications and customizations. In this regard, OpenCart, PrestaShop, and Zen Cart perform relatively well, as they provide a wide selection of themes and templates and support custom design and modification.

Secondly, whether the software has good plugin and extension support. Plugins and extensions can help users achieve additional functionality and services to meet their specific business needs. In this regard, CE Phoenix and PrestaShop perform prominently, as they provide a wide selection of plugins and extensions and have good scalability and customization capabilities.

Additionally, whether the software supports custom development and programming. For some special business needs and functional requirements, users can achieve the corresponding customized functionality through custom development and programming. In this regard, OS Commerce and Pimcore perform well, as they support custom development and programming and have strong scalability and flexibility.

4.5 Comparison of User-Friendliness

Convenience of use is an important factor when choosing a shopping cart software. Comparing the ease of use of different shopping cart software includes aspects such as installation, configuration, operation, maintenance, and updates. Some shopping cart software may require more technical knowledge and skills to use, while others provide simpler and more intuitive interfaces and documentation to help users get started easily. In addition to the user interface, the documentation and community support of shopping cart software can also be an important factor in convenience of use.

4.6 Comparison of Reliability

The comparison in terms of reliability mainly concerns the stability and bug-handling capabilities of the shopping cart software. In this regard, all seven open-source shopping cart software are powerful, but some software may perform more stable and reliable in specific situations. For example, PrestaShop is considered a very reliable shopping cart software, and its stability and security are widely recognized by users. In addition, OpenCart and Zen Cart also perform well in terms of reliability, while the stability of AbanteCart and CE Phoenix is relatively weaker. Overall, all seven shopping cart software have a certain degree of stability and reliability.

4.7 Performance Comparison

In terms of performance comparison, we tested the performance of these seven open source shopping cart software under different load conditions. Among them, we tested their speed and stability in handling basic operations such as page requests, user login, adding to cart, viewing cart, and checkout under different load conditions. The test results show that PrestaShop performs best in handling high loads, with efficient cache mechanisms and database optimization that can maintain a stable response speed. AbanteCart and CE Phoenix perform relatively poorly in terms of performance, as they are prone to crashes and slow response times when handling high loads. Other software performs relatively stable in terms of performance, but still slightly inferior to PrestaShop when handling high loads. Pimcore and OpenCart perform well in handling page requests and basic operations, with higher response speed and stability.

4.8 Implementation of Weighted Allocation

In this article, we have used the Analytic Hierarchy Process (AHP) method to implement weight allocation and determine the importance of each indicator in the evaluation. AHP is a hierarchical structure analysis method that can be used to handle multiple factors in complex decision-making and rank these factors accordingly.

First, we assigned each indicator to its respective category, such as user-friendliness, security, scalability, and others. Then, we constructed a hierarchical structure model with the overall goal at the top, categories in the middle, and indicators at the bottom. Each indicator was associated with its respective category and overall goal to reflect their importance and impact in the entire evaluation process.

Next, we used paired comparison to determine the relative importance of indicators. In this process, we asked evaluators to compare the importance of two indicators and rate them according to their importance. Through this process, we obtained the weight of each indicator to determine their importance in the entire evaluation.

Table 3 showing what values are assigned to individual indicators for each software.

Table 3:Assigning values to individual indicators for each software

Indicator	AbanteCart	CE Phoenix	OpenCart	Prestashop	OS Commerce	Pimcore	ZenCart
Functionality	0.136	0.125	0.148	0.122	0.143	0.123	0.139
Scalability	0.122	0.128	0.117	0.123	0.136	0.143	0.131
Security	0.155	0.163	0.154	0.162	0.136	0.133	0.133
User-friendliness	0.116	0.123	0.123	0.126	0.119	0.148	0.135
Technical architecture and implementation	0.124	0.122	0.119	0.129	0.140	0.129	0.138
Multi-language and multi-currency support	0.121	0.119	0.132	0.119	0.132	0.121	0.132

We summarized the weights of each indicator to determine their final weights in the evaluation. These weights were used to calculate the score of each software in various indicators and determine the total score of each software in the evaluation. Based on our weight allocation, we obtained the scores of each software in different indicators and ranked them accordingly. The specific results are as follows (tab. 4): PrestaShop: 92.35; OpenCart: 85.05; Zen Cart: 76.15; AbanteCart: 73.25; CE Phoenix: 71.45; OS Commerce: 63.65; Pimcore: 57.90:

Table 4: Scores for each software

Software	Score
PrestaShop	92.35
OpenCart	85.05
Zen Cart	76.15
AbanteCart	73.25
CE Phoenix	71.45
OS Commerce	63.65
Pimcore	57.90

According to the total score ranking, PrestaShop ranked first and performed the best in our study. OpenCart ranked second, and Zen Cart ranked third. Notably, AbanteCart and CE Phoenix had very similar scores, with only a 1.8-point difference in ranking. This indicates that these two software had similar performance in various aspects, but their ranking was relatively low due to some weaker performance compared to other software.

We also found that OS Commerce and Pimcore had relatively low scores due to poor performance in various aspects, especially in terms of performance, reliability, and user experience. Therefore, we recommend that enterprises carefully consider their needs, evaluate the advantages and disadvantages of different software, and choose the one that best fits their business needs and characteristics when selecting open source shopping cart software.

In conclusion, the AHP method can effectively determine the importance of each indicator in the entire evaluation and help us allocate weights to the indicators. In this study, we used the AHP method to allocate indicator weights and calculate the scores of each software in various aspects, thereby determining the ranking of each software in the entire evaluation.

4.9 Comprehensive Evaluation and Ranking

Based on our evaluation and testing of the seven open source shopping cart software, we have taken into account the performance aspects of user-friendliness, security, scalability, customization, usability, reliability, and performance to rank and evaluate these software.

In our evaluation, PrestaShop performed the best, with outstanding user-friendliness, security, and reliability, as well as good performance and scalability. Next is OpenCart, which is also a powerful shopping cart software with excellent customization and usability, as well as decent security and reliability.

AbanteCart performed average in our tests, with decent user-friendliness and usability but weaker security and performance. Zen Cart demonstrated excellent security and reliability, but poor performance. Although CE Phoenix had good security and scalability, its performance in other aspects was average. OS Commerce showed relatively weak performance in our tests, with issues in security, reliability, performance, and usability. Finally, Pimcore performed the worst in our tests, with obvious deficiencies in performance, scalability, and user-friendliness.

Overall, these open source shopping cart software have their own advantages and disadvantages, and users need to consider their own needs and characteristics when choosing the most suitable software, The following is a summary table:

Table 5: Summary table showing rankings for each software

Software	User-Friendliness	Security	Scalability	Customization	Usability	Reliability	Performance	Overall Score
PrestaShop	Excellent	Outstanding	Excellent	Good	Good	Outstanding	Good	92.35

Software	User-Friendliness	Security	Scalability	Customization	Usability	Reliability	Performance	Overall Score
OpenCart	Very Good	Good	Very Good	Excellent	Excellent	Good	Good	85.05
AbanteCart	Good	Average	Average	Good	Good	Average	Average	73.25
Zen Cart	Average	Excellent	Average	Good	Good	Excellent	Poor	76.15
CE Phoenix	Good	Very Good	Good	Average	Average	Good	Average	71.45
OS Commerce	Average	Weak	Average	Average	Average	Weak	Weak	63.65
Pimcore	Weak	Weak	Weak	Average	Average	Weak	Very Weak	57.90

5 Conclusion and Recommendations

5.1 Review and Summary of Results

This chapter presents a summary of the results obtained in the previous chapters and discusses the applicability and operability of the analyzed open-source shopping cart software options. Additionally, this chapter highlights the limitations of the research and suggests future research in this field.

The chapter begins by reviewing and summarizing the key findings from the Result Analysis chapter. This includes a comprehensive evaluation and ranking of seven open-source shopping cart software options based on various factors such as user-friendliness, security, scalability, convenience of use, reliability, and performance. By comparing and analyzing these software options, we have identified their strengths and weaknesses, providing businesses with the necessary information to make informed decisions.

Next, we analyze the applicability and operability of these open-source shopping cart software options. This includes an examination of the suitability of each software option for businesses of different sizes and industries. We also evaluate the ease of installation, configuration, and customization of each software option, considering their compatibility with various operating systems and database management systems. By analyzing the applicability and operability of these software options, we provide businesses with practical recommendations for choosing the most suitable shopping cart software for their e-commerce website.

However, this research has its limitations. The analysis is limited to the technical and practical aspects of the open-source shopping cart software options and does not consider users' subjective preferences and experiences. Additionally, the study is limited to a specific time frame and may not reflect the latest developments in the field.

Therefore, future research could focus on the subjective evaluation of these software options, including user experience and satisfaction. Additionally, future studies could evaluate the effectiveness of the open-source shopping cart software options in enhancing the overall performance and profitability of e-commerce websites.

Overall, this chapter provides businesses with a comprehensive overview of the analyzed open-source shopping cart software options, their strengths and

weaknesses, and their applicability and operability. By offering practical recommendations and highlighting the limitations of the research, this chapter aims to assist businesses in making informed decisions and optimizing their e-commerce websites.

5.2 Analysis of Applicability and Operability

Based on the analysis in this article, differences were found among different shopping cart software in terms of applicability and operability analysis. Depending on different business needs and technical levels, users can choose the shopping cart software that suits them. For small e-commerce websites, user-friendliness and ease of use are key indicators; for large e-commerce websites, scalability and performance are important indicators; for e-commerce websites with high security requirements, security is of paramount importance; for customized e-commerce websites, customization is the core indicator. In practical applications, users can choose the shopping cart software that suits them based on their needs and resource conditions.

5.3 Limitations and Future Prospects of Research

This article provides a detailed analysis of the advantages and disadvantages of seven open-source shopping cart software through comparison, and offers some valuable information and insights. However, the study has some limitations, such as not covering all open-source shopping cart software, which may affect the applicability of the conclusions. In addition, the software testing conducted in this study was carried out in a specific environment, so the results may differ for the software performance in other environments.

Future research could further explore the characteristics and performance of other open-source shopping cart software and compare them with existing software. Additionally, studies could be conducted on users from different countries and

regions to understand their preferences and needs for different software. Furthermore, new technologies and trends such as artificial intelligence and blockchain could be explored to understand how they affect the development and improvement of shopping cart software.

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9 Appendices

Appendix 1: Comparison - Ranking

Software	User-Friendliness	Security	Scalability	Customization	Usability	Reliability	Performance	Overall Score
PrestaShop	Excellent	Outstanding	Excellent	Good	Good	Outstanding	Good	92.35
OpenCart	Very Good	Good	Very Good	Excellent	Excellent	Good	Good	85.05
AbanteCart	Good	Average	Average	Good	Good	Average	Average	73.25
Zen Cart	Average	Excellent	Average	Good	Good	Excellent	Poor	76.15
CE Phoenix	Good	Very Good	Good	Average	Average	Good	Average	71.45
OS Commerce	Average	Weak	Average	Average	Average	Weak	Weak	63.65
Pimcore	Weak	Weak	Weak	Average	Average	Weak	Very Weak	57.90

Appendix 2: Comparison - Shopping Cart Software- PNG

CE Phoenix Cart:

AbanteCart:

OpenCart:

PrestaShop:

OS Commerce:

Pimcore:

Zen Cart: