

THE MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF
KAZAKHSTAN

Kazakh National Research Technical University named after K. I. Satbayev

Institute of Information and Telecommunication Technologies

Department of Cybersecurity, Data Storage and Processing

Abdrakova Dinara

IT infrastructure of the enterprise

DIPLOMA WORK

specialty 5B070300 –«Information systems»

Almaty 2019

THE MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF
KAZAKHSTAN


Kazakh National Research Technical University named after K. I. Satbayev

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« 13 » 05 2019.

DIPLOMA WORK

Theme: « IT infrastructure of the enterprise»

specialty 5B070300 – Information systems

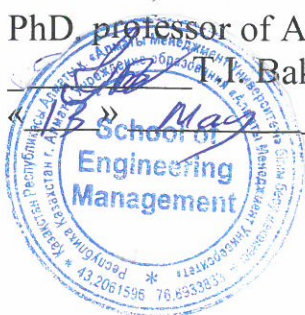
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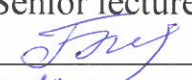
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Scientific advisor,

Senior lecture

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Almaty 2019

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Department of Cybersecurity, Data Storage and Processing

5B070300 – Information system

AFFIRM

Head of Department Cybersecurity
Data Storage and Processing,
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 N.A. Seilova
« 13 » 05 2019.

TASK

to perform the Diploma work

Student Abdrakova Dinara

Theme: IT infrastructure of the enterprise.

Approved by the order of the University № 465 from « 16 » 10 2018

Deadline for completion of work « 13 » 05 2019

Source data to diploma work: Domestic and foreign scientific works and textbooks, scientific articles were used in electronic versions.

The list of subject to the development of the thesis or a summary of its content:

a) to consider the basic concepts of the IT-infrastructure;

b) the study of elements of IT-infrastructure ;

c) creation of the ERP program for the IT-infrastructure of the enterprise.

Recommended main literature: 14 sources

SCHEDULE
of preparation of the Diploma work

The name of the sections, a list of issues	Deadline for submission to supervisor and consultants	Notice
Overview and analysis of existing IS on the market	10.01.2019 - 08.03.2019.	<i>Tary</i>
Writing the functional structure of IS	05.02.2019-10.03.2019.	<i>Tary</i>
Writing program part	11.03.2019-28.04.2019.	<i>Tary</i>

Signature

Consultants and normocontrol to complete a thesis indicating the related sections of the Diploma work

Section titles	Consultants, Full name (academic degree, rank)	Data of signing	Signature
Program software	M. B. Bauyrzhan Master of Technical Sciences, tutor	8.05.19	<i>J</i>
Normocontrol	O.V. Kisseleva, PhD, senior-lector	5.05.19	<i>O.KS-</i>

Scientific adviser

Tary

Baymataeva Sh. M.

Task was accepted for execution by the student

Abdrakova

Abdrakova D.E.

Date

«14» May 2019

REVIEW

On Diploma Thesis Work
Of Abdrakova Dinara, student of Satbayev University
Information systems, 5B070300

Entitled: **Development of the IT-infrastructure of production**

This work consist of:

- a) 17 chapters;
- b) 12 tables;
- c) 15 figures;

COMMENTS AND EVALUATION

The first chapters are focused on general principles of the architectural approach, methods of IT-strategies. Also author of this diploma thesis used MEGA software product for modeling enterprise architecture, and why choose this product. In the second and third chapters introduces software solution of this task. For processing author used SQL with PHP programming language to write ERP-system. The experimental results are summarized in other chapters consists of conclusions and recommendations for future work.

On my mind the work belong to more difficult work, needs to complete knowledge of student. The given task was completely fulfilled; methods of solution were correctly chosen.

Conclusion

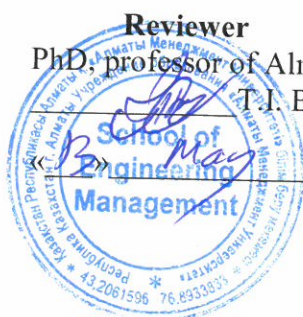
I appreciate that the author successfully integrated tools and knowledge from several areas connected. I do recommend this diploma work for presentation with the aim to receiving the Bachelors Degree.

I propose to classify the work with grade B.

Reviewer

PhD, professor of AlmaU

T.I. Bakibayev



2019 г.

**THE OPINION
OF THE SUPERVISOR**

for thesis

Abdrakova Dinara

5B070300-Information systems

Subject: Designing of mobile application for the scientific library of Satbaev
University

The thesis is dedicated to the development of the IT infrastructure of the enterprise.

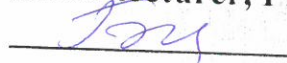
In the course of carrying out the thesis, the basic concepts of creating the enterprise's IT infrastructure and elements of IT infrastructure were studied; system development tools were selected; a data model was developed as an integral part of the IT infrastructure, a network was selected, an ERP program was created for the enterprise IT infrastructure. ERP-system is written in PHP.

In the course of carrying out the thesis work Abdrakova Dinara, showed good theoretical training, showed herself to be an expert, which was able to solve the problems of building information systems.

Taking into account the above mentioned, the thesis meets the requirements for graduation papers of specialty 5B070300 – "Information systems" and Abdrakova Dinara worthy of awarding the academic title of bachelor of engineering and technology.

Scientific adviser

senior lecturer, Ph. D.

 Baimatayeva Sh.

" 8 " 05 2019.

Протокол анализа Отчета подобия

заведующего кафедрой / начальника структурного подразделения

Заведующий кафедрой / начальник структурного подразделения заявляет, что ознакомился(-ась) с Полным отчетом подобия, который был сгенерирован Системой выявления и предотвращения плагиата в отношении работы:

Автор: Abdrakova Dinara

Название: IT infrastructure of the enterprise

Координатор: Шолпан Байматаева

Коэффициент подобия 1:0,7

Коэффициент подобия 2:0

Тревога:0

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- ☐ обнаруженные в работе заимствования не обладают признаками плагиата, но их чрезмерное количество вызывает сомнения в отношении ценности работы по существу и отсутствием самостоятельности ее автора. В связи с чем, работа должна быть вновь отредактирована с целью ограничения заимствований;
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Обоснование:

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Дата 13.05.19

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начальника структурного подразделения


13.05.19

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13.05.19

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Автор: Abdrakova Dinara

Название: IT infrastructure of the enterprise

Координатор: Шолпан Байматаева

Коэффициент подобия 1:0,7

Коэффициент подобия 2:0

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- ☐ обнаруженные в работе заимствования являются недобросовестными и обладают признаками плагиата, или в ней содержатся преднамеренные искажения текста, указывающие на попытки сокрытия недобросовестных заимствований. В связи с чем, не допускаю работу к защите.

Обоснование:

Результаты планета соответствуют
требованиям, необходимым для
выпуска готовых работ и защиты

13.05.19

Дата

Т.И.

Подпись Научного руководителя

Краткий отчет



Университет:	Satbayev University
Название:	IT infrastructure of the enterprise
Автор:	Abdrakova Dinara
Координатор:	Шолпан Байматаева
Дата отчета:	2019-05-08 06:20:31
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Коэффициент подобия № 2:	0,0%
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Адреса пропущенные при проверке:	
Количество завершенных проверок:	49

Самые длинные фрагменты, определенные, как подобные

№	Название, имя автора или адрес гиперссылки (Название базы данных)	Количество Автородинаковых слов
1	URL_ http://cobweb.cs.uga.edu/~jam/jsim/JSIM/docs/jsim/jmessage/CostReport.html	6
2	URL_ https://www.iep.utm.edu/sen-cap/	5

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| https://en.wikipedia.org/wiki/Internet_of_things | |
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1	URL_ https://www.iep.utm.edu/sen-cap/	10 (2)
2	URL_ http://cobweb.cs.uga.edu/~jam/jsim/JSIM/docs/jsim/jmessage/CostReport.html	6 (1)
3	URL_ https://en.wikipedia.org/wiki/Internet_of_things	5 (1)

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АНДАТПА

Бұл дипломдық жұмыста кәсіпорынның ІТ инфрақұрылымы зерттеліп, арнайы ERP бағдарламасы құрылады. Бүгінгі күні ұйымдар нарықта, қоршаған ортаға және технологиядағы өзгерістерге жауап беру үшін үнемі өзгеруі керек. Мақсаты бар, бақыланатын және табысты өзгерістер - ұйымдық инженерия шеңберінде жүйеленген және дамыған арнайы әдістер мен модельдерді қажет етеді. ІТ инфрақұрылымға арналған ERP бағдарламасы PHP тілінде құрылды.

Дипломдық жобаның тақырыбын зерттеу барысында отандық және шетелдік ғылыми еңбектері мен оқулықтар, электронды басылымдардағы ғылыми мақалалар қолданылды.

Зерттеу тәжірибесі: Салыстырмалық, аналитикалық, логикалық, құрылымдық жүйе, функционалдық жүйе, жалпылау тәжірибесі.

АННОТАЦИЯ

В этой дипломной работе исследуется IT-инфраструктура предприятия и разрабатывается соответствующая программа ERP. Сегодня организации должны постоянно меняться, чтобы реагировать на изменения рынка, среды и технологий. Целенаправленные, контролируемые и успешные изменения требуют систематических и передовых специализированных методов и моделей в рамках организационного проектирования. Для IT-инфраструктуры написана ERP-система на языке PHP.

При изучении темы дипломной работы, отечественных и зарубежных научных работ и учебников использовались научные статьи в электронных изданиях.

Опыт исследования: относительная, аналитическая, логическая, структурная система, функциональная система, опыт обобщения.

ANNOTATION

In this thesis the IT infrastructure of the enterprise is studied and develop a special ERP program is created.

Today organizations must constantly change to respond to changes in the market, environment and technology. Purposeful, controlled, and successful changes require systematic and advanced specialized methods and models within organizational design. ERP programs for IT infrastructure are developed in PHP. In the study of the theme of the diploma thesis used domestic and foreign scientific works, textbooks, scientific articles in electronic publications.

Research experience: comparative, analytical, logical, structural system, functional system, generalizing experience.

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INTRODUCTION

Today, Kazakhstan business is experiencing one of the most difficult and critical moments in its recent history. On the one hand, in most industries, the consequences of the 1990s and the 1998 crisis are overcome. The last 5-6 years there has been a steady economic growth. Confidently improved macroeconomic indicators. But on the other hand, competition in the domestic market is getting tougher, both from domestic enterprises and from international corporations. One of the ways to not only maintain the required level of competitiveness of the organization, but also to gain leadership positions in the international market, is the use of information technology. If before IT was still considered as resource consumers, then today there is a growing conviction in the effectiveness of IT investments. The development of information technologies and the growth of their importance in meeting the needs of the business objectively lead to an increase in IT costs. At present, the level of expenditures on information technology of an enterprise is approaching, and sometimes even exceeds the level of investment in other production processes combined.

But despite the active financing of the IT industry, the percentage of unsuccessful projects remains high. According to the research of StandishGroupChaos, which specializes in conducting research in the IT industry, providing consulting services for project management, investing in software, of all software projects completed in 2010, only 32% of projects are successful. 44% are controversial (having overspending, budget overruns, other shortcomings), and 24% are failures. If we compare it with the first results of similar studies conducted in 1994, there is an improvement - at that time 16% of projects were successful, 53% were controversial and 31% were unsuccessful. However, current statistics still leave a lot of room for improvement.

1 OVERVIEW OF METHODS AND MEANS FOR DEVELOPING IT STRATEGIES

1.1 Principles of the architectural approach and modeling tools used

In a modern, highly volatile market, one can survive only by being mobile: speed can be a crucial competitive advantage, and a well-established organizational structure often becomes a burden. Progressive-minded firms are already beginning to adapt to continuous, unpredictable changes. Achieving the necessary flexibility can help the use of the architectural model of the enterprise.

The architectural approach is based on the idea of close, efficient and effective interaction between business and information technologies, in which they are considered as a whole and are united in the concept of enterprise architecture. The development of an IT strategy should be based on

Enterprise architecture - a rigorous description of its structure, decomposition into subsystems, connections between subsystems and with the external environment, as well as terminology and guidelines for designing and developing an enterprise. This comprehensive description should also include the objectives of the enterprise, business functions, business processes, roles, organizational structure, applications and computer systems. The concept of enterprise architecture was first introduced by Zachman in 1987.

Enterprise architecture is a new approach to enterprise description. It can cover the entire enterprise as a whole, as well as individual departments and divisions. Currently, attention is shifting in favor of an integrated enterprise model. Thus, there is a growing need to use integrated modeling tools to analyze and optimize a portfolio of business strategy, organizational structure, business processes, tasks and activities, information flows, applications and technological infrastructure. Important when choosing this approach is also the availability of tools to support the development, storage and enhancement of enterprise architecture visualization.

In 2012, Scart Britli, analyst at Gartner, presented a report reflecting the current state of the EA market.

Tools, in which he evaluated 15 companies involved in enterprise architecture solutions and placed them in 4 quadrants: leaders, challengers for leadership, and niche players. During the study, the leader in the field of enterprise architecture among such companies as IBM, SAP-Sybase, Troux was recognized by MEGA. The company has been widely recognized for its business processes, risk analysis and risk management and regulatory compliance.

1.2 MEGA is a software product for modeling enterprise architecture

MEGA is unique in combining architecture and experience in designing systems and methods of corporate governance. A global approach to an enterprise's activity represents a stable way to improve business performance for organizations, providing the means for optimization, transformation and consistent management. You cannot change what you cannot see. Enterprise modeling techniques provide transparency and understanding of business operations and IT systems, as well as the associated risks. The allocated funds provide an opportunity to provide this information to all interested parties in exactly the way it is understood by them.

In order to represent, understand, share and optimize operations and IT systems, MEGA includes various components. All of them are built on the same database. Thus, they can be used individually or together, depending on the requirements of the project.

The vision of managing enterprise architecture at MEGA supports 3 main objectives.

1. Providing benefits to business.

Driven by business vision, the MEGA approach is based on a clear description of the priorities of the organization and business. The complete enterprise architecture solution includes a full view of the business architecture for working with the business strategy, planned opportunities and business motivation models.

2. Planning transformations.

Nowadays, when organizations are faced with an increasing complexity of changes in business and technology, managing major transformation projects requires new approaches to organizing change management and describing effective paths from current to target models. To do this, MEGA integrates IT transformation tools that facilitate the planning and analysis of any change scenarios for existing information systems and IT infrastructure. MEGA also provides system architects with standard frameworks for integrated analysis and design of IT systems and structuring of system architecture.

3. Expanded opportunities for communication and informed decision making.

As enterprise architecture projects involve an ever wider range of stakeholders in organizations, meeting the various requirements of each user has become a very important aspect of the solution.

MEGA Suite provides a collaborative environment, including workflow capabilities for managing changes in the repository. A management-oriented library of predefined reports and dashboards on enterprise architecture offers the information you need to make informed decisions by managers and top management.

MEGA solutions cover all aspects of enterprise architecture, from business architecture to infrastructure modeling. They are based on international frameworks and standards and a complete software package for managing enterprise architecture.

1.3 Strategic management in the development of IT strategy

The main purpose of strategic management as an element of the management system is to focus the activity of the organization as a whole and its individual

aspects on the achievement of the main goals set by the owners and / or top management of the company. The overall structure of the strategy:

- strategic concepts, ideas, principles (declaration);
- strategic goals and indicators (strategy map, table with target values);
- strategic programs and plans.

Modern strategic management proceeds from the fact that “conceptual ideas” occupy a central place in the strategy, but in order to implement these ideas, they need to be translated into a system of goals and indicators.

After analyzing the gaps between the existing and target values of the strategic indicators, the points of application of the efforts to which the strategic projects and programs should be directed become clear.

The company, as a system, is part of the established economic, social and ecological environment. The mission defines its role in the “social division of labor”. The composition and peculiarities of the enterprise's processes are, in many respects, determined exclusively by the specifics of the industry. At this level of consideration of the company, it is difficult to say about the goals of the business, the coma of the fact that “this is making money for the public utility”.

The strategic goals are connected with the desires of the subjects, their desire to win in the competition, choosing a special line of economic behavior in a constantly changing environment, differently than others, having organized their business. Therefore, companies are constantly restructured, implement new strategic ideas or improve to better implement old ideas.

All these transformations and improvements are carried out at the level of functional systems and processes that underlie any firm. The strategy in its own right sets the priorities for the important, from its point of view, aspects of the activity. These goals are called critical success factors (KFU) and form their own system of strategic goals. Accordingly, the indicators measuring these goals, KPI (key performance indicators), fall into the zone of strategic interest. But not all indicators measuring the activities of a company are strategic (related to strategic goals - KFU). Similarly, the process approach allows for the description and design of strategies at different levels.

1.4 Statement of the problem

Data exchange between client applications and the database is carried out by standard components of the ODBC technology.

Principles of user interface organization:

- use a graphical interface;
- information should be provided to users in a convenient and familiar way for them, and using standard visual components of MS Windows;
- changes made to the data should be immediately reflected on the screen;
- functions intended to change the information should be called by separate context menu items;

- when information is changed, the possibility of canceling the changes made should be implemented;
- in case of incomplete or incorrect user input of information, it is necessary to indicate which particular values the user did not indicate, or which errors he made;
- the results of the use of sorting or searching should immediately be reflected on the screen;
- at each time point, only buttons and context menu items should be available that implement the valid for the current state of the form and operation data.

2 DEVELOPMENT DATABASE

2.1 Database review

Data is organized into rows, columns and tables, and it is indexed to make it easier to find relevant information. Data gets updated, expanded and deleted as new information is added. Databases process workloads to create and update themselves, querying the data they contain and running applications against it. Databases support storage and manipulation of data. Let's discuss few examples.

An online telephone directory would definitely use database to store data pertaining to people, phone numbers, other contact details, etc.

Your electricity service provider is obviously using a database to manage billing , client related issues, to handle fault data, etc.

Let's also consider the facebook. It needs to store, manipulate and present data related to members, their friends, member activities, messages, advertisements and lot more.

We can provide countless number of examples for usage of databases .

2.2 Database management system

A database management system (DBMS) is system software for creating and managing databases. The DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data.

A DBMS makes it possible for end users to create, read, update and delete data in a database. The DBMS essentially serves as an interface between the database and end users or application programs, ensuring that data is consistently organized and remains easily accessible.

The DBMS manages three important things: the data, the database engine that allows data to be accessed, locked and modified -- and the database schema, which defines the database's logical structure. These three foundational elements help provide concurrency, security, data integrity and uniform administration procedures. Typical database administration tasks supported by the DBMS include change management, performance monitoring/tuning and backup and recovery. Many database management systems are also responsible for automated rollbacks, restarts and recovery as well as the logging and auditing of activity.

Database Management Systems are not a new concept and as such had been first implemented in 1960s.

Charles Bachmen's Integrated Data Store (IDS) is said to be the first DBMS in history.

With time database technologies evolved a lot while usage and expected functionalities of databases have been increased immensely.

The DBMS can offer both logical and physical data independence. That means it can protect users and applications from needing to know where data is stored or having to be concerned about changes to the physical structure of data (storage and

hardware). As long as programs use the application programming interface (API) for the database that is provided by the DBMS, developers won't have to modify programs just because changes have been made to the database.

With relational DBMSs (RDBMSs), this API is SQL, a standard programming language for defining, protecting and accessing data in a RDBMS is given Figure 2.1

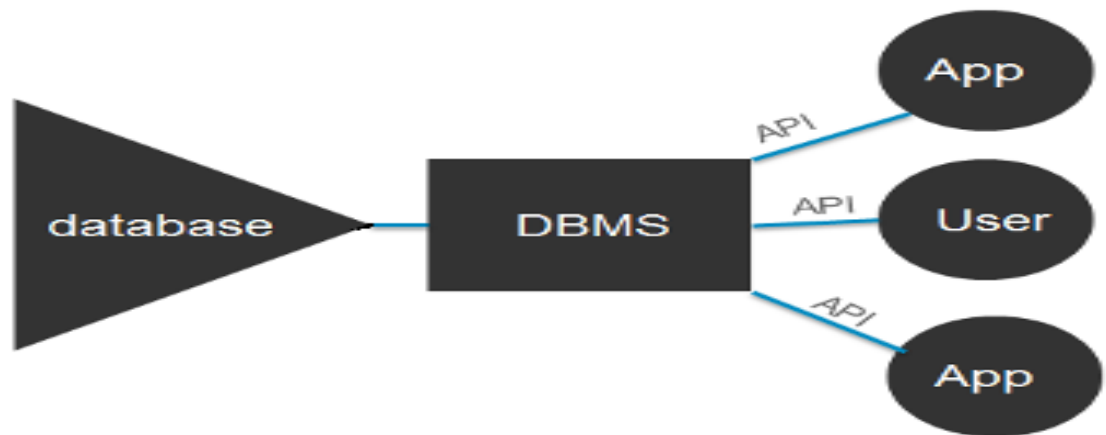


Figure 2.1 – Relation Database Management System

2.3 Popular types of DBMSes

Let's see how the DBMS family got evolved with the time. Following diagram shows the evolution of DBMS categories.



Figure 2.2 – Types of DBMS

There are 4 major types of DBMS. Let's look into them in detail.

1. Hierarchical.

This type of DBMS employs the "parent-child" relationship of storing data. This type of DBMS is rarely used nowadays. Its structure is like a tree with nodes representing records and branches representing fields. The windows registry used in Windows XP is an example of a hierarchical database. Configuration settings are stored as tree structures with nodes.

2. Network DBMS.

This type of DBMS supports many-to many relations. This usually results in complex database structures. RDM Server is an example of a database management system that implements the network model.

3. Relational DBMS.

This type of DBMS defines database relationships in form of tables, also known as relations. Unlike network DBMS, RDBMS does not support many to many

relationships. Relational DBMS usually have pre-defined data types that they can support. This is the most popular DBMS type in the market. Examples of relational database management systems include MySQL, Oracle, and Microsoft SQL Server database.

4. Object Oriented Relation DBMS.

This type supports storage of new data types. The data to be stored is in form of objects. The objects to be stored in the database have attributes (i.e. gender, age) and methods that define what to do with the data. PostgreSQL is an example of an object oriented relational DBMS.

In order to facilitate these functions, DBMS has the following key components.

1. Software.

DBMS is primarily a software system that can be considered as a management console or an interface to interact with and manage databases. The interfacing also spreads across real-world physical systems that contribute data to the backend databases. The OS, networking software and the hardware infrastructure is involved in creating, accessing, managing and processing the databases.

2. Data.

DBMS contains operational data, access to database records and metadata as a resource to perform the necessary functionality. The data may include files with such as index files, administrative information and data dictionaries used to represent data flows, ownership, structure and relationships to other records or objects.

3. Procedures.

While not a part of the DBMS software, procedures can be considered as instructions on using DBMS. The documented guidelines assist users in designing, modifying, managing and processing databases.

4. Database Languages.

These are components of the DBMS used to access, modify, store and retrieve data items from databases; specify database schema; control user access and perform other associated database management operations. Types of DBMS languages include Data Definition Language (DDL), Data Manipulation Language (DML), Database Access Language (DAL) and Data Control Language (DCL).

5. Query Processor.

As a fundamental component of the DBMS, the Query Processor acts as an intermediary between users and the DBMS data engine in order to communicate query requests. When users enter an instruction in SQL language, the command is executed from the high-level language instruction to a low-level language that the underlying machine can understand and process to perform the appropriate DBMS functionality. In addition to instruction parsing and translation, the Query Processor also optimizes queries to ensure fast processing and accurate results.

6. Runtime Database Manager.

A centralized management component of DBMS that handles functionality associated with runtime data, which is commonly used for context-based database access. This component checks for user authorization to request the query; processes the approved queries; devises an optimal strategy for query execution; supports

concurrency so that multiple users can simultaneously work on same databases; and ensures integrity of data recorded into the databases.

7. Database Manager.

Unlike runtime database manager that handles queries and data at runtime, the database manager performs DBMS functionality associated with the data within databases. Database manager allows a set of commands to perform different DBMS operations that include creating, deleting, backup, restore, cloning and other database maintenance tasks. Database manager may also be used to update the database with patches from vendors.

8. Database Engine.

This is the core software component within the DBMS solution that performs the core functions associated with data storage and retrieval. A database engine is also accessible via APIs that allow users or apps to create, read, write and delete records in databases.

9. Reporting.

The report generator extracts useful information from DBMS files and displays it in structured format based on defined specifications. This information may be used for further analysis, decision making or business intelligence.

2.4 Advantages and disadvantages of DBMS

Using a DBMS to store and manage data comes with advantages, but also overhead. One of the biggest advantages of using a DBMS is that it lets end users and application programmers access and use the same data while managing data integrity. Data is better protected and maintained when it can be shared using a DBMS instead of creating new iterations of the same data stored in new files for every new application. The DBMS provides a central store of data that can be accessed by multiple users in a controlled manner:

- DBMS offers a variety of techniques to store & retrieve data;
- DBMS serves as an efficient handler to balance the needs of multiple applications using the same data;
- uniform administration procedures for data;
- application programmers never exposed to details of data representation and storage;
- DBMS uses various powerful functions to store and retrieve data efficiently;
- offers Data Integrity and Security;
- the DBMS implies integrity constraints to get a high level of protection against prohibited access to data;
- DBMS schedules concurrent access to the data in such a manner that only one user can access the same data at a time;
- Reduced Application Development Time.

But it has certain limitations or disadvantages. Let's find various disadvantages of database system. Although the database system yields considerable advantages over previous data management approaches, database systems do carry significant disadvantages.

Data.

DBMS contains operational data, access to database records and metadata as a resource to perform the necessary functionality. The data may include files with such as index files, administrative information and data dictionaries used to represent data flows, ownership, structure and relationships to other records or objects.

1. Costs.

One of the disadvantages of dbms is Database systems require sophisticated hardware and software and highly skilled personnel. The cost of maintaining the hardware, software, and personnel required to operate and manage a database system can be substantial. Training, licensing, and regulation compliance costs are often overlooked when database systems are implemented.

2. Management Complexity.

Database systems interface with many different technologies and have a significant impact on a company's resources and culture. The changes introduced by the adoption of a database system must be properly managed to ensure that they help advance the company's objectives. Given the fact that database systems hold crucial company data that are accessed from multiple sources, security issues must be assessed constantly.

3. Maintaining Currency.

To maximize the efficiency of the database system, you must keep your system current. Therefore, you must perform frequent updates and apply the latest patches and security measures to all components. Because database technology advances rapidly, personnel training costs tend to be significant. Vendor dependence. Given the heavy investment in technology and personnel training, companies might be reluctant to change database vendors. As a consequence, vendors are less likely to offer pricing point advantages to existing customers, and those customers might be limited in their choice of database system components.

4. Replacement cycles.

DBMS vendors frequently upgrade their products by adding new functionality. Such new features often come bundled in new upgrade versions of the software. Some of these versions require hardware upgrades. Not only do the upgrades themselves cost money, but it also costs money to train database users and administrators to properly use and manage the new features.

2.5 Development of the physical structure of the database

Conceptual, logical and physical model or ERD are three different ways of modeling data in a domain. While they all contain entities and relationships, they differ in the purposes they are created for and audiences they are meant to target. A

general understanding to the three models is that, business analyst uses conceptual and logical model for modeling the data required and produced by system from a business angle, while database designer refines the early design to produce the physical model for presenting physical database structure ready for database construction.

A well-structured database:

- saves disk space by eliminating redundant data;
- maintains data accuracy and integrity;
- provides access to the data in useful ways;

Designing an efficient, useful database is a matter of following the proper process, including these phases:

1. Organizing data into tables
2. Specifying primary keys and analyzing relationships
3. Normalizing to standardize the tables

It is a set of methods and means of placing data in external memory and an internal (physical) data model based on them. Unlike logical models, the physical data model is associated with how data is organized on media by data access methods. This model indicates how the records are placed in the database, how they are ordered, how the connections are organized, how to localize the records and make a selection.

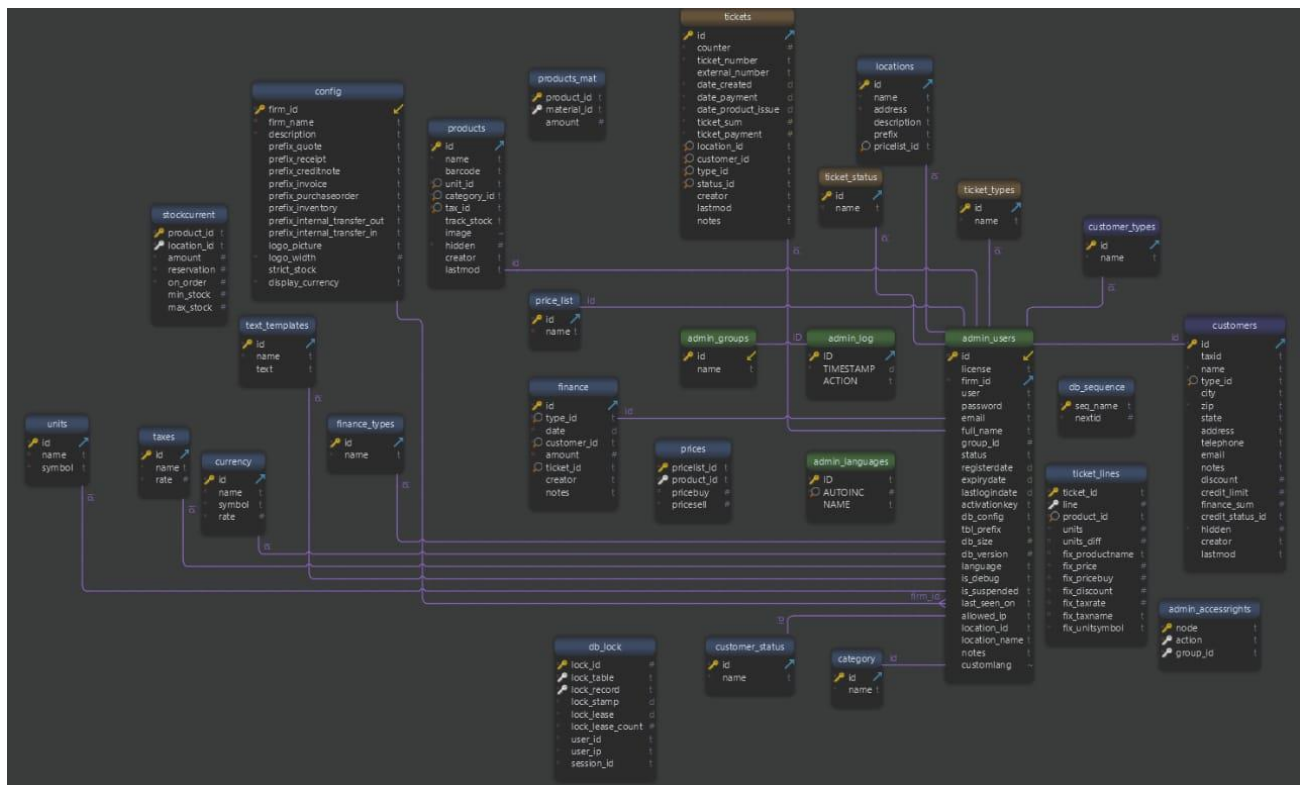


Figure 2.3 - ER database model

The admin_accessrights table is located in the erp32 database, it stores information about the actions of the administrator in the system. The structure of the table is given in table 2.1.

Within a database, related data are grouped into tables, each of which consists of rows (also called tuples) and columns, like a spreadsheet.

To convert your lists of data into tables, start by creating a table for each type of entity, such as products, sales, customers, and orders. Here's an example:

Each row of a table is called a record. Records include data about something or someone, such as a particular customer. By contrast, columns (also known as fields or attributes) contain a single type of information that appears in each record, such as the addresses of all the customers listed in the table.

Finally, you should decide which attribute or attributes will serve as the primary key for each table, if any. A primary key (PK) is a unique identifier for a given entity, meaning that you could pick out an exact customer even if you only knew that value.

Attributes chosen as primary keys should be unique, unchanging, and always present (never NULL or empty). For this reason, order numbers and usernames make good primary keys, while telephone numbers or street addresses do not. You can also use multiple fields in conjunction as the primary key (this is known as a composite key).

When it comes time to create the actual database, you'll put both the logical data structure and the physical data structure into the data definition language supported by your database management system. At that point, you should also estimate the size of the database to be sure you can get the performance level and storage space it will require.

With your database tables now converted into tables, you're ready to analyze the relationships between those tables. Cardinality refers to the quantity of elements that interact between two related tables. Identifying the cardinality helps make sure you've divided the data into tables most efficiently.

Each entity can potentially have a relationship with every other one, but those relationships are typically one of three types.

1. One-to-one relationships.

When there's only one instance of Entity A for every instance of Entity B, they are said to have a one-to-one relationship (often written 1:1).

2. One-to-many relationships.

These relationships occur when a record in one table is associated with multiple entries in another. For example, a single customer might have placed many orders, or a patron may have multiple books checked out from the library at once. One-to-many (1:M) relationships are indicated with what's called "Crow's foot notation".

3. Many-to-many relationships.

When multiple entities from a table can be associated with multiple entities in another table, they are said to have a many-to-many (M:N) relationship. This might happen in the case of students and classes, since a student can take many classes and a class can have many students. Unfortunately, it's not directly possible to implement this kind of relationship in a database. Instead, you have to break it up into two one-to-many relationships.

To keep the data consistent from one record to the next, assign the appropriate data type to each column. Common data types include:

- CHAR - a specific length of text;
- VARCHAR - text of variable lengths;
- TEXT - large amounts of text;
- INT - positive or negative whole number;
- FLOAT, DOUBLE - can also store floating point numbers;
- BLOB - binary data.

Some database management systems also offer the Autonumber data type, which automatically generates a unique number in each row. For the purposes of creating a visual overview of the database, known as an entity-relationship diagram, you won't include the actual tables. Instead, each table becomes a box in the diagram.

Table 2.1 - Description of the admin_accessrights table

Indexes	Field Name	Data Type
*	Node	varchar(255) DEFAULT "
*	Action	varchar(25) DEFAULT "
*	group_id	varchar(10) DEFAULT "
Indexes		
	pk_admin_accessrights	ON node, action, group_id

The admin_groups table is located in the erp32 database, it stores information about the location of administrators per group. The structure of the table is given in table 2.2

Table 2.2 - Description of the admin_groups table

Indexes	Field Name	Data Type
*	Id	int DEFAULT 0
	Name	varchar(50)
Indexes		
	pk_admin_groups	ON id

Table 2.3 - Description of the admin_languages table

Indexes	Field Name	Data Type
*	ID	varchar(10) DEFAULT "
*	AUTOINC	int AUTOINCREMENT
	NAME	varchar(255)
Indexes		
	pk_admin_languages	ON ID
	AUTOINC	ON AUTOINC

Table 2.4 - Description of the admin_log table

Indexes	Field Name	Data Type
*	ID	int AUTOINCREMENT
*	TIMESTAMP	timestamp DEFAULT CURRENT_TIMESTAMP
	ACTION	varchar(255)
Indexes		
Indexes	Field Name	Data Type
Foreign Keys		
	fk_admin_log_admin_groups	(ID) ref admin_groups (id)

Table 2.5 - Description of the admin_users table

Indexes	Field Name	Data Type
*	Id	varchar(255) DEFAULT '0'
	License	varchar(255)
*	firm_id	varchar(255) DEFAULT "
	User	varchar(255)
	password	varchar(255)
	Email	varchar(255)
	full_name	varchar(100)
	group_id	Int
	Status	varchar(255)
	registerdate	Date
	expirydate	Date
	lastlogindate	Date
	activationkey	varchar(255)
	db_config	varchar(255) DEFAULT 'default'
	tbl_prefix	varchar(255)
	db_size	decimal(11, 2)
	db_version	Int
	language	varchar(255)
	is_debug	varchar(1) DEFAULT "
	is_suspended	varchar(1)
	last_seen_on	varchar(255) DEFAULT "
	allowed_ip	varchar(255)
	location_id	varchar(255)
	location_name	varchar(255)
	Notes	varchar(1000)
	customlang	Blob
Indexes		
	pk_admin_users	ON id
Foreign Keys		
	fk_admin_users_config	(firm_id) ref config (firm_id)

Table 2.6 - Description of the category table

Indexes	Field Name	Data Type	Description
*	Id	varchar(255) DEFAULT "	
*	Name	varchar(255) DEFAULT "	
Indexes			
	pk_category	ON id	

Table 2.7 - Description of the configtable

Indexes	Field Name	Data Type	Description
*	firm_id	varchar(255) DEFAULT "	
*	firm_name	varchar(255) DEFAULT "	
*	Description	varchar(1000) DEFAULT "	
	prefix_quote	varchar(255)	
	prefix_receipt	varchar(255)	
	prefix_creditnote	varchar(255)	
	prefix_invoice	varchar(255)	
	prefix_purchaseorder	varchar(255)	
	prefix_inventory	varchar(255)	
	prefix_internal_transfer_out	varchar(255)	
	prefix_internal_transfer_in	varchar(255)	
	logo_picture	varchar(255)	
*	logo_width	int DEFAULT 40	
	strict_stock	varchar(1) DEFAULT '1'	
*	display_currency	varchar(255) DEFAULT '1000'	
Indexes			
	pk_config	ON firm_id	

Table 2.8 - Description of the currency table

Indexes	Field Name	Data Type	Description
*	Id	varchar(255) DEFAULT "	
*	Name	varchar(255) DEFAULT "	
*	Symbol	varchar(10) DEFAULT "	
*	Rate	decimal(10, 5) DEFAULT 0.00000	
Indexes			
	pk_currency	ON id	
Foreign Keys			
	fk_currency_admin_users	(id) ref admin_users (id)	

Table 2.9 - Description of the customer_status table

Indexes	Field Name	Data Type	Description
*	Id	varchar(255) DEFAULT "	
*	Name	varchar(255) DEFAULT "	
Indexes			
	pk_customer_status	ON id	
Foreign Keys			
	fk_customer_status_admin_users	(id) ref admin_users (id)	

Table 2.10 - Description of the customer_types table

Indexes	Field Name	Data Type	Description
*	Id	varchar(255) DEFAULT "	
*	Name	varchar(255) DEFAULT "	
Indexes			
	pk_customer_types	ON id	
Foreign Keys			
	fk_customer_types_admin_users	(id) ref admin_users (id)	

Table 2.11 - Description of the customerst table

Indexes	Field Name	Data Type	Description
*	Id	varchar(255) DEFAULT "	
	Taxid	varchar(255)	
*	Name	varchar(255) DEFAULT "	
*	type_id	varchar(255) DEFAULT "	
	City	varchar(255)	
*	Zip	varchar(255) DEFAULT '0'	
	State	varchar(255)	
	Address	varchar(255)	
	Telephone	varchar(255)	
	Email	varchar(255)	
	Notes	varchar(1000)	
	Discount	decimal(15, 2)	
	credit_limit	decimal(15, 2)	
	finance_sum	decimal(15, 2) DEFAULT 0.00	
	credit_status_id	varchar(255) DEFAULT "	
*	Hidden	int DEFAULT 0	
	Creator	varchar(255)	

2.6 Enterprise network

Network topology is a way of describing network configuration, the layout and connections of network devices. The network topology allows you to see its entire structure, network devices included in the network, and their connection with each other.

There are several types of topologies: physical, logical, informational and exchange management topology. In this article we will talk about the physical network topology, which describes the actual location and communication between the nodes of the local network.

There are several main types of physical network topologies:

1. Bus network topology is a topology in which all computers on a network are connected to a single cable that is shared among all workstations. With this topology, the failure of one machine does not affect the operation of the entire network as a whole. The disadvantage is that if the bus fails or the bus breaks, the entire network is disrupted.

2. Star network topology is a topology in which all workstations are directly connected to the server, which is the center of the star. With this connection scheme, the request from any network device is sent straight to the server, where it is processed at different speeds, depending on the hardware capabilities of the central machine. Failure of the central machine causes the entire network to stop. The failure of any other machine does not affect the operation of the network.

3. Ring network topology is a scheme in which all nodes are connected by communication channels into an inseparable ring (not necessarily a circle) over which data is transmitted. The output of one PC is connected to the input of the other. Starting movement from one point, the data, ultimately, fall on its beginning. The data in the ring always moves in the same direction. This network topology does not require the installation of additional equipment (server or hub), but when a single computer fails, the entire network also stops working.

4. Mesh network topology is a topology in which each workstation connects to all other workstations on the same network. Each computer has many possible ways to connect with other computers. Therefore, a cable break will not lead to loss of connection between two computers. This network topology allows the connection of a large number of computers and is typical, as a rule, for large networks.

5. In a mixed topology, several types of computers are connected at once. It occurs quite rarely in very large companies and organizations.

Why do you need to know the types of topologies and all their minuses and advantages? The composition of the equipment and software depends on the network layout. The topology is chosen based on the needs of the enterprise. In addition, knowledge of the network topology makes it possible to assess its weak points, as well as the dependence of the stability of its work on individual components, to plan the subsequent connections of the new network equipment and PC more carefully. In the case of some kind of failure, lack of communication with any computer on the network, you can always see on the map where this device is located, on which floor,

in which office or room, on which, above all, you need to pay attention and where to go to first to troubleshoot.

A modern software market offers special programs for automatic research and construction of network diagrams. This allows the system administrator to find out where and what equipment is located without resorting to manual wire testing.

Any large company sooner or later faces such a problem as the need to systematize the available information and automate production processes. To solve this problem, corporate networks and systems are being developed to streamline the data used.

The corporate information network is a system for automating production processes and computer applications that employees of an enterprise work with. The main task of the network is to manage the economic activity of the enterprise or corporation.

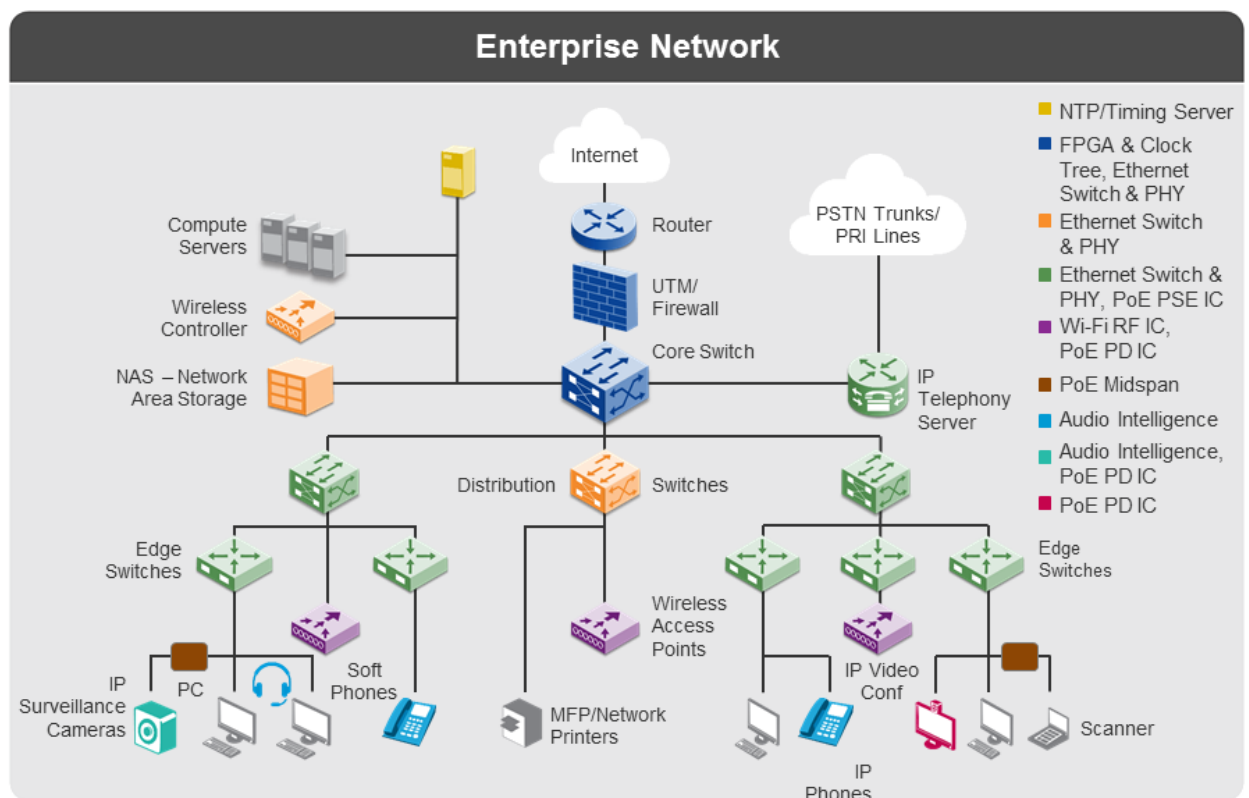


Figure 2.4 - Enterprise network

The result of the successful implementation of an effective corporate system or network is:

- improving enterprise manageability and business performance;
- improved financial performance;
- sales growth;

Improving partnerships with other companies; reduction of time spent on order fulfillment. Corporate information system of the enterprise network The corporate information system of the enterprise network is used to ensure the effectiveness of the

core business processes of several firms or companies. It is designed to improve electronic workflow in each enterprise and create a unified information space to facilitate important management decisions.

The corporate information system of an enterprise network is, as a rule, simple and multifunctional. It is also characterized by a high degree of reliability and scalability of information components. The construction of such a system should be based on a detailed analysis of the work of each company within the network of enterprises.

To build an effective corporate network in enterprises, various methods can be used. Previously, the organization of such networks occurred on the Local Area Network (LAN), which includes a limited number of personal computers. The advantage of this option is the rapid exchange of files in the system, as well as the reliability of the transmitted information. The disadvantage of this method is the high cost of system implementation, as well as the impossibility of connecting remote users.

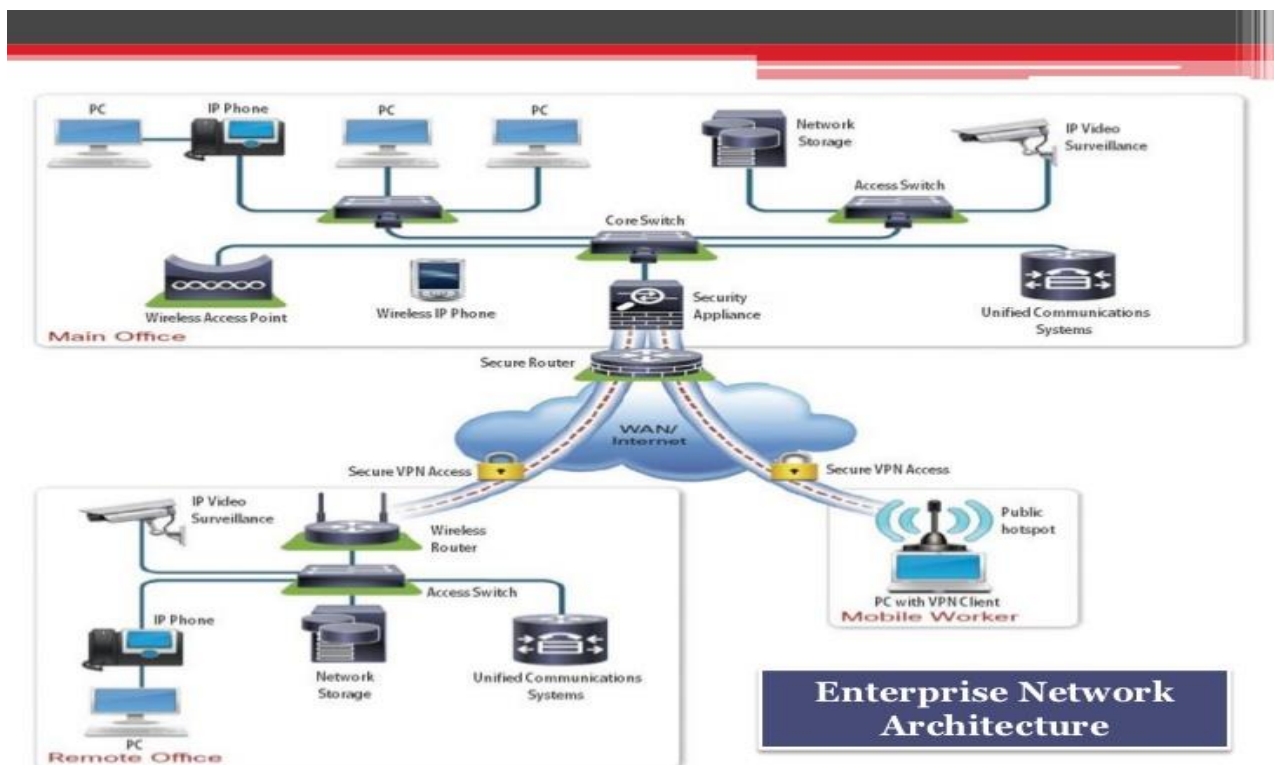


Figure 2.5 - Enterprise network architecture

3 CREATING SOFTWARE

3.1 Justification of the choice of programming languages

PHP recursive abbreviation PHP in English: Hypertext Preprocessor (hypertext preprocessor), is a general-purpose programming language for server-side code, originally intended for dynamic web development. It was one of the first server-side programming languages that could be included directly in an HTML document instead of calling an external file that processes the data. The code is interpreted by a web server with a PHP processor module that generates the resulting HTML code.

PHP has evolved, so now it also includes a command line interface that can be used in independent graphical applications. It can be used free of charge on most web servers, as well as on many operating systems and platforms [16].

It was originally created by Rasmus Lerdorf in 1995. The language is still being developed with new PHP 2 features. This language is part of the free software published under the PHPv3_01 license, this is an open source license, approved by the open source initiative, the PHP license has the BSD style license, this license does not have copyright restrictions associated with the GPL.

The main PHP implementation is currently being produced by the PHP group and actually serves as a standard for PHP, since there is no formal specification. Published with a PHP license, the free software foundation treats this license as free software.

PHP can be deployed on most web servers and on all operating systems and platforms for free. PHP language is installed on more than 20 million websites and one million servers. In recent years, the number of sites based on PHP has been gradually reduced with the advent of new technologies such as Node.JS, ASP.NET, etc. The Wikipedia website was developed in PHP 5. It is also the most popular Apache module among computers that use Apache as a web server.

The great similarity that PHP has with the most common programming languages such as C and Perl allows most programmers to create complex applications with a very short learning time. It also allows them to connect with applications with dynamic content without learning a completely new group of functions.

Although everything in its design is aimed at facilitating the creation of websites, you can create applications with a graphical user interface using some extensions, such as PHP-Qt, PHP-GTK, 6 WxPHP, WinBinder, Roadsend PHP, Phalanger. It can also be used from the command line just as Perl or Python can do, this version of PHP is called PHP-CLI (command line interface).

When a client sends a request to send a web page to the server, the server executes the PHP interpreter. It processes the requested script, which will generate the content dynamically. The result is sent by the interpreter to the server, which, in turn, sends it to the client.

With the help of extensions you can also create PDF-files, 8 Flash, as well as images in different formats.

3.2 Description of information support

Information support of the site is maintaining the database of the site up to date, managing the interactive systems of the site (news feeds, forums, FAQ sections, etc.), tracking the popularity of materials and products.

Constant informational support of the site is the key to success and effectiveness of the Internet project. The effective work of the site requires constant development and updating, which is achieved by providing the site with information in combination with other methods of supporting the site (technical support of the site, SEO optimization, site registration in thematic directories and search engines).

Informational support of the site with up-to-date information, maintenance of news feeds, periodic distribution, creation of forums, blogs, FAQ sections and other interactive systems attracts the attention of visitors, gives them interesting and relevant information, prompts to return to the site.

3.3 Program Development Description

The site can be developed by two technologies. The first - without use of special tools, ready-made item templates as they say, from scratch. The most effective toolkit in this case. HTML, CSS and PHP.

The second way is to use the control system. Content or CMS, a variety of templates that greatly simplify development. This is the way to develop large multipage relief process of site maintenance, making various changes as in can change on it.

However, the first method opens up more opportunities for developers, since development is done in the language environment programming, so only when learning the first way acquire deep professional knowledge in website design. Considering the benefits of methods and the need for practice each one of them. Learning HTML, CSS and PHP programming language. This sequence of actions is to use CMS WordPress.

In the process of evolution, inevitably leads to an inability testing the site being run, as long as it puts it onto the host. If the source code was written using the language PHP programming, for which the interpretation is to be exploited server. If the developer gets into the globally unchanged changes already acting site, which in the past has not been able to verify the workability of the local server so that the site can not be used without the backup of the site. If the developer plans to use a valid site, such as CMS, WordPress uses the content store for content storage, added to the site through the admin panel, so you need support for MySQL databases and a web interface for administration exhaust base. You can use the Web server to resolve the issue, which includes all the unsaved components for the functionality of the site in the offline mode. In this connection we need set up and star XAMPP.

After installing the local server, a directory is created, where in

structured form will be the site files. To write the source code of the site in this work, we use the text editor Notepad ++. The system should include the display of extensions of registered file types. All files to be created must be UTF-8 encoded.

4 REALIZATION AND IMPLEMENTATION

4.1 Technical support

To build a site, you must have a computer with the Windows operating system, you also need to have several of the most popular browsers on your computer where you can view the results of your work. The presence of several browsers is due to the fact that the code written in the html editor is different from what we see in browsers, and one information can be displayed differently. The most popular browsers today: Google Chrome, Microsoft Internet Explorer, Mozilla Firefox, Apple Safari and Opera.

4.2 Users

Integration with e-business applications is one of the conditions for success in the ERP system market. Companies began to realize that it was time to open their ERP-systems through the Internet for customers and suppliers. There is a view of industry analysts that the development of electronic business will be a bad investment for any company, if it does not take care of creating a reliable back-office solution. In this case, the ERP-system is considered in most cases as the basis for building an Internet solution. In this regard, for developers, the quality of integration of their ERP-systems with e-business applications is very important.

A user is a visitor to any Internet site or an online service client. User – person or organization that uses the current system to perform a specific function.

From the point of view of information security, the user is a person. The program, working on his assignments, is already a subject. With its help, the user interacts with the subscriber system, possibly included in the network, and receives the working environment created by it.

A user is a person who uses the system or the Internet network to solve his tasks.

Also called an end user. User information is called a user profile or user account.

Observations on the latest trends in web development aimed at expansion of cooperation and interaction, adaptation of applications for work on the Web, collective use of social networks, etc, they talk about the need to update the classic user concept as a separate person working with the application.

4.3 Development prospects

It optimizes the costs and resources of the organization. To achieve it, specific tasks are solved: create a common space for interaction of components, set up data exchange, make access to them simple, understandable, etc. The ERP system sets uniform standards for production processes, work of remote units and employees, it is

much easier to determine with it their effectiveness. The successful implementation of solutions helps to combine accounting in the warehouse and in the accounting department, to abandon the oral, paper transmission of information that is dependent on the human factor.

Several research studies have identified various prospects associated with ERP systems in organizations. O'Leary stated that an ERP system integrates the majority of the business processes and allows access to the data in real time. Furthermore, ERP improves the performance level of a supply chain by helping to reduce cycle times.

There are also some intangible prospects that an organization may enjoy by implementing an ERP system including, better customer satisfaction, improved vendor performance, increased flexibility, reduced quality costs, improved resource utility, improved information accuracy and improved decision-making capability.

The primary goal of ERP is to improve and increase information flow within an organization. Ideally, ERP software improves cooperation and interaction between all the business units in an organization payroll, personnel, purchasing, and inventory management among others. Integration allows the various departments to more easily share information and communicate with each other. Also, ERP software standardizes information within the organization. This streamlines the data flow between different parts of a business . In an ERP system, data are entered by one department and staff in other departments immediately has access to the information without having to reenter the information into the system. Minahan stated —ERP gives all users a single, real-time view of their company's available resources and commitments. Public-sector organizations, such as school systems, may have specific requirements not applicable to private organizations. In addition, the cost of implementing an ERP system also may make it prohibitive for public-sector organizations to implement. According to Miranda, if an ERP vendor only designs software for the public sector then he may not be following universal best business practices.

CONCLUSION

IT strategy is a resource functional strategy. Its task is to manage the life cycle of the company's support system.

In the IT system, the components are distinguished: hardware, applications, data. Together they form the top level of IT architecture.

The concept of IT development is a means of achieving an understanding between business and IT - understanding the tasks and problems of business, IT represents a rational and reasonable program of actions, which shows how business tasks will be solved by business, by what means, in what time frame and in what order It can be done.

Effective business requires flexibility in business processes and their supporting information technologies. To become more successful in modern business, you need to revise the business model in order to obtain the possibility of rapid changes, achieving business flexibility and scalability.

The main issue solved in the framework of the IT strategy is “How to develop an IT system for future businesses”. In parallel with the corporate strategy, there should be a choice of directions for the development of the resource potential, the company's assets, and, among other things, IT assets. Thus, an IT strategy is created on the basis of a corporate development strategy.

Key requirements for the state of the resource potential and the opportunities it provides determine the goals of the corporate business development strategy at the lower level. For IT strategies, on the contrary, they are top-level goals. They are deploying requirements for IT architecture elements. Thus, the strategic importance of these elements arises from the influence of corporate assets on development. But in order to design an IT Strategy, it is necessary to proceed not only from these requirements that are relevant to the business model in terms of gaining competitive advantages.

Components - this is what makes the company a leader in its field, and exactly what the company should develop as much as possible, including in terms of information technology.

The business model sets the basic requirements for its components, which are mandatory for work in the selected industry market. Basic components do not create a competitive advantage for a business, while at the same time their absence can kill a business. This component of the business should be developed no worse than the others. For example, the lack of financial management can kill even the most successful business, but even the best financial specialists are not able to make the company a leader.

Any strategy concentrates on obtaining sustainable competitive advantages, i.e. hard to reproduce by competitors. Typically, such opportunities lie in the field of IP automation of the main processes of the supply chain and, even, production or design systems, rather than in the field of management systems.

LIST OF USED LITERATURE

- 1 Official site of the company "Business Engineering Groups" [Electronic resource]. –[Http: //www.big.spb.ru/](http://www.big.spb.ru/)
- 2 The official site of the company "Center CT" [Electronic resource]. - <http://center-comptech.ru>
- 3 The official site of the company "MEGA" [Electronic resource]. - <http://www.mega.com/>
- 4 The official website of the company "IBM" [Electronic resource]. –[Ibm.com](http://ibm.com)
- 5 Textbook "Strategic Management" - Parakhina V. N, Moscow, 2005, Published: KnoRus.
- 6 Website of the company "Simple Business" [Electronic resource] <http://www.prostoy.ru>
- 7 Computer Press magazine [Electronic resource] <http://compress.ru>
- 8 [Electronic resource] <http://parus8.wordpress.com>
- 9 [Electronic resource] <http://citforum.novgorod.ru>
- 10 NewsTit companies [Electronic resource] <http://www.itcontent.ru>
- 11 Journal "Open Database Systems" [Electronic resource] <http://www.osp.ru>
- 12 The official website of the company "KROK" [Electronic resource] [http: // www. business.croc.ru](http://www.business.croc.ru)
- 13 Non-profit partnership "Assistance" [Electronic resource]. [http: // www. npsod.ru](http://www.npsod.ru)
- 14 The official site of the national open university "Intuit" [Electronic resource]. [http: // www. intuit.ru](http://www.intuit.ru)

Appendix A

Main script of the program

```
<?php

// disable error reporting
error_reporting(NULL);

/**

@internal includes

*/

$config_atkroot = ".";

require_once("atk.inc");

require_once("atk/atkbrowsertools.inc");

/* load ia32node overloader */

require_once($config_atkroot.'../modules/utils/class.ia32node.inc');

require_once("../modules/utils/tools.php");

require_once("ip_blacklist.php");

atksession();

atksecure();

include "theme.inc";

$theme = &atkinstance('atk.ui.atktheme');

$user = &atkGetUser();

$user['name'] = strtolower($user['name']);

/*

if not administrator perform security checks...

*/
```


Continue of appendix A

```
if ($user['name'] != 'administrator')

{

/*

check if user is suspended or already logged in

*/

// read data directly from database because session is cached

// security class.auth_db.inc->selectUser writes user info to db

$usertable = atkconfig("auth_usertable");

$userfield = atkconfig("auth_userfield");

$userid = $user['id'];

$query = "SELECT allowed_ip, is_suspended, last_seen_on, tbl_prefix FROM
$usertable WHERE id = '$userid'";

$db = &atkGetDb(atkconfig("auth_database"));

$recs = $db->getrows($query);

$db_allowed_ip = $recs[0]['allowed_ip'];

$db_is_suspended = $recs[0]['is_suspended'];

$db_last_seen_on = $recs[0]['last_seen_on'];

$db_tbl_prefix = $recs[0]['tbl_prefix'];

$exp = explode(';', $db_last_seen_on);

$db_last_seen_ip = $exp[0];

$last_seen_on = $_SERVER[REMOTE_ADDR].';
'.atkconfig('identifier').'='.$htmlspecialchars($_COOKIE[atkconfig('identifier')]);

// check if IP is allowed

if ($db_allowed_ip && $db_allowed_ip != '0' && $db_allowed_ip != ';'){
```

Continue of appendix A

```
$pass_ip = false;

$exp = explode(';', $db_allowed_ip);

foreach ($exp as $ip) // search IP match
{
    if (trim($ip) == $_SERVER[REMOTE_ADDR])
    {
        $pass_ip = true;
        break;
    }
}

if (!$pass_ip) // if no IP match is found
{
    $content = atktext('ip_not_allowed_ml');

    $content .= '<br><br><center>IP: ' . $_SERVER[REMOTE_ADDR] . '</center>';

    show_error_window($content, false);

    die;
}

// check if user is suspended

if ($db_is_suspended==1)
{
    $content = atktext('account_suspended_ml');

    $content .= '<br><br>';
```

Continue of appendix A

```
$content .= '<a href="index.php?atklogout=1">'.atktext('login_here_ml').'</a>';  
  
show_error_window($content, false);  
  
die;  
  
}  
  
}  
  
/*  
  
run...  
  
*/  
  
$indexpage = &atknew('atk.ui.atkindexpage');  
  
$indexpage->setUsername(getFullUsername());  
  
$indexpage->setTitle(getTitle());  
  
$indexpage->setTopSearchPiece(getSearchPiece());  
  
$centerpiece="";  
  
$centerpiecelinks=array();  
  
getCenterPiece($centerpiece,$centerpiecelinks);  
  
$indexpage->setTopCenterPieceLinks($centerpiecelinks);  
  
$destination = array("atknodetype"=>"dashboard.mainboard","atkaction"=>"start");  
  
if (atkGetUser('name')== 'administrator')  
  
{  
  
$destination = array("atknodetype"=>"loginmanager.users","atkaction"=>"admin");  
  
}  
  
$indexpage->setDefaultDestination($destination);  
  
$indexpage->generate();
```

Continue of appendix A

?>

<?php

//

// CONFIGURATION FILE

//

// -----

// EXTERNAL MODULES

// -----

module("loginmanager", "../modules/utils/loginmanager/");

module("dashboard", "../modules/utils/dashboard/");

module("search", "../modules/utils/search/");

module("admin_tools", "../modules/utils/admin_tools/");

module("erp", "../modules/erp/");

module("config", "../modules/erp/config/");

module("products", "../modules/erp/products/");

module("customers", "../modules/erp/customers/");

module("locations", "../modules/erp/locations/");

module("tickets", "../modules/erp/tickets/");

module("stocklist", "../modules/erp/stocklist/");

module("pricelist", "../modules/erp/pricelist/");

module("finance", "../modules/erp/finance/");

module("reports", "../modules/erp/reports/");

// -----

Continue of appendix A

// LOGS

// -----

// Atk can write security events to a logfile.

// There are several values you can choose for \$config_logging.

// 0 - No logging

// 1 - Log logins

// 2 - Log actions ("User x performed action x on module y")

\$config_debug = 0;

\$config_logging = 2;

\$config_logfile = "../userlog.log";

// -----

// LAYOUT CONFIGURATION

// -----

// In admin pages, Achievo shows you a number of records with previous and

// next buttons. You can specify the number of records to show on a page.

//

\$config_recordsperpage=10;

// num of rows on paging_logic, MAX=10

\$config_num_of_rows=8;

// max pages on paging_logic

\$config_pages_limit=10;

// max pricelist user can create

\$config_pricelists_limit=100;

Continue of appendix A

```
// max locations user can create

$config_locations_limit=100;

// The theme defines the layout of Achievo. You can see which
// themes there are in the directory themes. Users can choose their own
// theme in the user preferences section.

//

$config_defaulttheme = "stillblue";

// The language of the application. You can use any language for which
// a language file is present in the languages directory.

//

$config_language="en";

$config_defaultlanguage="en"; // fallback language

// The menu to use

$config_menu_layout = "modern";

// This variable determines wether all manytoone dropdowns should have
// the autocompletion feature (instead of dropdowns)

//

$config_manytoone_autocomplete_default = false;

// -----

// SECURITY CONFIGURATION

// -----

// The method to use for user/password validation.

$config_authentication = "db";
```

Continue of appendix A

```
// The password to use for guest login.

// A guest password that is empty will *DISABLE* guest login!

$config_guestpassword = ""; // disabled!, also disabled in atksecuritymanager

// If you set $config_auth_dropdown to true, the login screen will contain

// a list of available usernames. If you set it to false, there will be

// an input box to manually enter the userid. Use the dropdown only if

// the number of users is small.

//

$config_auth_dropdown = false;

// As an extra security measure, to prevent session highjacking, Achievo

// will regenerate it's session id on each hit. This does not work

// properly on some (usually older) PHP installations. If you experience

// login trouble, set the next value to false.

$config_session_regenerate = false;

// If set to true, a cookie with username/password is written, so

// users will stay logged in, even if they close their browser.

$config_authentication_cookie = false;

// -----

// PIM MODULE

// -----

// If you don't want a pim, set an URL in the config below to let PIM

// redirect to the specified url. If not set or empty this feature is

// disabled.
```

Continue of appendix A

```
$config_pim_redirect_to = "";

// -----

// DOCMANAGER MODULE

// -----

// If you a docmanager to other nodes add the node and file location here

$config_docmanageroptions = array(

    "project.project"=>array("dir"=>"./documents/project/",
    "url"=>"documents/project/"),

    "quotation.quotation"=>array("dir"=>"./documents/quotations/",
    "url"=>"documents/quotations/"),

);

// -----

// GENERAL SETTINGS

// -----

// Startday is

// 6 = saturday

// 0 = sunday

// 1 = monday (ISO)

// 3 = wednesday

$config_startday = 1;

$config_lose_changes_warning = false;

// First week contains has 3 valid options

// 1 = Starts on 1 january

// 4 = First week with 4 days (ISO)
```


Continue of appendix A

// 7 = First full week

\$config_firstweekcontains = 4;

\$config_identifier = "ia32";

\$config_top_frame = 1;

\$config_authorization = "db";

\$config_auth_usernode = "loginmanager.users";

\$config_auth_emailfield = "email";

//\$config_auth_accountenableexpression = "role='employee' AND status='active'";

\$config_auth_accountenableexpression = "1=1";

// config per user

\$config_auth_usertable = "admin_users";

\$config_auth_logtable = "admin_log";

\$config_auth_userfield = "user";

\$config_auth_passwordfield = "password";

\$config_auth_accesstable = "admin_accessrights";

\$config_auth_leveltable = "admin_users";

\$config_auth_levelfield = "group_id";

\$config_auth_languagefield = "language";

\$config_auth_userpk = "id";

\$config_auth_userfk = "employee_id";

\$config_auth_dbconfigfield = "db_config"; // user database config

\$config_auth_tblprefixfield = "tbl_prefix"; // user table prefix config

\$config_auth_usersgroup = 3; // for checks

Continue of appendix A

```
$config_auth_demogroup = 4; // for demo checks

$config_max_loginattempts = 10; // resolve error with index.php?atklogout=1

$config_auth_enablepasswordmailer = true;

$config_auth_loginform = true;

$config_auth_userdescriptor = "[userid]";

$config_authentication_md5 = true;

$config_securityscheme = "group";

$config_atktempdir = $config_atkroot."app_tmp/";
```

Continue of appendix A.

```
$config_tplcompiledir = $config_atktempdir."compiled/tpl/";

$config_auth_grantall_privilege = "employee.profile.grantall";

$config_durationformat = 0;

$config_defaultfavico = "atk/themes/ia32.ico";

$config_supported_languages_module = $config_atkroot.'atk/languages/';

$config_autoload_classes = true;

$config_top_search_node = 'search.search';

$config_top_search_minchars = 2;

$config_compress_pdf = false;

// -----

// DOCUMENT WRITER CONFIGURATION

// -----

// For document attributes, ATK automatically searches for template

// documents in a specific directory. The base directory to search in
```

Continue of appendix A

```
// can be specified below. The document templates must be put in a
// specific directory structure under this base directory: first of all
// a subdirectory must be made for every module for which you want to
// include document templates (equal to the modulename of that module, as
// set in config.inc.php). Then a subdirectory in that directory must be
// made according to the name of the node for which you want to include
// document templates. In this subdirectory you can put your document
// template files. So if you have $config_doctemplatedir set to
// "doctemplates/", then you can put your documents in
```

Continue of appendix A.

```
// "doctemplates/modulename/nodename/".
//
$config_doctemplatedir = "doctemplates/";
// -----
// AJAX CONFIG
// -----
// This variable configures the visibility of the parameters in printed
// reports such as the hoursurvey.
$config_report_hide_parameters = false;
// This variable determines how many characters a user must enter
// before an autocompletion search is performed.
//
$config_manytoone_autocomplete_minchars = 2;
```

Continue of appendix A

```
//The search mode of the autocomplete fields.
```

```
//Can be 'startswith', 'exact' or 'contains'.
```

```
$config_manytoone_autocomplete_searchmode = "contains";
```

```
// Value determines wether the search of the autocompletion is case-sensitive.
```

```
$config_manytoone_autocomplete_search_case_sensitive = false;
```

```
// Should all many-to-one relations that have the AF_LARGE flag set also
```

```
// have the AF_RELATION_AUTOCOMplete flag set?
```

```
//
```

```
$config_manytoone_autocomplete_large = true;
```

```
// -----
```

```
// SESSIONS
```

```
// -----
```

Continue of appendix A.

```
// Session cache expire (minutes)
```

```
// @var int
```

```
$config_session_cache_expire = 180;
```

```
// Session cache limiter
```

```
//
```

```
// Possible values:
```

```
// - nocache
```

```
// - public (permits caching by proxies and clients
```

```
// - private (permits caching by clients
```

```
// - private_no_expire (permits caching by clients but not sending expire
```

Continue of appendix A

```
// headers >PHP4.2.0)
```

```
// @var String
```

```
$config_session_cache_limiter = "nocache";
```

Appendix B

To run our program you need to start a WAMP server. After starting the server, we write in the browser `http://localhost/erp32-master`. The main program window appears as shown in Figure 3.1.

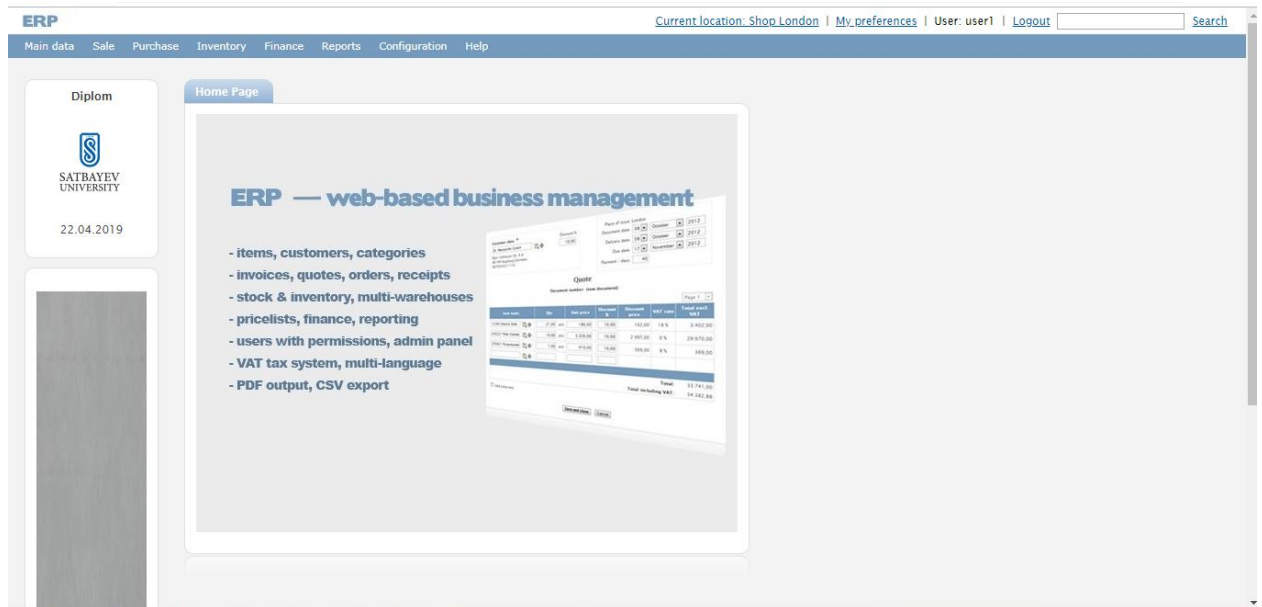


Figure B.1 - Main page

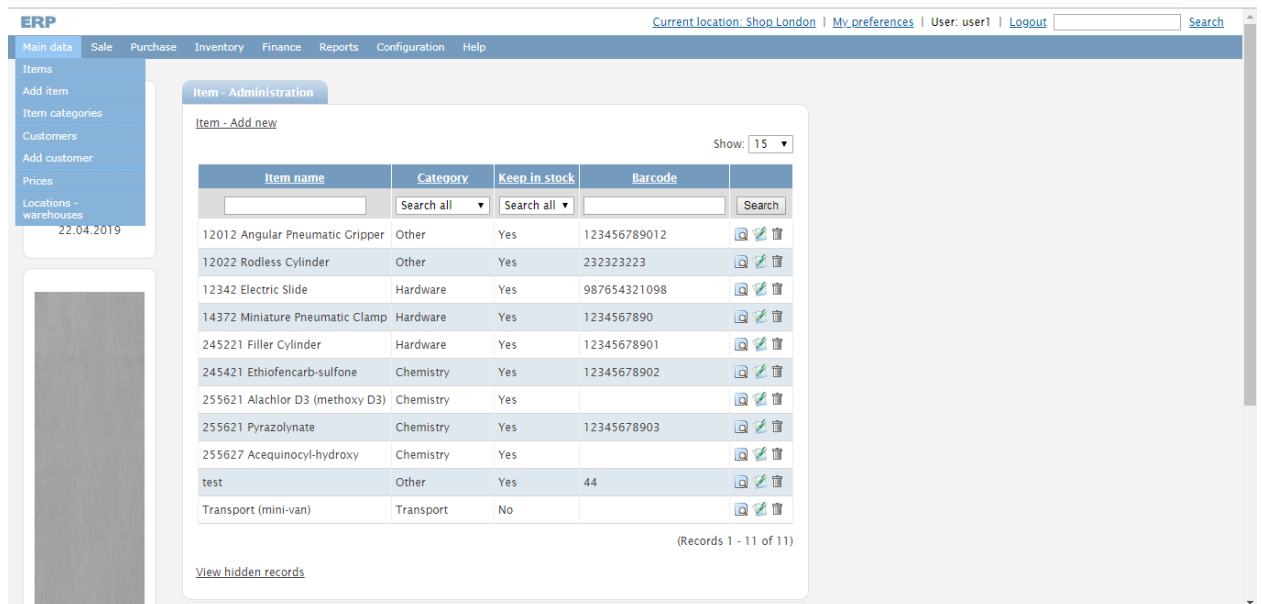



Figure B.2–Item administration page

ERP Current location: Shop London | My preferences | User: user1 | Logout

Main data | Sale | Purchase | Inventory | Finance | Reports | Configuration | Help

Diplom



SATBAYEV UNIVERSITY

22.04.2019

Item - Add New

General | Price lists | System options

Item name: *

Unit: * pcs

VAT rate: * 0 %

Category: * Other

Keep in stock: ☒

Barcode:


[Save and close](#) [Back to the list](#)

Figure B.3 – Add item page

ERP Current location: Shop London | My preferences | User: user1 | Logout

Main data | Sale | Purchase | Inventory | Finance | Reports | Configuration | Help

Diplom



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22.04.2019

Category - Administration

[Category - Add new](#)

| Name | |
|----------------------|--|
| <input type="text"/> | Search |
| Chemistry | View Edit Delete |
| Other | |
| Food & Drink | View Edit Delete |
| Hardware | View Edit Delete |
| Transport | View Edit Delete |

(Records 1 - 5 of 5)

Figure B.4 – Company administration page

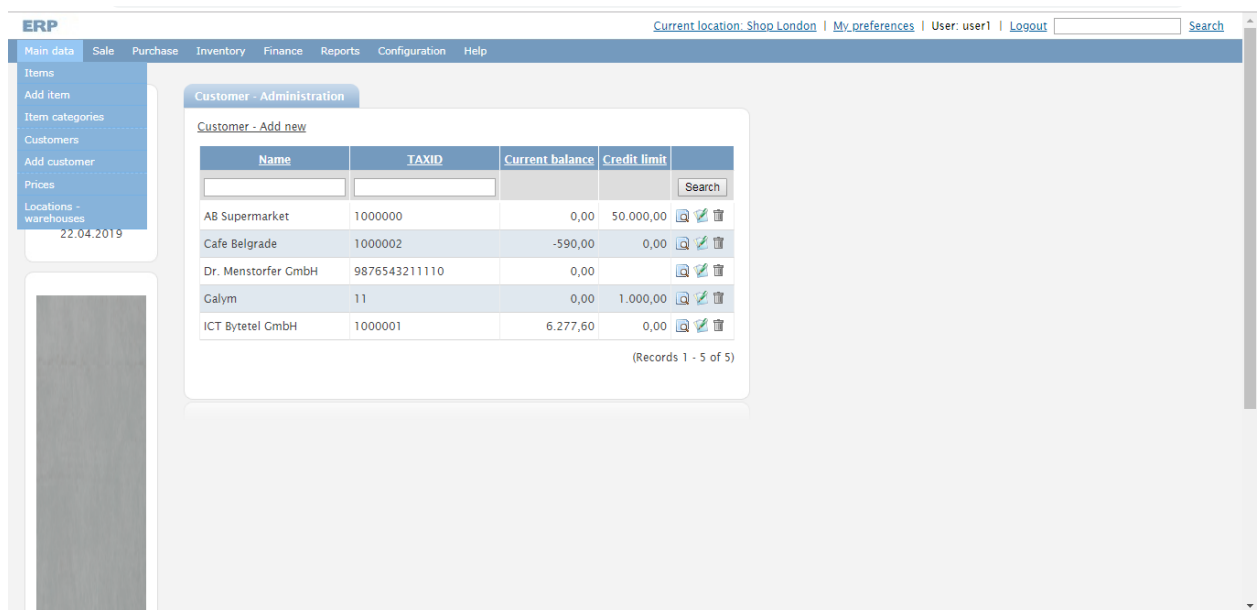


Figure B.5 – Company administration page

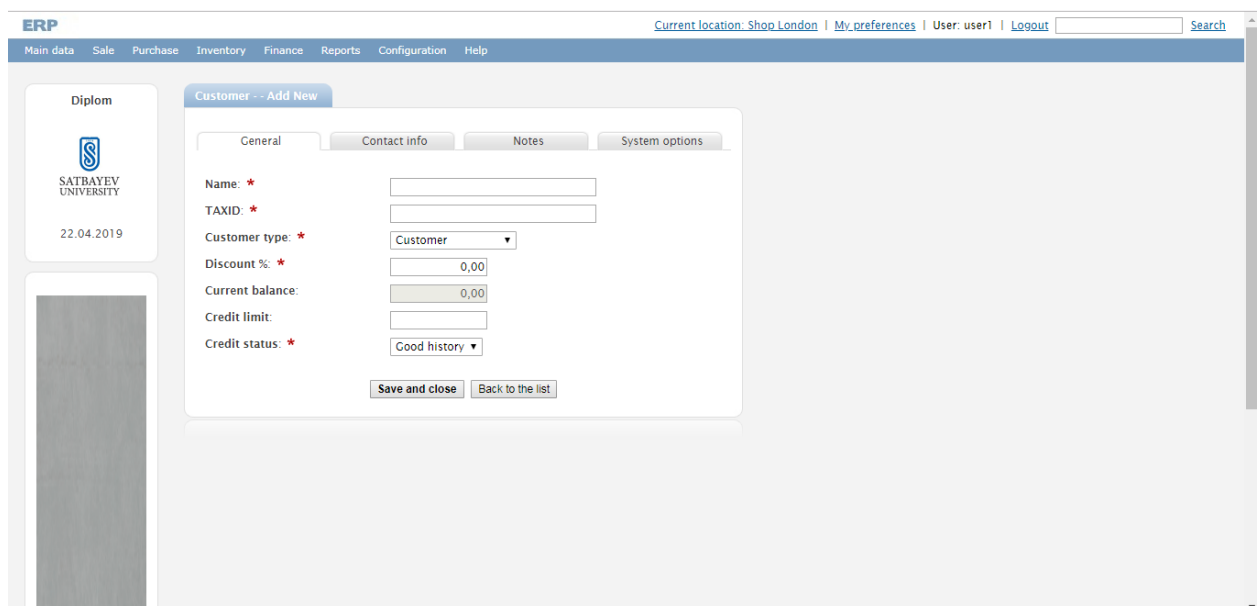


Figure B.6 – Customer add page

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Price - Administration

Price - Add new

Show: 15

| Price list | Item Name | Sell price | Cost price | |
|------------|---------------------------------|------------|------------|--------|
| Search all | | | | Search |
| Main | test | 0,00 | 0,00 | |
| Main | 12342 Electric Slide | 180,00 | 122,00 | |
| Main | Transport (mini-van) | 4,00 | 0,00 | |
| Main | 12012 Angular Pneumatic Gripper | 10,00 | 8,00 | |
| Main | 12022 Rodless Cylinder | 25,00 | 22,00 | |
| Main | 14372 Miniature Pneumatic Clamp | 110,00 | 70,00 | |
| Main | 245221 Filler Cylinder | 3.330,00 | 2.220,00 | |
| Main | 245421 Ethiofencarb-sulfone | 5.250,00 | 5.210,00 | |
| Main | 255621 Pyrazolynate | 410,00 | 320,00 | |
| Main | 255621 Alachlor D3 (methoxy D3) | 7.760,00 | 7.660,00 | |
| Main | 255627 Acequinocyl-hydroxy | 80,00 | 60,00 | |
| SALE 20% | 12342 Electric Slide | 144,00 | 97,60 | |
| SALE 20% | Transport (mini-van) | 3,20 | 0,00 | |
| SALE 20% | 12012 Angular Pneumatic Gripper | 8,00 | 6,40 | |

(Records 1 - 14 of 14)

Figure B.7 – Price administration page

ERP
Main data Sale Purchase Inventory Finance Reports Configuration Help

Current location: Shop London | My preferences | User: user1 | Logout

Locations - Warehouses

Location - Add new

| Name | City / Location | Price list | |
|-------------|-----------------|------------|--|
| Office | Almaty | Main | |
| Office | Berlin | Main | |
| Shop Paris | Paris | Main | |
| Shop London | London | Main | |

(Records 1 - 4 of 4)

Figure B.8 – Location administration page